

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

Centro de Ciências da Saúde

Faculdade de Odontologia

**TRAUMATISMOS DENTÁRIOS: TRATAMENTO, IMPACTOS NA
QUALIDADE DE VIDA E JULGAMENTO SOCIAL DE CRIANÇAS E
ADOLESCENTES, E FATORES DE RISCO ASSOCIADOS.**

Marcela Baraúna Magno

**Rio de Janeiro
2019**

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Tese de doutorado submetida ao Programa de Pós graduação em Odontologia (Área de Concentração: Odontopediatria) da Faculdade de Odontologia da Universidade Federal do Rio de Janeiro como parte dos requisitos para obtenção do título de Doutor em Odontologia (Área de Concentração: Odontopediatria).

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**Rio de Janeiro
2019**

Ficha Catalográfica

Magno, Marcela Baraúna.

Traumatismos dentários: tratamento, impactos na qualidade de vida e julgamento social de crianças e adolescentes, e fatores de risco associados. / Marcela Baraúna Magno. – Rio de Janeiro: UFRJ / Centro de Ciências da Saúde, Faculdade de Odontologia, 2019.

196 f.: il.; 31 cm.

Orientadora: Lucianne Cople Maia de Faria e Matheus Melo Pithon

Tese (doutorado) – Universidade Federal do Rio de Janeiro / Faculdade de Odontologia, Programa de Pós-Graduação Programa de pós-graduação em odontologia, 2019.

Referências: f. 160.

1. Traumatismos dentários. 2. Qualidade de Vida. 3. Meio Social. 4. Desejabilidade Social. 5. Fatores de risco. 6. Odontopediatria- Tese. I. Faria, Lucianne



UNIVERSIDADE FEDERAL DO RIO DE JANEIRO
FACULDADE DE ODONTOLOGIA
DISCIPLINA DE ODONTOPEDIATRIA

ATA DA SESSÃO PÚBLICA DA DEFESA DE TESE E JULGAMENTO FINAL PARA OBTENÇÃO DO TÍTULO DE DOUTOR EM ODONTOLOGIA ÁREA DE CONCENTRAÇÃO EM ODONTOPEDIATRIA DO PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA DA CIRURGIÁ-DENTISTA MARCELA BARAÚNA MAGNO QUE APRESENTOU O TRABALHO INTITULADO: "TRAUMATISMOS DENTÁRIOS: TRATAMENTO, IMPACTOS NA QUALIDADE DE VIDA E JULGAMENTO SOCIAL DE CRIANÇAS E ADOLESCENTES, E FATORES DE RISCO ASSOCIADOS". Aos dois dias do mês de julho do ano de dois mil e dezenove, reuniu-se em sessão pública na Sede da Faculdade de Odontologia da Universidade Federal do Rio de Janeiro situada na Avenida Professor Rodolpho Paulo Rocco, 325 – Ilha do Fundão, a Comissão Julgadora da Defesa de Tese da aluna do Programa de Pós-Graduação em Odontologia, constituída pelos professores(as) Doutores(as): ANDREA FONSECA GONÇALVES, LAURA SALIGNAC DE SOUZA GUIMARÃES PRIMO, LUCIANNE COPLE MAIA DE FARIA, LÍVIA AZEREDO ALVES ANTUNES e RAFAEL RODRIGUES LIMA. Aberta a sessão pela Professora Dra. LAURA SALIGNAC DE SOUZA GUIMARÃES PRIMO foram iniciados os trabalhos de arguição e defesa de Tese intitulada "TRAUMATISMOS DENTÁRIOS: TRATAMENTO, IMPACTOS NA QUALIDADE DE VIDA E JULGAMENTO SOCIAL DE CRIANÇAS E ADOLESCENTES, E FATORES DE RISCO ASSOCIADOS" que teve como Orientadores os Professores Dra. LUCIANNE COPLE MAIA DE FARIA e Dr. MATHEUS MELO PITHON. Foi obedecido o Regulamento dos Cursos de Pós-Graduação da Faculdade de Odontologia, aprovado pelo Conselho de Ensino de Pós-Graduação da Universidade Federal do Rio de Janeiro em dois de março de dois mil e sete, tendo os examinadores aprovado a candidata, elaborando um parecer fundamentado de sua decisão. Concluídos os trabalhos, a Comissão Julgadora emitiu um parecer final considerando a candidata aprovada com o conceito " A " fazendo jus ao Título de Doutor em Odontologia, Área de Concentração em Odontopediatria. Nada mais havendo a tratar e encerrada a sessão, eu ROBSON CLOVIS DE AZEVEDO, Secretário do Departamento de Odontopediatria e Ortodontia da Faculdade de Odontologia da Universidade Federal do Rio de Janeiro lavrei a presente ata que vai por mim assinada e pela Comissão Julgadora.//

Rio de Janeiro, 02 de julho de 2019.


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ROBSON CLOVIS DE AZEVEDO
(Secretário do Dep^o de Odontopediatria)

DEDICO

Aos meus amados pai e mãe.
Eles, que me dão tudo quando tem tudo,
Tudo quando tem pouco
E tudo quando não tem nada.
(Letra de 'Seja Forte', adaptada)

AGRADECIMENTOS ESPECIAIS

Agradeço primeiramente a Deus, por me dar saúde e a oportunidade pra chegar nesse dia de hoje. Obrigada por todos os obstáculos que Tu colocastes em meu caminho, de onde reconheço que tirei lições para crescer mais ainda.

Aos meus pais, Luís e Fátima. De todos os amores que podemos receber durante a vida, o amor dos nosso pais é o mais especial. Amor incondicional. Obrigada pelos anos de dedicação, por todo o esforço e ensinamentos ao longo dos anos e que, juntos, fizeram de mim a pessoa que sou hoje. Obrigada pelo apoio e pelo suporte. Eu só tenho motivos pra agradecer. Eu tenho muito orgulho de ser filha de vocês e muita admiração pelos pais que tenho. Obrigado por tudo. Amo muito vocês!

Aos meus orientadores, professora Lucianne e professor Matheus. Professores, chefes e exemplos. Seus profissionalismo, dedicação constante e sabedoria os tornam verdadeiros professores. Muito obrigada pela confiança em mim depositada, pela sinceridade, apoio e incentivo constante.

À professora Lucianne, uma Orientadora com O maiúsculo. Diariamente me ensina, estimula e reforça, com muita seriedade, responsabilidade e sempre com humanidade. Sua orientação integral inspira a busca pelo desafio e a ambição pelo conhecimento. Agradeço a Deus por ter colocado a senhora no meu caminho em 2013, quando foi dar um curso em Belém, e, de lá pra cá, ter acreditado no meu potencial e me presenteado com a oportunidade de ser sua orientada. Obrigada pelas oportunidades que me deu diariamente. Muito obrigada por termos uma relação além de orientada-orientador, por me entender, aconselhar, por querer o meu melhor pra que eu possa me tornar melhor. Obrigada pelas conversas e por ser como somos.

Ao professor Matheus, que fazia da distância um mero detalhe e conseguia estar sempre presente. Obrigada por me apresentar uma pesquisa científica inovadora, dinâmica, atual e leve. Com o senhor, minhas ideias saíram da caixinha, e eu adorei isso. Obrigada por tornar as coisas mais simples e fáceis, por dividir sua equipe da Bahia comigo, pelos conselhos, espontaneidade e pelas figurinhas.

Aos meus pacientes, e seus pais, que aceitaram dividir esse trabalho comigo. Como é bom ver vocês crescendo a cada consulta.

As fundações Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) e Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ), pelo suporte financeiro durante esses 3 anos de doutorado.

AGRADECIMENTOS

Agradeço as minhas irmãs, Patrícia e Paola, pela vida dividida e pela torcida durante esse doutorado e por esse trabalho.

Aos professores da disciplina de odontopediatria da FO/UFRJ por me mostrarem esse mundo apaixonante da odontopediatria, que é rodeado de amor. Obrigada prof Laura Primo, Andrea Gonçalves, Aline Neves, Luciana Pomarico, Ivete Pomarico, Gloria Castro, Marcelo Castro, Rogerio Gleiser. Vocês são inspiração.

Aos odontólogos, Bárbara, Ana Vollu, Cristiane Cruz, João Farinhas, Thomaz e Rafael, que também são professores.

Aos funcionários do departamento da Disciplina de Odontopediatria FO/UFRJ pela competência e carinho com os alunos e os pacientes: João, Robson, Mery, Andrea, Rose, Izabel e Kátia.

Aos professores e parceiros na FO/UFGA, minha casa. Rafael Lima, Cecy Martins, David Normando, Sidney Sant'Clair, Sandro Loreto e Juliana Brandão. Espero me tornar colega de instituição e vocês, um dia.

Aos amigos que ficaram em Belém, mas que sempre torceram por mim e por esse trabalho. Que me deram força e apoiaram, nos momentos bons e ruins, durante esses anos: Gizelle, Glaucia, Cinthia, Roberta, Larissa, Iana, Osny, Bárbara, Camila, Mariana, Thais, Ana Paula, Nádia, Ana Paula e Diogo,

Aos colegas que fiz durante o doutorado: Fernanda(s), Gabriele, Kriss, Amanda, Clarissa, Adilis, Tatiana, Michelle, Aline Borburema, Paula Pires, Stefânia, Karlinha, Mariana, Thiago, Michelle, Mariana(s), Sylvia, Kairon, Nathalia, Thais. Desejo muito sucesso para todos esses guerreiros.

Agradeço especial aos amigos que fiz durante essa jornada. Fernanda Mafei, Aline Letieri, Luciana Pereira, Maysa Lanes, Lucas Jural, Patricia Nadelman, Karla Lorene, Larissa Soares e Henrique. Obrigada por ajudarem diretamente na alegria dos meus dias e na elaboração dessa tese. Sem vocês, não seria a mesma

coisa. Obrigada pelos risos, apoios e pelas histórias pra contar. Todo o sucesso do mundo é pouco pra vocês.

E a todos que não foram mencionados textualmente, mas que fizeram e fazem parte deste percurso, minha eterna gratidão!

“Não é a força ou a sorte, mas o empenho e a persistência que determinam seu sucesso.”

Resumo

MAGNO, Marcela Baraúna. **Traumatismos dentários: tratamento, impactos na qualidade de vida e julgamento social de crianças e adolescentes, e fatores de risco associados.** Rio de Janeiro, 2019. Tese (Doutorado em Odontologia – Área de concentração: Odontopediatria) – Faculdade de Odontologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2019.

Seis estudos compõem essa tese. O primeiro deles tem como objetivo analisar a influência do bisel vestibular (BV) no sucesso clínico (SC) de restaurações em resina composta e na incidência de necrose pulpar (INP), em dentes permanentes anteriores traumatizados por meio de um estudo clínico controlado e randomizado (objetivo-I); o impacto do tratamento desse trauma dental (TD) na qualidade de vida relacionada à saúde bucal (QVRSB) de crianças e adolescentes (C/A), e suas famílias, através de um estudo clínico prospectivo (II); a influência de TDs não tratados e suas consequências (TDs-C) no julgamento social (JS) de C/A, através de um estudo observacional (III); os fatores de risco associados ao TD de maneira específica, considerando-se a exposição a TD prévio (IV) e ao consumo de bebidas alcoólicas/uso de drogas ilícitas (V), através de revisões sistemáticas da literatura, e de forma geral (VI) por meio de uma overview. Para responder o objetivo I, 74 dentes foram randomizados em grupos com e sem BV, restaurados, acompanhados e avaliados segundo USPHS modificado. O BV não influenciou na SC e na INP ($p > 0.05$). A análise da QVRSB (objetivo-II) foi avaliada através de questionários aplicados às C/A, e aos pais/responsáveis, antes e após o tratamento restaurador, e pode-se observar melhora na QVRSB das C/A ($p < 0.05$), sem impacto na QVRSB das suas famílias ($p > 0.05$). Para responder o objetivo III, um questionário foi elaborado, validado e aplicado em 100 C/A, enquanto avaliavam imagens de um menino e uma menina com diferentes tipos de TDs-C. O questionário desenvolvido apresentou propriedades de validade e confiabilidade em sua administração. A presença de TDs-C impactam negativamente no JS de C/A ($p < 0,001$). Para responder os objetivos IV, V e VI foram conduzidas revisões seguindo o PRISMA, a extração de dados e o risco de viés dos estudos incluídos seguiu a ferramenta específica e, quando possível, a certeza da evidência (CV) foi avaliada por meio da ferramenta GRADE, e meta-análises foram realizadas. Nas revisões que responderam aos objetivos IV, V e VI foram incluídos 5, 12 e 16 artigos, respectivamente. Em todas as revisões, algum estudo apresentou algum tipo de risco de viés metodológico. Observou-se com moderada CV que a exposição ao TD prévio é um fator de risco para um novo TD (RR 2.17 $p = 0.01$) e que pessoas que consomem bebidas alcoólicas apresentam maior chance de sofrerem TD (OR 1.57 $p = 0.00001$). Com baixa CV, problemas relacionados ao consumo de álcool, e o uso de drogas ilícitas, não estão associados a maior chance de sofrer TD (OR 0.75 $p = 0.18$ e OR 1.20 $p = 0.27$, respectivamente). De uma forma geral, fatores clínicos individuais, sociodemográficos e ambientais estão associados ao TD. Pode-se concluir que: (I) o BV não influencia no SC e INP; (II) o tratamento das fraturas em esmalte e dentina causam impacto positivo na QVRSB, enquanto (III) os TDs-C causam impacto negativo no JS de C/A; (IV) a exposição a TD prévio e (V) o uso de bebidas alcoólicas estão associados a maior prevalência de TD, bem como (IV) fatores clínicos, sociodemográficos e ambientais.

Palavras-chave: Traumatismos dentários, Qualidade de vida, Meio social, Aceitação social, Fatores de risco.

Abstract

MAGNO, Marcela Baraúna. **Traumatismos dentários: tratamento, impactos na qualidade de vida e julgamento social de crianças e adolescentes, e fatores de risco associados**. Rio de Janeiro, 2019. Tese (Doutorado em Odontologia – Área de concentração: Odontopediatria) – Faculdade de Odontologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2019.

Six studies compose this thesis. The first one aims to analyze the influence of the vestibular bevel (VB) on the clinical success (CS) of composite resin restorations and the incidence of pulp necrosis (IPN) in traumatized anterior permanent teeth by means of a randomized controlled clinical study (objective-I); the impact of treatment of dental trauma (DT) on oral health-related quality of life (OHRQoL) of children and adolescents (C/A), and their families, through a prospective clinical study (II); the influence of untreated TDs and their consequences (TDs-C) on social judgment (SJ) of C/A through an observational study (III); the risk factors associated with DT in a specific way, considering previous exposure to DT (IV) and consumption of alcoholic beverages/use of illicit drugs (V) through systematic reviews of the literature, and in general (VI) through an overview. To respond to objective I, 74 teeth were randomized into groups with and without VB, restored, monitored and evaluated according to modified USPHS. VB did not influence CS and IPN ($p > 0.05$). The OHRQoL analysis (objective-II) was evaluated through questionnaires applied to C/A, and parents/guardians, before and after the restorative treatment, and it could be observed an improvement in OHRQoL of C/A ($p < 0.05$), with no impact on the OHRQoL of their families ($p > 0.05$). To answer objective III, a questionnaire was developed, validated and applied in 100 C/A, during a boy and girl images evaluating with different types of TDs-C. The questionnaire developed presented properties of validity and reliability in its administration. The presence of TDs-C negatively impacted the C/A SJ ($p < 0.001$). In order to respond to objectives IV, V and VI, revisions were conducted following PRISMA, data extraction and risk of bias of included studies were performed using a specific tool and, when possible, certainty of evidence (CE) was evaluated by means of the tool GRADE, and meta-analyses were performed. In the reviews that responded to objectives IV, V and VI were included 5, 12 and 16 articles, respectively. In all reviews, some study presented some kind of risk of methodological bias. It was observed with moderate CE that exposure to previous DT is a risk factor for a new DT (RR 2.17 $p = 0.01$) and that people who consume alcoholic beverages are more likely to suffer DT (OR 1.57 $p = 0.00001$). With low CE, problems related to alcohol consumption and the use of illicit drugs are not associated with a greater chance of suffering from DT (OR 0.75 $p = 0.18$ and OR 1.20 $p = 0.27$, respectively). In general, individual, sociodemographic and environmental clinical factors are associated with DT. It can be concluded that: (I) VB does not influence CS and IPN; (II) the treatment of enamel and dentin fractures have a positive impact on OHRQoL, while (III) TDs-C have a negative impact on C/A SJ; (IV) exposure to previous DT and (V) the use of alcoholic beverages are associated with a higher prevalence of DT, as well as (VI) clinical, sociodemographic and environmental factors.

Key words: Dental trauma, Quality of life, Social environment, Social acceptance, Risk factors.

Resumen

MAGNO, Marcela Baraúna. **Traumatismos dentários: tratamento, impactos na qualidade de vida e julgamento social de crianças e adolescentes, e fatores de risco associados.** Rio de Janeiro, 2019. Tese (Doutorado em Odontologia – Área de concentração: Odontopediatria) – Faculdade de Odontologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2019.

Seis estudios componen esta tesis. El primero de ellos tiene como objetivo analizar la influencia del bisel vestibular (BV) en la éxito clínico (EC) de restauraciones en resina compuesta y en la incidencia de necrosis pulpar (INP), en dientes permanentes anteriores traumatizados por medio de un estudio clínico controlado y randomizado (meta-I); el impacto del tratamiento de este trauma dental (TD) en la calidad de vida relacionada con la salud bucal (OHRQoL) de niños y adolescentes (C/A), y sus familias, a través de un estudio clínico prospectivo (II); la influencia de TDs no tratados y sus consecuencias (TDs-C) en el juicio social (JS) de C/A, a través de un estudio observacional (III); los factores de riesgo asociados al TD de manera específica, considerando la exposición a TD previo (IV) y al consumo de bebidas alcohólicas / uso de drogas ilícitas (V), a través de revisiones sistemáticas de la literatura, y de forma general (VI) por medio de una revisión de revisiones. Para responder al objetivo I, 74 dientes fueron randomizados en grupos con y sin BV, restaurados, acompañados y evaluados según USPHS modificado. El BV no influyó en la EC y en la INP ($p > 0.05$). El análisis de la OHRQoL (objetivo-II) fue evaluado a través de cuestionarios aplicados a las C/A, ya los padres/responsables, antes y después del tratamiento restaurador, y se puede observar una mejora en la OHRQoL de las C/A ($p < 0.05$), sin impacto en la OHRQoL de sus familias ($p > 0.05$). Para responder al objetivo III, un cuestionario fue elaborado, validado y aplicado en 100 C/A, mientras evalúan imágenes de un niño y niña con diferentes tipos de TDs-C. El cuestionario desarrollado presentó propiedades de validez y confiabilidad en su administración. La presencia de TDs-C impacta negativamente en el JS de C/A ($p < 0,001$). Para responder a los objetivos IV, V y VI se realizaron revisiones siguiendo el PRISMA, la extracción de datos y el riesgo de sesgo de los estudios incluidos siguió la herramienta específica y, cuando posible, la certeza de la evidencia (CV) fue evaluada por medio de la herramienta GRADE, y meta-análisis se realizaron. En las revisiones que respondieron a los objetivos IV, V y VI se incluyeron 5, 12 y 16 artículos, respectivamente. En todas las revisiones, algún estudio presentó algún tipo de riesgo de sesgo metodológico. Se observó con moderado CV que la exposición al TD previo es un factor de riesgo para un nuevo TD (RR 2.17 $p=0.01$) y que las personas que consumen bebidas alcohólicas presentan mayor probabilidad de sufrir TD (OR 1.57 $p=0.00001$). Con baja CV, problemas relacionados con el consumo de alcohol y el uso de drogas ilícitas no están asociados a la mayor probabilidad de sufrir TD (OR 0.75 $p=0.18$ y OR 1.20 $p=0.27$, respectivamente). En general, los factores clínicos individuales, sociodemográficos y ambientales están asociados al TD. Se puede concluir que: (I) el BV no influye en la EC e INP; (II) el tratamiento de las fracturas en esmalte y dentina causan un impacto positivo en la OHRQoL, mientras que (III) los TDs-C causan un impacto negativo en el JS de C/A; (IV) la exposición a TD previo y (V) el uso de bebidas alcohólicas están asociadas a la mayor prevalencia de TD, así como (IV) factores clínicos, sociodemográficos y ambientales.

Palabras clave: Traumatismos dentales, Calidad de vida, Medio social, Aceptación social, Factores de riesgo.

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LISTA DE SIGLAS

AMSTAR	A MeaSurement Tool to Assess systematic Reviews
BV	Bisel Vestibular
BSJ	Bad Social Judgment
C/A	Crianças e Adolescentes
CC	Color Change
CCS	Centro de Ciências da Saúde
CE	Certainty Of Evidence
CI	Confidence Interval
CP	Clinical Performance
CPQ	Children Perceptions Questionnaire
CSVB	CavoSurface Vestibular Bevel
DT	Dental Trauma
ECR	Estudo Clínico Randomizado
EDF	Enamel and Dentin Fracture
EF	Enamel Fracture
FIS	Familiar Impact Scale
FO	Faculdade de Odontologia
FSJ	Final Social Judgment
GRADE	Grading of Recommendations Assessment, Development and Evaluation
GSJ	Good Social Judgment
HUCFF	Hospital Universitário Clementino Fraga Filho
ICC	Intraclass correlation coefficients

INP	Incidência de Necrose Pulpar
IPN	Incidence Of Pulp Necrosis
JS	Julgamento Social
LILACS	Literatura Latino-americana e do Caribe em Ciências da Saúde
Medline	Medical Literature Analysis and Retrieval System Online
MeSH	Medical Subject Headings
OHRQoL	Qualidade De Vida Relacionada À Saúde Bucal
OR	Odds Ratio
P-CPQ	Parental-Children Perceptions Questionnaire
PC	Performance Clínica
PECO	Population, Exposition, Control, Outcome
PRISMA	<i>Preferred Reporting Items for Systematic Review and Meta Analysis</i>
PROSPERO	<i>Internacional Prospective Register of Systematic Review</i>
QVRSB	Qualidade de Vida Relacionada A Saúde Bucal
RCT	Randomized Clinical Trial
RR	Risk Ratio
SCOPUS	Base de Dados Bibliográficos SCOPUS
SJ	Social Judgment
SPSS	Statistical Package for the Social Science
TD	Traumatismo Dentário
TDI	Traumatic Dental Injury
TDs-C	Traumatismos Dentários e suas Consequências
UESB	Universidade Estadual do Sudoeste da Bahia

UFRJ Universidade Federal do Rio de Janeiro

USPHS United States Public Health Service

VB Vestibular Bevel

LISTA DE ABREVEATURAS

Fem.	Female
Fig,	Figure
Masc.	Male
Prof.	Professor
Profa.	Professora

LISTA DE SÍMBOLOS

<	Menor que
>	Maior que
%	Porcentagem
α	Alfa
=	Igual
\pm	Mais ou Menos

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1 INTRODUÇÃO

Os traumatismos dentários (TDs) são consideradas um problema de saúde pública devido à sua alta prevalência (Azami-Aghdash *et al.*, 2015), com sequelas físicas (Lenzi *et al.* 2018), sociais (Magno *et al.* 2019) e econômicas (Andreasen 2007). Além disso, os TDs podem ter um impacto negativo na qualidade de vida das crianças e adolescentes (Antunes *et al.* 2013). Sua prevalência gira em torno de 20.5% no Brasil, na idade de 12 anos (Brasil, 2010) sendo os incisivos superiores os elementos mais envolvidos e a fratura em esmalte e dentina um dos TDs mais prevalentes (Azami-Aghdash *et al.*, 2015). Em um parâmetro global a prevalência do TD é de 17.5%, variando de acordo com a região demográfica (Azami-Aghdash *et al.*, 2015).

Segundo Andreasen (Andreasen 2007) os TDs podem ser classificados em injúrias dos tecidos dentais duros e pulpar, subdividas em fraturas de coroa não complicadas (trinca de esmalte, fratura de esmalte e fratura em esmalte e dentina) e fraturas de coroa complicadas (fratura em esmalte e dentina com exposição pulpar); injúrias aos tecidos dentais duros, polpa e processo alveolar (fratura coronoradicular, fratura radicular, fratura da parede alveolar da maxila ou mandíbula, fratura do processo alveolar da maxila ou mandíbula); injúrias aos tecidos periodontais (concussão, subluxação, luxação lateral, luxação intrusiva, luxação extrusiva e avulsão); e injúrias à gengiva ou mucosa oral (contusão, abrasão laceração).

A qualidade de vida relacionada à saúde bucal (QVRSB) refere-se ao impacto que a saúde bucal ou doença tem sobre as funções físicas, psicológicas e sociais de uma pessoa, afetando seu bem-estar (Castro Rde *et al.*, 2011). Os TDs podem causar dor, prejuízos funcionais, estéticos e problemas psicossociais, levando a efeitos negativos na vida de crianças e adolescentes (Fakhruddin *et al.*, 2008; Borges *et al.*, 2017; Zaror *et al.*, 2018). No entanto, deve-se ter em mente que a qualidade de vida é um processo dinâmico (Carr *et al.*, 2001) e que a autopercepção de cada pessoa é influenciada por suas experiências, ambições para o futuro, sonhos e modo de vida (Eiser e Morse,

2001). Além disso, as pessoas alteram sua visão sobre a QVRSB ao longo do tempo devido a mudanças físicas ou acontecimentos em sua vida (Allison *et al.*, 1997).

Nesse contexto, hipoteticamente, o tratamento do TD pode influenciar positivamente os fatores da QVRSB, restaurando a capacidade de sorrir, comer e realizar atividades diárias sem dano estético e funcional. Enquanto autores que avaliaram a relação entre a QVRSB de pessoas com TD tratados e sem TDs mostraram que o tratamento do TD e a ausência de TD não estavam associados a um impacto na qualidade de vida (Ramos-Jorge *et al.*, 2007; Bendo *et al.*, 2010), outros demonstraram que o TD não tratado estava associado a um impacto negativo na QVRSB de escolares (Ramos-Jorge *et al.*, 2014). Com essa diversidade de achados, dúvidas sobre esse assunto continuam existindo e criando um campo de estudo a ser explorado, por meio de uma metodologia de pesquisa de alta qualidade com investigações longitudinais clínicas.

A região dentofacial contribui significativamente para a aparência facial geral, onde um sorriso harmonioso desempenha papel importante no estabelecimento da beleza facial (Shaw, 1981). Como já relatado, crianças que sofreram TD apresentam impacto negativo na sua vida diária, em relação à dor, aspectos funcionais, emocionais e sociais (El-Kalla *et al.*, 2017), existindo uma forte relação entre aparência física e interação social (Shaw, 1981). Sabendo-se que a adolescência é um estágio de transição do desenvolvimento humano nos parâmetros físico e psicológico, alteração da autoimagem facial pode ter impacto em muitas facetas da vida dos adolescentes, como socialização, aspectos emocionais e funcionais (Perillo *et al.*, 2014). Além disso, as percepções dos outros podem influenciar a maneira como a pessoa age em termos de transgressões sociais e pode até resultar em mudanças de desenvolvimento a longo prazo (Ma e Hu, 2015). Estudos que avaliem a influência do TD não tratado, ou suas sequelas, no julgamento social de C/A, com instrumentos válidos, são interessantes para que possa haver uma noção sobre os impactos do TD em vários aspectos da vida das pessoas.

Diversos fatores anatômicos e biológicos têm sido associados a um aumento da prevalência de TD, como obesidade (Correa-Faria e Petti, 2011),

acentuado overjet (Nguyen *et al.* 1999), mordida aberta anterior (Correa-Faria *et al.* 2016) e selamento labial inadequado (Correa-Faria *et al.* 2016).

No contexto da socialização, a adolescência é uma etapa da vida na qual muitas vezes há experimentação de álcool e drogas, sejam elas lícitas ou ilícitas. Embora na maioria das vezes esse uso seja apenas experimental, é possível notar comportamentos que refletem esses padrões na vida adulta (Tavares *et al.*, 2001). O uso de drogas por adolescentes constitui um importante problema social e de saúde pública (Hall e Degenhardt, 2015), pois apresenta alta prevalência e início cada vez mais precoce (Hoch *et al.*, 2015). Estudos que abordem a temática da associação entre o uso de álcool e drogas e o TD são importantes para permitir o planejamento de políticas de intervenção adequadas que abordem fatores biológicos e comportamentais que possam servir como mediadores desse problema de saúde pública (Magno *et al.*, 2019). A necessidade de se desenvolver meios de identificar a associação entre o uso de substâncias e o TD é condição essencial para combater de forma eficaz esse consumo.

Além disso, estudos realizados em crianças e adolescentes (C/A) relatam que 2% (Viegas *et al.*, 2010) a 37% (Oldin *et al.*, 2015) dos indivíduos que já sofreram TD sofrerão trauma novamente, podendo ser esse um fator de risco para a falha de restaurações classe IV. Desta forma, estudos que abordem a temática de recorrência dos TDs são encorajados.

Diante de todo o exposto, e com a alta prevalência dos TDs (Azami-Aghdash *et al.*, 2015) e as sérias consequências associadas a eles, a prevenção se torna uma meta primária. Uma abordagem de prevenção baseia-se na identificação de fatores de risco e em medidas que visam evitar esses fatores ou reduzir seu impacto (Bourguignon e Sigurdsson, 2009). Sabendo que a detecção dos fatores de risco que realmente influenciam na ocorrência do TD é um dos primeiros passos na sua prevenção, mostram-se importantes estudos que forneçam uma síntese da evidência abordando a temática de fatores de risco relacionados ao TD.

No que envolve o tratamento das fraturas em esmalte e dentina não complicadas, restaurações em resina composta são consideradas o tratamento mais conservador para esse tipo de trauma, necessitando de mínimos preparos dentário (Diangelis *et al.*, 2016).

A preparação de um ângulo cavo superficial vestibular (bisel vestibular) tem sido recomendada para aumentar a retenção da restauração (Xu *et al.*, 2012) e permitir uma transição gradual entre a restauração e o dente. No entanto, a influência desse preparo no desempenho de restaurações é controversa e discutível (Stellini *et al.*, 2008; Schroeder *et al.*, 2015). Uma revisão sistemática (Heintze *et al.*, 2015) avaliou o desempenho clínico de restaurações anteriores, entretanto, quando os estudos que avaliaram restaurações classe IV são isolados, observa-se que nenhum deles avaliou diretamente a influência do bisel vestibular no desempenho clínico das restaurações. Sabendo que a preparação do bisel vestibular é rotina em muitas faculdades e clínicas e levando em conta a ausência de estudos que avaliem essa variável, justifica-se a importância de investigações sobre a relação da execução do bisel com o desempenho clínico de restaurações anteriores de classe IV. Esta mesma revisão sistemática (Heintze *et al.*, 2015) reportou que a maioria das restaurações que precisaram ser refeitas foram por razões relacionadas a falha adesiva e cárie nas margens da restauração (Heintze *et al.*, 2015).

2 PROPOSIÇÃO

2.1. Objetivo geral

Através de uma recompilação, avaliar o tratamento, a qualidade de vida, o julgamento social e fatores de risco de indivíduos que sofreram traumas dentários.

2.2 Objetivos específicos

A fim de cumprir com os objetivos específicos da presente tese, estes foram subdivididos em seis diferentes estudos, de acordo com as temáticas específicas delineadas, a saber:

Estudo 1-

- Avaliar a influência do bisel vestibular no desempenho clínico de restaurações anteriores classe IV, e na incidência de necrose pulpar, em dentes que sofreram fratura de esmalte e dentina sem exposição pulpar, através de um estudo clínico controlado e randomizado (ECR).
- Avaliar a influência no número de ângulos fraturados / restaurados e da recorrência de TD na retenção das restaurações e na incidência de necrose pulpar.

Estudo 2-

- Avaliar o impacto do tratamento da fratura em esmalte e dentina na QVRSB de C/A, e de suas famílias, através de um estudo prospectivo com intervenção clínica.

Estudo 3-

- Desenvolver e validar um questionário para considerar julgamentos sociais feitos por C/A.
- Avaliar, por meio da aplicação deste questionário, as percepções e julgamentos de C/A sobre diferentes TDs e suas consequências (TDs-C), bem como a motivação para procurar tratamento odontológico.

Estudo 4-

- Verificar a evidência científica referente ao traumatismo dentário prévio como fator de risco para novos TD em C/A, através de uma revisão sistemática.

Estudo 5-

- Verificar a evidência científica referente a associação entre o consumo de bebidas alcoólicas e uso de drogas ilícitas e o TD, através de uma revisão sistemática.

Estudo 6-

- Verificar a evidência científica disponível sobre os fatores de risco associados, ou não, aos TDs através de uma revisão sistemática de revisões sistemáticas disponíveis na literatura científica, resumindo o corpo de evidências com base nas informações atuais.

3 DELINEAMENTO DA PESQUISA

3.1 Considerações iniciais e éticas

A presente tese, formada por 6 artigos, propõe predominantemente apresentar uma recopilação acerca de questões associadas ao tratamento dos TDs, aos impactos dos TDs tratados e não tratados, assim como dos fatores de risco para TDs.

Partiu-se de um questionamento a cerca da influência do bisel vestibular em restaurações classe IV após TD, resultando em um estudo controlado e randomizado (ECR – estudo 1). Questionou-se, também, se a restauração desses dentes traumatizados influenciavam na QVRSB, resultando em um estudo clínico prospectivo (estudo 2). Ainda no cenário de TD, os pesquisadores detectaram uma lacuna na literatura envolvendo o julgamento social de crianças e adolescentes com TD não tratados, ou com sequelas destes, resultando no estudo 3. Sabendo que o TD causa sequelas além das questões estéticas, seu tratamento imediato e prevenção são necessários. Diante disso, surgiram os estudos 4 e 5, para avaliar o TD e o uso de álcool e drogas ilícitas como fatores de risco para o TD, respectivamente, e o estudo 6 com o objetivo de verificar a evidência científica disponível sobre os fatores de risco associados, ou não, ao TD.

Os estudos 1, 2 e 3 foram aprovados pelo Comitê de Ética do HUCFF-UFRJ (no 1.836.586) com cópia presente no Anexo A e pelo Comitê de Ética da Universidade Estadual do Sudoeste da Bahia (UESB) (no 0154.0.454.000-11) com cópia presente no anexo B. Estas pesquisas estão em consonância com o estabelecido na resolução no 510/2016, e suas complementares com o Código de Ética Médica de 1988 (artigos 122 a 130). Os Termos de Consentimento Livre e Esclarecido e os Termos de Assentimento foram apresentados aos integrantes da pesquisa segundo sua faixa etária e condição (cuidador/criança/adolescente). Após a leitura, caso estivessem de acordo na participação, registraram oficialmente sua participação (Apêndices A, B e C). Aos participantes foram esclarecidos que suas identidades seriam preservadas, sendo cada usuário identificado por número.

Todos os participantes da pesquisa foram previamente expostos verbalmente sobre o objetivo da pesquisa, procedendo a seguir esclarecimentos sobre eventuais dúvidas.

3.2 Primeiro estudo - ECR

Com o objetivo de avaliar a influência do bisel vestibular na performance clínica e incidência de necrose pulpar, em dentes traumatizados submetidos a restaurações classe IV foi realizado um ECR paralelo e cego no departamento de Odontopediatria da FO/UFRJ.

A pesquisa seguiu as normas do CONSORT (Schulz *et al.*, 2010) e foi cadastrada registrada no site www.ensaiosclinicos.gov.br.

Previamente à realização do exame físico intrabucal e restaurações anteriores, a examinadora e operadora (M.B.M.) participaram do processo de calibração para diagnóstico clínico e radiográfico do TD, fatores de risco e sequelas associadas, através da análise de 40 imagens clínicas e radiográficas, tendo como objetivo proporcionar consistência aos critérios de inclusão adotados. Essas imagens foram analisadas em dois momentos, com intervalo de 21 dias, para fornecer a confiabilidade intraexaminador e interexaminador, com um pesquisador sênior em TD (L.C.M.).

Através da análise clínica de 20 dente*s anteriores com restauração classe IV em resina composta, o processo de calibração interexaminadores (M.B.M. e L.C.M.) também ocorreu para proporcionar consistência à análise da performance clínica das restaurações segundo o critério modificado da *Unites States Public Health Service* (USPHS).

Foram incluídos todos os pacientes que compareceram à Clínica de Trauma Dental, na FO/UFRJ com, no mínimo, um dente anterior superior permanente (incisivos centrais, incisivos laterais ou caninos) necessitando de restauração classe IV devido fratura coronária não complicada (Andreasen *et al.*, 2007), condições físicas e emocionais capazes de tolerar o procedimento restaurador e vitalidade pulpar no referido elemento dentário traumatizado.

Pacientes com inflamação ou necrose pulpar, tratamento endodôntico prévio, doença periodontal não controlada, hábitos parafuncionais, portadores de necessidades especiais e com déficit motor foram excluídos do estudo.

Foram coletados dados socioeconômicos, avaliação clínica intra e extra-oral, realizadas fotografias e radiografias dos dentes traumatizados, e coletados dados de prevalência e dados de má oclusão, permitindo tratamento adequado (Anexo C – Ficha clínica do Centro de Vigilância e Monitoramento de Traumatismos Dentários UFRJ).

Os dentes foram randomizados em dois grupos: com e sem a realização de bisel vestibular. O mesmo operador (M.B.M.) realizou todas as restaurações sob isolamento absoluto e após a seleção da cor da resina composta sob luz natural.

Nos dentes alocados no grupo 'com bisel' foi realizado um bisel vestibular de, em média, 2mm de extensão cervico-incisal com a broca diamantada 1111. A partir dessa etapa, o tratamento restaurador seguiu as mesmas etapas para ambos os grupos: polimento com pedra pomes e água, condicionamento com ácido fosfórico à 35% durante 15 segundos, lavagem e secagem, aplicação do sistema adesivo, inserção e escultura coronária através da técnica incremental com polimerização durante 20 segundos. Finalizada a anatomia, foi realizado ajuste oclusal em máxima intercuspidação habitual e durante os movimentos excursivos da mandíbula, polimento e acabamento.

Dois avaliadores calibrados (M.B.M. e L.C.M.), realizaram a avaliação das restaurações segundo o critério modificado da USPHS (Cvar e Ryge, 2005) nos tempos baseline (01 semana) e 06 meses. Durante essa avaliação foi utilizado apenas espelho clínico e sonda exploradora, sem auxílio de lupas ou lentes de aumento. Restaurações que receberam classificação Alpha ou Bravo para todos os parâmetros foram consideradas sucesso clínico. Restaurações que receberam classificação Charlie para qualquer critério avaliado foram consideradas insucesso clínico.

Todos os dados foram analisados no SPSS 20.0 (SPSS Inc, IL, EUA). Os dados dicotomizados para cada critério USPHS em sucesso e insucesso, bem

como a presença ou não de bisel vestibular ('sim' ou 'não'), novo TD ('sim' ou 'não') e número de ângulos fraturados ('um' ou 'dois' ângulos). O teste do qui-quadrado com bootstrapping random (10.000) e o teste t para variáveis independentes foram utilizados para verificar a distribuição das variáveis e a diferença entre os grupos. O nível de significância considerado para todos os testes foi de 5%.

3.3 Segundo estudo – Estudo clínico prospectivo de QVRSB

Após discussão entre os pesquisadores sobre a melhor e mais uniforme metodologia a ser adotada na aplicação dos questionários e previamente ao início da coleta de dados do ECR, foram distribuídos os questionários de qualidade de vida relacionados à saúde bucal aos pacientes recrutados e seus responsáveis.

A pesquisa que avaliou o impacto do tratamento da fratura em esmalte e dentina na QVRSB seguiu as normas do CONSORT (Schulz *et al.*, 2010) e foi cadastrada registrada no site www.ensaiosclinicos.gov.br.

Foram incluídos 32 pares pais-C/A pacientes que compareceram à Clínica de Trauma Dental, na FO/UFRJ com, no mínimo um dente anterior superior permanente (incisivos centrais, incisivos laterais ou caninos) necessitando de restauração classe IV devido fratura coronária não complicada, (Andreasen *et al.*, 2007), com condições físicas e emocionais capazes de tolerar o procedimento restaurador, e vitalidade pulpar. Pacientes com inflamação ou necrose pulpar e cárie foram excluídos do estudo.

Foram coletados dados socioeconômicos, feita avaliação clínica intra e extra-oral, realizadas fotografias e radiografias dos dentes traumatizados, e coletados dados de prevalência e dados de má oclusão, permitindo um tratamento adequado. O mesmo operador (M.B.M.) realizou todas as restaurações após a seleção da cor da resina composta sob luz natural e sob isolamento absoluto com a técnica incremental.

O questionário de QVRSB é composto por quatro componentes – questionário de percepção da criança de 8-10 anos e de 11-14 anos (CPQ8-10

e CPQ11-14, respectivamente) (Anexo D e E, respectivamente), Questionário de percepção dos parentes (P-CPQ – Anexo F) e Escala de impacto familiar (FIS – Anexo G) – e avalia a qualidade de vida em quatro domínios: sintomatologia oral, limitação funcional, bem-estar emocional e bem-estar social. O CPQ8-10 e o CPQ11-14 foram aplicados às crianças de acordo com sua idade, enquanto que o PPQ e o FIS foram aplicados aos responsáveis, independentemente da idade das crianças.

As respostas dos pacientes receberam pontuação e foram tabuladas para produzir uma escala de frequência: pontuação 0 – “nunca”, 1 – “uma ou duas vezes”, 2- “às vezes”, 3- “muitas vezes”, 4- “todo dia ou quase todo dia”. Respostas “não sei” foram permitidas e receberam score 0.²⁶ Os scores totais foram calculados pela soma das respostas individuais de cada questionário.

Esses questionários foram aplicados antes e após três meses do tratamento restaurador para identificar e avaliar possíveis alterações nos scores ao longo do tempo, permitindo avaliar como a restauração / reabilitação pós trauma pode influenciar na qualidade de vida da C/A e seus familiares.

Estatística descritiva foi utilizada para expressar os resultados com média e desvio padrão. A distribuição dos dados paramétricos foi avaliada pelo teste de Shapiro-Wilk. Para avaliar as diferenças entre os escores antes e após o tratamento restaurador, os dados com distribuição paramétrica foram avaliados por meio de teste t para amostras dependentes, e os dados com distribuição não paramétrica foram analisados pelo teste de Wilcoxon. O nível de significância foi de 5% ($\alpha = 0,05$). Os dados foram tabulados e analisados no IBM SPSS Statistics para Windows versão 21.0 (IBM Corp., Armonk, NY, EUA).

3.4 Terceiro estudo – Julgamento social de crianças e adolescentes

O terceiro estudo, realizado no departamento de clínica infantil da UESB e em uma escola municipal e uma escola estadual da cidade de Jequié, Bahia, foi dividido em duas etapas: primeira etapa elaboração e validação do questionário e segunda etapa estudo principal.

Primeiramente, houve uma discussão entre os pesquisadores para a elaboração primária do questionário abordando as percepções e julgamentos de C/A sobre diferentes TDs e TDs-C. Foi pesquisada na literatura os principais fatores envolvidos no julgamento social feito por C/A para a prévia elaboração do questionário. Os pesquisadores também discutiram quais TDs e TDs-C seriam simulados em fotografias analisadas durante a aplicação deste questionário. Imagens (fotos) de um menino e uma menina foram modificadas para simular diferentes TDs e TDs-C e avaliadas pela equipe do estudo até a aprovação de todos os pesquisadores envolvidos na pesquisa.

Elaboração e validação do questionário

O processo de validação foi dividido em 1) desenvolvimento de fotografias; 2) elaboração de questionário; 3) avaliação de questionários por profissionais de odontologia; 4) avaliação de questionários por profissionais da educação; 5) avaliação de questionários por crianças e adolescentes; 6) conclusão do questionário; e 7) validade e confiabilidade do questionário.

1) Desenvolvimento das fotografias: Foram utilizadas fotografias coloridas padronizadas do rosto de dois adolescentes, um menino e uma menina na mesma faixa etária dos avaliadores, manipuladas para criar TDs-C (mudança de cor da coroa, perda de dentes, fratura de esmalte e fratura de esmalte e dentina). Duas fotografias foram utilizadas como controles positivos, com ausência de alterações dentárias. As alterações foram feitas por meio de software de manipulação de imagens (Photoshop CS3, Adobe Systems, São José, Califórnia).

2) Elaboração do questionário: Um questionário inicial, contendo 12 questões referentes a imagens fotográficas, foi elaborado com o intuito de identificar percepções sobre os diferentes TDs-C, sua influência nas relações interpessoais (positivas e / ou negativas) e a motivação para buscar tratamento odontológico.

3) Avaliação por profissionais de odontologia: dez professores de Odontopediatria avaliaram o questionário e foram convidados a fazer comentários, modificações e sugestões, e apontar eventuais falhas.

4) Avaliação por profissionais da educação: o questionário foi avaliado por dois profissionais da educação que atuam em psicologia e saúde.

5) Avaliação por crianças e adolescentes: dez crianças e adolescentes estudantes, de uma escola municipal e estadual na cidade de Jequié, Bahia, Brasil, avaliaram o questionário quanto ao seu conteúdo, incluindo compreensão e dúvidas sobre questões ou opções de resposta, e foram encorajados a fazer sugestões que considerassem relevantes sobre o sujeito. As crianças e adolescentes incluídas nesta etapa não participaram do estudo principal.

6) Conclusão do questionário: As considerações e sugestões feitas pelos profissionais e participantes foram analisadas e o questionário foi finalizado com as seguintes 12 questões:

- 1) Você acha esse menino / menina engraçado?
- 2) Você acha que esse menino / menina é feliz?
- 3) Você acha que esse menino / menina tem muitos amigos?
- 4) Você gostaria que esse menino / menina fosse seu amigo?
- 5) Você acha que esse menino / menina é inteligente?
- 6) Você acha que esse menino / menina é bonito?
- 7) Você acha que esse menino / menina é envergonhado?
- 8) Você acha que esse menino / menina gosta de ficar sozinho?
- 9) Você acha que esse garoto / garota pode atormentar outras crianças ou começar brigas?
- 10) Você acha que os colegas de classe desse menino / menina lhes dão apelidos?
- 11) Você acha que esse garoto / garota deveria ter vergonha de sorrir?
- 12) Você acha que esse menino / menina precisa procurar um dentista?

Cada pergunta tinha quatro opções de resposta: "certamente sim", "talvez sim", "talvez não" e "certamente não". As características positivas (questões 01 a 06) foram codificadas como "certamente sim" = 3 pontos, "talvez sim" = 2 pontos, "talvez não" = 1 ponto, e "certamente não" = 0 pontos. As características negativas (questões 07 a 12) tiveram escores negativos invertidos, com 'certamente sim' = -3 pontos, 'talvez sim' = -2 pontos, 'talvez não' = -1 ponto e

'certamente não' = 0 pontos. As características positivas e negativas foram analisadas separadamente, em termos de escores totais. Os valores positivos (referente às boas características sociais - GSJs) e os valores negativos (referentes às características sociais ruins - BSJs) foram somados para obter um julgamento social final (FSJ), seguindo a fórmula $FSJ = GSJ + BSJ$. Desta forma, os resultados finais com valores positivos (+ FSJ) sugeriram que, em geral, o julgamento social referente ao TD ou suas consequências foram bons, e aqueles com valores negativos (-SF) indicaram que, em geral, o julgamento social sobre o TD ou suas consequências foram ruins.

7) Validade e confiabilidade do questionário: O questionário foi aplicado em dois momentos distintos, com intervalo de 20 dias entre as duas aplicações. Para a primeira aplicação (teste) e segunda (reteste) do questionário, 30 crianças e adolescentes foram abordados. Após a resposta ao questionário, as C/A foram convidadas a quantificar suas percepções de atratividade em relação aos indivíduos com TDs-C dos dentes anteriores, através das mesmas imagens fotográficas por meio de uma escala analógica visual, de 0 a 10.

A aceitabilidade foi avaliada de acordo com a proporção de indivíduos que não responderam a todos os itens. A presença de efeitos de chão e teto foi avaliada através da análise da frequência de respostas em cada item. A validade de construto foi testada pelo cálculo das correlações entre o FSJ e o escore de atratividade (escala visual analógica; VAS), usando o coeficiente de correlação de Spearman. A validade de constructo discriminante foi investigada por meio de uma comparação entre a imagem de controle e as imagens dos diferentes TDs-C, utilizando o teste de Friedman, sendo as comparações entre pares testadas pelo teste de Wilcoxon signed-rank.

A confiabilidade foi determinado pela concordância entre medidas repetidas (teste-reteste) por meio do coeficiente de correlação intraclass (CCI) e da consistência interna (alfa de Cronbach). A responsividade foi avaliada por meio da média de resposta padronizada (MRE) entre a imagem de controle e as imagens dos diferentes TDs-C, obtida por meio da seguinte equação: medida inicial - medida final / diferença do desvio padrão.

Estudo principal

Após cálculo amostral, 100 C/A, meninos e meninas, com idade entre 10 e 15 anos, estudantes de uma escola municipal e estadual em Jequié, Bahia foram selecionados para o estudo. No dia do estudo, os participantes foram instruídos sobre as questões do questionário e possíveis respostas, não sendo autorizados a conferir uns com os outros durante a conclusão do questionário. As imagens foram projetadas uma a uma e cada imagem foi acompanhada pelas 12 perguntas do questionário, totalizando 144 perguntas por respondente. As C/A receberam um minuto para observar cada imagem e, após esse tempo, responder às perguntas sobre essa imagem. Em seguida, as C/A quantificaram suas percepções de atratividade em relação aos indivíduos com TDs-C dos dentes anteriores através de uma escala analógica visual, de 0 a 10. Este processo foi realizado com as crianças e adolescentes sentados na frente de um computador com uma distância padronizada para a tela.

Estatística descritiva foi aplicada para expressar os resultados como média e desvio padrão. A análise inferencial incluiu o teste de Friedman para comparações intragrupos (com comparações entre pares sendo testados pelo teste de Wilcoxon), e o teste de Mann-Whitney foi usado para comparações intergrupos (comparações entre gêneros). Em ambas as análises estatísticas (questionário de validação e estudo principal), o nível de significância foi de 5% ($\alpha = 0,05$), e os dados foram tabulados e analisados no IBM SPSS Statistics for Windows para todas as análises (IBM SPSS, versão 21.0, 2012, IBM Corp., Armonk, NY).

3.5 Quarto estudo – Revisão sistemática sobre recorrência de TD

Com o objetivo de avaliar se o TD prévio é um fator de risco para um novo TD, foi realizada uma revisão sistemática, a qual seguiu as normas do PRISMA Statement (Moher *et al.*, 2009) e foi registrada no banco de dados PROSPERO (Internacional Prospective Register of Systematic Review) sob o número CRD42017061040.

A pesquisa bibliográfica sistemática foi realizada nas bases de dados PubMed, Scopus, LILACS, Web of Science, Cochrane Library e literatura cinzenta e atualizada em junho de 2017, sem restrições para o ano de publicação e idioma. 'MeSH' e termos livres relacionados ao assunto avaliado (trauma dental e recorrência) foram selecionados e uma estratégia de busca utilizando os operadores booleanos "AND" e "OR" foi utilizada na combinação destes termos, com o objetivo de realizar uma busca sensível e não restritiva.

Com base nos critérios PICO / PECO, estudos observacionais (cohort) que incluíram crianças ou adolescentes (P) com exposição prévia a algum TD (E) comparados àqueles sem exposição prévia ao TD (C) para determinar a associação entre TD prévio e novos episódios de TD (recidiva ou primeiros episódios) (O) foram incluídos. Após a busca nos bancos de dados e a remoção das duplicatas, dois pesquisadores (M.B.M. e A.B.N.) independentes procederam com a exclusão segundo critérios estabelecidos previamente. Após a seleção dos estudos incluídos, os mesmos pesquisadores realizaram a extração de dados de informações referentes a características dos estudos, da população, dos grupos caso e controle e dos resultados

Os artigos obtidos na seleção final foram avaliados criticamente quanto ao grau de validação metodológica interna de acordo com diretrizes preconizadas por Fowkes and Fulton (Fowkes e Fulton, 1991). Questões referentes ao design do estudo, representatividade da amostra, comparabilidade entre os grupos, qualidade do critério de avaliação do desfecho, completude e possíveis distorções foram analisadas em cada estudo incluído. Os critérios foram avaliados e classificados em 'sem problemas' (0), 'problema menor' (+) ou 'problema maior' (++). Esse critério (Fowkes e Fulton, 1991) apresenta ainda três questões sumárias que avaliam a chance dos resultados estarem enviesados em alguma direção, de apresentarem distorções ou fatores de confundimento, ou terem ocorrido pelo acaso. Essas questões podem receber respostas 'YES' ou 'NOT'.

A meta-análise foi realizada utilizando o software Review Manager 5.3, para avaliar a relação entre o TD anterior e os novos episódios de TD subgrupando de acordo com a dentição que sofreu TD (decídua ou permanente).

Apenas os estudos que receberam resposta 'NO' para as questões sumárias do critério Fowkes and Fulton (Fowkes e Fulton, 1991) foram considerados com solidez metodológica e foram incluídos na metanálise. A incidência de indivíduos que sofreram traumatismo dentário, com e sem TD prévio, foi extraída para calcular a razão de risco (RR) de cada estudo e geral. A heterogeneidade foi avaliada, usando o índice I^2 e a qualidade dessa evidência foi avaliada seguindo as recomendações do Grading of Recommendations Assessment, Development and Evaluation (GRADE) onde os estudos são avaliados quanto a influência do risco de viés, inconsistência dos resultados, validade externa, imprecisão, influência de fatores de confundimento e tamanho do efeito. Esses critérios podem ser classificados como com problemas 'não sérios', 'sérios' ou 'muito sérios'. Desta forma, a qualidade da evidência pode variar de muito baixa a alta.

3.6 Quinto estudo – Revisão sistemática sobre álcool e drogas e TD

Com o objetivo de avaliar se indivíduos que consomem bebidas alcoólicas e usam drogas ilícitas apresentam maior chance de sofrer TD, esta revisão sistemática seguiu as normas do PRISMA *Statement* (Moher *et al.*, 2009) e o guideline para meta-análise de estudos observacionais (MOOSE) (Stroup *et al.*, 2000) e foi registrada no banco de dados PROSPERO sob o número CRD42018096074.

A pesquisa bibliográfica sistemática foi realizada nas bases de dados PubMed, Scopus, LILACS, Web of Science, Cochrane Library e literatura cinzenta e atualizada em novembro de 2018 sem restrições para o ano de publicação e idioma. 'MeSH' e termos livres relacionados ao assunto avaliado (álcool, drogas e TD) foi selecionado e uma estratégia de busca utilizando os operadores booleanos "AND" e "OR" foi utilizada na combinação destes termos, com o objetivo de realizar uma busca sensível e não restritiva.

Com base nos critérios PICO / PECO, estudos observacionais (transversais, caso-controle ou cohort) que incluíram C/A ou adultos (P) que faziam ou fizeram uso de bebidas alcoólicas ou drogas ilícitas (E) comparados àqueles que não fizeram / faziam uso (C) para determinar a associação entre esses fatores e o TD (O) foram incluídos. Após a busca nos bancos de dados e

a remoção das duplicatas, dois pesquisadores (M.B.M. e K.L.F.L.) independentes procederam com a exclusão segundo critérios estabelecidos previamente. Após a seleção dos estudos incluídos, os mesmos pesquisadores realizaram a extração de dados de informações referentes a características dos estudos, da população, dos grupos caso e controle e dos resultados

Os artigos obtidos na seleção final foram avaliados criticamente quanto ao grau de validação metodológica interna seguindo as mesmas diretrizes do estudo 2.

Além disso, três meta-análises foram realizadas utilizando o software Review Manager 5.3, para avaliar a relação entre o uso de álcool ou drogas ilícitas e TD. A primeira análise que avaliou a relação do consumo de álcool e o TD teve seus resultados subgrupados de acordo com a quantidade de ingestão de álcool (sim X não) e consumo excessivo de álcool (definido como o consumo de cinco ou mais bebidas em uma única ocasião) (Lima *et al.*, 2005). Na segunda meta-análise avaliou-se a associação entre risco para problemas relacionados ao álcool (através de um questionário próprio – AUDIT) e TD, e na terceira meta-análise avaliou-se a associação entre o consumo de drogas ilícitas e a chance de sofrer TD. O número de casos de TD nos grupos caso e controle, de acordo com cada análise, foram inseridos e o *odds ratio* (OR) foi calculado. A heterogeneidade foi avaliada, usando o índice I^2 e a qualidade dessa evidência foi avaliada seguindo as recomendações do Grading of Recommendations Assessment, Development and Evaluation (GRADE) onde os estudos são avaliados quanto a influência do risco de viés, inconsistência dos resultados, validade externa, imprecisão, risco de viés, influência de fatores de confundimento e tamanho do efeito. Esses critérios podem ser classificados em problemas ‘não sérios’, ‘sérios’ ou ‘muito sérios’. Desta forma, a qualidade da evidência pode variar de muito baixa a alta.

3.7 Sexto estudo – Overreview sobre fatores de risco ao TD

Com o objetivo de verificar a evidência científica disponível sobre os fatores de risco associados, ou não, aos TDs, esta revisão sistemática de revisões sistemáticas seguiu as normas do PRISMA *Statment* (Moher *et al.*,

2009) e foi registrada na base de dados Open Science Framework sob o DOI identificador 10.17605/OSF.IO/MZ398.

A pesquisa bibliográfica sistemática foi realizada nas bases de dados PubMed, Scopus, LILACS, Web of Science, Cochrane Library e literatura cinzenta e atualizada em maio de 2019 sem restrições para o ano de publicação e idioma. 'MeSH' e termos livres relacionados ao assunto avaliado (TD e revisões sistemáticas) foram selecionados e uma estratégia de busca utilizando os operadores booleanos "AND" e "OR" foi utilizada na combinação destes termos com o objetivo de realizar uma busca sensível e não restritiva.

Com base nos critérios PICO / PECO, revisões sistemáticas que incluíram C/A ou adultos (P) expostos a algum fator de risco (E) comparados àqueles não expostos (C) para determinar a associação entre esse fator e o TD (O) foram incluídos. Após a busca nos bancos de dados e a remoção das duplicatas, três pesquisadores (M.B.M., P.N. e K.L.F.L.) independentes procederam com a exclusão segundo critérios estabelecidos previamente. Após a seleção dos estudos incluídos, os mesmos pesquisadores realizaram a extração de dados de informações referentes a características dos estudos, das buscas, da exposição, avaliação do risco de viés e certeza da evidência e dos resultados.

Os artigos obtidos na seleção final foram avaliados criticamente quanto ao grau de validação metodológica interna de acordo com diretrizes preconizadas por AMSTAR (A Measurement Tool to Assess systematic Reviews). (Shea *et al.*, 2009; Shea *et al.*, 2017) Esta ferramenta é composta por 16 itens que englobam perguntas sobre todas as etapas de uma revisão sistemática. As questões podem ser respondidas com 'yes', 'partial yes' ou 'no'. De acordo com as respostas, a qualidade da revisão sistemática pode ser classificada em 'critically low', 'low', 'moderate' ou 'high'.

Quando uma exposição foi abordada por mais de uma revisão sistemática com discordância nos resultados, o algoritmo de decisão de Jadad (Jadad *et al.*, 1997) foi aplicado para escolher a revisão sistemática que fornece o melhor corpo de evidência de acordo com os estudos atualmente disponíveis considerando os seguintes aspectos: diferenças na questão do estudo, estudos

selecionados, avaliação de qualidade e critérios de seleção de estudos primários, extração de dados, combinações de dados, análise estatística, estratégia de busca e seleção de estudos.

4 DESENVOLVIMENTO DA PESQUISA

Artigo 1: Influence of cavosurface vestibular bevel application on the clinical success of restored traumatized permanent teeth: six-months results of a single-blind randomized controlled clinical trial.

Status: A ser submetido

Revista: Journal of Dentistry

Artigo 2: Impact of crown fracture treatment on oral health-related quality of life of children, adolescents, and their families: A prospective clinical study

Status: Publicado

Revista: International Journal of Paediatric Dentistry

Artigo 3: Does dental trauma influence the social judgment and motivation to seek dental treatment by children and adolescents? Development, validation, and application of an instrument for the evaluation of traumatic dental injuries and their consequences.

Status: Publicado

Revista: International Journal of Paediatric Dentistry

Artigo 4: The relationship of previous dental trauma with new cases of dental trauma. A systematic review and meta-analysis

Status: Publicado

Revista: Dental Traumatology

Artigo 5: Are traumatic dental injuries greater in alcohol or illicit drugs consumers? A systematic review and meta-analysis

Status: Publicado

Revista: Drug and Alcohol Dependence

Artigo 6. What are the associated and risk factors for dental trauma? A systematic review of systematic reviews.

Status: A ser submetido

Revista: Community Dentistry and Oral Epidemiology

4.1 Artigo 1: Influence of cavosurface vestibular bevel application on the clinical success of restored traumatized permanent teeth: six-months results of a single-blind randomized controlled clinical trial

Running Title: Vestibular bevel and clinical performance of traumatized permanent teeth.

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Keywords: Traumatismos dentários, Restauração dentária permanente.

Abstract

Objectives: We sought to evaluate the influence of cavosurface vestibular bevel (CSVV) application on the clinical success of class IV restorations of traumatised permanent teeth. In addition, we observed the influence of the number of fracture angles and dental trauma (DT) recurrence on the restorations retention rate (RRR) and incidence of pulp necrosis in those teeth.

Methods: Fifty-seven children and adolescents with enamel and dentin fractures requiring class IV restorations were randomly allocated into a test (with CSVV) group and control (without CSVV) group. The primary outcomes were the clinical success of restorations, evaluated using modified United States Public Health Service (USPHS) criteria, and the incidence of pulp necrosis after 6-months follow-up. As secondary outcomes, the influence of the number of fractured angles and the recurrence of DT on the RRR and on the incidence of pulp necrosis were evaluated. The level of significance was set at 5%.

Results: Of 57 children and adolescents, 74 teeth were restored and 71 completed the six-month follow-up analysis. Teeth restored with and without CSVV displayed similar clinical success as well as the same incidence of pulp necrosis ($p > 0.05$). The number of fractured angles did not influence the RRR and DT recurrence was not associated with pulp necrosis ($p > 0.05$). DT recurrence was associated with a lower RRR ($p > 0.001$).

Conclusions: CSVV did not influence the clinical success of class IV restorations or incidence of pulp necrosis after 6-months follow-up. Separately, DT recurrence did not influence the incidence of pulp necrosis but did negatively influence the RRR. Number of fracture angles did not influenced in RRR.

Clinical significance: CSVV did not improve the retention or clinical success of class IV restorations, and did not influence in pulp necrosis incidence, in traumatised permanent teeth.

Keywords: Dental Restoration, Permanent; Composite Resin; Tooth Fracture; Dental Restoration Failure.

1. Introduction

Dental trauma (DT) is a common health problem in the child and adolescent population, with the upper incisors being the most frequently involved teeth and enamel and dentin fractures being the most prevalent DT events to occur in these age groups [1]. In cases where fragment bonding cannot be performed, restoration using composite resin is considered the MOST conservative treatment for teeth with enamel and dentin fractures, requiring minimal dental preparation [2].

The preparation of a vestibular cavosuperficial angle (bevel) has been recommended to increase the retention of the restoration [3] and to allow a more gradual transition between the restoration and the tooth. However, the influence of this technique on the clinical performance of previous restorations is controversial and debatable [4–6]. Heintze et al. [7] evaluated the clinical performance and clinical success of previous restorations through a systematic review: upon isolating the eight studies that evaluated class IV restorations, it was noticed that the majority of studies were carried out between 1977 and 1997, using many materials that are no longer available on the market and techniques that are not widely in use currently. Besides, none of the included studies evaluated the direct influence of the bevel on restoration clinical performance [7].

Knowing that the preparation of the vestibular bevel is a routine occurrence in many public and private dental clinics and taking into account the absence of clinical studies that evaluate this variable, the importance of investigations regarding the impact of cavosurface bevel execution on the clinical performance of class IV restorations is justified. In this regard, the present randomized clinical trial (RCT) sought to evaluate the clinical success of anterior class IV restorations, and incidence of pulp necrosis, in teeth that had suffered enamel and dentin fractures. As secondary outcomes, the authors evaluated the influence of the number of fracture angles and DT recurrence on retention rate and the incidence of pulp necrosis. The null hypothesis of this study was that the clinical success and incidence of necrosis of class IV restorations with vestibular bevel application would not be different from those of restorations without vestibular bevel application.

2. Materials and Methods

2.1. Ethical aspects

The present study followed the Consolidated Standards of Reporting Trials (CONSORT) [8] guidelines and was revised and approved by the Research Ethics Committee of Clementino Fraga Filho (Universidade Federal do Rio de Janeiro) under the number 1,836,586. At the beginning of the study, all parents and patients were asked to sign a consent form and a patient information sheet, respectively, in full compliance with the Declaration of Helsinki.

The present RCT was registered in the Registro Brasileiro de Ensaios Clínicos database with the identifier [RBR-2pqvv4](#) and number U1111-1194-7188.

2.2. Study design

This study was conducted as a prospective, single-blinded clinical RCT. Restorations were performed in 57 children and adolescents (total of 74 teeth) as part of the treatment and monitoring of DT. The parallel model was used and the teeth were randomized and allocated to one of two groups (with and without vestibular bevel application, respectively) (Figure 1).

2.3. Sample size and patient/ tooth selection

BioEstat software (Civil Society of Mamirauá, Tefe, AM, Brazil) was used to calculate the sample size using data from a similar study [9]. Considering a statistical power of 80%, an error of 5%, and predicting a sample loss of 20% at the end of the study, the calculated sample size was 154 teeth in total (77 in each group).

Patients with enamel and dentin fractures without pulp exposure[10] who sought treatment at the Dental Trauma Vigilance and Monitoring Center at the Dental School of the Universidade Federal do Rio de Janeiro between November 2016 and December 2018. Patients who met the following inclusion criteria were included: age between seven and 15 years old, having at least one permanent upper anterior tooth (e.g., central incisor, lateral incisor, canine) requiring class IV restoration due to uncomplicated coronary fracture [10], displaying the physical and emotional qualifications to tolerate restorative procedure, having pulp vitality and accept returning to perform periodic evaluations after restoration procedure.

Patients who suffered other types of trauma to the fractured tooth and/or those with pulpal inflammation or necrosis, previous endodontic treatment, uncontrolled periodontal disease, or parafunctional habits as well as individuals with special needs and/or motor deficits were excluded from this study.

2.4. *Randomization*

The included teeth were randomized through the order of procedure/technique to avoid any delay in patient care. The type of procedure (i.e., with and without vestibular bevel application) was randomized and predistributed between the two groups, with the aid of the BioEstat 5.0 computer program (Civil Society of Mamirauá, Tefé, AM, Brazil). This process was performed by an individual blinded to the restoration process and allocation concealment was assured.

A random numbers table was constructed twice: for the first incarnation, a randomization was performed for the first 50 teeth and, when complete, a new randomization was performed for another 50 teeth.

In general, confidentiality was ensured by distributing 100 sequentially numbered white envelopes containing mentions of one of the two groups, following the order of the randomly drawn numbers, totalling 50 envelopes for the control group (without vestibular bevel) and 50 envelopes for the test group (with vestibular bevel). The envelopes were sealed and opaque and the papers with the designated group inside the envelopes were folded to prevent them from being successfully held to a bright light to reveal the contents. The envelopes were opened sequentially and only after the envelope had been irreversibly assigned to a participant.

2.5. *Restorative procedure*

A single operator (M. B. M.) performed all restorative procedures. First, the composite resin (Nanofiller Filtek™ z350; 3M ESPE AG, Seefeld, Germany) shade was selected. Following the administration of local anaesthesia, a rubber dam was placed. If the tooth was allocated to the test group, prior to restoration, a bevel in the vestibular tooth surface with a diamond burr (number #1111) at high speed under water-cooling was applied. If the tooth was allocated to the control group, no such preparation was performed. After this step (bevel

application or not), the subsequent restorative procedure performed was the same for both groups as follows.

The fractured tooth was cleaned with flour of pumice and water in a rubber cup attached to a low-speed headpiece. The tooth was then acid-etched with 35% Scotchbond™ Etchant (3M ESPE AG, Seefeld, Germany) for 15 seconds, then thoroughly rinsed for an additional 15 seconds and air-dried prior to the application of the Scotchbond™ multipurpose adhesive system (3M ESPE AG, Seefeld, Germany) in accordance with the manufacturer's recommendations. Contour strips (Contour-Strip; Ivoclar Vivadent, Schaan, Liechtenstein) were placed with the help of wedges located interproximally to achieve a smooth restoration outline in the cervical area. The nanofiller Filtek™ z350 resin composite (3M ESPE AG, Seefeld, Germany) was placed incrementally in 2-mm layers, and each layer was cured for 40 seconds using a light-curing unit. Following removal of the contour strip, the proximal regions of the restorations were additionally polymerized for 20 seconds. Final contouring, finishing, and occlusal adjustments were performed with fine diamond-coated burs under water-cooling. Occlusion during habitual intercuspitation and excursive movements were checked. One week after restoration, polishing was completed with a four-step polishing disk system (Sof-lex™ Pop-on; 3M ESPE AG, Seefeld, Germany) to obtain smooth surfaces. Finally, all patients received orientations to prevent new TDI as well as failure of the restorative material and to assure the longevity of the restoration and entered the restoration follow-up period.

2.6. Evaluation procedures

The restorations were clinically evaluated by two trained and calibrated examiners using a dental explorer and mirror in accordance with modified United States Public Health Service (USPHS) criteria (Table 1) [11]. In this classification criteria, all scores Charlie were considered failures (requiring repair or replacement) and were considered unacceptable. The kappa interexaminer value was 0.95.

Visual inspection, radiographic examination, and cold vitality test were performed to evaluate the presence of clinical and radiographic signs of pulp necrosis [12] as well as the necessity of endodontic treatment one week

(baseline) and 6-months after restorative procedure. Where warranted, an evaluation was done to identify the need for endodontic treatment, and those patients who needed this specific treatment were referred to an endodontist. When restorations failed before the 6-months clinical evaluation, the date and reasons for failure were recorded in the affected patient's file.

2.7. Blinding

Only the principal investigator performed the clinical research steps. Two evaluators (M.B.M. and L.C.M.), the principal investigator and another evaluator, completed the assessment of USPHS parameters, without knowing which treatment was applied, thus ensuring a single-blind study.

2.8. Statistical analysis

All data were analysed using the SPSS version 20.0 software program (IBM Corp., Armonk, NY, USA). The data for each USPHS criterion were dichotomized according to success or failure as well as the presence or not of vestibular bevel ('yes' or 'no'), DT recurrence ('yes' or 'no'), pulp necrosis ('yes' or 'no'), and number of angles fractured ('one' or 'two' angles). The chi-squared test and t-test for independent variables were used to verify the distribution of characteristics variables of the sample among the groups and differences between the groups. In order to correct the internal correlation of more than one tooth per child, the bootstrap method was applied to construct the bias-corrected accelerated confidence interval with 10.000 resampling. Risk ratio was calculated to evaluate the influence of the vestibular bevel in the retention rate. The level of significance considered for all tests was 5%.

3. Results

Of the 74 teeth restored (57 children and adolescents), 71 completed the six-month follow-up analysis. The mean age of the children and adolescents included in this study was 9.9 ± 2.4 years, and 53 were male (71.6%) and 21 were female (28.4%). Ultimately, the trial had three drop-outs: two patients (two teeth) did not answer telephone calls and another (one tooth) was excluded due absence. Concerning all teeth, the demographic characteristics in each group are

described in Table 2. The number of teeth allocated to the test and control groups, drop-outs, adhesive failures, and necrosis, considering the number of teeth evaluated in the follow-up period, are described in Figure 1.

Clinically, all restored teeth were classified as 'success' for the 'retention' parameter (and could had other parameters evaluated) received scores of A or B at baseline and at six months follow-up for 'colour match', 'cavosurface marginal discoloration', 'anatomic form', 'marginal adaptation', 'surface texture', and 'secondary caries'. Three restorations (4.22%) presented with adhesive failure (one from the group with vestibular bevel and two from the group without bevel; $p = 0.811$) and one tooth (1.4%) was diagnosed with necrosis (from the group without bevel; $p = 0.582$). The number of angles fractured/restored did not influence the incidence of adhesive failure ($p > 0.05$). Adhesive failures and pulp necrosis diagnoses are described and statistically analysed in Table 3.

Of the total number of adhesive failure restorations ($n = 3$), 100% occurred due to DT recurrence ($p = 0.000$). All recurrence DT resulted in adhesive failure. There was no association between pulp necrosis and the recurrence of DT ($p = 0.915$).

4. Discussion

The concepts and techniques of dental preparation must evolve with the advance of composite and adhesive restorative systems, with attention paid to the current popular concept of minimally invasive operation [13]. This approach is especially relevant in young patients since it is perhaps more likely that restoration replacement will occur during their lives due to the anticipated greater length of such [6]. The initial composite restoration should be as conservative as possible to minimize the costs and complexity of any replacement restoration. However, besides preserving the dental remnant, it is necessary that these restorations present a good clinical performance without the occurrence of pulp lesions.

To our knowledge, the present study is the first RCT to directly evaluate the influence of vestibular bevel in class IV restorations. Ultimately, our null hypothesis was confirmed and preliminary results showed that applying a

vestibular bevel in class IV teeth did not influence the clinical performance of the restorations or impact the pulp vitality of the teeth. Not perform vestibular bevel could save time and money for clinicians.

The present RCT performed sample calculation but the number of teeth necessary in each group was not reached and these aspects could be considered as study limitation. However, it similarly needs to be considered that all patients with enamel and dentin crown fractures without pulp exposition that sought treatment at a DT reference centre during two years were included in the present study. Additional, brootstrap method was applied during statistical analysis [14, 15], and recall visits are planned to verify the clinical performance of these restoration procedures over time.

Two milometers adhesive bevel extension was adopted due previous in vitro studies report a lower [16, 17], and the bevel was performed only in buccal surface to preserve most dental structure.

Although the total number of adhesive failures in the present RCT was low (4.2%), it is in accordance with the finding of Demarco et al. [18], who reported that fracture of tooth/restoration was the most common reason for failure. Elsewhere, Spinás [2] suggested that all composite restorations in traumatically damaged teeth need to be replaced after three to five years of restorative procedure, representing a reason for why these restorations should be followed up with during at least this period. However, different from the present RCT, Spinás [2] included teeth both with and without pulp exposure, and the differences in inclusion criteria and follow-up period could explain this divergence.

Although in vitro studies have reported that enamel bevel application increased the fracture resistance of direct composite resins [3, 19], in the present RCT, the vestibular bevel did not influence the retention rate of restorations of uncomplicated enamel/dentine class IV fractures. It must be taken into account that, in the oral environment, tooth restorations are constantly subject to physical (e.g., abrasion, chewing, functional habits) and chemical (e.g., biofilm, humid environment, erosive and dietary products) challenges in a combined and routine manner, so the results of in vitro studies were not confirmed in the present RCT. Furthermore, all restoration failures were due to DT recurrence, meaning that the forces exerted on a tooth during DT should be considered as a sufficient factor to

break not only the tooth during an original episode of DT but also the class IV adhesive restoration in cases of DT recurrence.

In the present study, the rate of bond degradation, characterized by a further increase in the presence of small but clinically acceptable marginal defects and superficial marginal discoloration [11], was similar in both groups. Previous studies have reported that these failure parameters take longer to appear in adhesive restorations completed with etch-and-rinse adhesives [20, 21]. In the present RCT, a three-step etch-and-rinse adhesive system was used in all restorations. Perhaps use of a different adhesive system could influence marginal adaptation and marginal discolorations to a different degree than a vestibular bevel, and the choice and the use of Scotchbond™ multipurpose could influenced in none failure due marginal adaptation and discoloration failures. At this time, the literature lacks studies that elucidate these questions.

Colour match and surface texture are parameters that potentially depend more on the brand of the composite resin and polishing system used [22] than on the presence or not of a vestibular bevel, while the anatomical form is maybe dependent more on the manual skills of the operator. The similarities observed between groups could be explained because the composite resin, polishing system, and operator were the same for all restorations performed.

The incidence of caries adjacent to the restorations was null for both groups. This result agrees with a previous study that reported a low frequency (2.5%) of caries after 10 years in class III and IV restorations [7]. This study also reported that this outcome was not related with the type of composite resin, enamel and dentin conditioning, or bevelling of the cavity, but was associated with the absence of a rubber dam during the restoration procedure [7]. Since all of the restorations in the present study involved a rubber dam, this potential complicating factor was eliminated.

Only one tooth was diagnosed with pulp necrosis (1.4%) in the present research. Previous studies have reported the incidence of pulp necrosis in anterior restoration teeth ranges from 4.88% [23] to 22.7% [24]. It must be taken into account that, different from these other studies [23, 24], in the present RCT,

the participants were followed only for six months, and the incidence of pulp necrosis could easily increase over time.

The number of angles involved in restorations did not influence the retention rate of the restorations in the present RCT. Previous studies have found that any decrease in adhesive toughness appears to be independent of dentin tubule orientation [25, 26]. Changes in the fracture toughness may be related to dehydration [27], an increase in the degree of crosslinking of the collagen fibrils [28], or a rise in the degree of tubule mineralization with age [29]. More studies evaluating this subject are necessary to provide better clarification since other factors related to the area exposed for treatment and the force dissipation could also have an influence.

Although all patients received orientations to avoid DT recurrence, the incidence of restoration fracture due to new episodes of DT was high (100% of those that experienced retention failure) in the present RCT. This could be explained by the fact that individuals with a previous history of DT present a greater risk for DT recurrence [30], increasing the rate of restoration failure in the present study. Considering this, patients should be evaluated individually and not only considering DT itself, and the risk factors associated with this occurrence (i.e., anatomical, physical, behavioural, environmental, and health-related factors that can predispose children to DT) should be identified and treated and/or discussed about so as to avoid future DT. The authors want to highlight that, during the present RCT, the patients did not receive any orthodontic treatment; however, at the end of the six-month follow-up period, all patients were referred for orthodontic treatment, if necessary, since some of them presented increased overjet and inadequate lip covered.

5. Conclusion

Application of a cavosurface vestibular bevel did not significantly influence the clinical success of class IV restorations and incidence of pulp necrosis at six months after restorations. DT recurrence did not influence the incidence of pulp necrosis but negatively influenced the retention rate.

Acknowledgments

This study was conducted during the doctoral stage of Marcela Baraúna Magno, under supervision of the Prof. Lucianne Cople Maia and Matheus Melo Pithon. It was partially supported by Foundation for Research Support of the State of Rio de Janeiro under numbers E-26/202.191/2018 and E-26/010.100992/2018.

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Table 1. United States Public Health Service (USPHS) Ryge Criteria for Direct Clinical Evaluation of Restoration.[11]

Scores	USPHS criteria
Retention	
Alpha (A)	Restoration is intact and fully retained.
Bravo (B)	Restoration is partially retained with some portion of the restoration still intact.
Charlie (C)	Restoration is completely missing.
Color Match	
Alpha (A)	The restoration appears to match the shade and translucency of adjacent tooth tissues.
Bravo (B)	The restoration does not match the shade and translucency of adjacent tooth tissues, but the mismatch is within the normal range of tooth shades.
Charlie (C)	The restoration does not match the shade and translucency of the adjacent tooth structure, and the mismatch is outside the normal range of tooth shades and translucency.
Cavo surface Marginal Discoloration	
Alpha (A)	There is no visual evidence of marginal discoloration different from the color of the restorative material and from the color of the adjacent tooth structure.
Bravo (B)	There is visual evidence of marginal discoloration at the junction of the tooth structure and the restoration, but the discoloration has not penetrated along the restoration in a pulpal direction.
Charlie (C)	There is visual evidence of marginal discoloration at the junction of the tooth structure and the restoration that has penetrated along the restoration in a pulpal direction.
Anatomic Form	
Alpha (A)	The restoration is a continuation of existing anatomic form or is slightly flattened. It may be overcontoured. When the side of the explorer is placed tangentially across the restoration, it does not touch two opposing cavosurface line angles at the same time.
Bravo (B)	A surface concavity is evident. When the side of the explorer is placed tangentially across the restoration, it does not touch two opposing cavosurface line angles at the same time, but the dentin or base is not exposed.
Charlie (C)	There is a loss of restorative substance such that a surface concavity is evident and the base and/or dentin is exposed.
Marginal adaptation	
Alpha (A)	The explorer does not catch when drawn across the surface of the restoration toward the tooth, or, if the explorer does not catch, there is no visible crevice along the periphery of the restoration.
Bravo (B)	The explorer catches and there is visible evidence of a crevice, which the explorer penetrates, indicating that the edge of the restoration does not adapt closely to the tooth structure. The dentin and/or the base is not exposed, and the restoration is not mobile.
Charlie (C)	The explorer penetrates crevice defect extended to the dento-enamel junction.
Surface texture	
Alpha (A)	Surface texture similar to polished enamel as determined by means of a sharp explorer.
Bravo (B)	Surface texture gritty or similar to a surface subjects to a white stone or similar to a composite containing supramicron-sized particles.
Charlie (C)	Surface pitting is sufficiently coarse to inhibit the continuous movement of an explorer across the surface.
Secondary Caries	
Alpha (A)	The restoration is a continuation of existing anatomic form adjacent to the restoration.
Charlie (C)	There is visual evidence of dark keep discoloration adjacent to the restoration (but not directly associated with cavosurface margins).

Table 2. Teeth distribution between groups in baseline.

	Vestibular bevel		p value
	Yes (n=34)	No (n=40)	
Gender			
Female	13	8	0.08 ^t
Male	21	32	
Age	10.12 ± 2.6	9.7 ± 2.1	0.512 [*]
Tooth type			
Central incisor	29	36	0.528 ^t
Lateral incisor	4	4	
Canine	1	0	
Arch			
Superior	30	36	0.808 ^t
Inferior	4	4	
Number of angles restored			
One angle	28	33	0.987 ^t
Two angles	6	7	
Increased overjet			
Yes	9	10	0.723 ^t
No	25	30	
Inadequate lip covered			
No	24	34	0.133 ^t
Yes	10	6	

^tChi-squared test; ^{*} t test for independent variables

Table 3. Clinical parameters of restored teeth with vestibular bevel (test group) and without vestibular bevel (control group) at baseline and after 6 months of analysis.

Parameter	Outcome assessment	Score	Baseline		6 months		RR (CI)
			Test (n= 34)	Control (n= 40)	Test (n= 33)	Control (n= 38)	
Retention	Success	Alpha	34	40	30	36	0.57 (0.05, 6.06)
		Bravo	0	0	2	0	
	Insucess	Charlie	0	0	1 ^a	2 ^a	
Color match	Success	Alpha	32	36	30	31	NA
		Bravo	2	4	2	5	
	Insucess	Charlie	0	0	0	0	
Cavo surface marginal discoloration	Success	Alpha	34	40	31	34	NA
		Bravo	0	0	1	2	
	Insucess	Charlie	0	0	0	0	
Anatomic Form	Success	Alpha	34	40	31	33	NA
		Bravo	0	0	1	3	
	Insucess	Charlie	0	0	0	0	
Marginal Adaptation	Success	Alpha	34	40	23	33	NA
		Bravo	0	0	9	3	
	Insucess	Charlie	0	0	0	0	
Surface texture	Success	Alpha	34	40	32	36	NA
		Bravo	0	0	0	0	
	Insucess	Charlie	0	0	0	0	
Secondary Caries	Success	Alpha	34	40	33	38	NA
	Insucess	Charlie	0	0	0	0	
Pulpar condition	Success	Vitality	34	40	33	37	NA
	Insucess	Necrosis	0	0	0 ^a	1 ^a	

^a similar letters demonstrate statistical similarity (p>0.05); RR risk ratio; CI Confidence interval; NA not applied.

Figures descriptions

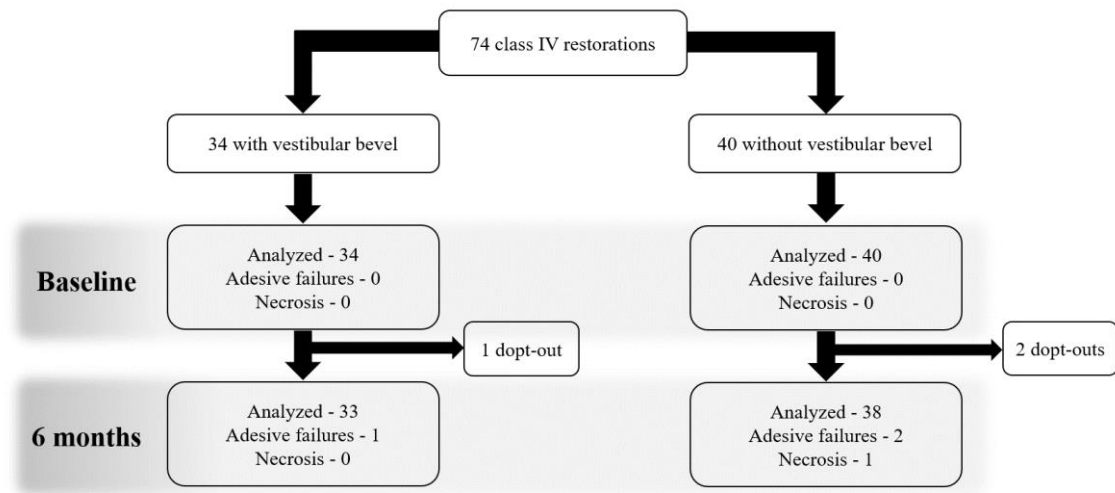


Figure 1. Flow diagram of the trial.

4.2 Artigo 2: Impact of crown fracture treatment on oral health-related quality of life of children, adolescents, and their families: A prospective clinical study

Received: 29 June 2018 | Revised: 20 September 2018 | Accepted: 25 September 2018

DOI: 10.1111/ipd.12437

ORIGINAL ARTICLE

WILEY INTERNATIONAL JOURNAL OF
PAEDIATRIC DENTISTRY

Impact of crown fracture treatment on oral health-related quality of life of children, adolescents, and their families: A prospective clinical study

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Background: Enamel-dentin fracture causes impact on the oral health-related quality of life (OHRQoL) of children.

Aim: To evaluate the impact of treatment of crown fracture involving enamel and dentin (CFED) in the permanent dentition on the OHRQoL of children and adolescents (C/As) and their families.

Design: This prospective clinical study included C/As between 8 and 14 years who presented anterior CFED treated thought direct composite resin restoration. Their parents/caregivers (P/Cs) were also invited to take part of the study. The quality of life was evaluated thought the Child Perceptions Questionnaires (CPQ₈₋₁₀ and CPQ₁₁₋₁₄), Parental-Caregiver Perceptions Questionnaire (P-CPQ), and Familiar Impact Scale (FIS), applied before and 3 months after the restorative procedure. *T* test for dependent samples and Wilcoxon test were applied ($P < 0.05$).

Results: Of 32 C/As included, 30 completed the study. The treatment of CFED reduced the negative impact in OHRQoL of C/As (CPQ₈₋₁₀ $P = 0.0065$; CPQ₁₁₋₁₄ $P = 0.0486$; P-CPQ, $P = 0.0259$), specially for “oral symptoms” (CPQ₈₋₁₀, $P = 0.0003$; P-CPQ, $P = 0.0455$) and “emotional well-being” (CPQ₁₁₋₁₄, $P = 0.0431$). Concerning the families’ perceptions, the treatment did not influence OHRQoL both in terms of the domains and total FIS score ($P > 0.05$).

Conclusion: Restorative treatment of CFED increases the OHRQoL of C/As but not influence the OHRQoL of their families.

KEYWORDS

adolescent, child, dental restoration, permanent, quality of life, tooth fracture

1 | INTRODUCTION

A previous study showed that more than one billion living people have experienced traumatic dental injuries (TDIs) in permanent or deciduous dentition, being the TDI a neglected condition and a public health concern.¹ These injuries may cause pain, functional and aesthetic impairments, and psychosocial problems, leading to negative effects on the lives of those who have them.² Previous

studies have been conducted to analyze the impact of TDI on OHRQoL and, according to these investigations, pre-school-aged children as well as children and adolescents (C/As) with untreated TDIs exhibited a higher adverse impact on OHRQoL as compared with those who never suffered a TDI.^{3,4}

Oral health-related quality of life (OHRQoL) refers to the impact that oral health or disease has on a person's physical, psychological, and social functions in a manner

that affects their well-being.⁵ Quality of life is a dynamic process and the self-perceptions of each person are influenced by their experiences, ambitions for the future, dreams, and way of life.⁶ Besides that, people alter their view of their OHRQoL over time because of physical changes or occurrences in their life.⁷ In this context, hypothetically, the treatment of TDI can positively influence OHRQoL factors, restoring the capacity to smile, eat, and carry out daily activities with no aesthetic and functional harm; however, previous research has presented conflicting results about this subject. Some studies evaluated the relation between OHRQoL and people with treated TDIs and without TDIs,^{2,8} finding that treated TDI and the absence of TDI were not associated with an impact on quality of life. Conversely, one study⁹ evaluated and showed that untreated TDI was associated with a negative impact on the OHRQoL of schoolchildren.

In addition, there are certain methodologic limitations associated with these studies, since they are all observational studies (case-control and cross-sectional),^{2,8,9} restricting the strength of evidence on which to base the results and conclusions of this question. Clearly, the impact of TDI treatment on OHRQoL needs to be explored using a high-quality research methodology with clinical longitudinal investigations.

Crown fracture involving enamel and dentin (CFED) is the second most prevalent TDI treated by dental clinics¹⁰ and it has been proven that it is associated with difficulty with eating, avoidance of smiling, pain and sensitivity, and a greater prevalence of a negative impact on OHRQoL.^{9,11} Treatment for C/As with CFED is of fundamental importance, as such ensures the integrity of the fractured tooth and contributes to the healthy development of these individuals from the physical, social, and emotional standpoints. Based on this assumption, the aim of this study was to evaluate the impact of CFED treatment on the OHRQoL of C/As through a prospective study with a clinical intervention. As a second outcome, we aimed to evaluate the impact of CFED treatment on OHRQoL in C/As' families.

2 | METHODS

2.1 | Ethical aspects

This study followed the guidelines published by the Consolidated Standards of Reporting Trials guidelines.¹² The Research Ethics Committee of Clementino Fraga Filho Hospital, Universidade Federal do Rio de Janeiro, Brazil, reviewed and approved the study (no. 1.836.586/2016). The clinical trial number was registered in the Brazilian Registry of Clinical Trials (REBEC) under the number of U1111-1194-7188.

Why this paper is important to paediatric dentists

- Research on children's and adolescent's perception about OHRQoL allow observing the patient in a general way, besides the oral cavity.
- Follow-up OHRQoL after treatment of crown fracture involving enamel and dentin provides additional information that supports that the treatment of dental trauma improves the OHRQoL of children's and adolescent's, in an appropriate study design. The treatment of dental trauma should be performed as soon as possible in order to minimize physical, aesthetic, functional, psychological and social damages.

2.2 | Sample calculation

The software BioEstat[®] (Civil Society Mamirauá, Manaus, Amazonas, Brazil) was used to calculate the sample size using data from a pilot study, which was conducted with eight volunteers and which followed the same procedures as this study. The impact of restorative treatment of CFED in C/As was adopted as the main outcome of this study and, in this way, the mean difference and the standard deviation difference (before and after treatment) of the total score obtained in the Child Perceptions Questionnaires CPQ₈₋₁₀ and CPQ₁₁₋₁₄ were used to calculate the sample size, adopting a statistical power of 90%, an alpha error of 5%, and a sample loss prediction of 20% at the end of the study. The sample calculated for this study consisted of 25 patients.

2.3 | Study design, population, and clinical procedures

This interventional prospective clinical study evaluated the OHRQoL of children and adolescents (through the questionnaires CPQ₈₋₁₀, CPQ₁₁₋₁₄, and P-CPQ) who suffered crown fractured involving enamel and dentin before and after the restorative treatment, as well as their families (through the questionnaire FIS). Pairs of patients and parents were selected from the Dental Trauma Surveillance and Monitoring Center—Department of Pediatric Dentistry of the Federal University of Rio de Janeiro (DTSMC-UFRJ), Brazil, from August 2016 to February 2018. Patients who were considered eligible for this study included those aged between 8 and 14 years who had suffered CFED without pulp exposure in one or more permanent anterior teeth (eg, central incisor, lateral incisor, canine) and who presented with adequate physical and emotional conditions for tolerating the restorative procedure

and pulp vitality. Patients with others type of TDI, such as luxations, avulsions or root fractures, caries cavitated in dentin, pulpal inflammation, crown discoloration, necrosis or uncontrolled periodontal disease in fractured tooth or any other teeth were excluded from this study.

At the time of injury, the following parameters were registered on trauma records: patient's gender and age (children's group: 8-10 years of age and adolescent's group: 11-14 years of age); family income; mother's schooling; affected tooth; number of injured teeth; type of injury; and gingival and bone damage. As protocol, for each tooth, clinical information was recorded, which included the colour of the clinical crown, mobility, tenderness to percussion, percussion tone, and thermal sensibility. In addition, intraoral photographs and periapical radiographs were taken at the initial examination. The standardized long-cone paralleling technique was used for periapical radiographic examination. The CFED diagnostic was made according to Andreasen's classification¹³ by a single examiner. The examiner who performed the diagnosis of CFED was previously trained and calibrated for TDI diagnostic and TDI sequelae through the analysis of 40 images. These images were analyzed in two moments, with interval of 21 days to provide the intra-examiner and inter-examiner reliability, with a senior in TDI (L.C.M.) (kappa scores: intra-examiner reliability = 0.84 and inter-examiner reliability = 0.88). The crown fractures were classified according to their involvement, as follows: one angle (inclined fractures) or two angles (horizontal fractures).

A single operator (M.B.M.) performed all restorative procedures. Firstly, the composite resin shade was selected. Following the administration of local anaesthesia, a rubber dam was placed and the fractured tooth was cleaned with flour of pumice and water in a rubber cup attached to a low-speed headpiece. The tooth was acid etched with 35% Scotchbond™ Etchant (3M ESPE, Seefeld, Germany), for 15 seconds, then thoroughly rinsed for an additional 15 seconds and air-dried prior to the application of the Scotchbond™ multipurpose (3M ESPE, Seefeld, Germany) adhesive system in accordance with the manufacturer's recommendations. Contour strips (Contour-Strip; Ivoclar Vivadent, Schaan, Liechtenstein) were placed with the help of wedges interproximally to achieve a smooth restoration outline in the cervical area. The nanofiller Filtek™ z350 resin composite (3M ESPE, Seefeld, Germany) was placed incrementally in 2-mm layers, and each layer was cured for 40 seconds using a light-curing unit. Following removal of the contour strip, the proximal region of the restorations was additionally polymerized for 20 seconds. Final contouring, finishing, and occlusal adjustments were performed with fine diamond-coated burrs under water-cooling. Occlusion during habitual intercuspitation and excursive movements were checked. One week after restoration, the polishing was done with a four-step polishing disc system

(Sof-lex™ Pop On; 3M ESPE, Seefeld, Germany) to obtain smooth surfaces. Finally, all patients received orientations to prevent new TDI as well as failure of the restorative material and to assure the longevity of the restoration.

2.4 | Quality of life evaluation

The OHRQoL questionnaires used in this study had four components: two questionnaires relating to C/A OHRQoL were applied directly to the C/As (CPQ₈₋₁₀ for 8-10-year-olds and CPQ₁₁₋₁₄ for 11-14-year-olds), while the other questionnaires relating to C/A OHRQoL were applied to their parents [Parental-Caregiver Perceptions Questionnaire (P-CPQ)], with a last questionnaire applied to the parents relating to familiar impact [Family Impact Scale (FIS)]. CPQ₈₋₁₀, CPQ₁₁₋₁₄, and P-CPQ assess quality of life in terms of the following four domains: oral symptoms, functional limitation, emotional well-being, and social well-being. Additionally, the FIS component assesses the familiar impact according to the three domains of parental emotions, family conflict, and parent/family activity. Patients and parents' responses were scored and tabulated to produce a frequency scale: score 0 = "never", 1 = "once or twice", 2 = "sometimes", 3 = "often", and 4 = "every day or almost every day". For P-CPQ, a "don't know" response was also allowed and tabulated as a score of 0.¹⁴ The scores for each domain and total scores were calculated by the sum of the individual answers in each questionnaire. The Brazilian validated versions of the questionnaires were applied before and at 3 months after the restorative treatment.¹⁴⁻¹⁷

For all domains and in all questionnaires, 0 represents no impact of the oral condition (in this case, CFED) on OHRQoL and, as the score increases, the negative impact of the oral condition on OHRQoL also increases.

2.5 | Statistical analysis

Descriptive statistics were used to express the results as means and standard deviations. The parametric data distribution was evaluated using the Shapiro-Wilk test. In order to evaluate differences between the scores between before and after the restorative treatment, data with parametric distributions were evaluated through a *t* test for dependent samples, and data with nonparametric distributions were analyzed using the Wilcoxon test. The level of significance was 5% ($\alpha = 0.05$). The data were tabulated and analyzed in IBM SPSS Statistics for Windows version 21.0 (IBM Corp., Armonk, NY, USA).

3 | RESULTS

From a total of 252 children recruitment period, 32 were initially included in and 30 completed this study. The two

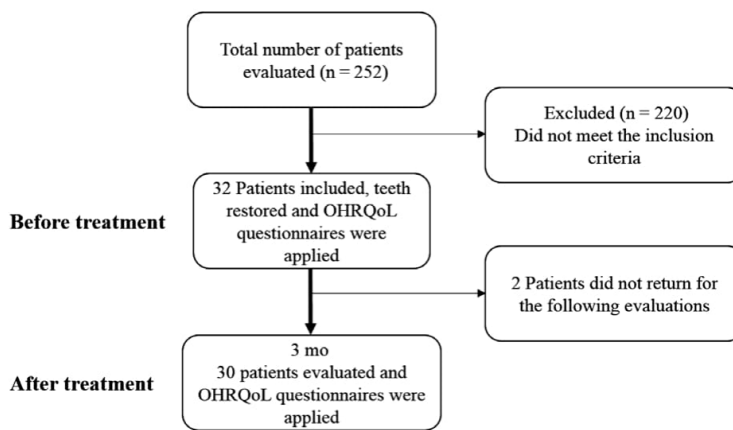


FIGURE 1 Flow diagram with schematic study design and number of participants

TABLE 1 Demographic characteristics of the sample

	Sample (n = 30)
Gender N (%)	
Boys	23 (76.7)
Girls	7 (23.3)
Age range N (%)	
8 -10 y	19 (63.3)
11-14 y	11 (36.7)
Mean age (DP)	9.97 (1.9)
Mean of fractured teeth (DP)	1.73 (0.99)
Type of tooth N (%)	
Central incisor	36 (70.6)
Lateral incisor	15 (29.4)
Time between TDI and treatment	
Between 4 d and 1 wk	8 (26.7)
Between 1 wk and 1 mo	2 (6.7)
Between 1 and 6 mo	10 (33.3)
Between 6 and 12 mo	3 (10)
More than 12 mo	7 (23.3)

children and their parents who did not finish the study were excluded because they did not return for the final evaluation (Figure 1).

The demographic characteristics of the sample are presented in Table 1.

After analyzing the domains separately, it can be observed that significant reductions of scores in “oral symptoms” for CPQ₈₋₁₀ ($P = 0.0003$) and for P-CPQ ($P = 0.0455$) questionnaires exist, as well as for “emotional well-being” for the CPQ₁₁₋₁₄ questionnaire ($P = 0.0431$). The other domains did not show significant score changes ($P > 0.05$). In an overall analysis, adopting the total questionnaires’ scores, a significant

TABLE 2 Mean \pm standard deviation of Child Perceptions Questionnaire (CPQ₈₋₁₀, CPQ₁₁₋₁₄) and Parental-Caregiver Perceptions Questionnaire (P-CPQ) scores before and after crown fracture treatment

Domains	Before treatment	After treatment	<i>P</i> -value
Oral Symptoms			
CPQ ₈₋₁₀	5.3 (3.4)	2.7 (2.9)	0.0003^b
CPQ ₁₁₋₁₄	3.2 (2.6)	2.4 (1.8)	0.37 ^a
P-CPQ	4.5 (3.2)	3.6 (2.9)	0.0455^b
Functional limitations			
CPQ ₈₋₁₀	2.6 (3.5)	1.7 (2.0)	0.4498 ^b
CPQ ₁₁₋₁₄	2.0 (1.6)	1.2 (1.6)	0.2049 ^b
P-CPQ	5.4 (4.4)	3.9 (3.5)	0.1213 ^b
Emotional well-being			
CPQ ₈₋₁₀	1.1 (2.8)	0.3 (0.7)	0.4990 ^b
CPQ ₁₁₋₁₄	1.1 (1.6)	0.0 (0.0)	0.0431^b
P-CPQ	5.4 (6.5)	3.5 (6.6)	0.0534 ^b
Social well-being			
CPQ ₈₋₁₀	2.8 (3.5)	1.5 (1.1)	0.0843 ^b
CPQ ₁₁₋₁₄	2.5 (3.5)	1.3 (1.7)	0.1083 ^b
P-CPQ	5.4 (4.9)	4.7 (6.5)	0.1482 ^b
Total score			
CPQ ₈₋₁₀	10.8 (10.0)	6.5 (4.5)	0.0065^b
CPQ ₁₁₋₁₄	8.8 (5.4)	5.4 (2.7)	0.0486^a
P-CPQ	20.7 (14.1)	15.7 (16.6)	0.0259^b

Bold values represent statistical significant P values ($P < 0.05$).

^a T test for dependent samples.

^bWilcoxon test.

score reduction and a decrease of negative impact in C/A OHRQoL as reported by children (CPQ₈₋₁₀, $P = 0.0065$), adolescents (CPQ₁₁₋₁₄, $P = 0.0486$), and their parents (P-CPQ, $P = 0.0259$) were revealed (Table 2).

TABLE 3 Mean \pm standard deviation of Familiar Impact Scale (FIS) scores before and after crown fracture treatment

Domains	Before treatment	After treatment	P-value ^a
Parental emotions	5.1 (4.6)	5.7 (5.3)	0.8456
Family conflict	1.7 (2.2)	1.3 (2.3)	0.2805
Parent/family activity	1.2 (1.8)	1.0 (1.8)	0.1823
Total score			
FIS	7.9 (7.4)	8.0 (7.9)	0.5850

^aWilcoxon test.

Concerning familiar impact, the restorative treatment of CFED did not influence the domains nor the total scale (FIS) ($P > 0.05$) (Table 3).

The tendency (changes of values) of the scores before and after the restorative treatment for each questionnaire is represented in Figure 2.

4 | DISCUSSION

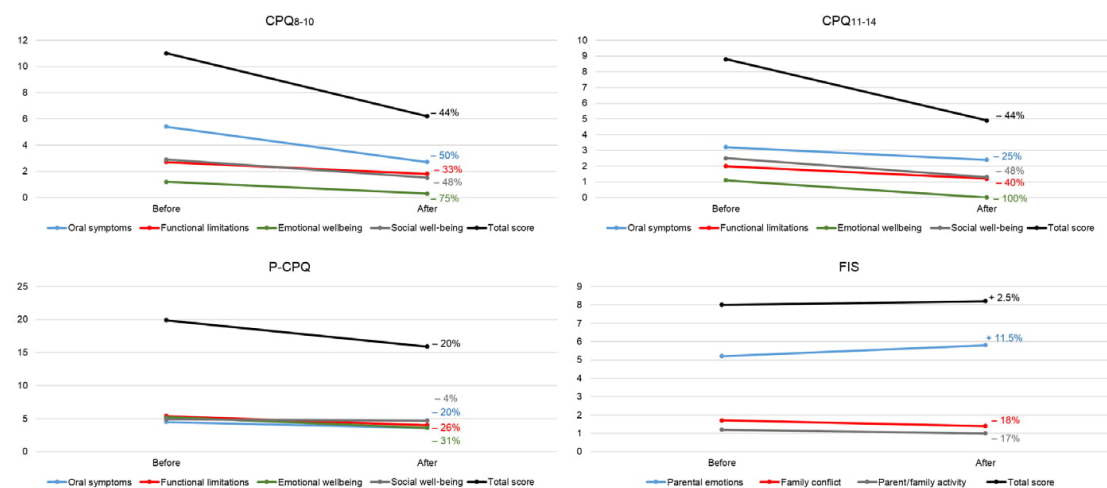
In view of the importance of facial and smile appearance in C/A social relations, treatment for anterior teeth injuries may yield important psychosocial benefits to these individuals and their families. The results of the present clinical prospective study showed that, in general, children (aged 8-10 years) and adolescents (aged 10-14 years) presented with a reduction in the negative impact of OHRQoL following restorative treatment of CFED; however, the completion of same treatment did not affect the OHRQoL of their families.

The use of language-validated questionnaires with psychometric properties similar to the original instruments is fundamental to ensure the reliability of results. The CPQ₈₋₁₀, CPQ₁₁₋₁₄, P-CPQ, and FIS questionnaires were shown to be valid and reliable for administration in the Brazilian population.¹⁴⁻¹⁷ The use of these solid instruments for measuring the impact of OHRQoL was essential because it allowed for us to conclude that the restorative treatment of CFED has a real benefit on people's lives.

The option of response "don't know" in P-CPQ questionnaire was permitted in original instrument, based on justification that the exclusion of "don't know" responses would result in loss of important data. So, the original questionnaire guides the researchers to attribute 0 score to "don't know" responses,¹⁴ as performed in this clinical study. In addition, the original questionnaire showed that this action did not affect the questionnaire performance and ensure a good discriminant and construct validity.¹⁸

As a limitation, this study suffers from an inherent problem of all questionnaire-based studies: the variable honesty and accuracy of the participants.¹⁹ In an attempt to reduce bias, the participants received a complete explanation about the questionnaire scores and the questionnaire was self-applied, as suggested by Palomares et al.²⁰ The responsible researcher stayed near to the C/A subject and their parents to help them only in the case of participant-required assistance. Besides that, a pilot study was conducted (data not shown) to calculate the sample size and to check the study viability; furthermore, patients with caries cavitated in dentin were excluded to avoid this confounding factor.

Concerning the study sample, in accordance with the eligibility criteria, a large amount of participants who

**FIGURE 2** Trend of the scores before and after crown fracture treatment. Positive change scores indicate an improvement in OHRQoL, while negative scores indicate deterioration

presented were excluded because these patients suffered from other types of TDIs or were younger than 8 years of age. The questionnaires used in this study have been designated for use in C/As aged between 8 and 14 years.^{16,17}

An ideal control group for clinical studies aiming to evaluate the influence of treatment in an outcome would involve participants with paired ages and genders, but who did not receive any treatment (eg, in this paper, patients without CFED restorative treatment).²¹ This would allow for the assessment of OHRQoL changes if treatment was not provided; however, the inclusion of a group with some type of TDI who did not receive treatment purposely would be unethical. This way, only one group (treated) was included, and the C/As and their parents prior the CFED restorative treatment acted as their own controls, in the manner of a nonpaired prospective clinical study design.

The 'oral symptoms' domain contains questions related to pain (spontaneous pain in all questionnaires or cold-provoked in CPQ₈₋₁₀); wounds; bad breath; and food remains trapped in the mouth. A significant score reduction was observed for this domain in CPQ₈₋₁₀, but not for such in CPQ₁₁₋₁₄. It is possible that the largest score reductions were related to issues that involved pain (spontaneous and cold-provoked) in CPQ₈₋₁₀. This result seems logical, since CFED leaves the dentin tubules exposed to stimuli that produce moment shifts in the tubule fluid and hydrostatic pressures, causing pain, as previously described by the hydrodynamic theory of dentin sensitivity.²² The restorative treatment of CFED and the consequent sealing of dentin tubules prevents the contact of pain-related stimuli with the dentinal tubules, reducing the incidence of pain, as occurred in the patients of the present study. The same domain result was not observed in CPQ₁₁₋₁₄, probably because the decrease in the volume of the pulp chamber with age^{23,24} due to the continual deposition of secondary dentin by odontoblasts along the pulp chamber walls.²⁵

Another hypothesis that can be attributed is the fact that "oral symptoms" domain in CPQ₁₁₋₁₄ has only one general question about pain (ie, "pain in your teeth, lips, or jaws?") in the "oral symptoms" domain, leading the patient to think not only in their teeth, but also in lips and jaws. If the question was focused only in the teeth, maybe the answers could also be more precise, as in the question "did you have difficulty with drinking or eating hot or cold foods?" (which is part of the domain "functional limitations" of CPQ₁₁₋₁₄) in which 36.4% of patients of the present study reported a difficulty reduction.

The "functional limitations" domain of CPQ₈₋₁₀ and CPQ₁₁₋₁₄ contains questions related to difficulty with eating, biting, speaking, and sleeping, and no significant OHRQoL change was observed in this domain after treatment. A previous cross-sectional study had already described that functional limitations may continue after

teeth fracture treatment due to the pulpal and periodontal effects of the injury.² Pulpal damage could present long-term effects on chewing, with sensibility or pain. Maybe the period between the CFED and the second moment of questionnaire application (3 months after CFED restoration) has been short and the pulp damage has not yet fully healed. It must be taken into account that, in the present prospective study, all patients and caregivers received information regarding the functional limitations of a restored tooth, such as recommendations to avoid biting hard foods directly using the restored tooth in order to avoid adhesive failure of the restoration.

The dissemination of these suggestions is probably related to the nonsignificant improvement on OHRQoL in this domain and with the greater incidence of children (aged 8-10 years) that reported "difficulty in biting or chewing harder foods" after CFED restoration.

The "emotional well-being" domain of CPQ₈₋₁₀ and CPQ₁₁₋₁₄ contains questions related to emotions (eg, sad, embarrassed, worried, upset, frustrated, or angry) and to the possibility of staying worried about his/her appearance. CFED treatment reduced the scores and led to improvements in the OHRQoL of adolescents (aged 11-14 years), mainly with regards to sad, embarrassed, worried, and upset feelings. On the other hand, the treatment did not impact the OHRQoL of children (aged 8-10 years). This difference between questionnaire groups is probably related to the age and the unique social factors present during the adolescence period. At the age of 11-14 years, relationship between peers is an important factor of an individual's perceptions regarding quality of life,²⁶ where physical appearance and attractiveness play an important role in social interactions and psychological well-being among adolescents.²⁷ As the mouth is an important determinant of facial attractiveness, any alterations in dental aspects can have a negative/positive impact on quality of life, depending on what they are.²⁸ A previous study showed that photographs of adolescents with ideal smile aesthetics were better judged by peers with respect to athletic performance, popularity, and leadership ability versus photographs of adolescents with nonideal smile aesthetics.²⁹

Besides the "social well-being" domain not having been influenced by CFED treatment, the authors think it is important to highlight that the incidence of C/As that stopped to "avoided smile" were 22.2% (children) and 18.2% (adolescents), respectively. This finding was in accordance with those of other studies that reported higher prevalence's of "avoided smile" in C/As with evidence of previous TDI as compared with in C/As without evidence of previous TDI.^{2,30} This result is significant in that C/As in the present study felt greater dissatisfaction with their appearance after CFED treatment, especially with regard to smiling and laughing.

The P-CPQ is an instrument that assesses a parent or a caregiver's perceptions regarding the impact of C/A oral health status on quality of life and should be considered as a complementary outcome measure contributing to clinical decisions.³¹ The score reductions in P-CPQ after CFED treatment are in agreement with Antunes et al's study;³² however, the changes in the "emotional well-being" domain scores, as detected by CPQ₁₁₋₁₄, were not detected by P-CPQ. These findings raise the question of whether the perceptions about TDI and OHRQoL of C/As and their parents or caregivers are in accordance with one another. The completion of further studies evaluating this question is necessary.

According to the American Academy of Pediatrics, children's health is defined as "the social, physical, and emotional functioning of the child and his or her family...".³³ In this manner, the measurement of OHRQoL from the family perspective is also important, although few studies have done this. Antunes et al³⁴ evaluated the responsiveness of FIS to describe changes in OHRQoL after treatment for TDI. The mean score before the treatment was 12.2 and that after the treatment was 2.7, which are in disagreement with the present study in which no significant score changes were found (ie, the before and after scores were 7.8 and 8.0, respectively). This disagreement between results is probably related to the different inclusion criteria of the studies. Antunes et al³⁴ included C/As aged between 2 years and 14 years and with all types of TDI (eg, fracture, concussion, subluxation, luxation, and avulsion), while the present study included only C/As aged between 8 years and 14 years and only with CFED.

In the present manuscript, the FIS questionnaire evaluated the TDI impact on the interruption of family activities. Previous studies showed that TDI severity is directly associated with families quality of life.^{35,36} Some factors could be associated with the absence of TDI impact, like: (a) parents do not considered uncomplicated CFED as a health problem that needs emergency care, which can be proven by the fact that most C/As and P/Cs (more than 65%) have sought care only after 1 month of TDI; (b) this study was conducted in a public dental clinic, where the P/Cs did not have any treatment costs (except for transport); (c) the type of TDI included in this study (CFED without pulp exposure) is a kind of trauma that requires only few attendances for treatment, not implying in excessive parents missing work, spending extra time taking care of their children or financial burden with transportation.

To our knowledge, the present study is the first prospective study to evaluate the impact of TDI treatment in OHRQoL of C/As, but can be considered a preliminary investigation because further prospective studies evaluating the impact of treatment for different types of TDI are still needed. Besides that, studies evaluating the impact of TDI recurrence in OHRQoL are still warranted as well.

In conclusion, restorative treatment of CFED had a positive influence on the OHRQoL of C/As, but not on the OHRQoL of their families. Based on the results found herein, the treatment of CFED should be performed in order to reduce the negative impact of this type of trauma on the OHRQoL of C/As.

ACKNOWLEDGEMENTS

These cases were conducted during the doctoral stage of Marcela Baraúna Magno, under supervision of the Prof. Lucianne Cople Maia. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001 - and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - Brasil (FAPERJ) process numbers E-26/202.191/2018 and E-26/202.810/2016.

CONFLICT OF INTEREST

This authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

M.B.M. conceived the ideas, collected the data and writing manuscript; L.A.J., A.V.N., and M.M.L. collected the data; L.C.M. and M.M.P. conceived the ideas and final reading of the manuscript.

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How to cite this article: Magno MB, Jural LA, Nogueira Adv, Lenzi MM, Pithon MM, Maia LC. Impact of crown fracture treatment on oral health-related quality of life of children, adolescents, and their families: A prospective clinical study. *Int J Paediatr Dent.* 2018;00:1-8. <https://doi.org/10.1111/ipd.12437>

4.3 Artigo 3: Does dental trauma influence the social judgment and motivation to seek dental treatment by children and adolescents? Development, validation, and application of an instrument for the evaluation of traumatic dental injuries and their consequences.



Received: 25 April 2018 | Revised: 20 November 2018 | Accepted: 7 January 2019

DOI: 10.1111/ijpd.12479

ORIGINAL ARTICLE

WILEY INTERNATIONAL JOURNAL OF
PAEDIATRIC DENTISTRY

Does dental trauma influence the social judgment and motivation to seek dental treatment by children and adolescents? Development, validation, and application of an instrument for the evaluation of traumatic dental injuries and their consequences

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Background: One's smile clearly plays a significant role in the perception and judgment that others have of one's appearance and personality.

Aim: We sought to develop and validate a questionnaire related to the social judgment of children and adolescents and to evaluate, through its application, the perceptions and judgment of children and adolescents regarding their view of different traumatic dental injuries and their consequences (TDIs-Cs) as well as the motivation to seek dental treatment.

Design: The aspects of acceptability, discriminative properties, internal consistency, test-retest reliability, and construct validity were evaluated in the developed questionnaire. A cross-sectional study was conducted involving 100 boys and girls aged 10-15 years. Images of an adolescent male and female were either manipulated or not (control) to create different types of TDI-C (eg, enamel fracture, enamel and dentin fracture, crown colour change, and tooth loss/avulsion). These images were analysed by the participants, using a previously validated questionnaire with a six-positive-point and six-negative-point scale, in relation to their social physical and psychosocial characteristics. The data were analysed with the Friedman, Wilcoxon, and Mann-Whitney tests ($P < 0.05$).

Results: The developed questionnaire presented high acceptability, strong discriminative properties, satisfactory internal consistency, and satisfactory test-retest reliability, but weak construct validity. The presence of TDI-C had a negative effect on all characteristics evaluated ($P < 0.001$). Tooth loss had the highest level of rejection. Additionally, the presence of TDI-C had a greater negative impact on the aspects of 'starting fights', 'being given a nickname', and 'being ashamed to smile' in males than in females ($P < 0.05$). Children and adolescents with TDI-C were judged as needing to seek dental treatment ($P < 0.001$).

Conclusion: The questionnaire developed showed properties of validity and reliability in its administration in a child and adolescent population. TDIs-Cs have a negative influence on the social judgment of children and adolescents.

KEYWORDS

aesthetics, dental care, dental trauma, judgment

1 | INTRODUCTION

There is a strong relationship between physical appearance and social interaction. The dentofacial region contributes significantly to overall facial appearance, and a harmonious smile plays an important role in establishing facial beauty.¹ This aspect has an influence on people's quality of life² and self-esteem,³ and is important in their interpersonal relationships. Previous studies have demonstrated that people with healthy and more attractive smiles are perceived to be more intelligent and to have better social attributes.^{4,5}

Adolescence is a transitional stage of physical and psychological human development. The alteration of facial self-image may have an impact on many facets of life, such as socialization, and emotional and functional aspects.⁶ Furthermore, the perceptions of others can influence the way a person acts, in terms of social transgressions and can even result in long-term developmental changes.⁷

Traumatic dental injury (TDI) is a common health problem in child and adolescent populations, which also has repercussions on their quality of life.² Approximately 50% of children are exposed to dental trauma before the age of 15 years.⁸ In permanent dentition, crown fracture is the most common type of TDI.⁹ The dental trauma sequelae go beyond and result in irreparable dental loss at the moment of the event, during treatment, or even some years later. Together with dental caries and oral cancer, TDI is among the major oral public health problems.¹⁰

Despite dental trauma having been extensively researched, certain questions about the impacts of TDI have still not been evaluated and elucidated. In this study, we aimed to develop and validate a questionnaire to consider social judgments made by children and adolescents and to evaluate, through its application, the perceptions and judgments of children and adolescents regarding different traumatic dental injuries and their consequences (TDIs-Cs), as well as the motivation to seek dental treatment.

2 | METHODS

This cross-sectional study included children and adolescents of both genders, ranging in age from 10-15 years, who answered a questionnaire about their perceptions concerning certain TDIs and their consequences, as well as their perceptions about the motivation to seek dental treatment in such situations. The study was approved by the Research Ethics Committee (number 0154.0.454.000-11). All participants

Why this paper is important for paediatric dentists

- The developed and validated questionnaire exhibited good psychometric properties and can be consistently used for assessing the influence of dental trauma and its consequences on social judgment and motivation to seek dental treatment by children and adolescents.
- Children and adolescents attribute bad social judgment of other children and adolescents with different TDIs and their consequences, reinforcing the importance of conservative dentistry in treating tooth irregularities that may have an influence on psychosocial issues.
- Providing a better dental appearance seems to have a direct impact in child and adolescent interpersonal relationships.

and their guardians signed informed consents to take part in the study.

2.1 | Questionnaire validation

Before beginning the study, a validation of the questionnaire used to collect data about children's and adolescent's perceptions was performed. The validation process was divided into seven stages: (a) development of photographs; (b) elaboration of questionnaire; (c) questionnaire evaluation by dentistry professionals; (d) questionnaire evaluation by educational professionals; (e) questionnaire evaluation by children and adolescents; (f) conclusion of the questionnaire; and (g) validity and reliability of questionnaire.

2.1.1 | Development of the photographs

Standardized, full-face colour photographs of two adolescents were used, a boy and a girl in the same age range as that of the evaluators. The images were manipulated to create TDI and their consequences, such as crown colour change, tooth loss, enamel fracture, and enamel and dentin fracture. Two photographs were used as positive controls, with the absence of any tooth alterations; their images served to verify the reliability of the evaluators' responses to the questionnaire. The alterations were made using image manipulation software (Photoshop CS3; Adobe Systems, San Jose, California), and

changes were made only to the teeth, the face remaining unaltered. All images were manipulated to eliminate malocclusions in order to avoid bias. A total of 12 images, six from each individual, were obtained (Figure 1).

2.1.2 | Elaboration of the questionnaire

An initial questionnaire, containing 12 questions relating to photographic images, was elaborated in order to identify perceptions to the different consequences of anterior TDI, their influence on (positive and/or negative) interpersonal relationships, and the motivation to seek dental treatment.

2.1.3 | Evaluation by dentistry professionals

Ten professors of Pediatric Dentistry evaluated the questionnaire. At this stage, the tool was distributed for reading and evaluation of the technical content. The participants were asked to make remarks, modifications, and suggestions, and to point out any potential flaws. The questionnaires with their

comments on were handed back to the researchers, and a consensus about the professors' suggestions was achieved.

2.1.4 | Evaluation by educational professionals

The questionnaire was submitted to educational professionals working in psychology and health. It was assessed, and the comments, which related to the developmental psychology and educational aspects, were returned and accepted.

2.1.5 | Evaluation by children and adolescents

Ten children and adolescent students of a municipal and a state school in Jequié city, Bahia, Brazil, assessed the questionnaire, regarding its content, including comprehension, and doubts about questions or response options, and were encouraged to make suggestions that they considered relevant about the subject. The questionnaires with their comments on

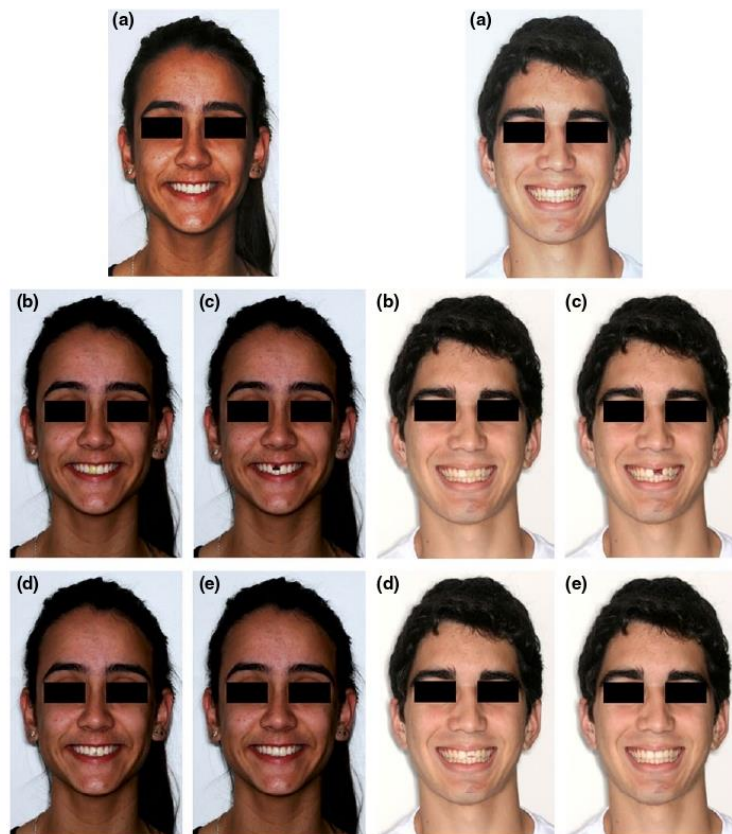


FIGURE 1 Full-face images of the two different subjects used in the study, with A, control; B, colour change; C, tooth loss, D, enamel and dentin fracture, and E, enamel fracture

were handed back to the researchers, and a consensus about the suggestions was achieved.

2.1.6 | Conclusion of the questionnaire

The considerations and suggestions made by the professionals and participants were analysed, and the questionnaire was finalized with the following 12 questions:

1. Do you find this boy/girl funny?
2. Do you think this boy/girl is happy?
3. Do you think this boy/girl has many friends?
4. Would you like this boy/girl to be your friend?
5. Do you think this boy/girl is intelligent?
6. Do you think this boy/girl is handsome?
7. Do you think this boy/girl is ashamed?
8. Do you think this boy/girl likes to be alone?
9. Do you think this boy/girl could torment other children or start fights?
10. Do you think that classmates of this boy/girl gave them nicknames?
11. Do you think this boy/girl should be ashamed to smile?
12. Do you think this boy/girl needs look for a dentist?

Each question had four answer options: 'certainly yes', 'maybe yes', 'maybe not', and 'certainly not'. The positive characteristics (questions 01-06) were coded as 'certainly yes' = 3 points, 'maybe yes' = 2 points, 'maybe not' = 1 point, and 'certainly not' = 0 points. Negative characteristics (questions 07-12) had inverted negative scores, with 'certainly yes' = -3 points, 'maybe yes' = -2 points, 'maybe not' = -1 point, and 'certainly not' = 0 points. The positive and negative characteristics

were analysed separately, in terms of total scores. The per-question score could vary from 0 to 3/-3 for each positive or negative characteristic, respectively. The total score could range from 0 to 18 for positive characteristics, and from 0 to -18 for negative characteristics. For the total positive score, 0 represented the worst, whereas 18 was the best score. For the total negative score, the order was inverse, where -18 was the worst and 0 was the best score that could be achieved.

The positive values (referring to good social characteristics—GSCs) and negative values (referring to bad social characteristics—BSCs) were added together to obtain a final social judgment (FSJ), following the formula $FSJ = GSC + BSC$. In this way, the final results with positive values (+FSJ) suggested that, in general, the social judgment concerning the TDI or its consequences were good, and those with negative values (-FSJ) indicated that, in general, the social judgment concerning the TDI or its consequences were bad (Figure 2).

2.1.7 | Validity and reliability of questionnaire

The questionnaire was applied at two distinct times, with an interval of 20 days between the two applications. For the first (test) and second (retest) application of the questionnaire, 30 children and adolescents were approached. These groups were not included in the final sample.

2.2 | Statistical analysis

The acceptability was assessed according to the proportion of individuals who did not respond to all items. The presence

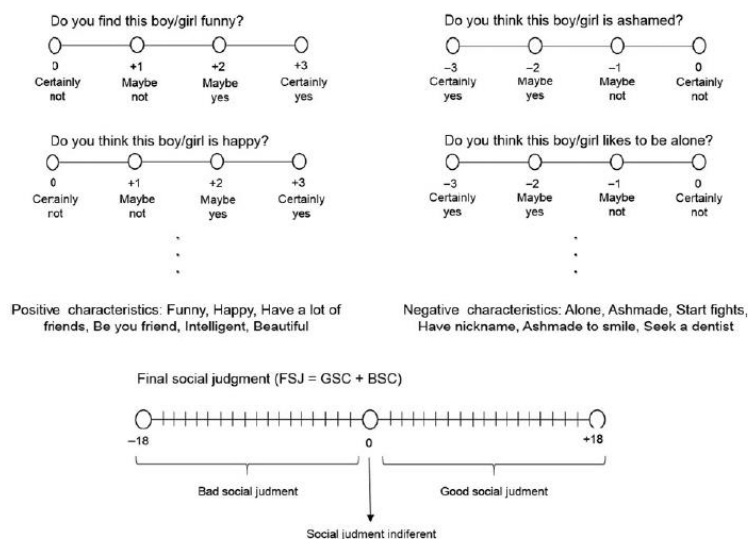


FIGURE 2 Answer options to identify positive and negative characteristics, and for FSJ

of floor and ceiling effects was evaluated by analysing the frequency of responses in each item. The floor effect occurs when more than 15% of the answers are concentrated in the minimum value, whereas the ceiling effect refers to the same at the maximum value.¹¹

Construct validity was tested by calculating correlations between the FSJ and the attractiveness score (visual analogue scale; VAS), using Spearman's correlation coefficient. The discriminant construct validity was investigated by way of a comparison between the control image and the images of the different TDI-C, using the Friedman test, with the comparisons between pairs being tested by use of the Wilcoxon signed-rank test.

The reliability was evaluated by the measurement error, according to the criterion of the temporal stability of the measure; in other words, it was determined using the agreement between repeated measures (test-retest) by means of the intraclass correlation coefficient (ICC) and the internal consistency (Cronbach's alpha). Evidence of internal consistency was considered to exist if the Cronbach's alpha coefficient was >0.70 ¹¹ and, for temporal stability, if the ICC was >0.70 .¹²

3 | MAIN STUDY

3.1 | Sample size calculation

The sample size calculation was done for the analysis of variance of repeated measurements, considering the following parameters: effect size $f = 0.25$ (mean effect size), $\alpha = 0.05$, power = 0.80, number of measurements = 5 (control, colour change, avulsion, dentin fracture, and enamel fracture), Pearson's correlation coefficient among repeated measures = 0.20, and the non-sphericity correction = 0.25. A minimum sample size of 83 individuals was estimated. Subsequently, a 15% increase was made as an adjustment for the use of non-parametric tests.¹³ Thus, the minimum sample size estimated for this study was 95 individuals. The questionnaire was applied to 100 adolescents. The sample calculation was performed using G * Power (version 3.1.9.2, Germany).

The criteria for inclusion in the sample were children and adolescents, boys and girls, ranging in age from 10 to 15 years, students at a municipal and a state school in Jequié, Bahia. Information was provided to, and consent given by, the participants and their parents/guardians prior to the study. Only those whose parents allowed them to participate were included. On the day of the study, the participants were instructed about the questionnaire questions and possible answers prior to filling out the questionnaire. They were not allowed to confer with one another during the completion of the questionnaire. The images were projected one by one, and each image was accompanied by 12 questions for a total

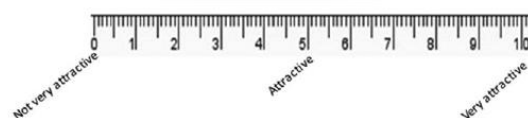


FIGURE 3 Visual analogue scale of attractiveness

of 144 questions per respondent. The images were shown at life-size, as if the person was present, in a 42-in., high-resolution monitor positioned upon a table at 35 cm from the edge. For the image analysis, the participants sat in a chair positioned in front of this monitor, with the chair centre located 15 cm from the edge of the table. This way, the images were analysed at an average distance of 50 cm, simulating a casual conversation. The children and adolescents were given one minute to observe each image and to respond to the questions about that image. During the analysis, the children and adolescents could not apply a magnification effect or other tool that modified the projection. The respondents were not allowed to return to previous images and make comparisons or to alter their initial responses. After answering the questionnaire, the children and adolescents were invited to quantify their perceptions of attractiveness concerning individuals with TDI of the anterior teeth, and their consequences, through the same photographic images. The quantification was achieved by using a visual analogue scale, from 0 to 10, where 0 represented complete disagreement, 5 was neutral, and 10 was complete agreement (Figure 3). The corresponding numerical data were saved in PowerPoint 2010 (Microsoft, Redmond, Washington) for later tabulation.

3.2 | Statistical analysis

Descriptive statistics were applied to express the results as means and standard deviations. Inferential analysis included the Friedman test for intragroup comparisons (with comparisons between pairs being tested by the Wilcoxon test), and the Mann-Whitney test was used for intergroup comparisons (comparisons between genders).

In both statistical analysis (validation questionnaire and main study), the level of significance was 5% ($\alpha = 0.05$), and the data were tabulated and analysed in IBM SPSS Statistics for Windows for all analyses (IBM SPSS, version 21.0, 2012; IBM Corp., Armonk, NY).

4 | RESULTS

4.1 | Questionnaire validation

The item 'Do you think this boy/girl is happy?' obtained a response rate of 93.3%, both in the test and in the retest, whereas the other 11 items of the questionnaire showed a response rate of 100%, indicating high acceptability of the

instrument. Floor effect was observed only when 'tooth loss' (for the scores of GSCs and BSCs and for the FSJ) and 'colour change' images (for the BSC scores) were evaluated. The ceiling effect was observed only when the control images were evaluated (Table 1).

Construct validity correlation between the FSJ and attractiveness score was weak (<0.40). Discriminant construct validity showed that there was a significant difference ($P < 0.05$) between the control image and all TDI-C evaluated in the GSCs, BSCs, and FSJ scores (Table 2).

The internal consistency presented satisfactory grade for both factors evaluated (GSCs and BSCs) and for the instrument as a whole (FSJ), regardless of the photograph viewed (Table 3). Satisfactory indexes of agreement were found between the test and retest results, as evidenced by the ICCs (Table 4).

4.2 | Main study

Table 5 shows the average scores for the positive social characteristics, according to the type of dental trauma and its

TABLE 1 Analysis of the floor and ceiling effects of the social judgment scale in adolescents aged 10-15 years

Domain	Floor effect (%)	Ceiling effect (%)
Good social characteristics		
Control	-	25.0
Colour change	-	-
Tooth loss	17.9	-
Enamel and dentin fracture	-	3.6
Enamel and dentin fracture	-	10.7
Bad social characteristics		
Control	-	33.3
Colour change	23.3	-
Tooth loss	66.7	-
Enamel and dentin fracture	-	-
Enamel and dentin fracture	-	10.0
Final social judgment		
Control	-	17.9
Colour change	-	-
Tooth loss	17.9	-
Enamel and dentin fracture	-	-
Enamel and dentin fracture	-	7.1

consequences, and gender. It is possible to observe that dental trauma had an effect on all of the characteristics evaluated ($P < 0.001$) where tooth loss had the lowest mean scores, both for the questions individually ($P < 0.05$) and overall (total GSCs) ($P < 0.001$). Only the enamel and dentin fracture (for the 'intelligent' feature) and the enamel fracture (for 'happy', 'be your friend', and 'intelligent' characteristics) did not result in reduction of the score in relation to the control ($P > 0.05$). There was no significant difference between model's genders.

Table 6 shows the mean scores for negative social characteristics, according to the type of dental trauma and its consequences, and the model's gender. Again, dental trauma had an effect on all negative characteristics evaluated ($P < 0.001$), and tooth loss had the lowest average scores, both for the questions individually ($P < 0.05$) and overall (total BSC) ($P < 0.001$). The enamel fracture had a positive influence on the characteristic 'alone', with scores higher than the control image score ($P < 0.05$). Statistical difference was observed between the genders in the scores of questions related to 'start fights' (for colour change and tooth loss), 'gave them nicknames' (for tooth loss), and 'shame while smiling' (for colour change); in all of these cases, the scores were higher for female, indicating that the consequences of dental trauma had a greater negative impact on these issues for the male. All of the participants judged that it was necessary to 'seek a dentist' for all TDIs and their consequences, for both genders ($P < 0.001$).

From Figure 4, it can be seen that different types of trauma and their consequences had a negative influence on the final social judgment of children and adolescents of both genders ($P < 0.001$). The dental traumas and their consequences that negatively impacted on social judgment were, in order (worst first): tooth loss, colour change, enamel and dentin fracture, and enamel fracture.

Figure 5 shows that different types of dental trauma and their consequences had an influence on attractiveness ($P < 0.001$). The modifications that most negatively impacted attractiveness were, in order (worst first): tooth loss, colour change, enamel and dentin fracture, and enamel fracture.

There was no significant difference between the model's genders in the final social judgment (Figure 4) and attractiveness (Figure 5) scores.

5 | DISCUSSION

In this study, based on a validated questionnaire, the perceptions of children and adolescents from both genders were evaluated in judging the positive and negative characteristics of other adolescents that had suffered different TDIs, and on their perceptions about the consequences of TDIs, as well as their motivation to seek dental treatment.

TABLE 2 Analysis of the discriminant construct validity of the social judgment scale in adolescents aged 10-15 years

Domain	Dental trauma and consequences (mean ± SD)					P-value*
	Control	CC	Tooth loss	EDF	EF	
GSC	15.00 ± 6.00	11.00 ± 4.00 [†]	5.00 ± 6.00 [†]	12.00 ± 2.00 [†]	13.00 ± 4.00 [†]	<0.001
BSC	00.00 ± 1.00	-14.00 ± 5.00 [†]	-18.00 ± 2.00 [†]	-12.00 ± 4.00 [†]	-4.00 ± 2.00 [†]	<0.001
FSJ	15.00 ± 6.00	-4.50 ± 8.00 [†]	-12.00 ± 6.00 [†]	0.00 ± 5.00 [†]	8.00 ± 4.00 [†]	<0.001

BSC, bad social characteristics; CC, colour change; EDF, enamel and dentin fracture; EF, enamel fracture; FSJ, final social judgment; GSC, good social characteristics; SD, standard deviation.

*Friedman test.

[†]Significant difference in relation to the control image (Wilcoxon test).

TABLE 3 Measures of internal consistency of the social judgment scale in adolescents aged 10-15 years

Domain	Number of items	Alpha de Cronbach
Good social characteristics		
Control	06	0.91
Colour change		0.74
Tooth loss		0.91
Enamel and dentin fracture		0.90
Enamel and dentin fracture		0.95
Bad social characteristics		
Control	06	0.84
Colour change		0.88
Tooth loss		0.83
Enamel and dentin fracture		0.93
Enamel and dentin fracture		0.95
Final social judgment		
Control	12	0.82
Colour change		0.76
Tooth loss		0.79
Enamel and dentin fracture		0.83
Enamel and dentin fracture		0.88

Evaluating the validity is the first step in determining the accuracy of an instrument. In summary, the questionnaire presented high acceptability, strong discriminative properties, satisfactory internal consistency, and good test-retest reliability. As such, the presented developed questionnaire showed valid and reliable properties to be administered in children and adolescents population.

Concerning construct validity, the developed questionnaire presented weak correlation. Similar results were found in a previous study by Torres et al.,¹⁴ who found no

TABLE 4 Intraclass correlation coefficients (ICCs) and respective test-retest confidence intervals (CIs) of the social judgment scale in adolescents aged 10-15 years

Domain	ICC	CI 95%
Good social characteristics		
Control	0.95	0.89-0.98
Colour change	0.95	0.90-0.98
Tooth loss	0.97	0.93-0.98
Enamel and dentin fracture	0.87	0.49-0.95
Enamel and dentin fracture	0.93	0.83-0.97
Bad social characteristics		
Control	0.88	0.75-0.94
Colour change	0.98	0.95-0.99
Tooth loss	0.98	0.96-0.99
Enamel and dentin fracture	0.97	0.93-0.99
Enamel and dentin fracture	0.98	0.95-0.99
Final social judgment		
Control	0.92	0.82-0.96
Colour change	0.97	0.93-0.98
Tooth loss	0.97	0.93-0.99
Enamel and dentin fracture	0.91	0.46-0.97
Enamel and dentin fracture	0.95	0.88-0.98

statistical significant difference between the functional limitations subscale and the well-being global indicator in an oral health-related quality of life questionnaire. The weak construct validity correlation seen in our study could be associated with the different items evaluated and the different forms of analysis of the results of the instruments used. Although the questionnaire discussed in this manuscript evaluated 12 different factors associated with social judgment, the VAS was applied related to only one item (attractiveness). Furthermore, the term 'analogue' refers to the large number of possible numeric responses of VAS allowing a large range of gradations to characterize a continuous variable,¹⁵ differing clearly from the scale proposed in the present manuscript, which has four response options in

TABLE 5 Scores (mean \pm standard deviation, and median \pm interquartile range) for positive social characteristics, according to image's dental trauma and its consequences, and gender

Characteristic/gender	Dental trauma and consequences					P-value*
	Control	CC	Tooth loss	EDF	EF	
Funny						
Male						
Mean \pm SD	2.52 \pm 0.59 ^a	2.22 \pm 0.68 ^b	0.89 \pm 0.84 ^c	2.26 \pm 0.63 ^{bd}	2.43 \pm 0.69 ^d	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 1.00 ^c	2.00 \pm 1.00 ^{bd}	3.00 \pm 1.00 ^d	
Female						
Mean \pm SD	2.53 \pm 0.67 ^a	2.12 \pm 0.61 ^b	0.86 \pm 0.90 ^c	2.17 \pm 0.60 ^b	2.40 \pm 0.79 ^d	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 2.00 ^c	2.00 \pm 1.00 ^b	3.00 \pm 1.00 ^d	
P-value [†]	0.630	0.226	0.704	0.277	0.903	
Happy						
Male						
Mean \pm SD	2.51 \pm 0.59 ^a	2.16 \pm 0.73 ^b	0.86 \pm 0.82 ^c	2.18 \pm 0.64 ^b	2.41 \pm 0.68 ^a	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 1.00 ^c	2.00 \pm 1.00 ^b	2.50 \pm 1.00 ^a	
Female						
Mean \pm SD	2.50 \pm 0.67 ^a	2.07 \pm 0.61 ^b	0.82 \pm 0.86 ^c	2.09 \pm 0.62 ^b	2.39 \pm 0.79 ^a	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 0.00 ^b	1.00 \pm 2.00 ^c	2.00 \pm 0.00 ^b	3.00 \pm 1.00 ^a	
P-value [‡]	0.836	0.280	0.676	0.300	0.817	
Have a lot of friends						
Male						
Mean \pm SD	2.57 \pm 0.57 ^a	2.16 \pm 0.77 ^b	0.84 \pm 0.84 ^c	2.22 \pm 0.68 ^{bd}	2.38 \pm 0.72 ^d	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 1.00 ^c	2.00 \pm 1.00 ^{bd}	2.50 \pm 1.00 ^d	
Female						
Mean \pm SD	2.57 \pm 0.67 ^a	2.00 \pm 0.71 ^b	0.80 \pm 0.86 ^c	2.15 \pm 0.59 ^{bd}	2.33 \pm 0.83 ^d	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 0.00 ^b	1.00 \pm 2.00 ^c	2.00 \pm 1.00 ^{bd}	3.00 \pm 1.00 ^d	
P-value [§]	0.644	0.087	0.675	0.320	0.918	
Be your friend						
Male						
Mean \pm SD	2.45 \pm 0.69 ^a	2.05 \pm 0.80 ^b	0.74 \pm 0.84 ^c	2.16 \pm 0.69 ^{bd}	2.32 \pm 0.78 ^{ad}	<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 1.00 ^c	2.00 \pm 1.00 ^{bd}	2.00 \pm 1.00 ^{ad}	
Female						
Mean \pm SD	2.44 \pm 0.76 ^a	1.95 \pm 0.80 ^b	0.68 \pm 0.84 ^c	2.08 \pm 0.68 ^{bd}	2.29 \pm 0.87 ^{ad}	<0.001

(Continues)

TABLE 5 (Continued)

Characteristic/gender	Dental trauma and consequences						P-value*
	Control	CC	Tooth loss	EDF	EF		
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 0.00 ^b	0.00 \pm 1.00 ^c	2.00 \pm 1.00 ^{bd}	3.00 \pm 1.00 ^{ad}		
P-value [†]	0.834	0.411	0.530	0.419	0.956		
Intelligent							
Male							
Mean \pm SD	2.28 \pm 0.84 ^a	1.79 \pm 0.84 ^b	0.71 \pm 0.78 ^c	2.19 \pm 0.68 ^a	2.31 \pm 0.81 ^a		<0.001
Median \pm IR	2.50 \pm 1.00 ^a	2.00 \pm 1.00 ^b	1.00 \pm 1.00 ^c	2.00 \pm 1.00 ^a	2.00 \pm 1.00 ^a		
Female							
Mean \pm SD	2.30 \pm 0.89 ^a	1.74 \pm 0.89 ^b	0.71 \pm 0.86 ^c	2.12 \pm 0.67 ^a	2.29 \pm 0.90 ^a		<0.001
Median \pm IR	3.00 \pm 1.00 ^a	2.00 \pm 1.00 ^b	0.00 \pm 1.00 ^c	2.00 \pm 1.00 ^a	3.00 \pm 1.00 ^a		
P-value [†]	0.714	0.890	0.794	0.461	0.845		
Beautiful							
Male							
Mean \pm SD	2.61 \pm 0.60 ^a	1.18 \pm 0.88 ^b	0.37 \pm 0.56 ^c	1.71 \pm 0.77 ^d	2.22 \pm 0.68 ^e		<0.001
Median \pm IR	3.00 \pm 1.00 ^a	1.00 \pm 2.00 ^b	0.00 \pm 1.00 ^c	2.00 \pm 1.00 ^d	2.00 \pm 1.00 ^e		
Female							
Mean \pm SD	2.57 \pm 0.70 ^a	1.18 \pm 0.89 ^b	0.35 \pm 0.64 ^c	1.60 \pm 0.75 ^d	2.18 \pm 0.83 ^e		<0.001
Median \pm IR	3.00 \pm 1.00 ^a	1.00 \pm 2.00 ^b	0.00 \pm 1.00 ^c	2.00 \pm 1.00 ^d	2.00 \pm 1.00 ^e		
P-value [†]	0.908	0.836	0.471	0.406	0.977		
Total GSC							
Male							
Mean \pm SD	14.94 \pm 3.88 ^a	11.56 \pm 4.7 ^b	4.41 \pm 4.68 ^c	12.72 \pm 4.09 ^d	14.07 \pm 4.36 ^e		<0.001
Median \pm IR	16.00 \pm 6.00 ^a	12.00 \pm 3.00 ^b	5.00 \pm 6.00 ^c	12.00 \pm 5.00 ^d	14.00 \pm 6.00 ^e		
Female							
Mean \pm SD	14.91 \pm 4.36 ^a	11.06 \pm 4.51 ^b	4.22 \pm 4.96 ^c	12.21 \pm 3.91 ^d	13.88 \pm 5.01 ^e		<0.001
Median \pm IR	16.00 \pm 6.00 ^a	12.00 \pm 2.00 ^b	5.00 \pm 7.00 ^c	12.00 \pm 3.00 ^d	16.00 \pm 6.00 ^e		
P-value [†]	0.817	0.145	0.588	0.238	0.906		

CC, colour change; EDF, enamel fracture; EF, enamel fracture; GSC, good social characteristics; SD, standard deviation; IR, interquartile range.

*Friedman test (^{a,b,c,d,e}) and other letters indicate the statistical difference calculated by the Wilcoxon test).

[†]Mann-Whitney test.

TABLE 6 Scores (mean \pm standard deviation, and median \pm interquartile range) for negative social characteristics, according to image's dental trauma and its consequences, and gender

Characteristic/gender	Dental trauma and consequences					P-value*
	Control	CC	Tooth loss	EDF	EF	
Ashamed						
Male						
Mean \pm SD	-0.38 \pm 0.53 ^a	-2.3 \pm 0.67 ^b	-2.54 \pm 0.59 ^c	-1.75 \pm 0.74 ^d	-0.47 \pm 0.54 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 1.00 ^c	-2.00 \pm 1.00 ^d	0.00 \pm 1.00 ^e	
Female						
Mean \pm SD	-0.50 \pm 0.67 ^a	-2.32 \pm 0.66 ^b	-2.65 \pm 0.48 ^c	-1.67 \pm 0.77 ^d	-0.59 \pm 0.62 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 1.00 ^c	-2.00 \pm 1.00 ^d	-1.00 \pm 1.00 ^e	
P-value ^f	0.311	0.844	0.263	0.478	0.207	
Alone						
Male						
Mean \pm SD	-0.95 \pm 0.30 ^a	-2.3 \pm 0.66 ^b	-2.49 \pm 0.63 ^c	-1.69 \pm 0.73 ^d	-0.44 \pm 0.54 ^e	<0.001
Median \pm IR	-1.00 \pm 0.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 1.00 ^c	-2.00 \pm 1.00 ^d	0.00 \pm 1.00 ^e	
Female						
Mean \pm SD	-0.87 \pm 0.42 ^a	-2.34 \pm 0.65 ^b	-2.61 \pm 0.53 ^c	-1.6 \pm 0.75 ^d	-0.56 \pm 0.62 ^e	<0.001
Median \pm IR	-1.00 \pm 0.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 1.00 ^c	-2.00 \pm 1.00 ^d	0.00 \pm 1.00 ^e	
P-value ^f	0.109	0.660	0.217	0.406	0.212	
Start fights						
Male						
Mean \pm SD	-0.34 \pm 0.50 ^a	-2.35 \pm 0.66 ^b	-2.86 \pm 0.38 ^c	-1.84 \pm 0.63 ^d	-0.78 \pm 0.52 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 0.00 ^c	-2.00 \pm 1.00 ^d	-1.00 \pm 1.00 ^e	
Female						
Mean \pm SD	-0.26 \pm 0.48 ^a	-2.04 \pm 0.80 ^b	-2.69 \pm 0.46 ^c	-1.8 \pm 0.65 ^d	-0.77 \pm 0.57 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 0.00 ^c	-2.00 \pm 1.00 ^d	-1.00 \pm 1.00 ^e	
P-value ^f	0.181	0.006	0.003	0.701	0.839	
Nickname						
Male						
Mean \pm SD	-0.33 \pm 0.47 ^a	-2.39 \pm 0.62 ^b	-2.88 \pm 0.33 ^c	-1.96 \pm 0.74 ^d	-0.82 \pm 0.56 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 0.00 ^c	-2.00 \pm 1.00 ^d	-1.00 \pm 1.00 ^e	
Female						
Mean \pm SD	-0.28 \pm 0.49 ^a	-2.2 \pm 0.77 ^b	-2.76 \pm 0.43 ^c	-1.95 \pm 0.73 ^d	-0.81 \pm 0.60 ^e	<0.001
Median \pm IR	0.00 \pm 1.00 ^a	-2.00 \pm 1.00 ^b	-3.00 \pm 0.00 ^c	-2.00 \pm 1.00 ^d	-1.00 \pm 1.00 ^e	

(Continues)

TABLE 6 (Continued)

Characteristic/gender	Dental trauma and consequences						P-value*
	Control	CC	Tooth loss	EDF	EF		
P-value [†]	0.328	0.107	0.028	0.976	0.854		
Ashamed to smile							
Male							
Mean ± SD	-0.16 ± 0.37 ^a	-2.71 ± 0.52 ^b	-2.96 ± 0.20 ^c	-2.1 ± 0.61 ^d	-0.85 ± 0.59 ^e		<0.001
Median ± IR	0.00 ± 0.00 ^a	-3.00 ± 1.00 ^b	-3.00 ± 0.00 ^c	-2.00 ± 0.00 ^d	-1.00 ± 1.00 ^e		
Female							
Mean ± SD	-0.2 ± 0.43 ^a	-2.49 ± 0.73 ^b	-2.93 ± 0.26 ^c	-2.07 ± 0.62 ^d	-0.84 ± 0.63 ^e		<0.001
Median ± IR	0.00 ± 0.00 ^a	-3.00 ± 1.00 ^b	-3.00 ± 0.00 ^c	-2.00 ± 0.00 ^d	-1.00 ± 1.00 ^e		
P-value [†]	0.558	0.031	0.353	0.791	0.867		
Seek a dentist							
Male							
Mean ± SD	-0.11 ± 0.31 ^a	-2.74 ± 0.50 ^b	-2.97 ± 0.17 ^c	-2.08 ± 0.61 ^d	-0.84 ± 0.60 ^e		<0.001
Median ± IR	0.00 ± 0.00 ^a	-3.00 ± 0.00 ^b	-3.00 ± 0.00 ^c	-2.00 ± 0.00 ^d	-1.00 ± 1.00 ^e		
Female							
Mean ± SD	-0.11 ± 0.31 ^a	-2.74 ± 0.56 ^b	-2.99 ± 0.10 ^c	-2.05 ± 0.63 ^d	-0.83 ± 0.64 ^e		<0.001
Median ± IR	0.00 ± 0.00 ^a	-3.00 ± 0.00 ^b	-3.00 ± 0.00 ^c	-2.00 ± 0.00 ^d	-1.00 ± 1.00 ^e		
P-value [†]	1.000	0.704	0.314	0.792	0.866		
Total BSC							
Male							
Mean ± SD	-2.27 ± 2.48 ^a	-14.79 ± 3.63 ^b	-16.7 ± 2.3 ^c	-11.42 ± 4.06 ^d	-4.2 ± 3.35 ^e		<0.001
Median ± IR	-1.00 ± 3.00 ^a	-14.00 ± 6.00 ^b	-18.00 ± 2.00 ^c	-12.00 ± 4.00 ^d	-5.00 ± 6.00 ^e		
Female							
Mean ± SD	-2.22 ± 2.8 ^a	-14.13 ± 4.17 ^b	-13.63 ± 2.26 ^c	-11.14 ± 4.15 ^d	-4.4 ± 3.68 ^e		<0.001
Median ± IR	-1.00 ± 6.00 ^a	-14.00 ± 6.00 ^b	-18.00 ± 3.00 ^c	-12.00 ± 4.00 ^d	-6.00 ± 6.00 ^e		
P-value [†]	0.602	0.178	0.887	0.517	0.740		

BSC, bad social characteristics; CC, colour change; EDF, enamel and dentin fracture; EF, enamel fracture; IR, interquartile range; SD, standard deviation.

[†]Friedman test (^{a,b,c,d,e} and other letters indicate the statistical difference calculated by the Wilcoxon test).[‡]Mann-Whitney test.

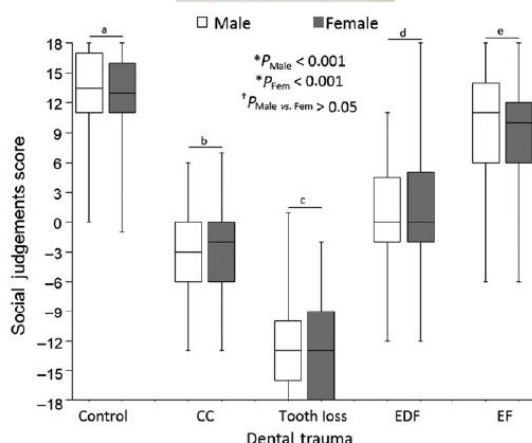


FIGURE 4 Social judgement scores, according to the image's TDI and its consequences, and model gender. The height of the rectangle represents quartiles 1 and 3; the line that cuts the rectangle represents the median; the lines connect quartiles 1 and 3 to the minimum and maximum values. Masc, male; Fem, female; CC, colour change; EDF, enamel and dentin fracture; EF, enamel fracture, and tooth loss. *Friedman's test (a, b, c, d, and other letters indicate the statistical difference calculated by the Wilcoxon test); †Mann-Whitney test (comparison of gender for each type of TDI)

which each response receives a rising or falling score, characterizing categorical data.

Knowing that solitary facial modifications on photographs have a negative effect on perceived facial aesthetics,¹⁶ in this study, the image changes were made only to the teeth of the photographic models so that the faces remained unaltered in order to avoid bias. Besides that, images of the full face were used, instead of images of the teeth alone. This most closely resembles the situation in a typical social interaction. Dental changes related to tooth luxation were not performed in order to avoid confounding factors with malocclusions.

The natural exfoliation of a primary central upper incisor occurs around 6-8 years of age and that of the primary lateral incisors at around 7-9 years, respectively.¹⁷ The confounding factor associated with 'missing tooth due to natural exfoliation' has been eliminated, since the ages at which children and adolescents were selected to have their images modified (ie, 12-15 years of age) as well as those at which they were selected to participate in the study as image assessors (10-15 years old) were higher than the ages at which the absence of any anteriosuperior incisor would not be considered acceptable. We believe that the results could be different if the ages of the boy and girl in the evaluated images were lower and/or if the ages of the study participants were lower. In both situations, if the individuals (boy and girl) in the modified and evaluated images as well as the children who participated in the study and evaluated the images were younger

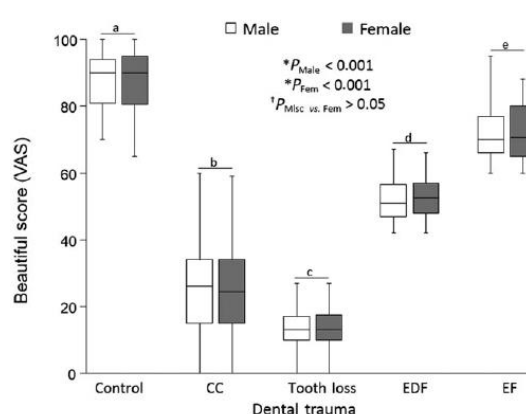


FIGURE 5 Attractiveness score, according to the image's TDI and its consequences, and gender. The height of the rectangle represents quartiles 1 and 3; the line that cuts the rectangle represents the median; the lines connect quartiles 1 and 3 to the minimum and maximum values. Masc, male; Fem, female; CC, colour change; EDF, enamel and dentin fracture; EF, enamel fracture, and tooth loss. *Friedman's test (a, b, c, d, and other letters indicate the statistical difference calculated by the Wilcoxon test); †Mann-Whitney test (comparison of gender for each type of TDI)

(eg, <10 years of age), they would likely judge the absence of an upper central incisor (one of the modifications made) as an acceptable situation due to the natural exfoliation of this tooth at the age of 7-8 years.

Since 12 images were used, six from each photographic model (one boy and one girl), and analysed by different evaluators, it was necessary to have control photographs without dental trauma. For the statistical analysis, the control groups were evaluated in a similar way, as an independent group. This is important in order to show the reliability of the obtained responses.¹⁸

In general, TDIs on the incisors, and their consequences, influenced the social judgments made by the participants. As the severity of the TDI and its consequences increased, the participants attributed less positive characteristics and more negative characteristics, resulting in a final BSJ observed both in the social judgment scale results (Figure 4) and the visual analogue scale results of attractiveness (Figure 5). This result shows that these physical features significantly influenced the psychosocial and beauty perceptions.

Tooth loss was the consequence that most negatively influenced the perception of the participants. This result is in agreement with other studies^{19,20} and can be justified because physical appearance is critical to teenagers and is valued more than any other lifestyle factor.²¹ Besides that, missing teeth have previously been identified as an important factor that influences adolescent's satisfaction with dental appearance²² and self-esteem,³ as also seen in this study.

Dentin fracture (for the 'intelligent' feature) and enamel fracture (for the 'happy', 'friend-like', and 'intelligent' characteristics) did not result in a reduction of the score when compared to the control image. This finding can be attributed to the fact that some minor dental defects may be of low negative influence in some aspects of social judgment or self-conception. Meneghim et al²³ and Wondwossen et al²⁴ evaluated the perception of dental fluorosis in adolescents using images and the conclusions were that teenagers did not have a negative perception of mild dental fluorosis, but did for dental fluorosis at moderate and severe levels.^{23,24} Only more pronounced dental/facial features (such as eyes, absence of smile, absence or colour alteration of teeth) would have a real impact on the evaluation of positive characteristics. Despite this non-significant difference, however, it should be noted that the participants of these two cited studies,^{23,24} as with the participants of this study, were able to detect smile-related problems, represented by a reduction in the mean scores for enamel fractures and enamel/dentine fractures, when compared to the control.

The dental appearance and dental health-related problems of children and adolescents affect their psychological and social well-being, leading to harmful complications, and having a greater impact on their quality of life.²⁵ The perceptions concerning the control images were different from all of the images of TDIs and their consequences, in relation to the negative characteristics evaluated, indicating that all of the TDIs and their consequences had a negative influence on social judgment aspects. This probably occurred because the participants, with their particular age range, put themselves in the 'position of the other' in answering the question, *Would I do that if I were in this condition?*, since they can understand that untreated DTIs in children allow them to be more exposed to physical, functional, and psychological disorders, such as chewing difficulties, and avoiding smiling, laughing, and socializing with others, as has been previously suggested.²

The most common direct aggression is verbal abuse, in the form of nicknames.²⁶ According to a study that investigated the bullying experienced by 11- to 12-year-old children, in which the authors analysed the general physical and dental features that contributed to this phenomenon, teeth were the number one feature targeted for bullying, followed by strength, and weight. When the children were asked which dental features they had been bullied about, missing teeth, and shape or colour of the teeth were the three most commonly reported dental features targeted.²⁷ Our results are in agreement with that finding, in which the presence of TDIs and their consequences significantly influenced the participants' answers to the question, *Do you think that classmates of this boy/girl gave them nicknames?*. In disagreement, no association was found between frequency of bullying at school and dental trauma in a sample of 15- to 16-year-old adolescents

in East London.²⁸ This could be explained by the prevalence of bullying decreasing with age.^{29,30}

In the dental literature, significantly more boys used to report being involved in bullying episodes than girls.^{27,31,32} The dominance of bullying among boys justifies the statistical differences found between the genders in relation to the questions related to 'start fights' (when the person with the TDI and consequences is in the position of bully), and 'gave nicknames' and 'avoided smiling' (when the person with the TDI and consequences is in the position of victim of bullying). Perhaps verbal attacks precede physical aggression. A previous study has shown that adolescent aggressors have low scores of self-satisfaction, being more frequent among boys; the low self-esteem is thought to cause them to attack others.³² Besides that, another study has related that the children in images of children with cleft lips and missing teeth were perceived to be less desirable as friends, leading to an improvement in their tendency towards aggression.¹

Considering the motivation to seek dental treatment, it is suggested that the answers were influenced by two main factors:³³ adolescents 10- to 15-year-olds are already aware of the importance of dental evaluation/treatment, both for minor alterations (enamel fracture) and for significant alterations (enamel and dentin fracture, tooth loss, and colour change); and³³ comparison to others, both in daily life and those that influence social media, in the search for the most desired aesthetic parameters (considered to be beautiful, successful, and influential).

The originality of this study results in a limitation: there have been no studies that have evaluated the influence of different TDIs and their consequences, in terms of social judgment, to compare our results to. Two studies were found in the literature that had evaluated social judgments¹⁹ or psychosocial effects³⁴ and TDI; however, both evaluated only the presence, or not, of TDI. Further information is necessary to clarify the relationship between the different types and consequences of dental trauma and the observations of personality among children and adolescents.

The main result of this study was the observation that an increase in the severity of TDI increases the likelihood of negative social judgment scores. The main clinical significance of these findings is the need for the dentist to prioritize the correction of anterior teeth irregularity in order to improve the perception of dental appearance, through a model of integrated care with a multidisciplinary team approach. Providing better dental appearance appears to have a direct impact on psychosocial issues. The implications of a dental appearance that attracts unfavourable social judgment have a considerable emotional, physical, and social significance.

In conclusion, the questionnaire used proved to be a valid and reliable instrument for evaluating the perceptions and social judgment of children and adolescents in view of different

traumatic dental injuries. 10- to 15-year-old children and adolescents attributed bad social judgment to other children and adolescents with different TDI-C in relation to visible incisor trauma, with tooth loss being the type of trauma consequence that most negatively influenced their social judgments. Following dental trauma, adolescents believed it is necessary to seek dental treatment.

ACKNOWLEDGMENTS

This study was conducted during the doctoral stage of Marcela Baraúna Magno under supervision of the Prof. Lucianne Cople Maia and Prof. Matheus Melo Pithon. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001 - and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - Brasil (FAPERJ).

CONFLICT OF INTEREST

All of the authors have no conflict of interest to disclose.

AUTHORS' CONTRIBUTION

M.B.M. conceived the ideas, collected the data, and wrote the manuscript; S.K.P.C.T. and L.A.J. conceived the ideas and collected the data; R.S.C. analysed the data; L.C.M. and M.M.P. conceived the ideas and final reading of the manuscript.

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How to cite this article: Magno MB, Tristão SKDPC, Jural LA, et al. Does dental trauma influence the social judgment and motivation to seek dental treatment by children and adolescents? Development, validation, and application of an instrument for the evaluation of traumatic dental injuries and their consequences. *Int J Paediatr Dent*. 2019;00:1–15. <https://doi.org/10.1111/ipd.12479>

4.4 Artigo 4: The relationship of previous dental trauma with new cases of dental trauma. A systematic review and meta-analysis

Received: 15 February 2018 | Revised: 1 October 2018 | Accepted: 2 October 2018

DOI: 10.1111/edt.12449

ORIGINAL ARTICLE

WILEY **Dental Traumatology**

The relationship of previous dental trauma with new cases of dental trauma. A systematic review and meta-analysis

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Abstract

Background/Aims: Traumatic dental injuries (TDI) are a public health concern with high prevalence and recurrence rate. The aim of this study was to perform a systematic review and meta-analysis to determine whether previous dental trauma is a predictive factor for new episodes of TDI (recurrence or first episodes).

Materials and Methods: Electronic searches were performed with no language or date restrictions. According to the PECOS strategy, cohort studies that investigated subjects with and without previous TDI, and its association with new TDI episodes, as primary or secondary outcomes, were included. Quality assessment and bias control were carried out according to Fowkes and Fulton guidelines. A meta-analysis was performed by sub-grouping studies into deciduous and permanent dentition, and the risk ratio (RR) was also calculated ($P \leq 0.05$). The evidence was quality-tested using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Results: After titles and abstracts were examined, and full texts were read, five studies were included in this systematic review. Four studies had high methodological quality, and one presented a risk of bias on confounding factors. No association and a positive association were determined between previous history of TDI and new episodes of TDI in the primary (RR 1.26 [0.99, 1.62], $P = 0.06$) and in the permanent dentitions (RR 2.68 [1.20, 4.19], $I^2 = 37\%$, $P < 0.00001$), respectively. The pooled results demonstrated a positive association ($P < 0.00001$) between previous dental trauma and new episodes of TDI (RR 2.17 [1.20, 3.90], $P = 0.01$, $I^2 = 83\%$) with moderate evidence quality level.

Conclusions: Individuals that have suffered previous TDI present a greater risk of suffering new episodes of TDI.

KEYWORDS

child, dental trauma, incidence, tooth injury

1 | INTRODUCTION

Traumatic dental injury (TDI) is a common health problem that affects a large part of the younger population. The prevalence of TDI is variable, with the mean estimated to be 17.5%

by Azami-Aghdash et al¹ although it may affect up to 62.1% of preschool children.² Previous studies have shown that older children, those with overbite or overjet, with inadequate lip coverage,³⁻⁵ and overweight/obese children,⁶ are more likely to have TDI.

Studies conducted on children and adolescents reported that 2%⁷ to 37%⁸ of individuals had sustained a TDI more than once. In relation to the recurrence of TDI, Verzak et al⁹ showed that psychosocial variables did not differentiate between individuals with no experience of dental trauma, with experience of one dental trauma, or with repeated dental trauma. Ceconello and Traeber¹⁰ reported that having increased incisal overjet and inadequate lip coverage was not considered to be risk factors for a new TDI. Chen et al¹¹ examined the prevalence and incidence of incisor trauma in a randomized clinical trial that divided the participants into three groups—headgear or biteplane, bionator, and observation (no treatment)—and concluded that early orthodontic treatment did not affect the incidence of incisor injury. These findings suggest that risk factors for the occurrence of TDI are not related to the recurrence of TDI. So, it seems that changes, or not, in the environmental or physical circumstances of the child will not change the risk of TDI, and recurrent events are likely.

Knowing that the factors related to the causes of TDI are complex and influenced by many variables,¹² and that recurrence is high¹³ and can negatively affect the prognostic of the teeth,¹⁴ determining possible predictor factors associated with TDI is crucial in order to help identify children at greater risk of suffering such injury. In this context, the aim of this systematic review and meta-analysis was to verify the scientific evidence concerning previous dental trauma as a risk factor for new TDI among children and adolescents.

2 | MATERIALS AND METHODS

This systematic review was registered in the PROSPERO database (PROSPERO registry number CRD42017061040) and was undertaken in accordance with the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.¹⁵

Four electronic databases were searched up to June 2017: PubMed, Scopus, Lilacs/BBO, and Web of Science. The gray literature (OpenGrey) was also searched. The search strategy used MeSH terms and synonyms in order not to impose any restrictions and to maximize the search for articles in this research phase (Table 1). The search strategy was guided by an expert librarian (D.M.) and adapted for each database, with no language or date restrictions. A manual search was also performed, and the reference lists of selected articles were used for obtaining additional relevant publications that could have been missed during the database searches. Articles available in more than one database were considered only once. Alerts containing the search strategy were created in the databases.

Based on the PICO/PECO criteria, observational studies that included children or adolescents (P) with prior exposure to some TDI (E) compared to those without prior exposure to TDI (C) to determine the association between previous TDI and new episodes of TDI (recurrence or first episodes) (O) were included. To identify this association, the included studies had to present statistical analyses, including odds ratio (OR), relative risk (RR), prevalence ratio, or be studies that reported frequency of events, and the

total number of children per group. Literature reviews, letters to the editor, case reports or case series, studies only with prevalence results, outcomes other than TDI, and studies of quality of life were excluded.

Two reviewers (M.B.M. and A.B.N.) performed the search strategy, in order to identify eligible studies and independently evaluate the titles and abstracts of all studies identified from the electronic databases. Full-text copies were retrieved from studies that met the inclusion criteria, or for which there were insufficient data in the title and abstract to make a clear decision. These copies were assessed independently. Any disagreements on the eligibility of included studies, at any point in the process, were resolved through consensus or through discussion with a third reviewer (L.C.M.).

Details of the study (author(s), year of publication, country, and study design), details of participants (age, number of participants in case and control groups, and source of sample), study methods (evaluation criteria and follow-up period), and results (prevalence at baseline, new episodes of TDI—recurrence or first episodes—and *P* value) were extracted and tabulated by two reviewers (M.B.M. and A.B.N.). If some information was not clear in the study text, the author was contacted, by e-mail or LinkedIn, to clarify. If, after the contact attempt, there was no response from the author, the study was not included in the meta-analysis.

Regarding concerns about any risk of bias (quality assessment analysis), the article data, concerning methods, participants, and results, were evaluated, extracted, and judged. If relevant data were missing, the authors of the articles were contacted for additional information. Three contacts were made to clarify any doubts.

Quality assessment and risk of bias were applied, according to the guidelines described by Fowkes and Fulton.¹⁶ This quality assessment can be applied to cross-sectional and case-control studies, and cohort and controlled trials, and included questions about study design, study samples, control groups, the quality of measurements and outcomes, completeness, and distorting influences. For each included study, the analyzed criteria assigned were major problems (++), minor problems (+), or no problems (0), in terms of their expected effect on the results. If the question was not applicable, "NA" was written.

The evaluation of each topic of the checklist was standardized by the evaluators. In "Source of sample," major problem (++) was assigned if the group of participants was not representative of the group from which this systematic review was drawn. In "Sampling method," minor problem (+) was assigned when no person, or local randomization, was related. In "Sample size," minor problem (+) was assigned when a representative sample, or the sample size calculation of the population, was not clear, and major problem (++) was assigned when, despite a representative sample being reported, it was not based on the general population age. In "Matching/randomization," if the case and control groups were not matched for certain characteristics, such as age or gender, or if it was not clear in the paper, it was considered a major problem (++); and if overjet and/or lip covered was not matched between the case and control groups, it was considered a major problem (++) for "Comparable characteristics" and "Confounding factors."

TABLE 1 Search strategy (25/01/2018)

PubMed	((Tooth Injuries[mh] OR Tooth Movement[mh] OR Teeth injur*[tiab] OR dental injur*[tiab] OR dental trauma[tiab] OR traumatic injur*[tiab] OR Teeth avulsion[tiab] OR Exarticulation[tiab] OR Dental dislocation[tiab] OR Tooth Movement[tiab] OR teeth extrusion[tiab] OR lateral luxation[tiab] OR Tooth Fractur*[tiab] OR crown fractur*[tiab] OR root fractur*[tiab]) AND (Incidence[mh] OR Probability[mh] OR Recurrence[tiab] OR Predict[tiab] OR Incidence[tiab] OR Risk Factor*[tiab] OR factor related[tiab] OR factors related[tiab] OR Odds ratio[tiab] OR Relative odds[tiab] OR Probabilit*[tiab] OR Prevalence[mh] OR Prevalenc*[tiab]))
Scopus	((TITLE-ABS-KEY (recurrence) OR TITLE-ABS-KEY (predict) OR TITLE-ABS-KEY (incidence) OR TITLE-ABS-KEY ("risk factor") OR TITLE-ABS-KEY ("risk factors") OR TITLE-ABS-KEY ("factor related") OR TITLE-ABS-KEY ("factors related") OR TITLE-ABS-KEY ("odds ratio") OR TITLE-ABS-KEY ("relative odds") OR TITLE-ABS-KEY (probability)) OR TITLE-ABS-KEY (probabilities) OR TITLE-ABS-KEY (prevalence) OR TITLE-ABS-KEY (prevalences) AND (TITLE-ABS-KEY ("tooth avulsion") OR TITLE-ABS-KEY ("tooth injuries") OR TITLE-ABS-KEY ("tooth injury") OR TITLE-ABS-KEY ("tooth movement") OR TITLE-ABS-KEY ("tooth fracture") OR TITLE-ABS-KEY ("tooth fractures") OR TITLE-ABS-KEY ("teeth injury") OR TITLE-ABS-KEY ("teeth injuries") OR TITLE-ABS-KEY ("dental injury") OR TITLE-ABS-KEY ("dental injuries") OR TITLE-ABS-KEY ("dental trauma") OR TITLE-ABS-KEY ("traumatic injury") OR TITLE-ABS-KEY ("traumatic injuries") OR TITLE-ABS-KEY ("teeth avulsion") OR TITLE-ABS-KEY (Exarticulation) OR TITLE-ABS-KEY ("dental dislocation") OR TITLE-ABS-KEY ("teeth extrusion") OR TITLE-ABS-KEY ("lateral luxation") OR TITLE-ABS-KEY ("crown fracture") OR TITLE-ABS-KEY ("crown fractures") OR TITLE-ABS-KEY ("root fracture") OR TITLE-ABS-KEY ("root fractures")) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO (SUBJAREA, "DENT"))
Web of Science	Tópico: (((((((((((((((("Tooth Injuries" OR "Tooth Avulsion") OR "Tooth Movement") OR "Tooth Fracture") OR "tooth fractures") OR "Teeth injury") OR "teeth injuries") OR "dental injury") OR "dental injuries") OR "dental trauma") OR "traumatic injury") OR "traumatic injuries") OR "Teeth avulsion") OR Exarticulation) OR "Dental dislocation") OR "teeth extrusion") OR "lateral luxation") OR "crown fractur") OR "crown fractures") OR "root fracture") OR "root fractures")) AND Tópico: (((((((((((((((("Recurrence OR Predict) OR Incidence) OR "Risk Factor") OR "Risk Factors") OR "factor related") OR "factors related") OR "Odds ratio") OR "Relative odds") OR Probability) OR Probabilities) OR Prevalence) OR prevalence))
Cochrane	#1 MeSH descriptor: [Tooth Injuries] explode all trees 250 #2 "Tooth Injury" or "tooth injuries" or "dental injury" or "dental injuries" or "dental trauma" or "traumatic injury" or "traumatic injuries" 475 #3 #1 or #2 678 #4 "Tooth avulsion" 27 #5 "tooth movement" 444 #6 MeSH descriptor: [Tooth Fractures] explode all trees 192 #7 "Tooth Fracture" or "Tooth Fractures" or "crown fracture" or "crown fractures" or "root fracture" or "root fractures" 294 #8 #6 or #7 298 #9 Exarticulation 1 #10 "Dental dislocation" 0 #11 "teeth extrusion" 0 #12 "lateral luxation" 2 #13 #3 or #4 or #5 or #8 or #9 or #10 or #11 or #12 1217 #14 MeSH descriptor: [Incidence] explode all trees 9989 #15 Incidence 85029 #16 #14 or #15 85029 #17 MeSH descriptor: [Risk Factors] explode all trees 25512 #18 "Risk Factor" or "Risk Factors" or "factor related" or "factors related" 55441 #19 #17 or #18 55441 #20 MeSH descriptor: [Odds Ratio] explode all trees 4121 #21 "Odds ratio" or "Relative odds" 21887 #22 #20 or #21 21887 #23 MeSH descriptor: [Probability] explode all trees 48282 #24 Probability or probabilities 18414 #25 #23 or #24 61041 #26 MeSH descriptor: [Prevalence] explode all trees 5127 #27 Prevalence or prevalences 30085 #28 #26 or #27 30085 #29 Recurrence 35285 #30 Predict 15532 #31 #16 or #19 or #22 or #25 or #28 or #29 or #30 217312 #32 #13 and #31 283

(Continues)

TABLE 1 (Continued)

Lilacs/ BBO	(mh:(Tooth Injuries) OR (mh:(Tooth Movement)) OR (tw:(Tooth Injuries" OR "Tooth Avulsion" OR "Tooth Movement" OR Tooth Fractur\$ OR Teeth injur\$ OR dental injur\$ OR "dental trauma" OR traumatic injur\$ OR "Teeth avulsion" OR Exarticulation OR "Dental dislocation" OR "teeth extrusion" OR "lateral luxation" OR crown fractur\$ OR root fractur\$)) OR (tw:(injuria dental" OR "avulsão dental" OR "movimentação dental" OR "fratura dental" OR "injurias dentais" OR "trauma dental" OR "injurias traumáticas" OR "deslocamento dental" OR extrusão dental" OR luxação lateral" OR "fratura coronária" OR "fratura radicular" OR exarticulação) AND (mh:(Incidence) OR (mh:(Probability)) OR (mh:(Prevalence)) OR (tw:(Recurrence OR Predict OR Incidence OR Risk Factor\$ OR "factor related" OR "factors related" OR "Odds ratio" OR "Relative odds" OR Probabilit\$ OR Prevalenc\$)) OR (tw:(Recorrência OR prever OR previs\$ OR incidência OR "fator de risco" OR "fatores de risco" OR "fator relacionado" OR "fatores relacionados" OR "razão de chance" OR "chance relativa" OR "probabilidade relativa" OR probabilidade\$ OR prevalência\$))
OpenGrey	("Tooth Injuries" OR "Tooth Avulsion" OR "Tooth Movement" OR "Tooth Fracture" OR "tooth fractures" OR "Teeth injury" OR "teeth injuries" OR "dental injury" OR "dental injuries" OR "dental trauma" OR "traumatic injury" OR "traumatic injuries" OR "Teeth avulsion" OR Exarticulation OR "Dental dislocation" OR "teeth extrusion" OR "lateral luxation" OR "crown fractur" OR "crown fractures" OR "root fracture" OR "root fractures") AND (Recurrence OR Predict OR Incidence OR "Risk Factor" OR "Risk Factors" OR "factor related" OR "factors related" OR "Odds ratio" OR "Relative odds" OR Probability OR Probabilities OR Prevalence OR prevalence)

For "Blindness," a minor problem (+) was assigned if the second evaluator was not blinded to the previous trauma. Since the lack of evaluator blindness is not a major problem for the trauma diagnosis, (++) was not considered for this topic. For "Quality control," it was considered to be a minor problem (+) if the study reported training and calibration of the evaluators, but Kappa values were not reported, and it was considered a major problem (++) if no training or calibration were reported. For "Compliance" and "Dropouts," it was a minor problem (+) if the number of dropouts was higher than 30%, but justified, and a major problem (++) if the number of dropouts was higher than 30%, but not justified. For "Distortion reduced by analysis," it was a minor problem (++) if no multiple logistic regression analysis was made to verify the effect of each confounding variable on the risk of TDI. This quality check provided evidence for answering summary questions concerning the methodological soundness of the studies.

Once a detailed appraisal of the methods and results had been conducted, a summary of methodological quality was performed, based on three summary questions, that allowed determination of the possibility of "results erroneously biased in a certain direction," "serious confounding or other distorting influences," and the "results occurred by chance." If one of these three summary questions were answered with "yes," then there was a high probability that the research presented a high risk of bias. This process was performed by two reviewers (M.B.M. and A.B.N.), independently, and was also checked by a third reviewer (L.C.M.).

The quality of the evidence (certainty in the estimates of effect) was determined for the outcome using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach,¹⁷ where observational studies start as low evidence, and the quality of, or certainty in, the body of evidence decreases to very low quality, if serious or very serious issues, related to risk of bias, inconsistency, indirectness, imprecision, and publication bias, are present. In addition, the quality of the evidence can be upgraded if the magnitude of effect is large or very large, a dose-response was showed, or if the effect of all plausible confounding factors would be to reduce the effect, or suggest a spurious effect. In this way, the quality of the evidence can vary from very low to

high. Two reviewers (M.B.M. and L.C.M.) independently conducted these evaluations.

The meta-analysis was performed using Review Manager software 5.3, in order to assess the relationship between previous TDI and new episodes of TDI. A sub-group analysis was performed, with a subset of studies involving trauma in the deciduous dentition, and another of studies involving the permanent dentition.

Only the studies with methodological soundness were included in the meta-analysis. As the purpose of this meta-analysis was to evaluate the presence of previous TDI as a risk factor to have a new TDI, the incidence of subjects that suffered dental trauma, with and without previous TDI, was extracted to calculate the crude risk ratio (RR) of each study. If confounding factors were present, the adjusted RRs were combined to measure effect as a log RR and the standard error of the log RR using generic inverse-variance weighting method in another meta-analysis. The pooled RR was calculated, a random-effect model was used, and heterogeneity was assessed, using the I^2 index. A sensitivity analysis was conducted, in order to estimate and verify the influence of the studies, one by one, on the pooled result.¹⁸

3 | RESULTS

A high number ($n = 9278$) of potentially relevant articles were initially retrieved from the databases, and 2487 of these were excluded because they were duplicates. After application of the eligibility criteria, a large number of studies ($n = 6768$) were excluded, and only 23 full texts were read. Of these, 16 papers were excluded because of overlap (1), absence of a control group (4), not related to oral injury (2), or they presented only the overall population TDI incidence, without sub-groups indicating whether there had been previous TDI episodes or not (11). Thus, only five studies^{13,19-22} met the inclusion criteria and were selected for quality assessment and risk of bias, and only four of these were included in the quantitative synthesis. No articles were found by manual searching. Figure 1 summarizes the study selection process.

All included studies were of prospective observational design. From these, one was conducted in India,¹⁹ three in Brazil,^{13,20,21} and

one in Greece.²² Ages of the included participants ranged from one to 13 years old, and the locales for the data collection were schools¹⁹⁻²¹ and vaccination campaigns.¹³ Venderas and Papagiannoullis²² did not report the locale of their data collection.

Dental injuries were assessed according to Andreasen's criteria in four studies. In one of them, Andreasen's criteria were adopted without any modification;²⁰ in two of them, Andreasen's criteria were applied to evaluate only crown fractures;^{13,19} and in the other study, Andreasen's criteria were applied with a criterion for soft injuries.²² The fifth study by Ramos-Jorge et al²¹ classified TDI according to the Children's Dental Health Survey of the UK. A total of 397 children and adolescents were included in the case group (with

previous TDI). New episodes of TDI (recurrence or first episode) in this group ranged from 11.9% to 64.6%, while 977 children and adolescents were included in the control group (without previous TDI), and new episodes of TDI in this group ranged from 2.7% to 51.2%. The follow-up period ranged from 1 to 3 years. A higher incidence of new episodes of TDI was observed in the study that included a lower age range (1-4 years) and evaluated only a crown fracture as a TDI.¹³ All of the articles found statistical significance between the occurrence of previous dental trauma and new episodes of TDI. Table 2 presents the data extracted from the five included studies.

Regarding concerns of any risk of bias (quality assessment), for a representative sample, Basha et al¹⁹ Goettems et al.,²⁰ Ramos-Jorge

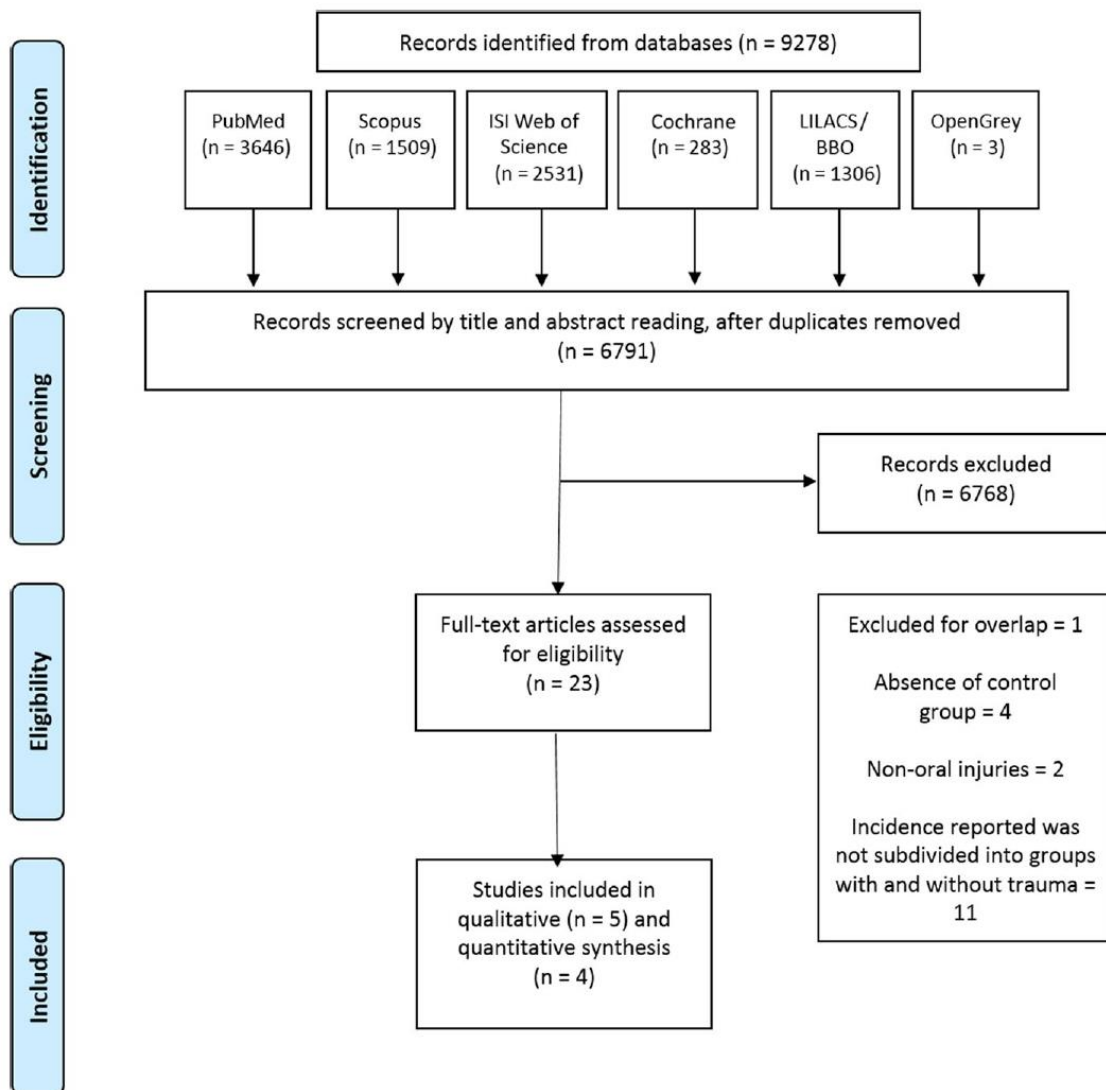


FIGURE 1 Flow diagram of the search results from the databases

TABLE 2 Description of included studies

Author, year, country	Study design	Age range (mean) years	Source of sample	Number of participants		Evaluation criteria	Follow-up period	Prevalence at baseline		New episodes of TDI (recurrence or first episodes)		Results
				Case	Control			Case (%)	Control (%)	Case (%)	Control (%)	
Basha et al (2015) ¹⁹ India	Cohort	13 y	Schools	131	633	Andreasen's criteria with the inclusion of only crown fracture	3 y	131 (16.6)	42 (6.63)	27 (20.61)	42 (6.63)	0.0001 Children with obesity and overweight had 2.78 times greater chance suffering TDI even after adjusting for relevant risk factors and covariates.
Corrêa-Faria et al (2016) ¹³ Brazil	Cross-sectional with prospective longitudinal	1-4 y	Vaccination campaigns	65	129	Andreasen's criteria with the inclusion of only crown fracture	1 y	91 (34.8)	66 (51.2)	42 (64.6)	66 (51.2)	<0.001 The incidence of crown fracture was high, and children with previous crown fracture had a greater risk of suffering new cases of crown fracture during the 1-y follow-up period.
Gottens et al (2017) ²⁰ Brazil	Longitudinal	FP: 2-5 y SP: 8-11 y	Schools	42	68	Andreasen's criteria	Minimum 3 y	209 (36.6)	16 (23.5)	18 (42.9)	16 (23.5)	0.03 Individuals with previous trauma in the primary dentition are prone to further trauma in the permanent dentition.
Ramos-Jorge et al (2008) ²¹ Brazil	Cohort	11-13 y	Schools	159	147	Children's Dental Health Survey of the UK	2 y	(10.7 in the cross-sectional phase of the study / n=2260)	4 (2.7)	19 (11.9)	4 (2.7)	<0.001 Individuals with previous dental trauma had greater chances of developing further dental trauma in a 2-y follow up.
Vanderas et al (1999) ²²	NR	8-10 y	NR	NR	NR	Andreasen's criteria and a criteria for soft injuries	2 y	NR	NR	NR	NR	"The present prospective study showed a high incidence of dent facial injuries in children. The highest incidence was recorded for dental injuries followed by facial injuries, historical evidence of injuries, and dental and facial injuries."

FP, First phase; SP, second phase; NR, not reported.

TABLE 3 Quality assessment according to Folks and Fulton¹⁶

Guideline	Checklist	Basha et al ¹⁹	Corrêa-Faria et al ¹³	Goettems et al ²⁰	Ramos-Jorge et al ²¹	Vanderas and Papagiannoulis ²²
	Objective					
Study design appropriate to objective?	Prevalence	NA	NA	NA	NA	NA
	Prognosis	NA	NA	NA	NA	NA
	Treatment	NA	NA	NA	NA	NA
	Cause	0	0	0	0	0
Study sample representative?	Source of sample	0	0	0	0	0
	Sampling method	+	0	+	+	+
	Sample size	+	0	0	+	+
	Entry criteria/exclusions	0	0	0	0	0
	Non-respondents	NA	NA	NA	NA	NA
Control group acceptable?	Definition of controls	0	0	0	0	0
	Source of controls	0	0	0	0	0
	Matching/randomization	0	0	0	0	++
	Comparable characteristics	++	++	++	0	++
Quality of measurements and outcomes?	Validity	0	0	0	0	0
	Reproducibility	0	0	0	0	0
	Blindness	+	+	0	+	+
	Quality control	0	0	0	0	+
Completeness?	Compliance	0	0	0	0	0
	Dropouts	0	0	0	0	0
	Deaths	NA	NA	NA	NA	NA
	Missing data	0	0	0	0	0
Distorting influences?	Extraneous treatments	NA	NA	NA	NA	NA
	Contamination	NA	NA	NA	NA	NA
	Changes over time	0	0	0	0	0
	Confounding factors	++	++	++	0	++
	Distortion reduced by analysis	+	0	0	0	++
Summary questions	Bias—Are the results erroneously biased in a certain direction?	NO	NO	NO	NO	NO
	Confounding—Are there any serious confounding or other distorting influences?	NO	NO	NO	NO	YES
	Chance—Is it likely that the results occurred by chance?	NO	NO	NO	NO	NO

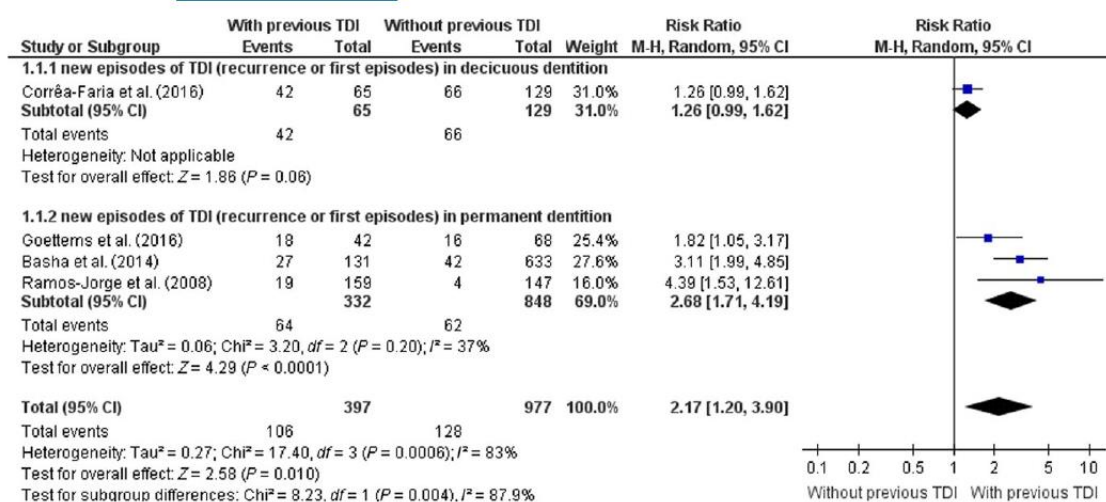


FIGURE 2 Association between previous dental trauma episode and risk of new episodes of TDI (recurrence or first episodes)

et al.,²¹ and Vanderas and Papagiannoulis²² did not describe any method for randomization, which was considered to be a minor problem. Basha et al¹⁹ Ramos-Jorge et al²¹ and Vanderas and Papagiannoulis²² did not provide any sample size, although all had a representative sample ($n = 764$, $n = 306$, and $n = 199$, respectively), so this was a minor problem.

In relation to the quality of measurements and outcomes, Basha et al¹⁹ Correa-Faria et al¹³ Ramos-Jorge et al²¹ and Vanderas and Papagiannoulis²² did not perform a blinding of the second examiner (for evaluation of new cases of trauma), but this did not seem to influence the analyses or results. Vanderas and Papagiannoulis²² reported that the examiners were trained and/or calibrated, but no Kappa values were reported. This was considered to be a minor problem.

With respect to the control group and confounding factors, the studies of Basha et al¹⁹ Correa-Faria et al¹³ and Goettems et al²⁰ did not present control or case groups paired for overjet of >3 mm, or for lip coverage, which was considered to be a major problem. Despite this, a statistical analysis was performed by them to determine the effects of these confounding variables on the risk of children with previous dental trauma experiencing new cases of TDI. The Vanderas and Papagiannoulis²² study groups were not paired for these factors, and the statistical analysis did not consider this. For this reason, that study was classified as a major problem in the control group and confounding factors.

As the outcomes of the Correa-Faria et al¹³ and Goettems et al²⁰ studies were related to trauma, this was not considered a problem for "Distortion reduced by analysis." However, this was

TABLE 4 Evidence profile: previous trauma as a risk factor for traumatic dental injuries

Certainty assessment					
No of participants (studies)	Risk of bias	Inconsistency	Indirectness	Imprecision	Others considerations
Follow up					
Overall					
1374 (4 observational studies)	Not serious	Not serious ^a	Not serious	Not serious	Strong association
Incidence/Further cases of TDI in deciduous dentition—children 1 to 4 y old (follow up: 1 y)					
194 (1 observational study)	Not serious	Not serious	Not serious	Very serious ^b	None
Incidence/Further cases of TDI in permanent dentition—children and adolescents 8-13 y old (follow-up range: 2—minimum of 3 y)					
1180 (3 observational studies)	Not serious	Not serious	Not serious	Not serious	Strong association

CI, confidence interval; RR, risk ratio.

^aAlthough heterogeneity remains high (83%), the analysis of subgroups identified that it occurs due to the different dentitions analyzed.

^bTotal number lower than 300 and the 95% CI overlaps no effect (CI includes RR of 1.0).

considered a minor problem for Basha et al¹⁹ where the outcome was related to obesity. In view of the careful statistical analysis, this was not considered to be a major problem for the summary question related to confounding factors. Although Vanderas and Papagiannoulis²² met the eligibility criteria, they did not provide sufficient data about the outcome and for this reason that was classified as a major problem.

Although some minor and major problems were identified, most of the studies were assessed as having high methodological quality.^{13,19-21} Only one study was considered as having "Any serious confounding or other distorting influences."²² Table 3 describes the risk of bias in the five included studies, classified according to the Fowkes and Fulton¹⁶ quality assessment.

Regarding quantitative synthesis (meta-analysis), Vanderas and Papagiannoulis²² did not provide sufficient data and did not return any contact attempts. Hence, this study was not included in the meta-analysis. The quantitative synthesis was performed with four studies.^{13,19-21}

Only one study¹³ was included in the sub-group that analyzed new episodes of TDI (recurrence or first episodes) in the deciduous dentition, and no association was identified between previous history of TDI and new episodes of TDI in primary teeth (RR 1.26 [0.99, 1.62], $P = 0.06$). Three studies analyzed new episodes of TDI (recurrence or first episodes) in the permanent dentition,¹⁹⁻²¹ and a positive association was determined between previous history of TDI and new cases of TDI in permanent teeth (RR 2.68 [1.20, 4.19], $I^2 = 37%$, $P < 0.00001$).

In the pooled results, the heterogeneity was substantial ($I^2 = 83%$). During sensitivity analysis, the heterogeneity range from 37% to 89%. Regardless of the value of heterogeneity, the overall effect remained unchanged, showing that the result of this meta-analysis is real. The authors decided to remain with the analysis including all possible studies and random-effects models were employed. The pooled meta-analysis comprised a total of 1374 children,

397 with a previous history of TDI and 977 without. Of the children that had previous trauma, 106 (26.7%) presented new cases of dental trauma, while 128 (13.1%) children that had not previously suffered dental trauma presented a first case of this type of injury. The overall new episodes of TDI (recurrence or first episodes) were 17.03%. Children that had suffered some type of TDI had more than twice the chance of having another case of TDI (RR 2.17 [1.20; 3.90], $P = 0.01$, $I^2 = 83%$) (Figure 2) than children that had not previously had a TDI. Sensitivity analysis showed that the omission of any study would not modify the association between previous TDI and new episodes of TDI. No funnel plot was generated, since only four studies were included.¹⁸

Three of the four studies included in the meta-analysis provided adjusted odds ratio (OR), instead of adjusted RR data. Since OR is not suitable for risk evaluation, a meta-analysis with adjusted effect was not possible.

The four studies included in the meta-analysis were used with the GRADE approach.^{13,19-21} A moderate quality of evidence for the outcome of new episodes of TDI without previous TDI, compared to a previous history of TDI, was found for the pooled results since the magnitude of the effect was considered to be large (RR > 2 or <0.5, based on consistent evidence from at least two studies, with no plausible confounders), and one point was upgraded. In the "deciduous dentition" sub-group GRADE, for "Imprecision," Cochrane¹⁷ considered a total number of events of less than 300 to be very low for dichotomous outcomes and, besides that, the 95% CI overlaps had no effect (CI includes RR of 1.0), and for these reasons, two points were downgraded (considered "some imprecision") in this sub-group analysis. In the "permanent dentition" sub-group GRADE, the magnitude of the effect was considered to be large and one point was upgraded, so this sub-group evidence remained at three points, with a moderate quality level. The quality of evidence is described in Table 4.

Overall certainty of evidence	Summary of findings			Anticipated absolute effects	
	Study event rates (%)		Relative effect (95% CI)	Risk with/without previous trauma	Risk difference with previous trauma
	With/without previous trauma	With previous trauma			
⊕⊕⊕⊕ MODERATE	128/977 (13.1%)	106/397 (26.7%)	RR 2.17 (1.20 to 3.90)	131 per 1.000	153 more per 1.000 (26 more to 380 more)
⊕○○○ VERY LOW	66/129 (51.2%)	42/65 (64.6%)	RR 1.26 (0.99 to 1.62)	512 per 1.000	133 more per 1.000 (5 fewer to 317 more)
⊕⊕⊕⊕ MODERATE	62/848 (7.3%)	64/332 (19.3%)	RR 2.68 (1.71 to 4.19)	73 per 1.000	123 more per 1.000 (52 more to 233 more)

4 | DISCUSSION

Dental trauma is considered to be a major health problem because it affects a large number of people, with higher prevalence rates among children and adolescents.^{1,23} Although there are a lot of studies concerning the risk factors associated with TDI episodes, the literature has gaps regarding the identification of predictor factors and the recurrence of TDI, and, as such, most of the investigations offer a cumulative incidence of data on dental trauma.^{10,11}

The goal of a systematic review is to provide the best available evidence, given a specific research question, since pooled analysis of the results of all relevant studies can provide a more precise conclusion than one derived from a single study alone.²⁴ Meta-analysis is a statistical method used for summarizing the results of independent studies included in a systematic review.¹⁸ In order to fill this knowledge gap, this systematic review was developed with the purpose of verifying the relationship between a previous history of TDI as a risk factor for new episodes of TDI. Five studies were included in the systematic review, and four of them in the meta-analysis. The pooled results show that new episodes of TDI are greater in children and adolescents that present a previous history of TDI.

Analyzing the details of the included studies, and conducting a critical appraisal of the research, is an important step in a systematic review, in order to discover whether the methods and results of the research are sufficiently valid to produce useful information.²⁴ Fowkes and Fulton¹⁶ contain guidelines that provide a standardized approach to quality assessment in cross-sectional, case-control, and cohort studies. This tool has been efficiently used in dentistry systematic reviews.^{25,26} All studies included in this meta-analysis received a "no problem" classification in the summary questions related to presence of bias, confounding factors, and results occurred by chance, showing their good methodological quality. Besides that, the evidence was classified as moderate, which means that the true effect is likely to be close to the estimate of the effect.¹⁷

An important point is that this systematic review and meta-analysis include only cohort studies. This type of primary study design has the benefit of controlling the dental records for TDI methodological development, permits the calculation of incidence rates (absolute risk), as well as relative risk, and provides a clear temporal sequence of exposure and disease, when compared to retrospective or cross-sectional studies.^{27,28} Besides that, all studies included in this review involve trained and/or calibrated examiners, by way of demonstrating the good methodological quality of the included studies.

Three of the four studies included in this meta-analysis were conducted in Brazil. Although this was a limitation of this review, the results of the studies, analyzed individually, show homogeneity in their results, since most of them show a statistically significant association¹⁹⁻²¹ between children and adolescents that had suffered some type of TDI having more chance of experiencing new episodes of TDI. Probably, new cohort studies with methodologies similar

to those of the included studies will present similar results to the present meta-analysis, since the pooled results present a large magnitude of effect. However, ideally, more studies in other countries need to be conducted.

The studies included in this systematic review have two moments of evaluation: the first, baseline (that determines the prevalence of TDI), and the second, after follow up (that determines new episodes of TDI). The studies in which the first evaluation was performed during the deciduous dentition stage presented a higher prevalence of TDI (36.6%²⁰ and 34.8%¹³) than studies in which the first evaluation was performed during the permanent dentition stage (16.6%¹⁹ and 10.7%²¹). This is perhaps explained by individuals in this age range (0-3 years) still being in the motor development phase, thus presenting a higher number of cases of collisions and falls.²⁹ Besides that, the heads of the children are relatively larger than the children's bodies, due to the rapid growth of the brain, resulting in a greater number of injuries to the craniofacial skeleton.^{30,31}

It is important to highlight that no study was conducted in a dental clinical situation. All of them were conducted in schools or vaccination clinics. Because of this, only a clinical evaluation could be performed, without radiographic analysis. Only two studies reported crown discoloration,^{20,21} loss of teeth due to trauma,²¹ and fistula as a sequel to dental trauma.²⁰ This may represent under-diagnosis, since traumatic dental injuries, based on both clinical and radiographic evidence, are more obvious than when based on clinical examination alone.³² As a result, root fractures, alveolar fractures and luxation without clinical sequelae were not considered.

Several factors have been reported as risk factors for the prevalence of TDI, with the most commonly reported being increased overjet and absence of lip coverage.^{2,3,5} Concerning the incidence of TDI, Ceconello and Traibert¹⁰ did not identify increased overjet and absence of lip coverage as risk factors for reoccurrence of TDI. A limitation of the present study was the impossibility of performing a meta-analysis of adjusted risk ratio, since only data of adjusted odds ratio were present in most of the included studies. In this sense, studies with statistical adjustments considering increased overjet and absence of lip coverage and their effect in the incidence of TDI are encouraged in the future.

The results of this meta-analysis contribute to creating a trauma risk profile of an individual.²¹ The presence of some dental trauma, or sequel, during a clinical examination should serve as a clinical and relevant alert to the need to identify possible anatomical, physical, behavioral, environmental, and health-related factors that can predispose children to TDI. Therefore, a detailed patient history and clinical oral examination are very important in identifying and preventing/treating TDI.

Based on the results of this systematic review and meta-analysis, it can be concluded that there is evidence of an association between previous dental trauma and the recurrence of TDI. Individuals that have suffered previous TDI present more of a chance of suffering new episodes of TDI, supporting previous research that suggested that certain children may be accident-prone.²¹ This conclusion should guide public health authorities,

and clinicians must consider a preventive, individualized treatment plan for children and adolescents that present any TDI, in order to avoid new episodes of TDI.

5 | CONCLUSIONS

A history of TDI increases the risk of new episodes of TDI. When dental trauma appears in the dental office, preventive measures must be adopted in order to avoid new cases of TDI, thereby avoiding greater consequences for children and adolescents.

ACKNOWLEDGEMENTS

This study was conducted during the doctoral stage of Marcela Baraúna Magno, under supervision of the Prof. Lucianne Cople Maia. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001 - and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - Brasil (FAPERJ) process numbers E-26/202.191/2018.

CONFLICT OF INTEREST

The authors confirm that they have no conflict of interest.

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How to cite this article: Magno MB, Neves AB, Ferreira DM, Pithon MM, Maia LC. The relationship of previous dental trauma with new cases of dental trauma. A systematic review and meta-analysis. *Dent Traumatol*. 2019;35:3–14. <https://doi.org/10.1111/edt.12449>

4.5 Artigo 5: Are traumatic dental injuries greater in alcohol or illicit drugs consumers? A systematic review and meta-analysis

Drug and Alcohol Dependence 197 (2019) 236–249



Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep



Are traumatic dental injuries greater in alcohol or illicit drugs consumers? A systematic review and meta-analysis



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ARTICLE INFO

Keywords:
Street drugs
Alcohol drinking
Tooth injuries
Literature review

ABSTRACT

Introduction and aims: Traumatic dental injuries (TDI), alcohol and illicit drugs consumption are highly-prevalent public health concerns. The aim of this study was to evaluate the association between alcohol and/or illicit drugs consumption and the presence of TDI.

Design and methods: This review was performed in accordance with MOOSE and PRISMA guidelines. Electronic searches were performed to find observational studies that investigated subjects that consumed alcohol and/or illicit drugs associated with TDI. Data extraction and a risk of bias assessment were performed. Three meta-analyses (MA) were performed to evaluate the association between TDI and alcohol consumption (1stMA), subgrouping the studies into alcohol intake and binge-drinking, alcohol-related problems (2ndMA), and drugs (3rdMA). The odds ratio (OR) were calculated ($p \leq 0.05$) for all analyses. The evidence was certainty-tested using the GRADE approach.

Results: Twelve articles met the eligibility criteria. Nine studies were methodologically sound, while three had some confounding factors. In the pooled MA, an association between alcohol consumption and TDI (OR 1.57[1.33,1.85], $p = 0.00001$) was determined with moderate certainty of evidence, confirmed in the subgroups of alcohol intake (OR 1.49[1.17,1.90], $p = 0.001$) and binge-drinking (OR 1.68[1.30,2.18], $p = 0.0001$). No associations were found between TDI and risk for alcohol-related problems and drug use (OR 0.75[0.50,1.14], $p = 0.18$, and OR 1.20[0.82,1.75], $p = 0.27$, respectively), with both analyses having a very low certainty of evidence.

Discussion and conclusions: There is moderate evidence concerning the association between alcohol use and TDI. Despite the absence of an association between illicit drugs use, alcohol-related problems and the presence of TDI, these results should be viewed with caution, since they had very low-certainty-evidence.

1. Introduction

Traumatic dental injuries (TDI) are a significant public health problem due to their high prevalence (Cortes et al., 2001), their impact on quality of life with potential for negative impacts on social relations (Antunes et al., 2013) and treatment expense (Glendor et al., 2007). Several biological and anatomical factors have been associated with the increased prevalence of TDI, such as accentuated overjet and inadequate lip seal (Correa-Faria et al., 2015), obesity (Basha et al., 2015), and socioeconomic status (Correa-Faria et al., 2015); however, social determinants and behavioral risk factors also influence the occurrence of TDI and should not be neglected.

The use of illicit drugs and alcohol consumption have been considered to be significant social problems because they present high prevalence (Greene et al., 2017; Underwood et al., 2010) and an increasingly early onset (Stahre et al., 2009; Paiva et al., 2015). Alcohol and illicit drugs consumption can result in TDI through intentional and unintentional injuries once these substances consumption can affect cognitive judgment, psychomotor skills, reaction time, visual focus, and concentration, encouraging individuals to take on risk behavior, and hence making the user more prone to either intentional or accidental injury (Gould, 2010; Taylor et al., 2010). Besides that, compulsive drug-seeking behavior due to dependence can lead to risk-taking behaviors, such as violent acts and accidents (Degenhardt et al., 2014).

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<https://doi.org/10.1016/j.drugalcdep.2018.12.028>

Received 1 October 2018; Received in revised form 26 November 2018; Accepted 6 December 2018

Available online 20 February 2019

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Studies in the literature that have evaluated the association between alcohol and/or illicit drugs and TDI have reported conflicting results (Paiva et al., 2015; Baig Enver et al., 2016; Damarasingh et al., 2008; Reis et al., 2014; Filho et al., 2014). While (Damarasingh et al., 2008) and Enver et al. (Baig Enver et al., 2016) found no support for an association between TDI and illicit drugs use and/or alcohol consumption, Filho et al. (2014) in their cross-sectional study, concluded that a higher prevalence of TDI was associated with the use of illicit drugs. Also, Paiva et al. (2015) and Reis et al. (2014) suggested that binge-drinking is associated with TDI. Elucidating these conflicting reports, and identifying the evidence among these associations, is fundamental for planning adequate intervention policies that can address both biological and behavioral factors that can serve as mediators of these public health problems.

To this end, the following systematic review was conducted in order to answer the following focused question: Are TDI greater in alcohol or illicit drugs users?

2. Materials and methods

2.1. Protocol and registration

This systematic review was registered in the PROSPERO database (PROSPERO registry number CRD42018096074), and was undertaken in accordance with the guidelines of the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) Group (Stroup et al., 2000) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009).

2.2. Sources, search and study selection

Five electronic databases were searched, up to November 2018, including PubMed, Scopus, Web of Science, Lilacs/BBO, and the Cochrane Library. The grey literature (OpenGrey) was also searched. The search strategy used MeSH terms and synonyms in order not to impose any restrictions, and to maximize the search for articles in this research phase (Table 1). The search strategy was adapted for each database, with no language or date restrictions. A manual search was also performed, and the reference lists of selected articles were used for obtaining additional relevant publications that could have been missed during the database searches. Articles available in more than one database were considered only once. Alerts containing the search strategy were created in the databases.

Based on the PICO/PECO criteria, observational studies that included children, adolescents or adults (P) that consumed/used alcohol and/or illicit drugs (E) compared to those that non-consumed/non-used (C) were included to determine the association between these variables and TDI (O), as primary or secondary outcomes. The drugs were classified as illegal according to the National Institute on Drug Abuse (Stroup et al., 2000; Moher et al., 2009; Ridderikhof et al., 2017) To identify presence of association, the included studies had to present statistical analyses, including prevalence ratio, odds ratio (OR), and risk ratio, or be studies that reported frequency of events, and the total number of individuals per group. Literature reviews, letters to the editor, case reports or case series, studies with only prevalence results, outcomes other than TDI, studies of quality of life and those that did not report any associations between TDI and consumption/use of alcohol and/or illicit drugs were excluded.

Two reviewers (M.B.M. and K.L.F.L.) discussed the search criteria and performed the search strategy, in order to identify eligible studies. These reviewers independently evaluated the titles and abstracts of all studies identified from the electronic databases. Full-text copies were retrieved from studies that met the inclusion criteria, or for which there were insufficient data in the title and abstract to make a clear decision possible. Any disagreements on the eligibility of the included studies, at any point in the process, were resolved through consensus, or through

discussion with a third expert reviewer (L.C.M.).

2.3. Data extraction

Details of the study (author(s), year of publication, country, and study design), details of participants (age range, number of participants in case and control groups, and source of sample), study methods (evaluation criteria for alcohol and/or illicit drugs consumption/use), results (overall prevalence of TDI, prevalence of TDI in case and control groups, and p value), and study conclusions were extracted by two reviewers (M.B.M. and K.L.F.L.). In studies for which additional data were necessary, the corresponding authors were contacted by e-mail or LinkedIn (weekly, up to five times), in order to clear up doubts. If, after the contact attempt, there was no response from the author, the study was not included in the meta-analysis.

2.4. Risk of bias (quality assessment analysis)

Evaluation of the methodological quality of the selected studies was carried out separately and independently by the same two examiners (M.B.M. and K.L.F.L.), following the guidelines described by (Fowkes and Fulton, 1991). This quality assessment can be applied to cross-sectional, case-control, and cohort studies, and included questions about study design, study samples, control groups, the quality of measurements and outcomes, completeness, and distorting influences. For each included study, the analysed criteria assigned were: problems – major (++), minor (+), or no problems (Atanasov, 2003), in terms of their expected effect on the results. If the question was not applicable, 'NA' was written.

The evaluation of each topic on the checklist was standardized by the evaluators. In 'source of sample', major problem (++) was assigned if the group of participants was not representative of the group from which this systematic review was drawn. In 'sampling method', minor problem (+) was assigned when no person, or local randomization, was related. In 'sample size', minor problem (+) was assigned when a representative sample, or the sample size calculation of the population, was not clear, and major problem (++) was assigned when, despite a representative sample being reported, it was not based on the general population age. In 'matching/randomization', if the case and control groups were not matched on age or sex, or if this was not clear in the paper, it was considered a major problem (++); and if overjet and/or lip covered was not matched between the case and control groups, it was considered a major problem (++) for 'comparable characteristics' and 'confounding factors'.

For 'reproducibility' and 'validity', it was considered a major problem (++) if the study did not use previously validated criteria for TDI or alcohol/drug consumption/use. For 'blindness', a minor problem (+) was assigned if the evaluator was not blinded to the group's case and control, or did not report any comments on this issue. Since the lack of evaluator blindness is not a major problem for the trauma diagnostic, major problem (++) was not considered for this topic. For 'quality control', it was considered to be a minor problem (+) if the study reported training and calibration of the evaluators, but kappa values were not reported; it was considered a major problem (++) if no training or calibration was reported, or if the study adopted self-reporting by participants. For 'compliance' and 'dropouts', it was NA if the study presented a cross-sectional or case-control design, a minor problem (+) if, in cohort studies, the number of dropouts was higher than 30%, but justified, and a major problem (++) if the number of dropouts was higher than 30%, but not justified. For 'distortion reduced by analysis', it was a major problem (++) if the case and control group were not paired for matching and confounding factors, and no multiple logistic regression analysis was performed to verify the effect of each confounding variable on the risk of TDI. In case of absence of significant difference, an NA* classification was adopted for 'distortion reduced by analysis' due to the impossible application of multiple logistic

Table 1
Search strategy.

Pubmed (922)	((((Alcoholism[Mesh Terms] OR alcoholism[tiab] OR Alcohol Drinking[Mesh Terms] OR Alcohol Drinking[tiab] OR alcohol[tiab] OR Alcoholic Beverages[Mesh] OR Alcoholic beverage[tiab] OR Alcoholic[Mesh] OR Alcoholic[tiab]) OR (Drug users[mesh terms] OR drug user*[tiab] OR Illicit Drug*[tiab] OR drug* abuse[tiab] OR drug*[tiab] OR Cannabis[mesh terms] OR cannabis*[tiab] OR marijuana*[tiab] OR marihuana*[tiab] OR Codeine [mesh terms] OR codeine[tiab] OR crack cocaine[mesh terms] OR crack[tiab] OR cocaine[mesh terms] OR cocaine[tiab] OR Heroin[mesh terms] OR Heroin[tiab] OR Amphetamine[mesh terms] OR Amphetamine[tiab] OR methamphetamine[mesh terms] OR methamphetamine[tiab] OR Inhalant Abuse [mesh terms] OR Inhalant[tiab] OR glues[tiab] OR butane[tiab] OR propane[tiab] OR aerosol propellants[tiab] OR nitrous oxide[tiab] OR isobutyl[tiab] OR Methadone[mesh terms] OR Methadone[tiab] OR ecstasy[tiab] OR Lysergic acid diethylamide[mesh terms] OR LSD[tiab] OR Mescaline[mesh terms] OR mescaline[tiab] OR Psilocybin[mesh terms] OR Psilocybin[tiab])) AND ((Tooth Injuries[mh] OR Tooth Avulsion[mh] OR Tooth Movement[mh] OR Tooth Fractures[mh] OR Teeth injur*[tiab] OR dental injur*[tiab] OR dental trauma[tiab] OR traumatic injur*[tiab] OR Teeth avulsion[tiab] OR Exarticulation[tiab] OR Dental dislocation[tiab] OR Tooth Movement[tiab] OR teeth extrusion[tiab] OR lateral luxation[tiab] OR Tooth Fractur*[tiab] OR crown fractur*[tiab] OR root fractur*[tiab]))
Scopus (1041)	(TITLE-ABS-KEY (alcoholism) OR TITLE-ABS-KEY ("Alcohol Drinking") OR TITLE-ABS-KEY ("Alcohol Drink") OR TITLE-ABS-KEY (alcohol) OR TITLE-ABS-KEY ("Alcoholic beverage") OR TITLE-ABS-KEY ("Alcoholic beverages") OR TITLE-ABS-KEY (alcoholic*) OR TITLE-ABS-KEY ("drug user") OR TITLE-ABS-KEY ("drug users") OR TITLE-ABS-KEY ("Illicit Drug") OR TITLE-ABS-KEY ("Illicit Drugs") OR TITLE-ABS-KEY ("drug abuse") OR TITLE-ABS-KEY ("drugs abuse") OR TITLE-ABS-KEY (drug*) OR TITLE-ABS-KEY (cannab*) OR TITLE-ABS-KEY (marijuana*) OR TITLE-ABS-KEY (marihuana*) OR TITLE-ABS-KEY (codeine) OR TITLE-ABS-KEY (crack) OR TITLE-ABS-KEY (cocaine) OR TITLE-ABS-KEY (heroin) OR TITLE-ABS-KEY (amphetamine) OR TITLE-ABS-KEY (methamphetamine) OR TITLE-ABS-KEY (inhalant) OR TITLE-ABS-KEY (glues) OR TITLE-ABS-KEY (butane) OR TITLE-ABS-KEY (propane) OR TITLE-ABS-KEY ("aerosol propellants") OR TITLE-ABS-KEY ("nitrous oxide") OR TITLE-ABS-KEY (isobutyl) OR TITLE-ABS-KEY (methadone) OR TITLE-ABS-KEY (ecstasy) OR TITLE-ABS-KEY ("Lysergic acid diethylamide") OR TITLE-ABS-KEY (lsd) OR TITLE-ABS-KEY (mescaline) OR TITLE-ABS-KEY (psilocybin)) AND (TITLE-ABS-KEY ("tooth avulsion") OR TITLE-ABS-KEY ("tooth injuries") OR TITLE-ABS-KEY ("tooth injury") OR TITLE-ABS-KEY ("tooth movement") OR TITLE-ABS-KEY ("tooth fracture") OR TITLE-ABS-KEY ("tooth fractures") OR TITLE-ABS-KEY ("teeth injury") OR TITLE-ABS-KEY ("teeth injuries") OR TITLE-ABS-KEY ("dental injury") OR TITLE-ABS-KEY ("dental injuries") OR TITLE-ABS-KEY ("dental trauma") OR TITLE-ABS-KEY ("traumatic injury") OR TITLE-ABS-KEY ("traumatic injuries") OR TITLE-ABS-KEY ("teeth avulsion") OR TITLE-ABS-KEY (exarticulation) OR TITLE-ABS-KEY ("dental dislocation") OR TITLE-ABS-KEY ("teeth extrusion") OR TITLE-ABS-KEY ("lateral luxation") OR TITLE-ABS-KEY ("crown fracture") OR TITLE-ABS-KEY ("crown fractures") OR TITLE-ABS-KEY ("root fracture") OR TITLE-ABS-KEY ("root fractures")) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO (SUBJAREA, "DENT"))
Web of science (878)	(alcoholism OR "Alcohol Drinking" OR "Alcohol Drink" OR alcohol OR "Alcoholic beverage" OR "Alcoholic beverages" OR alcoholic* OR "drug user" OR "drug users" OR "Illicit Drug" OR "Illicit Drugs" OR "drug abuse" OR "drugs abuse" OR drug* OR cannabis* OR marijuana* OR marihuana* OR codeine OR crack OR cocaine OR heroin OR amphetamine OR methamphetamine OR inhalant OR glues OR butane OR propane OR "aerosol propellants" OR "nitrous oxide" OR isobutyl OR methadone OR ecstasy OR "Lysergic acid diethylamide" OR lsd OR mescaline OR psilocybin) AND ("tooth avulsion" OR "tooth injuries" OR "tooth injury" OR "tooth movement" OR "tooth fracture" OR "tooth fractures" OR "teeth injury" OR "teeth injuries" OR "dental injury" OR "dental injuries" OR "dental trauma" OR "traumatic injury" OR "traumatic injuries" OR "teeth avulsion" OR exarticulation OR "dental dislocation" OR "teeth extrusion" OR "lateral luxation" OR "crown fracture" OR "crown fractures" OR "root fracture" OR "root fractures")
Lilacs – BBO (1357)	((mh:(Alcoholism)) OR (mh:(Alcohol Drinking)) OR (mh:(Alcoholic Beverages)) OR (mh:(Alcoholics)) OR (mh:(Drug users)) OR (mh:(Cannabis)) OR (mh:(Codeine)) OR (mh:(crack cocaine)) OR (mh:(cocaine)) OR (mh:(heroin)) OR (mh:(Amphetamine)) OR (mh:(methamphetamine)) OR (mh:(Inhalant Abuse)) OR (mh:(Methadone)) OR (mh:(Lysergic acid diethylamide)) OR (mh:(Mescaline)) OR (mh:(Psilocybin)) OR (tw:(alcoholism OR "Alcohol Drinking" OR alcohol OR "Alcoholic beverage" OR Alcoholic* OR drug user* OR drug* abuse OR drug* OR cannabis* OR marijuana* OR marihuana* OR codeine OR crack OR cocaine OR Heroin OR Amphetamine OR methamphetamine OR Inhalant OR glues OR butane OR propane OR "aerosol propellants" OR "nitrous oxide" OR isobutyl OR Methadone OR ecstasy OR LSD OR mescaline OR Psilocybin OR alcohol OR alcoholismo OR maconha OR cocaina OR heroína OR anfetamina OR metanfetamina OR metadona OR inalantes))) AND ((mh:(Tooth Injuries)) OR (mh:(Tooth Movement)) OR (tw:(("Tooth Injuries" OR "Tooth Avulsion" OR "Tooth Movement" OR Tooth Fractur* OR Teeth injur* OR dental injur* OR "dental trauma" OR traumatic injur* OR "Teeth avulsion" OR Exarticulation OR "Dental dislocation" OR "teeth extrusion" OR "lateral luxation" OR crown fractur * OR root fractur* OR "injuria dental" OR "avulsão dental" OR "movimentação dental" OR "fratura dental" OR "injurias dentais" OR "trauma dental" OR "injurias traumáticas" OR "deslocamento dental" OR extrusão dental" OR luxação lateral" OR "fratura coronária" OR "fratura radicular" OR exarticulação))))
Cochrane (187)	#1MeSH descriptor: [Alcohols] explode all trees34894 #2MeSH descriptor: [Alcohol Drinking] explode all trees3404 #3MeSH descriptor: [Alcoholic Beverages] explode all trees485 #4MeSH descriptor: [Alcoholics] explode all trees34894 #5[alcoholism OR "Alcohol Drinking" OR alcohol OR "Alcoholic beverage" OR Alcoholic OR alcoholics]:ti,ab,kw21242 #6MeSH descriptor: [Drug Users] explode all trees100 #7MeSH descriptor: [Cannabis] explode all trees281 #8MeSH descriptor: [Crack Cocaine] explode all trees84 #9MeSH descriptor: [Cocaine] explode all trees898 #10MeSH descriptor: [Heroin] explode all trees292 #11MeSH descriptor: [Amphetamines] explode all trees1647 #12MeSH descriptor: [Methamphetamine] explode all trees443 #13MeSH descriptor: [Inhalant Abuse] explode all trees3 #14MeSH descriptor: [Methadone] explode all trees1145 #15MeSH descriptor: [Lysergic Acid Diethylamide] explode all trees66 #16MeSH descriptor: [Mescaline] explode all trees7 #17MeSH descriptor: [Psilocybin] explode all trees51 #18("drug user" OR "drug users" OR "Illicit Drug" OR "Illicit Drugs" OR "drug abuse" OR "drugs abuse" OR drug OR drugs OR cannabis OR marijuana OR marihuana OR marihuana OR crack OR cocaine OR heroin OR amphetamine OR methamphetamine OR inhalant OR glues OR butane OR propane OR "aerosol propellants" OR "nitrous oxide" OR isobutyl OR methadone OR ecstasy OR "Lysergic acid diethylamide" OR lsd OR mescaline OR psilocybin):ti,ab,kw 480,917 #19#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18#97844 #20MeSH descriptor: [Tooth Injuries] explode all trees255 #21MeSH descriptor: [Tooth Avulsion] explode all trees24 #22MeSH descriptor: [Tooth Fractures] explode all trees196 #23("Tooth Injury" OR "tooth injuries" OR "dental injury" OR "dental injuries" OR "dental trauma" OR "traumatic injury" OR "traumatic injuries" OR "Tooth avulsion" OR "tooth movement" OR "Tooth Fracture" OR "Tooth Fractures" OR "crown fracture" OR "crown fractures" OR "root fracture" OR "root fractures" OR Exarticulation OR "Dental dislocation" OR "teeth extrusion" OR "lateral luxation"):ti,ab,kw1169 #24#20 OR #21 OR #22 OR #23#1173 #25#19 AND #24#187
OpenGrey (3)	(alcoholism OR "Alcohol Drinking" OR "Alcohol Drink" OR alcohol OR "Alcoholic beverage" OR "Alcoholic beverages" OR alcoholic* OR "drug user" OR "drug users" OR "Illicit Drug" OR "Illicit Drugs" OR "drug abuse" OR "drugs abuse" OR drug* OR cannabis* OR marijuana* OR marihuana* OR codeine OR

(continued on next page)

Table 1 (continued)

crack OR cocaine OR heroin OR amphetamine OR methamphetamine OR inhalant OR glues OR butane OR propane OR "aerosol propellants" OR "nitrous oxide" OR isobutyl OR methadone OR ecstasy OR "Lysergic acid diethylamide" OR lsd OR mescaline OR psilocybin) AND ("tooth avulsion" OR "tooth injuries" OR "tooth injury" OR "tooth movement" OR "tooth fracture" OR "tooth fractures" OR "teeth injury" OR "teeth injuries" OR "dental injury" OR "dental injuries" OR "dental trauma" OR "traumatic injury" OR "traumatic injuries" OR "teeth avulsion" OR exarticulation OR "dental dislocation" OR "teeth extrusion" OR "lateral luxation" OR "crown fracture" OR "crown fractures" OR "root fracture" OR "root fractures")

regression. It was considered no problem (Atanasov, 2003) if the study performed statistical adjustments for matching and confounding factors not paired between groups. This quality check provided evidence for answering summary questions concerning the studies' methodological soundness.

Once a detailed appraisal of the methods and results had been conducted, a summary of the methodological quality was performed, based on three questions that allowed the determination of the possibility of 'results erroneously biased in a certain direction', 'serious confounding or other distorting influences', and 'results occurred by chance'. 'Distortion reduced by analysis' was directly related to the 'serious confounding or other distorting influences' question and, if the study presented no problem (Atanasov, 2003) to this criterion, the answer 'NO' was given to this summary question. If 'distortion reduced by analysis' had a minor or major problem, 'YES' was given to this summary question.

If one of these three summary questions was answered with 'YES', then there was a high probability that the research was not methodologically sound, and presented a high risk of bias. This process was performed by two reviewers (M.B.M. and K.L.F.L.), independently, and was also checked by a third experienced reviewer (L.C.M.).

2.5. Quantitative synthesis (meta-analysis)

The meta-analysis was performed, using Review Manager software v. 5.3, in order to assess the relationship between alcohol consumption and TDI, and to assess the relationship between drugs use and TDI. Two pooled meta-analyses were performed to evaluate the association between TDI and alcohol intake, and another was performed for TDI and drugs consumption.

For the alcohol analysis, the first meta-analysis evaluated the association between alcohol consumption and TDI. This meta-analysis was subgrouped according to the quantity of alcohol intake (yes X no) and binge-drinking (defined as having five or more drinks on a single occasion) (Lima et al., 2005). For the analysis, the number of TDI (events) for the case/exposed and control groups was included. The second meta-analysis evaluated the association between risk for alcohol-related problems and TDI. For this one, the number of TDI (events) for the case/exposed (high risk for alcohol-related problems) and control (abstinence or a low risk for alcohol-related problems) group were included.

The third meta-analysis evaluated the association between illicit drugs use (yes X no) and the presence of TDI. The number of TDI (events) for the case/exposed (drugs use) and control (non-drugs use) groups were included in this analysis.

For all meta-analyses, the OR was calculated, a random-effect model was used, and heterogeneity was assessed, using the I^2 index. To be included in the meta-analysis, the studies had to be considered to be methodologically sound after application of all three summary questions proposed by the risk of bias assessment tool. If necessary, a sensitivity analysis was conducted in order to estimate and verify the influence of the studies, one by one, on the pooled result (Higgins and Green, 2011).

2.6. Assessment of the certainty of the evidence

The certainty of the evidence (certainty in the estimates of effect) was determined for the outcome using the Grading of Recommendations Assessment, Development and Evaluation (GRADE)

approach (Ryan and Hill, 2016), whereby observational studies start as low evidence, and the quality of, or certainty in, the body of evidence decreases to low or very low quality, if serious or very serious issues, related to risk of bias, inconsistency, indirectness, imprecision, and publication bias, are present. In addition, the quality of the evidence can be upgraded if the magnitude of effect is large or very large, a dose-response was showed, or if the effect of all plausible confounding factors would be to reduce the effect, or suggest a spurious effect. In this way, the quality of the evidence can vary from very low to high.

3. Results

3.1. Study selection

Initially, 4,388 of potentially relevant articles were retrieved from searched databases; 572 records were excluded because they were duplicates. After title, abstract, and full text evaluation, 12 studies (Paiva et al., 2015; Baig Enver et al., 2016; Damarasingh et al., 2008; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; de Paiva et al., 2016; Paiva et al., 2014; Perheentupa et al., 2001; Reece, 2007) met the inclusion criteria, and were selected for quality and risk of bias assessment. Nine studies were included in the quantitative synthesis, since they qualified through being found to have methodological soundness. No further articles were found by manual searching. Fig. 1 summarizes the study selection process.

3.2. Characteristics of studies included in the systematic review

All 12 included studies had observational designs. Of these, two were conducted in London (Baig Enver et al., 2016; Damarasingh et al., 2008), eight in Brazil (Paiva et al., 2015; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; de Paiva et al., 2016; Paiva et al., 2014), one in Queensland

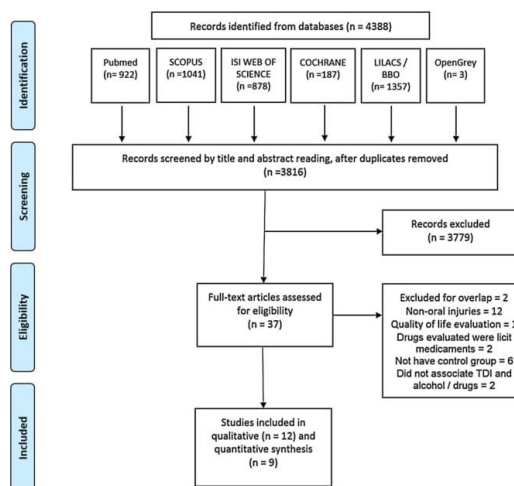


Fig. 1. Flow diagram of the search results from the databases.

(Reece, 2007), and one in Finland (Perheentupa et al., 2001), and the ages of the included participants ranged from 11 to 45 years old.

Ten studies evaluated the association between TDI and alcohol consumption, in which the Alcohol Use Disorders Identification Test (AUDIT) (Reis et al., 2014; Jorge et al., 2012; Oliveira Filho et al., 2013) and its short version, AUDIT-C (Paiva et al., 2015; de Paiva et al., 2015; Paiva et al., 2014), were the tests most used to identify the frequency of alcohol intake and binge-drinking. In addition, one study evaluated through personal recall (Reece, 2007), postal questionnaire (Perheentupa et al., 2001), health survey for young people in England, the Office for National Statistics (ONS) national surveys for adolescents (Baig Enver et al., 2016), and the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) (de Paiva et al., 2016).

Five studies evaluated the association between TDI and illicit drugs use, most of them applying the ASSIST questionnaire for this (Filho et al., 2014; Jorge et al., 2012; de Paiva et al., 2016). (Damarasingh et al., 2008) used questions taken from the UK ONS survey for teenagers, and Reece et al. (Reece, 2007) made an evaluation through personal recall.

TDI were assessed according to Andreassen et al.'s criteria (Paiva et al., 2015; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; de Paiva et al., 2016; Paiva et al., 2014), Glendor et al.'s criteria (Baig Enver et al., 2016; Damarasingh et al., 2008; Oliveira Filho et al., 2013), a computer-based questionnaire (Perheentupa et al., 2001), and patient self-reporting (Reece, 2007).

The prevalence of TDI in case/exposition (consumption/use of alcohol and/or illicit drugs) groups ranged from 0% to 75%, while in the control groups, the prevalence of TDI ranged from 14.1% to 68.8%. Six studies supported the association between alcohol consumption and TDI (Paiva et al., 2015; Reis et al., 2014; Oliveira Filho et al., 2013; Paiva et al., 2014; Perheentupa et al., 2001; Reece, 2007), while three studies did not support it (Baig Enver et al., 2016; Jorge et al., 2012; Paiva et al., 2014). Concerning the relation between illicit drugs use and TDI, three studies supported this association (Filho et al., 2014; de Paiva et al., 2016; Reece, 2007), while two studies did not support it (Damarasingh et al., 2008; Jorge et al., 2012). Table 2 presents the description of the included studies.

3.3. Risk of bias (quality assessment)

Table 3 describes the risk of bias in the 12 included studies, classified according to the Fowkes and Fulton (1991) quality assessment.

For a representative sample, Paiva et al. (2014) and Reece (2007) did not describe any method for randomization, which was considered to be a minor problem. These two studies (Paiva et al., 2014; Reece, 2007) and Reis et al. (2014) did not report the sample size, adopting a convenience sample, thus this was a minor problem.

In relation to 'acceptance' of the control group, most of the studies presented major problems in 'matching' and 'comparable characteristics' due to not present, not evaluated, or not described pairing between the case and control groups for age and gender (Paiva et al., 2015; Filho et al., 2014; de Paiva et al., 2015; Oliveira Filho et al., 2013; de Paiva et al., 2016; Paiva et al., 2014), and for accentuated overjet and absence of lip covered (Paiva et al., 2015; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; de Paiva et al., 2016; Paiva et al., 2014; Perheentupa et al., 2001; Reece, 2007), respectively.

In relation to the quality of measurements and outcomes, Perheentupa et al. (2001) and Reece (2007) performed the TDI and alcohol/drugs use analyses through a questionnaire and, due to this methodology, these were classified with minor problems for 'validity' and 'reproducibility', and with major problems for 'quality control'. None of the included studies reported that the evaluators were blind, but this fact did not seem to influence the analyses or results.

Concerning completeness, Perheentupa et al. (2001) had the number of dropouts being higher than 30%, but not justified, so

considered a major problem.

With respect to 'distortion reduced by analysis', five studies (Paiva et al., 2015; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Oliveira Filho et al., 2013) did not present case and control groups paired for gender, age, overjet, and absence of lip covered, but performed statistical treatments to minimize this problem, which was considered no problem. In two studies (Jorge et al., 2012; Paiva et al., 2014), this treatment was not possible due to 'non-statistical significance' observed in the crude analysis of the association between the variables in question in this systematic review (alcohol/drugs and TDI), so this criterion was classified as NA* for these studies. Paiva et al. (de Paiva et al., 2016), (Perheentupa et al., 2001), and Reece et al. (Reece, 2007) did not perform statistical adjustments for confounding variables, being a major problem.

Although some minor and major problems were identified, most of the studies were assessed as having high methodological quality (Paiva et al., 2015; Baig Enver et al., 2016; Damarasingh et al., 2008; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; Paiva et al., 2014). Two studies (Perheentupa et al., 2001; Reece, 2007) were considered as having 'results erroneously biased in a certain direction', and three (de Paiva et al., 2016; Perheentupa et al., 2001; Reece, 2007) were considered as having any 'serious confounding or other distorting influences'. Studies (de Paiva et al., 2016; Perheentupa et al., 2001; Reece, 2007) had major problems for 'validity', 'reproducibility', 'dropouts', and 'distortion reduced by analysis', were finally considered not methodologically sound in the summary questions, and so were not considered eligible for meta-analysis.

3.4. Meta-analysis and quality of evidence

Nine studies were included in the meta-analysis (Paiva et al., 2015; Baig Enver et al., 2016; Damarasingh et al., 2008; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; Paiva et al., 2014).

3.4.1. Alcohol consumption

Six studies were included in this meta-analysis. The overall heterogeneity was null ($I^2 = 15\%$, $p = 0.47$). For the alcohol intake subgroup, of the total individuals that consumed alcohol ($n = 865$), 30.6% ($n = 265$) presented TDI, while 21% ($n = 284$) of the total of individuals that did not consume alcohol ($n = 1350$) presented TDI. The alcohol intake people presented a 49% higher chance of suffering TDI (OR 1.49 [1.17, 1.90], $p = 0.001$, $I^2 = 15\%$). Concerning the binge-drinking subgroup, of the total binge-drinking individuals ($n = 439$), 34.5% ($n = 151$) presented TDI, while 25% ($n = 208$) of the total non-binge-drinking individuals ($n = 833$) presented TDI. Binge-drinking people presented a 1.68 higher chance of suffering TDI (OR 1.68 [1.30, 2.18], $p < 0.0001$, $I^2 = 0\%$).

Pooled results showed that alcohol consumption, independent of quantity, was associated with a greater prevalence of TDI (OR 1.57 [1.33, 1.85], $p < 0.0001$; Fig. 2). This evidence was qualified as moderate (Table 4).

3.4.2. Risk for alcohol-related problems

Three studies were included in this analysis. The heterogeneity was substantial ($I^2 = 70\%$, $p = 0.04$). During sensitivity analysis, the heterogeneity ranged from 0% to 82%. In an attempt to reduce heterogeneity, Oliveira Filho et al. (2013) was excluded from this analysis. Of the total individuals considered at high risk for alcohol-related problems ($n = 165$), 20% ($n = 33$) presented TDI, while 24.5% ($n = 228$) of the total individuals considered to be abstinent or at low risk for alcohol-related problems ($n = 932$) presented TDI. The level of risk for alcohol-related problems did not influence the chances of an individual suffering TDI (OR 0.75 [0.50, 1.14], $p = 0.18$, $I^2 = 0\%$, $I^2 p = 0.46$; Fig. 3). This evidence was qualified as low (Table 4).

Table 2
Description of included studies.

Author, year, country	Study design	Age range (years)	Source of sample	Number of participants		Evaluation criteria for alcohol	Evaluation criteria for drugs	Evaluation criteria for TDI	Prevalence of TDI	Episodes of TDI		Results	Conclusions
				Case	Control					Case (%)	Control (%)		
Damarasingh et al. 2018, ¹⁴ East London, UK.	Cross-sectional	15–16 (Phase III)	618	Phase I: 39 Phase I: 579	–	–	Questions taken from the UK ONS survey for teenagers	Glendor et al.	Phase III: 8.7%	Phase I: 7 (17%)	Phase I: 98 (16.9%)	There was no significant association between lifetime prevalence of illicit drug use reported at age 11–12 years OR: 1.07 (0.45–2.54) or age 15–16 years OR: 1.19 (0.74–1.93) and TDI.	This study did not support the association between illicit drug use and TDI.
Bag Envers et al. 2016, ¹⁵ East London, UK.	Cross-sectional	15–16 (Phase III)	635	Phase II: 157 Phase II: 461	Health Survey for young people in England and the ONS national surveys in adolescents	–	–	Glendor et al.	Phase III: 17%	Phase III: 30 (19.1%) Lifetime alcohol consumption: 16.3%	Phase III: 75 (16.3%) Lifetime alcohol consumption: 17.7%	No significant association of alcohol consumption with TDI was seen in these adolescents for either lifetime (adjusted OR: 0.87; 0.45–1.67) or last month consumption of alcohol (adjusted OR: 0.86; 0.28–2.69).	This study did not support the association between alcohol use and TDI.
Joyge et al., 2012, ²⁶ Belo Horizonte, Brazil.	Cross-sectional	15–19	891	Last month alcohol consumption: 22 Alcohol: 613 Alcohol: 756	AUDIT	ASSIST	Andreasen et al.	220 (24.7%)	Last month alcohol consumption: 18.2% Alcohol: 220 (24.7%)	Last month alcohol consumption: 17.5% Alcohol: 186 (24.6%)	No statistically significant associations were found between alcohol and illicit drug use and a history of TDI.	This study did not support the association between alcohol and illicit drugs use and TDI.	

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Table 2 (continued)

Author, year, country	Study design	Age range (years)	Source of sample	Number of participants		Evaluation criteria for alcohol	Evaluation criteria for drugs	Evaluation criteria for TDI	Prevalence of TDI	Episodes of TDI		Results	Conclusions
				Case	Control					Case (%)	Control (%)		
Oliveira Filho et al., 2013, ²⁷ Diamantina, Minas Gerais, Brazil	Cross-sectional	14-19	738		AUDIT	-	Glendor et al.		26.60%			Dental trauma was significantly associated with a high risk of problems related to alcohol intake (P = 0.031), hazardous alcohol use (P = 0.009) and binge drinking (P = 0.036). The results of the Poisson logistic regression revealed that hazardous alcohol use [PR = 1.30 (95% CI: 1.01–1.66) P = 0.042] remained associated with dental trauma independently from age, gender, overjet, and type of school.	This study support the association between alcohol use and TDI.
Oliveira Filho et al., 2014, ⁶ Diamantina, Minas Gerais, Brazil	Cross-sectional	14-19	701	48	639	-	ASSIST	Andreasen et al.	183 (26.6%)	21 (43.8%)	162 (25.5%)	Dental trauma was more prevalent among adolescents who had used marijuana and/or cocaine in their lifetime (P = 0.005). The regression results revealed that illicit drug use was still associated with dental trauma independent of other variables [PR = 1.54 (95% CI: 1.06–2.24)	This study support the association between illicit drugs use and TDI.

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Table 2 (continued)

Author, year, country	Study design	Age range (years)	Source of sample	Number of participants		Evaluation criteria for alcohol	Evaluation criteria for drugs	Evaluation criteria for TDI	Prevalence of TDI	Episodes of TDI		Results	Conclusions
				Case	Control					Case (%)	Control (%)		
Paiva et al., 2014 (a), ²⁹ Minas Gerais, Brazil	Cross-sectional	12	101	34	67	AUDIT-C	-	Andreasen et al.	33.70%	15 (45.5%)	23 (54.5%)	Statistically, dental trauma was not associated with the consumption of alcoholic beverages (p = 0.281) or abusive consumption of alcoholic beverages (p = 0.207). (OR: 1.54; 0.68, 3.73). The prevalence of traumatic dental injuries was significantly higher among those who engaged in binge drinking (adjusted PR = 1.410; 95% CI: 1.133–1.754)	This study did not support the association between alcohol use and TDI.
Paiva et al. Minas Gerais, Brazil 2014 (b) ⁹	Cross-sectional	12	588	Binge drinking: 136	Binge drinking: 452	AUDIT-C	-	Andreasen et al.	29.90%	Binge drinking: 55 (31.3%)	Binge drinking: 121 (68.8%)	The prevalence of traumatic dental injuries was significantly higher among those who engaged in binge drinking (adjusted PR = 1.410; 95% CI: 1.133–1.754)	This study support the association between alcohol use and TDI.
Paiva et al. 2016, ²⁸ Minas Gerais, Brazil	Cross-sectional	12	588	Alcohol intake: 264 Binge drinking: 136	Alcohol intake: 324 Binge drinking: 452	AUDIT-C	-	Andreasen et al.	29.90%	Alcohol intake: 91 (51.7%) Binge drinking: 55 (59.5%)	Alcohol intake: 85 (48.3%) Binge drinking: 121 (26.7%)	Binge drinking remained significantly associated with TDI after adjustments (Adjusted OR 1.928 (1.213, 3.0.63)	This study support the association between alcohol use and TDI.
Paiva et al. 2016, ²⁸ Minas Gerais, Brazil	Cross-sectional	12	588	Alcohol: 275 Marijuana: 9 Cocaine: 4 Inhalants: 10 Hallucinogens: 1	Alcohol: 313 Marijuana: 579 Cocaine: 584 Inhalants: 578 Hallucinogens: 587	ASSIST	ASSIST	Andreasen et al.	29.90%	Alcohol: 91 (33.1%) Marijuana: 6 (66.7%) Cocaine: 3 (75%) Inhalants: 3 (30%) Hallucinogens: 0	Alcohol: 85 (27.2%) Marijuana: 170 (29.4%) Cocaine: 173 (29.6%) Inhalants: 173 (29.9%) Hallucinogens: 176 (30%)	Alcohol: OR 133 (0.93-1.89)	This study support the association between illicit drugs use and TDI.

(continued on next page)

Table 2 (continued)

Author, year, country	Study design	Age range (years)	Source of sample	Number of participants		Evaluation criteria for alcohol	Evaluation criteria for drugs	Evaluation criteria for TDI	Prevalence of TDI	Episodes of TDI		Results	Conclusions
				Case	Control					Case (%)	Control (%)		
Perheentupa et al., 2001. ³⁰ Northern Finland and Helsinki.	Cohort	31 years longitudinal birth	5737	Dental fractures: 553 Luxation and avulsion: 554	Postal questionnaire	–	Computer-based questionnaire	43.3% for fractures, 14.3% for luxation and avulsion	Dental fractures: 233 (42.1%)	Dental fractures: 233 (42.1%)	Lower or average consumption: 1353 (39.7%) High consumption: 839 (50.8%) Luxation and avulsion Lower or average consumption: 392 (11.5%) High consumption: 324 (19.6%)	Lower or average consumption: RR 0.94, 0.85–1.05 High consumption: RR 1.20, 1.08–1.34* Luxation and avulsion Lower or average consumption: RR 0.80, 0.64–1.00 High consumption: RR 1.36, 1.08–1.70*	This study support the association between high consumption of alcohol and TDI.
Reece et al., 2007. ³¹ Brisbane, Queensland.	Cross-sectional	19–45	275	228 1651	Personal recall (not specified)	–	Patient report (not specified)	NR	Mean (SD)	Mean (SD)	Statistically, addicts had more alcohol than non-addicts (p = 0.0434)	This study support the association between alcohol consumption and drugs use and TDI.	
Reis et al., 2014. ¹⁵ Minas Gerais, Brazil	Cross-sectional	11–19	207	NR	AUDIT	–	Andreasen et al.	19.80%	0.02 (0.15)	0.02 (0.15)	Statistically, adolescents that consumption alcohol had more alcohol than non-consumers (p = 0.013). Adjusted PR 057 (0.28–1.15) (0119)	This study support the association between alcohol consumption and TDI.	

DI Traumatic Dental injuries. AUDIT Alcohol Use Disorders Identification Test. ONS Office for National Statistics. ASSIST Alcohol, Smoking and Substance Involvement Screening Test. NR Not reported.

Table 3
Quality assessment according Folks and Fulton (Fowkes and Fulton, 1991).

Guideline	Objective	Checklist	Damasasingh et al. 2018, ¹⁴	Erver et al. 2016, ¹³	Jorge et al. 2012, ²⁶	Oliveira Filho et al. 2013, ²⁷	Oliveira Filho et al. 2014, ¹⁶	Paiva et al. 2014, ^(a) / ²⁹	Paiva et al. 2014, ^(b) / ⁹	Paiva et al. 2015, ²⁵	Paiva et al. 2016, ²⁸	Perhentupa et al. 2001, ³⁰	Reece et al. 2007, ³¹	Reis et al. 2014, ¹⁵	
Study design appropriate to objective?	Prevalence	Common design	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Prognosis	Cross sectional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Treatment	Cohort	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cause	Controlled trial	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cohort, case-control, cross-sectional													
Study sample representative?	Source of sample		0	0	0	0	0	0	0	0	0	0	0	0	0
	Sampling method		0	0	0	0	0	0	0	0	0	0	0	0	0
	Sample size		0	0	0	0	0	0	0	0	0	0	0	0	0
	Entry criteria/exclusions		0	0	0	0	0	0	0	0	0	0	0	0	0
Control group acceptable?	Non-respondents		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Definition of controls		0	0	0	0	0	0	0	0	0	0	0	0	0
	Source of controls		0	0	0	0	0	0	0	0	0	0	0	0	0
	Matching/randomization		0	0	0	0	0	0	0	0	0	0	0	0	0
Quality of measurements and outcomes?	Comparable characteristics		0	0	0	0	0	0	0	0	0	0	0	0	0
	Validity		0	0	0	0	0	0	0	0	0	0	0	0	0
	Reproducibility		0	0	0	0	0	0	0	0	0	0	0	0	0
	Blindness		+	+	+	+	+	+	+	+	+	+	+	+	+
Completeness?	Quality control		0	0	0	0	0	0	0	0	0	0	0	0	0
	Compliance		+	+	+	+	+	+	+	+	+	+	+	+	+
	Dropouts		+	+	+	+	+	+	+	+	+	+	+	+	+
	Deaths		+	+	+	+	+	+	+	+	+	+	+	+	+
Distorting influences?	Missing data		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Extraneous treatments		0	0	0	0	0	0	0	0	0	0	0	0	0
	Contamination		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Changes over time		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Confounding factors		0	0	0	0	0	0	0	0	0	0	0	0	0
Summary questions	Distortion reduced by analysis		0	0	0	0	0	0	0	0	0	0	0	0	0
	Bias - Are the results erroneously biased in a certain direction?		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Confounding - Are there any serious confounding or other distorting influences?		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Chance - Is it likely that the results occurred by chance?		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

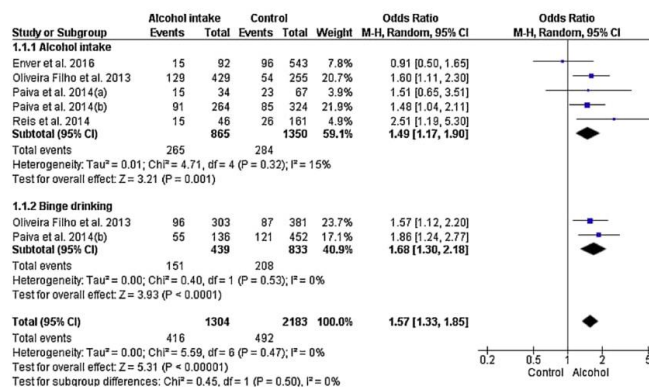


Fig. 2. Forest plot of association between alcohol consumption and TDI.

3.4.3. Drugs use

Three studies were included in this meta-analysis with insignificant heterogeneity ($I^2 = 24\%$, $p = 0.27$). Of the total individuals that already used drugs ($n = 68$), 22.7% ($n = 299$) presented TDI, while 23.2% ($n = 440$) of the total individuals that never used drugs ($n = 1894$) presented TDI. People that used and did not use illicit drugs presented a similar chance of suffering TDI (OR 1.20 [0.82, 1.75], $p = 0.35$; Fig. 4). This evidence was qualified as very low due serious problems with imprecision (Table 4).

4. Discussion

This systematic review, using four meta-analyses, shows that alcohol intake and binge-drinking are associated with TDI, while a high risk for alcohol-related problems and drugs use are not.

The studies included in this review were carefully evaluated through a validated methodological checklist, following the guidelines described by Fowkes and Fulton (1991). Whilst these guidelines were created for the evaluation of medical studies, they have previously been used in the dental field (Penoni et al., 2017; Lenzi et al., 2015). Considering these guidelines, the studies of Perheentupa et al. (2001) and Reece et al. (Reece, 2007) had certain methodological limitations, as only participant self-reporting was used to access the presence of TDI, without professional statements or dental files. As TDI diagnostics should ideally be performed based on clinical and/or radiographic examination (Diangelis et al., 2017), their results could have been erroneously biased in a certain direction. Apart from that, those two studies (Perheentupa et al. (2001); Reece, 2007) and that of Paiva et al. (de Paiva et al., 2016) did not perform statistical adjustments to eliminate confounding factors and, because of this, their results could have contained serious confounding, or other distorting, influences.

The studies included in this review had enough in common that it made sense to synthesize their information; however, they were performed in different countries, with different age-range populations and TDI criteria for diagnosis. Because of this, it could not be assumed that the studies were functionally equivalent and, since the goal of meta-analysis is usually to generalize to a range of scenarios (Borenstein et al., 2007), the random-effects model was applied in all of the meta-analyses.

The presented meta-analysis results show that alcohol consumption was significantly associated with TDI. Previous studies have reported that alcohol consumption is associated with aggressive behavior (Kivimaki et al., 2014), violence (Sonderlund et al., 2014), and traffic accidents (Karakus et al., 2015), which can result in dental and maxillofacial trauma (Goulart et al., 2015; Jayaraj et al., 2012). The greater effect for the binge-drinking subgroup (OR 1.68), in relation to the

effect of the alcohol intake subgroup (OR 1.49), could suggest that the amount of alcohol consumption is related to the increased chance of TDI. This is in accordance with Savola et al. (2005) and Lee et al. (2017), who reported the involvement of binge-drinking in head and maxillofacial fractures, and that trauma risk increased with increasing blood alcohol levels.

This finding emphasizes the adverse consequences of binge drinking due the deleterious effects of alcohol on psychomotor skills and the lack of preventive mechanisms to respond to situational hazards. The quantity of alcohol consumption has been shown to be more predictive of interpersonal violence related injury than frequency of drinking (Borges et al., 1998). Besides that, excess alcohol use is associated with poor mental health (Paljarvi et al., 2009) and is known to have adverse consequences on sleep and in the long-term on anxiety (Roehrs and Roth, 2001; Vitiello, 1997; Kushner et al., 2000). All these factors could interact with each other, once previous studies reported that sleep problems were associated with a higher prevalence of TDI (Toderio et al., 2018) and anxiety levels is greater in children that suffered TDI and with aggressive behavior (Haliti and Juric, 2017).

The AUDIT questionnaire scores helped to identify individuals with risk or abuse of alcohol consumption. Scores ranging from 0 to 7 indicated abstinence or low risk for alcohol-related problems, and scores ranging from 8 to 40 denoted high risk or possible dependence (Lima et al., 2005). Individuals with absence of, or low- and high risk for, alcohol-related problems presented a similar chance of suffering TDI. This result could be associated with the low prevalence of individuals with high risk for alcohol-related problems (15%) due to the young age of the participants (11 to 19 years), who may have unconsolidated drinking habits. Oliveira Filho et al. (2013) suggested that different results can be obtained when using the AUDIT in a young population, relative to an adult population. Besides that, some authors have argued a tendency concerning lower alcohol intake and its association with fewer TDI (Jorge et al., 2012), which would be in accordance with the lower prevalence of TDI in the low-risk group presented in this meta-analysis. The association of the risk for alcohol-related problems and TDI still needs to be elucidated and confirmed from the perspective of population coverage and cases of low-intensity TDI underreporting.

The type of drug could be related to the result observed in the drugs meta-analysis. The most prevalent drug reported in the meta-analysis was cannabis (Damarasingh et al., 2008; Filho et al., 2014; Jorge et al., 2012). This finding is in accordance with the National Institute on Drug Abuse (Ridderikhof et al., 2017), which reported cannabis to be the most commonly used illicit substance. Cannabis' short-term effects are related to enhanced sensory perception and euphoria, followed by drowsiness and relaxation, slowed reaction times and problems with balance and coordination (Ridderikhof et al., 2017). The slowness, in

Table 4
Evidence profile: Association between alcohol or drugs use and TDI.

Certainty assessment		Summary of findings									
# of participants (studies) Follow-up	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Overall certainty of evidence	Study event rates (%) With Control	With Drugs and alcohol	Relative effect (95% CI)	Anticipated absolute effects Risk with Control	Risk difference with Drugs and alcohol
Alcohol consumption 3487 (5 observational studies)	not serious	not serious	not serious	not serious	all plausible residual confounding would reduce the demonstrated effect	⊕⊕⊕ MODERATE	492/2183 (22.5%)	416/1304 (31.9%)	OR 1.57 (1.33 to 1.85)	225 per 1,000	88 more per 1,000 (54 more to 125 more)
Binge drinking 1272 (2 observational studies)	not serious	not serious	not serious	serious ^a	none	⊕○○○ LOW	208/833 (25.0%)	151/439 (34.4%)	OR 1.68 (1.30 to 2.18)	250 per 1,000	109 more per 1,000 (52 more to 171 more)
Drugs use 2193 (3 observational studies)	not serious	not serious	not serious	serious ^a	none	⊕○○○ LOW	440/1894 (23.2%)	68/799 (22.7%)	OR 1.20 (0.82 to 1.75)	232 per 1,000	34 more per 1,000 (34 fewer to 114 more)

tandem with the relaxation and drowsiness observed in individuals who have used cannabis may have contributed to the non-significant increase in the prevalence of TDI in this group.

The underestimation of drug use by participants in such studies could be related to the stigmatization of people who consume illicit drugs, leaving the participant embarrassed about answering affirmatively to drug-related questions (Lloyd, 2013); however, all studies included in the drugs meta-analysis used self-administered questionnaires, so eliminating this hypothesis. This type of administration has been supported in the literature as a valid method for defining drug use (Brener et al., 2003).

The drugs meta-analysis results, however, should be interpreted with caution, since three of the six studies that evaluated the association between TDI and drugs were not included in the meta-analysis due to their methodological biases. More studies, with high methodological quality, designed for evaluating the association between these two factors, are necessary to support the results presented here.

Of the 12 studies included in this review, 10 (Paiva et al., 2015; Baig Enver et al., 2016; Damarasingh et al., 2008; Reis et al., 2014; Filho et al., 2014; de Paiva et al., 2015; Jorge et al., 2012; Oliveira Filho et al., 2013; de Paiva et al., 2016; Paiva et al., 2014) were performed with children and adolescents (11–19 years old). This could be considered a limitation of this systematic review, since the low prevalence of drug use limits multivariate analyzes, as well as adequate matching and randomization. Future studies, in adults population, with case-control studies and a cohort with good randomization and pairing can contribute to elucidate these results.

Besides that, the higher number of studies with adolescents is worrisome, since this vulnerable population is in transition between childhood and adulthood (Schulenberg et al., 2004; Kessler et al., 2010). The professionals dealing with TDI need to be attentive and aware of this issue, as earlier experience with alcohol and drugs consumption could be related to more serious problems from a wide variety cases, like alcohol-related sexual assault (Abbey, 2002), mental and behavioral disorders, major noncommunicable diseases (such as liver cirrhosis, some cancers and cardiovascular diseases), injuries resulting from violence and road clashes, as well as premature death (WHO, 2019). In addition, the precocious exposure to alcohol consumption in young populations may be related to an increased risk of TDI and alcohol-related problems when this population reaches majority legal age. World Health Organization reports that alcohol consumption could be related with arises from unintentional and intentional injuries and fatal alcohol-related injuries tend to occur in relatively younger age groups (WHO, 2019).

The results of this review should be taken into consideration when developing longitudinal studies to gain a better understanding of the dynamic nature of alcohol and drug consumption, their consequences (quality of life, chemical dependence, etc.), and their relationship with TDI. Public health strategies and intervention studies are encouraged for evaluating the effectiveness of guidance strategies on the harmful effects of these substances in early school age, in the prevention of alcohol and drug consumption and, consequently, in preventing the occurrence and recurrence of dental and maxillofacial trauma.

5. Conclusions

There is moderate evidence concerning the association between alcohol use and TDI occurrence. Although absence of an association between illicit drugs use, alcohol-related problems and the presence of TDI was found, these results should be viewed with caution, since they were determined from very low-quality evidence studies.

Role of funding source

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

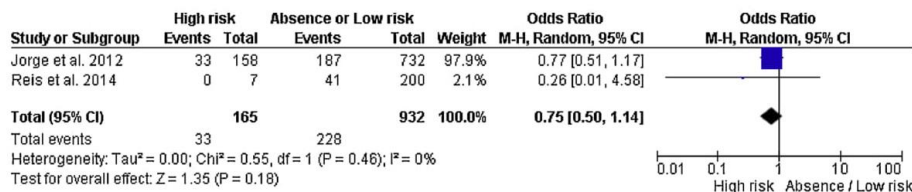


Fig. 3. Forest plot of association between high risk for alcohol-related and TDI.

Study or Subgroup	Drugs users		Control		Weight	Odds Ratio	
	Events	Total	Events	Total		M-H, Random, 95% CI	M-H, Random, 95% CI
Damarasingh et al. 2018	30	157	75	461	43.8%	1.22 [0.76, 1.94]	
Jorge et al. 2012	34	135	186	756	50.1%	1.03 [0.88, 1.57]	
Oliveira Filho et al. 2014	4	7	179	677	6.1%	3.71 [0.82, 16.74]	
Total (95% CI)		299		1894	100.0%	1.20 [0.82, 1.75]	
Total events		68	440				
Heterogeneity: Tau ² = 0.03; Chi ² = 2.62, df = 2 (P = 0.27); I ² = 24%							
Test for overall effect: Z = 0.93 (P = 0.35)							

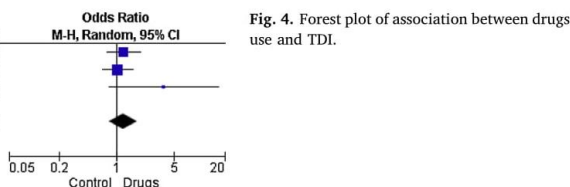


Fig. 4. Forest plot of association between drugs use and TDI.

Contributors

M.B.M. contributed to conception and design of the study, acquisition, analysis and interpretation of data, wrote and edited the manuscript text. K.L.F.L. contributed to design of the study and acquisition of data. L.C.M. contributed to conception and design of the study, analysis and interpretation of data, supervised the work, participated in revising the manuscript critically for important intellectual content. M.M.P. participated in revising the manuscript critically for important intellectual content. All authors reviewed the manuscript and give final approval of the version to be submitted and any revised version.

Conflict of interest

The authors declare that they have no conflict of interest concerning this article.

Acknowledgements

For cooperation in this systematic review, the authors would like to thank professor Eduardo Bernabé, Lia Castilho and professor Warnakulasuriya who graciously provided information not given in the published texts of their previous studies. This study was conducted during the doctoral stage of Marcela Baraúna Magno under supervision of the Prof. Lucianne Cople Maia and Prof. Matheus Melo Python. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001 - and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - Brasil (FAPERJ).

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4.6 Artigo 6: What are the associated and risk factors for dental trauma? A systematic review of systematic reviews.

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Abstract

Objective: We sought to revise, qualify, and summarize the body of evidence based on current information regarding the known associated and risk factors for traumatic dental injury (TDI) occurrence by way of an overview of systematic reviews.

Materials and Methods: Electronic searches were performed with no language nor date restrictions. According to the PECO strategy, systematic reviews that investigated subjects with and without the presentation of factors relating to TDI and these factors' association with TDI episodes as primary or secondary outcomes were included. Quality assessment and bias control were carried out according to the AMSTAR 2 checklist. In cases of systematic review results discordance, the Jadad decision algorithm was applied.

Results: After titles, abstracts, and full texts were read, 16 systematic reviews were included in this overview. Four were classified with critically low, nine with low, and three with moderate methodological quality, respectively. Gender, children's age, increased overjet, inadequate lip coverage, anterior open bite, caries in permanent dentition, overweightness, previous history of TDI, tongue piercing, the use of alcoholic beverages, and participation in sports were all related to a greater chance of suffering TDI.

Conclusion: Sociodemographic, clinical, and environmental factors are related with a greater chance of TDI occurrence. However, most of the systematic reviews included were of a low quality and may not provide an accurate and comprehensive summary of the available research that addresses the question of interest.

KEYWORDS: Tooth Injuries; Risk Factors; Review.

Introduction

There has been a proliferation of systematic reviews as one of the key tools for promoting evidence-based health care.^{1,2} This trend leads to both the onset of opportunities and of risks: more specifically, it creates an environment wherein researchers can base decisions on accurate, succinct, credible, and comprehensible summaries of the best-available evidence on a topic, minimizing error and bias, but variation in quality and empirical validation may exist, affecting the accuracy of the results.¹

Traumatic dental injuries (TDIs) are considered a public health problem due to their high prevalence,³ with physical⁴, physiological,⁵ social,⁶ and economic consequences.⁵ In addition, TDIs can have a negative impact on the quality of life of children and adolescents.⁷ Several anatomical and biological factors have been associated with an increased prevalence of TDI, such as obesity,⁸ accentuated overjet,⁹ anterior open bite,¹⁰ and inadequate lip seal.¹⁰ Certain behavioral habits¹¹ and a previous history of TDI have also shown notable correlations.¹²

Considering the high prevalence of TDI and the serious associated consequences, prevention constitutes a primary goal. A prevention approach relies on the identification of risk factors and on the development of measures aimed at avoiding these factors or at least reducing their impact.¹³ Given that detecting the risk factors that truly influence TDI is one of the first steps in its prevention, this overview of systematic reviews aims to revise, qualify, and summarize the existing body of evidence regarding the associated and risk factors for TDI occurrence.

Materials and Methods

This overview was registered in the Open Science Framework database (DOI no. 10.17605/OSF.IO/MZ398) and was undertaken in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.¹⁴

Sources, search and study selection

PubMed, Scopus, the Web of Science, Lilacs/BBO, and the Cochrane Library were reviewed up to May 2019. The grey literature (OpenGrey) was also searched for the same period. The search strategy included considering MeSH

terms and synonyms related to TDI and “systematic reviews” adapted for each database, with no language or date restrictions (Table 1). A hand search was also performed, and the reference lists of selected articles were examined so as to obtain additional relevant publications that could have been missed during the database searches. Experts on the chosen subject matter were contacted through e-mail. Articles available in more than one database were considered only once. A bibliographic citation management software (EndNote X7 version 17.0.1.7212; Thomson Reuters, Eagan, MN, USA) was used for literature management.

Based on the PICO/PECO criteria, systematic reviews studies that included primary studies (either observational or clinical) that evaluated children, adolescents, or adults (P) exposed to some risk factor (E) as compared with nonexposed individuals (C) were included to determine the association between these risk factors and TDI (O) as either a primary or secondary outcome. Only systematic reviews that performed a methodological quality assessment with some tool for this purpose were included. To identify the presence of an association, the included studies had to report the frequency of relevant events and the total number of individuals per group or had to incorporate statistical analyses including p value, prevalence ratio, odds ratio, or risk ratio.

Literature reviews, critical reviews, systematic reviews without quality methodological assessment, letters to the editor, case reports or case series, and observational or clinical studies were excluded.

Three reviewers (M. B. M., P. N., and K. L. F. L.) evaluated on an independent basis the titles and abstracts of all studies identified from the electronic databases. This process was previously validated using the first 50 titles/abstracts, where the reviews verified whether they were consistently collecting the same parameters as one another in the selection of studies. Full-text copies were retrieved from studies that met the inclusion criteria or for which there were insufficient data available in the title and abstract to make a clear decision possible. Any disagreements on the eligibility of the included studies, at any point in the process, were resolved through consensus or through discussion with a fourth expert reviewer (L. C. M.).

Data extraction

Details of each study (e.g., author names, year of publication, country, data of search), study methods [e.g., database search, risk factor(s) evaluated, methodological quality assessment tool(s) used], results (e.g., number of studies included, risk of bias results, meta-analysis results, GRADE results), and study conclusions were extracted by three reviewers (M. B. M., P. N. and K. L. F. L.). This process was previously validated by reviewers in an attempt to standardize the data extraction process. In studies for which the acquisition of additional data was necessary, the corresponding authors were contacted to help clear up doubts. One contact was attempted weekly for three weeks.

Risk of bias (methodological quality assessment)

A Measurement Tool to Assess Systematic Reviews (AMSTAR 2) approach was used to evaluate the methodological quality of recruited systematic reviews.^{1,2} Four reviewers (M. B. M., P. N., K. L. F. L., and L. C. M.) discussed the AMSTAR 2 criteria and this instrument's application in the selected studies, defining each parameter of analysis. Three reviewers (M. B. M., P. N., and K. L. F. L.) performed this analysis. Any disagreement was resolved by consultation with a fourth reviewer (L. C. M.).

AMSTAR 2 includes a 16-item checklist covering all of the steps taken during the conduct of a systematic review and meta-analysis. Of these, the following seven are domains that can critically affect the conclusions: protocol registered before commencement of the review (item 2), adequacy of literature search (item 4), justification for excluding individual studies (item 7), risk of bias from individual studies included in the review (item 9), appropriateness of meta-analytical methods (item 11), considerations of risk of bias when interpreting the results of the review (item 13), and assessment of the presence and likely impact of publication bias (item 15).¹

Based on critical and noncritical domains, AMSTAR 2 calculates the degree of confidence in the results of a review as either critically low, low, moderate, or high.¹

The criteria adopted for each AMSTAR 2 question classification are described in Table 2.

Choice of the best body of evidence

When an exposition was addressed by more than one systematic review with discordance, the Jadad decision algorithm was applied to select the

systematic review that provided the best body of evidence according to the currently available studies. The Jadad decision algorithm is designed as an adjunct decision tool to help decision-makers interpret and choose among discordant systematic reviews.¹⁷ This decision is based on differences in the study question, type of study method selected, quality of assessments, criteria for the selection of primary studies, data extraction methods, data combinations, statistical analysis methods, search strategies, and study selection (Figure 1).¹⁷

Results

Study selection

A total of 4,354 articles were retrieved from the aforementioned databases; 786 of them were subsequently excluded because they were duplicates. Of the 3,568 titles and abstract evaluated, 42 had their full texts assessed and 26 were excluded because they did not perform a quality assessment (n = 13) or risk evaluation (n = 3); were a protocol (n = 1), response letter (n = 3), bibliometric review (n=1), systematic review including in vitro studies (n = 2), or overview with different issue (n = 1); or covered tooth loss as edentulism (n = 1) or evaluated survival rates of restored teeth (n = 1) (Table 3, supplementary file). Finally, 16 studies^{8–12,18–28} were included in this overview (Figure 2).

Characteristics of studies included in the systematic review

All of the systematic reviews^{8–12,18–28} included observational studies (cross-sectional, case–control, or cohort). One systematic review²⁶ also included case series, but, as this study presented separate analyses for included case series and case–control studies, it was still included in this overview. Thirteen^{8–12,19,22,24–28} of the recruited systematic reviews involved statistical analysis and, among them, 11^{8–12,18,19,22,24,26,27} studies performed a meta-analysis, but only three assessed the quality of evidence.^{11,12,24}

The number of databases searched in the selected studies ranged from one¹⁸ to six,^{11,12,19,24,25,27,28} and the methodological quality of the studies was assessed using the Newcastle–Ottawa,^{8,10,20–23,25,26,28} Folks and Fulton,^{11,12,24,27} Joanna Briggs Institute,¹⁹ and Nguyen et al. systems,^{9,18} respectively.

A total of 22 risk factors were evaluated, including sociodemographic (e.g. gender and age), clinical factors (e.g. overjet, lip coverage, overbite, dental caries, anterior open bite, and overweightness), socioeconomic indicators (e.g.,

household income, socioeconomic status, house ownership, parents' schooling), general habits (physical activity, alcohol use, drug use), factors related to sports habits (e.g., professionalism in sports, use of a mouthguard), special needs status (e.g., autism spectrum disorder, down syndrome, cerebral palsy), use of lip and/or tongue piercings, and previous history of TDI.

A higher prevalence of TDI was observed in the professional/elite sports group^{20,28}; overweight individuals⁸; males^{10,18}; older children^{10,18}; those with inadequate lip coverage,^{10,18} overbite,¹⁰ or overjet,^{9,10,18} caries,²⁷ cerebral palsy,²³ and piercings²⁶; and those who consume alcoholic drinks¹¹ or who have a previous history of TDI.¹² Two studies revealed that low income was associated with a lower prevalence of TDI.^{18,22} A lower association of TDI was similarly observed among mouthguard users.²⁴

The general details of the included studies are summarized in Table 4.

Risk of bias (quality assessment)

The methodological quality assessment of the included systematic reviews, performed in accordance with the AMSTAR 2 criteria (Table 2), is described in Table 5.

Choice of the best body of evidence

Expositions evaluated in more than one systematic review with a discordance of results were gender (two studies^{10,18} found a positive association between male gender and TDI, while one did not²⁸), parents' schooling (one study¹⁸ found a positive association between more parent schooling and TDI and one no association²²), and caries in deciduous dentition (one study¹⁰ found no association between the presence of caries in deciduous dentition and TDI, while other study²⁷ concluded that caries in deciduous dentition is a protective factor for TDI). The Jadad algorithm was applied for these expositions. The process of choice of the best body of evidence for these factors is described in Figures 3, 4, and 5.

Risk factors conclusion

Considering the included studies' results and Jadad algorithm outcomes, the relationships between the discussed factors and TDI are described in Table 6.

Discussion

Previous studies have reported that TDI occurrence, especially in anterior teeth, has consequences that may impact the aesthetics,²⁹ quality of life,^{30,31} psychosocial behaviors,²⁹ and social reception⁶ of children and/or adolescents, and the treatment of TDI is necessary to minimize some of these negative impacts.³² Once the tooth has been traumatized, local sequelae may occur immediately or over the months or years thereafter,^{4,33} leading to the requirement of years of follow-up after a dental trauma treatment, resulting in further direct and indirect costs.³⁴ In this regard, recognizing the risk factors for dental trauma is fundamental to preventing the latter's occurrence. The present systematic review collected existing scientific evidence of risk factors and protective factors related or not to TDI in order to provide further education about this condition so as to guide clinician's approaches and decisions in patient care.

In this research, it was determined that some sociodemographic factors are related with a higher chance of TDI, like male gender,^{10,18} younger age,^{10,18} and lower income,^{18,22} while others such as parents' schooling and socioeconomic status were not clearly associated.²² These characteristics allow us to draw a profile of the nature of the population more likely to experience TDI and to tailor prevention strategies for implementation in schools and health units. However, it is important to highlight that the included studies presented different cutoff points for parents' schooling and income.^{18,22} Thus, preventive actions must be directed toward all levels of income and parents' schooling.

Caries is the principal factor associated with toothache and the resultant pain can negatively affect quality of life.³⁵ Malocclusion is associated with less masticatory efficiency,³⁶ a reduced quality of life,³⁷ and lower self-reported happiness.³⁸ As such, clinical factors related to a higher chance of suffering TDI (such as increased overjet, inadequate lip sealing, anterior open bite, caries in permanent dentition, and overweightness) should be prevented and treated not only because of their association with TDI but also due their own individual impacts on children and adolescents³⁶⁻³⁸ as soon as possible. Even before malocclusion treatment is started, these patients should be periodically monitored and educated about TDI prevention. The use of mouthguards should also be promoted in these groups.

The association between caries and TDI in deciduous dentition remains inconclusive. Of two studies that evaluated this relationship, one¹⁰ found no association and the other²⁷ reported that the presence of caries is a protective factor for TDI. However, neither study evaluated TDI and caries in the same tooth but rather examined TDI and dmft. So, the nature of a direct association cannot be concluded. Again, dental caries should be prevented and treated where observed due to its own negative impact on people, independent of age.

Contact sports are those in which participants have direct physical contact with other players or objects, resulting in a greater likelihood of trauma and injury to the body.³⁹ The higher chance for TDI among elite sports professionals could be related to the lower frequency of mouthguard use, despite the assumption that these individuals know of the device's importance for the prevention of mouth injury and the clear finding that this device is effective in preventing TDI during sports activities.^{40,41} Most athletes cited interference with speaking, breathing, and swallowing as the main disadvantages of mouthguard use.⁴² As previously mentioned, in relation to malocclusion, the use of mouthguards should be encouraged in sports by athletes, coaches, and sports clubs.

Sometimes, the TDI risk is not associated with clinical factors but instead with lifestyle choices and habits like drinking alcoholic beverages¹¹ and the practice of sports at the elite level.²⁸ Alcohol consumption could result in intentional and unintentional alterations in psychomotor skills, reaction time, visual focus, and the ability to concentrate,^{43,44} leading to a greater chance of suffering TDI. Public health education and guidance on the harmful effects of alcohol as well as those in favor of limiting alcohol consumption and consequently preventing the occurrence and recurrence of dental and maxillofacial trauma should be introduced.

AMSTAR is a popular instrument for critically appraising systematic reviews of randomized and nonrandomized (AMSTAR 2) trials.¹ Although AMSTAR is considered the most suitable tool for evaluating the methodological quality of systematic reviews,² we would like to suggest some reflection be completed about this approach's application and use, like the inclusion of only studies with a low risk of bias in a meta-analysis and the funnel plot evaluation.

Systematic reviews have evolved over the years in terms of their steps as well as search strategies, data meta-analyses, and the evaluation of the certainty

of evidence. In this sense, some aspects evaluated in AMSTAR guidelines should be viewed with caution, since they have not kept up with the evolution and fast advances of systematic reviews. One example of an AMSTAR limitation is that, while AMSTAR performs the assessment of the presence and likely impact of publication bias on results through funnel plot or statistical analysis (item 15), independent of the number of studies, some studies^{12,24} did not perform this analysis because the Cochrane handbook⁴⁵ suggests that a funnel plot should be generated only if the quantitative analysis includes 10 or more studies. Furthermore, nowadays, the GRADE approach⁴⁶ is applied to evaluate the quality or certainty of the evidence of systematic reviews with or without meta-analysis. During GRADE analysis, publication bias is evaluated without the statistical or graphic demonstratives expressed in published reviews, classified as “detected” or “undetected.” These criteria oblige the authors to evaluate the publication bias without a graphic demonstration necessarily printed in the article.

Another point to be elucidated is that AMSTAR assesses the potential impact of risk of bias in individual studies on the results of the meta-analysis (item 12) if the meta-analysis included only a low risk of bias or if the authors performed analyses to investigate the possible impact of risk of bias on the summary estimates of effect.¹ Again, GRADE⁴⁶ evaluates the impact of risk of bias in meta-analysis through an analysis of pooled results including and excluding studies classified with some risk of bias as necessary. In this regard, GRADE classifies the results as having “not serious,” “serious,” or “very serious” problems. In this sense, the flexibilization of this topic in AMSTAR should be suitable or actualized. As a suggestion, the development and approval of modifications to certain AMSTAR parameters including the recommendations of the principal guidelines for systematic reviews could be considered as part of future research.

It could be observed a evolution in methodological criteria adopted in systematic reviews over the years. The systematic reviews began to include more bases in electronic searches and most recent reviews start to perform GRADE. This shows the methodological evolution that has been happening in all scientific studies, regardless of their design, as scientific journals are becoming increasingly critical to accept a study for publication.

Despite the limitations of the present overview, the definition of risk factors for TDI is important to guide clinician’s management of their patients in order to

prevent TDI episodes and reduce adverse health impacts and costs. Public health strategies need to be developed and deployed, especially among children and adolescents. Professionals dealing with these populations should be prepared to identify, treat, or refer patients to treatment where necessary. While some characteristics cannot be changed (e.g., gender, sociodemographic factors) others could be addressed, such as mouthguard adherence, and so should be pursued.

Conclusion

Certain sociodemographic, clinical, and environmental factors are related with a greater chance of TDI. However, most of the systematic reviews included in the present research were of a low quality and may not provide an accurate and comprehensive summary of the necessary evidence to accurately answer the question of interest.

Acknowledgments

This study was conducted during the doctoral stage of Marcela Baraúna Magno, under supervision of the Prof. Lucianne Cople Maia and Matheus Melo Pithon. It was partially supported by Foundation for Research Support of the State of Rio de Janeiro under numbers E-26/202.191/2018 and E-26/010.100992/2018.

For their cooperation in this systematic review, the authors would like to thank professor Correa-Faria and Kramer who contributed during this overview search.

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Tables, Figures and Figure Legends

Table 1. Search strategy (15 May 2019).

Pubmed 661	(Tooth Injuries[mh] OR Teeth injur*[tiab] OR dental injur*[tiab] OR dental trauma[tiab] OR traumatic injur*[tiab] OR Tooth Avulsion[mh] OR Teeth avulsion[tiab] OR Tooth Movement[mh] OR Exarticulation[tiab] OR Dental dislocation[tiab] OR Tooth Movement[tiab] OR teeth extrusion[tiab] OR lateral luxation[tiab] OR Tooth Fractures[mh] OR Tooth Fractur*[tiab] OR crown fractur*[tiab] OR root fractur*[tiab] OR tooth intrusion[tiab] OR teeth intrusion[tiab]) Filters: Systematic Reviews																											
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Cochrane 155	<table border="1"> <thead> <tr> <th>ID</th> <th>Search</th> <th>Hits</th> </tr> </thead> <tbody> <tr> <td>#1</td> <td>MeSH descriptor: [Tooth Injuries] explode all trees</td> <td>255</td> </tr> <tr> <td>#2</td> <td>((Teeth injur* OR dental injur* OR "dental trauma" OR traumatic injur*)):ti,ab,kw</td> <td>5044</td> </tr> <tr> <td>#3</td> <td>MeSH descriptor: [Tooth Avulsion] explode all trees</td> <td>24</td> </tr> <tr> <td>#4</td> <td>((“Teeth avulsion”)):ti,ab,kw</td> <td>27</td> </tr> <tr> <td>#5</td> <td>((Exarticulation OR “Dental dislocation” OR “Tooth Movement” OR “teeth extrusion” OR “lateral luxation” OR “tooth intrusion” OR “teeth intrusion”)):ti,ab,kw</td> <td>441</td> </tr> <tr> <td>#6</td> <td>MeSH descriptor: [Tooth Fractures] explode all trees</td> <td>196</td> </tr> <tr> <td>#7</td> <td>((Tooth Fractur* OR crown fractur OR root fractur*)):ti,ab,kw</td> <td>776</td> </tr> <tr> <td>#8</td> <td>#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7</td> <td>6156</td> </tr> </tbody> </table>	ID	Search	Hits	#1	MeSH descriptor: [Tooth Injuries] explode all trees	255	#2	((Teeth injur* OR dental injur* OR "dental trauma" OR traumatic injur*)):ti,ab,kw	5044	#3	MeSH descriptor: [Tooth Avulsion] explode all trees	24	#4	((“Teeth avulsion”)):ti,ab,kw	27	#5	((Exarticulation OR “Dental dislocation” OR “Tooth Movement” OR “teeth extrusion” OR “lateral luxation” OR “tooth intrusion” OR “teeth intrusion”)):ti,ab,kw	441	#6	MeSH descriptor: [Tooth Fractures] explode all trees	196	#7	((Tooth Fractur* OR crown fractur OR root fractur*)):ti,ab,kw	776	#8	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7	6156
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Table 2. AMSTAR 2 classification for each question taking into account the characteristics of the included systematic reviews.

Question	Response Classification
1. Did the research questions and inclusion criteria for the review include the components of PICO?	<p>YES: The 4 elements of PICO are described somewhere in the report or the criteria of studies inclusion was clear.</p> <p>NO: Any element of PICO was not described or the criteria of studies inclusion was not clear.</p>
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	<p>YES: A previous registered protocol guide the study in review question, search, eligibility criteria, risk of bias and meta-analysis.</p> <p>PARTIAL YES: A previous registered protocol guide the study in review question, search, eligibility criteria and risk of bias.</p> <p>NO: Did not report about previous registered protocol.</p>
3. Did the review authors explain their selection of the study designs for inclusion in the review?	<p>YES: The study report the type of studies included.</p> <p>NO: The study did not report the type of study included.</p>
4. Did the review authors use a comprehensive literature search strategy?	<p>YES: search in at las 2 databases, provide keyword/ search strategy, justified publication restrictions, search in reference list of included studies, search in register studies, consulted experts, search in grey literature and conducted search in 24 months of competition review.</p> <p>PARTIAL YES: search in at las 2 databases, provide keyword/ search strategy and justified publication restrictions.</p> <p>NO: search in 1 databases or not provide keyword/ search strategy and not justified publication restrictions.</p>
5. Did the review authors perform study selection in duplicate?	<p>YES: at least two reviewers independently agreed on selection of eligible studies and achieved consensus on which studies to include, or two reviewers selected a sample of eligible studies and achieved good agreement (at least 80 percent), with the remainder selected by one reviewer.</p> <p>NO: Only one reviewer without kappa performed the studies selection.</p>
6. Did the review authors perform data extraction in duplicate?	<p>YES: at least two reviewers achieved consensus on which data to extract from included studies or two reviewers extracted data from a sample of eligible studies and achieved good agreement (at least 80 percent), with the remainder extracted by one reviewer.</p> <p>NO: Only one reviewer without kappa performed the data extraction.</p>
7. Did the review authors provide a list of excluded studies and justify the exclusions?	<p>YES: Justified the exclusion from the review of each potentially relevant study</p> <p>PARTIAL YES: Provided a list of all potentially relevant studies that were read in full-text form but excluded from the review.</p> <p>NO: Did not report any detail about full-text assessed studies and excluded.</p>
8. Did the review authors describe the included studies inadequate detail?	<p>YES: described in detail populations (age and gender), exposition (n and diagnostic criteria or TDI), comparators (n), outcomes (studies results and conclusion) and research design.</p> <p>PARTIAL YES: described not in detail populations, interventions, comparators, outcomes and research design.</p> <p>NO: did not describe populations, interventions, comparators, outcomes or research design.</p>
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	<p>YES: Use a standard instrument for RoB, or a non-standard instrument but capable of detecting serious methodological flaws.</p> <p>NO: Use a non-standard instrument not capable of detecting serious methodological flaws.</p>
10. Did the review authors report on the sources of funding for the studies included in the review?	<p>YES: Reported the sources of funding for individual studies included in the review or report that the reviewers looked for this information but it was not reported by study authors also qualifies.</p> <p>NO: Did not report sources of funding for individual studies included in the review and didn't looked for this information.</p>
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	<p>YES: The authors justified combining the data in a meta-analysis; used an appropriate weighted technique to combine study results adjusting for heterogeneity if present; combined effect estimates from non-randomised studies that were adjusted for confounding, rather than combining raw data, or justified combining raw data when adjusted effect estimates were not available; and report separate summary estimates for randomized and non-randomised studies separately when both were included in the review.</p> <p>NO: Did not perform one or more criteria described above.</p>
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	<p>YES: Included only low risk of bias studies (according each risk of bias scale used in systematic reviews)* or if the authors performed analyses to investigate possible impact of RoB on summary estimates of effect.</p> <p>NO: Did not perform one or more criteria described above.</p>

13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	YES: Included only the low risk of bias studies or a discussion of the likely impact of RoB was discussed. NO: Did not perform one or more criteria described above.
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	YES: No significant heterogeneity or the authors performed an investigation of sources of any heterogeneity in the results and discussed the impact of this on the results of the review. NO: Did not perform one or more criteria described above.
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	YES: Performed graphical or statistical tests for publication bias and discussed the likelihood and magnitude of impact of publication bias NO: Did not perform a statistical evaluation about publication bias.
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	YES: The authors reported no competing interests or the authors described their funding sources and how they managed potential conflicts of interest. NO: The authors did not report anything about conflict of interest.

*Newcastle-Ottawas scale: 0-3 high risk of bias, 4-6 moderate risk of bias and 7-8 or 9 points low risk of bias.¹⁵

Folkes and Foulton: If the study received 'YES' in any summary question was considered high risk of bias, if received 'NO' in all summary question was considered low risk of bias.¹⁶

JBI system include only low risk of bias in systematic review and exclude others studies.

Table 3. Studies excluded after full text analysis and reasons for exclusion.

Study	Reason
Kanapik et al. Mouthguards in Sport Activities History, Physical Properties and Injury Prevention Effectiveness. <i>Sports Med</i> 2007; 37 (2): 117-144	Did not performed quality assessment
Wallace et al. Traumatic dental injury research: on children or with children? Dent Traumatol . 2017 Jun;33(3):153-159.	Did not evaluated risk factor for TDI
AlKhalifa and AlAzemi. Intrusive luxation of permanent teeth: a systematic review of factors important for treatment decision-making. Dent Traumatol . 2014 Jun;30(3):169-75.	Did not evaluated risk factor for TDI
Barbato and Peres. Contextual socioeconomic determinants of tooth loss in adults and elderly: a systematic review. Rev Bras Epidemiol . 2015 Apr-Jun;18(2):357-71.	Did not evaluated TDI.
Belladonna et al. Avulsion of permanent teeth with open apex: a systematic review of the literature. <i>RSBO</i> . 2012 Jul-Sep;9(3):309-15	Did not performed quality assessment
Coulthard et al. Domestic violence screening and intervention programmes for adults with dental or facial injury. Cochrane Database Syst Rev . 2004;(2):CD004486.	Did not presented results of TDI risk factors
Coulthard et al. Domestic violence screening and intervention programmes for adults with dental or facial injury. Cochrane Database Syst Rev . 2010; 8(12):CD004486	Did not presented results of TDI risk factors
Correa-Faria et al. Socioeconomic indicators and traumatic dental injury. <i>Evidence-Based Dentistry</i> (2015) 16, 120-21.	Response letter
Simon et al. Influence of patient age on the nature of tooth fracture. J Prosthet Dent . 1999 Aug;82(2):226-30.	Did not performed quality assessment
Coulthard et al. Dentofacial injuries and domestic abuse. <i>Evidence-Based Dentistry</i> (2012) 13, 86.	Response letter
Al-Omiri et al. Fracture Resistance of Teeth Restored with Post-retained Restorations: An Overview. <i>Endod</i> 2010;36:1439–1449	In vitro studies
Kraner et al. Traumatic Dental Injuries in the primary dentition: a 15-year bibliometric analysis of Dental Traumatology. Dent Traumatol . 2016 Oct;32(5):341-6.	Bibliometric review
Maguire et al. Diagnosing abuse: a systematic review of torn frenum and other intra-oral injuries. <i>Arch Dis Child</i> 2007;92:1113–1117	Did not performed quality assessment
Majare et al. A Systematic Map of Systematic Reviews in Pediatric Dentistry—What Do We Really Know? PLoS One . 2015 Feb 23;10(2):e0117537	Overview with diferente issue
Petti. Over two hundred million injuries to anterior teeth attributable to large overjet: a meta-analysis. Dent Traumatol . 2015 Feb;31(1):1-8.	Did not performed quality assessment
Petti et al. World traumatic dental injury prevalence and incidence, a metaanalysis – One billion living people have had traumatic dental injuries. Dent Traumatol . 2018 Apr;34(2):71-86	Did not performed quality assessment
Sabuncuoglu et al. The adhd model for traumatic dental injuries: a critical review and update of the last 10 years. Dent Traumatol . 2017 Apr;33(2):71-76	Did not performed quality assessment
Suksaphar et al. Survival rates against fracture of endodontically treated posterior teeth restored with full-coverage crowns or resin composite restorations: a systematic review. <i>Restor Dent Endod</i> . 2017 Aug;42(3):157-167.	Evaluated survival rates of restorations
Wei et al. The incidence of dentinal cracks during root canal preparations with reciprocating single-file and rotary-file systems: A meta-analysis. <i>Dental Materials Journal</i> 2017; 36(3): 243–252	Included in vitro studies
Bendo et al. Childhood dental trauma and socioeconomic status. <i>Evidence-Based Dentistry</i> (2010) 11, 78.	Response letter
Zimmermann et al. Pediatric facial fractures: recent advances in prevention, diagnosis and management. <i>Int. J. Oral Maxillofac. Surg</i> . 2006; 35: 2–13	Did not performed quality assessment

Aldrigui et al. Trends and associated factors in prevalence of dental trauma in Latin America and Caribbean: a systematic review and meta analysis. <i>Community Dent Oral Epidemiol</i> 2014; 42; 30–42	Did not performed quality assessment
Azami-Aghdashi et al. Prevalence, etiology, and types of dental trauma in children and adolescents: systematic review and meta-analysis. Med J Islam Repub Iran . 2015 Jul 10;29(4):234.	Did not performed quality assessment
Bendo et al. Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review. Dent Traumatol . 2009 Aug;25(4):420-5	Did not performed quality assessment
Chau et al. Oral Health of Children With Attention Deficit Hyperactivity Disorder: Systematic Review and Meta-Analysis. J Atten Disord . 2017 Nov 1: [Epub ahead of print]	Did not performed quality assessment

Table 4. Description of studies.

Author, year, Country	Data of search	Databases searched	Number of studies included	Risk factors evaluated	Risk of bias tool used	Risk of bias results	Meta-analysis results	GRADE results	Conclusion
Arraj et al. 2019.(19) Australia	Until October 2018	MEDLINE via OVID, Embase, Scopus, Dentistry & Oral Sciences Source (DOSS) via EBSCO, OpenGrey and TRIP Database	41	Different overjet sizes across different ages and dentition stages.	JBI System	Only studies with good methodological assessment were included in systematic review.	Deciduous dentition (0-6 years): overjet ≤ 3 mm vs. >3 mm OR 3.37, 95% CI: 1.36-8.38 Mixed and secondary dentition (7-15 years): overjet >5 mm OR 2.43 95% CI: 1.34-4.42 and OR 1.81 95% CI: 1.44-2.27, respectively.	NP	The results confirm the association between increased overjet and dental trauma. A child in the primary dentition could be considered as having an overjet at risk for trauma when it is ≥ 3 mm. In the early secondary dentition, the threshold for trauma is an overjet ≥ 5 mm.
Ashley et al. 2015.(20) UK.	Until october 2013	MEDLINE, EMBASE, EBSCO SPORTDiscus and OpenGrey	34	Professionalism in the sport	Newcastle-Ottawa	In general, methodological quality was low with all the studies being at risk of bias	NP	NP	Studies showed a higher prevalence of trauma in the professional/elite group compared with the controls.
Bartolomé-Villar et al. 2016.(21) Spain	Between 2000 to 2015	PubMed, Scopus and Cochrane Library	16	ASD and SD	Newcastle-Ottawa	NR	NP	NP	Due de low number of studies that evaluated TDI, no association between TDI and ASD or SD could be concluded.
Correa-Faria et al. 2015 (a)(8) Brazil	Until march 2014	PubMed, ISI Web of Science, Cochrane Library, Scopus and Google scholar	17	Overweight/obese	Newcastle-Ottawa	All studies were classified as cross-sectional, their NOS scores ranged between 4 and 8 in the 8-point scale	The pooled OR of TDI for overweight/obesity assessed with this method was 1.30 (95 CI, 1.11–1.53; P < 0.05)	NP	The risk of TDI among overweight/obese children is higher than among lean children and the causal association between these two conditions is plausible.
Correa-Faria et al. 2015 (b).(22) Brazil	Until december 2013	PubMed, ISI Web of Science, Cochrane Library,	16	Socioeconomic indicators	Newcastle-Ottawa	All studies were classified as cross-sectional, their NOS scores ranged	Children from families with household income less than two times average salary (US\$ 592) (OR: 0.77; 95% CI: 0.66–0.90) or more than three times the average salary (US\$ 888) (OR:	NP	The scientific evidence demonstrates that socioeconomic indicators are not associated with TDI in the primary dentition.

		LILACS, Embase				between 4 and 8 in the 8-point scale	0.76; 95% CI: 0.65–0.89) had a significantly lower chance of having TDI in the primary dentition. TDI was not associated with socioeconomic status (high vs low – OR: 0.77; 95% CI: 0.43–1.36; high vs medium – OR: 1.03; 95% CI: 0.72–1.48; medium vs low – OR: 0.70; 95% CI: 0.42–1.19), house ownership (owned vs rented – OR: 1.28; 95% CI: 0.98–1.66), mother’s schooling (OR: 0.89; 95% CI: 0.74–1.08), or father’s schooling (OR: 1.01; 95% CI: 0.62–2.74).		The association between a low income and the occurrence of TDI is weak and doubtful.
Correa-Faria et al. 2016.(10) Brazil	Until december 2013	PubMed, ISI Web of Science, Cochrane Library and LILACS, Embase	24	Clinical factors and socio-demographic characteristic	Newcastle-Ottawa	All studies were classified as cross-sectional, their NOS scores ranged between 4 and 7 in the 8-point scale	TDI was associated with males (OR: 1.24; 95%CI: 1.09–1.41), inadequate lip coverage (OR: 1.81; 95%CI: 1.50–2.17), overbite (OR: 1.438; 95%CI: 0.94–2.19), caries (OR 0.879; 95%CI: 0.613-1.262) and age (1 vs 2 years – OR: 0.47; 95%CI: 0.38–0.58; 2 vs 3 years – OR: 0.78; 95%CI: 0.67–0.91; 3 vs 4 years – OR: 0.82; 95%CI: 0.71–0.95). Overjet and anterior open bite were associated with TDI in the majority of studies.	NP	Males, older children, and those with inadequate lip coverage, overbite, or overjet are more likely to have TDI in the primary dentition.
Diéguez-Pérez et al. 2016.(23) Spain	Between 200 and 2015	Pubmed, Cochrane and SCOPUS	11 for CP and 3 for DS	CP and DS	Newcastle-Ottawa	NR	NP	NP	All authors report that person with CP presented a greater frequency of TDI than the control group, but only one showed statistically significant difference between groups. None study selected evaluate relation between DS and TDI.

Fernandes et al. 2019.(24) Brazil	Until march 2018	PubMed (MEDLINE), Scopus, Web of Science, Lilacs, Cochrane Library and System for Information on Gray Literature in Europe (SiGLE) databases	14	Use of MG	Fowkes and Fulton	Six studies were considered "free of problems" in summary questions, five with "minor problems" and three with "major problems" summary questions.	Athletes that played American football, handball and 'many sports' using MG showed a similar chance of suffering TDI than athletes that did not use MG (OR = 0.54 [95%CI = 0.16-1.78] p = 0.31; OR = 0.36 [95%CI = 0.12-1.07] p = 0.07, I2 = 0% and OR = 0.10 [95%CI = 0.00-70.58] p = 0.49, I2 = 95%, respectively). Athletes that played basketball and hockey that use MG showed a lower chance of suffering TDI than athletes that did not use MG (OR = 0.07 [95%CI = 0.05-0.09], p<0.001, I2 = 0% and OR = 0.06 [95%CI = 0.04-0.09], p<0.001, respectively). The pooled results with "free" and with "minor" bias studies showed a positive association between the use of MG and TDI (OR = 0.18 [95%CI = 0.07-0.45] p<0.001) and with "free" of bias meta-analysis (OR = 0.07 [95%CI = 0.05-0.08] p<0.001, I2 = 0%).	"Free" of bias meta-analysis presented moderate certainty of evidence, while "free" and with "minor" bias meta-analysis presented very low certainty of evidence.	MG contribute to a lower prevalence of TDI among athletes of contact sports.
Goettems et al. 2014.(25) Brazil	Between 1987 and 2012 for CAPES for these databank and between 1982 and 2012 for others databases	PubMed, ISI, Scopus, SciELO, LILACS, and CAPES theses databank	13	Nutritional status and physical activity	Newcastle-Ottawa	All studies were classified as cross-sectional, their NOS scores ranged between 4 and 9 in the 9-point scale	Did not performed meta-analysis, but differences in prevalence test using chi-squared and Fisher's exact tests were collected when present. Six studies showed no association between overweight and TDI (p>0.05) and five studies showed that obesity was associated with greater TDI. Two studies showed no association between physical activity and TDI, while one study showed that physical activity is a protective factor and two studies showed that TDI	NP	The results suggest that no truly causal relationship exists between dental trauma and physical activity and nutritional status.

Hennequin-Hoenderdos et al. 2015.(26) Amsterdam	Until January 2015	PubMed, Cochrane Library and EMBASE	15 (7 case control and 8 case series)	Lip and/or tongue piercings	Institute of Health Economics for case series and Newcastle-Ottawa for case-control studies	For case series, the estimated potential risk of bias was low for one study, moderate for two, high for three and very high for two studies. For case-control studies, five studies were considered to have a low risk of bias, two had a moderate risk, and none had a high risk of bias.	was more prevalent among those participating in sports. The RR for tooth injuries in subjects with a lip piercing was 1.33 with a 95% CI ranging from 0.74 to 2.41 (P = 0.34) and for tongue piercing the tooth injury RR was 2.44 with a 95% CI ranging from 1.35 to 4.41 (P = 0.003).	NP	The results showed greater risk for TDI when associated with tongue.
Janaina Merli Aldrigui, 2012(18) Brazil	Until 18 April 2012	PubMed	26	Gender, age, AOB, IOv, DLC, socio-demographic characteristics, caries, presence of deleterious habits.	Based in Nguyen et al. 1999	The total score ranged from 37 to 76, out of a total of 80 points.	Association were identified between males (OR 1.20 [1.09; 1.33]), older children (OR 2.18 [1.66; 2.86]), children with AOB (OR 2.26 [1.38; 3.70]), IOvj (OR 2.01 [1.37; 2.94]), DLC (OR 1.66 [1.26; 2.20]), higher income (OR 0.79 [0.69; 0.92]) and with mothers with higher schooling (OR 1.30 [1.01; 1.66]) presented higher chance of TDI	NP	Gender (males), age (older), children with AOB, IOv, DLC, higher income and with mothers with higher schooling presented higher chance of TDI.
Magno et al. 2019 (a).(12) Brazil	Until June 2017	PubMed, Scopus, Lilacs/BBO and Web of Science, Cochrane Library and OpenGrey	5	Previous history of TDI	Fowkes and Fulton	Four studies were assessed as having high methodological quality and only one study was considered as having 'any serious	No association was identified between previous history of TDI and new episodes of TDI in primary teeth (RR 1.26 [0.99, 1.62], p=0.06), positive association was determined between previous history of TDI and new cases of TDI in permanent teeth (RR 2.68 [1.20, 4.19], I2=37%,	For primary teeth analysis it was found very low certainty of evidence, while permanent dentition and pooled results presented moderate	Individuals that have suffered previous TDI present a greater risk of suffering new episodes of TDI.

						confounding or other distorting influences'	p<0.00001). The pooled results showed that children with previous history of TDI had more than twice the chance of having another case of TDI (RR 2.17 [1.20; 3.90], p=0.01, I ² =83%)	certainty of evidence.	
Magno et al. 2019 (b).(11) Brazil	Until November 2018	PubMed, Scopus, Web of Science, Lilacs/BBO, the Cochrane Library and OpenGrey	12	Alcohol and drugs use	Fowkes and Fulton	Nine studies were assessed as having high methodological quality and three studies were considered as having problems in summary questions	Alcohol consumption was associated with a greater prevalence of TDI (OR 1.57 [1.33, 1.85], p<0.0001). The level of risk for alcohol-related problems and drugs use did not influence the chances of an individual suffering TDI (OR 0.75 [0.50, 1.14], p=0.18 and (OR 1.20 [0.82, 1.75], p=0.35, respectively).	For alcohol consumption analysis the certainty of evidence was moderate, for alcohol-related problems was low and for drugs use was very low.	Individuals who consume alcohol present a greater chance of suffering TDI.
Nguyen et al. 1999(9). Amsterdam	Between January 1966 and 1996 for Medline database and between January 1985 and December 1996 for Excerpta Medica	Medline and Excerpta Medica	11	Overjet size	Own developed quality assessment list	The outcome scores of internal validity range from 13 to 27 (maximum 62), and for validity of pooled results range from 33 to 51 points.	For analysis overjet of ≤3mm versus >3mm: it was observed positive association between overjet size and TDI, even after a stratified analysis by gender and methodological quality (OR 2.90 [2.33, 3.76] and OR 1.77 [1.41, 2.20]) . For overjet ≤3mm versus ≥6mm: it was observed positive association between overjet size and TDI (OR 2.63 [2.03, 3.29])	NP	Children with overjet larger than 3mm presented greater chance of suffer TDI. This chance increase with increase overjet size.
Soares et al. 2017(27) Brazil	Until march 2015	PubMed, SCOPUS, LILACS/BBO, ISI Web of Science, Cochrane Library and SINGLE	7	Caries	Fowkes and Fulton	Six studies were assessed as having high methodological quality and only one study was considered as having 'erroneously biased in a certain direction'	Caries in permanent dentition was associated with an increased risk of TDI in permanent teeth [OR: 1.490, 95%, CI: 1.209–1.835], p < 0.001. While caries in primary dentition was showed a negative association between TDI and caries [OR: 0.706, 95%, CI: 0.550–0.906], p = 0.006. The pooled meta-analysis demonstrated no association between TDI and	NP	The results demonstrated positive and negative association between the presence of caries and dental trauma in permanent and primary teeth, respectively.

Vucic et al. 2015.(28) Netherlands	Until February 2015	PubMed, EMBASE, OvidSP, ISI Web of Science, Cochrane and Cinahl	11	Gender, professional sports.	Newcastle- Ottawa	The quality of studies ranged from 1 to 4 out of 5 stars with an average score of 2.8±1.3.	dental caries [1.097, 95%, CI: 0.934–1.287], p = 0.259. A significantly higher proportion of international elite hockey players have TDI compared with non-elite players (p=0.09). No significant differences with respect to gender (elite level: p=0.24 and non-elite: p=0.74) were detected.	NP	Elite soccer players presented higher chance for TDI.
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NP Not performed; NR Not reported; ASD Autism Spectrum Disorder; SD Sensory Deficits; MEDLINE International Database for Medical Literature; BBO Brazilian Bibliography of Dentistry; ScIELO Scientific Electronic Library online; LILACS Latin American and Caribbean Health Sciences; CAPES Brazilian Coordination of Higher Education Personnel Improvement; SINGLE System for Information on Gray Literature in Europe; ADHD Attention Deficit Hyperactivity Disorder; NOS Newcastle-Ottawa Scores; CP Cerebral Palsy; DS Down Syndrome; MG mouth guards; OR Odds Ratio; RR Risk ratio; AOB Anterior open bite; IOvj Increased Overjet; DLC Deficiency lip coverage;

the study designs for inclusion in the review?

4. Did the review authors use a comprehensive literature search strategy?	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	NO	NO	PARTIAL YES	PARTIAL YES	NO	YES	PARTIAL YES
5. Did the review authors perform study selection in duplicate?	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES
6. Did the review authors perform data extraction in duplicate?	NO	YES	YES	NO	NO	NO	NO	YES	YES	YES	NO	YES	YES	NO	YES	NO
7. Did the review authors provide a list of excluded studies and justify the exclusions?	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	NO
8. Did the review authors describe the included studies	NO	NO	NO	PARTIAL YES	PARTIAL YES	PARTIAL YES	NO	YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	YES	YES	NO	PARTIAL YES	PARTIAL YES

inadequate detail?																	
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	PARTIAL YES	YES	YES	PARTIAL YES	YES	YES
10. Did the review authors report on the sources of funding for the studies included in the review?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	NO	-	-	NO	NO	NO	-	NO	-	NO	NO	YES	NO	NO	NO	NO	NO
12. If meta-analysis was performed, did the review	YES	-	-	NO	NO	NO	-	YES	-	NO	NO	YES	YES	YES	NO	NO	NO

authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?

13. Did the review authors account for RoB in individual studies when interpreting / discussing the results of the review?

14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?

15. If they performed quantitative synthesis did the

YES YES NO YES NO YES NO YES YES YES YES YES YES YES YES YES YES

YES NO NO NO YES YES NO YES NO YES YES YES YES YES YES YES YES

NO - - YES NO YES - NO - NO NO NO NO NO YES NO

review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?

16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	YES	YES	YES	NO	YES	YES	YES	YES	NO	YES	NO	YES	YES	NO	YES	YES
Final classification	LOW	MODERATE	LOW	LOW	CRITICALLY LOW	LOW	LOW	LOW	MODERATE	CRITICALLY LOW	CRITICALLY LOW	MODERATE	LOW	CRITICALLY LOW	LOW	LOW

Table 6. Exposed factors and relationship with TDI, according to age.

	Risk factor for TDI	Protective factor for TDI	Not associated with TDI	Inconclusive
Children				
Socioeconomic status			*	
Higher income	*			
Parent's schooling			*	
Have house			*	
overship				
Inadequate lip coverage	*			
Gender (males)	*			
Age (younger)	*			
Overbite			*	
Anterior open bite	*			
Presence of caries in deciduous dentition				*
Children and adolescents				
Increased overjet	*			
Autism Spectrum Disorder			*	
Cerebral palsy			*	
Previous history of TDI	*			
Presence of caries in permanent dentition	*			
Adolescents and adults				
Alcohol drink	*			
Illicit drugs use			*	
Use of mouthguard		*		
Sensory deficit			*	
Overweight	*			
Presence of thong piercing	*			
Presence of lip piercing			*	
Children, adolescents and adults				
Physical activity				*
Nutritional status				*
Adults				
Elite sports professional	*			

*Association between TDI and exposed factor

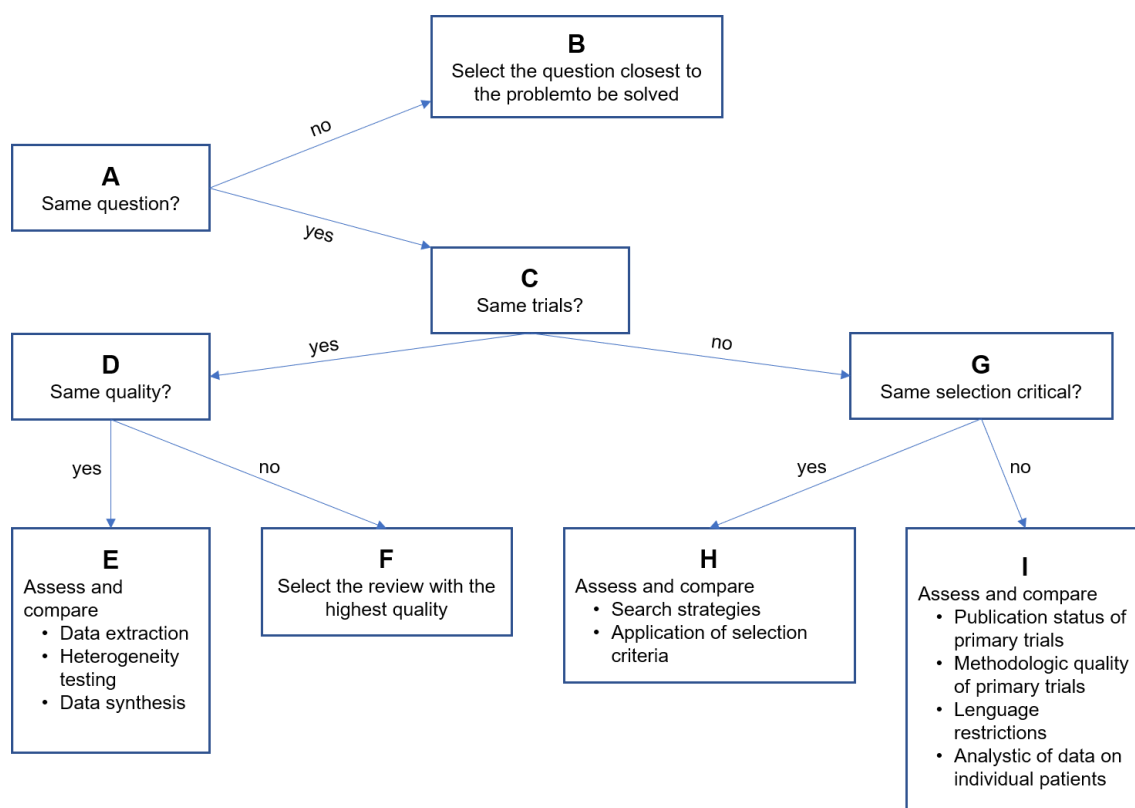


Figure 1. Algorithm for interpreting discordant reviews (assuming that the reviews have few and minimal flaws).¹⁷

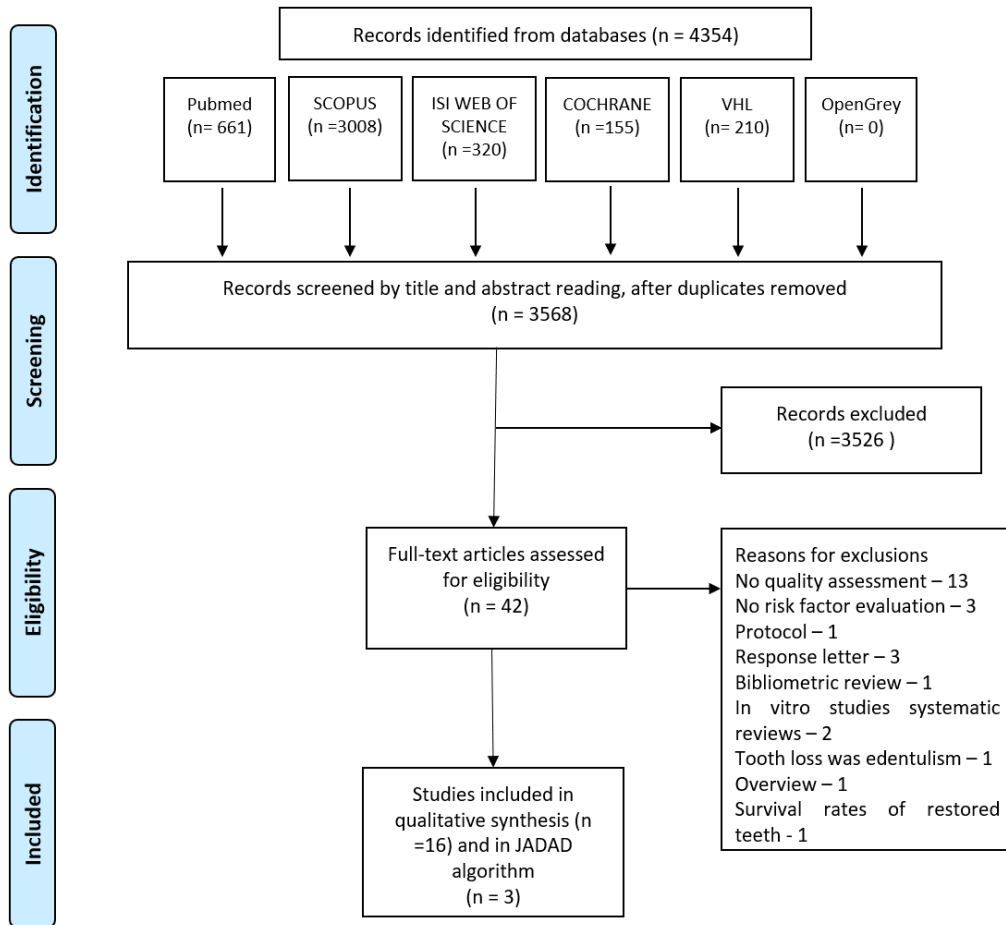


Figure 2. Flow diagram of study selection process.

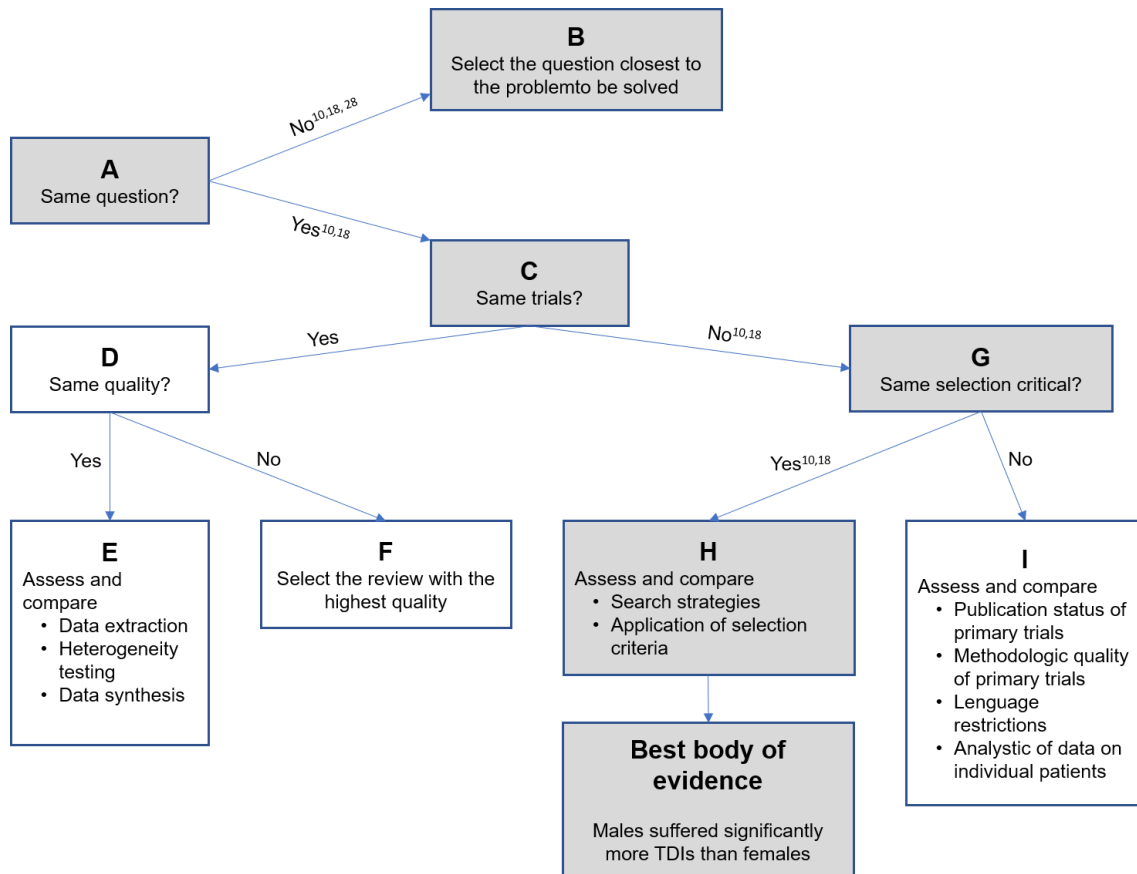


Figure 3. Best body of evidence for association between TDI and gender.

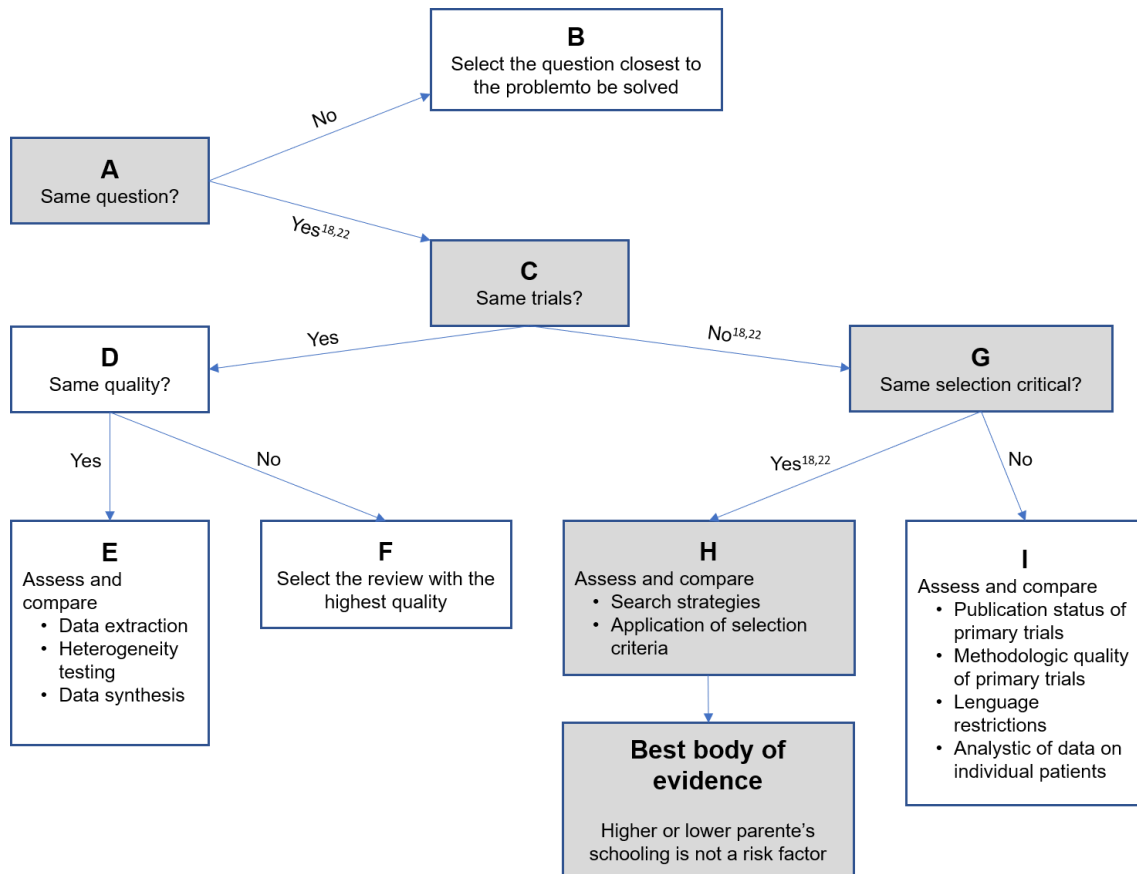


Figure 4. Best body of evidence for association between TDI and parent's schooling.

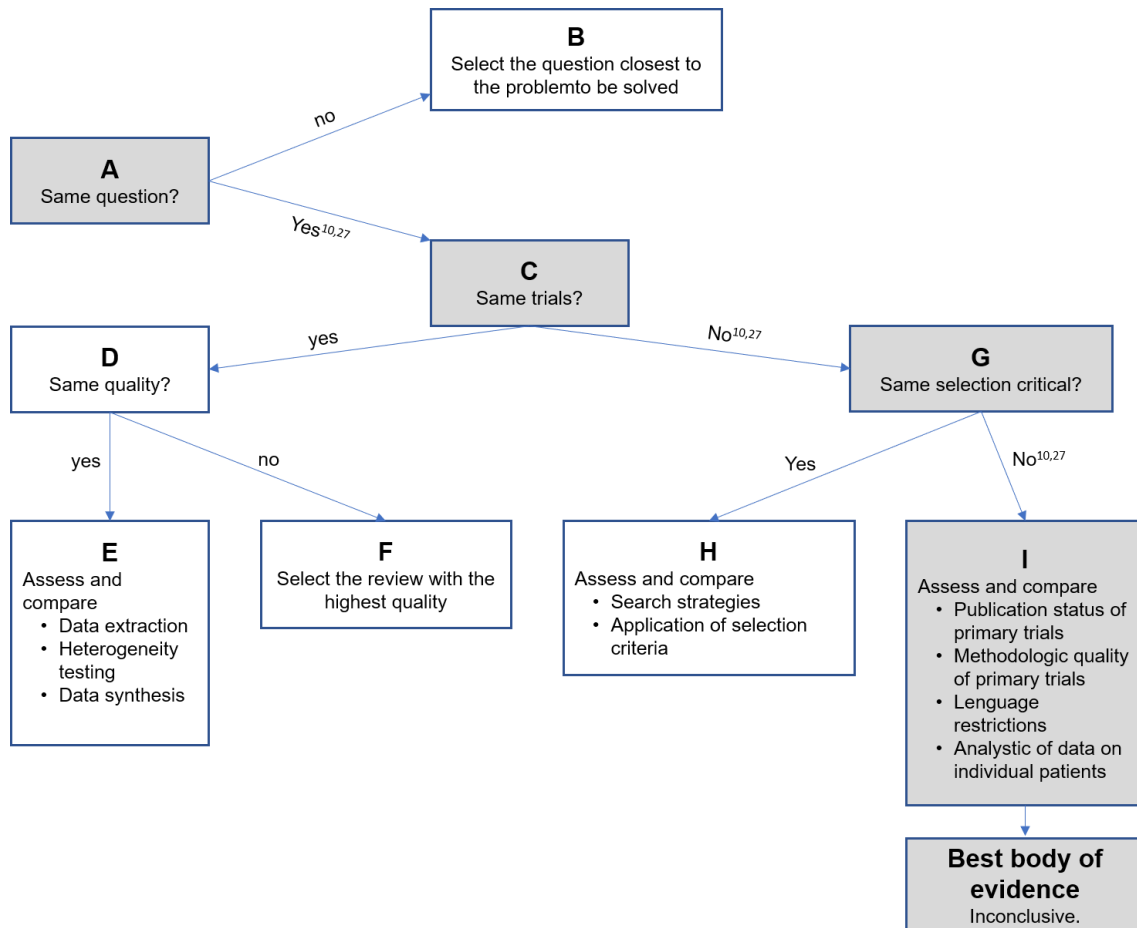


Figure 5. Best body of evidence for association between TDI and caries in deciduous dentition.

5 CONSIDERAÇÕES FINAIS

Sabendo que o TD é mais prevalente na população jovem (Azami-Aghdash *et al.*, 2015), a escolha do tratamento deve ser pautada respeitando o conceito atual de odontologia minimamente invasiva (Mackenzie e Banerjee, 2017), acreditando na filosofia que qualquer material odontológico utilizado no tratamento é de valor biológico menor do que o tecido saudável original no que envolve todas as especialidades da área odontológica (Ericson, 2004). O delineador comum é a preservação do tecido, preferencialmente prevenindo a doença e interceptando seu progresso, mas também removendo e substituindo com a menor perda de tecido possível (Ericson, 2004).

Sabe-se que o TD não tratado está relacionado a impactos negativos clínicos nos próprios dentes e/ou nos seus sucessores (Soares *et al.*, 2014; Lenzi *et al.*, 2015; Lenzi *et al.*, 2018), na qualidade de vida (Bendo *et al.*, 2010) e auto percepção (Kaur *et al.*, 2017) daqueles que sofreram a injúria. A presente tese explora o traumatismo dentário no que tange seu tratamento, impactos do tratamento, ou não, na QVRSB e julgamento social de C/A, e fatores de risco envolvidos na ocorrência TD. Desta forma, os resultados oriundo dos seis estudos que compõem essa tese de doutorado permitem que sejam discorridas algumas considerações.

A confecção de um bisel vestibular não influenciou na retenção e performance clínica de restaurações classe IV, e nem na incidência de necrose pulpar, após 6 meses do tratamento restaurador, em dentes que sofreram fratura não complicada em esmalte e dentina. Tendo em vista que restaurações são refeitas ao longo da vida (Baratieri e Ritter, 2005), a restauração inicial deve ser o mais conservadora possível para minimizar os custos e a complexidade das eventuais restaurações por substituição. Esse achado pode ser estendido para dentes anteriores que sofreram fraturas envolvendo um ou dois ângulos.

O fator envolvido na falha das restaurações anteriores no ECR desenvolvido foi a recorrência do TD. Entretanto, na hora de optar por realizar ou não bisel, o clínico deve levar em consideração a sua habilidade manual e

materiais restauradores disponíveis, com a intenção de alcançar as expectativas estéticas do paciente.

Tendo em mente que os impactos do TD vão além do acometimento físico e estético, causando danos psicológicos, funcionais, desvios de comportamento e constrangimento, dificultando as relações sociais (Cortes *et al.*, 2002; Antunes *et al.*, 2013), os dados obtidos no segundo estudo mostram que o tratamento das fraturas em esmalte e dentina contribuem para melhora significativa na QVRSB de C/A que sofreram TD. O impacto positivo pode ser visualizado, de uma forma geral, para C/A de 8 a 14 anos.

Avaliando os domínios da QVRSB de forma isolada, observa-se que houve uma melhora significativa nos domínios ‘sintomatologia oral’ para crianças de 8 a 10 anos e ‘bem-estar emocional’ para adolescentes de 11 a 14 anos. Esse resultado está relacionado à idade e aos fatores sociais únicos presentes durante o período da adolescência. Na faixa etária de 11 a 14 anos, a relação entre os pares é um fator importante na percepção do indivíduo (Jokovic *et al.*, 2005), onde a aparência física e a atratividade exercem papel importante nas interações sociais e no bem-estar psicológico dos adolescentes (Marques *et al.*, 2006).

Sabendo que a boca é um importante determinante da atratividade facial e que quaisquer alterações nos aspectos dentários podem ter um impacto negativo / positivo na qualidade de vida e nas relações interpessoais das pessoas (Ahrari *et al.*, 2015), no terceiro estudo houve a oportunidade de associar a influência de diferentes TDs-C no julgamento social de C/A para com outras C/A.

O uso de questionários validados para a língua utilizada e com propriedades psicométricas é fundamental para garantir a confiabilidade dos resultados (Martins *et al.*, 2009; Torres *et al.*, 2009). Portanto, primeiramente, um questionário foi elaborado e validado para determinar a precisão de um instrumento. Em resumo, o questionário desenvolvido apresentou propriedades válidas e confiáveis para serem administradas na população de C/A garantindo a confiabilidade dos resultados do quarto estudo.

Como o aumento da gravidade do TDs-C, mais características negativas e menos características positivas foram atribuídas, resultando em um julgamento social final pior e em menor pontuação na escala visual analógica de atratividade. Este resultado mostra que essas características físicas influenciaram significativamente as percepções psicossociais e de beleza. A perda dentária foi a consequência que mais influenciou negativamente a percepção dos participantes, demonstrando o quanto é valorizada pelos adolescentes (Prokhorov *et al.*, 1993).

Tanto o estudo dois, quanto o estudo três, reiteram a importância do acolhimento e do tratamento precoce de pacientes que sofreram TD, com a intenção de minimizar danos maiores envolvendo aspectos clínicos, qualidade de vida e julgamentos sociais. Esta abordagem permite olhar as C/As de maneira efetiva, uma vez que tratar unicamente sinais e sintomas de uma patologia não permite que o indivíduo usufrua de sua saúde integralmente. Tal avaliação acompanha o conceito de saúde que considera os aspectos envolvidos na rotina diária das pessoas (como bem estar, qualidade de vida e relações sociais) com uma conotação multidimensional (Ra, 1997).

O quarto estudo mostra que pacientes que sofreram TD apresentam maior risco de sofrer um novo TD. Esse resultado, associado aos resultados do RCT desenvolvido, mostra que o TD é um fator de risco para o próprio TD, e está associado à falha de restaurações adesivas e a necrose pulpar. Esses achados chamam a atenção para a importância do acompanhamento clínico e radiográfico, bem como para a implementação de atitudes preventivas ao TD, nos pacientes que já o sofreram, evitando o desenvolvimento de patologias, com diagnóstico e tratamento precoces antes que ocorra morbidade significativa.

Diante do exposto, deve-se ter em mente que atitudes destinadas a prevenir o TD podem reduzir sua prevalência e seus impactos, e uma abordagem de prevenção depende da identificação de fatores de risco e da adoção de medidas destinadas a evitar esses fatores (Bourguignon e Sigurdsson, 2009). O quinto e sexto estudos da presente tese objetivaram identificar os fatores de risco relacionados ao TD, incluindo a associação do consumo de bebidas alcoólicas e uso de drogas ilícitas e do TD.

No estudo seis da presente tese, vários fatores clínicos, sociodemográficos e ambientais foram identificados como fatores de risco para os TDs. Alguns fatores não podem ser alterados, como gênero, idade e renda familiar (Aldrigui, 2012); outros fatores podem ser modificados, como a presença de determinadas má oclusões (Arraj *et al.*, 2019), da cárie dental (Soares *et al.*, 2017) e da obesidade (Correa-Faria e Petti, 2015), ou orientados para sua prevenção, como o consumo de bebidas alcoólicas (Barauna Magno *et al.*, 2019) e uso de protetores bucais durante a prática de atividades esportivas (Fernandes *et al.*, 2019), principalmente para profissionais da elite esportiva (Vucic *et al.*, 2016).

Esses achados permitem identificar populações e fatores que aumentam a chance do TD, permitindo o estabelecimento de estratégias preventivas, bem como estratégias que permitam a difusão do conhecimento sobre primeiros cuidados frente a um TD, fornecendo à população prevenção primária e secundária. Deve-se educar outros dentistas para a identificação dos fatores de risco a fim de atuarem tratando-os, quando possível, ou orientando sobre o TD.

Pode-se e deve-se, também, educar a população (pais e responsáveis) e outros profissionais (professores de escolas primárias, profissionais da área de educação física, outros profissionais da saúde não dentistas) que lidam com as populações de maior risco, na tentativa de divulgar conhecimento e permitir um serviço em relação a TD com um apoio contínuo por todas as partes.

Finalmente, na presente tese infere-se uma abordagem complexa e completa de atendimento ao paciente que sofreu TD. Nas questões dos fatores protetores e de risco relacionados ao TD deve-se considerar a existência de fatores que atuam de forma isolada ou em conjunto; e que o indivíduo que sofreu TD deve ser tratado da forma mais conservadora possível, e que permita bons prognósticos; bem como acompanhado constante para a identificação e tratamento imediato de possíveis sequelas decorrentes do trauma. Atitudes como essas evitam consequências negativas maiores nas atividades e relações diárias desses pacientes, que podem estar presentes desde a sua juventude e perpetuar até a fase adulta. Espera-se que as discussões advindas dos estudos que compõem a presente tese permitam um direcionamento para a elaboração

de planos e ações na Odontologia, especialmente no que diz respeito às estratégias de prevenção e promoção de saúde relacionadas ao TD.

6 CONCLUSÕES

O bisel vestibular não influenciou no sucesso clínico de restaurações classe IV de C/A que sofreram TD; o tratamento restaurador melhorou a QVRSB dessas C/A, enquanto a de seus familiares não; a presença de TDs-C influenciam negativamente no julgamento social de C/A; fatores sociodemográficos, clínicos e ambientais estão relacionados a ocorrência do TD.

Estudo 1-

- O bisel vestibular não influenciou na performance clínica de restaurações anteriores classe IV e na incidência de necrose pulpar em dentes que sofreram fratura de esmalte e dentina não complicada, após 6 meses de acompanhamento.
- A quantidade de ângulos fraturados / restaurados não influenciou na retenção das restaurações classe IV e a recorrência de TD está associada a menor retenção das restaurações classe IV e maior incidência de necrose pulpar.

Estudo 2-

- O tratamento restaurador influenciou positivamente na QVRSB de C/A.
- O tratamento restaurador não influenciou na QVRSB da família de C/A.

Estudo 3-

- O questionário de julgamento social desenvolvido mostrou propriedades de validade e confiabilidade em sua administração em uma população de C/A, no que tange TDs-C.
- Os TDs-C influenciam negativamente o julgamento social de C/A.

Estudo 4-

- Pessoas que sofreram um TD prévio apresentam maior risco de sofrer recorrência de TD, com moderada certeza de evidência.

Estudo 5-

- Há moderada evidência sobre a associação entre uso de álcool e a ocorrência de TD.
- Uso de drogas ilícitas e TD não estão associados, com baixa certeza de evidências.

Estudo 6-

- Fatores sociodemográficos, clínicos e ambientais estão relacionados com maior chance de TDI.
- O uso de protetor bucal é um fator protetor.
- A maioria das revisões sistemáticas apresentou baixa qualidade metodológica e pode não fornecer um resumo preciso e abrangente dos estudos disponíveis que abordam a questão de interesse.

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ANEXOS

Anexo A – Parecer Comitê de Ética HUCFF-UFRJ

HOSPITAL UNIVERSITÁRIO
CLEMENTINO FRAGA FILHO
/HUCFF/ UFRJ



PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Restaurações em dentes anteriores permanentes traumatizados: estudo clínico, controlado e randomizado.

Pesquisador: Marcela Baraúna Magno

Área Temática:

Versão: 2

CAAE: 60436616.2.0000.5257

Instituição Proponente: UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

Patrocinador Principal: UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

DADOS DO PARECER

Número do Parecer: 1.836.586

Apresentação do Projeto:

Protocolo 278-16. Respostas recebidas em 3.11.2016.

INTRODUÇÃO

O trauma dental (TD) é um problema de saúde comum na população infantil e adolescente, sendo os incisivos superiores os elementos envolvidos com maior frequência.¹ Nos casos onde a colagem do fragmento não pode ser realizada, a restauração em resina composta é considerada o tipo mais conservador de tratamento para o dente fraturado, exigindo preparos dentários mínimos. O preparo de um ângulo cavossuperficial vestibular tem sido recomendado para aumentar a retenção da restauração³ e permitir uma transição gradual entre a restauração e o dente. No entanto, influência desse preparo sobre o desempenho das restaurações anteriores é controverso e discutível⁴⁻⁶. Heintze et al.⁷ avaliaram a performance clínica de restaurações anteriores através de uma revisão sistemática; isolando os 8 estudos que avaliaram restaurações classe IV, notou-se que a maioria foi realizado entre 1977 e 1997, com muitos materiais que não estão mais disponíveis no mercado e técnicas que não são mais utilizadas, além de não incluir pesquisas que avaliem diretamente a influência do bisel na performance clínica. Sabendo que a confecção do bisel vestibular é rotina em muitas faculdades e clínicas, e que não existem estudos

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Continuação do Parecer: 1.836.586

Outros	Carta_resposta.docx	22:09:38	Magno	Aceito
Outros	Carta_de_apresentacao_corrigido.doc	03/11/2016 22:08:36	Marcela Baraúna Magno	Aceito
Projeto Detalhado / Brochura Investigador	Carta_de_apresentacao_corrigindo.doc	03/11/2016 22:08:05	Marcela Baraúna Magno	Aceito
Projeto Detalhado / Brochura Investigador	projeto_Marela_Magno_corrigido.docx	03/11/2016 22:07:49	Marcela Baraúna Magno	Aceito
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Outros	Lattes_Aline_Borburema_Neves.pdf	22/09/2016 19:48:24	Marcela Baraúna Magno	Aceito
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Outros	Lattes_Marcela_Barauna_Magno.pdf	22/09/2016 19:47:20	Marcela Baraúna Magno	Aceito
Outros	Termo_de_responsabilidade.pdf	22/09/2016 19:46:40	Marcela Baraúna Magno	Aceito
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Outros	Folha_de_rosto_VERSO.pdf	22/09/2016 19:44:56	Marcela Baraúna Magno	Aceito
Folha de Rosto	Folha_de_rosto_FRENTE.pdf	22/09/2016 19:44:36	Marcela Baraúna Magno	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

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Anexo B – Parecer Comitê de Ética UESB

UNIVERSIDADE ESTADUAL DO
SUDOESTE DA BAHIA -
UESB/BA



PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: PERCEPÇÃO ESTÉTICA QUANTO A ALTERAÇÕES DECORRENTES DO TRATAMENTO ORTODÔNTICO

Pesquisador: Matheus Melo Pithon

Área Temática:

Versão: 2

CAAE: 17333113.1.0000.0055

Instituição Proponente: Universidade Estadual do Sudoeste da Bahia - UESB

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 405.925

Data da Relatoria: 25/09/2013

Apresentação do Projeto:

A maloclusão dentária corresponde a qualquer desvio dos dentes de sua oclusão normal, que afeta a função oral e a aparência, mas que também tem efeitos econômicos, sociais e psicológicos. Porém, devido à importância dada a estética dental, a preocupação maior dos pacientes recai sobre a auto-confiança e autoestima, considerando que a aparência é um importante fator de interação social, sucesso e de influência significativa na qualidade de vida. A boa aparência é apontada como sinal de pessoas mais capazes, inteligentes, mais qualificadas para o trabalho, responsáveis, socialmente bem integradas. Isso gera mais prestígio, mais felicidade e mais êxito, do que aquelas que têm aparência ruim, inadequada. Muitos pacientes possuem o que se chama de sorriso não ideal e estão cientes que possuem uma má-oclusão, e isso pode dificultar a sua qualidade de vida, inclusive o acesso ao mercado de trabalho.

Objetivo da Pesquisa:

Determinar se a estética dentária influencia na contratação ou não de indivíduos por setores de Recursos Humanos das cidades de Jequié-BA e Vitória da Conquista-BA.

Avaliação dos Riscos e Benefícios:

Riscos:

Este estudo apresenta desconfortos ou riscos mínimos aos sujeitos da pesquisa. Se houver algum

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UNIVERSIDADE ESTADUAL DO
SUDOESTE DA BAHIA -
UESB/BA



Continuação do Parecer: 405.925

dano será oferecido tratamento sem ônus e será providenciado pelos pesquisadores responsáveis.

Benefícios:

Apresentar os dados obtidos quanto à influência da estética dentária na conquista de um emprego.

Comentários e Considerações sobre a Pesquisa:

Nesta pesquisa serão selecionados dez pacientes com maloclusão e necessidade de tratamento ortodôntico dos quais serão tiradas fotos da face desses pacientes, sorrindo. Para nove desses sujeitos a foto será digitalmente alterada (correção ortodôntica dos dentes) e um sujeito (CONTROLE) continuará com o sorriso não ideal. Duas pesquisas paralelas serão construídas, uma com a foto mostrando um sorriso ideal e a outra com sorriso não ideal de cada sujeito. As imagens serão avaliadas por 100 responsáveis dos setores de RH de empresas do município de Jequié/BA e de Vitória da Conquista/BA. Haverá 10 fotografias em cada pesquisa, contendo uma pergunta: você contrataria essa pessoa? Acompanhada de uma escala visual analógica (VAS) 0-100 mm. Além disso, características do avaliado, tais como, gênero, etnia, idade e qual o cargo que possui na empresa serão considerados durante a avaliação das diferenças entre os sorrisos ideais e não ideais. As pesquisas 1 e 2 serão comparadas por meio de análise de Variância (ANOVA). Isto será conseguido usando medidas do modelo de análise (versão 9.1; AS Institute, Cary, NC).

Considerações sobre os Termos de apresentação obrigatória:

São apresentados adequadamente os Termos obrigatórios

Recomendações:

As recomendações feitas foram acatadas pelos autores. Sugerimos a substituição do termo percepção do título do projeto por concepção.

Conclusões ou Pendências e Lista de Inadequações:

A pesquisa é relevante, viável e exequível.

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

Considerações Finais a critério do CEP:

Em reunião do dia 25/09/2013 a plenária do CEP/UESB aprovou o parecer do relator.

Endereço: Avenida José Moreira Sobrinho, s/n
Bairro: Jequiezinho **CEP:** 45.206-510
UF: BA **Município:** JEQUIE
Telefone: (73)3525-6683 **Fax:** (73)3528-9727 **E-mail:** cepuesb.jq@gmail.com

Anexo C – Ficha clínica do Centro de Vigilância e Monitoramento de Traumatismos Dentários UFRJ

FICHA CLÍNICA DE TRAUMATISMO DENTÁRIO

PRONTUÁRIO N° |

Data do atendimento: / /

Nome da Criança:					
Nascimento:	Idade atual:	Idade na data do trauma:			
Etnia da criança: <input type="checkbox"/> Branca <input type="checkbox"/> Parda <input type="checkbox"/> Negra <input type="checkbox"/> Asiático					
Nome do responsável:					
Nome do acompanhante:					
Etnia do acompanhante: <input type="checkbox"/> Branca <input type="checkbox"/> Parda <input type="checkbox"/> Negra <input type="checkbox"/> Asiático					
Idade:	Escolaridade:				
O acompanhante possui parentesco com a criança? Caso não queira responder, assinale o motivo. <input type="checkbox"/> Não <input type="checkbox"/> Sim () mãe () pai () avô/avó () tio/tia () irmão/irmã () outros: _____					
Endereço:					
Bairro:		Cidade:	CEP:		
Tel residencial:	Tel recado:	Tel trabalho:	Celular		
Renda familiar (avaliar baseado no salário mínimo atual):					
<input type="checkbox"/> até ½ salário mínimo	<input type="checkbox"/> de ½ e 1 salário	<input type="checkbox"/> de 1 e 2 salários			
<input type="checkbox"/> de 2 e 3 salários	<input type="checkbox"/> de 3 e 5 salários	<input type="checkbox"/> acima de 5 salários			
Dados Sócio-econômicos:					
Posse de Itens					
	Quantidade de Itens				
	0	1	2	3	4 ou +
Televisão em cores	0	2	3	4	5
Rádio	0	1	2	3	4
Banheiro	0	2	3	4	4
Automóvel	0	2	4	5	5
Empregada mensalista	0	2	4	4	4
Aspirador de pó	0	1	1	1	1
Máquina de lavar	0	1	1	1	1
Videocassete e/ou DVD	0	2	2	2	2
Geladeira	0	2	2	2	2
Freezer (aparelho independente ou parte da geladeira duplex)	0	1	1	1	1
Grau de Instrução do chefe de família					
Analfabeto / Primário incompleto	0				
Primário completo / Ginásial incompleto	1				
Ginásial completo / Colegial incompleto	2				
Colegial completo / Superior incompleto	3				
Superior completo	5				
CORTES DO CRITÉRIO BRASIL					
Classe	PONTOS	TOTAL BRASIL (%)			
A1	30-34	1			
A2	25-29	5			
B1	21-24	9			
B2	17-20	14			
C	11-16	36			
D	6-10	31			
E	0-5	4			

Qual (ais) o(s) motivo (s) ou queixa (s) para a procura por atendimento na UFRJ?					
<input type="checkbox"/> Dor	<input type="checkbox"/> Estética				
<input type="checkbox"/> Dificuldade na alimentação	<input type="checkbox"/> Dificuldade na fala				
<input type="checkbox"/> Dificuldade na socialização	<input type="checkbox"/> Alteração de cor				
<input type="checkbox"/> Dificuldade de higienização	<input type="checkbox"/> Mobilidade dentária				
<input type="checkbox"/> Edema	<input type="checkbox"/> Outra – qual?				
ANAMNESE					
Acompanhamento médico: <input type="checkbox"/> Não <input type="checkbox"/> Sim					
<input type="checkbox"/> Hospital Público	<input type="checkbox"/> IPPMG				
<input type="checkbox"/> Pediatria particular	<input type="checkbox"/> Posto de Saúde				
Está em tratamento médico atualmente?	<input type="checkbox"/> Não <input type="checkbox"/> Sim				
Qual?					
Está utilizando algum medicamento no momento?	<input type="checkbox"/> Não <input type="checkbox"/> Sim Qual?				
Já esteve hospitalizado? <input type="checkbox"/> Não <input type="checkbox"/> Sim	Motivo:				
Já recebeu transfusão sanguínea: <input type="checkbox"/> Não <input type="checkbox"/> Sim					
Apresenta algum tipo de alergia: <input type="checkbox"/> Não <input type="checkbox"/> Sim	Qual?				
Já recebeu ou recebe algum (ns) dos seguintes tratamentos?					
<input type="checkbox"/> Cardíaco	<input type="checkbox"/> Sanguíneo	<input type="checkbox"/> Hepático	<input type="checkbox"/> Endócrino		
<input type="checkbox"/> Neurológico	<input type="checkbox"/> Psicológico	<input type="checkbox"/> Gastrointestinal	<input type="checkbox"/> Dermatológico		
<input type="checkbox"/> Oftalmológico	<input type="checkbox"/> Otorrinolaringológico	<input type="checkbox"/> Respiratório	<input type="checkbox"/> Renal		
<input type="checkbox"/> Ortopédico					
Possui Cobertura antitetânica?	<input type="checkbox"/> Não <input type="checkbox"/> Sim				
Pratica algum tipo de esporte?	<input type="checkbox"/> Não <input type="checkbox"/> Sim Qual?				
Usa protetor bucal?	<input type="checkbox"/> Não <input type="checkbox"/> Sim				
História do Trauma					
Quando ocorreu o trauma?					
Quem estava com a criança no momento do trauma?					
Qual foi o primeiro socorro prestado					
Onde ocorreu o trauma:					
<input type="checkbox"/> rua	<input type="checkbox"/> casa	<input type="checkbox"/> parque	<input type="checkbox"/> escola	<input type="checkbox"/> igreja	<input type="checkbox"/> piscina
Outros:					
Como ocorreu o trauma?					
<input type="checkbox"/> queda da própria altura	<input type="checkbox"/> outra queda - qual?				
<input type="checkbox"/> agressão física	<input type="checkbox"/> acidente ciclístico	<input type="checkbox"/> acidente automóvel			
<input type="checkbox"/> acidente esportivo	<input type="checkbox"/> colisão	<input type="checkbox"/> outros			
Durante a queda ou acidente, a criança estava com algum objeto na boca? <input type="checkbox"/> Não <input type="checkbox"/> Sim					
Qual?					
<input type="checkbox"/> chupeta	<input type="checkbox"/> mamadeira	<input type="checkbox"/> copo	<input type="checkbox"/> colher		
<input type="checkbox"/> lápis/caneta	<input type="checkbox"/> brinquedo	<input type="checkbox"/> mordedor	<input type="checkbox"/> outros:		
Acrescente dados que julgar importantes:					
Caso haja um novo trauma ou recorrência de trauma, os dados serão acrescentados nesta mesma ficha com caneta da cor VERMELHA, representando as anotações referentes a este novo trauma / recorrência, exatamente da mesma maneira realizada para o novo trauma. Um relato resumido da situação na parte de "tratamento realizado" deve ser feito. Importante: o novo trauma receberá acompanhamento.					

HISTÓRIA DE ATENDIMENTOS ANTERIORES RELACIONADOS A ESTE TRAUMA	
Este é o primeiro atendimento da criança relacionado a este trauma? <input type="checkbox"/> Sim <input type="checkbox"/> Não	
Em caso negativo, onde foi o 1º atendimento?	Data do 1º atendimento?
Demorou quanto tempo para ser atendido desde o acidente?	
<input type="checkbox"/> Menos de ½ hora	<input type="checkbox"/> ½ hora
<input type="checkbox"/> entre 2 e 6 horas	<input type="checkbox"/> entre 6 e 12 horas
<input type="checkbox"/> entre 48 horas e 1 semana	<input type="checkbox"/> entre 1 semana e 1 mês
<input type="checkbox"/> entre 6 e 12 meses	<input type="checkbox"/> após 12 meses
Foi atendido por:	
<input type="checkbox"/> médico	<input type="checkbox"/> cirurgião-dentista
<input type="checkbox"/> outros	
Recebeu algum tipo de tratamento? <input type="checkbox"/> Sim <input type="checkbox"/> Não <input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	
Qual?	
A criança foi medicada (a)? <input type="checkbox"/> Sim <input type="checkbox"/> Não <input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	
Qual?	
O que o responsável achou do tratamento anterior: <input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	
<input type="checkbox"/> Muito bom	<input type="checkbox"/> Bom
<input type="checkbox"/> Regular	<input type="checkbox"/> Ruim
<input type="checkbox"/> Muito ruim	
O paciente veio encaminhado? <input type="checkbox"/> Não <input type="checkbox"/> Sim	
Por quem?	
<input type="checkbox"/> UPA	<input type="checkbox"/> Hospital
<input type="checkbox"/> Dentista particular	<input type="checkbox"/> Escola
<input type="checkbox"/> Outro	
O paciente possui história anterior de trauma em dente permanente? <input type="checkbox"/> Não <input type="checkbox"/> Sim	
Qual dente?	

Acrescente dados que julgar importantes:

1º ATENDIMENTO NO CVMT/UFRJ (DIA DE HOJE): (PARA SER PREENCHIDO EM CASO DE TRAUMAS ANTIGOS OU NOVOS)	
Demorou quanto tempo após o trauma ter ocorrido para chegar AQUI na UFRJ?	
<input type="checkbox"/> menos de ½ hora	<input type="checkbox"/> ½ hora
<input type="checkbox"/> entre 1 e 2 horas	<input type="checkbox"/> entre 2 e 6 horas
<input type="checkbox"/> entre 12 e 24 horas	<input type="checkbox"/> entre 24 e 48 horas
<input type="checkbox"/> entre 1 semana e 1 mês	<input type="checkbox"/> após 12 meses
<input type="checkbox"/> entre 1 e 6 meses	<input type="checkbox"/> entre 6 e 12 meses
<input type="checkbox"/> entre ½ e 1 hora	<input type="checkbox"/> entre 6 e 12 horas
<input type="checkbox"/> entre 48 horas e 1 semana	
Caso já tenha havido algum atendimento anterior ao que está sendo realizado neste momento, também será avaliado:	
Qualidade do atendimento anterior: <input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	
<input type="checkbox"/> muito bom	<input type="checkbox"/> bom
<input type="checkbox"/> regular	<input type="checkbox"/> ruim
<input type="checkbox"/> muito ruim	
Houve necessidade de contenção? <input type="checkbox"/> não <input type="checkbox"/> sim	Foi realizada? <input type="checkbox"/> não <input type="checkbox"/> sim
<input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	<input type="checkbox"/> Não se aplica, pois não teve atendimento anterior
Foi realizada alguma restauração? <input type="checkbox"/> não <input type="checkbox"/> sim	Foi orientado quanto a cuidados? <input type="checkbox"/> não <input type="checkbox"/> sim
<input type="checkbox"/> Não se aplica, pois não teve atendimento anterior	<input type="checkbox"/> Não se aplica, pois não teve atendimento anterior
Está usando alguma substância para higiene do local?	
<input type="checkbox"/> não <input type="checkbox"/> sim Quais?	<input type="checkbox"/> Não se aplica, pois não teve atendimento anterior

AVALIE O QUE ESTÁ SENDO VISTO AGORA EM NOSSO PRIMEIRO EXAME DA CRIANÇA:														
Exame dos tecidos moles (preencher de acordo com a legenda)														
Exame extraoral (preencher de acordo com a legenda)														
Pescoço	Bochecha	Mento	Lábio inf.	Lábio sup.	Nariz	Olhos	Fronte							
Lábios	Fundo de Vestíbulo	Gengiva	Língua	Mucosa jugal	Palato	Assoalho								
Legenda injúrias de tecidos moles														
0 Ausente		1 Contusão (edema, hematoma)		2 Abrasão (escoriação)		3 Laceração (perda de continuidade do tecido)		4 Sutura						
Higiene Deficiente: <input type="checkbox"/> não <input type="checkbox"/> sim: <input type="checkbox"/> generalizada ou <input type="checkbox"/> somente na área afetada														
Dentição: <input type="checkbox"/> decídua <input type="checkbox"/> mista <input type="checkbox"/> permanente														
Oclusão: <input type="checkbox"/> normal <input type="checkbox"/> aberta anterior <input type="checkbox"/> cruzada anterior <input type="checkbox"/> over Jet acentuado (mm)														
Vedamento labial: <input type="checkbox"/> adequado <input type="checkbox"/> inadequado														
Hábitos orais: <input type="checkbox"/> Não <input type="checkbox"/> Sim <input type="checkbox"/> Sucção de dedo <input type="checkbox"/> Chupeta <input type="checkbox"/> Bruxismo <input type="checkbox"/> Roer unhas <input type="checkbox"/> outros														
Existe alguma queixa da criança em relação a: Cor: <input type="checkbox"/> Não <input type="checkbox"/> Sim Posição do dente: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dificuldade para comer: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dificuldade para higienizar: <input type="checkbox"/> Não <input type="checkbox"/> Sim Mobilidade: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dor no dente traumatizado: <input type="checkbox"/> Não <input type="checkbox"/> Sim														
Dor em outro dente que não seja o traumatizado: <input type="checkbox"/> Não <input type="checkbox"/> Sim														
Existe alguma queixa do responsável em relação a: Cor: <input type="checkbox"/> Não <input type="checkbox"/> Sim Posição do dente: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dificuldade para comer: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dificuldade para higienizar: <input type="checkbox"/> Não <input type="checkbox"/> Sim Mobilidade: <input type="checkbox"/> Não <input type="checkbox"/> Sim Dor no dente traumatizado: <input type="checkbox"/> Não <input type="checkbox"/> Sim														
Após o nosso exame, marcar um X nos dentes envolvidos no trauma:														
55	54	53	52	51	61	62	63	65						
85	84	83	82	81	71	72	74	75						
18	17	16	15	14	13	12	11	21	22	23	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	36	37	38
Algum dente envolvido possui mobilidade dentária acentuada? <input type="checkbox"/> Não <input type="checkbox"/> sim Qual (is)?														
Os dentes envolvidos possuem alteração de cor? <input type="checkbox"/> Não <input type="checkbox"/> sim Qual (is)?														

**DIAGNÓSTICO CLÍNICO E RADIOGRÁFICO:
Após exame clínico e radiográfico.**

Assinalar os achados nos dentes e as injúrias (aos tecidos de sustentação e dentários), de acordo com a legenda.

Dentes										
Injúrias										
Legenda Tipos de Injúrias (Tecidos de sustentação) 1 Concussão; 2 Subluxação 3 Luxação lateral (V, L/P, M ou D); 4 Extrusão; 5 Intrusão (coroa p/ V ou P; T-total, P-parcial); 6 Avulsão. Tipos de Injúrias (Tecidos dentários/Ósseo) – 7. Trinca; 8. Fratura – esmalte (Horizontal, Vertical ou Obliqua); 9. Fratura – esmalte e dentina sem exposição pulpar; 10. Fratura – esmalte e dentina com exposição pulpar; 11. Fratura radicular : C- cervical M – médio A – apical; 12. Fratura corono-radicular; 13. Fratura alveolar										

Assinalar as sequelas nos dentes traumatizados (aos tecidos de sustentação e dentários), de acordo com a legenda (decíduos e permanentes).

Dentes									
Achados									
LEGENDA DAS POSSÍVEIS SEQUELAS 1 Lesão periapical; 2. Reabsorção radicular externa por substituição; 3. Reabsorção radicular externa inflamatória; 4. Reabsorção radicular interna; 5. Anquilose; 6. Calcificação pulpar; 7. Tratamento endodôntico; 8. Fístula; 9. infra oclusão; 10. perda precoce; 11. Parada de formação; 12. Atraso de erupção; 13. Alteração de posição 14. Outros (descrever):									

Exames para dentes traumatizados:

Dente	Resultado dos testes				OBSERVAÇÃO: NÃO FAZER TESTE FRIO EM DENTES DECIDUOS
	FRIO	PAL.	PER.	MOB	
					LEGENDAS O teste de vitalidade será realizado a cada consulta e seus resultados anotados de acordo com a legenda. FRIO: (+) sensibilidade ao frio; (-) insensível ao frio. PALPAÇÃO (PAL): (D) dor, (E) edema, (F) flutuações, (S) secreção. PERCUSSÃO AXIAL (PER.): (D) dor; (I) insensível. MOBILIDADE: (A) ausente (L) leve (M) moderada (S) severa

Plano de tratamento

Dente	Tratamento
1	
2	
3	
4	
5	
6	
7	

Observações: <hr/> <hr/> <hr/> <hr/> <p>Existe a necessidade de encaminhar o paciente para outra unidade de saúde ou clínica? Em caso afirmativo, indique qual:</p>

CONSULTAS DE REVISÃO:

DIAGNÓSTICO CLÍNICO E RADIOGRÁFICO (Consultas de revisão):

Assinalar as sequelas (aos tecidos de sustentação e dentários), de acordo com a legenda.

DENTE	_/_/_	_/_/_	_/_/_	_/_/_	_/_/_	_/_/_	_/_/_	_/_/_

LEGENDA DAS POSSÍVEIS SEQUELAS

1 Lesão periapical; 2. Reabsorção radicular externa por substituição; 3. Reabsorção radicular externa inflamatória; 4. Reabsorção radicular interna; 5. Anquilose; 6. Calcificação pulpar; 7. Tratamento endodôntico; 8. Fistula; 9. infra oclusão; 10. perda precoce; 11. Parada de formação; 12. Atraso de erupção; 13. Alteração de posição 14. Outros (descrever):

NÃO FAZER TESTE FRIO EM DENTES DECIDUOS:

DENTE	_/_/_				_/_/_				_/_/_				_/_/_				
	F	PA	PE	M	F	PA	PE	M	F	PA	PE	M	F	PA	PE	M	

O teste de vitalidade deve ser feito a cada consulta e seus resultados anotados de acordo com a legenda.

FRIO: (+) sensibilidade ao frio; (-) insensível ao frio.

PALPAÇÃO (PA): (D) dor, (E) edema, (F) flutuações, (S) secreção.

PERCUSSÃO AXIAL (PE): (D) dor; (I) insensível.

MOBILIDADE: (A) ausente (L) leve (M) moderada (S) severa

SEQUELAS NO SUCESSOR PERMANENTE

Dentes								
Achados								

LEGENDA DAS POSSÍVEIS SEQUELAS

1. Opacidade; 2. Hipoplasia; 3. Dilaceração coronária; 4. Dilaceração radicular; 5. Atraso de erupção; 6. Erupção ectópica; 7. Erupção precoce; 8. Impactação; 9. Odontoma; 10. Sequestro de germe; 11. Paralisação da formação radicular; 12. Outros (descrever):

Anexo D – Children perception questionnaire 8-10 anos

QUESTIONÁRIO CPQ₈₋₁₀

No: _____

Nome: _____

Data: ____/____/____

Sexo: _____ Idade: _____

| **A** – Nenhuma vez | **B** – 1 ou 2 vezes | **C** – Às vezes

| **D** – Muitas vezes | **E** – Todos ou quase todos os dias | **F** – Por quê?

NOS ÚLTIMOS 3 MESES, QUANTAS VEZES, COM QUE FREQUÊNCIA								
SINTOMAS BUCAIS	1	você sentiu dor nos seus dentes ou dor na boca?	A	B	C	D	E	F
	2	você sentiu feridas na boca?	A	B	C	D	E	F
	3	você sentiu dor nos seus dentes quando comeu alguma coisa ou bebeu alguma coisa gelada?	A	B	C	D	E	F
	4	a comida ficou agarrada em seus dentes?	A	B	C	D	E	F
	5	você ficou com cheiro ruim na sua boca ?	A	B	C	D	E	F
LIMITAÇÕES FUNCIONAIS	6	vezes você gastou mais tempo do que os outros para comer sua comida por causa de seus dentes ou de sua boca?	A	B	C	D	E	F
	7	você teve dificuldade para morder ou mastigar comidas mais duras como: maçã, pão, milho ou carne, por causa de seus dentes ou de sua boca?	A	B	C	D	E	F
	8	foi difícil para você comer o que você queria por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	9	você teve problemas para falar por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	10	você teve problemas para dormir à noite por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
BEM ESTAR EMOCIONAL	11	você ficou chateado por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	12	você se sentiu triste por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	13	você ficou com vergonha por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	14	você ficou preocupado com o que as pessoas pensam sobre seus dentes ou sua boca?	A	B	C	D	E	F

BEM ESTAR SOCIAL	15	você não era tão bonito quanto outras pessoas por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	16	você faltou à aula por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	17	21 você teve problemas para fazer seu dever de casa por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	18	você teve dificuldade para prestar atenção na aula por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	19	você não quis falar ou ler em voz alta na sala de aula por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	20	você deixou de sorrir ou dar risadas quando estava junto de outras crianças por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	21	você não quis falar com outras crianças por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	22	você não quis ficar perto de outras crianças por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	23	você ficou de fora de jogos e brincadeiras por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
	24	vezes outras crianças fizeram gozação ou colocaram apelidos em você por causa dos seus dentes ou de sua boca?	A	B	C	D	E	F
25	vezes outras crianças fizeram perguntas para você sobre seus dentes ou sua boca?	A	B	C	D	E	F	

a. Você acha que os seus dentes e a sua boca são:

Muito bons Bons Mais ou menos Ruins

b. Quanto os seus dentes ou a sua boca te incomodam?

Não incomodam Quase nada Um pouco Muito

c. Até que ponto a condição dos seus dentes, lábios, maxilares e boca afetam sua vida em geral?

Não incomodam Quase nada Um pouco Muito

Anexo E – Children perception questionnaire 11-14 anos

Questionário CPQ₁₁₋₁₄ (16itens)

No: _____

Nome: _____

Data: ____/____/____

Sexo: ____ Idade: _____

PERGUNTAS SOBRE PROBLEMAS

| **A** – Nenhuma vez | **B** – 1 ou 2 vezes | **C** – Às vezes

| **D** – Muitas vezes | **E** – Todos ou quase todos os dias | **F** – Por quê?

SINTOMAS BUCAIS	1. Dor nos seus dentes, lábios, maxilares ou boca?	A	B	C	D	E	
	2. Feridas na boca?	A	B	C	D	E	
	3. Mau hálito?	A	B	C	D	E	
	4. Restos de alimentos presos dentre ou entre os seus dentes?	A	B	C	D	E	
LIMITAÇÕES FUNCIONAIS	5. Demorou mais que os outros para terminar sua refeição?	A	B	C	D	E	
	6. Teve dificuldade para morder ou mastigar alimentos como maçãs, espiga de milho ou carne?	A	B	C	D	E	
	7. Teve dificuldades para dizer algumas palavras?	A	B	C	D	E	
	8. Teve dificuldades para beber ou comer alimentos quentes ou frios?	A	B	C	D	E	
BEM ESTAR EMOCIONAL	9. Ficou irritado (a) ou frustrado (a)?	A	B	C	D	E	
	10. Ficou tímido (a), constrangido (a) ou com vergonha?	A	B	C	D	E	
	11. Ficou chateado (a)?	A	B	C	D	E	
	12. Ficou preocupado (a) com o que as outras pessoas pensam sobre seus dentes, lábios, boca ou maxilares?	A	B	C	D	E	
BEM ESTAR SOCIAL	13. Evitou sorrir ou dar risadas quando está com outras crianças?	A	B	C	D	E	
	14. Discutiu com outras crianças ou pessoas de sua família?	A	B	C	D	E	
	15. Outras crianças lhe aborreceram ou lhe chamaram por apelidos?	A	B	C	D	E	
	16. Outras crianças lhe fizeram perguntas sobre seus dentes, lábios, maxilares e boca?	A	B	C	D	E	

a. Você acha que os seus dentes e a sua boca são:

Muito bons Bons Mais ou menos Ruins

b. Quanto os seus dentes ou a sua boca te incomodam?

Não incomodam Quase nada Um pouco Muito

c. Até que ponto a condição dos seus dentes, lábios, maxilares e boca afetam sua vida em geral?

Não incomodam Quase nada Um pouco Muito

Anexo F – Parent - Children perception questionnaire (P-CPQ)

Questionário P-CPQ Nº.: _____

Nome: _____ Data: ____/____/____

As perguntas seguintes tratam dos sintomas e desconforto que sua criança pode apresentar

0 – Nunca | 1 – 1 ou 2 vezes | 2 – Algumas vezes | 3 – frequentemente | 4 – Todos os dias |

DEVIDO ÀS CONDIÇÕES DE SEUS DENTES, LÁBIOS, BOCA E MAXILARES						
SINTOMAS ORAIS	Nos últimos 3 meses, devido a condições de seus dentes, lábios, boca e maxilares, com que frequência sua criança teve?					
	1. Dor nos seus dentes, lábios, maxilares ou boca?	0	1	2	3	4
	2. Gengivas sangrantes?	0	1	2	3	4
	3. Feridas na boca?	0	1	2	3	4
	4. Mau hálito?	0	1	2	3	4
	5. Restos de alimentos no céu da boca?	0	1	2	3	4
LIMITAÇÕES FUNCIONAIS	Nos últimos 3 meses, devido a condições de seus dentes, lábios, boca e maxilares, com que frequência sua criança teve?					
	7. Dificuldade para morder ou mastigar alimentos como maçãs, espiga de milho ou carne?	0	1	2	3	4
	8. Repirou pela boca?	0	1	2	3	4
	9. Teve problemas para dormir?	0	1	2	3	4
	10. Teve dificuldades para dizer algumas palavras?	0	1	2	3	4
	11. Demorou mais que os outros para terminar sua refeição?	0	1	2	3	4
	12. Dificuldades para beber ou comer alimentos quentes ou frios?	0	1	2	3	4
	13. Teve dificuldades para comer alimentos que ela gostaria de comer?	0	1	2	3	4
BEM ESTAR EMOCIONAL	Nos últimos 3 meses, devido a condições de seus dentes, lábios, boca e maxilares, com que frequência sua criança?					
	14. Teve a dieta restringida a certos tipos de alimentos (ex. alimentos moles)?	0	1	2	3	4
	15. Ficou chateada?	0	1	2	3	4
	16. Ficou irritável ou frustrada?	0	1	2	3	4
	17. Ficou ansiosa ou com medo?	0	1	2	3	4
	18. Ficou preocupada por achar que ela tem poucos amigos?	0	1	2	3	4
	19. Ficou preocupada por achar que ela é diferente das outras pessoas?	0	1	2	3	4
	20. Ficou preocupada por achar que sua aparência não é tão boa como a das outras pessoas?	0	1	2	3	4
BEM ESTAR SOCIAL	Nos últimos 3 meses, devido a condições de seus dentes, lábios, boca e maxilares, com que frequência sua criança?					
	21. Agiu de modo tímido, constrangido ou com vergonha?	0	1	2	3	4
	22. Teve dificuldade para prestar atenção na sala de aula?	0	1	2	3	4
	23. Não quis falar ou ler em voz alta na sala de aula?	0	1	2	3	4
	24. Não quis conversar com outras crianças?	0	1	2	3	4
	25. Evitou sorrir ou dar risadas na companhia de outras crianças?	0	1	2	3	4
	26. Foi alvo de brincadeiras ou apelidos por parte de outras crianças?	0	1	2	3	4
	27. Foi excluída por outras crianças?	0	1	2	3	4
	28. Não quis ou não pôde brincar com outras crianças?	0	1	2	3	4
	29. Não quis ou não pôde participar de atividades tais como esporte, clubes, teatro, musica, passeios escolares?	0	1	2	3	4
	30. Faltou à escola (ex. por dor, consulta com o dentista, cirurgia)?	0	1	2	3	4
31. Foi perguntada por outras crianças a respeito dos dentes, lábios, boca ou maxilares dela?	0	1	2	3	4	

Perguntas gerais

- Como você acha que seu filho considera, comparando com outras crianças da mesma idade, o estado de saúde bucal - dentes e gengiva- dele?
(1) Muito bom (2) Bom (3) Nem ruim nem bom (4) Ruim (5) Muito ruim
- Como você acha que seu filho considera, comparando com outras crianças da mesma idade, o estado de saúde geral dele?
(1) Muito bom (2) Bom (3) Nem ruim nem bom (4) Ruim (5) Muito ruim
- Nos últimos 3 meses, devido a problemas com dentes, boca, ou maxilares (ossos da boca) e seus tratamentos o quanto o bem estar de sua criança foi afetado por conta deste evento?
(1) Nada (2) Muito pouco (3) Mais ou menos (4) Bastante (5) Extremamente

Anexo G – Familiar Impact Scale (FIS)

FIS (Familiar Scale Impact)

No: _____

Nome: _____

Data: ____/____/____

Sexo: ____ Idade: _____

Nos últimos 3 meses, por causa dos dentes, lábios, boca ou maxilares, com que frequência você ou outro membro da família:

| 0 – Nunca | 1 – 1 ou 2 vezes | 2 – Algumas vezes | 3 – Frequentemente | 4 – Todos os dias ou quase todos os dias

EMOÇÕES PARENTAIS	1	Ficou chateada (o)?	0	1	2	3	4	
	2	Teve seu sono interrompido?	0	1	2	3	4	
	3	Sentiu-se culpada (o)?	0	1	2	3	4	
	4	Teve que se ausentar do trabalho (ex. por dor, consultas com o dentista, cirurgia)?	0	1	2	3	4	
	5	Teve menos tempo para você ou para sua família?	0	1	2	3	4	
	6	Ficou preocupada (o) com a possibilidade de sua criança ter menos oportunidades na vida (p. ex. para namorar, casar, ter filhos, conseguir um emprego de que ela goste?).	0	1	2	3	4	
	7	Ficou pouco a vontade em lugares (p. ex. lojas, restaurantes) na companhia de sua criança?	0	1	2	3	4	
CONFLITO FAMILIAR	8	Teve ciúmes de você ou de outros membros da família?	0	1	2	3	4	
	9	Culpou você ou outro membro da família?	0	1	2	3	4	
	10	Discutiu com você ou outros membros da família?	0	1	2	3	4	
ATIVIDADE DOS PAIS/FAMÍLIA	11	Exigiu mais atenção de você ou de outros membros da família?	0	1	2	3	4	
	12	Interferiu nas atividades da família em casa ou em outro lugar?	0	1	2	3	4	
	13	Causou discordância ou conflito em sua família?	0	1	2	3	4	
	14	Causou dificuldades financeiras para sua família?	0	1	2	3	4	

a. Você acha que os seus dentes e a sua boca são:

Muito bons Bons Mais ou menos Ruins

b. Quanto os seus dentes ou a sua boca te incomodam?

Não incomodam Quase nada Um pouco Muito

c. Até que ponto a condição dos seus dentes, lábios, maxilares e boca afetam sua vida em geral?

Não incomodam Quase nada Um pouco Muito

Apêndices

Apêndice A - TERMO DE ASSENTIMENTO PARA CRIANÇAS DE 7 A 11 ANOS

TA (Criança de 7-11 anos como participante da pesquisa)

Você está sendo convidado a participar da pesquisa “Restaurações anteriores em dentes permanentes traumatizados: estudo clínico, controlado e randomizado”, de responsabilidade da dentista de crianças Marcela Baraúna Magno. Seus pais permitiram que você participe.

Por favor, leia este papel com atenção. Nele nós explicamos tudo que será feito. Se você ficar com alguma dúvida, você deverá perguntar para a dentista Marcela Baraúna Magno.

Justificativa e objetivos: Muitas crianças batem os dentes e eles podem acabar quebrando. Esses pedaços de dente podem ser refeitos com resina (massinha da cor do dente). Antes de colocar essa massinha, o dente pode ser desgastado, um pouquinho, ou não. Essa pesquisa que você está sendo convidado a participar, quer avaliar se restaurações feitas com esses pequeninos desgastes na borda quebrada do dente duram mais tempo do que as feitas sem nenhum desgaste. Além disso, queremos avaliar se as restaurações desses dentes quebrados melhoram a sua qualidade de vida (se você está comendo melhor, se está mais feliz com seu sorriso), e dos seus responsáveis (seus pais).

Descrição do estudo: Para essa pesquisa, nós vamos selecionar crianças entre 8 e 14 anos de idade. Essas crianças devem ter pelo menos 1 dente de cima, e da frente, quebrado. As crianças que forem escolhidas para o estudo vão receber um dos tratamentos (podem ter um pouco da bordinha do dente desgastada, ou não), decidido por sorteio. Ou seja, a dentista da criança não vai escolher o que será feito. Isso será decidido na sorte. Todas as crianças terão seus dentes radiografados (vamos bater uma foto do dente com uma máquina especial de dentista) na primeira consulta, e a parte da dentina exposta (parte mais profunda do dente) será protegida com um material que diminui a

sensibilidade (incômodo). Será agendado um novo dia / horário para isolarmos o dente (colocaremos um plástico para deixar somente os dentes que vamos colocar a massinha visíveis), e colocarmos a massinha nele. As crianças serão acompanhadas após 1 mês, 6 meses, 1 ano e 1 ano e meio, através de consultas. O dentista vai olhar se a restauração está boa, se a sua borda está quebradinha ou se está manchada, se a cor e a forma da massinha estão bonitas, se tem cárie e se a criança está com sensibilidade (incômodo) no dente. Além disso os dentes (apenas os dentes, e não o rosto) serão fotografados. E você e seu pai vão responder algumas perguntas sobre como o seu dente quebrado, e o seu tratamento (colocar a massinha), podem mudar a rotina do seu dia a dia. Depois que o estudo terminar, você continuará matriculada no departamento e será acompanhada por outros dentistas de criança em uma das clínicas de Odontopediatria.

Riscos: Com o passar do tempo, a restauração (massinha) poderá cair, quebrar um pedaço, mudar a cor e/ou desgastar em qualquer um dos grupos. O sucesso do tratamento também depende dos seus cuidados de limpeza com os dentes e do que você come (mas você e seu pai serão orientados), além de cuidados para que novas quedas não aconteçam. Mas não se preocupe, se isso acontecer, você receberá o tratamento certo. Além disso, caso sinta qualquer incômodo, deve nos procurar na clínica. Quanto ao risco da radiação (RX), você e seu pai (caso seja ele precise ajudar na hora de bater a foto do dente) serão protegidos com aventais e colares de chumbo (capas especiais que protegem a gente). Vale avisar, que essa foto do dente no início do tratamento (RX) é feita em todas as crianças atendidas nas clínicas de Odontopediatria do Departamento de Odontopediatria e Ortodontia da UFRJ para permitir um correto plano de tratamento.

Benefícios Esperados: Ao aceitar participar desse estudo, além de estar ajudando com a pesquisa, você vai receber orientações sobre cuidados com a sua saúde bucal (escovação, flúor, dieta). Se precisar de tratamento de canal ou outros tipos de tratamento por trauma, ou cárie, você terá a oportunidade de receber tratamento na clínica de Odontopediatria da FO-UFRJ. Crianças com outros problemas nos dentes, ou na boca, serão encaminhadas para triagem e tratamento na FO-UFRJ.

Forma de acompanhamento e ajuda: A dentista responsável vai responder todas as suas dúvidas, ou do seu responsável, sobre tudo que será feito durante todos os 18 meses do estudo. A criança vai receber atenção completa e o mais rápido possível, de forma gratuita (sem pagar nada), pelo tempo que for necessário em caso de danos decorrentes da pesquisa. Se você tiver alguma dúvida sobre as regras da pesquisa, entre em contato com o Comitê de Ética em Pesquisa (CEP) do Hospital Universitário Clementino Fraga Filho/HUCFF/UFRJ – R. Prof. Rodolpho Paulo Rocco, n.º 255 – Cidade Universitária/Ilha do Fundão - Sala 01D-46/1º andar - pelo telefone 3938-2480, de segunda a sexta-feira, das 8 às 16 horas, ou através do e-mail: cep@hucff.ufrj.br.

Meios de contato com o pesquisador responsável: Telefone para contato: Marcela Baraúna Magno (21) 3938-2101. Endereço: Rua Prof. Rodolpho Paulo Rocco, 325 - Disciplina de Odontopediatria da Faculdade de Odontologia - UFRJ / Cidade Universitária – RJ / CEP 21941-617. Meio de contato em caso de urgência, além dos dados acima, você pode escrever para a pesquisadora responsável e dentista de criança marcela.magno@hotmail.com.

Forma de esclarecimento: A dentista responsável vai responder todas as suas dúvidas, ou do seu responsável, sobre tudo que será feito durante todos os 18 meses do estudo. E, se você quiser, receberão informações sobre os resultados finais.

Retirada do consentimento: Você tem liberdade de retirar a sua autorização em qualquer momento e deixar de participar do estudo, sem que seu tratamento na FO-UFRJ seja prejudicado.

Garantia de sigilo: Os dados na pesquisa serão apenas para estudo. Seu nome, ou qualquer outro dado que possa mostrar quem você é, não será divulgado.

Ressarcimento de despesas: O voluntário não terá nenhum gasto para participar desta pesquisa.

Métodos alternativos para tratamento: a qualquer momento, durante todo o estudo, caso o dente perca a vitalidade (o nervo do dente morra), você receberá o tratamento indicado.

Possibilidade de inclusão nos grupos: todas as crianças possuem a mesma chance de participar de todos os grupos da pesquisa, já que a distribuição será por sorteio.

Eu, _____, RG nº _____, acredito recebi informações suficientes sobre o estudo, nas coisas que li ou que foram lidas para mim. Eu discuti com a Dra. Marcela Baraúna Magno, sobre a minha decisão em participar nesse estudo. Eu entendi para que o estudo está sendo feito, os tipos de tratamento, seus possíveis incômodos, que eu não poderei escolher qual tratamento vou receber (pois será decidido por sorteio), que a minha identidade não será revelada e que eu posso tirar minhas dúvidas sempre que quiser. Entendi também que não preciso pagar pelo tratamento e que serei atendido em uma das clínicas quando necessário. Concordo voluntariamente em participar deste estudo e poderei desistir a qualquer momento, sem prejuízos e sem a perda de atendimento nesta Instituição ou de qualquer benefício que eu possa ter adquirido. Eu receberei uma cópia desse Termo de Assentimento (TA) e a outra ficará com a pesquisadora responsável por essa pesquisa. Além disso, estou ciente de que eu e a pesquisadora responsável deveremos assinar nossos nomes em todas as folhas das duas vias desse TA e assinar na última folha.

Nome do representante legal

Data: ___/___/20___

Assinatura do representante legal

Assinatura da pesquisadora responsável (Marcela Baraúna Magno)

Apêndice B - TERMO DE ASSENTIMENTO PARA CRIANÇAS DE 12 A 17 ANOS

TA (Criança de 12-17 anos como participante da pesquisa)

Você está sendo convidado a participar da pesquisa “Restaurações anteriores em dentes permanentes traumatizados: estudo clínico, controlado e randomizado”, de responsabilidade da dentista de crianças Marcela Baraúna Magno. Seus pais permitiram que você participe.

Por favor, leia este papel com atenção. Nele nós explicamos tudo que será feito. Se você ficar com alguma dúvida, você deverá perguntar para a dentista Marcela Baraúna Magno.

Justificativa e objetivos: Muitas crianças batem os dentes e eles podem acabar quebrando. Esses pedaços de dente podem ser refeitos com resina (massinha da cor do dente). Antes de colocar essa massinha, o dente pode ser desgastado, um pouquinho, ou não. Essa pesquisa que você está sendo convidado a participar, quer avaliar se restaurações feitas com esses pequeninos desgastes na borda quebrada do dente duram mais tempo do que as feitas sem nenhum desgaste. Além disso, queremos avaliar se as restaurações desses dentes quebrados melhoram a sua qualidade de vida (se você está comendo melhor, se está mais feliz com seu sorriso), e dos seus responsáveis (seus pais).

Descrição do estudo: Para essa pesquisa, nós vamos selecionar crianças entre 8 e 14 anos de idade. Essas crianças devem ter pelo menos 1 dente de cima, e da frente, quebrado. As crianças que forem escolhidas para o estudo vão receber um dos tratamentos (podem ter um pouco da bordinha do dente desgastada, ou não), decidido por sorteio. Ou seja, a dentista da criança não vai escolher o que será feito. Isso será decidido na sorte. Todas as crianças terão seus dentes radiografados (vamos bater uma foto do dente com uma máquina especial de dentista) na primeira consulta, e a parte da dentina exposta (parte mais profunda do dente) será protegida com um material que diminui a sensibilidade (incômodo). Será agendado um novo dia / horário para isolarmos o dente (colocaremos um plástico para deixar somente os dentes que vamos

colocar a massinha visíveis), e colocarmos a massinha nele. As crianças serão acompanhadas após 1 mês, 6 meses, 1 ano e 1 ano e meio, através de consultas. O dentista vai olhar se a restauração está boa, se a sua borda está quebradinha ou se está manchada, se a cor e a forma da massinha estão bonitas, se tem cárie e se a criança está com sensibilidade (incômodo) no dente. Além disso os dentes (apenas os dentes, e não o rosto) serão fotografados. E você e seu pai vão responder algumas perguntas sobre como o seu dente quebrado, e o seu tratamento (colocar a massinha), podem mudar a rotina do seu dia a dia. Depois que o estudo terminar, você continuará matriculada no departamento e será acompanhada por outros dentistas de criança em uma das clínicas de Odontopediatria.

Riscos: Com o passar do tempo, a restauração (massinha) poderá cair, quebrar um pedaço, mudar a cor e/ou desgastar em qualquer um dos grupos. O sucesso do tratamento também depende dos seus cuidados de limpeza com os dentes e do que você come (mas você e seu pai serão orientados), além de cuidados para que novas quedas não aconteçam. Mas não se preocupe, se isso acontecer, você receberá o tratamento certo. Além disso, caso sinta qualquer incômodo, deve nos procurar na clínica. Quanto ao risco da radiação (RX), você e seu pai (caso seja ele precise ajudar na hora de bater a foto do dente) serão protegidos com aventais e colares de chumbo (capas especiais que protegem a gente). Vale avisar, que essa radiografia do dente no início do tratamento é feita em todas as crianças atendidas nas clínicas de Odontopediatria do Departamento de Odontopediatria e Ortodontia da UFRJ para permitir um correto plano de tratamento.

Benefícios Esperados: Ao aceitar participar desse estudo, além de estar ajudando com a pesquisa, você vai receber orientações sobre cuidados com a sua saúde bucal (escovação, flúor, dieta). Se precisar de tratamento de canal ou outros tipos de tratamento por trauma, ou cárie, você terá a oportunidade de receber tratamento na clínica de Odontopediatria da FO-UFRJ. Crianças com outros problemas nos dentes, ou na boca, serão encaminhadas para triagem e tratamento na FO-UFRJ.

Forma de acompanhamento e ajuda: A dentista responsável vai responder todas as suas dúvidas, ou do seu responsável, sobre tudo que será feito durante todos os 18 meses do estudo. A criança vai receber atenção completa e o mais rápido possível, de forma gratuita (sem pagar nada), pelo tempo que for necessário em caso de danos decorrentes da pesquisa. Se você tiver alguma dúvida sobre as regras da pesquisa, entre em contato com o Comitê de Ética em Pesquisa (CEP) do Hospital Universitário Clementino Fraga Filho/HUCFF/UFRJ – R. Prof. Rodolpho Paulo Rocco, n.º 255 – Cidade Universitária/Ilha do Fundão - Sala 01D-46/1º andar - pelo telefone 3938-2480, de segunda a sexta-feira, das 8 às 16 horas, ou através do e-mail: cep@hucff.ufrj.br.

Meios de contato com o pesquisador responsável: Telefone para contato: Marcela Baraúna Magno (21) 3938-2101. Endereço: Rua Prof. Rodolpho Paulo Rocco, 325 - Disciplina de Odontopediatria da Faculdade de Odontologia - UFRJ / Cidade Universitária – RJ / CEP 21941-617. Meio de contato em caso de urgência, além dos dados acima, você pode escrever para a pesquisadora responsável e dentista de criança marcela.magno@hotmail.com.

Forma de esclarecimento: A dentista responsável vai responder todas as suas dúvidas, ou do seu responsável, sobre tudo que será feito durante todos os 18 meses do estudo. E, se você quiser, receberão informações sobre os resultados finais.

Retirada do consentimento: Você tem liberdade de retirar a sua autorização em qualquer momento e deixar de participar do estudo, sem que seu tratamento na FO-UFRJ seja prejudicado.

Garantia de sigilo: Os dados na pesquisa serão apenas para estudo. Seu nome, ou qualquer outro dado que possa mostrar quem você é, não será divulgado.

Ressarcimento de despesas: O voluntário não terá nenhum gasto para participar desta pesquisa.

Métodos alternativos para tratamento: a qualquer momento, durante todo o estudo, caso o dente perca a vitalidade (o nervo do dente morra), você receberá o tratamento indicado.

Possibilidade de inclusão nos grupos: todas as crianças possuem a mesma chance de participar de todos os grupos da pesquisa, já que a distribuição será por sorteio.

Eu, _____, RG nº _____, acredito recebi informações suficientes sobre o estudo, nas coisas que li ou que foram lidas para mim. Eu discuti com a Dra. Marcela Baraúna Magno, sobre a minha decisão em participar nesse estudo. Eu entendi para que o estudo está sendo feito, os tipos de tratamento, seus possíveis incômodos, que eu não poderei escolher qual tratamento vou receber (pois será decidido por sorteio), que a minha identidade não será revelada e que eu posso tirar minhas dúvidas sempre que quiser. Entendi também que não preciso pagar pelo tratamento e que serei atendido em uma das clínicas quando necessário. Concordo voluntariamente em participar deste estudo e poderei desistir a qualquer momento, sem prejuízos e sem a perda de atendimento nesta Instituição ou de qualquer benefício que eu possa ter adquirido. Eu receberei uma cópia desse Termo de Assentimento (TA) e a outra ficará com a pesquisadora responsável por essa pesquisa. Além disso, estou ciente de que eu e a pesquisadora responsável deveremos assinar nossos nomes em todas as folhas das duas vias desse TA e assinar na última folha.

Nome do representante legal

Data: ___/___/20___

Assinatura do representante legal

Assinatura da pesquisadora responsável (Marcela Baraúna Magno)

Apêndice C - TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

TCLE (Responsável/Pais)

Prezado responsável, você e sua criança estão sendo convidados a participar do projeto de pesquisa “Restaurações anteriores em dentes permanentes traumatizados: estudo clínico, controlado e randomizado”, de responsabilidade da pesquisadora Marcela Baraúna Magno.

Por favor, leia este termo cuidadosamente, pois, as informações a seguir irão descrever esta pesquisa e sua função nela como participante. Caso tenha qualquer dúvida sobre este estudo ou termo, você deverá esclarecê-la com a pesquisadora responsável pelo trabalho.

Justificativa e objetivos: Muitas crianças batem os dentes e eles podem acabar fraturando (quebrando). Esses pedaços de dente podem ser reconstruídos com resina (massinha). Para receber esse material, o dente pode ser preparado (desgastado um pouquinho), ou não. Essa pesquisa que você está sendo convidado a participar quer avaliar restaurações feitas com essas duas técnicas (com e sem mínimos desgastes na borda do dente). Além disso, queremos verificar se a realização de restaurações nesses dentes quebrados traz melhorias na qualidade de vida das crianças (seus filhos) e seus responsáveis (pais) com aparência dos dentes das crianças.

Descrição do estudo: Para realização desta pesquisa serão selecionadas crianças, com idade entre 8 e 14 anos, apresentando pelo menos 1 dente de cima, e da frente, quebrado. As crianças serão selecionadas para o estudo e receberão um dos tratamentos propostos, decidido por sorteio. Todas as crianças terão seus dentes radiografados (RX) na consulta inicial e a parte da dentina exposta (parte mais profunda do dente) será protegida com um material que diminui a sensibilidade (incômodo). Será agendado um novo horário para que os dentes sejam restaurados. As crianças serão acompanhadas após 1 mês, 6 meses, 1 ano e 1 ano e meio, através de consultas. O dentista vai olhar se a restauração está boa, se a sua borda está quebradinha ou se está manchada, se a cor e a forma do material estão bonitas, se tem cárie e se o paciente está com sensibilidade no dente. Além disso os dentes (apenas os dentes, e não o

rosto) serão fotografados e moldados (uma massinha será utilizada para que criemos uma cópia do dente do seu filho). E você e seu filho vão responder algumas perguntas sobre como o trauma do dente, e o seu tratamento, influenciaram na rotina do seu dia a dia. Depois que o estudo terminar, as crianças continuarão matriculadas no departamento e serão acompanhadas por outros profissionais de uma das clínicas de Odontopediatria.

Riscos: As resinas não oferecem risco para a saúde, pelo que se sabe dos estudos já feitos. Com o passar do tempo, a restauração poderá quebrar ou cair, manchar e/ou desgastar em qualquer um dos grupos. O sucesso do tratamento também depende dos cuidados de limpeza dos dentes e do que sua criança come (mas você e a criança serão orientados), além de cuidados para que novos baques não aconteçam. Se isso ocorrer, a criança receberá o tratamento adequado. Além disso, caso sinta qualquer desconforto, deve nos procurar na clínica. Quanto ao risco da radiação (RX), todas as crianças e seus responsáveis (caso sejam solicitados durante o exame radiográfico), serão protegidos com aventais e colares de chumbo. Vale avisar, que o exame de RX no início do tratamento e de acompanhamento são realizados em todas as crianças atendidas nas clínicas de Odontopediatria do Departamento de Odontopediatria e Ortodontia da UFRJ para possibilitar um correto plano de tratamento.

Benefícios Esperados: Ao ser voluntário, além de estar contribuindo com a pesquisa, o Sr(a) receberá maiores informações sobre cuidados com a saúde bucal do(a) seu(ua) filho(a). As crianças que necessitarem de tratamento de canal ou outros tipos de tratamento por trauma, ou cárie dentária, terão a oportunidade de receber tratamento na clínica de Odontopediatria da FO-UFRJ. Todas as crianças receberão orientações de higiene bucal. Crianças com outros problemas bucais serão encaminhadas para triagem e tratamento na FO-UFRJ.

Forma de acompanhamento e assistência: O participante da pesquisa ou seu responsável legal tem garantia de que receberá respostas a qualquer pergunta ou esclarecimento sobre tudo que será feito, e aspectos relacionados à pesquisa em qualquer momento. A criança participante de pesquisa receberá a assistência integral e imediata, de forma gratuita (sem pagar nada), pelo tempo

que for necessário em caso de danos decorrentes da pesquisa. Se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato com o Comitê de Ética em Pesquisa (CEP) do Hospital Universitário Clementino Fraga Filho/HUCFF/UFRJ – R. Prof. Rodolpho Paulo Rocco, n.º 255 – Cidade Universitária/Ilha do Fundão - Sala 01D-46/1º andar - pelo telefone 3938-2480, de segunda a sexta-feira, das 8 às 16 horas, ou através do e-mail: cep@hucff.ufrj.br. O CEP é um colegiado multidisciplinar, independente, que existe nas instituições (faculdades, hospitais, etc) que realizam pesquisas com seres humanos no Brasil. Sua função é defender os interesses dos sujeitos participantes da pesquisa, quanto a sua integridade e dignidade, e contribuir no desenvolvimento da pesquisa dentro de padrões éticos (Resolução nº 466/12 Conselho Nacional de Saúde).

Meios de contato com o pesquisador responsável: Telefone para contato: Marcela Baraúna Magno (21) 3938-2101. Endereço: Rua Prof. Rodolpho Paulo Rocco, 325 - Disciplina de Odontopediatria da Faculdade de Odontologia - UFRJ / Cidade Universitária – RJ / CEP 21941-617. Meio de contato em caso de urgência, além dos dados acima, você pode escrever para a pesquisadora responsável marcela.magno@hotmail.com.

Forma de esclarecimento: Os voluntários têm garantia de que receberão informações, antes e durante a pesquisa, sobre como o estudo será feito. E, se for de seu interesse receberão informações sobre os resultados finais obtidos.

Retirada do consentimento: Os voluntários têm liberdade de retirar o consentimento (essa autorização) a qualquer momento e deixar de participar do estudo, sem que isso resulte em qualquer prejuízo para o tratamento do(a) seu(ua) filho(a) na FO-UFRJ.

Garantia de sigilo: Os dados obtidos na pesquisa têm finalidade exclusivamente científica (para estudo), sendo assegurada privacidade das crianças que participarem do estudo.

Ressarcimento de despesas: O voluntário não terá nenhum gasto para participar desta pesquisa.

Métodos alternativos para tratamento: a qualquer momento, ao longo do estudo, caso o dente perca a vitalidade (o nervo do dente morra), a criança receberá o tratamento indicado.

Possibilidade de inclusão nos grupos: todas as crianças possuem a mesma chance de participar de todos os grupos da pesquisa, já que a distribuição será por sorteio.

Eu, _____ RG
 nº _____, responsável legal por
 _____, acredito ter sido suficientemente informado a respeito das informações sobre o estudo acima citado que li ou que foram lidas para mim. Eu discuti com a Dra. Marcela Baraúna Magno, sobre a minha decisão em participar nesse estudo e autorizo minha criança a participar. Eu entendi para que o estudo está sendo feito, os tipos de tratamento, seus desconfortos e riscos, que eu não poderei escolher qual tratamento minha criança vai receber (pois será decidido por sorteio), que a minha identidade, e da minha criança, não serão reveladas e que eu posso tirar minhas dúvidas sempre que quiser. Entendi também que não preciso pagar pelo tratamento e que minha criança será atendida em uma das clínicas quando necessário. Concordo voluntariamente em participar e que minha criança participe deste estudo e poderei desistir a qualquer momento, sem penalidades ou prejuízos e sem a perda de atendimento de minha criança nesta Instituição ou de qualquer benefício que eu possa ter adquirido. Eu receberei uma via desse Termo de Consentimento Livre e Esclarecido (TCLE) e a outra ficará com a pesquisadora responsável por essa pesquisa. Além disso, estou ciente de que eu e a pesquisadora responsável deveremos rubricar todas as folhas das duas vias desse TCLE e assinar na última folha.

_____ Data: ___/___/20___

Assinatura do representante legal

Assinatura da pesquisadora responsável (Marcela Baraúna Magno)