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**PREVALÊNCIA DE TRAUMAS OROFACIAIS EM ESPORTES NÃO  
MOTORIZADOS SOBRE RODAS:  
UMA REVISÃO SISTEMÁTICA E META-ANÁLISE**

Florianópolis  
2020

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UMA REVISÃO SISTEMÁTICA E META-ANÁLISE**

Dissertação submetida ao Programa de Pós-Graduação em Odontologia da Universidade Federal de Santa Catarina para obtenção do Grau de Mestre em Odontologia.

Orientadora: Prof<sup>ª</sup>. Graziela De Luca Canto, Dr<sup>ª</sup>.

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O presente trabalho em nível de Mestrado foi avaliado e aprovado por banca examinadora composta pelos seguintes membros:

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Certificamos que esta é a **versão original e final** do trabalho de conclusão que foi julgado adequado para a obtenção do título de Mestre em Odontologia.

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Prof<sup>ª</sup>. Elena Riet Correa Rivero, Dr<sup>ª</sup>.  
Coordenadora do Programa de Pós-Graduação

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Prof<sup>ª</sup>. Graziela de Luca Canto, Dr<sup>ª</sup>.  
Orientadora

Florianópolis, 2020.

*Aos meu pais, namorado, familiares e amigos*  
que estiveram sempre na torcida e entenderam  
meus momentos de ausência.  
Este trabalho é para vocês!

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“A única forma de chegar ao impossível, é acreditar que é possível.”

*Lewis Carroll*

## APRESENTAÇÃO

Esta dissertação foi originalmente escrita como um artigo na língua inglesa, com o objetivo de ser submetida ao periódico *Dental Traumatology*. Essa pesquisa foi realizada em parceria com os pesquisadores **Ma. Patrícia Pauletto, Mariana Oliveira Werlich, Ma. Karyn Munyk Lehmkuhl, Prof<sup>ª</sup>. Dr<sup>ª</sup>. Ana Luiza Curi Hallal e Prof<sup>ª</sup>. Dr<sup>ª</sup>. Graziela De Luca Canto**, da Universidade Federal de Santa Catarina; a pesquisadora **Prof<sup>ª</sup>. Dr<sup>ª</sup>. Carla Massignan**, da Universidade de Brasília; e o pesquisador **Prof. Dr. Gustavo José Martiniano Porfírio** da Universidade Municipal de São Caetano do Sul e Universidade São Judas Tadeu.

## RESUMO

**Contextualização/Objetivos:** Com o aumento do número de novos praticantes e a popularização de atividades esportivas, o número de traumas relacionados à esportes também aumentou. Além disso, esportes nos quais há o uso de equipamentos e veículos que modificam a velocidade do atleta podem apresentar lesões mais graves. O objetivo desta revisão sistemática foi identificar a prevalência geral de diferentes tipos de traumas orofaciais em esportes com veículos sobre rodas não motorizados. **Métodos:** Estratégias de busca foram aplicadas em oito bases de dados (Embase, LILACS, Livivo, PEDro, PubMed, Scopus, SportDiscus and Web of Science) e na literatura cinzenta (Google Scholar, OpenGrey and ProQuest Dissertations & Theses Global). Adicionalmente, foram realizadas buscas manuais nas listas de referências dos artigos incluídos e em artigos indicados por especialistas no assunto. Os artigos incluídos foram estudos observacionais com dados sobre prevalência de traumas orofaciais (tipo e local do trauma) em esportes com veículos sobre rodas não motorizados, independente do nível de competitividade. O risco de viés dos estudos incluídos foi realizado utilizando o checklist para estudos de prevalência do Instituto Joanna Briggs. A meta-análise foi realizada com a extensão MetaXL 5.3 para o software Microsoft Excel, e a força da evidência acumulada foi mensurada pelos Critérios de Avaliação, Desenvolvimento e Pontuação da Classificação de Recomendações (GRADE). **Resultados:** Os artigos foram selecionados em duas fases. Inicialmente, foram identificados 4042 artigos nas bases de dados, restando 251 após a realização da fase 1 (leitura de títulos e resumos). Após a conclusão da fase 2 (leitura dos artigos na íntegra), seis artigos foram finalmente incluídos. Dois estudos foram julgados com baixo risco de viés e quatro estudos com risco de viés moderado. A prevalência geral de injúrias orofaciais em esportes sobre rodas com veículos não motorizados foi calculada por meio de meta-análise chegando a um resultado de 9,2% (I<sup>2</sup>:99,31%;CI:0,00-0,27) e a prevalência de injúrias dentais foi calculada em 4,9% (I<sup>2</sup>:98,83%;CI:0,00-0,15). A certeza de evidência acumulada foi considerada muito baixa.

**Conclusão:** Em torno de 9% dos praticantes de esportes com veículos sobre rodas não motorizados já sofreram traumas orofaciais. O tipo mais prevalente de trauma foi o trauma dentário com prevalência global de aproximadamente 5%.

**Palavras-chave:** Esporte, atletas, lesões orofaciais, odontologia baseada em evidências, revisão sistemática.

## ABSTRACT

**Backgrounds/Aims:** With the increasing number of new participants and popularity of sport practices, the number of sport-related injuries also grew. Therefore, sports that use equipment or vehicles that modify the velocity of the player can present more serious injuries. The aim of this systematic review was to identify the overall prevalence of different orofacial trauma types in sports with non-motorized wheeled vehicles players. **Methods:** A search strategy of the literature was performed in eight electronic databases (Embase, LILACS, Livivo, PEDro, PubMed, Scopus, SportDiscus and Web of Science). Additionally, complementary search on grey literature (Google Scholar, OpenGrey and ProQuest Dissertations & Theses Global), reference lists of included articles and studies indicated by experts on the subject. The included articles were observational studies with sufficient data of orofacial trauma (type and anatomical site) in sports with non-motorized wheeled vehicles players regarding the competition level. Risk of bias was assessed by using Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data. The meta-analysis was performed using the add-in MetaXL 5.3 for software Microsoft Excel, and the strength of cumulative evidence was assessed by The Grading of Recommendations Assessment, Development and Evaluation (GRADE). **Results:** The studies were selected in a two phases process. From 4,042 identified studies, after duplicates removal and phase one of selection (title and abstracts screening), 251 studies remained for phase two (full text screening) and six articles were finally included. Two studies were considered as low risk of bias and four as moderate risk of bias. The overall prevalence of orofacial injuries in sports with non-motorized wheeled vehicles was 9.2% (I<sup>2</sup>:99.31%,CI:0.00-0.27) and the prevalence of dental injuries was 4.9% (I<sup>2</sup>:98.83%,CI:0.00-0.15). The certainty in cumulative evidence was considered very low.

**Conclusion:** About 9% of the sports with non-motorized wheeled vehicles players have already suffered of orofacial injuries. The most prevalent type of injury was classified as dental traumas with approximately 5% of all cases.

**Keywords:** Sports, athletes, athletic injuries, maxillofacial injuries, evidence-based dentistry, systematic review.

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## LISTA DE ABREVIATURAS E SIGLAS

RS - Revisão sistemática

### **Do artigo em inglês:**

CI - *Confidence interval*

GRADE - *The Grading of Recommendations Assessment, Development and Evaluation*

JBI – *Joanna Briggs Institute*

MA – *Meta-analysis*

N - *No*

NA - *Not applicable*

NI - *Not informed*

OSF – *Open Science Framework*

PRISMA - *Preferred reporting items for systematic reviews and meta-analysis*

PRISMA-P - *Preferred reporting items for systematic reviews and meta-analyses protocols*

SR - *Systematic review*

Y - *Yes*



## LISTA DE SÍMBOLOS

% - Percentual

± - Mais ou menos

## SUMÁRIO

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## 1 INTRODUÇÃO

Traumas orofaciais são considerados lesões decorrentes de eventos súbitos ocasionadas em regiões de face, boca e dentes, envolvendo tecidos duros, como ossos e dentes, e/ou tecidos moles, como pele e mucosas (BERG *et al.*, 1998). Estas lesões podem ocorrer de diferentes maneiras e em diferentes níveis de severidade, dependendo da força e da direção em que uma determinada região da face é acometida (ANDREASEN, ANDREASEN e ANDERSSON, 2007; YOUNG, MACIAS e STEPHENS, 2015).

Entre as maiores causas dos traumas orofaciais estão acidentes automobilísticos, assaltos e prática de esportes (GARON, MERKLE e WRIGHT, 1986; KERR, 1986; MARROW, 1986; MAESTRELLO-DEMOYA e PRIMOSCH, 1989; MCNUTT *et al.*, 1989; MORROW, 1989; MARROW, 1991; LEE-KNIGHT, HARRISON e PRICE, 1992; FLANDERS e BHAT, 1995; ANDREASEN, ANDREASEN e ANDERSSON, 2007). Traumas orofaciais ocasionados por motivos esportivos podem variar de aproximadamente 10 a 40%, se considerarmos respectivamente lesões mais leves, acometendo apenas tecidos moles, a lesões mais graves, envolvendo também tecidos dentais e/ou ósseos (DAVIS e KNOTT, 1984; FLANDERS e BHAT, 1995; NEWSOME, TRAN e COOKE, 2001; SAINI, 2011; PICCININNI *et al.*, 2017).

Segundo Revisões Sistemáticas (RS) publicadas sobre o assunto, traumas dentofaciais ocasionados por esportes de inverno, como o *hockey*, e esportes de combate e coletivos possuem prevalência aproximada de 24% e 30%, para os dois últimos tipos de esporte, respectivamente, entre atletas de diferentes níveis de competitividades, idades e sexo (VUCIC *et al.*, 2016; POLMANN *et al.*, 2019, WERLICH *et al.*, 2020). Considerando que todo esporte apresenta algum risco para traumas orofaciais, é importante destacar que alguns esportes apresentam este risco em um nível mais ou menos elevado, dependendo das características e regras da modalidade em questão (MACKO *et al.*, 1979; VAN MECHELEN, HLOBIL e KEMPER,

1992; GASSNER *et al.*, 1999; SKAARE e JACOBSEN, 2003). Esportes com contato, golpes ou uso de equipamentos e acessórios que possam acertar o rosto de algum atleta, podem apresentar riscos elevados de traumas em região orofacial (YARD e COMSTOCK, 2006).

Em 2007, a *British Standards Institution* classificou os esportes de acordo com o risco de traumas orofaciais, sendo atletas de esportes como de combate, de inverno e sobre rodas, os considerados com maior risco de sofrer traumatismos (BRITISH STANDARDS INSTITUTE, 2007). Além disto, em conjunto com a Academia Americana de Odontologia, a Academia Internacional de Odontologia do Esporte criou uma classificação para esportes onde o uso do protetor bucal esportivo é recomendado, e esportes como ciclismo, *skateboarding* e patinação, apesar de serem esportes individuais e sem contato direto com outros competidores, foram listados (AMERICAN ACADEMY OF PEDIATRIC DENTISTRY CLINICAL AFFAIRS COMMITTEE, 2005).

Esses esportes praticados em veículos não motorizados sobre rodas, também conhecidos como esportes radicais de ação, possuem o objetivo de realizarem manobras e movimentos, em velocidade, buscando a perfeição durante a sua prática e, com isso, elevando o risco de acidentes e traumatismos dos atletas (GÁSPARI e ALMEIDA, 2014; SINGH *et al.*, 2014). Entretanto, apesar de serem esportes sem alto contato entre os atletas, não há estudos como RS que envolvam esportes sobre rodas, mesmo com evidências de que o aumento da velocidade pode ser um fator potencializador para a prevalência de traumas orofaciais (SINGH *et al.*, 2014). Por este motivo, o objetivo deste estudo foi realizar uma RS para identificar a prevalência geral de diferentes tipos traumas orofaciais em esportes com veículos sobre rodas não motorizados.

## 2 JUSTIFICATIVA

A odontologia do esporte é o ramo da odontologia que trabalha não só com o tratamento de atletas traumatizados em decorrência do esporte, como também da prevenção e disseminação de dados referentes ao tratamento destes (ACADEMY FOR SPORTS DENTISTRY, 2013). Pesquisas sobre traumatismos orofaciais em atletas vêm se tornando cada vez mais realizadas por pesquisadores do assunto e tomando importância para clínicos com pacientes esportistas (VUCIC *et al.*, 2015; POLMANN *et al.*, 2019; WERLICH *et al.*, 2020). Diversas modalidades tiveram a prevalência de trauma orofacial pesquisadas em suas populações, chegando a resultados consideráveis e justificando assim a recomendação para o uso de equipamentos de proteção, como os protetores bucais esportivos (FREITAG *et al.*, 2015; VUCIC *et al.*, 2015; FERNANDES *et al.*, 2019; KNAPIK *et al.*, 2019; POLMANN *et al.*, 2019; WERLICH *et al.*, 2020). Porém um *gap* na literatura faz com que atletas de esportes com altos riscos de traumas orofaciais, como esportes sobre rodas, não tenham acesso a esse resultado aplicado à sua modalidade, prejudicando a difusão do conhecimento sobre os equipamentos de proteção e prejudicando estratégias de prevenção ao trauma (SMITH e KRACHER, 1998; NAYDUCH, 2009; FARRINGTON *et al.*, 2012; SINGH *et al.*, 2014; SVIDER *et al.*, 2015). Por serem esportes com grande potencial de trauma orofacial e ainda não participarem de um estudo que os englobe nos resultados, aplicando suas conclusões para estas modalidades, esportes com veículos sobre rodas não motorizados devem ser estudados.

### **3 OBJETIVOS**

#### **3.1 OBJETIVO GERAL**

- Responder sistematicamente a pergunta de pesquisa: “Qual a prevalência de diferentes traumas orofaciais em atletas de esportes não motorizados sobre rodas?”

#### **3.2 OBJETIVO ESPECÍFICO**

- Identificar a prevalência dos diferentes tipos de traumas dentais em esportes sobre rodas.

#### 4 ARTIGO

Artigo formatado conforme as normas da revista *Dental Traumatology* (acessadas em: 07/06/2020).

### **Prevalence of orofacial injuries in sports with non-motorized wheeled vehicles players: a systematic review and meta-analysis**

**Running title:** Systematic review of orofacial injuries in sports on wheels

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## **CONFLICT OF INTEREST**

Authors have no conflicts of interest to declare.



## ABSTRACT

**Backgrounds/Aims:** With the increasing number of new participants and popularity of sport practices, the number of sport-related injuries also grew. Therefore, sports that use equipment or vehicles that modify the velocity of the player can present more serious injuries. The aim of this systematic review was to identify the overall prevalence of different orofacial trauma types in sports with non-motorized wheeled vehicles players. **Methods:** A search strategy of the literature was performed in eight electronic databases (Embase, LILACS, Livivo, PEDro, PubMed, Scopus, SportDiscus and Web of Science). Additionally, complementary search on grey literature (Google Scholar, OpenGrey and ProQuest Dissertations & Theses Global), reference lists of included articles and studies indicated by experts on the subject. The included articles were observational studies with sufficient data of orofacial trauma (type and anatomical site) in sports with non-motorized wheeled vehicles players regarding the competition level. Risk of bias was assessed by using Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data. The meta-analysis was performed using the add-in MetaXL 5.3 for software Microsoft Excel, and the strength of cumulative evidence was assessed by The Grading of Recommendations Assessment, Development and Evaluation (GRADE). **Results:** The studies were selected in a two phases process. From 4,042 identified studies, after duplicates removal and phase one of selection (title and abstracts screening), 251 studies remained for phase two (full text screening) and six articles were finally included. Two studies were considered as low risk of bias and four as moderate risk of bias. The overall prevalence of orofacial injuries in sports with non-motorized wheeled vehicles was 9.2% ( $I^2:99.31\%$ ,  $CI:0.00-0.27$ ) and the prevalence of dental injuries was 4.9% ( $I^2:98.83\%$ ,  $CI:0.00-0.15$ ). The certainty in cumulative evidence was considered very low.

**Conclusion:** About 9% of the sports with non-motorized wheeled vehicles players have already suffered of orofacial injuries. The most prevalent type of injury was classified as dental traumas with approximately 5% of all cases.

**Keywords:** Sports, athletes, athletic injuries, maxillofacial injuries, evidence-based dentistry, systematic review.

## INTRODUCTION

Traumatic injuries are upward health issues in different populations worldwide <sup>1, 2</sup>. Generally, trauma events are associated with assaults, road traffic accidents, and sport activities <sup>3-13</sup>. With the increasing number of new participants and popularity of sport practices, the number of sport-related injuries also grew <sup>14-16</sup>.

Sport-related injuries can occur in soft or hard tissues, depending on the anatomical site and direction of the forces on the trauma event <sup>17, 18</sup>. The frequency rate of sport-related orofacial injuries is ranged between 11-40%, considering all types of sportive traumas, and being the most common type of trauma in this population <sup>19, 20</sup>. According to the National Youth Sport Safety Foundation, sports players have 10% more risk to experience an orofacial trauma than an individual of non player population, and this trauma is 56% more likely to happen during the activities involving the athlete routine of competition and training <sup>21</sup>.

As the overall prevalence of orofacial trauma in general population varies according to the sample characteristics, likewise such rates in players and athletes population respect the same criteria <sup>2, 22, 23</sup>. Following this idea, sports activities represent a multifactorial set of risk factors for traumatic injuries, such as sports types, modalities, if there are any mandatory safety devices in the regulations, and level of trauma risk in the studied group of players, for example <sup>24</sup>.

Taking into account these differences between the sports characteristics, three systematic reviews (SRs) were already published assessing the prevalence of dentofacial injuries in different types of sports. Vucic et al.<sup>25</sup>, in 2015, assessed the prevalence of dentofacial injuries in field hockey players, and in 2019 and 2020, two SRs brought data on dentofacial trauma in athletes from combat and collective contact sports players respectively <sup>26, 27</sup>. In all SR, the result were nearly the same, with overall prevalence rate of dentofacial

injury in field hockey established at 22% and both SR of 2019 and 2020, presenting prevalence rates of approximately 30%<sup>25-27</sup>.

The British Standards Institution classified sports according to the risk level of orofacial injuries, highlighting some contact sports, winter sports and sports with non-motorized wheeled vehicles as the higher rating<sup>28</sup>. Moreover, the American Dental Association and the International Academy of Sports Dentistry used this classification to determine a list of sports that the use of mouthguards was recommended, and sports as bicycling, skateboarding and inline skating, even though were considered as individual sports, were also listed there<sup>29</sup>. These sports practiced with non-motorized wheeled vehicles, also known as extreme action sports, have the objective of performing maneuvers and movements, during speed, seeking perfection in their practice and, thus, increasing the risk of accidents and injuries of athletes<sup>14,30</sup>.

However, all these sports are practiced without any equipment or vehicles that modify the velocity of the player, inducing null or minimal changes of the expected injury risks<sup>31,32</sup>. Sports with non-motorized wheeled vehicles as bicycling and skating, categorized as level high of orofacial injury risk<sup>29</sup>, were not involved at the SR yet. Considering that every sport have potential to increase the risk of orofacial trauma, sports with vehicles, by adding the speed factor, are possibly sports with higher risks and prevalence of orofacial injuries<sup>31-33</sup>. For this reason, the aim of this SR was to identify the overall prevalence of orofacial trauma types in different sports with non-motorized wheeled vehicles players.

## **MATERIALS AND METHODS**

### **Protocol and registration**

This SR was reported following the PRISMA checklist<sup>34</sup>. For previous registration, a SR protocol based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P)<sup>35</sup> was developed and registered at Prospective Register of

Systematic Reviews (PROSPERO; Center for Reviews and Dissemination, University of York; and the National Institute for Health Research)<sup>36</sup>. The registration number is CRD42020173979.

### **Inclusion criteria**

The inclusion criteria were based on the PECOS acronym, in which: P) Athletes and players regardless of sex, age or competition level (recreational, amateur, semi-professional, and professional); E) Sports with non-motorized wheeled vehicles practice; C) None, once this is an prevalence study; O) Overall prevalence of orofacial injuries in athletes of sports with non-motorized wheeled vehicles; and S) Observational studies. The study was included when: the study related and evaluated orofacial traumas in sports with non-motorized wheeled vehicles players, regardless of the sex, age and competition level, with quantitative data such as injury type, anatomical site and sport-related etiology of trauma. As in previous studies, orofacial injury was defined as any injury on mouth, teeth, jaw, maxilla, alveolar bone, and soft tissues<sup>37, 38</sup>. Injuries on head, neck, ears, eyes and bones as nose, orbit, and zygomatic were not considered<sup>26, 27</sup>. No restriction criteria regarding language and publication time were applied.

### **Exclusion criteria**

The following exclusion criteria were applied: 1) Studies in which samples did not include separated data of trauma in sports with non-motorized wheeled vehicles players; 2) Studies in which samples were composed only by players of sports with motorized vehicle, sports with wheelchair (paralympic sports), sports with animals, winter sports or water sports; 3) Studies that only evaluated trauma related to non-motorized wheeled vehicle when used only as transportation mean; 4) Studies that did not evaluate orofacial trauma separately and/or that investigated only sport-related trauma in other region than mouth, teeth and face; 5) Studies that did not provide quantitative data in regards to the prevalence of orofacial trauma; 6) Studies

with samples composed only by trauma patients attended on hospitals or medical centers or reporting only annual incidences of orofacial trauma; 7) Studies focused on any other syndrome associated to trauma event; 8) Studies with duplicated data from another included study; 9) Reviews, letters, books, conference abstracts, case report, opinion article, technique articles, posters and guidelines; 10) Full-text not available.

### **Information sources and search strategy**

A literature search was performed on February 6<sup>th</sup> of 2020 with a librarian support. Individual search strategies with terms as “athletes”, “sports”, “orofacial trauma” and its synonyms were conducted for each of the eight electronic databases: Embase, Latin American and Caribbean Health Sciences (LILACS), Livivo, Physiotherapy Evidence Database (PEDro), PubMed, Scopus, SPORTDiscus, and Web of Science. Complementary, search in the grey literature was conducted on Google Scholar, OpenGrey, and ProQuest Dissertations & Theses Global, reference lists of included articles were manually-searched and experts on subject were contacted to indicate additional studies to be included<sup>39</sup>. All search strategies used are presented on Appendix 1. The references were managed and duplicated references were removed using a computer software (EndNote X9, Thomson Reuters).

### **Study selection**

A two-phase selection process was conducted to studies inclusion by two independent reviewers (J.M.D.O.; P.P.). In phase-one, titles and abstracts were screened using an online software (Rayyan, Qatar Computing Research Institute) and applying the eligibility criteria by reviewers separately. In phase-two, the same two reviewers applied the eligibility criteria after reading the remaining full-text articles. In both phases, any discrepancies were resolved by a consensus discussion and a third reviewer (C.M.) was involved to make a final decision, if necessary. If minimum data for inclusion were unclear or missing, an electronic contact were

attempt to the corresponding authors to clarify the question and include or exclude the study for quantitative analysis.

### **Data collection process and data items**

Pertinent data from the included studies were extracted by two independent reviewers (J.M.D.O.; P.P.) with an extraction form and crosschecked in a consensus discussion to ensure the integrity of collected data. The following information were extracted regarding included studies: authors, country and year of publication, sample size, age range, type of sport and competition level, type and anatomical site of injury, overall and partials prevalences. Moreover, if prevalence rate was not expressed, it was calculated by using the definition of prevalence, once is frequency of actual cases of a condition in a population over a given period of time<sup>40</sup>. In this case the number of cases of sports with non-motorized wheeled vehicles athletes traumatized in the orofacial region was used as a numerator and the total population of athletes from these same sports was the denominator.

### **Risk of bias in individual studies**

The Risk of Bias of selected studies was assessed by using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Studies Reporting Prevalence Data<sup>41</sup>. Independently, two reviewers (J.M.D.O.; P.P.) evaluated the included studies and all decisions about scoring system were agreed upon by all reviewers prior to critical appraisal assessments. The studies risk of bias were characterized according to the percentage of answers “yes”, being high when the study reaches up to 49% score “yes”, moderate when the study reached 50% to 69% score “yes”, and low when the study reached more than 70% score “yes”. In addition, the online tool *robvis* (Risk-Of-Bias VISualization) (National Institute for Health Research) was used to generate figures<sup>42</sup>.

### **Summary measures and data synthesis**

The quantitative analysis of results was performed based on considering as the primary outcome the overall prevalence rate of different types of orofacial injuries in sports with non-motorized wheeled vehicles players, measured by means of relative or absolute frequencies and its 95% confidence intervals (CI). Prevalence rater per type of orofacial injuries was considered as secondary outcomes.

A meta-analysis of proportions and graphs were performed using the add-in MetaXL 5.3 (EpiGear International, Australia) for software Microsoft® Excel 16.29.1 (Microsoft Office 2019, Microsoft, Redmond, United States). The heterogeneity was calculated using the  $I^2$  statistics and the significance level was set at 5%<sup>43</sup>. Freeman-Tukey double arcsine transformed prevalence was used for analyzes. Forest plots were used to graphically represent the meta-analyzes results<sup>44</sup>.

### **Confidence in cumulative evidence**

The strength of cumulative evidence was assessed as stated by The Grading of Recommendations Assessment, Development and Evaluation (GRADE)<sup>45</sup>. The risk of bias, inconsistency, inditectness and imprecision domains were evaluated as “not serious”, “serious” or “very serious”. For the “serious” and “very serious” evaluations, an explanation were added to justify de judgement. For observational studies, the overall certainty starts at “low” and can be downgraded to “very low” or upgraded to “moderate” or “high” certainty of evidence.

A Summary of Findings table was performed by using the online software GRADEpro GDT (GRADE working group, McMaster University).

## **RESULTS**

### **Study selection**

From a total of 5,525 studies identified by the searches on databases, 4,042 remained after duplicated removal records. After the first selection phase of reading of title and abstracts,

251 studies full-text were read in the second phase. Thereafter, six studies were finally included for qualitative and quantitative synthesis<sup>14, 46-50</sup>. No study was included from manual search and experts' indications once all were already on the phase-two list. Further information about reason of exclusion of the 245 remaining studies were available in Appendix 2 and the studies selection steps was presented in a detailed flowchart diagram on Figure 1.

### **Study characteristics**

From the six cross-sectional studies included<sup>14, 46-50</sup> in this SR, one were performed in Brazil<sup>47</sup>, one in India<sup>14</sup>, one in Japan<sup>50</sup>, one in Scotland<sup>46</sup>, and two pooling players from more than one country, these being Switzerland, Germany, Austria, and Italy<sup>48, 49</sup>.

Regarding only players of non-motorized wheeled sports, the sample sizes ranged from 5<sup>47</sup> to 130,900<sup>46</sup>, while the overall included studies sample sizes ranged from 120<sup>47</sup> to 130,900 players<sup>46</sup>. Most players of the sports in focus were men, considering that the female participation rate was up to 49.58% in the included studies<sup>14, 46-48, 50</sup>. The borderlines ages were 8 years<sup>14</sup> and 66 years<sup>46, 49</sup>, however, the average ages ranged between 12.4<sup>14</sup> and 32 years<sup>46</sup>.

Included studies comprised four different modalities of non-motorized wheeled sports. Three studies addressed skating players<sup>14, 48, 50</sup>, while mountain biking<sup>46, 49</sup> and biking/cycling<sup>14, 47</sup> were cited by two studies each. Triathlon was cited only by one study<sup>47</sup>. All these studies embraced a total of 132,167 players considering just these modalities.

Sports level was reported by five studies<sup>14, 46-49</sup>. The categories of professionals, semi-professionals, amateurs and juniors were considered in three studies<sup>14, 47, 49</sup>, while the other two studies separated the players in beginners, spare timeplayers and advanced<sup>48</sup>, or only in recreational players<sup>46</sup>. The included studies were performed in three different situations: during competitions<sup>47, 48</sup>; by inviting athletes from school teams<sup>14, 50</sup>, and with data analysis of sportive centers<sup>46</sup>.



Among all types of orofacial injuries that were screened by the included articles, dental trauma was the most popular, participating on six studies results<sup>46-50</sup>. Moreover, only one study presented data about facial fractures<sup>48</sup>.

### **Risk of bias within studies**

Among all included studies, four were judged with moderate risk of bias<sup>14, 46-48</sup>, while two were with low risk of bias<sup>49, 50</sup>. The checklist questions about the sample representativeness and sampling process (1 and 2, respectively) were determined as high risk of bias, once all studies were composed by convenience samples. Further information about author's judgments for each included study is provided in Figure 2.

### **Results of individual studies**

Aitken et al<sup>46</sup> investigated the prevalence of injuries among recreational mountain biking riders. The authors studied prevalence of all types of injuries over one year period in population of 130,900 mountain bikers visitors of the Glentress Mountain Biking center in Scotland. After analyzing the centre's database, facial fractures were found in maxillary bone and teeth. However for the 130,900 patients of the overall population, only two reported maxillary fracture and three dental fracture.

Among the included studies, one was conducted during Pan American Games held on Rio de Janeiro (Brazil) in 2007<sup>47</sup>. In this study, Andrade et al<sup>47</sup> embraced 35 different modalities in the searched for prevalence of dental trauma in athletes who played in the regular games. The 424 professional athletes who participated in the research contribute to the detailed report of previous dental trauma separating in "during practice", "during game", "in another situation (not related to the sport)", and its combinations. For situations involving sports-related activities, the overall prevalence found was 19.2%.

The study of Fasciglione et al<sup>48</sup> was conducted during a national championship races of inline skating. Regarding the 612 inline skaters comprised in the study, the authors found 56

teeth injuries. They divided these injuries in three categories, resulting on a group of 17 dislocations, a group of 36 crowns fractures and a last group with 3 avulsions, resulting on a prevalence rate of 2.78%, 5.88%, and 3% respectively and an overall rate of 56%.

Müller et al<sup>49</sup> researched the prevalence of dental injuries among athletes of four neighboring countries (Switzerland, Austria, Germany and Italy). They collected data of a total of 473 mountain bikers: 207 professionals and semi-professionals; 216 amateurs; and 50 juniors. Of the 27 dental injuries, were on 6.76% professionals and semi-professionals athletes, 4.63% in amateurs and 10% in juniors. The prevalence rates stated at 4.2% for crown fractures, 1.1% for dislocation and 0.8% for avulsions.

Nonoyama et al<sup>50</sup> researched orodental injuries on data of students' injuries sustained during participation in school sports clubs. The overall population of the database was 485,539 high school students. Among them, 302 dental injuries were found but involving only one kind of sport with non-motorized wheeled vehicles (skating), resulting on a prevalence rate of 2.86% in the mentioned sport.

One other study was performed in students participating on sports school teams<sup>14</sup>. Skating and cycling riders were included representing the sports with non-motorized wheeled vehicles in this study. Orofacial injuries were searched among the 1,105 students and 77 answered the questionnaire positively for previous cases. Of these, 31 were skaters and 46 cyclists.

A detailing individual studies characteristics is presented on Table 1.

### **Synthesis of results**

Once the included studies presented high heterogeneity among each other, statistical analysis was performed considering random effects. The overall prevalence of orofacial injuries in sports with non-motorized wheeled vehicles was calculated by including a total of

132,167 players in four different sports, and the rate was set at 9.2% ( $I^2:99.31\%$ ,  $CI:0.00-0.27$ ) (Figure 3A).

Concerning different types of orofacial trauma, the quantitative analysis was performed only by dental traumas. For this meta-analysis, five studies<sup>46-50</sup> participated on the sum of 132,025 players for the statistics and the prevalence rate was 4.9% ( $I^2:98.83\%$ ,  $CI:0.00-0.15$ ) (Figure 4). These athletes comprised all types of sports studies by all included studies too.

However, due to low number of studies with information regarding other types of orofacial traumas and sports with non-motorized wheeled vehicles separately, additional meta-analyses were not performed.

### **Additional Analysis**

After excluding the studies scored as moderate risk of bias<sup>14, 46-48</sup>, two studies<sup>49, 50</sup> remained for a sensitivity analysis (Figure 3B). However, the test results did not signaled any influence on final result of the primary meta-analysis.

### **Risk of bias across studies**

The certainty in cumulative evidence assessed by GRADE was considered very low for dentofacial injuries and dental trauma. The “risk of bias” and “indirectness” topics were categorized as “not serious”. The “inconsistency” topic was “very serious” due to the high heterogeneity of the meta-analysis. Further explanations with regard to evidence appraisal are presented in Table 2.

## **DISCUSSION**

The aim of this SR was to investigate the overall prevalence of orofacial injuries in players of sports with non-motorized wheeled vehicles. The approach to the prevalence rates of orofacial trauma in different types of sports in SR is a subject of increasing importance among sportive researches and experts worldwide<sup>25-27</sup>. Questions about this kind of injury

among other types of sports were recently published and its conclusions may reflect on clinical routine of sports patients<sup>25-27, 51-53</sup>. However, all sports that were already mentioned in on these SRs are practiced without any equipment or vehicles that modify the player's velocity, which would allow to increase the risk of traumas and injuries<sup>31, 32</sup>. For this reason, sports with non-motorized wheeled vehicles are possible enhancers of these conditions and had to be approached.

Despite the importance and necessity of the subject, in contrast to previously published reviews of other modalities<sup>25-27</sup>, this SR included fewer studies that were considered eligible according to the criteria established by the authors<sup>14, 46-50</sup>. The reason for this low number of eligible studies on the prevalence rate of orofacial injuries in sports with non-motorized wheeled vehicles is probably due to the fact that these sports are mostly practiced individually. Players included in this SR were contacted during competitions<sup>47, 48</sup> in two studies, in other three studies dataset was taken from databases of sportive centers or schools<sup>14, 46, 50</sup>, and only one study was made with invited players contacted by the sport team<sup>49</sup>. This characteristic highlights the lack of possible teams of skateboarders, cyclists and skaters for example to be addressed in a prevalence study. Considering a researcher point of view, it become clear the difficulty to carry out studies with these athletes and players due the necessity to contact them one by one, without a place in which they can be easily found.

Nevertheless, during the execution of this SR, the authors excluded 19 studies (see Appendix 2) with samples composed only by trauma patients attended in hospitals or medical centers. Once prevalence is the rate of affected individuals calculated over a population total with a common characteristic<sup>40</sup>, studies in hospital and medical centers can not be used to provide prevalence of orofacial injuries among players of sports with non-motorized wheeled vehicles since the population size is not expressed in the studies. However, this information can be interpreted differently. If we consider that studies about injury cases in players of sports

with non-motorized vehicles are more frequent in emergency departments, hospitals and medical centers, so these injuries are also more severe than injuries suffered by players of other sports such as collective sports.

Studies on the biomechanics of traumatic events highlight that understanding fundamental principles of physics is important to be aware of the risk rate and severity level that injuries can be when speed and acceleration are present<sup>32, 54</sup>. Newton's second law of motion is based on the concept that force is mass times acceleration ( $F=m*a$ )<sup>55</sup>. Wheeled sports are an example for this increased acceleration, promoting stronger impacts when players fall or hit against each other at higher speed<sup>14</sup>. This idea, combined with the kinetic energy exchange theorem, explains that if two bodies collide, the impact and, in this case, the injuries of the athletes in question will be greater<sup>32, 54, 56</sup>. As sports naturally provide acceleration and the face, in addition to being the most prone to trauma in athletes, is an anatomic field with relatively few soft tissues to dissipate forces, orofacial injuries in sport with bicycles, skateboards and skatings, as approached in this SR, have to be seriously discussed and taken into account when attending a patient player<sup>20</sup>.

Another contributing factor to the increased prevalence, risk and severity of orofacial injuries among athletes is the low adherence to the use of protective equipment such as mouthguards<sup>57, 58</sup>. Primary studies and SR on the subject are widely published and argue that the failure to use mouth and facial protectors magnifies the number of orofacial injury cases in athletes of different modalities<sup>52, 57-59</sup>. In accordance to conclusions of SRs in combat and collective sports, in this SR the included studies reported that the vast majority of players did not use mouthguards or any other form of dental and jaw protection<sup>49, 50</sup>. Besides the overall prevalence rate found through this SR about this types of sport [8.7%(I<sup>2</sup>:99.39%,CI:0.00-0.24)] has showed lower values than other modalities' SR, as combat [25.2% (I<sup>2</sup>:100%,CI:12.3-40.8)] or collective sports [27.57% (I<sup>2</sup>:98.40%,CI:17.87-38.47)], and in addition with the speed factor,

it is clear that sports with non-motorized wheeled vehicles have raised risks of orofacial injuries. Moreover, compared with modalities that the use of protection equipment as mouthguard are mandatory during games and practices, it is easy to notice that the use of this type of protection is imperative recommended for the reduction of prevalence rates of orofacial injuries among all sports <sup>52</sup>.

Concerning orofacial injuries, for the population in question, the included studies of this SR <sup>14, 46-50</sup> classified the outcome in general orodental injuries <sup>14</sup>, in dental injuries <sup>46, 47, 50</sup>, in specific dental trauma types, as crown fractures, avulsion and dislocations <sup>14, 48, 49</sup>, and in maxillary fractures <sup>46</sup>. This heterogeneity of grouping orofacial traumas in small subgroups is a problem of padronization of the term “orofacial injury”, since this term is defined differently in literature by many authors <sup>37, 38, 60, 61</sup>. It is important to highlight that the subgroup analysis in this SR was not possible because of the amount of different names reported by the included studies, becoming difficult to assess whether the injuries in question were the same considered in the different studies, and hence precluding the subgroup meta-analysis.

Moreover, the heterogeneity within included studies was another point valuable to focus on. The quantity of modalities covered in this SR made it unviable to carry out a quantitative analysis for the secondary outcome of different types of sports. Although, previous SRs about other types of sports also grouped, as combat <sup>26</sup> and collective <sup>27</sup> sports, did not manifest this obstacle, as they included 27 and 17 studies respectively. In addition, studies aiming to assess prevalence of orofacial injuries among sports players are mostly cross-sectional studies, composed by convenience samples that are invited to the research by contact with the sport team <sup>26, 27</sup>. However, this type of sampling can be a challenge for researchers, once the sample size is crucial for prevalence studies <sup>62</sup>. Among the included studies of this SR <sup>14, 46-50</sup>, considering only the target population for this study, only three studies <sup>46, 48, 49</sup> reached the minimum population of 400 participants to be considered suitable for a prevalence study <sup>62</sup>.

Finally, it is important to highlight that the only included study of this SR that presented individual values of prevalence below 20% was the study performed by Singh et al <sup>14</sup> (54.23%). However, it is worth noting that this study was carried out with athletes of two modalities (skating and cycling) and different levels of competitiveness in sports school teams. Besides, the study in question <sup>14</sup> included younger athletes, with greater physical strength and ability to perform dangerous radical maneuvers in their training and competitions, constantly risking and consequently presenting greater impact force in the moment of a traumatic event <sup>63</sup>.

### **Limitations**

The low amount of eligible primary studies carried out on sports with non-motorized wheeled vehicles, the small samples used and the high heterogeneity between the studies were limiting factors in the development of this SR. Consequently, this small number of studies made it impossible to make meta-analyzes regarding the prevalence of injuries in each modality and for each type of orofacial injury. In addition, all of the included studies were cross-sectional, which presents a high risk of bias due to the methodology.

### **CONCLUSIONS**

The total prevalence of orofacial injuries in sports with non-motorized wheel vehicles obtained was approximately 9%. In addition, among them, dental injury presented a global prevalence of 5.1%. However, the quantity and quality of primary studies on these sports is still small and with very low certainty of the evidence what means, in fact, we can not safely extrapolate these results for all players of sports with non-motorized wheel vehicles.

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**Table 1** - Summary of descriptive characteristics of included articles (n=6).

STUDY CHARACTERISTICS		SAMPLE CHARACTERISTICS		EXPOSITION CHARACTERISTICS		MAIN FINDINGS		
Author, Year (Country)	Setting	Size (women/%)	Range age (mean ± SD)	Type of Sport (n) (Competition level)	Type of Injury (n)	Prevalence of orofacial trauma per type of sport (n/%)	Prevalence of orofacial trauma per type of injury (n/%)	Overall prevalence of orofacial trauma (n/%)
Aitken, Biant and Court-Brown 2011 (Scotland)	Glentress Mountain biking Centre	130,900 bikers (22,253/17)	10-66y (32y±NR)	Mountain biking (130,900) (recreational)	Facial Fractures (8) - Maxillary - Dental	Mountain biking (5/0.0038†)	Facial Fractures - Maxillary (2/0.0015†) - Dental (3/0.0023†)	Overall (5/0.0038)†
Andrade et al 2010 (Brazil)	Pan American Games in Rio	409 athletes (†/45)	13-46y (24.4y±5.3y)	Biking (4) Triathlon (1) (professional)	Dental trauma (129)	Biking (0/0) Triathlon (1/100)	Dental trauma (1/20†)	Overall (1/20)†

Fasciglione et al 2007 (Switzerland and Germany)	Mainly place at national championship races	612 athletes (288/47.1)†	NR (31.2y±NR)	Inline skating (612) (fun/beginner, fitness/spare time and speed/advanced)	Tooth injuries (56) - Dislocation - Crown fracture - Avulsion	Inline skating (56/9.2)	Tooth injuries -Dislocation (17/2.78†) -Crown fracture (36/5.88†) -Avulsion (3/0.49†)	Overall (56/9.2)
Muller et al 2008 (Switzerland, Austria, Germany and Italy)	Athletes from Switzerland, Austria, Germany and Italy	473 mountain bikers (NR)	9-66y (30.8y±NR)	Mountain biking (207 professional/semi-professional; 216 amateur; and 50 junior)	Dental injuries (27) -Crown fracture (20) -Dislocation (5) - Avulsion (4)	Mountain biking (27/5.7) -Professional and Semi-professional (14/6.76)† -Amateur (10/4.63)† - Junior (5/10)	Dental injuries (27/5.7) Crown fracture (20/4.2) -Professional and Semi-professional (11/55†) -Amateur (5/25†) - Junior (4/20†)	Overall prevalence (27/5.7)

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Dislocation

(5/1.1)

-Professional  
and Semi-  
professional

(1/20†)

-Amateur

(3/60†)

- Junior (1/20†)

Avulsion

(4/0.8)

-Professional  
and Semi-  
professional

(2/50†)

-Amateur

(2/50†)

- Junior (0/0)†

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Nonoyama et al 2016 (Japan)	Data on students' injuries sustained in junior high schools and high schools in seven prefectures	485,539 high school students (240,735/49.58†)	NR	Skating (35) (NR)	Dental injuries (302)†	Skating (1/2.86†)	Dental injuries (1/2.86†)	Overall (1/2.86†)
Singh et al 2014 (India)	Students from 19 organized sports school teams	1,105 students participating on sports school teams (391/35.4)	8-16y (12.4y±3.5y)	Skating (74) Cycling (68) (juniors, amateurs, semiprofessionals and professionals)	Oro dental injuries (335) -Soft tissue injuries (161)† -Tooth fractures (144)†	Skating (31/41.89†) Cycling (46/67.65†)	Oro dental injuries (77/54.23)†	Overall (77/54.23)†

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-Tooth  
discoloration  
(21)†  
-Lateral  
dislocations  
(5)†  
- Avulsion (4)†

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NR: Not reported; SD: Standard Deviation; y: years; (†) data calculated by the authors.

**Table 2** – The Grading of Recommendation Assessment, Development and Evaluation (GRADE) summary of findings table.

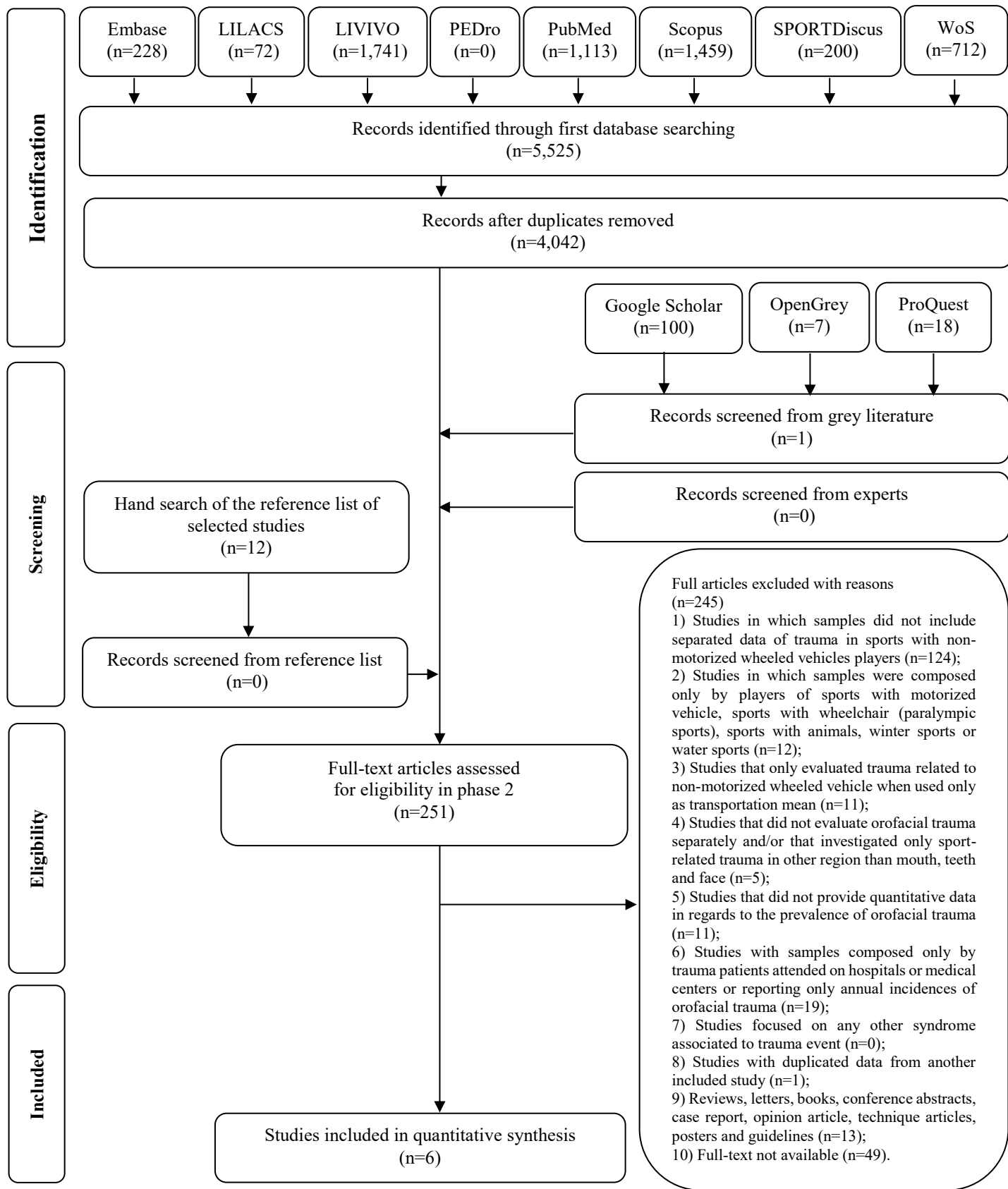
N° of studies	Study design	Risk of bias	Certainty assessment				Summary of Findings		
			Inconsistency	Indirectness	Imprecision	Publication bias	Sample	Pooled data (Prevalence)	Certainty of evidence
<b>Overall Prevalence of Orofacial trauma in sports with non-motorized wheeled vehicles</b>									
6	Observational studies	not serious	very serious <sup>a</sup>	not serious	not serious	strongly suspected <sup>b</sup>	132,167	0.001% (167/132,167)	⊕○○○ VERY LOW
<b>Prevalence of Dental trauma in sports with non-motorized wheeled vehicles</b>									
5	Observational studies	not serious	very serious <sup>a</sup>	not serious	not serious	strongly suspected <sup>b</sup>	132,025	0.001% (88/132,025)	⊕○○○ VERY LOW

Explanations:

- a. High heterogeneity of the meta-analyses;
- b. Observational studies with mostly insufficient sample size.

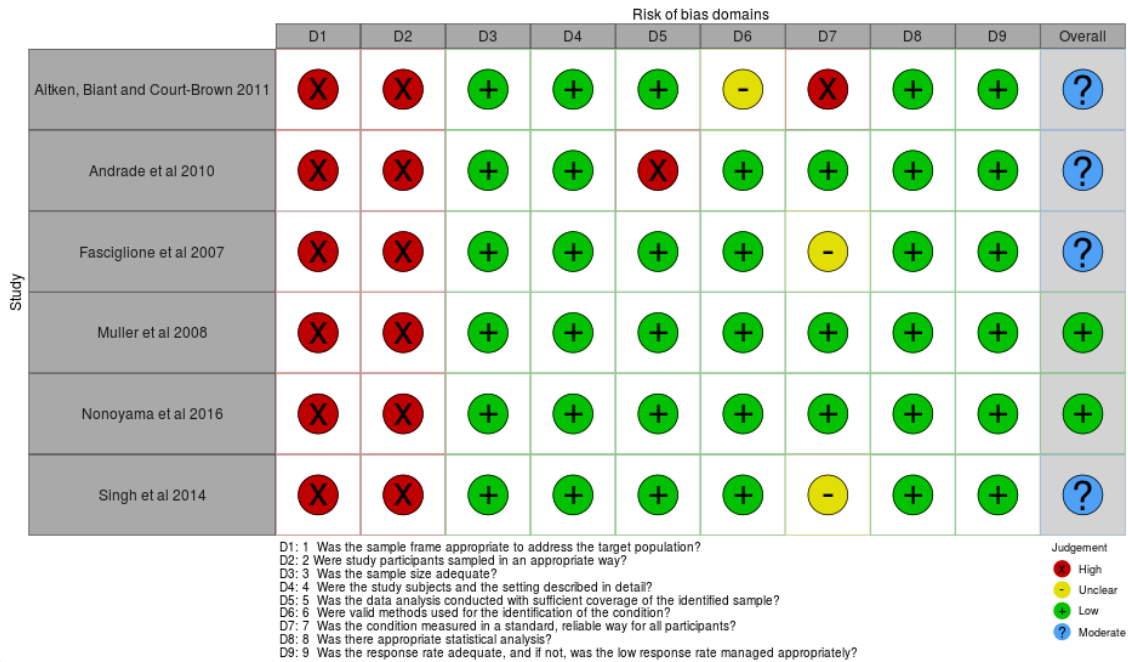


**Figure 1 - Flow Diagram of Literature Search and Selection Criteria (2020, February 6th).<sup>1</sup>**

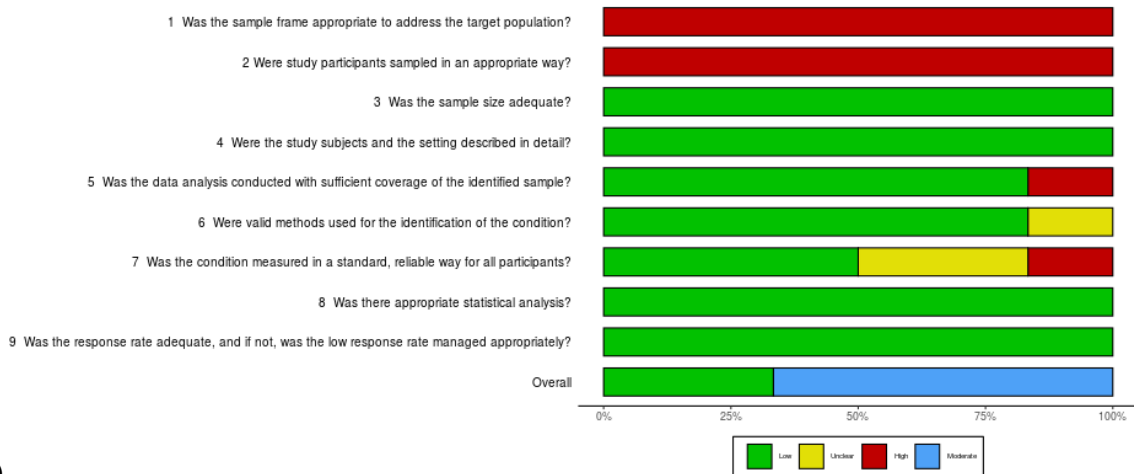


<sup>1</sup> Adapted from PRISMA.

**Figure 2 - RoB summary author's judgments for each included study, assessed by the Joanna Briggs Institute (JBI)<sup>41</sup> Critical Appraisal Checklist for Prevalence studies and graphically represented by "Traffic-light" plot (A) and Weighted bar plot (B) (generated using the online tool *robvis* (Risk-Of-Bias VISualization) (National Institute for Health Research)<sup>42</sup>.**

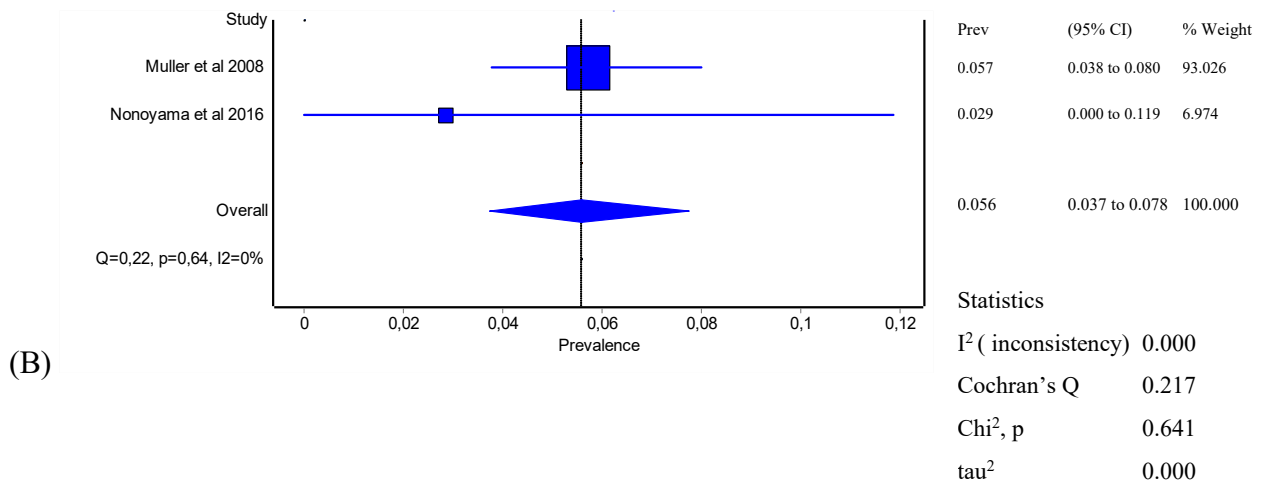
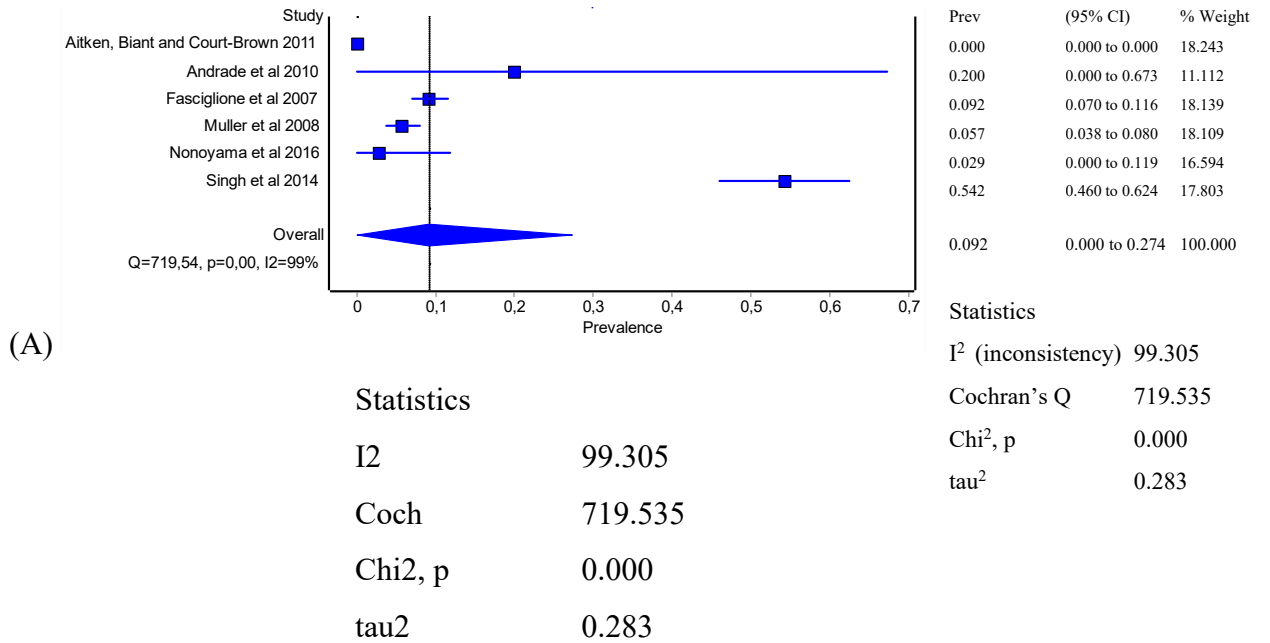


(A)

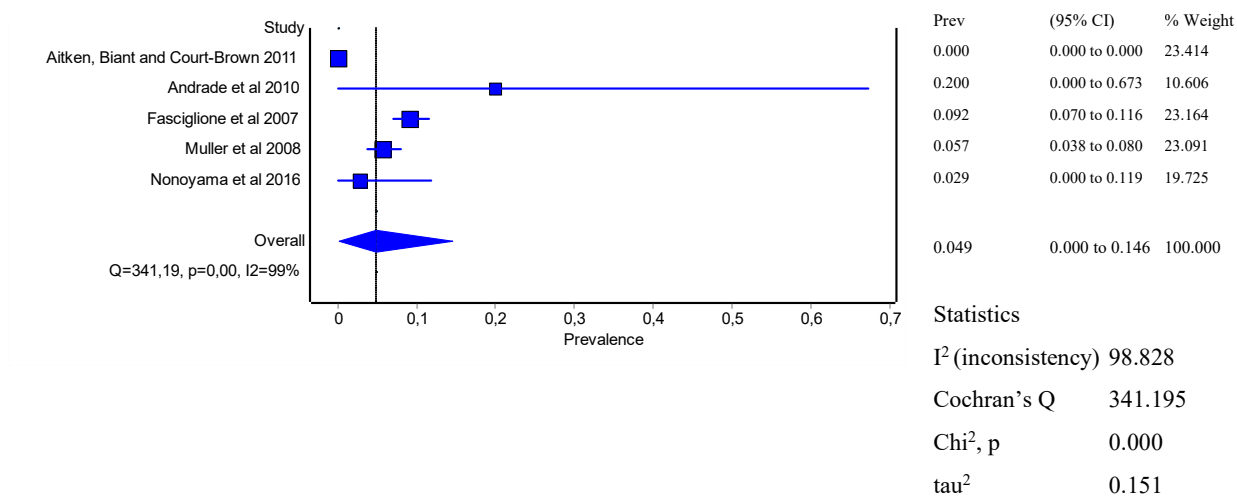


(B)

**Figure 3** – Meta-analysis’ graphs for Overall Prevalence of Orofacial injuries in Sports with Non-motorized Wheeled Vehicles (A) and the respective sensitivity test (B), generated by using the add-in MetaXL 5.3 (EpiGear International, Australia) for software Microsoft® Excel 16.29.1 (Microsoft Office 2019, Microsoft, Redmond, United States).



**Figure 4** – Meta-analysis’ graphs for the subgroup Dental trauma Prevalence of Orofacial injuries in Sports with Non-motorized Wheeled Vehicles, generated by using the add-in MetaXL 5.3 (EpiGear International, Australia) for software Microsoft® Excel 16.29.1 (Microsoft Office 2019, Microsoft, Redmond, United States).



## **5 CONSIDERAÇÕES FINAIS**

A prevalência geral de injúrias orofaciais obtida em atletas de esportes sobre rodas não motorizados foi aproximadamente 9%. Em adição, entre estas, a injúria dental apresentou a maior prevalência (4,9%). Apesar da pouca quantidade e baixa qualidade dos estudos incluídos sobre traumas orofaciais nesse tipo de esporte, se considerarmos também o baixo nível de certeza acumulado da evidência, a extrapolação dos dados obtidos nesta RS deve ser recomendada com cautela. Por sua vez, apesar dos resultados servirem como indicativo da necessidade de proteção durante a prática desses esportes, os dados apresentados não são totalmente seguros para a aplicação em uma população geral de praticantes de esportes não motorizados sobre rodas. Desta forma, mostra-se a necessidade de mais estudos primários com alto rigor metodológico e baixo risco de viés sobre o assunto para complementar os resultados desta revisão sistemática.

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YARD, E. E.; COMSTOCK, R. D. Injuries sustained by pediatric ice hockey, lacrosse, and field hockey athletes presenting to United States emergency departments, 1990–2003. **Journal of athletic training**, v. 41, n. 4, p. 441, 2006.



YOUNG, E. J.; MACIAS, C. R.; STEPHENS, L. Common dental injury management in athletes. **Sports health**, v. 7, n. 3, p. 250-255, 2015.

## APÊNDICES

### Apêndice A - Registro do protocolo no site PROSPERO (*International prospective register of systematic reviews*).

**PROSPERO**  
International prospective register of systematic reviews

  
National Institute for  
Health Research

  
UNIVERSITY of York  
Centre for Reviews and Dissemination

#### Systematic review

##### 1. \* Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the P(I)E(C)OS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

**Prevalence of orofacial injuries in sports with non-motorized wheeled vehicles: a systematic review**

##### 2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

##### 3. \* Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.

**20/05/2020**

##### 4. \* Anticipated completion date.

Give the date by which the review is expected to be completed.

**31/10/2020**

##### 5. \* Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.

Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.

This field should be updated when any amendments are made to a published record and on completion and publication of the review. If this field was pre-populated from the initial screening questions then you are not able to edit it until the record is published.

**The review has not yet started: Yes**

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<b>Review stage</b>	<b>Started</b>	<b>Completed</b>
Preliminary searches	No	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No
Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalised).		
Finishing protocol.		
Finishing protocol.		

**6. \* Named contact.**

The named contact acts as the guarantor for the accuracy of the information presented in the register record.

Júlia Meller D. Oliveira

**Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:**

Miss Oliveira

**7. \* Named contact email.**

Give the electronic mail address of the named contact.

julia\_meller5@hotmail.com

**8. Named contact address**

Give the full postal address for the named contact.

Deputado Antônio Edu Vieira 376 Apto 403 Florianópolis-SC88040-000 BRAZIL

**9. Named contact phone number.**

Give the telephone number for the named contact, including international dialling code.

+55 48 999864802

**10. \* Organisational affiliation of the review.**

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

UFSC - Federal University of Santa Catarina

**Organisation web address:**

**11. \* Review team members and their organisational affiliations.**

Give the personal details and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong. **NOTE: email and country are now mandatory fields for each person.**

Dr Júlia Oliveira. Federal University of Santa Catarina (UFSC)  
Dr Patricia Pauletto. Federal University of Santa Catarina (UFSC)  
Professor Carla Massignan. Federal University of Santa Catarina (UFSC)  
Mrs Karyn Lehmkuhl. Federal University of Santa Catarina (UFSC)  
Professor Ana Luiza Hallal. Federal University of Santa Catarina (UFSC)  
Professor Graziela De Luca Canto. Federal University of Santa Catarina (UFSC)

**12. \* Funding sources/sponsors.**

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

None

Grant number(s)

**13. \* Conflicts of interest.**

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

**14. Collaborators.**

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members. **NOTE: email and country are now mandatory fields for each person.**

**15. \* Review question.**

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

What is the prevalence of orofacial injuries in sports with non-motorized wheeled vehicles?

**16. \* Searches.**

State the sources that will be searched. Give the search dates, and any restrictions (e.g. language or publication period). Do NOT enter the full search strategy (it may be provided as a link or attachment.)

Appropriate truncation and word combinations will be elaborated and adapted for each of the following

~~data bases~~ databases: EMBASE, Latin American and Caribbean Health Sciences (LILACS), Livivo, Physiotherapy Evidence Database (PEDro), PubMed, Scopus, SPORTDiscus, and Web of Science. Complementary, search in the grey literature will be conducted on Google Scholar, OpenGrey, and ProQuest Dissertations and Thesis. No time and language restriction will be applied.

**17. URL to search strategy.**

## **PROSPERO** **International prospective register of systematic reviews**

Give a link to a published pdf/word document detailing either the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies), or upload your search strategy. Do NOT provide links to your search results.

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

**Do not make this file publicly available until the review is complete**

### **18. \* Condition or domain being studied.**

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Nowadays, facial injury is a public health problem that its most frequent forms are in automobile accidents, violence and sports practice. Among the sports-related injuries, orofacial injuries are very common and constitute serious health problems in athletes of different competition levels, with short, medium and long term consequences. However, the prevalence of injuries in different types of sports may vary depending on modalities, competition level and epidemiological characteristics of athletes and equipment allowed. Considering the equipment, sports with vehicles are considered the most likely to cause injury. Among these, studies are more common with athletes of sports with non-motorized wheeled vehicles, as Cycling, Roller skating and Skating.

### **19. \* Participants/population.**

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Sports with non-motorized wheeled vehicles athletes and players (recreational, amateur, semi-professional, and professional)

### **20. \* Intervention(s), exposure(s).**

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

Sport-related orofacial injuries

### **21. \* Comparator(s)/control.**

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

None

### **22. \* Types of study to be included.**

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

Observational studies

### **23. Context.**

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

**24. \* Main outcome(s).**

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

Overall prevalence of sport-related orofacial injuries

**\* Measures of effect**

Please specify the effect measure(s) for you main outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

Prevalence - Cross-sectional

**25. \* Additional outcome(s).**

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

If possible, most frequent types of orofacial injuries and most frequent sports with non-motorized wheeled vehicles associated with orofacial injuries.

**\* Measures of effect**

Please specify the effect measure(s) for you additional outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

Prevalence - Cross-sectional

**26. \* Data extraction (selection and coding).**

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

Study selection: The included articles will be selected by two independent reviewers (J.M.D.O and P.P.). At first, the titles and abstracts will be screened; secondly, the reviewers will read the full-text versions and select articles by eligibility and exclusion criteria; then, they will crosscheck all the information found. If disagreements arise a third reviewer (C.M.) will participate to make a final decision. If important data for the review are missing or unclear, an attempt will be made to contact the study corresponding author to resolve ~~Data collection problem~~ Data collection problem. Independent reviewers (J.M.D.O and P.P.) will collect data from the selected articles. Subsequently, the retrieved information will be crosschecked="checked" value="1". Any disagreement will be discussed between them and the third reviewer (C.M.). The following data will be extracted and double recorded by two reviewers (J.M.D.O and P.P.) for each included study: author; year of publication; country; characteristics of the participants (sample, mean age); outcome measure(s); the pertinent result(s) and conclusion(s).

**27. \* Risk of bias (quality) assessment.**

Describe the method of assessing risk of bias or quality assessment. State which characteristics of the studies will be assessed and any formal risk of bias tools that will be used.

Studies will be assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data. Risk of bias will be categorized as “high” when the study reaches up to 49% score “yes”; “moderate” when the study reached 50% to 69% score “yes”; and “low” when the study reached more than 70% score “yes”.

#### 28. \* Strategy for data synthesis.

Provide details of the planned synthesis including a rationale for the methods selected. This **must not be generic text** but should be **specific to your review** and describe how the proposed analysis will be applied to your data.

If quantitative synthesis is appropriate, a meta-analysis will be performed using MedCalc Statistical Software version 19.1.3 (MedCalc Statistical Software, Ostend, Belgium). Statistical heterogeneity will be calculated by using the  $I^2$  test, and a fixed or random effect model will be applied, based on the heterogeneity values detected. A value greater than 50% will be considered as an indicator of substantial heterogeneity across studies, and therefore, the random effect model will be used.

#### 29. \* Analysis of subgroups or subsets.

State any planned investigation of ‘subgroups’. Be clear and specific about which type of study or participant will be included in each group or covariate investigated. State the planned analytic approach. Different sports modalities will be considered: mountain biking, bicycling, cycling, BMX, skating, in-line skating, skateboarding, rollerblading, and others.

#### 30. \* Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

##### Type of review

Cost effectiveness

No

Diagnostic

No

Epidemiologic

Yes

Individual patient data (IPD) meta-analysis

No

Intervention

No

Meta-analysis

No

Methodology

No

Narrative synthesis

No

Network meta-analysis

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No  
Pre-clinical  
No  
Prevention  
No  
Prognostic  
No  
Prospective meta-analysis (PMA)  
No  
Review of reviews  
No  
Service delivery  
No  
Synthesis of qualitative studies  
No  
Systematic review  
Yes  
Other  
No

**Health area of the review**

Alcohol/substance misuse/abuse  
No  
Blood and immune system  
No  
Cancer  
No  
Cardiovascular  
No  
Care of the elderly  
No  
Child health  
No  
Complementary therapies  
No  
COVID-19  
No  
Crime and justice  
No  
Dental  
No  
Digestive system  
No  
Ear, nose and throat  
No  
Education  
No  
Endocrine and metabolic disorders  
No  
Eye disorders



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No  
General interest  
No  
Genetics  
No  
Health inequalities/health equity  
No  
Infections and infestations  
No  
International development  
No  
Mental health and behavioural conditions  
No  
Musculoskeletal  
No  
Neurological  
No  
Nursing  
No  
Obstetrics and gynaecology  
No  
Oral health  
No  
Palliative care  
No  
Perioperative care  
No  
Physiotherapy  
No  
Pregnancy and childbirth  
No  
Public health (including social determinants of health)  
No  
Rehabilitation  
No  
Respiratory disorders  
No  
Service delivery  
No  
Skin disorders  
No  
Social care  
No  
Surgery  
No  
Tropical Medicine  
No  
Urological  
No  
Wounds, injuries and accidents  
Yes

**PROSPERO**  
**International prospective register of systematic reviews**

Violence and abuse  
No

**31. Language.**

Select each language individually to add it to the list below, use the bin icon to remove any added in error.  
English

There is not an English language summary

**32. \* Country.**

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.

Brazil

**33. Other registration details.**

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

**34. Reference and/or URL for published protocol.**

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

**No I do not make this file publicly available until the review is complete**

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

**35. Dissemination plans.**

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

**Do you intend to publish the review on completion?**

Yes

**36. Keywords.**

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

**37. Details of any existing review of the same topic by the same authors.**

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

**38. \* Current review status.**

Review status should be updated when the review is completed and when it is published. For newregistrations the review must be Ongoing.  
Please provide anticipated publication date

Review\_Ongoing

**39. Any additional information.**

Provide any other information the review team feel is relevant to the registration of the review.

**40. Details of final report/publication(s) or preprints if available.**

This field should be left empty until details of the completed review are available OR you have a link to a preprint.

Give the link to the published review.

## Apêndice B - Estratégias de busca nas bases de dados

### Do artigo em inglês:

#### Appendix 1 - Database search strategy.

Database	Search query 2020, February 6 <sup>th</sup>
<b>Embase</b>	(Athlet* OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street luge" OR "Mountain Boarding" OR "Off road Boarding" OR Dirtboarding OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide" OR "Speed riding" OR "roller hockey" OR "Off-Road Racing" OR "Skatings") AND ("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR

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"dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury" OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial fractures") AND [embase]/lim AND [article]/lim

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**LILACS**

English: (tw:(athlete OR sport OR player OR practitioner OR athletic OR sportswoman OR sportsmen OR sportswomen OR sportsman OR driver OR pilot OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide" OR "roller hockey" OR "Off-Road Racing" OR "Skatings")) AND (tw:("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR

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"dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial Injuries" OR "Facial injuries" OR "facial injury"))

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Portuguese: (tw:(atleta OR esportista OR esporte OR "esporte com roda" OR "esporte sobre rodas" OR ciclismo OR patinacao OR patinação OR skate OR Triciclo OR bicicleta OR ciclismo OR patins OR "Monociclo De Montanha" OR skate OR piloto OR ciclista OR triciclo)) AND (tw:(("trauma maxilofacial" OR "injúria maxilofacial" OR "fratura maxilofacial" OR "trauma maxilo-facial" OR "injúria maxilofacial" OR "fratura maxilo-facial" OR "traumas maxilofacial" OR "injúrias maxilofaciais" OR "fraturas maxilofaciais" OR "traumas maxilo-faciais" OR "injúrias maxilo-faciais" OR "fraturas maxilo-faciais" OR "trauma orofacial" OR "injúria orofacial" OR "fratura orofacial" OR "traumas orofaciais" OR "injúrias orofaciais" OR "fraturas orofaciais" OR "traumas oro-faciais" OR "injúrias oro-faciais" OR "fraturas oro-faciais" OR "traumas oro- faciais" OR "injúrias oro-faciais" OR "fraturas oro-faciais" OR "trauma dental" OR "injúria dental" OR "fratura dental" OR "traumas dentais" OR "injúrias dentais" OR "fraturas dentais" OR "trauma dentofacial" OR "injúria dentofacial" OR "fratura dentofacial" OR "traumas dentofaciais" OR "injúrias dentofaciais" OR "fraturas dentofaciais" OR "trauma dento-facial" OR "injúria dento-facial" OR "fratura dento-facial" OR "traumas dento-faciais" OR "injúrias dento-faciais" OR "fraturas dento-faciais" OR "trauma dentoalveolar" OR "injúria dentoalveolar" OR "fratura dentoalveolar" OR "traumas dentoalveolares" OR "injúrias dentoalveolares" OR "fraturas dentoalveolares" OR "trauma dento-alveolar" OR "injúria dento-alveolar" OR "fratura dento-alveolar" OR "traumas dento-alveolares"))

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OR "injúrias dento-alveolares" OR "fraturas dento-alveolares" OR "injurias maxilofacial"))

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Spanish: (tw:(atleta OR desportista OR Deporte OR "desporte de rueda" OR ciclismo OR hockey OR Triciclo OR bicicleta OR ciclismo OR patinacion OR patins OR skate OR piloto OR minibike OR minibike)) AND (tw:("fracturamaxilofacial" OR "fracturamaxilo-facial" OR "injurias maxilofaciales" OR "fracturasmxilofaciales" OR "traumas maxilo-faciales" OR "injurias maxilo-faciales" OR "fracturasmxilo-faciales" OR "fractura orofacial" OR "traumas orofaciales" OR "injurias orofaciales" OR "fracturasorofaciales" OR "traumas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas oro-faciales" OR "fracturas doradas" OR "fractura dental" OR "traumas dentales" OR "fracturasdentales" OR "fracturasdentales" OR "injurias dentofacial" OR "fracturadentofacial" OR "traumas dentofaciales" OR "injurias dentofaciales" OR "fracturasdentofaciales" OR "injurias dento-facial" OR "fractura dento-facial" OR "fracturasdentoalveolar" OR "molestiadentoalveolar" OR "molestiasdentoalveolares" OR "molestiadentoalveolar" OR "fracturasdentoalveolares"))

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**LIVIVO**

(athlete OR sport OR player OR practitioner OR athletic OR sportswoman OR sportsmen OR sportswomen OR sportsman OR driver OR pilot OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide" OR "roller hockey" OR "Off-Road Racing" OR "Skatings") AND ("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR

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"oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial Injuries" OR "Facial injuries" OR "facial injury"))

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<b>PubMed</b>	(	"Athletes"[Mesh]	OR	"athletes"[Title/Abstract]	OR
		"athlete"[Title/Abstract]	OR	"player"[Title/Abstract]	OR
		"players"[Title/Abstract]	OR	"practitioner"[Title/Abstract]	OR
		"practitioners"[Title/Abstract]	OR	"sportswoman"[Title/Abstract]	OR
		"sportsmen"[Title/Abstract]	OR	"sportswomen"[Title/Abstract]	OR
		"sportsman"[Title/Abstract]	OR	"pilot"[Title/Abstract]	OR
		"cyclist"[Title/Abstract]	OR	"biker"[Title/Abstract]	OR
		"rider"[Title/Abstract]	OR	"skater"[Title/Abstract]	OR
		"athletics"[Title/Abstract]	OR	"athletic"[Title/Abstract]	OR
		"bicycling"[Title/Abstract]	OR	"cycling"[Title/Abstract]	OR
		"hoverboard"[Title/Abstract]	OR	"skateboard"[Title/Abstract]	OR
		"Skating"[Mesh]	OR	"Skating"[Title/Abstract]	OR
		"Skateboarding"[Title/Abstract]	OR	"Dirt Bikes"[Title/Abstract]	OR
		"Dirt Bike"[Title/Abstract]	OR	"Three Wheeler Vehicle"[Title/Abstract]	

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OR "Three Wheeled Vehicle"[Title/Abstract] OR "Three Wheeled Vehicles"[Title/Abstract] OR "Minibikes"[Title/Abstract] OR "Minibike"[Title/Abstract] OR "racing"[Title/Abstract] OR "rally"[Title/Abstract] OR "bike"[Title/Abstract] OR "bicycle"[Title/Abstract] OR "Mountain Bike"[Title/Abstract] OR "BMX"[Title/Abstract] OR "Bicycle Motocross"[Title/Abstract] OR "roller skating"[Title/Abstract] OR "Downhill Mountain Biking"[Title/Abstract] OR "Downhill Slide"[Title/Abstract] OR "Speed riding"[Title/Abstract] OR "biathlon"[Title/Abstract] OR "hockey"[Title/Abstract] OR "roller hockey"[Title/Abstract]) AND ("Maxillofacial Injuries"[Mesh] OR "Orofacial trauma"[Title/Abstract] OR "Orofacial traumas"[Title/Abstract] OR "Oro facial trauma"[Title/Abstract] OR "oro-facial trauma"[Title/Abstract] OR "Orofacial injury"[Title/Abstract] OR "Orofacial injuries"[Title/Abstract] OR "Oro facial injury"[Title/Abstract] OR "Oro facial injuries"[Title/Abstract] OR "oro-facial injury"[Title/Abstract] OR "oro-facial injuries"[Title/Abstract] OR "maxillofacial trauma"[Title/Abstract] OR "maxillofacial traumas"[Title/Abstract] OR "maxillo-facial trauma"[Title/Abstract] OR "maxillo-facial traumas"[Title/Abstract] OR "maxillofacial injury"[Title/Abstract] OR "maxillofacial injuries"[Title/Abstract] OR "maxillo-facial injury"[Title/Abstract] OR "maxillo-facial injuries"[Title/Abstract] OR "maxillofacial fracture"[Title/Abstract] OR "maxillofacial fractures"[Title/Abstract] OR "maxillo-facial fracture"[Title/Abstract] OR "maxillo-facial fractures"[Title/Abstract] OR "dentofacial trauma"[Title/Abstract] OR "dentofacial injury"[Title/Abstract] OR "dentofacial injuries"[Title/Abstract] OR "dento facial injuries"[Title/Abstract] OR "dento-facial injuries"[Title/Abstract] OR "dentoalveolar trauma"[Title/Abstract] OR "dentoalveolar traumas"[Title/Abstract] OR "dento alveolar trauma"[Title/Abstract] OR "dento-alveolar trauma"[Title/Abstract] OR "dentoalveolar injury"[Title/Abstract] OR "dentoalveolar injuries"[Title/Abstract] OR "dento alveolar injury"[Title/Abstract] OR "dento alveolar

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injuries"[Title/Abstract] OR "dento-alveolar injury"[Title/Abstract] OR "dento-alveolar injuries"[Title/Abstract] OR "dentoalveolar fracture"[Title/Abstract] OR "dentoalveolar fractures"[Title/Abstract] OR "dento alveolar fracture"[Title/Abstract] OR "dento alveolar fractures"[Title/Abstract] OR "dento-alveolar fracture"[Title/Abstract] OR "dento-alveolar fractures"[Title/Abstract] OR "Oral injury"[Title/Abstract] OR "Oral injuries"[Title/Abstract] OR "Oral trauma"[Title/Abstract] OR "Dental injury"[Title/Abstract] OR "Dental injuries"[Title/Abstract] OR "Dental trauma"[Title/Abstract] OR "Dental Traumas"[Title/Abstract] OR "dental fracture"[Title/Abstract] OR "dental fractures"[Title/Abstract] OR "Facial Injuries"[MeSH Terms] OR "Facial injuries"[Title/Abstract] OR "facial injury"[Title/Abstract])

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**Scopus**

TITLE-ABS-KEY(Athlet\* OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street luge" OR "Mountain Boarding" OR "Off road Boarding" OR Dirtboarding OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide" OR "Speed riding" OR "roller hockey" OR "Off-Road Racing" OR "Skatings") AND TITLE-ABS-KEY("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial

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injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-  
facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas"  
OR "dento alveolar trauma" OR "dento-alveolar trauma" OR  
"dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar  
injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR  
"dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar  
fractures" OR "dento alveolar fracture" OR "dento alveolar fractures"  
OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral  
injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR  
"Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental  
fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury"  
OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture"  
OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial  
fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR  
"dentofacial fractures" OR "dento-facial trauma" OR "dento-facial  
injury" OR "dento-facial fracture" OR "dento-facial traumas" OR  
"dento-facial fractures")

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**SPORTDiscus** (TI ( Athlet\* OR player OR practitioner OR sportswoman OR sportsmen  
OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider  
OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR  
Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three  
Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled  
Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike"  
OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street  
luge" OR "Mountain Boarding" OR "Off road Boarding" OR  
Dirtboarding OR "Downhill Mountain Biking" OR "Downhill  
Skateboarding" OR "Downhill Slide" OR "Speed riding" OR "roller  
hockey" OR "Off-Road Racing" OR "Skatings" ) AND TI ( "Orofacial  
trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial  
trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial  
injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial  
injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR  
"maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial

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injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury" OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial fractures" )) OR (AB (Athlet\* OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street luge" OR "Mountain Boarding" OR "Off road Boarding" OR Dirtboarding OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide" OR "Speed riding" OR "roller hockey" OR "Off-Road Racing" OR "Skatings")) AND AB ( "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial

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injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury" OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial fractures" ))

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**PEDro**

facial OR maxillofacial OR dental OR oral

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**Web of Science**

TS=(Athlet\* OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street luge" OR "Mountain Boarding" OR "Off road Boarding" OR Dirtboarding OR "Downhill Mountain Biking" OR "Downhill

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Skateboarding" OR "Downhill Slide" OR "Speed riding" OR "roller hockey" OR "Off-Road Racing" OR "Skatings") AND TS=("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury" OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial fractures")

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**Google Scholar** ((bike OR vehicle OR racing OR sport) AND ((facial OR maxillofacial OR dental OR oral) AND (injury OR injuries OR trauma))

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**Open Grey** ((bike OR vehicle OR racing OR sport\*) AND ((facial OR maxillofacial OR dent\* OR oral) AND (injur\* OR trauma))

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**ProQuest (Dissertations & Theses Global)** NOFT("Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "oro-facial trauma" OR "Orofacial injury" OR "Orofacial

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injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "oro-facial injury" OR "oro-facial injuries" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo-facial trauma" OR "maxillo-facial traumas" OR "maxillofacial injury" OR "maxillofacial injuries" OR "maxillo-facial injury" OR "maxillo-facial injuries" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo-facial fracture" OR "maxillo-facial fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "dento-facial injuries" OR "dentoalveolar trauma" OR "dentoalveolar traumas" OR "dento alveolar trauma" OR "dento-alveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar injuries" OR "dento alveolar injury" OR "dento alveolar injuries" OR "dento-alveolar injury" OR "dento-alveolar injuries" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "dento-alveolar fracture" OR "dento-alveolar fractures" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dental fracture" OR "dental fractures" OR "Facial injuries" OR "facial injury" OR "oro facial fracture" OR "oro facial fractures" OR "orofacial fracture" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial fracture" OR "oro-facial fractures" OR "dentofacial fracture" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial fractures") AND NOFT(Athlet\* OR player OR practitioner OR sportswoman OR sportsmen OR sportswomen OR sportsman OR pilot OR cyclist OR biker OR rider OR skater OR bicycling OR cycling OR hoverboard OR skateboard OR Skating OR Skateboarding OR "Dirt Bikes" OR "Dirt Bike" OR "Three Wheeler Vehicle" OR "Three Wheeled Vehicle" OR "Three Wheeled Vehicles" OR racing OR rally OR bike OR bicycle OR "Mountain Bike" OR "BMX" OR "Bicycle Motocross" OR "roller skating" OR "street luge" OR "Mountain Boarding" OR "Off road Boarding" OR Dirtboarding OR "Downhill Mountain Biking" OR "Downhill Skateboarding" OR "Downhill Slide"

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OR "Speed riding" OR "roller hockey" OR "Off-Road Racing" OR  
"Skatings")

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†Search strategies were performed for each database by using specific words combinations and truncations with support of an experienced librarian, Msc Karyn Munk Lehmkühl.



## Apêndice C – Artigos excluídos e justificativas

### Do artigo em inglês:

#### Appendix 2 - Articles excluded and the reasons for exclusion (n=245).

References	Author	Reasons for Exclusion†
1	Acosta et al 2014	1
2	Adekeye 2016	9
3	Adekeye 1980	1
4	Adlam 1984	10
5	Aksoy, Ünlü, Sensoz 2015	1
6	Altun, Ozen and Guven 2011	3
7	Amadori et al 2017	3
8	Amy 2005	1
9	Andersson, Johansson and Franzen 1986	10
10	Andrade et al 2012	2
11	Andreasen 1970	1
12	Arvind et al 2013	1
13	Ascani et al 2014	6
14	Ashrafullaha, Pandeyb and Mishrab 2017	1
15	Atisha et al 2016	1
16	Balle et al 1982	1
17	Bartosiak-Drosio et al 2016	6
18	Bataineh and Jordan 1998	1
19	Batista et al 2012 (B)	1
20	Bemelmans and Pfeiffer 2011	10
21	Bemelmans and Pfeiffer 2000	10
22	Bentley, Page and Macky 2007	5
23	Biagi et al 2010	5
24	Biazevic et al 2010	1
25	Bilgen, Ural, and Bekerecioglu 2019	3
26	Bíró and Barcza 1978	10
27	Blagojevi, Bojan and Dejan 2005	1
28	Blanc et al 1984	10
29	Boden et al 2017	4
30	Boffano et al 2015	2
31	Boyd 1974	1
32	Brusati, Biglioli and Salvato 1998	5

33	Caldas Jr. and Burgos 2001	1
34	Caliskan et al 1995	1
35	Cannon et al 2009	9
36	Capote 2015	2
37	Carlin et al 1998	10
38	Castaldi 1986	10
39	Castro et al 2005	1
40	Cecava et al 1980	10
41	Çetinbas, Yildirim and Sonmez 2007	5
42	Chorney et al 2016	2
43	Cohenca, Roges and Roges 2007	2
44	Collins and McKenzie, 2015	1
45	Collins et al 2015	2
46	Copcu, Sisman and Oztan 2004	1
47	Cossio et al 1994	1
48	Crespo et al 2008	1
49	Da Costa et al 2011	1
50	Dagon et al 2018	1
51	Davis and Knott 1984	1
52	De Giovanni, Mazzeo and Servadio 2000	10
53	Delank, Meldau and Stoll 1995	3
54	Díaz and López 1996	6
55	Dillon and Kahanov 2000	1
56	Eilert-Petersson and Schlep 1997	3
57	Erdmann et al 2008	1
58	Fakhruddin and Al Kawas 2010	1
59	Farrington 2015	6
60	Faverani et al 2009	1
61	Feldens et al 2010	1
62	Fernandez et al 2015	1
63	Ferreira et al 2004	1
64	Flanders and Bhat 1995	1
65	Freire et al 2014	1
66	Frenguelli et al 1991	6
67	Frohberg and Bonsmann 1992	10
68	Gassner et al 1999 (A)	6
69	Gassner et al 2004	1
70	Gassner et al 2003	1

71	Gassner et al 1999 (B)	6
72	Ghosh 1973	4
73	Gialain, Coto and Dias 2014	1
74	Giordano-Lanza, Guerra and Tafuri 2002	10
75	Glendor 2013	5
76	Gomes et al 2006	1
77	Gómez et al 2010	1
78	Goswami, Kumar and Bhushan 2017	5
79	Goulet, Régnier and Turner 1991	10
80	Grundill and Muller 1986	3
81	Grunwaldt et al 2011	1
82	Gupta, Gupta and Bhagat 1985	10
83	Halsey et al 2016	1
84	Hamilton 1994	10
85	Harrison and Telander 2002	4
86	Haug and Foss 2000	1
87	Haug, Prather and Indresano 1990	1
88	Haug et al 1992	1
89	Heider 1967	10
90	Hill, Crosher and Mason 1985	1
91	Hill et al 1984	1
92	Himani et al 2016	1
93	Hoppe et al 2014	1
94	Huang et al 2009	1
95	Hunter 1991	10
96	Hutchison and Morrison 2012	1
97	Iida et al 2001	1
98	Järvinen 1980	6
99	Jesus et al 2010	1
100	Júnior et al 2012	1
101	Kania et al 1996	1
102	Kansky and Dovak 2002	4
103	Karampouta-Boulgaropoulou et al 1981	1
104	Kaste et al 1996	1
105	Kececi et al 2005	1
106	Kellman and Tatum 2004	1
107	Khadka and Chaurasia 2014	1
108	Kieser et al 2002	1

109	Kirzioglu et al 2008	1
110	Klenka 1955	4
111	Kovacs et al 2012	1
112	Kraft et al 2012	1
113	Kumar et al 2011	1
114	Kvittem et al 1998	1
115	Lebeau, Giraud and Raphael 1981	10
116	Lebeau et al 1996	10
117	Lee, Manson and Robertson 2002	3
118	Lee-Knight, Harrison and Price 1992	10
119	Leurs et al 1992	10
120	Levin, Friedlander and Geiger 2003	6
121	Levin et al 2007	1
122	Lieger and Arx 2006	2
123	Liew and Daly 1986	1
124	Lin and Naidoo 2008	10
125	Lin et al 2007	1
126	Lin et al 2008	1
127	Linn et al 1986	5
128	Love et al 1998	10
129	Love and Ponnambalam 2008	6
130	Lukas and Rambousek 2001	10
131	Lukas and Rambousek 2000	10
132	Lyby and Enevoldsen 1986	10
133	Lynn 1966	10
134	Maladière et al 2001	6
135	Maliska et al 2012	1
136	McDermott and Klug 1982	10
137	Meadow, Lindner and Needleman 1984	1
138	Meier and Barsekow 1988	3
139	Menezes et al 2007	1
140	Mesa et al 2013	1
141	Micheli-Pellegrini 1965	10
142	Moghaddam et al 2017	1
143	Mohajerani and Asghari 2011	1
144	Monnazzi et al 2017	1
145	Mori et al 2009	5
146	Motamedi 2003	1

147	Motamedi et al 2014	1
148	Mulligan and Mahabir 2010	1
149	Muñante-Cárdenas et al 2010	1
150	Muñante-Cárdenas et al 2015	1
151	Muñante-Cárdenas et al 2011	1
152	Muñante-Cárdenas et al 2012	1
153	Nagappan et al 2019	5
154	Namdev et al 2016	1
155	Nysether 1987	10
156	Obregón, Hernández and Pando 2013	1
157	Olofsson, Bunketorp and Andersson 2017	3
158	Olson et al 1982	1
159	Olvera 1990	10
160	Onetto, Flores and Garbarino 1994	1
161	Onyeaso and Adegbesan 2003 (A)	1
162	Onyeaso and Adegbesan 2003 (B)	1
163	Oredugba and Perlman 2010	1
164	Pacheco, Zapata and Núñez 2012	1
165	Panzoni, Branchi and Piccioli 1983	10
166	Paoli et al 1999	10
167	Pedrini et al 2017	1
168	Pedroso 2005	1
169	Perottino et al 2009	10
170	Peyresblanques 1976	10
171	Posnick et al 1993	1
172	Pritchard 1961	10
173	Pungrasmi and Haetanurak 2017	1
174	Qing-Bin et al 2013	3
175	Qudah and Bataineh 2002	1
176	Rajab 2003	1
177	Ramdas, Lingam and Sateesh 2014	3
178	Regmi et al 2017	1
179	Remi et al 2003	1
180	Rhouma et al 2013	1
181	Rizzo and Melloni 1988	10
182	Roccia et al 2011	1
183	Rodd and Chesham 1997	10
184	Rodríguez and Jacobo 2004	1

185	Roed-Petersen 1980	10
186	Rojas et al 2016	1
187	Rouhani et al 2016	1
188	Rubiev and Deliverska 2012	1
189	Ruslin et al 2016	6
190	Sakamoto et al 2017	2
191	Sane and Ylipaavalniemi 1988	2
192	Santos et al 2010	1
193	Satpathy et al 2016	1
194	Schatz and Joho 1994	1
195	Scherer et al 1989	1
196	Schier 2019	2
197	Schultz and Camara 1984	9
198	Selig et al 2012	2
199	Shayyab et al 2012	9
200	Shenoi, Budhraj and Badjate 2012	9
201	Shoshani, Givol and Taicher 1999	10
202	Simsek et al 2007	1
203	Sonnenburg et al 1977	10
204	Souza 2010 (B)	1
205	Spengos, Zotales and Demetroglou 1980	10
206	Spinas et al 2018	9
207	Stock and Cornell 1991	9
208	Stockwell 1988	6
209	Strohm et al 2005	6
210	Subedi, Shrestha and Adhikari 2015	1
211	Suggs and Cannon 2011	10
212	Swenson et al 2010	1
213	Szymela 1985	9
214	Tanaka et al 1996	6
215	Tanaka et al 1992	6
216	Tanaka et al 1994	1
217	Thelen and Bardsen 2010	5
218	Thorén et al 1992	1
219	Todero et al 2019	1
220	Tong et al 2010	1
221	Toprak et al 2014	1
222	Traebert et al 2006	5

223	Tsai, Cheng and Lu 1999	10
224	Tschan et al 2003	10
225	Tuinzing and van der Kwast 1989	10
226	Tuli et al 2002	9
227	Valle et al 2012	1
228	Van de Griend, Hashemi and Shkoukani 2015	1
229	Van Den Bergh et al 2012	1
230	Vazquez et al 2016	9
231	Verfaillie and Bourry 1988	10
232	Vieira 2008	8
233	Viozzi 2017	9
234	Vougiouklakis et al 2008	1
235	Vuletić et al 2014	1
236	Wang and Fan 2006	10
237	Welch, Thomson and Kennedy 2010	6
238	White 1962	9
239	Wood and Freer 2002	6
240	Wymann et al 2008	9
241	Xavier et al 2011	1
242	Yamada et al 1998	2
243	Yamamoto et al 2018	6
244	Yasui et al 2013	10
245	Zachariades et al 1983	1

†Legend: 1) Studies in which samples did not include separated data of trauma in sports with non-motorized wheeled vehicles players; 2) Studies in which samples were composed only by players of sports with motorized vehicle, sports with wheelchair (paralympic sports), sports with animals, winter sports or water sports; 3) Studies that only evaluated trauma related to non-motorized wheeled vehicle when used only as transportation mean; 4) Studies that did not evaluate orofacial trauma separately and/or that investigated only sport-related trauma in other region than mouth, teeth and face; 5) Studies that did not provide quantitative data in regards to the prevalence of orofacial trauma; 6) Studies with samples composed only by trauma patients attended on hospitals or medical centers or reporting only annual incidences of orofacial trauma; 7) Studies focused on any other syndrome associated to trauma event; 8)

Studies with duplicated data from another included study; 9) Reviews, letters, books, conference abstracts, case report, opinion article, technique articles, posters and guidelines; 10)

Full-text not available.

## Appendix 2 References <sup>1-245</sup>

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## Apêndice D – Risco de Viés

### Do artigo em inglês:

**Appendix 3** - Risk of bias assessed by Joanna Briggs Institute critical appraisal tools. Risk of bias was categorized as High when the study reaches up to 49% score “yes”, Moderate when the study reached 50% to 69% score “yes”, and Low when the study reached more than 70% score “yes”.

Question	1. Was the sample frame appropriate to address the target population?	2. Were study participants sampled in an appropriate way?	3. Was the sample size adequate?	4. Were the study subjects and the setting described in detail?	5. Was the data analysis conducted with sufficient coverage of the identified sample?	6. Were valid methods used for the identification of the condition?	7. Was the condition measured in a standard, reliable way for all participants?	8. Was there appropriate statistical analysis?	9. Was the response rate adequate, and if not, was the low response rate managed appropriately?	%yes/risk
Aitken, Biant and Court-Brown 2011	N	N	Y	Y	Y	U	N	Y	Y	55.56
Andrade et al 2010	N	N	Y	Y	N	Y	Y	Y	Y	66.67
Fasciglione et al 2007	N	N	Y	Y	Y	Y	U	Y	Y	66.67
Muller et al 2008	N	N	Y	Y	Y	Y	Y	Y	Y	77.78
Nonoyama et al 2016	N	N	Y	Y	Y	Y	Y	Y	Y	77.78
Singh et al 2014	N	N	Y	Y	Y	Y	U	Y	Y	66.67

Legend - Y=Yes, N=No, U=Unclear, NA=Not applicable.

## Apêndice E – Prisma checklist

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	23
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	25
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	27
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	27
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	27
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	28
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	29
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix 1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	29
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	29/30
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	29/30
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of	30

		whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	30
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	31