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**Prevalência de Injúrias Dentofaciais em Esportes de Contato:**  
Uma Revisão Sistemática e Meta-análise

Florianópolis  
2020

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Uma Revisão Sistemática e Meta-análise

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Orientadora: Profa. Dra. Graziela De Luca Canto

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Mariana Oliveira Werlich

**Prevalência de Injúrias Dentofaciais em Esportes de Contato:  
Uma Revisão Sistemática e Meta-análise**

Este Trabalho de Conclusão de Curso foi julgado adequado para obtenção do Título de “Cirurgiã-dentista” e aprovado em sua forma final pelo Departamento de Odontologia da Universidade Federal de Santa Catarina.

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Prof.<sup>a</sup> Dra. Carla Massignan  
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## APRESENTAÇÃO

Esta revisão sistemática foi originalmente escrita na forma de artigo na língua inglesa e submetida ao periódico Dental Traumatology, em parceria com pesquisadores da Universidade Federal de Santa Catarina (UFSC): Prof.<sup>a</sup> Dr.<sup>a</sup> Graziela De Luca Canto, Prof.<sup>a</sup> Dr.<sup>a</sup> Ana Luiza Curi Hallal, Prof.<sup>a</sup> Dr.<sup>a</sup> Thaís Mageste Duque, Prof.<sup>a</sup> Dr.<sup>a</sup> Beatriz Dulcineia Mendes de Souza, MSc Patrícia Pauletto, Fábio Luiz Domingos, João Victor Silva Bett e Lia Rosana Honnef. O artigo foi aceito pela revista Dental Traumatology em 11 de Março de 2020 e publicado em 16 de Março de 2020.

A aluna Mariana Oliveira Werlich foi bolsista do PIBIC durante a realização dessa pesquisa.

Este Trabalho de Conclusão de Curso será apresentado na seguinte sequência:

Capítulo 1: Introdução

Capítulo 2: Artigo científico escrito na língua inglesa

Capítulo 3: Considerações Finais

Referências

Anexos

## RESUMO

**Antecedentes/Objetivos:** Esportes de contato apresentam intenso contato físico e geralmente os jogadores têm um alto risco de lesões dentofaciais. Não está claro com que frequência essas lesões ocorrem e quais esportes coletivos apresentam as maiores taxas. O objetivo deste estudo foi avaliar a prevalência de lesões dentofaciais entre os praticantes de esportes de contato. **Métodos:** Foi realizada uma revisão sistemática. A pesquisa bibliográfica foi feita em sete bases de dados eletrônicas (Embase, LILACS, LIVIVO, PubMed, Scopus, Sport Discuss e Web of Science). A literatura cinzenta (Google Scholar, OpenGrey e ProQuest) e as listas de referências dos estudos incluídos foram avaliadas. Os especialistas foram consultados para indicar estudos adicionais. Foram elegíveis estudos observacionais que apresentaram: características da amostra (participantes dos esportes de contato com mais de 18 anos, profissionais ou não, que sofreram pelo menos uma lesão dentofacial no passado), características da exposição (número de lesões ocorridas) características dos desfechos (informações quantitativas sobre as lesões dentofaciais, como tipo e local). O risco de viés foi avaliado usando a Lista de Verificação Crítica de Avaliação do Instituto Joanna Briggs para Estudos que Relatam Dados de Prevalência. **Resultados:** Dos 1.152 estudos inicialmente identificados, dezesse foram incluídos na revisão sistemática. Um estudo foi classificado como alto risco de viés, quatorze estudos como moderado e dois como baixo risco. A prevalência geral de lesões dentofaciais foi de 27,57% (IC 95%: 17,87-38,47). Os esportes onde as lesões forma mais prevalentes foram: rugby 37,36% (IC95%: 17,45-59,82), basquete 27,26% (IC95%: 9,45-50,08), handebol 24,59% (IC95%: 14,88-35,83) e hóquei em campo 19,07% (IC95%: 6,82-35,62). A lesão mais comum foi a lesão dentária 19,61% (IC 95%: 8,13-34,56). **Conclusão:** A prevalência geral de lesões dentofaciais entre os praticantes de esportes de contato é de aproximadamente 30%. A lesão mais comum apresentada foi a lesão dentária e o esporte com maior número de lesões foi o rugby.

**Palavras-chave:** esportes, epidemiologia, traumatismos em atletas, protetores bucais, prevalência, odontologia baseada em evidências.

## ABSTRACT

**Background / Objectives:** Contact sports have intense physical contact and players are generally at high risk for dentofacial injuries. It is not clear how often these injuries occur and which team sports have the highest rates. The aim of this study was to evaluate the prevalence of dentofacial injuries among contact sports practitioners. **Methods:** A systematic review was carried out. The bibliographic search was carried out in seven electronic databases (Embase, LILACS, LIVIVO, PubMed, Scopus, Sport Discuss and Web of Science). The gray literature (Google Scholar, OpenGrey and ProQuest) and the reference lists of the included studies were evaluated. The experts were consulted to indicate additional studies. Observational studies were eligible which presented: sample characteristics (contact sports participants over 18 years old, professional or not, who have suffered at least one dentofacial injury in the past), characteristics of exposure (number of injuries occurred) characteristics of outcomes (quantitative information on dentofacial lesions, such as type and location). The risk of bias was assessed using the Joanna Briggs Institute's Critical Assessment Checklist for Studies Reporting Prevalence Data. **Results:** Of the 1,152 studies initially identified, sixteen were included in the systematic review. One study was classified as high risk of bias, fourteen studies as moderate and two as low risk. The general prevalence of dentofacial injuries was 27.57% (95% CI: 17.87-38.47). The sports where injuries were the most prevalent were: rugby 37.36% (95% CI: 17.45-59.82) basketball 27.26% (95% CI: 9.45-50.08), handball 24.59% (95% CI: 14.88-35.83), and field hockey 19.07% (95% CI: 6.82-35.62). The most common injury was dental injury 19.61% (95% CI: 8.13-34.56). **Conclusion:** The general prevalence of dentofacial injuries among contact sports practitioners is approximately 30%. The most common injury presented was dental injury and the sport with the highest number of injuries was rugby.

**Keywords:** sports, epidemiology, athletic injuries, mouth guards, prevalence, evidence based dentistry.

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## LISTA DE ABREVIATURAS E SIGLAS

### **Do Inglês:**

**CI:** *Confidence Interval*

**JBI:** *Joanna Briggs Intitute*

**RoB:** *Risk of Bias*

**PRISMA:** *Preferred Reporting Items for Systematic Reviews*

**PROSPERO:** *Prospective Register of Systematic Reviews*

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## 1. CAPÍTULO 1

### INTRODUÇÃO

Os esportes de contato são considerados esportes que apresentam intensa interação física entre os jogadores para impedir a vitória da outra equipe. (ILIA *et al.*, 2014) Os jogadores têm alto risco de lesões dentofaciais devido ao contato de alto impacto, ao aumento da competitividade e ao crescimento do número de jogadores tanto profissionais quanto não profissionais (FERRARI e FERREIRA DE MEDEIROS, 2002).

As lesões esportivas representam, assim, o segundo tipo mais comum de acidente após acidentes domésticos e ocupacionais (SCHNEIDER *et al.*, 2006). A maioria das lesões relacionadas ao esporte são nos tecidos moles, lesões ósseas e lesões dentárias (NEWSOME *et al.*, 2001; AGBOR *et al.*, 2012; TUNA *et al.*, 2014; EMSHOFF *et al.*, 1997). As causas mais comuns de lesões dentofaciais são quedas e colisões com outros jogadores e objetos esportivos (DURSUN *et al.*, 2015; CORREA *et al.*, 2010; RANALLI *et al.*, 2000).

O uso de equipamentos de proteção, como protetores bucais, é reconhecido como importante para a prevenção de lesões dentofaciais por sua capacidade de absorver e dissipar a energia do impacto do trauma (MA, 2008; BIAGI *et al.*, 2010). No entanto, o uso de protetores bucais varia significativamente entre os diferentes esportes de contato, somente no futebol americano eles se tornaram totalmente aceitos e obrigatórios para todos os jogadores. Por outro lado, esportes como handebol e futebol não possuem esses dispositivos de proteção obrigatórios (SANE, 1988a; b).

Os traumas dentofaciais no esporte são considerados um importante problema de saúde bucal pública devido ao grande número de casos, à frequência, ao impacto causado na vida cotidiana e ao tratamento oneroso (FERRARI e FERREIRA DE MEDEIROS, 2002; DURSUN *et al.*, 2015). Podendo causar danos dentários irreparáveis durante ou após o tratamento e até anos após o trauma, devido a



sequelas como necrose pulpar com infecção e reabsorção radicular. (MAGNUSSEN *et al*; FERRARI e FERREIRA DE MEDEIROS, 2002).

Em relação às lesões nos esportes de contato, foi realizada uma revisão sistemática em 2016, com foco apenas em jogadores de hóquei em campo (VUCIC *et al*, 2016). Há também uma revisão sistemática recente, publicada em 2019, sobre traumas em esportes de contato (SELVA *et al*, 2019). No entanto, essa revisão sistemática mostrou algumas diferenças na metodologia, tais como: os autores utilizaram esportes de contato diferentes, usaram outros critérios de inclusão, realizaram a busca em menos bases de dados e não apresentaram a prevalência geral de lesões orofaciais em esportes de contato, apenas o percentual de cada estudo individual incluído (SELVA *et al*, 2019). Além disso, outra revisão sistemática foi publicada no mesmo ano, mas focada na prevalência de lesões em esportes de combate como jiu-jitsu e boxe, que não foram incluídas no presente estudo (POLMANN *et al*, 2019).

## **2. OBJETIVOS**

### **2.1. Objetivo Geral**

Avaliar a prevalência de injúrias dentofaciais em esportes de contato.

### **2.2. Objetivos Específicos**

- Verificar qual a prevalência de injúrias dentofaciais por modalidade de esporte de contato.
- Verificar qual o tipo de injúrias dentofacial mais frequente.

### 3. CAPÍTULO 2

#### **Prevalence of dentofacial injuries in contact sports players: a systematic review and meta-analysis**

**Running title:** dentofacial injuries in contact sports

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## INTRODUCTION

Contact sports are considered sports that present intense physical interaction between players to prevent the other team to win<sup>1,2</sup> The players have a high risk of dentofacial injuries due to high impact contact, the increase of competitiveness and the growth of the number of players from professional to the occasional weekend players.<sup>1,3,4</sup>

Sports injuries thus represent the second most common type of accident after domestic accidents and occupational accidents.<sup>5</sup> The majority of sports-related injuries are soft tissue, bone injury and dental injuries.<sup>2,3,6,7</sup> The most common causes of dentofacial injuries are falls and collisions with other sport players and objects.<sup>8-10</sup>

The use of protective equipment such as mouthguards is recognized as important for the prevention of dentofacial injuries because of their ability to absorb and dissipate the energy of the impact.<sup>6,11-13</sup> However the use of mouthguards varies significantly among different contact sports; only in American football have they become fully accepted and mandatory for all players. On the other hand, sports such as handball and soccer do not have this protective device as obligatory in all countries.<sup>14,15</sup>

Dentofacial trauma in sports is considered a major public oral health problem due to a large number of cases, the frequency, the impact caused in daily life and the costly treatment.<sup>4,8,9,11,16</sup> It can cause irreparable dental harm during or post-treatment and even for years after the trauma because of sequelae such as pulp necrosis with infection and root resorption.<sup>4,17</sup>

With regard to injuries in team contact sports, a systematic review was carried out in 2016 with a focus only on field hockey players.<sup>18</sup> There is also a previous systematic review, published in 2019, on the same subject. However, this review showed some differences in methodology such as: the authors used contact sports different from those presented in this systematic review, used other inclusion criteria, included fewer databases and did not present the overall prevalence of orofacial injuries in contact sports with only the percentage in each study included in the review.<sup>19</sup> In addition, another systematic review was published in the same year but focused on the prevalence of injuries in combat sports such as jiu-jitsu and boxing, that were not

included in the current study.<sup>20</sup> Therefore, the aim of this systematic review was to summarize and critically appraise available evidence regarding the prevalence of dentofacial injuries that occur during contact sports.

## **MATERIAL AND METHODS**

A systematic review protocol based on PRISMA-P guidelines was performed<sup>21</sup>. The protocol was registered at the International Prospective Register of Systematic Reviews (PROSPERO; Center for Reviews and Dissemination, University of York; and the National Institute for Health Research)<sup>22</sup> on 25 April 2019 under the number CRD42019129944. This systematic review was reported accordingly to the PRISMA guidelines.

The prevalence indicates the number of people in a population that have a health condition at a given point in time<sup>23</sup>. The PECOS acronym was used to formulate the question, in which: Participants: Contact sports participants (amateur, semi-professional and professional); Exposition: Dentofacial injuries; Comparison: No comparison since it is a prevalence study; Outcomes: 1. Overall prevalence of dentofacial injuries. 2. Most frequent types of dentofacial injuries. 3. Most frequent sports associated with dentofacial injuries. Studies: Observational studies. Studies that contained the following were included: contact sports participants over 18 years old, either professional or not, who had sustained at least one dentofacial injury in the past, the number of sustained injuries, and studies which provided quantitative data on characteristics of dentofacial injuries, such as type and site. Dentofacial injuries were defined as an injury of teeth, alveolar bone, jaws, lips, cheek bone and/or tongue. Other injuries such as those to nose, orbit, ear, head and neck were excluded. No restriction criteria regarding time, gender and competition level (elite or recreational) were applied.

The following exclusion criteria were applied: (1) Studies with samples composed only by trauma patients attending medical centers or hospitals, since it is not possible to carry out a prevalence study when samples are composed only of traumatized patients; (2) Studies in which samples included participants under 18 years old or did not provide enough information about the samples; (3) Studies that did not investigate dentofacial trauma; (4) Studies that did not evaluate injuries related to

contact sports; (5) Studies that evaluated the prevalence of dentofacial injuries among winter sports participants; (6) Studies that evaluated the prevalence of dentofacial injuries among water sports participants; (7) Studies reporting only annual incidences of dentofacial trauma; (8) Studies that did not provide adequate data regarding the frequency or prevalence of dental injuries in contact sports, even after trying to contact the corresponding authors; (9) Studies with insufficient data; (10) Abstracts only, systematic reviews, letters, book chapters, case reports, personal opinions, posters and case series reports; (11) Studies that were not written in Latin-Roman alphabet.

There were no time restrictions, and studies that were written in languages other than English but with Latin-Roman alphabet were translated with the help of collaborators fluent in that language.

A literature search was performed on 5 September 2018. The last update of the literature search was carried out on 20 April 2019. The search was conducted using the following electronic databases: Embase, LILACS, LIVIVO, PubMed, Scopus, and Sport Discuss. An additional search in the grey literature including Google Scholar, OpenGrey, and ProQuest, as well as manual searches across reference lists of the included studies were performed. Experts were also consulted to help locate additional studies to be included. The software reference manager (EndNote X7, Thompson Reuters, Philadelphia, PA) was used to collect references and remove duplicate articles.

A two-phase selection process was applied to select studies (Figure 1). In the first phase, three reviewers (M.O.W.; J.V.B.; L.R.H.) independently selected articles based on reading the titles and abstracts using an online software (Rayyan, Qatar Computing Research Institute).<sup>24</sup> In the second phase the same three reviewers applied the eligibility criteria to the full text of the studies. If disagreements a fourth reviewer (F.L.D.) was consulted. If important data for the review were missing or unclear, an attempt to contact the corresponding authors to resolve or clarify the problem was made.

Information regarding the author, year of publication, sample size, age range, type of sport, level of the participants and the overall and partial prevalence of dental injuries

was collected. Furthermore, the number of players who possessed and regularly wore a mouthguard was collected, taking into account factors that may have influenced the use of mouthguard on the injuries, or if the studies analyzed data on the players' attitudes towards mouthguards. Data collection procedures of studies eligible for this systematic review were self-reported questionnaires and injury surveillance reports during matches and training (Table 1).

The Risk of Bias (RoB) of the selected studies was evaluated by two reviewers (M.O.W., L.R.H.) using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data.<sup>25</sup> Decisions about scoring were agreed upon by all reviewers before critical appraisal assessments, and the studies were characterized according to the following: "high" when the study reached 49% scores of "yes"; "moderate" when the study reached 50% to 69% scores of "yes"; and "low" when the study reached more than 70% scores of "yes".

The prevalence of dentofacial injuries in contact sports players, expressed by means of relative or absolute frequencies and their 95% confidence intervals (CI), was considered as the main outcome. Secondary outcomes were the prevalence by type of sports and by type of injuries.

The meta-analyses of proportions and figures were performed using MedCalc Statistical Software version 19 (MedCalc Software bvba, Ostend, Belgium). The prevalence of dentofacial injuries was expressed by means of relative or absolute frequencies and its 95% CI. The default options of the program were used.

The  $I^2$  test was used to calculate statistical heterogeneity, and the level of significance was set at 5%. A value greater than 50% was considered a signal of substantial heterogeneity among studies and a random-effect model was prioritized. Graphical representations of results of the meta-analyses are presented as forest plots.

Clinical heterogeneity across studies was assessed by comparing variability among participant's characteristics (such as age, type of sport, gender and use of protection) and methodological heterogeneity by comparing variability in study design (such as prevalence reported) and risk of bias in individual studies.

A sensitivity analysis was performed with the objective of ascertaining if the studies with the low RoB interfered in the final result of the meta-analysis. Also, a funnel plot was made in order to check for publication bias.

## RESULTS

In phase one, 1152 articles were collected. After the removal of the duplicates, 487 articles remained. Eighty articles remained for phase two. This process resulted in exclusion of 63 articles, and 17 articles remained for final analysis.<sup>1,4,9,16,26-38</sup>

Seventeen studies were included<sup>1,4,9,16,26-38</sup> and their characteristics are presented in Table 1. All studies had male participants, five studies included female athletes<sup>26,30,31,33,36</sup> and six studies did not have females.<sup>1,4,29,32,34,38</sup> In addition, some studies did not report whether females were included.<sup>9,16,27,28,35</sup>

All studies were published between 1985 and 2018, sixteen were written in English<sup>1,4,9,16,26-31,33-38</sup> and one in Turkish.<sup>32</sup> The studies included a total of 4933 participants and 1167 dentofacial injuries. All studies were cross-sectional and collected their data using questionnaires.

The injuries that appeared in more than one study were: dental injury,<sup>4,9,27-31,37</sup> lip injury,<sup>9,27,29,31,37</sup> mandible injury,<sup>9,28,29,34</sup> luxation,<sup>29,32-34,36,38</sup> avulsion,<sup>1,29,32-34,36,38</sup> tongue injury,<sup>9,27,29</sup> cheek injury,<sup>29,37</sup> and dental fractures.<sup>16,34</sup> Other injuries such as extrusion and gingival injury;<sup>29</sup> subluxation and dislocated jaw;<sup>1</sup> intraoral laceration and circumoral laceration;<sup>28</sup> and soft tissue injury<sup>35</sup> appeared only in one study each. In addition, some studies grouped the injuries for analysis such as: bone and temporomandibular joint injury, dental/periodontium injury;<sup>35</sup> and crown/root fracture, facial/mandibular fractures.<sup>1</sup> The way that authors from each study separated and evaluated injuries was respected and for that reason only the injuries that appeared in more than two studies were used for the meta-analysis.

Thirteen studies provided information on the use of mouthguards<sup>1,4,9,27-36</sup> and four studies did not provide such information.<sup>16,26,37,38</sup>

One study was classified as high RoB,<sup>28</sup> fourteen studies as moderate RoB,<sup>1,16,26,27,29-38</sup> and two as low RoB<sup>4,9</sup> (Figure 2).



Azodo et al. investigated the prevalence of dentofacial injuries in basketball in amateur and professional players but did not separate the prevalence according to the type of injuries and they also did not report the use of mouthguards. The overall prevalence was 6.4%.<sup>26</sup>

Two included studies that examined professional rugby players were written by the same author but in different years. In 1985, Chapman reported an overall prevalence of dentofacial injuries of 60.7%<sup>27</sup> and in 1989 it was 36.4% but with a high RoB.<sup>28</sup>

Ferrari & Ferreira De Medeiros<sup>4</sup> was one of the three included studies that evaluated more than one sport but the only one that presented separate prevalence figures for each sport. The sports and their respective prevalences were: hockey (71.9%), soccer (10.4%), basketball (5.5%) and handball (8.8%).<sup>4</sup>

Two other studies investigated more than one sport but did not separate the prevalence of dentofacial injuries for each sport. Hodson<sup>31</sup> included hockey, rugby and basketball and obtained an overall prevalence of 48%. Lieger & Von Arx<sup>34</sup> evaluated soccer, handball and basketball and the overall prevalence was 38.1%.

Muller-Bolla et al.<sup>35</sup> presented the largest sample size with 1140 rugby players. The prevalence of dentofacial injuries was 26%.<sup>35</sup> Dursun et al.<sup>9</sup> with a sample size of 983 soccer players reported an overall prevalence of 1.5%.

Two studies were written by a Turkish author, one in English and the other one in Turkish, and published at the same year. Both studies investigated professional handball players. Keceçi & Eroglu<sup>16</sup> had a sample size of 36 handball players with an overall prevalence of 33.3%. Keceçi et al.<sup>32</sup> was written in Turkish and had a larger sample with 62 players and a prevalence of dentofacial injuries of 25.8%.

Perunski et al.<sup>36</sup> studied injuries in basketball in semiprofessional and amateur players. The sample was divided into half men and half women and the overall prevalence was 22.8%.

Frontera et al.<sup>29</sup> and Gialain et al.<sup>30</sup> were studies from Brazil. The first one investigated the prevalence of dentofacial injuries in basketball and obtained an overall prevalence of 50%.<sup>29</sup> The second one investigated handball and the prevalence was 19.6%.

One study was added after the search update. Praveena et al.<sup>37</sup> was published in 2018 and had a prevalence of injuries in field hockey players of 34%.

Two studies that investigated rugby and did not include women in their sample were Ilija et al.<sup>1</sup> with an overall prevalence of 64.9% and Schildknecht et al.<sup>38</sup> with an overall prevalence of 8.7%. The first study had a sample size of 225 men and the second one had 277 men.

Lang et al.<sup>33</sup> studied the prevalence of dentofacial injuries in handball players and obtained an overall prevalence of 10.7% injuries.

A total of 4933 players in five different sports were included for the meta-analysis. The heterogeneity among the studies was high, so the random model was chosen for the statistical analysis<sup>39</sup>. The overall prevalence of dentofacial injuries was 27.57% (I<sup>2</sup>: 98.4%, CI: 17.87-38.47) (Figure 3).

In regards to the type of sports, the highest prevalence of dentofacial injuries in contact sports players was rugby 37.36% (I<sup>2</sup>: 98.17%, CI: 17.45-59.82), followed by basketball 27.26% (I<sup>2</sup>: 97.77%, CI: 9.45-50.08), handball 24.59% (I<sup>2</sup>: 86.40%, CI: 14.88-35.83), field hockey 19.07% (I<sup>2</sup>: 91.10%, CI: 6.82-35.62) and soccer 9.49% (I<sup>2</sup>: 99.21%, CI: 0.3-39.73) (Figure 4).

The meta-analysis performed to compare the types of injuries and their prevalence resulted in: dental injury at 19.61% (I<sup>2</sup>: 98.41%, CI: 8.13-34.56) as the most prevalent injury, followed by crown fracture 18.13% (I<sup>2</sup>: 94.33%, CI: 7.16-32.70), lip injury 11.93% (I<sup>2</sup>: 98.85%, CI: 0.96-32.54), mandible injury 6.94% (I<sup>2</sup>: 96.67%, CI: 1.03-17.46), luxation 5.56% (I<sup>2</sup>: 82.12%, CI: 2.57-9.60), avulsion 3.89% (I<sup>2</sup>: 70.17%, CI: 2.22-6.00) and tongue injury 3.83% (I<sup>2</sup>: 97.95%, CI: 0.13-17.41). Cheek injury 9.07% (I<sup>2</sup>: 0%, CI: 7.01-11.36) was the only type of injury that did not have high heterogeneity but the random effect and the fixed effect were the same so the random effect continued to be used in the analysis.

Regarding the risk of bias across studies, two questions: "Was the sample frame appropriate to address the target population?" and "Were study participants sampled in an appropriate way?" were scored as "high RoB" for all studies since all studies were from non-randomized convenience samples.

A sensitivity analysis was performed and after the removal of all studies classified as high and moderate RoB two studies remained for analysis. Dursun et al.<sup>9</sup> and Ferrari et al.<sup>4</sup> were the studies classified as low RoB and used for sensitivity analysis. However, they did not show any influence on the final results of the meta-analysis. In addition, a funnel plot was performed and this showed great heterogeneity between the studies and inaccuracy of the data (Figure 5).

## **DISCUSSION**

The objective of this systematic review was to evaluate the prevalence of dentofacial injuries in contact sports participants. Although there is another systematic review that was published in 2019 on the same subject that included baseball, water polo, and ice hockey as team sports. That review did not present a general prevalence of injuries, but it reported relatively similar prevalence in the sports that were included in the current study. Only basketball was more prevalent for orofacial injuries among professional players. This difference may have been due to the use of different inclusion criteria that resulted in different studies being included.<sup>19</sup> This type of sport is considered to have a high risk for injuries (both bodily and facial) due to the constant physical interaction between participants.<sup>1,2</sup> Summarizing the available data is considered useful to provide the basis to prevent injuries.

All the included studies were used for the meta-analysis to obtain the overall prevalence of dentofacial injuries. Heterogeneity within studies was considered high by inconsistency ( $I^2$ : 98.40%), and the random-effect model was prioritized because the studies were not functionally equivalent.<sup>40</sup>

The major bias of the included studies in this systematic review was that the sample sizes were considered small for prevalence studies ( $\leq 400$ )<sup>41</sup>, and it was not possible to relate the prevalence to the general population due to the use of convenience samples composed only of athletes, either professional or non-professional.<sup>41</sup> Because of the small sample sizes used, some studies had a large confidence interval in the meta-analyses which generates imprecision.<sup>16,27,28,32</sup> The results obtained during the meta-analyses showed that the overall prevalence of dentofacial injuries was approximately 30%<sup>42</sup>. This high result is concerning, since dentofacial injuries not only bring aesthetic problems to the athlete, but they can interfere with

the person's normal functions. They can also reduce the player's performance and prevent participation in matches. Contact sports present a greater risk of trauma that can be reduced or even prevented with the use of protective devices such as mouthguards.<sup>43</sup>

The meta-analysis performed to detect the sports with the highest index of dentofacial trauma showed that rugby is at the top of the pyramid. Since rugby is considered the third most common contact sport and has the characteristic of being a fast paced collision sport, the susceptibility of trauma is high.<sup>44</sup> A systematic review in 2015<sup>45</sup> found that 28% of rugby players under 21 years are likely to sustain an injury to the body during a season.

The sports in sequence after rugby in the prevalence pyramid of dentofacial injuries were basketball, handball, field hockey and soccer. This can be explained by the use of protective devices not being a current habit in some of these sports, such as soccer and handball,<sup>46,47</sup> and the aggressive interaction among players in contact sports.<sup>1</sup> Previous studies have stated that the risk group for sports injuries is young men under 30 who play sports for at least 4 hours a week.<sup>5</sup> In addition, the same study indicated that 62% of injuries resulted in occupational disability/time off work bringing great harm to athletes.<sup>5</sup>

The face is one of the most vulnerable and exposed areas of the body and is usually the least protected.<sup>48</sup> The primary method for preventing dentofacial injuries during contact sports is the wearing of protective devices such as mouthguards. A mouthguard is defined as a resilient device placed inside the mouth in order to protect the player.<sup>6</sup> The use of mouthguards can protect the lips and intra-oral tissues from bruising and laceration, prevent the teeth from crown fracture, root fracture, luxation, and avulsion, safeguard the jaw from fracture and dislocation, provide support for the edentulous space and reduce the severity of condylar dislocation and temporomandibular joint trauma.<sup>6,49</sup> They can be pre-fabricated (stock), mouth-formed and custom-made. The latter type is made by dentists and provides the greatest protection. Other qualities of custom-made mouthguards are that they do not obstruct breathing and speaking, they do not cause nausea and they last longer.<sup>18,31</sup>

In regards to the type of injury, dental injury was the most prevalent dentofacial injury, followed by crown fracture, lip injury, mandible injury, luxation, avulsion, tongue and cheek injuries. However, one of the reasons for dental injuries being the most prevalent type is that some of the included studies did not specify what the dental injury was (for example, luxation, crown/root fracture, dislocation, avulsion, etc.) making the prevalence higher than other specific injuries. These injuries could have been avoided with the use of mouthguards.<sup>46</sup> However the use of these protective devices was extremely low or not clearly reported in some studies. The prevalence of each injury in this study could be lower if the participants had used mouthguards regularly.

It is important to mention that this systematic review did not focus on assessing the effectiveness of mouthguards on preventing dentofacial injuries, but there is an intimate correlation between the high rate of injuries presented by the players and the use of mouthguards. That correlation is reported in other systematic reviews that have shown the association between dental trauma and the use of this protective device.<sup>46,50</sup>

Although the studies included in this review reported the prevalence of injuries generally, it was not possible to analyze the prevalence of injuries by gender. However, a recent review study showed that males are more likely to experience sports related traumatic injuries than females<sup>5</sup> but women suffered injuries that result in surgery more often. According to that study, men's football and wrestling, and girl's basketball and soccer accounted for the highest rates of acute and potentially severe injuries.<sup>5</sup>

The small sample sizes of the included studies and the difficulty of uniting the types of injuries due to the poor specification of the trauma in some studies promoted a high risk of bias. Further studies need rigorous methodology with larger sample sizes and better division of types of injuries. This would increase the reliability of the prevalence data and reduce the risk of bias.

## **CONCLUSION**

The overall pooled prevalence of dentofacial injuries among contact sports participants was approximately 30%. Rugby had the highest prevalence of dentofacial injuries. The most common injury was dental injury. Most studies showed low or moderate risk of bias.

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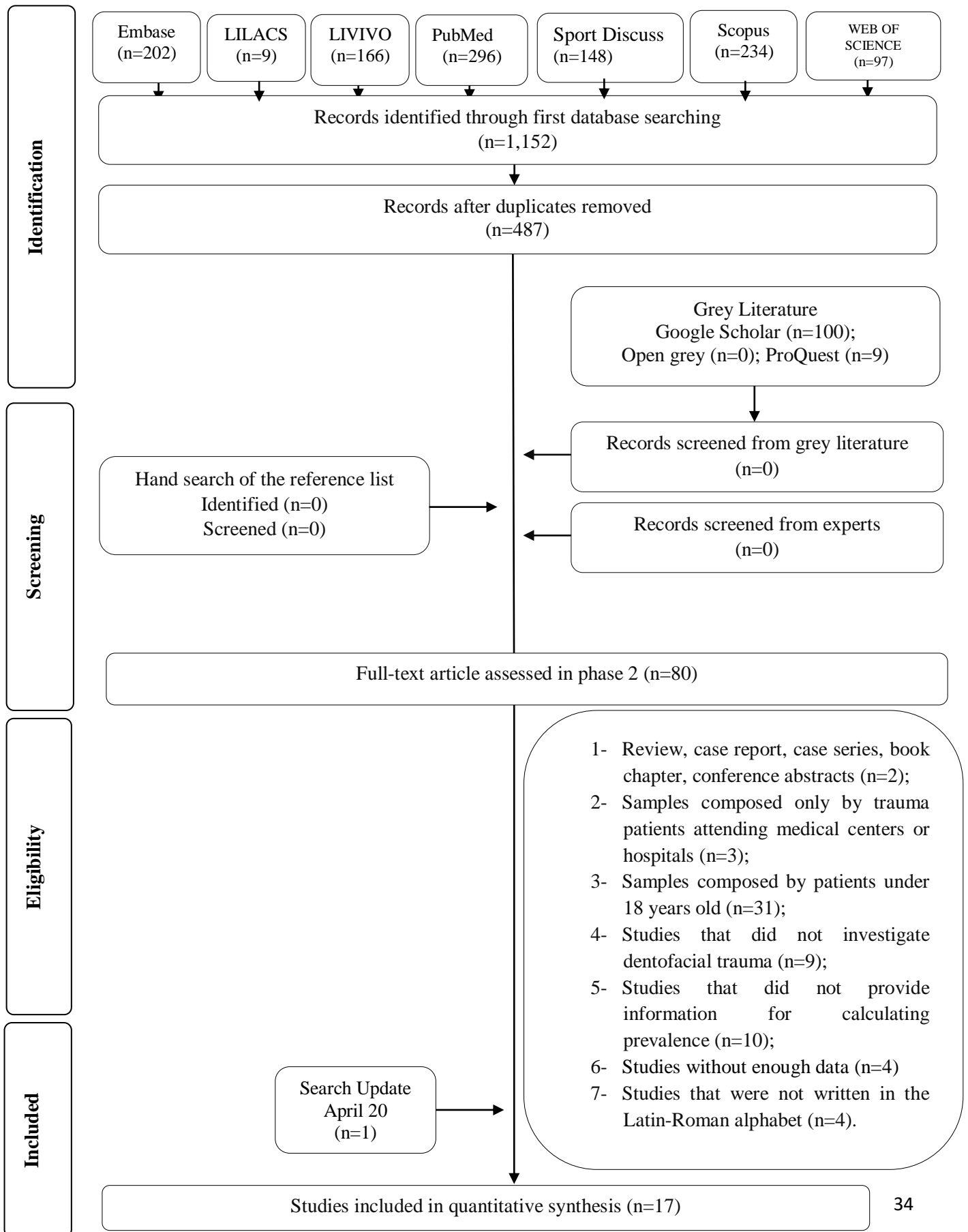
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**Figure 1- Flow Diagram of the Literature Search and the Selection Criteria.**



**Figure 2 - Risk of Bias - Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data.**

	Was the sample frame appropriate to address the target population?	Were study participants sampled in an appropriate way?	Was the sample size adequate?	Were the study subjects and the setting described in detail?	Was the data analysis conducted with sufficient coverage of the identified sample?	Were valid methods used for the identification of the condition?	Was the condition measured in a standard, reliable way for all participants?	Was there appropriate statistical analysis?	Was the response rate adequate, and if not, was the low response rate managed appropriately?
Azodo et al, 2011	+	+	+	-	-	-	?	+	+
Chapman, 1985	+	+	+	?	?	+	?	+	+
Chapman, 1989	+	+	+	?	?	?	?	+	+
Dursun et al, 2015	+	+	-	-	-	-	?	+	+
Ferrari & Ferreira De Medeiros, 2002	+	+	-	-	-	-	?	+	+
Frontera et al, 2011	+	+	-	-	-	-	?	+	+
Gialain et al, 2014	+	+	-	-	-	-	?	+	+
Hodson, 2009	+	+	-	-	-	-	?	+	+
Ilija et al, 2014	+	+	-	-	-	-	?	+	+
Kececi & Eroglu, 2005	+	+	-	-	-	-	?	+	+
Kececi et al, 2005	+	+	-	-	-	-	?	+	+
Lang et al, 2002	+	+	-	-	-	-	?	+	+
Lieger & Von Arx, 2006	+	+	-	-	-	-	?	+	+
Muller-Bolla et al, 2003	+	+	-	-	-	-	?	+	+
Perunski et al, 2005	+	+	-	-	-	-	?	+	+
Praveena et al, 2018	+	+	-	-	-	-	?	+	+
Schildknecht et al, 2012	+	+	-	-	-	-	?	+	+

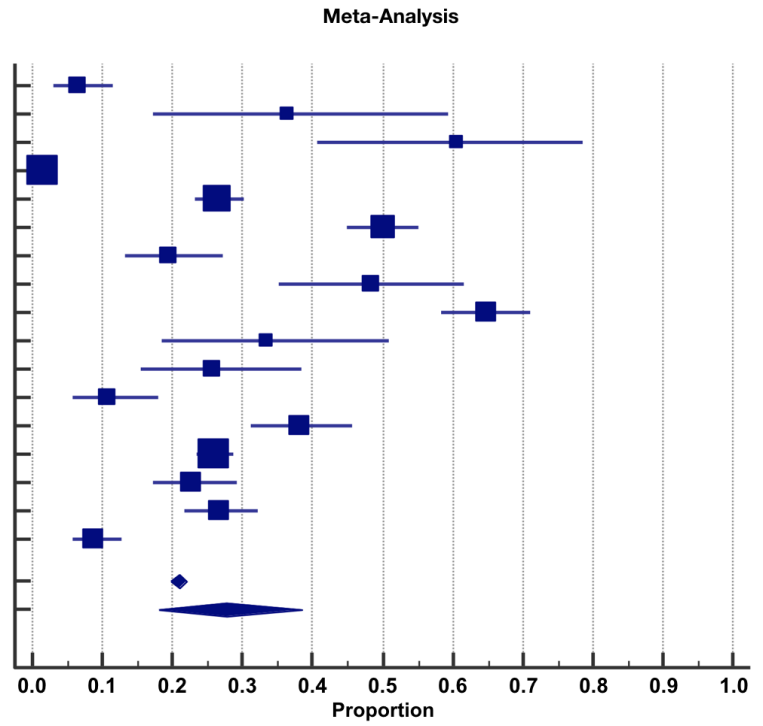
**Figure 3 - Meta-analysis for the overall prevalence.**

**META-ANALYSIS OVERALL**

Study	Sample size	Proportion (%)	95% CI
Azodo et al 2011	156	6.410	3.116 to 11.473
Chapman et al 1989	22	36.364	17.198 to 59.342
Chapman et al 1985	28	60.714	40.577 to 78.496
Dursun et al 2015	983	1.526	0.857 to 2.504
Ferrari et al 2002	637	26.531	23.139 to 30.141
Frontera et al 2011	388	50.000	44.912 to 55.088
Gialain et al 2014	138	19.565	13.307 to 27.175
Hodson et al 2009	60	48.333	35.231 to 61.605
Iliä et al 2014	225	64.889	58.265 to 71.114
Keceçi1 et al 2005	36	33.333	18.556 to 50.970
Keceçi2 et al 2005	62	25.806	15.527 to 38.497
Lang et al 2002	112	10.714	5.660 to 17.968
Lieger et al 2006	186	38.172	31.161 to 45.566
Muller-Bolla et al 2013	1140	25.965	23.441 to 28.614
Perunski et al 2005	202	22.772	17.181 to 29.181
Praveena et al 2018	281	26.690	21.611 to 32.269
Schildknecht et al 2012	277	8.664	5.630 to 12.617
<b>Total (fixed effects)</b>	<b>4933</b>	<b>20.858</b>	<b>19.734 to 22.017</b>
<b>Total (random effects)</b>	<b>4933</b>	<b>27.572</b>	<b>17.879 to 38.472</b>

Test for Heterogeneity	
Q	1001.4515
Significance level	P < 0.0001
I2 (inconsistency)	98.40%
95% CI for I2	98.04 to 98.70



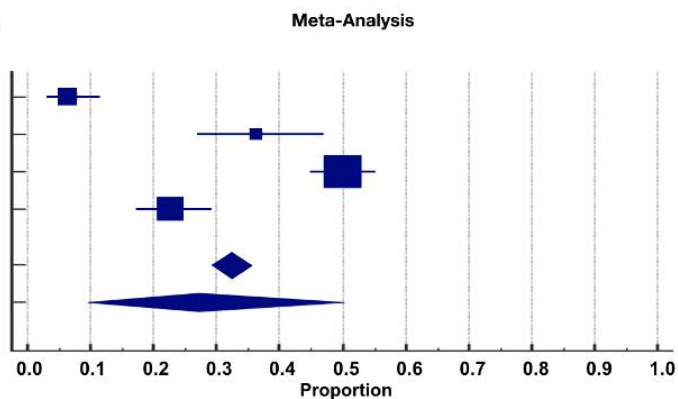
**Figure 4 - Meta-analysis of the prevalence by type of sport.**

**META-ANALYSIS BASKETBALL**

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Azodo et al 2011	156	6.410	3.116 to 11.473	18.56	24.96
Ferrari et al 2002	96	36.458	26.870 to 46.906	11.47	24.55
Frontera et al 2011	388	50.000	44.912 to 55.088	45.98	25.37
Perunski et al 2005	202	22.772	17.181 to 29.181	24.00	25.12
<b>Total (fixed effects)</b>	<b>842</b>	<b>32.247</b>	<b>29.105 to 35.514</b>	<b>100.00</b>	<b>100.00</b>
<b>Total (random effects)</b>	<b>842</b>	<b>27.267</b>	<b>9.454 to 50.086</b>	<b>100.00</b>	<b>100.00</b>

**Test for Heterogeneity**

Q	134.6163
DF	3
Significance level	P < 0.0001
I <sup>2</sup> (inconsistency)	97.77%
95% CI for I <sup>2</sup>	96.23 to 98.68

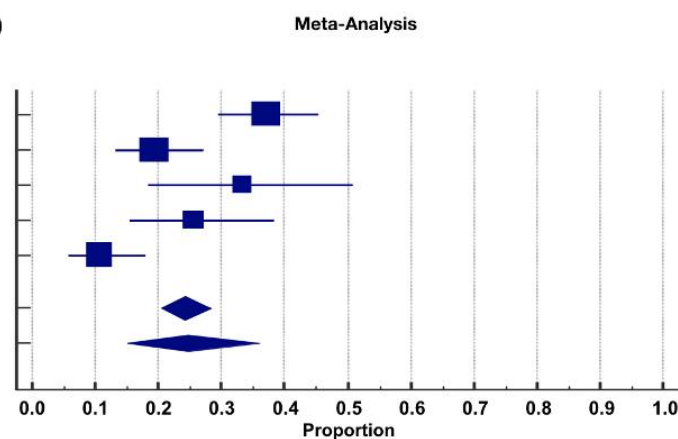


**META-ANALYSIS HANDBALL**

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Ferrari et al 2002	151	37.086	29.375 to 45.315	30.16	21.60
Gialain et al 2014	138	19.565	13.307 to 27.175	27.58	21.42
Kececi1 et al 2005	36	33.333	18.556 to 50.970	7.34	16.87
Kececi2 et al 2005	62	25.806	15.527 to 38.497	12.50	19.16
Lang et al 2002	112	10.714	5.660 to 17.968	22.42	20.95
<b>Total (fixed effects)</b>	<b>499</b>	<b>24.134</b>	<b>19.734 to 22.017</b>	<b>100.00</b>	<b>100.00</b>
<b>Total (random effects)</b>	<b>499</b>	<b>24.596</b>	<b>14.881 to 35.837</b>	<b>100.00</b>	<b>100.00</b>

**Test for Heterogeneity**

Q	29.4136
DF	4
Significance level	P < 0.0001
I <sup>2</sup> (inconsistency)	86.40%
95% CI for I <sup>2</sup>	70.38 to 93.76

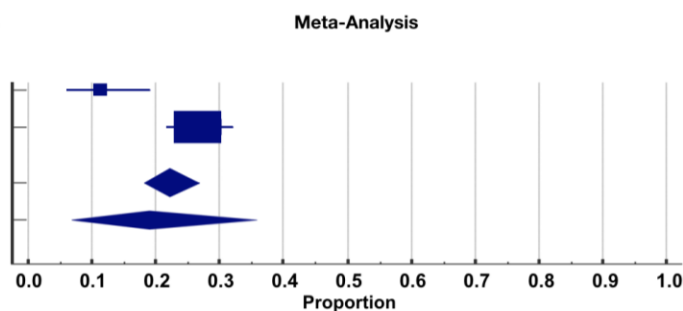


**META-ANALYSIS HOCKEY**

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Ferrari et al 2002	104	11.538	6.106 to 19.288	27.13	47.97
Praveena et al 2018	281	26.690	21.611 to 32.269	72.87	52.03
<b>Total (fixed effects)</b>	<b>385</b>	<b>22.302</b>	<b>18.251 to 26.783</b>	<b>100.00</b>	<b>100.00</b>
<b>Total (random effects)</b>	<b>385</b>	<b>19.070</b>	<b>6.823 to 35.623</b>	<b>100.00</b>	<b>100.00</b>

**Test for Heterogeneity**

Q	11.2385
DF	1
Significance level	P = 0.0008
I <sup>2</sup> (inconsistency)	91.10%
95% CI for I <sup>2</sup>	68.39 to 97.50

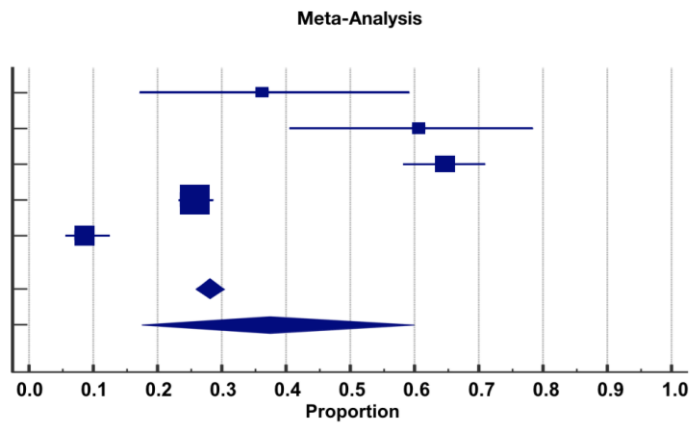


**META-ANALYSIS RUGBY**

Study	Sample size	Proportion (%)	95% CI	Weight (%) Fixed	Weight (%) Random
Chapman et al 1989	22	36.364	17.198 to 59.342	1.36	18.15
Chapman et al 1985	28	60.714	40.577 to 78.496	1.71	18.72
Ilija et al 2014	225	64.889	58.265 to 71.114	13.32	20.92
Muller-Bolla et al 2013	1140	25.965	23.441 to 28.614	67.24	21.22
Schildknecht et al 2012	277	8.664	5.630 to 12.617	16.38	20.99
<b>Total (fixed effects)</b>	<b>1692</b>	<b>28.011</b>	<b>25.885 to 30.214</b>	<b>100.00</b>	<b>100.00</b>
<b>Total (random effects)</b>	<b>1692</b>	<b>37.368</b>	<b>17.459 to 59.827</b>	<b>100.00</b>	<b>100.00</b>

**Test for Heterogeneity**

Q	218.3427
DF	4
Significance level	P < 0.0001
I <sup>2</sup> (inconsistency)	98.17%
95% CI for I <sup>2</sup>	97.19 to 98.81



**META-ANALYSIS SOCCER**

Study	Sample size	Proportion (%)	95% CI	Weight (%) Fixed	Weight (%) Random
Dursun et al 2015	983	1.526	0.857 to 2.504	77.42	50.22
Ferrari et al 2002	286	23.077	18.321 to 28.400	22.58	49.78
<b>Total (fixed effects)</b>	<b>1269</b>	<b>4.379</b>	<b>3.321 to 5.653</b>	<b>100.00</b>	<b>100.00</b>
<b>Total (random effects)</b>	<b>1269</b>	<b>9.492</b>	<b>0.309 to 39.738</b>	<b>100.00</b>	<b>1269</b>

**Test for Heterogeneity**

Q	125.9055
DF	1
Significance level	P < 0.0001
I <sup>2</sup> (inconsistency)	99.21%
95% CI for I <sup>2</sup>	98.50 to 99.58

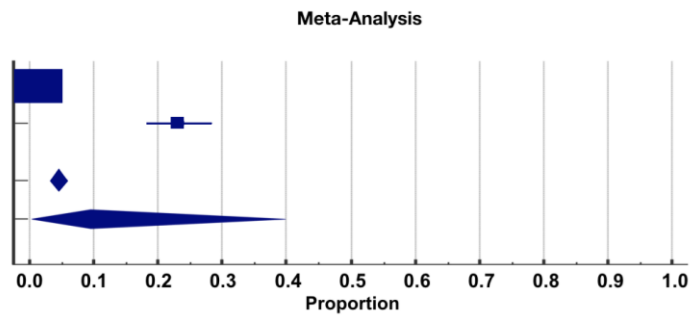
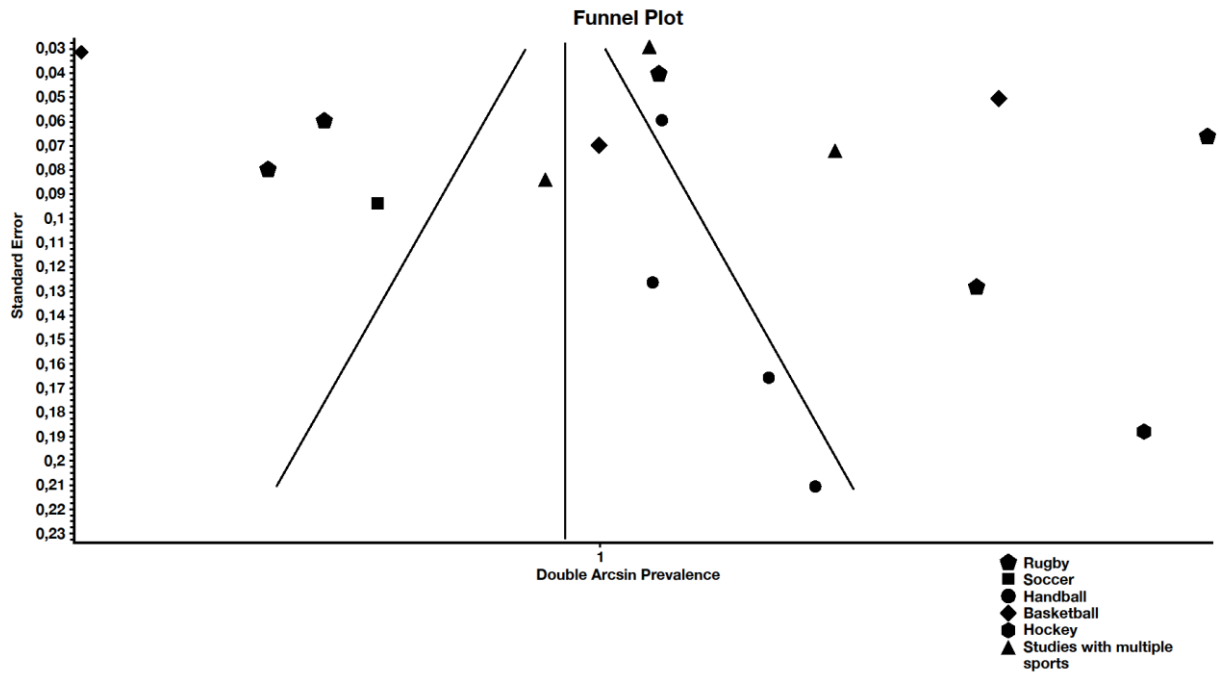


Figure 5 - Funnel plot.



**Table 1** - Summary of descriptive characteristics of the included articles (n=17).

STUDY CHARACTERISTICS		POPULATION		SPORT CHARACTERISTICS		OUTCOME CHARACTERISTICS	
Author, Year (Country)	Setting	Size	Mean age (years ± SD)	Type of sport (n)	Sports level (n)	Prevalence per type of dentofacial trauma (n/%)	Overall prevalence of dentofacial trauma (n/%)
Azodo <i>et al</i> , 2011 (United States)	Basketball teams at stadium, university and school	156	23.1± 4.8 years	Basketball	Amateur (96) Professional (60)	NS	10/6.4
Chapman, 1989 (Australia)	Rugby World Cup	22	29.7 years	Rugby	Professional	Circumoral laceration 1/4.5 Mandible injury 1/4.5 Dental injury 2/9 Dentoalveolar injury 2/9 Intraoral laceration 2/9	8/36.4
Chapman, 1985 (Australia)	Professionals Rugby Teams	28	24.1 years	Rugby	Professional	Dental injury 14/50 Lip injury 2/7.1 Tongue injury 1/3.6	17/60.7



Dursun <i>et al</i> , 2015 (Turkey)	Soccer Tournament	983	20 – 55	Soccer	Amateur (378)	Dental injury 7/0.7	15/1.5
					Professional (151)	Lip injury 1/0.1	
					No license (454)	Mandible injury 6/0.6 Tongue injury 1/0.1	
Ferrari & Ferreira De Medeiros 2002 (Brazil)	Official Competitions	637	18 – 30	Hockey (104)	Professional (NS) Semi- professional (NS)	Dental injury in Hockey 12/71.9	169/26.5
				Soccer (286)		Dental injury in Soccer 66/10.4	
				Basketball (96)		Dental injury in Basketball 35/5.5	
				Handball (151)		Dental injury in Handball 56/8.8	
Frontera <i>et al</i> , 2011 (Brazil)	São Paulo and Brazilian Championships	388	23.2 ± 5.11 years	Basketball	Professional	Avulsion 10/2.6	194/50.0
						Cheek injury 32/8.2	
						Dental injury 73/18.8	
						Extrusion 1/0.2	
						Gingival injury 17/4.4	
						Intrusion 22/5.7	
						Lip injury 103/26.5	
						Luxation 41/10.6	
						Mandible injury 39/10	
Tongue injury 41/10.6							

Gialain <i>et al</i> , 2014 (Brazil)	Amateur Handball Teams	138	21.4 years	Handball	Amateur	Dental injury 40/29	27/19.6
Hodson, 2009 (England)	Amateur Teams	60	18 - 25	Hockey (20) Rugby (20) Basketball (20)	Amateur	Dental injury 17/29 Lip injury 25/42	29/48
Ilia <i>et al</i> , 2014 (Australia)	Rugby Clubs	225	18 - 51	Rugby	Professional	Avulsion 15/6.7 Crown/root fracture 41/18.2 Dental loss 32/14.2 Dislocated jaw 10/4.4 Facial/mandibular fracture 23/10.2 Lacerations to lip, cheeks or tongue 115/51 Subluxation 20/8.9	146/64.9
Keceçi & Eroglu, 2005 (Turkey)	Professional Handball Teams	36	26.91 ± 4.67 years	Handball	Professional	Dental fracture 12/33.3	12/33.3
Keceçi <i>et al</i> , 2005 (Turkey)	Professional Handball Teams	62	24.36 ± 5.34 years	Handball (62)	Professional	Avulsion 2/3.2 Crown fracture 10/16.12 Luxation 4/6.45	16/25.8

Lang <i>et al</i> , 2002 (Germany)	Amateur and Semi-professional Leagues	112	27.05 ± 7.2 years	Handball	Amateur (64) Semi-professional (48)	Avulsion 4/3.6 Crown fracture 23/20.5 Luxation 5/4.6	12/10.7
Lieger & Von Arx 2006 (Switzerland)	National Leagues	186	26 years	Soccer (71) Handball (73) Basketball (42)	Professional	Avulsion 10/5.4 Dental fracture 68/36.5 Luxation 8/4.3 Mandible injury 2/1.1	71/38.1
Muller-Bolla <i>et al</i> , 2003 (France)	Professional Teams	1140	26.42 ± 3.93 years	Rugby	Professional	Bone and TMJ injury 83/7.3 Dental/periodontium injury 206/22.3 Soft tissue injury 36/3.2	296/26.0
Perunski <i>et al</i> , 2005 (Switzerland)	Amateur and Semi-professional Teams	202	25 years – Semi-professional Female 23.8 years – Semi-professional Male 24.7 years – Amateur Female 26.6 years –	Basketball	Amateur (100) Semi-professional (102)	Avulsion 11/5.4 Crown fracture 64/31.7 Combined injuries 5/2.5 Luxation 8/4	46/22.8

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Amateur Male

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Praveena <i>et al</i> , 2018 (India)	Amateur, Professional and Semi-professional Teams	281	32.7 ± 4.3 years	Field hockey	Amateur (55)	Cheek injury 28/38	75/34	
					Professional (95)	Lip injury 10/14		
					Semi- professional (131)	Dental injury 36/48		
Schildknecht <i>et al</i> , 2012 (Switzerland)	2010/2011 Season	277	27.8 Years - National league	Rugby	Professional	Avulsion 2/0.7	24/8.7	
			25.7 Years - Premier league			Crown fracture 19/6.9		
						Luxation 6/2.2		

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NR = Not Reported; NS = Not Separated

## APÊNDICE A – Data search strategy.

Database	Search query
<b>Embase</b>	<p data-bbox="389 456 1447 533">#1 = "prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence" OR "frequency" OR "frequencies" OR "epidemiology" OR "epidemiological"</p> <p data-bbox="389 562 1447 1144">#2 = "Facial injuries" OR "facial injury" OR "maxillofacial injuries" OR "maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "Facial Injuries" OR "facial injury"</p> <p data-bbox="389 1173 1447 1294">#3 = "basketball" OR "basketballs" OR "football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse"</p> <p data-bbox="389 1323 687 1357">#4 = #1 AND #2 AND #3</p>
<b>LILACS</b>	<p data-bbox="389 1406 1447 2029">(tw:("Prevalência" OR "predominio" OR "incidência" OR "prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence" OR "frequency" OR "frequencies" OR "epidemiology" OR "epidemiological")) AND (tw:("lesión maxilofacial" OR "lesiones faciales maxilo" OR "lesión facial maxilo" OR "trauma maxilofacial" OR "traumatismos maxilofaciales" OR "trauma facial maxilo" OR "traumatismos faciales maxilo" OR "fractura maxilofacial" OR "fracturas maxilofaciales" OR "fractura facial maxilo" OR "fracturas faciales maxilo" OR "trauma orofacial" OR "traumatismos orofaciales" OR "trauma orofacial" OR "lesión orofacial" OR "lesiones orofaciales" OR "lesión oro facial" OR "lesiones oro facial" OR "trauma dentofacial" OR "lesión dentofacial" OR "lesiones dentofaciales" OR "lesiones dento faciales" OR "lesión oral" OR "lesiones orales" OR "trauma oral" OR "lesión dental" OR "lesiones dentales" OR "trauma dental" OR "Traumas dentales" OR "lesiones dentoalveolares" OR "lesión dentoalveolar" OR "lesiones dentoalveolares" OR "lesión dentoalveolar" OR "trauma dentoalveolar" OR "trauma dentoalveolar" OR "fractura dentoalveolar" OR "fracturas dentoalveolares" OR</p>

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"dento fractura alveolar" OR "fracturas dento alveolares" OR "Lesões maxilo-facial" OR "lesões maxilo facial" OR "trauma maxilo-facial" OR "trauma maxilo-facial" OR "fraturas maxilofaciais" OR "trauma orofacial" OR "lesões orofacial" OR "lesões orofaciais" OR "trauma dental" OR " lesão dental" OR "lesão bucal" OR "lesões orais" OR "trauma bucal" OR "lesões dentárias" OR "lesões dentoalveolar" OR "lesão dentoalveolar" OR "fratura dentoalveolar" OR "fraturas dentárias" OR "fraturas dento alveolares" OR "Facial injuries" OR "facial injury" OR "maxillofacial injuries" OR "maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "Facial Injuries" OR "facial injury")) AND (tw:( "Basquete" OR "basquetebol" OR "baloncesto" OR "Handebol" OR "balonmano" OR "Futebol" OR "fútbol" OR "Futebol americano" OR "Fútbol americano" OR "Rúgbi" OR "rugby" OR "Hóquei de campo" OR "hockey" OR "Lacrosse" OR "basketball" OR "basketballs" OR "football" OR "footballs" OR "soccer" OR "soccers" OR "handball" OR "futsal" OR "basketball" OR "basketballs"))

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**LIVIVO** (prevalence OR prevalences OR occurrence OR frequency OR frequencies OR incidence OR epidemiology OR epidemiologic OR incidence OR incidences) AND ("maxillofacial trauma" OR "maxillofacial injury" OR "maxillofacial fracture" OR "maxillo-facial trauma" OR "maxillo-facial injury" OR "maxillo-facial fracture" OR "maxillofacial traumas" OR "maxillofacial injuries" OR "maxillofacial fractures" OR "maxillo-facial traumas" OR "maxillo-facial injuries" OR "maxillo-facial fractures" OR "orofacial trauma" OR "orofacial injury" OR "orofacial fracture" OR "orofacial traumas" OR "orofacial injuries" OR "orofacial fractures" OR "oro-facial traumas" OR "oro-facial injuries" OR "oro-facial fractures" OR "oro-facial traumas" OR "oro-facial injuries" OR "oro-facial fractures" OR "dental trauma" OR "dental injury" OR "dental fracture" OR "dental traumas" OR "dental injuries" OR "dental fractures" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial fracture" OR "dentofacial traumas" OR "dentofacial injuries" OR "dentofacial fractures" OR "dento-facial trauma" OR "dento-facial injury" OR "dento-facial fracture" OR "dento-facial traumas" OR "dento-facial injuries" OR "dento-facial fractures" OR "dentoalveolar trauma" OR "dentoalveolar injury" OR "dentoalveolar

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fracture" OR "dentoalveolar traumas" OR "dentoalveolar injuries" OR "dentoalveolar fractures" OR "dento-alveolar trauma" OR "dento-alveolar injury" OR "dento-alveolar fracture" OR "dento-alveolar traumas" OR "dento-alveolar injuries" OR "dento-alveolar fractures") AND ("football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse")

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**PubMed** #1 = "prevalence"[MeSH Terms] OR "prevalence" OR "prevalences" OR "Incidence"[Mesh] OR "Incidence" OR "Incidences" OR "occurrence" OR "frequency" OR "frequencies" OR "Epidemiology"[Mesh] OR "epidemiology"[Subheading] OR "epidemiology" OR "epidemiological"

#2 = "Facial Injuries"[MeSH Terms] OR "Facial injuries" OR "facial injury" OR "maxillofacial injuries"[MeSH Terms] OR "maxillofacial injuries" OR "maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "Facial Injuries"[MeSH Terms] OR "Facil Injuries" OR "facial injury"

#3 = "basketball"[MeSH Terms] OR "basketball" OR "basketballs" OR "football"[MeSH Terms] OR "football" OR "footballs" OR "Rugby" OR "soccer"[MeSH Terms] OR "soccer" OR "soccers" OR "hockey"[MeSH Terms] OR "hockey" OR "handball" OR "futsal" OR "basketball"[MeSH Terms] OR "basketball" OR "basketballs" OR "lacrosse"

#4 = #1 AND #2 AND #3

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**Scopus** ALL("prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence" OR "frequency" OR "frequencies" OR "epidemiology" OR "epidemiological") AND TITLE-ABS-KEY("Facial injuries" OR "facial injury" OR "maxillofacial injuries" OR "maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial

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trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures") AND TITLE-ABS-KEY("football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse")

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**SPORT Discuss** ("prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence") AND ("maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures") AND ("football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse")

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**Web of Science** TS=("prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence") AND TS=("maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures") AND TS=("football" OR "footballs" OR "Rugby" OR "soccer"

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OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs")

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### Grey Literature

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**Google Scholar** prevalence AND trauma AND "collective sports"

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**Open Grey** ("prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence") AND ("maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures") AND ("football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse")

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**Proquest** noft("prevalence" OR "prevalences" OR "Incidence" OR "Incidences" OR "occurrence" OR "frequency" OR "frequencies" OR "epidemiology" OR "epidemiological") AND noft("Facial injuries" OR "facial injury" OR "maxillofacial injuries" OR "maxillofacial injury" OR "maxillo facial injuries" OR "maxillo facial injury" OR "maxillofacial trauma" OR "maxillofacial traumas" OR "maxillo facial trauma" OR "maxillo facial traumas" OR "maxillofacial fracture" OR "maxillofacial fractures" OR "maxillo facial fracture" OR "maxillo facial fractures" OR "Orofacial trauma" OR "Orofacial traumas" OR "Oro facial trauma" OR "Orofacial injury" OR "Orofacial injuries" OR "Oro facial injury" OR "Oro facial injuries" OR "dentofacial trauma" OR "dentofacial injury" OR "dentofacial injuries" OR "dento facial injuries" OR "Oral injury" OR "Oral injuries" OR "Oral trauma" OR "Dental injury" OR "Dental injuries" OR "Dental trauma" OR "Dental Traumas" OR "dentoalveolar injuries" OR "dentoalveolar injury" OR "dento alveolar injuries" OR "dento alveolar injury" OR "dentoalveolar trauma" OR "dento alveolar trauma" OR "dentoalveolar fracture" OR "dentoalveolar fractures" OR "dento alveolar fracture" OR "dento alveolar fractures" OR "Facial Injuries" OR "facial injury") AND noft("basketball" OR "basketballs" OR "football" OR "footballs" OR "Rugby" OR "soccer" OR "soccers" OR "hockey" OR "handball" OR "futsal" OR "basketball" OR "basketballs" OR "lacrosse")

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## APÊNDICE B – Articles excluded and the reasons for exclusion (n=63).

Reference	Author	Reasons for Exclusion*
1.	Agbor <sup>3</sup> (2018)	2
2.	Amy <sup>51</sup> (2005)	2
3.	Andrade <sup>52</sup> (2010)	2
4.	Barbic <sup>53</sup> (2005)	3
5.	Beachy <sup>54</sup> (2004)	2
6.	Bemelmans <sup>55</sup> (2000)	8
7.	Bergman <sup>56</sup> (2017)	2
8.	Biagi <sup>11</sup> (2010)	2
9.	Bolhuis <sup>57</sup> (1987)	9
10.	Braham <sup>58</sup> (2004)	8
11.	Britto <sup>8</sup> (2009)	8
12.	Chapman <sup>59</sup> (1985)	8
13.	Chapman <sup>60</sup> (1993)	1
14.	Davies <sup>61</sup> (1977)	8
15.	Dilberovic <sup>62</sup> (2004)	2
16.	Durkin <sup>63</sup> (1977)	3
17.	Durkin <sup>64</sup> (1981)	3
18.	Levin <sup>65</sup> (2003)	8
19.	Faude <sup>66</sup> (2017)	2
20.	Flanders <sup>43</sup> (1995)	2
21.	Furlong <sup>67</sup> (2018)	2
22.	Gabbet <sup>68</sup> (2002)	3
23.	Galic <sup>69</sup> (2018)	2
24.	Garon <sup>70</sup> (1986)	2
25.	Gomez <sup>71</sup> (1996)	2
26.	Hawke <sup>72</sup> (1969)	2
27.	Hendrick <sup>73</sup> (2018)	2
28.	Ilhan <sup>74</sup> (2014)	2
29.	Jagger <sup>75</sup> (2010)	2

30.	Kvittem <sup>76</sup> (1998)	2
31.	Labella <sup>77</sup> (2002)	8
32.	Lésic <sup>78</sup> (2011)	2
33.	Leung <sup>79</sup> (2017)	3
34.	Ma <sup>13</sup> (2008)	9
35.	Maeda <sup>80</sup> (2006)	11
36.	Maestrello-De Moya <sup>81</sup> (1989)	2
37.	Mathur <sup>82</sup> (1981)	9
38.	Maxén <sup>83</sup> (2010)	2
39.	McFayden <sup>84</sup> (1998)	2
40.	Mcintosh <sup>85</sup> (2008)	3
41.	Merglová <sup>86</sup> (2014)	11
42.	Merglová <sup>87</sup> (2018)	2
43.	Mukherjee <sup>88</sup> (2012)	3
44.	Nonoyama <sup>89</sup> (2016)	1
45.	O'Malley <sup>90</sup> (2012)	2
46.	Ozbay <sup>91</sup> (2013)	2
47.	Pelaez <sup>92</sup> (2008)	3
48.	Petrovic <sup>93</sup> (2000)	2
49.	Ramírez <sup>94</sup> (2014)	9
50.	Re <sup>95</sup> (1984)	10
51.	Rodd <sup>96</sup> (1997)	2
52.	Sane <sup>15</sup> (1988)	1
53.	Schwenzer <sup>97</sup> (2000)	8
54.	Seifert <sup>98</sup> (2014)	2
55.	Singh <sup>99</sup> (2014)	2
56.	Snellman <sup>100</sup> (2001)	3
57.	Souza <sup>101</sup> (2014)	2
58.	Tanaka <sup>102</sup> (1992)	11
59.	Tiryak <sup>103</sup> (2017)	8
60.	Tsuchiya <sup>104</sup> (2017)	2
61.	Vucic <sup>12</sup> (2016)	8
62.	Zaleckiene <sup>105</sup> (2014)	10
63.	Zuashkiani <sup>106</sup> (2001)	11

Reasons for exclusion:

- 1) Samples composed only by trauma patients attending medical centers or hospitals;
- 2) Samples composed by patients under 18 years old;
- 3) Studies that did not investigate dentofacial trauma;
- 4) Studies that did not evaluate injuries related to collective contact sports
- 5) Studies that evaluate prevalence of dentofacial injuries among winter sports practitioners
- 6) Studies that evaluate prevalence of dentofacial injuries among water sports practitioners.
- 7) Studies reporting only annual incidences of dentofacial trauma;
- 8) Studies that did not provide information for calculating prevalence;
- 9) Studies without enough data;
- 10) Abstracts only, systematic reviews, case-reports, case series protocols, personal opinions, letters, and posters, in vitro, in vivo;
- 11) Studies that were not written in the Latin-Roman alphabet.

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## APÊNDICE C – 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.	17
<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.	9
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	18
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	18
<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.	19
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.	19
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.	19
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	20
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).	20
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.	20
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	20

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	21
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	21
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.	21
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	21
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	22
<b>RESULTS</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	22
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	22
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	23
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	24
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	24
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	25
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	25
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	25
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	25
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	26
<b>FUNDING</b>			



Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	27
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## APÊNDICE D – PROSPERO

### 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 PI(E)COS 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 dentofacial injuries in contact sports players: a systematic review and meta-analyses

#### 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. 30/07/2018

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

Give the date by which the review is expected to be completed. 30/06/2019

#### 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: No

<b>Review stage</b>	<b>Completed</b>
Preliminary searches	Yes
Piloting of the study selection process	Yes
Formal screening of search results against eligibility criteria	Yes
Data extraction	Yes
Risk of bias (quality) assessment	Yes
Data analysis	Yes

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalized).

#### **6. \* Named contact.**

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

Mariana Oliveira Werlich

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

Give the electronic mail address of the named contact.

mariwerlichodonto@gmail.com

## **8. Named contact address**

**PLEASE NOTE this information will be published in the PROSPERO record so please do not enter private information**

Give the full postal address for the named contact.

## **9. Named contact phone number.**

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

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

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

Federal University of Santa Catarina.

## **11. \* Review team members and their organizational affiliations.**

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

Miss Mariana Oliveira Werlich. Brazilian Centre for Evidence Based Research of the Federal University of Santa Catarina (UFSC)

Miss Lia Rosana Honnef. Brazilian Centre for Evidence Based Research of the Federal University of Santa Catarina (UFSC)

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Professor Ana Luiza Curi Hallal. Department of Public Health of the Federal University of Santa Catarina (UFSC)

Professor Graziela De Luca Canto. Brazilian Centre for Evidence Based Research of the 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.

#### **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 organizations 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 dentofacial injuries among collective contact sports practitioners?

#### **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 electronic databases: Embase, Latin American and Caribbean Health Sciences (LILACS), PubMed, Scopus, Web of Science, Sport Discuss and LIVIVO. Furthermore, a grey literature search will be conducted on Google Scholar, OpenGrey, and ProQuest. No publication time or gender restrictions will be applied.

#### **17. URL to search strategy.**

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.

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.

Dentofacial injuries are considered a public health problem and vary from minor to complex injuries among competitive and recreational athletes worldwide. The consequences of dentofacial injuries are substantial because of the potential for pain, emotional distress, psychological impact, and economic implications. Dentofacial injuries occur in high rate in collective contact sports, partly due to the prominence of the face, the use of a projectile and relatively poor adherence to personal protective equipment use in some of the modalities. The prevalence, nature, severity and impact of these injuries vary with geographical location, age group, gender, professionalism of the athletes, personal protective equipment use, types, nature and organization of the sports.

#### **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.

Collective contact sports adults practitioners (recreational, amateur, semi-

professional, and professional collective contact sports players).

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

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

\* Measures of effect

Prevalence Meta-analyses

**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

1. Most frequent types of dentofacial injuries;
2. Most frequent sports associated with dentofacial injuries.

\* Measures of effect

Prevalence Meta-analyses

## **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.

Three independent reviewers (1R, 2R, 3R) will collect data from the selected articles. Subsequently, the retrieved information will be crosschecked. Any disagreement will be discussed between them and the fourth reviewer (4R). The following data will be extracted and recorded in duplicate by two reviewers for each included study: author; year of publication; country; characteristics of the participants (n, age); outcome measure(s); 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 a quantitative synthesis is appropriate, a method of proportion meta-analysis will be performed using the MedCalc

Statistical Software version 14.8.1 (MedCalc Software, Ostend, Belgium).



Heterogeneity will be assessed using the Q test and I<sup>2</sup> statistics. A fixed or random effects model will be applied, based on the heterogeneity values detected, and a value greater than 50% will be considered as an indicator of substantial heterogeneity between studies, applying random effect.

### **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.

If applicable, we will classify into subgroups based on use of mouthguard, type of sport and type of injury.

### **30. 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 an English language summary.

### **31. \* 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

### **32. Other registration details.**

Give the name of any organization 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.

### **33. Reference and/or URL for published protocol.**

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

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

#### **34. 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

#### **35. 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.

Evidence-based dentistry; prevalence; maxillofacial injuries; sports; systematic review.

#### **36. 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.

#### **37. \* Current review status.**

Review status should be updated when the review is completed and when it is published. For new registrations the review must be Ongoing.

Review\_Completed\_published

#### **38. Any additional information.**

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

#### **39. 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.

#### **4. CAPÍTULO 3**

##### **CONSIDERAÇÕES FINAIS**

A prevalência geral de lesões dentofaciais entre os participantes dos esportes de contato foi de aproximadamente 30%. O rugby teve a maior prevalência de lesões dentofaciais. A lesão mais comum foi a lesão dentária. A maioria dos estudos mostrou baixo ou moderado risco de viés.

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## ANEXO 1 – ATA DA DEFESA



UNIVERSIDADE FEDERAL DE SANTA CATARINA  
CENTRO DE CIÊNCIAS DA SAÚDE  
CURSO DE ODONTOLOGIA  
DISCIPLINA DE TRABALHO DE CONCLUSÃO DE CURSO DE ODONTOLOGIA

### ATA DE APRESENTAÇÃO DO TRABALHO DE CONCLUSÃO DE CURSO

Aos 10 dias do mês de Julho de 2020, às 9 horas, em sessão pública no Link: <https://conferenciaweb.rnp.br/webconf/tcc-do-curso-de-graduacao-em-odontologia-ufscsala-2> desta Universidade, na presença da Banca Examinadora presidida pela Professora Graziela De Luca Canto

e pelos examinadores:

1 – Prof<sup>o</sup>. Dr<sup>a</sup>. Michele Bolan,

2 – Prof<sup>o</sup>. Dr<sup>a</sup>. Carla Massignan,

a aluna Mariana Oliveira Werlich

apresentou o Trabalho de Conclusão de Curso de Graduação intitulado:

“Prevalência de injúrias dentofaciais em esportes de contato: uma revisão sistemática e meta-análise.”

como requisito curricular indispensável à aprovação na Disciplina de Defesa do TCC e a integralização do Curso de Graduação em Odontologia. A Banca Examinadora, após reunião em sessão reservada, deliberou e decidiu pela aprovação do referido Trabalho de Conclusão do Curso, divulgando o resultado formalmente ao aluno e aos demais presentes, e eu, na qualidade de presidente da Banca, lavrei a presente ata que será assinada por mim, pelos demais componentes da Banca Examinadora e pelo aluno orientando.



Documento assinado digitalmente

Graziela de Luca Canto  
Data: 13/07/2020 09:11:31-0300  
CPF: 573.310.659-04

Presidente da Banca Examinadora



Documento assinado digitalmente

Carla Massignan  
Data: 13/07/2020 14:33:22-0300  
CPF: 944.935.539-87

Examinador 1



Documento assinado digitalmente

Michele da Silva Bolan  
Data: 13/07/2020 09:39:01-0300  
CPF: 003.373.599-97

Examinador 2



Documento assinado digitalmente

Mariana Oliveira Werlich  
Data: 15/07/2020 19:04:04-0300  
CPF: 095.024.579-86

Aluno

## **ANEXO 2 – NORMAS DA REVISTA**

### **Main Text File**

Do not use any sub-headings within the above sections.

The text in the main document should be double-spaced.

Figures and supporting information should be supplied as separate files.

### **Abstract**

The abstract is limited to 300 words in length and should contain no abbreviations. The abstract should convey a brief background statement plus the essential purpose and message of the paper in an abbreviated form. For Original Scientific Articles, the abstract should be structured with the following headings: Background/Aim, Material and Methods, Results, and Conclusions.

### **Keywords**

Please provide 3-6 keywords. Keywords should be carefully chosen to ensure they reflect the content of the manuscript.

### **References**

All references should be numbered consecutively in order of appearance and should be as complete as possible. In text citations should be superscript numbers. Journal titles must be abbreviated.

Submissions are not required to reflect the precise reference formatting of the journal (use of italics, use of capital letters, bold etc.). However it is important that all key elements of each reference are included.

The style is: Vancouver Reference Style Guide.