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Awareness of Football Players about Dental Injuries and the Prevention Role of Mouthguards

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ABSTRACT

Aims This study evaluated semi-professional football players' awareness of dental injuries and prevention, focusing on mouthguard use and its association with injury experience, with the aim of proposing new guidelines for enhanced prevention strategies.

Instrument & Methods This cross-sectional survey of 212 male players with a mean age of 22.5±2.5 years covered demographics, injury history, emergency procedures (including tooth replantation), and mouthguard usage. The questionnaire used assessed the level of awareness of dental injuries and their prevention among football players. Data were analyzed using descriptive statistics and chi-square tests.

Findings Only 59.90% of participants knew about tooth replantation, with just 14.15% identifying the 60-minute critical window. While 69.34% recognized the importance of immediate action, mouthguard use was extremely low (4.25%). The main reasons for non-use were perceived unnecessity (41.98%), communication issues (23.11%), and breathing difficulties (19.81%). Only 5.19% of participants reported organized team dental care. Players with injury experience showed higher awareness and a greater inclination toward mouthguard use.

Conclusion Football players have insufficient awareness of dental injury prevention and very low mouthguard use.

Keywords Tooth Injuries; Mouth Protectors; Soccer; Primary Prevention; Education

CITATION LINKS

[1] Traumatic dental injuries resulting from sports activities; Immediate treatment ... [2] Impact of dental and orofacial trauma on oral health-related quality ... [3] IADT guidelines for the management of traumatic ... [4] Evidence-based review ... [5] Oro-dental trauma burden and mouthguard usage among ... [6] Traumatic dental injury and oral health-related quality of life ... [7] Oral health of elite athletes and association ... [8] Knowledge and attitudes about sports-related dental injuries and mouthguard ... [9] Prevalence of sports-related dental injuries ... [10] Clinical factors and socio-demographic characteristics associated ... [11] Incidence of crown fracture and risk factors in the ... [12] Prevalence of dental injuries and awareness ... [13] Epidemiology and outcomes of ... [14] Mouthguard use in youth ice hockey and the risk ... [15] Sports dentistry ... [16] Mouthguards in sport activities: History, physical ... [17] Evaluation of knowledge, awareness ... [18] Comprehensive comparison of protective ... [19] Effects of mouthpiece use on airway ... [20] EMG analysis of concurrent ... [21] Physiological responses of a jaw-repositioning ... [22] Knowledge and self-assessment ... [23] The use of mouthguards and prevalence of dento-alveolar ... [24] Sport dentistry: Brazilian athletes' ... [25] Effects of a customized over-the-counter mouth guard on ... [26] Sport-related dental trauma and mouthguard ... [27] Perceptions of the mouthguard in basketball, rugby ... [28] Knowledge and prevalence of trauma and impact ... [29] Prevalence of dental trauma and mouthguard ... [30] Dental trauma and mouthguard usage ... [31] Effect of a single dental health education on management of permanent ... [32] Traumatic injuries to teeth in Swedish ... [33] International association of dental traumatology guidelines ... [34] Importance of knowledge of the management of ... [35] Impacts of educational interventions on knowledge of prevention and emergency management ... [36] Knowledge of traumatic dental injuries and mouthguard behavior ... [37] Survey on the occurrence of dental trauma and preventive strategies among Brazilian ... [38] Level of information concerning ...

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Introduction

Dental injuries represent a significant problem in sports, particularly in contact disciplines, and can have long-term consequences for athletes' oral health [1, 2]. The most common types of dental injuries in sports include crown fractures, luxations, and avulsions, with prompt intervention being crucial for tooth preservation [3]. In addition to aesthetic and functional consequences, these injuries can have long-term psychological effects and often require permanent dental treatments [4], which may affect overall quality of life [5] and significantly impact oral health-related quality of life [6]. The oral health of athletes influences their performance and general well-being. Studies indicate a high prevalence of caries, dental erosion, and periodontal diseases among athletes, further emphasizing the need for prevention [7]. Research also points to mobility issues as a consequence of luxation in children [8, 9] and shows that children with a history of dental injuries are at greater risk for recurrent injuries, underscoring the importance of systematic education and protective measures, such as mouthguards [10-12], to avoid significant material costs [13].

Mouthguards have long been promoted as an effective means of reducing the frequency of orofacial injuries and concussions [14]. Today, there are three main types of mouthguards: standard, "boil-and-bite" adapted to the oral cavity, and custom-fitted mouthguards tailored to the individual, which provide optimal protection [4, 15]. Custom-fitted, multi-layered mouthguards exhibit better impact absorption and reduce pressure compared to stock models. The individualized design of a custom mouthguard enables coverage of both the upper and lower teeth, thereby reducing stress and enhancing bone protection [16-18]. For soft tissues, a custom-fitted mouthguard offers superior protection, while a stock mouthguard may increase stress on the temporomandibular joints and ligaments. An improperly fitted stock mouthguard can further trigger jaw movements, reducing its protective effect; thus, a stock mouthguard is not an adequate substitute for a custom-fitted one, as it may cause more damage than having no protection at all [18]. Moreover, ill-fitting mouthguards may diminish comfort and ventilation, whereas custom models allow for better airflow and reduce muscular strain, potentially enhancing athletic performance [19, 20].

Despite the proven reduction in dental injuries, many athletes avoid mouthguards due to discomfort [21, 22], the belief that they impair performance [21], difficulties in breathing and speaking [21, 23, 24], perceptions of their unnecessary nature [25-27], a lack of recommendations from coaches, and, for new users, the potential to trigger a gag reflex [27]. It is also important to note that among amateurs and semi-professionals, the cost of custom-fitted mouthguards can be a barrier to their use [23, 27, 28]. In football, although contact with opponents is less frequent than in combat sports, studies indicate that dental injuries still occur. Research conducted among football players in various countries shows that the percentage of mouthguard use is extremely low; among amateur football players in Ankara, only 2.9% used mouthguards [29], while only 8.7% of football players in Saudi Arabia [26] and just 35.64% of athletes in Brazil use them [24]. Furthermore, the perception that football is not a high-risk sport for dental injuries further contributes to the low level of prevention [30].

Education on the prevention of dental injuries is crucial for athletes of all ages. Studies show that educational programs targeting athletes, coaches, and parents can reduce the incidence of injuries and increase the use of mouthguards [23, 28, 31]. Such programs should be tailored to the specific needs of athletes and promote the use of high-quality, custom-fitted mouthguards to safeguard their health and safety [32, 33]. Informative campaigns via television, newspapers, the internet, and the distribution of brochures and posters can be effective in preventing traumatic dental injuries. Athletes should know how to apply first aid, such as attempting to replant an avulsed tooth or storing it in milk, and collecting fragments of a broken tooth before seeking dental care. Clearly and simply explained posters can attract attention and reinforce their knowledge [4]. One of the most common and serious injuries is tooth avulsion, which requires prompt intervention. According to the International Association of Dental Traumatology (IADT), replantation of an avulsed tooth should be performed within one hour after the injury to ensure the best possible prognosis [33]. Furthermore, replantation within 30 minutes offers a 90% chance of success, whereas the likelihood of long-term tooth retention becomes negligible after two hours [34]. Despite these guidelines, research shows that athletes are often unaware of the proper emergency procedures, and many are not familiar with preventive measures [8, 17, 22, 23, 28, 30, 35, 36]. These findings highlight the importance of education and awareness regarding emergency procedures among athletes and their teams.

The aim of this study was to investigate the level of awareness regarding dental injuries and their prevention among semi-professional football players and to examine the frequency of mouthguard use during training and competition. The study also assessed the association between injury frequency, players' positions, and the organization of dental care within football teams.

Instrument and Methods

Design and sample

This cross-sectional survey involved 212 male football players with an average age of 22.5±2.5 years. The youngest participant was 17 years old,

while the oldest was 32 years old, with the most common age (mode) being 22, which appeared 40 times. The participants were volunteers, and the research was conducted in Osijek between September and December 2024 during regular training sessions and competitions.

Instrument

A researcher-made questionnaire on the level of awareness of dental injuries and their prevention among football players was developed considering questionnaires used in previous relevant studies [37, 38].

The comprehensibility of the questions in the questionnaire was checked before conducting the research by interviewing 20 respondents. It consisted of 16 questions organized into several thematic sections: demographic data, experiences with dental injuries, questions regarding whether the participant witnessed or personally experienced a dental injury, the types of injuries that occurred, and the frequency of such incidents, as well as awareness of dental injuries, knowledge and use of mouthguards, questions about the awareness of the existence of mouthguards, their types, recommendations for use, personal usage, and the organization of dental care within the team. The types of questions included in the questionnaire consisted of dichotomous questions (e.g., yes/no) and multiple-choice questions.

Data collection

The research was conducted in accordance with ethical guidelines, with full respect for the privacy and voluntary participation of the respondents. The participants were informed about the purpose of the research and their right to withdraw at any time without consequences.

Data were collected in physical form during training sessions and competitions, with prior information provided to the participants about the purpose of the research and assurances of anonymity. The questionnaires were completed in the presence of the researchers to ensure the accuracy of the responses and to avoid misunderstandings.

Data analysis

Chi-square tests were used to examine the associations between parameters, with the significance level set at $p<0.01$. The data were processed using Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and TIBCO Statistica (TIBCO Software Inc., Palo Alto, CA, USA).

Findings

Most respondents (69.34%) were aware of the importance of immediate action for a successful outcome following a dental injury, while 30.66% were not aware of this need. The data show that 59.90% of respondents knew that an avulsed tooth can be replanted, whereas 40.10% were not familiar with this possibility.

Table 1. Frequency of Awareness and Knowledge of Dental Injuries and Their Prevention and Relationship with Injury Experience Among Football Players

Parameter	Possible Answers	Total	Seen/Experienced	Not Seen	P-Value
Have you ever seen a dental injury in a soccer player?	Yes	39 (18.40)	-	-	-
	No	173 (81.60)	-	-	-
If yes, what kind of dental injury?	Avulsion	9 (4.25)	-	-	-
	Dental fracture	16 (7.55)	-	-	-
	Dislocation	7 (3.30)	-	-	-
	Other	7 (3.30)	-	-	-
How many times did you presence a dental injury on players?	None	173 (81.60)	-	-	-
	Once	22 (10.38)	-	-	-
	Twice to 4 times	17 (8.02)	-	-	-
What's the players' position that they suffered dental trauma?	Goalkeeper	3 (1.42)	3 (11.5)	21 (11.3)	0.18
	Central defender	5 (2.36)	3 (11.5)	36 (19.4)	
	Full-back	4 (1.89)	3 (11.5)	28 (15.1)	
	Defensive midfielder	9 (4.25)	9 (34.6)	26 (14.0)	
	Offensive midfielder	4 (1.89)	4 (15.4)	45 (24.2)	
	Forward	14 (6.60)	4 (15.4)	30 (16.1)	
Do you know that it is possible to replant an avulsed tooth?	Yes	127 (59.90)	23 (59.0)	104 (60.1)	0.89
	No	85 (40.10)	16 (41.0)	69 (39.9)	
Are you aware that immediate action is essential for a successful outcome?	Yes	147 (69.34)	24 (61.5)	123 (71.1)	0.24
	No	65 (30.66)	15 (38.5)	50 (28.9)	
Do you know a mouthguard?	Yes	133 (62.74)	30 (76.9)	103 (59.5)	0.04
	No	79 (37.26)	9 (23.1)	70 (40.5)	
Do you recommend the wear of mouthguards to your team athletes?	Yes	16 (7.55)	13 (33.3)	32 (18.5)	0.04
	No	167 (78.77)	26 (66.7)	141 (81.5)	
	Only for somebody	29 (13.68)	-	-	-
Do you wear a mouthguard?	Yes	9 (4.25)	4 (10.3)	5 (2.9)	0.03
	No	203 (95.75)	35 (89.7)	168 (97.1)	
If not, why?	Communication	49 (23.11)	-	-	-
	Breathe	42 (19.81)	-	-	-
	Aesthetics	5 (2.36)	-	-	-
	Not necessary	89 (41.98)	-	-	-
	Others	18 (8.50)	-	-	-
The health department of your team has a dentistry department?	Yes	11 (5.19)	2 (7.7)	9 (4.8)	0.54
	No	201 (94.81)	24 (92.3)	177 (95.2)	

Regarding the timeframe within which replantation must be performed, the majority of respondents (52.36%) did not know the correct answer, and only 14.15% indicated the correct 60-minute window. An extremely small percentage of respondents reported using protective mouthguards (Chi-square test, $p<0.01$)—only 4.25%—while 95.75% did not. The most frequently cited reason (Chi-square test, $p<0.01$) was the perception that protection was unnecessary (41.98%), followed by communication difficulties (23.11%) and breathing problems (19.81%).

According to the results, 18.40% of respondents had witnessed a dental injury, while 12.30% had experienced one themselves. The most common form of injury was dental fractures (7.55%), whereas avulsions and dislocations occurred less frequently (4.25% and 3.30%, respectively). Players in positions with a higher risk—such as forwards (6.60%) and defensive midfielders (4.25%)—reported injuries more often. Only 5.19% of respondents reported that their team had an in-house dental department, while the majority (94.81%) did not have access to such support. Respondents who had witnessed a dental injury exhibited a higher level of awareness. Those who had witnessed or experienced a dental injury were significantly more likely to use mouthguards (10.30% versus 2.90%; $p=0.03$) and more likely to recommend their use to teammates (33.30% versus 18.50%; $p=0.04$; Table 1).

Discussion

This study investigated the level of awareness regarding dental injuries and their prevention among semi-professional football players and to examine the frequency of mouthguard use during training and competition. A significant portion of respondents (59.90%) knew that an avulsed tooth can be replanted; however, most were unaware of the time limit necessary for successful replantation, with only 14.15% indicating the correct 60-minute window. This suggests the need for improved education, as highlighted in the literature [28, 33], which emphasizes the crucial role of knowledge and timely action in preserving dental health. Players who had witnessed a dental injury exhibited a higher level of awareness, although the differences were not statistically significant.

Even though most respondents (69.34%) recognized the importance of immediate action, the differences between those who had witnessed injuries and those who had not were not significant.

This finding underlines the need for systematic education, especially given the lack of accurate information regarding the timeframe for replantation. The literature [4, 33] emphasizes education as a key element in preventing tooth loss, as studies consistently show that athletes generally possess insufficient knowledge about both the prevention and management of injuries [8, 17, 22, 23, 28, 30, 35, 36].

The very low usage rate of mouthguards (4.25%) indicates that the main reasons for not using them were the perception that mouthguards are unnecessary (41.98%), communication difficulties (23.11%), and breathing problems (19.81%). These results correspond with previous studies that identify practical obstacles as key factors for not using mouthguards [21-27]. However, these issues could be alleviated by the broader adoption of custom-fitted mouthguards that offer better ventilation and comfort [18, 19]. For example, according to the regulations of most boxing organizations, wearing a mouthguard is mandatory. In contrast, while wearing mouthguards in rugby is not mandatory according to the rules of the game, it is highly recommended. Many leagues, especially at the professional level, either encourage or require the use of mouthguards to reduce the risk of dental and other injuries during matches.

In addition to preventing the physical and psychological consequences of dental injuries, the use of mouthguards also yields economic benefits. For example, when comparing the costs of services at private dental clinics in Croatia, depending on the chosen type of mouthguard, composite fillings can be between 1.2 and 24.7 times more expensive, while root canal treatments can be between 2.9 and 44.9 times more expensive than the investment in a mouthguard. Considering this data, investing in a mouthguard represents a significant saving relative to the potential costs of dental treatments required for injuries that could be prevented by its use.

Given that 18.40% of respondents had witnessed a dental injury and 12.30% had experienced one themselves, the presence of dental trauma among football players was observed. The most common injuries included dental fractures (7.55%), which is consistent with the findings of other studies [17, 24, 26]. Players in positions with a higher risk, such as forwards, showed a higher incidence of injuries, which emphasizes the importance of tailoring preventive measures for players at increased risk. Most teams did not have organized dental care (94.81%). According to the literature [28], the presence of dental professionals within sports teams is associated with a higher level of awareness and use of protective equipment. Implementing such care could significantly improve prevention and emergency response.

Respondents who had experienced or witnessed a dental injury were more likely to use mouthguards and to recommend their use. This finding is consistent with previous research [23, 28], which indicates that direct experience with injuries enhances awareness of the importance of prevention. Although differences in awareness regarding tooth replantation were not statistically significant, the

higher level of awareness among those with injury experience suggests that education based on real cases could have a strong preventive effect.

Our study has several limitations that must be considered when interpreting the results. First, the sample consisted exclusively of 212 male football players, which limits the generalizability of the findings to a broader population of athletes, including female players and athletes from other sports. Second, the use of a structured questionnaire as the primary data collection instrument may be subject to self-report bias, potentially affecting the accuracy of the responses. Third, the cross-sectional design of this study allowed for the identification of associations between parameters but did not establish causal relationships. Finally, as this research was conducted within a specific geographic region, the applicability of the results to other regions or sports contexts may be limited.

Knowledge about tooth replantation was limited, and mouthguard use was extremely low, primarily due to discomfort and the perception that they are unnecessary. Players in high-risk positions reported more injuries, while organized dental care within teams was almost absent. Educational programs, the promotion of custom-fitted mouthguards, and better integration of dental care in sports are essential to improving prevention. Based on these findings, it is recommended to implement educational programs for football players, coaches, and healthcare personnel on the importance of preventing dental injuries, the proper use of mouthguards, and tooth replantation, Promote the use of custom-fitted mouthguards through subsidies and by raising awareness of their advantages, organize dental care within sports teams to improve preventive measures and emergency responses in the event of dental injuries, and conduct further research focused on identifying additional barriers to the adoption of preventive measures and evaluating the effectiveness of educational interventions.

Conclusion

The awareness and preventive practices regarding dental injuries is insufficient among football players.

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