

Evaluating the knowledge of sports participants regarding dental emergency procedures in national sports university, Imphal

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Abstract

Objective

To assess awareness of sports players regarding the emergency management of sports injuries in oro-facial region.

Methods

This study included 229 adolescent athletes who competed in four different sports (boxing (n = 59), karate (n = 58), taekwondo (n = 57), and football (n = 55). The researchers employed a standardized questionnaire to determine the frequency of orofacial and dental injuries. Athletes' behaviors regarding the wearing of mouthguards were also investigated. The players of National Sports University, Imphal were given a self-administered, validated online questionnaire based on their knowledge of the emergency

management of traumatized teeth. The information gathered was tallied and statistically examined.

Results

The participants' average age was 12.93.2 years, and their average playing experience was 4.83.1 years. 58 athletes (25.3 percent) had orofacial injury, whereas 31 athletes (13.5 percent) suffered dental injury. Water polo (18.6 percent), karate (17.2%), and football (21.8 percent) all had a higher prevalence of oral injuries than taekwondo (3.5 percent) (P=0.035). Although the majority of participants were aware of mouthguards for oral trauma prevention and believed they were effective in reducing dental injuries during sports activities, only 94 (41%) of them utilized them. There was a statistically significant difference in the use of mouthguards between taekwondo (73.7%) and karate (70.7%) players compared to football (14.5%) and water polo players (5.1%) (P<0.001).

Conclusions

Dental trauma was as common in football and boxing as karate, a high-risk martial art sport. As a result, the classification of sports based on the risk of dental damage needs to be revisited. Making mouthguards mandatory in all high-risk sports, as well as those with a medium risk of dental injuries, would be advantageous.

Keywords

Sports University, Sports, Dentistry, Trauma,

Introduction

Dental trauma during sports is the major associated factor which links dentistry and sports. This is one of the most recent and evolving dental sectors. Sports dentistry is the treatment of sporting oral / facial injuries and associated oral disorders and manifestations. It has two main components: first to treat orofacial injuries and second to avoid sport-related orofacial injuries.¹

Sports dentistry is the branch of dental sciences include prevention, protection and clinical management of oral and maxillofacial region of athletes and sports active members, it also deals with the safety precautions towards orofacial region and its disorders. Hence precaution, prevention and safety measures are the key factors in avoiding oral and maxillofacial injuries.² For all sports, particularly contact, it is normal for children to get injured, with face being the principal area of injury. As dentists, we have different types of dental and facial bone fractures to deal with.³

The face is the body's most defenseless area, and is often the least protected area. About 11–40 per cent of all sport injuries involve the face. Such injuries most frequently occur by clashing with impacts from a ball or surface or from player to player. A blow to the face may not only inflict damage to the tooth or soft tissue, but can also lead to fractures of the jaw or facial bones, or even head injury.

The complex facial anatomy poses a challenge for the physicians to diagnose and treat these injuries.⁴

Contact sports are described as those sports in which players communicate physically with each other in an effort to prevent the opposing team or person from winning.⁵ The National Youth Sports Foundation for the Prevention of Athletic Injuries has identified the most common form of dental / orofacial injuries suffered during sports participation, which include lacerations of the soft tissue, abrasions and contusions, intrusions of the dents or avulsions, fracturing of the crown or / and the root, loss of one or more teeth of maxillary incisors most often.⁶

Andersson and Bodin⁷ stated that the determining factors for a favorable prognosis of replantation of avulsed tooth are minimal time of the avulsed tooth outside the socket, the storage and transportation medium of the avulsed tooth, and also minimal handling of the root surface and the periodontal ligament. They also stated that prognosis of reimplanted tooth is largely determined in the first 15 min after avulsion. This states that immediate reimplantation is a necessity to achieve a better prognosis on reimplanted tooth.⁷ According to the study conducted by Andreasen and Hjorting-Hansen⁸, teeth that were reimplanted within 30 min gave a success rate of 90%, while only 5% chances of retention to those that were reimplanted after 2 h.

The less common trauma involves zygoma fractures, mandibular fractures, alveolar fractures and temporomandibular joint trauma. Temporomandibular sport injuries and disorders may be caused by direct blows to the temporomandibular region, and indirectly by blows to the chin or laterally to the lower jaw where the force is transferred to one or both jaws. At the same time, the surrounding muscles, articular and extra-articular ligaments, articular disks and capsules, teeth can dissipate and modify the pathogenic effect of force.⁶

Orofacial injuries have common consequences and are troublesome. These injuries can affect aspects of life physically, mentally, socially, and economically. Physically, orofacial injuries can lead to abnormal primary teeth exfoliation, permanent teeth eruption failure, unfavorable color changes in the teeth, painful abscesses and dental loss resulting in the injured victim's mouth unesthetic gaps.⁹ Protection from sport-related orofacial injuries currently comes in the form of three shielding equipments: mouth guards, facemasks, and helmets.¹⁰ Therefore, this study was conducted to assess the knowledge regarding prevention of traumatic injuries among contact sports players of National Sports University.

Materials and methods

Our study population consisted of 229 young athletes from four different sports (boxing (n = 59), karate (n = 58), taekwondo (n = 57) and football (n = 55))players of National Sports University. When the participants selected the 'next' button to answer the questionnaire, they inferred their agreement to participate in the study (inclusion criterion), and they had total freedom to decline or answer the questionnaire. The data was only accessible to the lead investigator, and no personal information (email address, phone number, name, etc.) was necessary. Only when the 'submit' button was hit at the end of the questionnaire was

a submission evaluated (inclusion criteria). A athlete was removed from the analysis if he or she failed to answer one question out of the total number of entries (exclusion criteria).

The study duration was from 1st August 2020 to 25th august, 2020, and both convenience sampling (researchers themselves contacted players to participate in the study) and snowball sampling (the participating players were asked to forward the questionnaire to their colleagues) were used so that maximal participation could be ensured. The questionnaire was distributed personally via a quick response (QR) code as well as posted on social media platform like WhatsApp.

A standardized questionnaire consisting, of three-part standardized questionnaire, comparable to those used in prior studies^{11,12,13,14}, was administered (Table 1). Before completing the questionnaire, the athletes were thoroughly briefed on the meaning of each topic. The first section includes questions regarding age, gender, sport, and time spent playing. The second section included questions about general and dental trauma, as well as awareness of tooth avulsion and emergency procedures. Participants answered questions about tooth trauma prevention, behaviors, and attitudes toward wearing a mouthguard in the third section of the survey.

Table 1: Questionnaire used in the study

No	Question
1.	Gender
2.	Date of birth
3.	What kind of sport do you practice?
4.	How long have you been practicing this sport?
5.	Do you think that an orofacial injury can occur during sports practice?
6.	Have you ever had any kind of injury?
7.	If yes, what kind of injury? (arm/leg fracture, luxation, laceration)

8.	Have you ever seen dental injury during sport practice?
9.	If yes, what kind of injury? (tooth avulsion, crown fracture, tooth luxation)
10.	Have you ever experienced orofacial or dental injury outside sports?
11.	Have you ever experienced orofacial or dental injury during sports activities?
12.	If yes, what kind of orofacial or dental injury it was? (soft tissue injury, dental and soft tissue injury, dental injury, facial bone fracture)
13.	If yes, what kind of dental injury did you experience? (tooth avulsion, crown fracture, tooth luxation)
14.	Do you think that it is possible to replant an avulsed tooth?
15.	Do you think that it is possible to replant an avulsed tooth?
16.	Have you heard of the tooth rescue box?
17.	Do you know what is a mouthguard?
18.	Do you wear a mouthguard?
19.	If yes, what kind?
20.	Do you think that wearing a mouthguard could be efficient in preventing dental injury during sports practice ?

Statistical analysis

SPSS Version 22 was used for statistical analysis. Continuous data were presented as means with standard deviations, age as median with ranges, and categorical variables as whole numbers and percentages. To examine the differences between categorical variables, the Chi-square test was used, with Yates correction if necessary. $P < 0.05$ was considered statistically significant.

questionnaire, 60 for each sport. Boxing received 59/229 (25.8%), karate received 58/229 (25.3%), taekwondo received 57/229 (24.9%), and football received 55/229 (25.8%). There were 157 male participants (68.6%) and 72 female players (31.4%), ranging in age from 5 to 19 years old (average 12.93.2 years). The average amount of time spent playing was 4.83.1 years.

Out of the 229 athletes, 226 (98.7%) who completed the questionnaire were informed that orofacial injury can emerge during sporting activities. A past history of general sports-related injury was reported by 121 athletes (52.8%), with the most prevalent injuries being sprains (n=52), lacerations (n=41), and limb fractures (n=25). Football injuries accounted for 49 (31.6%) of the total of 155 injuries.

Square test was used, with Yates correction if necessary. $P < 0.05$ was considered statistically significant.

Results

Two hundred twenty nine young athletes completed the questionnaire within two weeks, with a response rate of 95%, out of 240 young athletes who were given the questionnaire. Among all participants 58 athletes (25.3%) suffered orofacial injuries, with 16 of them suffering numerous orofacial injuries, either as a mix of soft tissue and dental injuries or as independent injuries that occurred on different occasions. Facial bone fractures, soft tissue injuries, soft tissue and dental injuries, and dental injuries like crown fracture, tooth luxation, and avulsion were all classified as orofacial injuries. Orofacial injuries were less common in taekwondo (8/57, 14%) than in boxing (17/59, 28.8%), karate (17/58, 29.3%), and football (16/55, 29%), even though difference was not statistically significant ($P=0.163$). Soft tissue damage was the most prevalent orofacial injury (n=22), preceded by single dental injury (n=17), and a conjunction of soft tissue and dental injury (n=15).

The distribution of orofacial injuries by type of injury in each sport is presented in **Table 2**.

Table 2: Distribution of orofacial injuries by type of injury in each sport (n=229)

	Boxing (n=59)		Karate (n=58)		Taekwondo (n=57)		Football (n=55)		Total (n=229)		P*
	N	%	N	%	N	%	N	%	N	%	
Soft tissue injury	6	10.2	6	10.3	5	8.8	5	9.1	22	9.6	0.989
Dental injury	6	10.2	4	6.9	2	3.5	5	9.1	17	7.4	0.539
Soft tissue and dental injury	3	5.1	6	10.3	1	1.7	5	9.1	15	6.6	0.232
Facial bone structures injury	2	3.4	1	1.3	0	0	1	1.8	4	1.7	0.584
Total	17	28.8	17	29.3	8	14	16	29.1	58	25.3	0.163

Data are presented as whole numbers and percentages. * χ^2 -test, df=3.

Thirty-one athletes (13.5%) sustained a sports-related dental injury out of a total of 229 athletes. Boxing (11/59, 18.6%), karate (10/58, 17.2%), and football (12/55, 21.8 percent) all had significantly greater incidence of dental injuries than taekwondo (2/57, 3.5 percent) (P=0.035). Four of the 31 sportsmen who sustained dental injuries had multiple injuries (2 athletes in boxing and 2 in football). The average age of athletes with dental trauma was 13.62.9 years, with the age of 17 (6 athletes, 19.4%) being the most common age for dental trauma. There was no statistically significant difference in the prevalence of dental injuries in athletes under the age of 12 (13 vs. 22

dental injuries, P=0.161, Table 3) compared to athletes over the age of 12 (22 dental injuries, P=0.161). The participants of the study suffered 35 dental injuries in total, with the distribution of dental injuries by kind of injury in each sport shown in Table 4. In terms of the distribution of each form of dental trauma, there was no statistically significant variation between sports. Furthermore, there was no statistically significant difference between males and females in the frequency of orofacial traumas (26.4 percent vs. 24.8 percent, respectively; P=0.803).

Table 3: Distribution of dental injuries by type of injury in younger group (≤ 12 years) (n=110) and in the older group (> 12 years) of athletes (n=119)

	Athletes ≤ 12 years old (n=110)		Athletes > 12 years old (n=119)		Total (n=229)		P
	N	%	N	%	N	%	
Crown fracture	3	2.7	6	5	9	3.9	0.369
Tooth luxation	4	3.6	6	5	10	4.4	0.064
Avulsion	6	5.5	10	8.4	16	7	0.383
Total	13	11.8	22	18.5	35	15.3	0.161

Data are presented as whole numbers and percentages. χ^2 -test, df=3

Table 4: Distribution of dental injuries by type of injury in each sport (n=229)

	Boxing (n=59)		Karate (n=58)		Taekwondo (n=57)		Football (n=55)		Total (n=229)		P
	N	%	N	%	N	%	N	%	N	%	
Crown fracture	4	6.8	1	1.7	0	0	4	7.3	9	3.9	0.113
Tooth luxation	2	3.4	4	6.9	0	0	4	7.3	10	4.4	0.192
Avulsion	5	8.5	5	8.6	2	3.5	4	7.3	16	7	0.681
Total	11	18.6	10	17.2	2	3.5	12	21.8	35	15.3	0.035

Data are presented as whole numbers and percentages. χ^2 -test, df=3.

In all, 83 athletes (36.2%) reported knowledgeable that an avulsed tooth can be replanted, and 104 athletes (45.4%) were aware of the tooth rescue box, which is used to keep the tooth safe until a professional dental surgery can be performed. Twenty out of the 31 athletes who had a dental injury were aware of the tooth rescue box (64.5%), compared to 84 out of 198 athletes (42.4%) who were conscious of the tooth rescue box but not had a dental injury. The majority of participants (223/229, 97.3 percent) were aware of mouthguards for dental injury prevention, and the majority of athletes (215/229, 93.9 percent) thought they were useful in preventing dental injuries during sports activities. Only 94 sportsmen (41%), on the other hand, wore mouthguards while their sports activities. There were 10 athletes (32.3 percent) who

utilized mouthguards out of 31 athletes who had a dental injury (seven custom-made and three pre-fabricated mouthguards). When comparing athletes who had no oral injuries to those who had dental trauma, there were substantially more athletes who thought mouthguards were unnecessary (44.4 percent vs. 4.4 percent, P0.001). Taekwondo (42/57, 73.7 percent) and karate (41/58, 70.7 percent) athletes used mouthguards significantly more than football (8/55, 14.5 percent) and boxing (3/59, 5.1 percent) athletes (P0.001). Table 5 depicts the list of athletes who used mouthguards by sport and mouthguard type. Table 6 shows the reasons stated for not wearing a mouthguard, with the most prevalent explanation being that a mouthguard was deemed unnecessary (50/135, 37%).

Table 5: Distribution of athletes by type of mouthguard used in each sport (n=229)

	Boxing (n=59)		Karate(n=58)		Taekwondo (n=57)		Football (n=55)		Total (n=229)		P
	N	%	N	%	N	%	N	%	N	%	
Pre- fabricated	0	0	8	13.8	5	8.8	1	1.8	14	6.1	0.006
Mouth-formed	0	0	12	20.7	17	29.8	2	3.6	31	13.5	<0.001
Custom-made	3	5.1	21	36.2	20	35.1	5	9.1	49	13.4	<0.001
Total	3	5.1	41	70.7	42	73.7	8	14.5	94	14	<0.001

Data are presented as whole numbers and percentages. χ^2 -test, df=3.

Table 6: Distribution of reasons for not wearing a mouth guard in each sport (n=229)

	Boxing (n=59)		Karate(n=58)		Taekwondo (n=57)		Football (n=55)		Total (n=229)		P
	N	%	N	%	N	%	N	%	N	%	
Uncomfortable	13	22	3	5.2	1	1.8	11	19.3	29	12.7	<0.001
Unnecessary	13	22	5	8.6	10	17.5	22	40	50	21.4	<0.001
Breathing/ Aesthetics/ Speech	3	5.1	0	0	0	0	3	5.5	7	3.1	0.101
Other	18	30.5	9	15.5	4	7	11	20	49	21.4	0.011
Total	56	94.9	17	29.3	15	26.3	47	85.5	135	58.9	<0.001

Discussion

According to the findings, 58 young athletes (25.3%) have had one or more sports-related orofacial injuries, and 31 athletes (13.5%) have suffered a sports-related dental injury. According to earlier studies, tooth injuries ranged from 8.5 percent to 37 percent depending on the sport and the athlete's age.¹⁵ Biaggi et al. looked at dental trauma in seven different sports, including ones that have a low risk of oral injury, hence the incidence of dental trauma was lower, at just 8.5 percent, than in our study.¹³

According to similar research, the rate of oral trauma among football players ranged from 11% to 19.7%.^{16,17,18} While Ferrari et al. found a greater rate of oral injuries, they recruited professional and semi-professional football players in their study, who typically have a higher rate of injuries due to the game's more competitive and combative nature.^{13,15,16}

Although past studies have found that the prevalence of dental damage in boxing is somewhere between 13 to 21%,^{13,11} similar to high-risk sports like rugby, American football, or ice hockey, boxing is classified as a sport with a moderate risk of oral trauma. 20 Young Boxing players suffered 28.8% orofacial damage in this study, with 18.6% of all those suffering from a dental trauma, which is consistent with previous findings.^{11,21}

There were 29.3 percent of 58 karate participants who had incurred an orofacial injury, and 17.2 percent who had sustained a dental damage, which is consistent to prior studies. The rate of dental trauma was 20% in Vidovic et al study's which included 484 taekwondo athletes.¹⁴ The incidence of orofacial and dental trauma in taekwondo athletes was lesser than in other analyzed sports (14 percent orofacial and 3.5 percent dental injuries), which can be justified by taekwondo athletes' use of mouthguards (78 percent). Soft tissue injury was the most prevalent orofacial injury in this study, while tooth avulsion was the most common dental injury. Avulsion can cause major periodontal damage with long-term effects, which is why coaches and sports officers should be trained in how to handle an avulsion emergency. Only 36.2 percent of athletes were aware that replanting an avulsed tooth was conceivable, while 45.4 percent were aware of tooth rescue kits, according to the current study. These data reveal that more than half of young athletes in various sports are unaware of emergency protocols in the event of oral injuries.

The duration of extra-oral time and extra-oral conditions influence the efficacy of periodontal healing following tooth replantation, as well as possible post-treatment problems and the final prognosis.²² The tooth rescue boxes, a specific physiological storage media for the

avulsed tooth, were shown to have a surprisingly high level of knowledge in this investigation. The prognosis for sports-related dental injuries may be enhanced by assuring the provision of tooth rescue boxes at sports venues and tournaments. There were 13 athletes (41.9%) in this study who were younger than 12 years old, indicating that the root apex has not yet fully grown. This information can have a significant impact on the treatment procedure chosen and the treatment's overall outcome.

However, despite the fact that the majority of the athletes in this study were aware that wearing a mouthguard reduced the risk of sports-related tooth injuries, only 94 athletes (41%) actually used one. Taekwondo athletes (73.7%) used mouthguards the most, and as a result had the fewest oral injuries (3.5%), while karate players (17.2%) experienced a dental injury due to a high rate of mouthguard use (70.7 percent). Some karate competitors may have begun wearing a mouthguard after suffering a dental injury, albeit the timing of when they began wearing a mouthguard in relation to the time of the injury was not studied.

According to Hersberger et al., 42 percent of boxing players in their study were aware of mouthguards and their benefits for preventing dental injuries, but only 7.7% were utilizing them.⁹ The majority of boxing players thought mouthguards were helpful in preventing dental injuries in the current study, but only 5.1 percent used them, which is consistent with earlier studies.^{11,14} Interestingly, Ozbay et al. found that 19.3 percent of children aged 6-14 years who played football had dental injuries and none of them wore mouthguards,¹⁶ while Petrovi et al. found that only 5.7 percent of football players wore mouthguards,¹⁷ while 14.5 percent of young football players wore them in this study. Despite the relatively high risk of dental injuries in various ball sports and the abundance of information regarding the

importance of wearing a mouth guard, mouth guard use remains low. In the present study, the most prevalent mouth guards worn by young athletes were custom-made mouth guards (52 percent). Most players utilized mouth-formed mouth guards in prior research, which are easier to obtain and less expensive, but have also been proven to be less protective.^{24,26} The most prevalent reasons for not wearing a mouth guard were that it was unnecessary (37%) or uncomfortable (21.5%), or that it impeded breathing or speech (5.2 percent). The biggest reason for not wearing a mouth guard in prior studies was the same: players thought it was unnecessary.^{11,13,17,18} Self-reported concerns linked with using mouth guards among rugby players, according to Boffano et al., were talking, shutting lips, breathing, swallowing, and slippage rather than thinking it was unnecessary or painful.²³

Dentists bear a significant amount of responsibility for the prevention of dental injuries and the use of mouth guards.²⁴ Each sports medical team should include a sports dentist who's really responsible for promoting knowledge about dental trauma prevention and implementing appropriate emergency procedures in the event of dental trauma. Coaches and parents of young players must also share information on the importance of wearing a mouth guard as part of routine protective gear to avoid sports-related oral injuries and to lessen the long-term consequences and expenses of dental injuries. Young athletes are at danger of orofacial injuries as the incidence of sports-related injuries rises around the world, and they should be informed about the available ways of prevention, and also the temporary and permanent repercussions of injuries received during sports activities. In many contact sports, a lot of emphasis is placed on preventing injuries to the ankles and fingers, as well as joints and muscles in general, but little emphasis is placed on promoting facial protection.²⁶ Sports-related or facial and dental traumas,

especially in a young athlete, a developing child, or an adolescent, might lead in persistent damage of stomatognathic functioning.

The use of a self-administered questionnaire as the survey technique was the study's principal weakness, which could lead to differences between objective findings and subjective experiences of sports-related injury. Nonetheless, the findings are useful in creating prevention techniques for young athletes participating in sports.

Conclusion

Football and boxing both showed a high prevalence of tooth trauma, as did karate, which is a high-risk martial art sport. As a result, the classification of sports based on the risk of dental trauma should be reviewed, particularly because tooth damage can be effectively avoided by wearing a mouth guard. Making mouth guards mandatory in all high-risk sports, and also those with a medium risk of dental trauma, would be advantageous.

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