



## Original Research Article

# ASSESSMENT OF KNOWLEDGE AND AWARENESS OF DENTAL TRAUMATIC INJURIES AND USE OF MOUTH GUARD AMONG THE SPORTS PHYSICIAN OF INDIAN PROFESSIONAL AMATEUR BOXERS A CROSS SECTIONAL SURVEY

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### ABSTRACT

**Background:** The aims of this study were to assess the level of knowledge among Sports Physicians associated with the boxing players about dental traumatic injuries, tooth avulsion, use of mouthguard.

**Aim & objective:** Study to assess the knowledge among Sports Physicians about dental traumatic injuries and use of mouthguards among Professional Boxers. Study objective was to access Sports Physicians knowledge about the dental traumatic injuries and preventive strategy.

**Material & Methods:** The descriptive cross sectional study was conducted to evaluate occurrence and prevention of dental traumatic injuries knowledge among Sports physicians. Closed questionnaires were sent to the physicians. The data obtained were subjected to descriptive analysis, relative frequencies and Chi square test was used to test the influence of different variables.

**Result:** 51 Physicians out of 56, serving with different boxing teams answered the questionnaires. 56.7% reported the occurrence of some type of dental injury during boxing practice, regarding mouthguard use, 20% of the physicians don't recommend mouthguard.

**Conclusion:** dental injuries are common during professional Boxing practice and there is lack of information in the medical departments associated with the game, related to emergency conducts and prevention of dental trauma.

**Keywords:** Sports Physician, Tooth injuries, Mouth guard impression

## INTRODUCTION

Injuries are very common in sports, especially in those modalities involving more speed and close contact between players, which are more susceptible to facial & dental trauma<sup>[1-2]</sup>

Dental services in sports competitions in the games sponsored by International Olympic committee are mandatory. In every Central American, Pan American and Olympic summer games, as well as winter games, the organizing committee has to take all the necessary measures to assure dental services to all competitors. In all Olympic villages, as part of the medical services, a dental clinic is set up to treat

any dental emergency that may arise during the games. Almost every participating country in the game has its own medical team. Some may include a dentist, and some may not.

The major responsibilities of the team physician and dentist as a member of the national sports delegation includes:

1. Education of the sports delegation about different oral and dental diseases and Illustration of possible problems that players may encounter during the games.
2. Adequate training and management of orofacial trauma during the competition.

3. Knowledge about the rules and regulations of the specific sport that the dentist is working.
4. Understanding of the anti-doping control regulations and procedures.

5. Necessary skills to fabricate custom – made and properly fitted mouthguard to all participants in contact or collision sports of the delegation<sup>[3]</sup>

Many researchers have showed the effectiveness of the mouthguard in sports; however the spread of suitable mouthguard is still slow. This seems to suggest that a lot of preventable dental related sports injuries continue to occur. One reason for this is that players might not recognize the advantages of mouth guard and may not have had a properly produced mouthguard for their age, the kind of sports they played, or their level of participation in sports. Knowledge is especially short concerning the relationship between mandibular bone fracture, concussion prevention and mouthguards<sup>[4]</sup>

Mouthguards have been determined to be the most effective way of preventing dental injuries. Three types of mouthguards are available<sup>[5]</sup>

1. Stock mouthguards, which are prefabricated in different sizes.
2. Boil and bite mouth guards made from a thermoplastic material, and immersed in hot water and formed in the mouth of the player.
3. Custom made mouthguards made by the dentist on a model of the patient's mouth.<sup>[6-7]</sup>

Boxing may lead to dental trauma, which often can be reduced with appropriate preventive measures. While numerous studies exist on this topic for several countries throughout the world, there is lack of comprehensive descriptive studies in India.

## MATERIAL AND METHOD

A descriptive cross sectional study was conducted to evaluate the occurrence and prevention of dental traumatic injuries knowledge among sports physicians associated with amateur and professional boxers in India.

### Study participants:

The total numbers of 56 sports physicians were approached including those who are serving with the teams, who are continuing their post graduation in sports medicine, and the staff in the same subject and 51 out of them answered the questionnaire. Each physician in charge of the medical departments of the boxing team was invited to participate in the study received an informational document about the research and signed an informed consent form prior to enrolment in the study.

### Study sample

Inclusion criteria –

1. Physicians' in charge of medical departments of the different boxing teams in India.
2. Physicians those who are serving with the professional boxing team of India and those physicians who have served earlier with the Indian Boxers.

3. Those that are pursuing post graduation or diploma in the same subject and staff associated with the subject.

### Sampling tools

Proforma

A survey was carried out using a self designed format, which consisted of three parts. The closed questionnaire was modified from those used in similar tested survey.

The first part addressed personal and professional information like nationality, age, sex, duration of service, what kind of dental injury they have often come across, and how frequently they noticed the dental injury.

Second part addressed information regarding knowledge about the avulsed tooth management and the knowledge regarding the storage medium used for the avulsed tooth.

The third part consisted of knowledge about kind of mouthguards recommended to players and knowledge about impression taking technique for the custom made mouthguards recommended to players by the Physicians. This part also verified whether the Health Departments of boxing teams in India have Dentistry Departments.

### Consent:

**Ethical Committee Clearance** Consent: Ethical clearance was obtained from the ethical committee of College of Dental College and Hospital Amargarh, Gujarat, India.

**Study Group Consent:** Voluntary written informed consent was availed from the study participants. All the physicians associated with the medical departments of boxing teams were requested to participate in the study, received an informational document about the research and signed an informed consent form prior to enrollment in the study.

The questionnaire was pretested in a pilot survey comprises of 63 (20%) participants. Kappa ( $k = 0.86$ ), weighted kappa ( $kW = 0.9$ ) were used to evaluate test – retest reliability of the questionnaire and internal consistency was assessed by Cronbach's alpha  $\alpha$  coefficient ( $\alpha = 0.78$ )

**Elaboration and delivery of questionnaire:** The questionnaire with informational document was posted by a regular mail including envelopes to ensure the return of answers. Telephonic conversation was done prior of sending mails. Those who could not send it back were interviewed by the telephonic conversation. The data obtained was subjected to descriptive analysis to determine absolute relative frequencies of answers and 95% confidence intervals for each one of the questions and to compare among duration of experiences of sports physicians.

### The statistical procedures were carried out in two steps.

- a. Data compilation and presentation
- b. Statistical Analysis.

#### a. Data compilation and presentation

The data was compiled systematically, transferred from a pre-coded Proforma to a computer and a master table was prepared using Microsoft Excel

2010. The returned questionnaire was analyzed: the results were expressed in frequency distribution

**b. Statistical analysis**

Chi square test was used to test the influence of different variables such as personnel and professional information, knowledge about avulsed tooth management, and knowledge about mouthguards. And the differences between two independent samples were analyzed using Student’s t-test.

Statistical analysis of data was processed using Microsoft excel 2007 and SPSS version 19.0. Chi square test was used to assess the association between duration of professional experiences among sports physicians’ variables. P <0.05 was considered as significant result.

**RESULTS**

Physicians from the boxing teams, those who are serving with the team, who had served earlier, and those who are still continuing the diploma and masters in sports medicine, answered the questionnaires. Regarding the duration of service as a sports physician, those who are serving with the team and who had already served. 65% had 5-10 years experience, and 30% had more than 10 years of experience. 20% from the student group have come across the dental injuries and 75% from the working group have come across the dental injuries. 20% from the student group have come across the tooth avulsion and 45% from the working group have come across the tooth avulsion.

Regarding the knowledge about the avulsed tooth replantation, 60% of the working group said that it is possible to replant an avulsed tooth. 50% from the student group don t have any knowledge about within

which period of time tooth must be replanted, 30 % said within 6 hours, and 20 % said within 1 hour. Whereas from the working group, 40 % of the physicians said that it can be replanted up to 1 hour and 45 % said up to 6 hours. 60% of the physicians from the working group, as well as student group believed that tooth can be replaced back in the socket from where it came. 30 % from the working physicians and 40 % from the student group answered that tooth can be wrapped in handkerchief, paper, gauge and cotton.

45% of working physicians said that tooth can be put in water whereas 40 % of the student group believed the same. 35 % of the working physicians answered that tooth can be put in disinfecting solution and patient s own saliva. 60% from the student group said that tooth can’t be put in disinfecting solution and it can be put in patient s own saliva. 70 % from the student group and 85% from the working group answered milk as useful medium for storing an avulsed tooth. About saline as storage medium, 60 % physicians from working group, and 50% from student group does not use it. 53.3% from all physicians doesn’t have any knowledge about dental emergency services and 96.7 % of the physicians find this information very important and necessary.

Regarding recommendation of mouthguards on regular basis, all sports physicians recommend the mouthguards to players on regular basis. 85 % of physicians recommend stock made mouthguards. And 15 % of the physicians recommended custom made mouthguards. 10% physicians uses, the impression taking technique before making mouthguards. And the health department of Indian boxing teams both amateur and professional does not have the dental department attached with them.

**Table 1: Professional information; Relative frequencies of dental trauma occurrence.**

QUESTIONS	GROUP I	GROUP II	X <sup>2</sup>	P VALUE
Duration of experience as a sports physician?				
5-10 years	-	65%	25.909	0.000
More than 10 years	-	30%		
Less than 10 years	100%	5%		
Have you ever come across dental injury in boxing players?				
Yes	20%	75%	8.213	0.004
No	80%	25%		
What kind of dental injury you have often come across?				
Tooth avulsion	20%	45%	2.636	0.268
Dental fracture/ dislocation	-	5%		
Others	80%	50%		
How frequently did you notice dental injury on patients?				
Once	30%	70%	5.757	0.56
2 – 4 times	-	5%		
Never	70%	25%		



**Figure 1: Knowledge about the use of mouthguards**

## DISCUSSION

There is lack of research on sports related dental trauma from India in the literature. So taking into consideration, the main objective of this study was to conduct a survey programme and better understand the role of Sports Physicians and their knowledge about the dental traumatic injuries and preventive strategies of tooth avulsion among Indian Boxing Players. The reason why boxing was chosen was the curiosity about the effect of contact type on dental trauma. It was assumed that direct contact would increase the injuries.

However, the studies and case descriptions of this sport are almost exclusively retrospective, thus subject to the severe limitations inherent to such studies, particularly in the epidemiology of sports injuries.<sup>[8-9]</sup> In addition the past literature on boxing focuses primarily on the analysis of head injuries.

Injury rate in contact sports such as ice hockey, professional rugby, hand ball and soccer range between 13.5 and 83 injuries per 1000 training hours.<sup>[10,11,12]</sup> Sports without contact such as power lifting; dancing, beach volleyball or rowing clearly shows lower injury rates (0.24-4 injuries/1000 hours of training. Previous prospective studies on boxing also showed low injury rates with 0.69 injuries per boxer per year and 2.0 injuries per 1000 h of training. The findings in this study showed that 75% of physicians having more than 10 years of experience have come across dental injuries like tooth avulsion, tooth subluxation and dental fracture. 50 % of physicians from the same group have come across other head injuries such as eyebrow laceration, nosebleed, nasal bone fracture etc.

The mandatory wear of mouthguards in various sports like American football, rugby and boxing, makes it possible the prevention of dental injuries<sup>[13-14]</sup> these injuries can be prevented by protection of buccal region with mouthguards and other strategies like application of preventive programmes in players focused in the adherence to match rules and spirit of fair play. Studies have demonstrated that most players don't have sufficient knowledge of prevention of dental injuries and mouthguards.<sup>[15]</sup>

Dental services should be established with enough time before the competition starts (months) in order to take care of any dental conditions such as caries or periodontal diseases. When travelling with the team, especially a large group, you have to be very well equipped. It's good to provide the necessary education on prevention of dental disease and construction of custom made and properly fitted mouthguards for boxing. Custom made mouthguards should be made for other sports such as: basketball, taekwon-do, karate-do, soccer, hockey, judo, wrestling and other contact sports.<sup>[3]</sup>

Regardless of the group, there was generally a low knowledge level regarding avulsion and replantation. Physicians knew that teeth could be replanted but had lesser knowledge of the storage medium used and emergency treatment of tooth avulsion. No physician demonstrated a full knowledge of extra alveolar time or storage media.

There is a long history of mouthguard use in sports. Mouthguards started being used in professional boxing in the early 1920's and became mandatory in American football in 1962, being currently requested in four sports modalities in USA (ice hockey, lacrosse, field hockey, and football). However the American Dental Association recommends the use of mouthguards in 29 sports/ exercise activities. A meta analysis have demonstrated that the risk of an orofacial sports injury was 1.6 – 1.9 times higher when mouthguard was not worn.<sup>[16]</sup>

In other studies aimed at need of dentistry department associated with the medical departments of the teams, 52.6% have dentistry department included in their medical departments. Whereas in the present study, there are no dental departments associated with the medical department of boxing teams of India. 96.7% of the physicians find this information very important and necessary.

To improve the situation observed in the study, the inclusion of a dentist as a member of medical departments of the Indian boxing teams should be mandatory, not only for the prevention and treatment of dental injuries but also for maintenance of players' oral health. In this context, Sports Dentistry emerges as a specialty to supply these and other future demands of the boxing players.

Worldwide, sports dentistry has gained an increased interest, and Indian dental professionals should be aware of this new area of clinical practice. Also the federation or confederations responsible for sports practice regulation must understand that dentistry is an important part in the context of systemic health and different dental problems can impair the performance of players.

## CONCLUSION

Reliable epidemiological studies on injury patterns and frequencies are essential for preventing injuries and also providing adequate care to the athletes.



Boxing is an Olympic sport, but its abolition continues to be the subject of debate. It is classified as injury prone and dangerous sport activity, with serious complications of head injuries, and dental traumatic injuries. In particular, injuries from boxing in children and adolescents have attracted great attention and are a subject of controversy. Even public funding of this sport has been criticized for this reason by medical association.

It can be considered that dental injuries like tooth avulsion, tooth subluxation, fractures and other head injuries are common in Indian, professional as well as in Indian amateur boxing players, and there is a lack of information in the medical departments associated with this game, related to emergency conducts, management of avulsed tooth management, uses of mouthguards, and prevention of dental trauma.

Strategies should be developed to improve the knowledge of team's health professionals about the prevention and management of dental injuries. Other studies should be performed to stimulate and improve the development of sports dentistry in India.

Boxing shows high injury rate that is comparable with other contact sports. However, the injuries are generally not serious. Injury frequency might be a function of age or whether the boxer is active in the junior or adult category. More studies should be performed in India regarding age and categories of boxing players.

Our study showed that physicians in India are aware of the mouthguard use but most of them are unaware of the custom made mouthguards, and also there is no dental department attached with most of the medical teams associated with the game. So it should be combined mission of dentist, sports physician and also the coaches to encourage use of properly fitted mouthguards. And inclusion of a dentist as a member of medical departments of the teams should be mandatory, not only for the prevention and treatment of dental injuries but also for maintenance of player's oral health.

We have to provide the necessary education on taking of an impression and construction of custom made and properly fitted mouthguards for each boxing player.

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