International Journal of Sport, Exercise and Health Research

Systematic Review

IJSEHR 2024; 8(1): 15-21

www.sportscienceresearch.com
Received: 16-12-2023
Accepted: 10-02-2024
DOI: 10.31254/sportmed.8104

Knowledge of Dental Injuries among Physical Activity Trainers or Teachers including Physical Education Students from Various Districts of India- A Systematic Review

Dhanakodieswaravishakan SMP[1], Rathna Piriyanga RS[2], Azhagu Abirami A[3], Malavika S[4]

[1,4] Student, Department of physical education, Madurai Kamaraj university, Madurai, Tamilnadu, India

[2] Reader, Department of conservative dentistry and endodontics, CSI college of dental sciences and Research, Madurai, Tamil Nadu, India

[3] Senior Lecturer, Department of conservative dentistry and endodontics, CSI college of dental sciences and Research, Madurai, Tamilnadu, India

Abstract

Background: Dental injuries are a common occurrence among athletes, and physical activity trainers or teachers play a crucial role in recognizing, preventing, and managing these injuries. This systematic review aims to assess the knowledge of dental injuries among physical activity trainers or teachers and physical education students from various districts of India. Methods: A comprehensive search of electronic databases was conducted to identify relevant studies. Studies were included if they assessed the knowledge of dental injuries among physical activity trainers or teachers and physical education students from various districts of India. Data extraction and synthesis were performed following the PRISMA guidelines. Results: A total of 11 studies were included in the review. The majority of studies reported that the knowledge of dental injuries among physical activity trainers or teachers and physical education students was inadequate. This lack of knowledge was evident in areas such as the identification of risk factors for dental injuries, the prevention of dental injuries, and the management of dental injuries. Conclusions: There is a need for comprehensive training programs to improve the knowledge of dental injuries among physical activity trainers or teachers and physical education students in India. These training programs should cover the identification of risk factors, the prevention of dental injuries, and the management of dental injuries.

Keywords: Dental injuries, Physical activity trainers, Teachers, Physical education students, India.

INTRODUCTION

Physical educators have a unique opportunity to impact students' overall health and well-being, extending beyond fostering physical literacy and activity. However, daily challenges such as large class sizes, limited resources, and the pressure to meet academic standards can hinder addressing all aspects of student health, including dental injuries.

Dental injuries are prevalent, especially among children and adolescents. A study by the Centers for Disease Control and Prevention (CDC) found that approximately 13% of children and adolescents aged 6-19 years experienced a dental injury in the past year [1]. These injuries can significantly impact students' health, quality of life, and academic performance [2].

Physical education settings pose a high risk for dental injuries due to the active nature of classes, the use of sports equipment, and the participation of a large number of students simultaneously. Despite this elevated risk, many physical educators have limited knowledge about dental injuries. A study by Fux-Noy et al. in 2016 found that only 50% of physical education teachers in Israel had adequate knowledge about the prevention and management of dental injuries [2].

This systematic review addresses a critical gap and aims to assess and synthesize the existing literature on the knowledge of dental injuries among physical education teachers, coaches, trainers, and students across various districts of India. It broadens its scope to include not only physical education teachers but also physical education students and sports coaches, recognizing the former as educators of tomorrow. The insights gained from this review can be utilized to develop educational programs and resources for physical educators and students. Furthermore, the findings of this review can contribute to the

***Corresponding author:**
Dr. Rathna Piriyanga RS
Reader, Department of conservative dentistry and endodontics, CSI college of dental sciences and Research, Madurai, Tamil Nadu, India
Email:
rathnapiriyanga14@gmail.com

formulation of evidence-based policies and procedures, fostering safer and more inclusive learning environments in the diverse districts of India.

MATERIAL AND METHODS

This systematic review follows PRISMA guidelines, with a PROSPERO protocol. (Figure 1) A comprehensive search strategy covered PubMed, Science Direct, Web of Science, and Google Scholar for English-language articles published between 2003 and 2023. Duplicate removal used Zotero, and title/abstract screening employed Rayyan, with inclusion/exclusion criteria specifying Indian origin, cross-sectional design, and questionnaire surveys. Full-text review and data extraction involved two authors, resolving discrepancies through discussion. The JBI Critical Appraisal Checklist assessed methodological quality. Cronbach's alpha measured inter-rater reliability was 0.8 which categorized as good.

RESULTS

The systematic review of 11 studies assessing the knowledge of dental injuries among physical activity trainers, teachers, and students in various districts of India reveals an overall inadequacy in understanding, with a mean correct response rate ranging from 52.6% to 54.2%. Notably, knowledge regarding the first aid management of dental injuries, particularly dental avulsion, is alarmingly low at 36.4%. Similarly, awareness about the importance and use of mouth guards stands at only 42.8%. Regional disparities are evident, with southern India reporting better knowledge than the north. Physical education teachers consistently exhibit better understanding than coaches, trainers, and students. Table 1. In the critical appraisal of the included studies for this systematic review, the majority demonstrated a good quality of methodology according to the Joanna Briggs Institute (JBI) Critical Appraisal Checklist, with two studies assessed as having a moderate quality. (Table 2)

Table 2: Quality assessment of included studies (Quality Assessment tools – JBI Critical Appraisal Score):

Authors	**Year**	JBI SCORE (%)	Risk
Sharma, et al[3]	2022	80%	***
Kalaskar AR, et al[8]	2016	90%	***
Priya M, et al[11]	2016	65%	**
Abhishek Anand, et al[9]	2016	90%	***
Gupta, et al[10]	2016	80%	***
Bhadana, et al[6]	2015	70%	***
Meka, et al[12]	2015	100%	***
G Neeraja, et al[13]	2014	80%	***
Keerthika Natarajan, et al[14]	2013	65%	**
Uma, S. R. et al[15]	2011	100%	***
Mohandas, U. et al[16]	2009	80%	***

Joanna Briggs institute (JBI) critical appraisal score for Risk of Bias Assessment of included
*studies. *-high risk, **-moderate risk, ***-low risk.*

DISCUSSION

The findings of this systematic review reveal an alarming knowledge gap regarding dental injuries among physical activity trainers, teachers, and students in various districts of India. The overall mean correct response rate of 52.6-54.2% falls short of the desired level of understanding, especially considering the high prevalence of dental injuries in physical education settings. These findings are consistent with those of previous studies conducted in other countries, which have also found low levels of knowledge about dental injuries among physical activity professionals and students [2,3]. This suggests that the knowledge gap regarding dental injuries is a global problem, rather than being unique to India.

There are several possible explanations for the low levels of knowledge about dental injuries among physical activity professionals and students. One possibility is that dental injury prevention and management are not adequately covered in physical education curricula. Another possibility is that physical activity professionals and students do not have access to high-quality educational resources on dental injuries. Additionally, it is possible that there is a lack of awareness about the importance of dental injury prevention and management among physical activity professionals and students [4].

Of particular concern is the low knowledge regarding the first aid management of dental injuries, particularly dental avulsion. Dental avulsion is a serious injury that can result in permanent tooth loss if not treated promptly and appropriately. Only 36.4% of participants in this review demonstrated adequate knowledge of the first aid steps for dental avulsion. This is particularly concerning because dental avulsion is a time-sensitive injury, and prompt and appropriate first aid treatment is essential to maximize the chances of successful reimplantation [4]. The low knowledge of first aid management for dental avulsion among physical activity professionals and students suggests that they may not be able to provide the necessary care to their students and athletes in the event of a dental injury.

The finding that physical education teachers consistently exhibited better knowledge of dental injuries than coaches, trainers, and students is likely due to the fact that physical education teachers receive formal training on dental injuries and other health-related topics. However, the fact that even physical education teachers demonstrated significant gaps in their knowledge suggests that there is a need to strengthen the dental injury training in physical education curricula [5].

The regional disparities in dental injury knowledge observed in this review are also noteworthy. Physical activity professionals and students in southern India demonstrated better knowledge than those in northern India. This could be attributed to a number of factors, such as the availability of educational resources, the level of awareness about dental injuries, and the cultural attitudes towards dental health [5].

The limited awareness about the importance and use of mouth guards is another area of concern. Only 42.8% of participants were able to correctly answer questions about the importance and use of mouth guards to prevent dental injuries. Mouth guards are essential protective gear for physical activities with a high risk of contact or falls, and their use can significantly reduce the risk of dental injuries [4,6]. The low awareness of the importance and use of mouth guards among physical activity professionals and students suggests that they may not be promoting the use of mouth guards to their students and athletes.

In our critical appraisal using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist, the majority of the included studies demonstrated a commendable methodology, indicating a good quality of research [7]. However, two studies were assigned a moderate quality rating due to notable shortcomings. These studies lacked explicit details on the validation process of their data collection instruments, raising concerns about the reliability of the gathered data. Additionally, the absence of information regarding pilot testing introduced uncertainties about the clarity and effectiveness of the survey tools employed. Furthermore, inadequate considerations for sample size in these studies were identified, potentially compromising the statistical power and generalizability of their findings. These limitations underscore the need for enhanced methodological transparency and rigor in future studies

examining knowledge of dental injuries among physical activity professionals and students.

The discussion highlights the pressing need for diverse studies across Indian states to comprehensively capture knowledge variations on dental injuries among physical activity professionals and students. Emphasizing the inclusion of dental injury education in physical education curricula is crucial to address identified knowledge gaps. Specialized training programs are pivotal for enhancing proficiency in injury management.

Limitations of the Study

This systematic review has several limitations. First, the search strategy was limited to four databases, which may have excluded relevant studies published in other sources. Second, the review only included studies published in English, which may have excluded studies conducted in other languages. Third, the majority of the included studies were cross-sectional surveys, which cannot establish causality. Fourth, the sample sizes of some studies were relatively small, which may have limited the generalizability of the findings.

Future directions:

Future research in dental injuries among Indian physical activity professionals and students should prioritize diverse state representation and longitudinal studies to track knowledge acquisition over time. Additionally, conducting more studies with and without training programs, incorporating behavioral assessments, and making comparisons with global benchmarks would enhance our understanding. Collaborative efforts with dental professionals or institutions and an exploration of socioeconomic factors will be pivotal for the development of specialized programs in injury prevention.

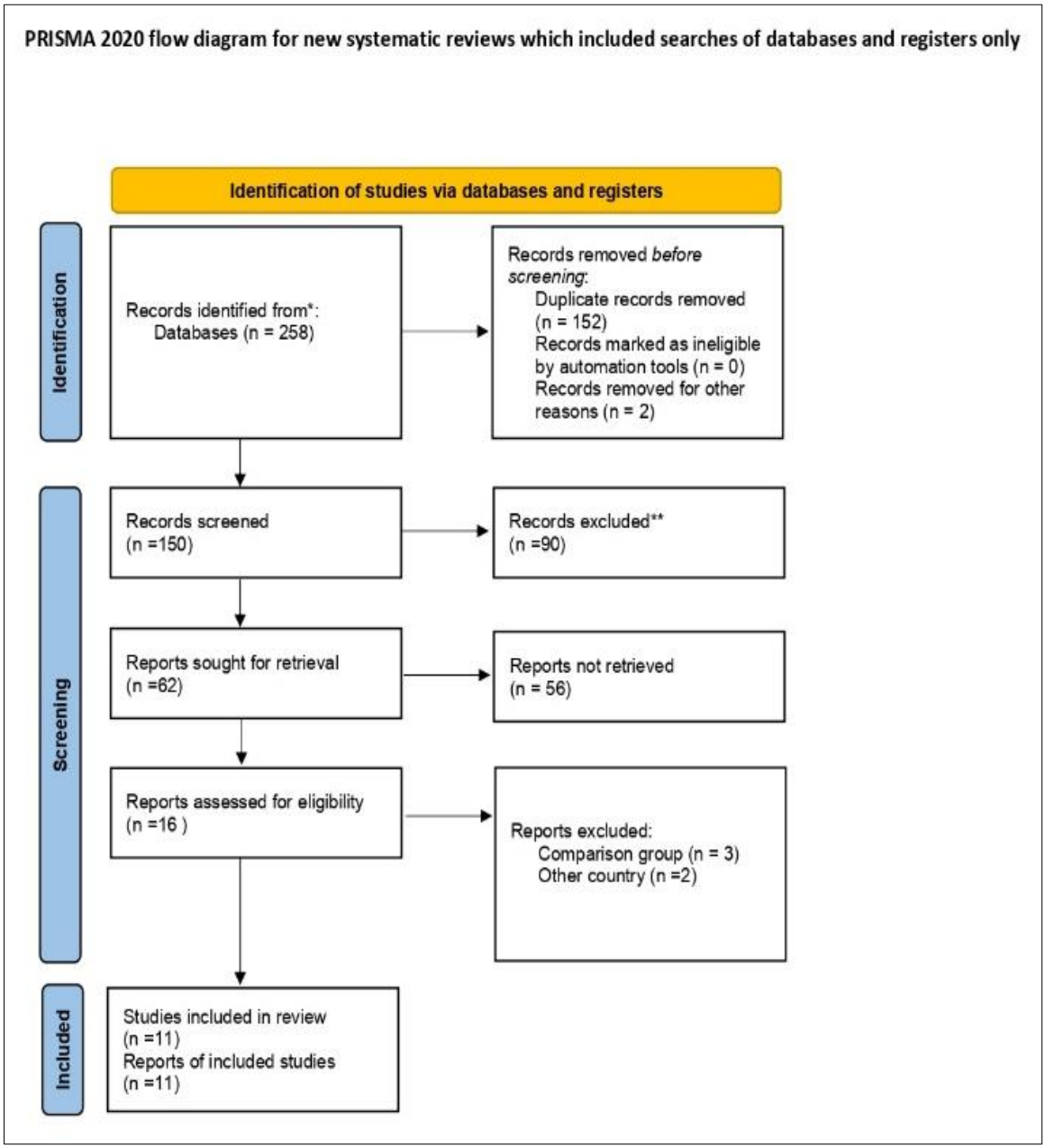

Figure 1: PRISMA flow diagram for included articles

Table 1: Summary of included studies

Article in Reference	Authors	Journal	Year	State	Sample Size	Objectives	Study Design	Source Of Question-Naire	Key Findings	Author Conclusion
3	Sharma, et al	Journal of the International Clinical Dental Research Organization	2022	Delhi	125	to evaluate the awareness of sports-related orofacial injuries among coaches in the Delhi-NCR region and to determine their awareness in providing first aid and prevention of sports-related orofacial injuries.	Cross-sectional survey	Self developed	- In the case of the most common type of tooth fracture that is being encountered, 94% of coaches believed that the front teeth of the upper jaw fractured more commonly - In the case of knowing whether it is possible to put the fractured tooth back into its position, 59% of coaches responded with Yes and 41% coaches responded with No.	The authors concluded that the knowledge of coaches regarding prevention and first-aid of orofacial trauma is not satisfactory. They also found that a majority of the coaches showed strong beliefs in implementing injury prevention interventions as an effective way to prevent and reduce sports injuries.
8	Kalaskar AR, et al	Journal of Sports Medicine & Doping Studies	2016	Vidarbha, Maharastra	197	to evaluate the sports teachers' knowledge and attitude towards sports-related oro-facial injuries and the use of mouth guards.	Cross-sectional survey	Self developed	- Approximately 67.5% of the sports teachers agreed that sports-related orofacial injuries are common. - Only 8.1% of the sport teachers had knowledge regarding first aid to orofacial injuries. - Only 10.1% of the sports teachers incorporated protective measures to prevent orofacial injuries. - 85.8% of the sports teachers were aware that mouth guards are used as a protective device to prevent orofacial injuries.	The authors' conclusion is that the study showed that there is a need for awareness programs to encourage sports teachers to incorporate protective devices such as mouth guards to prevent orofacial injuries. They suggest that motivating factors such as highlighting the importance of prevention to school and college administrations may help increase the prevalence of using mouth guards among sports teachers and students.
11	Priya M, et al	Dentistry	2016	Chennai, India	50	to evaluate the perception and attitudes of sports coaches in Chennai, India, regarding various aspects of sports-related oro-facial injuries as they have a direct influence on the trainees.	Cross-sectional	Modified	- 50% of the coaches had a Physical Education Training and 34% of the coaches had 11 or more years of coaching experience. - 70% of the coaches found the frequency of injury in the range of 1-5. - 46.20% of the coaches gave first aid by themselves.	The authors concluded that the results of the study show a lack of knowledge among physical education teachers in Chennai regarding tooth avulsion and its emergency management. Therefore, the authors suggest that educational programs are necessary to improve the level of knowledge among physical education teachers
9	Abhishek Anand, et al	International Journal of Scientific Study	2016	Patna	60	to evaluate the knowledge and awareness of physical education teachers in Patna regarding traumatic dental injuries among school children.	Cross-sectional	Modified	- 30% of physical education teachers replied that they would contact parents and carry the child to the dentist nearby the school upon seeing a child with trauma. - 50% of physical education	The authors concluded that their study provided a clear picture of insufficient knowledge and awareness of physical education teachers in Patna in the management of traumatic dental injuries among school children. They further suggest that protocols such as educational

									teachers replied that they would give child warm drink and call parents upon seeing a child with trauma. - 26.6% of physical education teachers had come across dental trauma in school. - 16.6% of physical education teachers had come across tooth that had fallen off in school. - 10.0% of physical education teachers had come across broken tooth with bleeding in school. - 8.3% of physical education teachers had received training regarding first aid.	and motivational programs, lectures, seminars, and regular visits to the school dentist should be implemented to improve the knowledge of physical education teachers.
10	Gupta, et al	J. Dent. Specialities	2016	Delhi	100	to assess the level of awareness towards management and prevention of dental injuries among sports instructors in Delhi, India, by a self-administered questionnaire.	Observational, cross-sectional	Self developed	- Out of the 96 instructors who responded to the questionnaire, 28% stated that they would preserve a fractured fragment or avulsed tooth, while 72% would not. - Additionally, 67% of the teachers were aware of the use of mouth guards, but 51% of these stated that they would not advise its use.	According to the authors of the study, the lack of awareness regarding the management and prevention of dental injuries in sports instructors necessitates the need for educational programs that can help sports instructors care for and prevent dental injuries among children.
6	Bhadana, et al	Current Medicine Research and Practice	2015	Faridabad, Delhi	335	to assess the level of knowledge among athletes and coaches about the sports-related dental injuries in Faridabad area adjoining Delhi state	Cross-sectional	Self developed	- 69.6% of athletes experienced dental injuries during sports, the most common being tooth fracture (27.5%) followed by loosened tooth (13.6%). - If any dental injury occurs, like a tooth has come out completely, 74% did not know how to proceed.	The authors conclude that the study highlights low levels of awareness about the prevention and management of traumatic dental injuries, particularly the use of mouthguards, among athletes and coaches in Faridabad area adjoining Delhi state.
12	Meka, et al	Indian Journal of Dental Sciences	2015	Khammam, Telungana	92	to evaluate the knowledge and awareness of physical education students in South India regarding emergency management of orofacial trauma and to assess the need for introducing dental trauma management programs in the teaching curriculum of physical education students.	Cross-sectional	Self developed	- Only 44.57% of respondents identified the broken tooth correctly as a permanent tooth. - Only 16.30% of respondents chose the correct option of looking for the avulsed tooth immediately and reaching the dentist in case of avulsion injury with emergency action to be taken. - Majority of the respondents (53.61%) chose anti-septic solution as the medium to carry the tooth to a dentist in case of	The author believes there is a significant lack of awareness and knowledge of proper emergency management of orofacial trauma among physical education students in South India. In conclusion, the author suggests that this area of study should be integrated into the curriculum of physical education programs to improve the awareness and education of students about how to handle dental traumatic injuries.

									avulsion injury. - Majority of the respondents would rinse the soiled avulsed tooth under tap water gently (51.01%) followed by cleaning with a toothbrush (36.96%).	
13	G Neeraja, et al	Journal of International Oral Health	2014	Bangalore, Karnataka	100	to assess the knowledge, attitude, and practices of physical instructors in Bangalore regarding oro-facial injuries and oro-facial protective devices.	Cross-sectional	Self developed	- 96% of physical instructors believed that oro-facial injuries can be prevented by using protective devices. - 58% of instructors reported that they had ever suggested the use of a protective device to their students. - 92% of instructors believed that athletes should use a mouth guard for contact sports.	The authors concluded that there was an urgent need to create more awareness about protective devices and their use in preventing oro-facial injuries. They also suggested that training programs could be conducted for physical instructors to improve their knowledge and practice regarding the use of protective devices.
14	Keerthika Natarajan, et al	Journal of Dental and Medical Science	2013	Chennai, tamilnadu	131	to evaluate the knowledge of Physical Education (PE) teachers in Chennai, India, regarding tooth avulsion and its emergency management.	Cross-sectional survey	Self developed	- it is reported that only 15.3% of the Physical Education (PE) teachers had previous experience with an avulsed tooth in a child, 64.1% of them knew the need for "immediate" emergency management, only 38.9% would replant an avulsed tooth, and only 5.3% chose milk as a suitable storage medium.	the author concludes that educational programs are necessary to improve the level of knowledge among physical education teachers.
15	Uma, S. R. et al	Journal of Indian Association of Public Health Dentistry	2011	Bangalore, Karnataka.	251	to assess the knowledge of trainees in emergency management, specifically in the management of orofacial trauma.	Cross sectional survey	Self developed	- out of the 251 participants in the study, 83.7% of the participants had received first aid training, and 71.7% of the training had covered management of injury.	The author's conclusion is that although the majority of the respondents in the study had received first aid training, the knowledge of emergency management among trainees for orofacial injuries was found to be limited.
16	Mohandas, U. et al	Journal of the Indian Society of Pedodontics and Preventive Dentistry	2009	Bangalore, Karnataka.	580	to assess the knowledge, attitude and practice of physical education teachers regarding emergency management of dental injuries in Bangalore schools.	Cross-sectional survey	Self developed	- 15.3% of respondents would scrub a soiled avulsed tooth gently with a toothbrush, - 45.1% would rinse the tooth under tap water, - 2.5% felt that they would put the tooth straight back into the socket, and - 36.8% did not know what to do. - 39% of physical education teachers who participated in the study had come across dental trauma during their job.	the authors concluded that, there is a gap that exist in the knowledge, attitude, and practice of physical education teachers in Bangalore schools about the emergency management of dental injuries.

CONCLUSION

In conclusion, this review exposes a concerning lack of knowledge about dental injuries among physical activity professionals and students in India. With an overall understanding of 52.6-54.2%, especially low awareness of first aid for dental injuries and mouth guard use, there's a clear need for improved education in curricula and targeted training programs. Regional variations and the better awareness among physical education teachers suggest a potential gender gap. The study's limitations, including language bias and small sample sizes, highlight areas for improvement in future research. These findings underscore the urgency of enhancing dental injury education and prevention strategies in Indian physical education.

Conflict of interest

The authors reports no conflicts of interest.

Financial Support

None declared.

ORCID ID

Dhanakodieswara vishakan S.M.P.: https://orcid.org/0009-0005-2764-4644

Rathna Piriyanga R S: https://orcid.org/0000-0002-1266-8847

Azhagu Abirami A: https://orcid.org/0000-0001-9106-4189

Malavika S.: https://orcid.org/0009-0003-5682-1019

REFERENCES

1. Shreya S, Baliga SD, Baliga SS. Sports-related facial trauma in the Indian population - A systematic review. J Indian Soc Pedod Prev Dent. 2022;40(1):3.
2. Fux-Noy A, Sarnat H, Amir E. Knowledge of elementary school teachers in Tel-Aviv, Israel, regarding emergency care of dental injuries. Dent Traumatol. 2011;27(4):252-6.
3. Sharma N, Srivastava B, Batra J, Sharma S, Khari PM. Evaluation of level of awareness among coaches regarding the prevalence of sports-related orofacial trauma in children and their first aid and prevention in Delhi-NCR region. J Int Clin Dent Res Organ. 2022;14(1):60–7.
4. C B, N C, E L, Mt F, Ac O, Pf D, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. Dent Traumatol Off Publ Int Assoc Dent Traumatol [Internet]. 2020 Aug [cited 2023 Nov 13];36(4). Available from: https://pubmed.ncbi.nlm.nih.gov/32475015/
5. Anjana M, Ahmed A, Duraisamy P. Knowledge, attitude and practice in dental trauma management among the teachers and physical education teachers. Indian J Multidiscip Dent. 2012;3(1):615.
6. Bhadana S, Tayal E, Indushekar KR, Saraf BG, Sheoran N, Sardana D. Knowledge and awareness of coaches and athletes regarding the sports-related dental injuries and their prevention in Faridabad. Curr Med Res Pract. 2015;5(6):253–7.
7. Tewari N, Goel S, Rahul M, Mathur VP, Ritwik P, Haldar P, et al. Global status of knowledge for prevention and emergency management of traumatic dental injuries among school teachers: A systematic review and meta-analysis. Dent Traumatol. 2020;36(6):568-83.
8. Ar K, R K. Knowledge and Attitude of the Sports Teachers in Central India towards Oro-facial Injuries and the use of Mouth Guard. J Sports Med Doping Stud [Internet]. 2016 [cited 2023 Nov 13];6(3). Available from: https://www.omicsonline.org/open-access/knowledge-and-attitude-of-the-sports-teachers-in-central-india-towardsorofacial-injuries-and-the-use-of-mouth-guard-2161-0673-1000179.php?aid=75131
9. Anand A, Mukherjee CG, Shukla JN, Sharma S. Knowledge and Awareness Regarding Traumatic Dental Injuries in School Children among Physical Education Teachers in Patna: A Cross-Sectional Study. 2016;4(1).
10. Gupta G, Gupta N, Chopra R, Sachde V. Awareness towards management and prevention of dental injuries among sports instructors in Delhi, India. J Dent Spec. 2016;4:135-8.
11. M P, Sharmin D. Knowledge and Attitudes of Coaches Regarding Sports Related Oro-facial Injuries in Chennai, India. Dentistry [Internet]. 2016 [cited 2023 Nov 13];6(6). Available from: https://www.omicsonline.org/open-access/knowledge-and-attitudes-of-coaches-regarding-sports-related-orofacial-injuries-in-chennai-india-2161-1122-1000383.php?aid=74575
12. Meka R, Pratap K, Padma CM, Kalyan VS, Bhargav ASK, Varma SC. Knowledge Of Emergency Management Of Orofacial Trauma Among Physical Education Students In South India. Indian J Dent Sci. 2015;7(2).
13. Neeraja G, Bharadwaj S, Shah K, Subramaniam P. Knowledge, attitude, and practices regarding oro-facial injuries and oro-facial protective devices among physical instructors in Bangalore.
14. Keerthika Natarajan D, Gurunathan D. Knowledge of tooth avulsion and its emergency management among physical education teachers in Chennai. J Dent Med Sci. 2013;11:21–4.
15. Uma SR, Aradhya MS. Knowledge of emergency management of orofacial trauma among physical education students-A questionnaire survey. J Indian Assoc Public Health Dent. 2011;9(Suppl 3):S646-53.
16. Mohandas U, Chandan GD. Knowledge, attitude and practice in emergency management of dental injury among physical education teachers: a survey in Bangalore urban schools. J Indian Soc Pedod Prev Dent. 2009;27(4):242-8.