

Review

Sports-Related Orofacial Injuries in Children: Types, Prevention and Treatment

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Received: 21 December 2023, Accepted: 24 December 2023, Published: 26 December 2023.

Abstract

Injuries to the face and mouth that occur during sports activities are a concern for athletes. It is important to understand the types of injuries, ways to prevent them and how to manage them. This review explores the aspects of oral injuries in children who participate in sports, including dental trauma lip injuries, facial bone fractures and soft tissue injuries. Dental trauma is especially common and can have lasting effects that require extensive dental treatment. Facial bone fractures can range in severity, often requiring intervention. Soft tissue injuries are also quite common and can potentially cause disfigurement, so they need wound care. To create an environment for sports activities, preventive measures like using fitted mouth guards and helmets as well as making rule modifications are essential. Educational programs targeting coaches and young athletes play a role in raising awareness about these injuries and promoting participation. It is crucial to identify injuries and provide appropriate management for optimal recovery. Implementing strategies such as using gear recommended by dental associations (like custom fitted mouth guards and helmets) significantly helps reduce the occurrence and severity of these injuries. In summary, the review underscores the challenges involved in dealing with injuries related to sports in children. It emphasizes the significance of taking actions and providing interventions. The healthcare community's dedication to improving protocols and promoting a safety-oriented environment is crucial for safeguarding the health of athletes participating in sports.

Keyword: *Orofacial injuries, Pediatric sports, Dental trauma, Preventive measures, Sports safety*

Introduction

Participating in sports is incredibly important for the social development of children. It helps them develop skills, build friendships and maintain a lifestyle (1). However, there are risks involved especially when it comes to injuries to the mouth and face. This literature review explores the types of injuries that young athletes may experience and looks into strategies for prevention and treatment. By examining existing research, we aim to gain an understanding of these issues and find ways to reduce the impact of such injuries on children engaging in sports. Orofacial injuries can range from mild to severe (2, 3). Include trauma (such as avulsion, luxation or fracture) lip injuries, fractures of facial bones and soft tissue injuries. Dental trauma is particularly common among athletes. Can lead to long term oral health problems that may require extensive dental treatments (4, 5). It can also have effects on the child. Facial bone fractures are another concern in sports related injuries often occurring during high impact collisions in contact sports (6, 7). The severity of these fractures varies, with some cases requiring intervention, for healing and realignment. Soft tissue injuries, like bruises, cuts and scrapes are quite common. Can lead to scarring or changes in appearance if not properly treated. To ensure the prevention of injuries, in children who participate in sports it is important to take an approach. One effective measure that is widely recommended is the use of gear like mouth guards and helmets. A study has shown that fitted mouth guards are particularly effective in reducing the occurrence and severity of injuries among young athletes involved in various sports (8-10). Additionally, certain sports have implemented rule modifications to minimize the risk of injuries. These include limitations on high risk activities and stricter penalties for plays in contact sports all aimed at providing a playing environment for children (11). Educational initiatives targeting both coaches and young athletes have played a role in increasing awareness about the importance of measures encouraging informed and cautious participation (12). In the case of injuries timely and appropriate treatment is vital for optimal recovery and minimizing potential complications. Immediate

intervention by professionals is often necessary for trauma cases. The International Association of Dental Traumatology guidelines provide an approach to managing injuries in children emphasizing quick assessment, documentation and appropriate dental care (13, 14). In situations involving facial bone fractures with critical structures involved surgical intervention may be required. Advancements such as the use of 3D printed implants for reconstruction have greatly improved precision and outcomes in procedures. On the side, injuries to tissues often necessitate careful wound treatment and could potentially benefit from the timely involvement of plastic surgeons in order to minimize scarring and enhance the healing process (15). In summary, dealing with sports-related injuries in children requires an integrated approach. These injuries can range from trauma to fractures of bones and soft tissue damage highlighting the importance of effective preventive measures. Consistently using gear, making rule adjustments and promoting initiatives are crucial in reducing the occurrence and severity of such injuries. Providing appropriate treatment based on established guidelines is essential for facilitating recovery and preventing long term complications. By advancing research emphasizing prevention strategies and continuously refining treatment approaches the healthcare community can play a role in creating a sports environment for children. As young athletes continue their involvement in sports, addressing injuries demonstrates a commitment to the well-being and safety of the pediatric sports community. This review aims to provide an overview of types, prevention methods and treatment approaches for sports related injuries in children.

Discussion

Sports related orofacial injuries in children present a range of conditions that require an understanding for management. Dental injuries, such as avulsion and fractures need attention to preserve health and prevent any potential psychological impact on the child (16, 17). Lip injuries, often caused by collisions or falls, should be promptly treated to alleviate pain and minimize scarring. Facial bone

fractures resulting from high impact collisions exhibit signs, which help determine if surgical intervention is necessary (18, 19). Soft tissue injuries like contusions and abrasions highlight the importance of wound care to prevent infections and promote healing. Taking measures plays a role in reducing these clinical manifestations. Using custom fitted mouth guards and helmets significantly decreases the occurrence and severity of injuries and facial bone fractures, making sports safer for everyone involved. Implementing rule modifications and educational initiatives further reinforce strategies fostering a culture of safety within sports communities. Managing orofacial injuries involves field care, comprehensive assessment and tailored interventions. Dental trauma requires care following standardized guidelines that emphasize prompt assessment and appropriate treatment. In some cases of bone fractures, surgical intervention may be necessary; recent advancements, like 3D printed implants have improved precision in these procedures leading to outcomes. Soft tissue injuries, depending on their severity, require attention to wound care and may benefit from early involvement of plastic surgeons to achieve the best possible results.

Clinical Manifestation

Sports related facial injuries in children can take on forms, each presenting challenges for athletes and healthcare professionals alike. These injuries can affect parts of the face such as the teeth, lips, facial bones and soft tissues. It is crucial to understand these manifestations to quickly identify, diagnose and effectively manage such injuries. Dental trauma is a manifestation of sports related injuries in children. Young athletes often experience injuries like tooth avulsion (displacement from its socket) tooth luxation (displacement within the socket) or fractures of varying severity affecting the enamel, dentin or pulp. These injuries may result in pain, swelling, bleeding or visible changes in tooth position that require attention to preserve health. Additionally, lip injuries are also frequently seen among children participating in sports activities. Lip injuries, such as contusions, lacerations and abrasions often occur due to impact collisions or

falls while participating in sports. You may experience symptoms like swelling, bruising, pain and visible wounds. The severity of lip injuries can differ, with significant lacerations affecting the structures underneath. Prompt evaluation and treatment are crucial for managing pain preventing infections and minimizing the appearance of scars. Facial bone fractures play a role in the range of injuries seen in children involved in sports activities. When high impact collisions occur in contact sports, it can result in fractures affecting facial bones such as the nose, cheekbones and jaw. Clinical indications may include pain, swelling, deformity, bruising and difficulty in moving the jaw or other affected facial structures. In some cases, fractures may easily occur. Even visible on the outside. To accurately assess the severity and guide treatment, an evaluation that includes imaging techniques like X rays or CT scans is often necessary. Soft tissue injuries are also common during sports related injuries and encompass contusions (bruises) lacerations (wounds) and abrasions (scrapes) (20, 21). These injuries can affect areas like the cheeks, gums, tongue or other oral tissues. Contusions are caused by blunt force trauma resulting in localized bruising and swelling. Lacerations occur when there is impact from objects involved in sports activities or sharp objects; clinical signs include bleeding, pain and obvious damage to the tissue. Abrasions typically involve scraping or rubbing off of the layers of skin or mucosa leading to localized discomfort and pain. Properly caring for wounds and managing them is really important to avoid infections and promote healing. Taking measures is crucial in reducing the effects of orofacial injuries in children that are related to sports activities. Wearing custom made mouth guards, which are highly recommended for protection, can significantly reduce the likelihood and severity of injuries. These mouth guards help absorb and distribute the impact of blows during sports activities, effectively safeguarding teeth from trauma. Helmets are particularly important in sports where head injuries are a risk as they help prevent bone fractures and traumatic brain injuries. Making rule changes in sports to decrease activities and enforce penalties for dangerous plays also

contributes to creating a safer playing environment and reduces the occurrence of injuries to the mouth and face. It is crucial to appropriately treat injuries in children to effectively address their clinical manifestations. Dental professionals should provide intervention following established guidelines for assessment, documentation and specialized dental care in cases of trauma. Surgical treatment may be necessary for facial bone fractures that involve critical structures. Soft tissue injuries require wound care with plastic surgeons being involved if needed to minimize scarring and promote optimal healing. To summarize sports related orofacial injuries in children can affect areas such as teeth, lips, facial bones and soft tissues. Timely identification and appropriate management are vital not, for pain relief but to prevent complications and ensure an optimal recovery process. Strategies aimed at prevention, such as wearing gear and making rule adjustments are important in reducing the occurrence and seriousness of these injuries. Ongoing research and education efforts contribute to gaining an understanding of how these injuries present themselves, creating a safer sports environment for children and promoting their overall health.

Management

Managing sports related facial injuries in children is a task that requires an approach. It involves a range of actions starting from care in the field to treatments with an emphasis on prevention and understanding the specific types of injuries. Dealing with these injuries requires an organized response to ensure recovery while minimizing any potential long-term effects. Immediate care on the field plays a role in mitigating the impact of injuries. When it comes to trauma, quick action is vital in cases where a tooth is completely knocked out (avulsion). Handling the tooth carefully and re implanting it without touching the root are steps. For dislocations or fractures applying compresses promptly can help reduce swelling and providing pain relief is important. Similarly, for lip injuries that involve bleeding and swelling swift attention should be given to controlling bleeding through pressure and reducing swelling using ice packs. In cases of bone

fractures temporary stabilization using splints or bandages can be done until professional medical assistance is available. Similarly, it is important to clean soft tissue injuries such as bruises and scrapes with soap and water to prevent infection. Afterwards, applying dressings can help protect the area. Once immediate field care is provided, it becomes crucial to conduct an assessment in order to gain an understanding of the severity and characteristics of orofacial injuries. Dental injuries often require an examination of the teeth, gums and surrounding tissues. This typically involves an evaluation, along with imaging studies like dental X rays or cone beam computed tomography (CBCT) scans to assess the severity of fractures, dislocations or tooth loss. When it comes to bone fractures, the assessment is guided by signs such as swelling, bruising, deformity and limited mobility. Imaging studies provide insights into the extent of these fractures. Help determine if surgical intervention is necessary. Soft tissue injuries are evaluated based on factors like depth, size and location of wounds. Clinical examination helps categorize these injuries as bruises, cuts or scrapes (22). The management of injuries usually requires dental care in accordance with guidelines provided by the International Association of Dental Traumatology (IADT). Re implantation of teeth followed by a period of stabilization through splinting is considered ideal. In cases where re-implantation's not possible it becomes crucial to store the tooth in a suitable medium like milk or saline and seek immediate dental attention. Treatment options for dislocations and fractures vary depending on their severity. May involve repositioning, splinting or restorative procedures such, as bonding or crowns. It is crucial to act in order to avoid complications, like pulp necrosis or infection. The treatment of bone fractures may require intervention to properly align and stabilize them. Maxillofacial surgeons use techniques ranging from realignment for fractures that haven't moved out of place to complex surgeries involving realignment and internal fixation, for displaced fractures. Advancements in methods have been made, like using 3D printed implants for reconstructing features. These customized implants are designed to ensure a restore facial symmetry.

After the surgery it's important to monitor for any signs of infection, promote wound healing and manage pain. Additional imaging studies might be necessary to evaluate the success of the surgery and identify any complications that may arise. The treatment approach for soft tissue injuries depends on their severity. Minor bruises and scrapes usually respond well to measures such as rest, ice, compression, elevation (RICE) along with applying antibiotics and sterile dressings. Deeper cuts may require stitches with the choice of suture material and technique based on the location and nature of the wound. If soft tissue injuries lead to scarring or affect functionality, it may be advisable to seek intervention from plastic surgeons, who can employ techniques like scar revision or tissue grafting to improve both appearance and function. In managing sports related injuries in children, preventive strategies are crucial. Custom made mouth guards, which have been recommended by associations, play a crucial role in preventing dental injuries by absorbing and dispersing the forces of impact. This helps to minimize the chances of fractures, dislocations and tooth loss. Similarly, helmets are vital in sports that involve a risk of head injuries as they provide protection not to the skull but also to the facial bones. Modifications to the rules in sports organizations play a role in preventing injuries by restricting high risk activities and penalizing plays. It is crucial to have programs that target coaches, parents and young athletes as part of strategies. Raising awareness about the importance of using gear, following rules and promptly reporting injuries helps create a safe culture within sports communities. In summary, managing sports related injuries in children is a process that requires careful attention to on-field care, thorough assessment and customized interventions. Incorporating strategies based on advancements and standardized guidelines ensures a comprehensive approach to minimizing the impact of orofacial injuries. By refining and adapting these management protocols, the healthcare community can contribute towards establishing a sports environment for children while prioritizing their long-term well-being and promoting safety in pediatric sports.

Conclusion

Managing sports related injuries in children is a process that requires a holistic approach. The various clinical signs, which include trauma and facial bone fractures highlight the importance of strategies and timely interventions. Using fitting mouth guards, helmets, rule adjustments and educational initiatives all contribute to preventing injuries. By implementing guidelines for treating trauma and facial bone fractures, we can ensure optimal recovery and long-term well-being. As the healthcare community continues to refine management protocols, our commitment to creating a sports environment for children remains paramount. By emphasizing the significance of measures, informed interventions and ongoing research efforts we aim to promote a culture of safety in pediatric sports. The overall well-being of athletes depends on our understanding of clinical signs and evidence-based practices so that their participation in sports remains positive and beneficial for their physical and social development.

Disclosure

Conflict of interest

There is no conflict of interest.

Funding

No funding

Ethical consideration

Non applicable

Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

References

1. Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR. A systematic review of the psychological and social benefits of participation in sport for children

- and adolescents: informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*. 2013;10(1):98.
2. Tokas A, Sood S, Bhatia HP, Sharma N, Singh A. Sports-related Orofacial Injuries in Children: Awareness and Experience among Sports Coaches in Delhi Region of India. *Int J Clin Pediatr Dent*. 2022;15(4):450-4.
 3. Shanmugam C, Maffulli N. Sports injuries in children. *British Medical Bulletin*. 2008;86(1):33-57.
 4. Mordini L, Lee P, Lazaro R, Biagi R, Giannetti L. Sport and Dental Traumatology: Surgical Solutions and Prevention. *Dent J (Basel)*. 2021;9(3).
 5. Young EJ, Macias CR, Stephens L. Common Dental Injury Management in Athletes. *Sports Health*. 2015;7(3):250-5.
 6. Cole P, Kaufman Y, Hollier LH, Jr. Managing the pediatric facial fracture. *Craniofacial Trauma Reconstr*. 2009;2(2):77-83.
 7. Dobitsch AA, Oleck NC, Liu FC, Halsey JN, Hoppe IC, Lee ES, et al. Sports-Related Pediatric Facial Trauma: Analysis of Facial Fracture Pattern and Concomitant Injuries. *Surg J (N Y)*. 2019;5(4):e146-e9.
 8. Daneshvar DH, Baugh CM, Nowinski CJ, McKee AC, Stern RA, Cantu RC. Helmets and mouth guards: the role of personal equipment in preventing sport-related concussions. *Clin Sports Med*. 2011;30(1):145-63, x.
 9. Ramagoni NK, Singamaneni VK, Rao SR, Karthikeyan J. Sports dentistry: A review. *J Int Soc Prev Community Dent*. 2014;4(Suppl 3):S139-46.
 10. Štyriak R, Hadža R, Arriaza R, Augustovičová D, Zemková E. Effectiveness of Protective Measures and Rules in Reducing the Incidence of Injuries in Combat Sports: A Scoping Review. *Journal of Functional Morphology and Kinesiology*. 2023;8(4):150.
 11. Arias JL, Argudo FM, Alonso JJ. Review of rule modification in sport. *J Sports Sci Med*. 2011;10(1):1-8.
 12. Walters SR, Minjares V, Bradbury T, Lucas P, Lenton A, Spencer K, et al. Promoting a culture change in junior and youth sport in New Zealand. *Frontiers in Sports and Active Living*. 2022;4.
 13. Bourguignon C, Cohenca N, Lauridsen E, Flores MT, O'Connell AC, Day PF, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. *Dent Traumatol*. 2020;36(4):314-30.
 14. Levin L, Day PF, Hicks L, O'Connell A, Fouad AF, Bourguignon C, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: General introduction. *Dent Traumatol*. 2020;36(4):309-13.
 15. Chhabra S, Chhabra N, Kaur A, Gupta N. Wound Healing Concepts in Clinical Practice of OMFS. *J Maxillofac Oral Surg*. 2017;16(4):403-23.
 16. Galic T, Kuncic D, Poklepovic Pericic T, Galic I, Mihanovic F, Bozic J, et al. Knowledge and attitudes about sports-related dental injuries and mouthguard use in young athletes in four different contact sports—water polo, karate, taekwondo and handball. *Dental Traumatology*. 2018;34(3):175-81.
 17. Udayamalee I, Amarasinghe H, Zhang P, Johnson N. Development and validation of a novel index to assess the perceived impact of sports-related orofacial trauma among adolescents: findings from Sri Lanka. *BMC Oral Health*. 2023;23(1):388.
 18. Truong TA. Initial Assessment and Evaluation of Traumatic Facial Injuries. *Semin Plast Surg*. 2017;31(2):69-72.
 19. Gómez Roselló E, Quiles Granado AM, Artajona Garcia M, Juanpere Martí S, Laguillo Sala G, Beltrán Mármol B, et al. Facial fractures: classification and highlights for a useful report. *Insights Imaging*. 2020;11(1):49.
 20. Hoogenboom BJ, Smith D. Management of bleeding and open wounds in athletes. *Int J Sports Phys Ther*. 2012;7(3):350-5.
 21. Bhattacharya V. Management of soft tissue wounds of the face. *Indian J Plast Surg*. 2012;45(3):436-43.
 22. Ibrahim DA, Swenson A, Sassoon A, Fernando ND. Classifications In Brief: The Tscherne

Classification of Soft Tissue Injury. Clin Orthop Relat Res. 2017;475(2):560-4.