

PROSTHODONTIC TREATMENT OF DENTAL INJURY AT FEMALE FOOTBALL PLAYER WITH ZIRCONIA RESTORATION

DOI: <https://doi.org/10.46733/PESH24131177s>
(Original scientific paper)

Natasha Stavreva¹, Emilija Bajraktarova Valjakova¹, Aneta Mijoska¹, Nadica Janeva¹, MIMOZA Sulejmani¹, Tanja Janchevska Georgievska²

¹ Ss. Cyril and Methodius University in Skopje, Faculty of Dentistry-Skopje,
Department of Prosthodontics, Skopje, Republic of Macedonia

² Ss. Cyril and Methodius University in Skopje, Faculty of Medicine-Skopje,
Center for Rehabilitation of Verbal Communication Patology, Skopje, Republic of Macedonia

Abstract

Sport plays an important role in physical and mental health, but also carries a risk of injuries. Participation in sports refers to injuries of the teeth, mouth, surrounding oral structures. Football carries risk of orofacial and dental injuries too. Rough play, kicking the ball with head and falls are the reasons for orofacial and dental trauma during the football trainings and matches. A large number of dental and orofacial injuries related to sports affect the maxilla, anterior teeth, and the upper lip, with 50-90% of the injures involving the maxillary incisors. The aim of this study was to present the prosthodontic treatment of female football player with dental trauma as a result of injury during women football match. The choice for prosthodontic treatment was all-ceramic zirconia restoration where the injury was successfully treated with excellent esthetic and function with satisfaction of the patient and the doctor. Dental trauma at sport activities causes functional, psychological and social problems for the patients. The correct and on-time dealing of the dentist with these conditions eliminates further problems. Education of the patients who take part in sport activities like football enables prevention and reduction of dental traumas.

Key Words: *prosthodontic treatment, dental trauma, sport*

Introduction

Sport plays an important role in physical and mental health. There is a large number of people all over the world taking part in professional and amateur sports (Agali et al., 2016). Sport participation refers to injuries or damage to the teeth, mouth or surrounding oral structures (Black et al., 2017). The sport injury can affect athletes of all ages: children, adolescents and adults among amateur and professional sports (Fernandes et al., 2019).

The causes for sport dental injuries are diverse and can include direct impact injuries, accidental collisions and falls (Mojarad et al., 2020). People who are taking part in sports with close body contacts are especially disposed to orofacial and dental injuries (Oliveira et al., 2020).

Contact sports are characterized by physical interaction between players striving to win against opposing player or team where the force and occurrence of contact may be significant factor for dental trauma. Based on the form of contact, sports can be categorized as direct (taekwondo, boxing, kick boxing, etc.), indirect (football, basketball, handball) and no/minimal contact (badminton, ping pong, volleyball) sports. Depending on the type of sport prevalence of dental trauma ranges 8-45% according to different studies (Papakosta et al., 2008).

According to the International Academy of Sport Dentistry, there are two risk categories of dental trauma: high risk sports (American football, ice hockey, inline skating, ski boarding, rugby, mountain biking) and medium risk sports (squash, gymnastics, basketball, handball, water polo and football) (Di Angelis et al., 2012).

In Journal of American Dental Association was reported that 13-39% of all dental injuries are sport related. Males are traumatized twice as often as females, with the maxillary central incisors being the most commonly injured teeth, with 50-90%. The most often injured soft tissue is the upper lip (Rouhani et al., 2016).

Football is most popular sport in the world. According to FIFA, nearly 130,000 professional football players and more than 4,400 professional football clubs have been registered around the world.

In football, irrespective of being an indirect contact sport, players exhibit high risk of injuries owing to the outline of the game where head is frequently used to score, pass and defend and therefore are exposed to possible orofacial and dental injuries due to the impact encountered (Selva Mani et al., 2019).

Mouthguards are considered as the most effective and efficient way to prevent dental injuries.

The most common sport related orofacial and dental injuries are soft and hard tissue injuries, tooth intrusion, luxation, crown and/or root fractures and complete avulsion of the tooth. Almost 40% of all injuries are dental traumas reported by the Journal of American Dental Association. Maxillary anterior teeth are most affected (Correa et al., 2010).

According to the literature a lot of studies have observed that sport accidents have 3 times higher risk than traffic accidents and six times higher than work related accidents. In the work of Gay-Escoda 14,4% of football players are suffering from dental trauma (Gay-Escoda et al., 2011)

A study by Ferrari and De Medeiros showed the predominance of dental trauma in different types of sports including jiu-jitsu with 41,2%, handball with 37,1%, basketball with 36,4%, football with 23,2%, judo with 22,3% and field hockey with 11,5% (Ferrari & De Medeiros, 2002)

Cohenca et al. attempted to classify various tooth injuries ranging from simple fractures to tooth avulsion. The study also reported that crown fractures were the most dominant class of injury. High prevalence of dental trauma and its impact in daily life is considered a major public oral health problem (Cohenca et al., 2007).

Unfortunately, there are not many published studies for dental injuries in Macedonia. There is a need for universal system to report sport related dental injuries in order to establish a valid database that may be used to enhance treatment outcomes. This will help to improve prevention of this type of injuries and to promote better education for players, coaches, officials and parents.

According to the International Academy of Sports Dentistry, "sport dentistry" had its origins in 1980s and involves the prevention and treatment of orofacial injuries and related oral diseases, as well as the collection and dissemination of information on dental orofacial injuries and the encouragement of research in the prevention of such injuries (Ranalli, 2005; Sigurdson, 2013).

The American Dental Association recommends wearing a mouthguard for the following sports (as shown in Table 1):

Table 1. Sports in which wearing of mouthguards is recommended

Acrobatics	Handball	Sky diving
Basketball	Ice hockey	Football
Bicycling	Inline skating	Softball
Boxing	Squash	Volleyball
Equestrian events	Martial arts	Surfing
Extreme sports	Rugby	Water polo
Field hockey	Weight lifting	Skate boarding
Wrestling	Gymnastics	Skiing

The use of mouthguards in contact sports is highly recommended because of their ability to absorb the shock of the force thereby protecting teeth. Most of the athletes do not recognize the necessity of using a mouthguard, others anticipate problems in verbal communication, poor retention, breathing difficulties and disagreeable esthetics (Ferrari et al., 2002)

Risk factors for sport related dental injuries

Risk factors for sports injuries are the following:

- **Type of sport** – risk of injury increases in case of the contact or fast moving sports
- **Age** – risk of injury in high school sports increases with age. Studies reported that the most of the sports dental injuries occurred in adolescents and young adults and that the risk of injury decreases with increasing of age.
- **Gender** – Men and boys have an apparent tendency to select more aggressively vigorous or "contact" sports and therefore more often are exposed to dental injuries than women and girls.

- **Skilled coaching** – Lack of skilled coaching and improper training can increase the risk potential.
- **Orthodontic status** – Maxillomandibular relationship influence vulnerability to sports related accidents. A class II molar relation with an overjet greater than 4 mm, short hypotonic or incompetent upper lips and mouth breathing increases the risk for sports dental trauma.
- **Psychological factors** – Kerr and Fowler documented that any psychological factor like stress, anxiety, performance pressure or low self-confidence would reduce the athlete's attention to the challenges and/or increase the possibility to fatigue, which may be an etiologic factor in sports injuries including dental injuries (Kerr & Fowler, 1988)

Case Report

The presented case report covers the sport related dental injury of the maxillary anterior teeth and the prosthodontic therapy with zirconia crown at University Dental Clinic "St. Pantelejmon"-Skopje.

The patient was 22 years old female football player. During a jump for a high ball she was hit by the opposing player's elbow and her upper left incisor was fractured. The fracture was with pulp exposure. With mild pain she continued the match until the end. The tooth was already endodontically treated. (as shown in Figure 1)



Fig 1. Pre-treatment view with fiberglass post

The clinical and radiographic examination showed crown fracture. Because of the previous good endodontic therapy, we decided to place a retention of fiberglass post cemented with composite cement. We chose zirconia as a restoration material for the crown. Tooth preparation was made with local anesthesia and we took the digital impression. In the next appointment we tried the fabricated zirconia crown. After checking the occlusion, the crown was cemented with glass-ionomer cement. We got an excellent result and satisfied patient. We achieved great esthetic and functional rehabilitation of the injured tooth (shown in Figure 2).



Fig 2. Post-treatment view

Discussion

Literature reported that 13-39% of all dental injuries were sports-related and of all sports accidents reporting 11-18% were maxillofacial injuries (Aykuz et al., 2012). The soft tissue injuries and the fractures of the nose, the zygoma and the mandible are the most common types of sports-related facial trauma (Aljohani et al., 2017). These injuries often occur in combination. Males are traumatized twice as often as females. In children, sports were found to be responsible for 13% of overall oral trauma.

The majority of sports-related dental and orofacial injuries affect the upper lip, maxilla and anterior teeth, with 50-90% of dental injuries involving the maxillary incisors (Isceri et al., 2011).

Because of potential pain, psychological effects and economic implications, the consequences of orofacial dental trauma are substantial for sport participants and their families (Goettems et al., 2014).

Appropriate treatment and therapy in patients with dental trauma is very important. It sometimes needs a multidisciplinary approach of different dental specialties (O'Malley et al., 2012).

In 2000, a predictive index was developed to identify the risk factors involved in various sports (Tripodi et al., 2021). This index was based upon a defined set of risk factors that predict the chance of injury including demographic information (gender, age, dental occlusion), type and usage of protective equipment, the intensity and the speed of the sport, level of activity and exposure time, level of coaching and type of sports organization, whether the player is a focus of attention in a contact or non-contact sport, history of previous sports-related injury, and the situation (e.g., practice vs game) (Spinas et al., 2018).

Wearing of proper protective equipment, particularly a mouthguard is highly recommended in all contact and ball sports, as well as in football (Ferrari et al., 2002; Mojarad et al., 2020).

Conclusion

Orofacial injuries that occur during sports activities, particularly during playing football are largely preventable. Mouth protection for athletes is one of dentistry's contributions to sports medicine. It is the responsibility of the dental profession, therefore, to become more active in sports injury prevention programs (Durkan et al., 2008).

We treat sports dental trauma very often in everyday practice. Proper therapy and treatment leads to very good restored teeth, established good function and excellent aesthetics, with satisfied patients and doctors.

Mouthguards provide protection against injuries to the orofacial and dental area, including the teeth, lips, cheeks and tongue, thereby reducing the incidence and severity of injuries that occur during sport practice, competition and matches. They also have been shown to prevent head and neck injuries, concussions and jaw fractures (Afrashtehfar et al., 2017).

Dentistry should be working diligently to require mandatory use of mouthguards in sports for best prevention of dental injuries.

References

- Afrashtehfar, K.I., Chung, J. (2017) Mouthguard Use May Reduce Dentofacial Injuries in Field Hockey Players: Question: In Field Hockey Players, What Are the Prevalence and Characteristics of Dentofacial Trauma and Mouthguard Use? *Evid. Based. Dent*, 18, 48–49. [CrossRef] [PubMed]
- Agali, C.R., Mathur, A., Suvama, M., Verma S., Ghosh, S. (2016) Insight to Epidemiology of Sports Related Dental Injuries; *International Journal of Oral Health and Medical Research*, 2(6): 141-144
- Akyuz, S.N., Erdemir A. (2012) Restoration of tooth fractures using fiber post and fragment reattachment: three case reports. *European Journal of General Dentistry*, vol. 1, no. 2, pp. 94–98
- Aljohani, Y.R., Alfaifi, K.H., Redwan, S.K., Sabbahi, D.A., Zahran, M.H. (2017) Dental injuries in taekwondo athletes practicing in Saudi Arabia. *Saudi medical journal*, 38:1143-7
- Black, A.M., Patton, D.A., Eliason, P.H., Emery, C.A. (2017) Prevention of Sport-related Facial Injuries. *Clin Sports Med*, 36(2):257-78
- Cohenca, N., Roges, R.A., Roges, R. (2007) The Incidence and Severity of Dental Trauma in Intercollegiate Athletes. *J Am Dent Assoc*, 138(8):1121-6
- Correa, M.B., Schuch, H.S., Collares, K. (2010) Survey on the occurrence of dental trauma and preventive strategies among Brazilian professional soccer players. *J Appl Oral Sci*, 18(6):572–576. DOI: 10.1590/s1678-77572010000600007
- Di Angelis, A.J., Andreasen, J.O., Ebelesede, K.A. (2012) International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1, fractures and luxations of permanent teeth. *Dental Traumatology*, 28(1):2–12
- Durkan, R.K., Ozel, M.B., Celik, D., Bağış, B. (2008) The restoration of a maxillary central incisor fracture with the original crown fragment using a glass fiber-reinforced post: A clinical report. *Dental Traumatology*, 24: e71-5
- Ferrari, C.H., Medeiros, J.M.F.D. (2002) Dental Trauma and Level of Information: Mouthguard Use in Different Contact Sports. *Dental Traumatology*, 18(3):144-7.
- Fernandes, L.M., Neto, J.C.L., Lima, T.F., Magno, M.B., Santiago, B.M., Cavalcanti Y.W. (2019) The use of mouthguards and

- prevalence of dento-alveolar trauma among athletes: a systematic review and meta-analysis. *Dental traumatology*, 35(1):54-72
- Gay-Escoda, C., Vieira-Duarte-Pereira, D.M., Ardèvol, J., Pruna, R., Fernandez, J., Valmaseda-Castellón, E. (2011) Study of the effect of oral health on physical condition of professional soccer players of the Football Club Barcelona. *Med. Oral Patol. Oral Cir. Bucal.*, 16, 436–439.
- Goettems, M.L., Schuch, H.S., Hallal, P.C., Torriani, D.D., Demarco, F.F. (2014) Nutritional status and physical activity level as risk factor for traumatic dental injuries occurrence: a systematic review. *Dental Traumatology*, 30:251-8
- Isceri, U., Ozkurt Z., Kazazo E. (2011) Clinical management of a fractured anterior tooth with reattachment technique: a case report with an 8-year follow up. *Dental Traumatology*, vol. 27, no. 5, pp. 399–403, 2011
- Kerr, G., Fowler, B. (1988) The relationship between psychological factors and sport injuries. *Sports Med*, 6:127-34.
- Mojarad, F., Farhadian, M., Torkaman, S. (2020) The Prevalence of Sports-related Dental Injuries and the Rate of Awareness of Mouthguard Use among Child Athletes. *Journal of Pediatric Research*, 7(4)
- Oliveira Werlich, M., Honnef, L.R., Silva Bett, J.V., Domingos, F.L., Pauletto, P., Dulcinea Mendes de Souza, B. (2020) Prevalence of dentofacial injuries in contact sports players: A systematic review and meta-analysis. *Dental Traumatology*, 36(5):477-88
- O'Malley, M., Evans, D.S., Hewson, A., Owens, J. (2012) Mouthguard use and dental injury in sport: a questionnaire study of national school children in the west of Ireland. *Journal of the Irish Dental Association*, 58:205-11
- Papakosta, V., Koumoura, F., Mourouzis, C. (2008) Maxillofacial injuries sustained during soccer: incidence, severity and risk factors. *Dental Traumatology*, 24(2):193–196. DOI: 10.1111/j.1600-9657.2007.00536.x
- Ranalli, D.N. (2005) Dental injuries in sports. *Curr Sports Med Rep*, 4(1):12–17
- Rouhani, A., Ghoddsi, J., Rahmandost, M.R., Akbari, M. (2016) Prevalence of Traumatic Dental Injuries among Contact Sport Practitioners in Northeast of Iran in 2012. *J Dent Materials Tech*, 5(2):82-5
- Selva Mani, S., Aparna, S., Madan Kumar, P.D. (2019) Prevalence of Orofacial Injuries in Contact Sports: A Systematic Review. *International Journal of Physical Education, Sports and Health*, 6(3):39-46
- Sigurdsson, A. (2013) Evidence-based review of prevention of dental injuries. *J Endod* 39(3 Suppl): S88–S93
- Spinas, E., Mamei, A., Giannetti, L. (2018) Traumatic dental injuries resulting from sports activities; immediate treatment and five years follow-up: an observational study. *The open dentistry journal*, 12:1
- Tripodi, D., Cosi, A., Fulco, D., D'Ercole, S. (2021) The impact of sport training on oral health in athletes. *Dent. J.*, 9, 51. [CrossRef]

