8. Orofacial sports injuries

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8.1. Introduction

Orofacial sports injuries are traumatic lesions involving the oral cavity as well as the facial region that occur as a result of sports activities. They are frequent and often cause esthetic, functional, psychological and economic problems. Among orofacial sports injuries, dental injuries are the most frequent (Scott et al., 1994).

Sports dentistry is an upcoming field in dentistry which is associated with the correct diagnosis, management of orofacial injuries and related complications. It also involves promoting prevention of the injuries. In the context of this chapter, the orofacial region encompasses various soft and hard tissues of the face below the supraorbital ridge including the dentition, various maxillofacial bones and the maxillary and mandibular arches.

Large numbers of licensed and unlicensed sports female and male participants of different ages in developing and developed countries, privileged and disadvantaged communities take part in various sports as professional or leisure activities. Unfortunately the very much liked sports related activities are known to produce a variety of sports injuries with orofacial injuries not being uncommon.
Orofacial sports injuries have no sexual, age, racial, socioeconomic or geographical boundaries (Bendo at al., 2010). The injuries can have significant negative functional, esthetic, and psychological effects both on children and adults. Orofacial sports injuries are a concern for sports participants, parents, trainers, coaches, sporting associations and federations, medical and oral health care providers who specialize in sports injuries.

A summary of the challenges related to sports injuries in the orofacial region especially among disadvantaged communities is presented in this chapter. In addition, the chapter provides motivation to oral health professionals to address stakeholders’ awareness on occurrence, management and prevention of orofacial sports injuries outside the health facilities environment.

8.2. Epidemiology of orofacial sports injuries

In the last four decades, sports related activities have been associated with the highest number of orofacial injuries among sports participants (Ranalli, 2002; Fakhruddin et al., 2008; Lam et al., 2008; Naidoo et al., 2009; Thelen & Bardsen, 2010; Bendo et al., 2010; Faus-Damia et al., 2011; Deogade et al., 2016). People participate in sports and related activities for various reasons including pleasure, relaxation, competition, socialization, maintenance and improvement of fitness and health. Furthermore, sports activities will keep multiplying due to international pressure and promotion as part of vigorous physical activities in the fight of the rising non communicable diseases (NCDs) worldwide (Deogade et al., 2016).

The prevalence of orofacial sports injuries ranges from 8% to 86% (LePhart & Fu, 1991; Ranalli, 2002; Cornwel et al., 2003; Levin et al., 2003; Saheeb & Sede, 2003; Skaare & Jacobsen, 2003; Gassner et al., 2004; Perunsky et al., 2005; Caglar & Sandalli, 2006; Fakhruddin et al., 2008; Naidoo et al., 2009; YesilDuymus & Gungor, 2009; Thelen & Bardsen, 2010; Bendo et al., 2010; Faus-Damia et al., 2011; Maxén et al., 2011; Sepet et al., 2014; Needleman et al., 2015). Such injuries include intra- and extra oral tissue lacerations, fractures, luxation and tooth avulsion, mandibular dislocation or fracture and cerebral concussion. The main causes of orofacial injuries are falls and collisions with people or objects, which are very common in contact sports (Ranalli, 2000; Ranalli, 2005; Bourguignon
Orofacial sports injuries & Sigurdsson, 2009; Correa et al., 2010). In Nigeria, maxillofacial fractures due to sports involved the mandible more (54.5%) than the middle third of the face (Fasola et al., 2000). Orofacial injuries are common in basketball, soccer, basketball, bicycling, in-line skating, gymnastics, and other sports (Maestrello et al., 1999). Baseball and basketball are associated with the largest number of orofacial sports injuries and the most common dental sports injuries are fractures of crowns of teeth (Cetinbaş et al., 2008). A universal finding is that injury to the central incisors accounts to 80% of the injuries affecting maxillary jaw (Cavalleri & Zerman, 1995). In Europe, soccer is responsible for up to 50% of sports-related orofacial injuries (Tozoglu & Tozoglu, 2006). The high prevalence of orofacial injuries among many sports participants reported by several research reports justifies the need for multidisciplinary sports injuries prevention interventional approach with emphasis on the rules of various games (Azodo et al., 2011; Nemutandani, et al., 2012). In addition, the occurrence nature of orofacial sports injuries reflects both the persistence of socioeconomic inequalities and the limitations of social and cares delivery systems that are not well designed to provide equitable access to promoting preventive health sustaining resources.

8.3. Awareness on orofacial sports injuries, emergency management and preventive strategies

Orofacial injuries are increasingly considered a public health problem in high impact sports. Unfortunately, to date not all sports participants, parents, school teachers, trainers, coaches, members of sporting associations and federations, medical as well as oral health care providers are adequately aware and knowledgeable about the occurrence, management and prevention of orofacial sports injuries (Sepet et al., 2014). Such awareness might inspire those involved in sports related activities to focus on specific preventive programs. For example, soccer referees have a role to play in the prevention of orofacial injuries by fairly and timely deciding a foul play whenever there is one. It has been observed that in more than 50% of the incidents that resulted in injuries, the decision taken by the referee was “no foul” (Andersen, et al., 2004; Arnason et al., 2004; Correa et al., 2010). Correa, et al., (2010) reported that most of the physicians of Brazilian professional soccer teams did not have sufficient knowledge about prevention of orofacial injuries.
Several studies have revealed that the school teachers’ awareness and knowledge on occurrence and emergency management of orofacial sports injuries within the school environment were insufficient (Chan et al., 2001; Al-Jundi et al., 2005; Caglar et al., 2005a; McIntyre et al., 2008; Mohandas & Chandan, 2009; Mesgarzadeh et al., 2009; Skeie et al., 2010; Al-Obaida, 2010; Fux-Noy et al., 2011; Hashim, 2011; Young et al., 2012).

Sports participants are not well informed about orofacial injuries emergency procedures (Dursun et al., 2015) therefore, they are not familiar with appropriate measures and how to act in the event of an orofacial injury (Merz et al., 2011; Saini, 2011, Sepet et al., 2014). Although they may consider use of protective gear necessary for preventing orofacial sports injuries, they do not use them (Frontera et al., 2011).

Correa, et al., (2010) reported that most of the physicians of Brazilian professional soccer teams did not have sufficient knowledge about emergency procedures of orofacial injuries. Dursun et al., (2015) reported very low awareness and use of mouthguards among soccer sports participants. Studies have shown that in basketball, the protective gear is hardly used (Yamada et al., 1998; Levin et al., 2003; Perunsky et al., 2005), while in American football and boxing in which mouthguards use is mandatory, it has been observed that the sports participants are more conscious of the need to use them (Diab & Mourino, 1996).

Due to scarcity of experts in sports dentistry especially in emerging economy countries, educational programs should provide information about orofacial sports injuries to various groups among stakeholders. The scope of the continuing education programme may include orofacial sports injuries occurrence, emergency management and promotion of preventive strategies. Also, the use of mouthguards and other sports injuries preventive equipment should be shared with sports participants, trainers, coaches, members of sporting associations and federations, parents, medical and oral health care providers and other interested stakeholders. More research on orofacial sports injuries in emerging economy countries should be carried out and published to provide data bank for planning better sports social services.

8.4. Risk factors for orofacial sports injuries

The participation in various physical and competitive sports activities offer varieties of benefits to participants. However, they also carry an inherent considerable risk for orofacial injuries due to impacts from fellow
competitors (collisions), projectiles, collisions with posts, ground falls, contact with hard surfaces and contact from sports related equipment (Lee et al., 2004; Caglar et al., 2005b; Finch & Cassell, 2006; Dhillon et al., 2014; Dursun et al., 2015). Other important risk factors for orofacial injuries are sex and age (Cortes et al., 2001; Shaikh & Worrall, 2002), some behavioural characteristics (Peerheentupa et al., 2001), facial profile (Kahabuka & Mugonzibwa, 2009) as well as physical and sporting activities (Tesini & Soporowski, 2000).

The Federation Dentaire Internationale (FDI, 1990) places organized sports into two categories based on risk of traumatic orofacial injuries: High-risk sports (such as American football, hockey, ice hockey, lacrosse, martial sports, rugby, inline skating, skateboarding and mountain biking) and medium-risk sports (such as basketball, soccer, team handball, diving, squash, gymnastics, parachuting and water polo). Orofacial protection in sports is increasingly advised since a considerable proportion of the common orofacial injuries could be prevented with appropriate strategies.

8.4.1. Age

In children, the incidence of injuries from sports accidents is highest in the age group of 8-11 years (Petti & Tarsitani, 1996; Rodd & Chesham, 1997). For professional, high level collegiate, amateur, and adult players, oral-facial injuries decline from the teen years, probably due to the level of skill of the participants. Sports injuries however, tend to be more serious when they occur in older sports participants.

8.4.2. Gender

Generally, orofacial sports injuries seem to occur more often among boys than girls (Brin et al., 2000). Even though more females are playing high level competitive sports every year, boys are more likely to be injured than girls with a female to male ratio of 1.5:3.1 (Rothman, 1996).

8.4.3. Environment

Risk factors for sports injuries include poor sporting infrastructure for various sports. Socially disadvantaged communities in both emerging economy countries and developed countries have inadequate sporting facilities which expose or contribute to the increased risk of orofacial sports injuries among sporting participants (Fig 8.1).
There are orofacial profile risk factors for sports injuries that include angle class II occlusions, increased overjet, labially inclined incisors, lip incompetence, a short upper lip and mouth breathing (Brin et al., 2000; Kahabuka & Mugonzibwa, 2009). It is commonly held that over 80% of all dental injuries involve the upper front teeth. Evidently, the further the incisors are proclined, the more likely the potential for sports injury and consequently the higher the need for mouth protection and orthodontic correction (braces). Sports participants with mandibular prognathism are also said to present higher risk of mandibular fractures, particularly at the condyle region.

8.4.5. Sport type

The frequency and intensity of contact during sports activities and competitions are the main cause of orofacial injuries. Everyone including sports participants, coaches, parents, sports health workers, sporting associations and federations need to know about which sports are the most dangerous and what the best means of protection are. The largest of
international sports meetings, the Olympic Games, reminds everyone that the number of organized sports across the globe is practically unlimited. A simple and useful categorization of sports consisting of low and high velocity non-contact sports, contact sports and collision sports, underscores the need for protection.

The type of contact can be classified as direct contact with competitors [taekwondo, jiu-jitsu, kickboxing, boxing, rugby etc.], indirect contact with rival competitors [handball, basketball, American football, soccer, ice-hockey, etc.] and no contact with rival competitors [volleyball, badminton, tennis, cricket etc.] (Dorney, 1998).

The commonly practiced or high risk sports include soccer, American football, rugby, ice hockey, European team handball, karate, floor ball, basketball, downhill skiing and motor sports. Floor ball has an equally high risk for orofacial sports injuries as handball (Maxén et al., 2011).

In sports activities where body contact between athletes usually occurs, they are more likely to suffer dangerous falls or blows and, consequently, injuries to the craniofacial complex (Yamada et al., 1998; Cerulli et al., 2002; Tozoglu & Tozoglu, 2006; Correa et al., 2012). Among contact and team sports, basketball carries the highest risk of orofacial injuries (McKay et al., 1996; Amy, 2005 Harmer, 2005). On the other hand, despite the popular belief that soccer is not a violent sport, it presents a high risk of injuries to sports participants, including oral and craniofacial injuries (Cerulli et al., 2002; Rahnama, et al., 2002; Pribble et al., 2004; Tozoglu & Tozoglu, 2006; Papakosta et al., 2008; Correa et al., 2010). Injuries to the head have been reported to account for 4–21% of all injuries in soccer (Tesini & Soporowski, 2000) occurring as a consequence of the impact between heads or head and elbow in most cases (Andersen et al., 2004; Papakosta et al., 2008). Tozoglu & Tozoglu (2006) reported 21% soccer related orofacial injuries in amateur soccer players during a 1-year period in Erzurum, Turkey.

8.5. Evaluation of orofacial sports injuries

Often many people with interest in sports (players; parents; school nurses, medical doctors, teachers, coaches, scouts, girl guides and emergency personnel) wonder whether sports players should receive medical attention after some orofacial injuries.

Actually, anyone with any of the following symptoms should be evaluated by an oral healthcare provider:
i. Pain, tenderness, or sensitivity (to hot/cold or pressure) in a tooth.
ii. A broken, loose, or missing tooth after trauma (the tooth could have been inhaled or swallowed).
iii. Bleeding that does not stop after applying pressure for 10 minutes.
iv. Pain in the jaw when opening or closing the mouth.
v. Difficulty swallowing or breathing.
vi. An object stuck in the roof of the mouth, cheek, tongue, or throat (Instruct the patient NOT to remove the object).
vii. A large or gaping cut inside the mouth or on the face.
viii. A puncture in the back of the throat.
ix. A cut on the lip that extends through the lip's border into the surrounding skin.
x. Weakness, numbness or blurred vision or slurred speech.
xii. Fever (temperature ≥100.4°F/38°C) or other signs of infection after a mouth or tooth injury (localized redness, pus and/or increasing pain). Signs of more serious infection may include neck pain or stiffness, inability to open the mouth, drooling or chest pain.

Depending on particular circumstances, this evaluation may be done over the phone, at the dentist's office, or in an emergency department.

8.5.1. Medical history and physical examination

The parent or child should try to describe how the injury occurred. If there is any reason to suspect that another adult or child intentionally injured the child, this should be discussed with the healthcare provider. During the physical examination, the clinician examines the child's mouth, throat, head, neck, and body.

For unconscious adults, there must be an informed person to give more information whenever possible.

8.5.2. Imaging tests

Depending on the type of injury, imaging (x-ray, CT scan, MRI) may be needed. The imaging tests usually help to determine if there are fractures in a bone, damage to the root of a tooth, damage to a blood vessel or if the patient has swallowed or inhaled a foreign body (i.e., a piece of a tooth). Not every patient with a dental or mouth injury will require an imaging test. However, appropriate imaging tests are necessary when the injuries involve children who may not adequately explain themselves.
8.6. Management of orofacial sports injuries

Orofacial sports injuries require appropriate and timely interventions preferably within 60 minutes of the occurrence of the trauma. If managed inappropriately, sports injuries may end up in complications that can lead to a long life need for oral health care involving multiple intervention over individual’s lifetime with high financial burden (Brullmann et al., 2011). Unfortunately orofacial sports injuries often occur together with other general injuries like limb fractures, concussion, or life-threatening injuries (Emerich & Gazda, 2010). As a result, they are frequently overlooked as emergency care initially concentrates more on conditions threatening life.

To efficiently determine the extent and correctly diagnose injuries to the jaws, teeth, face and associated structures, a systematic approach to trauma is essential. Assessment includes a thorough history, physical evaluation and imaging tests. Treatment also takes into consideration the patient’s general health and developmental status.

The good blood supply in the orofacial region makes injuries to this region prone to excessive bleeding. Therefore, priority should be given to instituting measures that will assure adequate breathing and achieving haemostasis. Before the player/athlete who has suffered an injury to the head region is allowed to continue with play, head injury such as concussion and orofacial damage must be ruled out.

Generally, apart from the sports participants (players), coaches, sports teachers, parents and other stakeholders should know the importance of emergency management and specifically know how to manage cases of orofacial sports injuries. Sports related orofacial injuries can be classified into three broad categories i.e. injuries to the soft tissues, the teeth and the jaws.

8.6.1. Soft tissues

Orofacial sports injuries involving soft tissues include bruises, cuts and lacerations to the cheeks, chin, lips, gingiva and/or tongue. Frontal impacts absorbed by the upper lip can result in displacement of a tooth from its socket and lacerations on the lip and gums. The wounds require careful cleaning and debridement to make sure there are no entrapped pieces of tooth or dirt. If lacerations are extensive, suturing may be necessary. In cases of awful open wounds, antibiotic treatment together with tetanus toxoid shots may be necessary to prevent serious and life threatening infection.
8.6.2. Dental sports injuries

Dental sports injuries vary from simple chipping to complex fractures or avulsions (the tooth completely knocked out its socket). Commonly occurring sports dental injuries are tooth avulsion, luxation (tooth displacement within the socket), and tooth fracture. More serious conditions occur when the teeth are fractured, a term that refers to a crack in the outer protective layers of a tooth, the enamel and dentin. The main goal is to salvage the affected teeth whenever possible: to maintain health, function and aesthetics. Various management methods may be employed to secure and treat chipped, fractured, loosened or displaced teeth by splinting or otherwise stabilizing them during the healing process.

Assessment, diagnosis and treatment differ for injured deciduous and permanent teeth depending on many factors including the state of development of underlying (un-erupted) permanent teeth. There are some simple rules to follow and it is helpful to think in terms of three categories of need when sports dental injuries occur:

**Immediate Need** — within minutes.
**Urgent Need** — within 6 hours and,
**Less Urgent Need** — within 12 hours.

Once the type of dental injury has been ascertained, identification of the required treatment can be done. It is recommended to get specialist consultation and/or treatment within 60 minutes, especially if the injury involves a dislodged or missing tooth.

8.6.2.1. Tooth avulsion

Tooth avulsion is the complete displacement of a tooth from its socket due to accidental or non-accidental injuries and may cause loss of healthy teeth (Abu-Dawoud et al, 2007). After the accident, the tooth should be located and picked up by the crown or enamel portion and not by the root. If the tooth is dirty or contaminated, it should gently be rinsed with milk or water. If the tooth is replanted within 5-30 min after avulsion, there is a chance for successful healing and the tooth can be saved. The ideal recommended time limit is 20 min or less (Usha et al., 2008). If a tooth cannot be replanted within 30 min, it should be temporarily stored in a suitable medium during transportation to the clinic. The tooth should not be stored in water.
8.6.2.2. Emergency management for an avulsed tooth

The following are recommended emergency management steps of an avulsed tooth:

i. Avoid additional trauma to the tooth while handling.
ii. Do not handle the tooth by the root.
iii. Do not brush or scrub the tooth.
iv. Do not try to sterilize the tooth.
v. If debris is on the tooth, gently using a slow stream rinse it with water.
vi. If possible, re-implant the tooth and stabilize it by biting down gently on a towel or handkerchief. Do this only if the patient is alert and conscious.

8.6.2.3. Handling of the avulsed tooth

<table>
<thead>
<tr>
<th>Storage media:</th>
<th>If unable to re-implant immediately.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best:</td>
<td>Place the tooth in a physiologic transport medium (e.g., Hank's balanced saline solution) (Usha et al., 2008; Emerich &amp; Kaczmarek, 2010).</td>
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<tr>
<td>2nd best</td>
<td>Place the tooth in milk.</td>
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<tr>
<td>3rd best:</td>
<td>Wrap the tooth in saline-soaked gauze.</td>
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<tr>
<td>4th best</td>
<td>Place the tooth under patient's tongue. Do this only if the patient is conscious and alert.</td>
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<tr>
<td>Time is very important:</td>
<td>Re-implantation within 30 min has the highest degree of success rate. Transport the patient immediately to the oral health clinician (Usha et al., 2008; Emerich &amp; Kaczmarek, 2010).</td>
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8.6.2.4. Luxation (tooth displaced but in socket)

There are three positions in luxation:

**Extrusion:** The tooth is extruded (looks longer).

**Extrusion of a tooth:** Upper tooth hangs down and/or lower tooth raises up. The tooth should be repositioned in the socket using firm finger pressure, stabilized gently by biting on a towel or handkerchief. Transport immediately to the oral health clinician.

**Intrusion:** The tooth is pushed into the gums (it looks short).

**Intruded tooth:** The tooth is pushed into the gums and looks short. For such a tooth do nothing and avoid any repositioning. Refer immediately the injured person to the oral health clinician.

**Lateral displacement:** The tooth is displaced lingually/palatally or mesially/distally. Reposition the tooth using finger pressure. A local
anesthetic application may be required to reposition the tooth; if so, stabilize the tooth by gently biting on a towel or handkerchief. Refer immediately to the oral health clinician.

8.6.2.5. Fracture

If a tooth is totally fractured into two halves, save the broken portion and immediately present to the oral health clinician. Stabilize the portion of the tooth left in the mouth by gently biting on a towel or handkerchief to control bleeding. Limit contact with other teeth, air or tongue, should the patient experience extreme pain.

8.6.3. Jaws

Orofacial sports injuries of the jaws/arches often include dislocations and/or fractures of the lower and/or upper jaws (mandible and maxilla). Such injuries often require more complex testing and scanning. Simple jaw dislocations are generally fairly simple to correct. However, jaw fractures, depending on extent and location, may necessitate closed reduction and fixation, splinting (joining together) of one or several teeth or open reduction and fixation using wires or mini plates. More sophisticated imaging techniques are usually required to determine the extent and location of fractures to allow proper management planning. The skills and expertise of an oral and maxillofacial surgeon are normally demanded in handling severe injuries of the orofacial region.

8.7. Complications of orofacial sports injuries

Among the complications associated with orofacial sports injuries are persistent pain, psychological effects and socio-economic implications. Apparently, a rather simple looking sports dental injury may never heal completely, and it can create lifetime or long term expensive, problems for the affected sports participant. Loss of the involved tooth can occur even after some years due to sequelae such as root resorption.

The disruptive influence of injuries on the sports participant’s life includes the temporary loss of the ability to participate in a highly valued activity which is a significant threat to continued success in the respective sport. Consequently, stress from orofacial sports injuries influence the physical, social, and psychological well being of athletes. In some situations a single injury may result in a complete termination of participation in sports. Sports participants respond to injuries differently, sometimes
underplaying their severity, but the injuries can mark an instant end of a sporting career which was cultivated for several years of hard work. The resultant psychological disturbance from injury, may be worsened by separation from family, friends, and team mates and the loss of important social roles. Ultimately, the impact of orofacial sports injuries is the net effect of the injuries themselves and the sports participant’s coping capability (Heil, 1993). On the other hand, for children whose oral and craniofacial structures, including the dentition, are not fully developed, sports injuries can lead to very serious adverse effects for life.

8.8. Prevention of orofacial sports injuries

Orofacial sports injuries are some of the most common injuries worldwide and treating them is often tricky, time consuming and expensive especially in developing economy communities. Thus, well planned preventive strategies are important on medical, economic as well as human rights grounds. Therefore, it is essential to adopt preventive methods to minimize orofacial sports injuries that can compromise the sports participant’s career and generate high treatment costs. Due to growing number of sports practitioners seeking improved quality of life, the prevalence of orofacial sports injuries associated with various sports is anticipated to increase appreciably.

Protection is an important action that various sports participants can take to ensure they do not experience serious orofacial injuries on the sporting field. Although sports related orofacial injuries cannot be entirely eliminated, in general a decreased risk has been associated with various interventions such as the use of orofacial sports protection gear (Aaltonen et al., 2007). Decreasing the prevalence, reducing severity and preventing sports related orofacial injuries are among the central targets in many sports which may be achieved by the use of appropriate protective equipment (Bemelmanns, et al., 2000; Barth et al., 2000; Labella et al., 2002; Walilko et al., 2004; Duarte-Pereira et al. 2008; YesilDuymus & Gungor, 2009; Farrington et al., 2012). The most significant aspect in preventing sports related orofacial injuries is wearing basic protective devices such as properly fitting helmets, mouthguards, and various other protective gears. Mouthguards are particularly useful and are indicated for high impact sports with high risk and high prevalence of orofacial injuries like basketball, soccer, boxing and others (Labella et al., 2002). However, there are may be a wide variety of appliances on the market that suit people participating in a wide range of sports. Sports participants taking part in sports activities that could result in more serious orofacial injuries should contact their sports oral health
professional consultants for advice about purchasing appropriate orofacial sports protection gear.

While the oral health professionals should always be in the first line of defense, orofacial sports injuries can be substantially reduced and have improved outcomes if the public would be aware of first aid measures as well as prevention. Sports oral health professional consultants especially in populations faced with severe scarcity of human resource for oral health must educate the general public regarding the need and benefits of prevention of orofacial sports injuries during various sports activities. In most emerging economy countries a lot has to be done to provide safe recreational and sporting facilities for their communities as basic requirements.

Through internet, the Dental Associations worldwide in collaboration with WHO; World Federation of Public Health Associations (WFPHAs); FDI, International Association for Dental Research (IADR) and various other oral health professional groups should publish booklets, leaflets, pamphlets, videos in various languages on all important aspects of orofacial sports injuries.

Training on assessing and managing emergency orofacial sports injuries should also be offered to sports participants themselves, school nurses, medical doctors, teachers, sports coaches, students in schools, colleges, universities, Scouts, Girl Guides and Emergency Personnel. They must be capable of identifying and understanding urgent measures to be taken and preventive protocol for these injuries.

8.9. Challenges for sports dentistry in low and middle income countries (emerging economy countries)

Sports dentistry focuses on the study, management, revision and prevention of orofacial injuries including sports participants’ oral health maintenance. It also emphasizes on the dissemination of information and new knowledge within the sports participants and other stakeholders. As it is with general health, there is a social gradient and substantial inequalities in oral health in developed, middle and low income countries (Sabbah et al., 2007; Marmot & Bell, 2011; Moysés, 2012). The nature of occurrence of orofacial sports injuries reflects both the persistence of socioeconomic inequalities and the limitations of social and cares delivery systems that are not well designed to provide equitable access to promoting and preventing health sustaining resources. Unfortunately in low and middle income countries, oral health conditions and/or diseases constitute a neglected
epidemic and rates are increasing (Benzian, 2014; Abid et al., 2015). Hence, orofacial sports injuries and related oral health complications are an additional oral health burden. Sports dentistry advocates and international agencies should develop appropriate strategies based on arrangement of integrated orofacial sports injuries preventive and complementary policies for the different strata of the population. Strategies should include involving and training other stakeholders working in various settings and institutions at the downstream end of the spectrum and advocating and lobbying to get fiscal and legislative measures implemented at the upstream end.

While sports dentistry is an emerging oral health discipline worldwide, lack of awareness on orofacial sports injuries among stakeholders remain one of the main challenges. Despite orofacial sports injuries being prevalent up to 30% of sports participants and central incisors accounting for 80% of the injuries affecting maxillary jaw, key partners like school teachers are not adequately aware about the measures to be taken to deal with such injuries (Cavalleri & Zerman, 1995; Chan, 1999). Young et al., (2012) reported insufficient knowledge on emergency management of dental injuries among primary and secondary school teachers in Hong Kong. In their study receipt of first-aid training with dental contents and acquisition of dental injury information from other sources were positively correlated with knowledge in managing orofacial injuries. Most likely, providing information, knowledge and some basic skills about the emergency management of orofacial injuries to sports stakeholders is significantly important for the prognosis of the injured player and in helping the injured person to receive appropriate first-aid treatment as soon as possible. This is important because sports stakeholders including coaches, trainers, fellow sports participants and the public (teachers, parents, and spectators) are usually nearby when the sports accidents occur. Oral health professionals should strive to play a critical role in informing sports participants, coaches, trainers, parents, other stakeholders and the public about the importance of diagnosis, management and prevention of orofacial sports injuries.

Severity of orofacial sports injuries is another challenging aspect. Some orofacial injuries are not very severe (e.g. lacerations) and therefore, do not stimulate the use of protecting devices even when it is thought that their use would totally eliminate these types of injuries (Seifert et al., 2014).

Many countries and communities in developed, middle and low-income countries are experiencing serious shortages/scarcity of skilled health workers especially in the area of general oral health besides sports dentistry. The shortages tend to be more severe in poor, remote, rural areas and specifically in socially disadvantaged communities. The scarcity reduces the capacity to appropriately inform and/or train the general public,
parents/guardians, school teachers, health emergency workers, sports coaches and sports participants on the awareness and importance of emergency care, management and prevention of orofacial sports injuries.

In the emerging economy countries, it is often heard/seen through social media that sports participants go for various competitions inadequately prepared sometimes without adequate funding for very necessary and basic sports gear, accommodation and food. Definitely inadequate preparations for competitions expose sports participants to various risks including orofacial sports injuries.

Often quality of sporting infrastructure, especially various sports playing surfaces, facilities and status of the equipment to be used or worn by sports players in several of the emerging economy countries are not the best. The economies in most such countries are not yet able to adequately shoulder the high costs for sports and recreation facilities. Therefore, the risk for orofacial sports injuries is likely to be on the high side. Also, in emerging economy countries some climatic conditions such as severe winters or very heavy rains, high temperatures or terrain/topography/landscape compromise sports playing surfaces and facilities.

Due to the spider web formed by various socioeconomic factors including low literacy rates, raised poverty levels, high birthrates, gender inequality, poor health, poorly planned cities/towns and many more in the majority of the emerging economy countries, the quality of supervision of the eager sports participants is compromised.

Also, due to international coalition for increased participation in sports to prevent non communicable Diseases (NCDs), the future will witness more orofacial sports related injuries. Since 2013, World Health Organization (WHO) Member States have agreed to reduce insufficient physical activity by 10% by 2025 for the prevention and control of the rising NCDs in the 2013-2020 time frame. WHO has also established several partnerships to support Member States in their efforts to promote sporting activities. The WHO partnerships include the United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations Sport for Development and Peace (UNOSPD) as well as a Memorandum of Understanding with the International Olympic Committee (IOC).

Mouthguards are considered one of the most effective means to prevent orofacial sports injuries, but Adegbesan & Onyeaso (2004) reported that in Nigeria, the orofacial sports injuries preventive knowledge among hobby and professional athletes was not satisfactory yet. Already in the late sixties, Heintz (1968) reported a 50% reduction rate of orofacial sports injuries possibly because two million people participating in sports
in the United States of America were made to wear mouthguards. More researchers have reported that wearing a mouthguard can significantly reduce the frequency and severity of orofacial injuries in sports (Kumamoto & Maeda 2005; Duarte-Pereira et al., 2008; YeşilDuymus & Gungor, 2009). However in Nigeria, Onyeaso (2004) reported that 70% of the respondents who claimed to be aware of the mouthguards were not using the protective device for football games. But the majority of the Nigerian secondary school sports coaches agreed on the protective effectiveness of mouthguards against sports related orofacial injuries (Adegbesan & Onyeaso, 2004). However, they were yet to be adequately informed about mouthguards generally so as to correctly advise and influence the adolescent athletes to use them.

Secondary schools should serve as good starting points in the campaign for use of mouthguards for contact sports before some go into professional sports. Although, preventive sports gear use is recommended, but surprisingly not all contact sports recommend the use of mouthguards and they are not mandatory for preventing orofacial injuries in many sports. For example, Maxén et al. (2011) reported that floor ball has a high risk of injury but did not recommend the use of mouthguards.

It is thought that many people do not use mouthguards because they are expensive and also necessitate visits to oral health professionals. Some sports participants report that mouthguards use during sports activities may result in discomfort, difficult breathing and alterations in strength (Ranalli, 2002; Duddy et al., 2012). Meanwhile in Turkey, YeşilDuymus & Gungor (2009) reported that the use of mouthguards was rare; therefore, a joint team of oral health professionals, sports physicians, trainers and coaches for encouraging the use of mouthguards during training and sport activities has been recommended. It has also been suggested that sports medicine and oral health professionals need to recommend a more intensive education of students in sports medicine and dentistry.

With innumerable injuries occurring to sports participants in the oro- and craniofacial region, mouth guards can offer significant protection and reduction in the number of players getting injured in various sports activities (Mueller et al., 2001). It is recommended that individual sports should be assisted to have full risk assessments and develop communally agreed compulsory standard protective devices that would be appropriate. The challenges for sports dentistry in emerging economy countries are factual and justify the need for multidisciplinary sports injuries prevention interventional approach with emphasis on the rules of the games.
8.10. Conclusion

Sports dentistry encompasses a wide range of treatment modalities of orofacial sports injuries, their complications and preventive strategies. Oral health professionals interested in sports dentistry must strive to acquire competencies and clinical skills regarding sports-related orofacial injuries and the various methods of prevention. With the increasing trend of sports participation in communities in the wake of NCDs prevention worldwide, protective devices and preventive options gain significance. Therefore, sports dentistry stakeholders should strive to plan and train sports oral health care teams including people trained or incentivized to engage in and promote integrated population-wide sports injuries prevention approaches aimed at reducing the orofacial sports injuries burden at the population level.

As sports related orofacial injuries are not uncommon in various sports, oral health professional associations must work close with sports teachers, coaches/trainers, parents, sports associations and federations and other health professionals to ensure comprehensive orofacial care. Preventive programmes should include information regarding sports-related orofacial injuries, preventive measures, use of orofacial protective gears like helmets and mouthguards, management of the orofacial injuries and general population awareness on sports orofacial injuries. It is also the responsibility of the sports orofacial injuries preventive team to identify, educate, and provide the sports men and women preventive measures.

Inclusion of an oral health sports professional of a certain level among risky sports supporting teams would be ideal, considering that such professional would work for the benefit of the sports participants’ oral health. The oral health sports professional member would not only increase sports participants’ awareness of use of sports injuries preventive gear enabling them to engage in various sports with greater safety but also how to act in the event of an orofacial injury.

8.11. References


