FABRICATION OF AN INDIVIDUAL EXTRA-ORAL FACIAL SHIELD TO PREVENT DENTAL TRAUMA IN CONTACT SPORTS: A CLINICAL REPORT

ABSTRACT

Facial shields are used when practicing contact sports. Examples of facial shields are commercially available per branch of sport standardized helmets. Fabricating individual protective shields is primarily restricted to mouth guards. In individual cases, a more extensive facial shield is demanded, for instance in case of a surgically stabilized facial bone fracture. This clinical report describes the fabrication of an individual extra-oral facial shield to prevent dental trauma in a football match.

Key words: Contact Sports, Dental Trauma, Facial Shield

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TEMAS SPORLARINDA DENTAL TRAVMADAN KORUNMAK İÇİN
EKSTRA-ORAL YÜZ KALKANI YAPIMI: BİR VAKA RAPORU

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ÖZET


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INTRODUCTION

Sports injuries are one of the most common injuries in modern western societies. Treatment of sports injuries is often difficult, expensive and time consuming.\(^1\) There is a lack of publication on helmets and face masks worn for the prevention of facial injuries in contact sports.\(^2\)

Dental injuries in contact sports consist dental avulsions, fractures, luxations, soft tissue hemorrhage and ecchymosis; lacerations or contusions to the gums, cheeks, tongue, lips, or jaws; jaw fractures; jaw locked open or closed; temporomandibular joint pain or chewing difficulty; and concussion from a blow under the chin.\(^3\) A common universal finding is that the majority of injuries affect the upper jaw, with the maxillary incisors being most prone to injury, often accounting for as many as 80% of all cases.\(^4,5\)

Highly significant differences exist between the number of teeth injured and the causes of injury.\(^6\) A blow or kick from another player mostly cause injury to a tooth, while a fall or blow from a hard object often result in injury to two teeth. In addition to the damage caused by a traumatic impact to the dento-alveolar structures, damage can also result in facial bone fracture and more seriously, neck or brain injury resulting from increased cranial pressure and deformation.\(^7\) Besides, mouthguards are not just effective for the prevention of dento-alveolar injuries. Chapman suggested that use of mouthguards should be encouraged in all contact sports, as the most important value of the mouthguard is the concussion-saving effect following impact to the mandible. This fact alone should make the wearing of mouthguards compulsory in all contact sports.\(^7,8\)

Facial shields are used when practicing contact sports, high speed sports, sports using hard balls, sticks or bats, sports using protective shields or covers, and sports using hard boardings around the sports ground. Examples of facial shields are commercially available, per branch of sport standardized helmets. Fabricating individual protective shields is primarily restricted to mouth guards. In individual cases, a more extensive facial shield is demanded, for instance in case of a surgically stabilized facial bone fracture.\(^9\)

This clinical report describes the fabrication of an individual extra-oral facial shield to prevent dental trauma in a football match.

CASE REPORT

A 27-year old male patient referred to our clinic with the complaint of maxillary fracture while playing in a football match. Previously the surgical treatment including the splinting of maxilla and maxillary teeth had been completed and the patient referred to prosthodontic department for fabrication of a facial shield. The desired border of the facial shield did not require coverage of the nasal cavity, therefore the patient could breathe through his nose during the impression-making procedure. A moulage was made with a layer of regular set irreversible hydrocolloid (Cavex Impressional, Cavex Holland BV: Haarlem, The Netherlands). After the initial setting of the hydrocolloid the impression was poured in a dental stone, (Glastone 3000, Dentsply Inc, PA 17405-0872, USA) (Figure 1). After trimming the facial cast (Figure 2), model waxing was performed with a modelling wax, (Dentsply Inc, KT 15 2SE, England) (Figure 3) and covered with light-curing base plate (Lead Dent Light Curing Baseplates, 482, Germany). The lip area was cut for easy breathing. The model was polymerized with a light curing unit (Tray-Lux cure-unit, Monitek Industrial Co, Ltd. M5, SN 06C0119) in 3 seconds. The undesired facial areas were marked with a black marker and the adjustments were done to define the outline of the facial shield by a hard bur. A tungsten carbide bur was used to smoothen the margins. The shield was fitted on the patient to ensure the proper coverage of the desired facial areas. 5 mm thickness of foam rubber (Safaş, Sünger-Styrapor, Istanbul, Türkiye)

Figure 1. A moulage was made with irreversible hydrocolloid
was cut for the inner part of the facial shield and stuck on the shield with an adhesive (Pattex, Henkel, Turkey) (Figure 4). Holes were created in the lateral edges of the shield to place the elasticated strip (Avortho Orthopedics, İstanbul, Turkey) that provides retention and stability of the facial shield (Figure 5). The adjustment of the facial shield was performed and the patient was followed up after his football match without any complaints.

**DISCUSSION**

Injured players returning to sports practice after experiencing a trauma or undergoing surgery have a high risk of reinjury, which affects the athlete’s overall training and performance.10 An individual protective shield that can be used by injured athletes while recovering from a facial injury is fabricated and described in this case report, so that these athletes can continue their sports practice. In order to fabricate an extensive individual facial shield, an accurate model of the anterior part of the head is required. Such a model can be provided by making an impression of the face, which is poured in a dental stone. Another method
is producing a stereolithographic model using computed tomography or magnetic resonance imaging. On the accurate model, the facial shield can be designed and fabricated from a strictly safe material, such as polyvinylchloride or polycarbonate. The light curing acrylic base-plate that is one of the easy fabricated dental clinic material was used in this case. The outer layer was rigid but the inner layer was composed of foam rubber to promote comfort and to reduce impact load. This simple procedure is applicable for athletes who participate in many contact sports.

CONCLUSION

Dentists may have a role in the prevention and treatment of sports-related dental and orofacial injuries. Therefore, dentists may be participants as sporting club consultants, and the use of mouthguards has to be widened among the athletes performing contact sports for the prevention of dental trauma.

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REFERENCES


