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MOUTHGUARD FOR ORTHODONTIC PATIENT TRUMPET PLAYER

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ABSTRACT

Mouthguards reduce greatly the frequency and the severity of injuries on intraoral tissues absorbing and dispersing the energy of the force impact. The brass instruments known as "lip-vibrated instruments" are played by blowing air through closed lips. The pressure applied on the lips can cause laceration and bruising. The use of mouthguards can prevent those damages by producing some relief on orthodontic patients that play those instruments. The aim of this work is to describe the technique of elaboration of an individualized mouthguard for orthodontic patient trumpet player (MOPTP) that prevents injuries not just on soft tissues but also on appliances while it allows simultaneously orthodontic tooth movement and a good performance playing music.

Keywords: orthodontics, oral protectors, music, mouthguards.

INTRODUCTION

Mouthguards reduce greatly the frequency and the severity of injuries on intraoral tissues (Bishop, 1985) by absorbing and dispersing the energy of the force impact (Park, 1994) when brass instruments are played. The brass instruments known as "lip-vibrated instruments" (Baines, 1993) are played by blowing air through the lips, producing a "buzzing" sound, which starts a wave vibration in the airstreams inside the instrument. The pressure applied on the lips, particularly on the upper, can cause laceration and bruising, especially on patients using devices attached to labial surface of anterior teeth. The use of a mouthguard by an orthodontic patient trumpet player (MOPTP) can prevent those damages producing some relief on orthodontic patient musicians. But the art of playing brass instruments has some sensitive peculiarities that should be carefully considered when the mouthguard is designed and constructed, in order to avoid loss of qualitative performance. According to Claude Gordon's teaching philosophy (Gordon, 1987), based on "the seven natural elements", the mouthguard should not interfere with the wind power, the tongue, the lips or the muscles of lips and face. With respect to tongue, it is of paramount importance not only its position but also its level (Gordon, 1987; Clarke, 1963). When positioned in place, the MOPTP should not interfere with the relation between the tip of the tongue and the internal surface of anterior teeth. Concerning the role of the lips, the mouthpiece should be placed in the centre of the lips with approximately 2/3 of it on the upper lip (Gordon, 1987). Louis Maggio (MacBeth, 1985) suggested that the upper and lower lips should be parallel when the mouthpiece is placed and held with some pressure. The rim of the mouthpiece must hold the embouchure in place while the lips, lightly apart, relax to vibrate while the airstream is blown through the centre of the lips (figure 1).

Fig. 1 Trumpet player. The placement of the mouthpiece.

Mouthguards are commonly made of ethylene vinyl acetate (EVA), a thermoplastic copolymer (Josell and Abrams, 1982; Amoric, 1993) with proven properties of non-toxicity, elasticity, minimal moisture absorption and ease of manufacture (Knapik, 2007). EVA mouthguards have high-energy absorption and distribute impact force over a wide area, reducing the transmitted stress (Park, 1994; Westerman, 2002).

The aim of this work was describing the technical process of fabrication of a MOPTP that can prevent injuries not only on soft tissues but also on the appliance, while it allows simultaneously orthodontic tooth movement without altering the musician's performance.

MATERIALS AND METHODS

An individualized protective mouthguard made of Bioplast® (Scheu-Dental. Iserlonh. Germany), an EVA copolymer, was constructed for a trumpet student orthodontic patient. The elaboration of this MOPTP was done with two laminated layers fused together by heat and pressure on dental plaster models.

The alginate impressions were poured and the plaster models trimmed. Then a layer of 1,5 mm of light-cured acrylic (Triad® Hi-Flow. Dentsply Prosthetics. York. USA) was applied on the brackets and areas where teeth were expected to move. The preparation of models ended by adapting to the upper cast a 0,1 mm sheet of polyethylene low density (Isofolan® Scheu-Dental. Iserlonh. Germany) in the Biostar® device **(**Scheu-Dental. Iserlonh. Germany) (figure 2).

Fig. 2 The preparation of upper cast to construct the MOPTP.

To accomplish the mouthguard, a 2 mm Bioplast® sheet was vacuum-formed and trimmed. And then a second sheet was adapted. After removing Bioplast® sheets from plaster cast they were roughly cut with Electronic-Thermo-Former® (Scheu-Dental. Iserlonh. Germany) and then removed Isofolan's® layer (figure 3).

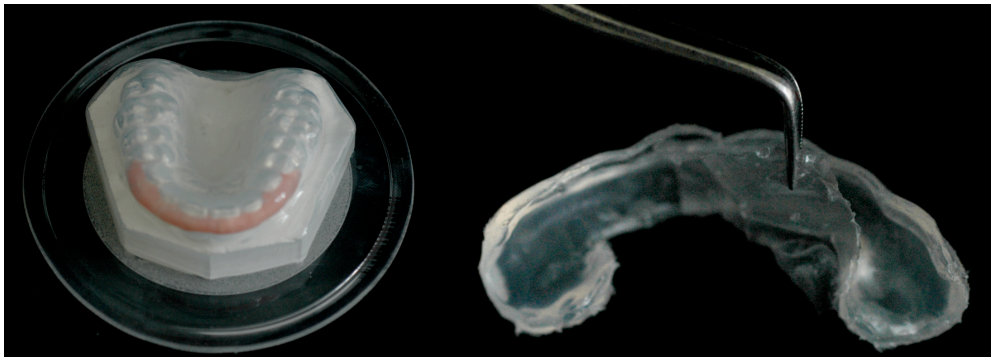

Fig. 3 Cut of vacuum-formed Bioplast® sheet and removal of Isofolan layer.

Afterwards, the MOPTP was carefully cut, removing EVA material from palatal and incisal surfaces of upper teeth. Only cuspids remained covered in order to improve retention. Finishing and polishing of the edges were performed with the Electronic-Thermo-Former®. This care is very important to avoid discomfort (figure 4).

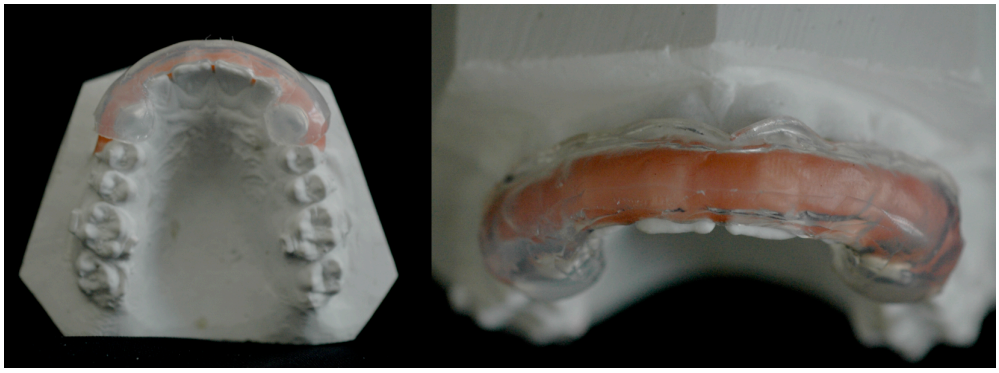

Fig. 4. Finishing and polishing of MOPTP.

RESULTS / CASE REPORT

The male patient BP, 15 years old and a trumpet student, began orthodontic treatment. During training, the pressure exerted on the lips by the mouthpiece caused damage and prevented good performance. The delivery of the MOPTP gave a great relief to the patient. In this particular case the MOPTP was constructed only to protect upper lip because the mouthpiece did not damage the lower lip (figure 5). However, in cases where an open bite is present, a mandibular MOPTP respecting the same principles of construction, should also be applied.

Fig. 5 The MOPTP finished and in place.

CONCLUSION

It is indicated the prescription of a MOPTP to instrument brass musicians undergoing orthodontic treatment, in order to prevent the laceration and the pain. With this device the performance is unaffected and orthodontic tooth movement can go on without delay or obstruction.

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