

PAPER REF: 4045

## **MOUTHGUARD FOR ORTHODONTIC PATIENT TRUMPET PLAYER**

**Maria João Ponces<sup>1(\*)</sup>, Saúl Castro<sup>2</sup>, Maria Cristina Pollmann<sup>3</sup>, Paula Vaz<sup>4</sup>, Jorge Dias Lopes<sup>5</sup>**

<sup>1, 2, 3, 5</sup>Department of Orthodontics, Faculty of Dental Medicine (FMDUP), University of Porto, Porto, Portugal.

<sup>4</sup>Department of Medical and Orofacial Genetics, Faculty of Dental Medicine, University of Porto, Porto, Portugal.

(\*)*Email*: mponces@fmd.up.pt

### **ABSTRACT**

Mouthguards reduce the occurrence and the severity of damages on intraoral tissues absorbing and diffusing the energy of the impact. The brass instruments, also known as 'lip-vibrated instruments, are played by propelling air through sealed lips. The pressure applied on the lips can cause damage and bruising. The use of mouthguards can prevent those injuries producing some relief on orthodontics patients playing those instruments. The aim of this work was to describe the procedures to construct a custom mouthguard for orthodontic patient trumpet player (MOPTP) that prevents injuries on soft tissues while it allows simultaneously orthodontic tooth movement and a good musical performance.

**Keywords:** oral protectors, music, mouthguards.

### **INTRODUCTION**

Mouthguards reduce greatly the frequency and the severity of injuries on intraoral tissues (Bishop, 1985) absorbing and dispersing the energy of the force impact (Park, 1994) during brass instruments playing. The brass instruments known as "lip-vibrated instruments" (Baines, 1993) are played by blowing air through the lips, producing a "buzzing" sound starting a wave vibration in the airstreams inside the instrument. The pressure applied on the lips, particularly on the upper, can cause laceration and bruising, specially on patients using devices attached on labial surface of anterior teeth.

The use of a mouthguard for orthodontic patient trumpet player (MOPTP) can prevent damages producing some relief on those orthodontic patients. 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 shouldn't interfere with the wind power, the tongue, the lips or the muscles of lips and face. Respecting the tongue, it is of paramount importance not only its position but also its level (Gordon, 1987; Clarke, 1963). When positioned in place, the MOPTP shouldn't interfere with the relation between the tip of the tongue and the internal surface of anterior teeth. About the role of the lips, the mouthpiece should be placed on the center 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 airstreams is blew through the center of the lips.

The aim of this work was describing the technical process of fabrication of an 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.

Mouthguards are commonly made of ethylene vinyl acetate (EVA), a thermoplastic copolymer (Josell, 1982; Amoric, 1993) with evidenced 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).

## RESULTS AND CONCLUSIONS

An individualized protective mouthguards made of Bioplast® (Scheu-Dental, Iserlonh, Germany), an EVA copolymer, was constructed to 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 patient BP, gender male, 15 years old, 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 case the MOPTP was constructed only to protect upper lip because the mouthpiece didn't damage lower lip. However, in Class III cases or when an open bite is present, a mandibular MOPTP, respecting the same principles of construction, should be applied.

It is indicated the prescription of an 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.

## REFERENCES

- Bishop BM, Davies EH, von Fraunhofer JA. Materials for mouth protectors. *J Prosthet Dent.* 1985 Feb;53(2):256-61.
- Park JB, Shaull KL, Overton B, Donly KJ. Improving mouth guards. *J Prosthet Dent.* 1994 Oct;72(4):373-80.
- Baines A. Brass instruments: their history and development. Publications CD, 1993.
- Gordon C. Brass playing is no harder than deep breathing. Carl Fischer I, New York. 1987.
- Clarke HL. Characteristic studies. Carl Fischer I, New York. 1963.
- MacBeth C. The original Louis Maggio System for brass. Press MM, North Hollywood. 1985.
- Josell SD, Abrams RG. Traumatic injuries to the dentition and its supporting structures. *Pediatr Clin North Am.* 1982 Jun;29(3):717-41.
- Amoric M. Gouttières orthodontiques et orthopédiques thermoformées. S.I.D. Paris. 1993.
- Knapik JJ, Marshall SW, Lee RB, et al. Mouthguards in sport activities: history, physical properties and injury prevention effectiveness. *Sports Med.* 2007;37(2):117-44.
- Westerman B, Stringfellow PM, Eccleston JA. Beneficial effects of air inclusions on the performance of ethylene vinyl acetate (EVA) mouthguard material. *Br J Sports Med.* 2002 Feb;36(1):51-3.