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A novel mouth guard for prevention of post-operative graft contraction of severely burned paediatric patients

BULEM YUZUGULLU[1], DUYGU ÇINAR[1] & TAHSIN DEMIR[2]

[1]Faculty of Dentistry, Department of Prosthodontics, Baskent University, Ankara, Turkey, and [2]Faculty of Dentistry, Department of Pediatric Dentistry, Baskent University, Ankara, Turkey

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Introduction

In the early stages of scar maturation, unless influenced by an opposing force, scar tissue quickly shortens and frequently leads to contractures[1]. Oral contractures caused by electrical, thermal, or chemical agents have been classified into three types as anterior, posterior, or total. Whereas anterior contractures involve the oral commissures, lips, anterior buccal sulcus, and anterior tongue, posterior contractures involve the posterior buccal mucosa, posterior tongue, and the oropharynx[2]. Skin grafts are used to cover the injured area[3].

Attempts to overcome contraction of the graft bed include surgical procedures[3]. However, a key component in amelioration and prevention of graft site contracture comprises wearing intra-oral or extra-oral appliances that are often troublesome for children[1,2]. Depending on the type of stretch that is elicited, which may be horizontal, vertical, or circumoral, various custom-made or prefabricated appliances are preferred[1]. Intra-oral appliances used for circumoral stretching may consist of commissural removable splints, mouth block[2], acrylic resin prong prosthesis, acrylic resin splints with elastics[4], cheek retractors, and jaw positioners[1].

This case report describes a custom-made silicone mouth guard described to seek an alternative for prevention and treatment of graft site contraction, in reconstruction of anterior oral contractures in a severely burned paediatric patient.

Correspondence to:
Bulem Yuzugullu, Baskent University, Faculty of Dentistry, Department of Prosthodontics, 11. sok no:26 06490, Bahcelievler-Ankara, Turkey. E-mail: bulemy@gmail.com

Case report

A 5-year-old girl was referred in July 2006 for reconstructive operations. She had been burned in a fire caused by the explosion of the floodlight projector in 2005. The patient has no systemic diseases. In September 2007, upper and lower lips, and dorsal facial scar contractions were incised, relieved, and reconstructed using split thickness skin grafts. Nasal rim reconstruction was made using local flaps, and commisuroplasty was made in a series of operations. Immediately after the operations, the patient was psychologically agitated as she could not open her mouth to eat and speak. Intra-oral examination revealed a dmf of zero and moderate oral hygiene. Two days after the final operation, a custom-made mouth guard was made to prevent graft and graft bed contraction, and to keep the oral space unrestricted. A direct impression was made using a putty (Affinis, Coltene/Whaledent, Cuyahoga Falls, OH, USA) covering the buccal surfaces of both dental arches like a mouth guard without the occlusal plane and in sufficient volume to support both cheeks and lips. These procedures were carried out under sedation (intramuscular, 0.5 mg/kg, Dormicum, Roche, Istanbul, Turkey). After adding two prongs with modelling wax distal to the commisures, the impression mould was invested in a denture flask (Fig. 1). To duplicate the impression mould, Ufi Gel P (VOCO, Cuxhaven, Germany) was prepared according to the manufacturer's instructions, and placed into the cavity created in the flasks. After Ufi Gel P had been processed (Fig. 2), the overhangs on the mouth guard were trimmed and a self-cure glaze (VOCO) was applied. An air opening was created around the midline.

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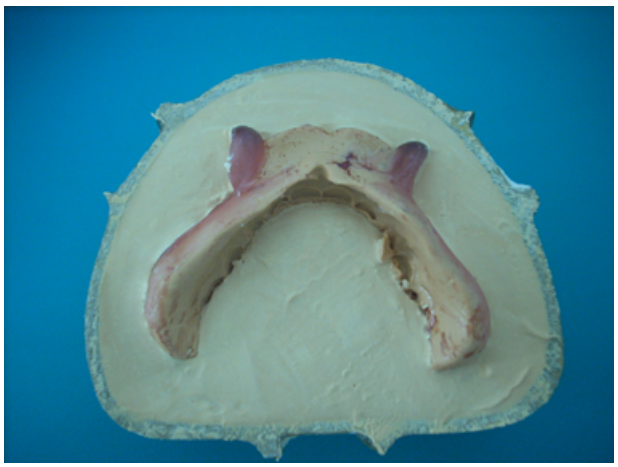

Fig. 1. The impression mould in denture flask.

Fig. 2. Ufi Gel P custom-made mouth guard after deflasking. (a) Commissural prongs; (b) buccal surfaces; (c) occlusal surfaces; (d) labial flanges.

Fig. 3. Mouth guard placed in patient's mouth.

Then, the mouth guard was placed in the patient's mouth (Fig. 3). She was instructed to use it at all times except during meals, and her parents were reminded to clean the mouth guard with a soft toothbrush. Within 2 weeks, microstomia was relieved, the patient's comfort and function improved, and an additional Ufi Gel P was applied on the buccal and labial surfaces of the mouth guard in order to further expand the buccal space. After using the mouth guard for 1 month, there was no need for further adjustments, and it was used for five more months to avoid relapse.

Comments

If teeth are present, the acrylic resin splint used for prevention of contraction is usually made to fit over the maxillary dentition. Fabrication of such splints, however, is complicated, and their usage by paediatric patients is troublesome.[4] Appliances with elastics might be difficult to tension and may not be used early in the patient's treatment due to open wounds or recently placed grafts[1]. Mouth blocks maintain adequate mouth opening, but they need to be moved from one side of the mouth to the other every 3 weeks under anaesthesia to prevent growth disturbance[2].

The mouth guard described in the present case report has the advantages of simplicity and ease for use in young children when compared with other techniques described in literature[1,2]. Benefits may also include the distribution of pressure over a large area so as to decrease the likelihood of developing pressure areas and providing an outward pressure to both cheeks in addition to stretching the mouth. Ufi Gel P is a cold-cured, silicone-based, permanently soft relining material. Owing to its elastic behaviour, adjustability, superior resistance of flow, and cushioning effects[5], it was ideally suited for the patient described in this case report. The elastic properties of the material make insertion of the mouth guard easier than most intra-oral acrylic appliances. Furthermore, the technique described in this case, the need for a full arch impression with a tray, was eliminated. Sufficient circumoral stretch was possible due to its resistance, and modifications were easily made due to its

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adjustability properties. Psychological stress was decreased within a few weeks due to improvement in mastication and speech.

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