

# SUCCESSIVE OBTURATOR-OVERDENTURE DESIGNS FOR LONG HISTORY CLEFT PALATE PATIENT

(RANCANGAN OVERDENTURE-OBTURATOR PADA PENDERITA CLEFT PALATE)

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## Abstract

A 39 year cleft palate lady had been treated since she was 19 years old by different design obturators after partial breakdown of surgical correction. The first obturator was fabricated into two pieces connected to each other using mini-dental magnets. A new obturator was prescribed to the patient and constructed in one piece with hollow opened box. Later, the box window was closed and retained by three ready-made ball stainless steel clasps. Two years later due to caries, a new obturator was designed with hollow palate and nasal box and retained by three magnets placed over three remaining abutment teeth into their cast copings.

**Key words:** obturator-overdenture, mini-magnets, ball clasp

## INTRODUCTION

Cleft lip and palate prevalence ranges from 1:500 to 1:2500 live births.<sup>1</sup> Cleft lip and palate constitute 35-50%, while cleft palate alone is estimated to form 30-45% with different complex aetiology. Cleft palate treatments include two modalities: surgical correction and or prosthetic replacement. Studying the consecutive prosthetic treatment of surgically corrected cleft defect is rarely found in the literature yet very important to provide the practitioner with several solutions for long-term treatment with expected complications.<sup>2</sup> Successive successful obturator for a deteriorating cleft palate is difficult mission due to many limitations. Therefore, another prosthetic solution had to be sought.<sup>3</sup> This report documents three obturator-overdenture designs with variable retentive means were prescribed for long term palatal defect. For each solution and treatment planning, different retentive mean should be used.

## CASE

In 2005, a 39 year cleft palate female patient was referred by a colleague to prescribe urgent treatment for her non retentive, food and water leaking two piece obturator. The examination revealed that she had bilateral complete lip and cleft palate corrected

surgically when she was 19 years. The closure seemed to breakdown later in the anterior and middle part of the palate leaving a big oronasal communication that had been treated by prosthesis. Intra-orally, the remaining teeth were; first and second left premolars, left first, second and third molars. The left first premolar was treated by root canal treatment (RCT) and postcrown coping holding magnet keeper (Figure 1).



Figure 1. Panoramic view of the defect

The second molar was covered by a metal cast crown and retentive external pin attached to the palatal surface of the crown. On the right side of maxillary arch only the first premolar was present. It

was treated by (RCT) and restored by postcrown that incorporated a magnetic keeper (Figure 2).



Figure 2. The defect and remaining teeth

The defect included primary and secondary palate and extending to the second molar area posteriorly. The remaining soft palate consisted of scar tissue but in healthy condition. The occlusal relationship was severe class III with open bite posteriorly. The mandibular arch was completely dentate. The previous restoration was a two-piece metallic partial overdenture. It was retained in its place by a nasal extension engaging the undercut and connected to the partial overdenture by two mini-magnets (Magfit ex System, Aichi steel workers, Ltd) (Figure 3).



Figure 3. The old partial overdenture

However, the expansion of the defect led to excessive instability and poor retention with fluid leakage through the nose.

## MANAGEMENT

First design (Obturator-overdenture retained by readymade ball clasps). The decision was taken to fabricate one piece hollow acrylic resin obturator-

overdenture retained by readymade ball stainless steel clasps (Figure 4).



Figure 4. The first prescribed overdenture in 2005

Two copies of primary impression were made using stock tray and irreversible hydrocolloid (Aroma fine DF III, GC Corp. 76-1 Tokyo, Japan). A base was fabricated using heat-activated acrylic resin (Meliodent, HK) and wax elimination technique. The finished base was adapted to cover the defect area and the edentulous side of the arch leaving the dentate side uncovered. The acrylic resin base was checked for fitting and interferences were removed. Then, the base was polished and replaced inside the patient's mouth and a new impression using irreversible hydrocolloid was made with a stock tray. The acrylic base was left inside the impression. The impression was beaded, boxed and poured using dental stone type III (Heraeus Kuzler Corp., Hanau, Germany). It was opened and a shellac base plate (Haarlem, Cavex Holland B.V.) was adapted to the cast with its acrylic base for making a record base with bitrim. After recording the maxillomandibular relationship and teeth have been arranged and tried-in, three readymade stainless steel ball clasps were bended and fixed into the interdental spaces using plaster of Paris. The waxed part and the acrylic resin base were flaked in two stages. The first was to flask the acrylic resin base and its cast. Then, the

box area was filled up with plaster of Paris mixed with pumice, leaving its margin uncovered. The second stage was to replace the shellac base on the acrylic base and pour the second layer of plaster after isolation. The other procedures were similar to conventional flasking for replacement technique of heat activated acrylic resin. The flask was opened and the wax was eliminated and packed using heat-activated acrylic resin. Slow curing method was used. The prosthesis was retrieved from the flask; excess was removed, finished and polished. The plaster-pumice mix was removed from the box through a small hole created in the tissue side of the box. During recall visit, the patient complained of watery discharge from the nose. Therefore, closing the nasal box eradicated this problem. The new one piece design in addition to improvement of whole functions was appreciated by the patient when compared to the old design with two pieces (Figure 5).



Figure 5. The finished obturator

Approximately one year later, the patient returned seeking dental help to enhance retention. The clasps were reactivated simply to improve the retention. In 2007 the patient revisited the clinic complaining of cervical and proximal caries that necessitated operative treatment. The carious teeth were restored. However, this procedure could not ameliorate the retention of the obturator and a new design should be prescribed for the patient.

Second design (Obturator-overdenture retained by mini-magnets). The new decision was to fabricate an obturator-overdenture retained by three mini magnets. Two metal cast crowns with magnetic keepers were fabricated and cemented to second premolar and first molar on the right side while, on the left side the old cast postcrown with its keeper was used as a third supporting and retentive point. A primary impression was made using irreversible hydrocolloid. The final impression was prepared

using siloxane medium viscosity (Exaflex, regular, GC America INC, ALSIP, IL) and custom-made tray with peripheries molded over the defect area using green thermoplastic compound (eds Kerr, Kerr corp, Japan .Inc.) (Figure 6).



Figure 6. The final impression

To fix the mini-magnets (Magfit Ex System, Aichi steel workers, Ltd.) inside the obturator base using heat-activated acrylic resin, the magnets were fixed to the stone cast on their keeper using fast waterproof glue. One thickness modeling wax was applied to the cast after blocking the defect undercut area with plaster of Paris. The remaining procedures were similar to conventional acrylic resin processing using flasking and wax elimination technique. The obturator base with the three fixed magnets was checked inside the patient mouth for extension, sealing, stability and retention. The next step was to provide the base with wax bitrim to record the maxillomandibular relation (MMR). The teeth were selected, arranged and tried-in. The try-in obturator was replaced on its cast after removing any interference. It was flaked by the normal way except the covering of the defect area on the acrylic base using plaster of Paris. The flask was opened to eliminate the wax, and process the acrylic resin (Figure 7).



Figure 7. The finished obturator with magnets

After retrieving the finished obturator from the flask, a uniform 2-3 mm width margin was prepared around the defect area and one layer modeling wax was adapted to cover the defect obturator acrylic base to make a palatal cover for the defect area. The palatal cover depth and shape conformity was tried inside the patient's mouth before processing. It was processed separately into acrylic resin using ordinary wax replacement technique. Finally, the palatal cover was attached to its place using auto-activated acrylic resin (Meliodent, HK). The finished obturator weight was 25 gm and nearly equal to the old one. The occlusion was checked and refined for any premature contacts. Patient satisfaction was excellent immediately after issue and this continued in the next recall sessions (Figure 8).



Figure 8. The finished prosthesis inside the mouth

## DISCUSSION

A patient with cleft palate whether limited to hard or including the soft part needs for continuous follow up and new device from time to time. Implants can be an excellent option to solve the problem of

retention.<sup>4</sup> However, this choice is not feasible in this case due to the absence of enough bone quantity and quality in addition, patient denied further surgery. In this patient, the two successive solutions were used for more than two years for each device. However, caries and gingivitis were unavoidable and interfered with the longevity of the device. Ideal preventive measures cannot be a simple daily practice for such patient due to many limitations.<sup>5</sup> Therefore, teeth protection by metal crowns should be done at the beginning of the treatment that is before 20 years. As a conclusion, mini magnets can be used on any type of dental restoration to provide acceptable retention. In addition, the progressive deterioration of the supporting tissues may be reduced by selecting more protective design to the remaining oral structures but this is not always feasible and it depends on many local and general factors.

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