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A Two-Piece Sectional Interim Obturator. A Clinical Report

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Abstract

Prosthetic rehabilitation of acquired maxillary defects can be achieved satisfactorily if all facets of treatment planning and design considerations are taken into account before the rehabilitation process. Complications associated with maxillary defects limit treatment protocols to a great extent. The prosthodontist has to identify these problem areas and suitably devise feasible options and incorporate them in the design. In this report, an acquired maxillary defect with unfavorable undercuts in the defect was successfully treated by making a two-piece sectional obturator. The two pieces were connected by the use of double-die pin system. The methodology greatly reduced chairside time and number of visits, and effective obturation was satisfactorily achieved.

Maxillectomy defects created after surgery for large cysts, tumors, or oral malignancies can be managed either by conventional prosthodontic rehabilitation or by surgical correction of the defect. Early management is essential in improving the patient's quality of life by enabling proper speech, mastication, and esthetics, in turn enhancing the patient's self-esteem. Obturators, the time-honored form of prosthodontic management for such defects are still one of the most widely used treatment modalities.

The fabrication of sectional prostheses has been advocated most commonly in patients with microstomia, trismus, large maxillofacial defects, and/or presence of deep undercuts interfering with insertion/removal of conventional dentures. Sectional dentures with preformed or customized attachments are designed with ease of insertion/removal and functional requirements in mind[1-4] for patients with microstomia or for maxillofacial rehabilitation.[5] This clinical report describes the clinical management and follow-up of a patient with an acquired maxillary defect with unfavorable undercuts in the defect using a sectional two-piece interim obturator.

Clinical report

A 25-year-old male patient was referred to the Department of Prosthodontics, ITS Centre for Dental Studies and Research, Ghaziabad, India, with a painful surgical defect in relation to the right maxillary canine region. The patient's surgical defect was created after a cyst enucleation procedure. This procedure was followed by an advancement flap procedure 1 week before referral to our department. The surgical notes and histopathological report confirmed that the patient had undergone an enucleation procedure for an infected dentigerous cyst.

Intraoral examination revealed a large defect, measuring approximately $11 \times 15 \times 20\,mm^3$. The defect was filled with granulation tissue and necrotic slough. Symptomatic treatment was provided through debridement and irrigation (with betadine), and the patient was instructed to eat a protein-rich soft/liquid diet during the postoperative period.

Thirteen days after surgery, the surgical site showed the presence of a deep undercut hindering the fabrication of a conventional obturator (Fig 1). Therefore, we decided to fabricate a two-piece split interim obturator, designed such that retention of the detachable buccal component (with acrylic tooth) was aided by the palatal component. The fabrication of an interim obturator was planned to enhance the healing of the lesion by preventing food accumulation and trauma to the surgical site.

Methodology

A preliminary impression covering the dental arch and the defect was made with irreversible hydrocolloid (Zelgan 2002, Dentsply, New Delhi, India). A cast was poured, and an acrylic

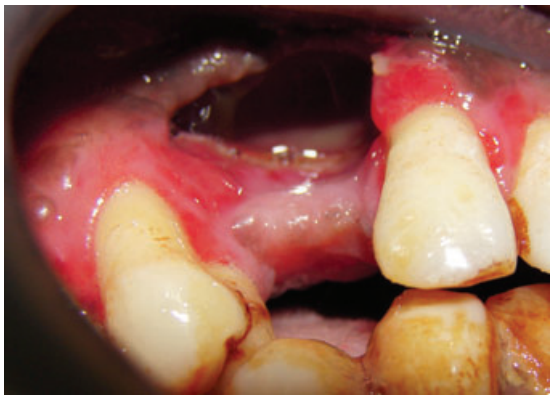

Figure 1 Postoperative intraoral photograph 13 days after surgery.

Figure 2 Survey of the working cast for undercut.

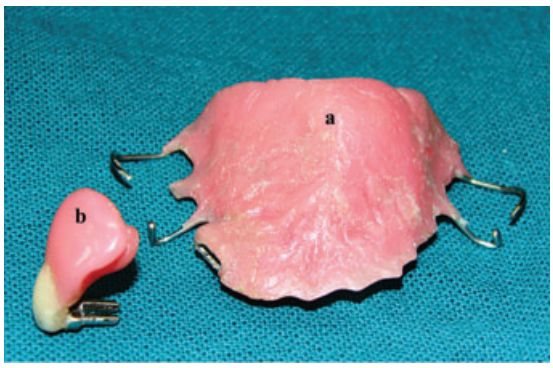

Figure 3 Palatal part of the obturator (a); buccal part of the obturator (b).

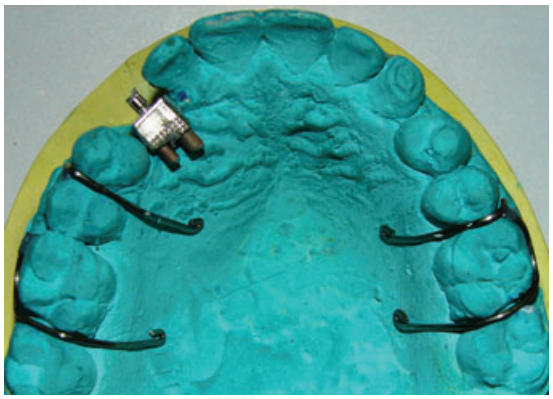

Figure 4 Trimmed and adjusted die pins, shaped wires on the casts.

Figure 5 Intraoral photograph of the obturator (inset: occlusal view).

Figure 6 Postoperative intraoral photograph after 2 months.

special tray was made for the final impression. A corrective impression of the defect portion was recorded with the help of heavy-body addition silicone (Aquasil Ultra Heavy, Dentsply, York, PA). The master cast was made in type III dental stone (Kalstone; Kalabhai Industries, Mumbai, India) and surveyed for undercuts. A deep undercut on the buccal aspect was recorded (Fig 2), leading us to fabricate a two-piece sectional obturator, designed such that retention of the detachable-buccal component (with the acrylic tooth) is aided by the palatal component.

The palatal part of the two-piece split interim obturator had the following descriptive components (Fig 3):

1. In the first component, we used the matrix component of a double-die pin (Select Dental Manufacturing Co., Farmingdale, NY).

2. In the second component, we used pin heads for retention. The pin heads were made with 21-gauge wrought stainless steel wire.
3. In the third component, we used an acrylic plate made of heat-cured denture base resin (Travelon, polymer and monomer; Dentsply, Gurgaon, India).

The buccal part of the two-piece split interim obturator consisted of the following descriptive components (Fig 3):

1. In the first component, the obturator was made with a heat-cured denture base resin (Travelon, polymer and monomer) over an acrylic tooth.
2. In the second component, the acrylic tooth was trimmed to fit into the space for the missing right maxillary canine on the cast. A hole was made on the palatal surface of the acrylic tooth to accommodate the distal end of the patrix component on the double-die pin (Select Dental Manufacturing Co.).

The matrix part of the die pin was trimmed to fit within the space of the missing canine (Fig 4) and then stabilized on the cast with sticky wax. An acrylic tooth (matching the dentition shade) was also trimmed, and a hole was made through the palatal surface to accommodate the distal end of the patrix part. The distal end of the patrix part was then set in the hole (of the acrylic tooth) using tooth-colored autopolymerizing acrylic resin. The palatal plate was made with a heat-cured denture base resin. After fabrication of the palatal component, we began construction of the buccal part on the duplicate cast.

The patrix part of the die pin was inserted into the matrix part of the die pin, which had been submerged in the palatal plate. The acrylic tooth was attached to the distal end of the patrix part of the die pin using autopolymerizing resin (before checking both their fits on the cast). The defect was blocked, and separating media was applied. A wax-up was done over the acrylic tooth and the defect. The wax-up of the buccal component was separately fabricated using heat-cured poly methyl methacrylate resin.

The patient was asked to report back to the department every 15 days for the next 2 months. An impression covering the defect was made with irreversible hydrocolloid (Zelgan 2002, Dentsply, New Delhi, India) at each appointment, and a cast was poured in type III dental stone (Kalstone; Kalabhai Industries). The intaglio surface of the buccal part was fitted into the defect and was reduced and polished during each appointment to provide adequate space for tissue growth. The patient used the interim obturator (Fig 5) for a shortened period of 8 weeks, as the size of the defect had reduced to $6 \times 4 \times 5$ mm^3 (Fig 6). The maxillary defect was further evaluated and successfully repaired using regional flap surgery.

Discussion

The management of patients with maxillofacial pathologies such as cysts and tumors often involves surgical resection of a substantial part of the jaws and teeth. Prosthodontic rehabilitation of such patients is critical to effectively restore form and function.

The decision whether to rehabilitate the patient by surgery or prosthodontic management rests in the combined hands of the surgeon, prosthodontist, and patient. Whereas minor maxillary defects can be easily managed using regional flaps or free-tissue transfers,[6] larger defects do not provide the desired functional and esthetic outcome. Therefore, despite significant advancements in surgical practices, the necessity for prosthetic rehabilitation still persists.

Patient motivation and education about the type of prosthesis along with its limitations are the first steps toward a successful treatment. Intraoral prostheses for maxillary defects primarily consist of three types of obturators (surgical, interim, definitive) based on their intended use. A surgical obturator is fabricated before the surgery and inserted in the operating room to facilitate immediate postoperative comfort. Interim obturators are usually fabricated 1 to 3 weeks after the surgery, while the patient's wound is still healing. A definitive obturator is fabricated for the patient once the site has completely healed, and minimal dimensional changes are likely.[7-9]

In the present case report we have described a technique to fabricate an interim obturator with two parts, which were fixed using nickel-chrome die pins, after ruling out any history of allergy to any metal. We could have also used custom-cast patrix/matrix components for joining the two parts, but space constraints and occlusal clearance favored the use of die pins, as they not only saved time, but also proved to be cost effective. We provided full palatal coverage for the obturator to provide excellent retention and support, although many clinicians will prefer partial palatal coverage for this case, as only one anterior tooth was being replaced.

This two-piece obturator prosthesis provided the necessary comfort and esthetics for the patient without compromising retention. Thus, the functions of mastication, speech, and esthetics were restored for the patient, and a satisfied smile could be seen on the patient's face.

Conclusion

Achieving desired results in prosthodontic rehabilitation of patients with maxillofacial defects requires a team effort by the surgeon, dentist, and prosthodontist in planning and management. Prosthodontic rehabilitation of extra- and intraoral defects not only restores form, function, and esthetics, but also lowers psychological morbidity. A technique for the construction of an interim two-piece sectional obturator has been described. The advantages of this technique include reduction of chairside time for both the patient and clinician, especially advantageous for the patient who has already had extensive medical and surgical treatment.

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