



FLEXIBLE OBTURATOR- AN ALTERNATIVE TO CONVENTIONAL RIGID OBTURATOR: A CASE REPORT

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ABSTRACT

Rehabilitation of hemimaxillectomy patients can be challenging. The most common prosthetic treatment problem with such patients is, getting adequate retention, stability and support. The size and location of the defect usually influences the amount of impairment and difficulty in prosthetic rehabilitation. Obturator prosthesis is commonly used as an effective means for rehabilitating hemimaxillectomy patients. In cases of maxillary defect, obtaining satisfactory retention, stability & biocompatibility in the definitive obturator prosthesis can be elusive. Resilient denture materials are extremely useful in retaining the prosthesis, which obturates the maxillary defects. This clinical report describes making of flexible obturator prosthesis with modified buccal flange on unresected side as a means of indirect retention. This approach provides excellent mouldability, light weight & strength of the prosthesis to increase the retention, stability and comfort

KEYWORDS : Injection moulding technique, maxillectomy, obturator, thermoplastic resin

INTRODUCTION

Surgical resection is an established and common method for treatment of maxillofacial tumors which normally results in a defect affecting phonetics, deglutition, mastication & aesthetics(1).

Lost maxillofacial structures are not completely restored by cosmetic surgeries. So, a prosthetic intervention in the form of maxillary obturator is deemed necessary to restore the lost function and aesthetic(2). There are varieties of maxillary obturators made of different materials as treatment options for such cases but selection of best material and right type of prosthesis is most critical for the success of definite obturators and it can vary with different situations.

One of the most recent advances in dental technology is the application of nylon-like materials for the fabrication of dental appliances. Since their introduction in the 1950s, there has been a continued interest in thermoplastic dental materials(3). Thermoplastic resins are used for a broad variety of applications from removable flexible partial dentures, preformed partial denture clasps, fiber-reinforced fixed partial dentures, provisional crowns and bridges, obturators and speech therapy appliances, orthodontic retainers and brackets, impression tray and border molding materials, occlusal splints, sleep apnea appliances, and implant abutments(4).

The case report presented below describes the use of thermoplastic resin in the fabrication of definitive obturator prosthesis for prosthetic rehabilitation of maxillary defect following tumor resection.

CASE REPORT

A 47 years old female patient reported to the Department of Prosthodontics and Crown & Bridge, Guru Nanak Institute of Dental Sciences and Research, Kolkata, India, after undergoing partial maxillectomy due to Haemangio-pericytoma. The patient was initially rehabilitated with surgical obturator at the time of surgery followed by interim obturator for six months and she was already wearing definite closed bulb obturator made of acrylic resin. The patient complained of looseness and inability to chew with her existing denture. She was also concerned about her unaesthetic look due to metal clasp display.

On clinical examination a small defect of approx. 2 X 3 inches was seen on the left side of the maxillary posterior region. No teeth were

present on the defect side. Remaining natural teeth were present on the contralateral side of the defect (11, 12, 13, 14, 15, 16). Potential abutments were right maxillary 1st molar and right maxillary central incisor, which were critically evaluated.

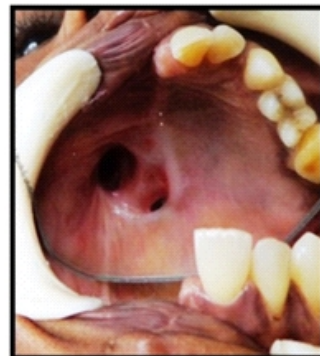


FIG.1 Class II maxillary defect

TREATMENT OPTIONS:

Three possible treatment options were considered for this clinical situation:

- Acrylic obturator
- Cast partial obturator
- Flexible obturator.

Acrylic obturators are easy to fabricate but are rigid. There is a risk of polymerization shrinkage resulting in compromised fit. They even require metal clasp for retention. On the other hand, cast partial obturators have complex design. Critical surveying and accurate tooth preparation is required.

Flexible obturator has the advantage of better aesthetics, more biocompatible and extremely light weight. They can also be used in cases of weaker abutments and severe undercuts. They do not contain residual monomer, no polymerization shrinkage, non porous & non allergic. But these flexible resins have poor bonding of acrylic tooth to the denture base resin and are expensive. Colour of denture base resin fades with time(5,6).

After weighing the various pros and cons of the possible treatment options it was decided to employ flexible resins for the fabrication of obturator in this case keeping in mind the critical factors like

condition of the abutment, size of the defect, weight of the prosthesis, amount of undercut present and the aesthetic demand of the patient.

CLINICAL STEPS

The intra-oral examination revealed a large defect on the left side of the maxilla and dentulous condition on the right side. The defect corresponded to Class II situation according to the Aramany Classification of defects [Figure 1](7).

Impressions of the maxillary and mandibular arches were made with irreversible hydrocolloid (Zelgan; Dentsply, India) taking care to block out the defect with petrolatum-laden gauge; diagnostic casts were prepared with dental stone (Gold stone; Asian chemicals, Rajkot, India) and diagnostic surveying done.

A definitive closed bulb obturator was planned as per the design principles given by Aramany in 1978 for Class II maxillary defects considering stability, retention and load distribution by the application of tripod design but with slight modifications(8). C clasps were planned on premolar and molar, unlike the conventional design no indirect retention and I bar clasp were planned instead a C clasp on the maxillary right central incisor(8,9). Since the patient expressed concern for show of metal on the incisor, retention on incisor was planned by using flexible thermoplastic resin (Valplast Int. Corp, New York, USA) instead of I bar clasp.

Mouth preparation was done as per treatment plan. Border molding was done with low-fusing compound (DPI Pinnacle tracing sticks, Mumbai, India) on custom-made tray. The defect area was molded with putty addition silicon (Elite HD+; Zhermack, Italy) and master impression was made with light body addition silicon (Elite HD+; Zhermack, Italy). The master cast was prepared with die stone (Ultra rock; Kalabhai, India), surveying and block-out of undercuts on master cast were done. Master cast was duplicated with reversible hydrocolloid and refractory cast was obtained. Jaw relations were recorded, tooth setting was done and wax try-in performed. Wax-up denture along with cast was invested in the bottom half of the flask with dental stone. After investing media was fully set, sprues were attached to the wax-up denture [Figure 2]. Separating medium was applied in the bottom half of the investment material, then upper half was closed and filled with second pour of investment material and allowed to set. Dewaxing was carried out in hot water bath. After the flask was cooled, the teeth were removed and prepared for mechanical retention. Mechanical retention was obtained by diatoric holes with medium drills. Then teeth were cemented in place with Val-cement (Valplast Int. Corp, New York, USA). The mold was insulated using a special agent (Acrylic Sep; Bredent, Germany).



FIG.2 Waxed up denture with cast invested in the flask with sprues

The flask was positioned carefully under the super injector by placing the sprue end of the flask with the shaft of the super injector. Furnace and melting cylinder were preheated to 220°C for 20 min. The selected valplast resin tube (Valplast Int. Corp, New York, USA) was placed into the melting cylinder and heated for 11 min according to the manufacturer's instructions. The melting cylinder with resin tube was removed carefully in horizontal position and placed over the sprue end of the flask. The lever of the super injector

was turned with rapid and steady motion and maintained for 3min. Flask was removed after disengaging from the press and bench-cooled for 30 min. The prosthesis was recovered after polymerization following which finishing and polishing done. The prosthesis was inserted [Figure 4] and the patient was instructed about home care and prosthesis maintenance.



FIG.3 Flexible obturator placed in the mouth

DISCUSSION

Thermoplastic resins have been used in dentistry for over 50 years. Thermoplastic resins and co-polymers have many advantages over conventional powder and liquid resin systems. Thermoplastic resins tend to have predictable long-term performance. They are stable and resist thermal polymer unzipping. They also exhibit high creep resistance and high fatigue endurance as well as excellent wear characteristics and solvent resistance. Thermoplastic resins typically have very little or almost no free monomer in the material. A significant percentage of the population is allergic to free monomer and these materials offer a new safe treatment alternative for these individuals(6,10,11,12,13). The disadvantage of these resins include gradual fading of denture base color, noticeable shift of prosthetic teeth during processing, air entrapment within the denture base material, poor bonding between the denture base material and acrylic resin teeth and technique sensitivity(14).

Prosthetic rehabilitation of dentate maxillectomy patients is a lengthy and involved process. However, if attention is paid to the proper sequencing and details of treatment, it can be one of the most satisfying procedures. Aramany Class II defects generally provide a favorable situation when sound remaining teeth are present. This clinical report illustrates a class II defect, which was rehabilitated by a closed bulb flexible obturator. The main objective was to decrease the weight and minimize the display of metal in the prosthesis. Flexible denture base material helps to reduce the weight of the obturator, to decrease pressure to the surrounding tissues, to aid in deglutition and to encourage regeneration of the tissues. The lightness of the obturator also does not cause excessive atrophy and physiological changes in muscle balance(2,15). The patient expressed concern for the show of metal on the anterior teeth. A flexible and aesthetic retention of anterior teeth was planned by using thermoplastic resin. These resins are nearly unbreakable, pink-colored like gums, can be built quite thin, and can form not only the denture base but also the clasps. Since the clasps are built to curl around the necks of the teeth, they are practically undistinguishable from the gums(5).

Flexible dentures absorb small amounts of water to make the denture more soft tissue compatible. They will not warp or become brittle. These dentures stand aesthetically superior removable dentures with full functionality and comfort. Complete biocompatibility is also achieved because the material is free of monomer and metal, these being the principle causes of allergic reactions in conventional denture materials(5,6).

CONCLUSION

The most challenging part in rehabilitating the patient with

hemimaxillectomy, is to obtain adequate retention and stability. Flexible obturator has excellent biocompatibility, light weight of prosthesis and provide good mouldability. The modified clasp design on the unresected side not only improves retention but also provides adequate stability to the prosthesis. This type of retention aid provides an easy option to achieve the primary objective of restoring the functions of mastication, speech and aesthetics. No two maxillofacial defects and the clinical situations are exactly same. So, every case should be carefully examined and critically evaluated and the pros and cons of different treatment options should be weighed prior to the treatment plan. Depending on that most preferable prosthesis and best material should be selected for a every maxillofacial case that gives maximum benefit and long term clinical success.

"Flexible obturator is certainly not the best option for all maxillofacial case but yes !!!!!, It can be a good alternative to conventional rigid obturator".

REFERENCES

1. Tannamala PK, Pulagam M, Pottam SR, Karnam S. 2012. Flexible resins in the rehabilitation of maxillectomy patient. Indian J Dent Res. 23(1):97-100.
2. Beumer J, Curtis TA, Firtell DN. Maxillofacial Rehabilitation. Prosthodontic and surgical considerations. C.V. Mosby Co., St Louis, Toronto. 1979 pg.183-243.
3. Negrutiu M, Sinescu C, Sticlaru C, Davidescu A, Rominu M. 2007. The analysis of removable partial dentures with clasps made from thermoplastic and chemoplastic materials. A biomedical approach of the interface between clasps and denture. Eur Cell Mater. 13:20.
4. Pusz A, Szymiczek M, Michalik K. 2010. Aging process influence on mechanical properties of polyamide-glass composites applied in dentistry. JAMME 38:49-55.
5. Prashanti E, Jain N, Shenoy V K, 2010. Flexible denture- A flexible option to treat edentulous patient. Journal of Nepal Dental Association 11; 85-87.
6. Dr Sunitha Shamnur, Dr Jagdish K N, Dr Kalavathi K R. 2011 - Flexible Dentures- An alternate for rigid dentures. Journal of Dental Sciences & Research 1:74-79.
7. Aramany MA. 1978. Basic principles of obturator design for partially edentulous patients. Part I: Classification. J Prosthet Dent 40:554-7.
8. Aramany MA. 1978. Basic principles of obturator design for partially edentulous patients. Part II: Classification. J Prosthet Dent 40:656-62.
9. Parr GR. 2005. Prosthodontic principles in frame work design of maxillary obturator prosthesis. J Prosthet Dent 93:405-11.
10. Abuzar MA, Bellur S, Duong N, Kim BB, Lu P, Palfreyman N. 2010. Evaluating surface roughness of a polyamide denture base material in comparison with poly (methyl methacrylate). J Oral Sci 52:577-81.
11. Yunus N, Rashid A, Azmi LL, Abu-Hassan MI. 2005. Some flexural properties of a nylon denture base polymer. J Oral Rehabil 32:65-71.
12. Takabayashi Y. 2010. Characteristics of denture thermoplastic resins for non-metal clasp dentures. Dent Mater J 29:353-61.
13. Goiato MC, Santos DM, Haddad MF, Pesqueira AA. 2010. Effect of accelerated aging on the microhardness and color stability of flexible resins for dentures. Braz Oral Res 24:114-9.
14. Anusavice KJ. Phillips Science of Dental Materials, 11 th Ed. Philadelphia: WB Saunders Co; 1996. p. 736-7.
15. Keyf F. 2001. Obturator prosthesis for maxillectomy patients. J Oral Rehab 28:821-29.