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Case Report

Rehabilitation of maxillectomy defect by using closed hollow bulb obturator with a detachable lid-a case report

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ABSTRACT

A male patient aged 41-year-old presented with a fracture of the obturator and malodor. The patient gave a history of a right partial maxillectomy, followed by prosthetic rehabilitation with an obturator 4 years ago. Preliminary impressions were made and the custom tray was fabricated. Final impressions were made using monophase material. On the master cast, metal reinforced was planned using wax pattern and casted. Two separate flasks were used one for obturator and another one for lid fabrication. In the open hollow bulb portion of the obturator, female portion of the button was fixed to have the connection with the male part of the button which was fixed on the inner side of the lid. 2mm of the lid was extended into the hollow part to have the tight seal. This article describes rehabilitation of maxillofacial defect by using hollow bulb obturator with detachable lid and metal reinforced which facilitates ease of cleaning, prevention of infections by minimizing formation of biofilms, malodour and prevent repeated fracture of the obturator respectively.

Keywords: Biofilm, Maxillofacial prosthesis, Rehabilitation, Hollow bulb obturator, Oral hygiene

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Introduction

Intraoral defects in the maxilla may occur due to trauma, pathological changes, radiation, burns, or surgical intervention. Maxillary defects which cannot be cannot be surgically closed and needed prosthetic intervention, with maxillary obturator prostheses, to restore and recreate the functional separation between the oral cavity, sinus and nasal cavity. The weight of prosthesis in large maxillary defects acts as dislodging factors. Therefore, making the bulb hollow reduces the weight of the prosthesis and prevents undue pressure on the tissue undercuts. Most hollow closed bulb obturators were well sealed and cordoned off from an external environment. A lot of studies demonstrated that due to porous nature of acrylic, saliva and other fluids percolate into the prosthesis. This contributed to the formation of dental plaque with Candida Albicans cells.[1] Inability to clean well and maintain hygiene of this large obturator prosthesis had provided a favorable condition for the formation of biofilm (They are most often formed by yeast-like fungi Candida spp., as well as bacteria of the genus Streptococcus, Staphylococcus)[2] which has resulted in various local and systemic infections. This case report highlights the use of removable lid in an obturator to facilitate ease of cleaning, which in turn minimize the formation of biofilm and provide better oral hygiene.

Case report

A male patient aged 41-year-old was referred to the department of prosthodontics, with a chief complaint of malodour and fracture of the obturator. The patient gave a history of a resected maxillary tumor in relation to the same region. Right partial maxillectomy was followed by prothetic rehabilitation with an obturator 4 years ago. Extra oral examination revealed gross asymmetry on right side of the face with depressed skin over the infraorbital margin. Intraoral examination revealed a defect on the right side of the maxilla extending anteriorly close the midline, posteriorly up to the posterior extent of the hard palate, superiorly nearing the floor of the orbit, mesially to the nasal septum and laterally the entire buccal aspect involving the alveolus (Figure1). Hard tissue examination revealed the presence of, second premolar and first molar which were root canal treated and restored with metal crowns on the left side of the maxilla. Mandibular arch revealed the full complement of teeth associated with generalized periodontitis. Overall oral hygiene was poor. Considering all these factors a hollow bulb obturator with removable lid using heat polymerizing acrylic resin was planned.

Procedure

Preliminary impressions were made using irreversible hydrocolloid (tropical in, The Zhermack Group, Germany). The custom tray was fabricated using auto-polymerizing resin (self-cure acrylic repair material, DENTSPLY India Pvt. Ltd.). This was followed by border molding using green stick impression compound (DPI Pinnacle, Dental Products of India, Mumbai).Using monophase material, final impression was made (Reprosil, DENTSPLY Caulk, USA). Beading and boxing of the impression were done using a flask and the master cast was fabricated using orthogonal (Kalstone, Kalabhai Karson Pvt. Ltd., India) (Figure 2). The undesirable undercuts present in the defect were blocked out in wax and record base was constructed with auto-polymerization resin (DPI –RR Cold Cure). The maxillo-mandibular jaw relations were recorded. Teeth arrangement, phonetics, esthetics and vertical dimension were evaluated. On the master cast wax pattern was designed and was casted (Figure 3). This metal reinforced was planned to prevent repeated fracture of the obturator. The conventional flashing procedure was performed using two separate flasks one for obturator (Figure 4) and another one for lid fabrication (Figure 5). In the open hollow bulb portion of the obturator, the cylindrical projection was made using auto-polymerizing resin, on to which female portion of the button was fixed using cold cure acrylic resin to have the connection with the male part of the button which was fixed on the inner side of the lid (Figure 6). 2mm of the lid was extended into the hollow part to have the tight seal to prevent ingress of liquids from the mouth into the defect. A notch was made on the posterior end of the lid for ease of opening and cleaning. The finished prosthesis (Figure 7) of two pieces hollow bulb obturator (obturator and detachable lid) was tried in the patient mouth Post insertion instructions were given on the technique of placement, removal, and maintenance of the Prosthesis. Post-insertion follow-up and patient care were carried out at regular intervals of time.

Discussion

Open and closed hollow obturator designs are considered for partial and total maxillectomy defects. Hollow bulb obturators are preferred over solid bulb as former reduces weight of the prosthesis. The lightweight prosthesis has been given consideration for maxillary resection by Chalian and Barnett. A simplified fabrication technique for a light weight prosthesis using polyurethane foam as core to reduce the weight of the obturator was proposed by Tanaka et al.[3] in 1977. Teny Fernandez et al, fabricated an obturator involving two-stage procedure in which body of obturator and lid both were fabricated separately and were later joined together using cold cure acrylic resin.[4] A method of fabricating a combination of both open and closed hollow obturators with a removable lid was put forth by Phankosol and Martin in 1985.[5] Asher et al used auto polymerizing acrylic resin to process the bulb portion to avoid fabricating a separate lid, however, the final sealed area was exposed to the oral, nasal, and antral environment. Thus ingress of oral fluids inside the bulb acts as a site for bacterial growth and also increased the weight of the prosthesis.[6] Many clinicians have noted that use of autopolymerzing acrylic resin to seal the lid of closed hollow-bulb obturators eventually leak fluids into the bulb.[7] As acrylic inherently being a porous structure has led to percolation of oral fluids into the bulb and disinfecting this hollow bulb portion is difficult. Percolation of fluids led to the constant presence of these microorganisms on PMMA maxillofacial prostheses which may contribute to undesirable infections and propagation of microorganisms in dental offices, leading to cross-contamination and malodour.[8] These foci of infection nearly seem to be hazardous for a patient with compromised immunity. Present techniques described a procedure to fabricate an open hollow bulb in which two separate parts i.e obturator and detachable lid were fabricated and were attached to each other with the help of button (male and the female part). This removable lid aids in disinfecting the prosthesis which in turn minimizes the formation of microbial biofilm over the prosthesis resulting in the reduced count of colony forming units and also reduces the chances of infection.

Conclusion

This technique of rehabilitating acquired maxillary defect using closed hollow bulb obturator with the removable lid has provided an ease for disinfecting the bulb portion. Thus, minimizing the bacterial growth and reduces the chance of infection in immunocompromised patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal.

Authors' contribution

Nitesh R: Guidance and Aided in diagnosis and planning
Vini P: Manuscript writing, Literature search, Case Procedure
Subhabrata M- Documentation, Data Collection, Case Procedure
Ponnanna A.A.- Manuscript editing

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Conflict of interest

The authors have nothing to disclose or any conflicts of interest.

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Figures

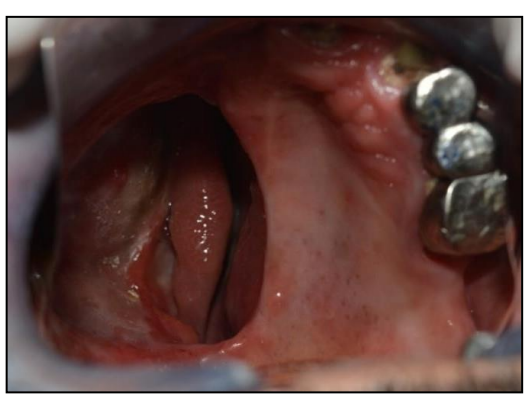

Figure 1. Intraoral view of Maxillary defect

Figure 2. Beading & boxing of the impression

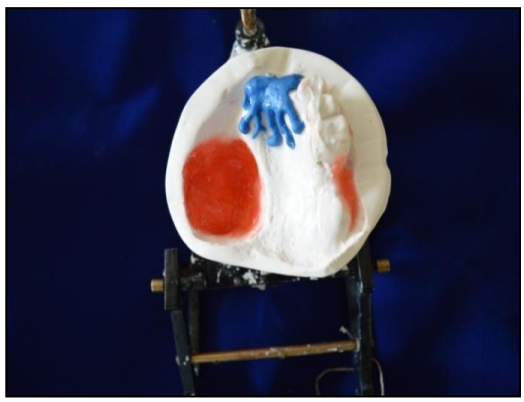

Figure 3. Master cast along with designed waxpatter for metal reinforcement

Figure 4. Part Flask used for fabricating Lid

Figure 5. Part of flask used for fabricating obturator with casted framework

Figure 6. Detachable lid

Figure 7. Final Prosthesis

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