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## Case Report

# Prosthetic Rehabilitation Of A Maxillary Defect With Hollow Bulb Obturator Retained By A Combination Of A Cast Clasp And Zest Anchor Type Radicular Ball Attachment- A Case Report

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### ABSTRACT

Prosthetic rehabilitation of patients with acquired defects of the maxilla present a challenging task and these goals are met by means of an obturator prosthesis. Palatal defects that are treated prosthodontically, present biomechanical problems. An obturator prosthesis fabricated for a unilateral maxillary resection, has intrinsic leverages that act as dislodging factors. Many methods have been recommended to accomplish the retention of maxillary obturator prostheses. The placement of radicular attachments and the process of making the prosthesis hollow can have a significant effect on the stability and retention of the obturator prosthesis in partially edentulous maxillectomy patients. This case report describes a clinical case of sub-total maxillectomy due to osteomyelitis, which was successfully rehabilitated with a hollow bulb obturator, retained in a unique combination of a cast clasp and zest anchor type of radicular ball attachment.

**Key Words:** Acquired maxillary defect, Osteomyelitis, Obturator, Radicular attachment

**Key Message:** In partial or sub-total maxillectomy patients with non parallel abutment teeth, a combination of clasps and attachments will be beneficial in providing retention and stability.

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and Cierny-Mader [3] classifications are the two most commonly used staging systems for Osteomyelitis. Treatments for osteomyelitis of the jaws include incision and drainage, antibiotics, sequestrectomy, extraction of teeth, saucerisation, decortications, resection of the jaw and hyperbaric oxygen therapy [4].

Defects of the maxilla may result from trauma, pathological changes, or following surgical resection of oral neoplasms. Maxillectomy defects result in the formation of a communication between the oral cavity and the antrum and/or the nasopharynx. This inevitably results in difficulty in mastication and swallowing, as well as impaired speech and facial aesthetics. Rehabilitation is important here, as functional impairments have a detrimental effect on the quality of life and self

esteem [5],[6],[7]. A well retained user- friendly, removable maxillofacial prosthesis is the key to successful prosthetic rehabilitation in such cases. The most common problems which are usually encountered include the weight of the obturator, lack of support from the defective site and the number of remaining teeth which aid in the retention and resistance to leverage forces. In partially edentulous patients support, stability and retention of a removable obturator prosthesis relies on the remaining hard and soft tissues [8]. The larger the surgical resection, the greater the loss of the mucogingival support, which in turn results in increased unfavourable forces acting on the remaining abutment teeth [9],[10].

Since the advent of radicular attachments, the usage of the zest anchor type of ball and socket attachment to retain the prosthetic obturator seems to be beneficial, easy to use and economical [11]. This clinical report demonstrates the use of the zest anchor type of radicular attachment to improve the stability and the retention of the hollow bulb obturator prosthesis for a patient with right side sub-total maxillectomy, secondary to Osteomyelitis.

### Case Report

A 57 year-old male patient presented to the Department of Prosthodontics, with a chief complaint of difficulty in speech and deglutition of seven year's duration. Medical history revealed that the patient was type II diabetic and was under oral hypoglycaemic drugs and insulin therapy. Seven years back, the patient had suffered from pansinusitis with soft tissue thickening and altered signal of the right nasopharyngeal tissue, with features of otitis media and mastoiditis. Myringotomy was performed and pus was drained, followed by extraction of the right maxillary molars and incisors. The palatal bone was highly necrosed and was yellowish black in colour, thus raising the suspicion of osteomyelitis and oroantral fistula. Subsequently, the necrosed tissue was removed and the patient was kept under medication.

Intraoral examination revealed sub-total maxillectomy of the right side and partially

edentulous maxilla on the left side, with 22, 23 and 28 (FDI) remaining [Table/Fig 1] [Table/Fig 2]. The presented defect corresponded to the Aramany's Class II situation [10]. All walls were lined with healthy mucosa. The mandibular arch was partially edentulous with missing 46 and 47. Mandibular movements were within the normal range, with no evidence of supra-eruption of mandibular teeth. Tongue function was normal and speech was altered.



(Table/Fig 1) Intra-oral view of defect



(Table/Fig 2) Panoramic radiograph

Considering stability, retention, load distribution and supra structure longevity, the decision was made to rehabilitate the patient with a hollow bulb obturator attached to the cast partial denture [Table/Fig 3] [Table/Fig 4]. To attain the common path of insertion and to fulfil the tripod effect, modification of buccally tilted 28 and a radicular ball attachment in 23 was planned. Canine was chosen in comparison to the lateral incisor because of its long root architecture and strategic position. Retention was obtained from cast circumferential clasp in 28 and zest anchor attachment in 23.



(Table/Fig 3) Occlusal view of obturator prosthesis



(Table/Fig 4) Palatal view of obturator prosthesis with hollow bulb

### Procedure

1. Preparation of the mesial rest seat on 28 was done to receive a cast clasp. 22 and 23 were intentionally root canal treated and the coronal portions were resected. The radicular portion of the canine was prepared to receive the zest anchor attachment. The male component of the zest anchor was cemented using glass ionomer luting cement. (GC Gold Label, JAPAN). A complete arch impression was then made using polyvinyl siloxane silicone impression material. (3M ESPE Express STD, GERMANY). A cast metal framework was fabricated and checked intraorally for retention.
2. The framework was used to make a final impression (putty-reline technique) of the defect using polyvinyl siloxane silicone impression material (3M ESPE Express STD, GERMANY). With the conventional

method, the jaw relation teeth arrangement and try-in were done. Processing was done to obtain a hollow bulb obturator and it was inserted in the patient's mouth to check adaptability.

3. The prosthesis was sufficiently relieved to accommodate the female component. The female component was attached to the male part and was transferred to the final prosthesis with the help of auto-polymerizing resin intraorally [Table/Fig 5], [Table/Fig 6], [Table/Fig 7].
4. The prosthesis was then removed and rechecked for proper seating of the components. Post insertion follow-up and patient care were carried out for a period of one year, which revealed that the patient was thoroughly satisfied and extremely comfortable with the functioning and the aesthetics of the prosthesis [Table/Fig 8] [Table/Fig 9].



(Table/Fig 5) Male component on maxillary left canine



(Table/Fig 6) Female component



(Table/Fig 7) Periapical radiograph showing radicular attachment on maxillary left canine



(Table/Fig 8) Intraoral post operative picture of patient with hollow bulb obturator



(Table/Fig 9) Extraoral picture of patient with obturator

## Discussion

Obturator prostheses are commonly used in the rehabilitation of total or sub-total maxillectomy patients, as it helps in separating the oral and the nasal cavities and restores normal deglutition and speech and further improves the mid-facial aesthetics by supporting the soft tissues [12],[13].

Brown [14] and Desjardins [12] have suggested extending the lateral wall of the bulb higher geometrically and using extracoronary and intracoronary direct retainers for engaging the remaining teeth to maximize support, retention, and stability. In cases where resection is the preferred treatment, bone grafting is not recommended because the blood supply to the graft area is compromised. Use of a vascularised myo-osseous flap may be more favourable, but may be precluded because of the absence of a suitable donor site [15]. Hence, in these patients, obturators are the favoured method for filling the defect [16].

The retentive design is critical in the sub-total maxillectomy patient who has lost extensive supportive and retentive structures [17]. Recent investigations have confirmed the effectiveness of the obturator prosthesis in terms of speech, masticatory function, swallowing and appearance [18]. There is evidence that speech can be restored to a pre-operative level with the maxillary obturator prosthesis [5]. The placement of a radicular attachment in the present case produced a more favourable tripod effect to enhance retention, which further helped in achieving stability and reduced the leverage for the remaining teeth which were adjacent to the defect. Our case report presented the successful rehabilitation of an acquired hard palate defect by utilizing a zest anchor type of radicular attachment on the left maxillary canine to increase the retention and stability of the prosthesis.

## Conclusion

Prosthetic rehabilitation of the dentate maxillectomy patient is a lengthy and time involved process. Radicular attachments have proved to be effective in various clinical

conditions to rehabilitate partial edentulous patients.

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