

Rehabilitation with cast removable prosthesis in mandibulectomy: a viable treatment modality**Manish Mittal¹, Ashish Kalra^{2*}, Yuvraj Issar³, Vijayalakshmi V Malali⁴**¹*Department of Prosthodontics, Jalandhar Cantt, India*²*Department of Prosthodontics, CMDC (CC)*³*Department of OMFS, WLDMH, IMTRAT, Bhutan*⁴*Department of Periodontics, ADC (R & R), New Delhi***ABSTRACT**

Maxillo-facial prosthodontics has evolved as a ever changing field with inception of various innovative techniques and materials, which have brought promising results and reforms in rehabilitation and reconstruction of various oral and maxillo-facial defects with optimum and at times much superior form and function. Viable treatment is discussed in the paper.

Key words: Ameloblastoma, mandibulectomy, microvascularised free fibular flap (MVFF), Cast prosthesis

Introduction

Maxillo-facial prosthodontics has evolved as a ever changing field with inception of various innovative techniques and materials, which have brought promising results and reforms in rehabilitation and reconstruction of various oral and maxillo-facial defects with optimum and at times much superior form and function. This has led to a much satisfied clientele, who could integrate themselves well among the society. The loss in continuity of the mandible perturbs the overall balance and symmetry of the stomatognathic system, adversely affecting the movement and function of mandible. Marginal mandibulectomy involves resection of the mandibular body with overlying soft tissues while maintaining the inferior cortex of the mandible and its continuity [1]. The reasons for mandibulectomy can be a malignant tumour resection or trauma [2]. The rehabilitation of such patients, especially with deranged swallowing, speech, saliva, mastication, respiration and cosmesis, all pose a serious challenge to the prosthodontist in treating and motivating them to live a normal happy

life. Apart from the precise laboratory and technical support, proper diagnosis and treatment planning synergistically with the clinical skills and manual dexterity of the operator are paramount and roadway to success. This clinical report falls no short in presenting a case report of rehabilitation of a patient who has undergone mandibulectomy of the right side alongwith MVFF reconstruction and later rehabilitated using provisional guide flange prosthesis followed by with definitive mandibular cast removable prosthesis.

Case report

The case pertains to a serving soldier, aged 36 years, who reported to the Dept of Prosthodontics with complaints of missing right lower back teeth and desired replacement. Relevant past dental history revealed that he has undergone removal of ameloblastoma on the right side, three years back at Army Dental Center, R & R, New Delhi. Further to this, concurrent marginal mandibulectomy was performed and alveolar fragment was resected [Fig 1]. The healing of the graft at the site and the follow up recall of the patient was uneventful owing to the defect being restored with micro-vascularised free fibular graft (MVFF). Clinical examination revealed well healed defect site on the right posterior region with all teeth present except 44, 45, 46, 47 and 48 [Fig 2]. A dehiscence was noted wrt tooth 43. A mucogingival surgery was performed to increase the width of

*Correspondence

Dr. Ashish Kalra

Department of Prosthodontics, CMDC (CC)

E mail: kalraashish2@gmail.com

attached gingiva wrt tooth 43 wherein a free gingival graft (FGG) was taken from palatal mucosa and satisfactory results were obtained. A treatment plan was formulated consisting of oral prophylaxis and fabrication of a definite cast removable prosthesis replacing the missing teeth. Diagnostic impressions were made and diagnostic casts were obtained. The surveying of the diagnostic cast was done using a microsurveyor to identify most desirable path of placement with minimal interferences, distinguish proximal surfaces which will act as guide planes and establish and measure undercuts. Mouth preparation was done in form of tooth contouring for various cast partial components and impression were made of the mandibular arch with addition silicone (3M) using the two step putty wash technique. The master cast was poured in die stone (Kalabhai Type IV) and surveyed

to ascertain and check parallelism of guide planes, survey lines and useful undercuts in final designing of the framework. Block out procedure was done [Fig 3] and the cast was duplicated in reversible hydrocolloid material and poured with refractory material (Wirovest, BEGO). Wax pattern fabrication using stippled, grid retention and the beading wax [Fig 4]. Sprues were attached and pattern invested. Induction casting was done using CoCr alloy. Framework retrieved, finished and electrolytic polishing was done. Try in was done and functional impression made with ZOE [Fig 5]. The master cast was sectioned and repoured to obtain the altered cast [Fig 6], on which teeth arrangement was done using semi anatomic teeth [Fig 7]. The acrylised prosthesis was finished & polished and finally inserted [Fig 8]. Post insertion instructions were given.

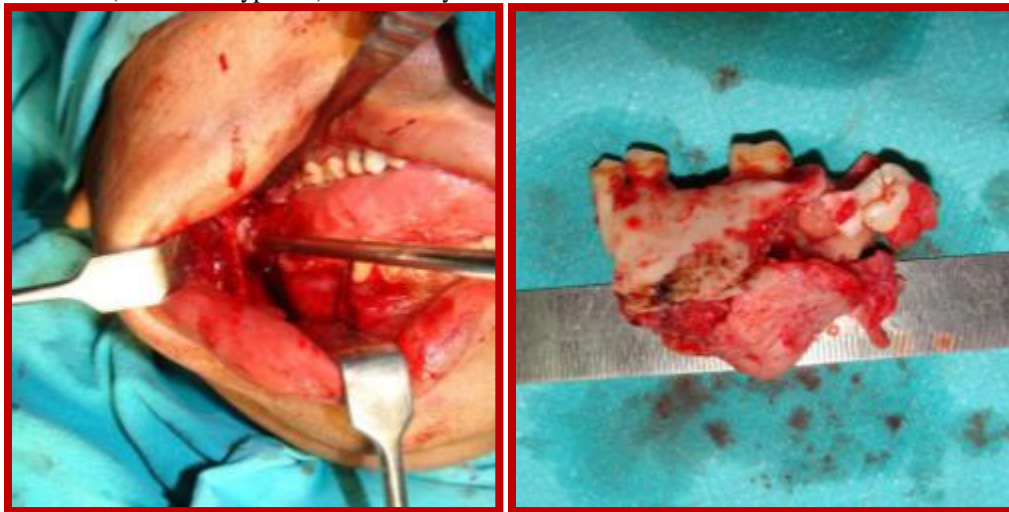


Fig 1: Surgical removal of ameloblastoma with resected alveolar segment



Fig 2 : Intra oral view post surgery

Fig 3 : Block out procedures



Fig 4 : Wax pattern on refractory cast



Fig 5 : Functional impression with ZOE



Fig 6 : Altered cast technique



Fig 7 : Teeth arrangement



Fig 8 : Prosthesis in situ (Frontal and occlusal view)



Fig 9: Pre and Post operative view comparison

Discussion

It is desire to convince yourself and the patient for the treatment and above all excel in whatever we desire as in famous quote by Napoleon Hill "The starting point of all achievement is desire." One has to make right decisions at the right time as such it is a uphill challenge and one should be too late to decide that it was worth the efforts. Ameloblastoma remains a rare tumor constituting 15% of oral neoplasms. In general, ameloblastoma can present at any age, though most are seen within 3rd and 5th decade of life [3]. Mandible as we know, being a single bone, any breach can disrupt the either component of stomatognathic system be it speech, chewing, respiration or deglutition. Therefore, the saying by Thomas D Taylor holds true that rehabilitation of mandibulectomy patient should consider both form and function. The various treatment options were either to provide firstly; an implant retained fixed/overlay prosthesis; secondly precision attachments and thirdly removable cast sectional prosthesis. McGill in 2002 suggested that the restoration of edentulous mandible with a conventional denture is no longer the most appropriate first choice prosthodontic treatment [4]. The last option was chosen as patient was not enthusiastic to bear additional cost burden and also negated further surgical intervention. The time frame was also a limiting factor for completion of treatment as he was already posted out of station and available for a short term. The counselling also proved futile to bring about any appreciable change in his decision. Hence, the option of rehabilitation with cast partial denture was chosen. The treatment plan in mandibulectomy seems to be provision of early post resection exercises and the physical therapy, mainly the stretching exercises initiated two weeks post surgically and consists of the patient grasping the chin and moving the mandible away from the surgical side [5]. This helps in loosening the scar contracture and improves the maxillo-mandibular relationship. Moist heat and the analgesics are also vital in restoration of normalcy. The various therapies include Intermaxillary fixation using arch bars and elastics 5-7 weeks post surgery, Gunning splints for edentulous patients, palatal speech aids, maxillary guidance ramps and mandibular guide flange prosthesis. All of them train NM system to avoid/reduce the mandibular deviation [6]. The basic principles of grafting include that it should be surrounded by a well vascularised tissue bed. A water tight closure is must. Isolation from the oral cavity and immobilization of the graft during healing are essential. In 1989, the first lower jaw reconstruction with a fibular flap using osteotomies to mimic the shape of the

mandible, was described. Since then, the use of revascularised free fibular flap as bone graft has become a cornerstone in the head neck armamentarium [7]. Fibular micro-vascularised free fibular grafts are preferred as they help achieve optimum esthetics, are resistant to infections, can survive irradiated recipient bed and the tissues retain their flexibility. They are graft of choice for lateral and symphyseal defects i.e. upto 25 mm of bone can be harvested at a stretch. Such grafts have in built advantage of being suitable for placement of dental implants. The prosthodontic considerations entails one to follow up of basic principles of rehabilitation with further modifications to match to the basic anatomic, physiologic and psychologic limitations of the oral cavity. The preliminary impressions are to be made with maximum extension and tissue coverage. The various techniques can be among the dual arch/altered cast/ functional relined method. The jaw relations have to be extended beyond the periphery to support the lip and the cheek musculature. The goals to success are aimed to employ processed denture bases for recording of maxillo-mandibular relation with preference for the injectable form of recording medium, without any attempts to guide the mandible. The teeth arrangement follows the neutral zone/ denture space concept with preference for broad contact points, which mandible to slide freely from initial contact to the final contact. The occlusal adjustments are always done in upright position as it is the most functional position of the mandible. The case sometimes demand non anatomic teeth due to abnormal jaw relationship and angular path of closure, lack of proprioception with increased lateral stresses on the denture base during the function. The cast prosthesis is designed on the basic principles of retention, stability and support. Rigidity is a must and achieved by rigid connectors and guide planes. The retainer, minor connector and the proximal plates should not provide any lateral stressed during function. The occlusal forces to be directed along the long axis of the teeth and the bracing and retentive elements should not exceed the forces beyond the physiologic limits. Multiple rests can be employed to provide support and distribute stress well among the abutment teeth. The last but not the least, designed framework should permit good oral hygiene [8].

Conclusion

A multidisciplinary team approach is to be sought. Modification to routine prosthodontic procedures is paramount for the successful outcome of the case. The

success also depends on the patient's confidence, cooperation, motivation levels and the psychological status, which will ultimately let him, lead a normal life. The ultimate **SMILE** of the patient needs a punch of - S from **DIVERSITY** as each case is different, got to take each as a new challenge.

M from **COMMITMENT** as continuous effort is the need of the hour.

I from **INNOVATION** as new ideas and techniques are welcome.

L from **COLLABORATION** as team work is the golden rule for the clinical efficacy.

E from **INTEGRITY** as trust and faith of the patient in the doctor.

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