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Case Report

Prosthetic rehabilitation of a gunshot wound defect with combination of fixed and removable prosthesis

Wg Cdr M.P. Shashidhar^{a,*}, Col E. Mahesh Gowda^b^a Graded Specialist (Prosthodontics), 1 Air Force Dental Centre, New Delhi 110010, India^b Dy Commandant & Classified Specialist (Prosthodontics), Army Dental Centre (R&R), Delhi Cantt 110010, India

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sustained with gunshot wound treated with maxillary cast partial denture and mandibular metal ceramic fixed dental prosthesis.

Case report

Twenty seven year old male patient was referred to outpatient department for rehabilitation of the missing teeth caused due to gunshot wound (Fig. 1). History revealed that he had sustained a gunshot injury to face as well as to abdomen, while on duty. After initial life saving emergency treatment, followed with multiple abdominal surgeries, he was stabilized. Later on he was referred to our dental center for Prosthodontic rehabilitation. Clinical evaluation of the maxillary arch revealed that he had missing teeth 12, 11, 21, 22, 23 and 24 with substantial loss of height and width of the alveolar bone (Fig. 2). Mandibular arch showed missing 37, root stumps in relation to 32, 33 and 34, and fractured 31 involving the pulp (Fig. 3). The patient was diagnosed as, a case of Kennedy's class IV maxillary arch with Siebert's class III alveolar ridge defect and Kennedy's Class III Mod 1 mandibular arch. The treatment plan was formulated to rehabilitate him with maxillary removable cast partial denture with acrylic extension on to the defect and rehabilitate mandibular arch with metal ceramic fixed dental prosthesis.

In maxillary arch quadrilateral design cast partial denture with anterior–posterior palatal strap major connector, embrasure clasps in the molar region bilaterally, bar clasp with Cingulum rest in relation to 13, RPI clasp assembly for 25 and mesh retention for acrylic saddle were planned.

Introduction

Maxillofacial defects created by gunshot wound can result in significant esthetic deformities and functional disorders, which may in turn result in psychosocial consequences.^{1,2} The complicated nature of the defect makes the rehabilitation of the maxilla and mandible challenging. The primary goal of rehabilitation is to restore the compromised function and esthetics caused due to maxillary and mandibular defects.^{3,4} There are several treatment options available for rehabilitation in cases of maxillary anterior defect involving alveolus, like removable partial dentures, fixed partial dentures, and teeth-implant supported hybrid prostheses.⁵ The prosthesis should replace all missing oral structures including both hard and soft tissues in the affected area.⁶ This clinical report describes the prosthetic rehabilitation of a patient

* Corresponding author. Tel.: +91 8826843435.

E-mail address: muttiga_001@yahoo.com (M.P. Shashidhar).<http://dx.doi.org/10.1016/j.mjafi.2014.04.010>

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Fig. 1 – Extraoral pretreatment view.

In mandibular arch, root stumps of 32, 33 and 34 were endodontically treated for preservation of associated alveolar bone. Fractured 31 was endodontically treated and restored with fiber post and direct composite resin core. Three unit metal ceramic fixed dental prosthesis for replacing 37 and six unit metal ceramic fixed dental prosthesis for replacing 32, 33 and 34 with 41, 31 and 35 as abutments was planned. The interdental area between the prosthesis was designed as a self cleansing area since patient had a high lip length and thus esthetics was not compromised.

Diagnostic impressions of maxillary and mandibular arches were made with irreversible hydrocolloid impression material and diagnostic casts fabricated. Occlusal rest seat preparation in relation to 16, 17, 26, 27 and 25 and cingulum

Fig. 2 – Maxillary partially edentulous arch- pretreatment view.

Fig. 3 – Mandibular partially edentulous arch- pretreatment view.

seat preparation in relation to 13 was carried out. Final impression was made with addition silicone impression material and master cast was fabricated. Surveying of master cast was done to mark height of contours and to locate undercuts. Unfavorable undercuts in the master cast were blocked using blockout wax and clay, and was duplicated with reversible hydrocolloid. Refractory cast was fabricated, hardened and wax pattern was fabricated. Patterns were sprued, invested in a phosphate bonded investment material and casting was carried out in an induction casting machine using chromium cobalt casting alloy. Casting was recovered from investment, trimmed, finished and tried on the master cast. After clinical try-in of the framework in patient's mouth (Fig. 4), it was polished in electrolytic polishing unit. Occlusal rim was fabricated on the framework and jaw relations were recorded with silicone interocclusal records. Casts were articulated and teeth arrangement was carried out. Waxed-up framework was tried in patient's mouth and minor adjustments were made to meet requirements of esthetics and phonetics of the patient. It was processed in heat cured acrylic resin, finished and polished (Fig. 5).

Mandibular metal ceramic restorations were fabricated according to standard Dental lab protocols technique and luted with Type-I glass ionomer luting cement (Fig. 6). Post-

Fig. 4 – Trial of cast partial denture framework.

Fig. 5 – Removable cast partial denture in maxillary arch.

treatment instructions were given to patient. Prostheses provided optimal esthetics and function to the patient (Fig. 7).

Discussion

At times prosthodontists come across cases of extensive injuries and mass casualties. The major gunshot wounds are where patients require extensive prosthodontic rehabilitations. Such patients are managed in four stages. In stage I or immediate management stage patients are managed with principles of Advanced Trauma Life Support (ATLS). It involves life saving measures like securing airway, control of bleeding, stabilizing the cervical spine, facilitating breathing and circulation. In second stage definitive surgical treatment is undertaken like, debridement and closure of wound, fracture reduction and fixation, extraction of involved teeth etc. Third stage involves reconstruction stage which includes reconstruction of hard and soft tissue defects with different types of bone grafts and soft tissue flaps, including local, distant and free vascular flaps. Fourth stage is a stage of rehabilitation which

Fig. 6 – Fixed dental prosthesis in mandibular arch.

Fig. 7 – Extraoral post-treatment view.

includes functional and psychological rehabilitation of patients. Prosthodontic rehabilitation of the defects which are beyond the scope of surgical reconstruction is taken up at this stage.

When significant defect in the oral cavity is created due to trauma or surgery there will be a serious difficulty in solving esthetic or occlusal problems, the use of a wide coverage cast partial denture in the form of a definitive prosthesis may be beneficial. This clinical report discusses various possible treatment options for rehabilitating anterior maxillary defect created due to gunshot injury.

Five possible treatment options were considered for rehabilitation of maxillary arch. They were reconstruction of lost alveolar bone with autogenous bone grafts followed by implant restoration, metal ceramic fixed dental prosthesis with gingival porcelain, acrylic removable partial dentures, telescopic dentures involving canine and bilateral premolars as abutments, Andrew's bridge and wide coverage cast partial denture.

Reconstruction of alveolar defect with autogenous bone graft followed by rehabilitation with implant restoration was considered as a first solution. But this approach had limitations where extensive surgery was involved and difficulty of covering graft with soft tissue was anticipated.⁷ Multiple gastro intestinal surgeries for associated abdominal injury and general health of the patient precluded further elective surgical procedures.

Second possible treatment option was to replace missing teeth with long span metal ceramic fixed dental prosthesis and associated alveolar defect with gingival porcelain. This would involve problem of preparing multiple abutment teeth, difficulty in maintaining arch form, excessive load on the periodontium of the abutment teeth, and difficulty in supporting large amount of gingival porcelain affecting esthetics.

Other treatment options were to rehabilitate either with telescopic denture involving 13, 14, 25 as abutment teeth or with Andrews bridge with metal coping and bar.⁸ These options would have involved endodontic treatment of abutment teeth, reduction of teeth structure and more chair side time. Considering patient's physical condition and inability to undergo dental treatment for long time, this treatment was not opted.

Removable cast partial denture with quadrilateral design provides more area of coverage, better retention, stability, resistance to rotational forces. It is less invasive when compared to other options, involves less chair side time and easier for the patient to maintain oral hygiene. Considering all these advantages it was decided to rehabilitate maxillary arch with removable cast partial denture.

Conclusion

This clinical report details the prosthodontic rehabilitation of a 27-year-old patient with a gunshot wound with maxillary removable cast partial denture and mandibular metal ceramic fixed dental prosthesis. Despite the limitations of poor physical condition of the patient and inability to lie on the dental chair for long duration, the esthetic and functional demands of the patient were fulfilled. The importance of patient evaluation and application of sound prosthodontic principles in designing of the prosthesis is emphasized.

Conflicts of interest

All authors have none to declare.

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