Review Article

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Role of dental professionals in prosthetic rehabilitation

Abstract:
Rehabilitation of facial defect is of paramount importance for the benefit of the patients as it adds to the improvement of their life and day to day struggles and also improve their confidance. There are various approaches which can be done to tackle the problem faced by these patients particularly the orofacial cancer survivor patients and totally edentulous patients as well as cleft patients. The dental professional particularly prosthodontists play a key role in rehabilitating these patients. This article aims on focussing various modalities to rehabilitate them.

Key-words: Prosthetic, Well being, Rehabilitation, Facial defects.

Introduction:

Rehabilitation official defects requires a multidisciplinary approach. In such cases, the role of a dental professional is of paramount importance, as Is that of are constructive surgeon.

Traumatic accidents, facial injuries, malignancies, infectious diseases, congenital or acquired deformities, treatment of head and neck cancer, chemical burns of the face, either accidentally or as a criminal offence, all can alter the oral function and overall aesthetics of a patient and simultaneously reduce their quality of life.

In such facede for mities, which are of primary concern to the patient's quality of life and are critical to aesthetics, function, and structural integrity, the role of a maxillofacial prosthodontist may not be overlooked. Dental experts play an important part in the rehabilitation and treatment planning for such problems.

This reviewad dresses the ultimate and integral role of the dental professional in treatment planning, prosthetic rehabilitation, and establishing the form, function, and aesthetics of apatient.[1]

1. What is prosthetic rehabilitation?

Before going into detail about any rehabilitation procedure, the first thing that came to mind was, "what is prosthetic rehabilitation?" Moreover, “why do we need it? The latter will be discussed in the next section of this review.

"A prosthesis is an artificial replacement for any part of the body. "Interms of maxillofacial prosthesis, according to GPT-9, it may be defined as "an artificial replacement of part of human anatomy, restoring form, function, and aesthetic integrity”.[2]

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Patients with maxillofacial disfigurement exhibit a compromised quality of life.[3] Such patients experience difficulties leading a socially acceptable life that affect their psyche and self-esteem.[14] In maxillofacial prostheses, dental professionals play an integral role in mainly two types of prostheses: intraoral and extra oral.[4]

Prosthetic rehabilitation

- **Intraoral:** (Mandible, maxilla)
- **Extraoral:** (Auricular, nasal, orbital)[4]

2. Goals of rehabilitation:

A number of factors could cause maxillofacial defects, whether they are acquired or congenital. The mainaim of prosthetic rehabilitation is to regain oral function, structural integrity, and aesthetics that were altered during the course of treatment or due to any congenital defect.[1]

The requirement or need for rehabilitation could be different based on the structure involved in the rehabilitation and reconstructive programme. For example, the rehabilitation of the nose, orbit, and ear is of primary importance for aesthetic purposes, predominantly in the rehabilitation of the nose (in the case of or nasal communications), maxilla, and mandibular defect, which demands regaining oral function (i.e., mastication, phonetics, swallowing, structural integrity), attachment of muscles (i.e., hyoid, larynx to the base of the mandible), patency of the palate, and airway closure In these defects, aesthetics is also paramount to the functional and psychological needs of the patient.

The main integral requirements of apros the tarehabilitation of maxillofacial defects should follow the following objectives, which should be considered during treatment planning by dental professionals:

1. Restoration of function
2. Protection of soft tissue
3. Aesthetic and cosmetic appearance
4. The urapticsor healing effects
5. Psychologicaltherapy[3]

Table (II.a) shows the main purpose and requirement of a prostheticrehabilitation of various parts of body.

Table (II.a) Mainandintegr alrequirement from prosthetic rehabilitation of any part is summarized in the table:

Mandibular defect	• Correctionofasymmetryofface[5,6] • Correction of phonetics, airway protection, establishing mastication [2,5,7] • Maintaining facial height and width[5,6] • Ensuring normal dental occlusion, proper orientation of temporom and ibularjoints[1,5,8] • Providing Osseo integrated teeth[5] • Correction of position of upper and lowerlip[5] • Oralcompetency[5]
Maxillary defect	• Oronasalpatency[9,7] • Reencountering of palate, alveolarbone[7,8] • Improvement feeding and swallowing[3,9] • Facialreconstruction[1,8,9] • Airwaymaintenance[1,5,8]
Nose, orbit, ear defects	• Functionaldisabilitycorrection[8,10] • Aesthetic[4] • Psychological satisfaction • Improvementinphonetics[8] • Aesthetic • Confidence and selfesteem

3. Treatment planning approaches

Before starting a rehabilitation programme, pre-dental screening and dental care are of utmost importance. Being dental professional, one cannot deny the importance of pre-dental screening in multi disciplinary approach to facial prosthetic rehabilitation.

Prosthetic rehabilitation of maxillary and mandibular defects follows crucial steps:

1. Pre-dental screening
2. Pre-treatment oral and dental rehabilitations creening1

Pre-radiation screening includes dental screening before radiation therapy for maxillary or mandibular malignancies, cysts, tumours, etc. During screening, all available information was gathered with regard to self-care, oral hygiene, dental situation, mouth opening, location of a suspected or confirmed tumour, estimation of the retention bearing of a future obturator or dental prosthes is, and estimation of the pre-existing level of oral function (refer to TableI. a). This information is needed to design the best prosthetic treatment plan. The size of the defects and the number of remaining teeth is considered to serve as anchorages for the conventional clasp-supported RPD framework. [1]

Table II. A Essential elements of pre-treatment screening

Pre-radiation dental screening	Pre- treatment dental and oral rehabilitation
1. Unrestorablecaries	1.Extent of defect an remaining soft tissue and natural teeth present
2. Periodontal disease with pocket>6mm	2.Decisiononimmediateord layed implant placement
3. Periapical radio lucency Partially or fully impacted teeth	3.Estimation of survival rate of Implants
4. Partially or fully impacted teeth	4.Identification of retentive sites (either natural teeth for clasporbone for implant) for implant placement

After the pre-treatment dental and oral rehabilitation screening intraoral impression taking, intraoral screening, or CBCT are required to capture all the intraoral pre-treatment situation analysis. If intraoral impressions are not feasible, dental professionals may proceed with an analogue impression, which can be digitalized in order to create a 3-D virtual model [1] of defects and rehabilitation procedures. Rehabilitation in maxillary defect cases requires in-depth and thorough communication between the maxillofacial surgeon and maxillofacial prosthodontics, as surgical obturators are needed to be provided to the patient at the time of surgery only. A prosthodontist should be well aware of the extent of surgery [3] and the remaining soft tissue available so as to construct a properly aligned and retentive obturator that can serve both purposes, i.e., Act as a surgical bandage and helps in the healing of underlyings of ttissue. Eliminate the need for anasogastric tube for feeding.[3]

For mandibular rehabilitation, the decision of graft placement is not only taken by the surgeon itself; again, a thorough discussion needs to be planned with the prosthodontist regarding the choice of graft as it can affect the osteointegration of implants and prolong the success rate in the future.

III. A- Intraoral rehabilitation of mandibular defects

Mandibular rehabilitation can be done with alloplastic material, non-vasculartissue, orvascularautologous tissue.[5] Vascularzed free boneflaps are the gold standard.[5]

Vascularized fibula only restores the structural integrity of the mandible; rehabilitation of the mandible requires a complete restoration of the form and function of the mandible through dental implants. Implant placement at the time of reconstructive surgery reduces the total number of surgical procedures required for rehabilitation.[5] This will optimize the outcomes of the rehabilitation programme and be helpful in obtaining an adequate dental-ridgerelationship.

Mandibular rehabilitation usually plans backwards from occlusion that maximizes the reconstructive surgeons as well. A maxillofacial Prosthodontics should be well aware of the time of implant placement because placement of implants post-radiation can lead to poor perfusion. For prosthetic rehabilitation of the mandible, a thorough and complete discussion should be had with the reconstructive surgeon, as the fibulais the preferred donor site for the implant. If a surgeon placed an iliac crest, it would be difficult to achieve stabilization and retention as dental implants are placed in very soft can cellous bone. The Iliac Crest could be the second choice.[8]

Fig(2) completely fixed rehabilitation of mandible [5]

For complete *functioning* and good retention and stabilization of the prosthesis, end-osseouscritical implants are mainly considered. Over dental implants, after Osseo integration, fixed or removable prostheses are fabricated according to the patient's convenience.[8] Sometimes, even after surgical restoration of the defect, it is difficult to attain maximum balanced biomechanics during mandibular movements. In cases where mandibular continuity is not restored surgically, the remaining segment will detrude and deviate to wards the surgical side. During function, i.e., mouth opening for yawing or mastication, a deviation increases lead stoanangular path of open in gand closing of the jaw. [11]

Here, dental professionals play a role in establishing the optimum maxillo-mandibular relationship with the help of intermaxillary fixation, vacuum-formed PVC splints, and mandibular-guidedpros theses.[12,13] Hence, dental professionals playarolein establishing the physio-the uraptic function of the jaw. [12]

]Rehabilitation of TMJ join.

TMJ joint rehabilitation can be possible in various ways, including: 1. Alloplastic (prefabricated or CAD/CAM) 2). Autologous graft (soft tissue graft and costochondral graft).[11]

TMJ disorders possess various clinical complications in front of dental professionals. The aetiology of TMJ disorders is difficult to understand. TMJ rehabilitation in any case may complicate the biomechanics and arouse further complications, i.e., ear infection, partialneural deafness, or dislocation. [5] In most cases, dental professionals focus on treating the dentition state (edentulous or partially edentulous) of the patient.[11] Even without rehabilitation of the TMJ joint, patients still function well. In such cases, the TMJ jointon the contra lateral side provides an adequate pivot, through which the jaw will rotate obliquely upon mouth opening.[1,5]

III. B- Intraoral rehabilitation of maxillary defect

Prosthetic rehabilitation of a maxillary defect begins be for esurgery. Management of maxillary and midface defects requires complete reconstructive and rehabilitation procedures. [3] Incases of maxillary defects, planning prosthetic rehabilitation with an obturator is standard care.[1]

The standard of a prosthesis, according to modern Adison, is followed for maxillary defects:

1. Maxillary acrylicres in that restores hard palates and teeth
2. Asection that recreates the extension of the palate in the presence of a metal bar of the same length of the palate and ends with a ring in the hypo pharynx
3. Section of the nasopharyngeal that ends with a bulb of propersize[9]

Obturatorsfill the hard palate and soft palate defects, along with the establish met of dentition for proper mastication, phonetics, and breathing[3,9]

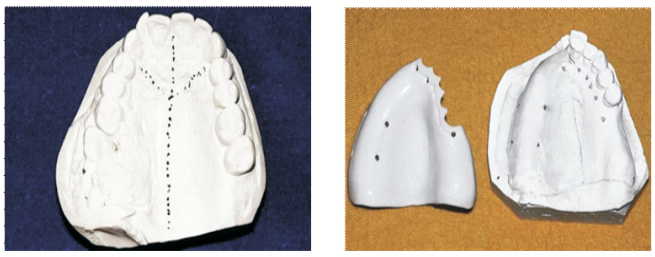

Fig (3) (A) Primary cast involving pathology extent (B) Analysis of extent of tumor resection and planning for surgical obturator [(3)]

Prosthodontics play an important role in the rehabilitation of maxillary defects during three stages of treatment:

1. Pre-operativecar
2. Interim care
3. Definitivec are [3]

Pre-operativecare:

Pre-operative discussions with the prosthodontist before surgery are important to remove potential post-operative complications and for the recommendation of a prosthodontist in surgical site preparation that is helpful in maintaining structural integrity.[3] Pre-existingdental disease could be severe enough to create potential serious complications post-operatively. Hence, any carious tooth, periodontal weak tooth, periapical pathology, etc. should be treated to avoid any further complications. [3]Anytoothisthatis non-restorabledueto either advanced caries or periodontal disease and cannot be utilized for temporary care needs to be removed be foreorat the time of surgery or resection.

Interim care:

Maxillary and mandibular arch impressions are made to provide a record of the existing occlusion, vertical dimension, condition of soft tissue, and malignancy for the construction of an immediate or interim denture. Consultation with the prosthodontist needs to be done regarding the amount and area of resection that are to be done so that the obturator prosthesis can be designed with well-defined margins and extents.[3] Prosthesis placementat the time of surgery, called surgical obturator, has many advantages. Immediate postoperative placement of the obturator improves the acceptance of the patient and helps in nourishment, eliminating the need for anasogastric tube.

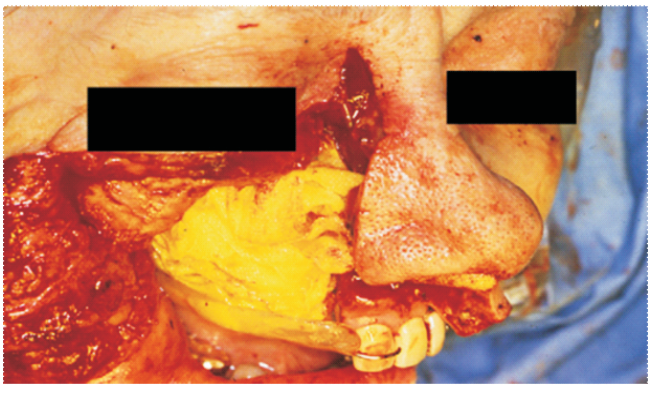

Fig (4) Surgical obturator in place after resection [6]

Definitive care:

Complete rehabilitation requires the definitive management of occlusion and structural integrity.3

Lack of stability and retention is the major concern in many cases. [1,3] In that case, end osseous implants placed in native maxillary bone improve the retention of the obturator, thus improving the success of rehabilitation. Definitive care with an implant-supported obturator is better than conventional obturator.

A definitive obturator enhancesmasticatory and oral function and causeless sdis com fort to the patient.[1]

Incases of soft tissue and bone, dental professional stake advantage of the neutral zone and utilize the under neath zygomatic bone implants for the retention of prostheses.[9]

III.C- Extraoral detects (Nose, Orbit, Ear)

Facial defects can result from traumatic loss, surgical resection, congenital abnormalities, infections (leishmanios is), and burns.[7,15]

Restoration of facial defects can be do nepros the tically when surgical options are not feasible[4]. Although be fore proceeding to prosthetic rehabilitation of facial defects, extra-oraldimensions have to be recorded along with intra-oral records. Impressions (facial moulage), analog impressions, 3D scanning, and clinical photographs need to be recorded for a better prosthetic treatment.[1,4]

Retention is the major problem in such prostheses, which can be achieved by biocompatible adhesives, mechanical undercuts; engaging prostheses to the patient's eyeglasses, magnets, or Osseointe grated implants retained Ti-screws.[4,7]

Implant-retained prostheses nowadays show excellent results. Moreover, bar clips or magnet systems can be used.[6,7]

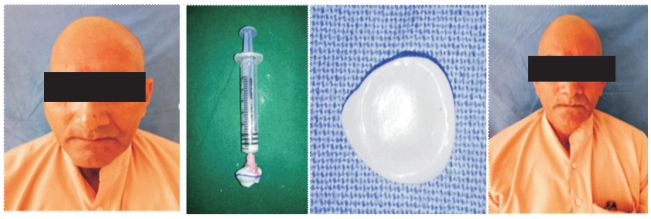

Fig (6) (A) Pre- operative view with ocular defect of right eye (B) Impression of socket with custom tray stem attached to syringe (C) Wax pattern of ocular prosthesis in place [14]

Rehabilitation of facial defects can be cumbersome, as these types of defects show poor retention. Facial prostheses can take retention and support from implant attachments. Pre-clinical records determine implant size. According to the records, the sites of implants that are most suitable are selected.[16]

Nose: Anteriornasalspine

Ear: Mastoid region

Orbit: Magnetsorbarclips[16]

Surgical guides are designed for the placement of extraoral implant stoavoid damage to vital anatomical structures (CAD/CAM).

Auto polymerizing acrylicres in materials are used for the fabrication of extraoral prostheses. Silicon elastomers are clinically the material of choice for the fabrication of facial prostheses.

Color matching can be achieved by addingsuitablepigmentstotranslucentsiliconelastomersuntila nacceptablecolor is achieved.

One can'tdeny the role of a dental professional in rehabilitation procedures whether it is Intraoral orextraoral. As Figure6 (A) shows prosthetic rehabilitation of ocular defect done by Dr. Chetan Pathak. In this situation, dental professional playshiscrucial role in all steps starting from impression taking, fabrication of custom tray, fabrication of wax pattern to acrylisation of definitive prosthesis with same colour matching of opposite eye)

Conclusion:

Prosthetic rehabilitation is an encompassing treatment of oral and facial defects.[1] In this situation, dental professionals, mainly maxillofacial prosthodontics, are a major contributor to enhancing the quality of life. [1] Dental professionals plan the prosthetic rehabilitation of a patientac cording to the needs of the hour. Nowadays, emerging[3] Dtechnologies, such as CAD and CAM, are even more help fulineasing the work of such multi disciplinary cases.

Maxillofacial prosthodontics should be aware of new developments and technologies so that they can enhance the quality of life of their patients. In maxillary and mandibular defects, which are predominant, dental professionals provide their major contribution in the selection of graft material suitable for implant Osseointegration. Even for extra oral prostheses, dental professionals are the major contributors to the establishment of the aesthetic and functional needs of a patient.

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