Abstract:
An implant retained fixed denture is one that is fabricated over a metal framework and is cement retained into the implant abutments. The anterior part of a mandibular prosthesis is fixed on implants while the posterior part of the denture is extended and cantilevered from implants. This article presents the fabrication of a maxillary complete denture opposing mandibular implant retained fixed prosthesis.

Introduction
Osseointegrated implant treatment was originally designed by Dr, Per Ingvar Branemark for the edentulous patient. The term used by Branemark and others is ‘Tissue–integrated Prosthesis’ [1]. Many designs have evolved for treating patients with compromised bone or special needs [2]. These prosthetic designs may have an impact on biomechanics, maintenance, and implant success rates. Preoperative evaluation of the structure and quality of the edentulous residual ridge, the intermaxillary relationship, esthetics, phonetics, hygiene, and cost considerations will aid in differential treatment planning.

Implant-supported prostheses are a good option for edentulous patients who could not adapt to long-term use of conventional complete dentures. In fixed implant prosthesis, number of implants and AP spread determines the extent of cantilever. Unfavourable occlusal loading on cantilever extension leads to failures like loosening and breakage of screws and prosthetic posts, framework fracture, and implant loss. Cantilever load is primarily determined by the length of the lever arms and distal extensions [3]. It has been suggested that the extension from the midpoint of the most distal implant must not exceed 15 mm in the mandible [4].

Case report
A 60-year-old woman was reported to PMS college of dental science and research with completely edentulous upper and lower arch having adequate interarch space [Figure 1]. Fabrication of cement retained prosthesis was planned for the mandibular arch and a new complete denture for maxillary arch. The unfavourable sinus anatomy in the posterior maxilla and patient’s unwillingness for bone grafting to facilitate implant placement circumvent the placement of implants in the maxillary arch. The treatment options presented to the patient also included the fabrication of an implant-supported over-denture, but the patient’s desire was to eliminate a removable prosthesis in the mandible.
Conventional procedure for fabrication of complete denture was carried out from primary impression till trial (Figure 2,3). Mandibular trial denture was used to evaluate and determine the position of implant placement. Mark the position of teeth in mandibular master cast (Figure 4). Radiographic stent fabricated for mandibular arch and assessed with OPG for bone height at the positions (Figure 5,6).

Stage I implant surgery

Surgical stent was fabricated with acrylic. With this stent mark the positions of implant on the
mandibular arch with punch drill. A full thickness mucoperiosteal flap was raised in the mandibular arch from distal to mental foramen on one side to 1st molar on the other side. In the right quadrant, implants (GMI frontier implant) were placed in the 2nd premolar (3.75 mm × 10 mm), canine (3.75 mm × 10 mm), lateral incisor (3.75 mm × 10 mm) regions. In the left quadrant, implants were placed in 1st molar (3.75 mm × 10 mm), 2nd premolar (3.75 mm × 10 mm), lateral incisor (3.75 mm × 10 mm) and regions. A total of six implants were placed in the mandibular arch with a help of surgical stent. The flap was closed using simple sutures. After 1 week, the sutures were removed and soft tissue healing was satisfactory [Figure 7, 8]

Stage II implant surgery

After a waiting period of 4 months, an OPG and IOPA were obtained to evaluate the bone to implant contact percentage [Figure 9] and later stage II surgery was performed under local anesthesia cover screws were exposed. Crestal portion of implant placed at canine and lateral incisor in fourth quadrant get more closed due to error in angulations. So implant placed in canine region was made submerged and five healing abutments were placed and the flap sutured.

Prosthetic phase

After 2 week, the healing abutments were removed [Figure 10]. A well formed gingival collar noticed. A custom open tray was fabricated in acrylic resin for the mandibular arch. Impression copings were connected to the implants. These open tray impressions copings were stabilized with dental floss and pattern resin. The open tray was verified in the patient’s mouth. The mandibular impression was made with polyvinyl siloxane impression material [figure11]. Jig trial was made on working cast and verified intraorally. Wax up for framework fabrication was carried out and casted. The metal framework was tried on straight abutments to evaluate and verify a passive fit intra-orally [Figure 12,13]. At this time an IOPA for each implant made to evaluate the fit between frameworks and implant interface. The maxillary complete denture acrylised, finished, polished and inserted. As the opposing denture is acrylic, mandibular implant prosthesis fabricated with acrylic over the metal frame work. Finished and polished prosthesis then cemented to the abutments. [Figure14]. Balanced occlusion verified. Post insertion instructions were given. Hygiene techniques were reviewed, and patient was scheduled for recall and maintenance.

Discussion

Functional stability and the preservation of remaining alveolar bone are primary, and often elusive, goals when restoring edentulous arch. But retention and stability in mandibular denture is compromised in many cases mainly due to interference of tongue. The incorporation of dental implants offers a practical adjunct in the fulfilment of these objectives. The degree of alveolar bone resorption determines whether teeth, or teeth and other tissues, must be replaced. With minimal resorption, a cement retained restoration is preferable to accommodate interarch space limitations.

According to Adell et al, the bridges were continuously stable in 89% of the maxillary and 100% of the mandibular cases. The mean value for marginal bone loss was 1.5 mm during healing and the first year after connection of the bridge. Thereafter only 0.1 mm was lost annually2.

Regarding impression making Dr. Babita5 systematically reviewed various impression materials and found polyvinyl siloxane and polyether both are the material of choice for making accurate impression. Wenz et al6 reported that one stage impression using both putty and light body simultaneously is more accurate than the two stage impression. An open tray impression technique was used in this case with joining impression copings with pattern resin to get accurate impression. Heeje
Lee et al found that for situations in which there were 4 or more implants, the pick-up technique was more accurate than the transfer technique. Using a rigid material, connect all the impression copings together to prevent individual coping movement during the impression-making procedure. Also studies reported more accuracy in implant impressions with the splint technique than with the non-splint technique.

The rehabilitation of edentulous patients with fixed dentures has been observed to achieve greater masticatory function and psychological satisfaction than with conventional over-dentures. Many investigators have studied occlusal force measurements in patients with implant-supported prostheses opposing complete maxillary dentures, but their force measurements vary significantly. Finger and Guerra stated that when implants are placed in one arch there is the possibility of rendering an opposing complete denture unstable. Zarb and Schmitt suggested that the imbalance in stress resolution may lead to rapid resorption of the alveolar ridge in the maxillary arch. However, there is a little quantitative analysis on the distribution of occlusal loads and the stability of a maxillary denture opposed by an implant denture.

Conclusion

Proper diagnosis and treatment plan are important. Every patient has unique treatment modalities. A thorough medical and dental history, clinical examination, dental radiographs, impressions, and jaw relation records are important steps leading to a successful oral rehabilitation. Careful execution and planning of treatment needed, enhances the final outcome. Dentists must consider the merits and demerits of implant prosthetic options and also to the patient’s expectations. This article reports on the fabrication of a maxillary complete denture opposing mandibular implant fixed prosthesis.

Occlusion and articulation were found to be good. Patient is satisfied with retention and stability.

References

1. Per-Ingvar Branemark, MD, Ph. D., George A. Zarb, DSS, MS, FRCD (C), and Thomas Albrektsson, MD, Ph. D. Chicago, Parr GR. Tissue-integrated prostheses: Osseointegration in clinical dentistry: 1985, Quintessence Publishing Company, Inc. 350 pages, illustrated, indexed.
5. Dr. Babita J. Yeshwante1, Dr. Sonali Vikas Gaikwad2, Dr. Nazish Baig3, Dr. Sonali Patil, Dr. Wahab A Shaikh; Comparative evaluation between accuracy of implant impression techniques: A Systematic Review; IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 4 Ver. X (Apr. 2015), PP 30-36