Rehabilitation of a Completely Edentulous Patient with a Mandibular Overdenture-supported by two Immediately Loaded Single Piece Implants

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ABSTRACT

For completely edentulous mandible, the rehabilitation modality of an implant retained overdenture on two implants placed in anterior mandible is a simple, acceptable and predictable treatment option. It contributes significantly to patients psychological and social well-being. Increased retention results in greater patient satisfaction than conventional removable complete denture. This case report describes the use of two single piece implants with ball attachments to retain an implant retained mandibular overdenture in order to rehabilitate a completely edentulous male patient. It also illustrates the approach of prosthetically driven implant placement.

Keywords: Dental implant, Immediate dental implant loading, Implant-supported denture, Overdenture.

Case Report

A 50-year-old male patient presented with a chief complaint of missing teeth and desired a replacement for the same. Dental history revealed that patient has lost his teeth 2 years back and has been completely edentulous since then. Medical history was non-contributory. The patient was well built and had a coordinated gait. Upon intraoral examination, it was found out that the patient was completely edentulous with well formed maxillary and mandibular ridges without any bony undercuts. Adequate amount of keratinized tissue was also present.

Upon discussion with the patient, the treatment option of maxillary conventional removable complete denture and mandibular implant supported overdenture was planned. Panoramic radiographic examination revealed that mandibular residual alveolar ridge was having good bone quality and quantity (Fig. 1). Two single piece implants of 11 mm length and 3.3 mm diameter with ball abutments (Myriad-Snap, Equinox) were planned to be placed at the bilateral canine premolar region using a single stage surgical protocol.

Primary and secondary impressions were made, tentative maxillomandibular relations were recorded, maxillary cast was mounted on a Hanau Wide Vue...
articulator using a facebow transfer (Fig. 2). Mandibular cast was mounted using a centric relation record. Gothic arch tracing was done to verify the centric relation and interocclusal records were made using bite registration paste (Coltène/Whaledent JET BLUE). Teeth were arranged in bilateral balanced occlusion, Try-in was done (Fig. 3) and patient’s consent was obtained. The trial denture was then duplicated in heat cure clear acrylic (Lucitone Clear, Dentsply) to be used as a surgical guide for implant placement (Fig. 4). Trial dentures were processed, finished and polished in the conventional manner. The duplicated denture is mounted on an implant surveyor and osteotomy sites were marked and prepared after planning optimum parallelism (Fig. 5). Two stainless steel balls were placed into the prepared sites and an orthopantomogram (OPG) was taken to confirm the position and location of mental foramen.

The final dentures were checked in patient’s mouth to confirm a bilateral balanced occlusion. On the day of surgery, after administering local anesthesia (2% lignocaine hydrochloride with epinephrine 1:200,000) a flapless approach was employed as good amount of keratinized mucosa was present. After placing the surgical guide in the planned position on the ridge initial access for the osteotomy was made using the D 2.0 mm pilot drill and sequentially enlarged to D 3.3 mm with a speed of 1000 RPM. To achieve parallelism Guidepin was placed in the first osteotomy site and the second osteotomy site was prepared on the contralateral side. The two implants were then placed in the prepared osteotomy sites using a torque ratchet and primary stability of 30 Ncm was achieved on both the implants (Fig. 6).

Since the primary stability was sufficient for immediately loading, the prosthetic phase was initiated in the same appointment. The fit of the plastic transfer caps
were applied around the neck of the laboratory analogs and cast was poured in type IV die stone (Elite Master, Zermack) to obtain a working model (Fig. 9). The female housings with the O-ring matrices were snapped into place on the laboratory analogs on the working model. Adequate block out below the housing was also done using latex. The final mandibular denture was relieved from inside to create space for housing (Fig. 10) and a pick-up was made onto the cast using autopolymerizing acrylic resin, hence preventing surgical site from exposure to the acrylic monomer (Fig. 11).

The denture was inserted and checked for retention and occlusion (Fig. 12). Postoperative instructions were given, including rinsing the mouth with 0.12% chlorhexidine gluconate three times per day. Furthermore, antibiotics and analgesics in appropriate doses were prescribed. Patient has instructed not to remove denture for next 48 hours. Two days later, he was reviewed where the healing was found to be uneventful. The prosthesis was functionally effective and esthetically pleasing (Figs 13 and 14).
One of the most important objectives of dental implantology is to improve retention of mandibular complete dentures, which are often encountered with problems in jaw bone with advanced ridge resorption. It is also imperative to realize that the conventional complete denture, the two-implant overdenture, multiple-implant splinted or unsplinted overdentures, and fixed implant prostheses are all currently accepted standard-of-care treatments for the edentulous mandible. The McGill consensus statement does not preclude more sophisticated treatments like bar overdentures or fixed prostheses, but merely states two-implant unsplinted overdentures ‘as a minimal treatment objective.

Although relatively high number of implants may give the prostheses some reliability, the success rate of two or three implants in the anterior mandible for overdenture retention has proved successful. A 95.6% success rate was observed by Cooper et al in their research of two microthreaded immediately loaded screw implants to retain a mandibular overdenture, with ball attachments. The literature is inconclusive as survival rates may not only depend on the loading protocol, but also on the number of implants, the attachment system, or the implant surface. Though the support is derived from both the implants as well as the anatomical primary stress bearing areas, the use of wide variety of attachment systems, including bar, magnets and stud attachments, has also proven both clinically predictable and effective. Studies conclude that failure to achieve ideal implant parallelism will result in higher maintenance needs for the unsplinted overdenture patient and would also generate deleterious forces on implant head. Therefore, implant parallelism is of paramount importance from a prosthetic and aftercare perspective.

The O-ring is used to enhance retention of implant retained overdenture prostheses. They have a number of advantages, including ease of use, maintenance, low cost, and elimination of a superstructure bar. Few shortcomings are that O-rings wear over time, gradually lose retention, and must be replaced periodically. It is also essential that O-ring abutments be parallel to each other. Prior to implant surgery, the clinician must first determine final tooth position and overdenture form and transfer this information to a surgical guide. Implant placement should be dictated by a balance between final tooth position via surgical guide and available bone, considered three dimensionally.
report, the denture was fabricated prior to surgical phase and hence the implant placement was prosthetically driven. It is also vital to avoid lingual perforation during implant placement. Hemorrhage of the floor of the mouth is a potentially serious complication. A simple, uncomplicated one-stage surgical protocol is considered the technique of choice with implants as parallel as possible to each other with the endpoint being supracrestal placement. As the chairside pick-up technique using autopolymerizing resin can cause monomer exposure to surgical site in immediately loaded cases, in the present case report a quick laboratory method is described where the pick-up is made using the same surgical guide and a working model is produced for final pick-up of housings.

CONCLUSION

Implant retained overdentures have emerged as a functionally superior treatment modality than the conventional removable dentures, also it has proven its worth as a cost effective and less invasive option to fixed implant dental prostheses. This article presents a case where a edentulous male patient is rehabilitated by a maxillary removable complete denture and an immediately loaded mandibular implant supported overdenture on two single piece implants with ball attachments and O-ring incorporated housings. The implants were provisionally driven as the denture fabrication was prior to implant surgery. Also, a quick laboratory pick-up impression technique is described with the help of an already made surgical guide. Since the surgical technique was a single stage flapless procedure, the healing was uneventful and fast. During follow-up, the patient was found to be happy and content as retention and esthetics were satisfactory.

REFERENCES