|| Print ISSN: 2589-7837 || Online ISSN: 2581-3935 ||
International Journal of Medical Science and Diagnosis Research (IJMSDR)
Available Online at www.ijmsdr.com
PubMed (National Library of Medicine ID: 101738824)
Case Report
Volume 4, Issue 3; March: 2020; Page No. 57-61

# IMPLANT RETAINED, TISSUE SUPPORTED MANDIBULAR OVERDENTURE: A CASE REPORT

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Conflicts of Interest: Nil
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**ABSTRACT**

**Introduction:** Conventional complete denture for long was the standard of care for all edentulous patients. However, most patients find it difficult to adapt to mandibular denture due to lack of retention and stability. Implant-retained, tissue-supported overdentures are considered an alternative to conventional complete dentures, as well as complex, fixed, implant-supported prostheses. In addition removable overdentures are more economical due to the limited number of implants needed and the lower cost of components and can be used as an intermediate prosthetic option till the patient can migrate to fixed implant retained prosthesis.

**Case report:** A 50 year old female patient presented to the Department of Prosthodontics with missing teeth in maxilla and mandible.Complete denture and implant retained , tissue supported (RP-5) overdenture prosthesis was planned for maxillary and mandibular arch respectively. Impressions were made and jaw relations were recorded. Diagnostic teeth setup was done at appropriate vertical dimension to assess the available restorative space for ball abutments. Bilateraly balanced occlusal scheme was given. Implants placed and after 3 months chair side pick up of of housings was carried out and final prosthesis was delivered to the patient.

**Discussion:** An implant supported overdenture excels conventional complete denture in retention, stability, chewing, efficiency and phonation. In *the above case mandibular anterior region was selected for implant placement as it has sufficient bone in height and width in the interforaminal region and Ball attachment were used as they are less costly, less technique sensitive, easier to clean and less wear or fracture of the components is seen as well as easy replacement as 0 rings can be changed when they wear out very easily. The oral health related quality of life assessment shows a consistently better patient satisfaction and acceptance than with conventional dentures.*

**Keywords:** *Ball attachment, Edentulous mandible, Implant overdenture, Overdentures*

## 1. Introduction

Overdentures are removable dental prostheses that cover and rest on one or more remaining natural teeth, the roots of natural teeth and/or dental implants improving stability and reducing ridge resorption. Implant overdentures are an excellent treatment option for the edentulous patient. This type of prosthesis is indicated when patient demands cannot be met either through fixed implant prosthesis or through a complete denture. Retention is obtained through use of attachments placed directly on implants or on bar superstructures. These overdentures can easily be removed by the patient and, by virtue of the implant components' simple design, hygiene procedures are usually easier for the patient to perform.[1]

By placing implants in the edentulous mandible and subsequently loading them, bone resorption can be limited as light irritative stimuli lead to changes in bone architecture, shape and volume resulting in subperiosteal growth.[2]

This is supported by Wolff's law, which states that a change in function leads to a change in structure.[3] The reduced degree of rotational freedom of overdenture diminishes the forces applied on the distal part of the mandible while still having mucosal support. Feine and Carlsson advocated the 2-implant retained overdenture as the standard of care for the edentulous mandible in a consensus conference held in 2002.[4,5]

## 2. Case Report:

A 50 year old female patient presented to the department of Prosthodontics with missing teeth in maxilla and mandible (fig.1, fig.2). Preoperative radiographs exhibited bone loss and deficiency in height and width in mandible except in the interforamina region .Maxillary ridge was favorable for complete denture fabrication. She was informed about the implant based treatment strategies that could be followed. After obtaining consent from the patient, conventional complete denture in the maxillary

arch and a two implant supported overdenture in the mandibular arch was planned.

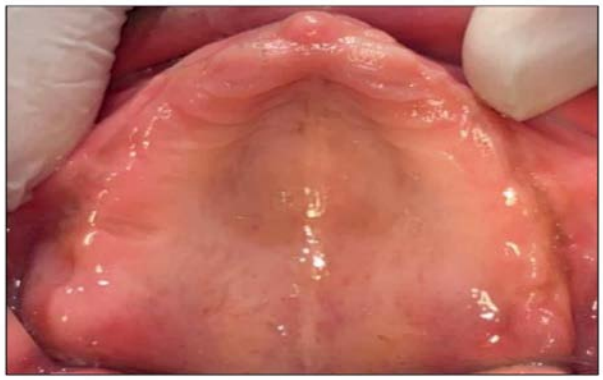

**Figure 1:** Preoperative view of the patient's maxillary edentulous arch.

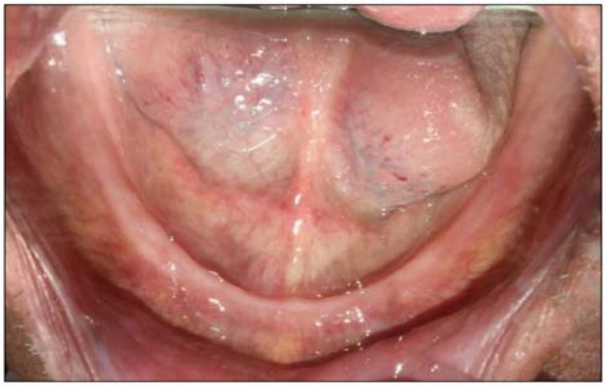

**Figure 2:** Preoperative view of the patient's mandibular edentulous arch.

All the required investigations were carried out:

Orthopantogram, CBCT, Bleeding time, Clotting time, Blood Glucose, Haemoglobin and Viral screening

**2.2 Prosthesis Fabrication:**

Impressions were made and jaw relation was recorded (fig.3). Diagnostic teeth setup was done at appropriate vertical dimension to assess the available restorative space for a ball abutment and O ring type of attachment to denture for chair side pickup technique. (fig.4). Occlusal scheme was bilaterally balanced (fig.5).Trial denture was processed, finished and polished followed by final insertion(fig.6).

Mandibular denture duplication done in Langers flask using alginate and poured with clear acrylic resin for surgical stent fabrication (fig.7). Aim was to verify if 10-12mm of prosthetic space was available to accommodate ball abutment and metal housings measured with the help of a caliper from tissue surface of the denture to the incisal edges of lower mandibular anterior teeth.

**Figure 3:** Jaw Relation recorded

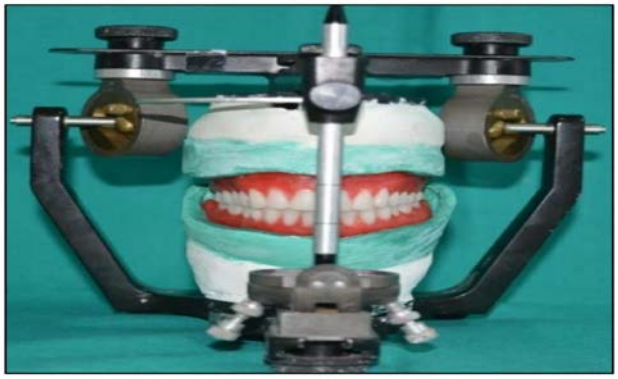

**Figure 4:** Teeth Set Up

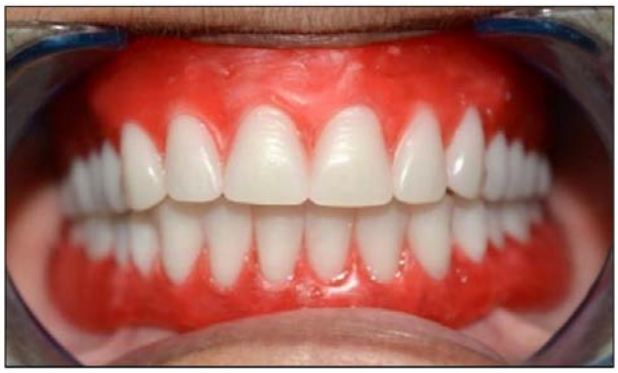

**Figure 5:** Try In

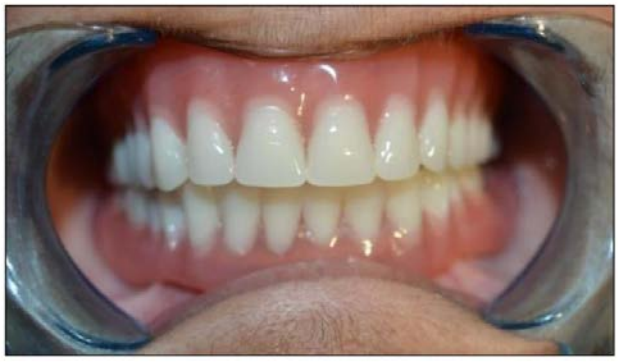

**Figure 6:** Final Denture Insertion

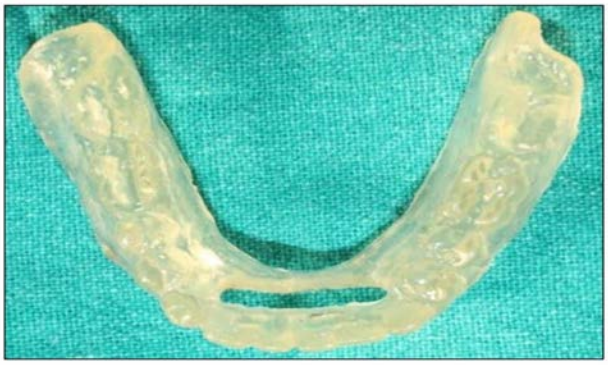

**Figure 7:** Duplicated Clear Acrylic Resin Surgical Stent with lingual vent to guide implant placement and to ensure implants are placed lingual to anterior teeth.

**2.3 Implant surgery:**

Potential implant site for overdenture support in anterior mandible is between the mental foramens and is customarily divided into five equal columns of bone A,B,C,D and E starting from the patients right side. In the above case two stage implant placement was planned and accordingly two implants 3.5mm*13mm Adin Toureg-S were placed in B and D positions (fig.8) through crestal incisions bilaterally and vertical releasing incision in the midline after 1 hour of loading dose of 100mg amoxicillin. The positions of mental foramen were identified after flap reflection and it was ensured appropriate anatomical safe distances from the mental nerve and foramen was ensured. It was ensured that no anterior loop of mental nerve was present.

Clear acrylic resin stent was used to place the pilot drills followed by subsequent drills and also parallelism was checked (fig.9,fig.10). The intension was to ensure that implant platforms were lying lingual to mandibular incisor teeth. Final Insertion Torque was 50Ncm and excellent primary stability was obtained. Interrupted suturing was done using silk 3-0 sutures for primary closure of the line of incision (fig.11). Post operative Orthopantomogram was carried out to check anatomical safe distances from right and left mental foraminas.

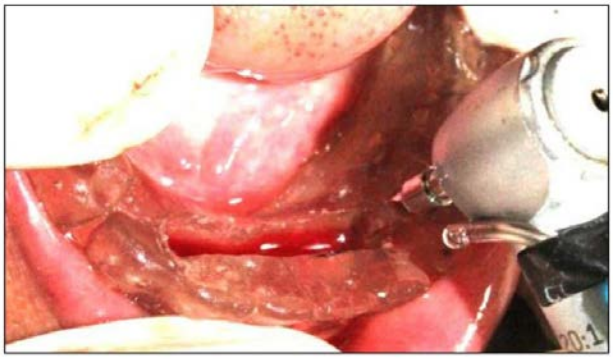

**Figure 8:** Pilot Drill Placed Using Surgical Stent

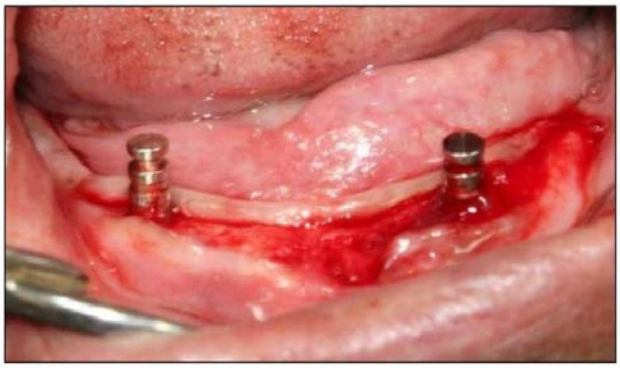

**Figure 9:** Parellelism Checked Using Parelling pins

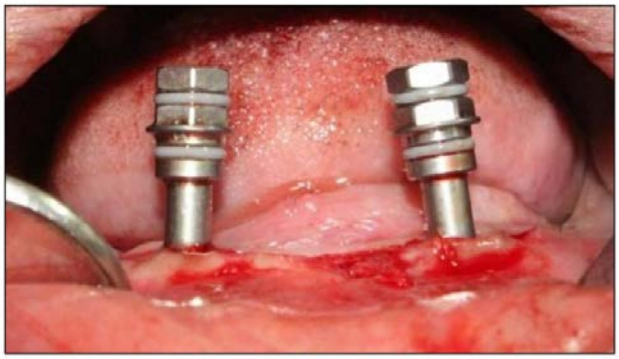

**Figure 10:** Final Insertion Torque was between 35-50Ncm and excellent primary stability was obtained.

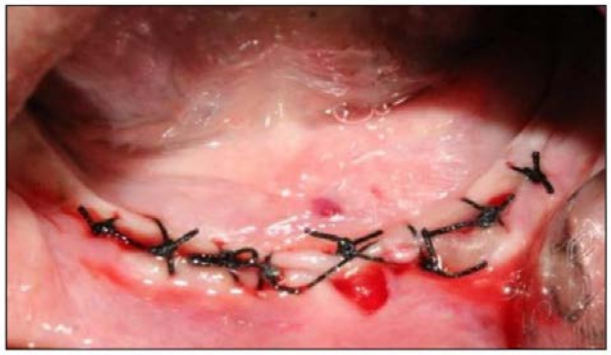

**Figure 11:** Interupted 3-0 Silk Sutures for Primary Closure

**2.4 Implant prosthesis:**

Second stage surgery was performed 3 months post-operative and stock gingival formers were attached (fig..12,fig.13),which were subsequently replaced after formation of gingival collar (fig.14) with metallic ball abutments (fig.15).The Ball abutment were torque to 30Ncm as recommended by the manufacturer (fig.16).Orthopantogram was taken with metal housings in place( fig.17).

The abutment site was marked intraorally with an indelible pencil and these markings were transferred to the lower denture. Dentures were relieved in the marked area. The

housings were blocked off by making a small hole in a latex glove and adapting it over the ball abutments (fig.18) and lingual vent holes were created for chair side pick up of metal housings using clear acrylic resin to prevent excess flash to exit without seeping into the gingival sulcus which can result in locking in of dentures and damage to implant platform as well as the gingival tissues(fig.19) and preffered over lab processing as it is easy, economical and can be corrected in case of any errors. Prosthesis type was RP-5 as the denture was implant retained and tissue supported (fig.20). The patient was recalled every week in the first month after the rehabilitation and then once a month to control the occlusion and no need to reline the prosthesis was felt and the patient was informed that it may be required in the future.

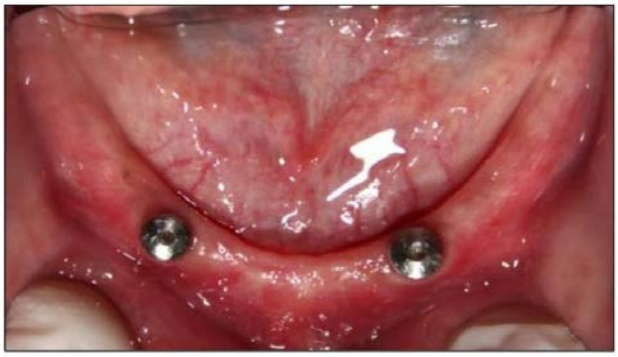

**Figure 12:** Gingival Formers Placed

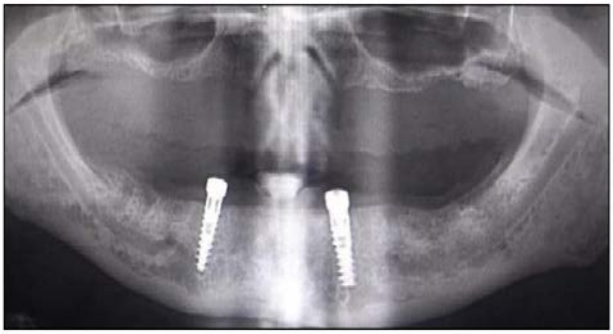

**Figure 13:** OPG with gingival formers in place

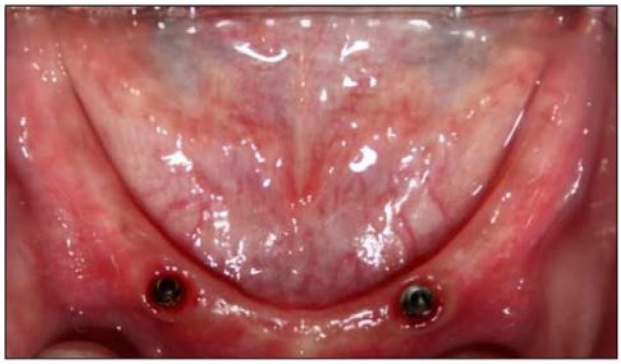

**Figure 14:** Gingival Collar Formed Around Gingival Formers

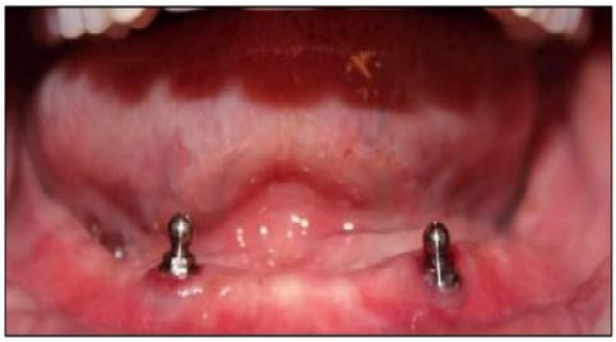

**Figure 15:** Ball Abutments in Place

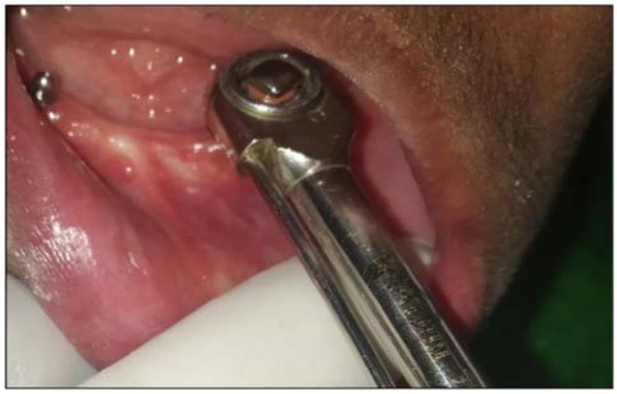

**Figure 16:** 30 Ncm torque given to the ball abutments

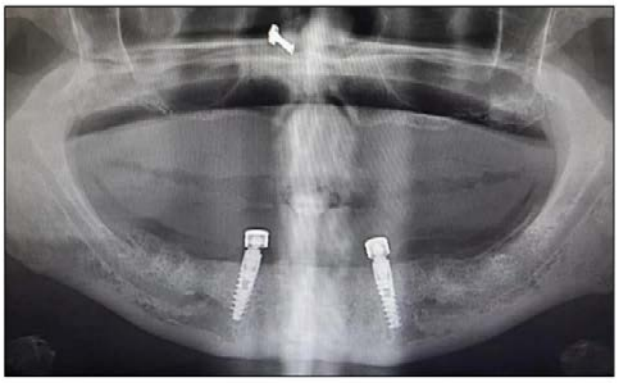

**Figure 17:** OPG With Metal Housing in Place after denture insertion

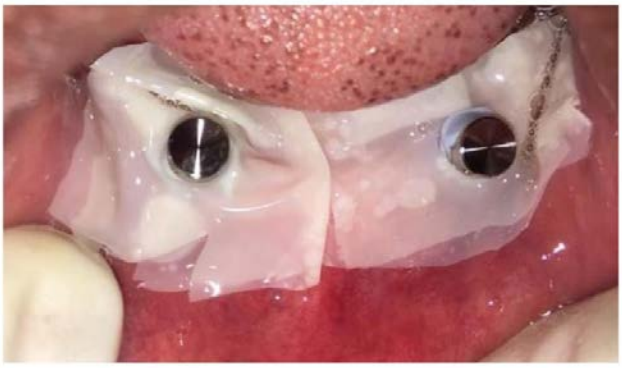

**Figure 18:** Blocking off of housings by adapting latex gloves over the ball abutments

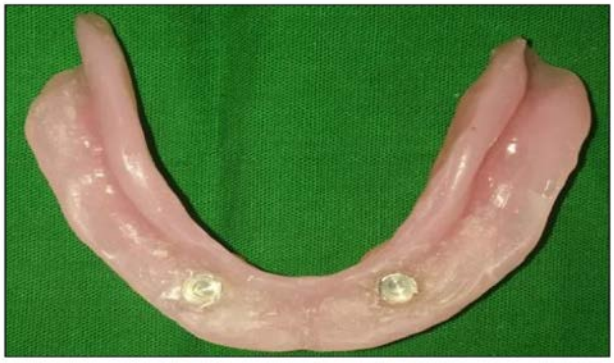

Figure 19: Chair side pickup of metal housing using clear acrylic resin

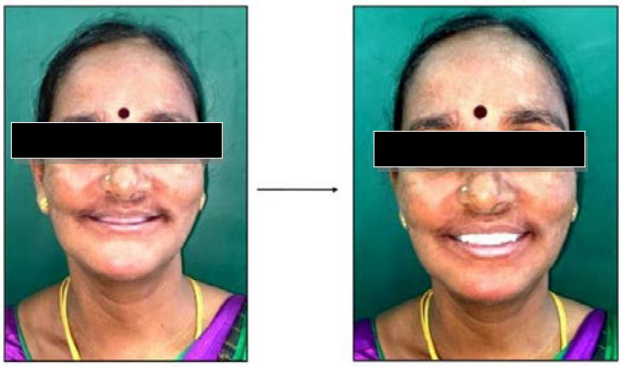

**Figure 20:** Patient without and with denture

**3. Discussion:**

There is improved chewing efficiency and biting force with implant overdentures. Due to the improved stability, the mandibular overdenture prosthesis remains in place during speech and mastication. Therefore, the tongue and peri-oral musculature may resume a more normal position because they are not required to limit the mandibular prosthesis movement.

In the above report mandibular anterior region was selected for implant placement as it has sufficient bone in height and width in the inter-foraminal region. Two implants were planned as literature shows that there is not much difference between the use of 2 implants versus 4 implants for over-dentures.[7] In the most basic form of a mandibular implant-retained and tissue-supported overdenture (Overdenture option 1 or OD-1), implants are inserted in position B and D (Where A, B, C, D, and E are equal columns of the mandible between the mental foramina beginning from the patient's right side).[8]

In the above report, ball attachment was placed because it is reported that ball attachment are less costly, less technique sensitive, and easier to clean and replace.[9,10] The implants remain independent of each other and are not connected by a superstructure. The function of implants in this type of prosthesis is primarily retention but not support.[11] The most common type of attachment used in an OD-1 is an O-ring design and the prosthesis movement should be as much as is practical.[8] This type of prosthesis is ideal for patients who complain of looseness and mobility, but not of soreness of the mucosa when using a conventional mandibular denture.[11] In addition, the bone quality must be good, implants must be at least 8 mm long and 3.5 mm wide, and the divergence of implants should be less than 20 degrees.[8]About 0.6 mm bone loss has been reported under implant overdentures over 5 years and the longterm resorption is thought to remain below 0.1mm per year.[8]

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