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Rigid telescopic attachments on two-implant supported mandibular overdenture. A case report with one year follow-up

Diana Khalil Khalil,[1*] Emad Mohammed Agamy,[2] Gihan Fekry Mohammed[3]

[1]Assistant Lecturer of Prosthodontics, Faculty of Dentistry, Fayoum University.
dianakhalil27@gmail.com
[2]Professor of Prosthodontics and Vice Dean for Education and Student Affairs, Faculty of Dentistry, Minia University
Emad_agamy@yahoo.com
[3]Professor of Prosthodontics and Vice President, Kantara University
Gogofekry_2010@yahoo.com

* Corresponding Author:

Dr. Diana Khalil Khalil
Assistant Lecturer,
Department of Prosthodontics,
Faculty of Dentistry,
Fayoum University, Fayoum, Egypt.
Tel: 00201271667526
Email: dianakhalil27@gmail.com

Abstract:

This report describes a case of a 65years old male who came to the dental clinic complaining from his complete denture, as he cannot eat properly because of movement of the mandibular denture. After examining the old denture and the inter-arch distance, it was adequate to provide the patient with 2-implant mandibular rigid telescopic overdenture. The patient was satisfied with function and reported high oral health related quality of life; there were no complications as screw loosening or fracture regarding the rigid attachments. Peri-implant bone loss was within the normal amount after one year of function.

Introduction:

Complete edentulism has many devastating effects on the patient. Functionally; teeth loss affects the patient's ability to masticate or even speak properly. One of the major problems related to complete denture patients is alveolar bone resorption which is more dramatic in the mandibular arch, because of smaller bearing surface area of the mandibular ridge in comparison to the maxillary one, thus force applied to it is much greater. Mandibular ridge resorption occurs four times more than the maxillary one [(1,2)]. A six-year retrospective study found that bone resorption in the mandible was 2.5 times greater than that in the maxilla [(3)].

Introduction of implants opened a new era in prosthetic dentistry which enhanced the prosthetic society to consider the two-implant mandibular overdenture as the minimum and first treatment option to be offered to edentulous patients [(4,5)].

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There are many types of attachments used to retain the prosthesis such as ball anchor, magnets, locator, bar and telescopic attachments. Telescopic attachments are made of primary or inner coping permanently cemented on the abutment, and secondary or outer coping incorporated or picked-up in the fitting surface of the denture and telescoped on the primary coping. The retention is gained either by friction or wedging action or using extra attachments [(6)].

Telescopic attachments are divided into rigid and non-rigid or resilient telescopes. The rigid type is formed of parallel walls primary coping with definite end position and accurately fitting secondary copings with no space in between; The non-rigid or resilient telescopes are formed from parallel walls with no end position and secondary coping with 0.3-0.5mm occlusal space to compensate for the resilient soft tissue covering the ridge and allow for some degree of vertical movement, and 0.03-0.05mm axial space to minimize torque on the implant [(6-8)].

Advanced degree of ridge atrophy may favor a rigid connector which offers a considerable amount of horizontal stability such as bar or parallel-walled rigid telescopic connector [(8)].

There is no evidence regarding the number of implants required to retain rigid telescopic attachments. Many studies recommended four implants as a minimum, but very few studies used the rigid telescopic attachments on two implants without reporting any complications that may preclude its use. This case report was done to evaluate the use of rigid telescopic attachments on two-implant retained mandibular overdenture.

Case study:

A patient came to the dental outpatient clinic at Faculty of Dentistry, Minia University complaining from poor function mandibular complete denture. Intraoral and radiographic examination revealed posterior resorbed mandible; after examining the denture and the inter-arch distance, and explaining the treatment options to the patient, we decided to make two-implant mandibular telescopic overdenture. The patient signed an informed consent. Glycosylated haemoglobin test was done to examine the blood sugar level during 3months period found 6.1%; the patient was not diabetic or pre-diabetic.

The mandibular denture was duplicated with a clear acrylic radiographic stent; gutta-percha was attached to the labial and buccal side of the stent in the area of lateral incisors, canines, and first premolar to choose the best location for inter-foraminal implants. A cone beam computed tomography was done for the mandibular arch, while the patient occluding with the maxillary complete denture versus the mandibular radiographic stent, the bilateral canine area was chosen to place two implants 11.5mm length and 4mm diameter (Neobiotech Co., Seoul, Korea) (Figure 1).

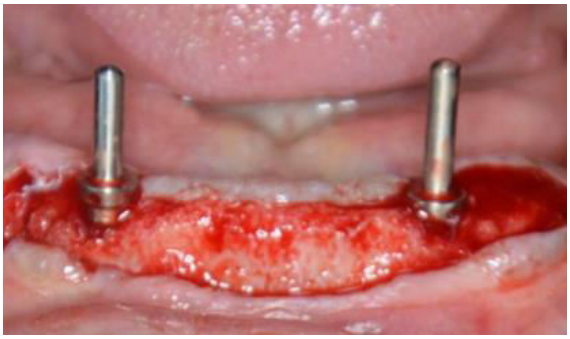

Figure 1. Parallel guiding pins

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The radiographic stent was transformed into surgical stent by drilling a hole in the lingual side opposite to the canines. Drilling was carried over through this stent by the pilot and first drill then the osteotomy site was completed free-hand after removing the stent. Patient was asked to rinse with 0.12% chlorhexidine digluconate 15 minutes prior to surgery; crestal mucoperiosteal envelop flap was made from the left second premolar to the right one. The surgical procedure was done under prophylactic antibiotic coverage.

The implants were covered and left for three months of uninterrupted healing. After three months of osseointegration, implants were uncovered with a scalpel by the aid of the surgical stent to detect them, impression copings were screwed and closed tray impression was made using putty and light body addition silicon (a-silicon impression material, Zhermack S.P.A. 45021 Badia Polesine (Rovigo) Italy) (Figure 2), the impression copings were removed and implant analogues were tightened to them and inserted in their places in the impression.

Figure 2. Addition silicon closed tray impression technique for the implants

Straight titanium implant abutments were used as the primary copings after milling them to have parallel walls and 5mm in length and definite end position with the use of dental parallelometer (Figure 3). A duralay verification jig was made to transfer the exact abutments position on the implants (Figure 4).

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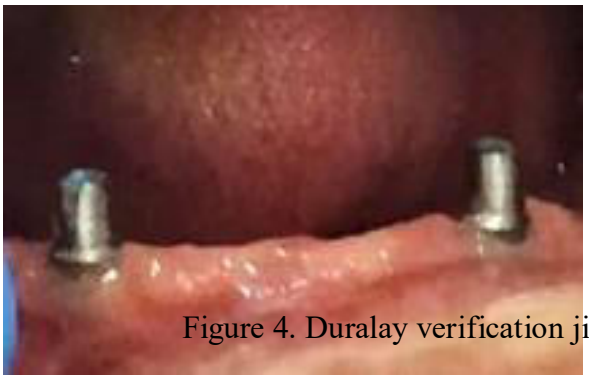

Figure 4. Duralay verification jig

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Secondary titanium copings were milled by CAD/CAM system (smart optics Vinyl scanner, exocad software, Emar ED5X milling machine) for accurate manufacturing. These copings are intimately contacted the primary abutments (rigid telescopic copings) and had metal tags for retention into the denture base (Figure 5 a,b). Direct pick-up of secondary copings was done in the patient mouth using methyl metha-acrylate monomer free chair side self-curing rebase material (Tokuyama Rebase II Fast, Tokuyama Dental Corporation, Japan) (Figure 6).

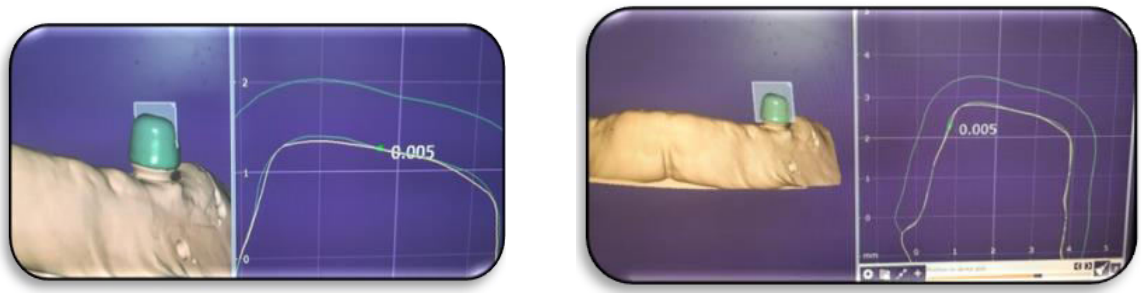

Figure 5 (a,b). CAD/CAM designing secondary copings for rigid telescopic attachments

Figure 6. Direct pick-up for secondary copings

Discussion

Two-implant supported mandibular overdenture had gained popularity over the conventional complete denture due to the recorded patient satisfaction, improved quality of life and better retention and stability of the mandibular denture [9]. Interforaminal area in the mandible is one of the best areas for implant placement for its good bone quality in addition to the absence of vital structures which allow the use of longer implants if there is enough bone [10,11].

Telescopic attachments were successfully used for many years with remaining natural teeth and reported higher success rate with implants [12,13]. Telescopic overdenture adds stability to the prosthesis in addition to the retention gained by friction between the primary and secondary copings. It is also characterized by its self-seating criteria which is advantageous especially with old patients and those with reduced dexterity plus it is easier to kept clean by the patient thus less plaque retention and peri-implant inflammation [14-20]. Direct pick-up of the secondary copings were done because it is easier and more precise[21].

Few clinical studies used rigid two-implant telescopic mandibular overdenture [14,22,23], although not reporting significant complications or peri-implant bone loss. Some studies did not recommend its use with two implants and reported high stress which may lead to implant fracture [8,24], and recommended the

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use of non-rigid type for two implants and the rigid type should be used with four implants. But most of these studies were done on models using force transducers or strain gauges.

In this case report, the choice of rigid attachments was justified by the need to decrease movements of the denture and obtain stable occlusal plane to decrease posterior bone resorption, considering decreased occlusal forces from opposing maxillary complete denture.

Conclusion

The patient reported high oral health related quality of life and great satisfaction after using Implant mandibular overdenture compared to his old conventional complete denture. Rigid telescopic attachment was used successfully with two-implant supported mandibular overdenture. After one year of using the overdenture there was no reported complications as implant loss or fracture, screw loosening or any other complications. Bone loss was within the normal range. More clinical studies should be done with longer follow-up period to verify the use of rigid telescopes with two-implant mandibular overdenture.

Conflict of Interest

The authors declared no conflicts of interest.

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Contribution

All authors had read the manuscript, revised and approved it.

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