

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## One Stage Implants - a New Standard Treatment Protocol in Totally Edentulous Mandible.

Edvard Janev<sup>1\*</sup>, Marija Peeva-Petreska<sup>2</sup>, Nadica Janeva<sup>3</sup>, and Simona Tosevska<sup>4</sup>.

<sup>1</sup>Assistant professor, Department of Oral Surgery, Faculty of Dentistry, Ss. Cyril and Methodius University, Skopje, R. Macedonia

<sup>2</sup>Professor, Department of Oral Surgery, Faculty of Dentistry, Ss. Cyril and Methodius University, Skopje, R. Macedonia

<sup>3</sup>Assistant professor, Department of Oral Prosthodontics, Faculty of Dentistry, Ss. Cyril and Methodius University, Skopje R. Macedonia

<sup>4</sup>Doctor of Dental Medicine, Postgraduate student in dentistry, Ss. Cyril and Methodius University, Skopje R. Macedonia

### ABSTRACT

After tooth loss, severely atrophic residual alveolar ridges are fairly common, especially in patients who have been edentulous for a long period of time. Anterior area of the the mandible is area where clinicians have great anatomical limitations. Reduced alveolar bone height very often represents a contraindication for implant therapy, unless a procedure such as ridge augmentation is performed. The aim of this study is to present two separate cases in highly selected edentulous anterior mandibular sites, where one-stage, mini-implants were used to support complete dentures. Small diameter implants have been used for retention of complete removable mandibular overdentures. They are an excellent option for those who suffer from the inconvenience and embarrassment of loose lower dentures and are tired of using sticky pastes and creams to make their dentures stable. Small diameter implants, when used multiples, may offer adequate support for removable dentures and overcome this problems.

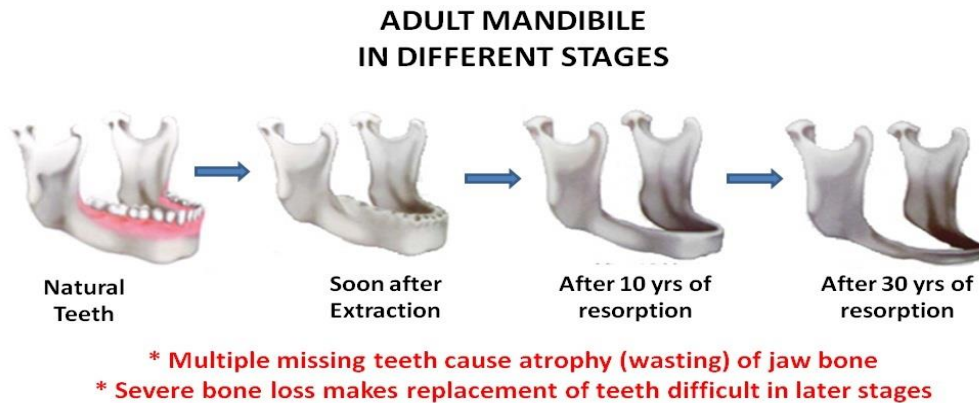
**Keywords:** mini-implants, edentulous mandible, complete dentures, augmentation.

*\*Corresponding author*

**INTRODUCTION**

The management of the atrophic mandibular ridge has always been a challenge for the clinicians because of inadequate retention and support that the ridge offers to the complete dentures. When the complete denture patient is unable to tolerate the prosthesis despite of all efforts from the clinician, the surgical approaches must be resorted. These includes the vestibuloplasties and the bone grafts [1].

Conventional removable complete dentures have a frequent motion during the act of eating, chewing, swallowing and even talking. According to some statistic data 50% of the patients report those problems and 40% of them are located in mandible, due to progressive bone resorption (figure 1).



**Figure 1. Resorption process in the mandible.**

Mini Dental Implants (MDI) anchors the existing upper or lower dentures and provides stability. They can be used to replace single or multiple missing teeth, in preparation for fixed porcelain crowns after eliminating dentures entirely and to eliminate a metal partial denture. MDS are characterized with small diameter- for minimally invasive insertion (2mm –D1 and D2/ over 2,4mm-D3 and D4), high-purity, blasted and etched surface-for safe osseointegration, self-tapping thread- for quick and easy application and they have two different connectors (balltop and conetop) for large range of indications.

Mini Dental Implants have many advantages over regular dental implants: MDIs are much smaller than conventional implants (2 mm as against 4mm- 5.75mm for conventional implants), so it takes less drilling of the jaw bones. MDI surgery is minimally invasive. The surgery does not usually need cutting of gums and removal of stitches afterwards. Trauma to jaw bone, bleeding, chances for injury, post-surgical discomfort are all minimized. Due to their smaller size, mini dental implants can also be used when the site for implantation is too narrow for a regular implant. Quite often, only local sedation of the implant site is needed in the case of MDIs. The MDI procedure is quick and can be completed in one sitting as opposed to conventional implants which require several visits to the dentist [2,3]. MDIs cost less than conventional dental implants, advance prosthesis stability and retention. They offer an easy approach for maintaining implant hygiene. MDIs can improve facial structure restoration and prevent further bone resorption and also provide immediate function. Almost anyone with weak gums and in need of dental implants can go for mini dental implants. On the other hand, mini dental implants are not advised in the following situations: uncontrolled diabetes, history of radiation treatment for cancer (this does not include X-rays for diagnostics), substance abuse, immuno-suppression. Patients with the following conditions may suffer complications or failure with MDIs: heavy smoking/drinking habits, Sjorgen's syndrome, Alzheimer's disease, people who clench/grind their teeth and young persons in their growing years.

The preoperative planning includes general anamnesis, systemic disease evaluation, x-rays, CT-scan and 3D-implant planning. Measuring the crest between the mental foramen of edentulous mandible and evaluating the alveolar process volume, thickness and inclination, bone density and implant marking (6mm space between implants) are all needed before starting the treatment.

MDIs can be successfully used in highly selected sites where there is adequate bone density and bone volume for immediate implant stability [4,5]. Atrophic residual alveolar crest can't be an option for a standard two stage implants with diameter from 3,75- 4,2 mm.

A series of mini implants (4-6) are placed along the gum line and they serve as the base of the denture. At least 2 implants may be successfully used to support fixed partial and total dentures in edentulous sites of compromised bone width or length.

The small size of mini implants often means that no incision needs to be made to place the implant. They can usually be inserted right through the gum into the bone. This eliminates the need for a recovery period, and the restoration can usually be placed right away or only a short time after.

In the one-stage dental implants surgery, the second stage is altogether avoided and during a single surgery, the implant is placed in the jaw bone in such a way that the top of the implant is higher than the surface of the bone, at the height of the soft tissue. When the soft tissue is stitched at the end of the surgery, the dental implant's head is exposed. There is, therefore, no need for a second surgery as the implant is already exposed and takes its place naturally [6]. Features of the One Stage Dental Implants are: osseointegration begins immediately, there is no need to wait for the bone to heal before placing the implant, there are no missing teeth in the mouth and the tooth looks natural while the implant is healing.

### Case report

The first case presented here is a 68-year-old female patient referred to our clinic with three periodontally compromised teeth remained in the mandible (figure 2). Three weeks after teeth extraction (figure 3), four cone top one-stage dental implants were inserted transmucosally, without raising a mucoperiosteal flap (figure 4). One week later, implant supported complete denture was adapted after cementing Dodler bar attachment construction (figure 5). The retention and stabilization were satisfying for the patient, resulting in optimal aesthetic and function.



Figure 2. X-ray view before extraction.



Figure 3. Clinical situation after wound healing.

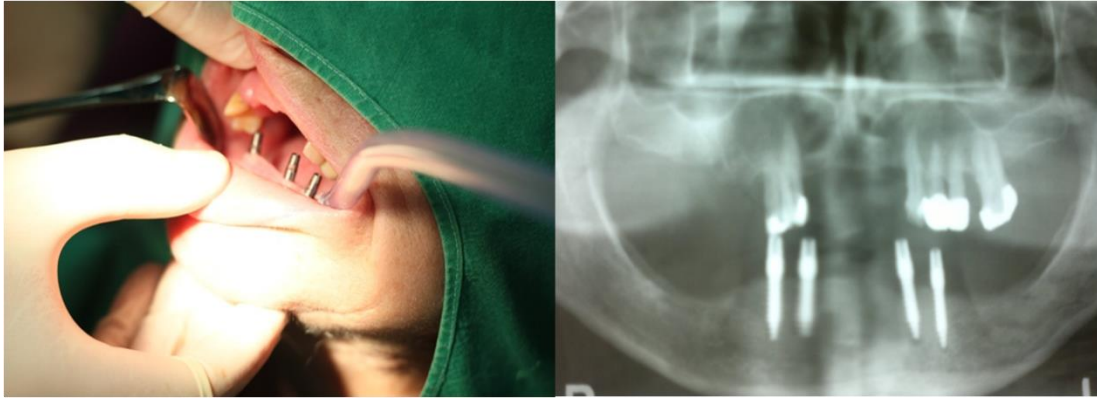


Figure 4. Positioning four one-stage cone top dental implants transmucosally



Figure 5. Fixing total prosthesis on cemented Dodler bar construction

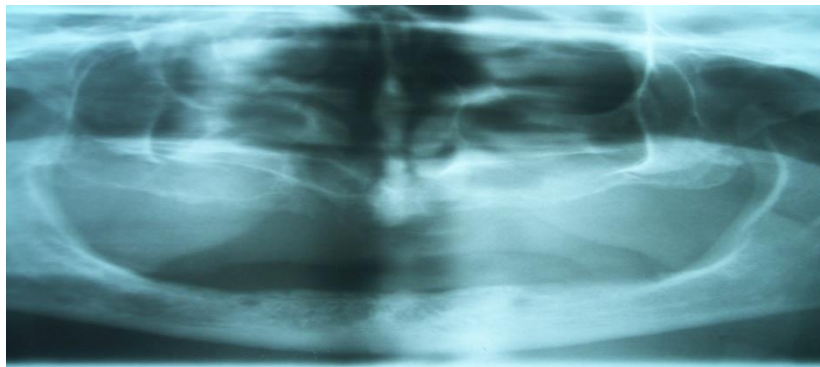


Figure 6. Radiological view of residual alveolar crest in the mandible

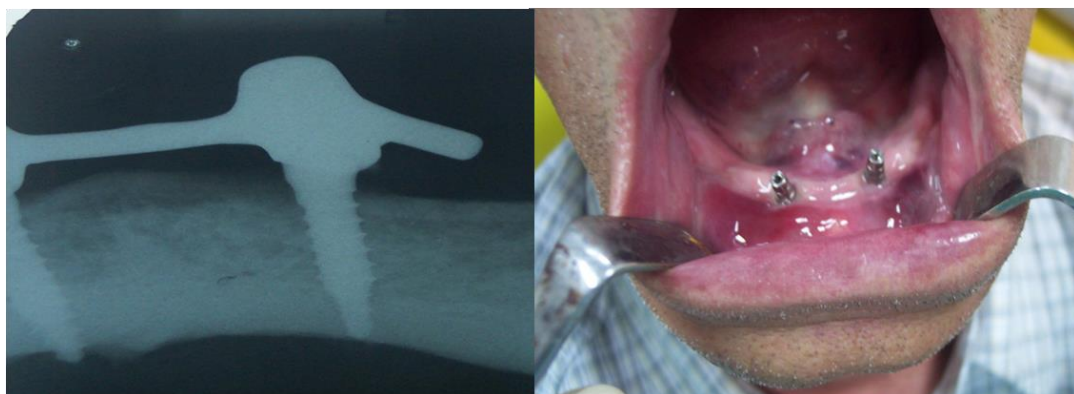


Figure 7. Inserted two MDIs in anterior mandible (X-ray and clinical image)



**Figure 8. Adapting total prosthesis on implant supported bar construction.**



**Figure 9. Advanced retention and stabilization**

The second case presented here was a 65-year-old male patient was unsatisfied with the existed complete dentures, due to uncontrolled motion and difficult function during the act of eating and even talking. Two MDIs dental implants were placed transmucosally in frontal mandible (figure 7), and then connected with bar attachment. A new denture was adapted to a new cemented implant supported construction (figure 8). Improved stabilization and prosthesis retention were achieved after the implant and prosthetic treatment (figure 9).

#### DISCUSSION

A small diameter implant presents less of an obstacle for angiogenesis and there is less percutaneous exposure and bone displacement as compared with standard sized implants [7]. Multiple splinted implants may be necessary to minimize metal fatigue from cyclic loading. Anterior restorations supported by mini implants may need occlusal relief to minimize the effects of cyclic loading [8, 9].

Because MDIs are one-piece fixtures and are immediately loaded, it is important to avoid lateral loads on the fixtures that may lead to failure of the implant to integrate and loss of the fixture. Teeth in posterior region must be with oval and narrow shape to minimize axial and nonaxial force [10, 11].

The resultant stress distribution was evaluated by Flanagan in patients with total prosthesis supported by 2 implant bar-retained [12, 13]. Overlay denture were simulated with 0-, 1-, 2-, and 3-mm bar heights. A vertical force was applied to the left first molar and gradually increased from 0 to 50 N. The amount of stress transferred by 3-mm heights of the bar connection was greater than that of 1- and 2-mm bar connections [14].

#### CONCLUSION

This kind of method by using one stage dental implants provides satisfying retention and stabilization of removable overdentures, in order to achieve better comfort and quality during mastication and other function. Preferable technique for the practitioners with transmucosal drilling and implant positioning. Magnifying indications for MDIs usage due to their affordable dimensions. Multiplying prosthetic options.

Considering an increased number of implants is recommended when mini implants are planned as an anchorage device. Proper stress distribution on dental implants is necessary in bar-retained implant overlay dentures. Dolder bar attachment with 1- and 2-mm heights could be associated with appropriate stress distribution for implant-retained prosthesis.

#### REFERENCES

- [1] Esposito M, Grusovin MG, Coulthard P, et al. *Int J Oral Maxillofac Implants*. 2006;21:696–710.
- [2] Davarpanah M, Martinez H, Tecucianu JF, et al. *J Esthet Dent*. 2000;12:186–194.
- [3] Tarnow D, Elian N, Fletcher P, et al. *J Periodontol*. 2003;74:1785–1788.
- [4] Cosme DC, Baldisserotto SM, Canabarro SA, et al. *Int J Prosthodont*. 2005;18:328–332.
- [5] Kim Y, Oh TJ, Misch CE, et al. *Clin Oral Implants Res*. 2005;16:26–35.
- [6] Comfort MB, Chu FC, Chai J, et al. *J Oral Rehabil*. 2005;32:341–345.
- [7] Romeo E, Lops D, Amorfini L, et al. *Clin Oral Implants Res*. 2006 Apr;17(2):139–148.
- [8] Fritz U, Diedrich P, Kinzinger G, et al. *J Orofac Orthop*. 2003;64:293–304.
- [9] Mazor Z, Steigmann M, Leshem R, et al. *Implant Dent*. 2004;13:336–341.
- [10] Kanié T, Nagata M, Ban S. *Implant Dent*. 2004;13:251–256.
- [11] Ahn MR, Choi JH, Sohn DS. *Implant Dent*. 2004;13:367–372.
- [12] Flanagan D. *J Oral Implantol*. 2006;32:34–37.
- [13] Vigolo P, Givani A, Majzoub Z, et al. *Int J Oral Maxillofac Implants*. 2004;19: 703–709.
- [14] Kim Y, Oh TJ, Misch CE, et al. *Clin Oral Implants Res*. 2005;16:26–35.