SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Dental Medicine

Mini Dental Implants in the Stabilization of the Complete Mandibular Removable Prosthesis

Wadii Bembli[1*], Narjes Hssan[2], Hichem Mehrez[1], Khattech Bassem[1]

[1]Oral Surgery Unit, Dental Medicine Department in the Principal Military Hospital of Instruction of Tunis (HMPIT), Tunisia
[2]University Hospital Farhat Hached, Sousse, Tunisia

DOI: 10.36347/sasjs.2023.v09i04.004 | **Received:** 21.02.2023 | **Accepted:** 03.04.2023 | **Published:** 09.04.2023

***Corresponding author:** Wadii Bembli
Oral Surgery Unit, Dental Medicine Department in the Principal Military Hospital of Instruction of Tunis (HMPIT), Tunisia

Abstract **Case Report**

Mini-implants represent a therapeutic alternative to conventional implants as they were proposed following the Mc Gill consensus. Their installation is faster, relatively simpler, reducing the postoperative course. Clinically, their use improves chewing and comfort. In the long term, the complications are fairly comparable to those encountered with prostheses using additional retention using conventional implants. In conclusion, this therapeutic solution represents an alternative to conventional implants, which can be proposed in response to the difficulties experienced by patients with unstable removable prostheses. The rehabilitation of a totally edentulous, resorbed mandible, with conventional removable prostheses, constitutes a very difficult challenge for the practitioner and often gives poor results in terms of satisfaction, comfort, stability and masticatory efficiency. Following the publication of the Mc Gill consensus of 2002, implant therapies appeared and became indisputable and uncontested. However, in some patients, the placement of so-called standard implants proves to be impossible due to the complexity of the protocols, the surgical consequences, sometimes an insufficient quantity of bone or even for economic reasons. In this context, the existence of mini-implants offers an interesting therapeutic alternative in totally bi-maxillary edentulous patients, wearers of complete maxillary removable prostheses and only in these cases.

Keywords: Mini-implants, survival, elderly patients, total mandibular prosthesis, immediate loading.

INTRODUCTION

Thanks to progress in prevention, total edentulism is often synonymous with old age [1]. Aging decreases adaptive capacities and degrades clinical conditions [2]. Bone resorption often reaches dramatic proportions, the oral mucosa becomes thinner and more fragile [3].

Under these conditions, the realization of a conventional removable total prosthesis becomes difficult or even impossible. In the past the only solutions to overcome these difficulties involved the use of prosthetic adhesive or the preservation of roots under prosthetics [4]. Supporting an attachment system, the dental organ then stabilizes the removable prosthesis while preserving the relief of the alveolar bone.

Currently, the implant-supported complete denture (PACSI) is considered the standard in the field of mandibular complete dentures. In fact, the region generally tolerates the placement of implants even in the case of strongly resorbed mandibles. The implant itself can be compared to an artificial dental root on which a prosthetic device will be screwed, sealed or stabilized (single crown, bridge or complete prosthesis [3]. Thus, the retention supplements placed on these implants make it possible to find comfort and a function close to that of the dentate patient [2, 3]. However, in the very old or weakened by disabling pathologies, the use of standards in the treatment of total edentulism comes up against the heaviness of the protocol and the surgical consequences. In addition, the high cost can be a barrier given the socio-economic status of older people. In this context, the use of mini-implants offers an interesting alternative [1, 4].

Mini-implants differ from standard implants in their architecture and diameter. Surgical placement of these implants can be done with or without flap. It is fast thanks to a restricted surgical protocol: only one drill is required [5].

To stabilize a mandibular prothesis, the manufacturers recommend placing four mini-implants in the symphyseal area. These implants are connected to

the prosthesis either by O'ring attachments or by a "soft base" type silicone [6].

Through a clinical case, we will detail the protocol for placing four mini-implants stabilizing a complete removable prosthesis.

CLINICAL CASE

A 70-year-old patient presented to our service for a possible complete maxillary bilateral prosthetic rehabilitation. On the mandible, we noted the presence of a flat ridge at the anterior level and very resorbed posteriorly. The floor of the mouth extends over the crest.

Prosthetic decision:

Total prosthesis with 4 axial attachments on mini implants

Prerequisites:

A complete mandibular prosthesis was made using conventional techniques. The patient was satisfied with the aesthetic rendering and the phonation stability of his prosthesis, but the masticatory efficiency leaves something to be desired.

An implant-retained solution was offered to the patient. The latter required a minimally invasive therapy rapidly improving their chewing performance.

Given these expectations, the placement of four mini-implants in the symphyseal region was indicated.

To make a self-curing resin duplicate of this prosthesis, it was made in order to make a radiological guide worn on the day of the CT scan.

The cone-beam type digital radiography showed, by contiguous parasagittal sections spaced 1 mm apart at the level of the symphyseal region, the presence of a hypercorticalized bone of reduced height and width.

The choice fell on self-tapping one-piece mini-implants of the Intralock type with a diameter of 2mm and a length of 10mm.

Surgical Phase:

- Local anesthesia of the identified areas was performed.
- An incision at the top of the ridge was made
- Marking of drilling sites
- The drilling was carried out with a single drill: the drilling was carried out under abundant irrigation and at a speed of 1500 rpm
- The placement of the mini-implants began with a speed of 15rpm, A minimum force of 35N/MIN must be reached to obtain good primary stability
- The parallelism between the implants was checked with the parallelism rods

Prosthetic phase:

The upper part of the mini-implants has a spherical attachment that will fit into an O 'ring and the location of the matrix is marked using a low viscosity silicone placed at the level of the intrados of the prosthesis

Subsequently, the intrados was hollowed out next to the emergence of the heads of the mini-implants so that they did not interfere with the housings of the female parts: A clearance of 1 mm is required.

In order to avoid the flare of the resin in the undercut areas, the necks of the mini-implants were first protected by a perforated rubber dam and then covered with petroleum jelly.

Self-curing resin was first applied to the female parts and then to the underside of the prosthesis.

The patient is guided in occlusion until the polymerization of the resin is complete. When the prosthesis was removed, the excesses were eliminated and the prosthetic intrados was polished with cups. Static and dynamic occlusal contacts were checked and slight occlusal equilibration was performed. Annual radiological checks should be carried out.

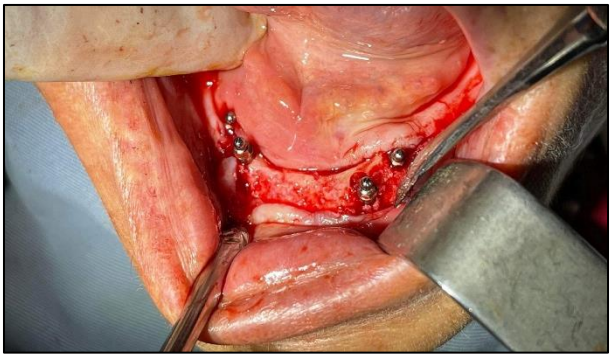

Figure 1: Four mini-implants in place

Figure 2: Mini-implants in place after mucosal healing

Figure 3: Interposition of a perforated and vaselined dam between the matrix and the patrice

Figure 4: Prosthetic intrados after polishing

Figure 5: Static occlusion control

DISCUSSION

Since the discovery of the concept of osseointegration, implants have been used to stabilize complete removable prostheses [2].

Full implant-retained prosthetic rehabilitation increases patient satisfaction and improves quality of life [4].

In 1968, Sendax was the first to use mini dental implants for the stabilization of provisional reconstructions of over-implant prostheses during the period necessary for the healing of conventional implants, assuming that their subsequent eviction would have been easy [3, 6].

However, 50% of the osseointegrated mini-implants were difficult to deposit. Histological studies have confirmed the appearance of mature and healthy bone on the surface of the titanium [7].

As a result, the design of the mini-implants has been improved to adapt to the requirements of osteoingration allowing their use in prostheses for use [8].

Currently, the mini-implants are self-tapping and have an etched surface which increases the developed surface. In addition, their primary stability is increased by their self-drilling shape and by an undersized pre-drilling compared to the diameter of the implant [7, 9].

In 2001, Balkin *et al*., confirm that mini-implants were perfectly osteintegrated after 4 to 5 months of immediate loading following histological studies in humans [6].

This functional ankylosis is favored by the attachments delivered with the mini-implants presenting a certain degree of resilience and allowing less micro-movements [10].

Some authors defend the use of 2 to 4 mini-implants with a moderately rough surface in order to improve fixation to the bone, to ensure good bone-implant contact and to guarantee the immediate long-term result [9, 11].

They add that surgery to place mini-implants can be performed transmucosal without soft tissue elevation with a success rate of 92.9% after 36 months [8]. Placing flapless implants reduces post-operative consequences to a minimum.

The mini-implants can be used in almost all clinical situations: in particular in cases of narrow ridges where they can be placed without prior arrangement of the ridge [7]. The stabilization of a prosthesis by mini-implants corresponds to an immediate loading, therefore resulting in an immediate benefit for the patient. Function and comfort are thus improved from day one. In addition, mini-implants can be offered at a reasonable cost. This aspect is essential in the eyes of elderly people with often modest incomes [12].

Improved function will also have significant nutritional consequences. The elderly person will thus be able to increase and vary the range of foods usually consumed.

A number of disadvantages can be listed. The placement of these implants may seem easy at first. But the use of a single drill implies that the axis of the implant must be correct from the outset for all implants without parallelism error. The passage of a second drill of greater diameter does not correct any axis approximation [11, 13].

Flapless work requires the practitioner to have good experience in placing conventional implants [12].

In summary, the placement of mini-implants should not be considered as an easy act by which one can begin implantology. On the contrary, it requires an experienced practitioner [10].

CONCLUSION

Given their advantage, the use of four mini-implants between the mental foramina for the stabilization of a mandibular prosthesis seems to represent a possible alternative to traditional implant therapy. It provides patients with immediate satisfaction and real benefit. However, their indication remains limited to elderly or fragile total edentulous patients to avoid the invasive and cumbersome nature of implant surgery.

REFERENCES

1. Christensen, G. J. (2006). The ‘mini'-implant has arrived. *The Journal of the American Dental Association*, *137*(3), 387-390.
2. Tomasi, C., Idmyr, B. O., & Wennström, J. L. (2013). Patient satisfaction with mini-implant stabilised full dentures. A 1-year prospective study. *Journal of oral rehabilitation*, *40*(7), 526-534.
3. Preoteasa, E., Marin, M., Imre, M., Lerner, H., & Preoteasa, C. T. (2012). Patients' satisfaction with conventional dentures and mini implant anchored overdentures. *Revista medico-chirurgicala a Societatii de Medici si Naturalisti din Iasi*, *116*(1), 310-316.
4. FDA Guidance for Industry and FDA Staff - Class II Special Controls Guidance Document: Root-form Endosseous Dental Implants and Endosseous Dental Abutments. U.S. Food and Drug Administration, 2002.
5. Omran, M., Abdelhamid, A., Elkarargy, A., & Sallom, M. (2013). Mini-implant overdenture versus conventional implant overdenture (a radiographic and clinical assessments). *J Am Sci*, *9*(9), 89-97.
6. Heydecke, G., Habil, D., Thomason, J. M., Awad, M. A., Lund, J. P., & Feine, J. S. (2008). Do mandibular implant overdentures and conventional complete dentures meet the expectations of edentulous patients?. *Quintessence international*, *39*(10), 803-809.
7. Zahran, A. (2008). Clinical evaluation of the OsteoCare Mini and Midi implants for immediate loading of mandibular overdentures. *Imp Dent today*, *2*, 154-159.
8. Moizan, H. (2009). Intérêt des mini-implants Easy Implant en prothèse complète stabilisée sur implants. *Implant 2009; 15: 31*, *36*.
9. Himmlova, L., Kácovský, A., & Konvičková, S. (2004). Influence of implant length and diameter on stress distribution: a finite element analysis. *The Journal of prosthetic dentistry*, *91*(1), 20-25.
10. Arunima Upendran; Dental, Mini-Implants Herb G. Salisbury, Bookshelf ID: NBK513266PMID: 30020638, Copyright © 2019, StatPearls Publishing LLC
11. Zygogiannis, K., Aartman, I. H., & Wismeijer, D. (2018). Implant Mandibular Overdentures Retained by Immediately Loaded Implants: A 1-Year Randomized Trial Comparing Patient-Based Outcomes between Mini Dental Implants and Standard-Sized Implants. *International Journal of Oral & Maxillofacial Implants*, *33*(1), 197-205. doi:10.11607/jomi.6009
12. Cannizzaro, G., Leone, M., & Esposito, M. (2008). Immediate versus early loading of two implants placed with a flapless technique supporting mandibular bar-retained overdentures: a single-blinded, randomised controlled clinical trial. *European Journal of Oral Implantology*, *1*(1).
13. Albrektsson, T., & Sennerby, L. (1990). Direct bone anchorage of oral implants: clinical and experimental considerations of the concept of osseointegration. *International Journal of Prosthodontics*, *3*(1), 30-41.