

# Editorial 2

## Mini-implants for Overdentures

Implant-supported dentures including either complete overdentures or a hybrid prosthesis significantly improve the quality of life for edentulous patients compared with conventional removable complete dentures. Consensus statements (made by the expert teams) in 2002, 2009 and 2011 from symposia in Canada, England and the US respectively, suggested that the first-choice standard of care for an edentulous mandible should be the two-implant retained mandibular overdentures.<sup>1</sup> However, the diameter of standard implants (approximately 3.5 mm) sometimes may need bone augmentation and limit their use for those who have lesser bone width and do not really want to go for further surgical procedures.

The introduction, approval and continuous observation of success of smaller-diameter mini-implants have stimulated use of implants in situations in which standard-sized implants could not be used without grafting. The diameter of mini-implant is less than 3 mm, unusually manufactured with the width of 1.8, 2.1, 2.4 and 2.9 mm. The mini-implants are one-piece implants; having lesser manufacturing cost than two-piece standard implants and hence are less costly. Also, there is no risk of abutment screw loosening, hence less micro-organisms harbor in surrounding crestal bone. The mini implants preferably can be placed without much manipulation of soft tissues and can be immediately loaded. The result has been more patients who can be served successfully at reduced cost with minimized pain and trauma, and who could not have been treated with implants otherwise.<sup>2</sup>

Liu et al evaluated strain distribution in peri-implant bone of mandibular overdentures anchored by different numbers of implants under different loading conditions, through the 3D finite element analysis (FEA), and suggested that the number of implants does not significantly affect the strain pattern.<sup>3</sup> Jofre et al<sup>4</sup> carried out the FEA and clinical trial, evaluating marginal bone loss of 2 year follow-up with two splinted *vs* two unsplinted mini-implant-retained overdentures.<sup>4</sup> A finite element analysis showed the minimum principal stress (-118 MPa) in bone surrounding the unsplinted mini-implant as compared to splinted implants (-56.8 MPa). After 2 years of follow-up in the clinical study, unsplinted mini-dental implants showed marginal bone loss of  $1.43 \pm 1.26$  mm, while splinted one showed  $0.92 \pm 0.75$  mm. Mangano et al placed a total of 231 one-piece direct metal laser sintering (DMLS) mini-implants in 62 patients and found that overall cumulative survival rate was 96.9% and the mean marginal bone loss was  $0.38 \pm 0.25$  and  $0.62 \pm 0.20$  mm at the 1 and 4 year follow-up examinations respectively.<sup>5</sup> Scepanovic et al treated 30 patients with mandibular complete dentures that were retained by four immediately loaded mini-dental implants resulting in a 98.3% success rate after 1 year of loading.<sup>6</sup>

The people with poor economical strata worldwide can afford to undergo the similar standard of care by reducing the cost and large population can be covered for the implant-retained-overdenture as a first choice standard of care. Only a few studies have dealt with immediately loaded, unsplinted mini-implants retained mandibular overdentures. There is a need of further biomechanical and clinical research to validate their use in routine clinical practice.

## REFERENCES

1. Das KP, Jahangiri L, Katz RV. The first-choice standard of care for an edentulous mandible: a Delphi method survey of academic prosthodontists in the United States. *J Am Dent Assoc* 2012;143(8):881-889.
2. Christensen GJ. The 'mini'-implant has arrived. *J Am Dent Assoc* 2006 Mar;137(3):387-390.
3. Liu J, Pan S, Dong J, Mo Z, Fan Y, Feng H. Influence of implant number on the biomechanical behaviour of mandibular implant-retained/supported overdentures: a three-dimensional finite element analysis. *J Dent* 2013;41(3):241-249.
4. Jofre J, Cendoya P, Munoz P. Effect of splinting mini-implants on marginal bone loss: a biomechanical model and clinical randomized study with mandibular overdentures. *Int J Oral Maxillofac Implants* 2010;25(6):1137-1144.
5. Mangano FG, Caprioglio A, Levrini L, Farronato D, Zecca PA, Mangano C. Immediate loading of mandibular overdentures supported by one-piece, direct metal laser sintering mini-implants: a short-term prospective clinical study. *J Periodontol* 2015;86(2):192-200.
6. Scepanovic M, Calvo-Guirado JL, Markovic A, Delgado-Ruiz R, Todorovic A, Milicic B, Mistic T. A 1-year prospective cohort study on mandibular overdentures retained by mini dental implants. *Eur J Oral Implantol* 2012;5(4):367-379.



**Pravinkumar G Patil**

Managing Editor

International Journal of Prosthodontics and Restorative Dentistry

Division of Clinical Dentistry

School of Dentistry, International Medical University

Kuala Lumpur, Malaysia