

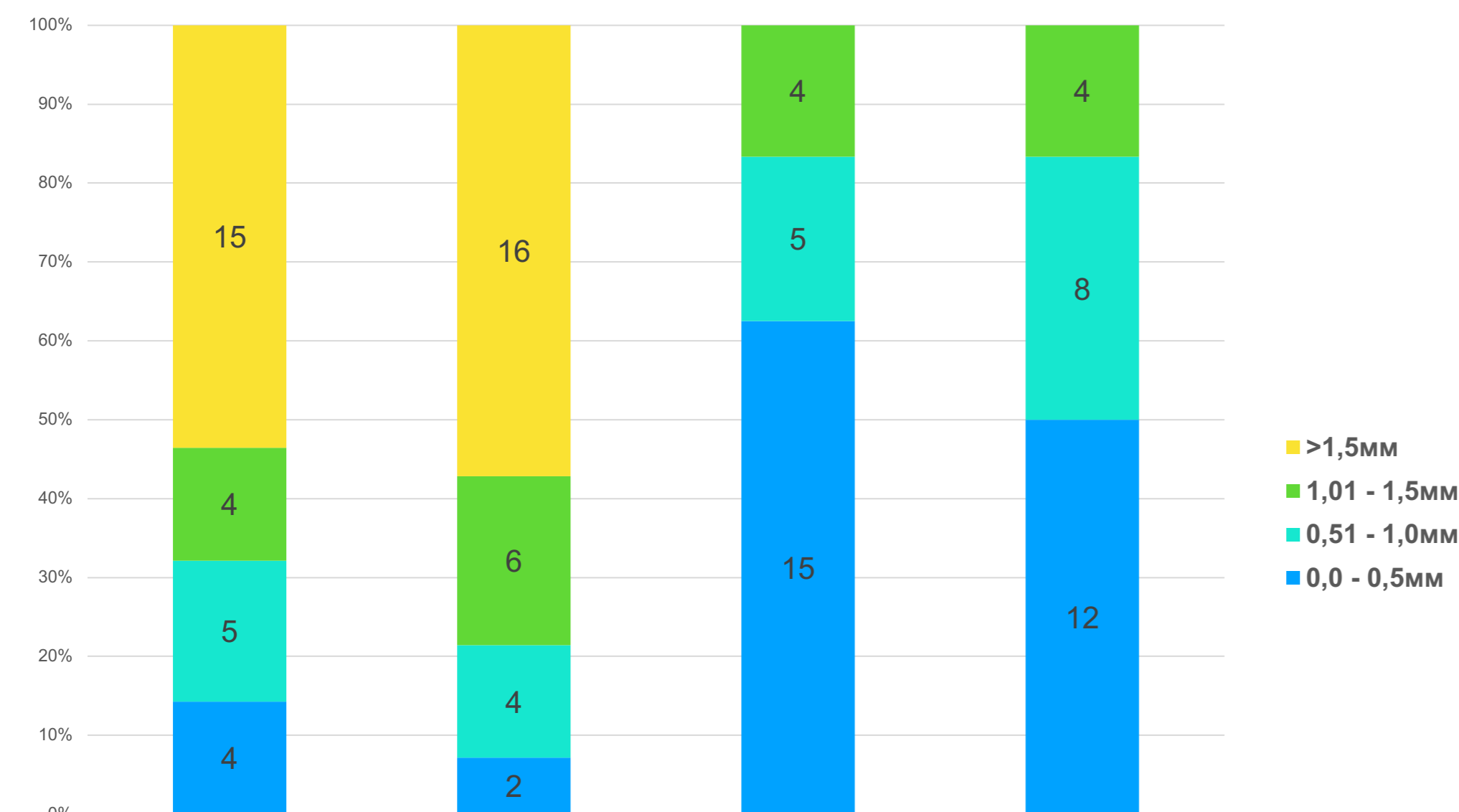
The subcrestal implant placement as factor for crestal bone stability in implant sites with vertically thin gingiva

Darko Veljanovski¹, Vancho Spirov², Denis Baftijari³, Krenar Papraniku⁴, Bojana Stefanovikj⁵

¹Clinic for Oral Surgery Hami Optimum, ²University Clinic For Oral Surgery, Skopje, ³Dental Clinic Vita Dent, ⁴Dental Clinic Prodent, Tetovo, ⁵Dental Clinic Optimum Dental, Skopje, North Macedonia

Abstract

This prospective comparative study aimed to determine the influence of the implant placement type (subcrestal or equirestal) on bone level changes in platform-switched implants placed in sites with vertically thin gingiva (<3 mm) and restored with screw-retained or cement-retained restorations. Moreover, the effect of vertical gingival thickness on peri-implant bone loss was analyzed. The clinical significance of the study's conclusions is in determining a modality of implant placement efficient in preserving stable crestal bone.



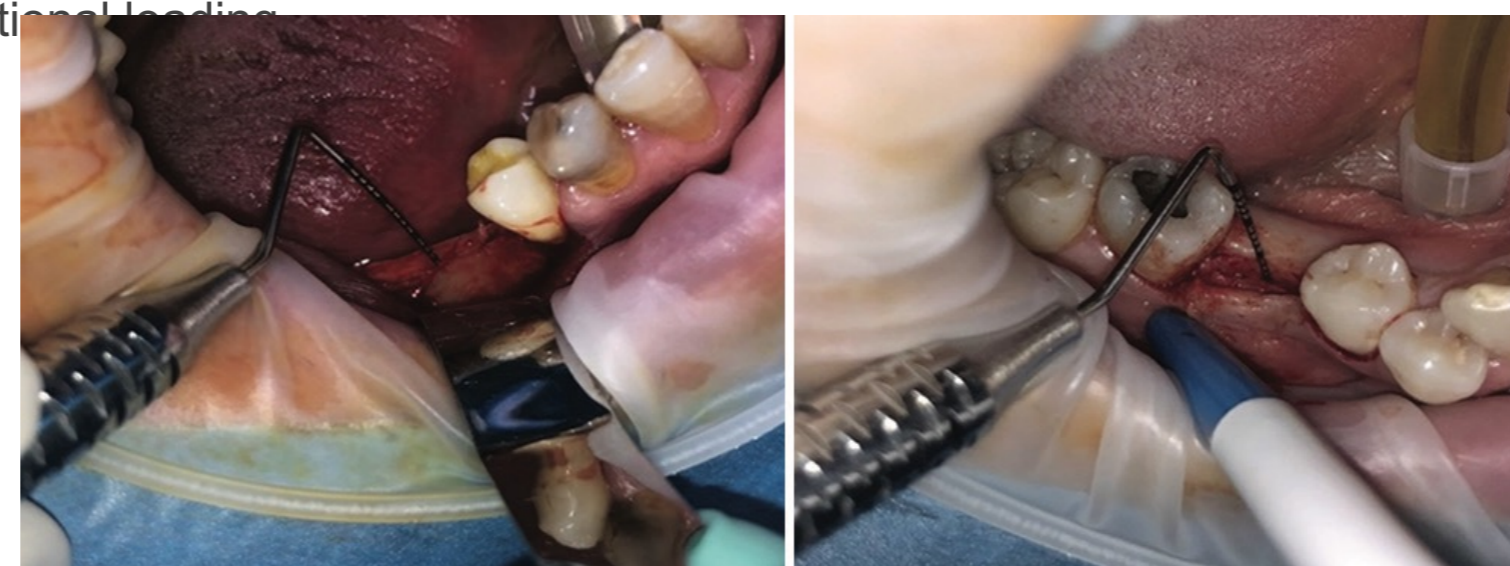
Bone loss distribution (mm) in implant sites with different vertical gingival thickness

Background and Aim

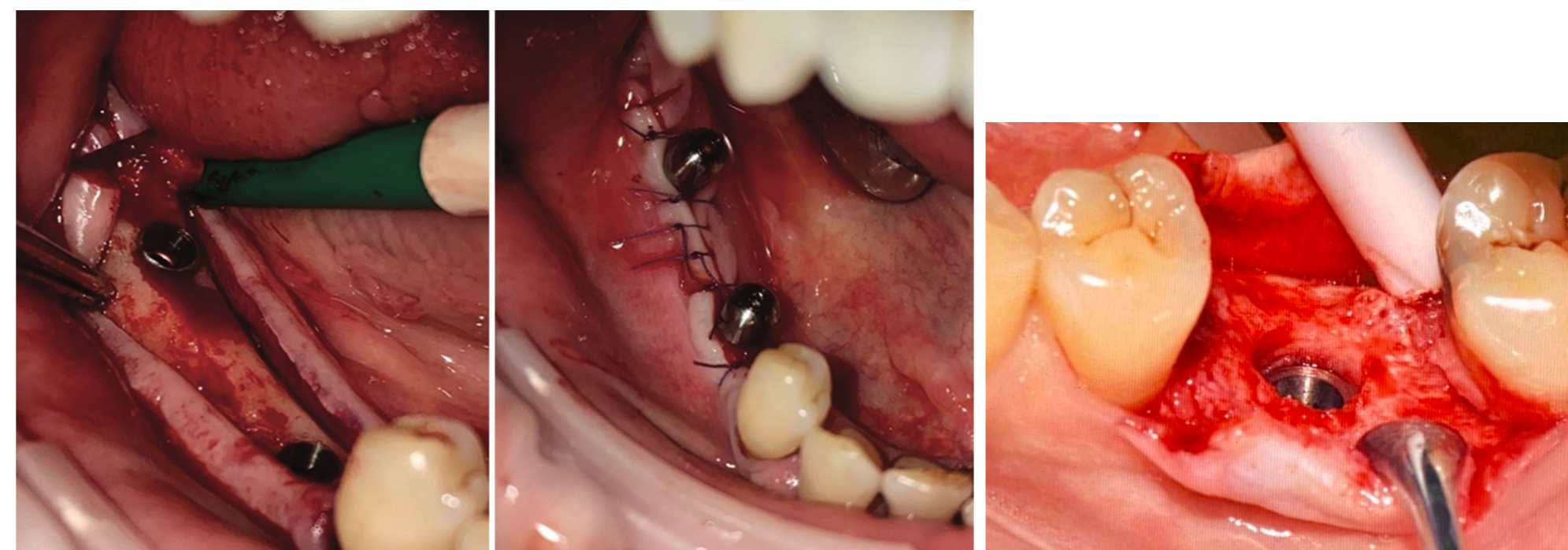
The stable peri-implant crestal bone is a prerequisite for long-term success of the dental implants. The sufficient vertical soft tissue thickness is an important factor in preserving the stable peri-implant crestal bone. One of the proposed methods for minimizing the crestal bone loss is the placement of the implants below the crestal bone level (subcrestally). Platform switched implants are believed to be able to preserve the crestal bone and can be placed subcrestally.

Methods and Materials

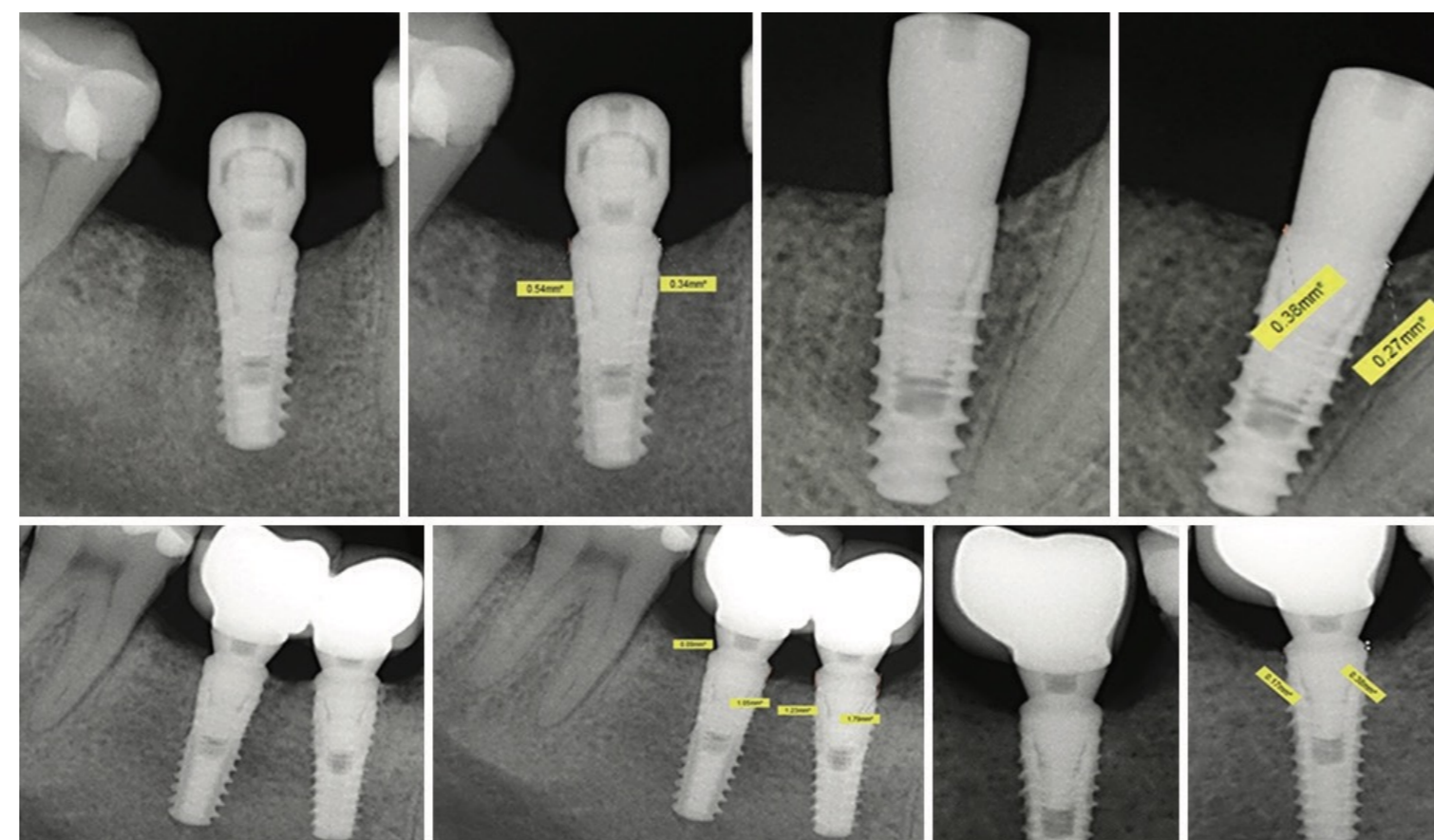
Fifty-two bone-level implants with platform switched prosthetic platform (Implantswiss, Novodent SA, Yverdon-les-Bains, Swiss) were placed in a single stage manner in the posterior mandibular region. The implant sites were divided into control group with vertically thick gingiva (≥3mm) and test group with vertically thin (<3 mm) gingiva. The implants in the control group were placed equirestally. The implant sites from the control group were randomly allocated to receive equirestally or subcrestally placed implants. Bone remodelling/loss was radiographically measured at digital peri-apical images using at two reference points: mesially and distally. The measurements were done at two timepoints: three months postoperatively and six months post functional loading.



Vertical soft tissue thickness: Thin versus thick implant sites



Implantswiss "bone-level" implant placement in single-stage manner (equirestally and subcrestally)



Radiographic measurement of bone loss at different time points

Results

The mean crestal bone loss values three months postoperatively and six months post functional loading were higher at sites with thin than at sites with thick gingiva (p<0.0001). At implant sites with thin gingiva, subcrestally placed implants presented less bone loss than equirestally placed implants (p<0,0001).

The type of final restoration does not affect the bone loss values at implant sites with vertically thin and thick gingiva.

"Tukey's multiple comparisons test"	mean	95% CI differences	p-value
vertical soft tissue thickness			
3 months thin/ 6 months thin	-0,2517	-0,5076 -0,004259	0,0558
3 months thin/ 3 months thick	0,7973	0,5338-1,061	<0,0001
3 months thin/ 6 months thick	0,6983	0,4348-0,9618	<0,0001
6 months thin/ 3 months thick	1,049	0,7854-1,312	<0,0001
6 months thin/ 6 months thick	0,9499	0,6864-1,213	<0,0001
3 months thick/ 6 months thick	-0,09900	0,3650-0,1670	0,7684

	mean	max value	min value	MD	SD
subcrestal					
after 3 months	0,82	1,77	1,77	1,77	0,49
6 months after prosthetic rest.	0,98	1,9	0,30	1,60	0,51
equirestal					
after 3 months	1,25	2,90	0,09	2,80	0,88
6 months after prosthetic rest.	1,44	3,09	0,09	3,00	0,98

Mean bone loss values (mm) in thin and thick gingiva sites and in subcrestal versus equirestal implants

"Tukey's multiple comparisons test"	mean	95% CI differences	p-value
subcrestal vs. equirestal			
3 months mesial subcrestal/ 3 months mesial equirestal	0,8898	-0,313-0,467	<0,0001
3 months distal subcrestal/ 3 months distal equirestal	-0,7808	-1204-0,3580	<0,0001
6 months mesial subcrestal/ 6 months mesial equirestal	-1,072	1,494-0,6487	<0,0001
6 months distal subcrestal/ 6 months distal equirestal	-0,7825	-1,205-0,3597	<0,0001

"Tukey's multiple comparisons test"	mean	95% CI differences	p-value
screw-retained vs. cement-retained in vertically thin gingiva			
3 months mesial screw-retained / 3 months mesial cement-retained	-0,03754	-0,6618-0,5871	>0,9999
3 months mesial screw-retained / 6 months mesial cement-retained	-0,1291	-0,7533-0,4951	0,9982
3 months distal screw-retained / 3 months distal cement-retained	-0,2089	-0,8331-0,4153	0,9672
3 months distal screw-retained / 6 months distal cement-retained	-0,3004	-0,9246-0,3238	0,8083

Mean bone loss values (mm) in thin gingiva sites depending on implant placement type and restoration type

Conclusion

The implants are receptive to more bone loss when they are placed in sites with vertically thin gingiva regardless of their platform switched design and the type of final restoration (screw-retained or cement-retained). The subcrestal placement of platform-switched implants can prevent crestal bone loss in sites with vertical gingival thickness < 3 mm.

References

- Canullo L, Fedele GR, Iannello G, Jepsen S. Platform switching and marginal bone-level alterations: The results of a randomized controlled trial. Clin Oral Implants Res. 2010;21(1):115-21
- Strietzel FP, Neumann K, Hertel M. Impact of platform switching on marginal peri-implant bone-level changes. A systematic review and meta-analysis. Clin Oral Implants Res. 2015;26(3):342-58
- Vervaeke S, Dierens M, Besseler J, De Bruyn H. The influence of initial soft tissue thickness on peri-implant bone remodeling. Clin Implant Dent Relat Res. 2014;16(2):238-47
- Linkevicius T, Apse P, Grybauskas S, Puisys A. The influence of soft tissue thickness on crestal bone changes around implants: A 1-year prospective controlled clinical trial. Int J Oral Maxillofac Implants. 2009;24(4):712-9
- Linkevicius T, Puisys A, Steigmann M, Vindasiute E, Linkeviciene L. Influence of vertical soft tissue thickness on crestal bone changes around implants with platform switching: A comparative clinical study. Clin Implant Dent Relat Res. 2015;17(6):1228-36.
- Puisys A, Linkevicius T. The influence of mucosal tissue thickening on crestal bone stability around bone-level implants. A prospective controlled clinical trial. Clin Oral Implants Res. 2015;26(2):123-9