Platform switching versus platform matching:

two-year results from a prospective randomized-controlled multicenter study

Salomão Rocha [1] , Wilfried Wagner [2] , Jörg Wiltfang [3] , Fernando Guerra [1] , Maximilian Moergel [2] , Eleonore Behrens [3] , Pedro Nicolau [1]

(1) Faculty of Medicine, University of Coimbra Coimbra Portugal, (2) Johannes Gutenberg University of Mainz Mainz Germany, (3) Schleswig-Holstein University of Kiel Kiel Germany

camlogfoundation

5TH INTERNATIONAL CAMLOG CONGRESS
26TH–28TH JUNE 2014, VALENCIA, SPAIN

Background and Aim:

Platform switching concept is based on the discrepancy between the prosthetic abutments of a smaller diameter in relation to the implant platform diameter and clinically seems to preserve crestal bone height and soft tissue levels increasing the quality outcomes in treatments with dental implants and the patient satisfaction. However, it is well-known that the lack of well-designed prospective randomized clinical trials evaluating the efficiency of platform switching (PS) versus platform matching (PM) placed in partially edentulous mandibles.

The purpose of this five-year prospective randomized multicenter study was to assess the differences in bone level changes between CAMLOG® SCREW-LINE implants supporting single crowns in the posterior mandible restored either with platform matching or platform switching abutments (FDI positions 37-34 and/or 44-47). The secondary objectives included implant success (Buser et al. 2002) and survival rate, performance of the restorative components, nature and frequency of the adverse events.

This paper presents interim results obtained in up to two years.

Material and methods:

Study design

The prospective multicenter randomized clinical study was performed in three centers located in Germany (two) and Portugal (one). The study was approved by the competent Ethics Committees (FECI 09/1308 and CES/0156) and performed in accordance with the Declaration of Helsinki (2008).

Inclusion criteria

Patients ≥18 years old missing two or more adjacent teeth in the posterior mandible and with a natural tooth mesially to the most proximal implant site.

Free end situation was allowed and opposing dentition must be natural teeth or implant supported fixed restorations.

Following implant placement (i.e. before placing the healing cap) patients were randomized either in the group of abutment for PM restoration or in the group for PS. All patients signed the detailed informed consent form before surgery.

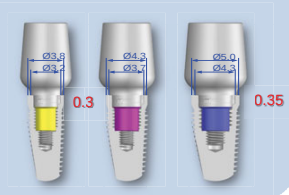
Exclusion criteria

Individuals who presented uncontrolled systemic diseases or took medications interfering with bone metabolism or presenting abuse of drugs or alcohol, use of tobacco equivalent to >10 cigarettes/day or presenting handicaps that would interfere with the ability to perform adequate oral hygiene.

Material

-CAMLOG® SCREW-LINE Implants, Promote® plus:
- Diameter 3.8 , 4.3 and 5 mm
- Length 9, 11 and 13 mm

-Platform switching and platform matching prosthetic components.



Study status

Center	Patients	Implants Intent to treat	Implants per protocol	Comments
Kiel	14	28	24 PS 12, Std 12	2 patients (4 implants) off-protocol
Mainz	21	57	53 PS 29, Std 24	4 implants in two pat. off-protocol 3 patients with split-mouth design
Coimbra	35	86	86 PS 42, Std 44	5 patients with split-mouth design
TOTAL	**70**	**167**	**163** **PS 83, Std 80**	

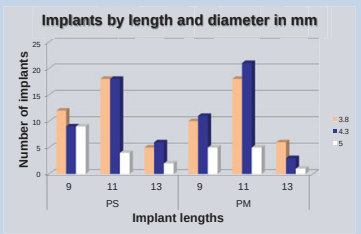
	Total patients / implants	Split-mouth pat.	Status
Randomized (In-protocol)	68 / 163	8	Completed
Loading*	67 / 160	8	Completed
12-month FU	67 / 160	8	Completed
24-month FU	61 / 144**	7	Ongoing

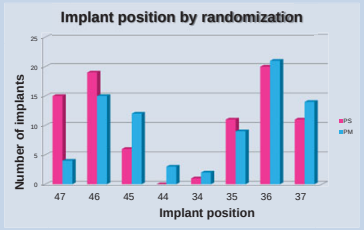
* 3 implants non-osseointegrated (NOI) and explanted prior to loading (two lost, one mobile).
** 5 patients (14 implants) 24-month FU information pending; 1 patient with 2 implants died 20-month post-loading.

Demography

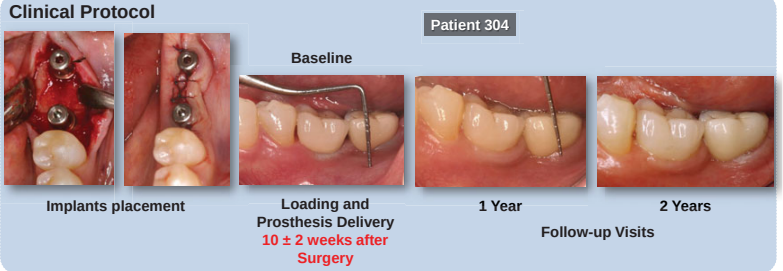
	Platform Switching (N=39)	Platform Matching (N=37)
Male / Female (by randomization)	22 / 17	20 /17
MEAN Age at surgery	53.29 (SD 10.44)	50.17 (SD 14.33)
Smoking status		
No smoker	31	25
Former smoker	7	4
Current smoker	1	8

Implants description

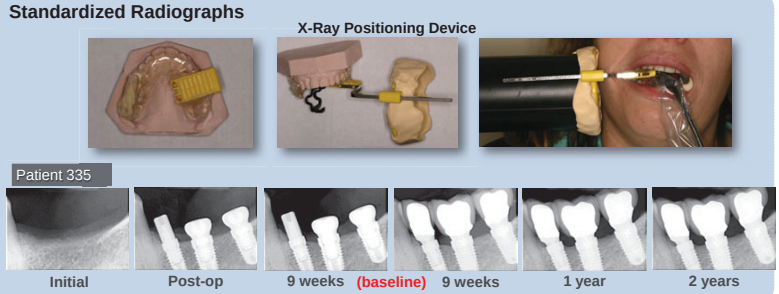




Clinical Protocol



Standardized Radiographs



Statistical methods

The distance from the implant shoulder to the first crestal bone contact, at the mesial and distal side, was measured with standardized radiographs and averaged to represent the change of bone level over time per implant. Two-way ANOVA considering Center and Randomization as factors was used to evaluate the mean differences in bone level change at a significance level of 0.05.

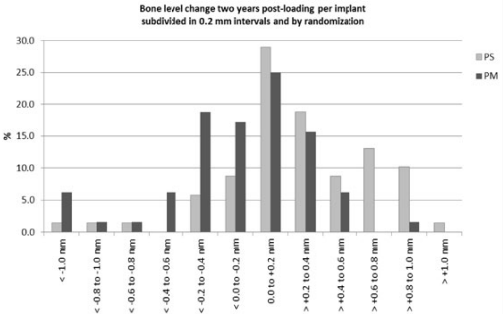
Survival analysis was applied to calculate implant success and survival rate.

Results:

Bone gain = positive value (+) Bone loss = negative value (-)

Randomization	Platform switching		Platform matching		2-way ANOVA	
	N	MEAN ± SD	N	MEAN ± SD	Center effect	Randomization effect
Surgery to loading	76	**- 0.53± 0.45**	70	**- 0.63 ± 0.70**	Yes (p<0.01)	**No (p=0.087)**[+]
Loading – 12M*	76	**0.10 ± 0.41**	68	**- 0.09 ± 0.50**	Yes (p=0.024)	**Yes (p=0.03)**[++]
Loading – 24M**	69	**0.26 ± 0.44**	64	**- 0.16 ± 0.65**	Yes (p=0.027)	**Yes (p<0.01)**[++]

[+] Despite statistically significant for centers 1 (0.046) and 2 (0.003)
[++] Overall difference between PS and PM attributable only to center 3 (p<0.01)



The mean bone level changes at two years post loading. Number of implants subdivided in 0.2 mm intervals. In 81% of the implants in PS group and 48% in PM group bone gain was observed. A bone gain higher than 0,4 mm was observed in 33% of the implants with PS and only in 7,8% in PM group.

The survival rate of this study are 97.6% .in the PS group and 98.8% in the PM group (not statistically significant).

Conclusions:

At two-year post-loading the implants restored with platform switching abutments appear to preserve the crestal bone more predictably than the implants restored with platform match.

References:

1-Becker J, Ferrari D, Herten M, Kirsch A, Schaer A, Schwarz F. Influence of platform switching on crestal bone changes at non-submerged titanium implants: a histomorphometrical study in dogs. *J Clin Periodontol 2007; 34: 1089-96.*
2-Canullo L, Iannello G, Götz W. The influence of individual bone patterns on peri-implant bone loss: preliminary report from a 3-year randomized clinical and histologic trial in patients treated with implants restored with matching-diameter abutments or the platform-switching concept. Int J Oral Maxillofac Implants 2011 May-Jun;26(3):618-30.
3-Hermann F, Lerner H, Palti A. Factors influencing the preservation of the periimplant marginal bone. *Implant Dent 2007; 16(2): 1-6.*
4-Hürzeler M, Fickl S, Zuhr O, Wachtel HC. Peri-Implant bone level around implants with platform-switched abutments:preliminary data from a prospective study. Journal of oral and maxillofacial surgery, July 2007, 65(7-suppl 1):33-39.
5-Lazzara R, Porter S. Platform switching: a new concept in implant dentistry for controlling post-restorative crestal bone levels. *Int J Periodontics Restorative Dent 2006; 26(1): 9-17.*
6-Luongo R, Traini T, Guidone P, Bianco G, Cocchetto R, Celletti R. Hard and soft tissue responses to the platform-switching technique. *Int J Periodontics Restorative Dent 2008; 28(6): 551-7.*