

Comparison of 5-year outcomes of implant therapy using bone level or tissue level implants in a specialty practice.

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Objective

As stated at the 6th European Workshop on Periodontology ¹ more information is needed on the effectiveness of implant therapy based on subjects recruited from private dental clinics. Thus, it was the aim of this comparative study ² to evaluate the peri-implant marginal bone level changes as well as biological and technical complications for bone level (BL) and soft tissue level (TL) implants over 5 years of service.

Material & Methods

After periodontal therapy, 48 partially edentulous subjects (age: 37-76 years, 44% females, 19% smokers) had received 54 BL and 84 TL implants (Straumann, Basel, CH) restored by 24 single crowns (SC), 43 cemented fixed partial dentures (FPD) and 4 screw retained removable dentures (RD) (Figure 2,3,5,7,8). 66% simultaneous bone augmentation procedures had been performed by maxillary sinus lift grafting and / or guided bone regeneration (GBR) with deproteinized bovine bone mineral covered by resorbable collagen membranes (Geistlich, Wolhusen, CH) (Figure 6). All patients participated in regular supportive care and had given consent. Radiographs were obtained at implant insertion, abutment connection and at 5 years after loading (Figure 4). Full mouth recordings included probing pocket depths, bleeding on probing and plaque scores recorded by one blinded examiner. Bone loss was calculated on digital radiographic images, biological and technical complications were recorded during observation period of service. Implant success was determined according to Pisa criteria ³. Data were analysed using chi-square test and logistic regression.

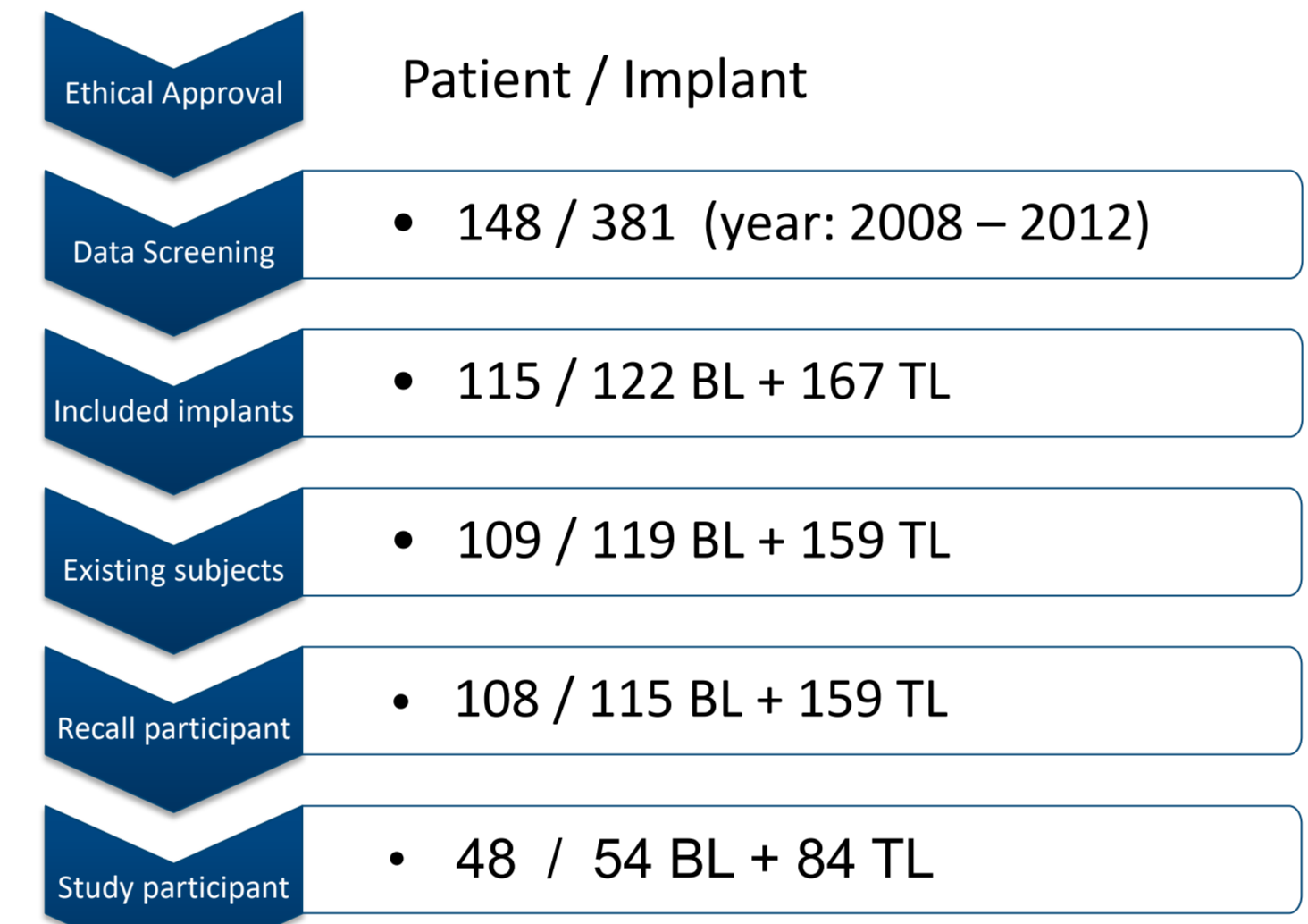
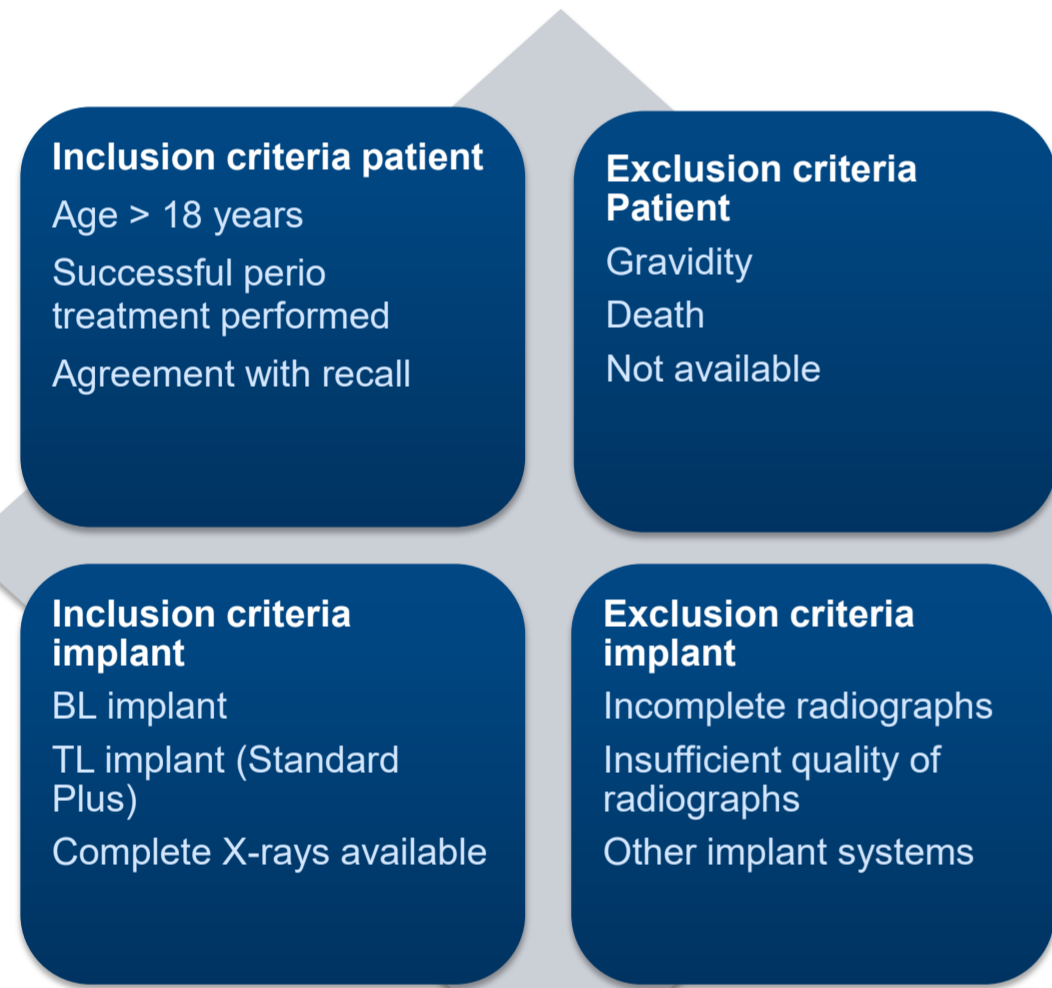


Figure 1: Inclusion/exclusion criteria for patients / implants

Figure 2: Flow chart for patient / implant selection

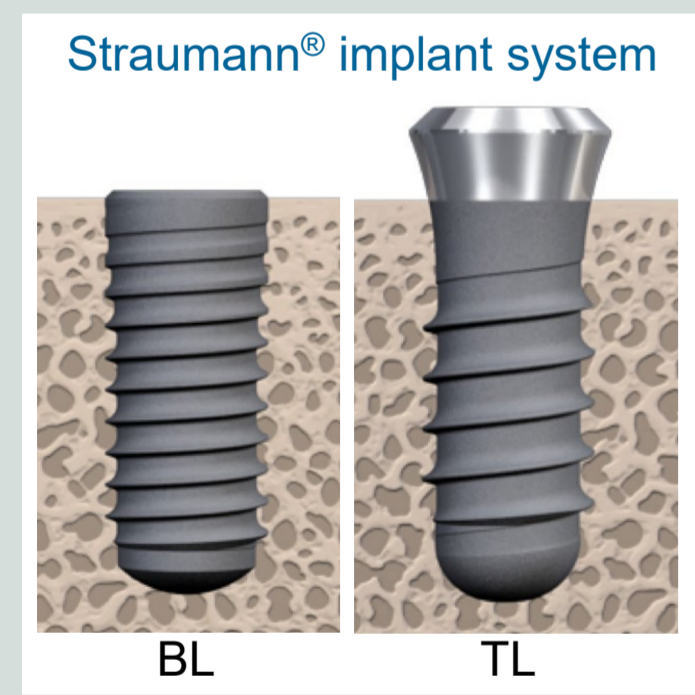


Figure 3: BL / TL implant

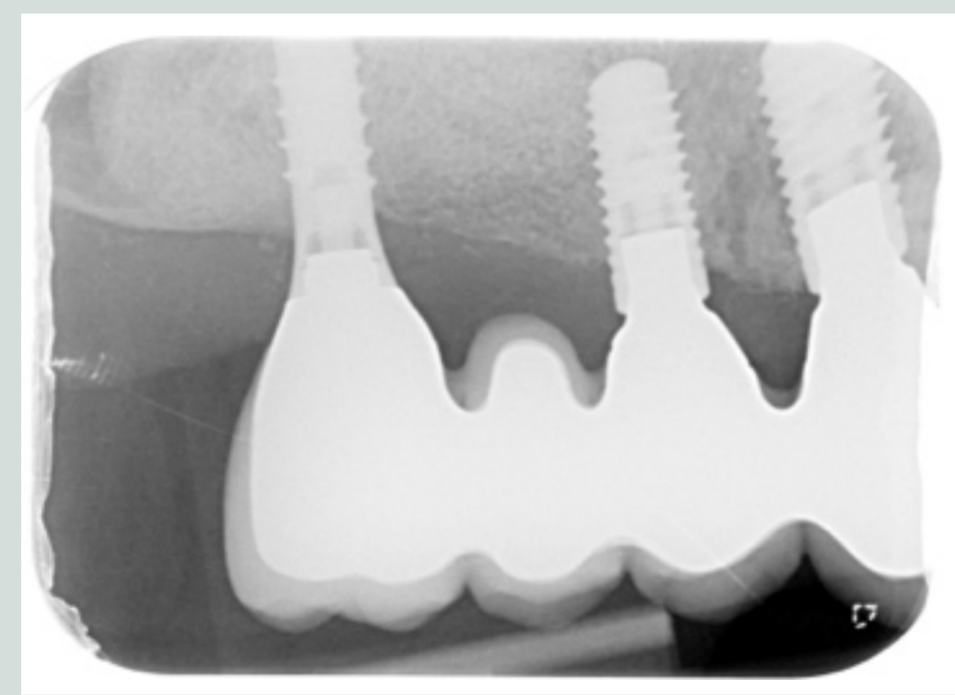


Figure 4: Radiographic analysis presenting periimplant tissue level / bone level measurement

Bone level measurement:
 Implant type: BL / TL
 Calibration by thread distance: 0,8 mm / 1,25 mm
 Reference: platform shift / rough surface
 Measuring mesial + distal (maximum value used)
 Periimplant bone loss (10⁻¹ mm)
 Measurement performed by one blinded examiner

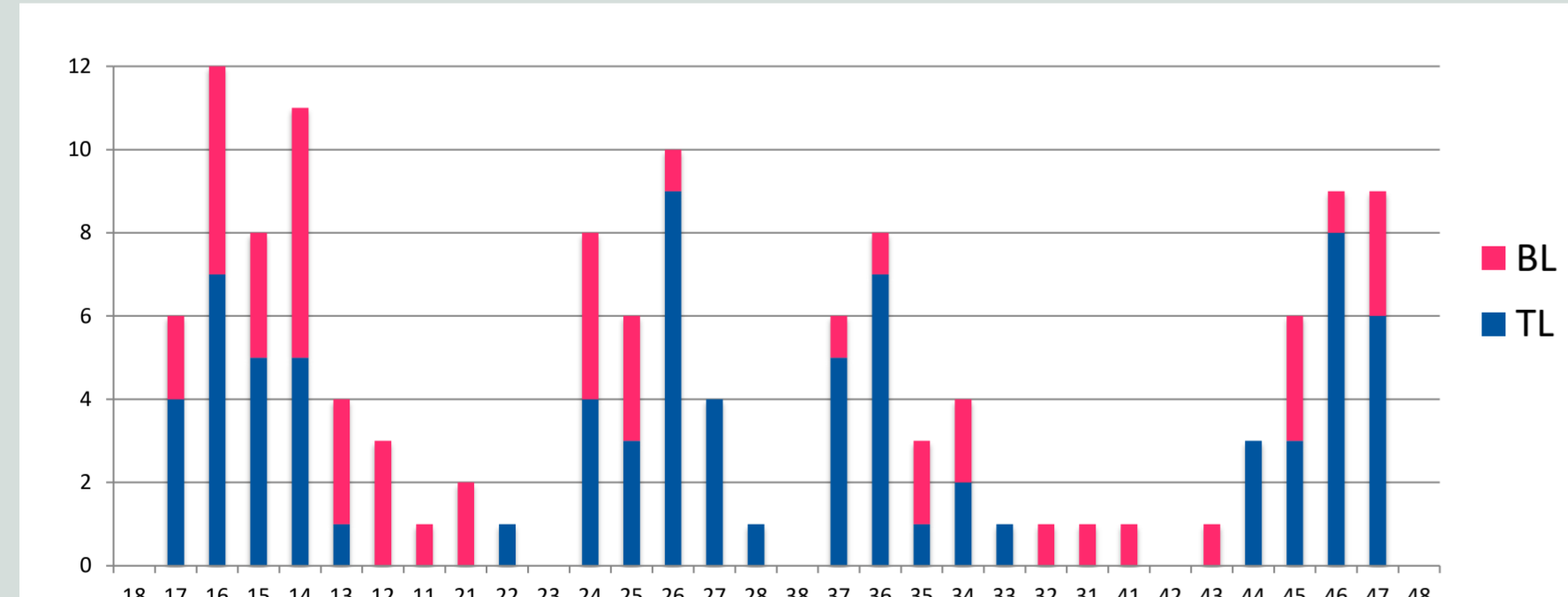


Figure 5: Distribution of BL and TL implants in teeth position

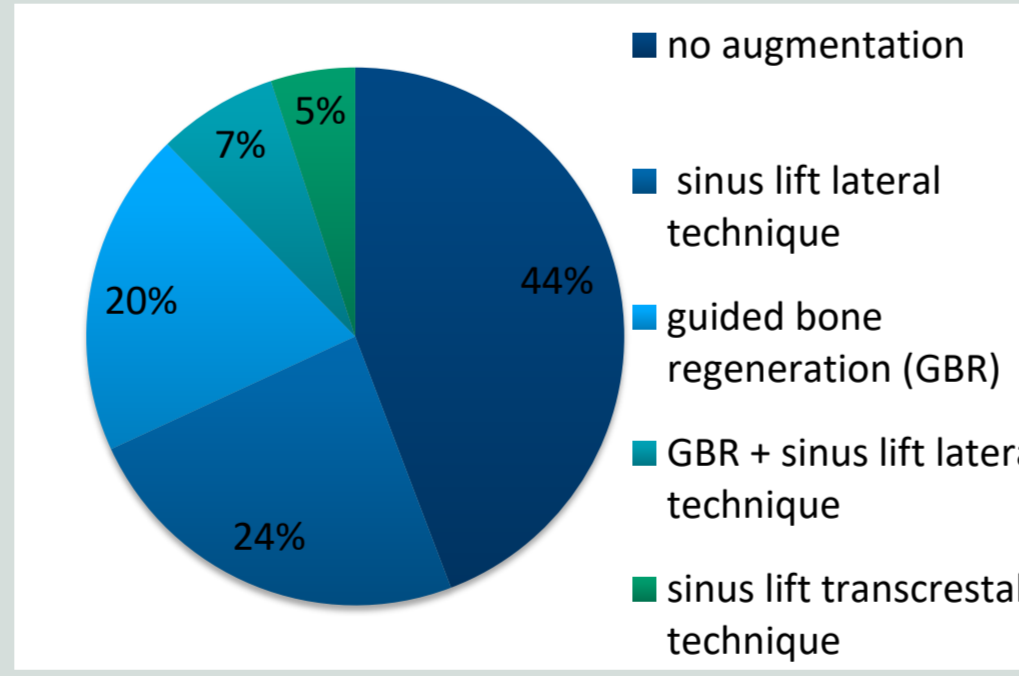


Figure 6: bone augmentation procedures parallel to implant placement (%)

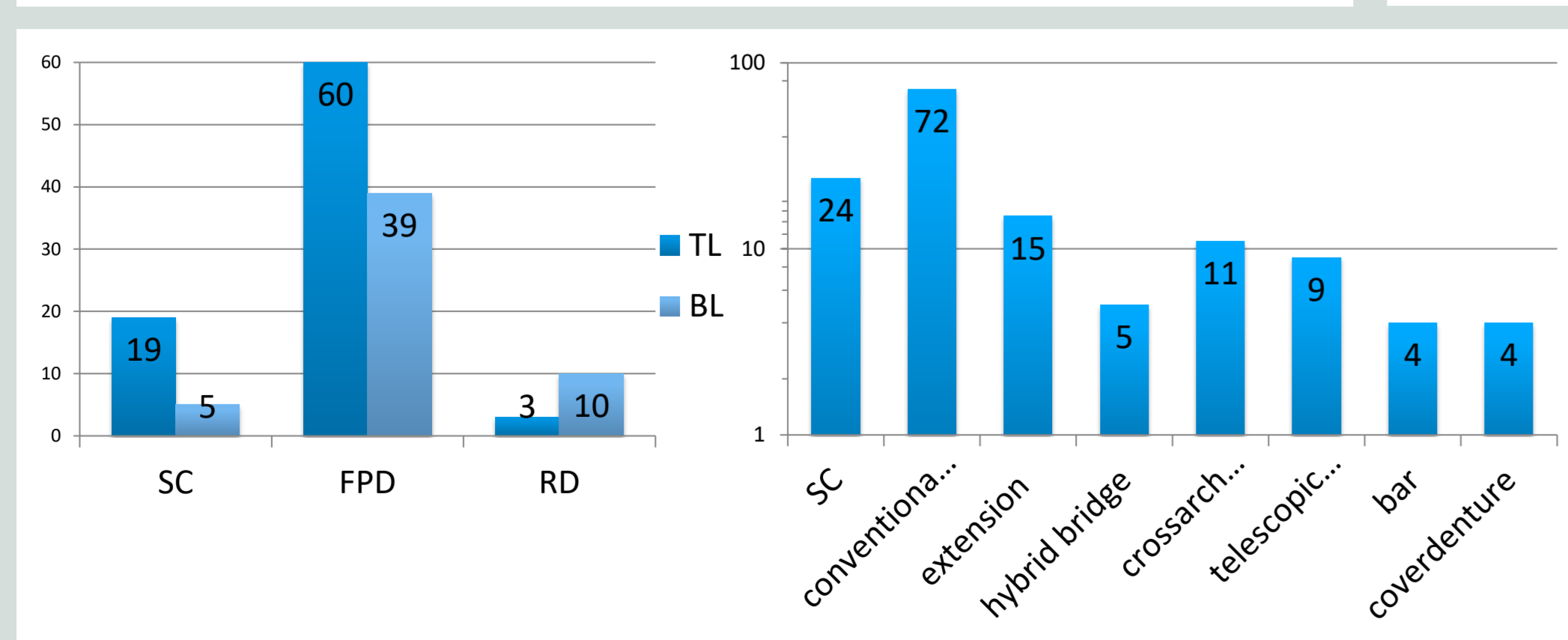


Figure 7: Distribution of different restorations on BL and TL implants

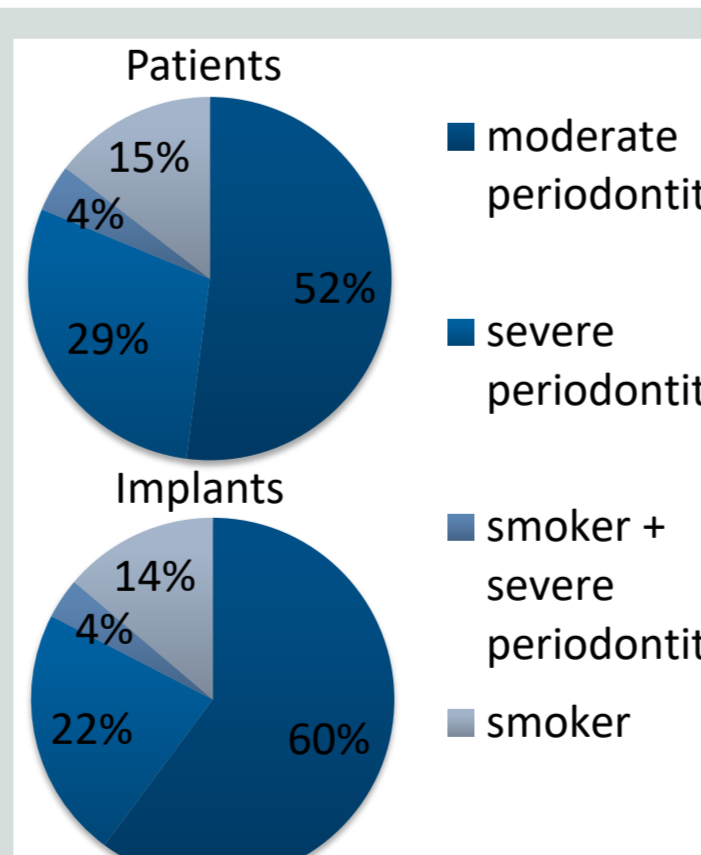


Figure 8: Distribution of periodontal⁴ and smoking conditions (%)

Results

Early implant loss occurred in 2 TL cases, whereas 2 BL implants were lost during service due to peri-implantitis. Mean bone loss at BL implants amounted to 0.72 mm (range: 0.0 - 5.3 mm) and at TL to 0.44 mm (range: 0.0 - 3.5 mm), with no significant intergroup difference. 4 BL and 1 TL implants experienced bone loss of ≥ 2 mm (Figure 9). Prevalence of peri-implant mucositis and peri-implantitis ^{5,6} was 25.4% (13 BL; 22 TL) and 2.7% (3 BL), respectively (Figure 12,13). Technical complications occurred in 3% (3 BL; 1 TL): retention loss and screw loosening (2 BL), abutment fracture (1 BL)(Figure 11). The overall implant success rate was 90.7% for BL and 98.8% for TL with significant intergroup difference (Figure 10). Severity of periodontitis ⁴ showed significant effects on the occurrence of peri-implant mucositis (Table 1).

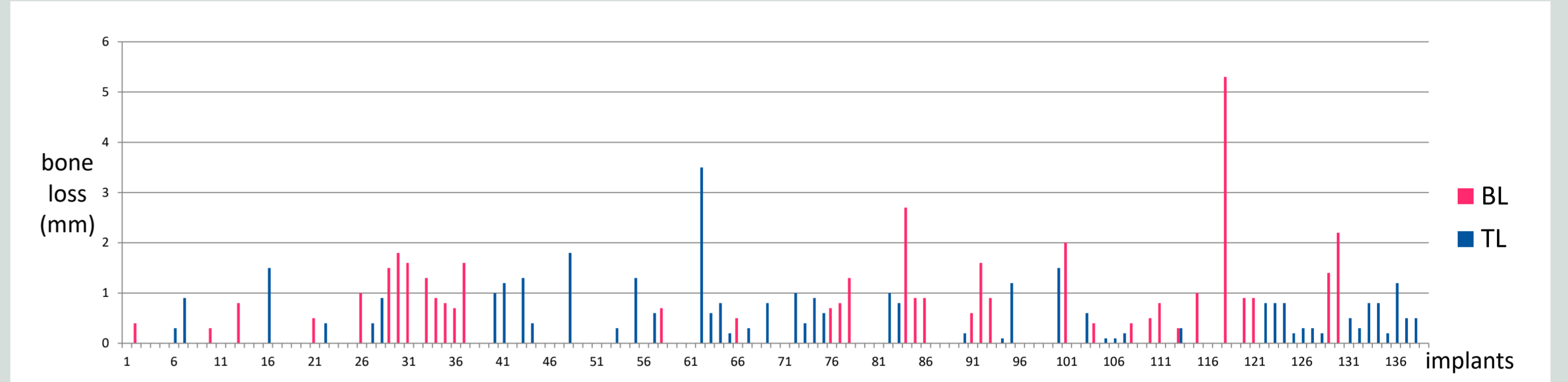


Figure 9: Peri-implant bone level loss (mm)

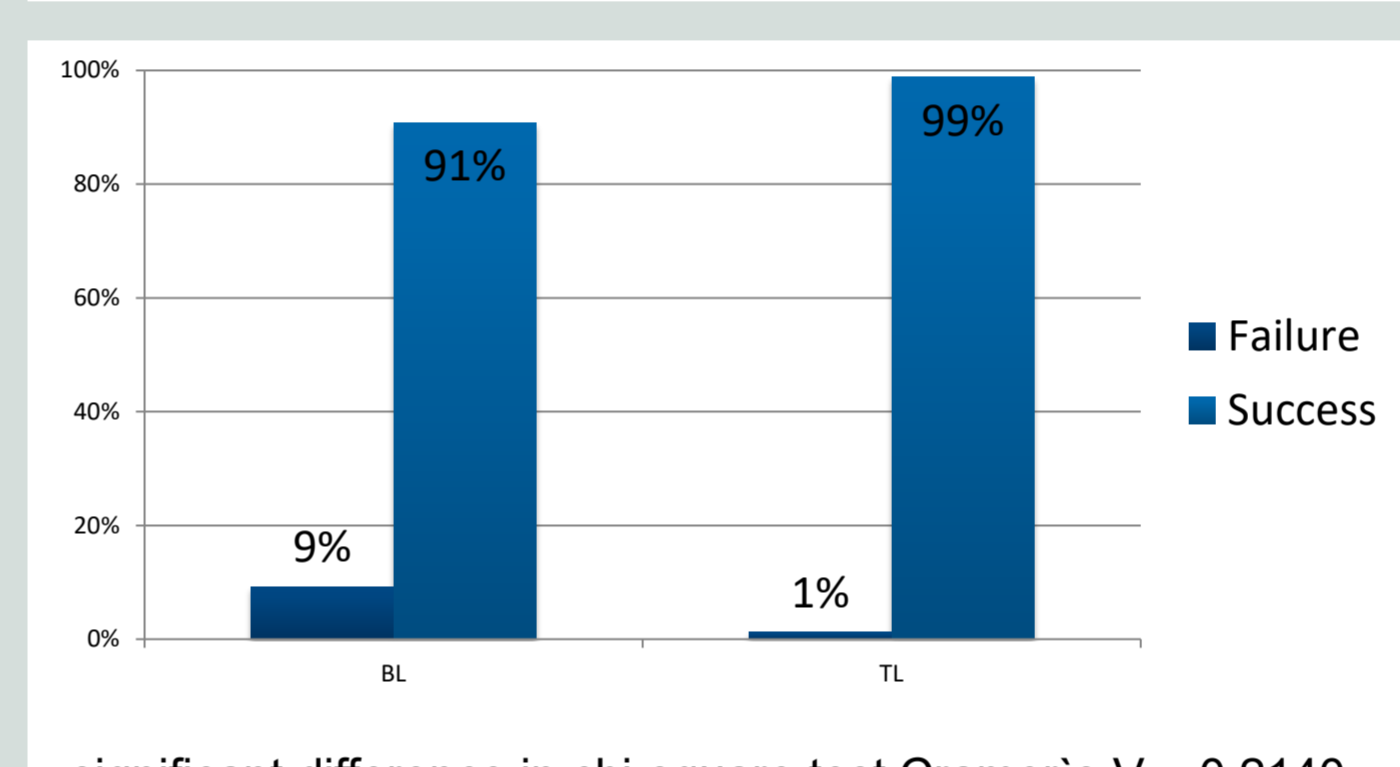


Figure 10: implant success³ based on BL- / TL-level (%)

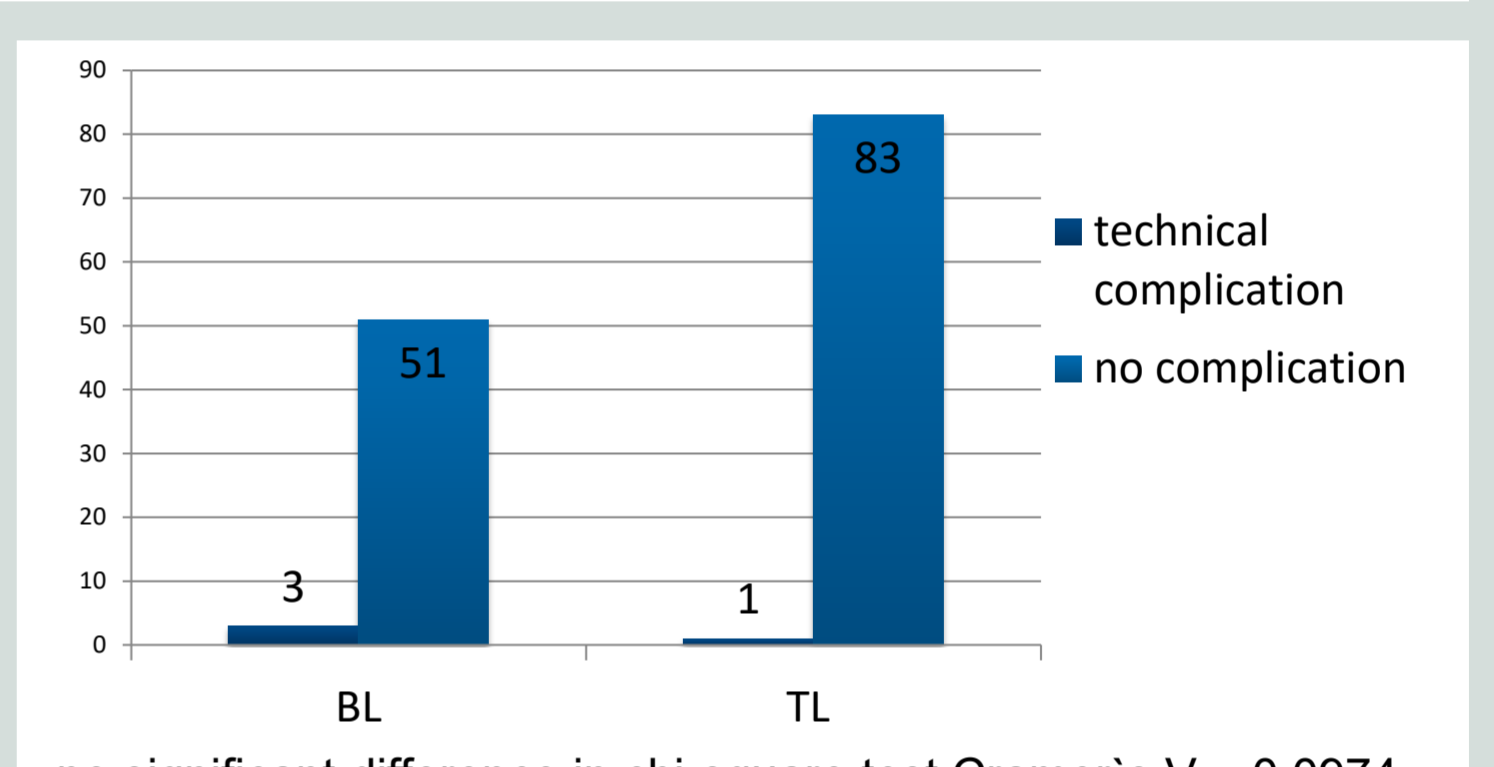


Figure 11: technical complications in TL and BL implants

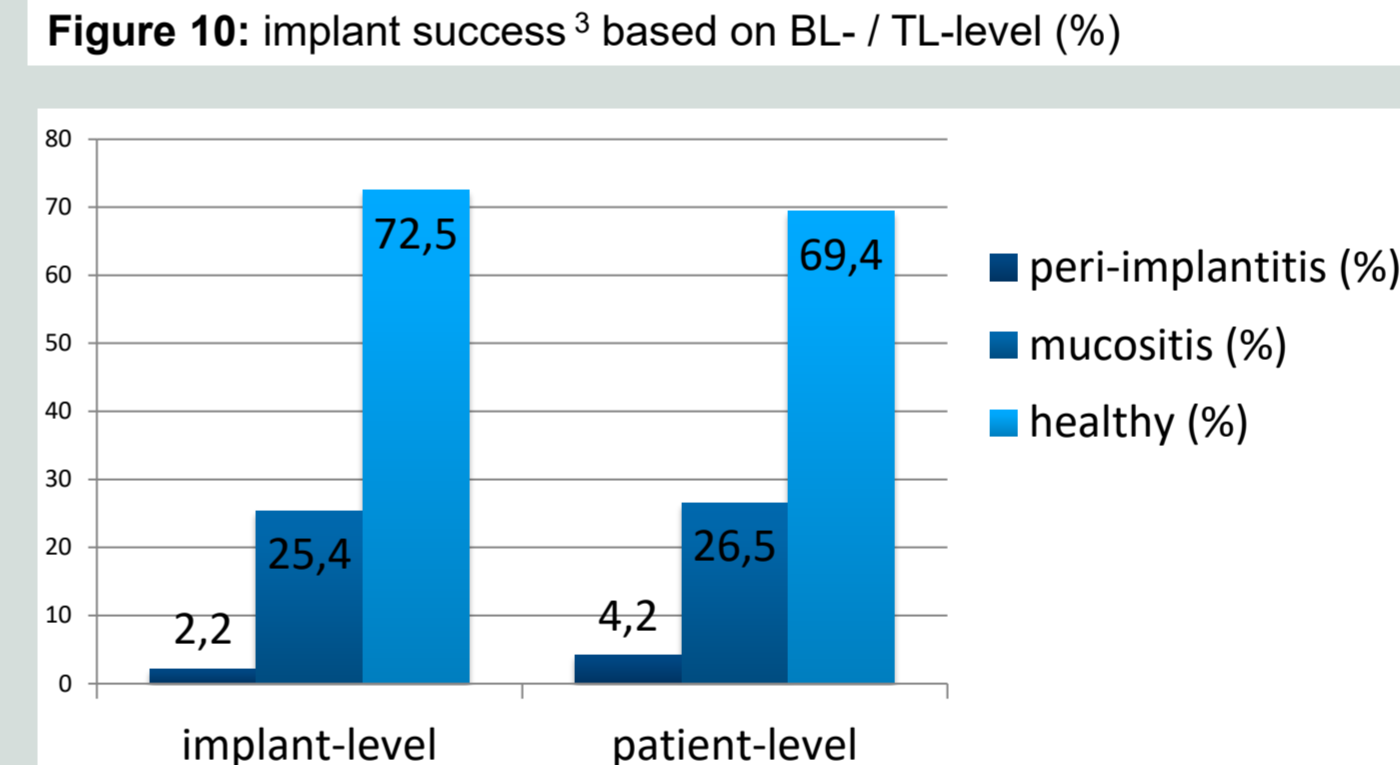


Figure 12: Prevalence of peri-implantitis and mucositis based on implant- / patient-level (%)

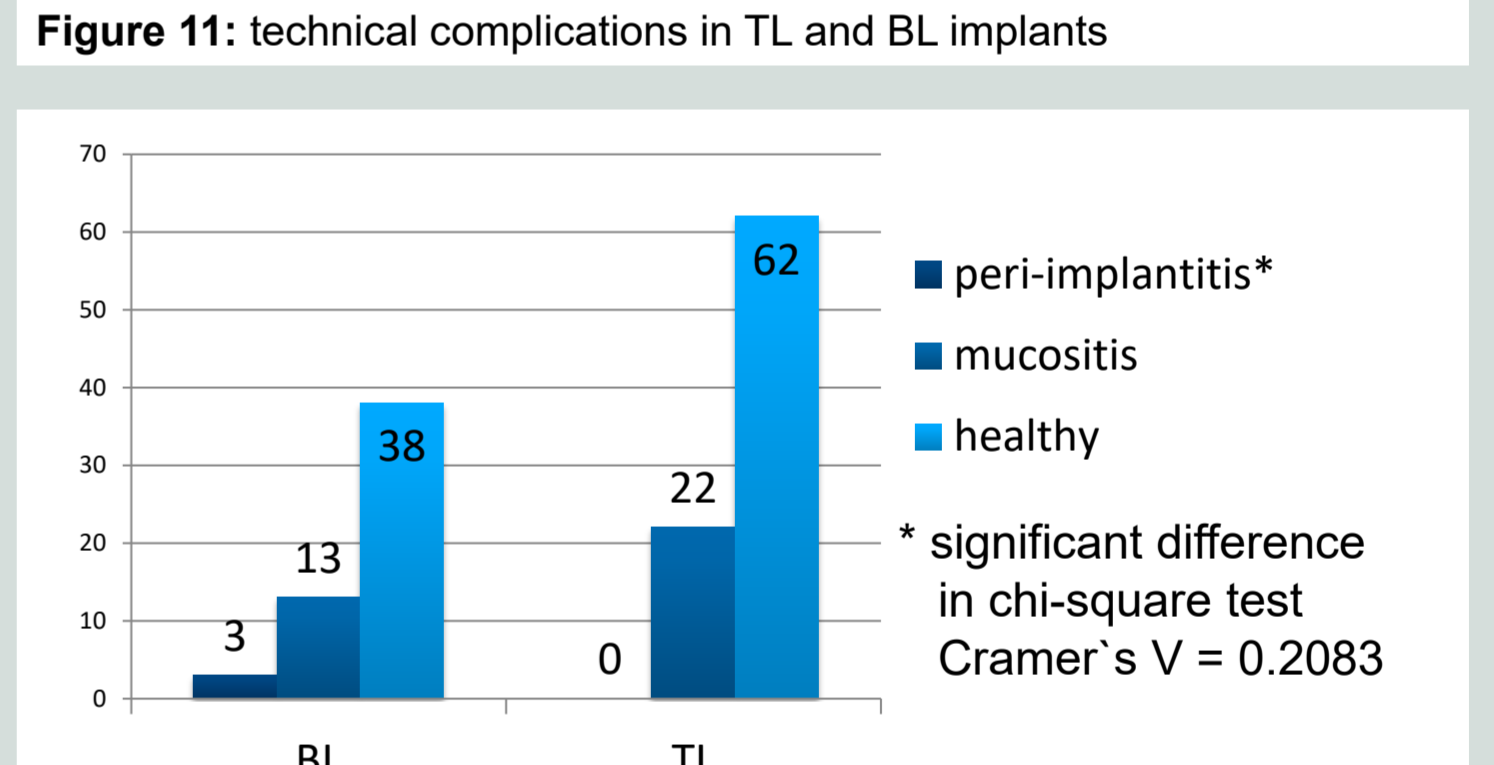


Figure 13: peri-implantitis and mucositis in BL and TL implants

Table 1: Logistic regression model analysing mucositis and the depending variables

Logistic regression	Number of obs	=	130		
LR chi2(6)	=	30.73			
Prob > chi2	=	0.0000			
Pseudo R2	=	0.2029			
Log likelihood = -60.360831					
mucositis	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]
BMI	-0.141	0.059	-2.38	0.017	[-0.256 -0.025]
sex	-0.558	0.518	-1.08	0.282	[-1.574 0.458]
age	-0.01	0.026	-0.4	0.689	[-0.061 0.04]
smoker	-1.35	0.827	-1.63	0.103	[-2.971 0.272]
diabetes	0 (omitted)	0 (omitted)	0 (omitted)	0 (omitted)	0 (omitted)
severe periodontitis	1.993	0.542	3.68	0	[0.932 3.055]
FMBS	0.023	0.019	1.22	0.223	[-0.014 0.06]
_cons	3.097	2.357	1.31	0.189	[-1.522 7.716]

Conclusion

The results of this study indicate that implants with different design could be maintained equally well over 5 years even in periodontitis susceptible patients under conditions of a specialized practice. Technical complications were very low, however some implants experienced biological complications.

References

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 [3]: Misch et al. (2008) Implant Dent; 17(1):5-15
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