

The Effect of Implant Vertical Position on Crestal Bone Loss of Adjacent Teeth

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Introduction

Dental implants placed at a deep apico-coronal position relative to the cementoenamel junction of adjacent teeth have been associated with an increased risk of peri-implant bone loss. However, limited research has explored the implications of implant apico-coronal position on the bone level of the adjacent teeth.

Objective

This retrospective study aimed to investigate the effect of implant vertical position on crestal bone loss of adjacent teeth.

Method

The dental records of patients at the University of California, San Francisco Dental Center who had received at least one implant were reviewed. To be included in the analysis, implants had to be functionally loaded for at least one year after crown insertion with clear, non-distorted periapical radiographs. Radiographic analysis was performed to assess the vertical position of the implant platform relative to the crestal bone level of implants and adjacent teeth at the time of placement and during follow-up visits. Crestal bone loss in relation to the mesial and distal sites of adjacent teeth and implants was calculated.

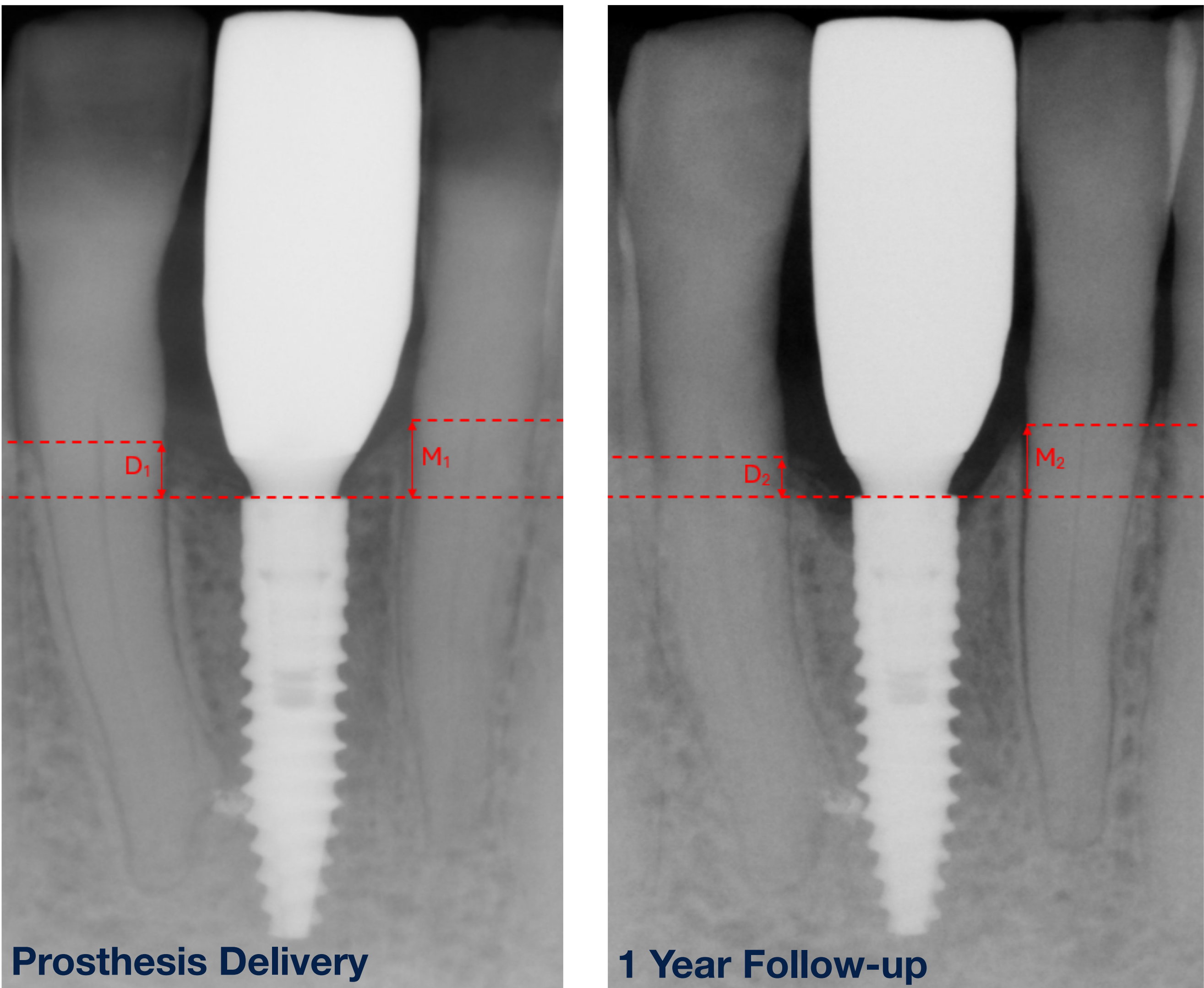


Figure 1.Two periapical radiographic images of #25 subcrestally placed implant at time of prosthesis delivery and one year follow-up. Measurements are taken from the crestal bone on adjacent teeth to the shoulder of the implant platform on the mesial and distal. Measurements D₁ and M₁ are taken at the time of prosthesis delivery and represents implant depth. Measurements D₂ and M₂ are taken one year after prosthesis delivery and the difference between the measurements (D₁ - D₂ and M₁ - M₂) represents bone loss at the distal and mesial, respectively.

		Subcrestal Position		
Sites		<2 mm	≥2 mm	P value
Adjacent Teeth	Both	0.10 ± 0.34	0.50 ± 0.65	P < 0.05
	Mesial	0.07 ± 0.30	0.55 ± 0.68	P < 0.05
	Distal	0.15 ± 0.38	0.39 ± 0.58	P = 0.06
Implants	Both	0.28 ± 0.53	0.36 ± 0.72	P = 0.41
	Mesial	0.29 ± 0.58	0.18 ± 0.42	P = 0.34
	Distal	0.27 ± 0.46	0.78 ± 1.06	P < 0.05

Table 1. Bone loss at <2 or ≥2 mm subcrestal implant platform positions in relation to the mesial and distal sites of adjacent teeth and implants

Results

- 96 patients with 117 implants were included with an average follow-up period of 41.73 months.
- Results showed significant crestal bone loss on adjacent teeth when the implant platforms were placed at a subcrestal position of ≥ 2 mm compared to those placed at < 2 mm (0.50 ± 0.65 mm vs. 0.10 ± 0.34 mm, P < 0.05).
- There was no significant difference in crestal bone loss between the mesial and distal adjacent teeth (P = 0.35).
- More crestal bone loss was observed on the mesial teeth (0.55 ± 0.68 mm vs. 0.07 ± 0.30 mm, P < 0.05) and the distal side of the implants (0.78 ± 1.06 mm vs. 0.27 ± 0.46 mm, P < 0.05) when comparing subcrestal positions of ≥ 2 mm to those < 2 mm.
- Linear regression analysis indicated that a greater subcrestal vertical depth of implant platforms was associated with greater crestal bone loss on adjacent teeth (P < 0.05).

Conclusion

The present study demonstrated that implant placement more than 2 mm subcrestally, relative to the crestal bone level of adjacent teeth, was associated with crestal bone loss on adjacent teeth. This suggests that clinicians should avoid placing implants too subcrestally to prevent adverse outcomes.