

The Effect of Interproximal Area between Implants and Adjacent Teeth on Crestal Bone Loss

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Introductions

- Previous studies have reported the ideal distance between implants and adjacent teeth to prevent crestal bone loss.
- However, limited research has explored how the interproximal area between implant restorations and adjacent teeth influences bone levels around both the implants and adjacent teeth.
- This retrospective study aimed to investigate the effect of the interproximal area between implants and adjacent teeth on crestal bone loss.

Methods

- Patient dental records from the University of California, San Francisco (UCSF) Dental Center, with at least one implant, were analyzed.
- Length of implant was used as baseline measurement for software calibration using an open-source software (ImageJ).
- To be included, implants had to be functionally loaded for at least one year after crown placement, with clear and undistorted periapical radiographs available.
- Radiographs were assessed to measure crestal bone levels and interproximal space between implant restorations and adjacent teeth.
- Changes in crestal bone levels were recorded at initial implant placement (T0), final prosthesis delivery (T1), and subsequent follow-up radiographs (T2).

Figure 1. Comparison of different interdental brushes used in the same interproximal space between implant and adjacent tooth.

Brush diameter (mm)	0.75mm	2.25mm	3.0mm
Brush cross-sectional area (mm ²)	0.44mm ²	3.97mm ²	7.07mm ²

Figure 2. The schematic illustration of study design and radiographs at different time points (T0, T1, T2).

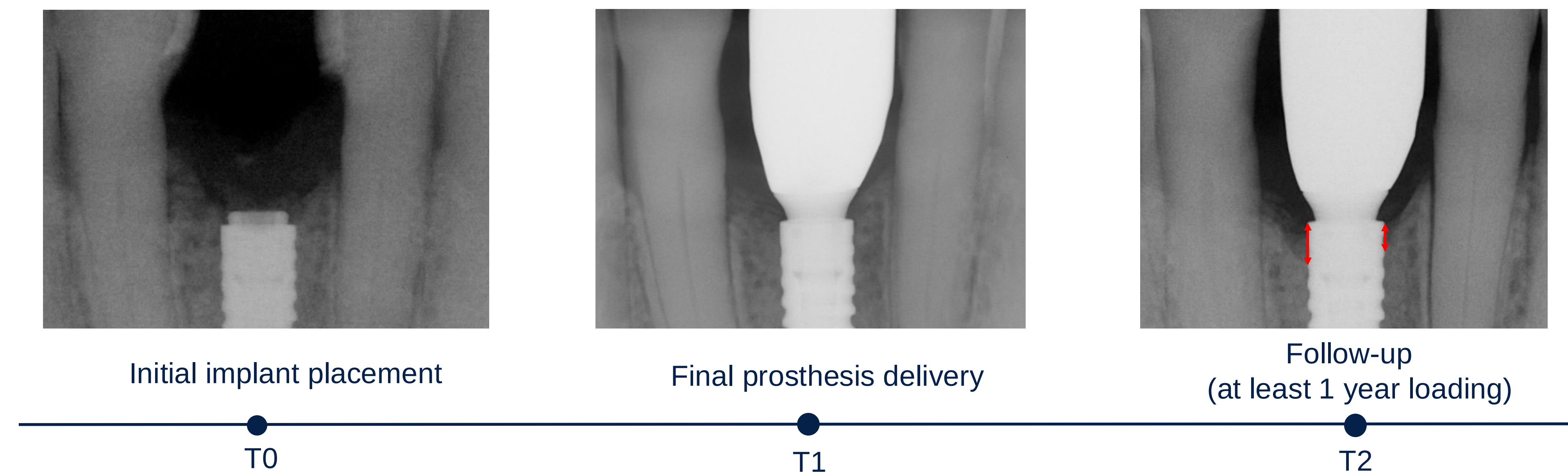
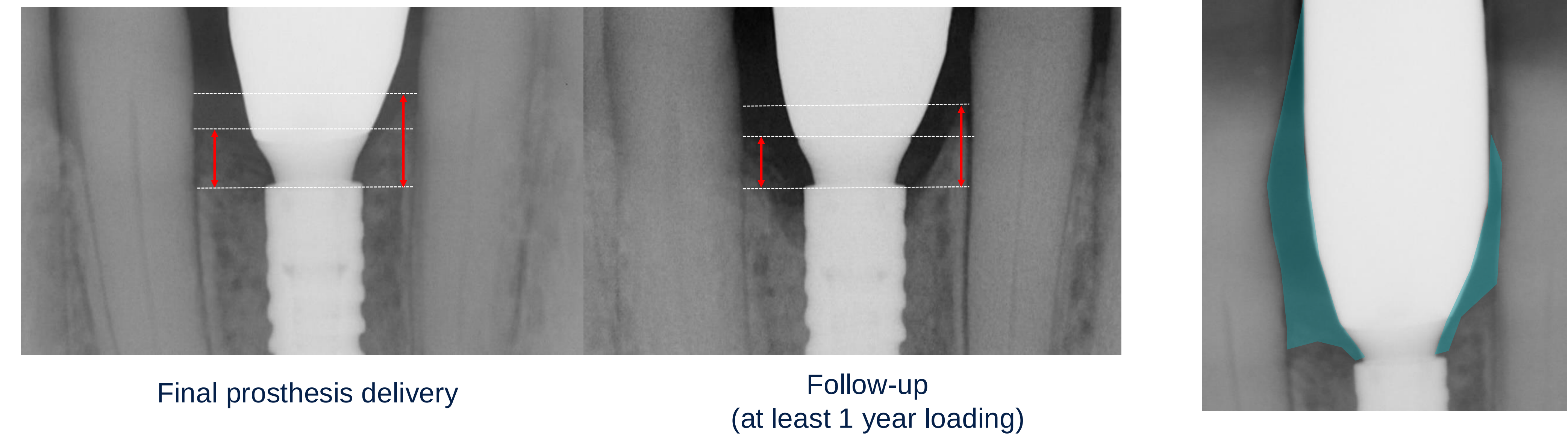


Figure 3. Radiographic illustrations demonstrating space area measurement (right) and crestal bone level changes (below) between implant and adjacent teeth.



Results

- A total of 96 patients with 117 implants were included with an average follow-up period of 41.73 months. The study found significantly greater crestal bone loss on implants when the interproximal space area between implant restorations and adjacent teeth was **<6mm²** compared to those with **≥6mm²** (0.49 ± 0.76mm vs. 0.25 ± 0.54mm, p<0.05).
- No significant differences were observed in crestal bone loss on adjacent teeth, regardless of whether the interproximal space area was **<6mm² or ≥6mm²** (0.27 ± 0.39mm vs. 0.29 ± 0.60mm, p=0.89).
- Among all implants, significantly more crestal bone loss was observed on mesial sites compared to distal sites (0.45 ± 0.76 mm vs. 0.24 ± 0.50mm, p< 0.05).
- However, when comparing interproximal space areas of **<6mm² to ≥6mm²**, neither mesial nor distal sites showed a significant difference in crestal bone loss on implants (mesial sites: 0.47 ± 0.77mm vs. 0.20 ± 0.40mm, p=0.18; distal sites: 0.60 ± 0.75mm vs. 0.35 ± 0.76mm, p=0.21).

Conclusions

- The study demonstrated that an **interproximal space area of <6mm²** between implant restorations and adjacent teeth was associated with significantly **greater crestal bone loss around the implants**.
- Insufficient interproximal space may limit patients' ability to effectively clean the area with oral hygiene tools, such as interproximal brushes, leading to inadequate plaque removal.

References

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