
Purpose: To retrospectively analyze the potential influence of implant inclination on marginal bone loss at freestanding, implant-supported, fixed partial dentures (FPDs) over a 5-year period of functional loading.

Material and Methods: The material comprised 38 periodontally treated, partially dentate patients with a total of 42 free-standing FPDs supported by implants of the Astra Tech Systems. 24 (57%) were placed in the maxilla. Fifteen FPDs were supported by two implants and 27 FPDs were placed on three implants. Twenty-two (52%) out of the 42 FPDs were designed with a cantilever extension. All implants used had a diameter of 3.5mm while the length varied between 17 and 19mm. Mesio-distal inclination of the implants in relation to a vertical axis perpendicular to the occlusal plane was measured with a protractor on standardized photographs of the master cast. Radiographs of all implant sites, obtained by the use of a standardized parallel long cone technique and custom-made stents, were taken at the time of insertion of FPDs and at the 5-year follow-up examination. The location of the marginal bone level – in relation to the marginal edge of the fixture – was assessed by the use of a magnifying lens (7x) to the nearest 0.1mm at the mesial and distal aspects of the implant. The implant inclination were defined as axial-positioned (mean 2.41; range 0–4) and non-axial positioned implants (mean 17.11; range 11–30), respectively. For FPDs supported by two implants, both the mesial–distal and buccal–lingual inter-implant inclination was measured. The primary outcome variable was change in peri-implant bone level from the time of FPD placement to the 5-year follow-up examination. Comparison between axial- and non axial positioned implants was performed by the use of a Mann–Whitney U-test. Spearman’s correlation analysis was used to analyze relationships between inter-implant inclination (mesial–distal and buccal–lingual) and 5-year bone level change on the FPD level.

Findings: The 5-year mean bone level change amounted to 0.4mm (SD 0.97) for the axial and 0.5mm (0.95) for non-axial-positioned implants. For the FPDs supported by two implants, the mean inter-implant inclination was 9.2(1–36) in the mesial–distal direction and 6.7(0–24) in the buccal–lingual direction. Correlation analysis revealed lack of statistically significant correlation between inter-implant inclination (mesial–distal and buccal–lingual) and 5-year bone level change (r=−0.19 and r=−0.32, respectively).

Conclusion: The findings of the current 5-year study involving moderately tilted implants (≤ 30) indicate that a tilted position of the implant does not render an increased risk for bone loss during functional loading.