

Positional Changes in Maxillary Anterior Teeth Adjacent to Single Implant-Supported Incisor Crowns: A Retrospective Cohort Study

Ariana Motamedi, Savita Gupta BDS MS, Despina Saffo, Tariq Alsahafi BDS MS, Richard Kinsel DDS
Department of Restorative Sciences, Adams School of Dentistry, University of North Carolina at Chapel Hill



Introduction

Single implant-supported crown restorations are widely accepted for replacing missing teeth. While the effects of craniofacial growth in growing patients have been well documented, changes associated with single-tooth implants in adults are less understood. Although alveolar growth in adults was assumed to remain stable, previous studies demonstrate that dentoalveolar growth continues throughout adulthood and occurs gradually over decades.¹⁻⁷ This continued growth may result in positional changes between implant crowns and adjacent natural teeth including opening of proximal contacts, occlusal discrepancies, and implant crown infraposition.^{1, 6-10} Longitudinal studies on mature adults indicate that implant-supported restorations may be affected by gradual dentoalveolar growth over time.^{4, 8, 9, 11} However, many of these studies have focused on documenting outcomes rather than identifying patient-specific factors associated with this increased risk.^{1, 5-9, 12} One study evaluated age-related patient variables in relation to long-term changes, but additional predictive patient factors were not observed.⁸ Identifying patient characteristics that may influence long-term changes in implant crowns is essential for improving treatment planning, preventive strategies, and informed consent.

Objectives

This study aimed to identify patient-specific factors contributing to positional changes in maxillary anterior implant-supported crowns adjacent to natural teeth. The secondary objective was to determine preventive protocols and establish a standard of care for informed consent regarding risks for aesthetic compromise.



Figure 1. Progressive photographs over a 9-year period demonstrating infraposition of a maxillary anterior implant-supported crown on tooth #9 relative to adjacent natural dentition.



Figure 2. Clinical photographs displaying apical movement relative to the implant-supported crown on tooth #9 at delivery and 6 years follow-up.

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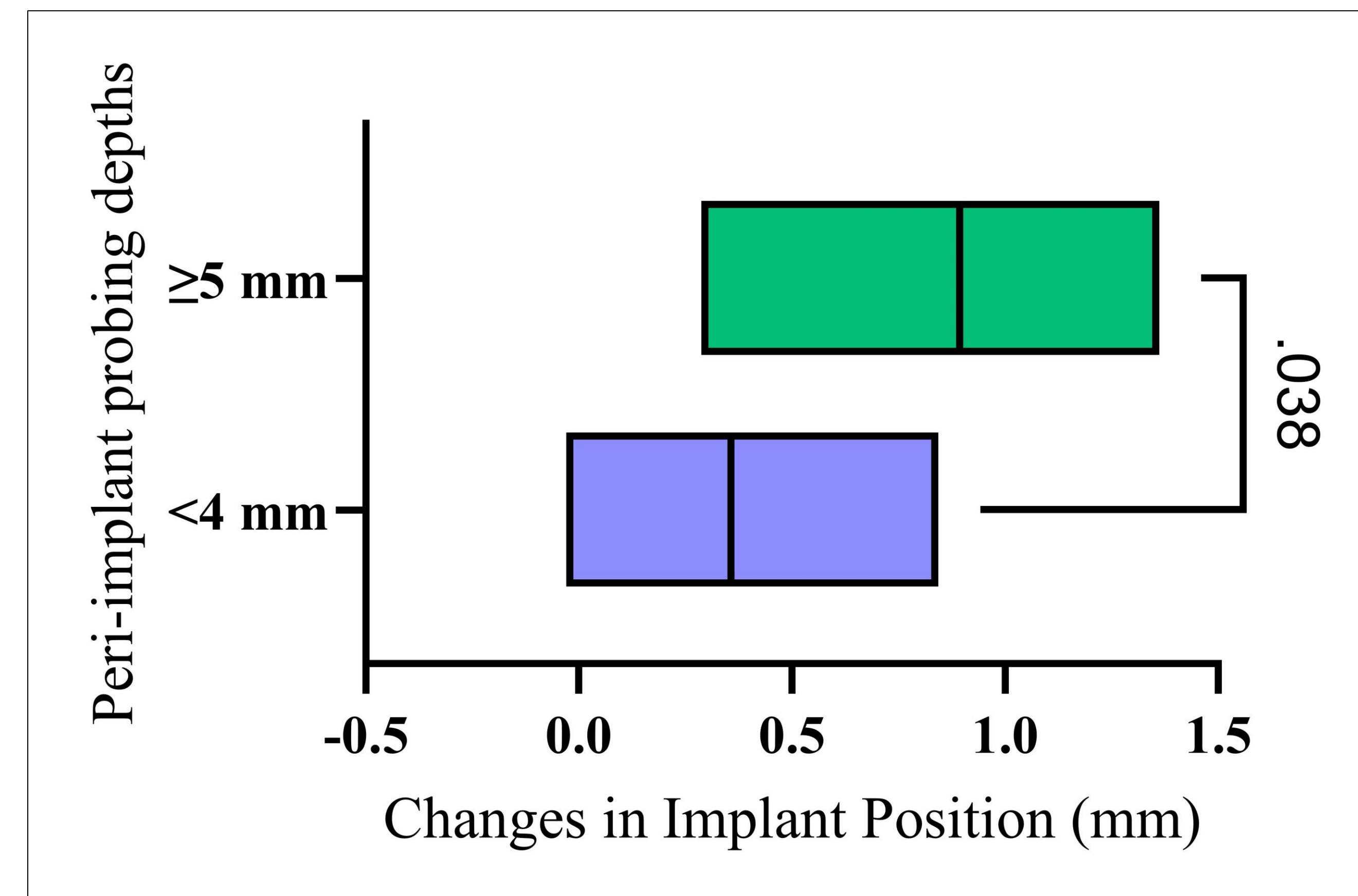


Figure 5. Relationship between peri-implant probing depths and changes in implant positions (mm).

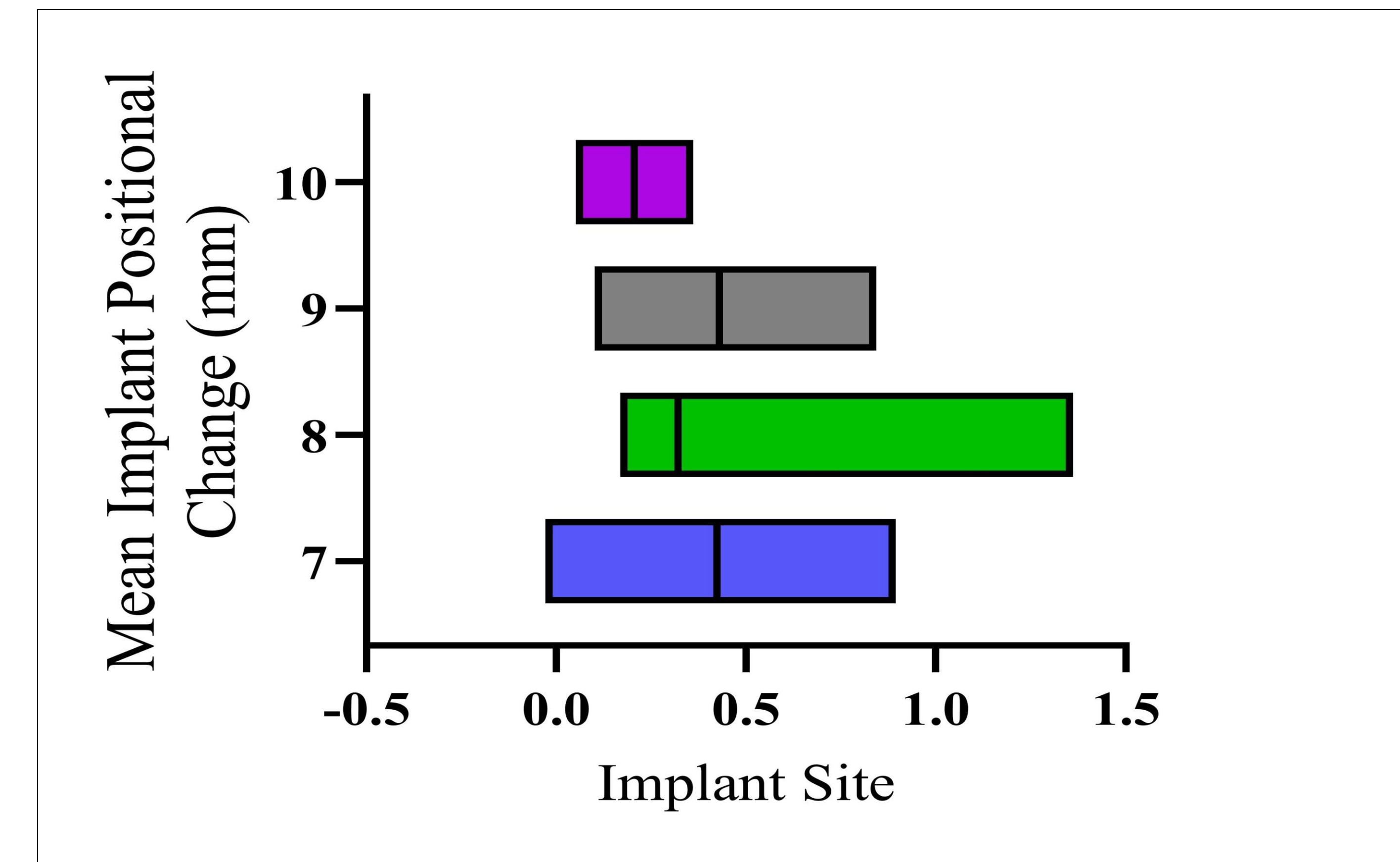


Figure 6. Mean implant positional changes (mm) based on implant position.

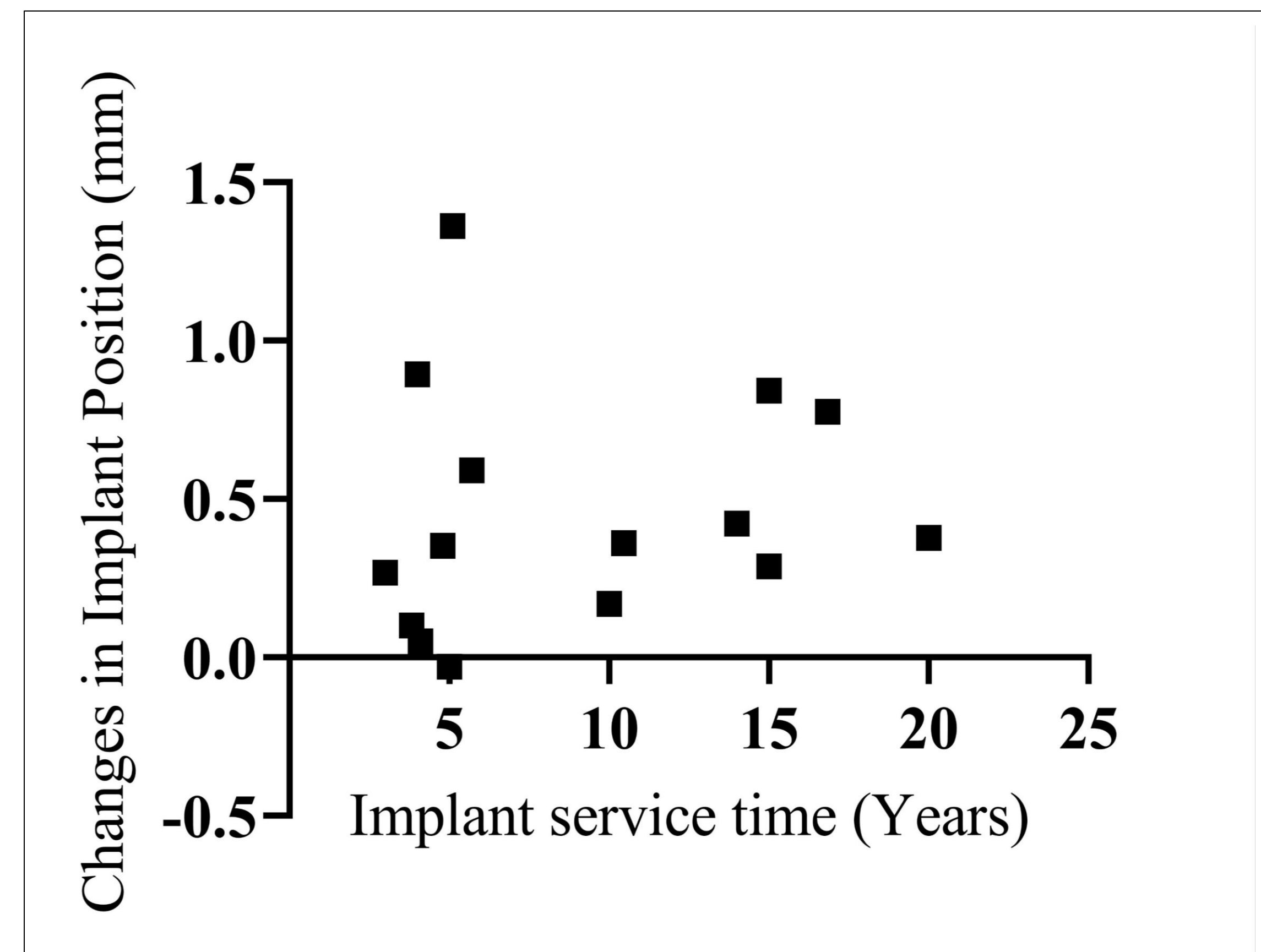


Figure 7. Association Between Changes in Implant Position (mm) and Implant Service Time (years).

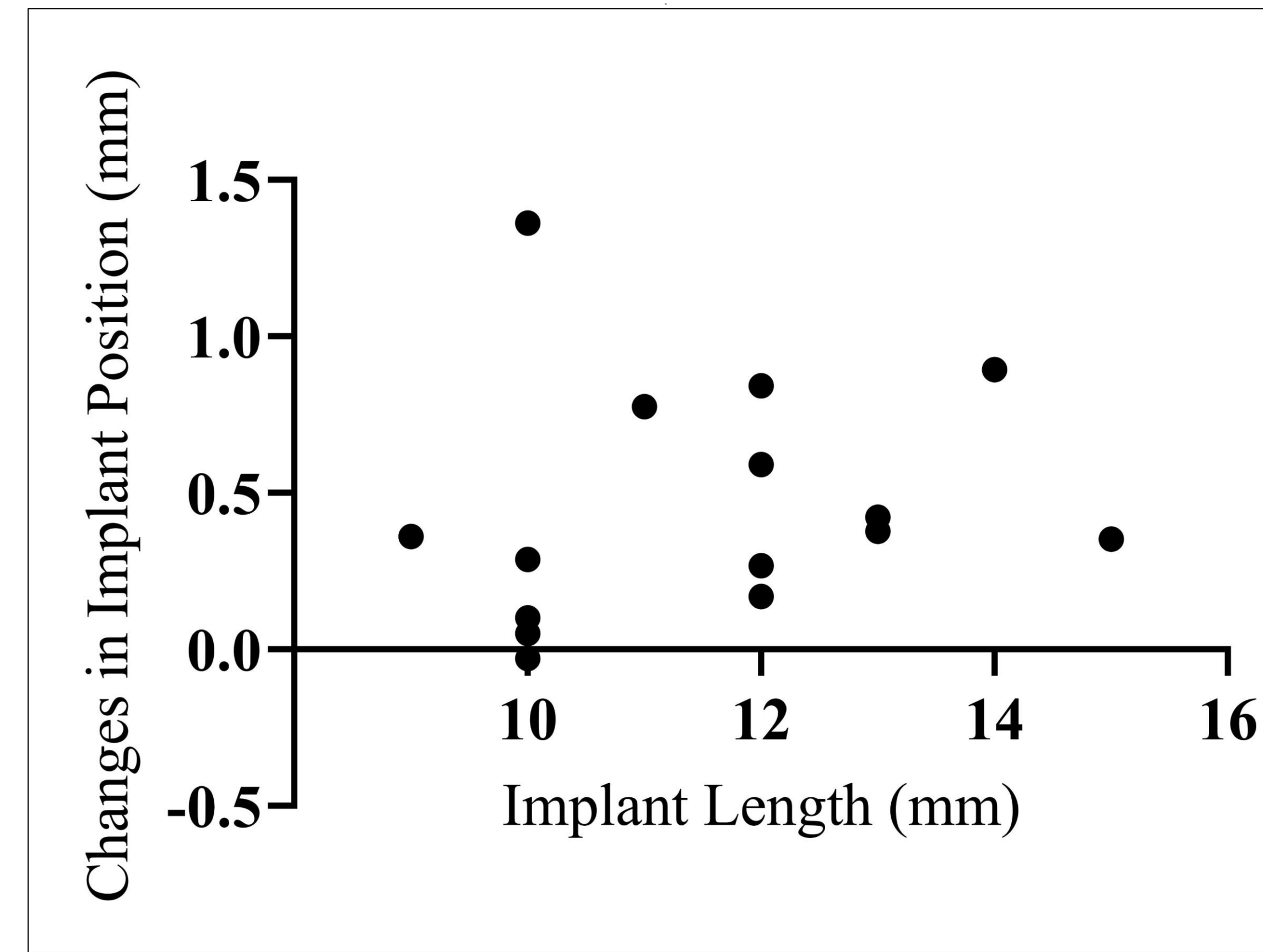


Figure 8. Association Between Changes in Implant Position (mm) and Implant Length (mm).

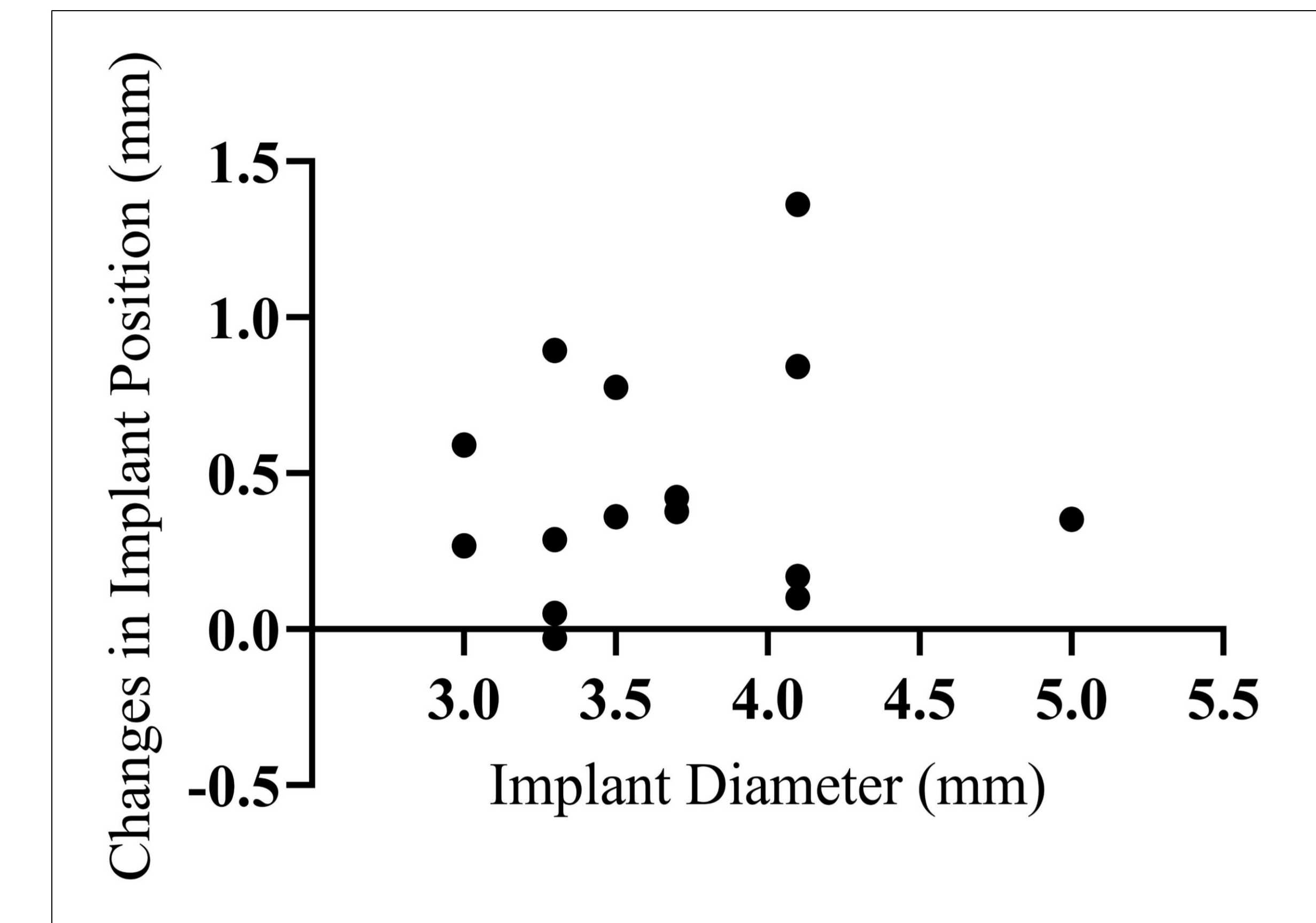


Figure 9. Association Between Changes in Implant Position (mm) and Implant Diameter (mm).

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Discussion

Preliminary findings indicate that positional changes to maxillary anterior implant-supported crowns occur in adult patients over time, supporting existing literature that dentoalveolar growth continues throughout adulthood. Although measurable changes were observed among patients, no statistically significant associations were observed between implant positional changes and the demographic, occlusal, or functional variables.

Greater mean differences were observed in patients with convex facial profiles, males, older age groups, and those with clinical signs of bruxism. However, these findings were not statistically significant, likely due to the limited initial sample size. While most mean positional changes remained below the 1.0 mm clinical threshold, small discrepancies in the anterior maxilla may have esthetic implications over time.

These preliminary findings emphasize the importance of comprehensive treatment planning and informed consent discussions regarding possible long-term positional changes in adults. As data collection continues, a larger sample size may determine potential predictive factors.

Conclusions

1. Patients with deeper PPD (≥ 5 mm) displayed higher average changes in implant position.
2. At averaged 9 years of clinical service, implant positional changes remained below clinical acceptable threshold of 1.0 mm.
3. The use of occlusal appliances did not significantly impact implant positional changes.

Limitations

The relatively small preliminary sample data limit the statistical power and ability to establish strong correlations between changes in implant position and the tested variables and predictors. While calibration radiographic measurements software was utilized, the lack of clinical photos, and other measuring tools may introduce minor discrepancies in the obtained measurements.

References



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