Quantitive Analysis of Occlusal and Interproximal Contacts in Posterior Single-Implant Supported Restorations

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BACKGROUND

Long-term maintenance of occlusal contact and interproximal contacts are paramount in providing ideal function and health around single implant restorations. Currently, there is a lack of understanding of the relationship between occlusion and the long-term health of dental implants. The central hypothesis is that the existing clinical protocols pertinent to implant occlusion do not provide adequate long-term occlusal stability due to the absence of PDL space. This project will break new ground via utilization of dual innovative approaches to document and analyze occlusion which have yet to be applied in published clinical studies.

AIMS

1.Evaluate the current clinical guidelines on implant occlusion using CAD 3D scan data analysis
2.Investigate implant restoration occlusal stability by monitoring changes in occlusion, tactile sensation, and interproximal contact tightness over a one-year follow-up.

OUTCOMES OF INTEREST

The occlusal stability of single-implant restorations over time has never been quantitatively analyzed. With advances in digital technologies implant occlusion and changes in inter proximal contact can now be quantified.

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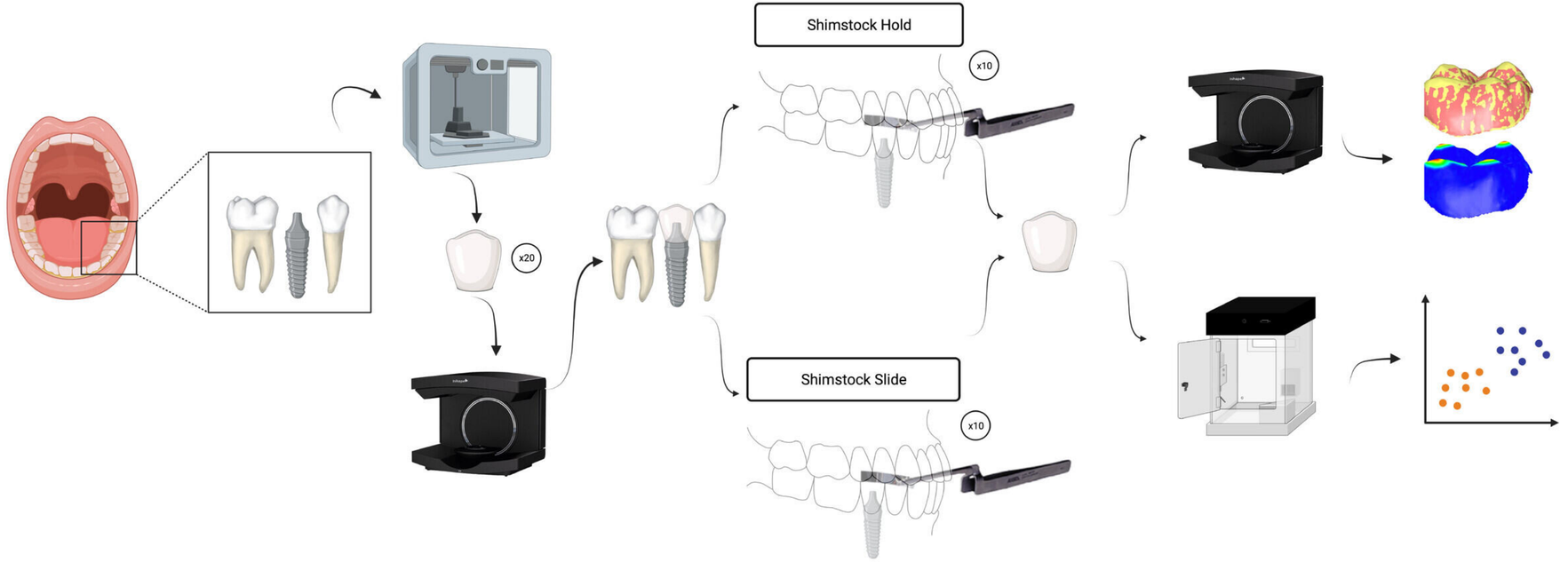
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METHODOLOGY

This prospective cohort study of partially edentulous patients is to be conducted at Harvard School of Dental Medicine. The study will recruit thirty participants with an existing posterior dental implant prior to the insertion of the restorations.

- All implants will be evaluated for successful osseointegration at 3 months
- All restorations will be evaluated, adjusted and delivered following a standardized protocol.

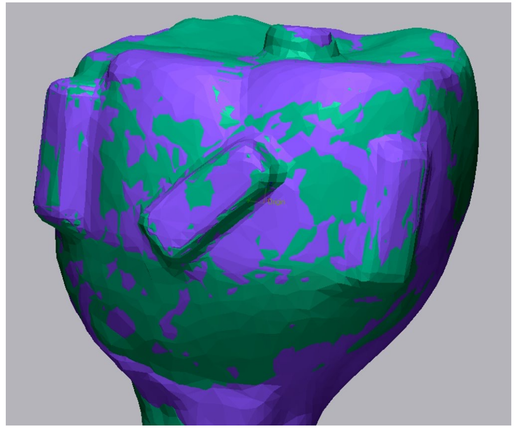
- Prototype crowns (n=10) will be printed for occlusal adjustments testing
    1) Occlusal contact in maximum intercuspation position (shim stock hold in MIP, when patients are instructed to “bite”)
    2) Following occlusal relief with light contact in MIP (shim stock drag when biting, and shim stock hold during when patients were instructed to “bite hard”)
- Group 1) and 2) are superimposed in CAD software and measure for occlusal reduction distance
- Occlusal-tactile sensitivity and the incidence of interproximal contact change of posterior single-implant supported restoration during a 1-year follow up period will be investigated.

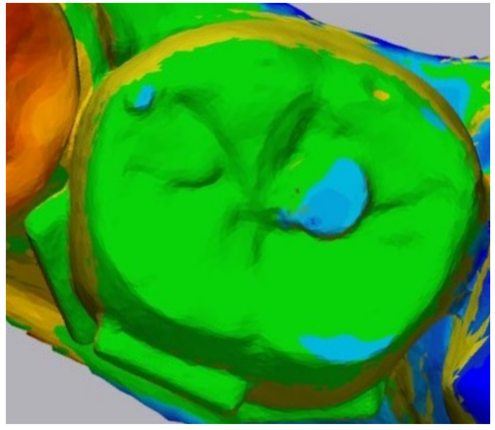


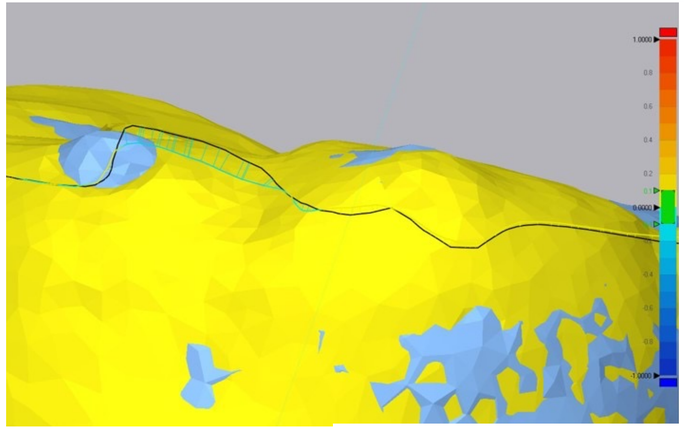
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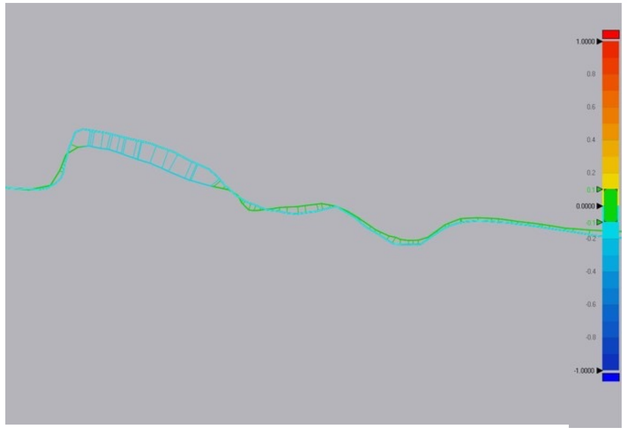
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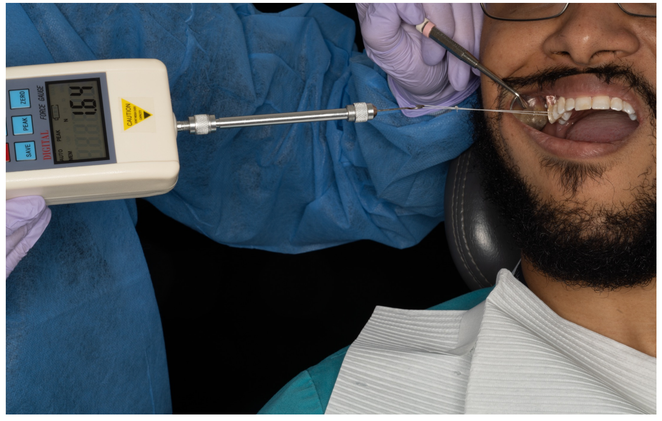
RESULTS

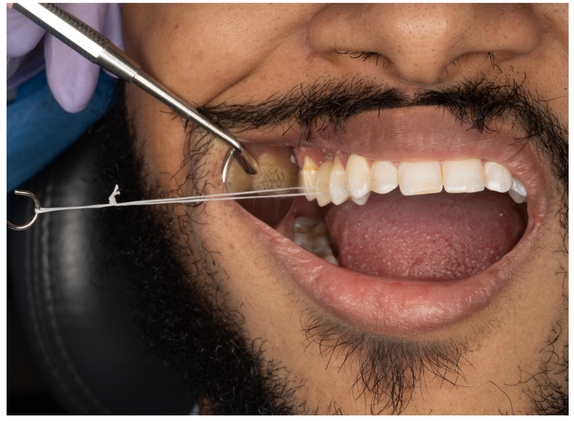


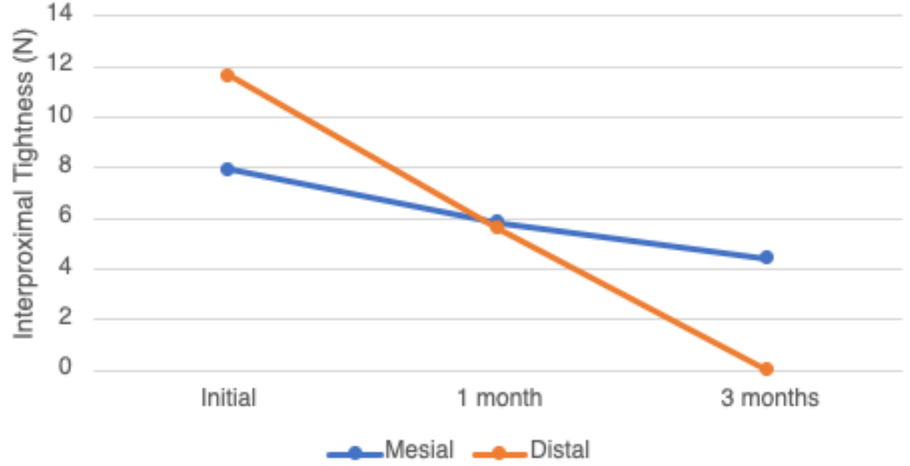












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CONCLUSION

- The reduction in the height of posterior implant-supported restorations after occlusal contact relief is approximately 100um
- Interproximal contact tightness between posterior single-implant prosthesis and adjacent natural teeth decreases over time, both mesially and distally
- Open contact was observed as early as at the 2-month follow-up visit
- Due to the lack of quantitative analysis of occlusion in implant dentistry, the current body of evidence is inconclusive. The results of this study will provide quantitative and objective analysis of occlusion in implant dentistry.
- This prospective study is the first objective and quantitative analysis of occlusion in implant dentistry and may set lay the groundwork for better understanding of the role of occlusion in the implant health and success.

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