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Oral Microbiome Profile of Patients Using Clear Aligners: Longitudinal Evaluation of Cariogenic and Carioprotective Species

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BACKGROUND

Orthodontic treatments can alter oral microbiome potentially influencing the risk of caries and periodontal disease. Clear aligners, developed through advances in dental materials and 3D technology, offer improved comfort and aesthetics. Despite their growing use, the long-term impact of clear aligners on the oral microbiome remains unclear, raising concerns about microbiome-related oral health risks.



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AIM

This study investigated changes in cariogenic and carioprotective bacterial species in patients undergoing clear aligner therapy. Findings aim to support the development of tailored oral hygiene and preventive strategies to reduce caries risk during orthodontic treatment.



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MATERIALS AND METHODS

A longitudinal observational study was conducted with 24 patients starting Invisalign® treatment in good general health. Patients with dental disease, systemic conditions, recent antibiotic use, pregnancy, and smoking habits were excluded.

Saliva and supragingival biofilm samples were collected at baseline, 1, 3, and 6 months. Twelve patients completed at least two time points. Samples underwent 16S rDNA sequencing through metagenomics.

Alpha diversity (Chao1, Shannon, Simpson) and relative abundance of key microbial species were analyzed.



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RESULTS

1. No significant changes in alpha diversity were observed between baseline and later time points. A trend toward reduced diversity in saliva and increased diversity in biofilm was noted.
2. Cariogenic bacteria remained low throughout treatment, with only transient *Veillonella dispar* presence.
3. Health-associated species like *Corynebacterium matruchotii* and *Rothia aerea* increased or remained stable, particularly in biofilm.



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CONCLUSION

- Clear aligners maintain a stable oral microbiome
- Clear aligners do not promote significant growth of cariogenic bacteria.
- Biofilm showed greater richness and more health-associated species.
- Findings support the microbiological safety of clear aligners and highlight the value of microbiome monitoring in orthodontics

References

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