

Changes in the oral microbiota after six months of clear aligner orthodontic treatment: Assessment of micro- and nanoplastic exposure using MinION sequencing

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Malocclusion is a common oral health issue that affects the normal functioning of the orofacial system. Orthodontic therapy aims to correct malocclusion and craniofacial skeletal discrepancies whilst also improving mastication and appearance. Clear aligners (CA) have transformed the field of orthodontics providing a more discreet and convenient alternative to fixed appliances, as they offer a more comfortable and aesthetically pleasing orthodontic treatment. CA are manufactured from different thermoformed materials that are susceptible to degradation into micro- and nanoplastics (MNPLs), which is worsened by various oral cavity factors such as pH fluctuations, mechanical attrition, among others. The use of CA and their associated MNPLs release may influence oral bacterial communities and impact oral health.

The objective of our study is to assess the changes in the oral microbiota of individuals undergoing CA orthodontic treatment. Bacterial DNA was extracted from buccal swabs using the PureLink Microbiome DNA Purification Kit (Invitrogen, Thermo Fisher Scientific), followed by sequencing with the MinION system and subsequent bioinformatic analysis.

At present, a total of thirty buccal samples from fifteen patients undergoing orthodontic treatment with CA were analyzed. Two different samples were taken from the same individual, one obtained before starting treatment with CA and one after six months of CA use. Preliminary data suggest that metrics related to alpha and beta diversity might shift between samples. Exposure to MNPLs may contribute to oral microbiota changes and therefore influence oral health.

Funding: This work is supported by the Ministry of Science, Innovation and Universities and National Research Agency (PID2023-146489OB-I00). AR is funded by the Generalitat de Catalunya (FI-SDUR 2023).