Abstract

Prof. Dr. Christina Erbe, Dr. Vanessa Knode & Dr. Carolin Kredig

Germany

Between cell biology and high tech-orthodontics: modern aligner treatment in clinical focus

The use of aligners has transformed orthodontic treatment. However, technological progress also increases the demands on biological safety and the preservation of periodontal health. Our presentation highlights the interplay between oral health and innovative 3D-printing materials.

A central aspect is the response of periodontal tissue during aligner treatment. We examine inflammation-related parameters such as active matrix metalloproteinase-8 (aMMP-8) and shifts within microbial marker complexes in sulcus fluid. We also investigate whether individual genetic predispositions such as the interleukin-1 (IL-1) polymorphism may modulate this inflammatory response in adolescents.

Another focus is on directly 3D-printed aligners. This technology enables variation in material thickness to create individual pressure zones or integrated functional orthodontic elements. We discuss the biocompatibility of this new generation of materials, particularly with regard to layer thickness and post-curing protocols.

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