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The Oral Microbiota Changes in Orthodontic Patients: Systematic Literature Review

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Objectives Treatment with fixed orthodontic appliances (FOA) makes patients' oral hygiene more difficult and may have an impact on the balance of oral microbiota. During orthodontic treatment there is a higher risk of white-spot lesions, dental caries, and periodontal complication because of the change in oral microbiota. The aim of this study is to analyze the oral microbiota changes in patients with FOA.

Methods A systematic review was performed according to PRISMA statement. The search was performed in PubMed, Google Scholar, ScienceDirect. Inclusion criteria: research articles published less than 5 years ago, studies in English language. Exclusion criteria: systematic reviews, case reports or series. The risk of bias of each study was assessed using the Cochrane Risk of Bias Tool (RoB-2).

Results In 6 articles, 133 patients with FOA were included. The changes of oral microbiota were analyzed after 15.4 (5.8) months, before orthodontic treatment, 1 month, 3 months and 6 months after beginning of the treatment with FOA. One study found that *Streptococcus mutans* significantly increased during orthodontic treatment with FOA from beginning to 3 months and to 6 months ($p < 0.05$). However, two studies did not find statistically significant results ($p > 0.05$). In addition, two studies showed that *Lactobacilli* species count significantly increased after bracket bonding ($p < 0.05$). During orthodontic treatment the colonization of *Candida* yeast increased, with dominance of *C. albicans*. Two studies showed that levels of *Candida albicans* in the saliva and occlusal plaque were higher but not statistically significant ($p > 0.05$). On the other hand, one study found statistically significant count of *Candida albicans* in patients with FOA ($p < 0.05$).

Conclusions In conclusion, orthodontic treatment with fixed appliances has an impact on the balance of oral microbiota, which might lead to the risk for bacterial and fungal related diseases.