

The dynamics of salivary bacteria presence during orthodontic treatment with fixed appliances and clear aligners: a systematic literature review

Authors:

Student Austėja Mitalauskienė, Student Reda Vaičiūnaitė, P.h.D Arūnas Vasiliauskas

Lithuanian University of Health Sciences

Introduction

Long orthodontic treatment may negatively affect oral health. The main factor inducing oral pathologies during treatment is the colonization of pathogenic microorganisms in dental plaque [1]. Having increased plaque retention, greater quantities of Streptococcus mutans and Lactobacillus are measured, which promote dental caries formation [2]. A few previous studies suggest better periodontal health wearing clear aligners than fixed appliances. Therefore, it is important to investigate how salivary bacteria's occurrence changes using both appliances and help choose the most beneficial appliance to maintain good oral health [3; 4].

Results

At baseline, no salivary Lactobacillus was found in patients treated with clear aligners and fixed appliances. However, S. mutans was present in 14 patients (93%) wearing fixed appliances and 13 patients (87%) treated with clear aligners [3]. After 2 weeks, the numbers decreased and after 1 month, S. mutans was more commonly found in the group of patients treated with fixed appliances than those treated with clear aligners (93% in group 1 and 80% in group 2, respectively). Lactobacillus was identified after 2 weeks in only 7% of patients treated with fixed appliances and remained unchanged. Patients with clear aligners showed no presence of Lactobacillus whenever measured ($p>0.05$) [3]. Another study did not identify Lactobacillus or S. mutans in patients' saliva at baseline, but after 3 months, bacteria were present in 8 patients (20%) treated with fixed orthodontic appliances [4]. After 6 months of treatment, 37.5% of patients wearing fixed orthodontic appliances had S. mutans present, while 8% of patients treated with clear aligners had it as well. Similarly, Lactobacillus was present in only 1 (2.5%) patient treated with clear aligner and 15 (37.5%) patients treated with fixed appliances ($p<0.05$) [4].

Aim

To compare pathogenic microorganisms' presence dynamics in saliva during orthodontic treatment with fixed orthodontic appliances and clear aligners.

Conclusions

Pathogenic salivary bacteria's presence was more frequent over time in patients treated with fixed orthodontic appliances than those treated with clear aligners

Methods

A literature review was conducted according to PRISMA guidelines. The electronic data search was performed in PubMed and Cochrane databases. Combinations of keywords „fixed appliances“, „clear aligners“, „saliva“ were utilized, and 218 articles were identified. To identify the main research question, PICO was formulated. The inclusion criteria were: articles written in English, published less than 6 years ago, human trials, studies included patients treated with clear aligners and fixed orthodontic appliances, samples of saliva were collected, presence of Lactobacillus and S. mutans were measured. After screening the abstracts and removing duplicates, 4 articles were selected for full-text reading. Two remaining articles were selected for the final analysis.

Time Passed	Bacteria	Appliance	
		Brackets	Clear Aligners
Baseline	Lactobacillus	0%	0%
	Mutans	93%	87%
2 w.	Lactobacillus	7%	0%
	Mutans	0%	0%
1 mo.	Lactobacillus	0%	0%
	Mutans	93%	80%
3 mo.	Lactobacillus	20%	0%
	Mutans	20%	0%
6 mo.	Lactobacillus	15%	1%
	Mutans	38%	8%
		0% 20% 40% 60% 80% 100%	0% 20% 40% 60% 80% 100%
		% of patients	

Contacts

Email: austeja.mitalauskiene@gmail.com

Phone number: +37068966276



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