BIOMARKERS IN SALIVA DURING ORTHODONTIC TOOTH MOVEMENT. A REVIEW.

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- Introduction: Many studies were accomplished in order to evaluate qualitative and quantitative changes of saliva in patients undergoing orthodontic treatment. These changes are associated with conditions such as effectiveness of treatment, rate of tooth movement, pain experienced by patients and other.

- Aim: The purpose of this systematic review was to identify the biomarkers present in saliva during orthodontic tooth movement.

- Materials and Methods: A total of 10 electronic databases (PubMed, Web of Science, Scopus, Cochrane Library, Virtual Health Library, Science Direct, Ovid MD, ProQuest, mRCT and DOAJ) were searched and the appropriate studies were identified with the use of specific eligibility criteria, according to PRISMA guidelines.. Out of 7.301 papers, after the removal of all duplicates and the exclusion methodology (using PICO criteria), 35 were finally included in the review and evaluated.

- Conclusions: Several biomarkers have been related to orthodontic tooth movement. These molecules could be used in the future to examine the effectiveness of applied treatment or to inspect patients' response.

*The authors declare that they have no conflict of interests.

Indicative References:

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- Results: Many biomarkers were observed during orthodontic tooth movement (Table 1). Changes in the amount of each one were noticed at different stages of the treatment.

Bone specific alkaline phosphate (BAP) ↓	C-reactive protein ↑	Superoxide Dismutase (SOD) ↓
Tiobarbituric acid reactive substance (TBARS) ↑	Cortisol ↑	Catalase ↓
Alkaline Phosphatase (ALP) ↑	Myeloperoxidase (MPO) ↑	Uric acid ↓
Amylase, A-amylase ↑	Lactate Dehydrogenase (LDH) ↑	Peroxidase ↓
Calcium (Ca) ↓	IL-1b ↑	Protein S-100-A9 ↓
Glucose ↑	Tumor necrosis factor-a ↑	ASAT ↑
Phosphate ↓	Aspartate Aminotransferase ↑	Serum albumin precursor ↓
Phosphorus (Pi) ↓	Tartrate-resistant Acid Phosphatase (TRAP) ↑	Immunoglobulin J ↓
MDA ↓	Sodium ↑	Cysteine rich secretory protein ↑
Albumin ↓	Lipase ↑	Hemoglobin subunit beta ↓
IgA ↑	MMPS (MMP8,MMP9,MMP12) ↑	IL-6 ↑
sRANKL ↑	OPG ↓	Anthranilic acid ↑
Leptin ↓	Deoxypyridinoline ↑	Potassium ↓
Chlorine ↑	ALAT ↑	
Stratifin protein ↓	TEAC ↓	

Table 1: Quantitative changes in biomarkers during orthodontic tooth movement based on the systematic review of the literature.