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Innovative Technologies Functional Methods of Dental Research

Authors : Sergey N. Ermoliev, Margarita A. Belousova, Aida D. Goncharenko

Abstract : Application of the diagnostic complex of highly informative functional methods (electromyography, reodentography, laser Doppler flowmetry, reoperiodontography, vital computer capillaroscopy, optical tissue oximetry, laser fluorescence diagnosis) allows to perform a multifactorial analysis of the dental status and to prescribe complex etiopathogenetic treatment. Introduction. It is necessary to create a complex of innovative highly informative and safe functional diagnostic methods for improvement of the quality of patient treatment by the early detection of stomatologic diseases. The purpose of the present study was to investigate the etiology and pathogenesis of functional disorders identified in the pathology of hard tissue, dental pulp, periodontal, oral mucosa and chewing function, and the creation of new approaches to the diagnosis of dental diseases. Material and methods. 172 patients were examined. Density of hard tissues of the teeth and jaw bone was studied by intraoral ultrasonic densitometry (USD). Electromyographic activity of masticatory muscles was assessed by electromyography (EMG). Functional state of dental pulp vessels assessed by reodentography (RDG) and laser Doppler flowmetry (LDF). Reoperiodontography method (RPG) studied regional blood flow in the periodontal tissues. Microcirculatory vascular periodontal studied by vital computer capillaroscopy (VCC) and laser Doppler flowmetry (LDF). The metabolic level of the mucous membrane was determined by optical tissue oximetry (OTO) and laser fluorescence diagnosis (LFD). Results and discussion. The results obtained revealed changes in mineral density of hard tissues of the teeth and jaw bone, the bioelectric activity of masticatory muscles, regional blood flow and microcirculation in the dental pulp and periodontal tissues. LDF and OTO methods estimated fluctuations of saturation level and oxygen transport in microvasculature of periodontal tissues. With LFD identified changes in the concentration of enzymes (nicotinamide, flavins, lipofuscin, porphyrins) involved in metabolic processes Conclusion. Our preliminary results confirmed feasibility and safety the of intraoral ultrasound densitometry technique in the density of bone tissue of periodontium. Conclusion. Application of the diagnostic complex of above mentioned highly informative functional methods allows to perform a multifactorial analysis of the dental status and to prescribe complex etiopathogenetic treatment.

Keywords : electromyography (EMG), reodentography (RDG), laser Doppler flowmetry (LDF), reoperiodontography method (RPG), vital computer capillaroscopy (VCC), optical tissue oximetry (OTO), laser fluorescence diagnosis (LFD)
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