عنوان مقاله:

Classification of sEMG Signals for Diagnosis of Unilateral Posterior Crossbite in Primary Dentition using Fast Fourier Transform and Logistic Regression

محل انتشار:

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خلاصه مقاله:

Posterior crossbite is a common malocclusion disorder in the primary dentition that strongly affects masticatory function. To the best of the author's knowledge, for the first time, this article presents a reasonable and computationally efficient diagnostic system for detecting characteristics between children with and without unilateral posterior crossbite (UPCB) in the primary dentition from the surface electromyography (sEMG) activity of masticatory muscles. In this study, ۴۰ children (۴–۶y) were selected and divided into UPCB (n = ۲۰) and normal occlusion (NOccl; n = ۲۰) groups. The preferred chewing side was determined using a visual spot-checking method. The chewing rate was determined as the average of two chewing cycles. The sEMG activity of the bilateral masticatory muscles was recorded during two ۲۰-s gum-chewing sequences. The data of the subjects were diagnosed by the dentist. In this study, the fast Fourier transform (FFT) analysis was applied to sEMG signals recorded from subjects. The number of FFT coefficients had been selected by using Logistic Regression (LR) methodology. Then the ability of a multilayer perceptron artificial neural network (MLPANN) in the diagnosis of neuromuscular disorders in investigated. To find the best neuron weights and structures for MLPANN, particle swarm optimization (PSO) was utilized. Results showed the proficiency of the suggested diagnostic system for the classification of EMG signals. The proposed method can be .utilized in clinical applications for diagnoses of unilateral posterior crossbite

کلمات کلیدی:

posterior crossbite, surface electromyography, multilayer perceptron artificial neural network (MLPANN), Particle (swarm optimization (PSO