A Feasibility Analysis of the Identification and Classification of Myofascial Trigger Points (MTrPs) using Ultrasound Image Processing

ECE Scholarly Paper Presentation
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Abstract

Pain is a significant public health problem. Neck and low back pain are a major cause of disability and lost productivity. Often, pain is associated with abnormalities in the soft tissues, such as muscle. Myofascial trigger points (MTrPs) are stiff, hyperirritable nodules typically found in a palpable taut band of muscle; the nodules are painful on compression and can produce referred pain, referred tenderness, motor dysfunction, and autonomic phenomena. MTrPs have been associated with various pain syndromes, including chronic headaches, neck and low back pain. However, MTrPs are not well understood because there are no objective methods to identify and characterize them. In recent years, one study demonstrated the feasibility of diagnostic ultrasound for imaging MTrPs. This paper investigates which ultrasound image processing techniques are most likely to be successful in terms of accurate MTrP segmentation and classification. Two statistical techniques, Statistical Moments of the Intensity Histogram (SMIH) and Gray Level Co-Occurrence Matrices (GLCM), are assessed for their ability to exploit the hypoechoic properties of MTrPs for the development of a semi-automatic segmentation system. Two texture classification techniques, Intensity Based Classification (IBC) and Fractal Dimension Classification (FDC), are also assessed for the development of a semi-automatic classification system. These techniques demonstrate the feasibility of using image processing for the identification and classification of MTrPs.