

2nd International Conference and Exhibition on **Physical Medicine & Rehabilitation**

July 14-16, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

Dynamic surface electromyography topography as a new objective and quantitative assessment tool for low back pain rehabilitation

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Chronic low back pain (LBP) is very popular among people. In order to assist in the treatment of this pain, surface electromyography (SEMG) is applied to the treatment. Based on SEMG, the dynamic SEMG topography is a new objective and quantitative assessment tool to assess the LBP level. Thus, how to analyze the prognostic value of the SEMG topography for identifying the patients' LBP level during rehabilitation more effectively is significant. 38 chronic non-specific LBP patients without previous history of acute LBP and 43 healthy subjects were recruited. They were required to accomplish the lumbar flexion and extension movement and the SEMG signal could be obtained from the relevant lumbar muscles. According to the patients' rehabilitation level after physiotherapy, the patients were divided into "responding" and "non-responding" groups. The former's recovery was good whereas the latter's was not. Through applying the root-mean-square difference (RMSD) to the quantitative analysis on the time-varying SEMG topography, the LBP level of the "responding" group could be differentiated from the "non-responding" group because the RMSD of RA and RW at lumbar flexion and extension in the "non-responding" group were significantly higher than those in the "responding" group ($p < 0.05$). Meanwhile, the discrimination accuracy of these two groups could also be tested by using the ROC curve. The areas under ROC curves of RMSD RA and RMSD RW were greater than 0.7 ($p < 0.05$). In conclusion, it is effective and useful to assess the LBP level through the RMSD RA and RMSD RW value from the SEMG topography.

Biography

Naifu Jiang has completed his Master degree from Beijing Institute of Technology in 2013 and is doing his PhD from the University of Hong Kong. His research interests are low back pain quantitative assessment, measurement and analysis on the surface EMG.

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