

# 不同负荷方式引起的腰部肌肉表面肌电信号变化特征

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采用时频、复杂度和定量递归信号分析方法对Biering-sorensen 和Ito-Shirado条件下腰部肌肉表面肌电信号的变化规律和特点进行了比较。10名正常受试者分别参加Biering-sorensen 和Ito-Shirado运动负荷试验, 分别获取两侧L2~L3和L5~S1部位表面肌电信号。研究发现, 以上两种运动负荷方式下平均功率频率和复杂度时间序列曲线呈单调递减型变化, 而确定性线段百分数时间序列曲线呈单调递增型变化。双因素方差分析表明负荷方式和采样部位对以上信号分析指标变化斜率的影响均有显著统计学意义, 证明Biering-sorensen负荷方式较 Ito-Shirado负荷方式对腰部肌肉表面肌电信号特征有较大的影响, 而采样部位也是腰部肌肉功能评价不可忽视的因素。

## LUMBAR MUSCLE sEMG SIGNAL CHARACTERISTICS INDUCED BY DIFFERENT LOAD METHOD

In order to compare the lumbar muscle surface electromyography signal characteristics induced by Biering-sorensen and Ito-Shirado testing, 10 normal volunteers took part in the experiment, both L2~L3 and L5~S1 surface electromyographic signals were collected and then analyzed by recurrence quantification, spectrum and Lempel-Ziv complexity methods. The results showed that both signal complexity and mean power frequency increased while Determin% decreased linearly during loading. Multiple analysis of variance showed both load method and electrode composition could influence the slope of signal parameters mentioned above. The results suggested Biering-sorensen testing was more influential on signal characteristics than Ito-Shirado testing and electrode composition should also be considered when lumbar muscle function was tested.

关键词