

# The Effects of Fatigue on Flexion-Relaxation Response of Erector Spinae Muscles in healthy subjects and Patients with chronic Low Back Pain

Bagheri H<sup>1\*</sup>, Talebian S<sup>2</sup>, Olyaei GR<sup>1</sup>, Barati N<sup>3</sup>

- 1- Full Professor of Tehran University of Medical Science
- 2- Associate Professor of Tehran University of Medical Science
- 3- B.sc of Physio Therapy

## Abstract

**Background and aim:** The presence of the flexion relaxation phenomenon (FRP) during trunk flexion represents myoelectric silence consistent with increased load sharing of the posterior discoligamentous passive structures. A number of studies have shown differences in the FRP between patients with chronic low back pain and healthy individuals, Persistent activation of the lumbar erector spinae musculature among patients with back pain may represent the body's attempt to stabilize injured spinal structures via reflexogenic ligamentomuscular activation for protecting them from further injury and avoiding pain.

**Materials and methods:** Two groups of female subjects ((20 – 40 years old) were participated in this study. First group consisted of 10 subjects with chronic low back pain (CLBP) and second group consisted of 10 healthy ones as control group. Both groups have performed 5 cycles of trunk flexion – extension . The speed of the movement repetition controlled by an electronic metronome . The EMG signals recorded from T12 and L3 paravertebral muscles and biceps femoris on the right side. The lumbar flexion motion degree has been measured by the digital flexible goniometry. All subjects have done Sorenson Back Endurance test in prone laying position. The subjects have extended their trunk up to the horizontal position and sustained in this position up to fatigue level .The subjects leave the table and asked to do 5 more cycle of trunk flexion – extension.

**Results:** In patients group there is an increment and significant differences in lumbar flexion degree at the time of muscle EMG off in comparison with healthy subjects after fatigue test ( $p<0.05$ ). In both groups, the myoelectric silence period showed a significant change with respect to the pre- fatigue ( $p<0.05$ ). The median frequencies shifted to lower frequencies after fatigue protocol ( $p<0.05$ ).

**Conclusion:** Muscle reflexive responses would change following fatigue protocol. Therefore, the muscle activity will increase after the fatigue period. In the other hand, in patient group the role of the muscles as a stabilizer seems to be increased to enhance the stability at the injured segment after fatigue protocol .This protects the segment against pain and disability.

**Key Words:** Flexion-Relaxation Phenomenon, Myoelectric Silence period, Mean and Median Frequency, Chronic Low Back Pain

\*Corresponding author :

Dr. Hossein Bagheri, Rehabilitation Faculty, Tehran University of Medical Sciences Tel: +98-21-77533939

Email: hbagheri@sina.tums.ac.ir

*This research was supported by Tehran University of Medical Sciences (TUMS).*