BIOMECHANICAL BACK DISABILITY INDEX SONOMYOGRAPHY-BASED: A NEW TOOL TO IDENTIFY RISK OF LOW BACK PAIN

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Purpose: To analyze associations and contributions between architecture and muscle function variables during a back extension in a maximal isometric contraction. To develop an index to identify the risk of low back pain.

Relevance: Identify predictors of the architecture and function of the back, particularly if such predictors are modifiable. Develop an index from a multivariate analysis to detect subjects at rick of low back pain. If such relationships exist and would create the index, then the effective intervention strategies could be used.

Participants: 66 subjects: 33 Healthy persons and 33 LBPpatients (49% ♀) with a mean age of 30.39 (±7.785).

Methods: The subjects performed a maximal isometric strength test from which, through the use of sonomyography and electromyography, six variables were obtained: inclination angle and thickness of the erector spinal muscle fibers left and right, by ultrasound scan and muscle activation level (MVC) using EMGs.

Analysis: A multiple regression was conducted to examine the relationship between the variables torque, architecture and muscle function. Discriminant analysis was performed. The grouping variable was the value of RMQ greater than or equal to 6. A logistic regression was calculated, with the variables of muscle architecture and activation level, during a maximal isometric contraction. The standardized scores of the variables included in the regression were used to develop the new index, a summative continuous scale assessing the risk of low back pain.

Results: Multiple regression models explained between 60 and 86% of the variance in torque (Newton)for the lumbar extension. Linear discrimination ratios were: Angle: right (0.407); left (-0177). Thickness: Right (23.913); Left (59.775). The new index showed a good validity in the assessment of low back pain (area under the Receiver Operating Characteristic curve) with a ratio of 0.844.

Conclusions: These findings suggest that it would be possible predicting the risk of low back pain from biomechanical variables. We suggest say that the Biomechanical Back Disability Index sonomyography-based is presented as a tool that can be used to indetify subjects with risk of low back pain.