

Research Project Report

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To compare the difference in repositioning errors and muscle stiffness between rowers with and without low back pain: A pilot study.

1. Objective: To compare the difference in repositioning errors (RE) in lumbopelvic upright posture and the muscle stiffness of Rectus Abdominus (RA) and Erector Spinus (ES) between rowers with and without low back pain (LBP).

2. Abstract:

Low back pain (LBP) is a common musculoskeletal disorder which affects the lumbar segment of the spine. It can be [acute](#), subacute or [chronic](#) in its clinical presentation¹. LBP is a considerable problem in the rowing world. A group of 7 with and 10 without LBP university rowers were recruited from the local Universities. Conditions such as acute low back pain, spinal disorders, neurological conditions, recent pelvic or abdominal surgery, pain in the testing postures, or previous specific postural training were identified for exclusion in the experimental group. Only male subjects were chosen in this study to avoid musculature difference between sexes.

Repositioning errors (RE) of the lumbar spine was assessed using the 3 Space Fastrak System, model 3SF0002 (Polhemus Navigation Science Division, Kaiser Aerospace, VT). A reliability test was performed on all the 38 subjects first and then ordinary normal subjects under 25 years of age were chosen to compare with the 17 rowers on their RE. The participants were asked first to put themselves into their best sitting posture, then assisted into a lumbopelvic upright sitting posture. Afterwards, they were asked to reproduce this position independently over four trials separated by periods of active full lumbar flexion and extension. The RE measured in this study was the absolute errors between the vertical axis with the tilting angle of the corresponding vertebra in the sagittal plane.

The muscle stiffness of ES and RA were assessed by tissue ultrasound palpation system (TUPS) for four times by two operators at one inch lateral to both sides of the L2 (spinous process) and navel with the subjects in prone and supine position respectively. Similarly, reliability tests were performed on all the 38 subjects and then on ordinary normal subjects under 25 years of age who were chosen to compare with the 17 rowers on their muscle stiffness of ES and RA.

For the reliability test of the RE using tracker system, all the measurement was collected twice in the ordinary normal subjects as well as rowers. The test-retest reliability was used to analysis for its consistency in measurement over time. For the muscle stiffness measurements of ES and RA using TUPS, both the intra-rater and inter-rater reliability were measured. Outcome measures in this study were RE and the muscle stiffness. The two outcome measures were compared among the LBP group with the non-LBP group as well as the ordinary normal subjects with rowers having similar age and multivariate analysis of variance (MANOVA) was used for the analysis.

ⁱ http://en.wikipedia.org/wiki/Low_back_pain