

LUMBAR SPINE IN SENIOR AND ELITE LEVEL ROWERS – A COMPARISON WITH THE LOW BACK PAIN POPULATION

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INTRODUCTION: Low back pain (LBP) is very prevalent in the sport of rowing. Elite rowers miss on average 24 days from training in rowing related injuries per year (Bernstein et al 2002). A wireless posture monitor (Sels Instruments, Belgium) has recently been developed, which can measure lumbar spine posture in real time. The monitor has good face validity and laboratory bench testing has established the accuracy of the monitor. The aims of this investigation were to; (1) determine the reliability of this novel method of monitoring lumbar spine posture during rowing, and (2) determine if there are differences in lumbar spine posture between rowers with/without LBP during an incremental “step-test”. These original pilot studies will inform further development of the monitor prior to final validation studies, and use of the monitor in larger studies.

METHODS: Ethical approval was attained. The monitor is based on a strain gauge where increasing elongation of the monitor’s strain gauge occurs with spinal flexion. The posture monitor was placed on the subjects pelvis (2nd sacral spinous process) and lumbar spine (3rd lumbar spinous process) determined by palpation. For the reliability study (n=7), subjects (6 males, 1 female, mean \pm SD, age 29.4 ± 7.6 years, height 1.84 ± 0.57 m, weight 85.9 ± 9.8 kg) performed stage 1 of the “step-test” on 3 occasions. To compare LBP and non-LBP groups, 11 male subjects were recruited; LBP=6; controls =5; (mean \pm SD, age 29.2 ± 5.6 years, height 1.88 ± 0.67 m, weight 86.3 ± 8.4 kgs). LBP subjects had self-reported “non-specific” LBP. They performed an incremental “step-test” which consisted of six 4-minute stages on a Concept 2 Model D ergometer.

RESULTS: The posture monitor demonstrated high reliability (all ICC values > 0.84 , with low mean differences of $<4\%$ ROM). Comparing the LBP and non-LBP groups, a one-way ANOVA (with repeated measures for the step-test stages) revealed there was no significant interaction effect ($p=0.541$). On average across the two groups (LBP, non-LBP) there was no significant main effect for time ($p=0.257$) or group ($p=0.620$).

DISCUSSION: The posture monitor demonstrates high reliability. No significant differences between groups were noted within the “step-test”. There was a non-significant trend for the LBP group to exhibit more extension than non-LBP group.

CONCLUSION: The study established that the posture monitor demonstrates high reliability and could be a useful tool in the field. The validity of the monitor as a measure of lumbar posture and movement compared to video fluoroscopy and another laboratory-based motion analysis system is currently being planned. When these studies are complete, larger studies using this device will be performed. This will include using more homogenous subgroups of LBP subjects, in addition to prolonged rowing.

REFERENCES:

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