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Low back pain in cycling: does it matter how you sit?

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Abstract

Background: Low Back Pain (LBP) is a common problem among cyclists, although studies investigating LBP during cycling are scarce. Most studies have focused on LBP and geometric bike-related variables. Until now no cycling field studies have investigated the relationship between maladaptive lumbar kinematics and LBP during cycling.

Purpose: To examine lower lumbar kinematics in cyclists with and without non-specific chronic low back pain (NSCLBP).

Methods: Cross-sectional cycling field study. Recreational and competitive eight cyclists with NSCLBP classified as having a 'Flexion Pattern' (FP) disorder and nine asymptomatic age- and gender-matched cyclists were tested. Subjects performed a two-hour outdoor cycling task on their personal race bike. Lower lumbar kinematics were measured with a wireless monitoring system (BodyGuardTM). Pain intensity during and after cycling was measured using a numerical pain rating scale.

Results: The NSCLBP (FP) subjects were significantly more flexed ($p=0.018$) at the lower lumbar spine during cycling compared to healthy controls (Figure 1) and reported a significant increase in pain ($p<0.001$) over the two hours of cycling (Figure 2). One-way repeated measures ANOVA revealed a significant main effect for group ($p=0.035$), which remained significant when adding saddle angle as a covariate ($p=0.05$). The difference in posture between groups did not change over time.

Conclusions: The findings of this first field study suggest that a well selected subgroup of cyclists with NSCLBP (FP) adopted and sustained increased lower lumbar flexion during cycling. This appears to reflect an inherent maladaptive motor control pattern at the lower lumbar spine during cycling. This posture is maintained and associated with a significant increase of LBP.

Implications: These findings suggest that in this subgroup LBP during cycling is related to maladaptive lower lumbar kinematics. Investigating rehabilitation/prevention strategies that address the control over the lower lumbar region during cycling seems the logic next step. A classification-based on cognitive functional training (CB-CFT) intervention including biofeedback (BFB) to monitor the lower lumbar kinematics and to facilitate a less end-range flexed cycling posture has been recently explored by our research group. The results revealed that an intervention targeting this maladaptive control at the symptomatic lower lumbar region resulted in a significant decrease of the near end-range lower lumbar flexion and a substantial reduction of LBP during cycling.

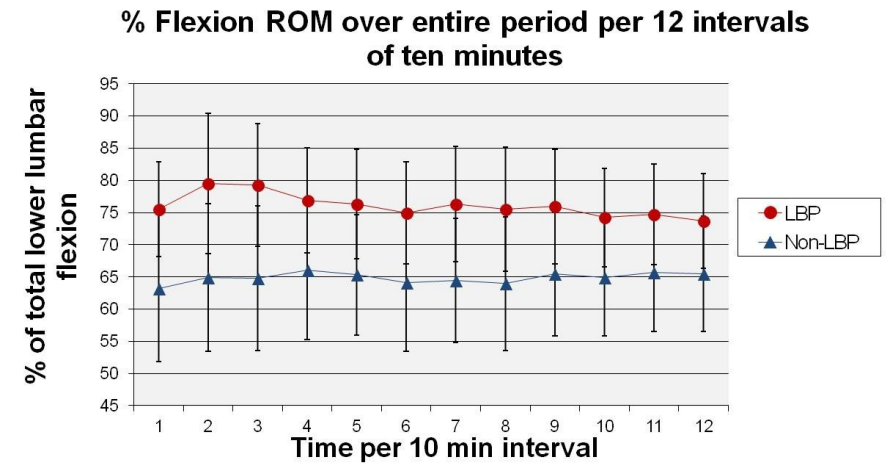

Figure 1. The average pain scores (NPRS; 0-10) (±SD) during and after cycling per group. The vertical dotted black line indicates the end of the cycling task and the start of the 24 h follow-up period. NPRS: Numerical Pain Rating Scale; LBP: low back pain; Non-LBP: no low back pain; h: hour.

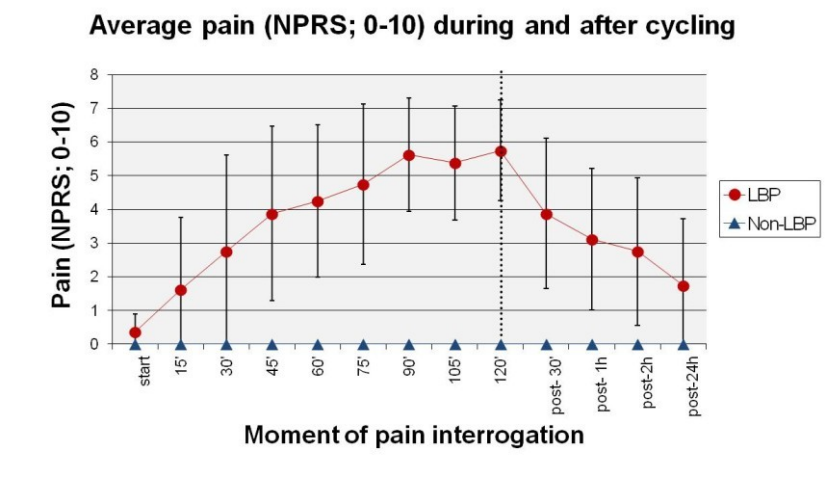

Figure 2. Percentage of total lower lumbar flexion (±SD) over entire period per 12 intervals of 10 min per group. LBP: low back pain; Non-LBP: no low back pain.

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