

COMPARISON OF LUMBOPELVIC RHYTHM AMONG ADOLESCENT SOCCER PLAYERS WITH AND WITHOUT LOW BACK PAIN

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ABSTRACT

Background: Hip–spine incoordination can cause low back pain (LBP) in adolescents. Hip–spine coordination, including the lumbopelvic rhythm (LPR) and the lumbar–hip ratio (LHR), can be used to assess lower limb and spine function. However, there are no reports of the values of LPR or LHR in adolescent soccer players with and without LBP.

Purpose: The purpose of this study was to clarify the effect of LBP on LPR and LHR during trunk extension among adolescent soccer players.

Study Design: A cross-sectional observational study.

Methods: One hundred and nine adolescent soccer players were recruited and divided into two groups, one with and one without LBP. Using three-dimensional motion analysis, participants range of motion (ROM) of the lumbar spine (LS) and hip during trunk and hip extension was measured to calculate the LPR and LHR. Paired, two-tailed *t*-tests were used to compare the LS and hip ROM between the non-LBP and LBP groups, two-way repeated measures analysis of variance was used to compare time with the non-LBP and LBP groups for LHR, and linear prediction was used to describe the LPR.

Results: The maximum LS ROM in the LBP group was significantly less than that in the non-LBP group by 6.6° ($p = .005$). There was no difference in the maximum hip ROM between the groups ($p = .376$). The LHR did not change during trunk extension ($F [4, 428] = 1.840, p = .120$), the mean LHR was 4.6 in the non-LBP group and 3.7 in the LBP group, and there was no difference between the groups ($p = .320$). The linear function of the LPR indicated, that when the hip joint was extended by 1°, the LS extended by 3.2° in the non-LBP group ($R^2 = .997, p < .001$) and 2.8° in the LBP group ($R^2 = .999, p < .001$).

Conclusion: LBP inhibited lumbar motion relative to hip extension as LPR was smaller in the LBP group than in the non-LBP group. However, there was no difference between the groups in LHR because inter-individual variability affected the LHR.

Level of Evidence: 3b

Keywords: Adolescent; low back pain; lumbar–hip ratio; lumbopelvic rhythm; trunk extension

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