

Anthropometric Factors, Strength, Physical Activity History And Lumbar Degeneration

T Videman, E Levälähti, MC Battié

University of Alberta, Edmonton, Canada; University of Helsinki; The Finnish Twin Cohort Study, Helsinki, Finland

Introduction: Traditionally, physical loading has been viewed as a risk factor for disc degeneration, although explaining little of the variation. Our goal was to compare the effect of lifetime physical loading and anthropometrics on disc degeneration. We hypothesized that the axial disc area could be of importance since a larger disc area should translate to smaller forces on the disc, however smaller disc may benefit from improved diffusion facilitating nutrition.

Methods: Comprehensive lifetime interview data on occupational and other physical loading conditions, anthropometric measures, isokinetic lifting strength, and MRI data were available (N = 575). Stepwise multiple regression modeling was used.

Results: Most anthropometric parameters were associated with degenerative findings in univariate analyses. In stepwise multiple regression modeling higher age, lower body mass and lifting strength, and larger axial disc areas were associated with lower signal. Of the total variance explained in disc signal (15.5%), age explained 8.0% ($p < 0.001$), body weight/axial disc area 3.9% ($p < 0.001$), isokinetic lifting work 2.3% ($p < 0.001$), occupational lifting history 1.3% ($p < 0.05$). Larger axial disc area, higher physical loading and age were associated with more disc height narrowing. Age accounted for 3.5% ($p < 0.001$), axial disc area for 2.5% ($p < 0.01$) of the variance, occupational loading score an additional 1% ($p < 0.01$).

Conclusions: Anthropometric parameters – body weight, muscle strength, and cross-sectional disc area - were more important than the physical activity parameters, which had minor effects on the studied outcomes. Lifelong ‘continuous’ loading from upright positions appear more important than work and leisure physical activity data, and could be a missing ‘risk factor’. High body weight and strength were associated with higher disc signal intensity, but also more disc height narrowing, suggesting that these two degenerative findings reflect different stages of degeneration and have different determinants.