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FoU Spenshult

Reumatologisk forskning och utveckling

Dynamic joint stability measured as gait symmetry in people with symptomatic knee osteoarthritis

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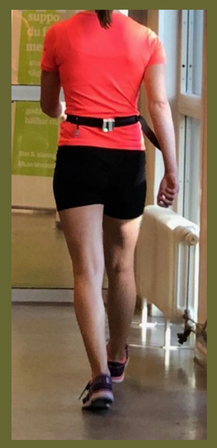
CONCLUSIONS

Knee pain affects the gait symmetry negatively and lower extremity muscle function is an important feature for symmetry and dynamic joint stability in people with early symptoms of knee OA.

Measuring gait symmetry will add information concerning lower extremity function but if the pain is bilateral, healthy controls are needed for comparison.



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Background

The very first sign of knee OA is pain or perceived knee instability, often experienced during weight bearing activities such as walking.

Specific measures of gait symmetry (GS) can be assessed objectively by using accelerometers, which potentially is a feasible method when evaluating early symptoms of knee OA.

Objective

The aim was to study if symptoms of early knee pain affected gait symmetry, and the association between lower extremity muscles function and gait symmetry in patients with symptomatic knee OA.

Method

Thirty-five participants mean age 52 (SD 9) years, 66% women, with uni- or bilateral early symptoms of knee OA, and without signs of an inflammatory rheumatic disease or knee trauma were included.

Pain was assessed by a numeric rating scale (NRS, range 0-10 best to worse), and tests of lower extremity muscle function with the maximum number of one leg rises.

Dynamic stability was measured as GS by using wearable inertial sensors (PXNordic senseneering platform), during the 6 min walking test to obtain spatio-temporal gait parameters. GS was computed based on stride time (temporal symmetry, TS) and stride length (spatial symmetry, SS). Stride length was normalized by height.

Kruskal-Wallis and Spearman's correlation coefficient were used for analyses. Descriptives were reported as mean and standard deviation (SD)

Results

Thirteen participants reported bilateral knee pain, and 22 unilateral knee pain (n=9 left side, n=13 right side) (Table I).

Table I. Descriptives of all 35 participants, stratified for bilateral or unilateral knee pain, as mean (SD).

	Bilateral knee pain n=13	Unilateral knee pain left n=9	Unilateral knee pain right n=13
Age (years)	51 (9)	51 (10)	54 (10)
Female/Male	9/4	7/2	7/6
Temporal symmetry	-1.09 (2.30)	-3.10 (3.35)	-2.22 (4.11)
Spatial symmetry	0.91 (2.47)	-0.21 (1.11)	-1.74 (1.81)

Pain in one leg was related to impaired gait symmetry:

- Participants with unilateral pain presented less SS gait than those who reported bilateral pain, median -0.79 vs. 0.31, p=0.005 (Figure I).
- Participants with unilateral knee pain had a shorter stride length on the painful side with a mean difference of 0.7% (SD 1.3%) of the subject's height (Figure 2).

The better muscle function, the better symmetry was observed in stride time:

- TS was related with number of one-leg rises, for the right (r_s=-0.39, p=0.006) and left (r_s=-0.40, p=0.004) side.
- No significant relationship was observed between SS and one-leg rises.

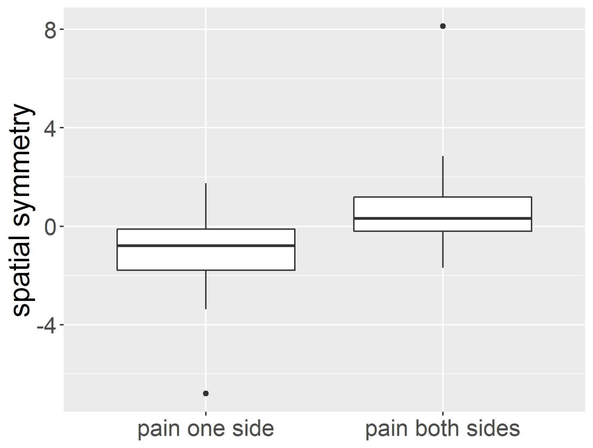

Figure I. Comparing distributions of spatial symmetry between subjects with unilateral and bilateral pain, n=35.

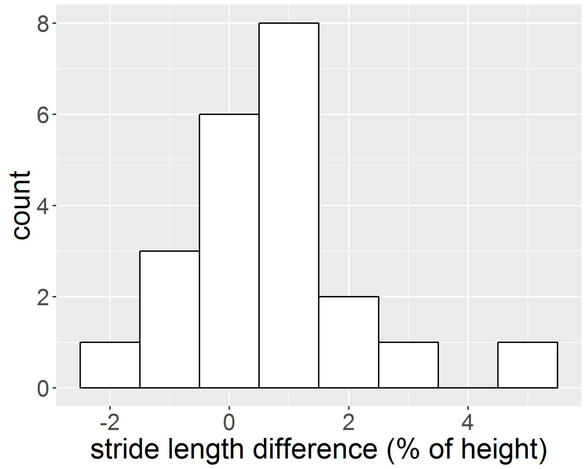

Figure 2. Histogram of stride length difference between leg without pain and with pain (% of height), n=22.

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