

# Differences in dynamic spinopelvic characteristics between patients with femoro-acetabular impingement and controls

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## Background:

Femoro-acetabular impingement (FAI) is a cause of hip pain; 14-35% of asymptomatic hips have radiographic FAI-features. Whether spinopelvic characteristics and degree of lumbar spine mobility is associated with the development of symptoms in the presence of FAI is unknown. This study aims to assess for differences in spinopelvic characteristics between asymptomatic volunteers with FAI-morphology and symptomatic FAI-patients to identify whether spinopelvic characteristics contribute to symptom development.

## Methods:

This is a prospective case-cohort study at a tertiary referral hospital. Among 313 patients presenting with symptoms to a hip preservation surgery unit, 165 were identified with FAI-features (LCEA $\geq$ 40°, negative sourcil angle, AWI $\geq$ 0.6, PWI $\geq$ 1.2, cross-over sign with ratio $\geq$ 0.25 or alpha-angle $\geq$ 55°) (age: 36 $\pm$ 8years-old; 48% females). Among 92 asymptomatic volunteers (Oxford Hip Score $\geq$ 45) without osteoarthritis (Tonnis $\leq$ 1), 46 were selected with FAI-features (age: 33 $\pm$ 10years-old, 28% females). All patients underwent standing and supine AP pelvic and Dunn radiographs, and standing and deep-seated radiographs to determine spinopelvic characteristics. Difference in pelvic tilt ( $\Delta$ PT), lumbar lordosis ( $\Delta$ LL) and pelvic-femoral angles ( $\Delta$ PFPA) allowed for calculation of pelvic-, spinal-, and hip- mobility respectively.

## Results:

There was no difference in the *static* standing spinopelvic parameters between symptomatic-FAI and controls ( $p=0.3-0.7$ ). There was no difference in the total SFA between patients and controls (155 $\pm$ 36° vs. 158 $\pm$ 17°;  $p=0.777$ ). Differences between hip- ( $\Delta$ PFPA: 101 $\pm$ 15° vs. 99 $\pm$ 15°;  $p=0.3$ ), pelvic- ( $\Delta$ PT: 12 $\pm$ 15° vs. 10 $\pm$ 13°;  $p=0.4$ ) and lumbar flexion ( $\Delta$ LL: 56 $\pm$ 12° vs. 58 $\pm$ 13°;  $p=0.1$ ) were small. However, hip-user index was much greater among patients compared to controls (64 $\pm$ 6% vs. 40 $\pm$ 10%;  $p<0.001$ ).

**Conclusion:**

Despite the presence of symptoms, patients with FAI morphology, exhibited greater hip dependency during sagittal flexion than asymptomatic volunteers. The increased hip requirements to achieve equivalent sagittal flexion is likely to contribute to the pathomechanics. Maintenance of spine health and mobility may prevent the development of symptoms in individuals with FAI morphology.