Ground Reaction Forces
Pattern of Femoroacetabular Impingement Subjects

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BACKGROUND

The femoroacetabular impingement (FAI) is a condition that results in abnormal contact between the head of the femur and the acetabulum due to alteration of the osseous morphology (Samora et al., 2011).
BACKGROUND

• The description of the forces acting in the body during gait can give important insights about the joint overload (Alaqtaish et al., 2011).

• However, we did not find studies that compared the ground reaction forces between FAI and healthy subjects.
OBJECTIVE

Our aim was to compare the 3D ground reaction forces during gait between healthy and femoroacetabular impingement subjects.
METHODS

- Sixteen healthy subjects and seven diagnosed with unilateral FAI walked along a walkway three times while the 3D ground reaction forces (GRF) were collected by a force plate embedded in the middle of the walkway.

- The signal was collected at 1 kHz and filtered by a 4th order low pass Butterworth filter with a cutoff frequency of 25 Hz.
METHODS

• The three cycles collected for each subject were averaged and the resultant cycle were divided into three support sub-phases, initial double support (0% to 17%), single support (17% to 83%) and terminal double support (83% to 100%), according to Perry and Burnfield (2010).

• The mean values of each sub-phase in the anterior-posterior, lateral and vertical GRF for each subject were calculated and the values were compared between the two groups with Mann-Whitney test, with a significance level of 0.05.
Sub-phases of the gait used in this study. % represents the time percentage of the support phase, according to Perry & Burnfield (2010).
RESULTS

There were statistical difference between both groups in the vertical GRF for the terminal double stance (p=0.02);
and a tendency of difference in the anterior-posterior GRF ($p=0.08$).
RESULTS

For the other sub-phases and for lateral GRF there were no significant differences (p>0.05).
CONCLUSION

• The results suggest that the FAI group had an increase of vertical and anterior forces in the propulsion phase.

• This may be related to a greater necessity of impulse to move the body forward due to a decrease of the momentum generated by the body (Whittle et al., 1999).

• However, an increase in the vertical and anterior ground reaction forces can lead to an increased hip overload, possibly increasing the joints degeneration (Correa et al., 2010).
REFERENCES


