Results Participants landed with more trunk flexion (success: 21.8°±13.2°; failed: 30.3±17.2°) (p<0.05), more anterior pelvic tilt (success: 4.2°±5.4°; failed: 7.7°±5.1°), and less lateral pelvic tilt towards the landing leg (success: 4.7±3.0°; failed: 2.7±3.7) during failed landings (p<0.05). Higher rectus femoris, biceps femoris and glutaeus medius excitation amplitudes were also observed during the failed landings (p<0.05). MACD analysis identified that differences between failed and successful landings were initiated during the preparatory phase of the drop-jump.

Conclusions While biomechanical variables were significantly different during the landing phase, our novel MACD analysis identified that these differences initiated during the flight phase. Our findings also highlight that proximal joints play a critical role for landing successfully. Preventive training must therefore include how athletes prepare for a landing with a strong emphasis on upper body and proximal joint control.

Background Dynamic valgus has been the focus of many studies to identify its association to an increased risk of running-related injuries. Many therapists suggest gluteus strengthening exercises to identify its association to an increased risk of running-dynamic valgus. However, it is not known which hip strength is associated with this movement dysfunction. How ever, it is not known which hip strength associated with this movement dysfunction. However, it is not known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction. It is known which hip strength is associated with this movement dysfunction.

Objective To test the correlation between hip strength and dynamic valgus in female runners.

Design Cross-sectional study.

Setting Biomechanics laboratory.

Participants Twenty-nine healthy recreational female runners.

Interventions Participants ran on a treadmill at 2.92 m/s. Kinematic data were collected using an 8 high-speed camera motion analysis system (Vicon, Oxford, UK) with a sample rate of 250 Hz. Maximal isometric hip strength was tested using a hand-held dynamometer.

Main Outcome Measurements Predictor variables were peak isometric strength of hip extensors, abductors and external rotators. Interest variables were contralateral pelvic drop, hip adduction and internal rotation (peak angles and joint excursion) during stance phase of running. Association between predictor and interest variables were tested using Pearson Correlation Coefficient (alpha = 0.05).

Results There was no significant correlation between hip strength and contralateral pelvic drop (r ranging from -0.39 to 0.32, p>0.05), hip adduction (r ranging from -0.23 to 0.11, p>0.05), and hip internal rotation (r ranging from -0.33 to 0.01, p>0.05).

Conclusions Although previous studies showed dynamic valgus was associated to hip weakness during single-leg squat and jump-landing tasks, the results of our study suggested that caution should be taken when linking hip disorders in female runners during running to posterolateral hip strength. These findings could be related to the linear nature of the statistical methods used to predict the biomechanical dysfunctions. It might be necessary to apply more robust techniques, as Artificial Neural Networks and Random Forests, to understand how physical variables interact to predict dynamic valgus in runners.