RELATIONSHIP AMONG INJURY STATUS, HIP STRENGTH, ARCH STRUCTURE, AND ANKLE FLEXIBILITY IN LONG DISTANCE RUNNERS: A PILOT STUDY

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• This study was approved by Saint Catherine University’s IRB. All subjects signed an informed consent before participating in the study. All results and consent forms were kept in a locked cabinet in the advisor’s office.
• No funding source was used for this study.

ABSTRACT:

BACKGROUND AND PURPOSE: Runners are at a high risk for overuse injuries due to repetitive high impact forces through their lower-extremities. Research has shown hip strength, ankle flexibility, and abnormal arch structure are associated with injury, but findings are inconsistent. Few studies have used reliable and valid arch measurements to examine lower-extremity overuse injuries. In addition, few studies have explored the relationship between hip strength and arch structure, and its potential impact on lower-leg injuries. The purpose of this study was to investigate the relationship among injury status, hip strength, arch structure, and ankle flexibility in long distance runners.

SUBJECTS: Twenty subjects from a marathon training program were recruited through a local running club. Six runners with a lower extremity overuse injury qualified as case subjects, and nine healthy runners qualified as controls.

METHODS: The runner’s intrinsic factors of hip strength, arch structure and ankle flexibility were measured. Hip external rotation and abduction strength were measured with a hand-held dynamometer. Arch structure was measured using longitudinal arch angle (LAA) and longitudinal arch height (LAH). Passive ankle dorsiflexion was measured using a standard goniometer.

ANALYSES: Relationships between intrinsic measures were analyzed using Pearson correlation. Comparisons between cases and controls were made using descriptive statistics, Chi-square, independent t-tests, and Mann-Whitney U tests.

RESULTS: The LAH and LAA were found to have excellent intrarater reliability (ICC=0.93, 0.91). There was a positive relationship between the LAA and LAH (r=0.68, p=0.000001), and between the LAH and hip abduction strength (r=0.31, p=0.05). There were no significant differences between the case and control groups in hip strength, arch structure, or ankle flexibility. However, there was a trend towards significance between the groups in hip external rotation strength. Healthy runners tended to have higher arches than injured runners.

CONCLUSION AND IMPLICATIONS: Although the data did not show differences between injured and non-injured runners, we identified trends towards significance regarding arch structure and hip strength. Among all runners, there is a significant positive relationship between hip abduction strength and LAH. Future research is needed to determine the extent of this relationship in the running population. The LAA and LAH are reliable measurements clinicians can use to determine arch structure.