INTRODUCTION

• Anatomical irregularities such as leg length discrepancy affect leg strength and injury rate in long distance runners [1].
• The relationship between leg length discrepancy and injury rate is unclear because of the numerous other factors that contribute to injury rate.
• For example, Q-angle and hip adduction are directly related to pain and the occurrence of injury in long distance runners [2].
• PURPOSE: To determine the correlation between leg length discrepancy and the frontal plane hip, knee, ankle angles for injured and non-injured distance runners.

METHODS

• Gait cycles for 28 long distance runners were tracked at their preferred running speed.
• Over a period of months, each subject submitted various reports on their activities and their status of injured or non-injured.
• Subjects were separated into groups based on injury status after 11 weeks of enrollment. The injured and non-injured subject groups were matched based on body mass index, running miles per week and usual running pace.
• The leg length was calculated as the distance between the greater trochanter and the lateral malleolus. Leg length discrepancy was the difference in leg length between right and left sides.
• For all subjects and each group, a Pearson correlation was performed between leg length discrepancy vs. peak hip, knee, and ankle angles.

RESULTS

• Leg length discrepancy was not statistically different between groups (P=0.316). However, the injured group had a 56% greater difference in leg length compared with the non-injured group.
• Weak correlations were found between the peak frontal plane angles of hip, knee, and ankle and leg length discrepancy (r = 0.019, 0.001, 0.027).
• The frontal plane hip joint angle during the stance phase was very similar between the injured and non-injured groups (Fig 1).
• The injured group had greater peak knee adduction angle that occurred at a later point in early stance compared with the non-injured group (Fig 2).
• Peak ankle eversion angle was greater in the injured group and occurred at a later point in the stance phase (Fig 3).

CONCLUSION

• Greater knee adduction observed in the injured group may be a result of weaker muscles in the shorter leg [1].
• The larger knee adduction can lead to a “knock-kneed” alignment during the gait cycle (Fig 4a). This alignment may increase stress on the knee and hip joints leading to an increase likelihood for injury in long distance runners [2].
• The similarity in hip joint motion during stance was likely the result of the small differences in leg length discrepancy between groups.
• The longer amount of time that the knee and ankle remain in adduction and eversion, respectively, in the injured group could be due to muscle weaknesses [1].
• The high subject variability in peak angles is a potential cause of the low correlations between leg length discrepancy and peak joint angles.
• In future studies, the process of measuring leg length discrepancy should be taken in multiple ways for accuracy.

REFERENCES


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