# SELECTED STRUCTUAL CHARACTERISTICS OF FEMALE RUNNERS WITH AND WITHOUT LOWER EXTREMITY STRESS FRACTURES

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Lower extremity stress fractures are a common injury among female distance runners. Stress fractures are thought to occur when tissues adapt abnormally to repetitive stress and may be a result of this abnormal adaptation. Selected static anthropometric measures have been implicated as a predictor of lower extremity stress fractures.

PURPOSE: The aim of this investigation was to examine selected structural characteristics of female runners with and without a history of lower extremity stress fractures to gain insight into the etiology of these injuries.

METHODS: Subjects consisted of 9 females with a confirmed history of at least one lower extremity stress fracture and 9 females with no stress fracture history. All subjects were between ages 18-35 and ran an average of 20 miles per week. Each subject underwent a structural evaluation by a licensed physical therapist that included measurement of tibial varum, static rearfoot angle, and arch height. Three radiographs of the distal lower extremity were used to calculate the area moments of inertia (Milgrom et al., 1989).

RESULTS: There were no significant differences in the selected structural characteristics between the two groups. However, mean area moments of inertia were 30\% less for the stress fracture group ($p<.10$).

CONCLUSION: There may be numerous underlying mechanisms associated with these stress fracture injuries that are difficult to account for in a retrospective study. Potential underlying mechanisms could have included training mileage, training surface, nutrition and history of amenorrhea. Although specific structural characteristics have been associated with stress fracture injuries, these groups of female distance runners did not demonstrate this relationship. However, the observed trend towards decreased tibial area moments of inertia in the stress fracture group were consistent with previous investigations that have suggested stress fractures occur where high bending loads are found.

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