CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

S1214

Project Title

Put One Foot in Front of the Other

Abstract

Objectives/Goals

Hypothesis: If a person's foot arches are higher and longer, then supination will be more likely to occur. If a person's foot arches are lower and shorter, then overpronation will be more likely to occur.

Methods/Materials

A left footprint was taken while sitting down, and another left foot print was taken standing, simulating a forward stride. The same process was repeated for the right foot. After this "Sit and Stand Test," subjects were filmed for 15-20 seconds while jogging on a treadmill at 5.5 mph. Measurements for arch length were taken from the heel to the ball of the foot on both types of footprints to calculate the average arch length. Balls of feet were marked on footprints. Footprints were examined to determine low, medium, or high arch height based on the surface area of the print. Video footage was viewed in slow motion so pronation status could be determined. Footprints were used to identify pronation status. Data were categorized by shoe size, arch length, arch height, and pronation status.

Results

After analysis of 74 films and 296 footprints (4 types of footprints per person), it was determined that there is a poor correlation between arch height, length and pronation status. However, the data depicts that there are relationships between the arch length and arch height, as well as the arch height and pronation. Commonly smaller feet that have shorter arches tend to have a medium to high arch height. Larger feet with longer foot arches exhibt a medium to low arch height, as opposed to a higher arch. Out of 74 subjects, 12 displayed low arches, 44 medium arches, and 18 high arches.

Pronation Status	Supination	Normal Pronation	Overpronation
Low Foot Arches	33% (4/12)	42% (5/12)	25% (3/12)
Medium Foot Arches	32% (14/44)	55% (24/44)	13% (6/44)
High Foot Arches	11% (2/18)	67% (12/18)	22% (4/18)
Overall Foot Arches	27% (20/74)	55% (41/74)	18% (13/74)

* ( ) = the number of people who performed at that Pronation Status over how many people displayed the certain foot arch height.

Conclusions/Discussion

Data does not support the hypothesis. There was no correlation between the foot arch length and height to pronation. Identifying one#s pronation status early in life can help to avoid health problems related to abnormal pronation in the future.

Summary Statement

The purpose of this project was to study and determine if there is a relationship between the length and height of foot arches and how one pronates.

Help Received