



Creditability of Shoe Selection Based on Foot Print Shape and Injury Risk

Running magazines and internet shoe sales sites often recommend that the shape of the wet foot print should be used to determine which type of running shoe should be selected. There is a common belief that a foot print reflecting low arch (flat feet) should select shoes designed for “motion control”. Motion control shoes are presumed to control excessive motion which occurs in individuals with low arch flat feet. Individuals with foot print suggesting a high arch is presumed to have rigid inflexible feet that under pronate, thus striking the ground with greater force. Cushioned shoes are recommended for those individuals, in order to allow more pronation and to attenuate forces. Individuals with foot prints assessed as average have arch height somewhere between the flat feet and high arch feet. The prevailing recommendation for these individuals is a neutral shoes-or as some shoe companies describe shoes designed for stability.

A large amount of the advertising and blogging suggests that it is important to select the correct shoe design that matches the individual’s foot in order to prevent injury. However there is less than a dozen scientific studies which have examined running shoe design or selection influencing the incidence of running injuries and all of these studies have major methodological flaws.

A recent study (Knapuk, J.J. 2009) prospectively examined whether or not using a foot print assessment technique influenced injury risk during US Army Basic Combat Training. After foot examinations, including foot print test, basic recruits were randomized into a control group or an experimental group.



All subjects in the control group were given a neutral stability shoe. Subjects in the experimental group were—given a shoe design based on the results of the foot print test. Subjects with flat feet were given a motion control shoe, subjects with neutral arch shape were given a neutral shoe, and subjects with high arch were given a shoe designed to provide cushioning and allow motion. The investigators were able to control for other previously know injury risk factors (age, fitness level, smoking).

The results were surprising. There was little difference in injury risk between the control group and the experimental group. The results of study demonstrated that selecting running shoes based on a foot print test did not reduce the risk of injury.

Comparing subjects in the extremes of the experimental group that is very high arch or very flat feet with the control subjects, the injury risk was slightly higher in the experimental group. This indicated that even with extreme foot shapes selecting running shoes based on foot print test did not reduce injury risk, and may have slightly increased risk of injury.

The results of this study are disheartening, in that, there is a simple elegance to the idea that equipment can be designed to match the anatomical structure of an individual and this should have a positive result in terms of function and injury risk. It seems logical that if sports equipment can be custom designed to match the structure of an individual it should result in better performance and less injury. The results of this study raise question regarding this belief.

In this study the shoes provided to the experimental group were from five different shoe companies. The classification of running shoe design into motion control, cushioning, or neutral stability shoes is determined by the manufacture. There is no independent third party to assure that claims made by shoe manufactures are accurate. There is no independent third party to test whether the shoe manufacture's statement that a size 9 shoes is actually a size 9. I have seen two pairs of shoes both size 9 shoes from reputable manufactures that were distinctly different in length/size. Perhaps the professed differences in shoe design, material, and structure are not real or significant. Alternatively perhaps there are real differences in materials and shoe designs between the 3 categories of shoes but these differences do not affect injury risk.

Bottom line

- When it comes to selecting running shoes “buyer be ware”

- Factors other than shoe design and selection may have greater influence on injury risk, such as training load, prior fitness level, manner in which you run.