

BAREFOOT VERSUS SHOD RUNNING – SELECTED CONSIDERATIONS

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INTRODUCTION

The discussion about barefoot and shod running has expanded into the biomechanical research circles and many claims are made about possible advantages and/or disadvantages of one mode of running over the other. The purpose of this paper is to discuss some of these claims critically.

CLAIM 1:

Barefoot running is associated with toe-landing while shod running with heel-landing.

This claim is not correct. It has been shown [1, 2] that the landing pattern is subject specific and influenced by the surface, the shoe, the running speed and the individual's past activity (Fig. 1).

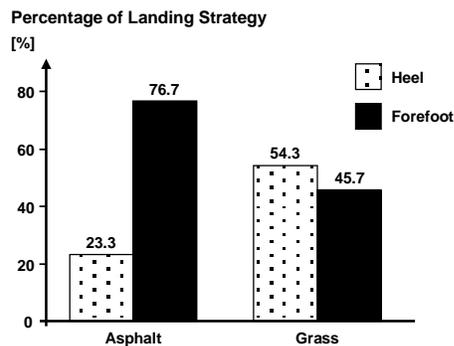


Figure 1: Frequency of forefoot and heel landing when jogging, running and sprinting barefoot on asphalt or grass for 12 subjects. (Data from [2]).

CLAIM 2:

Forces during barefoot running are smaller than during shod running.

This comment is possibly made because the external vertical impact forces are smaller than the corresponding forces during heel landing. However, the forces that are relevant in this context are the internal forces. Internal forces can be estimated using a free body diagram. These calculations show (a) the active forces are the same, (b) the impact forces in the ankle joint are about the same. The impact forces in the muscle-tendon units of the lower extremities are shifted (e.g. from triceps surae to tibialis anterior) but that their magnitudes are about the same [1].

CLAIM 3:

Barefoot running is associated with fewer injuries than shod running.

There is no study that is known to the author that shows conclusively that (a) people running barefoot or (b) people

landing on the heel have fewer injuries than people running with shoes or landing on the forefoot.

CLAIM 4:

Barefoot running needs less energy than shod running.

This aspect is discussed in more detail in two papers from two different research groups [3, 4]. In summary, there are many factors that influence the energy balance and some of them are not well understood.

CLAIM 5:

Barefoot running provides more training for the muscles crossing the ankle joint than shod running.

Multi-muscle pattern for the small muscles crossing the ankle joint suggest that (a) the activity of these muscles is smaller for running than for side-shuffling and that (b) the activity during running may be higher for shod than for barefoot running.

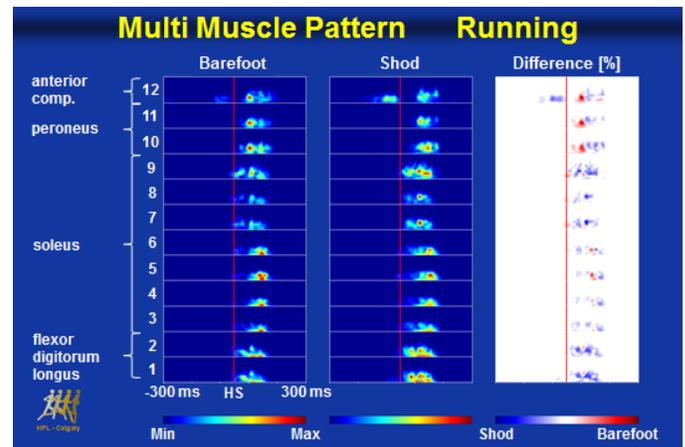


Figure 2: Illustration of the multi-muscle pattern around the ankle joint for one subject running in barefoot (left) running in shoes (center) and the difference plot of these two intensities (right).

REFERENCES

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