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IMPACT OF FOOTWEAR ON SPRINT PERFORMANCE

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Background

- ‘Cleats’ (CL) , athletic running shoes (RUN) and barefoot (BF) are three basic types of footwear that an athlete may use when training and performing, yet very little research has been conducted that compares the differences between them.
- The 40-yard dash is a frequently used test to assess sprint speed, which is an essential component for success in many sports (e.g. football).
- The purpose of this study was to explore the effects of these 3 different types of footwear on 40-yard dash sprint performance.

Method:

- The IRB approved this study prior to any research being done. Every participant signed written informed consent before any trials were done.
- Participants were healthy, physically active, male college students (n = 33, age range = 19-25 yrs) who were not on a varsity athletic team.
- Participants provided and wore their own shoes, which were inspected prior to testing to ensure they met study criteria.

Method:

- Within one day using a random counterbalanced design participants ran two 40-yard sprints in each footwear mode:

BF = barefoot

CL = athletic shoes with studded rubber cleats

RUN = athletic pavement running shoes with rubber soles

Method:

- Before each trial, the participant abstained from eating, drinking, and exercising at least two hours before the trials to add internal validity to the study.
- All runs were performed on FieldTurf artificial grass playing surface, and each participant followed a standardized dynamic warm up and stretching before testing that consisted of low skips, backward run, high knees, butt kicks, high knee carioca, and skip kicks according to Champion Sports Medicine. Each of these exercises was performed over 15-20 yards. After the dynamic warm-up, the researcher led the participant in static stretching of the hamstring, quad and groin.

- The researcher randomly assigned what footwear the participant wore. The participant had three minutes to change into the footwear and place his foot on the starting block.
- With each trial, the participant ran two sprints in the chosen footwear with a 1-minute rest period between each sprint and three-minute rest when changing footwear.
- Infrared timing gates recorded the time from when the participant's foot left the starting block, to when the participant's body crossed the 40-yard line.

Table 1 – Participant Demographics

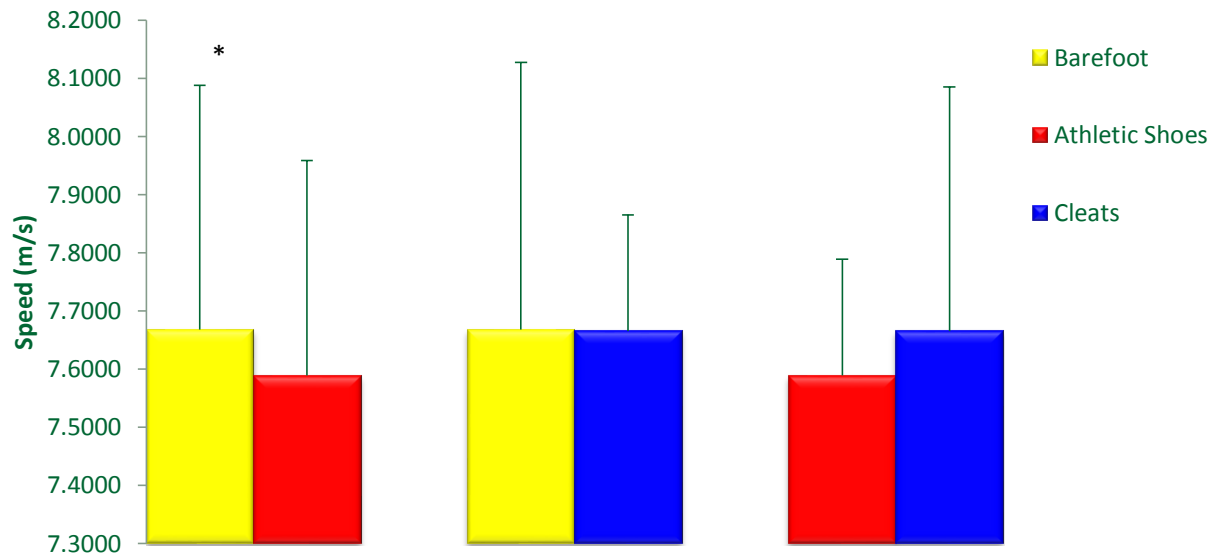
| Variable | Mean \pm SD |
|--------------------------|-----------------|
| Age (yr) | 21 \pm 1.0 |
| Height (cm) | 182.5 \pm 5.6 |
| Weight (kg) | 79.8 \pm 12.0 |
| BMI (kg/m ²) | 24 \pm 3.45 |
| Shoe Size (US) | 11.3 \pm 1.2 |

Table 2 – Footwear Sprint Speeds

| Footwear | Speed (m/s) |
|----------|-------------------|
| BF | 7.668 \pm 0.423 |
| CL | 7.665 \pm 0.190 |
| RUN | 7.589 \pm 0.192 |

- Repeated measures analysis found a significant difference in speed between BF and RUN ($p= 0.04$).
- No significant correlations were found between any of the anthropometric measures.

Figure 1: Average Speed in different types of footwear (barefoot, running shoes, cleats) when running 40-yard dash.



- The difference between barefoot (BF) and athletic shoes (RUN) was the only significance found ($p=0.04$).
- The difference between athletic shoes (RUN) and cleats (CL) was almost significant with $p=0.06$.

Conclusions:

- These findings suggest that the type of footwear worn while running a 40-yard dash may affect run speed. This study has shown that there was no significant difference between BF and CL, and that RUN shoes may impair performance.
- The results from the present study provide valuable information that can be used by coaches, trainers and athletes when selecting footwear and evaluating sprint performance.