

Soccer players' fitting perception of different upper boot materials



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ABSTRACT

The present study assessed the influence of upper boot materials on fitting perception. Twenty players tested three soccer boots only differing in the upper boot material (natural calf leather, natural kangaroo leather and synthetic leather). Players reported fitting perception and preference on specific foot areas using a perceived fitting scale. Ratings were averaged for every foot area. Repeated measures ANOVA was used to analyze the differences between boots. The kangaroo leather boots were perceived tighter and closer to the preferred fitting in general fitting, metatarsals area and instep area. The synthetic leather boots were perceived as the loosest and as the most distant boot from the preferred fitting in medial front area and instep area. In conclusion, the type of upper boot material influences the fitting perception of soccer players. The kangaroo leather was the material whose fitting was perceived closest to the players fitting preference.

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1. Introduction

Soccer is the most popular sport in the world (Hennig and Sterzing, 2010; Manning and Levy, 2006; Zarei et al., 2010), and soccer boots play a major role in players' performance (Hennig and Sterzing, 2010). Comfort has been identified to be one of the most relevant variables for sport shoes design (Lucas-Cuevas et al., 2014; Nigg, 2010) and for soccer players (Hennig and Sterzing, 2014). In this sense, footwear comfort and fitting have been associated not only with injuries (Mündermann et al., 2001) but also with performance in sports (Luo et al., 2009; Nigg et al., 1999). Even though previous studies observed that players are able to cope with a certain amount of discomfort during short motor performance situations, discomfort situations are likely to affect performance if maintained over long periods of time (Sterzing and Hennig, 2008; Sterzing et al., 2009). Thus, comfort perception should be a crucial factor to take into account when purchasing a soccer boot.

Fitting is one of the most important factors in comfort

perception (Hawes et al., 1994; Hennig and Sterzing, 2010). Fitting can be understood as the level of matching between the foot and boot shapes (Lam et al., 2011), unveiled by the pressure distribution generated by the boot on the foot (Olaso et al., 2007). In general, soccer players demand a tighter fit, in comparison with other sports like running where shoes provide 1–2 cm of space around the toes (Kunde et al., 2009). Tight fitting is said to provide better ball handling perception (Sterzing et al., 2011) and an even distribution of pressures over the foot dorsum, what has been related to shooting accuracy (Hennig and Sterzing, 2010, 2014). However, if applied over time, excessive pressures on the foot may lead to overuse injuries and foot pain (Chuckpaiwong et al., 2008; Fernández-Seguín et al., 2014; Weist et al., 2004). All these aspects highlight the importance of purchasing a boot that fits properly due to its influence over soccer performance and injury prevention (Sandrey et al., 1996).

The fit of a boot is related to the shoe-last shape and the materials used for its construction (Janisse, 1992). Certain types of leathers (e.g. kangaroo leather) have the ability to yield and accommodate different foot shapes, while still providing a strong resistance to splitting (Lees and Lake, 2003; Werd and Knight,

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2010). Moreover, each material has a different break-in period, which is the period where the shoe deforms and molds to the shape of the foot (Goonetilleke et al., 2000). As a result, the different properties of the materials used in shoe construction will ultimately influence fit and comfort perception (Lees and Lake, 2003; Werd and Knight, 2010).

Traditionally, leather has been the most commonly used material in soccer boot design, but during the second half of 20th century, synthetic leathers (a mixture of polymeric material and natural leather) and kangaroo leathers became very popular. Even though each type of leather is used for a different purpose, both synthetic and kangaroo leathers are nowadays widely used in the market. However, regardless of their popularity, no study to date has investigated how the different types of leathers used in boot design may influence the footwear fit perception of soccer players.

Fitting has been identified not only as one of the most important aspects that influence the purchase of a soccer boot (Blackwell et al., 2006; Kaplan and Okur, 2008), but also as one of the factors most relevant to satisfaction before and after the purchase of the boot (Chae et al., 2006). In this sense, even though a given soccer boot is reported to provide great levels of functional properties such as traction or stability, a negative perception of fit would make the player to purchase a different soccer boot. As a result, it is of great interest to investigate the players' fitting perception during the purchase of a soccer boot. Therefore, the aim of the present study was to analyze the influence of upper boot materials (natural calf leather, natural kangaroo leather and synthetic leather) on the fitting perception of soccer players during the purchase of a soccer boot on an environment simulating a footwear shop.

2. Material and methods

2.1. Participants

Twenty regional soccer players (age [23.4 ± 2.2 years], weight [72.9 ± 4.1 kg], height [176.9 ± 4.0 cm], European shoe size [42–43], soccer experience [15.2 ± 3.3 years], and weekly soccer practice [7.5 ± 1.8 h/week]) were recruited for the study. All participants gave written informed consent before participation. The study

procedures complied with the Declaration of Helsinki and were approved by the University ethics committee.

2.2. Soccer boots and questionnaire

Three types of soccer boots were used in the present study. The three types of boots were identical (same outsoles, midsoles, insoles) except for the upper boot material: natural calf leather, natural kangaroo leather and synthetic leather. A footwear company (New Millennium Sports S.L., Elche, Spain) manufactured the boots with the same shoe-last for each of the four sizes: 41, 42, 43 and 44 (European shoe size). The soccer players carried out the study using the same shoe size for the three boot conditions. Participants reported their subjective fitting perception on specific foot areas (general, medial front, lateral front, toes, metatarsals, instep and heel). A 5-point Likert scale ranging from very loose (−2) to very tight (+2) was used to assess the subjective fitting perception of the different boot conditions (Fig. 1). This type of scale has been widely used in previous studies that measured subjective perception in the foot-shoe inter-phase (Au and Goonetilleke, 2007; Lam et al., 2011; Witana et al., 2004).

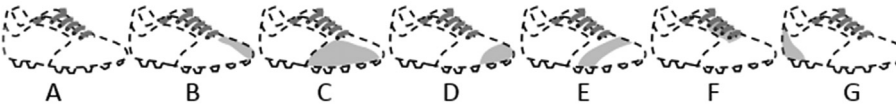
Prior to the beginning of the prototypes tests, participants reported what it would be their preferred level of fitting for each foot area [Preferred]. Then, they wore for 5 min in an environment simulating a footwear shop (synthetic pavement, artificial illumination, mild-controlled temperature of 23 °C) each of the boot types in a random order and reported their perception of fitting [Perceived]. Participants were allowed to choose the level of tightness of the lace. Participants were not informed about the boot condition they were testing and completed the fitting questionnaire after each boot condition.

2.3. Data analysis

Ratings of fitting perception were averaged for each foot area. Similar to previous studies where shoe-last outline was used as a reference value to quantify fitting by calculating the difference between shoe-last and feet outline (Luximon et al., 2003; Witana et al., 2004), "Perceived-Preferred fitting" was used in the present

Participant nº _____ Date: _____
Condition: _____

Mark with **black pen** how you **PREFER** the fit of the boot, and with **blue pen** how you **PERCEIVE** the fit.



	-2.Very Loose	-1.Loose	0.Neither Loose nor Tight	1.Tight	2.Very Tight
A. General Fit					
B. Medial front					
C. Lateral front					
D. Toes					
E. Metatarsals					
F. Instep					
G. Heel					

Fig. 1. The 5-point Likert scale used to assess footwear fitting.

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