Bipedal in-shoe kinetics of skateboarding – the ollie

Aliaksandr Leuchanka, Joanne Ewen & Ben Cooper

To cite this article: Aliaksandr Leuchanka, Joanne Ewen & Ben Cooper (2017) Bipedal in-shoe kinetics of skateboarding – the ollie, Footwear Science, 9:sup1, S122-S124, DOI: 10.1080/19424280.2017.1314373

To link to this article: http://dx.doi.org/10.1080/19424280.2017.1314373

Published online: 10 May 2017.

Submit your article to this journal

Article views: 6

View related articles

View Crossmark data
on an inclined surface, there is still a forefoot dominance. However, there is a clear change in the coordination pattern which appears to be in anti-phase at certain marked sections of the stance phase (Figure 2(a)).

Whilst there is a similarity in the pattern of the waveforms between level and incline walking (Figure 2(a)), they do not provide detailed information on the coordination pattern. However, as indicated in Figure 2(b), the new coordination classification technique identifies subtle changes in the segmental data. These changes provide an insight into the complexity of multi-segment foot kinematics both in level and in incline walking, which has not been observed or reported in traditional approaches. The results of the current investigation and the techniques reported within this study have the potential not only to inform functional footwear design but also a wider clinical and scientific community to understand foot function.

Disclosure statement
No potential conflict of interest was reported by the authors.

References

Bipedal in-shoe kinetics of skateboarding – the ollie
Aliaksandr Leuchanka*, Joanne Ewen and Ben Cooper
VF Global Innovation Center, Dover, NH, USA
(Received 13 February 2017; accepted 28 March 2017)

Keywords: impact forces; footwear; skateboarding; biomechanics; bipedal

Introduction
Skateboarding is a globally participated and popular sport with a reported participation of over 11 million in the United States alone (SGMA, 2007). Published epidemiological studies have stated the significant incidence of musculoskeletal injuries associated with skateboarding (Frederick, Determan, Whittlesey, & Hamill, 2006). The inherent nature of skateboarding makes it difficult to quantify using standard laboratory methods. In-field protocols have been attempted to quantify the metabolic demands of the activity, while only partial segments of a given movement have been quantified from a biomechanics perspective (Frederick et al., 2006; Hetzler, Hunt, Stickley, & Kimura, 2011). Therefore, unique methods of testing are necessary to develop a complete understanding behind the basic movements of skateboarding.

Purpose of the study
The purpose of this pilot study was to quantify the basic skateboarding manoeuvre of the ollie using novel methods and technology in the athlete’s own environment.

Methods
Four experienced male skateboarders participated in this pilot study. Each subject wore identical Vans Authentic footwear, but used their own skateboard throughout the
Results
The average peak take-off forces during an SO, RO and OD were 2.47 ± 0.38 BWs, 2.55 ± 0.51 BWs and 2.34 ± 0.32 BWs, respectively. Average peak landing forces of the SO, RO and OD were 2.40 ± 0.33 BWs, 2.71 ± 0.23 BWs and 3.15 ± 0.51 BWs, respectively. Pressure distribution during take-off and landing was centred around the medial forefoot in sensors 0, 2 and 3 shown in Figure 1.

Discussion and conclusion
The measured take-off forces were similar to previous studies that evaluated the impact forces from an ollie movement (Frederick et al., 2006; Nevitt, Determan, Cox, & Frederick, 2008). The landing forces in our findings were different when compared to previous literature (Nevitt et al., 2008). Nevitt et al. compared landing forces from various platform heights for the OD manoeuvre, while forces of 3.15 ± 0.51 BWs when landing from a height of 36.0 cm we found in this pilot study, they do not compare to the 4.61 ± 0.80 BWs from a platform of 22.9 cm. Previous literature on skateboarding forces utilized force plates to determine the force measurements for the whole system. It is critical to keep in mind that the board, bushings and wheels of the skateboard, as well as the footwear may provide for shock attenuation. As shown in Figure 2, the OpenGo system differentiates itself by providing for force measurements underneath each foot without the need for a tethered data logger on either the distal limb or waist of the subject (Stoggl & Mariner, 2016).

The unique methods of data collection in this pilot study allow the subject to perform in his or her given environment without external influence from testing equipment. This pilot study reveals that skaters experience significant forces underfoot while having the various factors of shock attenuation. Future investigation in the role...
of shock attenuation of the skateboard and footwear would be useful to footwear and skateboard manufacturers.

Disclosure statement
No potential conflict of interest was reported by the authors.

References


Effects of cleat stiffness on footwear comfort and performance in American football: A randomized control trial

Anh-Dung Nguyen*, Jeffrey B. Taylor, Audrey E. Westbrook, Lindsay M. Tiberi, Justin P. Waxman and Kevin Ray Ford

*Department of Athletic Training, High Point University, High Point, NC, USA; †Department of Physical Therapy, High Point University, High Point, NC, USA; ‡Department of Exercise Science, High Point University, High Point, NC, USA

(Received 13 February 2017; accepted 28 March 2017)

Keywords: athletic footwear; American football; cleated shoe; stiffness (bending or compressive); field testing

Introduction
Comfort and performance are the most desirable features that athletes consider when selecting footwear (Hennig & Sterzing, 2010). While footwear stiffness modifications aim to reduce the number of foot and ankle injuries during activity, the interaction between the foot and shoe surface can directly influence the perceived comfort, and therefore have functional performance implications (Wintana, Goonetilleke, Xiong, & Au, 2009). The effects of varying levels of shoe plate stiffness on comfort and functional performance are not well understood, particularly across an athletic season.

Purpose of the study
To determine the effects of footwear stiffness modification on subject-specific assessments in a large cohort of high school American football players prior to and during a football season.

Methods
Ninety-seven high-school-aged American football players (age 16.1 ± 1.2 years, height 175.3 ± 7.2 cm, mass 80.0 ± 21.3 kg) were fitted with two identical football specific cleats (CrazyQuick 2.0, adidas) with different magnitudes of plate stiffness measured by three-point bend testing (stiff: 61.2 N/mm, moderate stiffness: 47.3 N/mm). Subjects completed field-based performance assessments (Pro-agility test, T-test, vertical jump) during the pre-season. The order of testing for each cleat was randomized for each subject. Following the field-based assessments for each footwear condition, the athletes’ perception of the footwear was assessed via a computer-based visual analogue scale (VAS), Likert questions and regions of discomfort chart. Following the field-based assessments; subjects’ cleat preference was recorded. Each subject was then randomly assigned one of the two cleat conditions to wear throughout the season. A weekly questionnaire assessed player wear rate, perceived comfort and perceived performance. Logistic regression determined the primary predictors of athlete cleat preference. Linear mixed effects models determined differences throughout the 12-week season between cleats.

Results
During the pre-season testing, there were no statistical differences between cleats (stiff vs. moderately stiff) in the