GAIT RETRAINING USING VISUAL AND VERBAL FEEDBACK IN RUNNERS

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INTRODUCTION: Overuse injuries occur when the body is exposed to large magnitudes of repetitive forces such as those applied during to the body during running. Differences in running style have been found to modify impact forces and related shock applied to the lower extremity, having the ability to increase or decreasing the potential risk of injury. To date research has indicated that gait retraining biofeedback has a positive influence on both reducing injury factors as well as aiding in the rehabilitation of already injured athletes (Crowell & Davis, 2011; Crossley et al, 2010; Tate & Milner, 2010). However, an optimal biofeedback protocol within gait retraining remains unclear.

METHODS: Eight healthy males (average 28 years, height 178cm, weight 80kg) participated in the study. All participants were regular runners, averaging in excess of 10km per week, and were required to give written consent prior to their involvement in the study. The study followed a randomised cross over design with all participants undergoing two sessions, one week apart. Each session began with a warm up followed by a 'baseline' treadmill run at 3m/s for 5 minutes. During this time peak positive accelerations of the anteromedial aspect of right distal tibia were recorded using an accelerometer (PCB Piezotronics, USA) adhered to the skin. After the baseline run and a 5 minutes rest period participants underwent a further 20 minutes of treadmill running at 3m/s. This was broken into either 'visual' or 'verbal' feedback for 10 minutes, followed by a further 10 minutes post feedback. The visual feedback method was consistent with that employed by Crowell et al., (2010). The verbal feedback involved a clinician providing participants with verbal commands in response to how hard they were impact the ground. Specifically these verbal cues were limited to phrases such as 'run softer' and 'try not to hit the ground as hard'. Wilcox signed rank tests were run using SPSS (v.19) software to compare peak positive accelerations between baseline and during/post both types of feedback.

RESULTS AND DISCUSSION: A comparison of the pre-feedback, feedback and post-feedback results revealed that a significant reduction in peak tibial acceleration occurred in response to the visual feedback session (p = 0.01). Previous research has supported both visual and verbal feedback as being effective mechanisms for gait retaining (Crowell, 2010; Milner, 2011). There was also a trend indicating that both types of feedback were effective in producing a reduction in peak positive tibial accelerations, remaining after the feedback was removed (Table 1). The lack of statistical significance in this trend could be due to the low sample size as well as the high variability within the data. Future research should aim to address these issues with a larger sample and investigation into possible variance changes.

Table 1: Median ±SD peak positive tibial accelerations across time and conditions.

	Baseline	During Feedback	Post-Feedback
Verbal	4.41 ±1.64	3.44 ±1.62	3.60 ±1.49
Visual	3.89 ±1.54	**3.26*** ±1.20	3.20 ±0.67

* Significant difference from baseline (p=<.01)

CONCLUSION AND PRACTICAL IMPLICATION: In conclusion, visual feedback was the most effective in reducing peak tibial accelerations within the current sample. However, a reduction in tibial acceleration was also evident in the verbal condition, which may be shown to be significant in future studies. A major practical implication from this study is highlighting the real-time visual feedback method as a possible tool for injury prevention in the future.

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