EFFECT OF PERFORMANCE JEWLERY ON BALANCE OF ELITE AUSTRALIAN RULES FOOTBALLERS AND HEALTHY YOUNG ADULTS

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The purpose of this study was to test efficacy of a wrist band to improve static balance in an unstable environment using elite Australian Rules Football (AFL) players and healthy young adults. Thirty-five healthy young adults (AFL n=15, Female n=12, male n=8) were exposed to various static balance tasks using the Biodex Balance System®. The participants' ability to maintain static balance was quantified in degrees of deviation from stability for the left and right limb; following a random allocation to three conditions of testing (1) use of a Power Balance® wrist band, (2) a placebo wrist band, and, (3) a control condition. There was no effect of wrist band on static balance within and across the participants (p >0.05). The results of this study do not support efficacy of the Power Balance® wrist band to acutely improve balance of healthy young adults.

KEY WORDS: performance jewellery, balance, healthy young adults.

INTRODUCTION: Searching for a competitive edge has attracted some athletes to so called 'performance jewellery' (Porcari, Hazuga, Foster, Doberstein, Becker, Kline, Michschl, & Dodge, 2011). Although distributors promote efficacy for varying types of performance jewellery, the scientific evidence suggested that claims are susceptible to; (1) an intervention bias, (2) a learning effect, and (3) a placebo effect. The Power Balance® wrist band was promoted to acutely improve balance, muscular strength, muscular power and flexibility based about field tests conducted at point of sale. Even if the actual effect of the Power Balance® wrist band was attributed to a placebo effect, a learning effect or an intervention bias, consumers were none the wiser. Two published papers have scientifically investigated the claims made by distributers of holographic wrist bands. After a double-blind placebo trial, efficacy of the wrist band could not be established for performance improvement of elite college athletes (Porcari et al., 2011) or young individuals (Brice, Jarosz, Ames, & De Costa, 2011). However, these studies were limited since simply wearing performance jewellery may elicit a placebo effect regardless of the 'type' of wrist band (i.e. placebo wrist band or Power Balance® wrist band). The purpose of this study therefore, was to thoroughly describe effects of the Power Balance® wrist band on static balance of healthy young adults by using a research design incorporating a randomised, cross-over, controlled, double-blind placebo trial. It was hypothesised that wearing performance jewellery, regardless of a potential placebo effect, would improve static balance in an unstable environment compared with a control condition.

METHODS: Thirty-five healthy females and males (mean age=20.6 ±1.4 y, stature=1.78 ±0.25 m, mass=71.5 ±20.6 kg) provided voluntary informed consent to participate in the study. The study received approval from the University's Human Ethics Research Committee. Participants were free from muscular injury in the previous month and had no known joint injuries. The participants were grouped as (1) female, (2) male, and (3) elite male AFL footballer. The independent variables were 'type' of performance jewellery; (1) Power Balance® wrist band, (2) placebo wrist band, and, (3) control condition (no wrist band) (Figure 1).

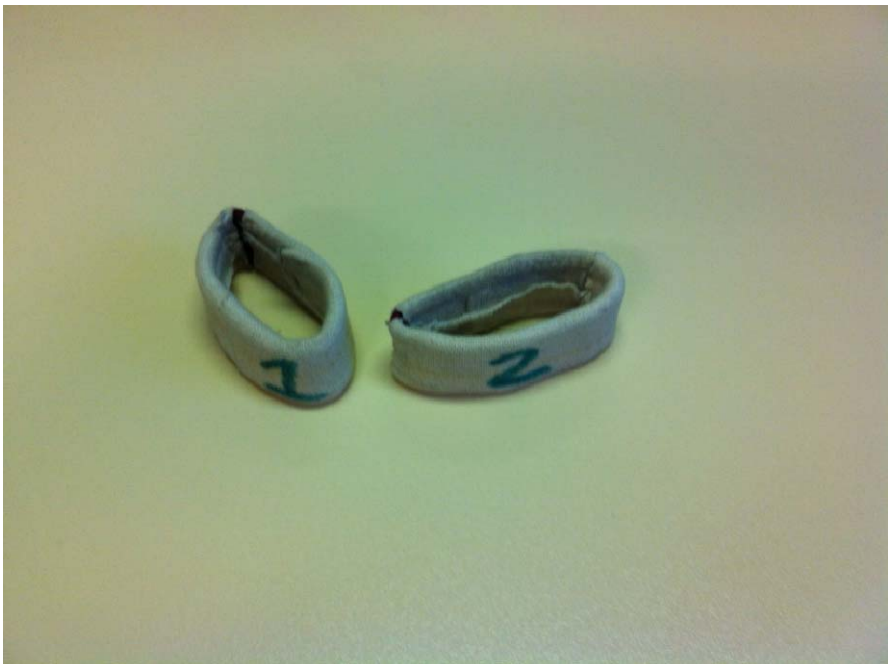

Figure 1: Performance jewellery used during the trials into efficacy of wrist bands on balance.

The wrist bands were covered with tape to create the placebo condition. For the placebo band, the hologram, central to the proposed efficacy of Power Balance®, was removed. The participants and the researcher collecting data were both blind to the 'type' of wrist band. For the control condition, participants did not wear performance jewellery.

The dependent variable, overall stability index (OSI) was expressed as degrees of deviation from stability regardless of orientation (i.e. anterior-posterior and medial-lateral directions), and quantified with the Biodex Balance System®. Reliability of the OSI by the Biodex Balance System® was previously reported as excellent (ICC=0.94) (Cachupe et al., 2001). When standing on the Biodex, an unstable environment was be created by removing support mechanisms within the machine to allow the surface to move much like that experienced when standing on a wobble board. The participants were instructed to maintain balance by keeping the surface of the Biodex level.

In a random order, all participants completed two trials of each level of the independent variable for both the left and right limbs. After two familiarisation trials for each level, data were collected for 20 seconds. Participant were able to assess their OSI performance during data collection. A successful trial was completed when the participant was able to maintain balance for 20 seconds without touching a supporting surface with the hands or foot (Figure 2).

Data were checked for normality and a 3 x 3 ANOVA was computed to describe difference among; (1) the type of wrist band, and, (2) the participant groups. Paired t-tests with a two-tail hypothesis were used to describe effects of limb on OSI for each group and the control condition. Data were imported to SPSS 19.0 for Windows (SPSS Inc., Chicago, USA). Descriptive statistics were calculated to quantify sample statistics and OSI. Effect size was expressed as Cohen's d. Significance was accepted at $\alpha \leq 0.05$.

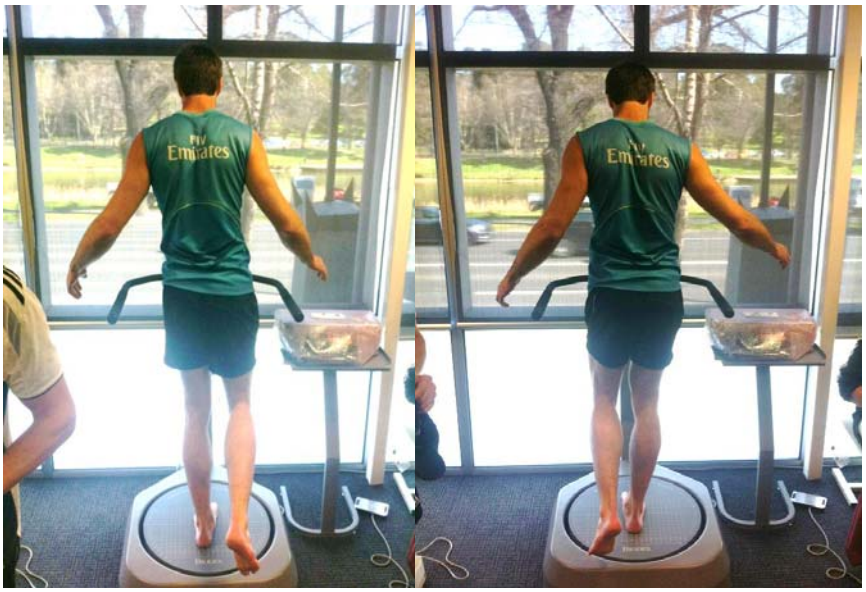

Figure 2: The Biodex Balance System® during the control condition for the left and right limb.

Figure 2 shows a participant standing on the Biodex Balance System® during the control condition. Participants completed trials on the left and right foot for each level of the independent variable.

RESULTS: Since data on stability were collected on two sides of the body, results had to be checked for the absence of bilateral differences. Data of the paired limb analysis are shown in Table 1. There was no difference within the left and right limbs for each group of participants. Table 2 shows the pooled left and right limb OSI data. There was no interaction effect of type of wrist band and group ($F(2, 123)=0.06$, $p=0.94$). There was no main effect of type of wrist band on OSI ($F(2, 116)=0.58$, $p= 0.56$). There was a main effect of group and OSI ($F(2, 116)=8.43$, $p=0.01$). Post hoc analyses revealed difference among results from female, and both male ($p=0.02$, effect size=0.96) and elite AFL footballers ($p=0.01$, effect size=0.99). Specifically, the females showed better static balance in an unstable environment. No differences were observed among elite male AFL footballers and healthy young males ($p=0.15$).

Table 1: Comparison of OSI among left and right limb in an unstable environment.

Group	Wrist band	OSI Left		OSI Right		Sig
		Mean	SD	Mean	SD	
Female	Control	1.2	0.6	1.1	0.4	0.61
Male	Control	1.8	0.9	1.8	1.7	0.88
AFL	Control	1.9	1.3	1.6	0.6	0.44

Table 2: Effects of type of wrist band on OSI for healthy young adults.

Group	Wrist band	n	OSI	
			Mean	SD
Female	Control	12	1.1	0.5
	Wrist band 1	12	1.0	0.4
	Wrist band 2	12	1.1	0.4
Male	Control	8	1.8	1.3
	Wrist band 1	8	1.6	1.0
	Wrist band 2	8	1.6	0.8
AFL	Control	15	1.7	1.0
	Wrist band 1	15	1.7	0.7
	Wrist band 2	15	1.7	0.8

DISCUSSION: This is the first study to show there was no difference among a Power Balance® wrist band, a placebo wrist band and a control condition. These data are supported by the results of an earlier studies in elite college athletes (Porcari et al., 2011) and young individuals (Brice et al., 2011). The previous investigation of Power Balance® wrist bands could not estimate a potential placebo effect because of a limited research design. In our trial, balance was not affected independent of the wrist band 'type'.
Females showed better balance than males in this study. This result however, may be expected since many studies have reported sex difference for balance of healthy young adults (Wikstrom, Tillman, Kline, & Borsa, 2006; Kim, Eom, Kim, Kim, Lee, Park, & Hong, 2010). Interestingly though, the Biodex Balance System® was sensitive enough to allow a differentiation of static balance ability among participants in this study.
A limitation of this study was that the selected task lacked sports specificity. Nevertheless, it could be argued that balance is fundamental to all movement tasks.

CONCLUSION: The results of this randomised, cross-over, controlled, double-blind placebo trial further challenge efficacy of commercially available performance jewellery. Specifically, a commercially available wrist band designed to acutely improve balance lacks a scientific evidence base to confirm developer claims of efficacy.

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