ELSEVIER

Physiotherapy 100 (2014) 36–40

Physiotherapy

Effects of kinesiotaping on foot posture in participants with pronated foot: A quasi-randomised, double-blind study

Alejandro Luque-Suarez [a,*], Gabriel Gijon-Nogueron [b], Francisco Javier Baron-Lopez [c], Maria Teresa Labajos-Manzanares [a], Julia Hush [d], Mark Jonathan Hancock [d]

[a] *Physiotherapy Department, University of Malaga, Malaga, Spain*
[b] *Nursing and Podiatry Department, University of Malaga, Malaga, Spain*
[c] *Faculty of Medicine, University of Malaga, Malaga, Spain*
[d] *Department of Health Professions, Faculty of Human Sciences, Macquarie University, Sydney, Australia*

Abstract

Objective To investigate whether kinesiotaping improves excessive foot pronation compared with sham kinesiotaping.
Design Quasi-randomised, double-blind study.
Setting One primary care centre.
Participants One hundred and thirty participants were screened for inclusion. Sixty-eight participants with pronated feet [Foot Posture Index (FPI) ≥ 6] were enrolled, and the follow-up rate was 100%.
Interventions Participants were allocated into one of two groups: an experimental kinesiotaping group (KT1) and a sham taping group (KT2). Measures were collected by a blinded assessor at baseline, and 1 minute, 10 minutes, 60 minutes and 24 hours after taping.
Main outcome measures The primary outcome was total FPI score, and the secondary outcome was rear-foot FPI score.
Results There were no significant differences in total FPI score between kinesiotaping and sham taping at any time point. Similarly, there were no significant differences in rear-foot FPI score, apart from at 60-minute follow-up when the difference between groups was significant ($P = 0.04$) but the effect size was very small (0.85 points on the rear-foot FPI score between −6 and +6).
Conclusions Kinesiotaping does not correct foot pronation compared with sham kinesiotaping in people with pronated feet.

Keywords: Foot; Pronation; Athletic taping

Introduction

Excessive foot pronation has been defined as a flattening or loss of the medial longitudinal arch [1,2]. The subtalar and midtarsal joints exhibit movement beyond the normal range of motion, and the foot remains pronated for a prolonged period of time during the gait cycle [3]. This condition has been cited as a contributing factor to many lower limb overuse injuries. A pronated foot type has been associated with medial tibial stress syndrome [4], plantar fasciitis [5], hallux rigidus [6] and patellofemoral pain syndrome [7]. Several tools have been developed to assess the degree of foot pronation, including the navicular drop test [8,9], tibial rotation angles [10] and Foot Posture Index (FPI) [11].

Interventions used to attempt to correct excessive pronation include prescription of orthotics [12] and taping. Low-dye taping and high-taping techniques have been investigated in the correction of foot pronation [13–17]; however, to the authors' knowledge, kinesiotaping has not been examined to date.

Kinesiotaping has recently become increasingly popular for the management of musculoskeletal impairments, including foot pronation. Kinesiotaping is designed to mimic the qualities of human skin. Unlike rigid tape, which is used in most traditional taping techniques, kinesiotaping has comparable thickness to the skin epidermis and can be stretched longitudinally between 30% and 40% of its resting length [18].

* Correspondence: Facultad de Ciencias de la Salud, Universidad de Malaga, Paseo de Martiricos, s/n, 29009 Malaga, Spain.
Tel.: +34 952137068; fax: +34 952132913.
E-mail address: aluques@uma.es (A. Luque-Suarez).

0031-9406/$ – see front matter
http://dx.doi.org/10.1016/j.physio.2013.04.005

While evidence exists that traditional taping can be effective in controlling excessive pronation [16,17,19,20], no studies have been published regarding the effectiveness of kinesiotaping for controlling foot pronation. The beneficial effects of traditional taping on correction of foot pronation have been shown to reduce after 10 to 30 minutes [17,19]. Current evidence suggests that traditional taping interventions may be effective via a sensorimotor or psychophysical feedback loop, rather than simply by 'motion control' [21]. In this sense, kinesiotaping has been shown to be effective in providing alignment correction in scapular movements [22] by offering constant proprioceptive feedback, although underlying mechanisms remain unclear. Therefore, it is feasible that kinesiotaping may be effective in correcting excessive pronation despite lacking the rigid properties of traditional tape. If kinesiotaping could reduce pronation and the effects could be maintained over time, it could be a simple alternative to traditional taping in people with overpronated feet.

As such, the aim of this study was to investigate whether kinesiotaping can improve excessive pronation, and if so, how well this correction is maintained over the first 24 hours.

Fig. 1. Participant in experimental kinesiotaping group.

Methods

Participants

One hundred and thirty volunteers from the student body of the Health Sciences School, University of Malaga were screened for inclusion in the study. The inclusion criteria were: (i) FPI score of 6 to 12; (ii) no ankle injury within the previous 6 months; (iii) no ankle pain at the time of the study; (4) age between 18 and 40 years; and (5) able to provide informed, written consent. Sixty-eight participants were enrolled into the study (Fig. A, see supplementary online material). Informed written consent was obtained from all participants before enrolment, and all rights of the participants were protected. All procedures were approved by the Medical Research Ethics Committee of the Faculty of Nursing, Physiotherapy, Podiatry and Occupational Therapy, University of Malaga and in accordance with the Declaration of Helsinki.

Protocol

Baseline assessment/screening

All potential participants completed a questionnaire regarding demographic data (gender, age, height and weight). Subsequently, the FPI score of all potential participants was assessed on the foot of the dominant lower limb by an experienced podiatrist (GGN), who was unaware of the requirement of an FPI score $\geq$6 for inclusion in the study. The assessor of FPI was also blinded to the participant's identity; a folding screen was placed between the subject and the assessor, and only the foot and 10 cm of shank were visible to the assessor.

Following the collection of baseline data, participants who met the inclusion criteria were allocated to one of two groups: experimental kinesiotaping group (KT1) or placebo kinesiotaping group (KT2), based on alternative entry into the study. Participants returned the following day for kinesiotaping according to their group allocation. Participants underwent blinded assessment of their FPI score immediately after taping, and then 1 minute, 10 minutes, 60 minutes and 24 hours later (Fig. A, see supplementary online material).

When the assessor scored FPI for each participant, the values were recorded by a research assistant. As such, the assessor was blinded to the treatment group (taping or sham taping), identity of participant (only foot was visible) and order of testing (each test could be any of the four follow-up time points).

All taping was applied by the primary author (ALS), an experienced kinesiotaping practitioner, to the foot of the dominant lower limb of each participant.

Experimental group (KT1)

Kinesiotaping was applied according to procedures recommended by Pijnappel [23]. Standard 5-cm blue Cure© tape was used for both groups. A single strip, 20 cm in length, was applied from the fibula (lateral malleolus), around the calcaneus, with 100% stretch, to the middle third of the medial tibia. The strip was applied directly to the skin, with the subject in a supine position and the rear foot positioned in a supinated position (Fig. 1). Once applied, the instructor warmed up the kinesiotaping strip by rubbing his hand three times from the fibula (malleolus) to the middle third of the tibia in order to maximise tape adhesion.