



The effects of kinesio taping on the color intensity of superficial skin hematomas: A pilot study



Stefano Vercelli ^{a, *}, Claudio Colombo ^b, Francesca Tolosa ^c, Andrea Moriondo ^d,
Elisabetta Bravini ^e, Giorgio Ferriero ^a, Sartorio Francesco ^a

^a Unit of Occupational Rehabilitation and Ergonomics, Salvatore Maugeri Foundation – IRCCS, Veruno (NO), Italy

^b Private Practice, Verbania, Italy

^c Private Practice, Oleggio (NO), Italy

^d Department of Surgical and Morphological Sciences, University of Insubria, Varese, Italy

^e School in Advanced Sciences and Technology in Rehabilitation Medicine and Sport, Tor Vergata University, Rome, Italy

ARTICLE INFO

Article history:

Received 8 May 2015

Received in revised form

12 April 2016

Accepted 14 June 2016

Keywords:

Physical therapy

Bruise

Tape

Hematoma

ABSTRACT

Objectives: To analyze the effects of kinesio taping (KT) -applied with three different strains that induced or not the formation of skin creases (called convolutions)- on color intensity of post-surgical superficial hematomas.

Design: Single-blind paired study.

Setting: Rehabilitation clinic.

Participants: A convenience sample of 13 inpatients with post-surgical superficial hematomas.

Interventions: The tape was applied for 24 consecutive hours. Three tails of KT were randomly applied with different degrees of strain: none (SN); light (SL); and full longitudinal stretch (SF). We expected to obtain correct formation of convolutions with SL, some convolutions with SN, and no convolutions with SF.

Main outcome measures: The change in color intensity of hematomas, measured by means of polar coordinates CIE L*a*b* using a validated and standardized digital images system.

Results: Applying KT to hematomas did not significantly change the color intensity in the central area under the tape ($p > 0.05$). There was a significant treatment effect ($p < 0.05$) under the edges of the tape, independently of the formation of convolutions ($p > 0.05$).

Conclusions: The changes observed along the edges of the tape could be related to the formation of a pressure gradient between the KT and the adjacent area, but were not dependent on the formation of skin convolutions.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Over the last decade, the kinesio taping (KT) method has become a popular treatment option in the field of musculoskeletal and sport injuries. The proposed effects of KT include the improvement of circulation by increasing the interstitial space between the skin and underlying connective tissues through the formation of convolutions, i.e. small creases of the patient's skin created by the combination of the tape's elastic capacity and its

application over stretched skin. This is claimed to be beneficial in treating conditions such as lymphedema, venous insufficiency, swelling, and superficial hematomas (Kase, Wallis, & Kase, 2003). Studies have been conducted examining the effects of KT in relation to improving lymphatic (Tsai, Hung, Yang, Huang, & Tsauo, 2009; Smykla et al., 2013; Bell & Muller, 2013; Pekyavaş, Tunay, Akbayrak, Kaya & Karataş, 2014; Donec & Kriščiūnas, 2014) and venous circulation (Aguilar-Ferrández et al., 2014; Aguilar-Ferrández et al., 2013), or reducing acute swelling after ankle sprains (Nunes et al., 2015). Although there is no firm evidence proving the effectiveness of KT on circulation, there appears to be some merit in the method warranting further research. To our knowledge, no study has yet investigated the effects of this application in the presence of hematomas, despite claims by the creators of the

* Corresponding author. Fondazione "Salvatore Maugeri", IRCCS, Istituto Scientifico di Veruno, Servizio di Fisiatria Occupazionale ed Ergonomia, Via per Revislate 13, I-28010, Veruno (NO), Italy.

E-mail address: stefano.vercelli@fsm.it (S. Vercelli).

method and positive clinical observations in this regard. As mentioned above, the key working mechanism proposed to speed up the absorption of superficial hematomas involves the formation of skin convolutions. This is hypothesized to reduce the pressure below the dermis, which in turn would: 1) increase the carrying capacity of the capillaries enhancing the efficiency of the drainage system, and 2) reduce the pressure in the mechanoreceptors located below the dermis, decreasing the nociceptive stimuli (Kase et al., 2003). However, the role of skin convolutions as a working mechanism in the treatment of hematomas has never been scientifically demonstrated. In fact, KT applied with stretch to generate convolutions in the skin was no more effective than a simple application of the tape without tension to reduce pain intensity and disability in a group of patients with low back pain (Parreira Pdo et al., 2014).

The research question of the present study was whether KT may have an effect on color of postoperative superficial hematomas. If the hematoma is localized just below the dermis or the fascia, then a red, purplish-brown, or black ecchymotic area is usually easily visible through the skin. Given the close relationship between bleeding and skin ecchymosis, one can assume that a decrease in the blackness represents an indirect measure of healing of the hematoma. Accordingly, it was hypothesized that KT application could be effective in accelerating the reduction of the skin color intensity. This hypothesis has been tested by investigating the effects of a three-tailed KT technique randomized with three different degrees of strain, designed to create or not the skin convolutions. A qualitative analysis of the captured images was also conducted in an attempt to gain some useful insights into the mechanisms of action of KT.

2. Materials and methods

2.1. Research design

This study had a single-blind paired design. The independent variable was the strain level applied to KT, while the dependent variable was the color intensity of the hematoma, which was measured through a standardized and previously validated system for the processing of digital images. The study was approved by the Fondazione Salvatore Maugeri's institutional review board and the local ethics committee of the Scientific Institute of Veruno, and was conducted in compliance with the Declaration of Helsinki. Before inclusion, all subjects signed an informed consent.

2.2. Subjects

Subjects were consecutively recruited among those hospitalized in the Rehabilitation Clinic of Veruno (NO), between July 1st and December 31st 2014. Subjects who fulfilled the following criteria were eligible for the study: age >18 years; presence of superficial hematomas resulting from surgical procedures that occurred not more than 4 weeks before, and with a surface area sufficiently large to enable the application of KT (i.e. at least 10 cm wide and 20 cm long). The exclusion criteria were: presence of wounds in the target area; use of any other external aids to speed up healing of the hematoma or that could limit the application of KT (e.g. patches or wound dressings, use of compressive stockings); the yellowing of the ecchymotic area, which indicates an advanced stage of healing; and the presence of diseases affecting lymphatic or vascular flow.

2.3. Tape application

The method consisted of the application of a KT technique. The tape used was a hypoallergenic, non-medicated, waterproof,

porous, adhesive, cotton tape, which can be stretched longitudinally up to 130–140% of its original length (Cure Tape; Aneid Italia, Rome, Italy).

Before application, the skin was shaven when necessary, cleaned with alcohol, and dried. Tape ends were rounded to prevent the square edges from peeling off and to increase the length of application. Patients were positioned in such a way that the affected area was elongated to the maximum extent. The KT was applied directly on the skin, over the hematoma. The same physical therapist, certified and extensively trained in the technique, did all applications, so ruling out inter-operator variability in performance of the procedure.

A modified technique based on the original “fan” strip application (Kase et al., 2003) was used. A common anchor base was applied without tension, followed by the application in a fan-shaped mode of 3 tails (each one about 1.6 cm wide) randomized with three different degrees of strain: none (SN), light (SL, about 10–15% of available tension), and full longitudinal stretch (SF).

According to the creators, none to light tension would allow the best results through the correct formation of skin convolutions, while applying too much tension would decrease the desired results instead of enhancing them. The consistency of the stretch applied was evaluated by comparing the length of the paper backing and tape applied. The location of different strain applied was recorded for each subject, and the tape was left *in situ* for 24 consecutive hours.

2.4. Standardized digital images system (SDIS)

To standardize light conditions, perpendicularity, and the distance between the skin and the camera, a validated digital images system was used to capture pictures (Cheon, Lee, & Rah, 2010; Kaartinen, Välisuo, Alander & Kuokkanen, 2011; Hallam, McNaught, Thomas & Nduka, 2013). The SDIS consisted of a cardboard dark chamber (with a base shaped like a truncated octagonal pyramid), a LED lighting system, and a digital camera (ST500 digital camera, Samsung Co.Ltd, Seoul, Korea) (Fig. 1). Three LED lights were fixed on the roof of the chamber, which was placed directly on the patient's skin with a dark green sheet arranged to preserve the skin from external light. The camera was positioned on the top of the chamber, so that its lens passed through the proper hole.

2.5. Procedures

Three consecutive photographs were taken for each subject: at baseline (T0), immediately after KT was applied, and after 24 h of use (T1). The second photograph was used only as a reference for the exact location of KT. To avoid possible bias due to the pressure marks left on the skin by the tape shortly after its removal, the third picture was taken half an hour after tape removal.

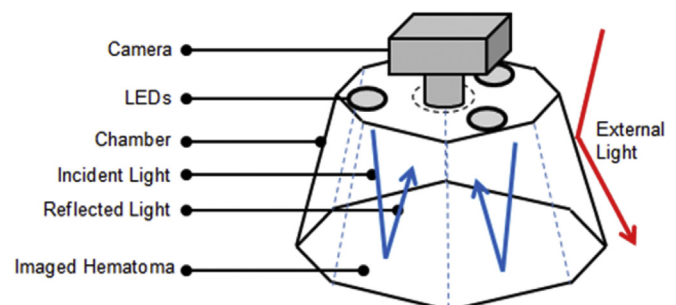


Fig. 1. The standardized digital system used to capture images.

Download English Version:

<https://daneshyari.com/en/article/5873630>

Download Persian Version:

<https://daneshyari.com/article/5873630>

[Daneshyari.com](https://daneshyari.com)