Ankle taping: Support given by different materials

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Three different adhesive and two non-adhesive tapes were used by the three operators to assess the compressive action exerted on the ankle at the moment of strapping, during different phases of gait, and after some days of treatment in ten volunteers.

Only the adhesive tapes were still able to prevent swelling after five days. They should be used if a prolonged compressive action is required.

Keywords: Ankle sprains, strapping, sports medicine, sports injuries

Introduction

Inversion injuries of the ankle are common among sportsmen^{1,2}. Taping is widely and routinely used to support the ankle joint when injured³ and to prevent injury in normal ankles²⁻⁵, or further re-injury⁶. It significantly decreases instability after even violent physical activity⁷. Taping is a fundamental component of the RICE (Rest-Ice-Compression-Elevation) treatment programme⁸. The compression exerted varies with the material, technique and operator^{2,9}. A properly strapped ankle can withstand torque forces up to 420Nm⁹.

The present investigation compares the compressive support given by different tapes when applied by different operators. Non-adhesive tapes have been chosen because they are cheap and easy to handle even by non-specialised personnel. The Thuasne tape is re-usable.

Materials and methods

Three experienced operators participated in this study. Ten volunteers (age 25 ± 4.2 years, range 19–31 years; weight 64 ± 7.3 kg, range 58–82 kg) gave their consent to take part. Five tapes were used:

- 1 Transelast (Lohman): non-adhesive elastic
- 2 Thuasne (Thuasne): cohesive elastic
- 3 Porelast (Lohman): elastic adhesive
- 4 Tensoplast (Smith & Nephew): elastic adhesive
- 5 Elastikon (Johnson & Johnson): elastic adhesive.

Each of the ten subjects underwent ankle taping with the five different tapes by the three different operators in a random order. A standard technique was used^{9,11}. Both ankles were strapped at the same

time, each by a different operator and with a different tape.

The compressive power exerted by the tapes was assessed by wrapping an anaeroid sphygmomanometer cuff, inflated to a pressure of 20 mmHg, around the lateral aspect of the ankle. The cuff was included in the strapping (Figure 1).

Pressure variations were recorded:

While lying supine every day for the five days of the study, including the day of strapping

While standing on one day only

In the different walking phases (heel strike, full foot and heel off)¹² on day one only.

The cuffs had been tested for air tightness by inflating them at different pressures, and keeping them still for five days. The maximum difference was less than five per cent. The subjects were asked to abstain from any physical activity, and to spend as much time as possible sitting at home with the leg elevated for the four days following each taping procedure. The results were analysed using the chi-square test. Significance level was set at $P < 0.05$.

Results

In four cases, all with tapes 1 and 2, the cuff slid along the ankle. The investigators were not able to measure accurately the compression pressure after the third day. In three cases, with the adhesive tapes, cutaneous hypersensitivity reaction developed, evident only when the tapes were removed. Results are shown in Table 1 and in Figure 2.

Figure 1. The experimental model

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Table 1. Pressure variations recorded during the five day study

	Transelast	Thuasne	Adhesive tapes
At rest	38.3±3.3	58.6±4.1	55.9±3.8
Standing	41.2±2.9	65.4±2.5	80.0±6.1
Heel strike	44.1±2.8	70.4±3.2	85.7±5.6
Flat foot	46.1±2.5	74.5±4.2	90.8±5.4
Heel off	49.2±3.0	77.4±3.7	94.7±4.9

The adhesive tape figures given are the average of the three elastic adhesive tapes used. All values are in mmHg

Figure 2. Pressure profile of the tapes

Transelast exerts the least pressure at all stages. There were no statistically significant differences among the three operators with any of the five tapes.

Discussion

Several methods have been advocated for treating¹³⁻¹⁵ and preventing^{4,16,17} first and second degree inversion injuries of the ankle. Some studies have shown that taping is indeed effective^{15,16} while other investigators obtained better results with ankle stabilizers^{17,18}.

In the present study, great care was taken to standardize taping technique, but the use of different materials could account for non-detectable and non-quantifiable differences in handling. Wide variability in compression was shown by the different tapes, with the elastic adhesive tapes giving the highest compression. This could be linked with the intrinsic properties of the tapes, which should prevent fluid extravasation from the interstitial compartment. The compressive effect could be lost by performing physical exercise while strapped. This effect was significantly lower after five days, due to the general loosening of the tapes, which was more evident with the non-adhesive tapes. Non-elastic tape proved to be the most restrictive¹⁹. At the end of a simulated training session, even

After the third day, a non-adhesive strapping should be renewed. Some effective compression is still exerted by the elastic adhesive tapes after five days (Figure 2). This should be taken into account when planning a therapeutic programme for a sprained ankle.

The three operators had been trained together and were routinely working together. If more than one operator is performing ankle taping in a clinical and/or research environment, it is important that they use a technique as similar as possible to each other, in order to be able to maximize and compare the results, and to give reliable prognostic indications.

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