‘TAPPING’ IT TOGETHER:
Efficacy, mechanism of action & different techniques of anti-pronation taping

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PART 1
Anti-pronation taping techniques

PART 2
Efficacy

PART 3
Mechanism of action

Overview
Overview

PART 1 Anti-pronation taping techniques
PART 2 Efficacy
PART 3 Mechanism of action

Efficacy of anti-pronation tape

Does tape work?
- Pain reduction
- Improve function

Overview

Mechanism of anti-pronation tape

How does tape work?

1. Neuro-physiological
2. Biomechanical
3. Psychological

Diagrams showing various taping techniques and their effects on different conditions such as plantar heel pain, anterior knee pain, and more.
Biomechanical effects

Mechanism underpinning effectiveness of tape is the ability to directly, by mechanical means:
• Correct foot posture
• Control motion
• Reduce stress on plantar surface of the foot


Foot posture – static
• Large effects (SMD > 0.8)
• Reduced calcaneal eversion (Jamali 2004; Whitaker 2003; Inman 2001)

Foot posture – static
• Small to moderate effects (SMD 0.2-0.8)

Foot posture – static
• Large effects (SMD > 1.0)
• Increased MLA height & arch height ratio (Vicenzino 2005; Franettovich 2010)

Foot posture – static
• Reduced tibial internal rotation 4.6 degrees (Hodley 1999)

(AH & = arch height
(Cornwall 1995)
Biomechanical effects


**Foot posture – dynamic**

- **Calcaneal eversion (SMD 0.1-0.7)**
  - Walking (Keenan 2001)
  - Running (Ross 1993; Kersting 2006)

- **Arch height ratio (SMD > 0.9)**
  - Walking (Vicenzino 2005)
  - Jogging (Vicenzino 2005)

**Foot mobility**

- Large differences (SMD > 1.3)
  - Increased weight-bearing arch height ~6mm
  - Reduced arch height difference ~4.7mm
  - Reduced midfoot width difference ~4.5mm
  - Reduced foot mobility magnitude ~6.3mm

- Navicular drop (del Rossi 2004)

**Arch Height**

**Midfoot Width**

**Kinematics walking - ankle**

- Increased peak dorsiflexion & adduction during walking
- Reduced peak plantarflexion
- Reduced pronation & supination (O’Sullivan 2008)

**Kinematics – Knee, hip**

- Small effects SMD < 0.4
  - Increased peak knee flexion
  - Increased peak hip flexion

**Plantar pressures**

- **LD** – small/moderate effects (SMD 0.4 – 0.8)
  - Reduced medial forefoot (Russo 2001; Lange 2004; O’Sullivan 2008)
  - Increased lateral midfoot (Russo 2001; Lange 2004; O’Sullivan 2008)

- **ALD** – large effects (SMD >1.7)
  - Reduced medial forefoot (Vicenzino 2006)
  - Increase lateral midfoot (Vicenzino 2006; Kelly 2010)
Difference between techniques?

- ALD greater magnitude mechanical effects (Vicenzino 1997; Franettovich 2008; Cheung 2011)
- ALD greater duration of mechanical effects (Vicenzino 1997; Franettovich 2008)

Mechanism of anti-pronation tape


How long do mechanical effects last?

- ALD effect diminished with activity but still present after 10-20 minutes of walking & jogging (Vicenzino 1997; Vicenzino 2000; Franettovich 2010)
- LD effect reduces with activity, still present after 10 minutes walking but not jogging (Nabuss 2002; Altar 1997; Vicenzino 1997)

Neurophysiological effects

Mechanism underpinning effectiveness of:

- alterations in muscle activity
- Stimulation of sensory receptors via surface contact / stretch of skin
- Influence on perception & execution of movement

Neurophysiological effects

Muscle activity

- Moderate effects leg (SMD = 0.6 – 0.9)
  - Reduced TP, TA, MG (Franettovich 2010 & 2012)
  - Increased peroneus longus (Franettovich 2010 & 2012)
- Minimal at thigh (Franettovich 2010; Kelly 2010)

Neurophysiological effects
**Difference between techniques**

Augmented low-Dye  
Brace (Push® Aequi)

- Effects similar i.e. TP & TA reduction  
  [Franettovich 2012]
- ALD reduction in TP significantly greater than brace (33% vs 22%)  
  [Franettovich 2012]

**Mechanism of anti-pronation tape**

**Psychological effects**

Mechanism underpinning effectiveness of tape is related to:  
- Perceived effect  
- Laying on of the hands

- Calcaneal tape, sham tape, plantar fascia stretches all produce reduction in pain 61%, 6% & 27% compared to control [Hyland 2006]
- 'Sham' applied without medially directed force, simply overlaid on skin

**Pschological effects**

- Low-Dye + sham ultrasound vs sham ultrasound both improved first step pain, foot pain, foot function [Radford 2006]
- Only first step pain was significantly greater improvement in LD vs sham

**Comparison between asymptomatic & exercise related leg pain**

- Effect of ALD on foot posture, foot mobility, muscle activity, kinematics similar (p > 0.05)  
  [Franettovich 2010]
- Possibly lends support to extrapolation of early studies in asymptomatics
Mechanism anti-pronation tape

Clinical Relevance of immediate effects?

Relief of symptomatic structures?
Exercise related leg pain
TP, TA, MG tendinopathy or injury
Increase MLA or reduce mobility
Reduce PF & ABD

Intervention for prevention?
Increased ankle abduction (1.5 degrees) risk factor for development of ERLP (Willems 2009)

Further investigations required

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Summary

• Low-Dye
• High-Dye

• Strong; Plantar heel pain
• Preliminary: AT, AKP, ITB, ERLP

• ALD mechanical effects larger & longer lasting compared to LD
• Brace can produce similar muscle reductions

• Biomechanical (Increase MLA, reduce mobility, reduce PF & ABD, reduce med FF & increase lat MF pressures)

• Neuropsychological (Reduce TP, TA, MG, increase PL)

• Psychological

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