The art and theory of using taping techniques as an adjunct when working with athletes

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Lecturer: Dr Martin Isaksson

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Norway hands on seminar – Jan 2020

“Education is the path from cocky ignorance to miserable uncertainty”
- Mark Twain

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Lecture Content

Theory of tape and their applications

- Kinesiology
- Biomechanical
- Rigid

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Kinesiology Taping can assist our bodies' own healing mechanisms.

Kenzo Kase, 1980 founded Kinesio Taping Method

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Kerri Walsh 2008 Olympics

Popularity started to grow…

2008 Summer Olympics

Natacha Pisarenko/The Associated Press

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And today we see it on both athletes and our regular patients

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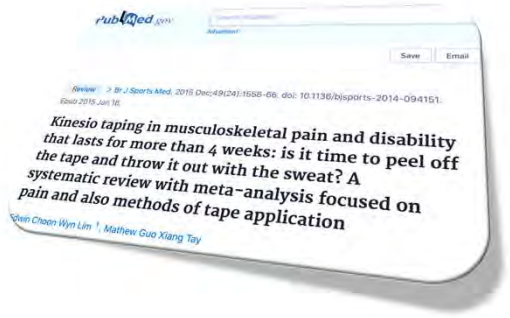
Does kinesiology tape really work or do we just "throw it out with the sweat" ?



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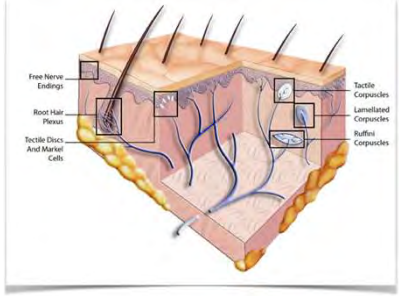

Largest organ of your body

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Skintelligence

Our skin is a megaphone to get our brain's attention.

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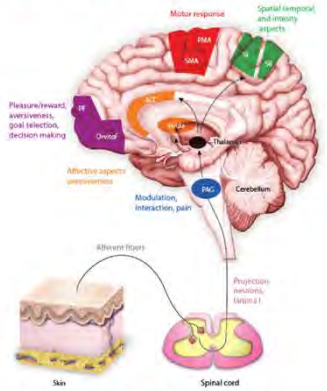
The 2 way street

- Skin and brain come from same neurological tissue
- Skin is like having a key to the brain – VIA the SKIN (largest organ in the body).
- This is how do we prime the nervous system through taping
- We do not touch muscles, we touch skin



Paus, Ralf., Schmelz, Martin., Biro, Tamas., Steinhoff, Martin. Frontiers in pruritus research: scratching the brain for more effective itch therapy. J Clin Invest. 2006; 116(5): 1174-1186.

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Let's dive deeper….

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The Sense of Touch

1. Tactile
2. Pain
3. Temperature
4. Pressure
5. Vibration
6. Proprioception
7. Interoreception

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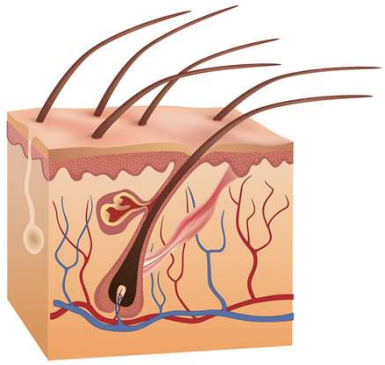
Hair Follicles



Root Hair Plexus

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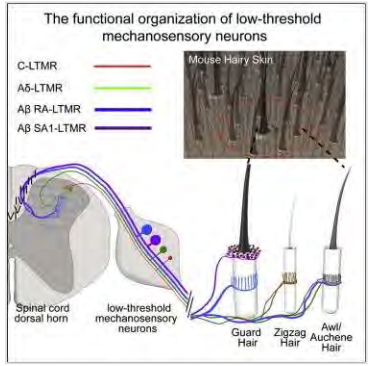
Hair Follicles

- Perception of Myriad Touch Sensations
- LTMR's - functionally distinct mechano-sensory end organs



The Functional Organization of Cutaneous Low-Threshold Mechanosensory Neurons. *Cell*, 2011; 147 (7)

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- What are we dealing with?

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72,4 KM

72,4 Km of peripheral nerve in a human body

Every cubic centimeter of skin organ has a nerve or portion thereof, supplying it, embedded into it.

Diane Jacobs

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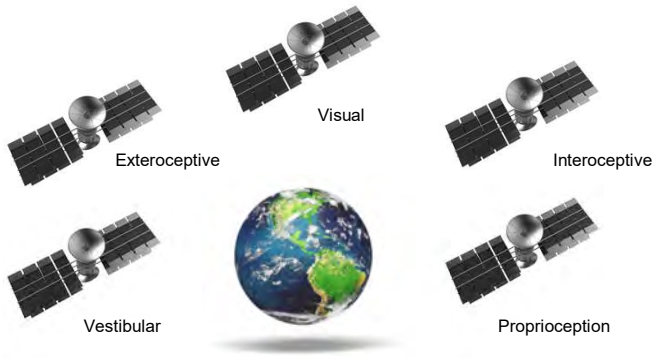
Satellite Systems



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Sensory Receptor Classification

Proprioception:

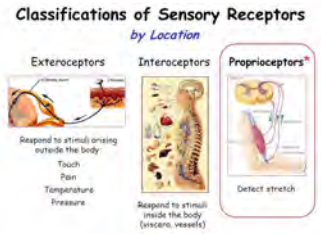
- Is the kinesthetic sense that enables us to sense the relative position of the parts of the body, posture, balance, and motion.
- Located in Muscles, tendons, joints, internal ear

Exteroception:

- Pertains to the stimuli that originates from outside the body
- Located at or near the body surface

Interoception:

- Is defined as sensitivity to stimuli originating inside of the body.
  - Interoceptors: Free nerve endings
  - Located in blood vessels, organs, and connective tissue (skin/Fascia)



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Mechanoreception

Connective tissue and fascia are highly innervated

Often reported only to occur in muscles and joints

The fascial network possesses approximately 10 times the sensory receptors as compared to its muscular counterpart (van der wall 2009)

Includes many types of receptors:
- Golgi, Ruffini, Pacinian, Free nerve endings (Interoceptors)

Fascia considered more of a perceptual organ than a mechanical organ.

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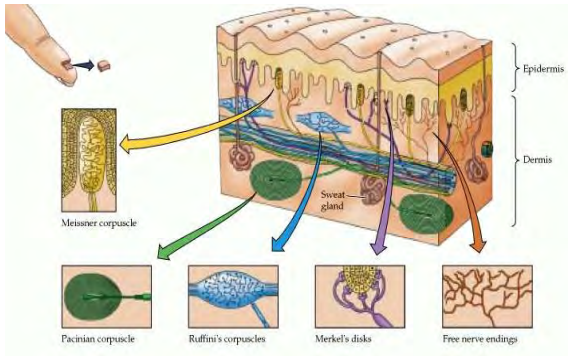

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Effects and Benefits of Kinesiology Tape

Pain Mitigation

Decompression

Neurosensory Input

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- Our relationship with pain…

It's Complicated

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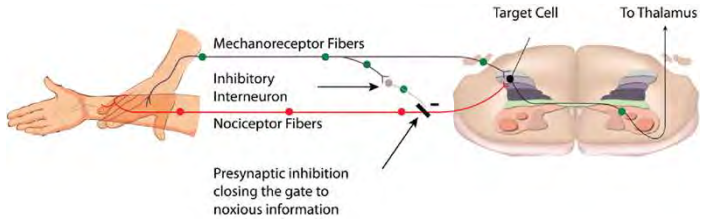
Pain Gate Theory in TextBooks



Melzack, Ronald, and Patrick D. Wall. "Pain mechanisms: a new theory."

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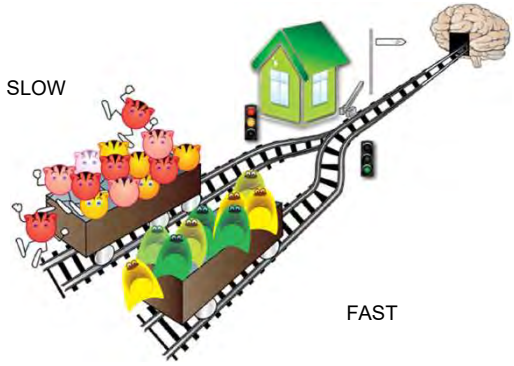
Pain Gate Theory Simplified



Melzack, Ronald, and Patrick D. Wall. "Pain mechanisms: a new theory."

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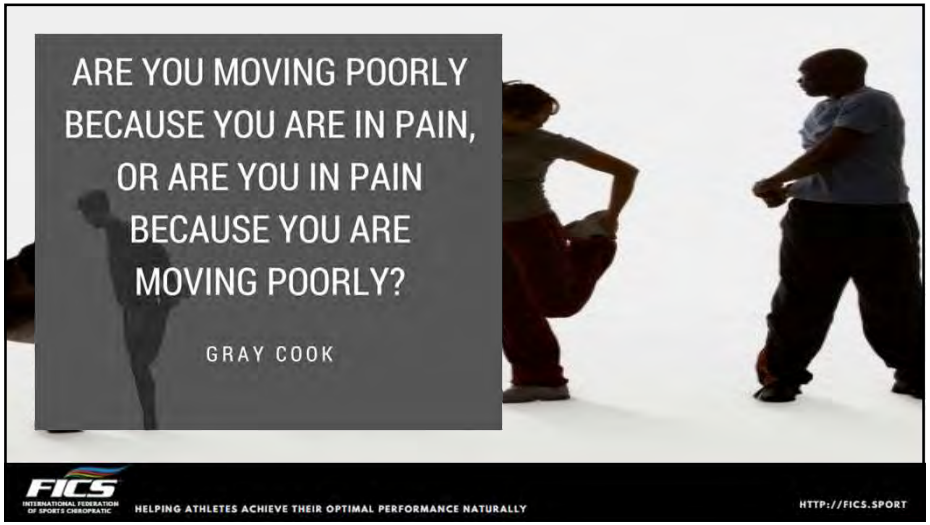

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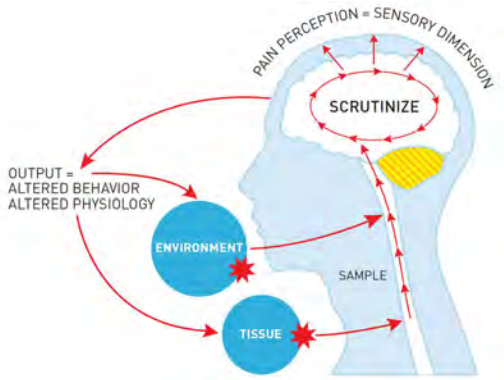
- Pain is an opinion of the brain



- **Figure 3:** Mature Organism Model. Adapted from Fig. 2 in Gifford (1998).

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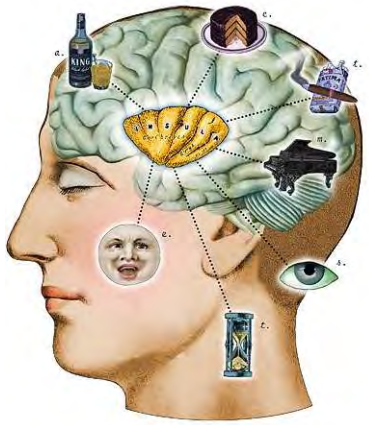

Insula

- Sense of wellbeing
- Anticipation of pain
- Perception of pain
- Empathy
- Affective touch
- **The judge of pain**

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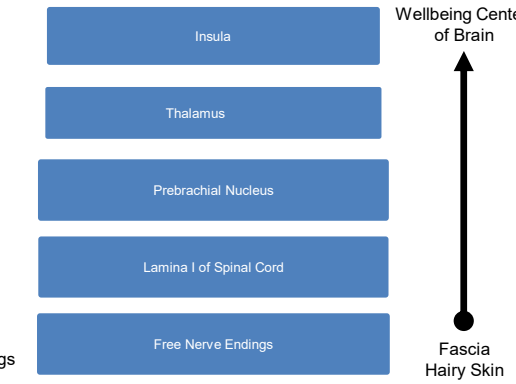
Interoreceptive Pathway



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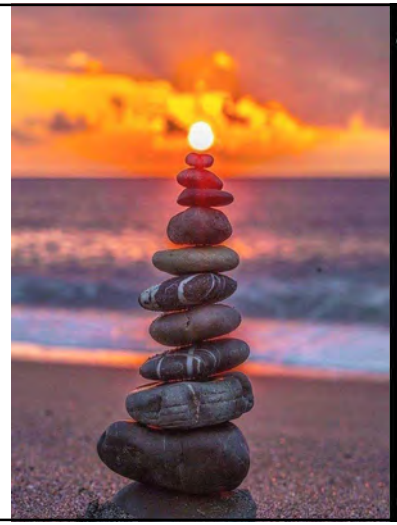
"To reduce pain, we need to reduce credible evidence of danger and increase credible evidence of safety"

Lorimer Moseley



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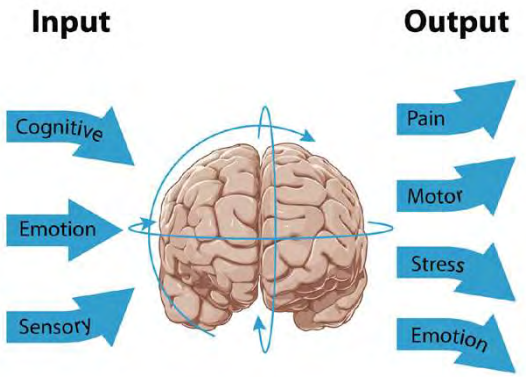
•Neuromatrix Model



Melzack, R. (2005), Evolution of the Neuromatrix Theory of Pain

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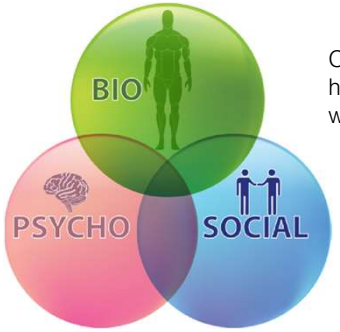
- Biopsychosocial (BPS) Model



Consideration of the whole human being we are working with.

- Kamper SJ, Apeldoorn AT, et al. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain.
- Cochrane Database of Systematic Reviews 2014, Issue 9. Art No: CD000963

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Evidence Informed

Guided but not Shackled by Science

https://www.clpna.com/wp-content/uploads/2020/09/ad_Evidence-Informed_Practice.png

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Pain Perception and the Human Brain

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•We Move Around Pain

Nociception Affects Motor Output

A Review on Sensory-motor Interaction With Focus on Clinical Implications

Jo Nijs, PT, MPT, PhD, Liesbeth Daenen, PT, MSc, Patrick Cras, MD, PhD, Filip Struyf, PT, MSc, Nathalie Roussel, PT, MPT, PhD, and Rob A.B. Oostendorp, PT, MPT, PhD

(Clin J Pain 2012;28:175–181)

Conclusion:

Chronic nociception alters motor output, making proper central movement impossible.

The shift in thinking is to stop trying to restore normal motor control in case of chronic nociception in patients with musculoskeletal disorders.

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•Meta-analysis Focused on Pain

BJSM Online First, published on January 16, 2015 as 10.1136/bjsports-2014-094151

Review

Kinesio taping in musculoskeletal pain and disability that lasts for more than 4 weeks: is it time to peel off the tape and throw it out with the sweat? A systematic review with meta-analysis focused on pain and also methods of tape application

Edwin Choon Wyn Lim, Mathew Guo Xiang Tay

Conclusion:

1. **KT is superior to minimal intervention for pain relief.**

2. **KT as an adjunct is beneficial in pain relief**

Choon Wyn Lim et al, BJSM, 2015

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•Superior Pain Relief

Methods Searches of eight major electronic databases were conducted. Data for pain and disability scores were extracted. Meta-analyses (wherever possible) with either a fixed or random effect(s) model, standardised mean differences (SMDs) and tests of heterogeneity were performed.
Results Seventeen clinical-controlled trials were identified and included in the meta-analyses. When compared to minimal intervention, Kinesio taping provided superior pain relief (pooled SMD=−0.36, 95% CI −0.64 to −0.09, p=0.009) but the pooled disability scores were not significantly different (pooled SMD=−0.41, 95% CI −0.83 to 0.01, p=0.05). No significant differences were found when comparing Kinesio taping to other treatment approaches for pain (pooled SMD=−0.44, 95% CI −1.69 to 0.82, p=0.49) and disability (pooled SMD=0.08, 95% CI −0.27 to 0.43, p=0.65).
Discussion Kinesio taping is superior to minimal intervention for pain relief. Existing evidence does not establish the superiority of Kinesio taping to other treatment approaches to reduce pain and disability for individuals with chronic musculoskeletal pain.

Conclusion:

3. Research is telling us that when used without other interventions, outcomes are good!

4. KT should be used as an adjunct for treatment

Choon Wyn Lim et al, BJSM, 2015

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•Cont

KT as an adjunct to exercise therapy

In contrast, the two trials which used KT as an adjunct to exercise reported a significant difference in pain and disability between groups, favouring the experimental group.[33 42] This is not surprising as exercise has been reported to garner good evidence of effectiveness as a standalone or adjunctive treatment for chronic musculoskeletal pain.[45] Taken together, our review suggests that KT, when used in combination with conventional therapy, may be effective in reducing pain. Our clinical impression is that many clinicians use KT in this way—as an adjunct to exercise.

Conclusion:

significant improvement when combining tape with

corrective exercise interventions.

- Choon Wyn Lim et al, BJSM, 2015

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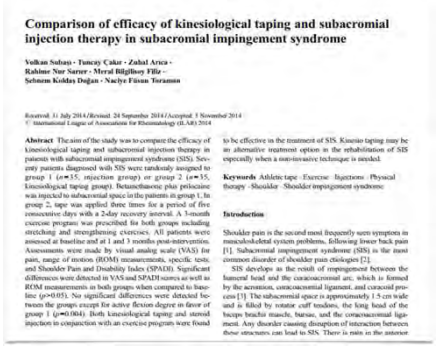
•Subacromial Impingement



Comparison of efficacy of kinesiological taping and subacromial injection therapy in subacromial impingement syndrome

Volkan Subası · Tuncay Çakar · Zuhal Arica · Rahime Nur Sarıer · Meral Bilgihoy Filiz · Şebnem Koldaş Doğan · Naciye Füsun Toramın

Received: 31 July 2014 / Revised: 24 September 2014 / Accepted: 5 November 2014
© International League of Associations for Rheumatology (ILAR) 2014

Abstract The aim of the study was to compare the efficacy of kinesiological taping and subacromial injection therapy in patients with subacromial impingement syndrome (SIS). Seventy patients diagnosed with SIS were randomly assigned to group 1 ($n=35$, injection group) or group 2 ($n=35$, kinesiological taping group). Betamethasone plus prilocaine was injected to subacromial space in the patients in group 1. In group 2, tape was applied three times for a period of five consecutive days with a 2-day recovery interval. A 3-month exercise program was prescribed for both groups including stretching and strengthening exercises. All patients were assessed at baseline and at 1 and 3 months post-intervention. Assessments were made by visual analog scale (VAS) for pain, range of motion (ROM) measurements, specific tests, and Shoulder Pain and Disability Index (SPADI). Significant differences were detected in VAS and SPADI scores as well as ROM measurements in both groups when compared to baseline ($p<0.05$). No significant differences were detected between the groups except for active flexion degree in favor of group 1 ($p=0.004$). Both kinesiological taping and steroid injection in conjunction with an exercise program were found to be effective in the treatment of SIS. Kinesio taping may be an alternative treatment option in the rehabilitation of SIS especially when a non-invasive technique is needed.

Keywords Athletic tape · Exercise · Injections · Physical therapy · Shoulder · Shoulder impingement syndrome

Introduction

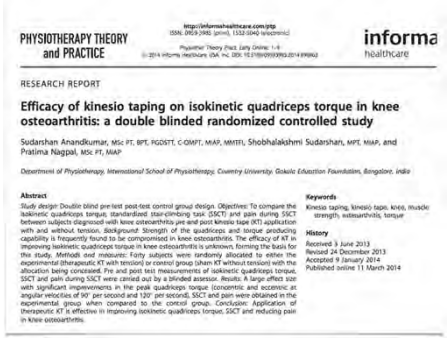
Shoulder pain is the second most frequently seen symptoms in musculoskeletal system problems, following lower back pain [1]. Subacromial impingement syndrome (SIS) is the most common disorder of shoulder pain etiologies [2].

SIS develops as the result of impingement between the humeral head and the coracoacromial arc, which is formed by the acromion, coracoacromial ligament, and coracoid process [3]. The subacromial space is approximately 1.5 cm wide and is filled by rotator cuff tendons, the long head of the biceps brachii muscle, bursas, and the coracoacromial ligament. Any disorder causing disruption of interaction between these structures can lead to SIS. There is pain in the anterior

Conclusion:

1. KT as good as steroid injection + Exercise for sub acromial impingement at 1 & 3 month follow up

•Compromised Population



PHYSIOTHERAPY THEORY and PRACTICE

informa healthcare

RESEARCH REPORT

Efficacy of kinesio taping on isokinetic quadriceps torque in knee osteoarthritis: a double blinded randomized controlled study

Sudarshan Anandkumar, MSc PT, BPT, PGDSTT, C-DMPT, MIAP, MMTFI, Shobhalakshmi Sudarshan, MPT, MIAP, and Pratima Nagpal, MSc PT, MIAP

Department of Physiotherapy, International School of Physiotherapy, Coventry University, Gokula Education Foundation, Bangalore, India

Abstract

Study design: Double blind pre-test post-test control group design. *Objectives:* To compare the isokinetic quadriceps torque, standardized stair-climbing task (SSCT) and pain during SSCT between subjects diagnosed with knee osteoarthritis pre and post kinesio tape (KT) application with and without tension. *Background:* Strength of the quadriceps and torque producing capability is frequently found to be compromised in knee osteoarthritis. The efficacy of KT in improving isokinetic quadriceps torque in knee osteoarthritis is unknown, forming the basis for this study. *Methods and measures:* Forty subjects were randomly allocated to either the experimental (therapeutic KT with tension) or control group (sham KT without tension) with the allocation being concealed. Pre and post test measurements of isokinetic quadriceps torque, SSCT and pain during SSCT were carried out by a blinded assessor. *Results:* A large effect size with significant improvements in the peak quadriceps torque (concentric and eccentric at angular velocities of 90° per second and 120° per second), SSCT and pain were obtained in the experimental group when compared to the control group. *Conclusion:* Application of therapeutic KT is effective in improving isokinetic quadriceps torque, SSCT and reducing pain in knee osteoarthritis.

Keywords

Kinesio taping, kinesio tape, knee, muscle strength, osteoarthritis, torque

History

Received 3 June 2013
Revised 24 December 2013
Accepted 9 January 2014
Published online 11 March 2014

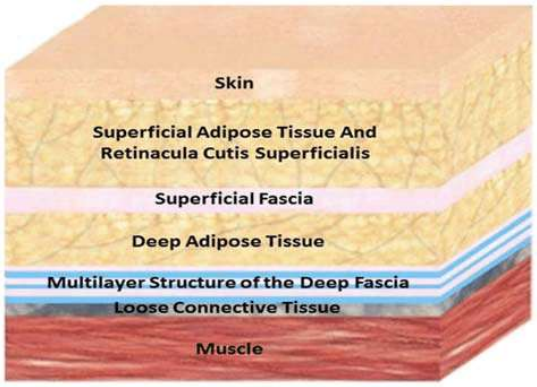
Conclusion:

Application of KT is effective in improving isokinetic quadriceps torque and reducing pain in knee osteoarthritis

Taping - Decompression

•Decompression

- Elastic recoil of tape sometimes causes tape and underlying skin to wrinkle.
- Example of decompression but not necessary for decompressive effect.



Elsharkawy et al, Interfascial Plane Blocks Back to Basics, Reg Anesth Pain Med 2018;43: 00–00

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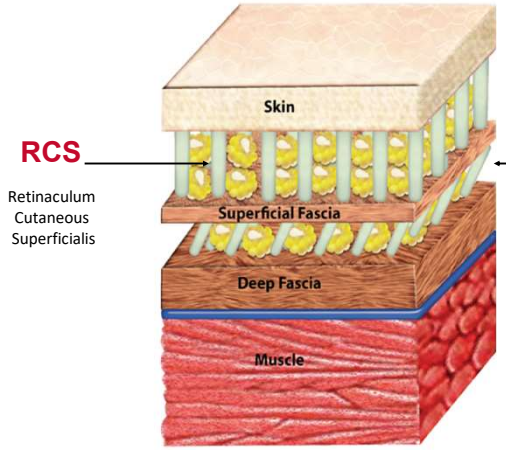

www.fascialmanipulation.com/en/

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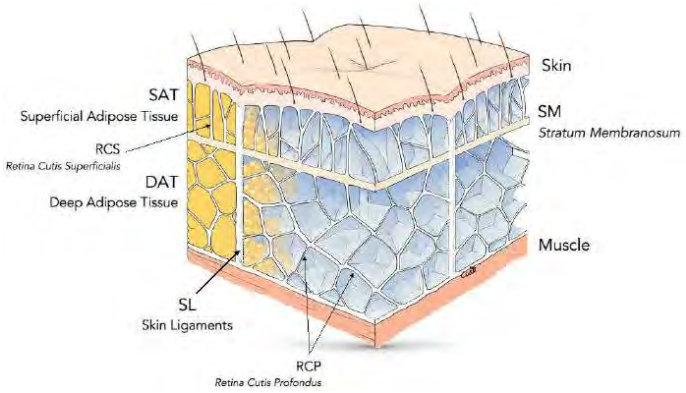

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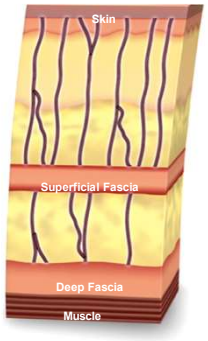
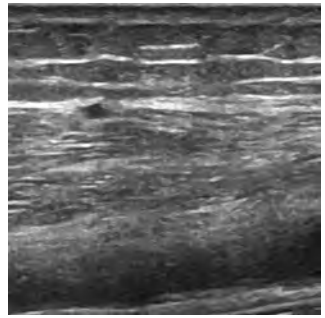
- MSK Ultrasound Tutorial





HC HEALCERION

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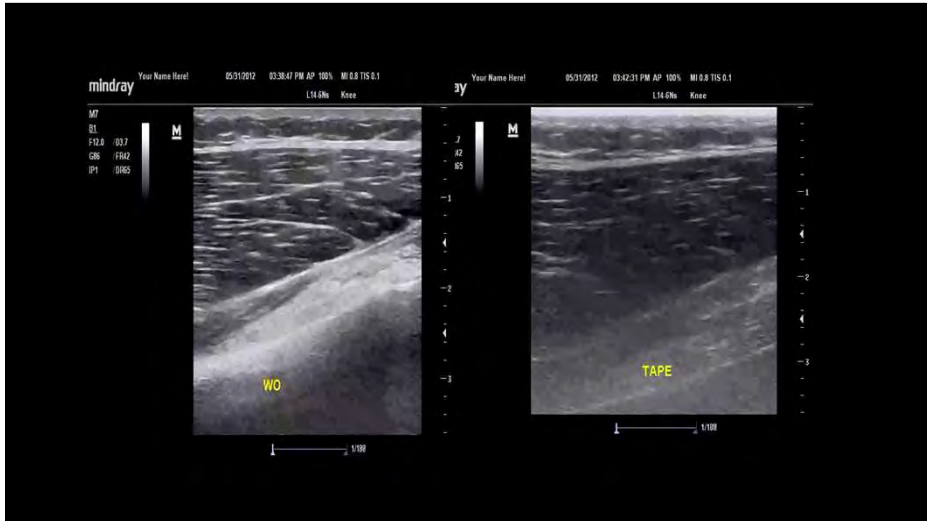

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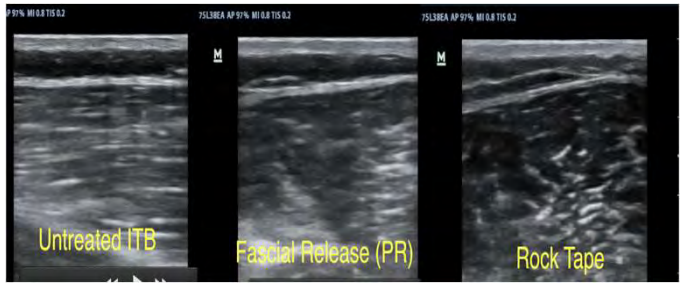
•ITB Case Study



Fascial Compression

Fascial Decompression

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• ↑ Space ↓ Pain, Edema

PHYSIOTHERAPY THEORY and PRACTICE

RESEARCH REPORT

Effects of kinesiologic taping on epidermal–dermal distance, pain, edema and inflammation after experimentally induced soft tissue trauma

Nihan Kafa, PhD, PT; Seyit Citaker, PhD, PT; Suna Dinccağlu, MD; Tuncay Peker, MD; Neslihan Coskun, MD; and Seyda Dilek, MD

Conclusion:

After soft-tissue trauma, it was histologically shown that KT increases epidermal–dermal distance, and may reduce the sensation of pain, edema and inflammation

- Nihan Kafa et al. Effects of kinesiologic taping on epidermal–dermal distance, pain, edema and inflammation after experimentally induced soft tissue trauma

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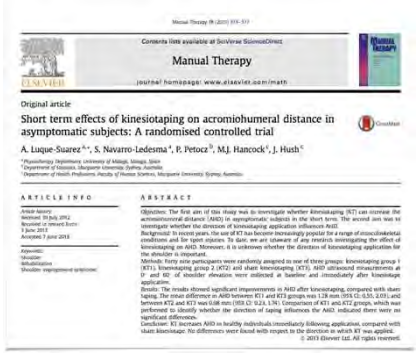
↑ Subacromial Space



Manual Therapy

Original article

Short term effects of kinesiotaping on acromiohumeral distance in asymptomatic subjects: A randomised controlled trial

A. Luque-Suarez, S. Navarro-Ledesma, P. Petoca, M.J. Hancock, J. Hush

Conclusion:

KT increases AHD in healthy individuals immediately following application, compared with sham tape.

- A. Luque-Suarez et al. Short term effects of kinesiotaping on acromiohumeral distance in asymptomatic subjects: A randomised controlled trial

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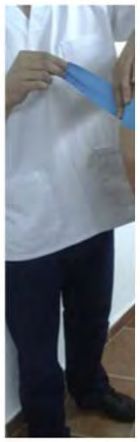

Fig. 2. KT1 (left), applied with 100% te

Fig. 3. Participant's position for AHD assessment with ultrasonography.

and in neutral rotation (s

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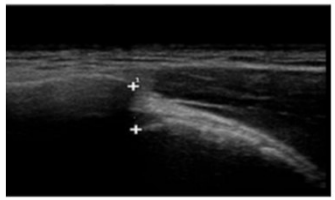

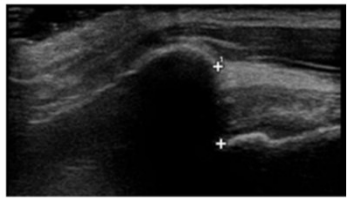

Pre Tape

Post Tape

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Neurosensory Input

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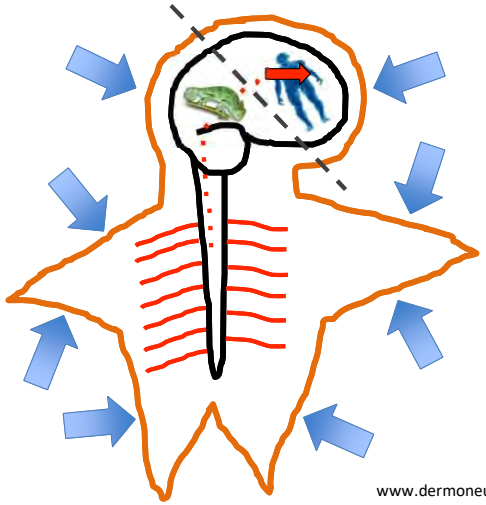

www.dermoneuromodulation.com/

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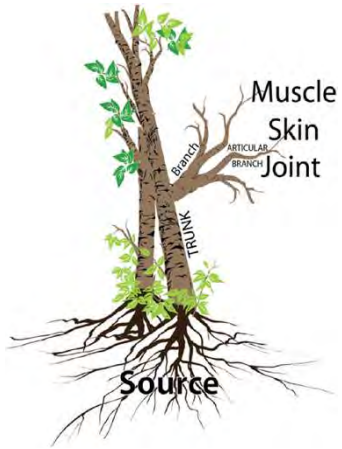

Hilton's Law 1863

"The same trunks of nerves whose branches supply the groups of muscles moving a joint furnish also a distribution of nerves to the skin over the insertions of the same muscles; and - what at this moment more especially merits our attention - the interior of the joint receives its nerves from the same source."

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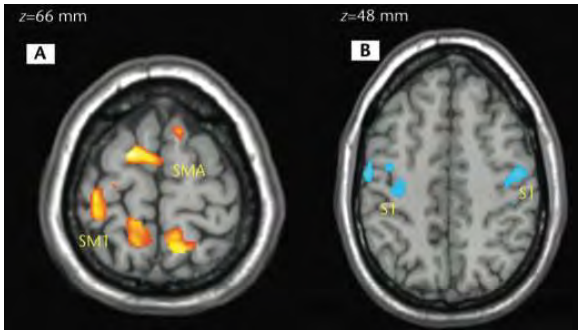
•Effects of Tape on the Brain



Effects of Patellar Taping on Brain Activity during Knee Joint Proprioception Tests Using functional Magnetic Resonance Imaging

Michael J.Callaghan, Shane McKie, Paul Richardson, Jacqueline A.Oldham

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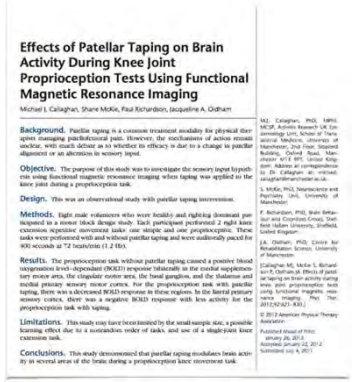
Tape your brain



Effects of Patellar Taping on Brain Activity During Knee Joint Proprioception Tests Using Functional Magnetic Resonance Imaging

Michael J. Callaghan, Shane McKie, Paul Richardson, Jacqueline A. Oldham

Background. Patellar taping is a common treatment modality for physical therapists managing patellofemoral pain. However, the mechanisms of action remain unclear, with much debate as to whether its efficacy is due to a change in patellar alignment or an alteration in sensory input.

Objective. The purpose of this study was to investigate the sensory input to pathways using functional magnetic resonance imaging when taping was applied to the knee joint during a proprioception task.

Design. This was an observational study with patellar taping intervention.

Methods. Eight male volunteers who were healthy and right-leg dominant participated in a motor block design study. Each participant performed 2 right knee extension repetitive movement tasks: one simple and one proprioceptive. These tasks were performed with and without patellar taping and were auditorally paced for 400 seconds at 72 beats/min (1.2 Hz).

Results. The proproception task without patellar taping caused a positive blood oxygenation level–dependent (BOLD) response bilaterally in the medial supplementary motor area, the cingulate motor area, the basal ganglion, and the thalamus and medial primary sensory motor cortex. For the proprioception task with patellar taping, there was a decreased BOLD response in these regions. In the lateral primary sensory cortex, there was a negative BOLD response with less activity for the proprioception task with taping.

Limitations. This study may have been limited by the small sample size, a possible learning effect due to a nonrandom order of tasks, and use of a single-joint knee extension task.

Conclusions. This study demonstrated that patellar taping modulates brain activity in several areas of the brain during a proprioception knee movement task.

Clinical Implications

Clinicians have developed a variety of complex taping techniques to alter patellar position, muscle activity, or pain. This study showed that the application of a simple patellar taping technique covering 50% of skin over the knee had effects on areas of the brain associated with sensation, coordination, decision making, and planning of complex coordination tasks and the coordination of the unconscious aspects of proprioception. Currently, there are no data to demonstrate whether using a simple or complex technique has a greater or lesser effect on activity in the proprioception areas of the brain.

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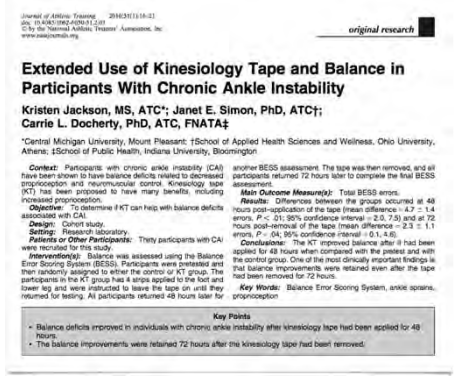
Balance



original research

Extended Use of Kinesiology Tape and Balance in Participants With Chronic Ankle Instability

Kristen Jackson, MS, ATC*; Janet E. Simon, PhD, ATC†; Carrie L. Docherty, PhD, ATC, FNATA‡

*Central Michigan University, Mount Pleasant; †School of Applied Health Sciences and Wellness, Ohio University, Athens; ‡School of Public Health, Indiana University, Bloomington

Context: Participants with chronic ankle instability (CAI) have been shown to have balance deficits related to decreased proprioception and neuromuscular control. Kinesiology tape (KT) has been proposed to have many benefits, including increased proprioception.

Objective: To determine if KT can help with balance deficits associated with CAI.

Design: Cohort study.

Setting: Research laboratory.

Patients or Other Participants: Thirty participants with CAI were recruited for this study.

Intervention(s): Balance was assessed using the Balance Error Scoring System (BESS). Participants were pretested and then randomly assigned to either the control or KT group. The participants in the KT group had 4 strips applied to the foot and lower leg and were instructed to leave the tape on until they returned for testing. All participants returned 48 hours later for another BESS assessment. The tape was then removed, and all participants returned 72 hours later to complete the final BESS assessment.

Main Outcome Measure(s): Total BESS errors.

Results: Differences between the groups occurred at 48 hours post–application of the tape (mean difference = 4.7 ± 1.4 errors, $P < .01$; 95% confidence interval = 2.0, 7.5) and at 72 hours post–removal of the tape (mean difference = 2.3 ± 1.1 errors, $P = .04$; 95% confidence interval = 0.1, 4.6).

Conclusions: The KT improved balance after it had been applied for 48 hours when compared with the pretest and with the control group. One of the most clinically important findings is that balance improvements were retained even after the tape had been removed for 72 hours.

Key Words: Balance Error Scoring System, ankle sprains, proprioception

Key Points

- Balance deficits improved in individuals with chronic ankle instability after kinesiology tape had been applied for 48 hours.
- The balance improvements were retained 72 hours after the kinesiology tape had been removed.

Conclusion:

Improved balance with chronic instability and for 72 hours after removal

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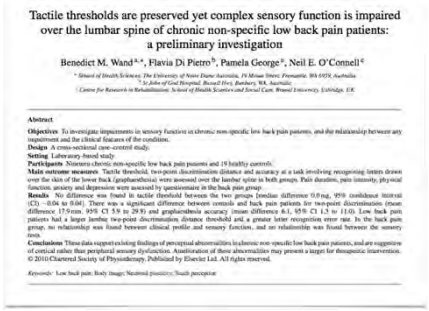
Chronic Pain is a Cortical Dysfunction



Tactile thresholds are preserved yet complex sensory function is impaired over the lumbar spine of chronic non-specific low back pain patients: a preliminary investigation

Benedict M. Wand[a,*], Flavia Di Pietro[b], Pamela George[a], Neil E. O'Connell[c]

Abstract

Objectives To investigate impairments in sensory function in chronic non-specific low back pain patients, and the relationship between any impairment and the clinical features of the condition.
Design A cross-sectional case–control study.
Setting Laboratory-based study.
Participants Nineteen chronic non-specific low back pain patients and 19 healthy controls.
Main outcome measures Tactile threshold, two-point discrimination distance and accuracy at a task involving recognising letters drawn over the skin of the lower back (graphaesthesia) were assessed over the lumbar spine in both groups. Pain duration, pain intensity, physical function, anxiety and depression were assessed by questionnaire in the back pain group.
Results No difference was found in tactile threshold between the two groups [median difference 0.0 mg, 95% confidence interval (CI) −0.04 to 0.04]. There was a significant difference between controls and back pain patients for two-point discrimination (mean difference 17.9 mm, 95% CI 5.9 to 29.8) and graphaesthesia accuracy (mean difference 6.1, 95% CI 1.3 to 11.0). Low back pain patients had a larger lumbar two-point discrimination distance threshold and a greater letter recognition error rate. In the back pain group, no relationship was found between clinical profile and sensory function, and no relationship was found between the sensory tests.
Conclusions These data support existing findings of perceptual abnormalities in chronic non-specific low back pain patients, and are suggestive of cortical rather than peripheral sensory dysfunction. Amelioration of these abnormalities may present a target for therapeutic intervention.
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Keywords: Low back pain; Body image; Neuronal plasticity; Touch perception

Conclusion:

2 Pt. Discrimination (perceptual abnormalities) deficits in chronic lower back pain patients.

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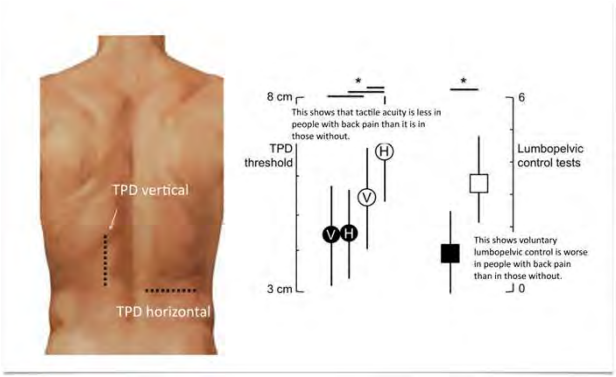
Tactile Acuity and Pain



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Improved Tactile Acuity
Improved Body Representation

Decreased Pain
Improved Control

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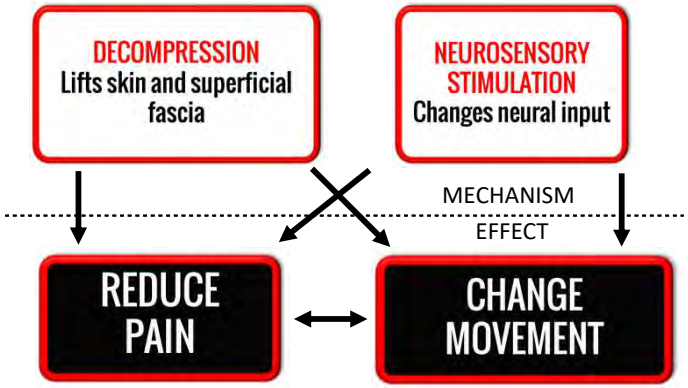
Summary - Mechanism/Effect



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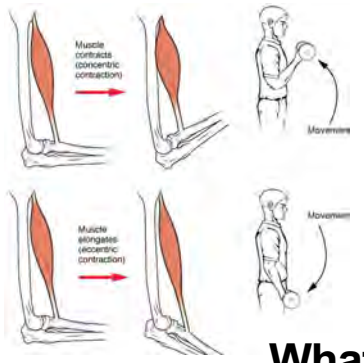
How do we MOVE?



What we thought.

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The Car Analogy

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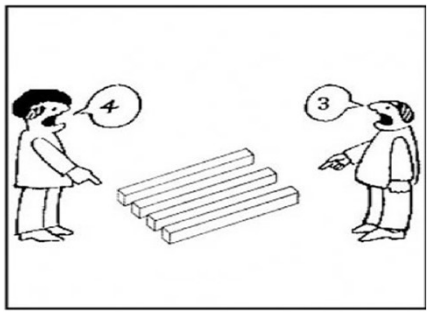
Different Perspective



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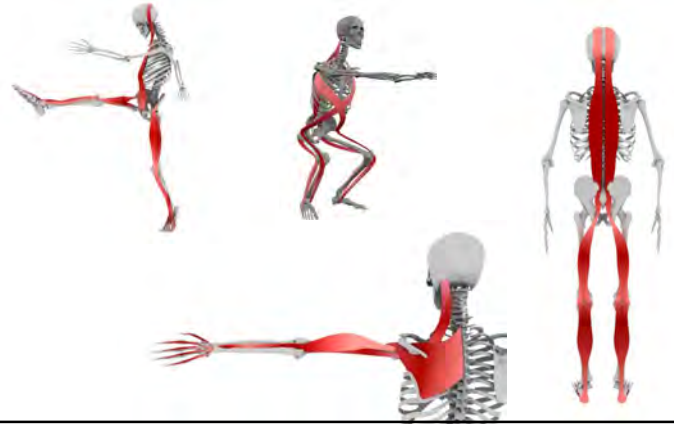
Current thinking



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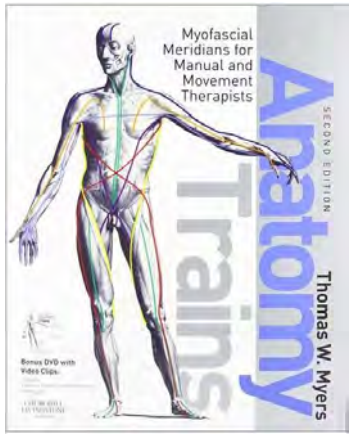
Anatomy Trains



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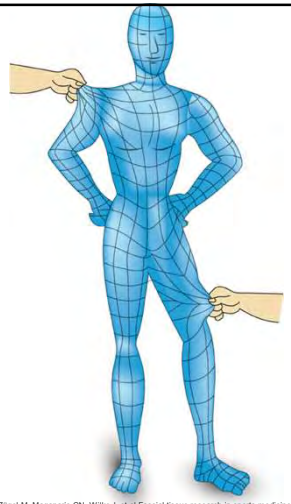

Fascia

The fascial system includes adipose tissue, adventitia, neurovascular sheaths, aponeuroses, deep and superficial fasciae, dermis, epineurium, joint capsules, ligaments, membranes, meninges, myofascial expansions, periostea, retinacula, septa, tendons (including endotendon/peritendon/epitendon/paratendon), visceral fasciae, and all the intramuscular and intermuscular connective tissues, including endomysium/perimysium/epimysium.

Zügel M, Maganaris CN, Wilke J, et al Fascial tissue research in sports medicine: from molecules to tissue adaptation, injury and diagnostics: consensus statement British Journal of Sports Medicine 2018;52:1497.

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Fascia Can Contract

- Fascia has the ability to change its tonus autonomously, independent of outside muscular forces.
- Dr. Jochen Staubesand found, using electron photomicroscopy, smooth muscle-like cells embedded within this fascia's collagen fibers.
- Staubesand also found a rich intrafascial supply of sympathetic nerve tissue and sensory nerve endings.
- Based on these findings he concluded that it is likely that these fascial smooth muscle cells enable the sympathetic NS to regulate a fascial pre-tension independent of the muscular tonus.

Staubesand, J., & Li, Y. (1996). Zum Feinbau der fascia cruris mit besonder Berucksichtigung epi – und intrafaszialer nerven. Manuelle Medizin, 34, 196-200.

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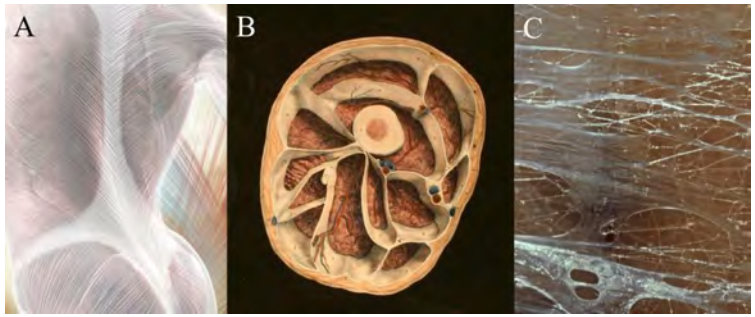
Thoracolumbar fascia (A) Skeletal muscles (B) The internal structure of fascia



Zügel M, Maganaris CN, Wilke J, et al Fascial tissue research in sports medicine: from molecules to tissue adaptation, injury and diagnostics: consensus statement British Journal of Sports Medicine 2018;52:1497.

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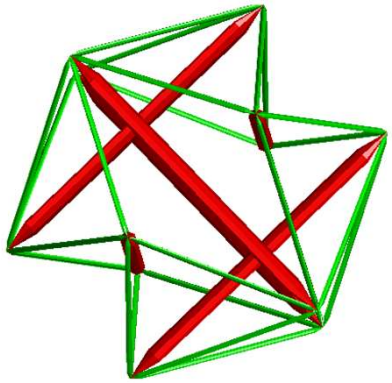

Tensegrity

Structures that maintain their integrity due to a balance of continuous tensile forces through the structure

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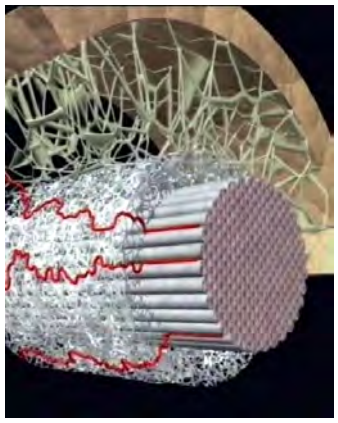

A Sensory Organ

These layers are more densely populated with mechanoreceptors than tissues situated more internally

(Stecco et al, 2008).

It is now believed that joints only provide joint feedback when at end of range movements and not during physiological motions

(Lu et al, 1985).

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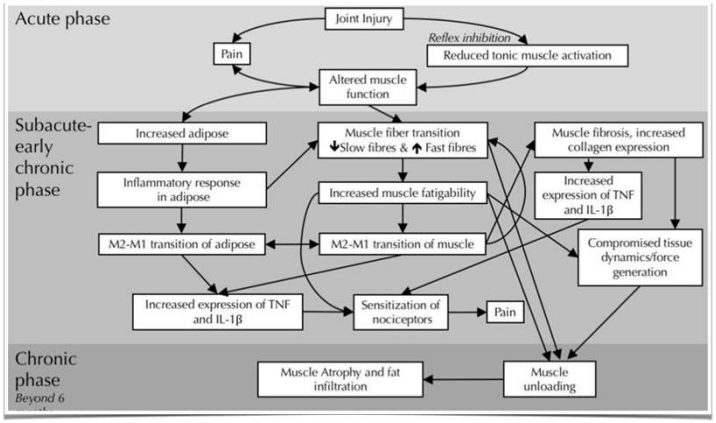
Proposed timeline and mechanisms for fascial, adipose and muscle changes in the multifidus muscle after intervertebral disc lesion



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Fascia, it's alive.
It senses.
It transmits force globally.

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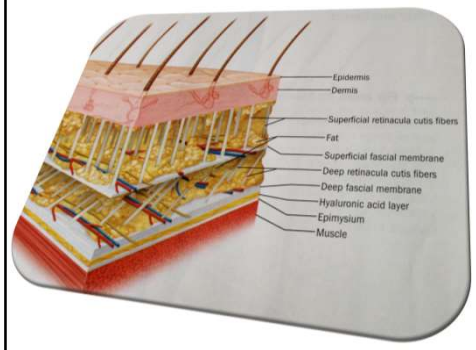

https://bouldertherapeutics.com/fascia-fascial-connections-connective-tissue/img_2116-3/

Deep Fascial membranes can be divided into;

- Aponeurotic fascia - fascia of the limbs, the thoracolumbar fascia and the rectus sheath
  - Mean thickness of 900 µm.
  - formed by two or three layers of parallel collagen fiber bundles, each layer having a mean thickness of 277 µm.
  - well vascularized and well-developed lymphatic channels
  - HA-rich matrix
- Epimysial fascia - deep fascia of the trunk pectoralis major, trapezium, deltoid, and gluteus maximus muscles.
  - Mean thickness of 150-200 µm.
  - Handles 30-40% of the muscle force

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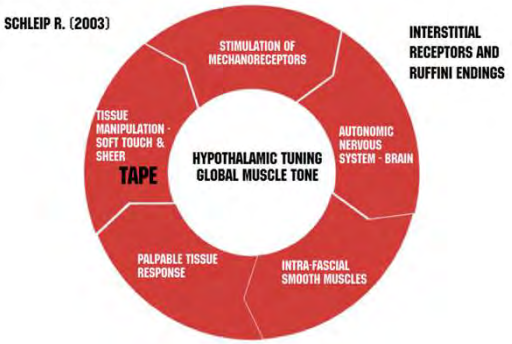
Reflexive Activation



Fascial plasticity – a new neurobiological explanation: Part 1
Schleip, Robert; Journal of Bodywork and Movement Therapies , Volume 7 , Issue 1 , 11 - 19

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Reflexive Activation

Touch Tape + Stimulate Receptors + Brain + MyoFibroBlasts

↓

Palpable Tissue Response

Fascial plasticity – a new neurobiological explanation: Part 1
Schleip, Robert; Journal of Bodywork and Movement Therapies , Volume 7 , Issue 1 , 11 - 19

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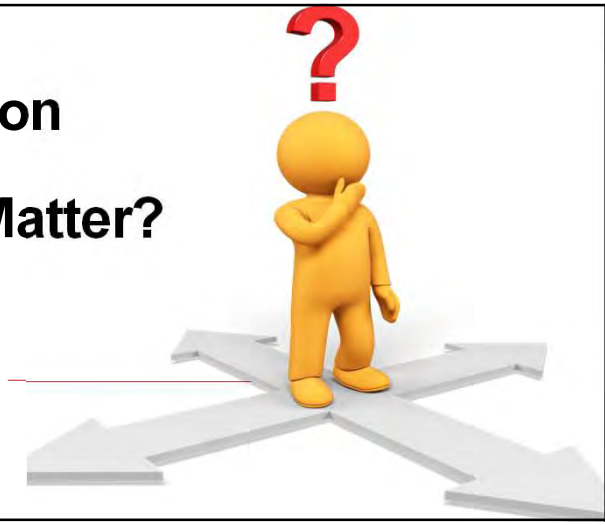
Does Direction of Tape Matter?



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No.

Contents lists available at SciVerse ScienceDirect
Journal of Science and Medicine in Sport
journal homepage: www.elsevier.com/locate/jsams

Original research

Influence of Kinesio Taping applied over biceps brachii on isokinetic elbow peak torque. A placebo controlled study in a population of young healthy subjects

Giancarlo Fratocchi[a], Francesco Di Mattia[a], Renato Rossi[a], Massimiliano Mangone[b], Valter Santilli[a,b], Marco Paoloni[a,b,*]

Conclusion - Statistically significant concentric elbow peak torque improvement between no tape group and kinesiology tape group - opposite of what was supposed to happen.

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No.

THE EFFECT OF APPLIED DIRECTION OF KINESIO TAPING IN ANKLE MUSCLE STRENGTH AND FLEXIBILITY

Yuan-Yuan Lee[1], Hsiao-Yun Chang[2], Yun-Chi Chang[1], Juo-Ming Chen[1]

School of Medical Laboratory and Biotechnology, College of Medical Technology, Chung Shan Medical University, Taichung, Taiwan [1]
School of Physical Therapy, College of Medical Technology, Chung Shan Medical University, Taichung, Taiwan [2]

The purpose of this study was to examine the effect of applied direction of Kinesio taping (KT) in ankle range of motion and calf muscle strength. Twenty healthy subjects voluntarily participated in this study. The ankle plantar flexor muscle strength and ankle dorsiflexion ROM were assessed in knee flexion and knee extension before and after taping applied. Two applied directions, heel to posterior of knee cap (insertion to origin of calf muscles) and posterior of knee cap to heel (origin to insertion of calf muscles) were applied over both side of calf muscles, respectively. The results had not showed significantly difference in any of the results. The beneficial effects of applied direction of KT has not provided scientific evidence in this study. Future study may be able to seek other methods to identify the effect on strength or flexibility while KT applied.

KEY WORDS: Kinesio taping, strength, range of motion, ankle, tape.

Conclusion:

According to this study, there is NO evidence to support directional taping.

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No.

Journal of Science and Medicine in Sport

Original research

Facilitatory and inhibitory effects of Kinesio tape: Fact or fad?

C. Cai, I.P.H. Au, W. An, R.T.H. Cheung

ARTICLE INFO

ABSTRACT

Conclusion:

NO evidence to support inhibitory nor facilitatory taping in healthy subjects.

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No.

Clinical Trial/Experimental Study

Medicine

OPEN

Effect of kinesiology tape application direction on quadriceps strength

Im-Rak Choi, PT[a,b]; Jung-Hoon Lee, PT, PhD[c,*]

Abstract

Conclusion:

Regardless of the application direction, there was a significant difference in the quadriceps peak torque before and after kinesiology tape application.

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Does amount of tape stretch matter?

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No.

J Physiother. 2014 Jun;60(2):90-6. doi: 10.1016/j.jphys.2014.05.003. Epub 2014 Jun 10.

Kinesio taping to generate skin convolutions is not better than sham taping for people with chronic non-specific low back pain: a randomised trial.

Pereira Pdo C[1], Costa Lda C[1], Takahashi R[2], Hespanhol Junior LC[3], Luz Junior MA[1], Silva TM[1], Costa LO[4].

Author information

Abstract

QUESTION: For people with chronic low back pain, does Kinesio Taping, applied according to the treatment manual to create skin convolutions, reduce pain and disability more than a simple application without convolutions?

DESIGN: Randomised trial with concealed allocation, intention-to-treat analysis and blinded assessment of some outcomes.

PARTICIPANTS: 148 participants with chronic non-specific low back pain.

INTERVENTION: Experimental group participants received eight sessions (over four weeks) of Kinesio Taping applied according to the Kinesio Taping Method treatment manual (ie, 10 to 15% tension applied in flexion to create skin convolutions in neutral). Control group participants received eight sessions (over four weeks) of Kinesio Taping with no tension, creating no convolutions.

OUTCOME MEASURES: The primary outcome measures were pain intensity and disability after the four-week intervention. Secondary outcomes were pain intensity and disability 12 weeks after randomisation, and global perceived effect at both four and 12 weeks after randomisation.

RESULTS: Applying Kinesio Tape to create convolutions in the skin did not significantly change its effect on pain (MD -0.4 points, 95% CI -1.3 to 0.4) or disability (MD -0.3 points, 95% CI -1.9 to 1.3) at four weeks. There was a small difference in favour of the experimental group for the secondary outcome of global perceived effect (MD 1.4 points, 95% CI 0.3 to 2.5) at four weeks. No significant between-group differences were observed for the other secondary outcomes.

CONCLUSION: Kinesio Taping applied with stretch to generate convolutions in the skin was no more effective than simple application of the tape without tension for the outcomes measured. These results challenge the proposed mechanism of action of this therapy.

Conclusion - Tape applied with stretch was NO more effective than simple application of tape without tension

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•Minimally Effective Dose

- The smallest dose that will produce a desired outcome.

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“Kinesthetic guidance translates to behavior 30x faster than visual guidance and many thousands of times faster than auditory guidance

Birdwhistell, 1971

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www.sentis.com

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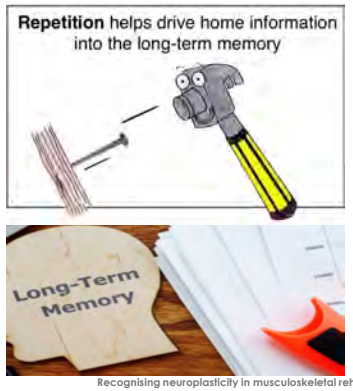
Principles of Neuroplasticity



“Adaptation occurs according to stress that is applied repetitively.”

Humans love repetition

Recognising neuroplasticity in musculoskeletal rehabilitation: A basis for greater collaboration between musculoskeletal and neurological physiotherapists. Snodgrass, Suzanne, et al. Manual Therapy, Vol. 19, Issue 6, 614-617.

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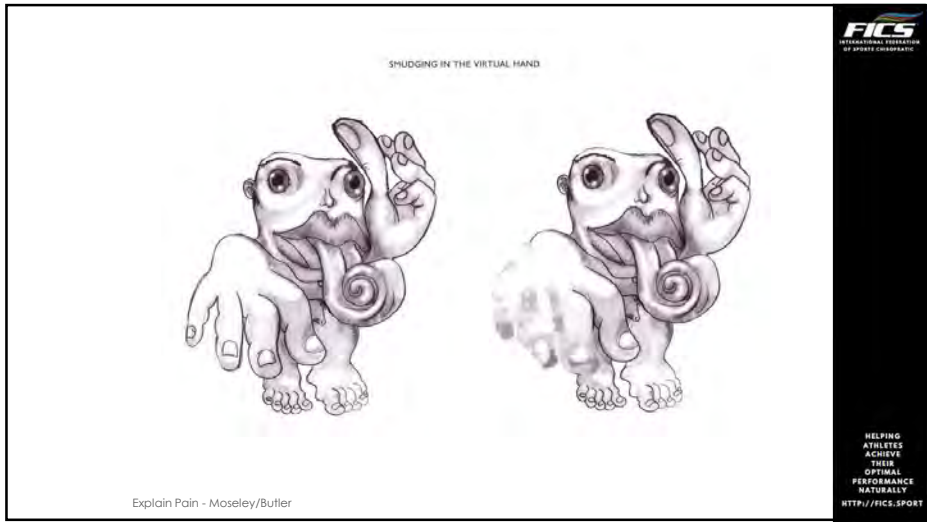

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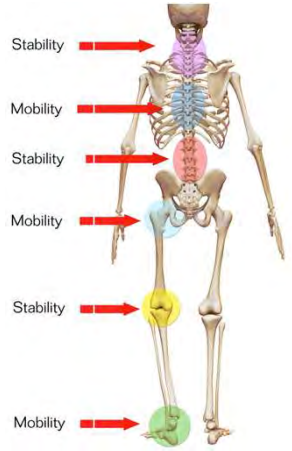
Joint by Joint



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Contraindications

- Open Wounds
- Skin Lesions
- Rashes
- Clients Unable to Communicate
- Decreased sensation - Neuropathies
- Adhesive Allergies
- Over Active Cancer Site
- Kidney/Heart Congestion
- Front of the neck

In some cases, mild/moderate skin reactions can occur. These include redness, itchiness, hives or swelling. Immediately remove the tape if you feel any skin reaction above and consult your physician if symptoms are severe or do not improve in 2 days.

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Caution

- History - past skin irritation
- Test Patch - no tape experience
- Medication - blood thinners
- Female hormone cycle
- Skin Type - fair skin
- Extreme heat - car seat heater, hot hot showers

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Not a Protocol-Based Technique

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It's a Framework. You Rule the Tool.

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Dynamic Tape

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Tissues don't fail because of pain, they fail because of load

Dynamic Tape has many clinical applications. Load is a key driver of pathology such as tendinopathy. Loading is necessary for recovery but often normal activities are beyond the capacity of the tendon. Dynamic Taping can be used to reduce loading to allow some functional stress to be applied without overloading the already sensitised tendon. This can allow capacity to be increased through controlled loading.

–Ryan Kendrick Creator of Dynamic Tape

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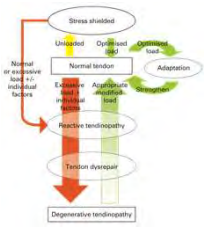
Load and Force Transfer



Cook & Purdham, 2009

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Modifying Load

1. Training and Competition Schedule
2. Equipment
3. Environment
4. Biomechanics
5. Kinetics

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Limitations of Traditional Approaches with Respect to Load & Function

- Restriction of range of motion
- Reduced capacity to dissipate load through movement
- Possible adverse effects on balance strategies
- Limited or no deceleration through range
- Limited capacity to functionally assist
- Tape Fatigue

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Fundamentals of Taping Mechanically

There are three critical factors that have to be met in order to affect mechanics of motion:

1. Cross a joint or joints

2. Apply in shortened position

3. Get good purchase on the levers (Pull)

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Modifying Load or Movement with Tape

1. Unaccustomed Load
2. Transition
3. Acute Overload
4. Permit Early Functional Loading and Reduce Compensation Strategies
5. Permit Optimal Tissue Healing
6. Functional Impairment or Technique
7. No Guts, No Glory

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1. Force Contribution

- EMG Pilot Study, Thomas Nikolaus, Germany
- Investigated the EMG activity in the taped and untaped conditions (very light taping application applied to finger and wrist flexors with the wrist in flexion)
- Statistical analysis showed that the increase in EMG activity was statistically significant and non-coincidental

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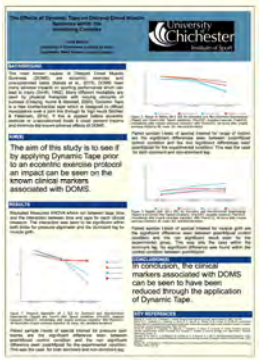
1. Force Contribution

The Effects of Dynamic Tape on Delayed Onset Muscle Soreness within the Hamstring Complex - Luke Welch, University of Chichester

- Measured PPTs, ROM and Muscle Girth
- Showed that Dynamic Taping largely prevented changes in common markers of DOMS which was elicited in the untaped limb



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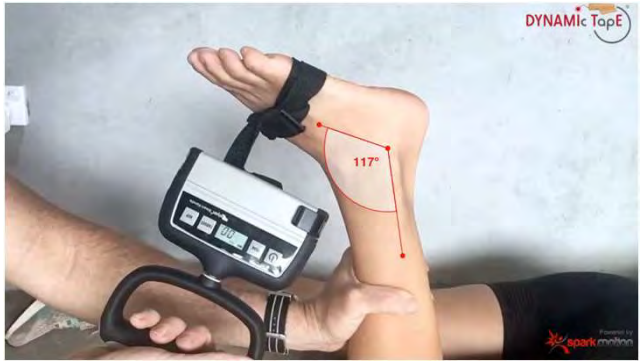
1. Force Contribution



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1. Force Contribution

- EMG Preliminary Study, Thomas Nikolaus, Germany
- Investigated the EMG activity of the upper trapezius pre and 48 hours after the application of cervical offload PowerBand technique in a group of office workers with neck pain
- EMG activity has previously been shown to be increased in preparation for, during and after typing or mousing tasks (Szeto et al)
- Results show a significant reduction in the EMG activity with tape

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1. Force Contribution

Anna Lygia Barbosa Lunardi

Benefícios imediatos da bandagem do tipo Dynamic Tape em pacientes com Síndrome do Ombro Caído decorrente de linfadenectomias cervicais

Dynamic Taping improved both pain and active ROM in subject with accessory nerve injury post lymphadenectomy.

Ref:
http://repositorio.unicamp.br/bitstream/REPOSIP/312471/1/Lunardi_AnnaLygiaBarbosa_M.pdf

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1. Force Contribution

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1. Force Contribution

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1. Force Contribution

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2. Modify Movement/Position - Kinematics

- Kinematics describes the motion of objects (in this case the bones) without consideration of the forces or circumstances leading to that motion
- Kinetics examines forces on an object and potentially the effect of these on motion of the object

- As certain kinematics have been associated with painful conditions or poor performance we can target our technique to simply improve the movement pattern by pulling the body part in one way or another (by applying an external force - modifying kinetics)
- this may include creating a joint gliding moment (Mulligan) into a position of ease, correcting deformity or resisting unwanted movements (e.g. Lateral translation of the patella).
- A change in kinematics (movement) is not necessary for there to be a change in kinetics (load/force)
- the aim may be to change the way they are loading on a particular structure , to improve function, permit better healing or to resist deformity but a change in movement or position can have additional effects

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2. Modify Movement/Position

- Emerging research on large joints such as the hip are showing effective change in magnitude and velocity of movement with Dynamic Taping
- Similar studies underway in Australia are showing similar changes in both athletic and non-athletic subjects and positive effects on pain in a symptomatic cohort
- The effect on movement is generally only significant when taped in the short position and with substantial resistance created by the tape


Dynamic Taping and High Frontal Plane Knee Projection Angle in Female Volleyball Athletes

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Gait & Posture
Available online 18 March 2019
In Press, Accepted Manuscript
Full length article
Does Dynamic Tape change the walking biomechanics of women with greater trochanteric pain syndrome? A double-blind randomised controlled crossover trial

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2. Modify Movement/Position

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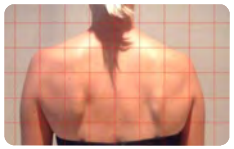
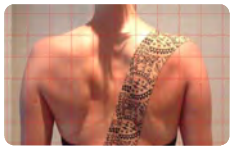
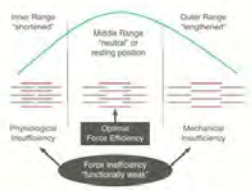
3. Length-Tension and Levers







- Positioning the muscle in a more mid range position increases its capacity to generate force
- Change in position can also result in an improved line of pull of the muscle and an increased effort arm resulting again in better transmission of forces or accommodation of load

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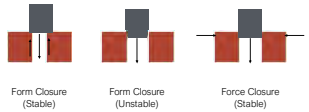
4. Augment Force Closure

- **Form Closure** is determined primarily by the architecture or the joints



- **Force Closure** refers to the additional forces provided across the joint to increase the friction forces and subsequent 'stability'. These forces may be from the musculotendinous/myofascial structures or may be applied externally.
- Dynamic Tape applied circumferentially (usually on an angle to reduce risk of circulatory or neural compromise will create a compression force which may augment force closure.

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4. Augment Force Closure

- Andreza RM Pereira et al, 2017 - presented at Brazilian Congress - Revista Movimenta 2017; 10(4):895

O Uso da Dynamic Tape na instabilidade lateral do tornozelo em atletas de voleibol

- This study looked at elite volleyballers with ankle instability and examined functional and balance measures pre & post Dynamic Taping
- Reported significant improvements in Cumberland Ankle Instability Tool (CAIT) and Foot & Ankle Ability Measure (FAAM) and also improvements in reach distance on Y Balance Test

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4. Augment Force Closure




Ankle & Foot | Carpal Instabilities | Finger Ligaments

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5. Soft Tissue Offload

- Gathers up soft tissue from all directions
- Manually gather and then hold in place with elastic recoil of tape
- Hug et al, 2014 showed using elastosongoraphy a reduction in tissue stress (load) when 'box' taping was applied to the quadriceps
- Reduces stimulation of sensitised nociceptors
- May improve circulation - appears to be a different mechanism from kinesio tapes (lifting the superficial layers of the skin)

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The Biomechanical Tape

AIMS:

- **Tissues do not fail because of pain, they fail because of load. Dynamic Tape aims to manage the loading profile of the tissues - either directly by absorbing load or indirectly by effecting an improvement in kinematics**
- **To provide strong mechanical compression, assistance or resistance (deceleration or acceleration), to permit applications which augment stability or introduce accessory motions and rotation, cross the midline and incorporate multiple joints without compromising range of motion or performance of complex, multi-planar movements**
- **The focus is on managing load, movement patterns or function (not pain centric) - patients may not have pain and function may be limited by load e.g. gravity/mass of hand rather than pain. Depending on the pain processes involved, the pain may well be load dependent anyway.**

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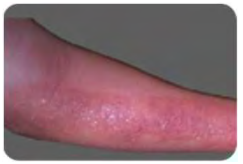
Skin Reactions to Tape

1. Allergic Reaction

- **type of contact dermatitis**
- **occurs quickly, usually within 30 minutes**
- **hot, itchy, stinging or burning**
- **red, raised, welts and blistering if left on**
- **covers the entire area in contact with the adhesive**
- **NEVER tell people that they MUST leave it on for a certain period of time**
- **Low incidence - appears to be less than 1%. Far more common with paper tapes, zinc oxide tapes.**
- **Clean with soap & water. Antihistamines & hydrocortisone if needed**



Severe reaction shown (left in place for over two days despite onset within 15 to 20 minutes)

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Skin Reactions to Tape

2. **Contact Dermatitis**

- this milder form is more commonly seen with fixomul/sports tapes
- due to a moist environment under the tape for a prolonged period
- do not occur with Dynamic Tape as it breathes so well and dries quickly
- comes on after a couple of days

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Skin Reactions to Tape

3. Mechanical Irritation

- this is the most common reaction when starting out
- due to excess shearing of the skin due to the pulling from the tape
- generally comes on after several hours up to a couple of days depending on how much tension is present, skin tolerance etc.
- is usually redness which can progress to a blister if not removed
- generally on the ends or one or two isolated places along the length of the tape where tension has been too great
- this is an application error and can be avoided with correct application

Mechanical Irritation

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WARNING

"If you experience any itching, burning, stinging, irritation or your pain is worse remove the tape immediately as you may be at risk of an adverse reaction which may result in skin breakdown. If you experience any pins & needles or numbness the tape may be too tight causing some compression on the nerve or compromise of the circulation. Remove tape immediately. Do you understand this warning?"

Patient Information sheets can be downloaded from www.dynamictape.com

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www.seminars.dynamictape.com
www.dynamictape.com.au

If anyone has problems you can reach out to Dynamic Tape Global
admin@dynamictape.com

Ryan Kendrick, BPhty, MPhtySt
Musculoskeletal Physiotherapist
Director | Dynamic Tape Global Ltd
ryan.kendrick@dynamictape.co.uk

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Rigid Tape

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Contraindications/Cautions

- Athletic taping is contraindicated if the patient has an allergy to the materials used, if there is active infection or irritation of the skin or if the circulation and/or nerve supply is compromised.

- The area to be taped should be clean and dry. Ideally the area should be trimmed to stubs. If not, an under-wrap should be used.
- Tape should be applied smoothly, making sure not to cause any wrinkles which can be uncomfortable for the athlete and even cause blisters.

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Contraindications/Cautions Cont…

- Once applied, the tape should be checked to make sure the athlete is comfortable with the taping application.
- The circulation and sensation of a taped area should be assessed. If the skin is excessively pale or blueish, cold or there is a lack of sensation, then the tape is too tight and should be removed immediately.
- Following activity, a tape cutter or bandage scissors should be used to remove the tape.
- Adhesive remover should be used to help ease off the tape.
- Tape should not be left on for too long in case skin irritation or breakdown occurs.

Tape scissors are a small investment. GET MORE THAN ONE for your kit

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TAPING INJURIES?

Would you consider taping these injuries so the athlete can return to the field of play?

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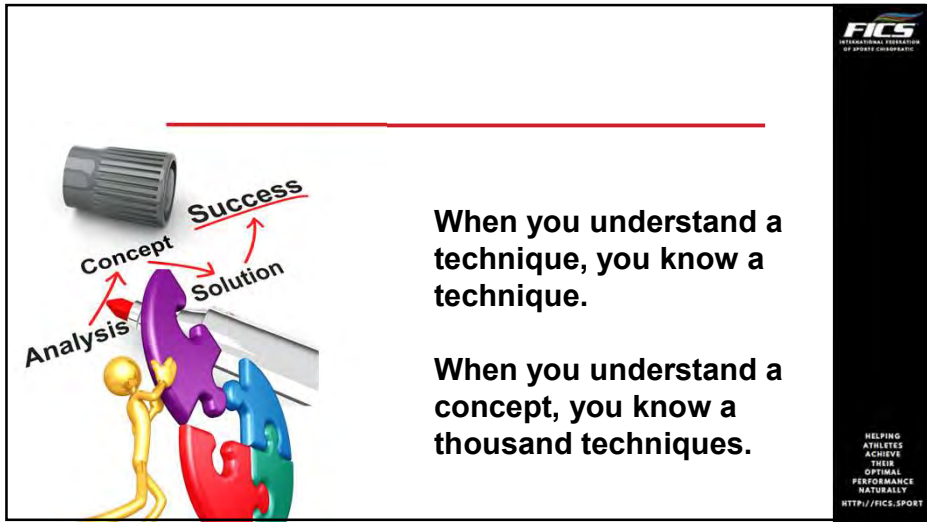
Success
Concept
Solution
Analysis
When you understand a technique, you know a technique.
When you understand a concept, you know a thousand techniques.
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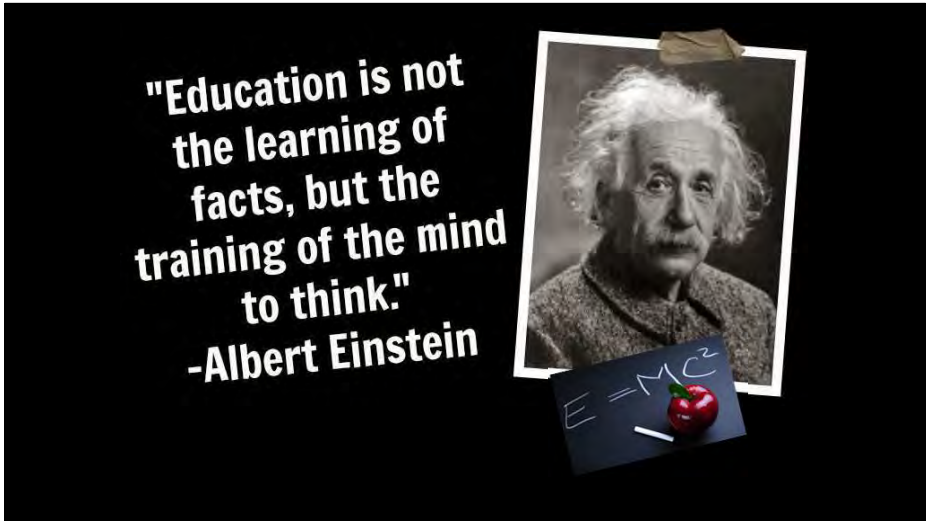
"Education is not the learning of facts, but the training of the mind to think."
-Albert Einstein
E=MC²

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Thank You!
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