



Therapeutic Taping For the Spine

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- DPT – University of Southern California
- BS – Kinesiology, California State U. Fullerton
- OCS - Orthopedic Certified Specialist (ABPTS)
- FAAOMPT-Fellow American Academy of Orthopedic Manual Physical Therapists (AAOMPT)
- CSCS - Certified Strength and Conditioning Specialist (NSCA)
- CEAS – Certified Ergonomics Assessment Specialist
- CGFI-MP2 – Certified Golf Fit Instructor Level 2 – Medical Professional (TPI)
- CCCE – Center Coordinator Clinical Education
- Co-Owner Rezac & Associates Physical Therapy, Colorado Springs, CO
- APTA CO SE District Delegate
- Colorado Physical Therapy Network Treasurer
- APTA CO Treasurer
- Member APTA, AAOMPT, & NSCA

Course Objectives

- *Participants will be able to identify appropriate patients for taping interventions relative to indications and contraindications.*
- *Participants will be able to identify and apply appropriate taping techniques based on patient presentation and functional limitations.*
- *Participants will identify methods to assess efficacy of taping application objectively.*
- *Participants will be able to identify points of discussion relative to current evidence for therapeutic taping.*

Types of Taping

- **Non-Elastic - Rigid**
- **Athletic Tape**
- **Cramer®/Mueller®/Johnson & Johnson®/Power Tape®**
 - Immobilization
 - Joint Protection / Support
 - Control Movement
 - Re-injury Prevention
- Utilized prewrap to prevent skin irritation
- Now also in cool colors for both the tape and prewrap, but not the same as the newer Elastic (Kinesio®/Balance Tex®) Tape
- Invented in 1920s by J&J, but hit height of popularity in 80s



Theories



- **Rigid Tape (Athletic Tape) Theories**
 - **Prevention of re-injury through immobilization**
 - **Provide rest to injured tissues**
 - **Mechanical Support**
 - **Unloading**
 - **Similar to bracing**
 - **Useful for acute injuries on field to allow athlete to complete game / competition**

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Types of Taping

- **Non-Elastic - Semi-Rigid**
- **McConnell Institute® and Mulligan Techniques (Leukotape® / EnduraTape® / DonJoy®) Tape**
 - **Some Flexibility**
 - **Neuro Re-ed**
 - **Facilitation – with direction of muscle fibers**
 - **Inhibition - across muscle belly**
 - **Joint position – patellar relocation, navicular lift**
 - **Improve muscle torque**
 - **Support for improved tolerance to joint loading**
 - **Unloading painful structure by shortening tissue**
- **Utilizes Cover Roll or Hypafix®**
- **Introduced by Jenny McConnell in 1986 and Brian Mulligan in 1989, most popular in the 90s**



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Theories

- **Semi-Rigid Tape Theories**

- **Jenny McConnell**

- Neuromuscular re-education through facilitation (along muscle) or inhibition (across muscle)
 - Relocation of joint for optimal biomechanical alignment
 - Mechanical Support
 - Unloading of painful structures



- **Brian Mulligan**

- Mobilization with Movement (MWM) – utilizes tape to carry-over manual techniques – joint mobilization, soft tissue unload, positional correction
 - Neuromuscular Re-education, biomechanical alignment, unload

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Types of Taping

- **Elastic Proprioceptive Tape**
- **Kinesio® Tex/ Balance Tex® / Sports Tex® / Kinesiology® / Spider® Tape**
 - Very Flexible
 - Neuro Re-ed
 - muscle facilitation
 - inhibition
 - Lymphatic Drainage
 - Unloading
 - Proprioceptive Input
 - Joint Support
- **Invented in the 70s by Dr. Kenso Kase (Chiropractor), not popular in US until 2000s**



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Kinesio® Taping Theories

- **Muscle Function**
 - Facilitate muscle contraction via muscle spindles
 - Inhibit / relax muscles via GTOs
 - Proprioceptive feedback / re-ed
 - Reduce over-extension or over-contraction of muscle
- **Skin Function**
 - Stimulation of nociceptors, mechnoreceptors and thermoreceptors influencing CNS response
- **Pain Function**
 - Unloading / Inhibition of painful structures



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Theories

- **Why these are THEORIES**
 - **No research to support:**
 - Joint realignment via radiography or MRI
 - EMG activation/de-activation of muscle fibers (muscle spindles, GTOs)
 - Effect on nociceptors, mechanoreceptors or thermoreceptors
 - Reproduction of Joint Position Sense (RJPS) / Proprioception

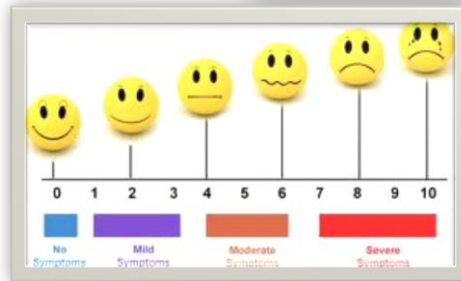


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Evidence Based Practice

- What the research DOES support:
 - Decrease in pain rating scales
 - Anandkumar, 2013
 - Jesse, 2012
 - Chen, 2012
 - Holtzman, 2012
 - Jung-hoon, 2011
 - Gonzalez-Iglesias, 2011
 - Kaya, 2011
 - Gonzalez-Iglesias, 2009
 - Garcia-Muro, 2009
 - Jotkowitz, 2009
 - Warden, 2008
 - Aminaka, 2008
 - Janacaitis, 2006
 - Frazier, 2006
 - Griffin, 2006
 - Brandon 2005
 - Vicenzio 2003



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Evidence Based Practice

- What the research DOES support:
 - Improvement in disability scores
 - Jung-hoon, 2011
 - Gonzalez-Iglesias, 2011
 - Kaneko, 2011
 - Kaya, 2011
 - Jotkowitz, 2009
 - Hughes, 2008
 - Michael, 2008
 - O'Sullivan, 2008
 - Kilbreath, 2006



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Evidence Based Practice

- What the research DOES support:

- Improvement in functional tasks

- Anandkumar, 2013
- Chen, 2013
- Jessee, 2012
- Yoho, 2012
- Jung-hoon, 2011
- Maguire, 2010
- Gonzalez-Iglesias, 2009
- Garcia-Muro, 2009
- McConnell, 2009
- Hsu, 2009
- Abian-Vicen, 2009
- Jotkowitz, 2009
- Callaghan, 2008
- Baltaci, 2008
- Callagan, 2008
- Meana, 2008
- Aminaka, 2008
- Michael, 2008
- O'Sullivan, 2008
- Thelen, 2008
- Vicenzino, 2007
- Yoshida, 2007
- Aspergren, 2007
- Kilbreath, 2007
- Moiler, 2006
- Jancaitis, 2006
- Halseth, 2004
- Vicenzion, 2005



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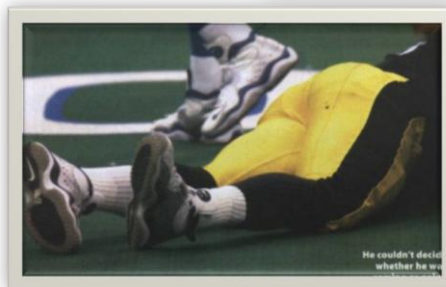
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Evidence Based Practice

- What the research DOES support:

- Decreased incidence of re-injury

- Fleet, 2009
- Eagleton, 2009
- Refshauge, 2009
- Franettovich, 2009
- Hughes, 2009
- Baltaci, 2009
- Meana, 2008
- Griffon, 2006
- Osterhues, 2004
- Crossley, 2000

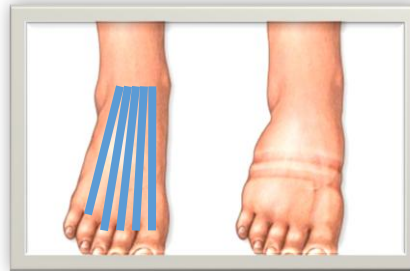


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Evidence Based Practice

- **What the research DOES support:**
 - **Decreased inflammation / edema**
 - Anandkumar, 2013
 - Tsai, 2009
 - Bialoszewski, 2009
 - Osterhues, 2004

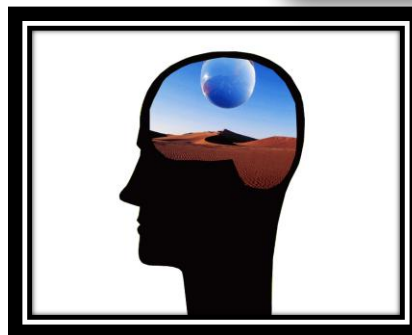


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Evidence Based Practice

- **What the research DOES support:**
 - **Psychological Benefit**
 - Abian-Vicen, 2009
 - Hughes, 2009
 - Paterson, 2009
 - Moiler, 2006
 - Jancaitis, 2006
 - Hunt, 2006
 - Crossley, 2006
 - Simoneau, 2006



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Evidence Based Practice

- What the research DOES support:
 - Does not make them worse
 - All of the above!



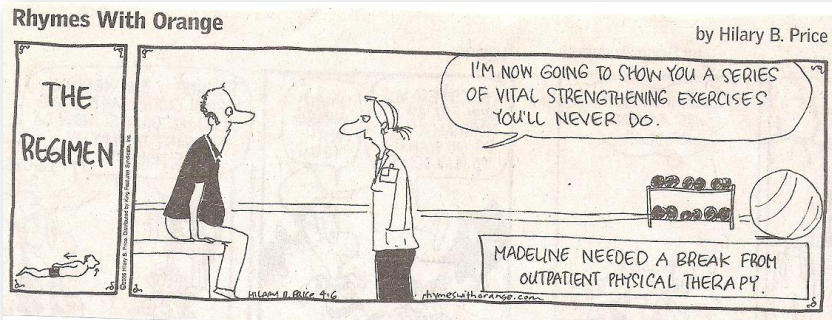
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Elastic Proprioceptive Taping



New adjunct for clinician tool box

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Application of Elastic Tape

- Skin free of oils / lotions and dry
- Spray adherent can be used, no prewrap or cover roll
- Clip or shave thick or "furry" hair
- Can apply as many of the individual techniques as needed – recommend taping for pain and function
- No tension at beginning and end of tape
- Round ends of tape to prevent rolling
- May be used in many people with tape allergy, still need to test
- Can be worn for 3-7 days, elastic properties prevent loosening

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Application of Elastic Tape

- **Other considerations**
 - **Age**
 - Use caution with elderly, frail skin (consider test strip)
 - Pediatric delicate skin (consider test strip)
 - Don't apply over non-closed incisions or wounds or abrasions/rashes
 - Elastic tape more tolerable in persons with tape allergy, generally if they can tolerate a band-aid, they can wear (test skin)
 - Can adjust wearing schedule to less time on for sensitivity
 - Tape should NEVER increase pain or dysfunction
 - Apply one technique at a time and test
 - Tape for pain AND function components as appropriate

Application of Elastic Tape

- **Facilitation- Moderate/50% to Maximum/100%**
- **Inhibition- Minimal /<25%**
- **Edema- No Stretch**
- **Space Correction/Unloading- Maximum/100% Stretch**

Elastic Tape Strip Types

- **Solid Strip**



- **Split Strip**



- **Cut Outs**

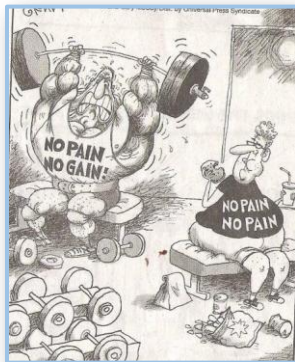


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Application of Tape

- **The Rezac Principles**
 - **Should not produce or increase pain**

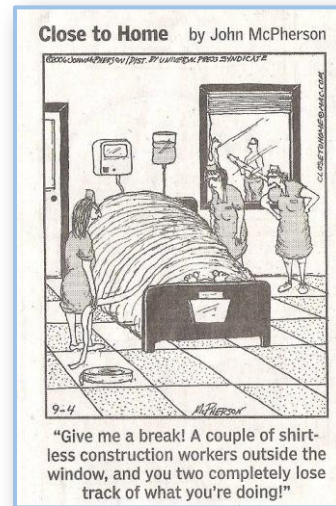


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Application of Tape

- **The Rezac Principles**
 - **Use the least amount of tape necessary to accomplish goal.**



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What happens if you overdo it!



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Elastic Taping

- **While rigid taping still has its use for immobilization with significant instability, all techniques presented in this course utilize elastic tape.**
- **Credit is given for each technique to the originator of the technique. If not noted, the technique has, to the knowledge of the instructor, never been presented by another person or organization.**

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Rules for Taping

- **There are no “rules” only guidelines**
- **All of these types of taping utilize very specific step-by-step instructions regarding position of muscle / joint, strips of tape and direction of pull – but NONE of them has substantial evidence to show THEIR technique is any better than any other one**
- **Utilize your knowledge of biomechanics and anatomy and tape for what you want to accomplish**
- **Use to carry-over manual techniques (JTM, STM, PNF)**
- **Then check to see if it accomplished your goal (objective measures)**

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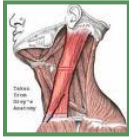
Therapeutic Taping for the Cervicothoracic

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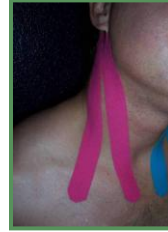
Taping for C/S & T/S

- **Identify your Asterisk (*) Sign**
- **Tape for * sign, re-check**
- **Spine tends to be more taping for function than pain (pain follows function)**
- **Great adjunct to manual techniques to carry over following Rx.**
 - **Joint mobilization**
 - **Soft Tissue mobilization**
 - **PNF (scapular)**
 - **Capital Flexion Neuro Re-ed**



Sternocleidomastiod (SCM) Kinesio® Technique

- Split strip in two, starting at mastoid, one strip to manubrium other to clavicle
- Tape with cervical spine in contralateral sidebend and ipsilateral rotation
- Facilitation or Inhibition



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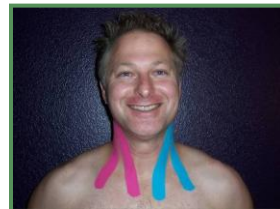
Sternocleidomastiod (SCM) Kinesio® Technique

Indications

- Inhibit SCM to facilitate deep capital flexors (longus colli / longus capitis)
- Correct Torticollis
- Decrease SCM spasm, facilitate ROM
- Decrease tension on TMJ
- Headaches

Testing

- Capital Flexion
- Posture
- Pain / HA
- ROM



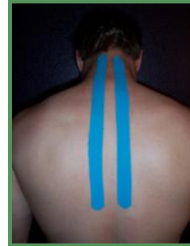
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Posterior Cervicothoracic (Erector Spinae) Muscles McConnell & Kinesio® Technique

- **Single strip to facilitate or inhibit over affected segments**
- **Tape with spine in flexion**
- **Unilateral or bilateral**
 - **Bilateral extension – facilitate both sides**
 - **Rotation – inhibit side with muscle spasm and facilitate contralateral side**



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Posterior Cervicothoracic (Erector Spinae) Muscles McConnell & Kinesio® Technique

- **Indications**
 - **Generally effective to tape C/S and T/S for enhanced postural correction**
 - **Bilaterally to decrease excess cervical lordosis**
 - **Vertebral rotations - Unilaterally to inhibit muscle spasm on contracted side and facilitate less active side**
 - **Improve painfree C/S and T/S extension or inhibit excessive extension**
- **Testing**
 - **Posture**
 - **AROM / quality of motion**
 - **Pain**
 - **Segmental spinal motion**



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Posterior Spine Mulligan Technique

- **Following Joint Mobilization**
- **2" strip across the segment mobilized with moderate to maximum stretch**
- **Can use this in conjunction with the McConnell & Kinesio® Erector Spinae Technique**



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Thoracic Spine Mulligan Technique

- **Indications**
 - **Following Joint Mobilization for Stabilization**
 - **Improve thoracic extension**
- **Testing**
 - **Posture**
 - **AROM / quality of motion**
 - **Pain**
 - **Segmental spinal motion**



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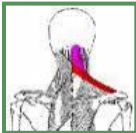
Levator Scapulae Kinesio® Tape

- **Kinesio® Technique**
 - Split strip starting at transverse processes C1-C4 one strip to the medial border of scapula, other to the superior angle with inhibition stretch
 - Tape with cervical spine in contralateral rotation and flexion
- **Modified Tape Practical Application**
 - Single strip



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Upper / Middle Trapezius Kinesio® Technique

- **Kinesio® Technique**
 - Split strip starting at the TP of the 2nd Vertebrae (below the hairline) with minimal stretch apply one strip to lateral clavicle / acromion, other strip to medial border of the scapula
 - Tape with cervical spine in contralateral sidebend
 - Indications – generally inhibition
- **Modified Tape Practical Application**
 - Single strip



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Kinesio® Taping UT

Decreased Pain, no change EMG

- **Murray H. Effect of Kinesio Taping on Upper Trapezius Muscle Tone and Cervical Discomfort. 15th Annual Kinesio Taping Symposium 2000**
 - Upper Trapezius inhibition
 - 15 subjects with neck pain
 - No significant difference with EMG
 - Subjective complaint of pain decreased with tape

Effects of Endura Fix on Lower Trapezius Inhibits Muscle Activity

- **Alexander CM et al. Does tape facilitate or inhibit the lower fibres of trapezius? *Man Ther.* 2003 Feb;8(1):37-41.**
- **The tape was found to inhibit lower trapezius activity. On average, the application of Endura Fix tape inhibited trapezius by 4%. The application of Endura Sports tape overlaying the Endura Fix tape inhibited trapezius on average by 22%. The inhibitory effect was negated once the tape was removed.**



Postural Correction McConnell Technique

- **Enhance Force Couple**
 - Can tape from scapula to contralateral pelvis
 - Unilateral or Bilateral
 - Carry-over PNF
- **Postural Correction**
 - Scapular retraction and depression
 - Unilateral or bilateral



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Postural Correction

Decreased Kyphosis

- Greig AM et al. Postural taping decreases thoracic kyphosis but does not influence trunk muscle electromyographic activity or balance in women with osteoporosis. *Man Ther*, 2007 Apr
- There was a significant effect of postural taping on thoracic kyphosis ($p=0.026$), with a greater reduction in thoracic kyphosis after taping compared with both control tape and no tape. No EMG or balance effects found.

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Scoliosis

- **Tape single strips moderate to maximum stretch on anterior rotated segments**



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Cervicothoracic pain

- **Decrease pressure / pain over C7-T1 joint**
- **2 - 4 space correction strips**
- **Maximal stretch over middle 1/3, no stretch lateral 2/3**
- **Great carry-over following C7-T1 fascial release**



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Clinical Evidence-Based

- **Gonzalez-Iglesias. Short-term effects of cervical kinesiotaping on pain and cervical ROM in patients with acute whiplash injury: a randomized clinical trial. JOSPT 2009.**
- **Tension application vs sham**
- **Increase in ROM and decrease in pain in tension group**



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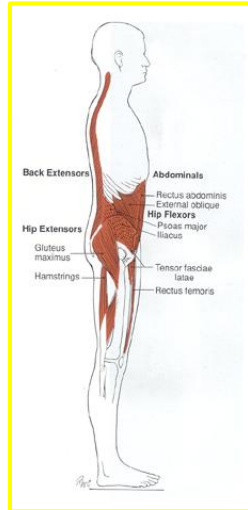
Therapeutic Taping for the Lumbar Spine and Pelvis



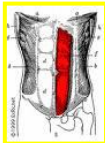
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Where is your Core?



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Rectus Abdominis Kinesio® Technique

- Two single strips suprapubic to xyphoid mod to max stretch
- Applied with patient in extension (can lean back in chair)
- Applications:
 - Pregnancy
 - Abdominal Obesity
 - Spinal Stenosis
 - Spondylolysis
 - Spondylolisthesis
 - Anterior Pelvic Tilt
 - Poor abdominal control



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External Abdominal Oblique “Stork Support”

- Two single strips starting suprapubic with mod to max stretch to lateral ribs V-XII
- Tape with patient in extension
- Applications:
 - Pregnancy
 - Abdominal Obesity
 - Lumbar disc bulge / HNP
 - Anterior Pelvic Tilt
 - Poor abdominal control
 - Colitis
 - Ossifying Costal Cartilage
- Great with rectus taping!

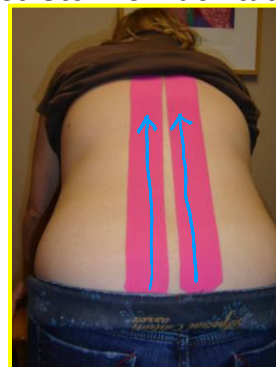


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Erector Spinae Kinesio® Technique

- Single strip from unilateral or bilateral
- Minimal stretch for inhibition, mod to max stretch for facilitation
- Tape with patient in flexion
- Applications:
 - Pregnancy
 - Abdominal Obesity
 - Lumbar disc herniation
 - Lumbar extension weakness
 - Scoliosis



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Pelvic Stabilization Mulligan & McConnell



- Postural Correction
- Works similarly to an SI belt, but does not slip!
- Correct pelvic alignment first!
- Maximal pull from iliac crest across sacrum to contralateral side, repeat opposite direction
- 2 single strips, no pull on ends

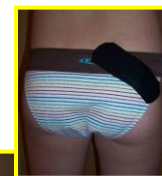


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L5-S1 or SI Space Correction McConnell & Kinesio®

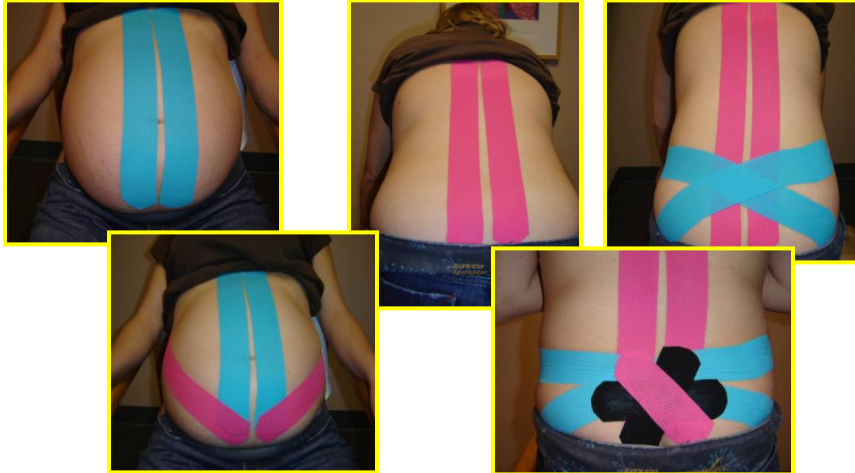
- 3-5 space correction strips
- 3 squares, remove middle
- Maximal stretch across middle
- No stretch on ends
- Each one in a different orientation
- Can combine with erector spinae and / or pelvic stabilization as needed



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Taping for Pregnancy McConnell, Mulligan & Kinesio®



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Spine Vertebral Rotations Mulligan & Kinesio® Technique

- 2 erector spinae strips over involved segment
- Single strip mod to max stretch across vertebral segment mobilized



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Kinesio® Tape on Trunk ROM Flexion AROM Improved

- Yoshida A, Kahanov L. (2007) "The Effect of Kinesio Taping on Lower Trunk Range of Motions". *Research in Sports Medicine*, 15:103-112.
- 30 subjects without back pain volunteered
- Lumbar flexion, extension and lateral flexion AROM were measured pre/post taping.
- Significant improvement was noted in flexion AROM only

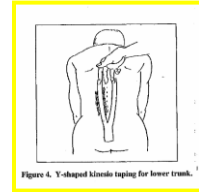


Figure 4. Y-shaped kinesio taping for lower trunk.

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Spine Unload Tape McConnell Technique

- For acute LBP
- Tape with person in flexion
- Single strip across spine above pain and two single strips in a V pulling up
- Essentially a large space correction with pain segment in middle of three pieces of tape



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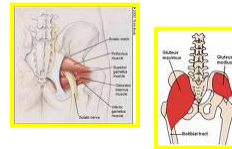
SI / Lumbar Joint – Edema Kinesio® Technique

- Applied over lumbar spine or painful SI joint
- Apply 2 split strips (cut into 4-8 strips) over edema site in a perpendicular fashion
- Applied with patient in flexion
- No stretch



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SI Dysfunction



- Piriformis and / or gluteal facilitation
 - Kinesio®
 - Split strip from lateral thigh mod to max stretch with strips approximating borders of muscle
 - With hip in flex, add, IR
 - Modified
 - Single strip for Piriformis
- Recommend with:
 - SI space correction
 - SI edema
- Can also consider adding:
 - Pelvic stabilization
 - Abdominal facilitation

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Clinical Evidence-Based

- AROM – increased range, decreased pain
- Pain – rating at rest and with movement
 - Retest aggravating direction
 - Retest actions
 - Retest positional tolerance
- Outcome Measures
 - Oswestry

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Clinical Evidence-Based

- Functional Improvements (improved ability, longer period of time)
 - Sitting, Standing, Walking Tolerance
 - ADL – housework, yardwork, childcare
 - Work – single/multiple lift (reps, weight)
 - Lifting, bending, twisting
- Special testing – SLR, SI Tests, SLS, prone instability
- Improved muscular control
 - Increased MMT LE or core
 - Decreased aberrant movement

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Questions / Comments / Discussion



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