Evidence -’?’ed practice

- Evidence-based vs Evidence-informed
- What is the definition of EBP?
  - (Sackett 1996) … best evidence from the literature applied to a specific patient
  - (Sackett 2000) … best evidence from the literature + clinician expertise + patient values/goals
  - EBP is more than applying best evidence from the literature

What is ‘Evidence’?

- Literature
  - Primary sources – research articles
  - Secondary sources – texts

- Clinical expertise/experience
  - Expert vs novice
    - Knowledge, skill acquisition, reflective practice
    - Pattern recognition

- Patient values/goals
The relative contribution of each will vary depending on the characteristics of each specific situation.

**EBP / EIP**

**The Evidence: Process**

- **Ask**
- **Acquire**
- **Appraise**
- **Apply**

**ASK**

- See Deb’s tutorials
  - PICO
    - Population
      - Age
      - Condition
      - Acuity/Stage
    - Intervention
      - Physiotherapy, Physical Therapy, Rehab
      - Taping, strapping, athletic tape, tapes, taping and strapping
  - Comparison
  - Outcome
    - ROM, function, specific OM, performance
ACQUIRE

1. Which Databases?
   - Google Scholar for the “Absolute Beginner”
   - Pubmed/Medline + CINAHL = best coverage of PT
   - Search all databases here

2. Which search terms? Next slides

3. How do I do a search? How do I limit to highest levels of evidence, populations, etc? Webinar series = recordings, upcoming

4. How do I get full-text articles?
   - Step 1: Is it free on the Web?
   - Step 2: Is it available in the PABC eLibrary A-Z Journals List?
   - Step 3: If not, ask Deb librarian@bcphysio.org
   - Webinar – recordings, upcoming

Quick & Dirty Search in PubMed

- Taping = pretty good results!

Search Terms: Taping

1. **Keyword** = kinesiotap*, kinesio tap*, taping
2. **MeSH** (for Medline/PubMed) =
   - Athletic Tape (older articles are indexed under Bandages)
3. **CINAHL Heading** (for CINAHL) =
   - Taping and Strapping
   - Athletic Tape
APPRAISE

• See Journal Club webinar recordings
  – How to appraise an RCT
    • Worksheet
    • Tennis elbow, Achilles tendinopathy and exercise and LASER, osteoarthritis & knee joint mobs, hip protectors
  – How to appraise a Systematic Review or meta-analysis
    • Worksheet
    • Orthoses & patellofemoral pain syndrome

TAPING – General Intro

• Commonly used
• Purported to:
  – Facilitate & inhibit muscle activity
  – Reposition joints
  – Prevent injury
  – Improve proprioception
    • Morris et al, 2012
TAPING – General Intro

- Pain reduction
  - Mechanical eg. McConnell PFPS taping, ankle, low dye
  - Neuromuscular
- Injury or re-injury prevention
- Reduction of strain on injured or vulnerable tissue
- Provisional stability
- Biomechanical correction
- Muscle inhibition
- Muscle facilitation
- Reduction of edema
- Psychological effects (confidence, decreased anxiety)

*Review of evidence for each provided by Constantinou & Brown, 2010

### Intended purpose

<table>
<thead>
<tr>
<th>Intended purpose</th>
<th>Mechanism</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce pain</td>
<td>Mechanical</td>
<td>McConnell PFPS + Ankle sprain + Low dye (pronation) + With MWM +</td>
</tr>
<tr>
<td></td>
<td>Neuromuscular</td>
<td>1. Facilitation - in line 2. Inhibition - across 3. Timing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed findings</td>
</tr>
</tbody>
</table>

### Enhance proprioception

- Tactile input to superficial and/or mm/joint mechanoreceptors
- Mixed findings

### Deloading/unloading

- Reduce strain on tissue by approximating mm
- Some evidence
  - Eg. Vicenzino diamond taping for lat epicondylalgia

### Psychological

- Increased confidence
  - + athletes + violinists

### Reduce edema

- Compression
- Some evidence

*temporary*
TAPING – General Intro

• Other considerations (Constanzou & Brown, 2010):
  – Excellent knowledge of the anatomy
  – Consider use of hypoallergenic underlay
  – Consent
  – Explanation
  – Standardized warning
  – Evaluate effectiveness

TAPING – General Intro

– Outcome measure to test effectiveness
  • Patient specific functional scale (PSFS)
    – “Today, are there any activities that you are unable to do or having difficulty due to your [nominated] problem?” (Sterling & Brentnall 2007)
    – 3 activities; 0-10 scale (0= unable to do at all; 10= preform at pre-injury level)
    – Minimal detectable change value
      • 2 points when avg score of 3 activities is used
      • 3 points for each single activity score
    – Aim: 50% or better improvement with taping (McCurley 2002, Vicenzino et al 2008) but 30% could be clinically meaningful (Rowbotham, 2001)

KinesioTape (Kinesio Tex® Tape)

• Latex free, porous, elastic
• stretches to 120-140% of resting length; recoils back after application thus creating a ‘pulling force’
• Training programs
• Purported:
  – mimic thickness & flexibility of skin
  – microconvolutions created when skin lifted away from tissue beneath (thus, less pressure and more space for lymphatic fluid movement)
  – Thus, less pain, prevent over-contraction, facilitate lymph drainage, improve joint position & kinesthetic awareness

*Summary of application principles (Kahanov 2007b)
SIDE EFFECTS

- Allergic contact dermatitis
- Irritant contact dermatitis
- Folliculitis
- Blisters
- Skin maceration

- Greater risk with frequent application and removal and with some types of tape (Constantiou & Brown, 2010)
- **DO A PATCH TEST (24 hrs)**
- Caution with shaving immed prior to application

WHAT DOES THE EVIDENCE TELL US?

- **Musculoskeletal**
  - Injury prevention
  - Injury management
    - Patellofemoral (McConnell)
    - CLBP
    - Plantar Fasciitis
    - Neck pain
    - Severs disease

- **Neurological**
  - Stroke
    - Low tone shoulder
    - Equinus foot
  - Multiple Sclerosis
  - Meralgia
  - Cerebral Palsy
  - Congential Torticollis

The following is a sample of the literature on this topic – it is not exhaustive / comprehensive

NONMECHANICAL EFFECTS

- **Nerve Conduction Velocity** (Lee et al, 2011)
  - Kinesio Tape; 17 normals
  - No sig diff with/without KTT

- **Brain Activity** (Caffghan et al, 2012)
  - Patellar taping (rigid) modulates brain activity during a proprioception knee movement task (fMRI) *8 normals, 1 piece of rigid tape*
    - Changes in blood oxygenation level dependent response bilaterally, in comparison with no taping, in medial supplementary motor area, cingulate motor area, basal ganglon, thalamus, medial and lateral primary sensory motor cortex (some increased, some decreased)
NONMECHANICAL EFFECTS

• **Strength** (Vercelli et al, 2012)
  – Kinesiotape, 36 normals, quads
  – facilitation (KT+), inhibition (KT-), sham
  – No sig diff on immed strength (isokinetic)

MECHANICAL EFFECTS

• **Biomechanical effects** (Tregouet et al, 2013) 12 normals, inversion platform after 30 min of running
  – (1) Nontaped control; (2) non-elastic basketweave (3) elastic adhesive bandage wrap
  – Rate of inversion (not total inversion) in non-elastic < elastic adhesive < control

MECHANICAL EFFECTS

• Biomechanical (Briem et al, 2011) 30 male basketball players – 15 highest & 15 lowest Star Excursion Balance Test
  – Each tested under 3 conditions: (1) nontaped, (2) non-elastic (3) KinesioT
  – Mean muscle activity sig greater with non-elastic; no sig diff btwn nontaped & KT
PERFORMANCE

  - 20 athletes (11 male), 4 sports
  - KT over triceps surae vs nonelastic tape
  - No sig diff in jumping height, distance & star excursion balance test

  - "Consistent message: KT, as applied in these studies, and measured by these methods, does not enhance performance, increase strength or prevent injury > rigid tape"

MUSCULOSKELETAL

- The clinical effects of Kinesio Tex taping: a systematic review (Morris et al, 2012)
  - Systematic review; 8 RCTs
  - "Limited to moderate evidence that KTT is no more effective than sham or usual care tape/bandage"
    - shoulder impingement
    - CLBP
    - PFPS
    - neck pain
    - *some, questionable, effect for plantar fasciitis

MUSCULOSKELETAL

  - Pain: trivial
  - ROM: small to trivial
  - Proprioception: likely beneficial grip force
  - Strength: some findings supported benefit but trivial for quads/hams/ grip strength
  - Muscle activity: some substantial effects but unclear if beneficial or harmful
MUSCULOSKELETAL

• A systematic review of the effectiveness of Kinesiotaping: Fact or fiction? (Kalron & Bar-Sela, 2013)
  – Eur J of Phys Rehabil Med
  – CINAHL, Cochrane, MEDLINE, PEDro
  – MSK:
    • Pain: 3/6 reduction immned pain
    • Strength: no evidence of improvement
    • ROM: no long term effect
  – Neurological: No evidence to support effectiveness
  – Lymphatic: Inconclusive evidence

In contrast with most physical therapy modalities (medical exercises, joint passive mobilization techniques, thermo and electrotherapy devices, etc), KT tape is marketed in a wide range of bright colors, application methods are creative and promotion strategies are far more intense than any other physical therapy modality. Moreover, the KT application is a visible treatment. As a consequence of its rising popularity among active sport professionals, more and more individuals are becoming aware of this application (as viewing sport competitions on TV or the internet). It is assumed that patients, especially those involved in amateur sport activities, tend to gravitate towards techniques or modalities they believe have helped the professional sport community. However, they are also uninformed as to the application’s effectiveness.

Kalron p. 10

MUSCULOSKELETAL
Shoulder Pain

• Djordjevic et al (2012). MWM and KT compared with supervised exercise program for painful shoulder.
  – 20 subjects (34-79): double blind randomized; Dx by MD as ‘rotator cuff lesion with impingement syndrome or impingement shoulder syndrome (Xray, USI)
  – MWM (posterolat glide; 10 reps, 3 sets, 30 sec btwn sets, daily; 10 sessions with 24 hrs btwn sessions) & KT or supervised exercise (pendulum, active elev/depress, F, A, IR, ER; strengthening of above; 10 reps in 1 set daily 30 sec btwn types of ex, 10 sessions with 24 hrs btwn sessions)
  – Sig > active pain free ROM (flexn & abdn) with MWM & KT
MUSCULOSKELETAL
Achilles Tendinopathy
- The effect of kinesiotape on pain, function and motoneuronal excitability in healthy people and people with achilles tendinopathy (Firth et al, 2010)
  - 26 normal; 29 with AT
  - Increased motoneuronal excitability after removal of KT in normals but not those with AT

NEUROLOGICAL - Stroke

Hemi Shoulder
- Pandian et al (2013)
  - 80 first time strokes in intervention; 82 in control
  - RCT of ‘tri-pull taping’ for 2 weeks
  - ‘Trend’ (not stat sig) for pain reduction (VAS) & functional improvement (SPADI)

Equinus Foot
- Carda et al (2011)
  - 69 chronic stroke
  - RCT 3 grps (after Botox A)
  - Taping
  - Casting & stretching X 1 wk
  - Stretching & gait training
  - T1: taping & casting groups
  - sig improvements in modified Ashworth, 6 MWT, 10 m WT, passive ROM
  - T2: casting grp maintained more improvement

Thus, better than stretching alone

NEUROLOGICAL - Stroke
  - Evidence-informed opinion article
  - Description of rationale and technique
  - Photos of taping technique
NEUROLOGICAL
Congenital Torticollis

• Ohman (2012): Immediate effect of KT on muscular imbalance for infants with congenital muscular torticollis
  – 28 infants; retrospective chart review for pre and post Muscle Function Scale
  – MT has a significant immediate effect
    – Muscle relaxing technique better than muscle facilitating
    – Technique or using both techniques together
  – Caution: retrospective, non-randomized, small and unequal groups, no standardized intervention, intrarater reliability of MFS for this clinician

NEUROLOGICAL - CP

• Simsek et al. 2011: The effects of Kinesio® taping on sitting posture, functional independence and gross motor function in children with CP
  – 31 children, Level III, IV, or V of GMFCS
  – 2 grps: KT and PT; only PT (no KT)
  – 12 weeks
  – Gross Motor Function Measure, WeeFIM, Sitting Assessment Scale (SAS)
  – Both groups sig improved from baseline; only sig diff between grps was SAS at 12 wks
  – No effect on gross motor function and functional indep but sitting posture was positively affected

NEUROLOGICAL - CP

• Functional taping applied to upper limb of children with hemiplegic cerebral palsy: a pilot study.
  (Mazzone et al 2011)
  - pilot study
  - 16 children with CP
  - 5 month taping and conventional PT
  - 7 month only conventional PT
  - 5 month taping and conventional PT
  - OM = Melbourne Assessment score
  - large improvements in first and third period
  - no improvement in second period
NEUROLOGICAL Paediatric Neuromuscular Disorders

  – Abstract, CSM 2011
  – Review of lit to investigate effectiveness of taping, strapping, and garments as an alternative to traditional orthotics (e.g. AFO’s), surgery & injections
  – “several databases, setting limiting criteria, 2000-9, evaluated using 2008 American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) methodology

NEUROLOGICAL Paediatric Neuromuscular Disorders Cont’d

• Most focused on the “activities and participation” (ICF)

• 3/7 various types of therapeutic taping, 1/7 strapping (with TheraTogs), and 3/7 Lycra garments.

• Improvements shown in all studies, but most were either not stat sig or not statistically analyzed

• All examined only immediate results

• “...current … research does not strongly support any specific clinical parameters for the use of taping, strapping, and garments for the treatment of children with NM disorders”

NEUROLOGICAL - MS

• Effect of KT on standing balance in subjects with MS (Cortisi et al, 2011)
  – Pilot study
  – 15 MS individuals attending rehab unit
  – 2 days of tape to skin of bilat calves
  – Result:
    • no change in med/lat plane
    • Sig reduction of sway in ant/post plane

• Neuromuscular taping in MS (Costantino, 2012)
  – Pilot study
  – 20 subjects
  – Tape at weakest portion of hamstrings
  – Every 4 days for 16 days
  – 6MWT and SF 36
  – Result:
    • Both outcome measures showed sig improvement
TAKE HOME MESSAGES

• Evidence:
  – Some: greater in ortho than neuro

• Clinical expertise:
  – Useful tool in clinician’s toolbox
  – Need training
  – Need practice

• Patient preference:
  – Attitude: Believe in it; engaged in monitoring
  – Caregiver support for neuro population

• Low risk / minimal side effects

Helpful resources

• Websites
  – www.kttape.com

• Texts

• YouTube
  – UK Sports Therapy
  – Original Kinesiotaping method
  – Travis Dodds (UBC)
    • http://www.youtube.com/playlist?list=PL3470D0317281A38