A Pragmatic Evidence Informed Approach to Chronic Lateral Elbow Tendinopathy with Lessons for Other Sites

Bill Vicenzino
Pre-event warm up ...!

How do you explain the client’s symptoms to them?
  – Namely where is the pain coming from?
  – Why does it hurt when they use their hand?

Which is the physical treatment that you most use?

What is your rationale for using this technique?
Short term gain - long term pain

Aetiology

Alternative construct

Role of Phty & Exercise

Smidt N and Van de Windt D BMJ 2006;333;927-928 doi:10.1136/bmj.39017.396389.BE

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Opinion piece

Stop injecting corticosteroid into patients with tennis elbow, they are much more likely to get better by themselves!

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Received 18 September 2009; accepted 28 September 2009

The management of tennis elbow

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...7/13 patients were relieved of pain from 1-5 months after the injection of hydrocortisone, only to have recurrence of symptoms...

THE USE OF HYDROCORTISONE ACETATE (COMPOUND F ACETATE) IN THE TREATMENT OF SOME COMMON ORTHOPAEDIC CONDITIONS

H. Herman Young, L. Emmerson Ward and Edward D. Henderson

www.the.lancet.com DOI:10.1016/S0140-6736(10)61160-9
Wait and see policy:
reassured that they will get better (n = 67)

Corticosteroid Injection:
1 ml quantity of 1% lidocaine + 10 mg of triaminolone acetonide in 1 ml (n = 65)

Physiotherapy:
MWM & exercise: 8 x 30’ sessions over 6 weeks (n = 66)

Advice to all: ergonomics and self management ...

Masterclass

Lateral epicondylalgia: a musculoskeletal physiotherapy perspective

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Department of Physiotherapy, University of Queensland, Brisbane, Australia

Effects of a novel manipulative physiotherapy technique on tennis elbow: a single case study

B. Vicenzino and A. Wright
Department of Physiotherapy, University of Queensland, Brisbane, Australia
MWM + exercise are beneficial:

MWM + exercise are beneficial:

NNT = 3
(RR: 2.44 [95CI: 1.55 to 3.85])

NNT = 2
(RR: 1.88 [95CI: 1.41 to 2.5])

MWM + exercise are beneficial:

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Recurrences</th>
<th>Not-per-protocol treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait-and-See</td>
<td>6/64</td>
<td>34/62</td>
</tr>
<tr>
<td>Corticosteroid Injection</td>
<td>47/65</td>
<td>32/65</td>
</tr>
<tr>
<td>MWM/Exercise</td>
<td>5/64</td>
<td>13/63</td>
</tr>
</tbody>
</table>

Short term gain - long term pain:

Corticosteroid injection for tennis elbow - clear evidence of worse outcome in mid to long term with higher recurrence rates and less satisfaction.
Short term gain - long term pain √

Aetiology

Alternative construct

Role of Phty & Exercise
Coombes B, Bisset L, Vicenzino B. A new integrative model of tennis elbow. BJSM Online First, published on December 2, 2008 as 10.1136/bjsm.2008.052738
Abnormal appearance:
- Disordered arrangement of collagen fibres
- Increase in vascularity
- Mucoid degeneration of collagen fibres
- Thin frayed fibrils
- Presence of stainable ground substance
- Absence of classic inflammatory cells

(Coonrad & Hooper 1973, Verhaar et al 1993, Doran et al 1990)

Loss of continuity of collagen
Loss of reflectivity
Frank defect present

angiofibroblastic hyperplasia (Nirschl 1979)
Patterns of Sliver Histopathology

Normal

Rounded, more prominent tenocytes
Rounded tenocytes

Prom tenocytes
abn matrix

Abn tenocytes/matrix
Fascicle rupture
http://www.mhprofessional.com/...and search for it
Local tendon pathology

- angiofibroblastic hyperplasia
- hypercellularity
- increased matrix protein
- collagen fibrils disarray
- neovascularisation

normal tendon

increased cellularity (myofibroblasts)

neovessels

collagen fibrils in disarray

epiphragmatic tendonosis

normal tightly-bundled type I collagen fibrils
Short term gain -
long term pain

Aetiology: does not support an anti-
inflammatory treatment
Short term gain - long term pain

Aetiology

Alternative construct

Role of Phty & Exercise
Coombes B, Bisset L, Vicenzino B. A new integrative model of tennis elbow. BJSM Online First, published on December 2, 2008 as 10.1136/bjsm.2008.052738
What is Tennis Elbow?

Clinical presentation

Slater et al Pain (2005) 114: 118-30
PFG or PFGS:

Pain free grip strength (force)

= to onset of pain
Motor system impairments

20 patients (mean duration 23.9 (7-72) months; mean age 36 (23-58) years; 11 male) & 9 normal (4 autopsy & 5 alive, 8 male, 36 (23-58) years old)

Morphological changes greater in LE

LE related changes:
- moth eaten fibres
- fibre necrosis
- high % fast-twitch oxidative (type 2A) fibre type

Morphological changes may contribute to decreased muscle performance in LE (along with pain)
N = 24 male + 16 female unilateral chronic lateral epicondylalgia (24 male; 49.5 years (32-66; mean duration: 7.7 ± 10 months) & 40 age-gender matched controls


Strength:

1. Metacarpophangeal extension/flexion ratio:

Control (0.56, n8) < recovered TE (0.87, n6) and TE (0.83, n7)
...no differences found for wrist F/E ratios.

2. Grip, Wrist F & E, Shoulder ABD, ER & IR
...all weaker in TE and recovered TE
...MCP E stronger in TE
Spontaneous wrist angle adopted on grip testing

Mean Deficit: 11°
Lower 95CI: 7°
Upper 95CI: 14°

No effect of Age, Gender, Side

Subjects:
32 CLE (median duration = 31 months)
11 male, 21 female aged 43 yrs
32 gender matched controls

Results: Compared to normal the patients had:
19-36% slower reaction times for both arms
31-32% slower speed of movement for both arms
There was no difference between affected and unaffected arm

Conclusion:
Unclear mechanisms at play
May be indicative of altered central processing
What comes first the pain of tennis elbow or motor control deficit

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Deficit</td>
<td>~30%</td>
<td>~15%</td>
</tr>
<tr>
<td>Age</td>
<td>43</td>
<td>49</td>
</tr>
<tr>
<td>Male:Female</td>
<td>11:21</td>
<td>24:16</td>
</tr>
<tr>
<td>Duration of LE*</td>
<td>31 months</td>
<td>4.5 months</td>
</tr>
</tbody>
</table>
Bilateral changes: scenario 1?
Bilateral changes: scenario 2?
Motor system impairments

- morphological deficits
- sensori-motor (bilateral)
- strength imbalance
- global changes
Motor system impairments
Pain system(s) changes
Pain system(s) changes
Coombes B, Bisset L, Vicenzino B. (submitted) Thermal hyperalgesia distinguishes those with severe pain & disability in unilateral lateral epicondylalgia
Abstract: There is evidence suggesting an important role of nociceptive sensitization in lateral epicondylalgia (LE). Our aim was to explore somato-sensory changes in patients with unilateral LE to better understand this musculoskeletal condition. Twelve patients (6 female) with LE with a mean (SD) age 47 (10) years, and 16 controls (7 female), aged 41 (9) years were tested. The following somato-sensory parameters were assessed: pressure-pain threshold (PPT), heat- and cold-pain thresholds, thermal, cold- and vibration-detection thresholds. All these tests were bilaterally assessed over the lateral epicondyle (affected/unaffected in patients; dominant/nondominant in controls) and at the dorsal-lateral surface of the wrist in all patients and controls. The results showed that patients with unilateral LE not only exhibited substantial reductions in PPT on the affected side compared to the unaffected side (mean difference and 95% confidence intervals: 219 kPa [136.8 to 301.1 kPa] but also when compared to controls (581.1 kPa [340.5 to 821.7 kPa]), showing bilateral pressure-pain hyperalgesia. These differences represented an effect size (i.e., standardized mean difference) of 1.23 and .94, respectively. In the same cohort, there were no such deficits in cold and heat pain, cold- and warm-detection thresholds, and vibration-detection thresholds, either between affected and unaffected sides in patients with LE or between patients and controls. Effect sizes for the sensory-detection tests were small, which were generally less than the pain tests. Our data imply that LE is largely characterized by peripheral and central mechanical pain hyperalgesia.

Perspective: This article reveals the presence of bilateral pressure-pain hypersensitivity in patients with unilateral LE. On the contrary, thermal and vibration tests were not significantly different from controls.

Coombes B, Bisset L, Vicenzino B. (submitted) Thermal hyperalgesia distinguishes those with severe pain & disability in unilateral lateral epicondylalgia
Pain system(s) changes

- mechanical hyperalgesia
- deep tissue sensitivity
- central sensitization
- local neurotransmitters
Motor system impairments:
- morphological deficits
- sensori-motor (bilateral)
- strength imbalance
- global changes

Pain system(s) changes:
- mechanical hyperalgesia
- deep tissue sensitivity
- central sensitization
- local neurotransmitters
Pain system(s) changes

Motor system impairments

Local tendon pathology

Morphological deficits

Sensori-motor (bilateral)

Strength imbalance

Global changes

Mechanical hyperalgesia

Deep tissue sensitivity

Central sensitization

Local neurotransmitters

Angiofibroblastic hyperplasia

Hypercellularity

Increased matrix protein

Collagen fibrils disarray

Neovascularisation
Pain system(s) changes

Motor system impairments

Local tendon pathology

Pain system(s) changes

Global changes

Sensori-motor (bilateral)

Strength imbalance

Neurotransmitters

Mechanical hyperalgesia

Central sensitization

Deep tissue sensitivity

Local neurotransmitters

EPA, Polydocinial, MWM, steroid?

Blood, Prolotherapy, Polydocinial, NO, Exercise

Angiofibroblastic hyperplasia

Hypercellularity

Increased matrix protein

Collagen fibrils disarray

Neovascularisation

Morphological deficits

Exercise, Exercise, Exercise, Exercise

Blood, Prolotherapy, Polydocinial, NO, Exercise
Pain system(s) changes

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Local tendon pathology

morphological deficits

sensori-motor (bilateral)

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Exercise, Exercise, Exercise, EPA, Polydocinal, MWM, steroid?
Short term gain - long term pain

Aetiology

Alternative construct: motor, sensorimotor and pain system impairments

Role of Phty & Exercise
Short term gain - long term pain

Aetiology

Alternative construct

Role of Phty & Exercise
Mulligan’s Mobilisation with Movement
Chapter 13
A recalcitrant case of aircraft engineer’s elbow

Leanne Bisset and Bill Vicenzino
Self Treatment
De-loading Diamond Tape and lateral glide Tape
Type of exercises: eccentric only?
Eccentric exercises

REVIEW

Chronic tendinopathy: effectiveness of eccentric exercise

Brett L Woodley, Richard J Newsham-West, G David Baxter

Results: Twenty relevant studies were sourced, 11 of which met the inclusion criteria. These included studies of Achilles tendinopathy (AT), patella tendinopathy (PT) and tendinopathy of the common wrist extensor tendon of the lateral elbow (LET). Limited levels of evidence exist to suggest that EE has a positive effect on clinical outcomes such as pain, function and patient satisfaction/return to work when compared to various control interventions such as concentric exercise (CE), stretching, splinting, frictions and ultrasound. Levels of evidence were found to be variable across the tendinopathies investigated.

Conclusions: This review demonstrates the dearth of high-quality research in support of the clinical effectiveness of EE over other treatments in the management of tendinopathies. Further adequately powered studies that include appropriate randomisation procedures, standardised outcome measures and long-term follow-up are required.
LET (2) = ecc v stretching

LET (3) = ecc v US (>6mth)

Exercise prevents recurrence & chronicity
<table>
<thead>
<tr>
<th></th>
<th>Exercise (n=20)</th>
<th>US (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men / women</td>
<td>8/12</td>
<td>6/13</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>43 (33-53)</td>
<td>41 (31-53)</td>
</tr>
<tr>
<td>Duration</td>
<td>9 &lt; 6 months</td>
<td>11 &lt; 6 months</td>
</tr>
<tr>
<td></td>
<td>11 &gt; 6 months</td>
<td>8 &gt; 6 months</td>
</tr>
<tr>
<td>Sick leave</td>
<td>6.3 weeks</td>
<td>7.1 weeks</td>
</tr>
<tr>
<td>Failed previous</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>treatment*</td>
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</tbody>
</table>

* Immobilisation (4/4), injections (20/15), oral meds (18/18), percutaneous med (11/7), support (11/7), PT (12/7)

After exercise there was:
- Significantly less PT and GP treatment required
- Fewer sick leave days
- Less pain on VAS
- Different to after US which had greater treatments, and sick days

Operation: 5 in US group and 1 in Exercise group
No spontaneous healing nor self limiting observed
Exercise may prevent chronicity

Short term gain - long term pain

Aetiology

Alternative construct

Role of Physio & Exercise
Lateral epicondylalgia: current evidence and clinical implications

Bill Vicenzino