Nerve Mobilization Techniques: When and Why?

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Background

- Nerve mobilization techniques have been used to treat radiating pain
- The research is not specific as to when and why to use each technique and their benefit
- The purpose of this presentation is to….

Presentation

- Superficial burning, stinging, numbness
- May be in typical dermatomal pattern
- Deep ache or cramp
  - May also be in typical nerve pattern
- Postures that unload tissue to decrease pain
- AROM impaired, PROM also in same pattern
- Can be produced with mechanical pressure or tension of corresponding neural tissue (especially that correspond with limitations seen in AROM/PROM)
- Motor and sensory deficits where symptoms exist
- If persistent may have no or limited and pain will ‘have a mind of its own’

Techniques

- When a joint is moved and elongates the nerve bed it places a tensile stress on the nerve
  - The nerve accommodates this force by both elongating and gliding
  - The longitudinal force that changed the nerve length is called strain
    - Percent change
  - The amount the nerve moves is called elongation and is dependent upon relationship between the nerve and the surrounding non-nerve tissue
    - Millimeters

Techniques

- When a joint moves and puts stress on the nerve it will glide toward the moving joint
  - Convergence
- If the joint moves which takes stress off the nerve it moves away from the joint
  - Divergence
- When a joint moves the nerve first moves near that joint then further away in a progressive fashion
  - The nerve will move most near the joint that is moving
- It is important to note the there is more nerve stiffness measured when a joint is moved quickly rather than a slow motion
- Stretching a nerve can reduce the tension experienced in tension positions

Rationale

- Repeated stretch 8-10% of a nerve will reduce the slope of the stress-strain curve
  - Increase compliance and decreased stiffness of nerve
- However, most people are limited and lack 12 +/- 13 degree elbow extension during median nerve test
  - 5.1 +/- 1.9 out of 10 on 10 point VAS
  - 7.6% +/- 8.2% is normal strain with full ULNTT position
- 1.0 mm/day of nerve stretch is usually handled well by patients
- Excursion of nerve is much greater at one joint if slack is given on another during ULNTT
- The nerve can move more at a proximal joint if both distal joints are put on tension
  - Coppieters 2008

Rationale

- Improving intraneural circulation, axoplasmic flow, neural connective tissue viscoelasticity
- Reduce sensitivity of AIGS
- Reduce fear of movement
  - Nee 2005

Sliders

- Intended to move nerve tissue in relation to the surrounding non neural tissue
  - Non provocative (Butler 2000)
    - Nee 2005
- Seradge et al states that performing one minute bouts of nerve glides can reduce carpal tunnel pressure and symptoms of CTS
  - Michlovitz 2004
- Nerve gliders have been effective at improving patients with CTS and preventing surgery
  - Lee 2004
- Starting at the distal portion of the nerve can be less irritable and still produce nerve motion and improved outcomes (Nee 2005)

Tensioners

- Nee states the purpose is not the stretch the nerve
  - Restore physical capabilities of neural tissues to tolerate movement of nerve bed
    - To mild resistance usually that is protected by muscle activation
  - Not to be used in patients with signs of neural deficits
    - Butler 2000

Sciatic Nerve Tensioner

- Koury in a case study found that performing tensioner position for 30 seconds to the point of near intolerance was effective at reducing radiating LE pain which was elicited by slump test
  - Treatment first focused on mobilizing L/S which was effective at reducing symptoms before nerve mobilization techniques were employed
- Maitland has stated reproducing referred symptoms are safe so long as
  - Pt is in safe and stable phase
  - No fluctuating or unstable neuro signs
  - Referred pain is minor and does not limit function/activity
  - Test with firm overpressure or in sustained positions elicit pain
  - Nerve tests are limited by stiffness and not pain
  - Protective abnormalities when corrected do not produce radiating pain

Tensioner

- Eckstrom in a case study performed both median and radial nerve tensioners for a patient with deep radial nerve entrapment in the elbow
  - After 14 visit of solely techniques the patient's symptoms were abolished
- Kornberg found treating "hamstrings" with a slump stretch was more effective at treating "grade 1 hamstring strain" than a static hamstring stretch in SLR position
- Patients better tolerate nerve tensioners when initially just one joint is moved at a time progressively adding more and assessing for tolerance
  - Novak 2004
- For pronator syndrome tensioning the nerve first at the neck then wrist then oscillating the elbow flex/ext with pron/sup gently has improved symptoms
  - Avoid worsening symptoms, respect pain (Lee 2004)

Tensioner

- A sham technique putting the median nerve on slack with wrist and finger flex/ext was just as effective as putting the nerve in a tension position with oscillating wrist and finger flexion/extension.
  - Bialosky 2009

Tensioners vs. Sliders

- Sliding techniques created more nerve motion compared to the surrounding tissues than tensioners in the median nerve
- Isolated neck or elbow motion both created more motion of the median nerve than tensioners
- Sciatic nerve sliders created only slightly more motion than tensioners but tensioners created more motion than isolated neck or elbow motion when measured at the mid thigh

Tensioners vs. Sliders

- Sliders for cervical spine and related upper extremity pain are more effective at producing positive outcomes when
  - Advanced age
  - Absence of neuropathic pain qualities
  - Smaller limitations to elbow extension during median nerve ULNTT
- These treatments were combined with manual therapy focused on the cervical spine
- Boyd (2013) states the nerve moves most nearest the joint that is moving
  - Depending on irritability it is important to move joints further or closer to the suspected site of injury/constriction
  - End range of nerve tension (SLR in this case) remains the same regardless of joint moved first

Tensioners vs Sliders

- Sliding techniques are generally accepted to less aggressive
  - Better for patients with acute injuries, post op management, and situations that can lead to nerve irritation
- Sliding techniques can limit scar formation, decrease venous enlargement, and prevent increased endoneurial fluid
- The large amplitudes of sliders can help reduce the threat imposed by potential nerve enjury
  - Can be incorporated into other activities to distract from injury
- Tensioning techniques can reduce swelling and vascular compromise
  - Milking effect or pumping action can have beneficial effect on nerve hydration
    - May also be present with sliding techniques

Warning

- Attenuating a tensile load is not a function of nerves
- Liu found an elongation of 4.2% of ulnar nerve can cause damage to axons/myelin sheaths. The perineurium can tear at 6% stress
  - Lee 2004