Functional Dry Needling for the Orthopedic Patient

By: Stephanie Brandt PT, DPT
CKSPT Bandana Square
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Stephanie Brandt PT, DPT

- Bachelor's of science in kinesiology from the University of Minnesota
- Doctorate in physical therapy from the University of Minnesota
- Functional Dry Needling (FDN) level 1 certified through Kineticore/Evidence in Motion

Objectives

- Define the treatment
- Precautions/contraindications
- Adverse Reactions
- Benefit of treatment
- Research
- Demonstration
- Questions

What is this intervention?

- Dry needling: A skilled intervention performed by a physical therapist that uses a thin filiform needle to penetrate the skin and stimulate underlying myofascial trigger points, muscular and connective tissues for the management of neuromusculoskeletal pain and movement impairments
- This is NOT wet needling or injection based needling
  - Origins of treatment/trigger points

(APTA Description of Dry Needling in Clinical Practice: an Educational Resource Paper, 2013)

What is a myofascial trigger point?

- Taut band of contractured skeletal muscle fibers
  - Hyperirritable
  - Produce local and referred pain when stimulated
  - Active and latent
    - Active; spontaneously painful
    - Latent; only painful when stimulated (i.e. with pressure or when stretched)

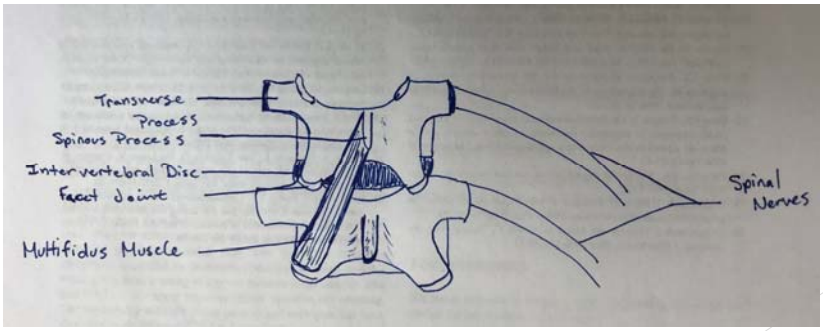
(APTA Description of Dry Needling in Clinical Practice: an Educational Resource Paper, 2013)

Myofascial Trigger Points: continued

- Etiology
  - Occur at motor end plates with abnormal activity
    - Cause sustained sarcomere contracture
      - Increased local metabolic demand
      - Compressed capillary circulation
      - Increased metabolic by-products
        - Inflammatory mediators
        - Proinflammatory cytokines
        - Catecholamines
        - Neuropeptides
        - More acidic pH levels

Functional Example

- Thought experiment involving the lumbar spine



Relative Contraindications

- Respiratory Illness (all acuities)
- History of lymph node removal
  - Varies based on presence of lymphedema and approval from oncologist
- Controlled anticoagulants
- Post surgical (therapist's responsibility to communicate/gain clearance from surgeon)
  - 6 weeks (nothing that communicates with surgical area)
  - 12 weeks (with surgeon approval)
- Autoimmune disorders

(APTA Description of Dry Needling in Clinical Practice: an Educational Resource Paper, 2013)

Precautions

- Fear of needles
- Significant cognitive impairment
- Communication/language barrier
- Severe hyperalgesia or allodynia
- Metal allergy
- Abnormal bleeding tendency
- Vascular disease
- History of traumatic or spontaneous pneumothorax

(APTA Description of Dry Needling in Clinical Practice: an Educational Resource Paper, 2013)

Additional Precautions (KinetaCore vs. APTA)

- Area over implant (breast, spinal stimulator etc.)
- Area over laminectomy
- Scoliosis
- Severe osteoporosis
- Post-surgical (dermatological and open joint vs. arthroscopic)

Adverse Reactions (Brady, et. al., 2013)

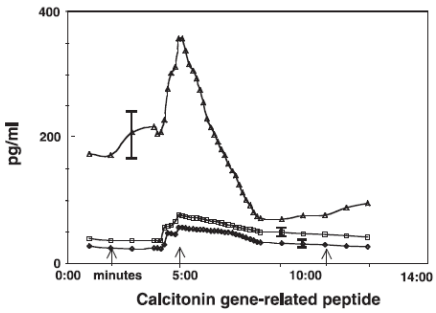
- Common (1-10%)
  - Bleeding (7.55%)
  - Bruising (4.65%)
  - Pain during treatment (3.01%)
  - Pain after treatment (2.19%)
- Uncommon (0.1-1.0%)
  - Aggravation of symptoms (0.88%)
  - Drowsiness (0.26%)
  - Feeling faint (0.22%)
  - Headache (0.14%)
  - Nausea (0.13%)

Adverse Reactions (Brady, et. al., 2013)

- Rare/Very Rare (0.01-0.1%)
  - Fatigue (0.04 %)
  - Emotional (0.04%)
  - Shaky, itching, claustrophobia and numbness (0.01%)
- Pneumothorax incidence
  - Traumatic iatrogenic from acupuncture (*McCutcheon, 2011*):
    - <1/10,000
    - WHO classification: very rare

Benefits of Treatment

Decrease in Metabolic By Products



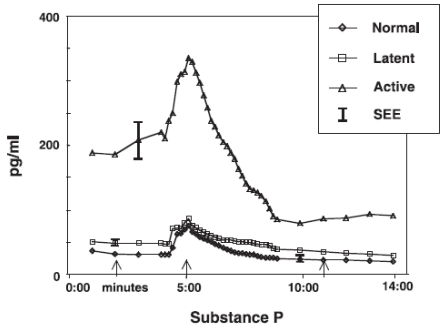


Fig. 5. Concentrations of calcitonin gene-related peptide (CGRP) and substance P (SP) over time.

(Shaw, et al., 2005)

Pain Prevention and Reduction

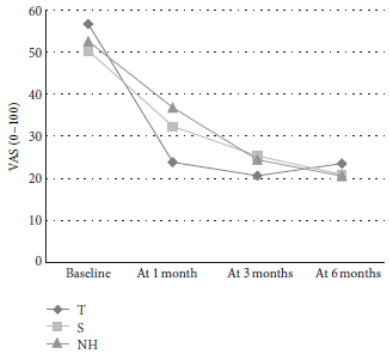
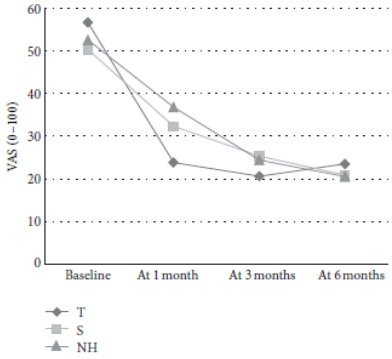


FIGURE 2: The graph shows average pain scores (VAS) at baseline, and at 1, 3, 6 months in the T group (true dry needling), in the S group (sham dry needling) and in the natural history (NH) [23].



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(Mayoral, et. al., 2013)

Decrease in Tissue Hypertonicity

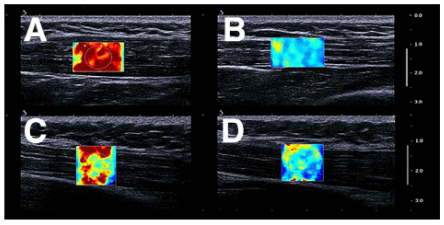


Fig 1 An example of a change in shear modulus in the upper trapezius muscle resulting from dry needling and posture. Color-coded representation in the presence of a palpable MTrP in the upper trapezius muscle in the sitting position before (A) and after dry needling (B) and in the prone position before (C) and after dry needling (D). The color-coded scale was identical across images.

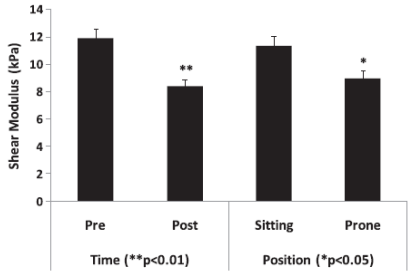
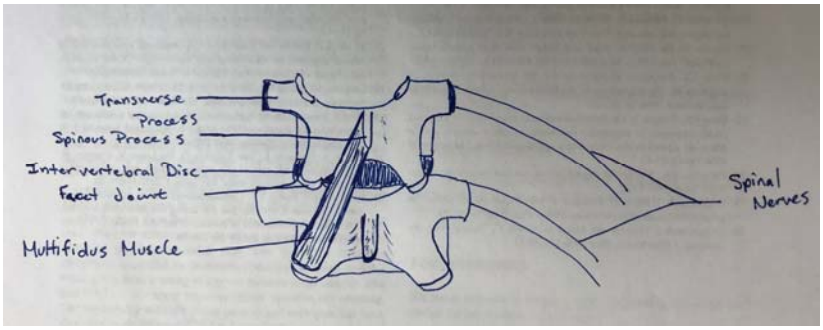


Fig 2 Effect of dry needling and posture on shear modulus of the upper trapezius muscle. Main effects of dry needling (time) and posture (position) are presented. $^{**}P<.01$ vs Pre; $^{*}P<.05$ vs Sitting.

(Maher, Hayes, & Shinohara, 2015)

Thought experiment continued:



Demonstration!

Thank You!!

Resources

- Brady, S., Mcevoy, J., Dommerholt, J., & Doody, C. (2013). Adverse events following trigger point dry needling: A prospective survey of chartered physiotherapists. *Journal of Manual & Manipulative Therapy, 22*(3), 134-140. doi:10.1179/2042618613y.0000000044
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- Maher, R., Hayes, D., & Shinohara, M. (2015). Quantification of Dry Needling and Posture Effects on Myofascial Trigger Points Using Shear Wave Elastography. *Ultrasound in Medicine & Biology, 41*(4). doi:10.1016/j.apmr.2013.04.021
- Mayoral, O., Salvat, I., Martín, M. T., Martín, S., Santiago, J., Cotarelo, J., & Rodríguez, C. (2013). Efficacy of Myofascial Trigger Point Dry Needling in the Prevention of Pain after Total Knee Arthroplasty: A Randomized, Double-Blinded, Placebo-Controlled Trial. *Evidence-Based Complementary and Alternative Medicine, 2013*, 1-8. doi:10.1155/2013/694941
- Shah, J. P., Phillips, T. M., Danoff, J. V., & Gerber, L. H. (2005). An in vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. *Journal of Applied Physiology, 99*(5), 1977-1984. doi:10.1152/japplphysiol.00419.2005

Contact me:

- Email: stephanie.brandt@allina.com
- Phone: 651-241-3939 (CKSPT Bandana Square clinic number)