Trigger Point Dry Needling: History and Application to Myofascial Pain Syndrome

April 18, 2015
Yuchin Chang, PT, DPT, OCS, CMTPT
Outline

- Trigger Points (TP)
- Myofascial Pain Syndrome (MPS)
- Theories for TP Formation
- Factors Contributing to TP Formation
- TP Identification/Evaluation
- Dry Needling (DN):
  - Indications, precautions, contraindications, safety
- Efficacy of DN as a Treatment Tool
- Controversy with Acupuncture
History of Muscle Pain

- **Multiple Terms Used** – fibrositis, myofasciitis, muscular rheumatism, rheumatic myositis, muscle hardening, myogelosis, myofascial pain, and myalgia.*


- Muscular Rheumatism – French physician, de Baillou in the 16\textsuperscript{th} century
- Myalgic spot, fibrositis, myogelosis – painful area of hardened muscle – 20\textsuperscript{th} century
Muscle Pain and History

- History of Muscle Pain
  
  - “full spontaneous pain has been reproduced by manipulating the tender spots and all symptoms then abolished by anaesthetizing [using Novocain injection] these spots locally”

History of Muscle Pain

- ‘Myofascial Trigger Point’ coined by Travell, Rinzler
- 1942– Travel and Rinzler observed fascia referred pain pattern similar to underlying muscle referred pain pattern. Changed the term to ‘Myofascial Trigger Point’ to highlight the interaction between these two elements.
- Muscles can be an origin of pain (from trigger points)
- Intramuscular infiltration with procaine is an effective treatment
Characteristics of Trigger Points (TPs)

- **Sensory** component – painful, exquisite tenderness to touch
- **Motor** component – taut band, increased stiffness in the muscle. Limit ROM.
  - persistently hard, considered to be a contracted band of muscle.
  - contract sharply with mechanical stimulation when plucking it manually or by inserting a needle into it.
  - Trigger point size as measured by area of reduced vibration with sonoelastography (mean ± SD)
    - Active TP: 0.57 ± 0.2 cm²;
    - Latent TP: 0.36 ± 0.16 cm²;
    - Palpable normal site: 0.17 ± 0.22 cm²
Characteristics of Trigger Points (TPs)

- **Autonomic** component – localized sweating, vasoconstriction, vasodilation, and/or pilomotor activity (goose bumps).
  - i.e. trigger points in head, cervical, abdominal region.
Characteristics of Trigger Points

Active vs Latent

- **Active TP** – spontaneous referred pain without stimuli
- **Latent TP** – motor dysfunction without referred pain when not stimulated
- **Latent TP causes muscle weakness**

**Trigger Point Identification**


**Essential Criteria**
- palpable taut band, exquisite tender spot of a nodule in a taut band, pt’s recognition of pain pattern
- identify manually through manual palpation

**Confirmatory Observations**
- visual or tactile ID of a local twitch response; pain or altered sensation (in the distribution expected from a TP in that muscle) on compression of tender nodule; restricted, painful limit to full stretch ROM; weakness
Myofascial Pain Syndrome (MPS)

- regional pain syndrome caused by TPs; acute or chronic; motor, sensory, autonomic components.*  
# Myofascial Pain Syndrome (MPS)

**Step-by-step procedure for identifying myofascial trigger points**

1. **Take the patient’s history and use a pain drawing to identify pain locations**
   - The history identifies the areas affected by pain and suggests possible provocative and perpetuating factors.
   - The pain drawing shows where the patient experiences pain.

2. **Conduct examination**
   - Select a muscle whose trigger points can refer pain to an affected area.
   - Lay the nonpalpating hand gently on the patient at a nonpainful site away from the trigger point. This first touch is nontthreatening. The patient’s movements are now controlled by the clinician.
   - Palpate the muscle for taut bands, using either flat palpation or pincer palpation.
   - Move the fingers along the taut band to find the trigger point—the hardest and most tender spot in the taut band.

3. **Compress the trigger point manually**
   - Ask the patient if the spot is tender or painful, and, if so,
   - Ask the patient if the elicited pain resembles his or her usual pain.

4. **Compress the trigger point for 5 to 10 seconds and then ask if there is pain or some sensation away from the trigger point (referred pain).**

---

People with MPS reported sleep disturbance, decreased function compared to people without MPS.*

Myofascial Pain Syndrome (MPS)

Hennemann’s size principle—motor neurons are recruited in order of increasing size*  

- Contractile characteristics—Cell size (Motor Unit) determines excitability.
- Smaller MU is more excitable. Therefore, increased usage and is recruited first

Cinderella Hypothesis (by Hagg)—Type I muscle fibers are activated during prolonged task*  
Trigger Point Formation

- **Energy Crisis Hypothesis** (1999) proposed by Simons and Travell*  

- **The integrated Trigger Point Hypothesis** – Expanded by Gerwin etc*  
  - biochemical features of receptor function,
  - motor endplates function, and
  - feature of muscle contraction in related to TP formation
Muscle Contraction Mechanism

- **Review***
- **Myofilaments**
  - **Thick filament (myosin)**
    - Shapes like golf club, 15 nm in diameter
  - **Thin filament (actin)**
    - 2 intertwined strains of protein
    - Fibrous actin – like beaded head
    - Globular actin – contain the active site for myosin head to bind
    - Tropomyosin – at rest, covers the binding site on the actin
    - Troponin – binds to Ca²⁺
Muscle Contraction Mechanism

Excitation of a muscle fiber

Excitation– Contraction Coupling

https://www.studyblue.com/notes/n/muscle-chapter-11/deck/6552322
The Sliding Filament Mechanism of Contraction

Relaxation of a Muscle Fiber
The integrated Trigger Point Hypothesis – Expanded by Gerwin etc*

- The activating event is muscle activity that stresses muscle beyond its tolerance and leads to muscle injury and capillary constriction.
- Muscle injury results in the release of substances that activate muscle nociceptors and cause pain.
- Capillary constriction occurs as a result of muscle contraction and sympathetic nervous system activation.
- Ischemia results from hypoperfusion, which is caused by capillary constriction.
- The pH becomes acidic, inhibiting AChE activity. CGRP is released from the motor terminal and from injured muscle.
- CGRP inhibits AChE, facilitates ACh release, and up-regulates AChRs.
- The end result is increased ACh activity with increased frequency of MEPPs, sarcomere hypercontraction, and the formation of taut bands.
Increased end-plate noise at TP

- Marked increase in the frequency of low voltage electrical activities found at point of maximum tenderness in the taut band. Appeared to be abnormal
- Low amplitude electrical discharges in the order of 10–50 microV and intermittent high amplitude discharges (up to 500 microV) in painful MTP. * Hubbard DR, Berkoff GM. Myofascial trigger points show spontaneous needle EMG activity. Spine 1993;18:1803–1807
- Dysfunction motor endplate noise is a piece of evidence to explain taut band phenomenon
Elevated biochemical concentration (CGRP, H+) has been found in active TPs compared to latent site and control chemicals that can disrupt the process and cause excessive contraction

- H+ (by enhancing CGRP; down-regulating AChE and improving Ach efficiency)
- **CGRP** (calcitonin gene-related peptide):  
  - enhance Ach release from motor endplate, decrease AChE effectiveness in the synaptic cleft.
  - Up-regulate AChR at the muscle and creates for docking stations for Ach.


- Chemical activation is specific at nociceptor. Distinctive receptors for Bradykinin (BK), prostaglandins (PG), 5–hydroxytryptamin/Serotonin (5–HT), Protons (H+), adenosine triphosphate (ATP), glutamate, a primary excitatory neurotransmitter
- Also purinergic receptor – bind to ATP. Vanilloid receptor – responded to low pH. Activated during acidic condition (ischemia).
- Nociceptor terminal also has substance P (SP) and CGRP. Both cause vasodilatation, stimulation of inflammatory response
- Chemicals carry nociceptive signals for central processing, but also alter local conditions at the site of tissue damage (leading to local edema)
**Trigger Point Formation**

  - **Increased vascular volume** – formation of blood vessel to the hypoxic area
  - **Increased outflow resistance** – capillary bed compression
Exercise under ischemic condition and eccentric muscle exercises can result in muscle pain.

Severe energy depletion, the sarcomeres may stay contracted until enough ATPs is available. Large amount of Ca2+ associated with sustained sarcomere contraction and muscle damage.

In summary, exercise under conditions that limit energy supply to muscle (high pressure inside muscle causing capillary constriction and subsequent muscle ischemia and cell damage. Damaged muscle cells → inflammatory mediators → activate muscle noceceptors to increase neuropeptide locally and in dorsal horn.
Factors Contributing to TP Formation

- Direct Trauma

- Sustained low level muscle contraction

- uneven intramuscular pressure
Factors contributing to TP formation

- Unconditional eccentric contraction or max/submax concentric contraction
  - irregular and uneven lengthening of the muscle fibers. Pain is induced by cellular destruction – frequently involved A band disorganization, disruption of cytoskeletal proteins (such as titin, nebulin, and desmin). *Newham DJ, Jones DA, Clarkson PM. Repeated high force eccentric exercise: Effects on muscle pain and damage. J Appl Physiol 1987;63:1381–1386

Factors contributing to TP formation

- **Afferent input from joint**  

- **Afferent input from internal organ (Visceral–somatic reflex)**  

- **Stress/tension**  

- N=24 with at least 1 TP on UT. (12 on L, 12 on R). experienced examiner (10yrs). 8 experiment sessions with 3 subjects each, examined twice in random order using palpation protocol. 2 PTs do screening, 3rd PT as examiner (Blind).
- Palpation protocol: identical taut band, find a spot of tenderness, use minimal pressure on ST until it is painful and verify pain recognition.
- A taut band with at least one of the following: spot of tenderness, pain recognition, or referred pain is required to confirm MTP presence.
No statistical difference observed between R & L. Particular side does not affect the reliability of the palpation protocol.

Interclass correlation coefficient (ICC); \( Y = 0.81 \) vertical distal distance – taut band; \( x = 0.62 \) horizontal (spot tenderness).

An experienced PT can reliably ID TPs in UT using a palpation protocol.
Inter-rater reliability


N = 40; 32 shoulder pain, 8 control. PT = 3 (29, 28, 16 yr experience; experience with MTP = 21, 16, 2); blind to pt status.

TP examination: infra (3), anterior deltoid (1), bicep brachii (2). Points nearby dysfunctional motor endplates.

Fig 1. The localization of trigger points in the infraspinatus muscle, biceps brachii, and the anterior deltoid muscles. The numbers correspond with the sequence of palpation during the test.
Trigger point identification/evaluation

- Inter-rater reliability
  - Subjects not allowed to report pain recognition produced by palpation. Not distinguish between active and latent
  - 4 criteria
    - Presence of TB with a nodule
    - Report referred pain with compression, not report pain recognition
    - Presence of LTR
    - Jump sign – presence of general pain response during palpation
  - For each 4 criteria, Yes (presence of TP); NO (absence or undetermined).
  - PTs were asked to judge the presence or absence of TP (not distinguish between active and latent).
    - According to Simon etc. minim criteria for TP dx is presence of TB with a nodule and pain recognition.
    - Decide on presence of taut band and a nodule with one or more of the criteria.
Trigger point identification/evaluation

- Inter-rater reliability
  - **Results:** no statistically significant difference between the rater pairs among the 3 observers
    - Referred Pain – most reliable criteria
    - Jump sign – a reliable palpatory criterion.
    - LTR – not a reliable characteristics, despite reliable in point 1 and 2 in infraspinatus
  - The presence of TP is muscle-dependent. Highest agreement on infraspinatus (the presence of nodule in taut band, LTR, and jump sign)
    - PA (Percentage Agreement) >70% in 2/3 points in infraspinatus
    - PA <70% in anterior deltidoid and bicep brachii.
  - 3 blinded observers are able to reach acceptable agreement on the presence or absence of TPs in the shoulder region.
  - Allowing pt report pain recognition may provide higher inter-rater agreement.
Dry Needling

- **Needle Effect**: observed by Lewit in 1979*
  

- Needling Effect (NE) – immediate analgesia produced by needling the ‘pain spot’
- is distinctive from that of the injected substance. Relief is achieved via mechanical property of needle.
Dry Needling

- **Physiological Effect of DN**

- **Mechanical Effect**
  - disruption of the contracted knots, localized stretch of contracted cytoskeletal structure, reduction of overlap of myosin and actin filament.

- **Neurophysiological Effect**
  - Effect on Taut band – mechanical disruption of integrity of dysfunctional endplates
  - sufficient mechanical activation around endplate area causes muscle fibers to discharge and cause LTR.
  - After LTR, [Sub P] and [CGRP] concentrate were significantly lowered. Influence on [ACh]
Dry Needling is distinguished from TP injection (with various substances).

- Steroid is no superior to Lidocaine and can actually cause tissue damage. *Garvey TA, Marks MR, Wiesel SW. A Prospective, randomized, double-blind evaluation of trigger point injection therapy for low back pain. Spine 1989;14:962–964

Dry Needling vs MTP injection

- DN provides as much relief as MTP injection but with ‘increased soreness afterwards’*


  - In Hong’s study, DN technique used syringe not a solid thin filament needle
  - Acupuncture needle is conically tipped compared to cutting edge hypodermic needle
Dry Needling Techniques


- Different models (emerged based on conceptual models)
  - **Trigger point model**, Radiculopathy model, and spinal segmental sensitization model (injection involved).
  - **Depth of penetration**: Deep (TP model and Radiculopathy) vs superficial DN (Baldry’s SDN and Fu’s subcutaneous needling)
Indication of Dry Needling

*Description of dry needling in clinical practice: An educational resource paper: *American Physical Therapy Association*; Feb 2013

- Myofascial pain related to Trigger points
- Diagnostic property
Precautions

- Description of dry needling in clinical practice: An educational resource paper: *American Physical Therapy Association*; Feb 2013

- 1st trimester of Pregnancy
- Severe allodynia/hyperalgesia
- Patients with blood thinner (esp for deep muscles)
- Joint surgery
Contraindications

- Fear of needle
- People with compromised immunity
- Bleeding/Coagulation disorder
- Impaired cognitive/mental state
- Unstable joint
- Local or generalized skin lesion
- Local or generalized circulatory disorders (varicosis, thrombosis, ulceration)
- Implants (breast, gluteal, gastroc, etc)
- Open wound
- Non-compliant patient
Possible Complications

- Vasodepressive syncope
- Hematoma
- Infection
- Nerve block
- Nerve injury
- Vascular injury
- Trauma to spinal cord or brainstem
- Penetration of internal organs (lung, bowel, or kidney)
- Increased spasm and pain of the muscles injected
- Muscle edema
- Pneumothorax
Dry Needling: Safety Concerns

- Review article
- Incidence of acupuncture induced pneumothrax is < 1/10,000, which is rare by WHO standard.
- Sign/symptoms of pneumothorax – dyspnoea (shortness of breath) on exertion, tachypnoea (increased respiratory rate), chest pain, dry cough, cyanosis, diaphoresis (sudomotor activity, and decreased breath sounds on auscultation over the affected region. Occurred after tx, sometimes takes several hours to occur.
- Most data from acupuncture literature. Most studies done are on acupuncture.
- German acupuncture trials (GERAC) – the largest prospective studies into the efficacy, effectiveness, and safety of acupuncture by well-trained medical practitioners to date. Initial 763 900 consultations, incidence rate is 1/ 381 950. After 2 338 146 consultations, incidence rate is 1/1 170 000.
Dry Needling: Safety Concerns

- Iatrogenic pneumothorax
- When DN or performing acupuncture, areas of concern: upper chest wall (UT, levator scapulae), anterior chest wall (pec major/minor), lateral chest wall (iliocostalis thoracic and lumborum), and posterior chest wall (Rhomboids, Serratus Posterior Superior, SPI)
- Acupuncture and DN performed in thorax is very safe when done by well trained PT. To maximize safety, PT should consider relevant anatomy and not practice using advanced needling techniques without adequate competency based training.
- Acupuncture data is helpful, but not sufficient for ensuring pt’s safety due to difference between 2 techniques.
Adverse Events

- Prospective study, avoiding recalling errors
- Adverse Effect (AE): any ill–effect, no matter how small, that is unintended and non–therapeutic.
  - Mild AE: short–term, non–serious with no change in function.
  - Significant AE: moderate or major as medium to Long term events that are serious, distressing, and may required further treatment.
- Possible adverse effects: soreness 1hr –2 days, fatigue, bruises, fainting, pneumothorax
Safety

- Subjects: n=39 PTs completed TPDN training in Ireland (64 hrs), experience varied from 1–30 years, TPDN experience from 3–60 months.
- Survey size: aim for 10,000 tx to ID any rare AE. Hope to recruit 183 PTs, 20 tx/months over 9 months to get 10,000
- Survey forms:
  - Form A, recording mild events, including bruising, bleeding, pain during treatment, pain after treatment, headache, and other mild AEs.
  - Form B, significant AEs, needling problems (eg. Forgotten needles, pneumothorax); systemic effects (eg. Fainting, vomiting); influence on symptoms (prolonged aggravation); or other significant events.
  - Participants were asked to record the muscle being treated when the event occurred, the technique used, any necessary medical intervention and the outcome.
- 51 volunteer, only 39 returned at least form A. majority of tx DDN 82.7% (6312 sessions); remainder SDN 17.3% (1317 sessions)
All AEs were reported on form A and considered mild.

No form B was returned, therefore no significant AE.

39 therapists, 7629 treatments, data collected over 9 months. Mild AE 1463 (19.18%) is common. No significant AE is reported.


Significant Adverse Effect (0.04%) is low when performed by trained therapists.

<table>
<thead>
<tr>
<th>Event</th>
<th>Cases reported</th>
<th>Number per 100 treatments</th>
<th>Number (%) of physiotherapists reporting none</th>
<th>Extreme values recorded by individual practitioners per 100 treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>576</td>
<td>7.55</td>
<td>4 (10.25)</td>
<td>32.23, 30</td>
</tr>
<tr>
<td>Bruising</td>
<td>355</td>
<td>4.66</td>
<td>3 (7.69)</td>
<td>26.09, 21.84</td>
</tr>
<tr>
<td>Pain during treatment</td>
<td>230</td>
<td>3.01</td>
<td>9 (23.08)</td>
<td>20.75, 20.69</td>
</tr>
<tr>
<td>Pain after treatment</td>
<td>167</td>
<td>2.19</td>
<td>14 (35.9)</td>
<td>20.69, 18.4</td>
</tr>
<tr>
<td>Aggravation</td>
<td>67</td>
<td>0.88</td>
<td>22 (56.41)</td>
<td>10.99, 5.75</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>20</td>
<td>0.26</td>
<td>32 (82.05)</td>
<td>4.44, 3.26</td>
</tr>
<tr>
<td>Feeling faint</td>
<td>17</td>
<td>0.22</td>
<td>28 (71.79)</td>
<td>4.17, 2.5</td>
</tr>
<tr>
<td>Headache</td>
<td>11</td>
<td>0.14</td>
<td>31 (79.49)</td>
<td>1.15, 1.1</td>
</tr>
<tr>
<td>Nausea</td>
<td>10</td>
<td>0.13</td>
<td>31 (79.49)</td>
<td>2.7, 2.22</td>
</tr>
<tr>
<td>Fatigue</td>
<td>3</td>
<td>0.04</td>
<td>37 (94.87)</td>
<td>1.77, 27</td>
</tr>
<tr>
<td>Emotional</td>
<td>3</td>
<td>0.04</td>
<td>37 (94.87)</td>
<td>1.59, 27</td>
</tr>
<tr>
<td>Shaky</td>
<td>1</td>
<td>0.01</td>
<td>38 (97.44)</td>
<td>3.03</td>
</tr>
<tr>
<td>Itching</td>
<td>1</td>
<td>0.01</td>
<td>38 (97.44)</td>
<td>0.47</td>
</tr>
<tr>
<td>Claustrophobia</td>
<td>1</td>
<td>0.01</td>
<td>38 (97.44)</td>
<td>0.16</td>
</tr>
<tr>
<td>Numbness</td>
<td>1</td>
<td>0.01</td>
<td>38 (97.44)</td>
<td>0.47</td>
</tr>
</tbody>
</table>
Trigger Point’s Role in Chronic Pain

- TP as a source for peripheral sensitization, which leads to central sensitization*.
- **Central Sensitization (CS)**
  - Altered sensory processing in the brain
  - Increased spontaneous activity of dorsal horn neurons
    - reduce pain threshold,
    - expansion of receptive field.
  - Such process results hyperalgesia and allodynia.
  - Increased responsiveness to variety of peripheral stimuli.
  - If patient has severe CS, DN may not be the first approach first. But not absolute contraindication. Note any additional pain will feed into CS.
Trigger Point’s Role in Chronic Pain

- Continuous input for peripheral muscle nociceptors lead to changes in function and connectivity of sensory dorsal horn neurons via central sensitization.
- Increased synaptic efficiency via activation of previous silent (ineffective) synapse at the dorsal horn.
- Leading to expansion of receptive field (area where pain is felt is increased).
  - Pain starts at peripheral tissue, transmitted by A delta and C fibers afferent sensory neuron (nociceptors).
  - Damaged tissue released chemicals to sensitize the surrounding tissue (lower the pain threshold), causing hyperalgesia.
- Persistent painful stimuli → central sensitization (neural plasticity involving changes in dorsal horn of spinal cord). The sensitized dorsal horn converged other painful input at the same spinal segment (somatic or visceral dysfunction) → allodynia.
Myofascial causes of Chronic Pelvic Pain


Chronic pelvic pain defined as presence of pain in pelvic region longer than 6 months that can originate from gynecologic, urologic, gastrointestinal, and musculoskeletal system.

Pelvic floor muscles – innervated by nerves from sacral region (sacral plexus).

Viscero–somatic convergence
Painful pelvic floor muscles may occur as a result of primary dysfunction in the pelvic floor, abd muscles, lig, tendons, and nerves, or as a functional adaptation to ther disorders within the pelvis, hip, or spine.

Recommended internal pelvic muscle exam and consider musculoskeletal causes as one of the differential dx for CPP to physicians.
MPS – DN vs sham DN.

Double-evaluator, subject blinded. Inclusion criteria – at least 1 TP, age between 24–65 and sx >6 months.

Excluded: fibromyalgia, pregnancy, cervical nerve root irritation, abnormal lab results, TOS, or UE entrapment syndromes. Also had PT or any local injection therapy within the last 3 months.

N=39 with MPS in UQ (neck/shoulder pain).

divided into 2 groups: sham 17, DN 22. Sham – blunted needle for sham DN causes prickling sensation applied at TP, but no penetration.

Fig. 2 a Standard single-use sterile acupuncture needles. b Blunted needle for sham dry needling.
Efficacy of DN as Another Tool

- MPS – DN vs sham DN.
- Treatments: 6 sessions over 4 weeks; 2x/wk for 2 weeks then 1x/wk for 2 weeks. Treated by one physician, assessed by the 2nd physician who was blinded.
- Treatment session: pt seated (Figure 3).
- No exercise or modality given during tx process. Asked not to take any NSAIDS or mm relaxant. Only acetaminophen (paracetamol), # of tablets were recorded.
- Assessment: VAS (10cm), Quality of Life (QOL) using SF36; assessed at before tx, after 1st tx, and after 6th tx
- Pain improvement in both group, but DN is significantly better. QOL (all subgroups) improved in DN.

Fig. 3 The groups were similar with respect to age, sex, the number of points being treated per session, and trigger point distribution.
Pain improvement in both group, but DN is significantly better. QOL (all subgroups) improved in DN.

**Table 3** VAS scores of the subjects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>VAS scores</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before treatment</td>
<td>After the 1st session</td>
</tr>
<tr>
<td>Sham intervention (n=17)</td>
<td>6.4±1.6</td>
<td>5.4±1.6</td>
</tr>
<tr>
<td>Dry needling (n=22)</td>
<td>6.6±1.3</td>
<td>4.0±1.6</td>
</tr>
<tr>
<td>p</td>
<td>&gt;0.05</td>
<td></td>
</tr>
</tbody>
</table>

*p1*, before treatment vs after the first session; *p2*, after the first session vs after the sixth session; *p3*, before treatment vs after the sixth session
Efficacy of DN as Another Tool

QOL (all subgroups) improved in DN.

Fig. 4 All subgroup values significantly increased in the dry needling group (all $p < 0.05$), whereas only those of vitality increased significantly in the sham intervention group.
Efficacy ofDN as another tool

- **TKR study**--Mayoral O, Salvat I, Martin MT, Martin S, Santiago J, Cotarelo J, and Rodriguez C. 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 Compl and Alter Med 2013, Article ID 694941

- Inclusion criteria:
  - (1) dx of knee OA and scheduled for total knee replacement surgery,
  - (2) presence of active or latent TPs at least one of the muscles included in the examination protocol.

- Exclusion criteria
  - (1) suffered from any other condition that could cause myofascial or neuropathic pain in the LE, such as lumbar radiculopathy, saphenous nerve entrapment, etc.
  - (2) presented any condition usually considered a perpetuating factor of TPs, such as Fibromyalgia, hypothyroidism, or iron deficiencies

- N=40 (into 2 groups: T (treatment) vs S (Sham), examined by 1st PT 4-5 hr before surgery (TKA). Then DN by 2nd PT on all marked TPs after anesthesia but before surgery. Outcomes were assessed by 1st PT. patients and 1st PT were blinded.

- Primary outcome measure– VAS

- Secondary measure–
  - WOMAC (knee functional outcome questionnaire)
  - post op medication demand,
  - ROM,
  - strength (isometric knee flexion and extension with 1 attempt)
Assessment: at check point (1, 3, 6 months after surgery), subjects were assessed using all these outcome, except for the use of analgesic.

Examination Protocol (Table 1), subjects were examined several hours before surgery. Manual examination marked active TPs – RED, latent TPs – Blue.

DN is done after anesthesia but before surgery using Hong’s fast in/fast out technique. 30 mmx50mm, 20x at each TP.

Table 1: Examination protocol.

<table>
<thead>
<tr>
<th>Hip position</th>
<th>Tensor fasciae latae</th>
<th>Hip adductors</th>
<th>Hamstrings</th>
<th>Quadriceps</th>
<th>Gastrocnemius</th>
<th>Popliteus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension</td>
<td>Flexion</td>
<td>Flexion</td>
<td>Flexion for medial and adduction for lateral muscles</td>
<td>Flexion</td>
<td>Flexion</td>
<td>Flexion</td>
</tr>
<tr>
<td>Lateral rotation</td>
<td>Abduction</td>
<td>Abduction</td>
<td>Abduction</td>
<td>Abduction</td>
<td>Abduction</td>
<td>Abduction</td>
</tr>
<tr>
<td>Knee position</td>
<td>Extension</td>
<td>Flexion</td>
<td>Flexion</td>
<td>Flexion</td>
<td>Flexion</td>
<td>Flexion</td>
</tr>
</tbody>
</table>

All muscles were examined with the subject in supine position.
Results: VAS at 1st month follow up, T group with VAS >40mm/100mm has decreased to 25% from 80%, which takes Sham group 6 months to achieve.

Sham group pain intensity matches that of the natural history subjects recorded in the previous study.

**Figure 3:** The graph shows percentage of patients with significant pain (VAS > 40) 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].

n = 17 (into 2 groups: one single DN session vs Control) with acute mechanical neck pain (<7days). Patients were required to have Active TP in the UT that reproduced their neck pain.

Exclusion criteria: whiplash, c–spine surgery, cervical radiculopathy, fibromyalgia, any PT intervention in the previous 12 months, fear of needles, any sign of vertebrobasilar insufficiency, and c–spine ligamentous instability.

Mechanical neck pain – neck, shoulder pain with sx provoked by neck posture, neck movement, or palpation of c–musculature.

Primary measurements:
- Pain Pressure Threshold (PPT) in various parts: C5–6 zygapophyseal joint, 2nd metacarpal, and the tibialis anterior muscle, mean of 3 trials were calculated with 30 sec break between trial); c–AROM; Pain (0–10); PPT – amount of pressure applied at which the pressure sensation first changes to pain.

1st PT screen, 2nd PT implement tx (blind to the baseline findings), 3rd PT – assess outcome (blind to tx group allocation).
TP DN: performed by PT >5 yr DN experience using 0.3x30mm for active TPs in the UT with ‘fast in–fast out’, penetrate the tissue to a depth of 10–15mm into TP.

Results
- Neck Pain outcome measure (Table 2). Reduction in neck pain is statistically significant at post tx and 1 week post tx.
Efficacy of DN as Another Tool

- C-spine ROM: (Table 4)
- DN group revealed significant improvement of ROM, pain, PPT compared to control.

### TABLE 4: Cervical-Range-of-Motion Outcome Data

<table>
<thead>
<tr>
<th>Variables/Groups</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>1 wk Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cervical flexion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>58.3 ± 12.2</td>
<td>68.3 ± 13.4</td>
<td>67.7 ± 5.0</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>51.2 ± 99</td>
<td>46.2 ± 9.5</td>
<td>50.6 ± 77</td>
</tr>
<tr>
<td><strong>Cervical extension</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>65.0 ± 16.2</td>
<td>78.8 ± 12.6</td>
<td>80.5 ± 8.4</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>61.8 ± 13.6</td>
<td>58.1 ± 16.0</td>
<td>60.2 ± 16.3</td>
</tr>
<tr>
<td><strong>Cervical lateral flexion toward treated side</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>36.1 ± 13.4</td>
<td>48.3 ± 6.6</td>
<td>51.6 ± 4.3</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>38.7 ± 12.7</td>
<td>38.1 ± 10.0</td>
<td>41.2 ± 10.3</td>
</tr>
<tr>
<td><strong>Cervical lateral flexion away from treated side</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>33.4 ± 15.1</td>
<td>51.6 ± 9.3</td>
<td>52.2 ± 6.6</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>36.2 ± 11.5</td>
<td>37.5 ± 12.8</td>
<td>42.5 ± 8.5</td>
</tr>
<tr>
<td><strong>Cervical rotation toward treated side</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>55.5 ± 24.1</td>
<td>66.6 ± 15.6</td>
<td>72.7 ± 14.1</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>58.1 ± 15.1</td>
<td>53.7 ± 15.0</td>
<td>57.5 ± 7.0</td>
</tr>
<tr>
<td><strong>Cervical rotation away from treated side</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental (TIPDN)</td>
<td>58.8 ± 23.5</td>
<td>68.3 ± 15.4</td>
<td>74.4 ± 8.0</td>
</tr>
<tr>
<td>Control (wait and see)</td>
<td>59.3 ± 18.2</td>
<td>55.1 ± 18.2</td>
<td>58.7 ± 7.9</td>
</tr>
</tbody>
</table>

| Within-group change score from pretreatment |             |               |                    |
| **Cervical flexion** |             |               |                    |
| Experimental (TIPDN) | 10.0 (2.3, 17.6) | 9.4 (2.9, 15.8) | 0.6 (−8.5, 7.2) |
| Control (wait and see) | −5.0 (−12.4, −2.4) | −5.0 (−12.4, −2.4) | −5.0 (−12.4, −2.4) |
| **Cervical extension** |             |               |                    |
| Experimental (TIPDN) | 13.8 (4.1, 23.6) | 15.5 (4.1, 26.9) | −1.6 (−9.5, 7.0) |
| Control (wait and see) | −3.7 (−10.3, −2.8) | −1.6 (−9.5, 7.0) | −1.6 (−9.5, 7.0) |
| **Cervical lateral flexion toward treated side** |             |               |                    |
| Experimental (TIPDN) | 12.2 (6.0, 19.4) | 15.5 (3.4, 27.6) | 2.5 (0.9, 4.2) |
| Control (wait and see) | −0.6 (−5.3, 4.0) | −0.6 (−5.3, 4.0) | −0.6 (−5.3, 4.0) |
| **Cervical lateral flexion away from treated side** |             |               |                    |
| Experimental (TIPDN) | 12.2 (5.4, 19.0) | 12.8 (6.4, 20.2) | 2.5 (0.9, 4.2) |
| Control (wait and see) | 1.3 (−3.6, 6.1) | 6.3 (0.5, 12.1) | 6.3 (0.5, 12.1) |
| **Cervical rotation toward treated side** |             |               |                    |
| Experimental (TIPDN) | 11.1 (3.4, 18.7) | 17.2 (6.6, 27.8) | −0.6 (−10.7, 9.4) |
| Control (wait and see) | −4.4 (−11.9, 3.1) | −0.6 (−10.7, 9.4) | −0.6 (−10.7, 9.4) |
| **Cervical rotation away from treated side** |             |               |                    |
| Experimental (TIPDN) | 9.4 (−0.8, 19.6) | 15.5 (−3.5, 34.6) | −0.6 (−13.0, 11.7) |
| Control (wait and see) | −4.2 (−10.0, 1.5) | −0.6 (−13.0, 11.7) | −0.6 (−13.0, 11.7) |

| Between-group difference in change score |             |               |                    |
| **Cervical flexion** |             |               |                    |
| Experimental (TIPDN) | 15.0 (6.1, 23.9) | 10.0 (5.1, 14.9) | 17.5 (5.5, 29.8) |
| **Cervical extension** |             |               |                    |
| Experimental (TIPDN) | 17.5 (6.5, 28.6) | 17.5 (5.5, 29.8) | 17.5 (5.5, 29.8) |

*Values are mean ± SD deg.
*Values are mean (95% confidence interval).
*Statistically significant (P<.01).
Efficacy of DN as Another Tool


  n = 94 (into 2 groups: DN vs manual trigger point treatment). Subject’s selection criteria is the same as the above. 2 PTs (one for each group, each with 6 yr experience).

  - **Outcome assessment:**
    - **neck pain** (0–10), **PPT** (at sp of C7), **ROM** measured at baseline, post tx, and 1wk, 2 wk post tx.
    - **NPQ** (Neck Pain Questionnaire) measured at 2 weeks after tx. Tx sessions: 2 treatment sessions (1x/wk for 2 weeks).
Efficacy of DN as Another Tool

- Manual treatment:
  - trigger point compression (Figure 2) – repeat 3 times at each session,
  - TP local stretch (Figure 3) at the taut band using both thumb – applied slowly without inducing pain, and passive stretching of UT (Figure 4) at supine for 45 sec.

**FIGURE 2.** Trigger point pressure release applied over upper trapezius muscle trigger points.

**FIGURE 3.** Stretching of upper trapezius muscle taut band. Both thumbs of the therapist are placed over the taut band above and below the trigger point. The therapist applies moderate, slow pressure over the trigger point and slides the fingers in opposite directions.

**FIGURE 4.** Passive stretching of the upper trapezius muscle in cervical flexion, contralateral flexion, and homolateral rotation.
Efficacy of DN as Another Tool

- DN and manual trigger point treatment have similar outcome (Table 2) in pain reduction, ROM, and disability (NPQ score). But DN has greater reduction in PPT.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>OUTCOME DATA FOR NECK PAIN, DISABILITY, AND PRESSURE PAIN SENSITIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
</tr>
<tr>
<td>Pain intensity (0-30)</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>6.2 ± 1.0</td>
</tr>
<tr>
<td>TP MT*</td>
<td>6.2 ± 1.3</td>
</tr>
<tr>
<td>Within-group change score from baseline:</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>-4.3 (-4.7, -3.9)</td>
</tr>
<tr>
<td>TP MT*</td>
<td>-4.0 (-4.5, -3.4)</td>
</tr>
<tr>
<td>Between-group difference in change score:</td>
<td></td>
</tr>
<tr>
<td>NPQ (0-38)</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>131 ± 6.4</td>
</tr>
<tr>
<td>TP MT*</td>
<td>178 ± 7.3</td>
</tr>
<tr>
<td>Within-group change score from baseline:</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>-137 (-152, -12.2)</td>
</tr>
<tr>
<td>TP MT*</td>
<td>-128 (-143, -11.4)</td>
</tr>
<tr>
<td>Between-group difference in change score:</td>
<td></td>
</tr>
<tr>
<td>PPT (kPa)</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>188.1 ± 38.5</td>
</tr>
<tr>
<td>TP MT*</td>
<td>188.1 ± 40.4</td>
</tr>
<tr>
<td>Within-group change score from baseline:</td>
<td></td>
</tr>
<tr>
<td>TP DN*</td>
<td>137 (128.6, 148.4)</td>
</tr>
<tr>
<td>TP MT*</td>
<td>78.9 (69.2, 89.0)</td>
</tr>
<tr>
<td>Between-group difference in change score:</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: DN, dry needling; MT, manual therapy; NPQ, Northwick Park Neck Pain Questionnaire; PPT, pressure pain threshold; TP, trigger point.

*Values are mean ± SD.
†Compared to pretreatment.
‡Values are mean (95% confidence interval).
§Statistically significant differences (P<.01).
Efficacy of DN as Another Tool

- DN vs TP injection vs Sham
- Recruited women aged 19–50 have limitations in routine activities due to MPS several times a week. N=78 females, aged 20–40. MPS (in UQ and LQ) in previous 3 months.
- (yes to 1/6 questions: during the last 3 months, did the pain interfere several times a week or daily with (1) your work, (2) enjoyable activities, (3)responsibilities at home, (4)relationships, (5)personal goals, (6)thinking clearly, and problem solving, concentration, or memory during the last 3 months?)
- Examiner = PT with 10 years of TP experience. Criteria for MPS were regional pain, normal neurologic examination, the presence of Tps, taut bands, tender point, and pain characterized as ‘dull, achy or deep. Palpable nodules, pain exacerbated by stress, decreased ROM, ropiness in the muscles.
- Exclusion criteria: RA, fibromyalgia, prior surgery on the affected areas, prior experience with acupuncture, primary radiculopathy, current use of psychotropic drugs, or habitual use of anti-inflammatory steroids.
Efficacy of DN as Another Tool

- Divided into 3 groups (MDIMS, Trp Lidocaine injection, Sham)
- Treatment frequency: 2 sessions/wk for 4 weeks. Total of 8 treatments.
- All treatment sessions were administered by the same acupuncture physician with 18 years experience. 2 independent evaluators blinded to tx allocation.
- IMS (Intramuscular Stimulation) – a type of DN. Applied at spinal segment of the nerve root associated with myotome, dermatome, or sclerotome where TP was found.
  - MPS is the result of disordered function in peripheral nerve.
  - In muscle, it manifested as muscle shortening, pain and taut band with TP.
  - Shortening paraspinal compressed disc, narrowing intervertebral foramen, narrowing or direct pressure on nerve root.
  - Needling applied specifically on the regions of muscular contractions and in paraspinal muscles of same spinal nerve.
Efficacy of DN as Another Tool

- **IMS** – needle 0.25mmx40mm. MDIMS combined with deep TP DN and paraspinal deep IMS and needle rotation (NR). The needling for paraspinal IMS was applied to dermatomes, myotome, or sclerotome where TPs were found. For TP DDN, the needle inserted directly into the TP. Maximum stimulation (Fast in Fast out technique) for 1 min per TP and 3 min per MDIMS was permitted.

- **Sham** – electroacupuncture device was used. The electrical connection between stimulator and the patient was broken, so that no current could pass to the patient. The patient was informed that his was a high frequency, low-intensity stimulation and would mostly feel no sensation from it. The device was placed over the same areas – over the dermatomes, myotome, or sclerotome where TPs were found and over painful TP.

- **TP injection** – administer when a visible LTR was evoked during the needle penetration. 0.2 to 0.5 mL of 1% lidocaine was injected each time into the TP using 1.25 inch long, 25 Gauge (0.25mm) hypodermic needles. During each treatment session, only 2 or 3 TPs were treated.
Characteristics of Study Sample (Table 1)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Placebo-Sham (n = 26)</th>
<th>LTrP-I (n = 26)</th>
<th>MDIMST (n = 26)</th>
<th>F or $\chi^2$</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)*</td>
<td>33.52 ± 5.07</td>
<td>34.44 ± 4.68</td>
<td>35.84 ± 5.02</td>
<td>1.40</td>
<td>0.25</td>
</tr>
<tr>
<td>Formal education (y)*</td>
<td>11.52 ± 1.85</td>
<td>10.76 ± 1.92</td>
<td>10.76 ± 2.24</td>
<td>1.19</td>
<td>0.31</td>
</tr>
<tr>
<td>Work activity (yes/no)†</td>
<td>19/6</td>
<td>19/6</td>
<td>20/5</td>
<td>0.15</td>
<td>0.93</td>
</tr>
<tr>
<td>Married (yes/no)†</td>
<td>18/7</td>
<td>19/6</td>
<td>17/8</td>
<td>0.40</td>
<td>0.82</td>
</tr>
<tr>
<td>Alcohol use (yes/no)†</td>
<td>5/21</td>
<td>7/18</td>
<td>6/20</td>
<td>0.72</td>
<td>0.69</td>
</tr>
<tr>
<td>Smoking (yes/no)†</td>
<td>3/23</td>
<td>2/24</td>
<td>4/22</td>
<td>0.85</td>
<td>0.65</td>
</tr>
<tr>
<td>Chronic disease (yes/no)†</td>
<td>5/21</td>
<td>4/22</td>
<td>3/23</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>No. positive answers to the questions about the interference of pain several times a week or daily during the last 3 mo</td>
<td>4.45 ± 1.23</td>
<td>4.78 ± 1.56</td>
<td>4.81 ± 1.32</td>
<td>0.6</td>
<td>0.56</td>
</tr>
<tr>
<td>No. muscles identified with trigger points (mean)</td>
<td>4.33 ± 1.94</td>
<td>4.30 ± 1.97</td>
<td>4.34 ± 2.14</td>
<td>0.37</td>
<td>0.69</td>
</tr>
<tr>
<td>No. patients with muscles identified with trigger points†</td>
<td>20/6</td>
<td>20/6</td>
<td>21/5</td>
<td>0.73</td>
<td>0.69</td>
</tr>
<tr>
<td>Muscles of myofascial pain syndrome in the upper half of the body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splenius capitis</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trapezius</td>
<td>11</td>
<td>10</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supraspinatus</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhomboid</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sternoleidomastoid</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscapularis</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalene</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levator scapularis</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infraspinatus</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latissimus</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoracic paravertebral</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscles involved in myofascial pain syndrome the in lower half of the body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumbar paravertebral</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadratus lumborum</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piriformis</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gluteus maximus</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gluteus medius</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gluteus minimus</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily analgesic doses (baseline 7 d)*</td>
<td>1.81 ± 0.84</td>
<td>1.93 ± 0.94</td>
<td>1.90 ± 0.82</td>
<td>3.26</td>
<td>0.04</td>
</tr>
<tr>
<td>Pain reported on visual analog scale*</td>
<td>6.66 ± 0.78</td>
<td>6.59 ± 1.18</td>
<td>6.61 ± 1.25</td>
<td>0.02</td>
<td>0.98</td>
</tr>
<tr>
<td>PPT (kg/cm²)*</td>
<td>2.36 ± 0.56</td>
<td>2.35 ± 0.49</td>
<td>2.37 ± 0.61</td>
<td>0.10</td>
<td>0.90</td>
</tr>
<tr>
<td>PPT to assess segmental pressure hyperalgesia (kg/cm²)*</td>
<td>0.97 ± 0.41</td>
<td>0.79 ± 0.20</td>
<td>0.84 ± 0.32</td>
<td>2.32</td>
<td>0.1</td>
</tr>
<tr>
<td>Beck Depression Inventory*</td>
<td>12.44 ± 10.65</td>
<td>13.68 ± 6.25</td>
<td>15.00 ± 7.81</td>
<td>0.58</td>
<td>0.56</td>
</tr>
<tr>
<td>Pittsburgh Sleep Quality*</td>
<td>8.88 ± 3.76</td>
<td>9.40 ± 3.71</td>
<td>9.76 ± 3.64</td>
<td>0.36</td>
<td>0.70</td>
</tr>
<tr>
<td>Physical health composite score of SF12*</td>
<td>43.73 ± 10.28</td>
<td>44.41 ± 10.28</td>
<td>40.12 ± 10.47</td>
<td>1.31</td>
<td>0.27</td>
</tr>
<tr>
<td>Mental health composite score of SF12*</td>
<td>51.78 ± 10.63</td>
<td>52.41 ± 8.989</td>
<td>50.38 ± 11.82</td>
<td>0.24</td>
<td>0.78</td>
</tr>
</tbody>
</table>
Efficacy of DN as Another Tool

Outcome assessment:
- **Primary outcome** – *pain diaries* (max pain (10cm) during last 24 hr), the *amount of analgesics* used throughout the treatment period and the pressure pain threshold (PPT).
- **Secondary outcome** – *sleep quality diaries* and *physical and mental health (SF-12)* scores.
- **PPT** – measured at baseline and 1x/wk during tx period.
  - To assess central censitization, PPT was measured contralaterally in medial deltoid for back pain and in the Anterior tib for neck pain.
  - Segmental hyperalgesia was assessed by PPT in the area with more intense pain on the baseline and at the end of the treatment.
- Health –related QOL – SF 12 physical and mental health.
Results: MDIMS and Trp injection have better outcome than Sham (in pain reduction, PPT and analgesic use).

MDIMS is better than Trp injection in all 3 aspects (pain reduction, PPT and analgesic use).

Both DN IMS and TP injection have clinical effects as assessed by sleep diary, SF12, physical and mental health scores.
Controversy with Acupuncture

- Compare and contrast with Acupuncture
  - Comparison
    - Same Acupuncture needles
    - Myotech needles
  - Contrast
- For Acupuncture vs Dry Needling
  - Treatment Paradigm (illness as result of energy interruption vs TPs cause pain, decrease ROM, and change structural balance)
  - Treatment Goal (restore the energy flow vs deactivate TPs)
  - Assessment Methods (Pulse, tongue color vs biomechanics, anatomy assessment)
  - Points of Insertion (meridian points, dequi, leave the needles for 15–20 min vs trigger point by manual palpation)
Controversy with Acupuncture

- Current status in US
  - ‘At this point in time, dry needling is formally within the scope of physical therapy practice in the District of Columbia and Alabama, Alaska, Arizona, Colorado, Connecticut, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, North Carolina, North Dakota, Ohio, Oregon, Rhode Island, South Carolina, Texas, Virginia, West Virginia, Wisconsin, and Wyoming.’

   *Myopain Seminar Website.

Current NJ Legislature

Current status in NJ
- The right for PT to perform DN in NJ is explicitly included in our proposed Physical Therapy Practice Act (A1648/S874)
- Had Assembly Committee Hearing in Mid March 2015, expected to have Assembly voting results in May/June 2015
- Need your support for the Bill!
- Contact your legal legislature/ Rally support from your patients
Any questions?
## References

References

- Description of dry needling in clinical practice: An educational resource paper: American Physical Therapy Association; Feb 2013
Lab

- Demo
  - Informed consent
  - Patient position/comfort
  - Identify TP/landmarks
  - Muscle testing
  - Safe needling techniques
  - Apply compression for 2 min
Lab

- **DN techniques**
  - Flat palpation
  - Pincer palpation
  - Rib blocking techniques

- **Safety precautions**
  - Needle safety – no loose needle, must place in the sharps container, no pointing at others
  - Wearing gloves
Lab

- Practice handling the needle
  - How to release the needle from the tube
  - Practice feeling endfeel from the needle (towel, orange)
  - How to reinsert needle safely