Pain Management & Sports Rehabilitation

Integrativedryneedling.com

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Course Agenda

	DAY ONE
8.00-9.30	Lecture: Introduction of concept, physiological mechanisms of dry needling; peripheral and central mechanisms; specific and non-specific mechanisms.
9.30-9.45	Break
9.45-10.30	Safety Lecture: Adverse Reactions, OSHA guidelines, BBP, Precautions.
10.30-11.15	Lab – Safe needle handling: Insertion & manipulation techniques using ½”- 1” needle.
11.15-12.00	Lecture: Neuroanatomy of neuro-trigger points and development of Homeostatic neuro-trigger points. Effects of Electrical Nerve Stimulation (ENS) on the central and peripheral nervous system.
12.00-1.00	Lunch on your own
1.00-2.30	Lab: Surface anatomy of neuro-trigger points in lower and upper extremities.
2.30-3.45	Lecture & Lab: Quantitative Sensory Testing
3.45-4.45	Needling Lab -1”: Deep Radial (1), Superficial Radial (12), Lateral Antebrachial Cutaneous (9)
4.45-6.00	Lab: Surface anatomy of neuro-trigger points head, cervical and trunk
	DAY TWO
8.00-10.30	Needling Lab - 3”: Iliopsoas, pectineus, adductor, Inferior Gluteal (16), Superior Cluneal (14). Break on your own
10.30-12.30	Needling Lab -2”: 2:2 Rule, Posterior cutaneous of L2 & L5, Suprascapular (8), Latissimus Dorsi, Lateral Pectoral (17) with Pectoralis-horizontal needling.
12.30-1.30	Lunch on your own
1.30-3.00	Needling Lab -1”: 1:1 Rule, Dorsal Scapular (13), Posterior Cutaneous of T6 (21), spinous process of T7 (20), Abdominal wall. Break on your own.
3.00-4.30	Needling Lab - ½”: Supraorbital (23), Infraorbital (19), Masseter, Temporalis (horizontal needling), Suprahyoids, Greater Auricular (2). Break on your own
4.30-6.00	Needling Lab: ITB (18), Lateral Popliteal (11), Saphenous (4), Common Fibular (24), Sural (10), Tibial (6), Deep Fibular (5).
	DAY THREE
8.00-10.00	Lecture & Lab - Cervical spine: Sternocleidomastoid, Greater Occipital (7), Posterior cutaneous of Cervical spine, Suboccipitals. Break on your own.
10.00-12.30	Lecture & Lab - Specialty needling techniques & Case Applications: Supraspinatus needling (muscular, musculotendinous, subacromial approach), Spinal Accessory (3), Needle manipulation techniques (Twitching/Pistoning, Needle Rotation, Tenting).
12.30-1.00	Working lunch
1.00-2.00	Administrative Discussion: Consent to treat, political & legislative issues effecting practice, marketing, and final details of providing dry needling in your clinic.
2.00-2.45	Written test and Group case studies.
2.45-End	Practical Examinations

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Course Description

The clinical course: *Integrative Dry Needling (IDN) for Pain Management and Sports Rehabilitation* is based on the anatomy and physiology of the musculoskeletal and peripheral nervous systems. The course content is based on over 40 years of research and experience providing a logical and systematic process for addressing pain and dysfunction. Our system does not divide the body into upper and lower halves, which require you to attend 2 courses before you can treat the entire body.

The Integrative Dry Needling program will develop the knowledge and clinical skills required to effectively identify and treat painful neuromuscular conditions in any region of the body. As a result, course participants develop an adaptable clinical procedure allowing immediate integration of dry needling into clinical practice

Learning Objectives

1. Independently identify each of the three types of trigger points (homeostatic, paravertebral and symptomatic) in a given case study.
2. Integrate the physiological mechanisms of needling when developing a treatment plan for a given musculoskeletal condition.
3. Discuss the prevention and management of adverse responses to dry needling based on OSHA requirements with 100% accuracy during case study.
4. Independently apply dry needling treatment safely into musculoskeletal trigger points during lab sessions.
5. Independently evaluate soft tissue dysfunctions relating to a given musculoskeletal condition and pain.
6. Correctly defend the IDN system for treatment of musculoskeletal pain based on the unique neurology and physiology of neuro-trigger points.
7. Independently integrate the IDN system into the participant's physical therapy practice in relation to current clinical guidelines.

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Why Modern Dry Needling is not Traditional Chinese Acupuncture

Dr Yun-Tao Ma

Modern dry needling (DN) is not traditional Chinese acupuncture (TCA) because DN practice is based on the laws of modern medicine, while TCA is based on the laws of Traditional Chinese Medicine (TCM).

Modern DN has developed on the foundation of modern Western medicine, which consists of biology, chemistry and physics. Each scientific field may offer DN the information from many sub-fields, such as molecular biology, physiology, pathology, anatomy, kinesiology, and more. Medicine is an applied biology and obeys the laws of chemistry and physics. Science advances when new information obtained is different from the old, the law of science may change, so the laws of modern medicine may change; DN is advancing with science and the new laws of medicine. Thus, DN is dynamically advancing and will not stagnate in its evolution.

Traditional Chinese acupuncture was developed at least 2,500 years ago in ancient agricultural Chinese society. Ancient Chinese believed that there were universal laws that govern the universe, nature, social structure (from family to politics), human body and human medicine and diseases. These laws are in fact a product of the Chinese agricultural civilization and philosophy. The first law of traditional Chinese medicine (TCM) is the Yin-Yang. The second law is the interrelation of five elements. Then there are numerous minor laws that govern the TCM and TCA. The third law is the Qi (vitality, energy) that exists in every entity. If the new information contradicts with those universal laws, the information must be modified to fit into the universal laws. The TCA community believes that Chinese medicine is different from modern medicine and it does not obey modern scientific laws, and the scientific method cannot be applied to TCA. However, the “laws” of Chinese medicine are just human-formed historical concepts, not natural laws. Thus, acupuncture theories, like the central concept of meridians, have been regarded as fact, not theory, and have been humanly kept in its antique form for thousands of years.

DN techniques are based on the laws of modern medicine. Those laws are rules nature must live by. The “laws” that format TCM and TCA are human-created concepts representing ancient human thoughts and bias. This is the fundamental difference between modern DN and TCA though both DN and TCA are clinically effective.

Current research and clinical data has modified the hypothesis and clinical techniques of modern DN. The result: Neurologic Dry Needling (NDN).

- Research demonstrates the clinical outcomes of needling “official” acupoints and non-acupoints are equally effective. This falsifies the uniqueness of meridians and acupoints
- Trigger point hypothesis: Trigger points cause myofascial pain. Based on this hypothesis it is important to identify and deactivate the trigger points. This approach can be clinically effective. However, a non- trigger point approach, such as superficial needling or needling of distant points can also reduce or heal myofascial pain even though the trigger points were untouched during treatment. *Note: Various research sources cite an overlap of the named trigger points and acupoints, ranging from 80% to 100%, claiming they are the same points. Thus, the same scientific discovery in (1) can be applied to the trigger point hypothesis.
- The clinical evidence demonstrates that healing can be achieved by using both local symptomatic points and distant points.

Based on research and clinical data since the 1960’s, we have falsified the meridian theory, and now we are improving the trigger point hypothesis. The results: IDN / NDN are developed by synthesizing all the DN scientific and empirical data.

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What is Dry Needling therapy?

Definition

Dry needling is a skilled technique performed by a physical therapist using filiform needles to penetrate the skin and/or underlying tissues to affect change in body structures and functions for the evaluation and management of neuromusculoskeletal conditions, pain, movement impairments, and disability.

Local effects of needling

Dry needling lesions in the soft tissue is a therapeutic modality for soft tissue dysfunction. Soft tissue dysfunction involves soft tissue injuries including tissue inflammation, sensitized nerve tissue, scar tissue formation, tissue adhesion, and deficiency of blood and lymphatic circulation. The process of inserting a needle starts with puncturing the skin, and then involves physical stretching the tissues (down and up, and/or rotation movement of needle shaft), which creates lesions in the soft tissue. When the needle is removed, the lesions remain for a few days. Needling process thus provides both physical (tissue stretching) and biochemical (lesions) stimuli. This lesion-induced process activates physiological mechanisms of remodeling of injured and inflamed soft tissues in and around the needling site. The tissue remodeling process includes (1) local physical stress reduction (tissue tension) and (2) normalizing local inflammation, and (3) replacement of injured tissues with fresh tissues of the same type.

Systemic effects of needling

Each needling process is invasive and creates both local and systemic effects – the restoration of both local tissue homeostasis* (tissue remodeling of injured tissues) and systemic homeostasis. Restoration of systemic homeostasis involves reducing both physical and physiological stress. Physical stress means muscular, which creates biomechanical imbalance such as joint and posture imbalance. Physiological stress may include local physiological dysfunction (inflammation, tissue ischemia, etc.) and all body systems like immune, cardiovascular, endocrine, and all others. Simple insertion of an invasive needle creates both local and systemic therapeutic effects.

Homeostasis:

The property of a system that regulates its internal environment and tends to maintain a stable, relatively constant condition of properties. In simple terms, it is a process in which the body's internal environment is kept stable, despite changes in external conditions.

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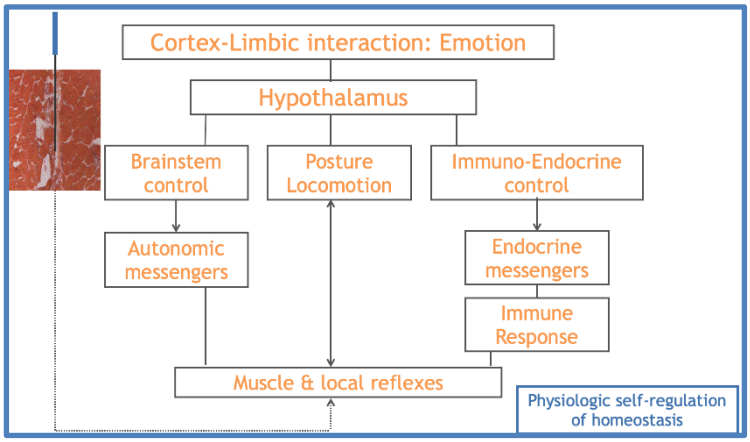
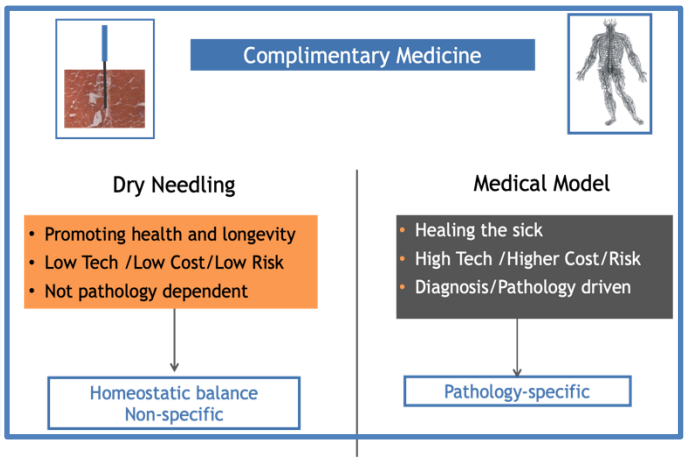
Non-specific pathophysiologic features of needling

It is important to understand that needling itself does not treat any specific disease, but may restore tissue homeostasis, during which the process of biological self-healing and self-repair physiology-mechanisms are activated. After needling many pathological conditions can be improved, including joint biomechanics. Thus, needling is a non-specific therapy.





Precise selection of points (traditional acupoints or trigger points) is clinically unnecessary.

The traditional view of selecting precise needling points is not supported by clinical evidence (Chae et al., 2013). The ancient view requires precise location of a so-called acupoint. More modern view requires precise location of trigger points. These empirical procedures are clinical effective but not supported by both empirical and evidence-based data (Chae et al., 2013). In general, needling the sensitized and inflamed area will achieve the same clinical efficacy as selecting precise trigger point location. This is because most soft tissue dysfunction involves tissue inflammation and related conditions such as vasoregulation-dependent dysfunction and blood and lymphatic circulation. Trigger point nodules are not the cause of the inflammation in many cases. Inflammation is one of the reasons causing the formation of nodules. Trigger points become “active” due to inflammation. As inflammation is reduced, trigger points become “latent”. Thus, the concepts of trigger points causing pain needs to be re- examined.

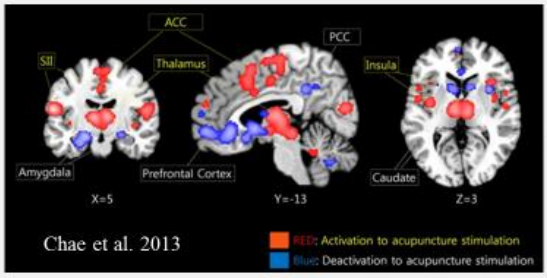


Figure 1. Brain areas associated with acupuncture stimulation that exhibited increased (red) and decreased (blue) activity

- The brain areas activated and deactivated by acupuncture needle stimulation largely overlap with the brain regions that constitute the so-called pain matrix.
- Activation/ deactivation patterns of brain response to needling were consistent regardless of specifically defined points.

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The Evolution of Dry Needling Models

Empirical Model type	Physiologic features of the model	Weakness of the model	Historical notes
Traditional model	The model reveals systemic and non-specific effects of needling physiology. A system of accumulation of ancient and modern clinical data.	Model development is disadvantages by its philosophy. Modern medical understanding is irrelevant (some improvement in modern versions). Complicated out of date theories and unnecessary clinical procedures.	Empirical development: Chinese agricultural civilization at least 2,500 years ago.
Trigger point model 1st generation of dry needling	Local muscle patho-histology and patho-physiology of trigger points are emphasized. Local gross anatomy is emphasized.	Systemic physiology of needling effect is ignored. Pain physiology of sensory nerve is underestimated. Anti-inflammatory physiology of needling is neglected.	Empirical development: 1930s: J Kellgren 1940s: J Travell 1970-2010: J Travell & D Simon
Gunn approach 2nd generation of dry needling	Spinal segmental physiology of needling stimulation is emphasized. Concept of soft tissue dysfunction is considered.	Non-segmental physiology of needling effect is ignored.	Empirical development: 1970s: Dr CC Gunn
Neurologic Dry Needling 3rd generation of dry needling	Integration of all known models. Systemic, segmental, and symptomatic needling is emphasized. Pain physiology of nervous system and soft tissue dysfunction are inter-connected. Pain of neurogenic origin is emphasized. Clinical procedure is comprehensive but simple. Preventive effect of needling is emphasized. Quantitative analysis as a prognostic is used.		Empirical development: 1970s: HC Dung 1990s: HC Dung & YT Ma 2000s: YT Ma 24 Homeostatic points.

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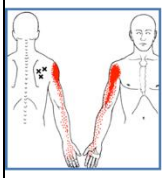
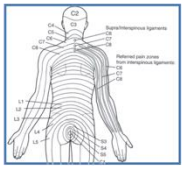
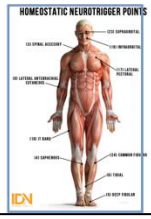
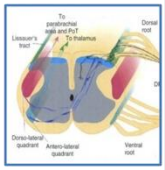
The Evolution of Dry Needling Models

1st generation: Dr. Janet Travell- Myofascial Trigger Points
2nd generation: Dr. CC Gun-Intramuscular Segmental Stimulation
3rd generation: Dr. Ma - Systemic Needling
4th generation: IDN- Integrative Dry Needling

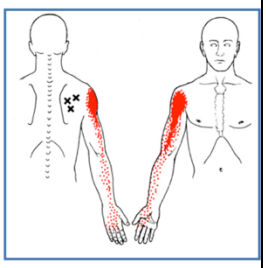


Trigger Point Approach-Dr. Janet Travell

1st Generation of Dry Needling

> A hyper-irritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in the taut band. The spot is tender when pressed, and can give characteristic referred pain, motor dysfunction, and

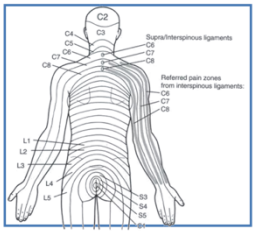
Travell



Gunn Approach-Intra-Muscular Stimulation (IMS)

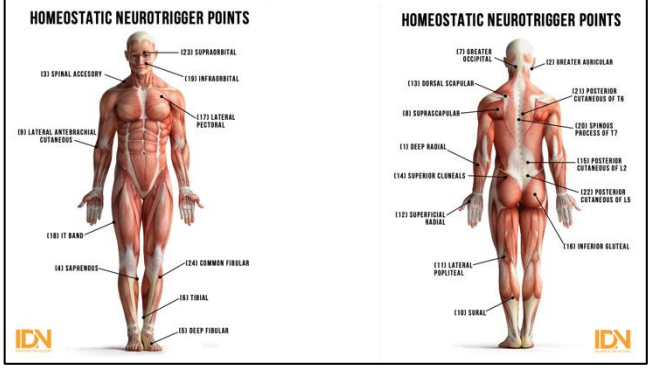
2nd Generation of Dry Needling -

> **Radiculopathy Model:** When the flow of nerve impulses is restricted, all innervated structures, skeletal muscle, smooth muscle, spinal neurons, sympathetic ganglions, brain cells, glands, become atrophic, highly irritable, and supersensitive.

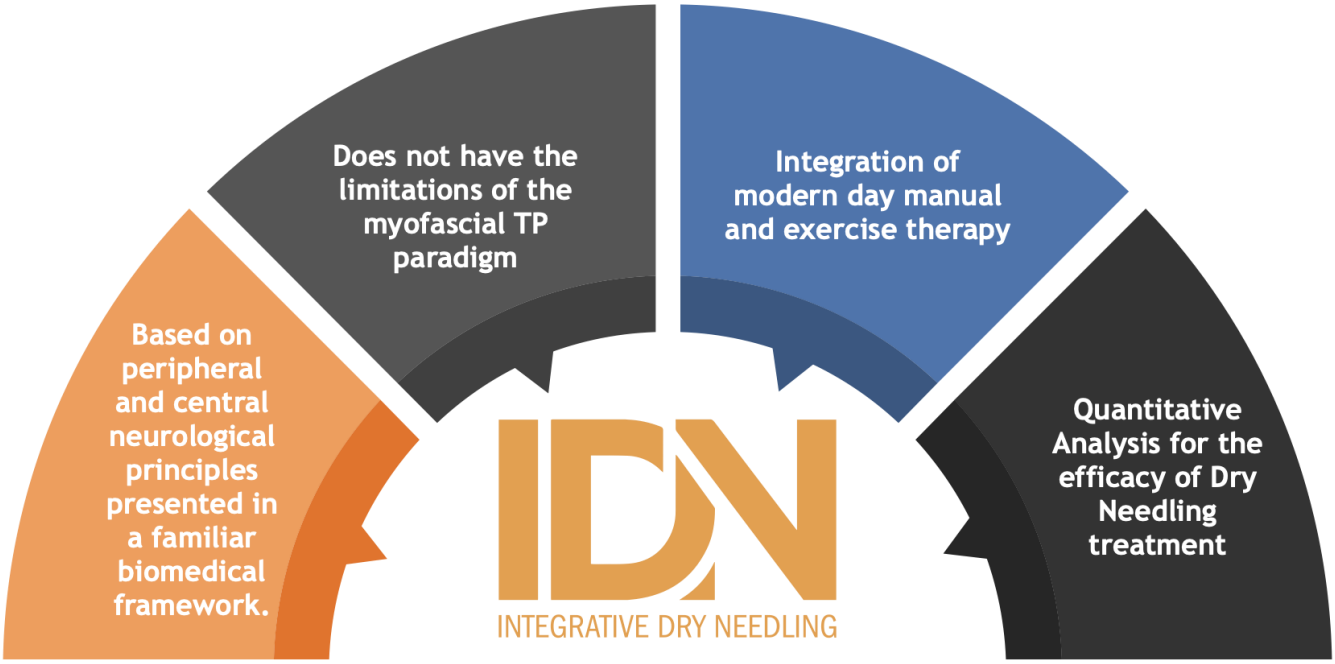


Dr. Ma's Systemic Dry Needling

3rd Generation of Dry Needling -



4th generation of dry needling



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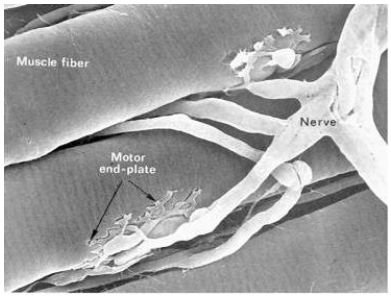
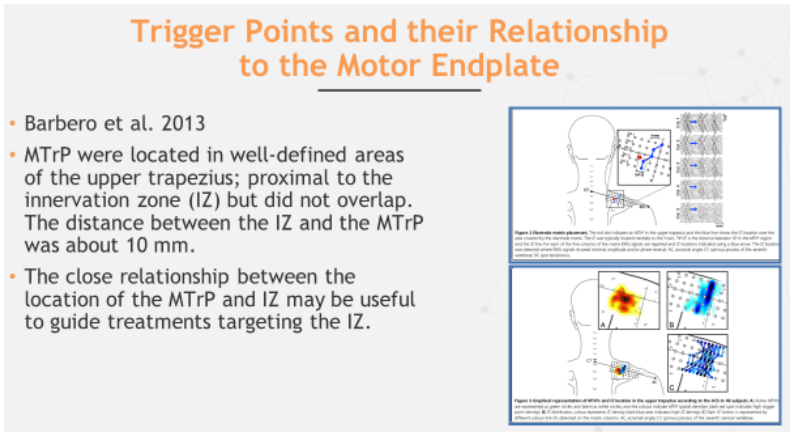
Limitations to the current diagnostic model of trigger point dry needling. Integrated hypothesis of MTrP (Simons, 2004):

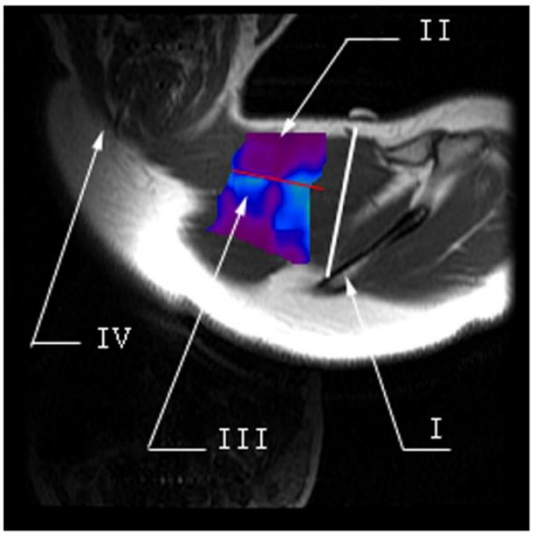
Excessive ACH release into the neuromuscular junction produces sarcomere shortening or the “taut band” that clinicians may palpate. This may create an “energy crisis” with an increase of sensitizing substances (Shah et al., 2008) in the area that may sensitize peripheral nerves and may be responsible for the spontaneous electrical activity (SEA) stated to be present as a result of the MTrP. (Quintner et al., 2015)



Barbero et al., 2013: Described innervation zones (IZ), which are anatomically the same as the motor end-plate (where the α-motor neuron divides into a number of branches and synapses onto target muscle fibers). It is in these IZ that the peripheral nerve will release the inflammatory mediators that Shah discovered in his research.



Chen et al., 2008: Utilized magnetic Resonance Elastography (MRE) to demonstrate that the region of the MTrP is associated with an increased stiffness relative to the surrounding muscle tissue. He found the MRE intra- and inter-rater reliability was excellent however, the agreement was poor between the MRE findings and the physician palpation exam for the location of the MTrP.



I. spine of scapula
II. taut band region in UT
III. MTrP identified by the physician palpation
IV. cervical spine

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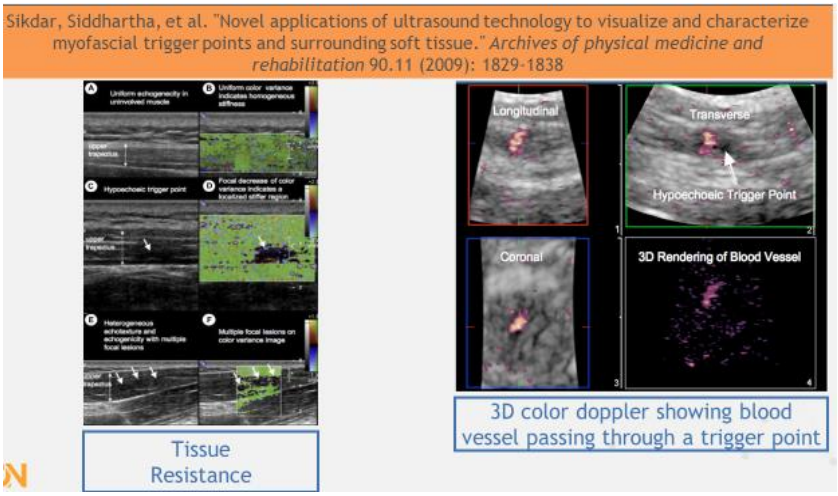
Sikdar et al.,2009: utilized colored US to show stiffness / nodules (lack of color) in tissue. There were multiple nodules existing along a muscle fiber demonstrating an area of stiff-ness not a point of attention. This may be explained by the other finding of a retrograde blood flow (in diastole) near an active trigger point indicating a highly resistive vascular bed.



What is currently known about Myofascial Pain Syndrome and MTrPS

Myofascial pain is complex, and the pathophysiology remains elusive. The original definition of MTrP by Travell, and Simons is outdated based on modern evidence of MPS pathophysiology.(Simons,1990) No diagnostic reference standard for MTrP is currently available to compare the clinical findings of MTrP through palpation. Therefore, it is not possible to truly assess the accuracy of manual palpation, however, reliability data suggests the consistency amongst clinicians for identifying the precise location of a MTrP is inadequate. The most consistent clinical features are “tenderness and pain” (Rathbone,2017) and not the physical nature of the tissue. Tenderness and pain are a result of the chemical changes in blood circulation (Sikdar,2009; Lee,2008) that sensitizes sensory nerve endings lowering their firing threshold. The perpetual presence of inflammatory agents may further sensitize the nervous system segmentally (Borstad,2015) and/or centrally.(Bordstad,2015; Sanchis,2015)

It is well documented that various conditions extending beyond the musculoskeletal system i.e visceral and psychological co-morbidities can generate signs and symptoms of MPS/MTrP due to their known etiologic mechanisms with systemic inflammatory processes. Recent evidence shows patients with MPS exhibit specific local and systemic inflammatory biomarkers. (Duarte,2021) This demonstrates that the development of MPS/MTrP is not a local phenomenon. Moreover, both peripheral and central sensitization of the nervous system may occur through neurogenic inflammatory mechanisms. (Matsuda, 2019) Both widespread inflammation and neuroplastic changes resulting from central sensitization can manifest as secondary hyperalgesia. Clinically, secondary hyperalgesia is important to recognize as it is an important prognostic factor for patients recovering from pain.

Conclusion: Duarte 2021:

MPS is diagnosed using subjective clinical criteria that includes measures of self-reported pain, exclusion of other pathologies, and clinical palpation of MTrP’s. No widely accepted objective reference standard exists, impacting negatively the precision of clinical diagnosis, therapeutic management and advancement of high-quality scientific evidence. Therefore, Travell and Simons criteria alone are likely insufficient to reliably and objectively assess MPS.

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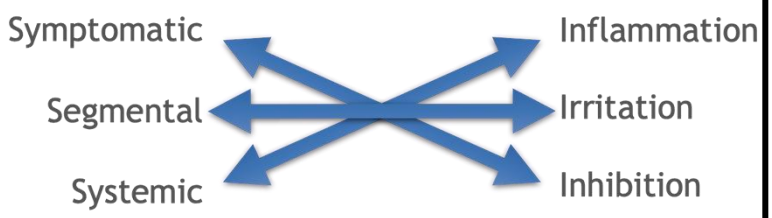
Integrative Dry Needling

*Our **Structured*** neurological model enables achievement of ***Reproducible*** and ***Predictable*** clinical outcomes regardless if the clinician has experience or is just a novice in providing dry needling treatment

Structured | Reproducible | Predictable

Research + clinical evidence Integrated over the past 40+ years.

IDN Systemic Approach



Dry Needling is non-specific

"A change anywhere creates a change everywhere"

"You can get to the point but miss the system"

IDN practitioner

Scientific thinker + Skillful clinician

=

Creation of your own style and approach

4th Generation of
Dry Needling Therapy

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Molecular mechanism of dry needling

Dry needling normalizes inflammation. This needling-induced anti-inflammatory process triggers regulatory mechanisms of blood and fluid circulation in inflamed tissues that includes microcirculatory vessels. The anti-inflammatory process of dry needling involves balancing sympathetic nervous system, thus balancing between vasodilators such as adenosine and nitric oxide (NO) and vasoconstrictors such as superoxide and many others. We are just at the beginning to understand the needling mechanisms at this level.

Chronic inflammation is the result of inflamed microcirculatory vessels that causes tissue hypoxia. Needling creates acute inflammation as a mechanism to reduce chronic inflammation. The micro-physiological effects that occur increase the local levels of NO, O2, and Adenosine are transient, but continue between 15-60 minutes even after the needle is removed (Cagnie et al., 2012; Takano et al., 2012; Tsuchiya et al., 2007).

Unique features of the systemic approach of the Integrative Dry Needling System

Treatment of soft tissue dysfunction: All modern dry needling models were developed by medical clinicians to treat clinical symptoms, especially soft tissue pain. For this reason, all other dry needling techniques focus on local symptoms or regional symptoms in general. Both doctors and patients will apply these techniques when pain is felt. Unfortunately, in many cases the most effective treatment using dry needling is during pre-pain or pre-symptom stage, not symptom- stage.

Systemic approach: In fact, all local symptoms have systemic effects over all the human systems, including physiologic systems and biomechanical balance of neuromusculoskeletal system as soft tissue pain always affects the biomechanical balance of part or all of the musculoskeletal system. Integrative Dry Needling System (IDNS) connects the local symptoms with the body as a whole, especially the systemic balance of biomechanics of human movement, which is very important in sports medicine. (See the 3 S's and I's paper in the pre-reading)

Prevention of pathologic conditions: Using IDNS, we can prevent soft tissue dysfunction in many cases if applied in pre-symptom stage or symptom-free persons. This is especially important for athletes, musicians, physical therapists and chiropractic doctors as their professional injuries shorten their careers. Unfortunately, both medical professionals and patients ignore the preventative approach.

Health promotion: IDNS is beneficial for prevention of soft tissue dysfunctions, which are a major pathologic condition involved in almost all diseases.

IDNS for sports medicine: We developed the IDNS for athletes because the techniques will (a) optimize physical performance by reducing biomechanical and physical stress during the pre-symptom stage, (b) prevent chronic soft tissue injuries and some acute injuries, (c) provide treatments for conditions such as overtraining stress, soft tissue injuries related to the respective professions and rehabilitation after surgeries.

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The clinical limitation of needling therapy

DN therapy is a process of physiological adjustment to normalize homeostasis in order to promote self- healing. However, as the severity of pathological condition (stressor) increases, the self-healing potential decreases. If the patient's self-healing potential is severely hindered, their response to DN therapy may be limited.

Dry needling efficacy varies from person to person. The same soft tissue pain symptom can be completely cured in some persons (28%), partially relieved in most persons (64%) and have low or no efficacy in a few patients (8%). DN therapeutic results for soft tissue pain management are reliably predictable and depend on (1) the self-healing potential and (2) the healing potential of the symptom(s) of each patient. The predictability arises from the fact that most soft tissue pains manifest through localized symptoms. For non-soft tissue pain symptoms, DN efficacy is less predictable.

Law of Dry Needling: The reality of dry needling therapy

There are different modalities of DN and this diversity, in fact, promotes the advancement of DN therapy. As science philosopher Karl Popper indicates that disagreement advances science. However, this diversity often confuses both instructors and students of DN. For example, some instructors believe that only their way is correct and other techniques are not supported by scientific data. This creates uncertainty with students trying to understand which technique is correct when facing different DN paradigms. These laws will help explain the diversity of DN and clarify the confusion.

- All needling models clinically work. All models are partially truthful models.
- All theories are tentative and subjective to change as science advances. Differentiation of facts from theories is needed in understanding the therapy.
- If any scientific researches support one model, in fact, support all models.
- If any scientific researches deny/falsify the theory of particular model, they only deny that theory, not the clinical techniques of the model.
- Each model has its unique benefits and unique limitations.
- Physiologically all models do not conflict with each other. Thus, it is possible to integrate all models into a new model with new theories.

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Evidence-based Research

Research helps to support or falsify/deny our empirical data. As research advances, our concepts and techniques also evolve. However, the interpretation of the research data is challenging in medicine and biology. We need to examine how the research is designed, how the data is collected and how the data is interpreted. Always question the research and never take the conclusion of a research paper as absolutely correct.

Quality of evidence-based research

Today many articles and books bear the title evidence-based. It should be noted that not all evidence is of equal quality. The highest quality of evidence is randomized clinical trials or systematic reviews of randomized trials, which have the lowest likelihood of bias.

Limitations of evidence-based medicine - (Sackett et al., 1996)

Evidence, whether strong or weak, is never sufficient to make clinical decisions. Individual values and preferences must balance this evidence to achieve optimal shared decision-making and highlight that the practice of evidence-based medicine is not “one-size fits all” approach. It has been recognized that providing evidence from clinical research is a necessary but not a sufficient condition to provide optimal care.

Evidence Based (Informed) Practice

Clinical decisions are influenced by a range of sources that include evidence-based research, empirical evidence, law and policy, opinion of colleagues and professionals and what can be thought of as clinical “gut feelings”.

Comparison of different models of needling therapy

It should be emphasized that each needling model has unique benefits and unique limitations. A good practitioner is encouraged to learn different models of needling. Those who believe that only one model is effective will limit the clinical efficacy of the dry needling procedure.

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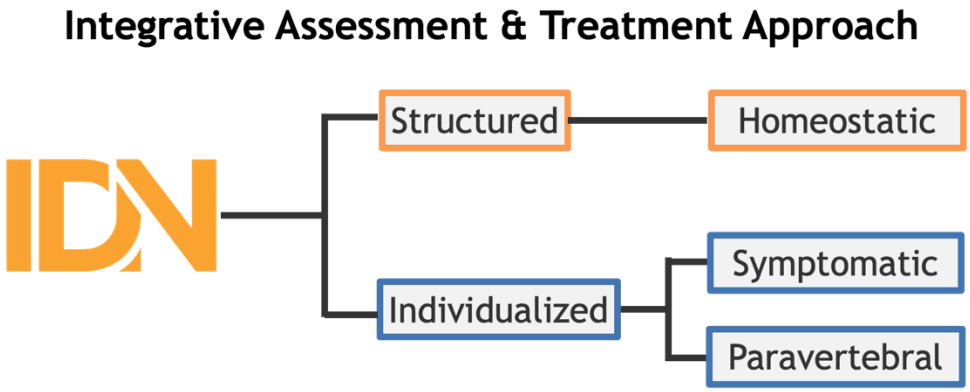
IDN Clinical Model

A structured yet adaptive clinical model that facilitates a deeper understanding for consistent clinical results. The IDN clinical model provides for an individualized plan as no two patients are identical.



Healing Patterns of DN Therapy

Healing patterns are not predictable, especially in C and D groups.

- Immediate: acute condition in healthy patients
- Cumulative: patients feel better after each treatment within 1-2 days.
- Wavering but gradually improving patients may feel alternatively better and worse, but gradually healing becomes faster and more stable.
- No-change-then-better: no improvement at first 2-3 weeks. Stop treatment for one week and patients suddenly or gradually feel better.
- Worse-then-better: mostly in stubborn and severe conditions. Some patients may interpret the needling sensation as “more pain” after treatment.
- Non-responders: most are in the D group.

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Clinically Important Mechanisms of DN Therapy.

Note:

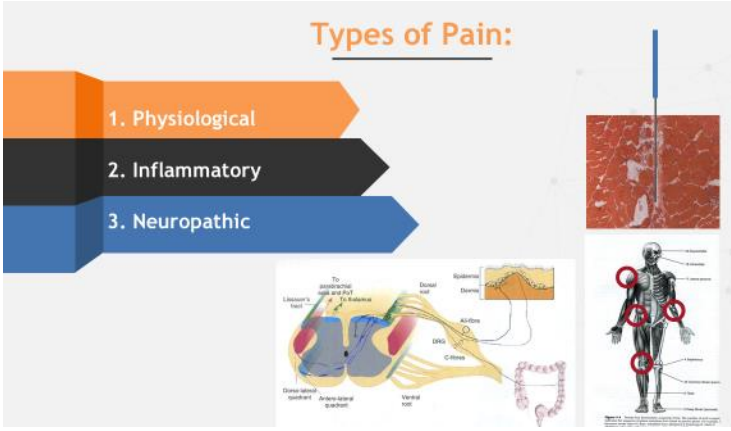
All the mechanisms listed here help identify the most effective neuro-trigger points/areas for needling.

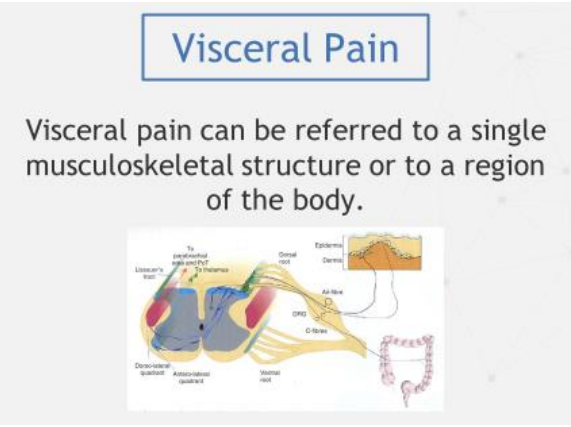
Local Mechanisms: See soft tissue dysfunction (below)

Systemic Normalization of Pathophysiological Imbalance

Pathological stimulations reach all levels of CNS (spinal cord, brain stem, pons, thalamus, limbic system and cortices). They disturb, interrupt or suppress normal interaction and cause dysregulation of a variety of physiological functions. Dry needling signals also reach these levels and interact with pathological signals. Needling stimulates the release of neural transmitters and bioactive factors from CNS and causes immune and endocrine systems to release immune factors and hormones to regulate physiological and biochemical environments of pathological tissues, thus affecting cells and microenvironment and leading to self-healing.

There are somatic and emotional imbalances. Any imbalance or load is a stress to the body. Systemic somatic stresses may include pain, low/high temperature, fever, infection, injuries, surgeries, hypoxia, overwork and repetitive overuse. Emotional stress may include fear, anxiety, depression, worry, hopelessness, helplessness and grief, etc.





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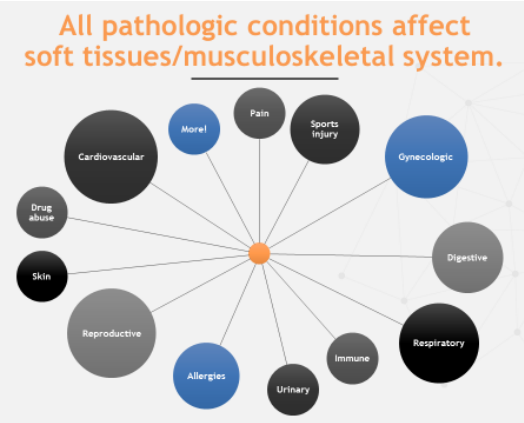
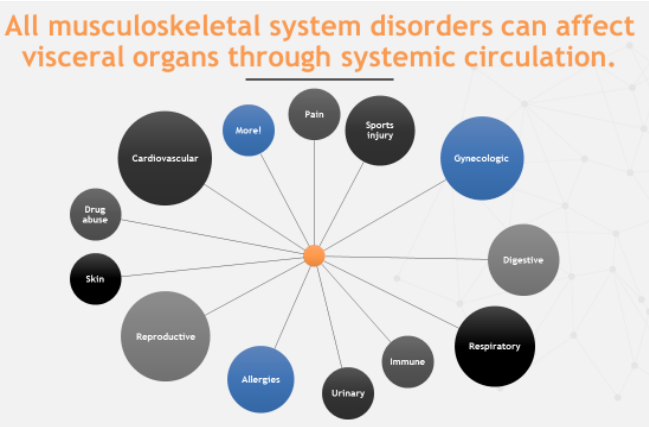
Somatic and Visceral Referral

Visceral reflex

If the patient's condition involves internal organ(s), the diseased organ(s) will project the pathological signals to the certain part(s) of the body, which are represented as tender points, soft tissue nodules, skin discoloration, or painful area. Most internal pathological insults affect only part or parts of the body in the beginning and tender Symptomatic Neuro-trigger Points (S's) are formed in the specific area. If the affected area harbors homeostatic NTrPs (H's), these H's are also S's. For example, in patients with a kidney problem, H15 and H14 would be more symptomatic than other H's. If the pathology of the kidneys continues to develop, the whole lumbar area can become tender.





Somatic referral

A part of the body can refer or radiate its pain to another part of the body. For example, inflamed low back muscles and nerves can project their pain to the thigh, leg and foot. Usually H15 and H22 are the centers of the pain and the pain may project to H14 and H16 of the gluteal area, to H18 and its vicinity of the thigh, and H11, H24 and H10 of the leg.

Systemic Pathological Sensitization

Visceral, metabolic and physiological pathology can cause neuro-trigger points to appear systemically. Clinicians need to be cognizant of medical condition, comorbidities, and risk factors that can influence clinical decisions on the appropriateness of using dry needling. Systemic conditions can masquerade as more common musculoskeletal conditions, so clinicians are strongly cautioned against relying solely on palpation findings when choosing dry needling without thorough systems screening and viewing provocative findings within the patient's overall presentation. (Kearns,2021)

Soft tissue dysfunction

DN therapy non-specifically promotes physiological normalization of dysfunctional or injured soft tissues. Self-healing begins after acute or chronic injuries of soft tissues. However, during this self-healing process, inflammation, contracture of soft tissues, adhesion formed between different soft tissues, scar formation within the same and between different soft tissues becomes the pathology of chronic soft tissue dysfunction. These compensatory changes cause the blockage of fluid and blood circulation in the affected soft tissues. Thus, inflammation, contracture, adhesion, scarring and blockage are the major pathologies of chronic soft tissue dysfunction. All human diseases can create some degree of soft tissue dysfunction. Many clinical symptoms are related or produced by the compensatory changes of soft tissues. The efficacy of medical intervention in treating many external injuries and internal dysfunction depends how much we can solve the pathologies of the soft tissue, the inflammation, contracture, adhesion, scarring and blockage of local microcirculation. Chronic soft

tissue syndrome is the pathological conditions caused by the compensatory inflammation, contracture, adhesion, scarring and blockage of circulation in the soft tissues after acute or chronic injuries.

Pathology of chronic soft tissue syndrome

Chronic soft tissue syndrome is new dysfunctions of soft tissues developed during the process of recovery after initial acute or chronic injuries (see below). The soft tissues involved include: muscles, ligaments, tendons, fascia, capsules, bursae, nerves, blood and lymph vessels, viscera with their related soft tissues such as, pleura or ligaments and the CNS. After injuries like external physical tear or internal tissue ulcer or inflammation, contracture, adhesion, scarring and blockage of local circulation will occur. These compensatory changes result in various chronic symptoms.

The types of soft tissue injuries

Injuries as consequences of tissue destruction from physical deformation, tear, breakage, necrosis, blockage of circulation, result in dysfunction and injuries of soft tissues. These injuries can be classified into the following types.

- Violent physical injuries: crushing, beating, falling, compressing, pushing and pulling;
- Cumulative injuries: injuries caused by frequent or repetitive activities, which involve particular tissues.
- Emotional stress: emotional stress causes dilation or constriction of blood vessels, strong contraction or cramping of muscles resulting in injuries to blood vessels. Emotional depression induces slow humoral and blood circulation resulting in fluid retention. This may lead to swelling or enlargement of tissues and organs which may compress other tissue or organs to cause injuries.
- Unconscious injuries: slight physical injuries in daily life.
- Overloading fatigue: overworking (limbs and muscles), overeating (digestive organs), over-exercising (physical training).
- Injuries from chemical toxins: alcoholics, drug-abuse, smoking, overmedication, and pollutants, etc.
- Over-weight injuries:
- Post-surgical injuries:
- Disease-related injuries: Rheumatoid arthritis causes inflammation, edema, and necrosis of soft tissues, etc.
- Environmentally-related injuries: extreme temperatures, burning and toxins.
- Injuries caused by abnormal physiology: imbalance between sympathetic and parasympathetic nervous system.

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Pathological process of soft tissue dysfunction/injuries

The major consequences of soft tissue dysfunction/injuries are from: inflammation; contracture; adhesion; trophic deficiency; scarring; and blockage of circulation.

Contracture/cramp

To protect from further injuries, some soft tissues (muscles, tendons, ligaments, fascia) become contracted and shortened after initial acute injuries. Some contractures of soft tissue are demonstrated as cramps as it happens during exercises.

Adhesion

Adhesion is a pathological consequence after soft tissue injuries. There are two types of soft tissue adhesion: Caused by external physical impact and by internal pathological insult. Adhesions demonstrate more symptoms when they occur in the limbs and the spine due to more physical motion; less symptoms are found in the face and abdomen.

Adhesion caused by external physical impact

Violent force, cumulative stress, subconscious damage in daily life, overloading injuries, overweight conditions, and emotional abnormalities (stress or depression) cause injuries of soft tissues such as broken capillaries and fibers. During the process of recovery from those injuries, different soft tissues like muscles, ligaments, blood vessels, nerves and bones may adhere to each other.

Adhesion caused by internal pathological insults

This adhesion can be caused from internal pathology, invasive infections, environmental conditions and post-surgical injuries.

Scarring

External and internal scars are formed during the process of soft tissue healing if the injuries are severe enough or involve large areas. Internal scars are often the pathological factors for chronic soft tissue dysfunctions.

Blockage of microcirculation:

The injuries cause damages in soft tissues such as breakage of blood and lymph vessels, tear of fibers, bleeding, fluid retention. During the healing process, scarring and fibrillation can block the normal circulation channels, resulting in retention of fluid in one part of the tissues and low or slow circulation in another part. This condition can become the pathology of the chronic soft tissue dysfunctions.

Trophic deficiency:

Injured tissues become weak and finally deformed because of lack of nutrition and exercise. This affects the range of motion and the mechanical balance of the joint. It takes time to restore the normal size and function of the muscles, which is one of the differences between acute and chronic injuries.

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Histology of soft tissue injuries

Contracture

Contracture is self-protective mechanisms of soft tissues. There are reversible and irreversible contractures. The shortening resulting from injuries within physiological range caused by overuse, overloading, misuse or physical insults are reversible. Contractures from severe injuries, and some medical surgeries, which destroy substantial amounts of tissue is irreversible.

Adhesion

During the process of self-healing after acute or chronic injuries, the tissue regeneration can cause the adhesion between neighboring tissues. The adhesion occurs between the following tissues: epimysium, endomysium, tendon and neighboring tissues, ligaments and joint capsules, the periosteum, nerves and neighboring tissues, organs and related soft tissues.

Scarring and Fibrogenesis

After injuries, the self-healing involves three stages: inflammation, cellular regeneration and differentiation, and tissue replacement. During this process, primordial cells and fibroblast cells are produced that secrete fibrogens to construct the tissue fibers. Usually the connective tissue fibers dominate the process over the muscle, capillary and capsule tissues. Some of the scarring tissues will be absorbed but some remain, which may cause the dysfunction of the soft tissue and organs.

Blockage

The contracture, adhesion and scar tissues disturb the local microcirculation, cause ischemia, hypoxia, water retention and accumulation of wastes.

Trophic deficiency:

An important factor in treating chronic musculoskeletal injuries. The restoration requires both treatment of soft tissues and exercise.

Three stages of self-healing of soft tissue after injuries

After injuries, soft tissues go through self-healing which involves three stages.

1. **Inflammation and immune reaction.** The coagulation process and immune reaction release active biological factors like platelet factors (PDGF), TGF, PDECGF and activated immune cells such as white blood cells to digest the injured tissues.
2. **Cellular regeneration and differentiation:** primordial cell regeneration and differentiation into the same type of cells of the injured tissues.
3. **Reconstruction of the injured tissues.** Endothelial cells move to the injured parts to form the tissues and capillaries.

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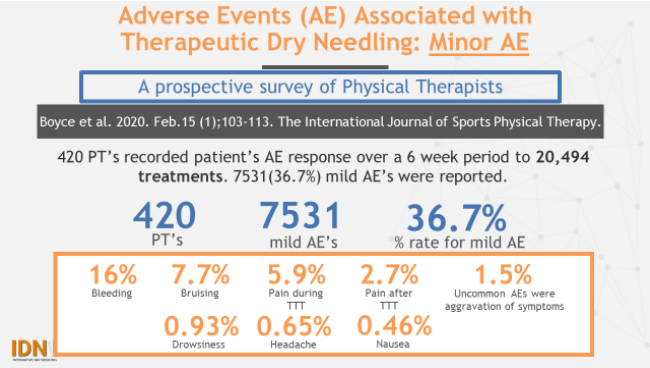
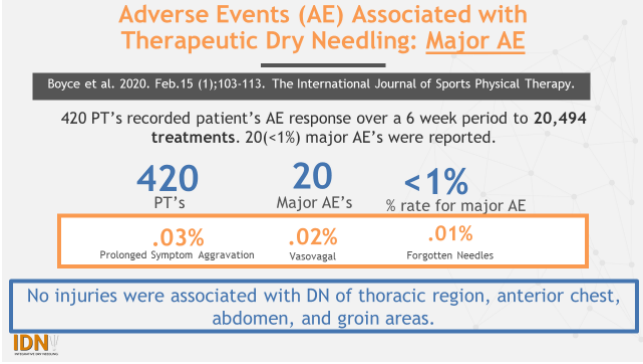
Types and Frequency of Short Term Reactions to Needling

DN is a medical modality with certain risks. It is very critical for both experienced and beginning practitioners to understand what adverse effects may occur during treatment, how to prevent them and how to manage them.

Boyce, D., Wempe, H., Campbell, C., Fuehne, S., Zylstra, E., Smith, G., Wingard, C., & Jones, R. (2020). Adverse Events Associated With Therapeutic Dry Needling. International Journal of Sports Physical Therapy, 15(1), 103–113





Types and Frequency of Short-Term Reactions to Acupuncture – survey of patient reports (MacPherson & Thomas, 2005).

Table 1: Positive Reactions n=9408

Type of event	Number of reported reactions	%
Relaxed	7436	79.1
Energized	3072	32.7
Other positive	166	1.8
Tiredness	2295	24.4

Table 2: Negative Reactions n=9408

Type of event	Number of reported reactions	%
Pain where needle was inserted	1154	12.3
Bruising	378	4.0
Pain other than at site of needling	373	4.0
Faint/dizzy	248	2.6
Worsening of condition	165	1.8
Nauseous	111	1.2
Sweating	79	0.8
Bleeding	66	0.7
Disorientation/anxiety/nervousness/insomnia/emotional	63	0.7
Ache/discomfort other than at needle point	49	0.5
Itching/pins & needles/tingling/ burning sensation	33	0.4
Irritation/ache at needle point	24	0.3

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Safety Considerations

Lungs and Thoracic Cage Considerations

Pneumothorax (Traumatic)

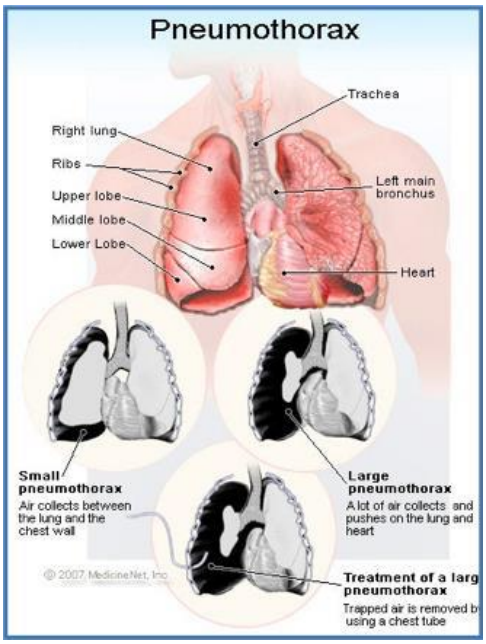
When the chest wall is pierced air is allowed to enter, the pleural space causing an uncoupling of the lung from the chest wall, often called a collapsed lung.

Symptoms:

- Chest pain of sudden onset that can be sharp and lead to feeling of tightness in the chest.
- Coughing, shortness of breath, rapid heart rate, rapid breathing pattern and or fatigue.

Treatment:

- This is a potential life-threatening emergency and the patient needs to be transported to an emergency department immediately.

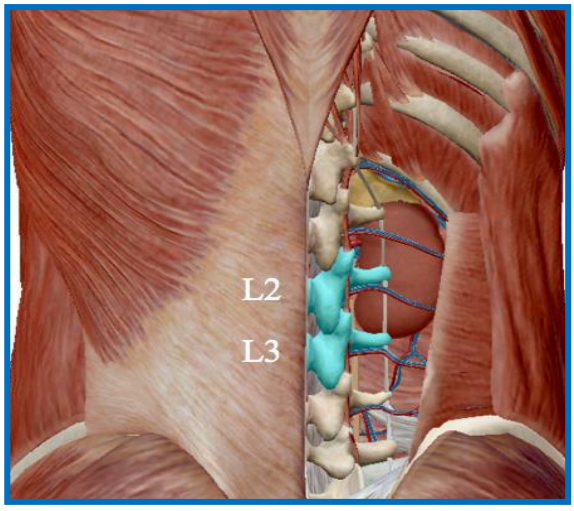


Considerations to prevent occurrence or complications:

- **Always follow the (1:1) rule in the thoracic spine**-
- *One finger width lateral to the spinous process and up to a 25-30mm / 1 inch needle.
- Care must be taken in the supraclavicular region, anterior chest/thorax, between the shoulder blades, and lateral thorax as these are at higher risk areas when performing needling treatment.
- Scoliosis, kyphosis or other rib cage anomaly may alter the position of the lung tissue within the chest cavity creating a greater risk of an adverse event when performing dry needling to the region.

Kidney Considerations

- Kidneys are located between T12-L3.
- Each kidney is approximately 3 vertebra in length
- Right kidney is approximately 2cm lower than the left due to the presence of the liver.
- On inhalation the kidneys descend approximately 2-3cm
- Note the difference between the anatomical point & the clinical point at L2
- **Follow the (2:2) rule in the upper lumbar spine** - 2 finger widths out from the lumbar spinous process and use up to a 50mm / 2 inch needle between the L1-L3 segments.



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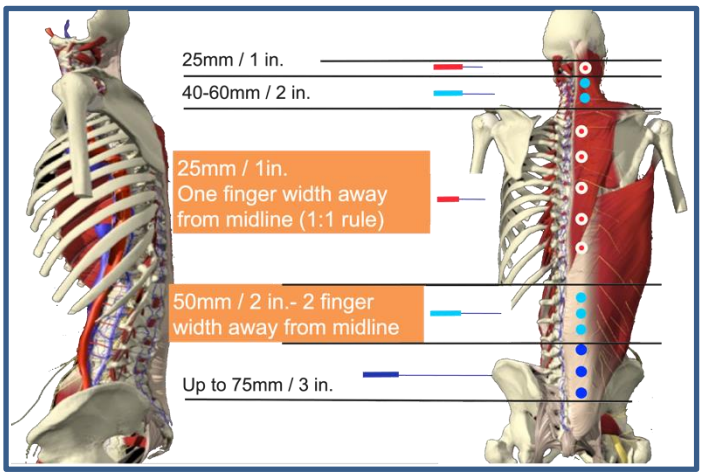
Remember (1:1) and (2:2) rules in the danger areas.

- This is a pictorial listing of the “up to” maximum-needling depths that we recommend for safety.
- ****Caution: It is imperative that you follow all the instructions relating to patient type and body location outlined in the course.**



Syncope and Dry Needling

Syncope will usually occur during first 1-3 sessions however, unpredictable syncope episodes can occur at any time, so care is warranted. In general, we can usually predict when a patient type is more prone to experience syncope:

- Young, strong 20 +/- year-old male athletes
- Thin female patients with blood pressure at or below 110/70 mmHg.
- Prior needling patients that have not had needling treatment within the last six months.

Patients that report and of the following, should not be treated until they have had time to rest, eat and drink water.

1. being extremely hungry or dehydrated,
2. feeling very tired or exhausted,
3. having consumed excessive alcohol

Syncope Treatment/Triage

If a patient begins to show pre-syncope symptoms or experiences an episode, immediately remove all needles, recline the patient to supine and raise the feet higher than the head. The patient will recover quickly, and no lasting effects will be felt, of course no further needling is to be performed that day.

**To reduce the likelihood of an episode, treat patients lying down and use fewer and/or shorter needles initially until their tolerance to needling can be better determined.

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Anticoagulants and dry needling

When considering performing dry needling (DN) on patient's taking antithrombotic drugs, clinicians must exercise caution and have the requisite competencies in DN techniques and human anatomy.

There are two classes of antithrombotic drugs that are prescribed each with specific mechanisms of action and side effects, see Munoz et al. 2022 for additional information.

1. Antiplatelet agents with the brand names of Ecotrin (aspirin), Plavix, or Brilinta among others.
2. Anticoagulants with the brand names of Coumadin, Xarelto, Eliquis or Bevyxxa among others.

To date, no DN studies have compared the prevalence of DN adverse events in patients taking antithrombotic medications and those that do not. However, acupuncture studies are available assessing the risk of adverse events in people taking antithrombotic medications.

Lee et al., 2018 assessed 428 in-patients who received acupuncture treatment. A total of 169 patients received anticoagulant or antiplatelet drugs (exposure group) and 259 patients did not receive either drug (non-exposure group). Sixty-five (38.5%) patients in the exposure group and, 115 (44.4%) patients in the non-exposure group had bleeding-related mild adverse events. There was no difference in the risk of bleeding-related adverse events between the two groups per sessions. The findings suggest that anticoagulant and antiplatelet drugs do not increase the incidence of bleeding-related adverse events after acupuncture treatment.

McCulloh et al., 2015 performed a systematic review of 7 studies with methodological quality ratings sufficient to assess acupuncture safety in 384 anticoagulated patients (3974 treatments). This systematic review concluded that acupuncture appears safe in patients taking anticoagulants citing a 0.003% complication rate, assuming adequate needling location and depth.

Anticoagulant Summary

A patient's bleeding response can vary from day to day depending on several factors including their intake of medication, the needle procedure, area being needled, and the characteristics of the needle. The monofilament needles being used for DN do not have a cutting beveled edge like hypodermic needles, thus they will cause less tissue damage, and the likelihood of bleeding is minimized (Halle et al., 2016).

Based on published data, DN is not contraindicated for use in patients taking antithrombotic medications, however, the following recommendations should be considered:

- Initially observe the patients bleeding response on more superficial structures avoiding deep needling until the safety of performing DN has been established.
- Apply prolonged hemostasis (10 seconds) in treated areas
- Use a smaller gauge needle that will provide treatment effect but minimize the tissue trauma, especially in deeper areas where hemostasis cannot be applied.
- Reduce the intensity of DN by avoiding aggressive needling techniques (such as pistoning) especially around vulnerable areas and into deeper structures where hemostasis cannot be applied.

Pregnancy and needling (Carr, 2015; Park et al., 2014).

Systematic Reviews have reported needling at forbidden points:

- Does not increase the risk of adverse pregnancy outcome in controlled clinical trials
- Is not associated with increased rates of adverse pregnancy outcomes in observational studies
- Does not induce miscarriage or labor.

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Description of Dry Needling in Clinical Practice

An Educational Resource Paper
(APTA Public Policy, Practice, and Professional Affairs Unit)

There are certain precautions to be considered with the use of DN:

1. Patients with a needle aversion or phobia may object to the physical therapy treatment with DN. With appropriate education, however, these patients may still consider DN.
2. Patients with significant cognitive impairment may have difficulty understanding the treatment parameters and DN intervention.
3. Patients who are unable to communicate directly or via an interpreter may not be appropriate for DN treatments.
4. Patients may not be willing to be treated with DN.
5. Patients need to be able to give consent for the treatment with DN.
6. Local skin lesions must be avoided with DN.
7. Local or systemic infections are generally considered to be contraindicated.
8. Local lymphedema (note: there is no evidence that DN would cause or contribute to increased lymphedema, i.e., post mastectomy, and as such is not a contraindication).
9. Severe hyperalgesia or allodynia may interfere with the application of DN but should not be considered an absolute contraindication.
10. Some patients may be allergic to certain metals in the needle, such as nickel or chromium. This situation can be remedied by using silver or gold-plated needle
11. Patients with an abnormal bleeding tendency, i.e., patients on anticoagulant therapy or with thrombocytopenia, must be needled with caution. DN of deep muscles, such as the lateral pterygoid or psoas major muscle, which cannot be approached with direct pressure to create hemostasis may need to be avoided to prevent excessive bleeding. (see above)
12. Patients with a compromised immune system may be more susceptible to local or systemic infections from DN, even though there is no documented increased risk of infection with DN.
13. DN during the first trimester of pregnancy, during which miscarriage is fairly common, must be approached with caution, even though there is no evidence that DN has any potential abortifacient effect.
14. DN should not be used in the presence of vascular disease, including varicose veins.
15. Caution is warranted with DN following surgical procedures where the joint capsule has been opened. Although septic arthritis is a concern, DN can still be performed as long as the needle is not directed toward the joint or implant.

As part of the procedural guidelines for DN, physical therapists must practice consistent with the OSHA Blood Borne Pathogens standard116 (osha.gov), which applies to all occupational exposure to blood or other potentially infectious materials. According to the OSHA Blood Borne Pathogens Standard (BBPS), gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin. As DN creates “non-intact skin” and recent research has shown that the most common adverse event of dry needling is minor bleeding, it follows that the OSHA BBPS applies. Disposal of sharps containers is controlled by the individual state in which you practice. The website www.safeneedledisposal.org provides information on how to dispose of sharps containers.

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Pathophysiology of Neuro-Trigger Points

Sensitized Neuro-trigger points can appear anywhere in the body there is a sensory nerve ending. Different neuro-trigger points have different secondary anatomical structures, they can be associated with tendons, capsules, aponeurosis, vessels, essentially all soft tissue structures can harbor an active or passive Neuro-trigger point

Dynamic Physical Properties of Neuro-Trigger Points (Dr. Dung/Dr. Ma)

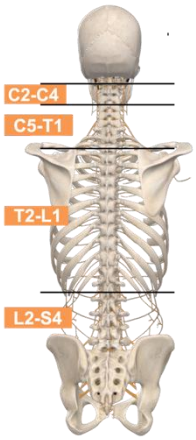
- Sensitivity: Increases or decreases.
- Specificity (size/area): Increases or decreases.
- Sequence: Homeostatic neuro-trigger points become sensitized in a predictable sequence.

- These circulating inflammatory markers perpetuate a neurogenic inflammatory response sensitizing the nervous system. (Ji, 2018)
- Mechanical threshold (PPT) used to identify primary hyperalgesia does not distinguish inflammatory generated hypersensitivity from nervous system sensitization.
- Clinically, it is used for identifying primary (localized) or secondary (widespread) hyperalgesia.

Shah, J. P., Danoff, J. V., Desai, M. J., Parikh, S., Nakamura, L. Y., Phillips, T. M., & Gerber, L. H. (2008). **Biochemicals associated with pain and inflammation are elevated in sites near to and remote from active myofascial trigger points.** *Archives of physical medicine and rehabilitation, 89*(1), 16-23.

Measurement	Sensitive Points
Pressure Pain Threshold (PPT)	↓
pH	↓
Substance P (SP)	↑
Calcitonin Gene-related Peptide	↑
Bradykinin	↑
Serotonin	↑
Norepinephrine	↑
Tumor Necrosis Factor	↑
Interleukin [IL-1 ß]	↑

- Clinically, the use of Quantitative Sensory Testing provides the ability to identify the presence of secondary hyperalgesia.

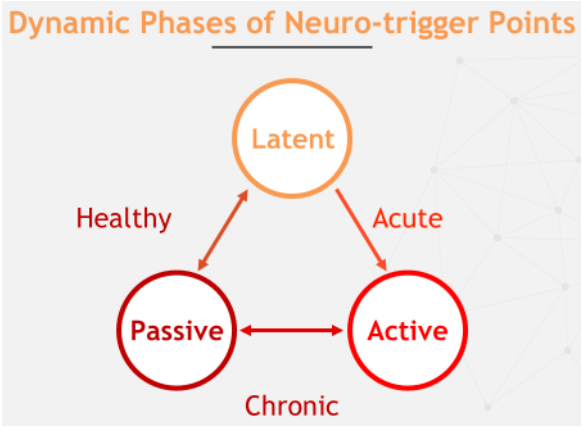


Homeostatic Points

1. Cranial nerves:
- Trigeminal & Facial N-TrPoints

2. Anterior rami of spinal nerves
- C1-C4: Cervical points (4)
- C5-T1: Upper Limb/Arm (3)
- C5-T1: Shoulder (4)
- (T6-T7) L2-S1: Torso (6)
- L2-S4: Hip & Lower Limb (7)

3. Posterior rami of spinal Nerves



Latent = Normal, non-sensitized tissue
Passive = Sensitive tissue upon palpation
Active = Painful tissue without palpation

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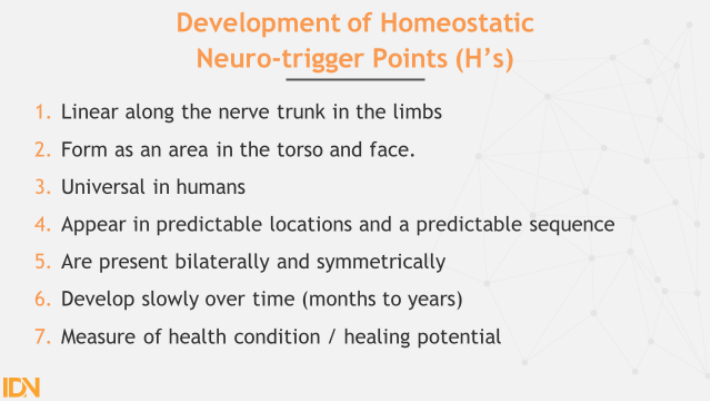
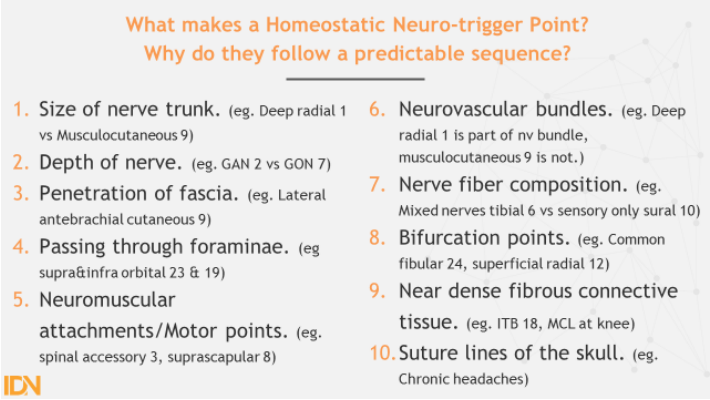
Three Types of Neuro-Trigger Points

1. Homeostatic Neuro-Trigger Points (H's)

Homeostatic N-TrP's are formed by both anterior and posterior rami of spinal nerves depending on their location on the body.

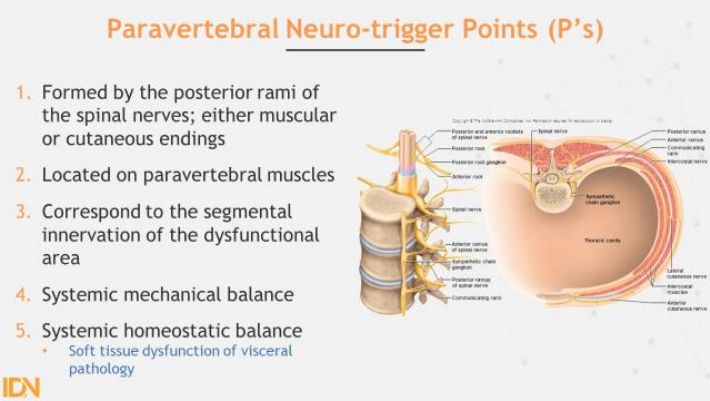
In terms of nomenclature, a homeostatic point is also a symptomatic point (painful with palpation) but not all symptomatic points are homeostatic points.



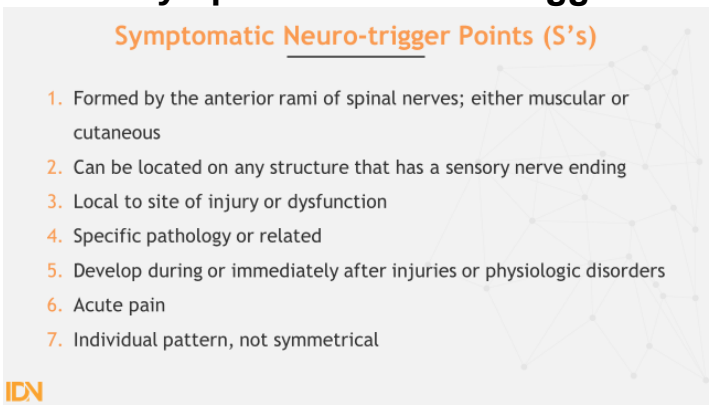


2. Paravertebral Neuro-Trigger Points (P's)

In terms of nomenclature, a paravertebral point is also a symptomatic point (painful with palpation) but not all symptomatic points are paravertebral points.



3. Symptomatic Neuro-Trigger Points (S's)



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Electrical Nerve Stimulation (ENS)

Electrical Nerve Stimulation (ENS) further increases the efficacy of manual needling by rhythmic vibration of the tissues. This rhythmic vibration also creates both local and systemic effects. A powerful local effect includes reducing tissue tension, including tension of scar tissue, and loosing tissue adhesion. Manual and electrical needle procedures help restore vasoregulation of blood and lymphatic circulation and reduce inflammation.

ENS delivers a mild electrical stimulation to soft tissue via a solid monofilament needles for the treatment of pain, abnormal muscle tone or neuromuscular re-education. Alligator clips attach to the metal handle (or shaft) of the filament. The stimulation can be delivered by various types of battery powered stimulators for example, a traditional TENS unit can be utilized. TENS units were not designed for this specific use so care must be taken when increasing and adjusting intensity to avoid patient discomfort. We recommend units specifically designed for use with needles, such as the ES 130, that have a more sensitive intensity regulator.

Indications

Acute and chronic pain conditions
Patients that do not tolerate manual manipulation of the needle
Higher QST scores due to enhanced central effects of needling with ENS
Presence of muscular spasm
Reduce post-treatment soreness following needle manipulation
Scars and adhesion may benefit from repeated contractions

Precautions

All contraindications and precautions for DN and for the specific electrical device used should be observed
Do not use ENS near implanted electrical devices such as pacemakers or spinal cord stimulators also avoid contact and areas close to metal implants.
Avoid areas of sensory denervation and areas where circulation is compromised.
Care must be taken when stimulating around the posterior cervical region as overstimulation or too aggressive stimulation can result in dizziness, nausea or exacerbation of symptoms. Avoid ENS stimulation in the anterior cervical region.
Avoid using ENS across the chest region i.e. AP to the thorax.

Parameters

If you are using a unit that is specifically designed for ENS with needles the only parameters that need adjusting are frequency and intensity. If you are using a traditional TENS unit, the following are simple guidelines to follow:

- Frequency: 1-2 Hz up to 10Hz to provide a slow rhythmical contraction during each session
- Pulse width: Between 100-150 microseconds is a good starting place
- Mode: Normal for most uses
- Time: Can range from seconds up to 5+ minutes depending on the treatment effect you are trying to accomplish. The clinician must be aware of the effects that strong or repeated muscle contractions have on the soft tissue affected by the ENS. In areas where there is possible concern about the health of the soft tissue the intensity and stimulation time need to be administered accordingly to avoid exacerbation of symptoms.

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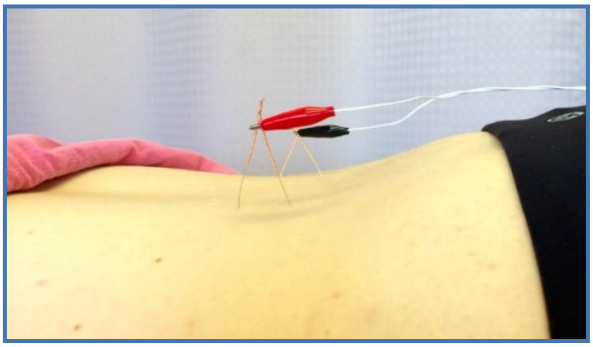
Electrical Nerve Stimulation (ENS) continued …

Needle placement:

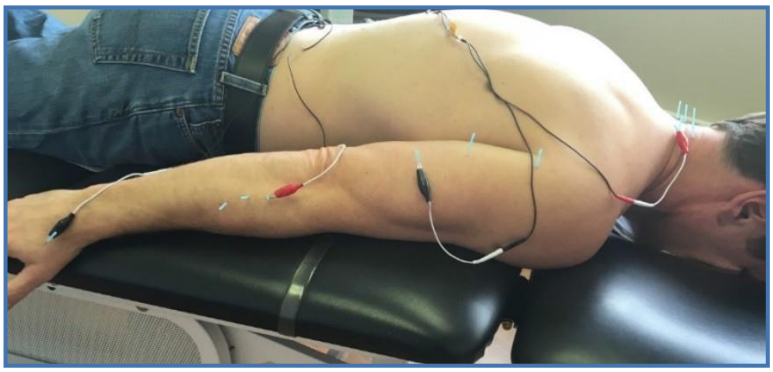
ENS can be applied (adhering to the above precautions) in all the needling areas that were taught in class.

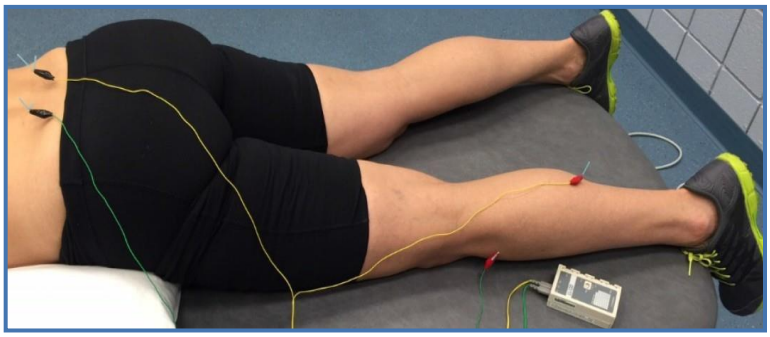
Two needles can be connected with one alligator clip to provide a larger treatment area.



Using ENS down nerve distributions in the extremities can be very effective in reducing nerve irritation over a larger area.

If reports of a burning, electric or shocking type sensation is reported the needle placement may be too close to the nerve and the needle should be removed and replaced in a position further from the nerve.





ENS has a stronger analgesic effect than needling alone. *(Manheimer, 2010, Schliessbach, 2011)*

Central Effects versus needling alone

Activates stronger patterning in the central pain matrices (Huang et al., 2012) and increases fMRI signaling in supplemental brain areas (Napadow et al., 2005).
Increased activity in the periaqueductal grey area (Zyloney et al., 2010).

Local tissue effects

Activates local endogenous opioids, local sympathetic nerve fibers (Hsieh, 1998) and increased muscle oxygenation (Kimura et al., 2015).

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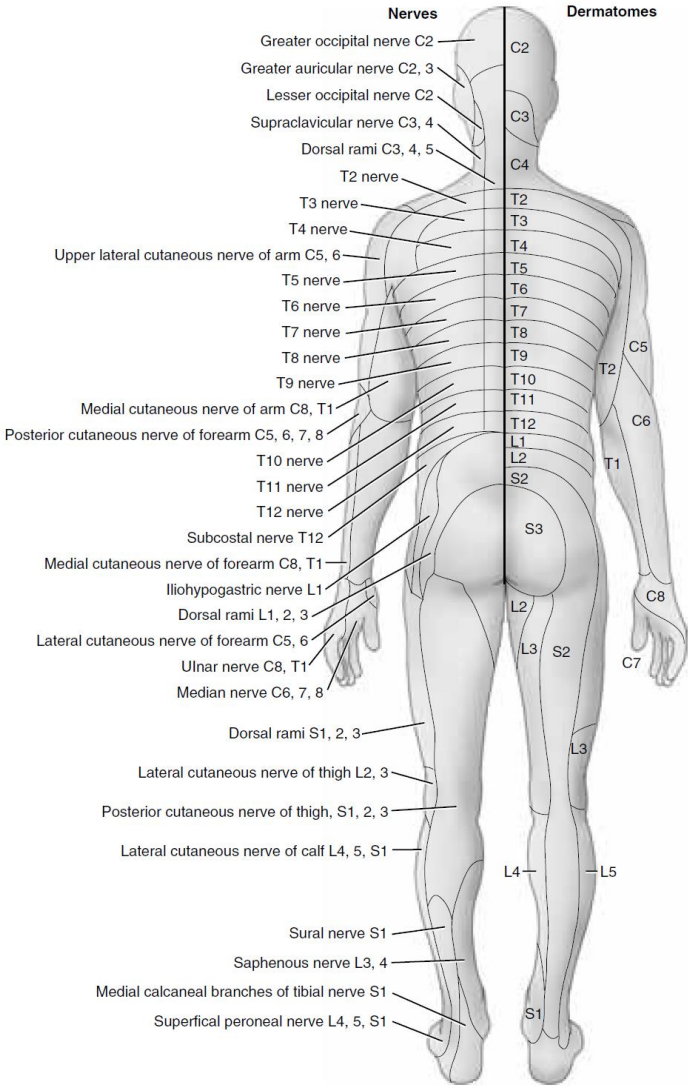
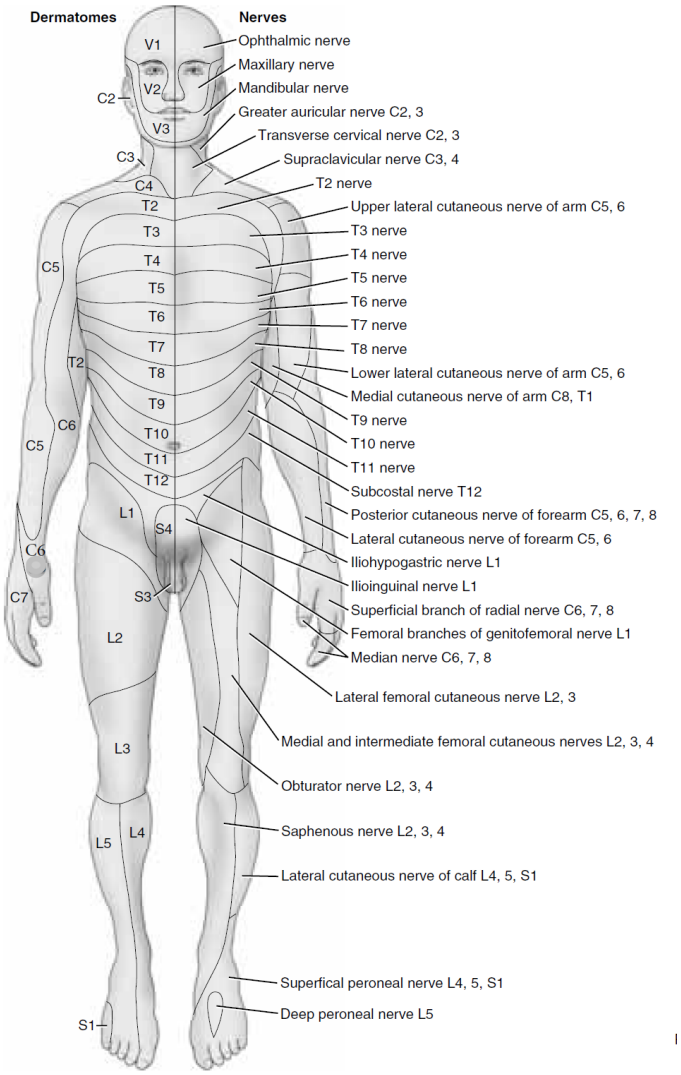
Dermatomes and Nerve Distributions





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Quantitative Sensory Testing and the Efficacy of Dry Needling Treatment

Frank Gargano PT, DPT, CIDN, MCTA, CMP

Quantitative Sensory Testing (QST) is the most widely used paradigm to assess central hypersensitivity, it consists of the application of a standardized stimulus to a peripheral (nerve) tissue and recording the patient's response. (Curatolo & Arendt-Nielsen, 2015) The paradigm relies on the assumption that a non-painful stimulus, when applied to a non-injured tissue, will evoke pain only if central nociceptive pathways are hypersensitive. Determining if the hypersensitivity (neuropathic pain) is caused by a peripheral mechanism, central mechanisms, or a combination of the two, can be difficult clinically due to their interdependence.

Neuropathic pain is defined as *"Pain caused by a lesion or disease of the somatosensory nervous system*". (Finnerup et al., 2016) The somatosensory nervous system provides information about the body including skin, musculoskeletal, and visceral organs, which has clinical relevance for the clinicians providing neuromusculoskeletal treatment, specifically dry needling treatment. Neuropathic pain may be spontaneous or evoked, as an increased response to a painful stimulus (hyperalgesia) or a painful response to a normally non-painful stimulus (allodynia). (Treede et al., 2015) This definition provides a broad concept and shares common features of chronic musculoskeletal pain with other pain conditions e.g. neuropathic, and visceral.

It is an ongoing clinical challenge to make a prognosis on the potential outcome of treatment and certainly the time required to achieve a treatment result. QST has shown some promise in assisting clinicians, specifically neuromusculoskeletal practitioners, in estimating these difficult prognoses. (Georgopoulos et al., 2019) In this paper an overview of a novel bedside (IDN) QST exam is provided, and how it can be used as a part of comprehensive evaluative plan in estimating if dry needling would be of clinical value as a part of the treatment plan.

Application

The stimulus applied in QST can be chemical, thermal, electrical, vibrational or physical (pressure) to evoke a response. In the IDN bedside QST exam the application of a physical pressure is the most readily available stimulus that can be trained and practiced achieving an acceptable level of intra-tester reliability. (Curatolo & Arendt-Nielsen, 2015) The IDN bedside QST exam involves applying a consistent pressure to 16 standardized assessment points in two peripheral nerve pathways, one in the upper extremity and one in the lower extremity.

In the IDN system, homeostatic neuro-trigger points are defined as areas of increased sensitivity that are universal in all humans, and are proposed to be of central origin based on meeting the following criteria:

1. Homeostatic neuro-trigger point sensitivity must be present bilaterally and symmetrically
2. Homeostatic neuro-trigger points develop in predictable locations and in a predictable sequence in all humans. The sequence of peripheral sensitization is the result of anatomical, physiological, biomechanical and behavioral factors
3. Homeostatic neuro-trigger points develop slowly over time based on intrinsic and extrinsic factors, which may represent the patient's health condition and healing potential
4. Homeostatic neuro-trigger point sensitization occurs linearly along nerve trunks in the limbs and occurs as an area or patch on the torso and face.
5. The sensitivity and specificity (size/area) of homeostatic neuro-trigger points are highly dynamic.

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The Radial and the Saphenous nerves were chosen to be assessed because they are the first peripheral nerves to become sensitized in the upper and lower extremities respectively. (Houchi Dung, 2013) Once the proper application of the stimulus is taught (during the IDN Foundation Course), the examiner applies the stimulus (pressure) down the standardized nerve pathways from proximal to distal (homeostatic points) in all four extremities for a total of 16 possible positive findings.

Because the IDN bedside QST exam is both an objective tactile interpretation by the examiner, and a subjective report of discomfort by the patient, a positive finding requires both. All positive findings are calculated with the range being from 0 to 16. The greater the number of positive findings the greater the correlation to the sensitization being centrally mediated. (Ma, 2016), (Houchi Dung, 2013) (H. Dung, 1986)

To make the IDN bedside QST exam of clinical utility the following was considered:

- Applicable to every patient
- Reproducible with any patient for any condition
- Able to be administered by all clinicians who are properly trained
- Testing is of short duration
- Quantitative results that can assist in clinical decision making
- Efficacy of dry needling treatment

The difficulty in assessing pain, and certainly the measurement of it, relates to its complexity and subjective nature. When we measure pain clinically, we invariably target subjective pain because it is perceivable and easy to find. Objective pain is not perceivable, patients that have objective pain will not know they have it unless it is triggered. Objective pain is, by definition, a passive neuro-trigger point sensitivity that is only perceivable when palpated. It is objective pain that is assessed in the IDN bedside QST exam because it is relatively stable in intensity and location (radial and saphenous nerve pathways). For this discussion objective pain is directly related to the level of sensitivity being maintained within the homeostatic points via central processes. (Ma, 2016) In other words, homeostatic points are objective pain, which are centrally mediated. The greater the number of sensitized homeostatic points a patient carries is directly related to their degree of central sensitization, which in turn influences the manageability of their symptoms and efficacy of the dry needling treatment. (Houchi Dung, 2013) (Ma, 2016) (H. Dung, 1986)

Interpretation

As is the case in many bedside clinical tests, it is not possible to make definitive statements, this certainly applies to making estimates on the presence and degree of central sensitivity. That said, central sensitivity has been extensively investigated in humans. (Georgopoulos et al., 2019) When exaggerated pain responses and expansion of pain areas occur after limited tissue damage it is reasonable to infer that it is the result of enhanced nociceptive processes within the central nervous system (Curatolo & Arendt-Nielsen, 2015) (Ma, 2016) (Uddin & MacDermid, 2016) (Greening et al., 2018) Unfortunately, we cannot say much more. For instance, clinicians are still unable to say whether, or to what extent pain hypersensitivity is the result of psychosocial factors.

QST is primarily a measure of pain sensitivity and does not allow conclusions to be drawn on the causes, mechanisms or location (peripheral or central) of the underlying hypersensitivity. For example, if a patient with shoulder pain did a vigorous run the morning of the IDN bedside QST exam they would experience exercised induced inflammation, which sensitizes the peripheral nervous system leading to false positive QST findings.

Recognizing the limitations, and understanding the intent is to only discover centrally mediated findings, the IDN bedside QST exam was modified as follows:

- Patients should only be assessed when at a resting baseline of physical activity to minimize acute inflammation influencing the findings.
- Pain medications and chemicals affecting consciousness, such as alcohol or marijuana, may influence the accuracy of the patient's response.
- The assessment of both upper and lower extremities provides a better systemic view of patient condition.
- Assessment of multiple points linearly down the nerve path gains insight into the degree of sensitivity.

The interpretation of the IDN bedside QST exam is empirically based on tens of thousands of patient examinations and treatments dating back from the 1970's to today. (Ma, 2016) (Houchi Dung, 2013) Founded in the premise that when the human body is under stress from injury, disease, surgery or other physiological events, inflammation increases causing peripheral sensitization and likely central effects. In patients presenting with chronic pain, this peripheral sensitization profoundly spreads, represented clinically as inflamed sensory nerves (homeostatic points). (Ma, 2016) The number of positive findings (peripheral sensitization) discovered during the IDN bedside QST exam is an indicator of the severity of inflammation in the body. The greater the number of positive findings is an empirical estimate of how many dry needling treatment sessions are needed to reduce the systemic inflammation and how long the pain relief can last.

Research

QST has demonstrated potential benefits when compared with traditional neurological diagnostic tools. For example, around 80% of the peripheral nervous system consists of small nerve fibers. (Greening et al., 2018) (Backonja & Lauria, 2010) Deep tissue pain sensation transmits through small caliber A-delta (group III), and C fibers (group IV). (Mense, 1993) QST can target these fibers by using frequencies that target small fibers (e.g., current perception threshold and vibratory perception threshold) or sensory stimuli (e.g., pain and temperature) that are preferential to these fibers. This lends itself to bedside assessment using pain, generated by the examiners pressure, as the measure. Potential disadvantages are that the specificity of these responses has not been adequately demonstrated, and this testing is not completely objective because pain is subjective by nature requiring the patient to provide a voluntary response. Considering the currently used methods of visual analog scales and pain questionnaires, the IDN bedside QST exam may provide a more objective measurement of neural sensitivity.

In the literature there is strong evidence for central hypersensitivity (abnormal pain response) being a prognostic factor for poor outcomes in chronic musculoskeletal pain. (Georgopoulos et al., 2019) (Lim et al., 2011) The evolution of pain theory and evidence of a central component of post-injury pain hypersensitivity implicate central sensitivity in musculoskeletal pain mechanisms. (Uddin & MacDermid, 2016) Involvement of the central nervous system in musculoskeletal pain mechanisms (specifically in chronic or maladaptive pain) is emerging as a new target area for treatment. Interestingly, acute and chronic pain have similar mechanisms and the temporal relationship may be more related to central mechanisms in making the transition from acute to chronic pain. This suggests that early detection might allow clinicians to make a more accurate prognosis for their patients.

Clinically, a patient who has been injured in a motor vehicle accident (MVA) is a good example of persistent pain complaints lasting well past the timeframe that tissue healing is expected to be complete. There is research to show this persistent pain, specifically in post MVA's, to be a function of neurologic sensitivity being maintained within the nerve structure secondary to the early vascular changes resulting from the injury. (Greening et al., 2018) (Shah et al., 2015) Patients present with cervical and upper extremity symptoms that are not localized to specific dermatomes or myotomes. A

likely explanation for these diffuse symptoms is the development of central sensitivity driven by the persistent nociceptive barrage into the dorsal horn. (Lim et al., 2011) (Woolf, 2011) Treatment that focuses solely on the peripheral driver misses the complexity of the systemic involvement.

A systematic review and meta-analysis (Georgopoulos et al., 2019) demonstrated a predictive relationship between baseline QST, a measure of pain hypersensitivity, and musculoskeletal pain and disability at follow-up. These studies showed this predictive relationship across multiple musculoskeletal conditions (OA, LBP, WAD, post-operative pain) affecting different anatomical sites (knee, hip, low back, neck, shoulder), and across different QST modalities and study contexts (cohort studies and RCTs). This review demonstrated that pain hypersensitivity predicts prognosis and that QST might help identify patients who could most benefit from interventions aiming to improve pain and disability. Clinically identifying which patients might be at particular risk of a poor outcome is important in order to identify those who are most likely to benefit from treatment. At a minimum this allows the clinician to have an informed discussion with the patient about the expected prognosis and potential treatment outcome prior to initiation of care.

Clinical Relevance

QST is a safe, simple and useful bedside tool to determine the potential benefit of engaging in a treatment plan and the potential treatment outcome. The IDN bedside QST exam is not intended to differentiate diseases or to investigate the mechanism of diseases. The goal of the IDN bedside QST exam is to provide the information necessary for evaluating the self-healing potential of a patient and the projected efficacy of dry needling treatments. IDN bedside QST exam accompanied by a full patient history, orthopedic examination, diagnostic testing, and the clinician’s experience and intuition provides a more inclusive view of patient condition and prognosis.

Future studies are needed to determine the reliability of specific QST approaches and establish clinically meaningful thresholds in specific pathologies in order to validate QST as a clinical decision aid for neuromusculoskeletal conditions.

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Quantitative Sensory Testing

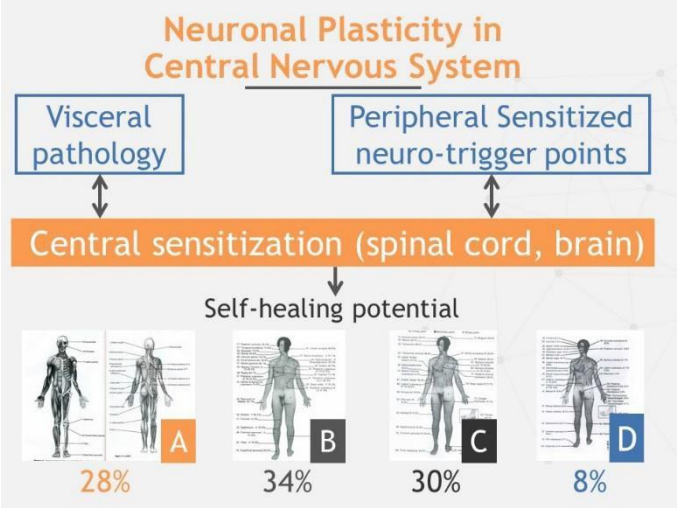
Quantitative Sensory Testing (QST)

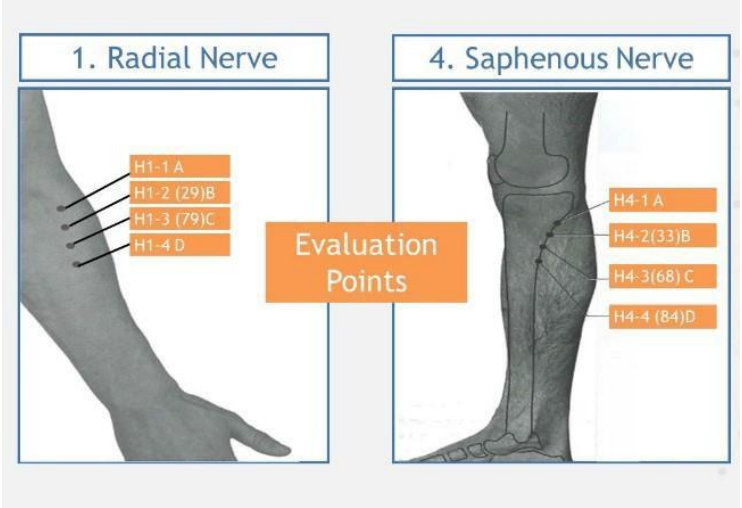
"The most widely used paradigm to assess central hypersensitivity consists of the application of a standardized stimulus to a peripheral tissue and the recording of a subject's response." Curatolo 2015.

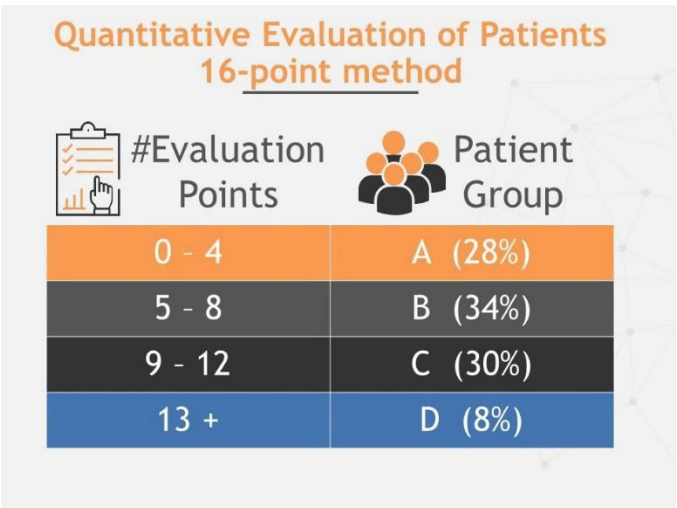
The paradigm relies on the assumption that a non-painful stimulus, when applied to a non-injured tissue (passive NTrP), can evoke pain only if central nociceptive pathways are hypersensitive. It is difficult for the clinician to determine if the hypersensitivity is caused by a peripheral mechanism, central mechanisms, or a combination of the two (Uddin & MacDermid 2016', Georgopoulos 2019').

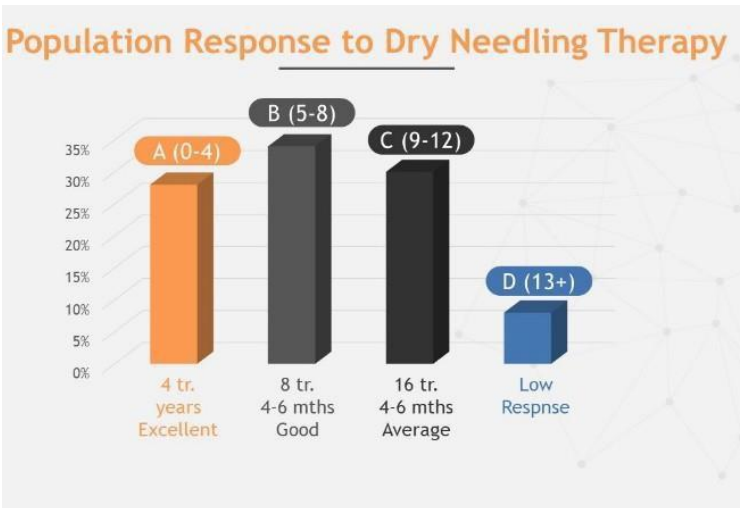
Technique

Apply sufficient pressure using your thumb to compress the soft tissue overlying the involved nerve until a firm end feel is reached. Firm end feel defined as a sensation of a firm yet elastic response.









"People with nonspecific LBP, compared to healthy controls, had significantly lower Pressure Pain Thresholds at remote sites and increased temporal summation at the lower back."

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Determining Dosage of Dry Needling Treatment

Frank Gargano PT, DPT, CIDN, MCTA, CMP

A definition of Dry Needling dosage is, the amount of therapeutic lesion produced.

The current literature is lacking on a definitive and scientific answer to the question of how dry needling dosage is clinically determined. Currently, the answer relies mostly on empirical and historical knowledge. In general, our definition of needling dosage is based on the number and extent of the therapeutic lesion(s) produced from the needle insertions. Therapeutic lesion is defined as the neurophysiological response of the body to the needle penetrations; the more therapeutic lesion(s) produced, the higher the needle dosage delivered. The extent of a therapeutic lesion(s) is not solely dependent on the number of needles used, but also on the gauge of the needle and how it is manipulated while in situ. Based on that description it is understandable that we do not have a standardized nomenclature to quantify the amount of therapeutic lesion required for optimal clinical effect. This is in contrast to exercise or medication prescription that can have a very specific and easy to follow prescription. For example, the always popular, but highly questionable 3 sets of 10 for exercise or take 2 pills 3 times per day. The lack of a standardized system to measure needle dosage leaves us with vague statements such as continue needling “until it stops twitching”, “until the energy flows”, ‘until the muscle relaxes”, or the intuitive “until the pain goes away?” This highlights one of the major limitations in dry needling research, lack of identification of the needle dosage used to obtain the clinical effect.

When deciding on the treatment dosage for dry needling there are several patient factors to consider. For the purpose of this paper, I would suggest the following short list of considerations related to needle dosage:

- Age and health status of the patient
- State of the condition being treated (acute/chronic)
- Patient experience with dry needling especially within the last 6 months
- Healing potential based on the IDN Quantitative Analysis

When the subjective and physical examinations have been completed, the decision to utilize dry needling has been made, and patient consent obtained, the next step is determining location and dosage of needling. On the first day of treatment it is recommended to “talk more and needle less.” By this we refer to educating the patient about dry needling while also reducing the potential for significant post-needle soreness. Determination of the patient’s tolerance and response to needling is a process so being conservative initially is prudent. With that said, the first treatment should have a therapeutic effect but not at the expense of dogma that states the mission is to “eliminate” knots or points at all costs.

There are several techniques of dry needling that can be integrated into each treatment session, each can be used separately or can be used in combination. The following describes the most common clinical applications utilized.

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Superficial needling

The needle is inserted into the dermal and epidermal layers and not into the muscle tissue. This type of needling is the most conservative and very unlikely to cause pain or post-treatment soreness. A minor therapeutic lesion is still produced allowing the patient to receive the neurological and physiological benefits.

Deep Needling

The needle is inserted directly into the muscle tissue. There are various levels of needle penetration from inoculating just the outer layer of muscle or needling through the entire thickness of the muscle. Depending on how deep the needle is placed will determine the neurophysiological responses that result because penetrating deeper provides greater stimulation to the additional soft tissue and neurological levels. When the needle is set without needle manipulation it would be considered a basic deep needling technique of low dosage but is a progression of dosage over superficial needling.

Needle manipulation

The amount of dosage (therapeutic lesion) obtained is also based on the variables of speed, amplitude and intensity of the needle manipulation or movement. This is a progression from basic deep needling and has several manipulation techniques that can be utilized depending on the specific goals you are trying to accomplish. In a subsequent paper, I will describe in detail these different techniques and their specific uses:

- Needle rotation - The in-situ needle is rotated until a definitive endpoint is reached signifying the soft tissue has completely “wound” around the needle shaft inducing additional therapeutic lesion.
- Needle tenting - When the soft tissue is wound tightly around the needle it is pulled up causing a traction or stretch of the tissue inducing additional therapeutic lesion.
- Needle pistoning – A high velocity up and down conical movement of the needle. There are various levels of intensity of pistoning that are dependent on the speed, and amplitude of the needling. The higher the speed and amplitude the larger the therapeutic lesion produced. Pistoning is considered the most aggressive needling technique and produces the greatest post-needling soreness.

Electrical Needle Stimulation (ENS)

ENS delivers a mild electrical stimulation to soft tissue via attaching alligator type clips onto the solid monofilament needles. ENS is a progression of dosage of manual needling by inducing rhythmic vibrations (of non-contractile tissue) and repeated muscle contractions. Because the needle is in situ the repeated muscles contractions will induce additional lesion.

Time in situ

Empirically, the length of time a needle is left in situ (without manipulation) does not influence the dosage, if we define dosage as amount of therapeutic lesion produced.

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Dosage determination

Research does not currently exist that provides a definitive guideline of needling dosage for specific diagnoses or conditions. Dry needling is a non-specific treatment that relies on the body's ability to self-heal the needle induced therapeutic lesions via multiple physiological processes.

Because each patient's situation, injury and condition are unique, trying to determine the correct dosage is complicated to say the least. Each clinician has their opinion on proper dosage, based primarily on their clinical experience and empirical evidence. This is important information, but it is not easily quantifiable to other patients or for use by other clinicians. We propose a clinical model that quantifies needling dosage into more general categories of low, moderate or high. Each category has an increasing number of needles and progressively more aggressive needling techniques that generate larger therapeutic lesions.

Low Dosage

Applies to the initial treatment session for all patients. Also, patients with compromised physical conditions, low healing potential or are at an advanced age require a cautious start. The following is recommended for this category:

- Superficial needling techniques
- Basic deep needling technique (no needle manipulation)
- Number of needles: 5-10 needles

Moderate Dosage

Applies to patients that have had prior needling treatment (low dosage) with a positive reaction within the last 6 months. They are in relatively good physical condition and have been assessed to have good healing potential.

- Deep needling can now include needle manipulation techniques of moderate intensity, which may include pistoning, rotation and or tenting techniques.
- ENS can be introduced and provided for up to 5 minutes of active muscle contraction.
- Number of needles: Up to 20 needles

High Dosage

Applies to patients that have had significant experience with dry needling treatment and are likely healthy, active individuals with excellent healing potential.

- Deep needling with high intensity needle manipulations, which may include pistoning, rotation and or tenting techniques.
- ENS treatment time can be extended up to 10+ minutes and multiple areas can be treated in one session.
- Number of needles: 21+ needles

Summary

In this short paper we provided general categories for the prescription of dry needling dosage focusing only on the induced therapeutic lesion. What needs to be addressed in a subsequent paper is the patient's perception and response, which are linked to dosage and ultimately the therapeutic outcome.

The current guidelines are intended to help all clinicians, but specifically clinicians new to dry needling treatment, with the clinical decision-making related to the original question of "How many needles should be used?" These guidelines were never intended to be the definitive answer as it is not currently possible to specifically quantify the non-specific and systemic modality of dry needling. As research progresses and physiological healing processes are better elucidated, we may be better able to quantify the amount of therapeutic lesion required to get the desired treatment effect.

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Example Documents for Dry Needling Standard of Care

Dry Needling Procedures

A solid monofilament needle is inserted through the skin and into symptomatic soft tissue. The proposed mechanism of action for Dry Needling is it creates a micro lesion within the symptomatic tissue releasing the tension in the shortened tissues and promotes an increase in the circulation to the symptomatic tissue. This mechanical and neuromuscular effect provides an environment that enhances the body's ability to heal which ultimately reduces pain.

Documentation will include a daily SOAP note and a body diagram indicating the needle placement.

Only sterile disposable needles are used and are disposed of in the red sharps containers. Sharps will be disposed of accordance with state guidelines. The practitioner is required to wash their hands thoroughly with soap and water before and after performing dry needling. The facility follows the OSHA Blood Borne Pathogens standard116 (osha.gov).

Dry Needling Policy

To perform Dry Needling all physical therapists must attend a hands-on continuing education seminar. This course must consist of a minimum of hours to be considered competent in this field of practice. The patient or parent/guardian, prior to performing dry needling, must sign the informed consent form.

Billing of Dry Needling

The Integrative Dry Needling Institute, LLC is a continuing education company and cannot provide billing recommendations or guidelines. The Institute will pass on the current information as is provided by CMS, APTA or other agencies about billing policies/procedures. Reimbursement for dry needling varies from payer to payer and from region to region throughout the country. Clinicians and administrators need to consider the language provided in their individual insurance contracts and it is recommended to consult with a billing specialist or attorney.

There are 2 codes now used when a clinician delivers dry needling services to a patient:

- 20560- Needle insertion(s) without injection(s); 1 or 2 muscle(s)
- 20561- Needle insertion(s) without injection(s); 3 or more muscles

CMS has assigned these codes the status of "non-covered" services under Medicare. This means you will be able to bill a Medicare beneficiary directly for services. They state to follow the below procedures for submitting a claim to Medicare:

1. Provide a mandatory ABN to the patient.
2. Include the appropriate code on the claim — 20560 or 20561.
3. Append the claim with the GA modifier — that's the modifier indicating that you expect Medicare to deny the services, and you have a signed ABN on file.

Source: APTA.org

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Dry Needling Consent to Treat Form

A full-scale pdf copy of this consent form is available for download from your IDN account dashboard.

{LOGO}

Dry Needling Consent Form

Dry Needling (DN) involves inserting a thin/flexible monofilament needle into symptomatic tissue to reduce pain and improve function. Benefits from DN can be experienced immediately or over a few days to weeks. DN is not Traditional Chinese Acupuncture. DN is based on anatomy, neurology, and physiology. DN has some risks that can occur with the treatment. In the hands of a skilled professional, these risks are small, but you should still be aware of the potential adverse events. The most likely adverse events are listed below by their level of severity ("Serious", "Significant", and "Mild") and how often it may occur ("Common" <10%, "Uncommon" <1%, and "Rare" < 0.1%).

Adverse Event	Likelihood	Additional Information
Serious Risks (may require hospitalization)		
Collapsed Lung (Pneumothorax)	Rare	Symptoms may include shortness of breath or chest pain that can last for many days to weeks. A more severe lung puncture can require a visit to the hospital.
Fainting (Syncope)	Rare	Symptoms leading to fainting may include: sweating; lightheadedness; dizziness. Let your healthcare provider know if you have any of these symptoms while being treated. People usually recover quickly but a medical exam may be needed if problems occur.
Significant Risks (May continue for days/weeks and can require medical care)		
Bleeding under skin resulting in a bump (Hematoma)	Uncommon	May result in a bruise.
Nerve Injury	Uncommon	May cause temporary numbness, tingling, weakness, or sensation changes. Needles are small, flexible, and do not have a cutting edge. Significant tissue trauma is unlikely.
Skin Irritation	Rare	Local redness, small bumps, and itching that may last a few hours.
Mild Risks (May cause temporary symptoms and little inconvenience)		
Bleeding (Droplet)	Common	Droplet is cleaned by healthcare provider but it may result in a bruise.
Bruising	Common	May last a few days
Sweating (Diaphoresis)	Common	Usually occurs during or after treatment and may last minutes to a few hours
Dizziness	Common	
Fatigue	Common	
Drowsiness	Uncommon	
Temporary Symptom Increase	Common	Usually occurs during or after treatment and may last a few hours up to a few days.
Pain During/After	Common	
Soreness	Uncommon	

There are other conditions that require consideration so please answer the following questions:

- Are you taking blood thinners? Yes / No
- Are you pregnant? Yes / No
- Are you receiving any treatments or have a medical condition effecting your immune system? Yes / No
- Do you have any known disease or infection that can be transmitted through bodily fluids? Yes / No
- Have you experienced an allergic skin reaction to metals like chromium or nickel? Yes / No
- Do you have any medical devices or implants anywhere in your body? Yes / No
- Have you had any surgical procedures? Yes / No

Patient's Consent:

I have read and fully understand this consent form and attest that no guarantees have been made on the success of this procedure related to my condition. I am aware that multiple treatment sessions may be required, thus this consent will cover this treatment as well as subsequent treatments by this facility. All of my questions, related to the procedure and possible risks, were answered to my satisfaction. My signature below represents my consent to receive dry needling and my consent to any measures necessary to correct complications, which may result. I am aware I can withdraw my consent at any time.

I,_____, read and understand the risks, all of my questions have been answered, and I am willing to be treated with dry needling.

_____ _____

Patient or Authorized Representative Signature Date

☐ I was offered a copy of the consent form and refused.

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Dry Needling Patient Information

INTEGRATIVE DRY NEEDLING

Integrative Dry Needling

is a highly effective form of therapy for the treatment of a multitude of musculoskeletal and neuromuscular conditions. It is not appropriate for all conditions or pathologies and the use of the technique will be at the discretion of your physical therapist.

How does it work?

Integrative dry needling is not acupuncture (traditional Chinese medicine), it is based on neuroanatomy and modern scientific study of the musculoskeletal and neuromuscular systems. A very fine filament needle is inserted through the skin and into the deeper tissues that are considered trigger points to your pain. Dry needling works by causing a micro lesion within the pathological tissue thus breaking up shortened tissues, inhibiting a reflex arc from the nervous system to the tissue, normalizing the inflammatory response, and centrally mediating the pain. This mechanical and neuromuscular effect provides an environment that enhances the body's ability to heal which ultimately reduces pain.

What conditions can be treated?

Conditions include, but are not limited to neck, back and shoulder pain, arm pain (tennis elbow, carpal tunnel, golfer's elbow), headache to include migraines and tension-type headaches, jaw pain, buttock pain and leg pain (sciatica, hamstrings strains, calf tightness/spasms).

Are the needles sterile?

Yes, we only use sterile disposable needles.

Is the procedure painful?

The fine filament needle is very thin, solid, and flexible, which allows for the needle to be pushed through the skin versus cutting the skin. This helps reduce any discomfort that may occur with the procedure. We strive to make the treatment virtually painless however at times a local twitch response of the muscle may be felt. When the needle is inserted into the pathological tissue the local twitch response sensation is normal and is felt only momentarily. Many patients describe this twitch response as a little electric shock, cramp or an ache sensation. These sensations are perfectly normal and even a desirable response. Your PT will make every effort to make your experience comfortable and therapeutic.

How will I feel after the Dry Needling treatment?

This will vary but many patients experience immediate relief of their symptoms and an increase in range of motion. Soreness can also be a common response from the needling but does not occur with all people. Some individuals may experience an immediate achiness or a delayed soreness the next day. The soreness, if present, will usually last 1-2 days, use of heat and light massage and movement will be beneficial. Mild bruising may occur at the needling sites and is more prevalent in certain parts of the body. Larger bruising may also occur but is rare. Application of ice on the bruise will help with the soreness and the skin discoloration will last several days but is not harmful.

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It is uncommon but possible that the treatment may temporarily increase your symptoms. This is not unusual but if this continues past the 1-2 day window, inform your PT to allow adjustment of your program to enhance your comfort the next time. This does not mean that needling will not be beneficial to your condition.

Will I continue to do exercises or receive other treatments?

Yes, your personalized physical therapy program will still integrate traditional physical therapy methods including manual therapy, therapeutic exercise, endurance training, stabilization and posture training.

How many treatments will I need?

This will depend on the category you fit in, which is determined by the state of the injury and your overall health. Remember we are attempting to cause mechanical and biochemical changes without any pharmacological means. Therefore, we are looking for a cumulative response to break the pain cycle. Your PT will be able to give you more insight after your evaluation.

What should I do to prepare for the treatment?

- Do not eat 30 minutes before the treatment
- Be well hydrated but empty your bladder prior to treatment
- Wear lose fitting clothing, shorts, or bathing suit for easy access to your painful areas

What should/can I do after treatment, what should I avoid?

Our recommendations vary depending on the amount of soreness you have and on the individual response to the treatment. Recommendations may include increasing your water intake, applying heat or ice over the area, gentle stretches and modifications of activities.

Is Dry Needling treatment covered by my insurance?

This is a Physical Therapy treatment and is NOT acupuncture therefore your coverage of Dry Needling should correspond with your Physical Therapy benefits. You can discuss this further with our administrative staff if you require more information.

Not all medical or Physical Therapy professionals are trained to perform the Integrative Dry Needling treatment technique. The physical therapists at **YOUR CLINIC** have been trained through the Integrative Dry Needling Institute.

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Supplies / Vendors

The following is a basic list of supplies that you will need to begin dry needling.

- Rubber gloves/ Finger Cots
- Sharp's container
- Cotton swabs and/or cotton balls
- Alcohol swab wipes
- Electrical stimulation unit

Needling Supplies

We have set up a direct link via the IDN site www.integrativedryneedling.com/under the resources tab) with a distribution company that can get you needling supplies. I also set up some starter kits that have recommended needle lengths/gauges and electrical stimulation units. There is a wide variety of needle manufacturers of various price points as well as different electrical stimulation units. I recommend initially starting with the following guidelines for needle selection then over time you will develop your own style and preferences.

- Half inch/13-15mm, gauge 36-38 (0.18-0.20 mm)
- One inch/25mm, gauge 32-34 (0.22-0.25mm)
- Two inch/50mm, gauge 30-32 (0.25-0.30mm)
- Three inch/75mm, gauge 28-30 (0.30-0.35 mm)
- Four inch/100mm, finest gauge available

Needle Gauges and Thicknesses			
Gauge		Thickness	
Japanese	Chinese	Millimeters	Inches
00	-	0.12	0.0047
0	-	0.14	0.0055
1	40	0.16	0.0063
2	38	0.18	0.0071
3	36	0.20	0.0079
-	34	0.22	0.0087
5	32	0.25	0.0098
8	30	0.30	0.0118
-	28	0.35	0.0137

Needle Length	
Millimeters	Inches
13	0.5
15	0.6
25	1.0
30	1.2
40	1.5
50	2.0
60	2.5
75	3.0
100	4.0
125	5.0

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24 Homeostatic Neuro-Trigger Points (HnTrP)

KEY: * In the extremities, the length and depth of the needle penetration is variable based on patient size and the intended therapeutic result. In the extremities, different needling techniques can be safely utilized from superficial to deep (including to the depth of bone). This decision is based solely on the specific need of the patient and your therapeutic goal for the treatment.

1. Deep Radial	**The deep radial nerve homeostatic point is 2-finger widths distal to the lateral epicondyle in the groove next to the extensor bulk**
Needle direction	Perpendicular to skin toward the radius
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	Upper extremity Quantitative Analysis point.
2. Greater Auricular	**Clinical point is inferior and posterior to the mastoid process (behind the ear lobe) directly over the SCM.**
Needle length	15mm / ½ inch
Needle direction	Perpendicular to skin
Needle depth	Up to ½ inch
Special notes	Set needle between 2 fingers bracketing the anterior and posterior margins of SCM.
3. Spinal Accessory	**Mid-point between the acromion and 7th cervical vertebra on the anterior aspect of the upper trap**
Needle length	25-50mm / 1-2 inch
Needle direction	Posterior to anterior, or anterior to posterior, slightly cephalic and always directed toward the clinician's palpating finger
Needle depth	Insert needle into muscle bulk until detected by palpating finger on opposite side
Special notes	LUNG FIELD SAFETY. Must hold muscle between thumb and fingers while needling. Needle IN/OUT +/- pistoning. Release muscle AFTER needle removed.
4. Saphenous	**Located in a 'box' below the tibial plateau and on the medial side of the tibial shaft. Palpate for the most tender spot within the box.**
Needle direction	Perpendicular to skin
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	Lower Extremity Quantitative Analysis point.
5. Deep Fibular	**Between the 1st and 2nd metatarsals approximately one finger width proximal to the web space**
Needle length	25-50mm / 1-2 inch
Needle direction	Perpendicular to skin
Needle depth	As deep as necessary, until detected by palpating finger on plantar aspect of foot.
Special notes	Use clinician's fingers to palpate plantar aspect of foot between 1st and 2nd MT while inserting.
6. Tibial	**4 finger widths proximal from the top of the medial malleolus and posterior to the tibia**
Needle direction	Perpendicular to skin, aiming behind tibia
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	Tibial nerve is immobile in this area, insert the needle slowly

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7. Greater Occipital	**Locate the C2 spinous process and move laterally over the paraspinal muscle bulk and move slightly superior to be located over the inferior oblique muscle. Halfway between C2 spinous process and C1 transverse process.**
Needle length	25-50mm / 1-2 inch
Needle direction	Perpendicular to skin
Needle depth	As deep as necessary, may go to the C2 lamina
Special notes	
8.Suprascapular (Infraspinatus)	**Bracket the medial border and lateral border of the scapula with your thumb and middle finger; center your index finger between them. (Center of the scapular fossa)**
Needle length	25-50mm / 1-2 inch
Needle direction	Perpendicular to skin
Needle depth	As deep as necessary, may go to the bone
Special notes	Care must be taken to verify that you are over the scapula and not medial to it!
9. Lateral Antebrachial Cutaneous	**With the elbow in slight flexion and forearm supinated, the HNTrP is at the lateral margin of the cubital crease.**
Needle direction	Insert needle medial to brachio-radialis muscle on lateral aspect of the cubital crease perpendicular to the skin toward the radial head
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	
10. Sural	**The HNTrP is between the two heads of the gastrocnemius muscle**
Needle direction	Perpendicular to skin.
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	
11. Lateral Popliteal	**Flex the knee, the HNTrP is on the crease just medial to the biceps femoris tendon.**
Needle direction	Perpendicular to skin.
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	Avoid neurovascular bundle in midline. Avoid visible blood vessels, or baker's cyst.
12. Superficial Radial	**Located between the 1st and 2nd metacarpals at the midpoint of the interosseous muscle bulk**
Needle length	25mm / 1inch
Needle direction	Perpendicular to skin.
Needle depth	As deep as necessary, until detected by palpating finger on palmar aspect of hand.
Special notes	Use clinician's fingers to palpate palmar aspect of hand between 1st and 2nd MC while inserting.

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13. Dorsal Scapular	**Locate the superior angle of the scapula, the HNTrP is in the levator scapulae insertion.**
Needle length	Up to 25mm / 1inch
Needle direction	The needle should be directed from the medial aspect of the superior angle of the scapula moving laterally away from the thorax, assuring the needle point is over the bony backdrop of superior angle of the scapula.
Needle depth	Assure the needle point is directed toward the bony backdrop of the superior angle of the scapula. It is also acceptable to grasp the soft tissue and lift away from the thorax and needle as described above.
Special notes	LUNG FIELD SAFETY. Needle IN/OUT and verify that you are needling from medial to lateral toward the superior angle of the scapula.
14. Superior Cluneal (L1-L3)	**There are 3 branches of the nerve traveling over the iliac crest inferiorly toward the gluteus medius region. There is variability in their location so draw a small box beginning 4 fingers widths from the spinous process**
Needle length	75mm / 3inch
Needle direction	Superior to inferior ensuring you are inferior to the iliac crest. Can vary the needle angle to obtain more depth into the gluteal muscles
Needle depth	Variable depending on therapeutic goal-can be superficial to affect the cutaneous distribution or deep to affect the gluteals.
Special notes	Care must be taken to verify the iliac crest is properly identified and the needle is inserted below it to avoid penetrating the abdominal cavity
15. Posterior Cutaneous of L2	**At the inferior aspect of the 12th rib make a horizontal line back toward the spine, which approximates the L2 vertebra. The clinical HNTrP is 2 finger widths lateral to L2 spinous process**
Needle length	Up to 50mm / 2 inch
Needle direction	Perpendicular to skin, can adjust angle the needle more medially toward lamina.
Needle depth	Up to 50mm / 2 inch
Special notes	KIDNEY FIELD SAFETY use 2:2 rule in upper lumbar region. 2:2 rule = 2 finger widths lateral to the spinous process and up to a 2" needle. In cases of the presence of a LAMINECTOMY use a shorter needle or move a segment up or down as there may be no bony backdrop.
16. Inferior Gluteal	**Find the "crown" or center of the buttock.**
Needle length	75mm / 3inch or more depending on patient size
Needle direction	Perpendicular to skin at center of buttock.
Needle depth	As deep as necessary, may go to the bone.
Special notes	Sciatic nerve is in close proximity, advance the needle slowly in final 25mm / 1inch.
17. Lateral Pectoral	HNTrP is located 2 finger widths inferior and perpendicular to the center of the clavicle (anatomical point).
Needle length	50mm / 2inch
Needle direction	Medial to lateral direction targeting the lateral third of the pectoralis major aiming the needle tip toward the clinician's palpating fingers.
Needle depth	Until the tip of the needle is detected by the palpating fingers under pectoralis major. It is not necessary to needle the anatomical point of the lateral pectoral homeostatic point.
Special notes	LUNG FIELD SAFETY. Must hold pectoralis muscle between thumb and fingers while needling, always identify the rib cage and needle parallel, never perpendicular, to it. Needle IN/OUT +/- pistoning. Release muscle hold AFTER needle is removed. Care must be taken when IMPLANTED DEVICES (tissue or other device) are present and may be prudent not to perform dry needling.

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18. Iliotibial	**Midway between the greater trochanter and lateral femoral condyle. (Center of the femur)**
Needle length	50-75mm / 2-3 inch
Needle direction	Perpendicular to skin, towards femur.
Needle depth	As deep as necessary, may go to the bone.
19. Infraorbital	**Located directly below the pupil, level with the nasal flare**
Needle length	15mm / ½ inch
Needle direction	Angled inferior to superior so needle handle is angled away from the eye.
Needle depth	Superficial, set the needle with minimal advancement just to ensure needle is well set
Special notes	To reduce the likelihood of bruising on the face apply direct pressure to the needle site simultaneously while removing the needle, hold pressure for 5-10 seconds after removing needle.
20. Spinous Process of T7	**Draw a horizontal line from the inferior angles of the scapula, which approximates T7, palpate for tenderness in the interspinous space. Select the most symptomatic interspinous space T6-7 or T7-8.**
Needle length	Up to 25mm / 1 inch
Needle direction	Inferior to superior in the interspinous space (i.e. between the spinous processes) adjusting the angle of the needle as necessary.
Needle depth	Up to 1 inch
Special notes	Use 2 palpating fingers to bracket the lateral borders of the intended interspinous space while needling.
21. Posterior Cutaneous of T6	**Locate the T7 HNTrP, move up 1 segment and laterally 1 finger width**
Needle length	Up to 25mm / 1 inch
Needle direction	Perpendicular to skin, or lateral to medial towards vertebra.
Needle depth	Up to 25mm / 1 inch
Special notes	LUNG FIELD SAFETY. Use the 1:1 rule when needling the thoracic paravertebral area T1-T12. 1:1 rule = 1 finger width lateral to the spinous process and up to a 1" needle. Reduce needle depth in cases of lung disease, fragility, small stature and severe scoliosis if unsure of rib orientation.
22. Posterior Cutaneous of L5	**HNTrP located within the paravertebral muscle above the sacrum at the level of L5, the 2:2 rule applies but can increase needle length on larger patients**
Needle length	50-75mm / 2-3inch as needed.
Needle direction	Perpendicular to skin, can adjust angle the needle more medially toward lamina.
Needle depth	As deep as necessary, may to go the bone.
Special notes	In case of LAMINECTOMY use a shorter needle or move a segment superior as there may be no bony backdrop.
23. Supraorbital	**Medial aspect of the eyebrow is the clinical point.**
Needle length	15mm / ½ inch
Needle direction	Slightly superior to inferior, ensuring the handle of needle is directed AWAY from the eye.
Needle depth	Superficial
Special notes	To reduce the likelihood of bruising on the face apply direct pressure to the needle site simultaneously while removing the needle, hold pressure for 5-10 seconds after removing needle.
24. Common fibular	**Located 4 finger widths below the patella between the anterior aspect of the fibular head and tibial shaft.**
Needle direction	Perpendicular to the skin, towards the tibia.
Needle depth	*Depth is variable dependent on patient size and clinical intent.
Special notes	Fibular nerve is superficial as it passes the fibular head so insert the needle slowly

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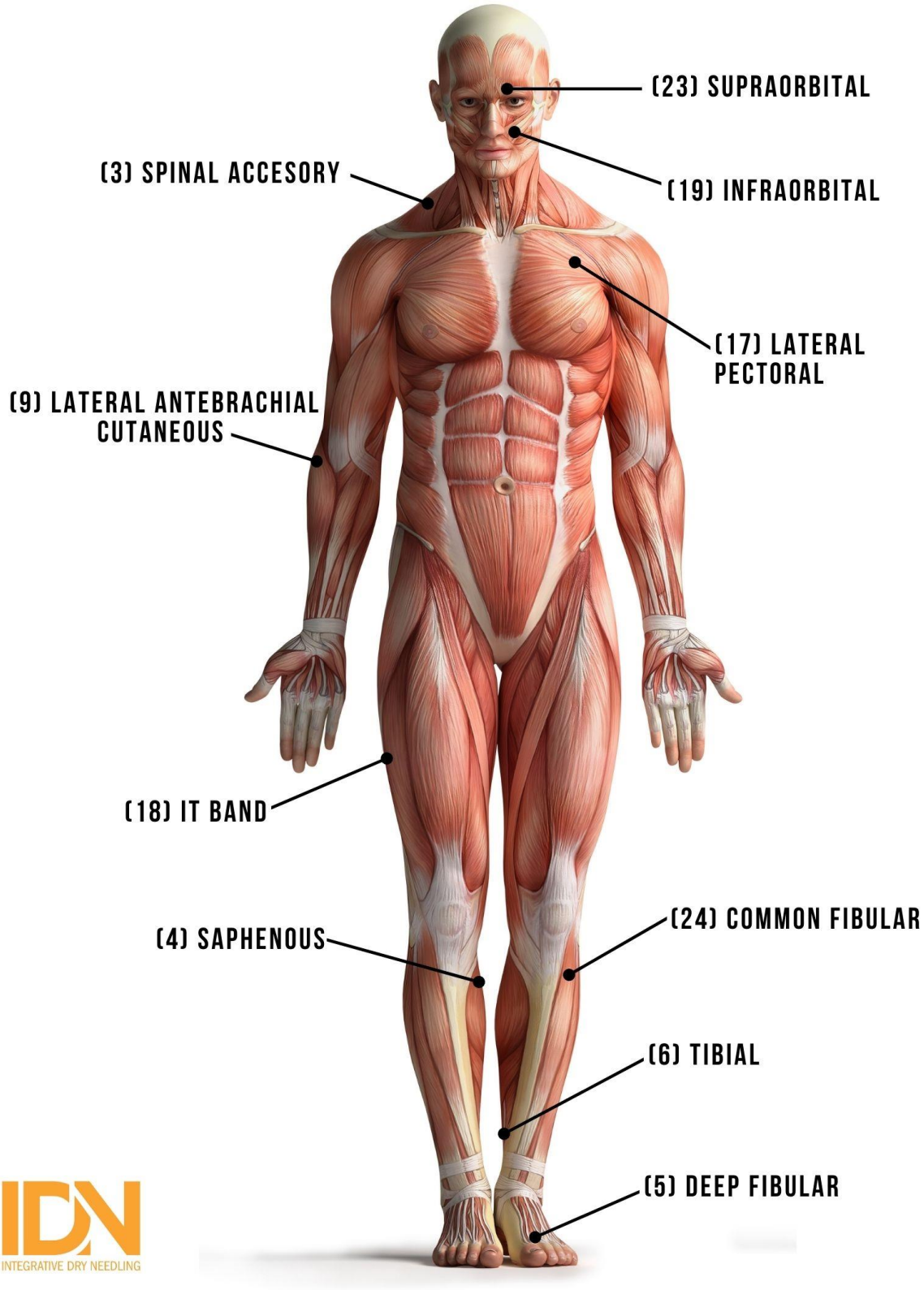
HOMEOSTATIC NEUROTRIGGER POINTS



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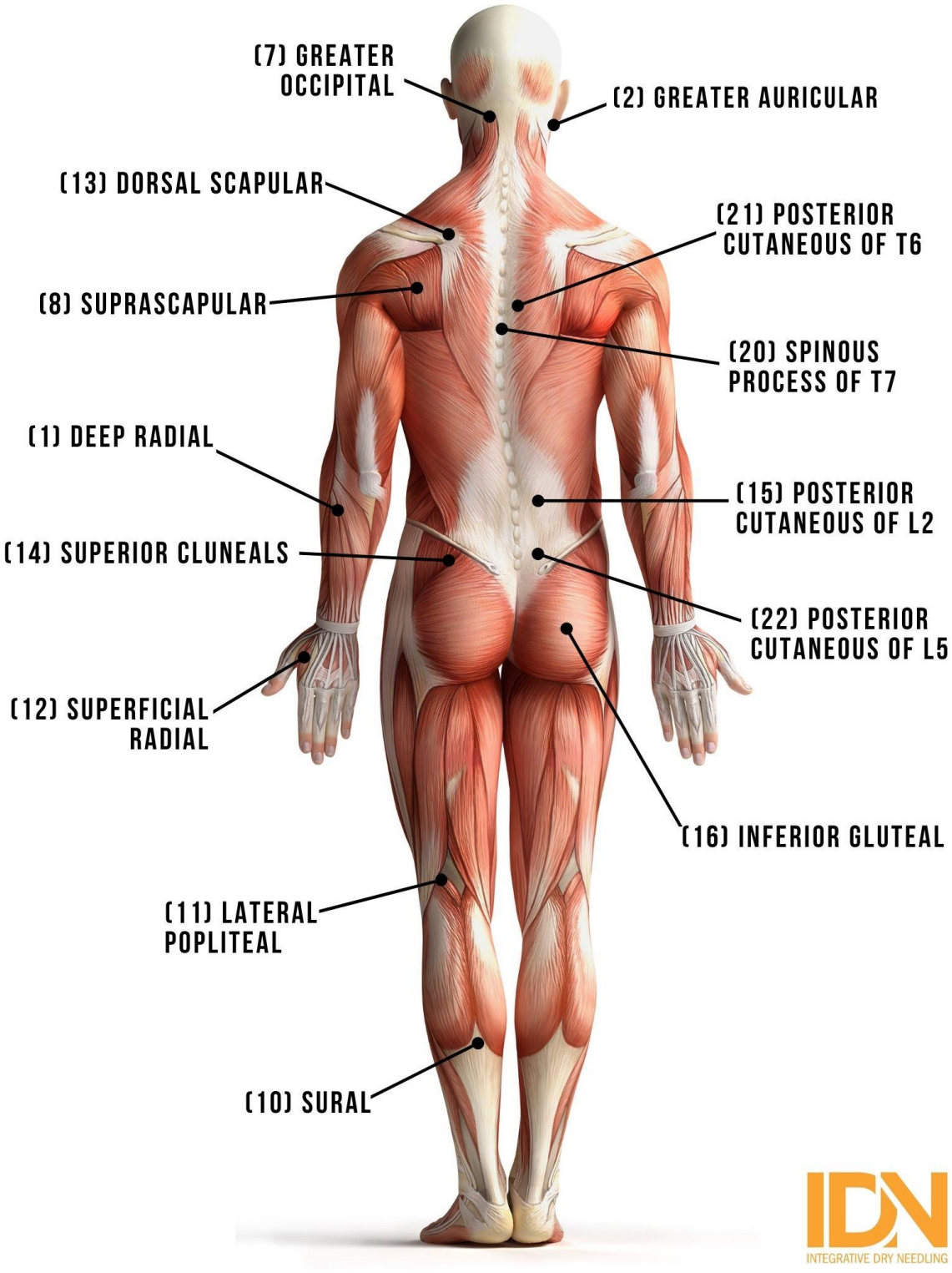
HOMEOSTATIC NEUROTRIGGER POINTS



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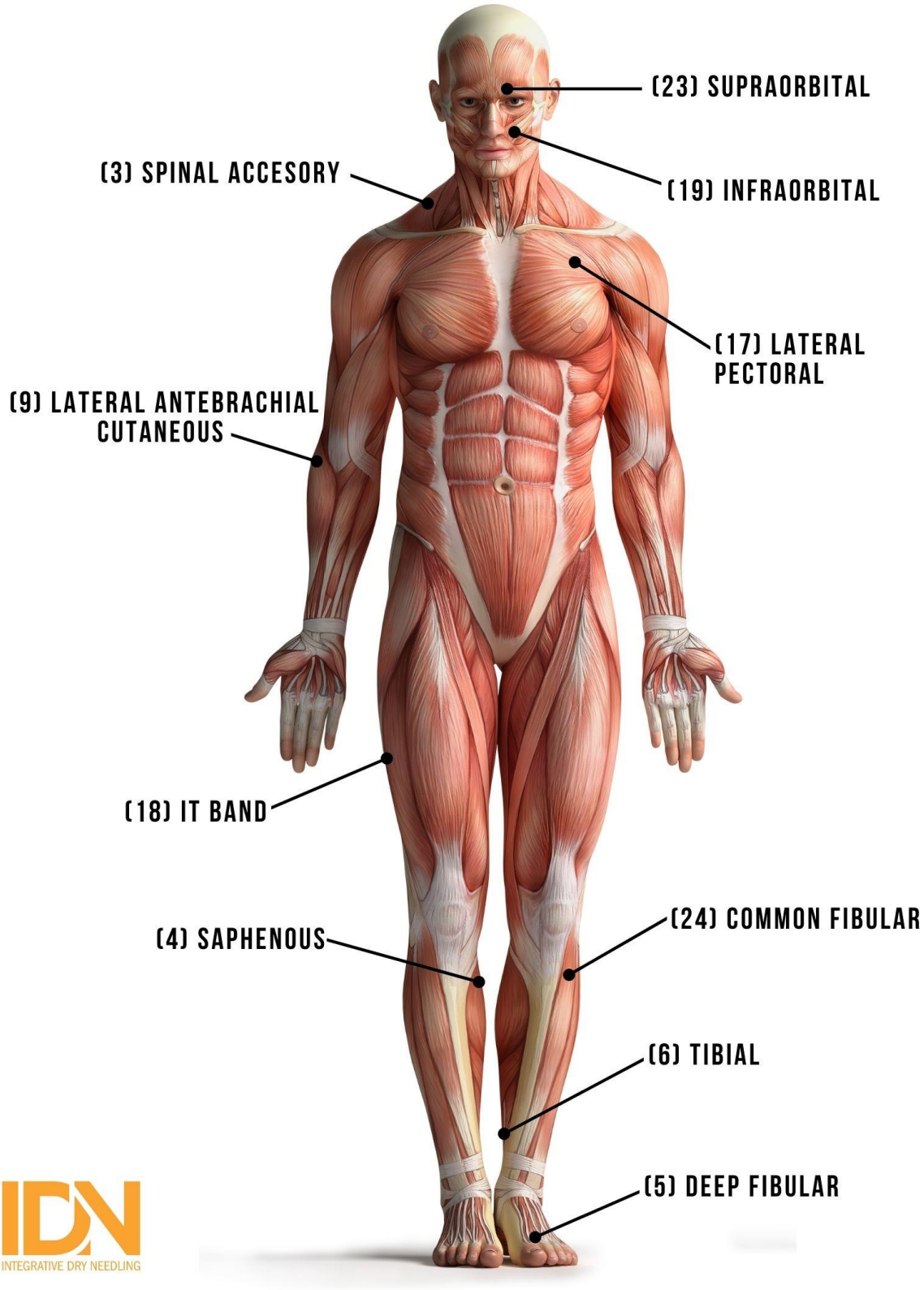
HOMEOSTATIC NEUROTRIGGER POINTS



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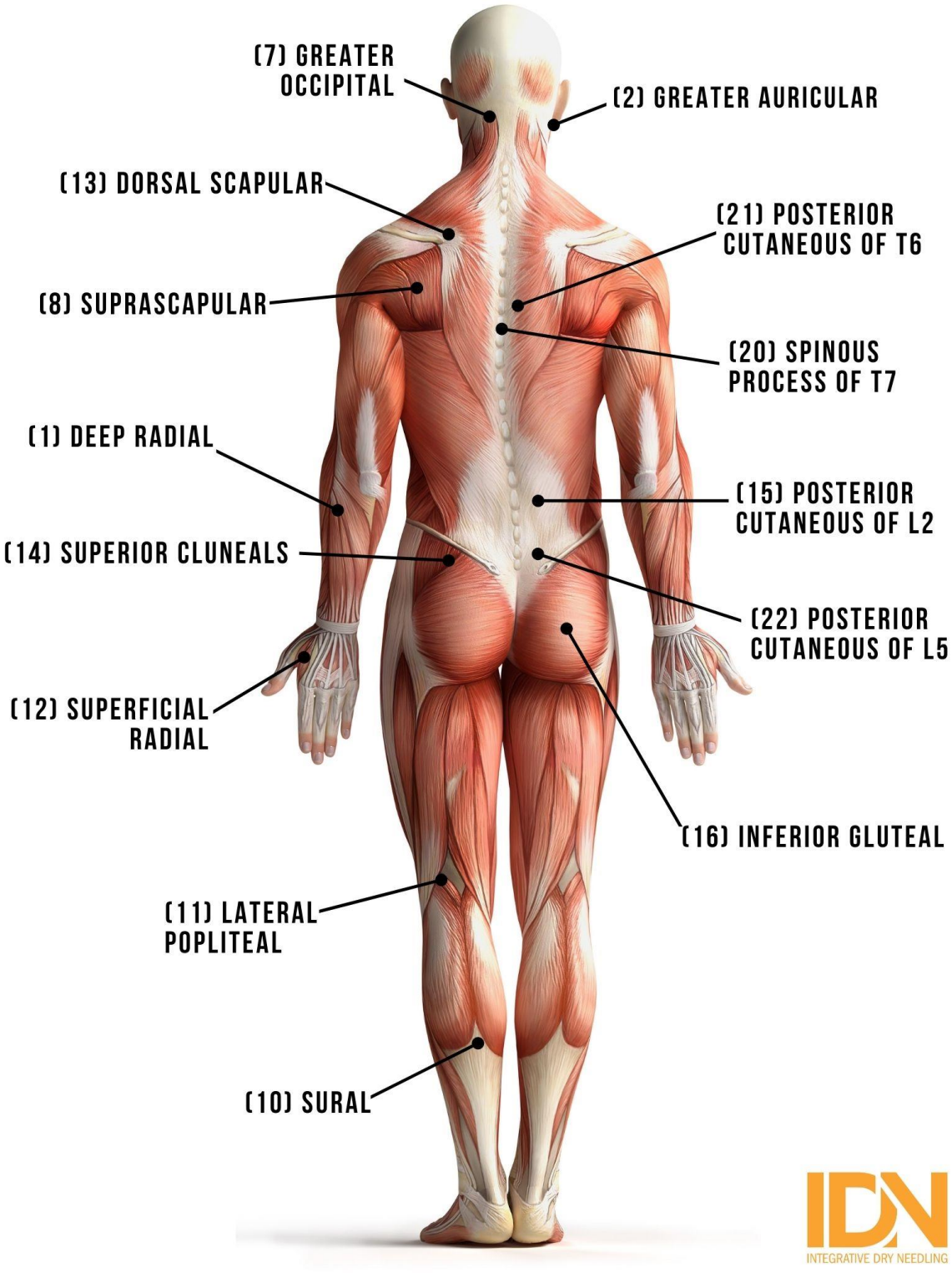
HOMEOSTATIC NEUROTRIGGER POINTS



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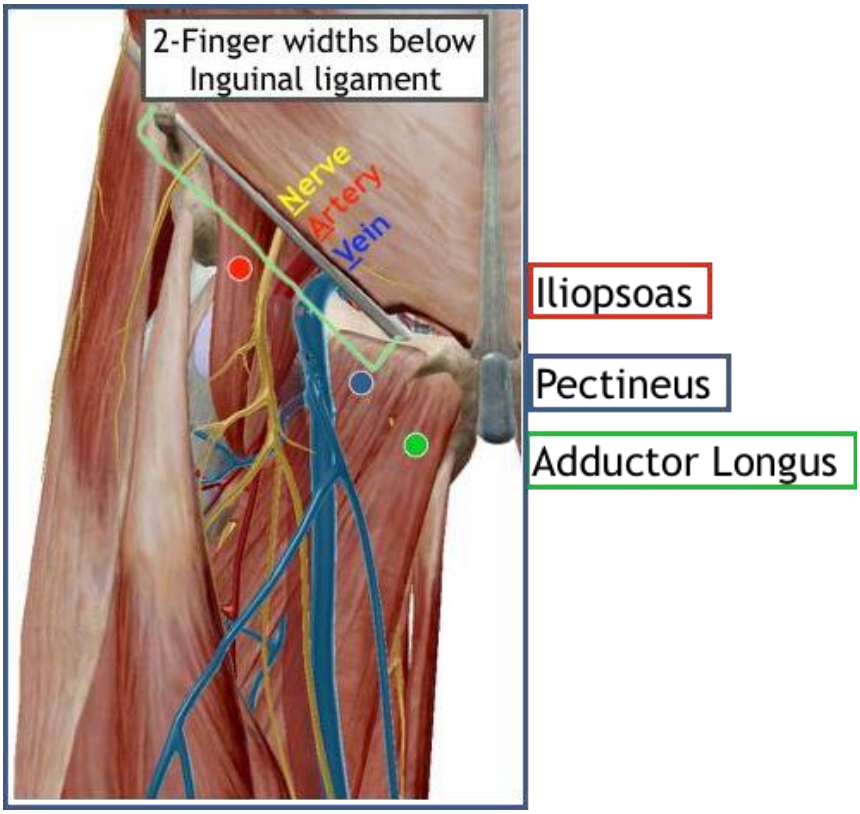
Up to 75 mm / 3” Needling Lab

Iliopsoas, Pectineus & Adductor Muscles

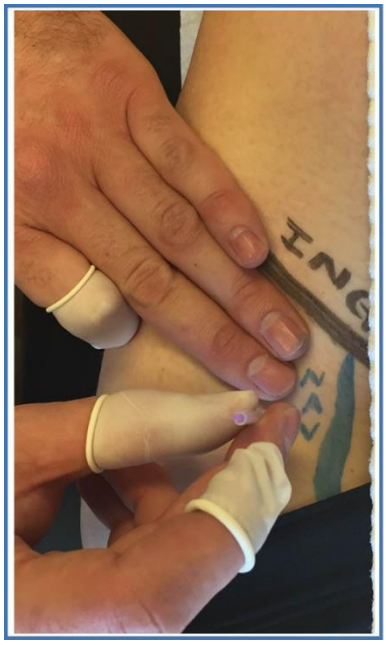


Identify the inguinal ligament between the ASIS and the pubic tubercle. Take care in assuring that you are needling 2-finger widths below the inguinal ligament to assure you are not needling into the abdominal cavity.

Identify the pulse of the femoral artery. The femoral nerve and vein will be on either side of the artery (NAV).

Needle perpendicular to the skin toward the femur and one-finger width lateral for the Iliopsoas, and one-finger width medial for the Pectineus muscle.

To needle the Adductor longus (brevis under longus) continue medially and maintain 2-finger width below and parallel to the inguinal ligament. Needle perpendicular to the skin toward the femur.



Iliopsoas

Pectineus

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Up to 75 mm / 3” Needling Lab continued …

Adductor Longus & Brevis Needing

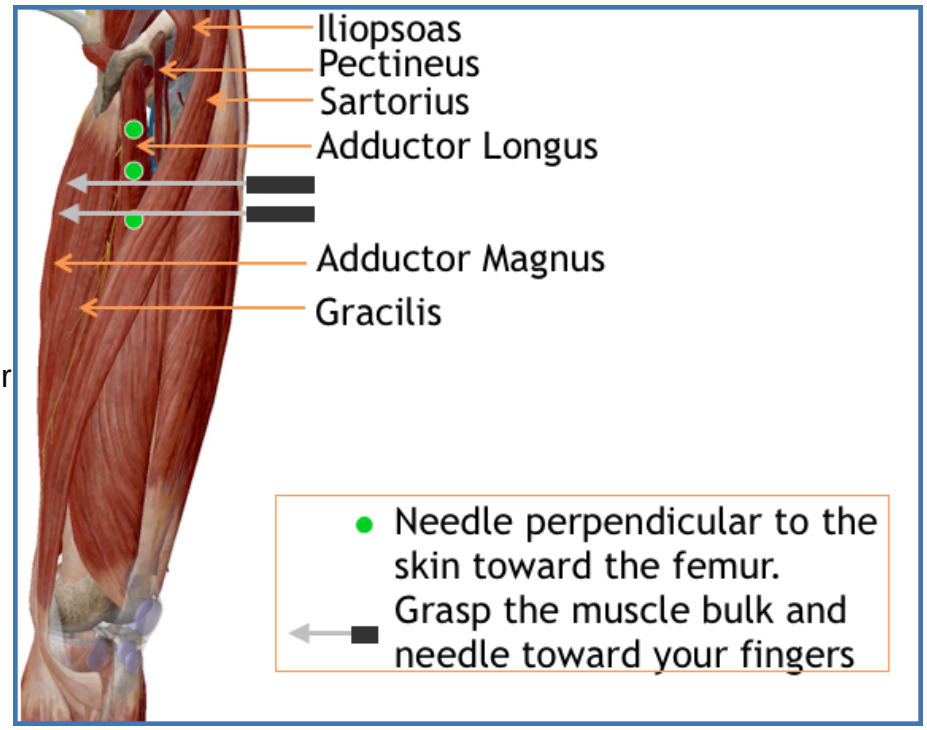
There are two techniques to effectively needle the Adductor muscle group:

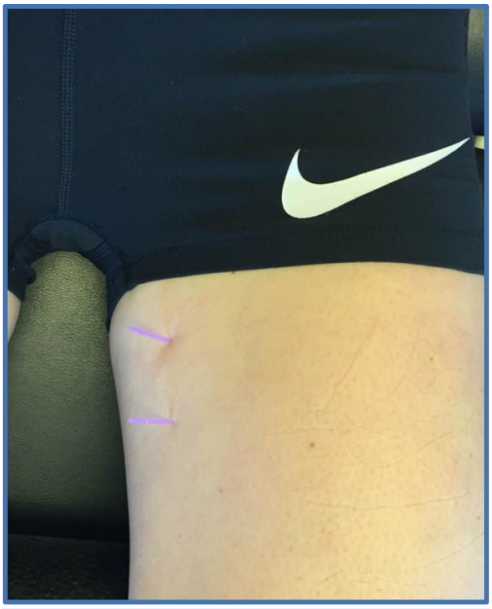
1. Continue medially from the Pectineus muscle until the Adductor Longus is identified.

   Insert a needle perpendicular to the skin aiming towards the femur.

2. Use a “pincer grasp” with your thumb and fingers, to secure the Adductor muscle group.

   Insert the needle into the muscle bulk until detected by your palpating fingers on the opposite side. You can perform needle manipulation once in the region but remove the needle before releasing your grasp.





Perpendicular toward bone

A/P toward fingers

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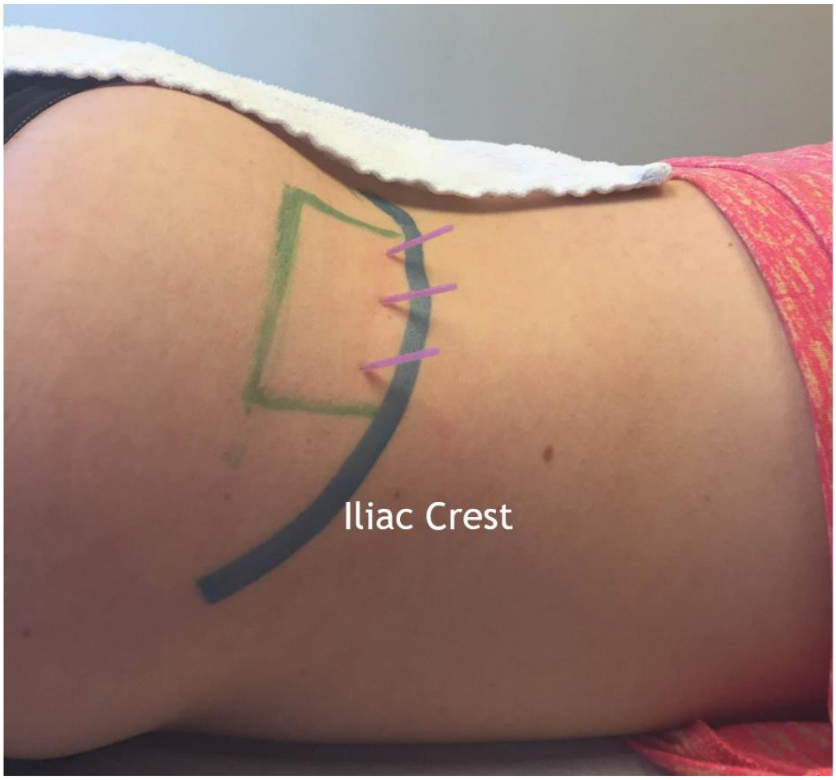
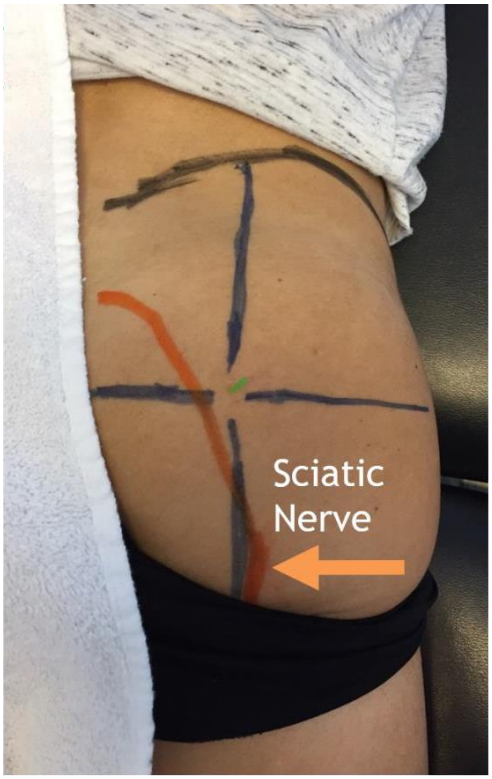
Up to 75 mm / 3" Needling Lab continued…

Superior Cluneal Homeostatic Point (14) & Inferior Gluteal Homeostatic Point (16)



Superior Cluneal (14)

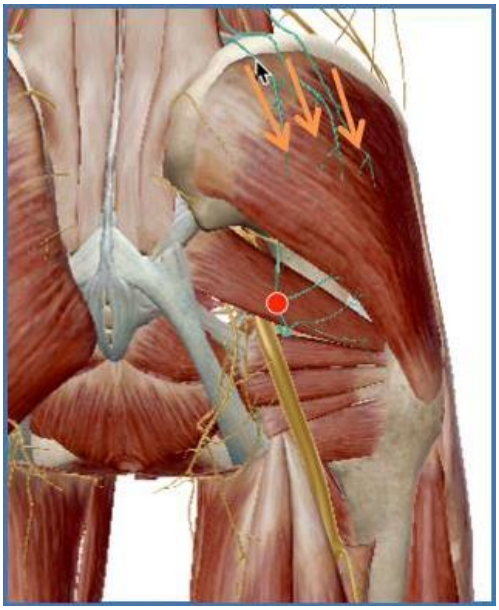


Inferior Gluteal (16)

Superior Cluneal Homeostatic Point (14)

There are 3-4 branches of this Superior Cluneal nerve that travel over the iliac crest (approximately 4 finger widths lateral to midline) and inferiorly toward the posterior lateral hip. There is variability in their location, which is why we draw a box below the iliac crest and use multiple needles angled inferiorly toward the gluteus medius.

**Care must be taken to avoid needling above the iliac crest as there is a risk of penetrating the peritoneum.



Inferior Gluteal Homeostatic Point (16)

Locate the "crown" of the buttock and insert needle perpendicular to skin. Care must be taken because the sciatic nerve courses deep through this area. The needle insertion should be progressed slowly to prevent piercing of the nerve trunk as it courses past the piriformis muscle.

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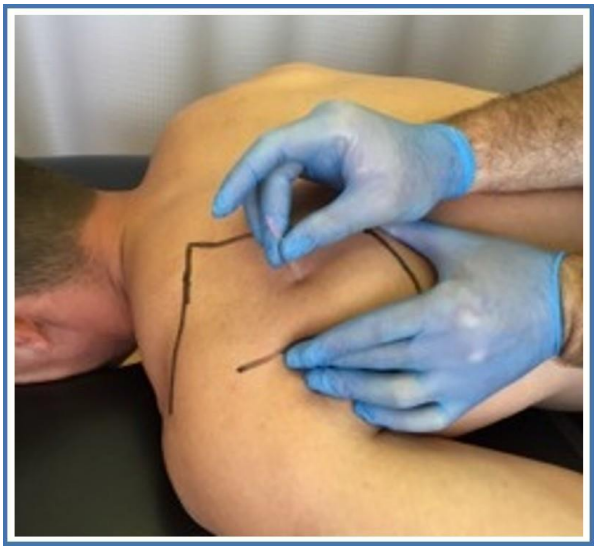
Up to 50 mm / 2” Needling Lab

Suprascapular Homeostatic Point (8)

Using your thumb and middle finger outline the medial and lateral boarder of the scapula.

Care must be taken to assure that you outline the borders of the scapula so that the needle is inserted directly over the boney backdrop of the scapula and not too far medially where the lungs could be at risk.

Suprascapular nerve provides majority of the innervation to the anterior and superior-posterior aspects of the glenohumeral joint. (Wu et.al 2021)

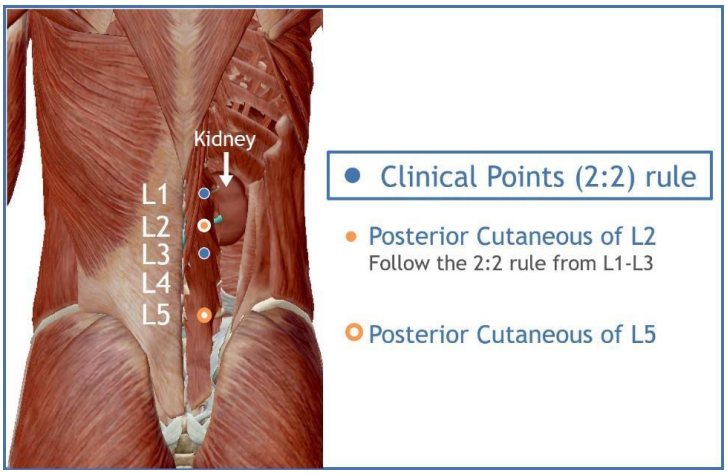


Posterior Cutaneous L2 & L5 Homeostatic Points (15 & 22), & Lumbar Paravertebrals

To safeguard the kidney, when needling from L1-L3, use the **2:2 rule,** which is needling a maximum of 2 finger widths from the lumbar spinous process and using up to a 2” needle.

Find the 12th rib and move medially to approximate the L2 vertebra and location of the L2 Posterior Cutaneous homeostatic NTrP.

The angle of the needle can be perpendicular to the skin or angled more medially, toward the body of the lumbar vertebra for additional safety.



When needling the L5 Posterior Cutaneous Homeostatic NTrP, the kidney is no longer a concern below L3, so the 2:2 rule is not required from L4-S1. Depending on the size of the patient and target tissue you can increase the length of the needle in this region if necessary.

Care must be taken with **lumbar laminectomies** and other surgical procedures that compromise the boney structure of the vertebral column. The treatment can be adjusted by performing superficial needling to the effected segment(s) or, choose to perform deep needling above and below the effected segments.

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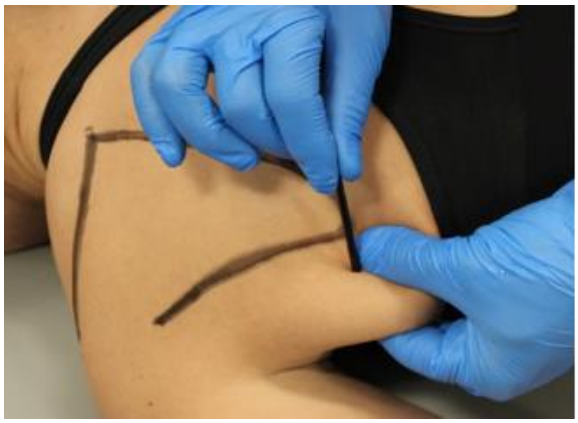
Up to 50 mm / 2” Needling Lab continued …

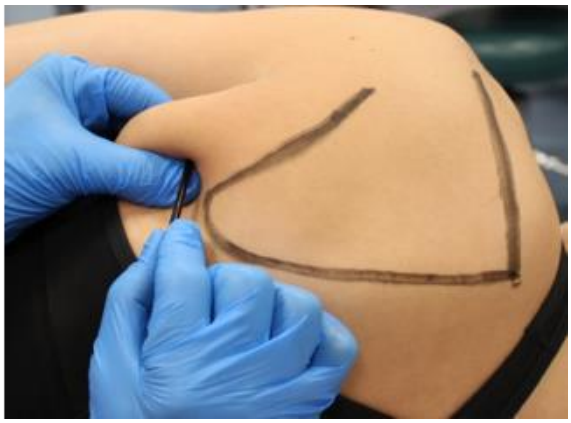
Latissimus Dorsi (Posterior Inferior Shoulder)

Patient is positioned prone arm at the side in slight abduction to allow access to the region.

Using a pincer grasp (between thumb & lateral side of index finger) identify the Latissimus muscle. Lightly press the index finger against the rib cage; gently pull the Latissimus away from the rib cage.

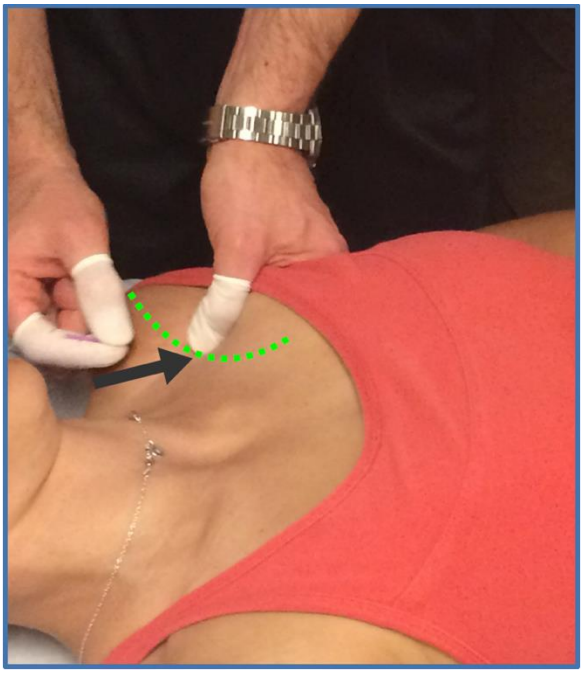
The needle is inserted parallel to the rib cage toward the practitioner’s index finger.





Lateral Pectoral Homeostatic Point (17)

There is a greater risk of pneumothorax when performing perpendicular needle insertions over the rib cage, therefore we strongly recommend against it. To minimize the risk, we use a horizontal insertion (**parallel to the chest wall).**



Place the back of your bent index finger up against the lateral ribcage. Use your thumb to pinch the pectoralis muscle bulk to identify the symptomatic area. For large chested males or females; have the patient assist by moving the chest tissue medially.
Using a 25 - 50mm / 1-2” needle, angle it so that the needlepoint is always moving medial to lateral toward your index finger - away from the thorax! The target zone for the needling is the lateral third of the pectoralis - it is not necessary to needle the anatomical lateral pectoral homeostatic point.

You can perform light needle manipulation once in the region and then remove the needle before releasing your grip on the pectoralis muscle.

Extreme care must be observed when needling around the rib cage to avoid accidental lung puncture.

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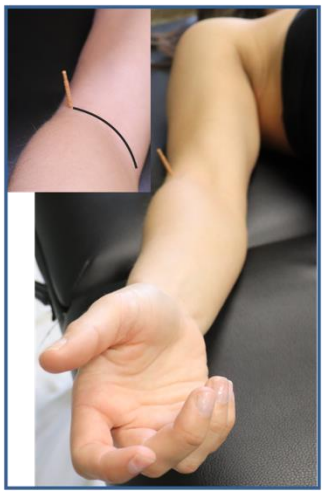
Up to 25 mm / 1” Needling Lab

You can utilize any length of needle (patient size dependent) as long as it is angled perpendicular to the skin toward a boney backdrop.

Lateral Antebrachial Cutaneous Homeostatic Point (9)



Cutaneous branch of the musculocutaneous nerve that provides sensory innervation to the lateral side of forearm.

Locate the lateral aspect of the cubital crease with the elbow in slight flexion.

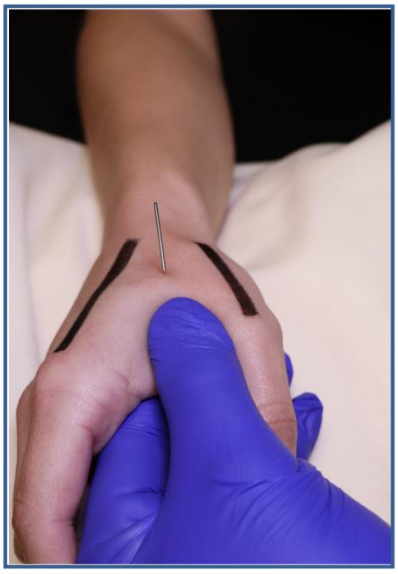
Insert the needle medial to the brachio-radialis muscle on the lateral aspect of the cubital crease perpendicular to the skin toward the radial head.

Deep Radial Nerve Homeostatic Point (1)

To locate the deep radial homeostatic point identify the extensor bulk muscles (brachioradialis, ECRL, & ECRB) use a pincer grasp between your thumb and index finger. Identify the lateral epicondyle and move 2 finger widths distal - the deep radial nerve travels in the groove next to the extensor bulk.

Insert the needle perpendicular to the skin toward the boney backdrop of the radius/ulna.

Superficial Radial Nerve Homeostatic Point (12)



Located between the 1st and 2nd metacarpals. Have the patient fully adduct the thumb and the homeostatic point will be at the apex of the muscle bulk

Place your index finger in the palmar webspace.

Insert the needle perpendicular to the skin toward your index finger on the palmar surface. Palpate for the needle to push against the soft tissue under your index finger assuring that the needle does not penetrate into palm.

Note: The needle penetrates through the Adductor Pollicus and the First Dorsal Intereossei muscles and influences the innervation fields of the Median, Radial and Ulnar nerves.

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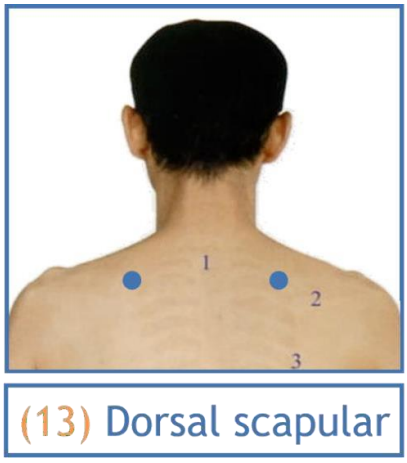
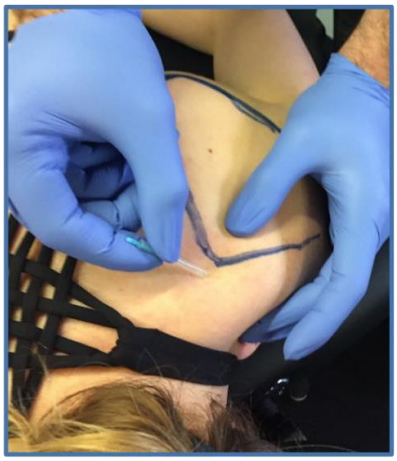
Up to 25 mm / 1” Needling Lab continued …

Dorsal Scapular Homeostatic Point (13)

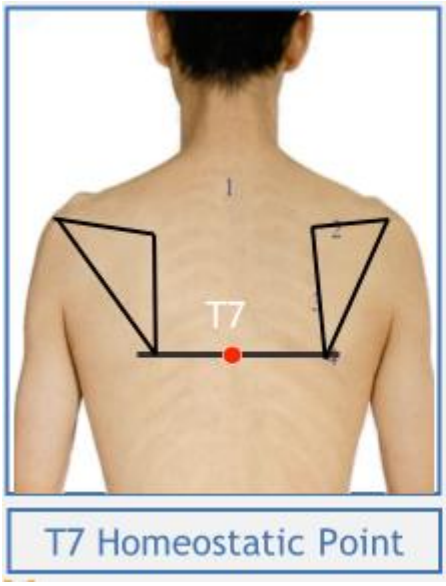
Use up to a 1” needle directed from the medial aspect of the superior angle of the scapula moving laterally away from the thorax, assuring the needle point is over the bony backdrop of superior angle of the scapula. It is also acceptable to grasp the soft tissue and lift away from the thorax and needle as described above.

Lung Field Safety - Care must be taken in this area because of the potential risk of lung puncture!





Spinous Process T7 Homeostatic Point (20)



Draw a line between the inferior angles of the scapula, which approximates T7, palpate for tenderness in the interspinous space.

The needle must be directly centered between the spinous processes and angled to allow ease of insertion between them.

Never force the needle and when resistance is met stop any further insertion.

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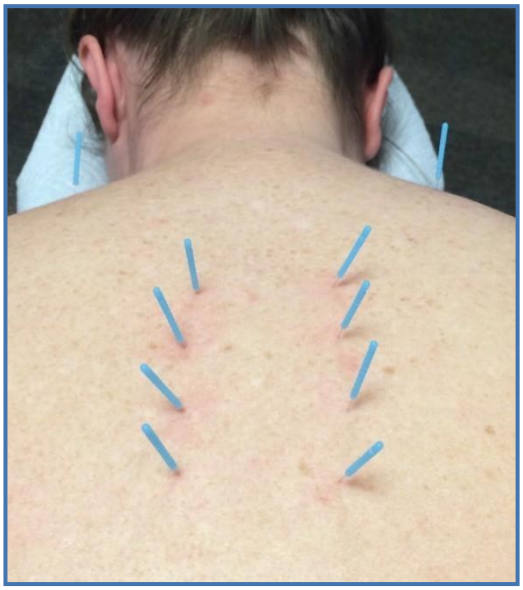
Posterior Cutaneous T6 Homeostatic Point (21) & Thoracic Paravertebrals

Posterior Cutaneous of T6: Lung (pleura) tissue is directly inferior to the ribs, which makes this a **high-risk area**; great care and attention must be paid when needling around the rib cage.

Always follow the 1:1 rule when performing needling of the T6 homeostatic points and with <u>all</u> thoracic paravertebral points.

1:1 Rule is defined as: Needle one finger width (patient's finger width, not yours) lateral to the spinous process using up to a 1" needle.

For additional safety, the needle point can be directly medially toward the thoracic vertebral body.

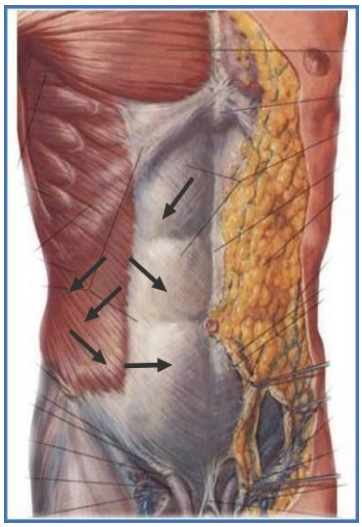


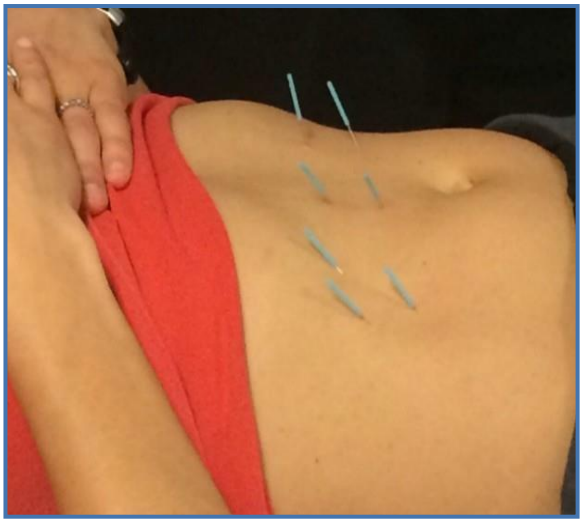
Thoracic paravertebral needling

Abdominal Muscle Needling

Care must be taken to assure the needles are angled so that they are safely inserted into abdominal muscles and not into the abdominal cavity.
To be safe, we use an angled needle approach and avoid straight vertical needle insertions.
This is especially important on thinner patients.

The direction of the needle (medial to lateral/superior to inferior etc.) does not make a clinical difference, use the needle orientation and direction that is easiest for you to safely insert the needle.





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Craniofacial Needling 15mm / ½" Needling Lab

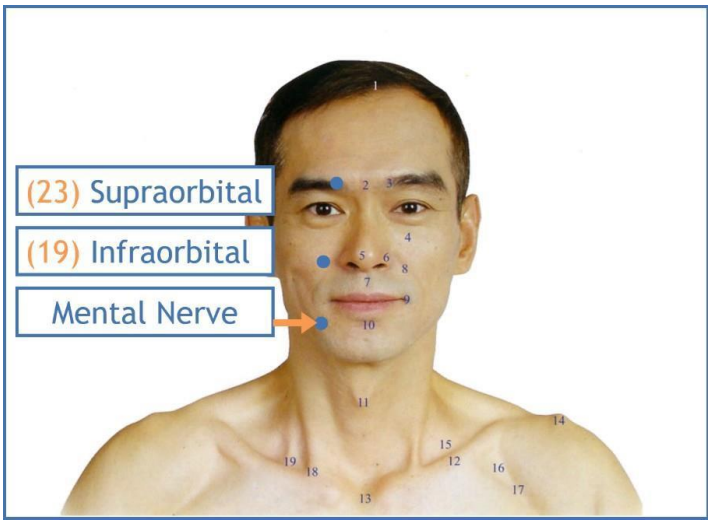
Supraorbital Homeostatic Point (23) & Infraorbital Homeostatic Point (19)

The **supraorbital homeostatic point** is located at the medial aspect of the eyebrow and supplies sensory to the mucosal membranes of the frontal sinus and skin and conjunctiva of the upper eyelid.

The **infraorbital homeostatic point** is located directly below the pupil, level with the nasal flare and is sensory to the lower eyelid, side of nose, anterior cheek and a portion of the upper lip.

The **Mental Nerve** (symptomatic point) is directly below the Infraorbital point below the angle of the mouth and is sensory to front of the chin, lower lip and gums of the anterior mandibular teeth.

These points are cutaneous points therefore you do not need to manipulate the needle, superficial setting of the ½" needle over the innervated skin will produce the therapeutic lesion required. Ensure the handle of the needle is directed AWAY from the eye.



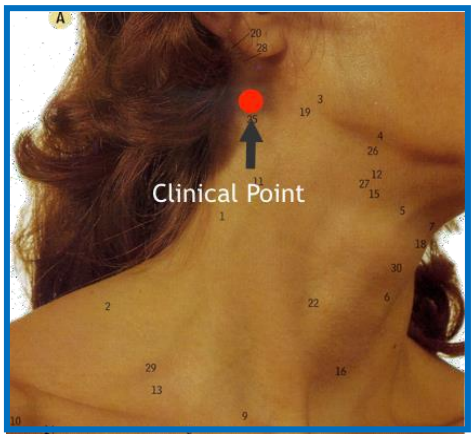
When removing the needle apply immediate compression for 5-10 seconds to the site to reduce the likelihood of producing a bruise.

Greater Auricular Homeostatic Point (2)

It is difficult on some patients to visualize the jugular vein; this can result in an accidental needle penetration of the jugular vein. To reduce this risk, we use a safer clinical point for treatment.

The clinical point is inferior and posterior to the mastoid process (behind the ear lobe) on the posterior border of SCM where the greater auricular nerve emerges.

Use of a 15mm / 1/2" needle, directed perpendicular to the skin on the posterior border of the SCM, is sufficient and safe for this area.



When removing the needle apply immediate compression 5-10 seconds to the site to reduce the likelihood of producing a bruise.

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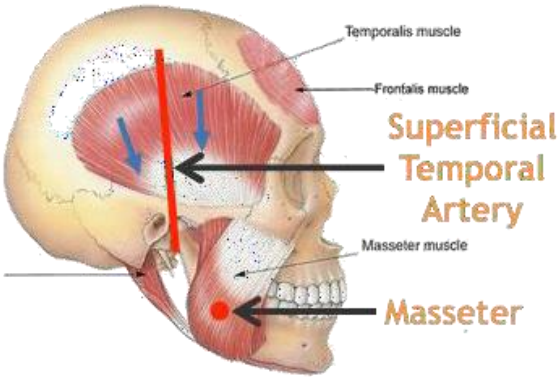
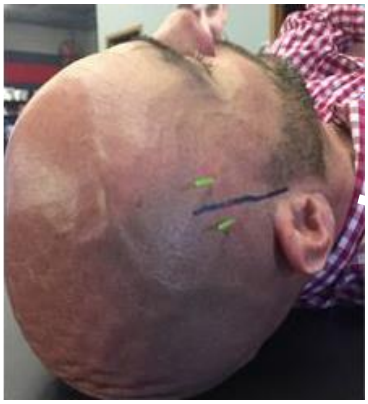
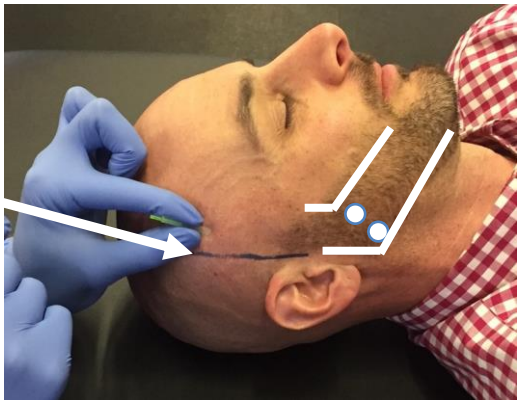
Craniofacial Needling 15mm / ½" Needling Lab continued …

Craniofacial Needling – Muscles of Mastication







Temporalis muscle

The superficial temporal artery, courses anterior to the tragus of the ear and superiorly over the temporalis muscle. Care must be taken to avoid piercing the artery when needling the Temporalis muscle. The artery can be avoided by needling medial or lateral to the expected path of the artery. ½" to 1" needles can be used for subcutaneous insertion into symptomatic tissue.

Masseter muscle

½" to 1" needle can be used for a perpendicular (to the skin) insertion into symptomatic tissue. Always direct the needlepoint toward the boney backdrop of the ramus.

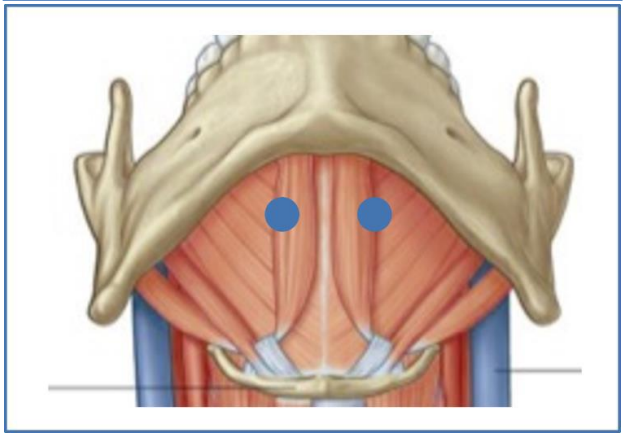
Suprahyoid Muscles

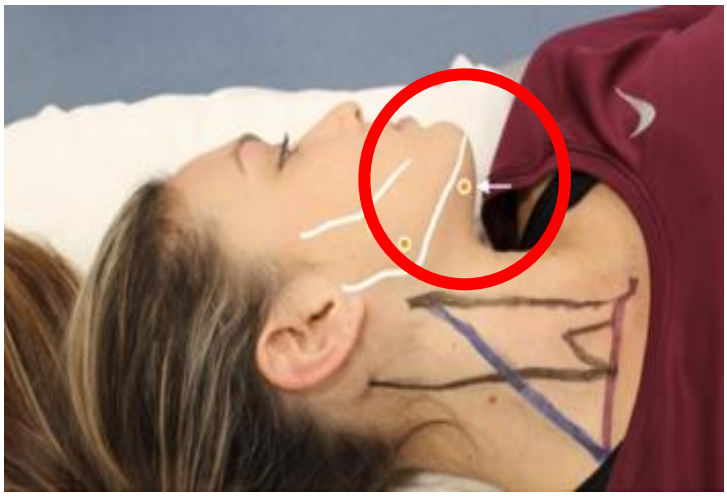
Suprahyoid muscles are important to assess and treat for neuromuscular balance of the TMJ as well as for coordinated swallowing.

To needle use up to a 1" needle setting it posterior and just off the midline to the anterior apex of the mandible. Direct the needle superiorly. The left and the right side should be treated on the same visit for symmetry.

Indications include dysfunctional swallowing, status post whiplash with anterior cervical pain, TMD and throat pain.

Apex of Mandible





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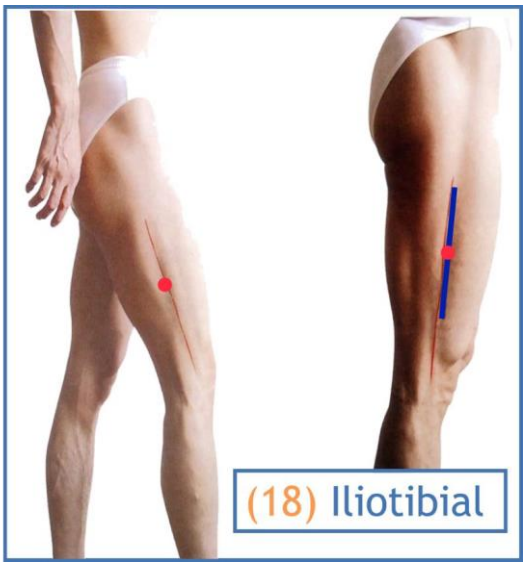
Lower Extremity Needling Lab

IMPORTANT: When needling into the lower extremities use a needle length that is sufficient to accomplish the goal of treatment (deep versus superficial). The needle should be aligned perpendicular to the skin and the needlepoint directed toward underlying bone or toward your fingers (when grasping the tissue).

Iliotibial Band Homeostatic Point (18)

The Iliotibial homeostatic point is located centered between the greater trochanter of the hip and the lateral femoral condyle. Because of the large forces acting on the ITB we recommend inserting multiple needles above and below the Iliotibial homeostatic point to maximize clinical effect.

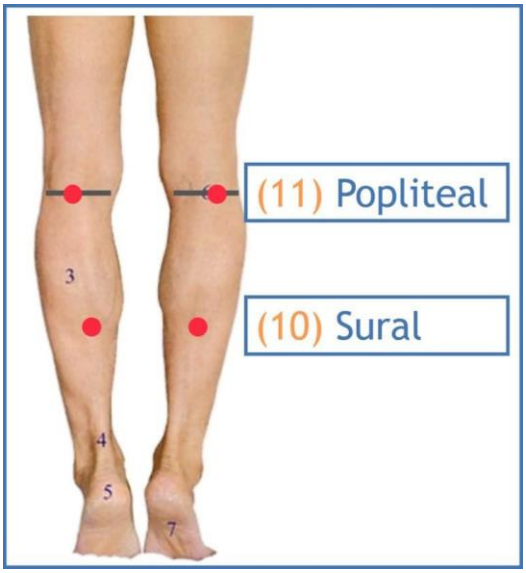


Lateral Popliteal Homeostatic Point (11)

Insert needle medial to the biceps femoris tendon, but can have some variability more medially along the knee crease. Avoid needling in areas of varicose veins.

Sural Homeostatic Point (10)

Insert needle between the heads of the gastrocnemius muscle.



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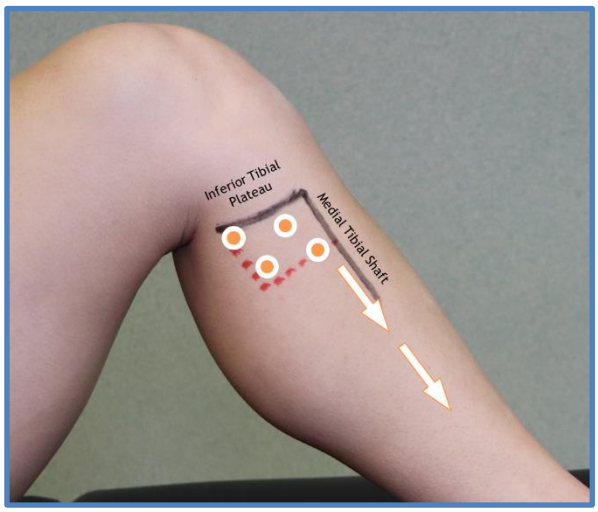
Lower Extremity Needling Lab continued …

Saphenous Homeostatic Point (4)



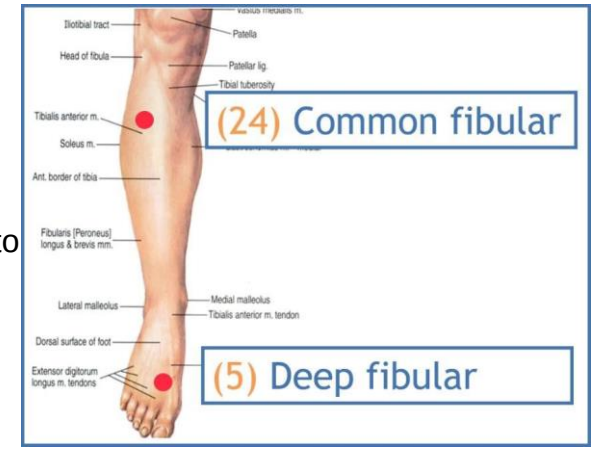
Identify the patient's homeostatic point by palpating for the most tender location within the "saphenous box" (see image). The homeostatic point can be anywhere in the "saphenous box".

Remember the Saphenous nerve tracks anteriorly toward, then down the tibial shaft.

There may be multiple points that are symptomatic so needling multiple areas may be required.

This is also the area we use for Quantitative Analysis

Common Fibular Homeostatic Point (24)

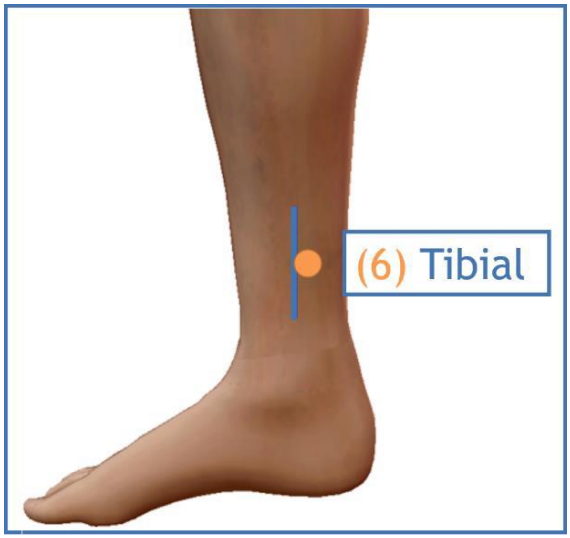


Measure 4-finger widths below the inferior pole of the patella. The point is just inferior to the fibular head and, between the fibular head and tibia.

Deep Fibular Homeostatic Point (5)

Insert a needle between the 1st and 2nd metatarsals, proximal to the web space.

Tibial Homeostatic Point (6)



The emergent point of the tibial nerve is 4 finger widths above the medial malleolus. This is also the location of the Tibial Homeostatic Point (6).

Because the nerve is very superficial and right up against the tibial bone you need to insert the needle slowly because it is possible to contact the nerve during this procedure.

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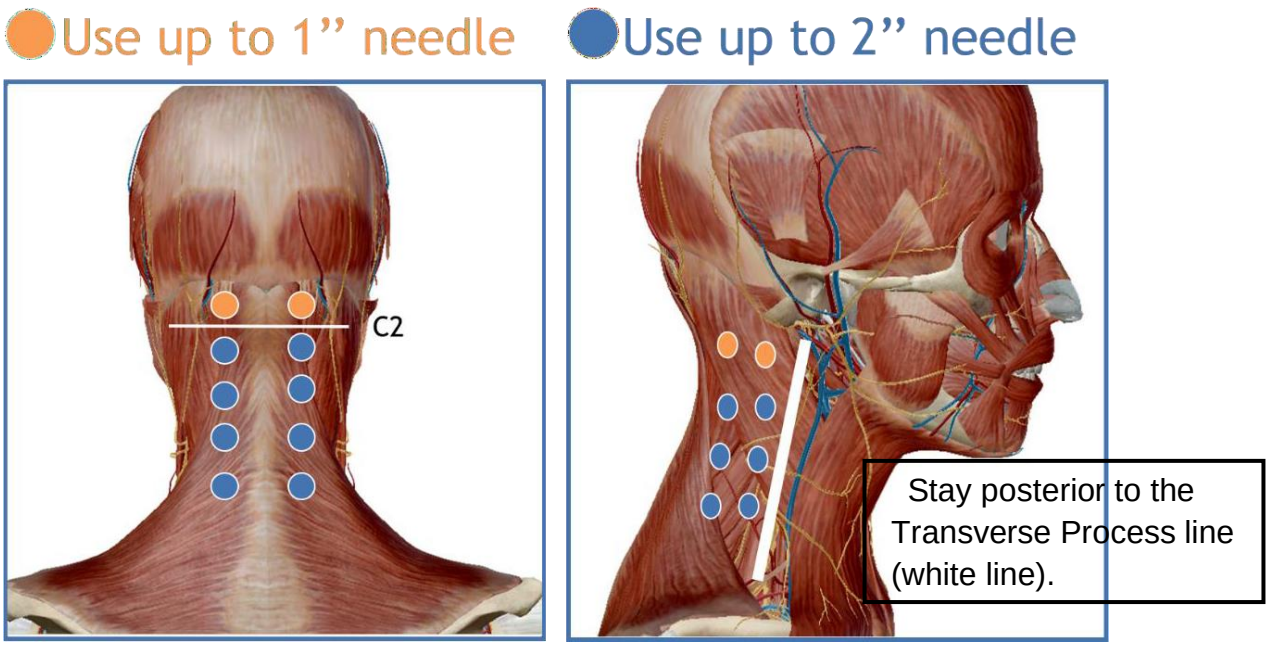
Cervical Needling Considerations



Multi-angle segmental needling

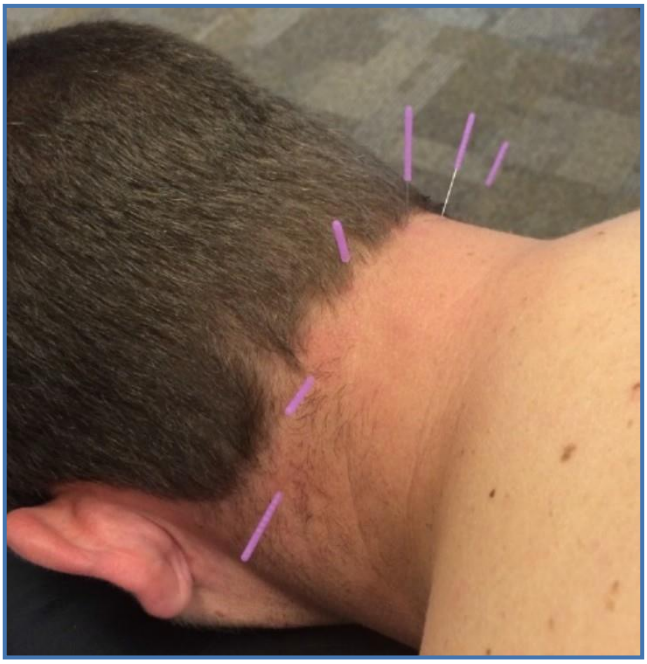
C2 to C7: Up to a 2" needle can be utilized with the option of the multi-angle segmental technique

1st needle is placed within 1 fingerbreadth lateral to spinous process,

2nd needle is placed perpendicular to the skin,

3rd needle use a lateral to medial approach posterior to the transverse process of the cervical vertebra to avoid the vertebral artery as it ascends in the transverse foramen.

Never push the needle with excessive force in this area!



Care must be taken with **cervical laminectomies** and other surgical procedures that compromises the boney structure of the vertebral column. The clinician can adjust the treatment by performing superficial needling to the involved segment(s) or can deep needle above and below the involved segments.

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Upper Cervical & Posterior Cervical Needling Lab

Needling Above C2

Use a 1” needle in this region. Never push the needle with excessive force in this area!

Between CO-C1 segment

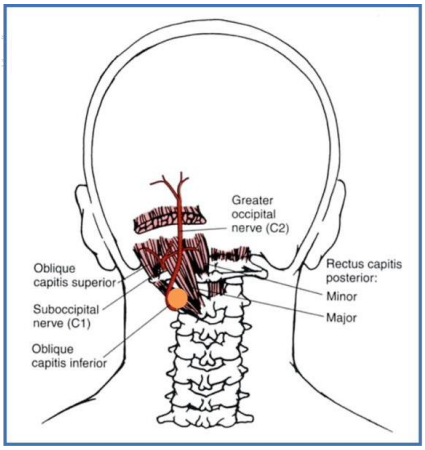
Angle the needle in a cranial direction toward the occipital bone (see below).

Between the C1-2 segment

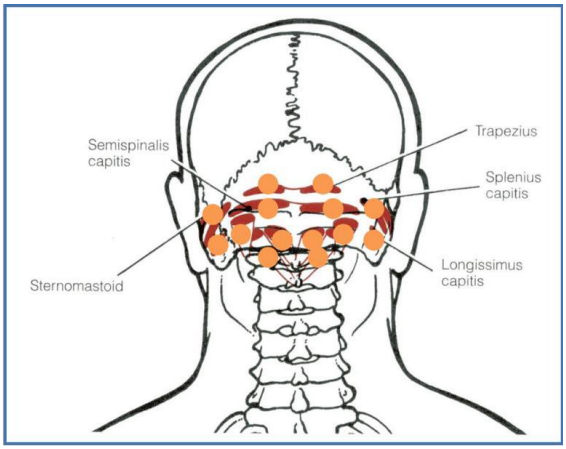
Insert the needle perpendicular to the skin toward the vertebra.

Vertebral artery considerations

Do not needle in a posterior to anterior direction laterally near the tip of the transverse process of C1.



Greater Occipital Homeostatic point (7)



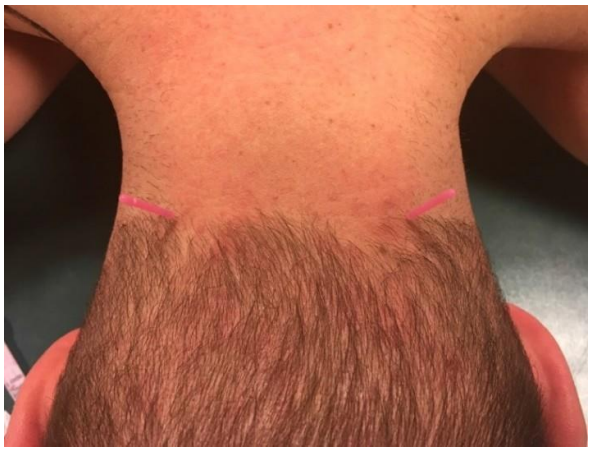
Needling of cervical muscle insertional areas

Greater Occipital Nerve Homeostatic Point (7)

The point is located halfway between C2 spinous process and C1 transverse process. Locate the C2 spinous process and move laterally over the paraspinal muscle bulk (into groove), then move slightly superior to be located over the inferior oblique muscle. Insert the needle perpendicular to the skin toward the cervical lamina.

Important for cervical, cranial and facial pain via connection with the trigeminal nerve.

Potential trigger for Migraine, cervicogenic dizziness, nausea and visual disturbances.



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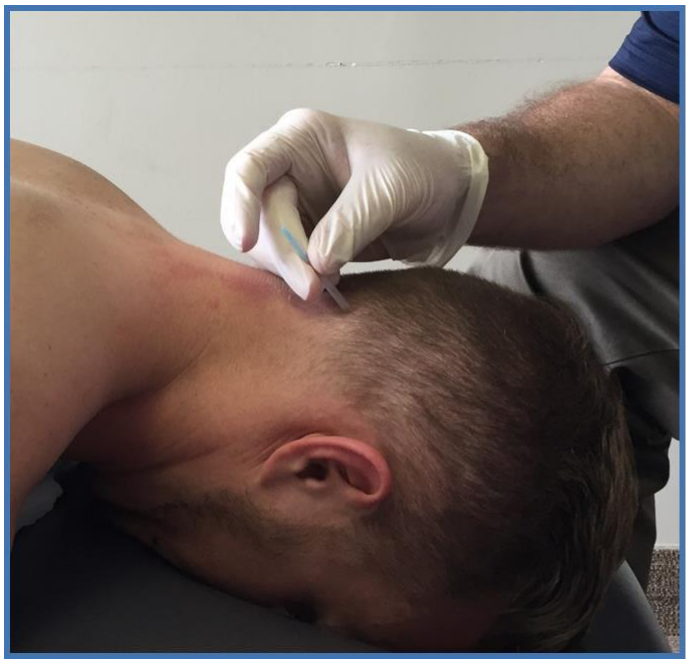
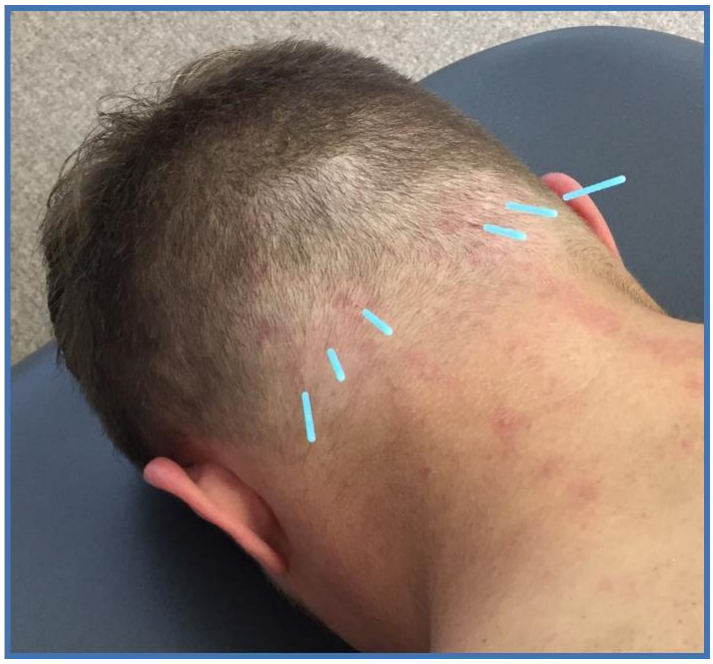
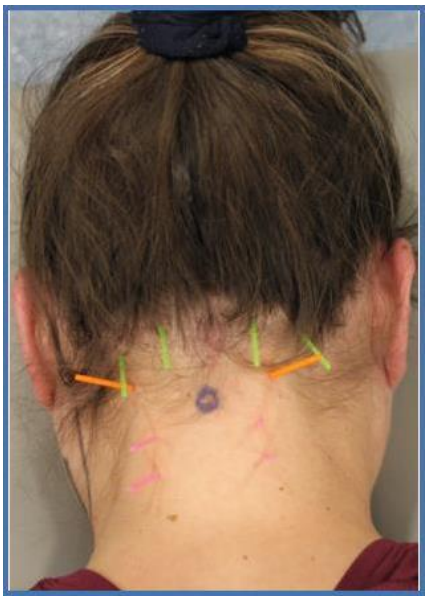
Sub-occipital Needling Lab





Use a 1” needle above C2. Multiple needles can be used along the base of the skull

Vary the needle angle superiorly toward the occipital bone to address sub-occipital muscles in the C0-C1 space.



Note that the orange GON NTrPs are further lateral then the pink paravertebral points.

Note that the needles for the GON NTrPs (orange) and the paravertebral (pink) are adjusted to remain perpendicular to the skin.

The sub-occipital needles (green) represent an example of an angle towards the occiput that can be used.

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Horizontal Sternocleidomastoid AP & PA Technique

Horizontal Sternocleidomastoid AP Technique

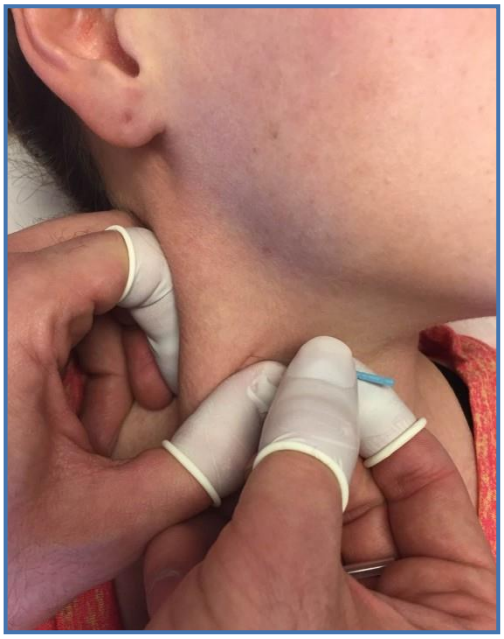
To reduce tension in the lateral cervical column and provide better access to the SCM, tilt the patient's head toward the involved side.

Secure the SCM between your thumb and index finger.

The needle is directed toward your fingers in an AP direction using up to a 25mm / 1" needle.

Upon removing the needle always apply immediate compression to the area to reduce the likelihood of bruising.

Care must be taken to avoid piercing the jugular vein. Sometimes it is difficult to visualize the jugular vein. The "expected" course of the jugular vein is it emerges from the mid- clavicular region courses superiorly over the middle portion of the SCM toward the angle of the mandible.

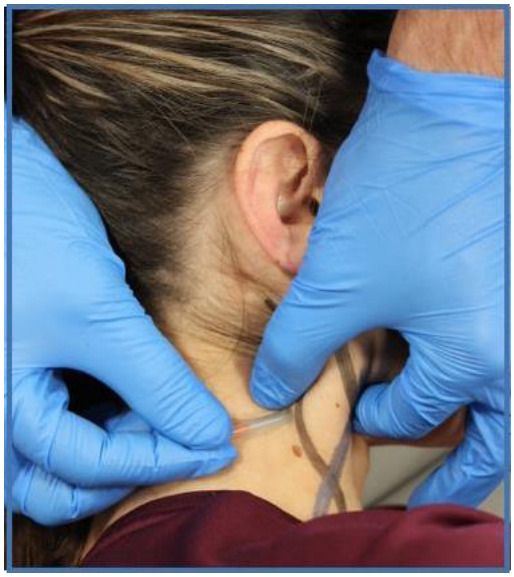


Horizontal Sternocleidomastoid PA Technique

Position the patient in side lying on their uninvolved side. Place a pillow under the head to side bend the neck and provide better access to grasp the SCM.

Secure the SCM between your thumb and index finger. The needle is directed toward your finger in a posterior to anterior using up to a 25mm/1" needle.

Note: this position can reduce the possibility of piercing the superior jugular vein as it is on the anterior aspect of the SCM. However, it is still recommended that upon removing the needle to apply immediate compression to the site to reduce the likelihood of bruising.



Integrative Dry Needling Applications for Sports Performance

Latent myofascial trigger points: Their effects on muscle activation and movement efficiency (Lucas et al., 2004, 2010).

Results: A significantly different temporal sequence of muscle activation was measured when LTrPs were present in the scapular rotator muscles suggesting that LTrPs do affect the timing of the MAP in this muscle group and of muscles more distal in the upper limb chain.

Clinical Relevance: MTrPs are not just contracted muscle fibers but neuromuscular lesions that form part of a neuro-logical system that affects and is affected by the CNS.

Ibarra et al., 2011

Higher intramuscular electrical activity observed with latent MTPs than non MTPs in posterior deltoid muscle at rest and during shoulder flexion

Ge et al., 2014

Increased electrical activity observed with latent TP in the upper trapezius (synergist to the deltoid) at rest and during active shoulder abduction.

Clinical Relevance: Latent MTPs are associated with reduced efficiency of muscle activation and early fatigability; Increased myographic activity at rest; Disordered fine movement; Imbalanced muscle activation patterning.

Tendon needling for treatment of tendinopathy: A systematic review. (Krey et al., 2015).

This review included 3 high-quality RCT's (Mishra et al., 2014; Dong-wook Rha et al., 2013; Stenhouse et al., 2013) that compared dry needling to wet needling with autologous concentrate alone. A fourth high-quality study (Bell et al., 2013) was included that combined the needling treatments with a standardized eccentric exercise program. The tendon areas investigated included the common extensor, (Mishra et al., 2014; Stenhouse et al., 2013) Achilles (Bell et al., 2013) and supraspinatus (Dong-wook Rha et al., 2013).

Conclusions: Within group changes were observed in all groups up to 6 months demonstrating statistical and clinically meaningful changes for impairment and functional data. The evidence suggests that tendon needling improves patient-reported outcome measures in patients with tendinopathy. Of course, they note that despite these results, more high-quality evidence is needed to further evaluate the benefit of tendon needling for tendinopathy.

720⁰ Assessment/Treatment Model

Symptoms and neuromuscular dysfunction can occur at various levels local, segmental, and systemic. The agonist-antagonist neuromuscular relationships must be considered. The latent (passive) TP's are just as significant as active TP in neuromuscular dysfunction (Lucas et al., 2004, Lucas et al., 2010, Ibarra et al., 2011). Assessment and treatment must focus on identification of neuromuscular lesions (i.e. NTP's) and not solely where the pain is reported. The human body is neurologically (Xu et al., 2010), chemically (Shah et al., 2005, Shah et al., 2008), horizontally and vertically integrated therefore these factors must be considered in dry needling assessment and treatment.

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Needle Manipulation

There are various forms of needle manipulation that can be used to create a therapeutic lesion. The goal of the treatment needs to be considered and a decision is then made on the dosage of needling based on the variables of speed, amplitude and intensity of the needle manipulation.

No Manipulation

The needle is set in the targeted soft tissue without additional movement, rotation or manipulation. No to minimal post-needle soreness can be expected with this technique.

Basic Manipulation

A low velocity, higher amplitude needle manipulation technique that has the intent to create a therapeutic lesion in the targeted soft tissue. Some mild post-needling soreness can be expected.

Pistoning Manipulation

A high velocity, usually low amplitude, needle manipulation that has the intent to create a Local Twitch Response (LTR). The movement of the needle is in a conical pattern with the intent to produce as many LTR's as possible in a small area. This is the most aggressive form of needling, which can produce significant post-needling soreness.

Needle Rotation

The process of rotating the needle in situ with the intent to create a therapeutic lesion by "winding" the soft tissue around the needle. Care must be taken when rotating the needle, as it will become uncomfortable if done too aggressively. Initially, the needle may be difficult to remove, however allowing it to remain in situ longer will allow the soft tissue to relax allowing easy removal of the needle. Some mild to moderate post-needling soreness can be expected depending on how aggressive the rotation is performed. This technique can be performed in all areas except the facial region to reduce the likelihood of bruising.

Tenting

Needle "tenting" is a technique that can be used after needle rotation. Once the soft tissue is wound up as described above, the clinician can pull the needle up creating a lifting of the soft tissue or the tenting appearance. This technique is theoretically used to put a tension/stretch on the involved soft tissue. Over a short period of time there will be a definite loosening or releasing of the tissue allowing easy removal of the needle.

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Case Study – Clinical Applications

A 19-year old college gymnast injured her shoulder on the uneven bars 6 weeks ago and is experiencing pain with a heavy and weak sensation in her right arm limiting her from competing and sleeping through the night.

Presents with weak and painful (R) shoulder abduction & external rotation, biceps is strong but painful.

Cervical ROM is limited in right lateral flexion, rotation & extension secondary to pain.

Shoulder has a painful arc motion, IR-limited to hand to side hip, ER-45, she cannot reach across the midline of her body.

Neuro: reduced (R) biceps reflex c/t (L); Sensation intact

Pain with palpation of the Supra/Infraspinatus, mid-lower cervical paraspinals, trap, biceps and mid-scapular muscles.

Quantitative Analysis score is 7/16.

Relevant Articles

Segmental and Distal Effects of DN

Tsai et al., 2010: Needling of the Extensor Carpi radialis, both deep and superficially improved pain and PPT in the UT, and increased cervical ROM.

Hsieh et al., 2007: Needling the Infraspinatus eliciting as many LTR's as possible for 1-2 minutes reduced pain locally and satellite Trp's (Ant Deltoid, Ext Carpi Radialis Longus).

Tendon Needling

Uyger et al., 2021: The use of DN vs. corticosteroid injection to treat lateral epicondylitis: a prospective, randomized, controlled study.
Results: Between group analysis demonstrated DN more effective than CS up to 6 months on the PRTEE. Minor skin complications in the CS group.

Stoychev et al.,2020: DN as a Treatment Modality for Tendinopathy: A Narrative Review.
Results: The evidence suggests that local tendon needling (US guided and blinded) improves patient-reported outcome measures in patients with various locations of tendinopathy. Few studies report benefit of medication injection over dry needling alone.

Krey et al., 2015: Tendon needling for treatment of tendinopathy: A systematic review.
Results: Within group changes observed up to 6 months demonstrating statistical and clinically meaningful changes for impairment and functional data. The evidence suggests that tendon needling improves patient-reported outcome measures in patients with tendinopathy.

Rha et al., 2013: Comparison of therapeutic effect of US-guided platelet-rich plasma injection and dry needling in rotator cuff disease: a randomized controlled trial.
Results: Both groups experienced significant within-group changes at all time points and clinically meaningful changes on pain and disability up to 6 months. Between group differences for pain and disability were significantly better for those who received PRP injections at 3 and 6 months.

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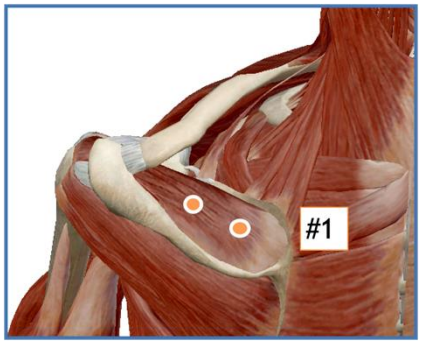
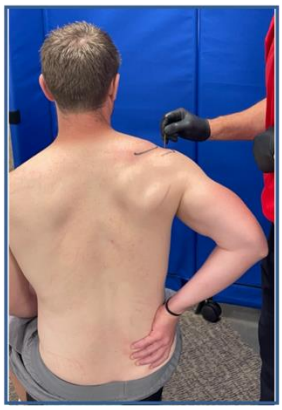
Supraspinatus Needling in 3 regions

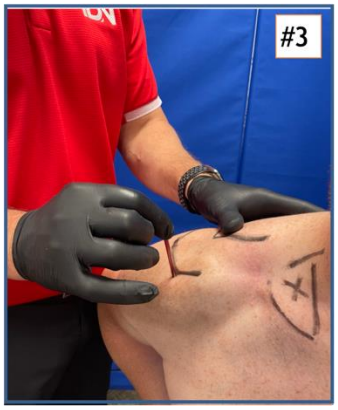
#1. Needle directly into the **supraspinatus muscle belly** located in the supraspinatus fossa. Locate the spine of the scapula and move one-finger width superior, place the needle perpendicular to the skin toward the boney backdrop of the supraspinatus fossa. Length of needle is dependent on patient size. ****Care must be taken to assure that the needle is in the fossa because the lung is below.**

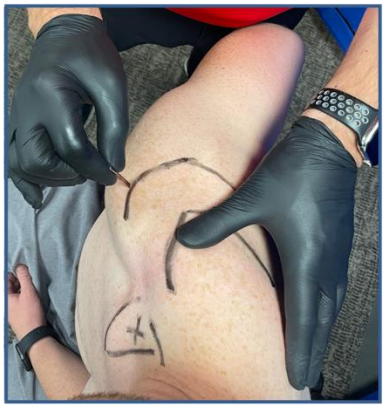


#2. To needle the **musculotendinous junction,** locate the "V" made up of the acromion and the AC joint. Place the needle medial to the "V". Apply and maintain inferior pressure to the distal end of the guide tube to lower the entry point of the needle to get inferior to the acromion. Maintain the inferior pressure on the needle as you deliver it laterally under the AC joint/acromion. The angle of needle entry should be adjusted so the needle point reaches musculotendinous tissue under the medial aspect of the acromion.

#3. **Supraspinatus Tendon Needling** is performed with the patient in a modified Crass position to expose the greater tubercle/tendon out from under the acromion. Palpate along the lateral acromion and identify the insertion of the supraspinatus tendon on the greater tubercle. The needle angle should be superior to inferior directed to the tendon insertion. Due to the variations in the distal acromion shape, the needle angle may need to be adjusted to reach the desired structures. Insertion into a tendon has a distinct "sticky" or "rubbery" end feel. Perform multiple insertions (as tolerated) into the tendon.







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Upper Trapezius Muscle Needling

Spinal Accessory Homeostatic Point (3)

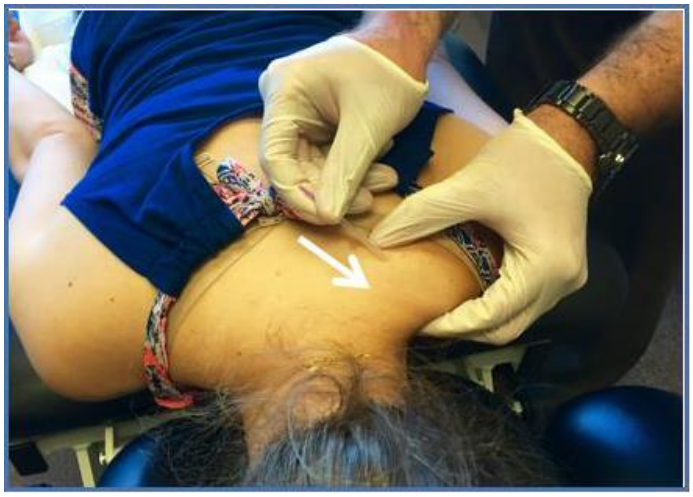
The homeostatic point can be needled in multiple positions and in most patients there are a considerable number of symptomatic points around it.

The obvious concern is the apex of the lung in the supraclavicular region. To reduce risk, use a pincer grasp of the upper trapezius muscle between your thumb and fingers.

Always locate your fingers above the supraclavicular space so that you are constantly aware of the location of the apex of the lung.

The needle is always directed toward your fingers and away from the lungs.

The length of the needle is dependent on patient size but 25 mm up to 50 mm is a reasonable guideline.



Clinical relevance of the Local Twitch Response (LTR)

Conflicting literature for the need to elicit or exhaust a LTR

More pain relief (Hong, 1994; D. Rha et al., 2011; Tekin et al., 2013)

Similar pain relief (Koppenhaver et al., 2017; Perreault et al., 2017)

Limited visibility, not easily detectable in lumbar musculature as in the upper trap (D. Rha et al., 2011)

More post-treatment soreness (Hong, 1994; Martín-Pintado-Zugasti et al., 2018)

Biochemicals associated with pain and inflammation are elevated in sites near to and remote from active myofascial trigger points. (Shah et al., 2008)

Active MTrP have a greater amount of sensitizing chemicals compared to latent TrP or normal tissue

These sensitizing chemicals were shown to be elevated systemically

Lowered concentrations of sensitizing and inflammatory chemicals occurred in the active groups who experienced the LTR

Explains the temporary pain reduction and PPT clinically

This suggest that elevations of biochemical associated with pain and inflammation may not be limited to localized areas of active MTrP but occur systemically.

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Info@Integrativedryneedling.com
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Continue Your Learning

Advanced Neurologic Dry Needling for Pain Management & Performance Enhancement: This is a one of a kind seminar, designed to provide our students with a deeper understanding of the therapeutic effects of dry needling on neuropathic and radiculopathic pain syndromes.

- Pain management nerve blocking techniques
- Advanced neuromuscular needling points
- Expansion and integration of the systemic nature of dry needling
- Peripheral nerve mapping concept to manage pain and radicular symptoms
- Expansion of Electrical Nerve Stimulation (ENS)
- Case study design for improved clinical decision-making and integration of information

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Specialty Courses Offerings:

- Neurologic Dry Needling for Pelvic Pain and Dysfunction: A systemic treatment model that addresses the multifactorial issues that contribute to and cause pelvic symptoms.
- NeuroRelease Treatment: A modern understanding of pain science with the time-tested manual therapy tools of cupping, instrument assisted massage, and the newer percussion massagers.
- Neurologic Dry Needling for Cranio-Cervical Pain and Dysfunction: Develop the knowledge and clinical skills required to effectively diagnose and treat painful neuromuscular conditions in the cranial, facial and cervical regions.
- Diagnostic Ultrasound for the Assessment & Dry Needling Treatment of Tendinopathy: Develop the knowledge and clinical skills to integrate diagnostic ultrasound into the evaluation and treatment of pathologic tendons and other soft tissue structures.

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