Pain Management & Sports Rehabilitation

Pre-course Reading

Integrativedryneedling.com

Course Agenda

Day One:

8:00 – 9:30	Lecture 1: 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 needling handling, insertion and manipulation techniques using ½”- 1” needle.
11:15-12:00	Lecture 2: Neuroanatomy of neuro-trigger points and development of Homeostatic neuro-trigger points.
12:00-1:00	Lunch break
1:00 –2:30	Lab: Surface anatomy of neuro-trigger points in head, cervical, upper extremities.
2:30- 3:30	Needling Lab-1”: Deep Radial (1), Superficial Radial (12), Lateral Antebrachial Cutaneous (9)
3:30 -3:45	Break
3:45 – 4:45	Lab: Surface anatomy of neuro-trigger points trunk and lower extremities
4:45-6:00	Lab: Quantitative Sensory Analysis

Day Two:

8:00 – 10:30	Needling Lab- 3” needling of 5 points in the hip. Iliopsoas/pectineus/adductor/Inferior Gluteal (16), Superior Cluneal (14). Break on your own
10:30-12:30	Needling Lab-2”: (2:2 Concept)- Lumbar to include Posterior cutaneous of L2 & L5, T7, Suprascapular (8) (infraspinatus) Latissimus Dorsi, Lateral Pectoral (17) with Pectoralis-horizontal needling.
12:30 –1:30	Lunch
1:30 – 3:00	Needling Lab-1”: (1:1 Concept)- Dorsal Scapular (13), Posterior Cutaneous of T6 (21), Abdominals,
3:00- 4:30	Craniofacial Pain and Dysfunction: • Needling Lab- ½”: Face and head- Supraorbital (23), Infraorbital (19), Masseter, Temporalis (horizontal needling) Suprahyoids, Greater Auricular (2)
4:30-6:00	Needling Lab: Lower Extremity: ITB (18), Lateral Popliteal (11), Saphenous (4), Common Fibular (24), Sural (10), Tibial (6), Deep Fibular (5)

Day Three:

8:00-10:00	Cervical Needling Lecture and Lab- Sternocleidomastoid, Greater Occipital (7), Posterior Cervical-Paravertebrals, Suboccipitals.
10:00–12:30	Case Applications- Shoulder (supraspinatus) needling (muscular, musculotendinous, subacromial approach); - Spinal Accessory (3), - Electrical nerve stimulation (ENS) demonstration and lab. - Special needling 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 Case studies as a group.
2:45- End	Practical Examinations.

INTEGRATIVE DRY NEEDLING

Pre-Course Reading and Review (Foundation Course)

Note: This course has both a written and practical examination on the last day. To receive course credit the participant must achieve an 80% or better on both the written and practical examinations. Each participant is required to complete this pre-reading manual prior to the first day of the course.

Course description:

The clinical lab-based course: Neurologic Dry Needling 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 applying the physiological mechanisms of dry needling within a systematic approach. The Integrative Dry Needling training program will develop the knowledge and clinical skills required to effectively identify and treat painful neuromuscular conditions in any region of the body.

Why Modern Dry Needling is not Traditional Chinese Acupuncture.

By 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).

1) Research demonstrates the clinical outcomes of needling "official" acupoints and non-acupoints are equally effective. This falsifies the uniqueness of meridians and acupoints.

2) 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.

3) 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.

Evolution of Dry Needling Models

Empirical Model type	Physiologic features of the model	Weakness of the model	Historical notes
Ancient 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 effecg 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 physiologiy 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.

The Laws of Dry Needling: The reality of dry needling therapy. - Dr Yun-Tao Ma.

There are different modalities of DN and this diversity, in fact, promotes the advancement of DN therapy. As science philosopher Karl Popper indicates - 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.

a. All needling models clinically work. All models are partially truthful models.

b. All theories are tentative and subjective to change as science advances. Differentiation of facts from theories is needed in understanding the therapy.

c. If any scientific researches support one model, in fact, the research will support all models.

d. If any scientific researches denies/falsifies the theory of particular model, it applies to that theory, not the clinical techniques of the model.

e. Each model has its unique benefits and unique limitations.

f. Physiologically all models do not conflict with each other. Thus, it is possible to integrate all models into a new model with new theories.

IDN Conceptual Model of the 3 S's and the 3 I's - Dr Frank Gargano

**I wrote this section as a simple way to describe how we view pain and dysfunction as a systemic issue and how neurologic dry needling can be utilized to address it.

The 3I's describe the "problem" with musculoskeletal pain and dysfunction, ***Inflammation***, ***Irritation***, and ***Inhibition***. The 3I's do not occur in isolation, they are coupled with one another in an injurious situation. Each of the 3I's occur ***locally (Symptomatic)***, ***Segmentally***, and ***Systemically***. If pain and dysfunction are treated solely at the site of the symptoms "you may get to the point but will miss the system," as we like to say. The human body works as an integrated organism and must be viewed and treated in this way. The human body shares neurology and circulation and to believe that an injury remains local to the site, absent an effect on the rest of the body, is limiting your treatment effect. This reminds me of the "guru" based treatment models of the 1980's and 90's. Clinicians would utilize a specific manual therapy paradigm and would become cult-like in their treatment approach, and if it failed the patient was labeled "not fixable". Since that time, the PT profession has become more eclectic in viewing the body as greater than the sum of its parts. This eclectic view is in perfect alignment with the IDN system of dry needling.

The days of focusing on a point as the source of pain and dysfunction are numbered and it is time to move toward a more reliable and global assessment and comprehensive treatment. The global thinking of the 3I's and the 3S's is the model that sums up both the injury of the system and a comprehensive treatment. The dilemma lies in the fact that we do not fully understand the experience of pain, dysfunction or the physiological mechanisms of dry needling. This is today's reality and if we can embrace it, we can continue to move our thinking forward.

The more you read about ***Inflammation*** the more it becomes apparent it is centered at the root of pain and dysfunction in the human body. This creates ***Irritation*** of peripheral nerves that can create the sensory experience of pain and the motor effects that drive neuromuscular ***Inhibition***. If inflammation could be managed more effectively we may be better able to mitigate its effect on both pain and motor dysfunction. This is not a revelation but a basic fact of treating most musculoskeletal conditions.

Following injury, the ***inflammation*** will reside in ***local*** tissues however, it will quickly become widespread ***(systemic)*** and involve multiple tissues but specifically the nervous system, such as is seen in chronic conditions. ***Neurogenic inflammation*** results from bioactive chemicals activating sensory neurons, which in turn activates the release of sensitizing chemicals from peripheral nerve terminals ***(irritation)***. This bi-directional process from local peripheral tissue to the CNS causes a more widespread inflammatory process. The ***inflammation*** that produces pain and dysfunction can be ***local***, ***segmental*** and or ***systemic***, which is what creates the challenge.

This may explain why the modern continuing education seminars now place more focus on assessing and treating the body as a whole, with less focus on identifying the specific tissue that is at fault. The tissue specific diagnoses that to aim identify the "involved" structure is faulty reasoning and should be reconsidered. Sizer et al.'s paper on sound clinical reasoning outlines the need for a multifactorial construct in encouraging innovative practice (Sizer et al., 2016). Acknowledging the lack of diagnostic accuracy in clinical testing, palpation and even patient report makes treatment design challenging to say the least. That may have led some to attempt to create a cookbook style of treatment where it is assumed that a common grouping of signs and symptoms will all respond to a specific treatment regimen. We all know how that worked out, and essentially lead back to the "not fixable" conclusions for patients that did not fit or respond favorably to the treatment mold they were put into.

IDN's 3S's concept of treatment provides no preconceived notions of the source of the 3I's, instead the 3S's and 3I's provide a foundation upon which to build a treatment plan.

• ***Symptomatic (local)*** - This is certainly the most obvious type of pain and dysfunction to treat as the patient tells you it hurts "here". This is usually an acute to sub-acute injury and the area may be swollen with a loss of motion.

• ***Segmental*** - Manual therapy clinicians understand that when treating musculoskeletal pain and dysfunction the spinal component cannot be ignored. They have been trained to first "clear" the spine to reduce the likelihood of missing a segmental problem based on a peripheral complaint. The ***segmental*** effects of needling help to reduce the symptoms of the ***local (symptomatic)*** points.

• ***Systemic*** - This is where the most confusion and even misunderstanding of mechanism is experienced. In the human body there is shared neurology, circulation and physiology that we cannot separate into pieces or parts. We base our ***systemic*** treatment on homeostatic points. Homeostatic points are key neurological areas in the body that have stronger therapeutic signaling to the CNS and are present in reproducible locations and patterns. The innervation zones of homeostatic points are extensions of major peripheral nerves that are present in consistent locations around the body based on the predictable anatomy of the peripheral nervous system. This is in stark contrast to locating the highly variable myofascial trigger points.

In some patient presentations (acute symptoms) treating just symptomatic points (local) may be all that is needed to get the desired effect. As you move from the acute patient to the sub-acute and into the chronic, the need to expand the treatment methods becomes empirically evident by the reduced clinical results. Assessment tools, such as quantitative sensory testing, may be used to identify the possible central mechanism driving the symptoms. We believe it is relevant to ***address the 3 S's together***, because clinically this approach has a better chance ***to address the 3 I's of pain and dysfunction***.

Determining Dosage of Dry Needling Treatment - Dr Frank Gargano

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:

1. **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.

2. **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.

3. **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.

4. **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.

5. **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.

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.

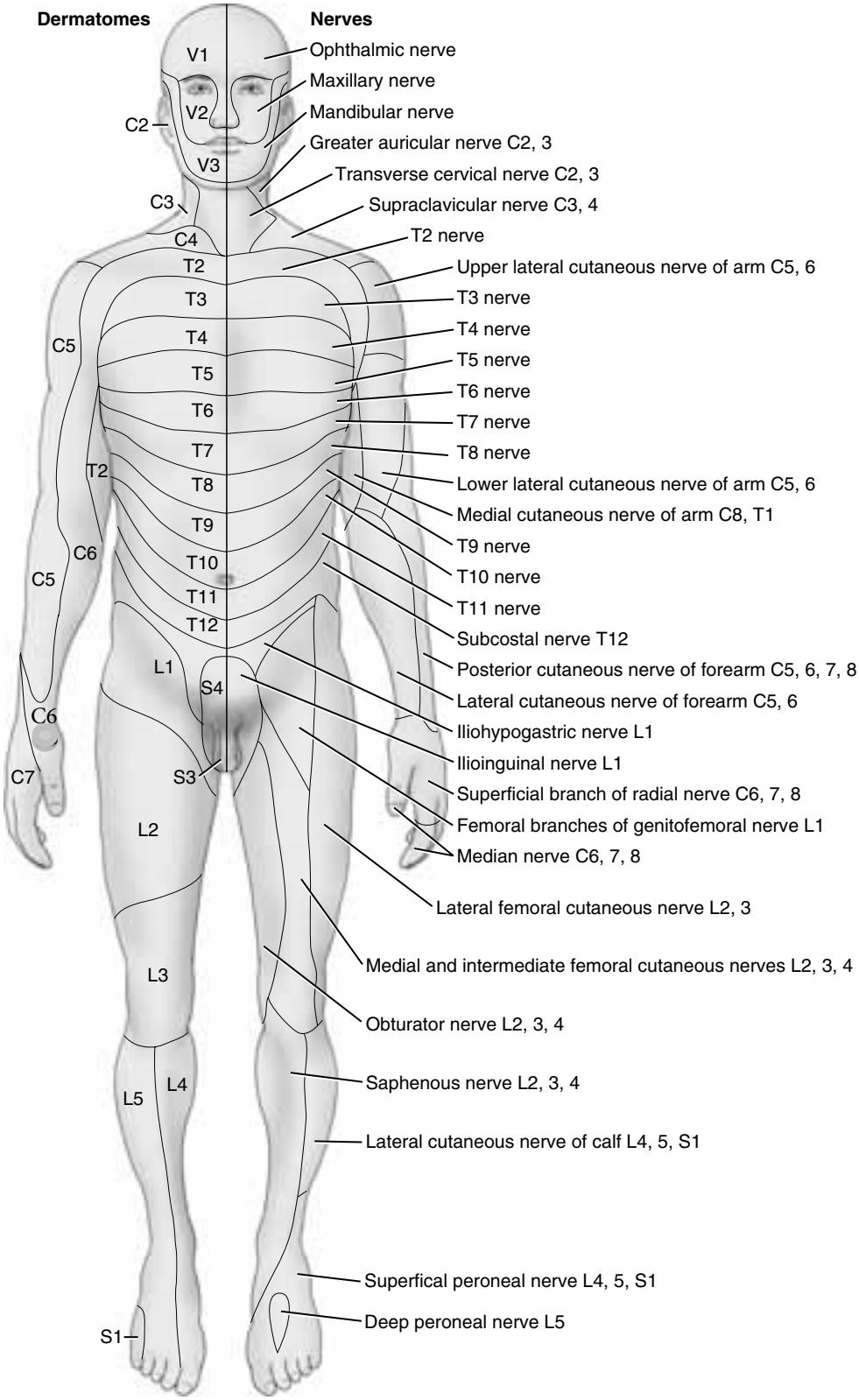
- Deep needling can now include needle manipulation techniques of moderate intensity, which may include pistoning, rotation and or tenting techniques.
- ENS can be introduced and provided for up to 5 minutes of active muscle contraction.
- Number of needles: Up to 20 needles

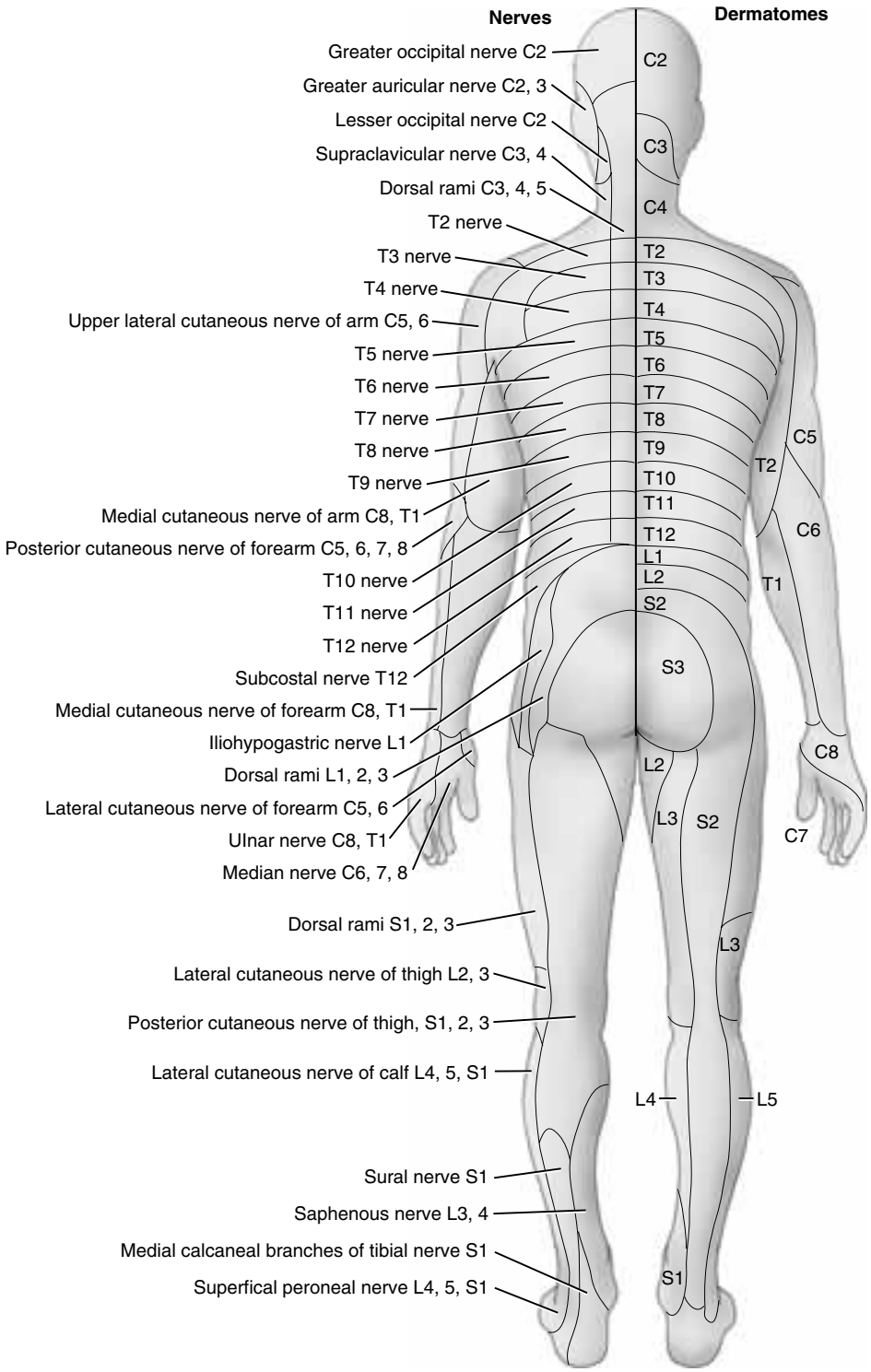
High Dosage: Applies to patients that have had significant experience with dry needling treatment and are likely healthy, active individuals with excellent healing potential.

- 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.


Dermatomes
Nerves
V1
V2
V3
C2
C3
C4
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
C5
C6
C7
L1
L2
L3
L4
L5
S1
S3
S4
Ophthalmic nerve
Maxillary nerve
Mandibular nerve
Greater auricular nerve C2, 3
Transverse cervical nerve C2, 3
Supraclavicular nerve C3, 4
T2 nerve
Upper lateral cutaneous nerve of arm C5, 6
T3 nerve
T4 nerve
T5 nerve
T6 nerve
T7 nerve
T8 nerve
Lower lateral cutaneous nerve of arm C5, 6
Medial cutaneous nerve of arm C8, T1
T9 nerve
T10 nerve
T11 nerve
Subcostal nerve T12
Posterior cutaneous nerve of forearm C5, 6, 7, 8
Lateral cutaneous nerve of forearm C5, 6
Iliohypogastric nerve L1
Ilioinguinal nerve L1
Superficial branch of radial nerve C6, 7, 8
Femoral branches of genitofemoral nerve L1
Median nerve C6, 7, 8
Lateral femoral cutaneous nerve L2, 3
Medial and intermediate femoral cutaneous nerves L2, 3, 4
Obturator nerve L2, 3, 4
Saphenous nerve L2, 3, 4
Lateral cutaneous nerve of calf L4, 5, S1
Superfical peroneal nerve L4, 5, S1
Deep peroneal nerve L5


Nerves
Dermatomes
Greater occipital nerve C2
Greater auricular nerve C2, 3
Lesser occipital nerve C2
Supraclavicular nerve C3, 4
Dorsal rami C3, 4, 5
T2 nerve
T3 nerve
T4 nerve
Upper lateral cutaneous nerve of arm C5, 6
T5 nerve
T6 nerve
T7 nerve
T8 nerve
T9 nerve
Medial cutaneous nerve of arm C8, T1
Posterior cutaneous nerve of forearm C5, 6, 7, 8
T10 nerve
T11 nerve
T12 nerve
Subcostal nerve T12
Medial cutaneous nerve of forearm C8, T1
Iliohypogastric nerve L1
Dorsal rami L1, 2, 3
Lateral cutaneous nerve of forearm C5, 6
Ulnar nerve C8, T1
Median nerve C6, 7, 8
Dorsal rami S1, 2, 3
Lateral cutaneous nerve of thigh L2, 3
Posterior cutaneous nerve of thigh, S1, 2, 3
Lateral cutaneous nerve of calf L4, 5, S1
Sural nerve S1
Saphenous nerve L3, 4
Medial calcaneal branches of tibial nerve S1
Superfical peroneal nerve L4, 5, S1
C2
C3
C4
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
L1
L2
S2
S3
L2
L3
S2
L3
L4
L5
S1
C5
T2
C6
T1
C8
C7

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	**2 finger widths distal to the lateral epicondyle of the elbow in the extensor groove between the brachioradialis and extensor carpi radialis brevis**
Needle direction	Perpendicular to skin
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

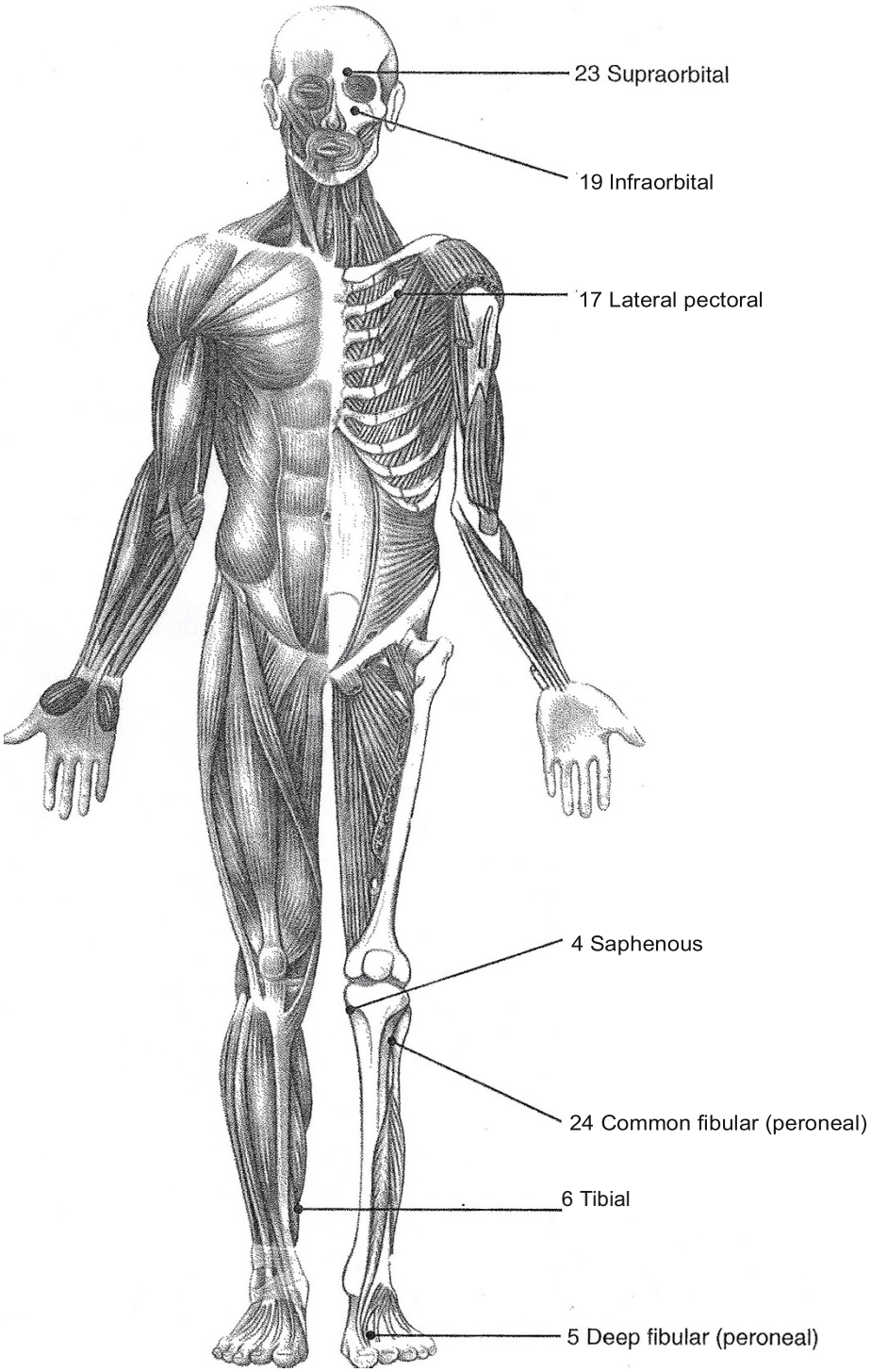
7. Greater Occipital	**Locate the C2 spinous process and move laterally over the paraspinal muscle bulk and move slightly superior to be located over the inferior oblique muscle. Halfway between C2 spinous process and C1 transverse process.**
Needle length	25-50mm / 1-2 inch
Needle direction	Perpendicular 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 bent and forearm supinated, the HNTrP is at the lateral margin of the cubital crease.**
Needle direction	Perpendicular to skin in a posterior to medial direction towards 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.

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	**2 finger widths inferior and perpendicular to the center of the clavicle.**
Needle length	50mm / 2inch
Needle direction	Medial to lateral direction aiming the needle tip toward the clinician's palpating fingers
Needle depth	As deep as necessary until detected by palpating fingers under pectoralis major.
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.

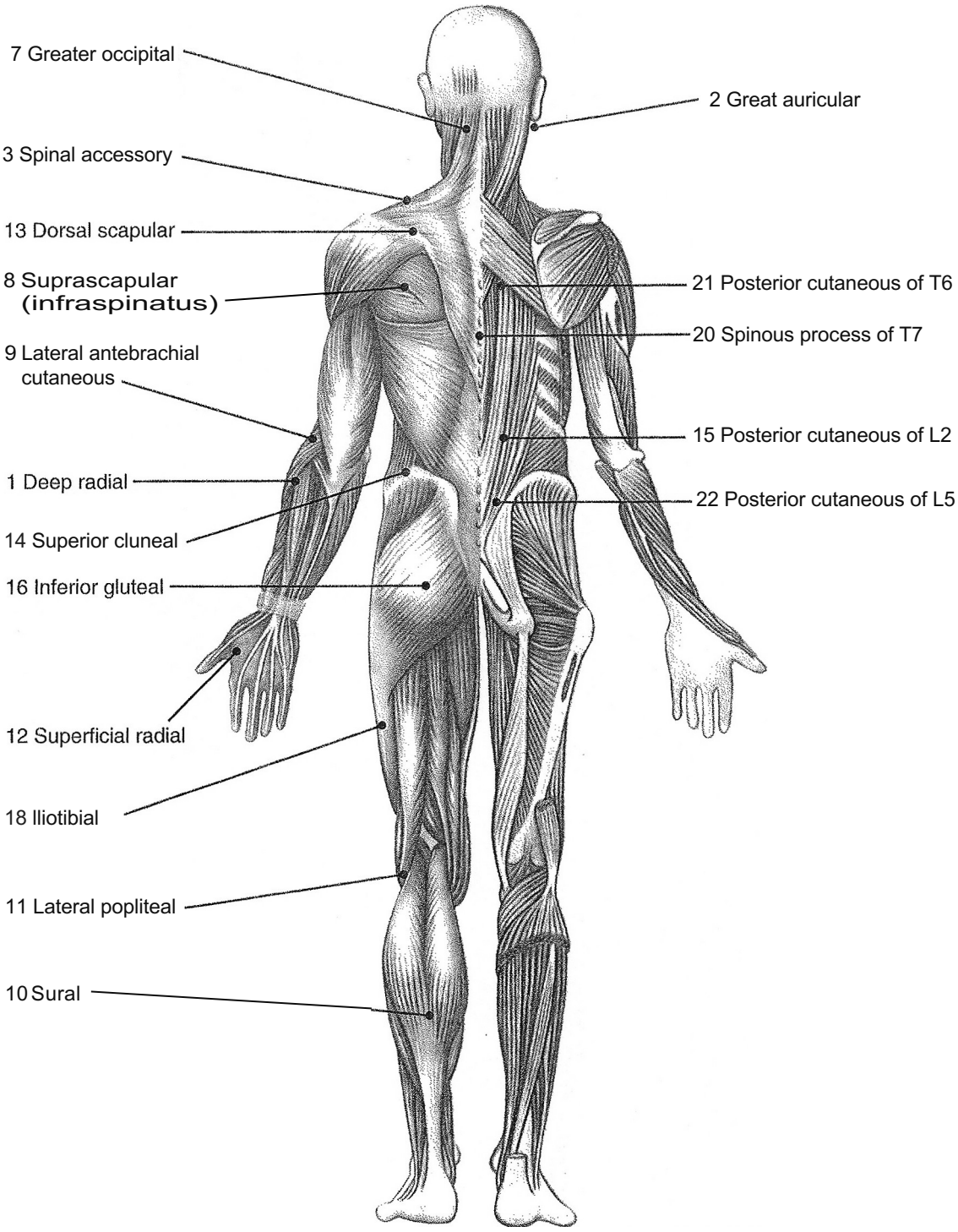
24 Homeostatic Neuro-Trigger Points (HNTrP)

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

Homeostatic Neuro-Trigger Points



Homeostatic Neuro-Trigger Points



Dry Needling Research

Relevant Information for Practical Application of DN

1. Overall Effectiveness of Dry Needling (DN) on Pain and Disability
   - Deep DN of Myofascial Trigger Points (MTrP)
2. Local Twitch Response (LTR)
3. DN of Symptomatic versus Non-symptomatic Points
4. Superficial DN
5. Superficial versus Deep DN
6. Tendon Needling
7. Paravertebral DN
8. Non-segmental Distant DN

Overall Effects of DN on Pain and Disability

Systematic Reviews with Meta-analysis
Level 1a Evidence

Gattie, 2017
- Trigger Point DN for Musculoskeletal Conditions by Physical Therapists

Liu, 2015
- DN for MTrP associated with neck and shoulder pain

Hu, 2018
- DN for Low Back Pain

Kietrys, 2013
- DN for upper quarter MPS

Consistent results across systematic reviews for various conditions that DN is more effective than sham, control, or placebo. Mixed results when DN was compared to other interventions.

Local Twitch Response

Clinical relevance of the LTR

- Conflicting literature for need to elicit or exhaust a LTR
  - More pain relief Hong,1994; Tekin,2013; Rha,2011
  - Similar pain relief as no LTR Perreault,2017; Koppenhaver,2017
  - Limited visibility Rha, 2011
    - Not easily detectable in lumbar musculature as the upper trapezius
  - More Post treatment soreness Hong,1994; Matin-Pintado-Zugasti, 2018

Local Twitch Response

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 LT
- Explains the temporary pain reduction and PPT clinically
- This suggests that elevations of biochemicals associated with pain and inflammation may not be limited to localized areas of active MTPs but occur systemically.

Superficial Needling

2 studies have evaluated the effectiveness of superficial needling versus control or placebo

Edwards and Knowles (2003)
- Compared superficial needling with active stretching to active stretching alone and a control group for 6 weeks.
- Needling group had significantly less pain than the control group and increased PPT compared to the active exercise only group

MacDonald et al. (1983)
- Compared superficial needling to placebo for chronic lumbar MTrPs
- Needling group had significantly better results on pain reduction

Superficial vs. Deep Needling

Superficial versus deep dry needling or acupuncture for reducing pain and disability in spine-related painful conditions: A systematic review with meta-analysis.

Griswold (2019)
- 10 studies included in the MA involving 2603 comparisons of deep and superficial needle insertion for pain relief.
  - Deep Needling (>10 mm into muscle)
  - Superficial Needling (<10 mm or Subcutaneous)
  - Both superficial and deep needling effective for pain reduction
    - Deeper insertion shown to be more effective than superficial

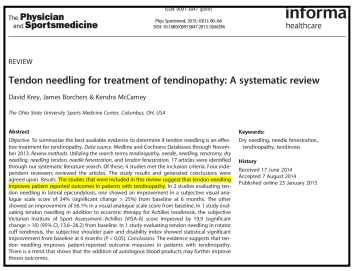
Secondary analysis
- Needling local or a combination of local and remote the site site of pain results in greater pain reduction than remote only.

DN of Symptomatic vs. Non-Symptomatic

Wong et al. (2015) - Systematic Review with Meta-analysis

- Investigated the comparative effectiveness between local needling of tender points and distant needling of non-tender points for chronic musculoskeletal pain.
  - Moderate evidence that both local and distant points elicit pain reduction compared to controls.
  - Local needling of an inflamed area (tender) elicited better pain reduction than a selected local acupuncture points.

Tendon Needling


The Physician and Sportsmedicine

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REVIEW

Tendon needling for treatment of tendinopathy: A systematic review

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Abstract

Objective. To summarize the best available evidence to determine if tendon needling is an effective treatment for tendinopathy. Data source. Medline and Cochrane Databases through November 2013. Review methods. Utilizing the search terms tendinopathy, needle, needling, tenotomy, dry needling, needling tendon, needle fenestration, and tendon fenestration, 17 articles were identified through our systematic literature search. Of these, 4 studies met the inclusion criteria. Four independent reviewers reviewed the articles. The study results and generated conclusions were agreed upon. Results. The studies that were included in this review suggest that tendon needling may improve patient-reported outcome measures in patients with tendinopathy. Ultrasound guided needling in lateral epicondylosis, one showed an improvement in a subjective visual analogue scale score of 34% (significant change > 25%) from baseline at 6 months. The other showed an improvement of 56.7% in a visual analogue scale score from baseline. In 1 study evaluating tendon needling in addition to eccentric therapy for Achilles tendinosis, the subjective Victorian Institute of Sport Assessment–Achilles (VISA-A) score improved by 19.9 (significant change > 10) (95% CI, 13.6–26.2) from baseline. In 1 study evaluating tendon needling in rotator cuff tendinosis, the subjective shoulder pain and disability index showed statistical significant improvement from baseline at 6 months ($P < 0.05$). Conclusions. The evidence suggests that tendon needling improves patient-reported outcome measures in patients with tendinopathy. There is a trend that shows that the addition of autologous blood products may further improve those outcomes.

Keywords: Dry needling, needle fenestration, tendinopathy, tendinosis

History

Received 17 June 2014
Accepted 7 August 2014
Published online 23 January 2015

- **Conclusions:** 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.

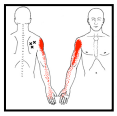
Segmental and Distal Effects

Tsai (2010)

- Needling of the extensor carpi radials both deep and superficially improved pain and PPT in the UT, and increased cervical ROM.

Hsieh (2007)

- Needling the infraspinatus eliciting as many LTR as possible for 1-2 minutes reduced pain locally and satellite TrP (Anterior deltoid, Extensor carpi radialis longus)



Travell and Simons 1998

Segmental and Distal DN for LBP

Journal of Manual & Manipulative Therapy

ISSN: 1066-9817 (Print) 2042-6186 (Online) Journal homepage: https://www.tandfonline.com/loi/yjmt20

A randomized clinical trial comparing non-thrust manipulation with segmental and distal dry needling on pain, disability, and rate of recovery for patients with non-specific low back pain

D. Griswold, F. Gargano & K. E. Learman

Basic insertion without needle manipulation produced similar outcomes on pain and disability as NTM for NSLBP. Targeted segmental and distal peripheral nerve distributions (Not MTrP)

Paravertebral Needling

Couto (2013)

- A randomized sham-controlled trial:
  - Deep needling at the spinal root level where symptoms were in the area of that root's myotomes, dermatomes, and sclerotomes + local needling
  - Comparison groups included local DN and sham e-stim
- Significantly greater reductions in pain, and increase in PPT for paravertebral + local needling

Ga (2007)

- RCT of 40 subjects with MPS of the upper trapezius
- 2 groups
  - Local TrP needling
  - Local TrP needling and Paravertebral needling
- Inclusion of paravertebral points resulted in greater ROM and more pain reduction

Summary

- Superficial dry needling is more effective than placebo, sham, or no treatment; not as effective as deep needling
- Needling of non-local trigger points reduces pain and increases PPT in primary trigger point sites
- Inclusion of paravertebral points results in clinically significant results compared to local needling in isolation
- Further investigation is needed to determine if LTR are necessary; several studies demonstrate immediate or short term improvement in pain/disability but to date no high quality, long term trials to support it.
- Elevations of biochemicals associated with pain and inflammation may not be limited to localized areas of active MTPs but occur systemically.

Blood Borne Pathogens and Universal Precautions

The information in this lecture has been drawn from the Centers for Disease Control and Prevention (CDC), and Occupational Safety and Health Administration (OSHA). This information has been adapted to the specific practice requirements of dry needling therapy. We suggest that you periodically consult the websites of the CDC and OSHA for new information, recommendations and/or requirements.

Table of Contents

Part 1: Knowledge of Bloodborne Pathogens

1.1 Introduction: Concept of infection

The following information is related to clinical practice of dry needling therapy. The human body is constantly exposed to infectious agents, on the skin, on mucous membranes of the eyes, in the mouth, respiratory passageways, urinary tract, respiratory passageways, urinary bladder, and colon. In healthy persons, these infectious pathogens do not cause infection as they are called normal flora. But these agents can cause diseases if they are introduced to other tissues or the immune system is ineffective in controlling the infectious agents. In addition, if a person is intermittently exposed to virulent bacteria or viruses from outside the body, specific infections like pneumonia, streptococcal and staphylococcal infections may occur.

Evolving with these pathogens, our body has established natural barriers to prevent infection. The barriers include intact skin, healthy respiratory mucosa, which expel inhaled pathogens, stomach acid that kills swallowed bacteria, cleaning effect of tears, urine, and acidity of vaginal secretions. Microbes can enter the body through a cut or wound of the skin, orifice (mouth, nose, urethra, etc.). There are many potential sources of infection in a clinic office, such as body secretions (sweat, nasal fluid, saliva, blood), dust, clothing, furniture, etc. Patients can get infected in a clinic office through two pathways, autogenous infections and cross-infections.

Autogenous infections

The infectious agents the patient is carrying cause this pathway of infection. It may happen in two ways in dry needling therapy. Firstly, if the same needle is used in two locations A and B, the bacteria on location A will be transferred to location B, which may cause an infection on B location. To prevent it, always use single-use and disposal needles. Secondly, for example, if the abdominal needling punctures the peritoneum and the intestine, the bacteria normal to intestine now will invade the abdominal cavity potentially causing an infection, such as life-threatening peritonitis. To prevent this occurring the guidelines of needling safety should be exactly followed.

Cross-infections

The infection is acquired from other sources, such as from other patients or from practitioner or by the environment. Infectious agents can travel from one host to another in a variety of ways, the media to transfer the agents can be bodily fluids, dust or droplets of moisture in the air or on the surface of office furniture, or personal contact. If the density of an infectious agent is high enough, it may cause infection even in healthy persons. The most serious infection acquired in a medical office is hepatitis B virus and HIV. Tuberculosis (TB) is another concern.

To prevent cross-infection, the proper guidelines will be provided in the next section. But as a rule, dry needling should not be used in patients with infectious diseases, especially patients with serious infections. Before treatment, a precise medical history should be obtained.

1.2 Bloodborne pathogens

Bloodborne pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

Part 2 Bloodborne Pathogens: Hepatitis

2.1 Hepatitis: CDC Recommendation

The CDC states that the highest risks occur during the professional training period; therefore, vaccination should be completed while in school. [1] When an employee hired for a position of high risk of infection to hepatitis refuses to be vaccinated, this employee should be required to complete and sign a document stating that he or she understands the risk of not being vaccinated and is refusing the vaccination despite the risk to acquire Hepatitis.

2.2 Hepatitis

Hepatitis means the inflammation of the liver. There are five types of hepatitis viruses: A, B, C, D, and E. Hepatitis A and E are transmitted through fecal-contaminated water and food. The others are transmitted by blood and sexual contact. For our practice, we will focus on hepatitis B and C, which are known to be blood-borne infections. For information on the other types of hepatitis consult the CDC website. (www.cdc.gov)

2.3 Hepatitis B (HBV)

Hepatitis B virus (HBV) is one of the bloodborne pathogens affecting office practice. HBV can cause lifelong infection, cirrhosis, cancer of the liver, and liver failure. Chronic infection is more likely to develop in persons infected as infants or young children; adults may have higher rates of new infections and acute infection. Health care professionals can have HBV immunity if they receive the HBV vaccine.

Transmission of HBV

HBV is contagious through contact with contaminated blood and body fluids, such as sharing living/working space and daily life utilities like eating utensils, toothpaste, and participating in high risk behaviors (unprotected sex, etc.).

It is estimated that there are 1.25 million Americans chronically infected with HBV, of whom 20-30% were infected since childhood. When treating patients, the medical history should be thoroughly recorded. Some HBV patients have more virus in their blood (source patients) so they are more likely to transmit diseases. Healthcare professionals have significant risk of exposure to HBV. The risk of HBV infection in the office is primarily related to the degree of contact with blood of the source patients. Healthcare professionals are at a higher risk of HBV infection than the public if their work involves occupational exposure to blood and body fluid. It should be noted that the unintentional injury of a healthcare worker from a needle stick or cut by a contaminated instrument could be the mode of transmission from the source patient.

HBV Infection Process

After initial infection, the incubation period for HBV is 50 to 180 days. During this period, the infectious virus appears in the blood, saliva, urine, feces, semen, tears and even sweat. The carrier during this period has no symptoms but can spread the virus. The early symptoms begin with mild flu-like signs, fever, chills, nausea, general fatigue, insidious onset of anorexia, joint pain or abdominal pain, skin rash and diarrhea. These symptoms may last two to six weeks. After the initial symptoms, extreme fatigue and depression may follow for several months. Approximately 30% of carriers have no signs or symptoms. Fully 70% of HBV patients that have recovered from the symptomatic stage are still infectious for more than three months after the symptoms have subsided. If a healthcare worker is infected, he may unknowingly transmit HBV to patients or office staff. The infected clinicians should not work but consult with a physician for treatment until fully recovered.

Precautionary Measures

High standards of office hygiene and clean needle technique should be strictly followed. For dry needling therapists, patients with any type of bloodborne pathogen should not be treated with dry needling and the patients should be referred a physician. Single-use sterile disposable needles should always be used and after use should be disposed of properly according to specific state guidelines.

Treatment of HBV

There are established pharmaceuticals to treat hepatitis B. The treatment of acute stage is mainly symptomatic. HBV patients should be evaluated by their physician for liver disease.

2.4 Hepatitis C (HCV)

Hepatitis C virus (HCV) infection is the most common chronic bloodborne viral infection in the United States. A national survey of the civilian, non-institutionalized U.S. population found that 1.8% of Americas have been infected with HCV, and 75-85% of them are chronically infected. Many of those infected are not aware of their infection resulting in chronic liver disease that may not become apparent for 10-20 years. Those with the highest risk of HCV infection are drug users. Sixty percent of individuals with a history of injection drug use are infected. 15% are infected through sexual intercourse. About 10% of those infected have no recognizable source of infection. There is a risk of occupational exposure for HCV if the healthcare workers are exposed to large amounts of blood (surgery, hemodialysis). The incubation period of HCV is 20 -90 days, with most cases occurring 5-10 weeks after being infected. After infected, the period of communicability can extend from one week through the chronic stage. The onset is insidious, and the symptoms may

include anorexia, vomiting, jaundice, and general fatigue. The course is similar to HBV but lasts longer.

Treatment of HCV

Therapy for HCV is changing rapidly. Treatment is based on liver enzyme levels, genotype of infected virus, and liver conditions. Usually the treatment may extend from 6 months to 2 years.

2.5 Other Types of Hepatitis

Other types of hepatitis, hepatitis A (HAV), hepatitis D (HDV), and hepatitis E (HEV) are not bloodborne infections. These conditions are not discussed here. Their information can be obtained from the CDC website. (www.cdc.gov)

2.6 Chronic Carriers of Hepatitis

Chronic carriers of HBV and HBC can spread the virus through bodily fluid and excretions. They are classified into two categories: Chronic persistent and chronic active. The former is asymptomatic or has minimal symptoms but can infect others. The latter shows progressive symptoms such as malaise, general fatigue, anorexia, jaundice and weight loss. Five to ten percent of HBV and 75-85% of HCV patients develop the chronic condition. Thus, as a general precaution, chronic carriers of hepatitis should not be treated with dry needling.

Table 1: Brief Summary of Hepatitis Characteristics

Hepatitis	Incubation	Transmission	Onset	Chronic
B	50-180 days	Bloodborne	Insidious	Depends on age group
C	20-90 days	Bloodborne	Insidious	60-70%
A	15-50 days	Fecal-oral	Abrupt	No
D	Unknown	Unknown	Unknown	Unknown
E	15-60 days	Fecal-oral	Abrupt	No

Table 2: Key Facts of HBV and HCV

	Hepatitis B	Hepatitis C
Number of US cases	Estimated 1.2 million people living with chronic Hepatitis B. About 19,800 new cases/year	Estimated 3.2 million living with chronic Hepatitis C. About 29,700 new cases/year
Key facts	About 2 in 3 people do not know they are infected by HBV	About 50% of infected do not know they are infected.
How long does it last?	From a mild illness, lasting a few weeks to a serious life-long or chronic condition.	From a mild illness, lasting a few weeks to a serious life-long infection. Most infected become chronic Hepatitis C.
How is it spread?	Exposure to blood, semen, other body fluids of the infected. Sharing personal items. Outbreaks from poor infection control in healthcare facilities.	Exposure to blood or body fluids of the infected. Sharing personal items. Outbreaks from poor infection control in healthcare facilities.
How serious is it	15-25% of infected patients develop chronic liver disease, cirrhosis, liver failure, or liver cancer	75-85% of infected develop chronic infection. 5-20% develops cirrhosis. 1-5% will die from cirrhosis or liver cancer.
Treatment	Medication and supportive care Some chronic patients are treated with antiviral drugs.	Acute: antiviral and supportive care. Chronic: antiviral drugs

Reference: http:// www.cdc.gov/ncidod/ diseases/ hepatitis

Part 3 Bloodborne pathogens: Human Immunodeficiency Disease (HIV)

3.1 HIV Basics

HIV virus can lead to acquired immunodeficiency syndrome, or AIDS. Unlike some other viruses, the human body cannot get rid of HIV. That means that once you have HIV, you have it for life. HIV spreads through body fluids that affect specific cells of the immune system, called CD4 cells, or T cells. Over time, HIV can destroy so many of these cells that the body can't fight off infections and disease.

About 50,000 people get infected with HIV each year. In 2010, there were around 47,500 new HIV infections in the United States. CDC estimates that 1,201,100 persons aged 13 years and older are living with HIV infection, including 168,300 (14%) who are unaware of their infection. Over the past decade, the number of people living with HIV has increased, while the annual number of new HIV infections has remained relatively stable. Still, the pace of new infections continues at far too high a level—particularly among certain groups.

HIV Incidence (new infections): The estimated incidence of HIV has remained stable overall in recent years, at about 50,000 new HIV infections per year. Within the overall estimates, however, some

groups are affected more than others. Men having sex with men continue to bear the greatest burden of HIV infection, and among races/ethnicities, African Americans continue to be disproportionately affected.

HIV Diagnoses (new diagnoses, regardless of when infection occurred or stage of disease at diagnosis): In 2013, an estimated 47,352 people were diagnosed with HIV infection in the United States. In that same year, an estimated 26,688 people were diagnosed with AIDS. Overall, an estimated 1,194,039 people in the United States have been diagnosed with AIDS.

Deaths: An estimated 13,712 people with an AIDS diagnosis died in 2012, and approximately 658,507 people in the United States with an AIDS diagnosis have died overall. The deaths of persons with an AIDS diagnosis can be due to any cause—that is, the death may or may not be related to AIDS.

3.2 HIV Transmission

In the United States, HIV is spread mainly by sexual intercourse or sharing drug injection equipment such as needles with a HIV infected person. Only certain fluids—blood, semen, pre-seminal fluid, rectal fluids, vaginal fluids, and breast milk—from an HIV infected person can transmit HIV. These fluids must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream (from a needle or syringe) for transmission to possibly occur. Mucous membranes can be found inside the rectum, the vagina, the opening of the penis, and the mouth.

In the United States, HIV is spread mainly by

Having sex with someone who has HIV. In general:

- Anal sex is the highest-risk sexual behavior. Receptive anal sex (bottoming) is riskier than insertion anal sex (topping).
- Vaginal sex is the second highest-risk sexual behavior.
- Having multiple sex partners or having other sexually transmitted infections can increase the risk of infection through sex.
- Sharing needles, syringes, rinse water, or other equipment (works) used to prepare injection drugs with someone who has HIV.

Less commonly, HIV may be spread by

- Being born to an infected mother. HIV can be passed from mother to child during pregnancy, birth, or breastfeeding.
- Being stuck with an HIV-contaminated needle or other sharp object. This is a risk mainly for health care workers.
- Receiving blood transfusions, blood products, or organ/tissue transplants that are contaminated with HIV. This risk is extremely small because of rigorous testing of the US blood supply and donated organs and tissues.
- Eating food that has been pre-chewed by an HIV-infected person. The contamination occurs when infected blood from a caregiver’s mouth mixes with food while chewing and is very rare.
- Being bitten by a person with HIV. Each of the very small number of documented cases

has involved severe trauma with extensive tissue damage and the presence of blood. There is no risk of transmission if the skin is not broken.

- Oral sex—using the mouth to stimulate the penis, vagina, or anus (fellatio, cunnilingus, and rimming). Giving fellatio (mouth to penis oral sex) and having the person ejaculate (cum) in your mouth is riskier than other types of oral sex.

- Contact between broken skin, wounds, or mucous membranes and HIV-infected blood or blood-contaminated body fluids. These reports have also been extremely rare.

- Deep, open-mouth kissing if the person with HIV has sores or bleeding gums and blood is exchanged. HIV is not spread through saliva. Transmission through kissing alone is extremely rare.

3.3 HIV Infection Process

HIV disease has a well-documented progression. Untreated, HIV is almost universally fatal because it eventually overwhelms the immune system—resulting in acquired immunodeficiency syndrome (AIDS). HIV treatment helps people at all stages of the disease, and treatment can slow or prevent progression from one stage to the next.

A person can transmit HIV to others during any of these stages:

Acute infection: Within 2 to 4 weeks after infection with HIV, you may feel sick with flu-like symptoms. This is called acute retroviral syndrome (ARS) or primary HIV infection, and it's the body's natural response to the HIV infection. (Not everyone develops ARS, however—and some people may have no symptoms.) During this period of infection, large amounts of HIV are being produced in your body. The virus uses important immune system cells called CD4 cells to make copies of itself and destroys these cells in the process. Because of this, the CD4 count can fall quickly.

Your ability to spread HIV is highest during this stage because the amount of virus in the blood is very high. Eventually, your immune response will begin to bring the amount of virus in your body back down to a stable level. At this point, your CD4 count will then begin to increase, but it may not return to pre-infection levels.

Clinical latency (inactivity or dormancy): This period is sometimes called asymptomatic HIV infection or chronic HIV infection. During this phase, HIV is still active, but reproduces at very low levels. You may not have any symptoms or get sick during this time. People who are on antiretroviral therapy (ART) may live with clinical latency for several decades. For people who are not on ART, this period can last up to a decade, but some may progress through this phase faster. It is important to remember that you are still able to transmit HIV to others during this phase even if you are treated with ART, although ART greatly reduces the risk. Toward the middle and end of this period, your viral load begins to rise and your CD4 cell count begins to drop. As this happens, you may begin to have symptoms of HIV infection as your immune system becomes too weak to protect you.

AIDS (acquired immunodeficiency syndrome): This is the stage of infection that occurs when your immune system is badly damaged, and you become vulnerable to infections and infection-related cancers called opportunistic illnesses. When the number of your CD4 cells falls below 200 cells per cubic millimeter of blood (200 cells/mm3), you are considered to have progressed to AIDS. (Normal CD4 counts are between 500 and 1,600 cells/mm3.) You can also be diagnosed with AIDS if you develop one or more opportunistic illnesses, regardless of your CD4 count. Without treatment, people

who are diagnosed with AIDS typically survive about 3 years. Once someone has a dangerous opportunistic illness, life expectancy without treatment falls to about 1 year. People with AIDS need medical treatment to prevent death.

3.4 Treatment of HIV

There is no cure for AIDS. Most reports of a cure involve HIV-infected people who needed treatment for a cancer that would have killed them otherwise. But these treatments are very risky, even life threatening, and are used only when the HIV-infected people would have died without them. Antiretroviral therapy (ART), however, can dramatically prolong the lives of many people infected with HIV and lower their chance of infecting others. It is important that people get tested for HIV and know that they are infected early so that medical care and treatment have the greatest effect. AZT was approved in 1987 and a variety of treatment has been developed to slow the progression of the disease.

3.5 Risks to Healthcare Workers

Special precautions should be taken when working with HIV patients because they may have other pathogens that are contagious such as tuberculosis, staphylococcal infection, hepatitis, and herpes virus. It is imperative to practice universal precautions when working with patients who may be HIV seropositive.

Part 4. CDC's Universal Precaution Recommendations

4.1 Definition: Updated May 9, 2014

Universal precautions, also termed standard precaution, refers to certain infection-control steps that medical professionals take to reduce the risk of transmitting HIV and other infectious diseases. The scientific basis of universal precautions is that individuals should treat any blood or bodily fluid as though it contains hepatitis, HIV or another infectious agent. In other words, universal precautions assume that all bodily fluids are dangerous and tell medical professionals to treat them accordingly.

This not only protects caregivers, but also, by applying the same procedures to everyone, removes the stigma that might otherwise be associated with glove-and-mask use around highly infectious patients.

4.2 OSHA Mandated the Use of Universal Precautions

OSHA mandated the use of universal precautions as a form of infection control in the early 1990s, after it became clear that HIV spread through exposure to blood and certain other bodily fluids. One of the most interesting aspects of the mandate is that the 1987 CDC document on which OSHA standards are based explicitly acknowledges the fact that medical history and examination are not reliable methods of identifying bloodborne illnesses in all patients. This is still true, particularly during the early weeks of HIV infection, even though the HIV test has improved. It is also a problem for several other illnesses.

4.3 Summary of CDC's Universal Precaution Recommendations

The following recommendations are provided, and the clinicians should follow the recommendations wherever applied.

1 Wash hands before and after each medical procedure (may use a waterless hand cleaner).
2 Wear gloves whenever there is a possibility of coming in contact with blood or other potentially infectious materials (body fluids, synovial fluid, wound exudates, etc.).
3 Wear full-body gowns whenever there is a possibility of blood splashing onto the practitioner.
4 Wear face masks and eye protection whenever there is a possibility of blood splashing into the practitioner's face.
5 Dispose of all contaminated sharp objects in an appropriate puncture-proof container.
6 Dispose of all contaminated personal protective equipment in an appropriate container marked bio-hazardous.
7 Spills of blood or blood-containing body fluids should be cleaned up using a solution of bleach (sodium hypochlorite) solution (1:100) for smooth surface and 1:10 for porous surface. The solution should be freshly made before use.

Part 5 Clean Needle Procedures

5.1 Skin Preparation Prior to Needling Insertion

The CDC (2002) states that alcohol, soap and water or chemical agents are not needed for preparation of the skin prior to vaccination, unless the skin is grossly contaminated or dirty. (1) Skin that is currently has an active lesion should not be used for needle insertion. These areas often carry higher risk for infection. According to NIH guidelines "injections are not given if the skin is burned, hardened, inflamed, swollen, or damaged..." (2)

Risk assessment of potentially contaminated skin should be conducted to maintain appropriate cleaning of the skin where required. If you believe that the patient's skin is soiled; it should be cleaned prior to needle insertion. There is no clear evidence that skin cleansing with soap and water, alcohol swabs, or antibacterial substances like chlorhexidine is better or worse than the other options. If the insertion site is cleaned with an alcohol swab, it should be allowed to dry prior to needle insertion.

Conclusion: If the skin is clean, the needling area does not necessarily need to be swabbed with alcohol.

Special Note for Dry Needling:

All the research on skin cleaning mentioned above were done with injection of medication like vaccination injection (wet needling). Dry needling is an effective treatment for tissue inflammation (pain) and swelling. Clinically, we insert dry needles into painful areas, which are usually inflamed or swollen. If the skin area is clean according to your assessment, dry needling is safe to be used in these areas. Otherwise skin should be properly cleaned prior to insertion if skin is not clean. Skin areas with open wounds should never be needled.

References:

1. Modlin, John F., et al. Vaccinia (Smallpox) Vaccine Recommendations of the Advisory Committee on Immunization Practice 2001. MMWR June 2001 50 (RR10): 1-25.
2. National Institutes of Health. Patient Education: Giving a subcutaneous injection. 6/2012. http://www.cc.nih.gov/ccc/patient_education/pepubs/subq.pdf. Accessed September 2013

5.2 Recommendations

The following information is provided for your reference. A summary of the recommendations is cited but the original research paper can be consulted. (1)

1. Insert needles into clean, intact skin.
2. For most patients, especially those with intact immune systems, skin preparation with antiseptics is unnecessary and may be disadvantageous by creating an imbalance between normal resident bacteria and pathogens.
3. While definitive studies of the effects of the practitioner touching the needle shaft remain to be done, needling characteristics, proper hand washing, and hand drying minimize the risk of patient infections and justify the continued practice of touching the needle shaft.
4. For patients with compromised immune systems, skin preparation with chlorhexidine-alcohol or providone-iodine scrubs is superior to 70% isopropyl alcohol.
5. Universal blood and body fluid precautions (universal precautions) should be followed. When treating patients with high risk of being infectious, the practitioner should protect himself or herself by using appropriate barriers, such as gloves or finger cots.

(1) Allen McDaniels, MD and Donna Pittman, MD: Is Skin Preparation Necessary Before Needling? A Review. Medical Acupuncture, Volume 23, Number 1, 2011. Pp. 7-10

5.3 Basic Procedures

1. Always wash hands between patients, and before and after needling.
2. Always prepare a clean field before performing dry needling. Here the clean field means both clean skin area for needling and clean office environment such as table surface for storing needles, etc.
3. Use only sterile single-use needles as instructed in the lecture.
4. Always use gloves or finger cots to handle needles before and after insertion.
5. If blood drop appears after removing needles, sterile cotton swab should be used to clean the blood and the swab should be properly disposed of according to specific state and federal laws.
6. Always immediately isolate used needles in special sharp's disposal containers.

Definition of Anti-Microbial Procedure:

Antiseptic: Product used to reduce the density of microbial life on living tissue, particularly on the skin area.

Aseptic techniques: Techniques for preventing infection during invasive procedures such as surgical operation or dressing wounds. Dry needling procedure does not need this technique.

Clean field: For dry needling, it means a clean skin area where the needling will be performed and a clean environment such as the table surface to store needles.

*Note: that clean field is not the same as a sterile field.

Disinfectants: The chemicals used in disinfection such as hypochlorite dilution (bleach), which should not be used on living tissue. (Not to be confused with antiseptics).

Disinfection: The use of disinfectants with proper procedures to destroy or reduce the number of pathogens on inanimate objects such as equipment and clinic surfaces. Some bacteria, spores, and viruses may resist the often-lethal effects of some disinfectants.

Sterilization: The use of specific procedures that destroy all microbial life, including viruses.

Part 6. Indication and Contraindication of Dry Needling

Dry needling is a non-pharmaceutical procedure that restores local and systemic homeostasis through multiple physiological mechanism. Dry needling is a non-specific therapy that does not conflict with any pharmaceutical or surgical procedures used in conventional medicine. Physiologically dry needling can be incorporated into many fields of conventional medicine as supplementary and supportive therapy. In physical medicine, dry needling is used to accelerate natural healing of soft tissue pain and neuromusculoskeletal dysfunction. However, from a clinical perspective, dry needling should never be used in the following cases:

1. Patients with bloodborne pathogens (BBP) as explained in lecture, regardless if patients are active or latent, acute or chronic. As medical history may not reveal the BBP condition in some patients, universal precautions should be applied when treating these patients.
2. Other blood diseases like hemophilia.
3. Patient is allergic to the metals in the needle.
4. Cancer tissue area. Dry needling is effective in reducing cancer pain in patients with chemo or radiation therapy as NIH panel (1997) shows. But needling should be performed away from site of the cancer tissue.
5. Patients that have a needle phobia.

Finally, safety issues instructed in the lecture should be strictly observed during the lab practice.

Part 7 Cleaning Cupping Devices

Cupping is not a sterile procedure. Cups can be soaked in bleach dilution (1:100) or other disinfectant solution for 5 minutes then rinsed with clean water and then dried with paper towels.

Part 8 Disposing of Biohazardous Waste

Any solid waste or liquid waste that may impose a threat of infection to humans, including human tissues, human blood and fluid, discarded dry needles, table paper or cotton balls that contain human blood are classified as medical, or biohazard waste. Note that OSHA has determined that a cotton ball containing enough blood that it can be wrung out must be classified as biohazardous waste, less than that amount on a cotton ball means that it is considered trash. OSHA has enacted specific rules concerning the handling and disposal of biohazardous waste to prevent exposure of employees, patients, and the public to disease-causing agents. These rules require that discarded biohazardous sharps must be packaged in impermeable, red, polyethylene or polypropylene bags and sealed. The discarded sharps must be separated from all other wastes and be collected by professional personnel. OSHA regulations contain minimum standards established by the federal government. However, state and local laws should be strictly followed for disposal of biohazardous waste.

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