

MUSCLE	PALPATION	PATIENT POSITION	PRECAUTIONS	TECHNIQUE	CLINICAL PEARLS
Abductor Digiti Minimi (foot)	pincer or flat	sidelying	n/a	Pt in S/L w/ tx side up. Can have pt abduct toes to ID or just wiggle them. Can pincer, but risk of skewering yourself if muscle very small so may be better to do shallow-->deeper or straight in toward 5th met. Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Use thinner needle for feet like 0.20mm or 0.15mm.	Rarely tx except for dancers and stress fx of 5th met.
Abductor Digiti Minimi (hand)	pincer or flat	supine	n/a	Can have pt abduct pinky to ID. Can pincer, but risk of skewering yourself if muscle very small so may be better to do shallow-->deeper.	Good to tx for musicians.
Abductor Hallucis	flat	sidelying	n/a	Pt in S/L w/ tx side down. Can ask pt to abduct toes to ID (if capable). Muscle belly is more posterior. Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Tap in and needle straight down toward bone. Use thinner needle for feet like 0.20mm or 0.15mm.	Don't worry about branches of medial plantar n. Don't tx commonly, but good for ballet dancers.
Abductor Pollicis Brevis	flat	supine	n/a	TPs here very small and thin, feel like unfolded paperclip. Don't use needle thinner than 0.16mm because it will bend too easily. Tap in and needle TPs directly. Can also approach from radial aspect of 1st met if palm too sensitive.	Can't differentiate between the thenar mm. (APB, OP, FPB), but APB more lateral and FPB more medial.
Abductor Pollicis Longus	see extensor pollicis longus	see extensor pollicis longus	see extensor pollicis longus	see extensor pollicis longus	see extensor pollicis longus
Adductor Brevis	flat	supine	femoral n., a., v., sciatic n., saphenous v.	Pt supine w/ slight hip ER and knee flex, pillow under knee. ID femoral a. via pulse palpation. Palpate through longus and pectineus or between them in upper 1/3 of femur and medial to NV bundle. ID TrP and TDN.	NV bundle med-->lat=VAN. Needling hip adductors may help decrease penile/testicular pain and improve ability to move bowels for non-constipation causes.
Adductor Hallucis	flat	supine or sidelying	dorsal vv.	Oblique Head: tx same as FHB, but deeper. Transverse Head: Pt supine or S/L and needle from dorsal approach going through interossei to reach TrPs. Keep finger or thumb on bottom of foot at location of TrP and needle toward it. Don't worry about nn., but move vv. out of the way if needed. Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Use thinner needle for feet like 0.20mm or 0.15mm.	Oblique head contributes to great toe flex and toe and foot stability. Transverse head goes from great toe to 3rd, 4th, 5th toes.
Adductor Longus	pincer, modified pincer, flat	supine	femoral n., a., v., sciatic n., saphenous v.	Pt supine w/ slight hip ER and knee flex, pillow under knee. ID femoral a. via pulse palpation. Adductor Longus runs upper 1/3 to 1/2 of thigh and is the thick cable-like muscle. ID TrP, pincer, and needle.	NV bundle med-->lat=VAN. Needling hip adductors may help decrease penile/testicular pain and improve ability to move bowels for non-constipation causes.
Adductor Magnus	flat	supine	femoral n., a., v., sciatic n., saphenous v.	Pt supine w/ slight hip ER and knee flex, pillow under knee. ID femoral a. via pulse palpation if needling in proximal thigh. May tx in any part of thigh medial to NV bundle, needling shallow-->deeper. Difficult to separate gracilis from adductor magnus so often tx together.	May present like HS strain. NV bundle med-->lat=VAN. Needling hip adductors may help decrease penile/testicular pain and improve ability to move bowels for non-constipation causes.
Adductor Pollicis	pincer	supine	n/a	Pt supine w/ forearm pronated. Tap in b/w 1st and 2nd mets and needle directly. Could also approach from palmar side w/ forearm supinated.	Good to tx for thumb OA and spasticity.
Biceps Brachii	pincer	supine	brachial a., median n.	Pt elbow bent to ~45 degrees, palpate brachial a. to ID and then move off of it, pincer biceps and lift up slightly away from artery and needle toward thumb, medial to lateral. Can have pt pro/sup to distinguish biceps from brachialis - biceps stronger supinaor, brachialis stronger elbow flexor.	Biceps acts at 3 joints: shoulder, elbow, PRUJ. Can tx for CTS.
Brachialis	flat	supine	UE NV bundle	Pt supine w/ elbow slightly flexed. Push biceps out of the way using flat palp. Only needle from lateral side of arm to avoid NV bundle, but can also go A-->P. Needle toward humerus on distal 2/3 of upper arm.	"Soleus of the arm," one of 3 mm. that refer to thumb. Check/tx here for most elbow pain.

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Brachioradialis	pincer	supine	radial n. and PIN	Pincer brachioradialis and needle from either medial or lateral direction. For pts with very thin muscle, way want to needle in line with muscle between pincering fingers rather than toward your thumb or finger.	
Buccinator (and Risorius)	flat or modified pincer w/ middle finger in mouth	supine	n/a	Same as zygomaticus, but middle finger slightly inferior.	Good to tx mm. that attach to orbicularis oris for musicians who play wind instruments.
Cervical Multifidi mm.	see Splenius	see Splenius	see Splenius	see Splenius (All post neck mm. needled together)	see Splenius (All post neck mm. needled together)
Coracobrachialis		supine	UE NV bundle	Tx either proximal or distal 1/3 of muscle, avoid middle 1/3 due to musculocutaneous n. and difficult to distinguish from surround mm. Cause use coracoid process and deltoid tuberosity as landmarks. For proximal 1/3 pt supine in slight abd w/ hand on chest, ID coracoid process then drop medially to hook it and pull laterally w/ flat palpation and needle toward humerus. For distal 1/3: pt arm more abducted off table and resting on PT. Find NV bundle and move just lateral than pin coracobrachialis against humerus with grip and needle toward humerus. May need to push or pull biceps out of the way to palpate. Use 40-50mm needle.	Proximal 1/3 is best bang for buck to needle. Pt may complain of pinched nerve feeling in biceps, this is normal. Good to tx distal 1/3 for pts post-lumpectomy or mastectomy.
Corrugator Supercilii	pincer	supine	increased bleeding	Pt needs to remove makeup if present. Located in medial corner of eyebrow. ID muscle by having pt frown. Eyebrow highly vascularized so need to lift brow w/ pincer and needle as close to the skull as possible. Use short, skinny needle like .15mmx20mm.	Contributes to frontal HA along with SCM, UT, frontalis, temporalis, masseter
Deltoid	flat or pincer	supine, prone, or sidelying	n/a	Regardless of position, arm in slight abd and supported by pillow if needed. Tap in to taught band and TDN til your little heart's content. Mid delt goes to lateral 1/3 of clavicle and spine of scapula.	Palpating LHBT is actually ant delt fibers. If TTP, often due to weak RTC and shit posture. Tx deltoids for pain, weakness, poor S-H rhythm.
Digastric mm. (anterior and posterior)	flat	supine	external jugular v.	<i>Anterior digastric:</i> pt supine w/ neck in slight ext, hook under jaw with fingers like when doing iliacus, palpate and ID w/ resisted mouth opening. Needle shallow toward hyoid bone with 0.25x30 needle. <i>Posterior digastric:</i> pt supine w/ head turned slightly away from tx side, ID hyoid bone and mastoid process, palpate and ID using resisted mouth opening, using 0.25x30 needle, tap in shallow and stay very shallow, needling toward mastoid process.	Digastrics are main mouth openers along with geniohyoid. Common to have dysfunction in these mm. w/ violinists.
ECRL and ECRB	pincer or modified pincer (OK)	supine	radial n. (for ECRB)	Pt supine w/ forearm pronated. Tap in and needle toward thumb or middle finger, depending on pincer type. ECRB just medial to ED.	May be helpful for lateral epicondylitis.
Extensor Carpi Ulnaris	flat	supine	radial n.	Pt supine w/ forearm pronated and have them ulnarly deviate to ID. Tap in and needle shallow-->deeper toward ulna. Could also go straight in.	
Extensor Digitorum	flat	supine	radial n.	Pt supine w/ forearm pronated. Since mm. are flat, tap in ~1cm away from TrPs and angle needle toward them w/ shallow-->deeper technique. Can angle needle either proximally or distally after tap in.	Refers to wrist.
Extensor Digitorum Brevis	flat	supine	deep peroneal/fibularis n., dorsal vessels of foot	ID by having pt extend or wiggle toes. Can usually tx lateral half of muscle not covered by tendons. Avoid directing needle medially toward NV bundle. Tap in and needle straight down.	
Extensor Digitorum Longus	flat	supine	deep peroneal/fibularis n.	Located b/w tib anterior and peroneals. Can ID by having pt wiggle toes. Similar technique to tib anterior, but w/o backdrop of tibia. Best technique is shallow-->deeper and may be better to tx longitudinally rather than perpendicular to m. fibers.	

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Extensor Hallucis Brevis	Can't really tx effectively due to presence of overlying tendons.	Can't really tx effectively due to presence of overlying tendons.	Can't really tx effectively due to presence of overlying tendons.	Can't really tx effectively due to presence of overlying tendons.	Can't really tx effectively due to presence of overlying tendons. Checking shoes and decreasing arch height usually more effective than TDN.
Extensor Hallucis Longus	flat	supine	anterior tibial a., v., deep peroneal/fibularis n.	ID by having pt extend great toe while palpating. Tap in and needle AP w/ bias toward fibula to avoid NV bundle. Usually tx in lower 1/3 of lower leg.	
Extensor Indicis	flat	supine	radial n.	Pt supine w/ forearm pronated. ID w/ 2nd finger extension to distinguish from EPL and AbPL. Since mm. are flat, tap in ~1cm away from TrPs and angle needle toward them w/ shallow-->deeper technique. Needle toward ulna after tap in.	
Extensor Pollicis Longus	flat	supine	radial n.	Pt supine, ID muscle via thumb movement. Tap in and needle toward dorsal radius. EPL runs diagonally from thumb to ulna. EPL and AbPL needled together as a group.	Rare to have TrPs here per Travell and Simons. More mm. attach to thumb than big toe. Tendons of EPL and AbdPL make up snuff box. EPB is between them and makes up the floor of the box. These 3 mm. are implicated in DeCuervain's Tenosynovitis, but may be from TrPs in supinator, brachialis, IS, neck, and shoulder mm. instead.
Flexor Carpi Radialis (wrist flexor group 2)	flat	supine	median n.	Can ID mm. by having pt flex wrist and wiggle fingers. Pt supine w/ arm by side and forearm supinated using towel to put into slight elbow flex. Can tap in and use shallow-->deeper or tap in and head prox or inf, or toward radius or ulna. Median n. is b/w bones, but may hit superficial branches.	Can pre/post test median n. glides.
Flexor Carpi Ulnaris (wrist flexor group 3)	flat	supine or modified sidelying	ulnar nv bundle	Located off ulna and slightly anterior, can ID mm. by having pt flex and UD wrist. Want to get pt positioned with pinky up for access to mm. Tap in and needle toward ulna using shallow-->deeper or just stay shallow.	Pre/post test ulnar nerve glides. Good to tx for n. entrapment, ulnar neuritis.
Flexor Digitorum Brevis & Quadratus Plantaris/Flexor Accessorius	flat	prone	plantar nn. and vessels	Pt prone w/ non-tx foot hooked under table or hanging off side. Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Use thinner needle for feet like 0.20mm or 0.15mm. Can have pt cough or hum loudly to distract themselves from tapping in. Needle straight down. Quadratus plantaris/flexor accessorius located deep to FDB. May need to push veins out of the way if visibly in the way. QP/FA may be needled from medial aspect of foot adjacent to bone if pt has low pain tolerance for perpendicular approach, but this is generally less effective.	Can tx for plantar fasciitis, but tx calf first unless pt specifically points to spot and you are very sure that FDB/QP is cause of sx.
Flexor Digitorum Longus	flat	sidelying or prone	tibial n., a., v.	Pt in S/L w/ tx side down in 90 degrees hip and knee flex and ankle PF. Palpate against post tibia while having pt wiggle toes to ID. Tap in and needle toward tibia, staying away from midline to avoid NV bundle.	Attaches everywhere to tibia. All post lower leg mm. refer to plantar foot. Tendons of FDL and FHL (the flexors) cross each other deep to medial Achilles tendon.
Flexor Digitorum Profundus (wrist flexor group 3)	flat	supine or modified sidelying	ulnar nv bundle if move too far away from ulna, median n. very deep	Located just off ulna, can ID mm. by having pt make bearclaw fingers. Want to get pt positioned with pinky up for access to mm. Tap in and needle toward interosseus membrane.	Pre/post test ulnar nerve glides. Good to tx for n. entrapment, ulnar neuritis.
Flexor Digitorum Superficialis (wrist flexor group 2)	flat	supine	median n.	Can ID mm. by having pt flex wrist and wiggle fingers. Pt supine w/ arm by side and forearm supinated using towel to put into slight elbow flex. Can tap in and use shallow-->deeper or tap in and head prox or inf, or toward radius or ulna. Median n. is b/w bones, but may hit superficial branches.	Can pre/post test neural tension.

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Flexor Hallucis Brevis	flat	sidelying	proper digital n.	Pt in S/L w/ tx side down. Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Use thinner needle for feet like 0.20mm or 0.15mm. Tap in medially just below 1st met. LTR may cause very significant flexion of great toe.	
Flexor Hallucis Longus	flat	sidelying or prone	peroneal/fibularis a., v.	Pt in S/L w/ tx side up w/ hip and knee flexed to 90. Palpate against post fibula in inf half of lower leg and have pt flex great toe to ID. Tap in lateral to medial, w/ needle directed toward fibula. May also needle shallow-->deeper if needed to avoid peroneal/fibularis n.	All post lower leg mm. refer to plantar foot. Tendons of FDL and FHL (the fleXors) cross each other deep to medial Achilles tendon. Can also needle Achilles tendon to use as DDX for Achilles tendonitis vs. FHL pathology.
Flexor Pollicis Brevis	see APB	see APB	see APB	see APB	see APB
Gastrocnemius	flat or pincer	prone or sidelying	tibial n., popliteal vessels, peroneal/fibularis n.	Pt prone w/ pillow/roller under ankles. Needle medial gastroc w/ pincer or modified pincer and lateral w/ flat palpation. Avoid tapping in at midline and needling perpendicular to avoid tibial n., although this is more of an issue for soleus than gastroc.	Usually avoid doing B due to soreness. Good to tx for plantar fasciitis to decrease pain, but not necessarily increase ROM. May want to check further up the posterior chain for TrPs in HS or glutes as well.
Genu Articularis	flat	supine	n/a	Pt supine w/ pillow or roller under knee. ID superior pole of patella and come up 3 fingers, 3rd finger is level to needle. Approach from medial or lateral at 45 degree angle to prevent needling through quad tendon. Have to hit femur to know you got it.	Function: retract and lift suprapatellar bursa to prevent compression of it b/w patella and femur.
Glute Max	flat	prone or sidelying	sciatic nerve roughly midline	If tx just Gmax, do in prone. If treating Gmed and Gmin as well, can do in S/L. Drape pt and tuck towel to expose tx area. Adjust direction or reposition needle if pt gets nerve sx.	There is a band of overlap where you can tx all 3 glutes slightly post from midline in S/L.
Glute Med and Min	flat	sidelying	n/a	Drape pt and expose tx area. Line b/w iliac crest and GT - anterior is TFL, posterior is glutes. Need to maintain good tissue compression to get Gmin. Gmed and Gmin go all the way to iliac crest. Need to contact bone to ensure tx Gmin.	Good to tx Gmed w/ QL. Strengthen glutes in WB after TDN (bridges not as good).
Gracilis	flat	supine	femoral n., a., v., sciatic n., saphenous v.	Pt supine w/ slight hip ER and knee flex, pillow under knee. ID femoral a. via pulse palpation if needling in proximal thigh. May tx in any part of thigh medial to NV bundle, needling shallow-->deeper. Difficult to separate out from adductor magnus, so often tx together.	NV bundle med-->lat=VAN. Needling hip adductors may help decrease penile/testicular pain and improve ability to move bowels for non-constipation causes.
Hamstrings	flat	prone	sciatic n.	Pt prone w/ pillow or roller under ankles to slack HS. To avoid sciatic n. - proximal 1/3 : after palpating ischial tuberosity, tap in in middle and needle straight down or angle medially; middle 1/3 : tap in in middle and angle med or lat, can go straight in if staying medial; distal 1/3 : tap in and stay medial or lateral only, never needle into popliteal fossa. Can also use shallow-->deeper technique if tx directly over sciatic n.	Tx near isch tub good for pelvic pain and hip pain.
Iliacus	flat w/ fingers hooked	sidelying, slightly rolled back rest on yourself, pillow b/w knees	peritonium	Need to be superior to inguinal lig. Hook fingers over iliac crest and tap in toward fossa. Only needle toward fossa, never toward inguinal lig. Need to hit bone to be sure you get it. Palpate w/ needle for TPs. Usually use 50-60mm needle.	Good to tx for pts w/ hip impingement, post hip surgery, or SIJ pain. Can pre/post test hip flex MMT.
Iliocostalis	flat	prone	lung	Intercostal blocking at angle of rib if needling inferior to scapula, needle in caudal medial direction. Downhill technique if needling superior to inferior angle of scapula.	Pt arm off table less tension than "woe is me." Iliocostalis and longissimus combine inferiorly.
Iliopsoas (distal)	flat	supine	femoral n., a., v.	Pt supine w/ slight knee flex and ER (less than for adductors) w/ pillow under knee. ID proximal rectus femoris and palpate just medial to that. Use 40-50mm needle.	Won't always get big twitches.

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Infraspinatus	flat	prone or sidelying	n/a (possibly fenestraction in pts w/ OP)	ID medial and lateral borders, scapular spine, inf angle. Tap in and needle TrPs.	Referral from IS may mimic CTS sx or cervical radicular pain. Ant delt is common referral (36%) for TDN IS. TDN IS can improve mm. recruitment and strength. If having trouble ID inf angle of scap on larger pt, can have pt do IR scratch.
Interosseous mm. (foot)	flat	supine	dorsal vv.	Good for PT to have a lot of body contact for TDN feet and if possible, hang non-tx leg off opposite side of table to avoid getting kicked or kneed in face. Use thinner needle for feet like 0.20mm or 0.15mm, usually 30mm long. Dorsal easier to needle, palpate with eraser on wooden pencil. Tx both dorsal and palmar from dorsal side. Tx DI needling toward 2nd toe, PI needling away from 2nd toe. There are 3 plantar and 4 dorsal.	If pt has Morton's Neuroma b/w 3rd/4th or 4th/5th mets, have them switch to wider shoes, should desensitize over time w/ decreased pressure. Try to avoid surgery.
Interosseous mm. (hand)	flat	supine	n/a	Dorsal easier to needle, palpate with eraser on wooden pencil. Tx both dorsal and palmar from dorsal side. Tx DI needling toward 3rd finger, PI needling away from 3rd finger. There are 3 palmar and 4 dorsal.	
Lateral Pterygoid	flat	supine	maxillary a., TMJ	Before starting ,establis hand signals to pause (one hand up) or stop and take needle out (both hands up). <i>Superior head</i> : the easier way is to slide posterior from zygomatic arch into the divot, and needle in inferior direction - if you hit bone, you are angled too far posterior. The harder way is to tap in perpendicularly through mandibular fossa, anterior to TMJ and posterior to coronoid process of mandible and direct in a superior-medial-forward direction. <i>Inferior head</i> : Same as the harder approach to superior head, but with mouth open slightly and direct needle medial-forward toward sphenoid bone.	Refers to ear, may be helpful for tinnitus. TDN improvements in ROM, decreased pain, lateral excursion for TMJ pts may last for months.
Latissimus Dorsi	pincer or intercostal block	prone, sie lying, supine	lung	In prone or supine, try to keep arm around 80 degrees abd. Use pincer as low as possible, switch to intercostal block if needed. Be sure to palpate lower part of muscle as well as upper. Litigation barrier for females. Use at least 60mm needle, do not needle toward lungs. If a big twitch bends the needle, dispose of it and get a new one.	Good to tx for shoulder, low back, posture, breathing. 43% of the time, the lat also attaches to the scapula.
Levator Scapulae	pincer or flat	sidelying or prone	lung	Vertical pincer around C6 vs. flat palpation around superior medial border of scapula. For pincer, move pt into passive shrug to put on slack. For flat palp, pt in prone w/ neutral head, have them move into hammerlock/IR scratch position to wing scapula then use scapula as backboard for needling inferior fibers. Fingers bracket the muscle for flat palp. If pt unable to get into hammerlock, can use towel roll(s) to prop up shoulder and elbow.	Can contribute to HA.
Longissimus	flat	prone	lung	Shelfing method preferred, needle in caudal medial direction parallel to ribs. Can also use shallow-->deeper in gutter where ribs join spine, still needling caudal medial.	Pt arm off table less tension than "woe is me." Longissimus and iliocostalis combine inferiorly.
Longus Colli	flat	supine	carotid a.	ID carotid a. and place fingers between that and trachea at level of C4-C6. Lift fingers up after palp carotid a. and move trachea away from tx side then drop finger tips down to ventral surface of cervical spine to palpate. Before placing needle, double check that carotid a. is lateral to fingers. Tap in perpendicular using 40-50mm needle. Can also go slightly superiorly or inferiorly.	Usually want to tx bilaterally. Muscle most affected in a whiplash injury (more whiplash in low speed MVA than high speed). Good to tx if pt has loss of cervical lordosis. Tx for vertigo, cervical instability in EDS pts.
Masseter	flat or intraoral pincer	supine	n/a	Pt needs to remove makeup if present. Usually tx superficial part. Have pt clench jaw to ID. Will needle through parotid gland, which is not a problem unless it is swollen due to pt being sick. Can go straight in or shallow-->deeper.	Have pt open and close jaw to check for deviation. Lateral shift caused by ipsi masseter and/or contra pterygoid. Can tx for toothache, sinus pain, ear ache, tinnitus.

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Medial Pterygoid	flat	supine	lingual n., alveolar n., maxillary a.	Pt supine w/ neck in slight extension w/ head turned slightly away from tx side, palpate coronoid process of mandible and move anterior. Position yourself at pt head, slightly biased toward tx side. For superior medial part, needle through mandibular fossa staying shallow and aiming toward medial surface of ramus and angle of mandible. For inferolateral part, hook under mandible like when TDN iliacus and needle toward internal surface of angle of mandible, being sure to stay shallow.	Pterygoids may limit mouth opening. Could tx for tinnitus. Medial pterygoids also assist with contralateral lateral excursion (L medial pterygoid will deviate jaw to R).
Multifidi	flat	prone	lung, subdural hematoma; contraindications are laminectomy and scoliosis >15%	Use at least 50mm needle. Position yourself opposite to tx side, index finger of dominant hand adjacent and parallel to spine and then place thumb and index fingers of other hand on either side of dominant index finger to mark safe zone. Position tube in safe zone oriented caudal medial and rest non-dom hand in flat palp and needle toward web space.	Need to contact lamina to know you hit multifidus. No safety zone needed for lumbar so start a little wider to hit paraspinals on the way in.
Obliques - External and Internal	BIG pincer	supine or sidelying	no lung precautions, but do not needle toward viscera	Use 40-50mm needle. Can tap in from either anterior or posterior in sidelying. Tx b/w ribs and ilium. Can stay more lateral for EO, more medial for IO.	MSR and sidebending are good pre/post test. Tx w/ QL and psoas. May be helpful for hip pts. May feel sharper or burnier than other muscles. Tx for pts w/ lumbar SMCD. TrPs in abdominal mm. predictive of endometriosis.
Oblique Capitis Inferior	flat	prone	vertebral a. is 30mm deep, foramen magnum	Only safe suboccipital mm. to needle. Use posterior arch of C1 as backboard. Only mm. in posterior cervical spine not done in caudal medial direction. Landmarks are TPs C1, SP C2, find midpoint and needle only medial half, usually closer to midpoint. To find TP C1 move inf med from mastoid. Needle direction is toward opposite eye. Can have pt point at eye for reference. Check needle alignment from multiple angles. Back off and change direction if you get 30mm in and do not hit bone. PT positioned at pt head with pt head neutral in face hole. Need at least 40-50mm needle, possibly bigger for bigger pts.	Very relevant to HA and upper cervical rotation AROM, which is a good pre/post test. Orientation of muscle is more horizontal than usually depicted. Try to avoid smashing pt face into table. LTR less common, HA sx and ache sensation more common. Can have pt move eyes side to side and may move needle. Pt may get zingers on occipital n.
Obturator Externus/Gemelli muscles	flat	prone better than sidelying	sciatic n.	Palpate length of posterior greater trochanter, then hook to compress tissue and tap straight in. Needle toward greater tro.	Not able to tx medial 1/3 due to sciatic n.
Obturator Internus	flat	side lying	pudendal n. and obturator n. in Alcock's Canal	Pt in S/L w/ tx side down, top leg in hip and knee flex, bottom leg in extension. Pull shorts/undergarments up and drape pt as appropriate (may need to pull down instead depending on clothing situation). Have pt pull top glute up and hold out of the way to spread the cheeks and allow room for activities. May need to clean area with ETOH wipe first if dirty. Can ID muscle by having pt isometrically ER lower hip. Hook fingers over ischial tuberosity and compress tissue, needle down onto it. After hit bone, may work slightly anterior if needed. Use 50 mm. needle. Extrenal portion of muscle needled medial to GT w/ other hip ER mm.	Good to tx for pts w/ hip, labrum, FAI, pelvic floor issues.
Oponens Pollicis	see APB	see APB	see APB	see APB	see APB
Orbicularis Oculi	n/a	n/a	n/a	Do not tx due to proximity to eyeball. It is possible, but not recommended.	n/a
Occipito-Frontalis	flat	supine, prone, sidelying	n/a	For frontalis, tx w/ pt in supine and flat palpation. For occipitalis, tx in prone or side lying and flat palpation.	May refer pain to eyeball, orbit, eyelid, especially occipitalis.
Palmaris Longus (wrist flexor group 2)	flat	supine	median n.	Can ID mm. by having pt flex wrist and wiggle fingers. Pt supine w/ arm by side and forearm supinated using towel to put into slight elbow flex. Can tap in and use shallow-->deeper or tap in and head prox or inf, or toward radius or ulna. Median n. is b/w bones, but may hit superficial branches.	Can pre/post test neural tension.

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Pec Major	pincer or flat	supine	lung, breast/pec implants are contraindication	Start w/ pt supine w/ arm in abd and head turned away (and litigation barrier for females). Can use pincer to get sternal head and needle away from lungs toward web space and thumb. Can use flat palpation for clavicular head with arm further abd to 80-90 degrees and needle shallow-->deeper. Do not needle toward clavicle due to proximity of UE NV bundle. Can also use intercostal block to hit TrPs closer to sternum or downhill technique (caudal-->cranial).	Normal for pec maj to feel more burning/stinging during needling. Can use tube to mark TrP and then tap in slightly further away to needle toward it for shallow-->deeper.
Pec Minor	pincer	supine	lung, breast/pec implants are contraindication, NV bundle to UE is deep to pec min near coracoid process	With pt arm in abd and head turned away (and litigation barrier for females), pincer lateral slip of muscle w/ thumb under and needle toward thumb using needle angle close to parallel to rib angle. Can make sup or inf direction changes, still needling toward thumb. If having difficulty, can move arm in more abd or have to get into "woe is me" position, but this may increase tension in the muscle. Use at least 50-60mm needle, may need 75mm for bigger guys.	Helpful for pts lacking shoulder ROM, w/ scap winging, or TOS.
Pectineus	flat	supine	femoral n., a., v., obturator n.	Pt supine w/ slight hip ER and knee flex, pillow under knee. ID femoral a. via pulse palpation. Tx medial to NV bundle. ID adductor longus tendon and drop off 1cm lateral onto pectineus in divot. Needle straight down and can bias medially (away from NV bundle). Use 50mm needle and litigation barrier to keep hands off junk.	Floor of femoral triangle. Tx for athletes w/ groin strain or hip pain. Tx for pts w/ hip pain in sitting.
Peroneus/Fibularis Longus & Brevis	flat	sidelying	peroneal/fibularis n.	Pt in S/L w/ tx side up, pillow under leg. Longus starts at fibular head and brevis about halfway down. Both run posterior to lateral malleolus. Avoid fibular head to avoid peroneal/fibularis n. and also not where TrPs are located. Can needle perpendicular or shallow-->deeper.	Good to tx for ankle sprain/instability, and ballet dancers.
Peroneus/Fibularis Tertius	flat	sidelying	superficial peroneal/fibularis n.	Not everyone has this muscle. If present, should be able to feel tendon attaching to post 5th met w/ pt moving into active DF and EV. If present, tx shallow-->deeper.	Located deep to EHL.
Piriformis	flat	prone, sidelying	sciatic n.	Pt in S/L, ID landmarks - inferior lateral angle of sacrum and superior portion of greater trochanter (can ID GT w/ hip rotation if needed), piriformis halfway between these. Tap in needle at midline and angle slightly med or lat to avoid sciatic n. Need to keep tissue compressed because will need to go through glutes to get to piriformis. May hit bone going lateral, but be careful because no backdrop going medial. Going slowly will allow pt to let you know if you are getting close to sciatic n. Use 75mm needle.	Sciatic n. deep to piriformis 92% of the time. Good to tx for pts lacking hip rotation, especially athletes. Validated via research that can safely TDN piriformis w/o hitting sciatic n.
Platysma	n/a	n/a	n/a	Tx doesn't do anything. Per Jan, if considering needling this, "Get a life."	n/a
Popliteus	flat	sidelying or prone	NV bundle, saphenous n.	Pt sidelying with hip and knee flexed to 90 degrees and tx side down. Push calf out of the way and palpate posterior tibia for TrP. Tap in from medial side and needle toward tibia. Can angle slightly superior or posterior, but mostly toward tibia.	Pain in posterior knee w/ standing is indicator to tx this.
Procerus	pincer	supine	n/a	Pt needs to remove makeup if present. Have pt make stink face to ID. Pt needs to have eyes closed. Attempt pincer and lateral approach first. If unable to do because of fat fingers, may pincer and approach from superior direction.	Also good to tx for HA along with mm. listed for Corrugator Supercilii.
Pronator Teres (wrist flexor group 1)	flat	supine, modified sidelying (if pt ok seeing needle)	median n.	Pt supine w/ arm at side or in modified sidelying, have pt pronate to ID muscle. Needle upper 1/3 only and avoid midline because of median n. Tap in and angle needle toward ME or radius.	Can pre/post test neural tension.
Psoas Major	flat	sidelying	kidney	Can use same approach as QL, but with 10mm longer needle if needed. Make 20 degree anterior direction change after tapping in. Can also do PA approach b/w L3, L4. Flick needle to insert. Minimize direction changes.	Have pt supine and palpate through abdominal region to assess pre and post tissue quality. Pt may get sad, cry due to autonomic response. Tx for pts w/ anterior hip pain, considering labral surgery, etc. Follow TDN w/ extension exercises.

MUSCLE	PALPATION	PATIENT POSITION	PRECAUTIONS	TECHNIQUE	CLINICAL PEARLS
Quadratus Femoris	flat	prone better than sidelying	sciatic n.	Same as GOGOs, but able to isolate this one more specifically. Palp ischial tuberosity and hook greater tro down low.	Good to tx for HS pain. Can also needle toward isch tub and get some glute attachments too.
Quadratus Lumborum	flat	sidelying	kidney (also could have floating kidneys if pt has EDS); bleeding risk if pt on anticoagulants	Find ASIS and PSIS w/ hands and halve that distance, then divide posterior half in half again and that is where you needle, between iliac crest and 12th rib. Push PA lateral to lumbar paraspinals to form "gutter" to insert needle for access QL. Need to maintain firm pressure to compress tissue enough to allow needle to reach QL. Needle straight down first, then can go slight anterior, posterior, and caudal.	Can have pt hip hike to confirm in correct location. More room to needle w/ top leg straight or arm overhead, can also put pillow under trunk. BUT, may need to let pt bend knees +/- pillow between if in acute pain. Can do glute med reaction test pre and post since QL can cause inhibition.
Quads	flat	supine, sidelying	for VM: saphenous n., gracilis and sartorius tendons	Pt supine w/ roller or pillow under knee. Vastus Lateralis: check near knee first, may needle in supine or side lying to get area posterior to ITB. Vastus Medialis: tx near knee, palpation usually less specific because whole thing is sensitive. Vastus Intermedius: needle same as RF, but need to hit bone to know you got it. Rectus Femoris: usually tx near hip and mid quad. Needle perpendicular for all.	Tx VM more for fxn: increase strength and stab, decrease pain.
Rectus Abdominus & Pyramidalis	flat	supine		Pillow under pt knees, arms at their sides to slack muscle. Position yourself opposite to tx side, compress a little down (but not too much) and use shelving technique. Drape pt and use litigation barrier for lower abdominals. Can use shallow-->deeper near pubic bone if can't shelf, pubic bone back board.	For shallow-->deeper, have pt find pubic bone first and get permission before tx. Can have pt lift head to contract RA for positioning hand to shelf. Lower ab closely tied to pelvic floor and urinary or sexual dysfunction. Pyramidalis may be relevant for pts w/ diastasis. May feel sharper or burnier than other muscles.
Rhomboid Maj and Min	flat, downhill technique	prone	lung	Pt prone w/ arms at sides if possible, may lower head of table and/or place pillow under abdomen to encourage thoracic kyphosis. Check curve of spine from side before needling. Tap in anywhere from inf angle of scapula and superior. Needle cranially down hill using shallow-->deeper. Use 50mm needle only.	Can use palpating hand to slide skin roll caudally and help flatten needle angle. Good for PT to be seated for this one.
Scalenes	flat	supine or sidelying	lung, carotid a., vertebral a., brachial plexus, jugular v.	Use 25-30 mm needle, but only use 10-15 mm of it. Needle ant and middle scalenes only because post is too close to apex of lung. NV bundle runs b/w ant and middle scalenes. For ant scalene: tx at least 2 fingers above clavicle. Pt supine w/ head neutral. Get pt to head lift to ID SCM and then tuck one finger under and have pt do quick, aggressive sniff x2 to ID mm. Palp fingers hold tube in place parallel to table then flick in. Only needle parallel to table with min to nil direction change and go slowly. For middle scalene: tx in S/L. ID mastoid and then move inf to middle of lateral neck. Can have pt side bend neck to pop mm. Tap in and needle shallow to deeper toward masatoid. Avoid vertebral a.	Can pre/post test neural tension. Very helpful for pts w/ c/s fusion, whiplash, MVA. If jugular v. on ant scalene, may need to push or pull up or down to move out of way.
SCM	pincer or flat	supine or sidelying	carotid a., internal and external jugualr vv.	Stay 2 cm/2 fingers width superior to clavicle. Carotid a. is very medial, internal jugular v. less so and under SCM. Can have pt valsalva to ID external jugular, may need to move it out of the way. Have pt head lift to ID borders of SCM. Pincer inferior portion w/ pt in supine and thumb on posterior border. Needle proximal portion in S/L. ID mastoid and bracket SCM w/ fingers in flat palp. Tap in and then needle shallow to deeper toward web space.	Presence of shunt is contraindication. Can contribute to HA. Both portions can refer to inner ear, contribute to tinnitus. May be helpful for pts w/ whiplash injury after MVA. Can scoop external jugular v. into most lateral aspect of pincer and needle more medially to avoid if needed. Sternal head refeers to vertex of head.
Semispinalis Capitis & Cervicis	see Splenius	see Splenius	see Splenius	see Splenius (All post neck mm. needled together)	see Splenius (All post neck mm. needled together)

MUSCLE	PALPATION	PATIENT POSITION	PRECAUTIONS	TECHNIQUE	CLINICAL PEARLS
Serratus Anterior	intercostal block	side lying	lung	Start palpating lower to find ribs and work up, only tx superior part of muscle. Need pt arm out of way, female pts may need gown to get rid of strap and clothing. Have pt take deep breath and fingers should sink in b/w ribs if hand in correct place. Establish intercostal block, roll pt slightly back toward yourself, and needle shallow-->deeper toward web space. Not mandatory to hit rib to tx. Use 40 mm needle.	Good to tx for shoulder pts, esp AC. Rib angles can vary a lot between individuals and between ribs on the same person. Can also tx under medial border of scapula if having trouble over ribs.
Soleus	flat	prone or sidelying	tibial n., a., v.	Pt prone w/ pillow/roller under ankles. Can approach from posterior, medial, or lateral. If M or L approach, stop short of midline to avoid tibial n. Other than that, can needle almost everywhere in the muscle. May want to increase body contact to avoid excessive movement from pt.	Make sure that runners and athletes are stretching both soleus and gastroc regularly. Tx calf may help ant or lat shin as well. Can refer to ipsilateral low back/glute or ipsilateral jaw as well.
Splenius Capitis & Cervicis	pincer or flat	prone or sidelying	do not do if pt has had laminectomy, sub-epidural bleed	Flat palp in prone or pincer in S/L. For pincer, find TPs and move medially to take grip. Needle between C2-C6 and between TPs only. Needle in cadual medial direction only regardless of pt position w/ lamina as backdrop. Usually use 50mm needle. Keep 1 finger on SP at all times.	All post neck mm. needled together. Can do either regular or tendon needling for cranial attachments. For cranial attachments stay 1 finger width away from midline to avoid forament magnum, hook bottom of skull and needle cranially, stay b/w mastoid processes.
Subscapularis	flat	prone, sidelying, or supine	lung	Medial Approach: pt prone, towel under shoulder (may also need towel under elbow), arm in hammerlock position w/ hand in pants. May also do in S/L w/ tx side down. Poke fingers into ribs medial to scapula to decrease tissue bulk and hook medial border w/ DIPs. Needle medially, should have needle angled to hit anterior surface of scapula to avoid entering pleural space. Use 50-60mm needle. Anterior Approach: pt in supine, grab medial border of scap and pull toward yourself. Flat palp, tap in and needle straight down and/or laterally to avoid lungs. Pt can also be in "woe is me" pose w/ pillow supporting elbow.	For dx of AC, if TDN subscap and ROM improves, it is not AC. Tx subscap if pt unable to get to 90-90 position. ER AROM at 90-90 is good pre/post test. May need to do mobility work first to allow correct and tolerable positioning for medial approach. Only way to confirm you needled subscap is to hit scapula w/ needle.
Supinator	flat	supine	radial n., PIN	Pt supine w/ forearm pronated. Palpate b/w prox radius and ulna and tap in between them and then direct needle toward either radius or ulna, depending on location of TrPs. Will go through ED to get to it.	Can be helpful w/ radial n. entrapments, lateral epicondylitis.
Supraspinatus	flat w/ fingers hooked	sidelying or prone	lung	Palpate whole scapula to ID borders and check orientation. Find spine of scapula and hook fingers over superiorly w/ hand flat on back to lock scap onto ribs. Needle into suprascapular fossa, tapping in about 1 finger width superior to spine of scap. Needle direction is always posterior and/or lateral only! Should and will hit bone, TrPs usually near bone. Don't fan a lot, better to reinsert needle. Use at least 50mm needle.	May be helpful for deep feeling shoulder pain or recurring upper trap pain.
Temporalis	flat	supine	avoid superficial temporal a. if possible	ID by having pt clench jaw. Use short, thin needle like .3mm.25mm and tap straight in. May bleed more if hit temporal A. or v.	Most TrPs in anterior fibers. Contributes to temporal HA along with UT. Refers to sinuses and teeth.
TFL	flat	supine or sidelying w/ pillow b/w knees	n/a	Drape pt and expose tx area. Line b/w anterior iliac crest and GT - anterior is TFL, posterior is glutes. TFL runs from ASIS to GT. Tap in and needle down to contact w/ pelvis to reach deeper TPs.	Active during 3 phases of gait cycle and if inhibited, can be contributor to trendelenberg gait. Tx w/ vastus lateralis for ITB pain.
Teres Major	pincer	prone, supine, or sidelying	lung	Find inf angle of scap first then pincer up toward axilla. Can confirm correct mm. by having pt IR. Tmaj more medial than lats, but usually end up being needled together. Tap in straight down toward thumb or at a slight lateral angle. If needling in sidelying, support pt arm w/ pillow(s).	Triangular space contents: scapular circumflex vessels. Quadrangular space contents: axillary n.
Teres Minor	flat or pincer	prone	lung	To ID, have pt IR first to ID Tmaj then move palpating hand superiorly and have pt ER to confirm Tmin. Feels like a sharpie on palpation. If unable to pincer, do w/ pt arm in 90 degrees abd. For flat palp, block lateral scapular border w/ finger and needle toward bone to prevent needle entering pleural space. Tap in and needle toward web space.	Tx w/ IS.

MUSCLE	PALPATION	PATIENT POSITION	PRECAUTIONS	TECHNIQUE	CLINICAL PEARLS
Tibialis Anterior	flat	supine	anterior tibial a., v., deep peroneal/fibularis n.	Tap in lateral to medial with tibia as backboard. Can also use shallow-->deeper if worried about NV bundle. The NV bundle can be located near tibia, near fibula, or in between. Usually use 40mm needle.	Refers to great toe and "feels like gout."
Tibialis Posterior	Do not needle w/o US guidance.	Do not needle w/o US guidance.	Do not needle w/o US guidance.	Do not needle w/o US guidance.	Do not needle w/o US guidance.
Traps (upper)	pincer or OK	any, prone or supine best	lung	Have pt get clothing or straps out of the way and drape if appropriate. Put traps on slack by supporting head and passively shrugging pt. Have pt use litigation barrier in supine if needed. Use 40mm needle.	Helpful for HA, esp upper orbital area. Start w/ upper traps and SCM for cervical dysfunction. Trap tight if contra c/s rotation and ipsi c/s SB restricted, same as SCM. May need longer hemostasis. May remove needle to re-palpate for mm. relaxation if LTR seems not to be decreasing.
Traps (middle)	pincer if possible, if not then downhill	prone	lung	MT tx area is C7 to spine of scapula. Pt arm off table better than at side, arm OH even better for pincer. Use 40-50 mm needle. Pillow under stomach and head of table lower if using downhill technique.	Horizontal fiber direction. For all parts of trap, palpate B and consider TDN B for HA sx.
Traps (lower)	pincer if possible, shelf or intercostal block if not	prone	lung	ID lateral border of LT by having pt do thumbs up Y raise. Use 40-50 mm needle.	Oblique fiber direction.
Triceps Brachii	pincer or flat	prone	radial n.	Needle as a group, not as separate heads (but can needle separate heads). Pincer and lift away from humerus to help prevent hitting radial n. Also don't needle toward humerus. Can needle lateral to medial or medial to lateral.	Tx for med or lat epicondylitis and wrist dysfunction. Can refer to ulnar n. distribution. There is 1 incident of needling radial nerve causing wrist drop.
Zygomatic muscle	flat or modified pincer w/ middle finger in mouth	supine	n/a, but don't want to pierce the cheek	Can ID and pre/post strength test by pinching then pulling down and having pt smile. Modified pincer w/ middle finger in mouth, but needle over it (tangential), not toward it to prevent needle piercing cheek into mouth.	Change gloves frequently if hands in/around mouth. This muscle could be tight if pt has drooling issue after Bell's Palsy.