

IN THE COURT OF APPEALS OF THE STATE OF OREGON

**OREGON ASSOCIATION OF
ACUPUNCTURE AND ORIENTAL
MEDICINE, ALFRED THIEME, AND
E. CHRISTO GORAWSKI,**

Petitioners,

vs.

**BOARD OF CHIROPRACTIC
EXAMINERS,**

Respondent,

and

**UNIVERSITY OF WESTERN
STATES AND JOHN L.V. PLATT,
D.C., P.C. dba WOODSTOCK
CHIROPRACTIC CLINIC,**

Intervenors-Respondents.

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OREGON BOARD OF
CHIROPRACTIC EXAMINERS

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INFORMATION

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**INTERVENOR-RESPONDENT UNIVERSITY
OF WESTERN STATES' ANSWERING BRIEF
AND SUPPLEMENTAL EXCERPT OF
RECORD AND APPENDIX**

Judicial Review of Oregon Board of Chiropractic
Examiners Administrative Rule
OAR 811-015-0036

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dated July 13, 2010

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I. STATEMENT OF THE CASE.

Pursuant to ORAP 5.77(4)(b), Intervenor-Respondent University of Western States (“UWS”) concurs with the Statement of the Case of the Oregon Board of Chiropractic Examiners (“OBCE”).

II. SUMMARY OF ARGUMENT.

UWS concurs in OBCE’s brief and submits this brief to amplify two key areas. First, OBCE administrative rule OAR 811-015-0036, which provides that dry needling is within the scope of practice for chiropractors, is consistent with the statute, ORS 648.010(2), defining “chiropractic.” Dry needling, as defined in OBCE’s rule, fits within the statutory definition of “chiropractic” by three separate measures. Dry needling is: (1) a “physiotherapy,” (2) a “chiropractic treatment” of “body dysfunction,” and/or (3) a “rational therapeutic measure” that is “taught in approved chiropractic colleges.” This court need only find that one of those three aspects of chiropractic encompasses dry needling for OBCE’s rule to be valid.

Second, OAR 811-015-0036 does not contravene ORS 684.025(2) because it does not involve the “administration of a substance” under the skin. Although a needle can be used to administer a substance, the OBCE rule is clear that it addresses only the use of a *dry* needle for a different purpose—treating myofascial trigger points.

This court should hold the rule is valid.

III. RESPONSE TO ASSIGNMENT OF ERROR.

UWS concurs with the OBCE's Answer to the assignment of error and supplements OBCE's response as follows.

A. Standard of Review.

UWS concurs with OBCE's statement of the standard of review, but notes that this case may test the scope of review for administrative rules. ORS 183.400(3) provides that "judicial review of a rule shall be limited to an examination of * * * the rule under review," the statutes authorizing the rule, and evidence necessary to demonstrate compliance with the rulemaking procedures. The Oregon Supreme Court has held that "the rule" includes only the text of the rule. *AFSCME Local 2623 v. Dep't of Corrections*, 315 Or 74, 79, 843 P2d 409 (1992) (stating "judicial review under ORS 183.400(3) is limited to *the face of the rule*") (Emphasis added). The Oregon Supreme Court reiterated that position in *Wolf v. Oregon Lottery Comm'n*, 344 Or 345, 355, 182 P3d 180 (2008).

One of the questions in this rule challenge is whether dry needling is encompassed within the part of the statute that defines "chiropractic" to include "the employment of all rational therapeutic measures as taught in approved chiropractic colleges." ORS 684.010(2)(b). On judicial review, this court may not be able to determine, by looking only at the rule and statute, whether approved chiropractic colleges teach dry needling. Although UWS's primary

position, described below, is that the rule on its face falls within the statute and OAAOM cannot show otherwise, UWS recognizes that the rulemaking record may be helpful in resolving a rule challenge like this one. Even if the court looks to the rulemaking record, the evidence before OBCE established that accredited chiropractic colleges teach dry needling. In the end, while this case may present an interesting question about the scope of review, the court need not resolve it in order to determine the validity of the OBCE's dry needling rule because other parts of the definition of chiropractic encompass dry needling.

B. Argument: OBCE's Rule Does Not Exceed its Statutory Authority.

Again, UWS concurs with OBCE's argument and supplements it as follows.

OBCE had authority to adopt OAR 811-015-0036, a rule which recognizes that dry needling is within the scope of practice for a chiropractic physician and imposes requirements on a chiropractic physician using dry needling. OAR 811-015-0036 provides in pertinent part:

“Dry needling is within the chiropractic physicians scope of practice for the treatment of myofascial triggerpoint pursuant to ORS 684.010(2).

“(1) Dry Needling is a technique used to evaluate and treat myofascial trigger points that uses a dry needle, without medication, that is inserted into a trigger point that has been identified by examination in accordance with OAR 811-015-0010 with the goal of releasing/inactivating the trigger points, relieving pain and/or improving function.

“(2) A chiropractic physician licensed in Oregon who wishes to practice dry needling must,

(a) Register with the Board on the form prescribed by the Board and,

(b) Provide proof of the basic Board approved course hour requirements before engaging in the practice of dry needling, and

(c) Perform all aspects of needle insertion and removal.

“(3) In order to perform dry needling, chiropractic physicians must complete a minimum of 24 hours of education with practicum specific to dry needling within the curriculum of an accredited chiropractic college, or through post graduate continuing education on dry needling approved by the Oregon Board of Chiropractic Examiners.

“(4) Chiropractic physicians must obtain a written Board approved informed consent from every patient treated with dry needling regarding the clinical purpose of dry needling and must state clearly that dry needling is not acupuncture.”

OBCE has broad rulemaking authority. It may “adopt such rules as it deems proper and necessary for the administration of” ORS chapter 684 and for “the performance of its work.” ORS 684.150. OBCE has specific authority to adopt “necessary and proper rules” to, among other things, “exercise general supervision over the practice of chiropractic within this state.” ORS 684.155(1)(b). OBCE has the authority to recognize a technique as within the scope of practice for chiropractic physicians.

1. OBCE’s rule does not contravene ORS 684.010(2).

OAAOM contends that OAR 811-015-0036 is invalid because dry needling does not fall within the statutory definition of chiropractic in ORS

684.010(2). Pet. Br. at 9-14. The OAAOM analyzes the statute as if it contains just two definitions of chiropractic and then blends those two definitions. Pet. Br. at 9. OAAOM also ignores the express text of the rule.

The OAAOM misreads the statute. The statute defines “chiropractic” as:

“(a) That system of adjusting with the hands the articulations of the bony framework of the human body, and the employment and practice of physiotherapy, electrotherapy, hydrotherapy and minor surgery.

“(b) The chiropractic diagnosis, treatment and prevention of body dysfunction; correction, maintenance of the structural and functional integrity of the neuro-musculoskeletal system and the effects thereof or interferences therewith by the utilization of all recognized and accepted chiropractic diagnostic procedures and the employment of all rational therapeutic measures as taught in approved chiropractic colleges.”

ORS 684.010(2). Although set forth in two subsections, the statutory definition contains *five* discrete descriptions of what constitutes “chiropractic”:

- 1) “That system of adjusting with the hands the articulations of the bony framework of the human body” (ORS 684.010(2)(a));
- 2) “[T]he employment and practice of physiotherapy, electrotherapy, hydrotherapy and minor surgery” (ORS 684.010(2)(a));
- 3) “The chiropractic diagnosis, treatment and prevention of body dysfunction” (ORS 684.010(2)(b));
- 4) The “correction, maintenance of the structural and functional integrity of the neuro-musculoskeletal system and the effects thereof or interferences therewith by the utilization of all recognized and accepted chiropractic diagnostic procedures” (ORS 684.010(2)(b)); and
- 5) “[T]he employment of all rational therapeutic measures as taught in approved chiropractic colleges” (ORS 684.010(2)(b)).

The five definitions overlap to some extent, but each is a separate definition as evidenced by the legislature's use of "and" or a semicolon to set apart each distinct idea. Accordingly, a technique is within the scope of "chiropractic" if it falls within *any one* of those definitions. Here, dry needling, as defined in OBCE's rule, falls within the second, third and fifth parts of the definition of chiropractic identified above.

- a. **Dry needling, as defined by the OBCE's rule, is a "physiotherapy" and therefore falls within ORS 684.010(2)(a).**

As OBCE aptly explains in its brief, dry needling is "physiotherapy." It therefore falls within the second definition above and within ORS 684.010(2)(a).

- b. **Dry needling, as defined by the OBCE's rule, is a "chiropractic treatment" of "body dysfunction" and therefore falls within ORS 684.010(2)(b).**

OBCE's rule specifically states that dry needling is "the treatment of myofascial trigger points." OAR 811-015-0036. The rule defines dry needling as, "a technique used to evaluate and treat myofascial trigger points that uses a dry needle, without medication, that is inserted into a trigger point that has been identified by examination in accordance with OAR 811-015-0010 with the goal of releasing/inactivating the trigger points, relieving pain and/or improving function." OAR 811-015-0036(1). The rule referred to in the dry needling rule,

OAR 811-015-0010, requires a clinical evaluation and justification consistent with chiropractic standards for any procedure.¹

¹ OAR 811-015-0010 provides in part:

“(1) Clinical rationale, within accepted standards and understood by a group of peers, must be shown for all opinions, diagnostic and therapeutic procedures.

“(2) Accepted standards mean skills and treatment which are recognized as being reasonable, prudent and acceptable under similar conditions and circumstances.

“(3) All initial examinations and subsequent re-examinations performed by a chiropractor to determine the need for chiropractic treatment of neuro-musculoskeletal conditions shall include a functional chiropractic analysis. Some combination of the following PARTS exam constitutes a functional chiropractic analysis: P Location, quality, and intensity of pain or tenderness produced by palpation and pressure over specific structures and soft tissues; A Asymmetry of sectional or segmental components identified by static palpation; R The decrease or loss of specific movements (active, passive, and accessory); T Tone, texture, and temperature change in specific soft tissues identified through palpation; S Use of special tests or procedures.

“(4) Chiropractic physicians shall treat their patients as often as necessary to insure favorable progress. * * * In addition, treatment of neuro-musculoskeletal conditions outside of the Oregon Practices and Utilization Guidelines -- NMS Volume I, Chapter 5, may be considered contrary to accepted standards. Chiropractic physicians treating outside of the Practices and Utilization Guidelines -- NMS Volume I, Chapter 5, bear the burden of proof to show that the treatment, or lack thereof, is clinically justified.

“* * * * *”

As defined by the rule, dry needling is a technique that a chiropractic physician may employ, when clinically justified by chiropractic standards, to treat myofascial trigger points. OAR 811-015-0036(1) (dry needling “is a technique used to * * * treat myofascial trigger points * * * with the goal of releasing/inactivating the trigger points, relieving pain and/or improving function.”) That definition puts dry needling squarely within the legislature’s definition of chiropractic in ORS 684.010(2)(b), as a “chiropractic treatment” of “body dysfunction.”

The statutory phrase “body dysfunction” would include “myofascial trigger points.” “Body” is defined as “the total organized physical substance of an animal or plant: the aggregate of tissues: the physical organism,” *Webster’s Third New Int’l Dictionary* 246 (unabridged ed 2002), and “dysfunction” means “impaired or abnormal functioning (as of an organ of the body),” *id.* at 711. Under the plain meaning of the text, “body dysfunction” would include impaired functioning of a human’s musculoskeletal system. A myofascial trigger point is just such an impairment. A “myofascial trigger point” is “a hyper-irritable spot, usually within a taut band of skeletal muscle or in the muscle’s fascia, that is painful on compression and that can give rise to characteristic referred pain, tenderness, and autonomic phenomena.” *Oregon Chiropractic Practices and Utilization Guidelines NMS* (1991), 23 (citing

Travell and Simons, *Myofascial Pain and Dysfunction, The Trigger Point Manual* (1983)).²

The OBCE's rule specifically provides that dry needling is a *treatment* for myofascial trigger points.³ In addition, the rule ties dry needling to chiropractic standards by requiring compliance with the OBCE's clinical evaluation and justification rule. Therefore, dry needling is a chiropractic treatment of body dysfunction because it is a treatment for myofascial trigger points done in compliance with chiropractic standards.

OAAOM's argument that "chiropractic treatment" in ORS 684.010(2)(b) encompasses ORS 684.010(2)(a) is incorrect. ORS 684.010(2)(a) and (b) define "chiropractic." OAAOM's approach collapses the distinct facets of chiropractic that the legislature has set forth. Even if OAAOM were correct that ORS 684.010(2)(b) encompasses ORS 684.010(2)(a), dry needling falls

² UWS asks the court to take judicial notice of this publication, available at http://www.oregon.gov/OBCE/publications/pt_guide.pdf.

A medical dictionary defines "myofascial" as "pertaining to a muscle and its sheath of connective tissue or fascia." *Mosby's Medical, Nursing, & Allied Health Dictionary*, 1145, (6th ed 2002) (SAPP-2). That same medical dictionary defines "trigger point" as "a point on the body that is particularly sensitive to touch and, when stimulated, becomes the site of a painful neuralgia." *Id.* at 1752 (SAPP-4).

³ "Treatment" means "the action or manner of treating a patient medically or surgically." *Webster's Third New Int'l Dictionary* at 2435.

within ORS 684.010(2)(b) because, in addition to being a “chiropractic treatment” of “body dysfunction” it is a “physiotherapy.”

- c. **Dry needling, as defined by the OBCE’s rule, is a “rational therapeutic measure” that is “taught in approved chiropractic colleges” and therefore falls within ORS 684.010(2)(b).**

Dry needling is also a “rational therapeutic measure” that is “taught in approved chiropractic colleges” and therefore encompassed in ORS 684.010(2)(b). A “therapeutic measure” is a medical treatment to achieve a specific end. *See Webster’s Third New Int’l Dictionary* at 2372 (“therapeutic” means “treat medically * * * of or relating to the treatment of disease or disorder by remedial agents or methods”); *id.* at 1400 (“measure” means “an action planned or taken toward the accomplishment of a purpose: means to an end”). The rule describing dry needling explains the method and purpose of the technique. OAR 811-050-03036(1). More specifically, dry needling is the insertion of a fine gauge, usually solid needle, into a trigger point in an effort to disrupt it and relieve regional muscle dysfunction and pain accompanying the point. Jan Dommerholt & Peter Huijbregts, *Myofascial Trigger Points* 180 (2011) (SAPP 5-6); C. Chan Gunn, *The Gunn Approach to the Treatment of Chronic Pain* XV, 11(1996) (SAPP-7-9); David G. Simons, M.D., Janet G. Travell, M.D., Lois S. Simons, M.S., P.T., 1 *Myofascial Pain and Dysfunction: The Trigger Point Manual* 150, 155 (2d ed 1999) (SAPP-10-12); Yun-tao Ma, PhD, Lac, *Biomedical Acupuncture for Sports and Trauma Rehabilitation: Dry*

Needling Techniques, preface x (2011) (SAPP-13-14). In addition to disrupting the trigger point, the insertion of the needle creates a focal minute traumatic insult that initiates a healing response, reversing the pathological process that initiated development of the trigger point. Gunn, *The Gunn Approach XV* (SAPP-8); Ma, *Biomedical Acupuncture for Sports and Trauma* preface x (2011) (SAPP-14); Simons, *Myofascial Pain and Dysfunction* 150, 155 (SAPP-11-12). Dry needling is a therapeutic measure.

This court may also infer from the text of the rule that chiropractic colleges teach dry needling. The rule requires that a chiropractic physician have 24 hours of education on dry needling in order to perform the technique on patients. OAR 811-015-0036(3). The rule provides that a practitioner may obtain those 24 hours of education “within the curriculum of an accredited chiropractic college.” *Id.* So the rule, on its face, recognizes that chiropractic colleges teach dry needling.

OAAOM ignores that part of the rule and asserts that the court should look to the rulemaking record. As the OBCE’s brief describes and UWS explains in describing the standard of review above, this court should *not* look to the rulemaking record. *See Wolf*, 344 Or at 355 (record in a rule challenge includes “two things only: the wording of the rule (read in context) and the statutory provisions authorizing the rule”).

Limiting review to the face of the rule, the rule is valid because it indicates that chiropractic colleges teach dry needling, and OAAOM cannot establish otherwise. *See* ORS 183.400(4)(a), (b) (court may declare rule invalid “only if” the rule violates a constitutional provision or “exceeds the statutory authority of the agency”).

However, even if the court accepts OAAOM’s invitation to look beyond the face of the rule in this case, there is substantial evidence to establish that approved chiropractic colleges teach dry needling. The rulemaking record establishes that accredited chiropractic colleges around the country teach dry needling including New York Chiropractic College, Northwestern Chiropractic College and National University of Health Sciences. Tr. 13, 95, 116, 136, 159-60; Rec. #74, p. 475; Rec. #83, p. 446. There was also considerable evidence that UWS teaches dry needling. SER 1 (Rec. #100, p. 395) (“This memorandum is to confirm that Dry Needling as a technique for the treatment of trigger points in the human body is taught within the core DC curriculum at the University of Western States College of Chiropractic.”); Tr. 108 (“Dry needling as a technique for the treatment of trigger points in taught within the core curriculum at the University of Western States. It is covered in the soft tissue therapies course, in various NMS courses and in clinical courses via lecture, demonstration, and supplemental video presentations.”); Tr. 162 (“Dry needling as a technique for the evaluation and management of trigger point is

taught within the core curriculum of the chiropractic program at University of Western States.”); Rec. #70, p. 481; Rec. #83, p. 446; Rec. #89, p. 427.

Accordingly, whether the court limits its review to the text of the rule, or whether it considers the rulemaking record, dry needling also falls within ORS 684.010(2)(b) as a “rational therapeutic measure” that is “taught in approved chiropractic colleges.”

2. OBCE’s rule does not contravene ORS 684.025(2).

OAAOM also asserts that OBCE’s rule contravenes ORS 684.025(2), which provides: “Neither this section nor ORS 684.010 authorizes the administration of any substance by the penetration of the skin or mucous membrane of the human body for a therapeutic purpose.” OAAOM argues that OAR 811-015-0036 contravenes that statute because the needle used in dry needling is a “substance” that penetrates the skin. Pet. Br. at 14.

UWS agrees that dry needling involves the penetration of the skin for a therapeutic purpose. Dry needling does not however involve “administration of any substance.” OAAOM states in its brief that “administration” means “application or dosage * * * of a medicine.” Pet. Br. at 14 (emphasis added) (quoting *Webster’s Third New Int’l Dictionary* at 28) (omission added). UWS agrees that the legislature likely intended administration to have that meaning.

In the medical field, “substance” means “any drug, chemical, or biologic entity.” *Mosby’s Medical, Nursing, & Allied Health Dictionary*, 1648, (6th ed

2002) (SAPP-3). That definition of “substance” is consistent with the definition of “administration,” and “administration of a substance” therefore means the insertion of a drug or chemical. Of course, a needle is not medicine or a chemical—it can be the vehicle for administering such substances. The rule however specifically describes dry needling as the use of a “dry needle, *without* medication.” OAR 811-015-0036(1) (emphasis added). So while a needle could be used to insert a drug or chemical, in the context of the statute, it is not itself the “administration of a substance” and certainly not when inserted dry as it is with dry needling.

3. OBCE’s rule does not interfere with acupuncture or usurp the Oregon Medical Board’s authority.

UWS concurs with OBCE’s brief on these points and simply reiterates that different medical disciplines may employ similar techniques or modalities and that there is a fundamental difference between the definition of acupuncture and the definition of dry needling.

4. OBCE is not forever bound by its past policy decisions.

UWS concurs with OBCE’s brief on this issue and supplements OBCE’s brief only to point out that when the legislature expanded the definition of chiropractic to include therapeutic measures taught in approved chiropractic colleges, it did so in order to allow the OBCE to respond to developments in the chiropractic field. A then-member of the OBCE testified to the legislative committee working on the definition of chiropractic that the prior definition was

CERTIFICATE OF COMPLIANCE WITH ORAP 5.05(2)(d)

I certify that (1) this brief complies with the word-count limitation in ORAP 5.05(2)(b), and (2) the word-count of this brief (as described in ORAP 5.05(2)(a)) is 4,191 words.

I certify that the size of the type in this brief is not smaller than 14 point for both the text of the brief and footnotes as required by ORAP 5.05(4)(f).

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CERTIFICATE OF FILING AND SERVICE

I certify that on July 2, 2012, I caused to be electronically filed the foregoing ***CORRECTED* INTERVENOR-RESPONDENT UNIVERSITY OF WESTERN STATES' ANSWERING BRIEF AND SUPPLEMENTAL EXCERPT OF RECORD AND APPENDIX** with the Appellate Court Administrator by using the eFiling system.

All participants in this case are registered eFilers and will be served via the electronic mail function of the eFiling system.

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MEMORANDUM

July 13, 2010

To: Sharron Fuchs, DC

From: Gary Schultz, DC, DACBR

RE: Dry Needling

This memorandum is to confirm that Dry Needling as a technique for the treatment of trigger points in the human body is taught within the core DC curriculum at the University of Western States College of Chiropractic. This technique is covered during of one of the Soft Tissue courses via a lecture and demonstration which is supplemented with a video presentation on the topic.

If you have any additional questions, please do not hesitate to contact my office.

cc: Dr. Joseph Brimhall, President

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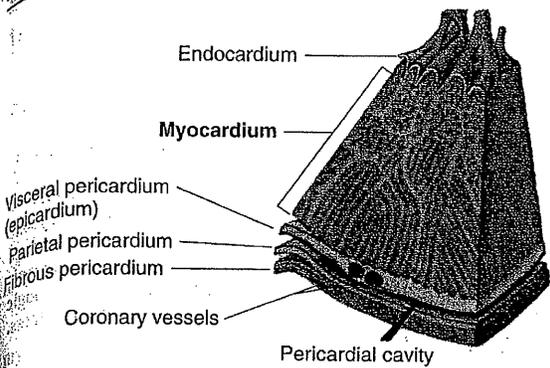
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myoclonic encephalopathy of childhood. See Kinsbourne syndrome.

myoclonus /mī'ōklō'nəs/ [Gk, *mys* muscle; + *klonos*, contraction], a spasm of a muscle or a group of muscles.

myoclonic, adj.
myocutaneous flap /mī'ōkyōō-tā'nē-əs/ [Gk, *mys*, muscle; + *cutis*, skin], a compound flap of skin and muscle with adequate vascularity to permit sufficient tissue to be transferred to the recipient site.

myocyte /mī'āsīt/, a muscle cell.
myodiastasis /mī'ōdī-as'tāsīs/ [Gk, *mys* + *diastasis*, separation], an abnormal condition in which there is separation of muscle bundles.

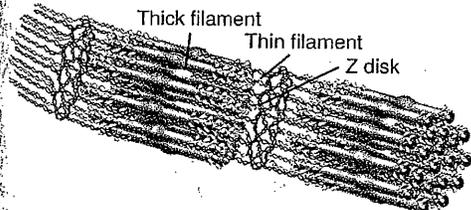
myodystrophy. See **muscular dystrophy.**
myoedema /mī'ō-idē'mə/, *pl.* **myoedemas, myoedemata**, muscle edema. Compare **myxedema.**

myoelectric, pertaining to the electric property of muscle.
myofascial /mī'ōfā'shəl/, pertaining to a muscle and its sheath of connective tissue, or fascia.

myofascial pain, jaw muscle distress associated with chewing or exercise of the masticatory muscles.

myofascial release, a set of massage techniques used to relieve muscle pain resulting from abnormally tight fascia.

myofibril /-fī'brīl/ [Gk, *mys* + *L, fibrilla*, small fiber], a slender striated strand within skeletal and cardiac muscle fibers and composed of bundles of myofilaments. Myofibrils occur in groups of branching threads running parallel to the cellular long axis of the fiber.



Molecular structure of a myofibril
(Thibodeau and Patton, 1999/Joanna Wild)

myofilament /mī'ō-fil'ə-mənt/ [Gk, *mys*, *L, filare*, to spin], any of the numerous ultramicroscopic threadlike structures occurring in bundles in the myofibrils of striated muscle fibers. The thick filaments of **myosin** and the thin filaments of **actin** are together responsible for the contractile properties of muscle. Also present are **intermediate filaments**, of uncertain function. See also **myofibril.**

myogelosis /mī'ōjələō'sīs/ [Gk, *mys* + *L, gelare*, to freeze; *Gk, osis*], a condition in which there are hardened areas or nodules within muscles, especially the gluteal muscles. There are no serious consequences of this condition, and no treatment is necessary.

myogenic /mī'ōjēn'ik/ [Gk, *mys* + *genesis*, origin], generated by muscles. The term usually refers to rhythmic activity in cardiac and smooth muscles, which do not require neural input to initiate and maintain contractions.

myoglobin /mī'ōglō'bīn/ [Gk, *mys* + *L, globus*, ball], a ferrous globin complex consisting of one heme molecule containing one iron molecule attached to a single globin chain. Myoglobin is responsible for the red color of muscle and for its ability to store oxygen. Normal blood levels of myoglobin are 0 to 85 ng/mL. Excessive myoglobin levels may result from massive burns or trauma.

myoglobin test, a blood test that detects levels of myoglobin, an oxygen-binding protein found in cardiac and skeletal muscle. Measurement of myoglobin is an index of damage to the myocardium in myocardial infarction or reinfarction, and also an indicator of disease or trauma of the skeletal muscle.

myoglobinuria /-glō'bīnōōr'ē-ə/ [Gk, *mys* + *L, globus* + *Gk, ouron*, urine], the presence of myoglobin, an oxygen-storing pigment of muscle tissue, in the urine. The condition usually occurs after massive muscle injury, physical trauma, or electrical injury.

myoglobinuric renal failure /-glō'bīnōōr'ik/, a kidney disease in which large amounts of filtered myoglobin coalesce in the tubules, obstructing nephronal flow and producing epithelial cell injury.

myokinase. See **adenylate kinase.**

myoma /mī'ō-mə/, *pl.* **myomas, myomata** [Gk, *mys* + *oma*, tumor], a common benign fibroid tumor of the uterine muscle. The tumor develops most frequently after 30 years of age in women, especially African-American women, who have never been pregnant. Menorrhagia, backache, constipation, dysmenorrhea, dyspareunia, and other symptoms develop in proportion to the size, location, and rate of growth of the tumor.

myoma previum. See **leiomyoma uteri.**

myoma striocellulare. See **rhabdomyoma.**

myomata. See **myoma.**

myomectomy /mī'ōmek'təmē/, the surgical removal of muscle tissue.

myomere. See **myotome.**

myometria. See **myometrium.**

myometritis /mī'ōmētrī'tīs/, an inflammation or infection of the myometrium of the uterus.

myometrium /mī'ōmē'trē-əm/, *pl.* **myometria** [Gk, *mys* + *metra*, womb], the muscular layer of the wall of the uterus. The smooth muscle fibers of the myometrium course around the uterus horizontally, vertically, and diagonally.

myonecrosis /mī'ōnek'rō'sīs/ [Gk, *mys* + *necrosis*, death], the death of muscle fibers. **Progressive or clostridial myonecrosis** is caused by the anaerobic bacteria of the genus *Clostridium*. Seen in deep wound infections, progressive myonecrosis is accompanied by pain, tenderness, a brown serous exudate, and a rapid accumulation of gas within the muscle tissue. The affected muscle turns a blackish green.

pertaining to the smallest anteroposterior diameter of an infant's neck when it is well flexed during labor.

subperiosteal fracture /sub'perē-os'tē-əl/ [L, *sub* + Gk, *peri*, around, *osteon*, bone], a fracture in a bone beneath the periosteum that does not disrupt the periosteum.

subphrenic /-fren'ik/ [L, *sub* + Gk, *phren*, diaphragm], pertaining to the area under the diaphragm.

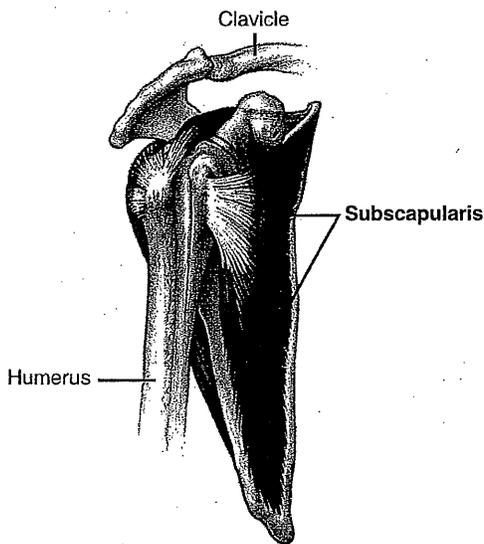
subphrenic abscess [L, *sub*, beneath; Gk, *phren*, diaphragm; L, *abscedere*, to go away], an abscess that develops on or near the undersurface of the diaphragm, usually as a result of peritonitis or from another visceral site.

subpoena /-pē'nə/ [L, *sub* + *poena*, penalty], (in law) a document from a court commanding that a person appear at a certain time and place to testify on a specific matter. Subpoenas are governed by federal rules for criminal and civil procedures.

subpoena duces tecum, (in law) a subpoena commanding a person to take books, papers, records, or other items to the court.

subpubic dislocation. See **dislocation of hip**.

subscapularis /-skap'yələr'is/ [L, *sub*, beneath, *scapulae*, shoulder blades], the muscle arising from the subscapular fossa with insertion in the humerus. It functions to rotate the arm medially.



Subscapularis (Thibodeau and Patton, 1999/John V. Hagen)

subscriber, (in managed care) an individual, agency, or employer that has contracted for services under a health plan.

subserous fascia /-sir'əs/ [L, *sub* + *serum*, whey, *fascia*, band], one of three kinds of fascia, lying between the internal layer of deep fascia and the serous membranes lining the body cavities in much the same manner as the subcutaneous fascia lies between the skin and the deep fascia. It is thin in some areas, such as between the pleura and the chest wall, and thick in other areas, where it forms a pad of adipose tissue. Compare **deep fascia**, **subcutaneous fascia**.

subsistence /-sis'təns/ [L, *subsistere*, to stand still], the

state of being sustained or remaining alive with a minimum of life essentials.

subspecialty /-spesh'əltē/ [L, *sub* + *specialis*, individual], (in nursing) a nurse's particular highly specific professional field of practice, such as dialysis, oncology, neurology, or newborn intensive care nursing. Compare **specialty**.

subspinale /sub'spī-nā'lē /, the deepest midline point on the maxilla on the concavity between the anterior nasal spine and the prosthion. Also called **point A**.

substance /sub'stəns/ [L, *substantia*, essence], 1. any drug, chemical, or biologic entity. 2. any material capable of being self-administered or abused because of its physiologic or psychologic effects.

substance abuse, the overindulgence in and dependence on a stimulant, depressant, or other chemical substance leading to effects that are detrimental to the individual's physical or mental health, or the welfare of others.

Substance Abuse and Mental Health Services Administration (SAMHSA), an agency of the United States Department of Health and Human Services with the function of disseminating accurate and up-to-date information about and providing leadership in the prevention and treatment of addictive and mental disorders.

substance addiction consequences, a nursing outcome from the Nursing Outcomes Classification (NOC) defined as the compromise in health status and social functioning due to substance addiction. See also **Nursing Outcomes Classification**.

substance dependence, a maladaptive pattern of substance abuse, leading to clinically significant impairment or distress as manifested by three or more episodes within a 12-month period of tolerance, withdrawal, use of large amounts or over a longer period, a persistent desire or unsuccessful effort to control substance abuse, or investment of a great deal of time in activities necessary to obtain the substance.

substance P, a polypeptide neurotransmitter that stimulates vasodilation and contraction of intestinal and smooth muscles. It also plays a part in salivary secretion, diuresis, natriuresis, and pain sensation. It has been isolated from certain cells of the GI and biliary tracts.

substance use prevention, a nursing intervention from the Nursing Interventions Classification (NIC) defined as prevention of an alcoholic or drug use life-style. See also **Nursing Interventions Classification**.

substance use treatment, a nursing intervention from the Nursing Interventions Classification (NIC) defined as supportive care of patient/family members with physical and psychosocial problems associated with the use of alcohol or drugs. See also **Nursing Interventions Classification**.

substance use treatment: alcohol withdrawal, a nursing intervention from the Nursing Interventions Classification (NIC) defined as care of the patient experiencing withdrawal cessation of alcohol consumption. See also **Nursing Interventions Classification**.

substance use treatment: drug withdrawal, a nursing intervention from the Nursing Interventions Classification (NIC) defined as care of a patient experiencing drug withdrawal. See also **Nursing Interventions Classification**.

substance use treatment: overdose, a nursing intervention from the Nursing Interventions Classification (NIC) defined as monitoring, treatment, and emotional support of a patient who has ingested prescription or over-the-counter drugs beyond the therapeutic range. See also **Nursing Interventions Classification**.

standard /-stan'dərd/ [L, *sub*, beneath], below the predetermined model or measure.

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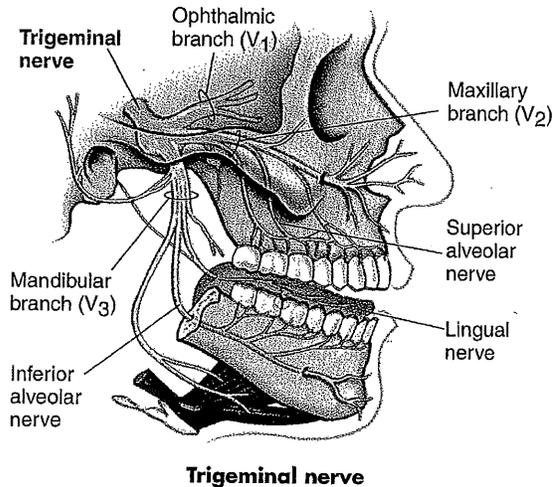
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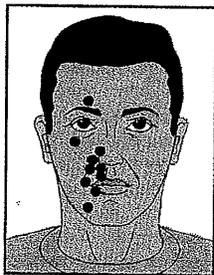
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areas in the brain. Also called **fifth cranial nerve**, **nervus trigeminus**, **trifacial nerve**, **trigeminus**.

trigeminal neuralgia, a neurologic condition of the trigeminal facial nerve, characterized by paroxysms of flashing, stablike pain radiating along the course of a branch of the nerve from the angle of the jaw. It is caused by degeneration of the nerve or by pressure on it. Any or all of the three branches of the nerve may be affected. Neuralgia of the first branch results in pain around the eyes and over the forehead; of the second branch, in pain in the upper lip, nose, and cheek; of the third branch, in pain on the side of the tongue and the lower lip. The momentary bursts of pain recur in clusters lasting many seconds; paroxysmal episodes of the pains may last for hours. Also called **prosopalgia**, **tic douloureux**.



Trigeminal neuralgia: distribution of trigger zones
(Perkin, 1998)

trigeminal pulse, an abnormal pulse in which every third beat is absent. See also **bigeminal pulse**, **trigeminny**.

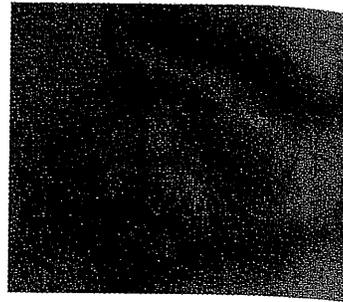
trigeminus. See **trigeminal nerve**.

trigeminny /trijem'ine/ [Gk, *treis* + L, *geminus*, twin], 1. a grouping in threes. 2. a cardiac arrhythmia characterized by the occurrence of three heartbeats in a repeating pattern: two normal beats coupled to an ectopic beat, or two ectopic beats coupled to a normal beat. —**trigeminal**, *adj.*

trigger [D, *trekker*; that which pulls], a substance, object, or agent that initiates or stimulates an action.

triggered activity [D, *trekker*; that which pulls; L, *activus*], rhythmic cardiac activity that results when a series of afterdepolarizations reach the threshold potential.

trigger finger, a phenomenon in which the movement of a finger is halted momentarily in flexion or extension and then continues with a jerk. Also called **jerk finger**.



Trigger finger, locked position (Lemmi and Lemmi, 2000)

trigger point, a point on the body that is particularly sensitive to touch and, when stimulated, becomes the site of a painful neuralgia. Also called **trigger zone**.

triglyceride /triglis'ærid/, a simple fat compound consisting of three molecules of fatty acid (e.g., oleic, palmitic, or stearic) and glycerol. Triglycerides make up most animal and vegetable fats and are the principal lipids in the blood where they circulate, within lipoproteins. The total amount of triglyceride and the amount, proportion, and kinds of lipoproteins are important in the diagnosis and treatment of many diseases and conditions, including diabetes, hypertension, and heart disease. Normally the total amount of triglyceride in the blood does not exceed 200 mg to 300 mg/dL.

triglycerides test (TGs), a blood test that detects levels of fats existing within the bloodstream that are transported by very low-density lipoproteins (VLDLs) and low-density lipoproteins (LDLs). It is done as part of a lipid profile, which also evaluates cholesterol and lipoproteins to assess the risk of coronary and vascular disease.

trigone /tri'gōn/ [Gk, *trigonos*, three-cornered], 1. a triangular space, especially one at the base of the shoulder. 2. the first three dominant cusps, considered collectively, of an upper molar.

trigonelline /tri'gōnel'ēn/, an alkaloid derived from various kinds of plant products, including coffee beans, fenugreek, and seeds of *Cannabis sativa*, as well as from sea urchins and jellyfish. Trigonelline is used in the manufacture of poultices and other medicinals.

trigone of the bladder /tri'gō'n/, a triangular area of the bladder between the opening of the ureters and the orifice of the urethra. Also called **trigonum vesicae**.

trigonitis /tri'gōn'itis/, inflammation of the trigone of the bladder, which often accompanies urethritis.

trigonum vesicae. See **trigone of the bladder**.

trihexyphenidyl hydrochloride /tri'hex'ifen'idil/, an anticholinergic agent.

■ **INDICATIONS:** It is prescribed in the treatment of Parkinson's disease and to control drug-induced extrapyramidal reactions.

■ **CONTRAINDICATIONS:** Narrow-angle glaucoma, asthma, obstruction of the genitourinary or GI tract, severe ulcerative

colitis, or kidney disease.

■ **ADVERSE EFFECTS:** Blurred vision, dry mouth, dizziness, and other actions.

trihybrid /tri'hibrid/, pertaining to a cross between two parents of different genetic backgrounds.

trihybrid cross, a cross between two individuals that are heterozygous for three specific traits.

trihybridism, a condition in which the gene loci for three specific traits are heterozygous.

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SAPP-5

MYOFASCIAL TRIGGER POINTS

► Pathophysiology and
Evidence-Informed Diagnosis
and Management



JAN DOMMERHOLT | PETER HUIJBREGTS

Conclusion

Trigger point dry needling is a relatively new treatment modality used by physical therapists worldwide. The introduction of trigger point dry needling to American physical therapists has many similarities with the introduction of manual therapy during the 1960s. During the past few decades, much progress has been made toward the understanding of the nature of MTrPs, and thereby of the various treatment options. Trigger point dry needling has been recognized by prestigious organizations such as the Cochrane Collaboration and is recommended as an option for the treatment of persons with chronic low back pain. Several clinical outcome studies have demonstrated the effectiveness of trigger point dry needling. However, questions remain regarding the mechanisms of needling procedures. Physical therapists are encouraged to explore using trigger point dry needling techniques in their practices.

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SAPP-7

The Gunn Approach to the
**TREATMENT OF
CHRONIC PAIN**

*Intramuscular Stimulation for
Myofascial Pain of Radiculopathic Origin*

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EDINBURGH LONDON NEW YORK OXFORD PHILADELPHIA ST LOUIS SYDNEY TORONTO 1996

Introduction

WHAT IS INTRAMUSCULAR STIMULATION (IMS)?

- Intramuscular stimulation, or IMS, is a total system for the diagnosis and treatment of myofascial pain syndromes (chronic pain conditions that occur in the musculoskeletal system when there is no obvious injury or inflammation).
- IMS explains this large category of pain in a new way. Instead of presuming pain to be signals of tissue injury, IMS blames pain on unwell nerves (when there is disturbed function and supersensitivity in the peripheral nervous system—"neuropathic pain").
- IMS applies Cannon and Rosenblueth's law of denervation to explain the supersensitivity that occurs with peripheral neuropathy. This physiologic law is fundamental but little known.
- IMS has introduced an examination technique that shows neuropathy to occur, almost invariably, at the nerve root—causing "radiculopathic pain". Because there is no satisfactory laboratory or imaging test for neuropathy, IMS's clinical examination is indispensable for diagnosis.
- IMS's radiculopathy model explains many apparently different and unrelated pain syndromes—from headache to low back pain, from tennis elbow to trigeminal neuralgia—and places them all into one classification.
- IMS borrows its needle technique

from traditional Chinese acupuncture, but updates and enhances it with anatomy and neurophysiology. IMS is simple to learn for doctors, nurses and therapists who have training in anatomy. Results are predictable and superior to acupuncture because treatment is based on physical signs.

- IMS should be taught in medical schools because it is more effective than any other physical therapy. Knowledge of IMS can provide an excellent bridge between Eastern and Western medicine. Indeed, not only does IMS bridge the gap between them, it transcends the limitations of both.

HOW INTRAMUSCULAR STIMULATION DEVELOPED

IMS and the radiculopathy model was developed from clinical observations and research carried out over a period of more than twenty years—first, at the Workers' Compensation Board of British Columbia and, subsequently, at my pain clinic in Vancouver.

IMS began in 1973. Frustrated by the generally unsatisfactory results obtained when using conventional physical therapies for chronic pain patients, I needed to learn more about chronic pain. I therefore carefully examined 100 patients who had chronic back pain but who did not have obvious signs of injury, and 100

IMS—the technique

Neuropathic pain affects all target structures innervated by the nerve, including joints, muscles, and their connective tissue attachments. While pain may present primarily in a muscle (e.g. shortening in the tibialis anterior muscle causing "shin splints"), or in a tendon (e.g. shortening of the biceps brachii muscle straining its tendon and producing "bicipital tendonitis"), or in a joint (e.g. shortening of the quadriceps femoris muscles giving rise to knee joint pain), all target structures are affected to varying degrees, and the common perpetrator of pain in all these structures is muscle shortening.

We have found that muscle shortening can be released when painful trigger points in the muscle are desensitized. Invariably, when muscle shortening is relieved, pain, whether in muscle, tendon, or joint, is alleviated.

The most effective way to desensitize painful points is to use an intramuscular technique. Injections of local anesthetic, with or without steroids, or saline, may be used; however, injections of medication, especially steroids, can cause side-effects such as infection, impaired healing, weakened tissue elements, local atrophy of fatty tissue and "dimpling" of skin, skin pigmentation, inflammation due to crystal deposits, suppression of the hypothalamic-pituitary axis, localized bleeding, accidental pneumothorax, and joint destruction by avascular necrosis that sometimes imitates a

Charcot joint. By contrast, IMS dry needling, which is more effective, has few iatrogenic side-effects (minor localized bleeding and accidental pneumothorax).²⁷ We prefer IMS dry needling for all of these reasons and others as described below.

NEEDLE TECHNIQUE

The technique of inserting a needle is simple, but good results require a correct diagnosis, a knowledge of muscle anatomy, and practice, especially to accurately reach deep muscle points. We use a fine solid needle (30 gauge or less), usually 1 or 2 inches long, in a plunger-type needle holder. The plunger allows the length of the needle to be varied according to the thickness of the muscle treated. The pointed tip of the solid needle is less traumatic than the beveled, cutting edge of a hollow needle; its flexible and springy quality, unlike that of a rigid hollow needle, transmits the nature and consistency of tissues penetrated. When it enters normal muscle, the needle meets with little resistance;



SAPP-10

Travell & Simons'

Myofascial Pain and Dysfunction: The Trigger Point Manual

VOLUME 1. Upper Half of Body

Second Edition

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[†] Dr. Janet Travell's genius and medical insight resulted in her identification of the clinical picture of several of myofascial pain syndromes and many perpetuating factors. In addition, her most recent features to this text the benefit of her advice in preparing some of the chapters. She emphasized the importance of including a new clinical chapter on the respiratory muscles and respiratory system parts of clinical wisdom that sprang from her research.

dysfunction is the area that was treated the following should be considered.

PERPETUATING FACTORS. When active myofascial TPs do not subside after correctly applied spray and stretch, one or more perpetuating factors are usually responsible.

INADEQUATE COVERAGE. If the spray is applied only to the reference zone where the patient complains of pain, it usually misses the skin overlying the TP that is causing the pain. When TPs in several widely separated muscles refer pain to the same area, stretching and spraying some, but not all, of these muscles will provide only partial relief.

PATIENT TENSION. For effective passive stretch, the patient must fully relax the muscles being treated. Frequently tension in postural muscles spills over, and the patient must assume a relaxed body position and feel relaxed all over to fully relax the muscles being treated.

FROST SPRAY TENDENCY. The vapocoolant is less effective if the stream of spray is passed too quickly over the skin, or if the spray container is held too close to the skin. On the other hand, the same skin area should not be sprayed so often, or so slowly that the underlying muscle becomes chilled. The line of spray must be directed over the line of muscle fibers that are under maximum tension so that the topographically related skin reflex effects of vapocooling can release them.

INCOMPLETE SPRAY AND STRETCH. Additional cycles of spray and stretch, with re-warming after each cycle, need to be repeated as long as the range of motion is insufficiently with each cycle, or

range of motion. Adjacent muscles often need releasing before the full range can be reached. If stretch is limited by structural impediments, such as an old fracture, osteoarthritis or idiopathic scoliosis,¹² local manual release techniques will be required.

PAIN POSTTREATMENT. Muscle soreness is likely to be greater if the skin is not re-

warmed immediately with a hot pack or pad. Recurrences are more likely if the patient fails to actively move the treated part through its fully shortened and lengthened range of motion several times to reestablish normal function.

ANEMIGRY. Pain recurs when aggravating or perpetuating factors are present and reactivate the TPs. However, chronicity alone need not prevent an immediate but temporary response to specific myofascial therapy.

13. TRIGGER POINT INJECTION

There are three different approaches to the needle-inactivation of the active loci in a central TP. Generally, we recommend injection of a local anesthetic without corticosteroid and no adrenalin. Dry needling can be effective but results in more postinjection soreness. Only under special circumstances would one inject Botulinum toxin A. Effective treatment using either the injection of a local anesthetic or dry needling depends on mechanical disruption and inactivation of the active loci in that TP. Inactivation of TPs by injecting botulinum toxin A depends on its specific pharmacological destructive effect on motor endplates.

It is essential to clearly define just what is meant by one injection. The number of injections should be counted in terms of the number of TP sites injected, not the number of times some solution has been deposited within one TP into. One TP site has a highly variable number of active loci that must be inactivated and all of the loci in one TP can be needled or injected with one skin penetration. Using a nonmyotoxic local anesthetic (which is the kind of anesthetic recommended) or dry needling, many needle movements within the TP are normally required. When a local anesthetic is used, one should inject only a small amount (< 1 ml) at any one location within the TP. The clinician must obtain twitch responses from all of the remaining active loci in that TP in order to ensure effective treatment.

Some clinicians depend on the injection of large amounts of seriously myotoxic drugs like Botulinum toxin A or concentrated long acting local anesthetics in the general vicinity of a point of tenderness, hoping to inject a TP. When myotoxic drugs are considered amyotrophic for injec-

100 mg/ml of 2% lidocaine after intramuscular injections that the increased strength of treated the muscle by approximately 150,000 spikes daily in a rat model of spinal cord injury.

100 mg/ml of 2% lidocaine into rat muscle almost totally after the same treatment, which was much less than the blood concentration and were clinically

Injection Botulinum toxin irreversibly blocks nerve terminals, terminals of motor nerve fiber endplates. The BTA blocks acetylcholine transmission at the nerve fiber contractile endplates has been thus paralyzing paw axons and to reestablish a connection for each

used in mouse. The estimated for 18-20 g which is approximately is typically a administration cal effects, af-

though patients may experience results in immediately axon sprouting and muscle fiber reinnervation terminate the clinical toxic effect of BTA usually in 2-6 months.

Botulinum toxin A has become well recognized as an effective therapy for spasticity caused by upper motor neuron lesions such as spinal cord injury because it terminates motor activity of the affected motor endplates. The increasingly extensive use of BTA for treatment of spasticity has recently been reviewed in depth.

Since the primary dysfunction of motor endplates associated with the TrP phenomenon appears to be excessive release of ACh, injection into the TrP of a substance like BTA which only blocks ACh release should be specific TrP therapy. BTA injection for the treatment of myofascial TrPs has been reported by several authors to be clinically effective.

One randomized, double-blind, placebo-controlled study* in 6 subjects compared the effect of TrP injections into cervical paraspinal and shoulder girdle muscles. Four patients experienced at least 30% reduction in TrP symptoms and signs following BTA but not saline injection as measured by clinical analog scales, verbal descriptors for pain intensity and unpleasantness, palpable muscle firmness, and pressure pain thresholds. Significant reduction in symptoms was not seen at 30 minutes following injection, but was found 1, 2, 3, and 6 weeks later. This corresponds to the usual 1- to 3-day delay in the onset of clinical effects. One subject had no response to either type of injection, and the other had an equal response to both types. This study employed valid criteria for diagnosing a TrP, but noted no confirmatory evidence that the injection was in the TrP. Since dry needling and saline injection of TrPs have also been reported effective treatment when properly placed, the placebo control may have had some therapeutic effect. This study* strengthens the expectation that BTA would be an effective therapeutic agent for treating TrPs.

It is important when using BTA to inject the minimum amount necessary and only in the TrP, since BTA destroys normal and dysfunctional TrP endplates alike. Ottaviani and Childers¹⁰ empha-

sized the importance of injecting BTA only where endplates were located and recommended that it be injected where a systematic search revealed endplate potentials. Since these spontaneous endplate potentials are highly correlated with TrPs,¹⁰ this is an ideal way to determine exactly where to inject the BTA for maximum TrP effectiveness and would greatly reduce unnecessary destruction of innocent endplates.

It is unknown whether the newly formed endplates following BTA denervation are more or less vulnerable to the development of TrP dysfunction than those endplates that they replaced.

Dry Needling Injection is effective using a dry needling technique.^{11, 12, 13, 14} However, Kraus¹⁵ stated that although dry needling is effective, postinjection pain follows immediately. Supporting this, Borges¹⁶ found that local anesthetics reduce the painfulness of TrP injection as compared with isotonic saline and dry needling. Hong¹⁷ reported that injecting lidocaine reduced postinjection soreness.

Lewis¹⁸ reported that accurately localized dry needling is effective, without quantitatively comparing it to procaine injections. He preferred dry needling to the use of a local anesthetic, because dry needling permitted location of all of the TrPs in a region by fully preserving their toll-free pain reaction.

Many practitioners of acupuncture use several TrP criteria to locate pain acupuncture points and, in fact, are successfully performing dry needling of TrPs that they speak of as acupuncture therapy (See Chapter 2 Section B).

How to Inject?

Preinjection Before injecting or needling a patient's TrPs the practitioner should consider patient positioning, vitamin C and aspirin intake with regard to possible increased bleeding tendency, needle selection, proper cleaning, painless skin penetration, and the value of preinjection blocks.

Patient Positioning. The patient should be recumbent for dry injection, to avoid psychogenic syncope and falling to the floor. When the patient sits in a chair for worse to standing, injections can be hazardous in susceptible individuals.^{19, 20} Recumbency also greatly facilitates locating

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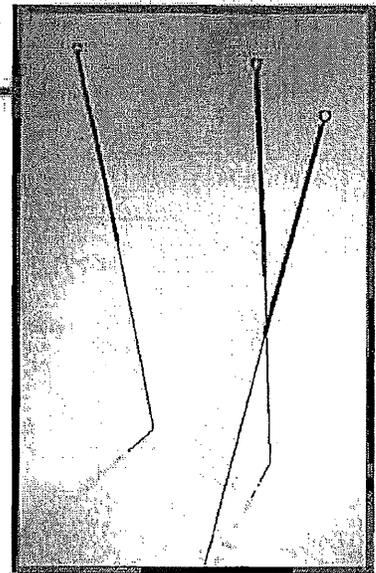
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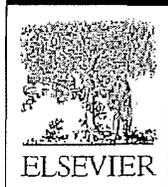
BIOMEDICAL ACUPUNCTURE for SPORTS and TRAUMA REHABILITATION

Dry Needling Techniques

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Paris, France



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without injection of any liquid substance to treat human pathology" in their classic text, *Myofascial Pain and Dysfunction: The Trigger Point Manual*.

They also state: "In comparative studies, dry needling was found to be as effective as injecting an anesthetic solution such as procaine or lidocaine in terms of immediate inactivation of the trigger point."¹ Their ground-breaking work and other innovative needling methods such as the approach of Dr. C. Chan Gunn, which is known as Intramuscular Stimulation (IMS), have laid the foundation of what is now known as the new modality of dry needling acupuncture.

Clinically, soft tissue pain is an aspect of soft tissue dysfunction and may include myofascial pain, other musculoskeletal pain, fibromyalgia, and other soft tissue pathology. Soft tissue injury is present in most types of sports injury. Dry needling acupuncture is a very effective modality for treating acute and chronic soft tissue damage. An additional clinical benefit of dry needling is that it is effective in preventing the chronic injuries which result from repetitive overuse of muscles as is commonly seen in sports and physical exercise.

Dry needling acupuncture is a unified system which successfully combines both systemic and analytical approaches. Practitioners should not treat local symptoms only, but also need to restore the systemic homeostasis of their patients.

In contrast to wet needling, the clinical procedure of dry needling acupuncture emphasizes more tissue healing than pain relief, a more systemic approach than treatment of local pathology, and both post-injury treatment and pre-injury prevention.

A brief history of dry needling acupuncture

Like any medical procedure, dry needling acupuncture has gone through a period of development and may now be considered to be reaching its maturity. Dry needling as a medical technique has been observed in various human civilizations for over two millennia. From historical literature, we know that it appeared in Egypt, Greece, India, Japan, and China. The Chinese, as we know, systematically preserved this technique, developed its medical value, and formulated the well-known acupuncture

of traditional Chinese medicine (TCM), widely acknowledged as one of the great inheritances of Chinese civilization.

Modern dry needling started in the 1930s in England and developed to maturity in the United States (see Chapter 10). Travell and Simons did comprehensive clinical research that led them to define and locate most of the important trigger points of skeletal muscles in the human body. They also noticed the relationship between trigger points and internal visceral pathology.¹ From the beginning they noticed that trigger points affect the posture and biomechanical balance of the musculoskeletal system. Other clinicians contributed different dry needling techniques, such as the Intramuscular Stimulation technique developed by Dr. C. Chan Gunn.² These researchers created the foundation of the analytical approach in dry needling therapy. Then came the synthetic approach.

Dr. Ronald Melzack found that more than 70% of the classic meridian acupoints corresponded to commonly used trigger points.³ Then the discovery of homeostatic trigger points by Dr. H.C. Dung, Professor of Anatomy at the University of Texas Health Science Center at San Antonio, advanced our understanding of the connection between homeostatic trigger points and the principle of the central innervation of trigger points (see Chapters 7 and 8). Travell herself paid attention to Dung's work (personal communications between Travell and Dung in 1984 and between Dr. Dung and myself).

With 40 years of clinical experience and medical training, I found that both the analytical and synthetic approaches could be organically integrated into a new modality—modern dry-needling therapy. Working in the neuroscience program of the National Institutes of Health and in the physical therapy department of the University of Iowa, I did research on pain relief and the neuropharmacology of the central nervous system, kinesiology, cognitive neural science, and neurology. I was able to incorporate all these fields into dry needling therapy.

For the last 10 years, my colleagues in the U.S., China, Germany, Brazil and other countries and I have used dry needling acupuncture to treat thousands of