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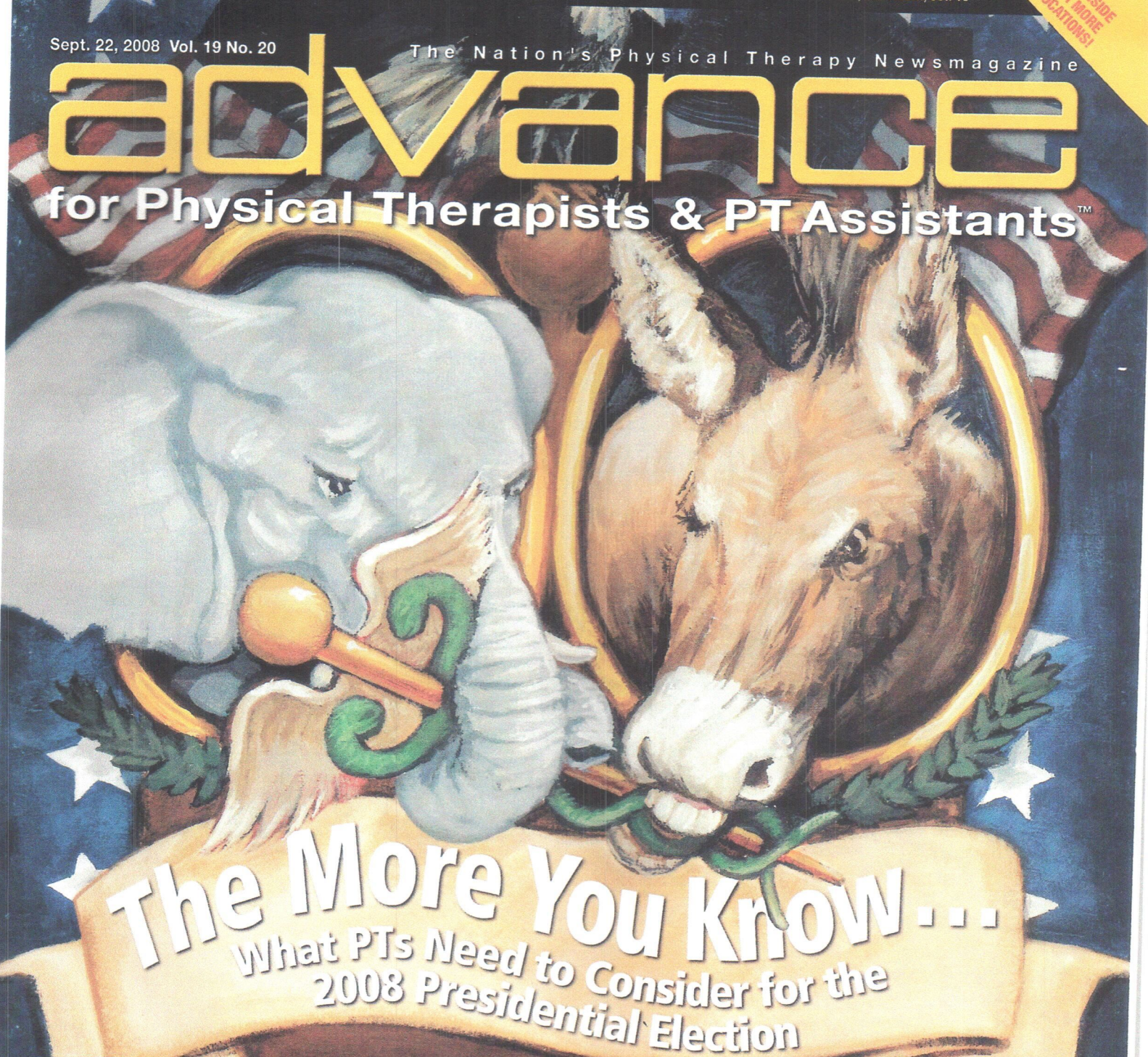
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Location, Location

What you don't know about trigger points will hurt your patients **By Valerie DeLaune, LAc**

DR. JANET TRAVELL, WHITE HOUSE PHYSICIAN FOR BOTH JOHN F. Kennedy and Lyndon Johnson, initially specialized in cardiology but soon became interested in pain relief. She pioneered and researched new pain treatments, including systematically mapping pain referral patterns from what she called trigger points.

Initially she inserted a hypodermic needle into these points and injected a numbing agent. She later discovered that dry needling also worked, as did applying pressure to trigger points.

Dr. David G. Simons became intrigued with trigger points after meeting Dr. Travell and soon joined her in her work. Together, Drs. Travell and Simons produced a comprehensive two-volume text on the causes and treatment of trigger points for physicians.

Referred Pain: The Most Important Thing

Any of the 400 muscles in the human body can develop trigger points, potentially causing referred pain and dysfunction. Symptoms can range from intolerable, agonizing pain to painless restriction of movement and distortion of posture.

Trigger points may refer pain both in the local area and/or to other areas of the body, and the most common referral patterns have been well documented and diagrammed. Approximately half of the time, trigger points are not located in the same place as the

symptoms.

For example, trigger points in the upper portion of the trapezius muscle can cause headache pain in the temples, the base of the skull, in the angle of the jaw and possibly above the ear and over the eye. As a practitioner, if you aren't familiar with referral patterns, you can't treat pain adequately, because you won't know which potential muscle(s) are harboring the offending trigger points.

Weakness and Muscle Fatigue

Trigger points cause weakness and loss of coordination of the involved muscles, along with an inability of the muscles to tolerate use. Many practitioners take this as a sign that they need to have the patient strengthen the weak muscles. But if the trigger points aren't inactivated first, conditioning exercises may encourage the surrounding muscles to do the work instead of the muscle containing the trigger point, further weakening and deconditioning the muscle containing trigger points.

Muscles containing trigger points are fatigued more easily and don't return to a relaxed state as quickly when use of the muscle ceases. In addition, trigger points may cause other muscles to tighten and become weak and fatigued in the areas of the referred pain and cause a generalized tightening of an area as a response to pain.

Trigger points can cause symptoms not normally associated with muscular problems, such as swelling, ringing in the ears, loss of balance, dizziness, urinary frequency, buckling knees, abnormal sweating, and tearing of the eyes. For example, the sternocleidomastoid muscle, in addition to causing a tension-type headache, can also cause dizziness, nausea, sinus congestion, eyelid twitching, hearing

problems, eye problems, a chronic sore throat and other symptoms. It probably wouldn't occur to most practitioners that these symptoms could be caused by a trigger point in a muscle.

Locations of Trigger Points

A trigger point can be in either an active or a latent phase depending on how irritated it is. If the trigger point is active, it will refer pain or other sensations and limit range of motion. If the trigger point is latent, it may cause only a decreased range of motion and weakness, but not pain.

Trigger points tend to form where the nerve ending that causes the muscle to contract attaches to the muscle fiber, generally in the middle of the muscle fiber. These are called central myofascial trigger points. Trigger points also tend to form at the muscle's attachments; these are called attachment trigger points.

A primary, or key, trigger point can cause a satellite trigger point to develop in a different muscle. It may form because it lies within the referral zone of the primary trigger point. Alternatively, the muscle with the satellite trigger point may be overloaded because it's substituting for the muscle with the primary trigger point, or it may be countering the tension in the muscle with the primary trigger point.

How Trigger Points Form

Trigger points may form after a sudden trauma or injury, or they may develop gradually. Common initiating and perpetuating factors are mechanical stresses, injuries, nutritional problems, emotional factors, sleep problems, acute or chronic infections and organ dysfunction and disease. It is crucial to identify and correct any perpetuating factors for lasting pain relief.

When a trigger point is present, numerous sarcomeres are contracted into a small thickened area and the rest of the sarcomeres in the myofibril are stretched thin. Several of these contractures in the same area are probably what we feel as a "knot" or "tight band" in the muscle. These muscle fibers are not available for use because they are already contracted, which is why you cannot strengthen a muscle that contains trigger points. If trigger points are left untreated, the myofibril may break in the middle, causing it to retract to each end and leave an empty shell in the middle, causing permanent damage.

When pressed, trigger points are usually very tender. The sustained contraction of the fibril probably leads to the release of sensitizing neurochemicals, producing the pain that is felt when the trigger point is pressed. The areas at the ends of the muscle fibers (either at the bone or where the muscle attaches to a tendon) also become tender as the attachments are stressed by the contraction in the center of the fiber.¹

Part of the current hypothesis about the mechanism responsible for the formation of trigger points is the energy crisis component theory. As you may recall, the sarcoplasmic reticulum is responsible for storing and releasing ionized calcium. The type of nerve ending that causes the muscle fiber to contract is called a motor end plate. This nerve ending releases acetylcholine, a neurotransmitter that tells the sarcoplasmic reticulum to release calcium, and then the muscle fiber contracts. If it is operating normally, when contraction of the muscle fiber is no longer needed, the nerve ending stops releasing acetylcholine, and the calcium pump in the sarcoplasmic reticulum returns calcium into the sarcoplasmic reticulum.

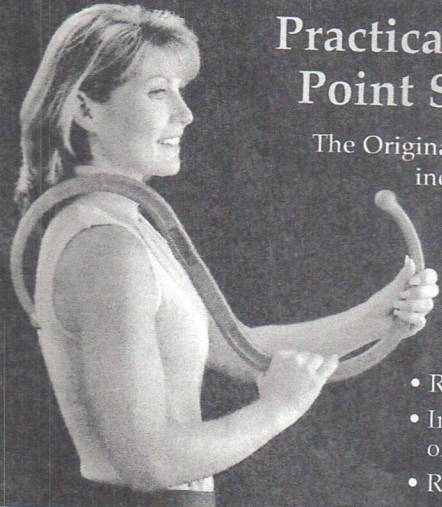
If a trauma occurs or there is a large increase in the motor end plate's release of acetylcholine, an excessive amount of calcium can be released by the sarcoplasmic reticulum, causing a maximal contracture of a segment of muscle. This leads to a maximal demand for energy and impairment of local circulation. If circulation is impeded, the calcium pump doesn't get the fuel and oxygen it needs to pump calcium back into the sarcoplasmic reticulum, so the muscle fiber continues to contract.

Central Nervous System Sensitization

Recent research has shown that certain types of nerve receptors in muscles relay information to neurons located within part of the gray matter of the spinal cord. The pain is amplified there and then is relayed to areas of other muscles, thereby expanding the region of pain beyond the initially affected area.

Once this part of the central nervous system is involved, or "sensitized" in this way (called central sensitization), the persistent pain leads to long-term or permanent changes in these neurons, which affect adjacent neurons through neurotransmitters. Histamine, serotonin, bradykinin and substance P are released, which stimulate the nervous system to release even more acetylcholine locally, adding to the perpetuation of the dysfunctional cycle.²

This may also cause the part of the nervous system that would normally counteract pain to malfunction and fail to do its job. Anx-
location continued on page 44




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The Boston Center for Rehabilitative and Subacute Care Boston, MA

"I think the best part of working at The Boston Center for Rehabilitative and Subacute Care is we see a very diverse range of diagnoses," said Kristen Lager, DPT, staff physical therapist. "It keeps life interesting. When you come to work, you never know what to expect."

The Boston Center, located in the West Roxbury section of Boston, MA, is affiliated with Spaulding Rehabilitation Hospital across town. It is a 75-bed inpatient care facility, with diagnoses ranging from orthopedic surgeries to oncology diseases, multitrauma accidents, CVAs, cardiopulmonary diseases and s/p vascular surgeries.

"We're technically classified as a skilled nursing facility (SNF), but I think we see a lot more complex and acute patients than most other SNFs do—which really makes The Boston Center unique."

The full-time rehabilitation staff currently consists of four PTs, one PTA, three OTs, three COTAs and a speech therapist. Openings are available for an additional full-time PT, PTA, OT and per diem staff.

"We work as a multidisciplinary team, but in terms of what a physical therapist's responsibilities are, we certainly see patients from start to finish. That includes conducting an initial evaluation, developing

a plan of care and treating each patient daily for anywhere from a half-hour to an hour."

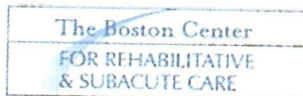
There is also a mock apartment in the facility's gym that OT and PT staff utilize to help patients practice real-life scenarios. Prospective employees must have Massachusetts licensure and new graduates are encouraged to apply.

"There is a wide range of experience levels among our rehabilitation staff," explained Dr. Lager. "And we do work with new grads to ease them into actually being on their own. We ask that all applicants be team-oriented, have strong communication skills and a positive, energetic attitude."

Full-time positions at The Boston Center are 40 hours per week with typical shifts of either 7 a.m. to 3:30 p.m. or 8 a.m. to 4:30 p.m. The facility is flexible in its scheduling, Dr. Lager noted. She also lauded the many benefits of its Boston location.

"I think overall it's just a great city. There's a lot of history here. Everything is very accessible by public transportation, which is nice. If you do have a car, The Boston Center offers free parking. And we're also located across the street from Arnold Arboretum, where a lot of people go after work to relax and enjoy the weather." ■

Recruitment information provided by the facility. For more information, contact Sherry Jacobs in human resources at 617-363-2148 ext. 308 or Sjacobs3@partners.org



[PAIN MANAGEMENT]

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ity and nervous tension also increase autonomic nervous system activity (the part of the nervous system that controls the release of acetylcholine, along with involuntary functions of blood vessels and glands), which commonly aggravates trigger points and their associated symptoms.³

The longer pain goes untreated, the greater the number of neurons that get involved, and the more muscles they affect. This causes pain in new areas and causes more neurons to get involved. The bigger the problem gets leads to the likelihood that the pain is going to turn into a chronic problem.

Trigger-Point Treatment

Trigger-point therapy is not one specific technique, but a protocol. The first step in identifying potential trigger points is to make a list of muscles that could possibly be causing the referred pain your patient is experiencing. For example, if your patient has pain in the temple area, you need to palpate the trapezius, sternocleidomastoid, temporalis and posterior neck muscles for trigger points. Note that of these muscles, only the temporalis is actually located within the area of referral.

Once you have selected the most likely culprit(s), treatment methods may include massage (compression and/or "milking"), stretching or dry needling (depending on the laws in your state), either with a hypodermic or an acupuncture needle. Identification and

elimination of perpetuating factors is crucial for lasting relief. Teaching patients self-help techniques can help speed healing.

Continuing education classes in trigger point treatment are available. If you take the time to learn the referral patterns, trigger point palpation, treatment protocols and perpetuating factor identification and resolution, both your patients and your practice will benefit.

In the next part of this article, two successful physical therapists will share their experience and insights into how they have incorporated trigger point treatment into their practices. ■

References

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Valerie DeLaune is a licensed acupuncturist and the author of Pain Relief with Trigger Point Self-Help and Trigger Point Therapy for Headaches and Migraines. She treats patients at the Natural Health Center in Anchorage, AK. She can be contacted through her Website www.triggerpointrelief.com, or at 907-653-1979.