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**SPECIAL ISSUE:  
PTA FOCUS**

# Under Pressure

Active trigger points can initiate a cycle of pain and dysfunction but these techniques can help break it **By Valerie DeLaune, LAc**

**T**rigger points must be treated before conditioning exercises are effective. Although there are differing theories about the physiology of trigger point formation, researchers agree that there are palpable “nodules” and taut bands due to rigor (silent spasm) of the muscle fibers. Because fibers are already contracted, conditioning exercises can actually aggravate active trigger points, causing an escalating cycle of pain and dysfunction.

If a trigger point is active, it will refer pain or other sensations and limit range of motion. If a trigger point is latent, it may cause a decreased range of motion and weakness, but not pain. The more frequent and intense your patient’s pain, the greater the number of active trigger points they are likely to have. It is imperative that trigger points be inactivated before conditioning exercises are assigned.

## How Do Trigger Points Form?

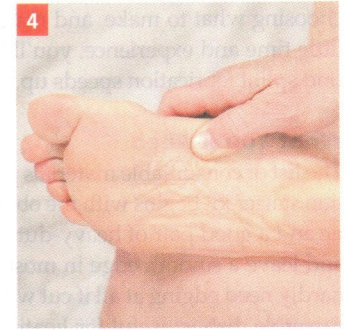
One of the prevailing theories surrounding the mechanism responsible for the formation of trigger points is the “integrated trigger point hypothesis.” If a trauma occurs, or there is a large increase in the motor end plate’s release of acetylcholine, an excessive amount of calcium can be released by the sarcoplasmic reticulum.

This causes a maximal contracture of a segment of muscle, leading to a maximal demand for energy and impairment of local circulation. If circulation is impaired, the calcium pump doesn’t get the fuel and oxygen it needs to pump calcium back into the sarcoplasmic reticulum, so the muscle fiber stays contracted. Sensitizing substances

## Self-help Techniques for Patients

- Use a tennis ball, racquetball, golf ball, dog’s play ball or baseball, or use your elbow or hand if instructed for particular muscles.
- Apply pressure for a minimum of eight seconds and a maximum of one minute.
- It should be somewhat uncomfortable, or “hurt good,” but it should not be so painful that you are either tensing up or holding your breath. If it is too painful, use a smaller or softer ball, or move to a softer surface (such as a bed or a surface padded with a pillow or blanket).
- Search the entire muscle for tender points, particularly the points of maximum tenderness.
- Be sure to work on both sides of the body to treat and relax the muscles symmetrically, but spend more time on the areas that need it more.
- If you have limited time, do one area thoroughly rather than rushing through many areas.
- Do stretches after the trigger-point work.
- Most people should work on their muscles once per day initially. If you have questions or your symptoms get worse, or you are sore for more than one day, stop the self-help until you have had a chance to consult with your therapist.

—Condensed and excerpted from *Trigger Point Therapy for Foot, Ankle, Knee & Leg Pain: A Self-Treatment Workbook* (DeLaune, 2010), New Harbinger



Referred pain from lower-extremity trigger points can be misdiagnosed as plantar fasciitis, since they have similar pain-referral patterns. True plantar fasciitis is caused by tension overload on the plantar aponeurosis, due to tightness in the gastrocnemius, soleus, abductor hallucis, flexor digitorum brevis, and/or abductor digiti minimi muscles. Trigger points may also contribute to tightness. Self-administered ischemic compression to the gastrocnemius and soleus (photos 1–2) and superficial plantar foot muscles (photos 3–4) can inactivate trigger points and allow the muscles to relax.

are released, causing pain and stimulation of the autonomic nervous system, resulting in a positive feedback system with the motor nerve terminal releasing excessive acetylcholine—and so the sarcomere stays contracted.

Another prevailing theory is the “muscle spindle” hypothesis, which proposes that the main cause of a trigger point is an inflamed muscle spindle.<sup>1</sup> Pain receptors activate skeletofusimotor units during sustained overload of muscles via a spinal reflex pathway, which connects to the muscle spindles.

As pain continues, sustained contraction and fatigue drive the skeletofusimotor units to exhaustion, and cause rigor of the extrafusal muscle fibers, forming the “taut band.” Because the muscle spindle itself has a poor blood supply, the inflammatory metabolites released will be concentrated inside the spindle and lead to sustained inflammation.

In a groundbreaking study, Shah et al were able to measure eleven elevated biochemicals in and surrounding active trigger points, including inflammatory mediators, neuropeptides, catecholamines and cytokines (primarily sensitizing substances and immune system biochemicals).<sup>2</sup> In addition, the pH of the samples was strongly acidic compared to other areas of the body.

In a 1996 study, researchers discovered that a localized acidic pH lowered the pain threshold sensitivity level of sensory receptors, even without acute damage to the muscle. Further investigation is needed to determine whether body-wide elevations in pH acidity and the substances mentioned above predispose people to the development of trigger points. While more studies are needed to determine the

exact mechanisms of trigger point formation and physiology, there is no doubt that they cause referred pain and muscle dysfunction, in addition to other symptoms.

### Teaching Self-Help Techniques

Trigger points can be treated with manual therapy (ischemic compression and/or repeated stroking), acupuncture needles or hypodermic injections. However, most practitioners probably can't sustain 20 to 35 hours of manual therapy per week without developing their own trigger points and muscular dysfunction.

Teaching your patients self-help techniques to relieve trigger points protects your own body, helps your patients get better faster, and gives them more control over their pain and other symptoms between visits with you. Patients are far more likely to actually do the self-help techniques if you make them easier by providing the necessary pressure devices (such as tennis balls) and written instructions coupled with illustrations.

Wendy Larson, a physical therapist from Centrepont Physical Therapy in Portland, OR, has been using manual therapy almost exclusively in her practice for several years, and sends her patients home with trigger point self-help books and assignments for self-care.

"Self-treatment trigger-point therapy books are an important adjunct to my patient's plan of care," said Larson. "In the clinic, my patients and I have the trigger point therapy book open for a point of reference while we review the treatment techniques."

If you teach patients the self-help techniques while they are in your office, they are much more likely to comply, since they will have better recall with kinesthetic learning. They will also be able to feel that it helps, and will look forward to being able to manage and treat their symptoms on their own schedule. In addition, you have the opportunity to ensure that they are applying pressure to the correct muscles, and using the proper technique. On subsequent visits, find out whether the patient is following your suggestions, and whether there were any problems. If they aren't doing the self-help, asking specific questions will help determine which barriers are preventing compliance. Is there a way they can follow your suggestions, perhaps with modifications? Did it aggravate their symptoms instead of helping?

Review the general guidelines to ensure they are performing the techniques in a way that relieves their pain rather than exacerbates it. Within a few weeks, you will likely be able to start adding conditioning exercises to ischemic compression and stretching exercises. ■

### References

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Valerie DeLaune is a licensed acupuncturist and certified neuromuscular therapist in Anchorage, AK. She is author of four books and several articles on trigger point and acupuncture topics, and teaches trigger point workshops nationally. Visit [www.triggerpointrelief.com](http://www.triggerpointrelief.com)

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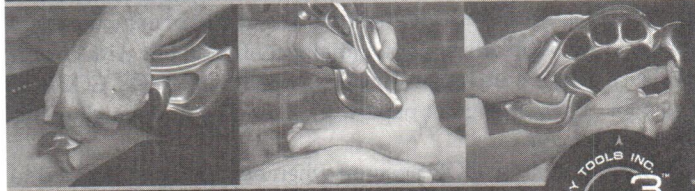
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