

# Ultrasound Q&A

Two PTs discuss the uses of therapeutic ultrasound in their practices

By Arati Murti

**P**hysical Therapy Products recently spoke with Juliana Bohn, PT, CMPT, and Rebecca Schneider, DPT, on the latest trends in ultrasound treatment.

**PTP:** Can you tell me a bit about your practice and the types of patients that you see?

**Bohn:** Our office, which is very different from a lot of other practices, is a “boutique-style” office. There are four physical therapists who each have their own niche or specialty. Each therapist has a dedicated room, so everything in my room has all of the tools that I use for my practice with my patients. A patient comes to my room and stays in my room for the full treatment period. There aren’t other people traipsing in and out, or people interrupting me saying, “How many more repetitions do I have to do?” or “Can I go home now?” So, the patients get total one-on-one time with me—anywhere from 45 minutes to a full hour.

As a consequence, the patients that we see are a little bit different style of patient—they are generally higher motivated and seek greater control with their care. We deal with a lot of performance dancers, people working behind desks, or laborers working out in the field. We also do running and tennis clinics, and I’ve done dance clinics. We also frequently provide lectures to the public. Since we are out in the public, people already have an idea of who we are and how we practice, so we get good matches.

**Schneider:** Westwood Physical Therapy has been a full-service physical therapist-owned private practice for over 28 years in West Los Angeles. We are an adult orthopedic clinic treating both the spine and TMJ along with peripheral conditions. Patients are not buying a product or a service. They are buying a result, a benefit, or an outcome that is self-serving to the quality of their lifestyle. The treating therapists embrace and support clear communication with all their patients. Westwood Physical Therapy delivers expert care through evidence-based treatments, as well as specialty programs in certain areas. We offer specialty



programs in: spinal/lumbar stabilization, TMJ/headaches, foot/ankle, Pilates—Mat, prevention of falls/balance disorders, aging athletes, and osteoporosis. We offer expert care in: orthopedic, head/neck, soft-tissue injury, sports medicine, postsurgery rehabilitation, injury prevention, acupuncture/massage, knee rehabilitation, women’s health, and oncology rehab. At Westwood Physical therapy, therapists have a strong background in manual therapy and therapeutic exercise, and they utilize additional interventions, including Pilates, laser-light therapy, ultrasound, electrical stimulation, compression therapy, taping and more to complement treatments and maximize patient outcomes.

**PTP:** What role does ultrasound play in your treatment?

**Bohn:** I work one-on-one with my patients—and I don’t have an aide, an assistant, and there’s no student, either—so I have to be very careful about being efficient. Since I am seeing a patient for 45 minutes, a lot of times I prefer to have [the patient] exercise while I use ultrasound. For example, if I have a patient with a stiff knee and I want to improve their flexibility and tissue extensibility, I may first heat their scar tissue by using ultrasound while passively stretching their knee. We’ll find that they’ll be able to get more knee flexion. Then, I might stop the ultrasound for a time and do massage in a tight area, put

the ultrasound on again, and then do joint mobilization to help them move their knee back actively. I’ll repeat this cycle of techniques to increase tissue extensibility for different joint restrictions. I find it’s way more effective to do this combo of techniques to increase ROM. Anecdotally, this tends to provide for a quicker recovery for my patients than if I just say, “Here’s a little ultrasound, then do a little exercise and see how it goes.” If I do that combo of techniques with active movement, they seem to recover quicker for me.

**PTP:** What ultrasound unit do you use?

**Bohn:** We use the Vectra Genesis [by Chattanooga Group, Hixson, Tex], and we call our machine “R2D2.” When R2D2 gets more “dates” than my hands, I’ll quit! I frequently use ultrasound and electrical stimulation in combo for different body parts that have recurrent inflammatory issues, such as tendinitis. I always keep in the back of my mind that therapeutic ultrasound research is inconclusive at this time (see Cochrane reviews), so I really have to debate with myself, “Am I using effective established parameters for this situation?” If I was just using a straight protocol or a blind mind-set, I know that I’m not being effective; so I use clinical reasoning before beginning. I find ultrasound to be very effective when I am sensitive to tissue staging and have a focused therapeutic goal.

## ULTRASOUND

**Schneider:** We use the Dynatron 125 Ultrasound [by Dynatronics, Salt Lake City] with one Smarthead that comes in three sizes—2 cm<sup>2</sup>, 5 cm<sup>2</sup>, and 10 cm<sup>2</sup>. The unit can be connected together to serve as an ultrasound/electrotherapy combination device. It is a multifrequency ultrasound (1 and 3 MHz) with duty cycles including 10%, 20%, 50%, and continuous.

**PTP:** What do you like about it?

**Bohn:** I personally use all of it (the Vectra Genisys). I like the versatility of it. I like having choices. I do not like protocols or preset parameters. Don't throw a TENS unit at me that has one button to push for "clinician ease and comfort"—no way! I like [using] pulse widths, frequencies, intensities, so I'm like a custom chef—I want to order it up exactly the way my professional expertise ascertains is best for the therapeutic goals I have identified. It just depends on your practice—some PTs want a button to push with little clinical thought. I really appreciate a physical agent that I can use all sides of my brain on and "whip up" a custom treatment for someone.

**Schneider:** An important feature for us is the three soundhead sizes, which is great for the different types of patients that we see. The 2 cm<sup>2</sup> size is great for our TMJ population, the 5 cm<sup>2</sup> works well for peripheral joints (elbows, wrist, ankle, feet), and the 10 cm<sup>2</sup> addresses all of our other needs. Another feature we really like is that it offers us some variety as far as the different duty cycles we would like to use, and this is really important when considering the different types of results that we are trying to achieve. We consider and use the different duty cycles depending on our specific clinical needs.

The pulse cycles are very beneficial for: acute soft tissue healing and repair (release of histamine from mast cells, release of serotonin from blood platelets, release of chemotactic agents and growth factors from macrophages, altered cell membrane permeability, increased protein synthesis in fibroblasts, accelerated collagen synthesis, stimulation of angiogenesis, accelerated glycosaminoglycan synthesis), reduction of muscle spasms (altered calcium ion transport across plasma membrane, increased blood supply to get rid of toxic soup), and improving/restoring circulation (stimulation of angiogenesis).

The continuous cycles are beneficial for: improving ROM (increased collagen extensibility of tendons, joint capsules, and scar tissue), decreasing pain (increased motor and sensory nerve conduction velocities, which elevates the pain threshold), reduction of muscle spasms (increased pain threshold, increased blood supply to get rid of toxic soup, altered contractility of skeletal muscle), and increasing blood flow (increased metabolic activity, heat).

**PTP:** How did you go about choosing the unit?

**Bohn:** [We] chose the Vectra because of a large number of modalities in one unit. We've got a small clinic, so we can't keep physical agents in each of the offices or practice rooms. [We] find the Vectra really easy to use. It also has the ability to save programs for each patient. In addition, the patient can control intensity of electrical stimulation for their comfort level by using a handheld device. The patient can see if they tolerate more muscle contraction while I am doing exercises with them. This is good because it provides the patient with a little more control and helps build rapport.

**Schneider:** I needed to have all options to use depending on my



clinical needs to include pulse, continuous, and the various ultrasound head sizes depending on the body part(s) and needed outcomes.

**PTP:** What types of injuries/treatments do you most use it for?

**Bohn:** All the therapists here have "niches," so patients are more appropriately assigned to us and we have a better chance of success. My niche now is more spinal, orthopedic manual therapy. For me, that is not just the lumbo-pelvic area; it's also the cervical thoracic area. I have a keen interest in the cranial-vertebral region, so I have a lot of [patients] with headaches, vertigo, and whiplashes. Quite frequently, I may be waiting and monitoring symptoms and not able to do a lot of manual work. In that case—in the severe or acute patient—I may be using ultrasound initially to reduce edema, muscle spasm, pain control. I can't move my acute neck patients very much, so that's a good

place to start.

**Schneider:** At Westwood PT, we are committed to providing treatment based on the most current research evidence. We most frequently use ultrasound to treat conditions that studies have shown to be significantly improved with ultrasound. In the pulsed cycle, these include carpal tunnel syndrome,<sup>1,2</sup> tendinitis (especially calcific tendinitis),<sup>3-5</sup> myofascial trigger points,<sup>6</sup> and osteoarthritis.<sup>7</sup> Westwood PT is known internationally for the care of TMJ dysfunction, and we do incorporate pulsed and continuous ultrasound into our treatment of TMJ dysfunction, depending on the stage of the patient's healing and the physiological effects we wish to create, including decreased pain, reduced edema, decreased muscle spasm, or improved range of motion.<sup>8-9</sup> In the continuous cycle (for a thermal effect), we use ultrasound to treat myofascial pain/trigger point irritability<sup>10</sup> and fibromyalgia.<sup>11-12</sup> In choosing to use ultrasound, we are always aware of the contraindications, including use over eyes, infection, open wounds, over growth plates, history of cancer, decreased sensation, over superficial nerves, impaired cognition, pregnancy, over reproductive organs, impaired circulation, deep vein thrombosis, over pelvis immediately following menses, plastic or metal implants, pacemaker, and continuous mode during acute phase of healing/inflammation.<sup>13</sup>

**PTP:** Any tips on how to make the process easy and comfortable for the patient?

**Bohn:** For ultrasound specifically, two things: First, the therapist has to continue to review the literature and stay on top of what is clinically appropriate and be clear on that. If you're clear, your patient will be more comfortable. Second, definitely tell the patient before you start what you're going to do—you've got to tell them the risks and benefits and explain the procedure before you do it. I think it's so important to take the time to explain this. I hear my patients complain about this issue all the time regarding their medical care in general. After my assessment, I take the time to educate the patient before I proceed. It just makes it safer and more appropriate. I've got a green light from the patient, and it is going to be a more successful outcome all around.

**Schneider:** It is important that you explain to each patient what the sensation will be like for them—they should not feel anything except slight warmth, and they should notify the therapist if any discomfort is experienced during the treatment. We place patients in a comfortable position that will not irritate their symptoms. We

Physical Therapy Products compiled a short list of companies offering ultrasound units and/or gels. For a complete list, visit our Online Buyer's Guide at [www.PTProductsOnline.com](http://www.PTProductsOnline.com).

- 1) Amrex-Zetron Inc, (800) 221-9069; [www.amrex-zetron.com](http://www.amrex-zetron.com)
- 2) Ari-Med Pharmaceuticals, (800) 527-4923, [www.ari-med.com](http://www.ari-med.com)
- 3) Brookdale Medical Specialties, (800) 655-1155, [www.brookdalemedical.com](http://www.brookdalemedical.com)
- 4) Chattanooga Group, (800) 592-7329; [www.chattgroup.com](http://www.chattgroup.com)
- 5) Dynatronics, (800) 874-6251; [www.dynatronics.com](http://www.dynatronics.com)
- 6) Hill Laboratories, (877) 445-5020; [www.HillLabs.com](http://www.HillLabs.com)
- 7) Metron Medical, (800) 500-4844; [www.metronmedical.com](http://www.metronmedical.com)
- 6) Mettler Electronics, (800) 854-9305; [www.mettlerelectronics.com](http://www.mettlerelectronics.com)
- 7) Orthopedic Pharmaceuticals, (866) 456-4687; [www.orthogel.com](http://www.orthogel.com)
- 8) Parker Laboratories Inc, (800) 631-8888; [www.parkerlabs.com](http://www.parkerlabs.com)
- 9) Rich-Mar, (888) 549-4945; [www.richmarweb.com](http://www.richmarweb.com)

warm our ultrasound gel and the ultrasound head when the patient is showing signs of sensitivity to cold. We put the patient on a mild stretch if we are looking to improve ROM with a continuous mode, and put them in a comfortable position that will not irritate their symptoms.

**PTP:** How has the use of ultrasound in physical therapy evolved recently?

**Bohn:** Ultrasound is important to our practice. Because of the clinician and patient response to it, the profession is going to continue to do more research on therapeutic ultrasound. (See Wong et al, "A survey of therapeutic ultrasound ..." *Phys Ther.* 2007;87:986-994.) In the near future, I think it will be a definite, solid evidence-based "established effective treatment."

It's got a solid place now because of all of the surveys that have been done. I think we will find that it is an established, effective treatment in the future and it will be a solid modality. I also think it (the use of therapeutic ultrasound) will broaden. They're doing incredible things surgically and diagnostically, such as 3D ultrasound in the emergency room for pediatric trauma.

**Schneider:** As more research is performed and published, we are able to use the results of randomized controlled clinical trials and systematic reviews to be more selective in our use of ultrasound and our parameters for treatment. Even though we understand the potential physiological effects of this modality, research helps us to identify the conditions in which ultrasound produces the greatest functional benefits for our patients. As far as new or future uses for ultrasound, we're keeping our eye on the research. And it's looking like there is preliminary to low-moderate level evidence showing that ultrasound may be effective in improving fracture healing, especially delayed-unions or non-unions. While the evidence for ultrasound in bone healing is not yet strong enough for us to begin to use it in our practice, we keep an eye on current research like this and will implement new uses for ultrasound as they are proven to be safe and effective in the literature.

**PTP:** Any interesting patient cases recently in which the use of therapeutic ultrasound helped the patient's recovery process?

**Schneider:** One of my colleagues presented the most interesting case that we had seen, where she used pulsed ultrasound to treat a patient with a TMJ replacement. Her patient came in with very visible facial edema, and even within one treatment session, the therapist, patient, and the patient's mother, who was there, were amazed by the reduction of facial edema. She has really seen some amazing things with this TMJ population with ultrasound. ■

References can be found in the online version of this article.

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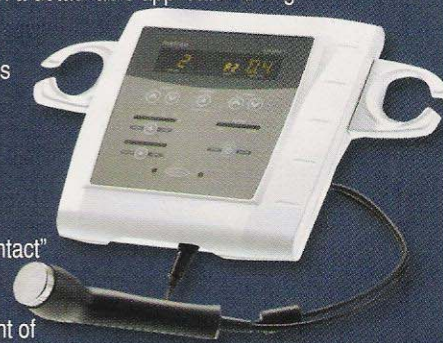
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