In primary care and orthopedic clinic settings in the United States, common musculoskeletal injuries account for nearly 100 million office visits annually. Many orthopedic, primary care, and sports medicine physicians view platelet-rich plasma (PRP) therapy as an emerging treatment option for tendon, muscle, and bone injuries. PRP therapy appears to accelerate the healing process, reducing patients’ pain and improving function. And our experience at Active Life Physical Medicine & Pain Center bears that out. We have administered PRP therapy to more than 400 patients for various tendinopathies, ligament strains, meniscal tears, degenerative joint disease, and other nonhealing painful areas with favorable results.

One practice’s success with platelet-rich plasma therapy

The 3 cases presented here represent the kind of success that one pain center is having with platelet-rich plasma therapy for the treatment of musculoskeletal pain.

Wendi Lundquist, DO, FAAPMR, DABPM
Active Life Physical Medicine & Pain Center, PLLC
Avondale, Ariz
Midwestern University, Glendale, Ariz

Ray Stanford, BS, MS-II
Midwestern University, Glendale, Ariz

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Dr. Lundquist reported that in October 2012, she was paid to speak on behalf of RS Medical, a distributor of a platelet concentrate system. Mr. Stanford reported no potential conflict of interest relevant to this article.
In this article, we share what is known about this emerging therapy, and we describe 3 cases in which patients were successfully treated with PRP therapy.

How PRP therapy boosts the healing process

Platelets, the tiny cell fragments almost exclusively associated with blood clots, conjointly perform a fundamental role in tissue repair. Their foremost function, clotting, is the first step in the healing process. Once activated, platelets release a host of factors that include additional adjuncts in clot formation and several growth factors.1 These growth factors significantly increase the proliferation of tenocytes, fibroblasts, chondrocytes, osteoblasts, and mesenchymal stem cells.2-4 The tissue-healing process takes place over 3 intricate and overlapping phases: inflammation, proliferation, and remodeling (FIGURE).5

Injecting platelets into the area of pathology is thought to kick-start and accelerate the healing cascade, enabling the body’s healing mechanism to regenerate a new matrix of tissue. In a study to assess the effects of different PRP separation methods on human muscle, bone, and tendon cells, researchers compared PRP preparations produced by 3 different methods (2 single-spin and one double-spin process) from blood collected from 8 subjects.6 Human cells (osteocytes, myocytes, and tenocytes) from discarded tissue samples were treated with the 3 PRP preparations. All 3 PRP preparations produced increases in platelet concentration compared with native blood, but wide variation occurred within the same individual’s blood draws, depending on the target cells studied.6

Clinical applications. In a randomized controlled clinical trial of 28 patients with chronic lateral epicondylitis, a controversial therapy

PRP therapy is considered controversial because high-level clinical evidence is lacking for many indications. A 2009 systematic review of the orthopedic surgery and sports medicine
PRP therapy is in treating lateral epicondylitis. One study of 140 patients with elbow epicondylar pain showed a 60% improvement of pain 8 weeks after PRP injection, compared with a 16% improvement in control patients; the PRP-treated patients reported an 81% improvement at 6-month follow-up. The treatment is also helpful as an adjunct in arthroscopic rotator cuff repair with mesenchymal stem cells and dermal allografts. The most widely used application for PRP, however, is in treating lateral epicondylitis. One of the PRP treatment systems available have been FDA 510(k) approved for point-of-care preparation since 1999, with the caveat that the device’s labeling must indicate that “The safety and effectiveness of this device for in vivo indications for use has not been established.”

The FDA weighs in. Although there is some debate as to whether the actual product (the patient’s own blood) for PRP injection requires approval by the Food and Drug Administration (FDA), centrifuge devices involved in processing the blood must be FDA approved. Several of the PRP preparation systems available have been FDA 510(k) approved for point-of-care preparation since 1999, with the caveat that the device’s labeling must indicate that “The safety and effectiveness of this device for in vivo indications for use has not been established.”

How the PRP solution is prepared and administered

Although different concentrations of PRP are commonly used, a preparation with 5 times the platelet concentration of whole blood has become standard. Various PRP separation methods (ie, single-step or 2-step procedures) are also used; single-step procedures can produce sufficient concentrations.

The basic steps for preparing the solution involve drawing approximately 20 to 60 cc of venous blood from the patient’s antecubital vein and placing it in an FDA-approved centrifuge device that separates the PRP from platelet-poor plasma and red blood cells. The process takes about 15 minutes and typically generates about 3 to 6 cc of PRP, which is withdrawn by syringe from a port on the device. The physician then positions the patient, instills local anesthesia with lidocaine, uses image guidance (ultrasonography or fluoroscopy) to direct the needle into the site of pathology, and injects the PRP preparation.

When to consider PRP therapy

Given that many patients with musculoskeletal injuries respond well to conservative treatments, such as physical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs), and/or corticosteroid injections, the Active Life Physical Medicine & Pain Center where I [WL] work generally offers the option of PRP injection to those who have an isolated injury and for whom the risk of cortisone therapy or no treatment outweighs the risk of PRP therapy. Treatment-related complications of PRP therapy include soreness at the injection site, short-term stiffness, and increase in usual pain, which varies in length from one day to one month. Practice physicians also encourage patients to speak with their insurance carriers to determine coverage; most do not cover the procedure because it is considered investigational. The approximate cost for one PRP treatment is $600 to $800 per body region, including the materials and labor for preparing the platelets.

When not to use PRP therapy

The International Cellular Medicine Society (ICMS) has published guidelines on the use of PRP therapy and lists the following as absolute contraindications to its use: platelet dysfunction syndrome, critical thrombocytopenia, hemodynamic instability, sepsis, local infection at the procedure site, and patient unwillingness to accept risks.

In addition, relative contraindications include use of NSAIDs within 48 hours of the procedure, corticosteroid injection at the treatment site within one month, systemic use of corticosteroids within 2 weeks, tobacco use, recent fever or illness, cancer (especially hematopoietic or bone), hemoglobin <10 g/dL, or a platelet count <105/µL.

The most widely used application for PRP therapy is in treating lateral epicondylitis.
CASE #1  Active older woman with elbow pain

A 74-year-old active, right-handed woman who, for many years, had progressive lateral epicondyle pain with activities involving wrist extension presented to the clinic to explore other conservative therapeutic options. She had previously tried physical therapy, bracing, cortisone injections, activity modification, NSAIDs, and various other pain medications without sustained relief. Her goal was to have her pain reduced and to be able to return to playing boccie.

Magnetic resonance imaging (MRI) and ultrasound studies showed evidence of a common extensor tendon tear and radial collateral ligament tear.

PRP injection, under ultrasound guidance, was done once. Local anesthesia was used, and approximately 2 to 3 cc of PRP concentrate was injected.

At follow-up 2 months later, the patient’s symptoms of tenderness, swelling, and pain with wrist extension/gripping had resolved. Repeat ultrasound examination revealed tendon healing. The patient was able to return to playing boccie.

CASE #2  Athletic man with debilitating knee pain

A 38-year-old man came to the clinic with patellar tendonitis. He had pain that was impacting his workout routines with squats. Physical therapy, modification of workout routine, and NSAIDs were all unsuccessful.

Ultrasound scan revealed evidence of a partial tear (50%) and fluid accumulation.

The patient underwent one injection with PRP concentrate utilizing a technique similar to that described for Case #1.

At the patient’s 3-month follow-up visit, he reported experiencing only slight pain upon performing deep knee bends. Ultrasound was done at that time and revealed nearly complete healing of the tear and resolution of fluid.
We have found that younger, nonsmoking patients who have a very specific problem respond best, while older patients who smoke and have more diffuse pain tend to have less benefit.

Who benefits most?
As noted earlier, at the Active Life Physical Medicine & Pain Center we have administered PRP therapy to more than 400 patients for various tendinopathies, ligament strains, meniscal tears, degenerative joint disease, and various other nonhealing painful areas. Clinically, we have found that younger, nonsmoking patients who have a very specific problem respond best, while older patients who smoke and experience more chronic, diffuse pain tend to have less benefit. Also, non–weight-bearing areas are more responsive in our clinical experience. We have seen only 3 cases that came to follow-up without some degree of positive response, either functionally or in pain improvement.

References


