ELSEVIER

Operative Techniques in

Sports Medicine

Clinical Indications and Techniques for the Use of Platelet-Rich Plasma in the Elbow

Allan Mishra, MD,* and Taco Gosens, MD, PhD†

Platelet-rich plasma (PRP) is an emerging biological treatment option in sports medicine. Its value is best established for elbow-related disorders, such as lateral epicondylar tendinopathy. This common condition typically resolves with simple treatment modalities, such as rest, icing, anti-inflammatory medications, and physical therapy. In cases that are not resolved by these measures, other options such as cortisone injections and surgery are considered. Level one data now support the use of PRP in patients who have chronic tennis elbow. It is important to note that the formulation of PRP contains both concentrated platelets and white blood cells. The specific technical steps on how to prepare PRP and treat a patient with chronic lateral epicondylitis are outlined in this article. Using PRP to treat medial epicondylar tendinopathy, triceps tendinopathy, distal biceps tendinopathy, and partial elbow ligament injuries is under investigation.
Oper Tech Sports Med 19:170-176

KEYWORDS cortisone, elbow, platelet-rich plasma, tendinopathy, tendon, tennis elbow

Lateral elbow tendinopathy, more colloquially known as "tennis elbow," presents commonly in the practice of sports medicine (Fig. 1). It is often associated with activities that require strong gripping or repetitive motion of the wrist and forearm. Patients describe a dull aching sensation on the outside part of the elbow at the lateral epicondyle that occasionally radiates toward the midportion of the forearm. They also will complain of difficulty in lifting objects sometimes as light as a cup of coffee. The history and physical examination are usually quite characteristic for tennis elbow. It is important, however, to rule out potential other causes, such as elbow arthritis, cervical radiculopathy, and radial tunnel syndrome. X-rays, ultrasound, and magnetic resonance imaging all can assist in confirmation of the diagnosis. Occasionally, a nerve conduction study may be required as well.

Initially, patients with tennis elbow can be treated with rest, activity modification, and a simple stretching protocol. Anti-inflammatory medication, bracing, and formal physical therapy may be added if needed. In patients who do not respond to these treatments, cortisone is often considered. Treatment with cortisone can provide short-term pain relief but also may result in dermal atrophy or skin pigmentation changes (Fig. 2). Peer-reviewed data now suggest platelet-rich plasma (PRP) should be offered to these patients as an alternative treatment.[1-4] PRP has also been investigated as a treatment for Achilles tendinopathy, patellar tendinopathy, and rotator cuff tears with varying degrees of success based on the formulation used and the specific indication.[4-12] Augmentation of surgical debridement and repair of elbow tendinopathy with PRP also can be done (Fig. 3).

PRP Classification

PRP has inadvertently been used as a generic term in the scientific literature. However, not all types of PRP have the same bioactivity. Several parameters must be considered when evaluating PRP. The concentration of platelets, the presence or absence of white blood cells (WBCs), and the activation status must be known to the clinician who chooses to use PRP. Platelet concentration varies widely in the commercial preparations of PRP. Some versions may or may not contain concentrated WBCs, and others none at all. Also, some versions of PRP are activated with calcium and/or thrombin before clinical use. These variations clearly create different versions of PRP. Finally, and most importantly, data exist supporting the use of only one type of PRP for chronic tennis elbow.[1,4] That version contains concentrated platelets approximately 5 to 6 times baseline combined with an increased concentration of WBCs injected in an unactivated

*Department of Orthopedic Surgery, Menlo Medical Clinic, Stanford University Medical Center, Menlo Park, CA.
†Department of Orthopaedic Surgery, St Elisabeth Hospital, Tilburg, The Netherlands.
Address reprint requests to Allan Mishra, MD, 340 August Cir, Menlo Park, CA 94025. E-mail: allan_mishra@yahoo.com

 1060-1872/11/$-see front matter
doi:10.1053/j.otsm.2011.03.003

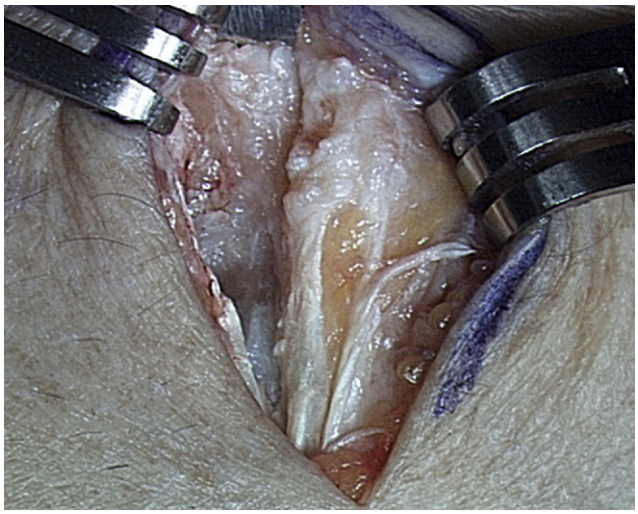

Figure 1 A surgical photograph of lateral epicondylar tendinopathy.

form (Fig. 4) (Biomet Biologics GPS, Warsaw, IN). Mishra et al have recently developed a classification system to help better understand the varieties of PRP presently available to clinicians (Table 1).[13] As PRP becomes more commonly used in sports medicine and orthopedic surgery, it will be crucial to document the type of PRP used and compare each version for specific clinical indications.

PRP Preparation Steps

Withdraw approximately 27 mL of blood from a peripheral vein into a syringe containing 3 mL of a citrate anticoagulant. Slowly load this into a cartridge and screw on the cap. This is then placed into a centrifuge for 15 minutes at 3,200 rpm. This separates the whole blood into red blood cells, platelet poor plasma, and PRP. The device is then inverted to remove

Figure 2 Skin damage after cortisone injection.

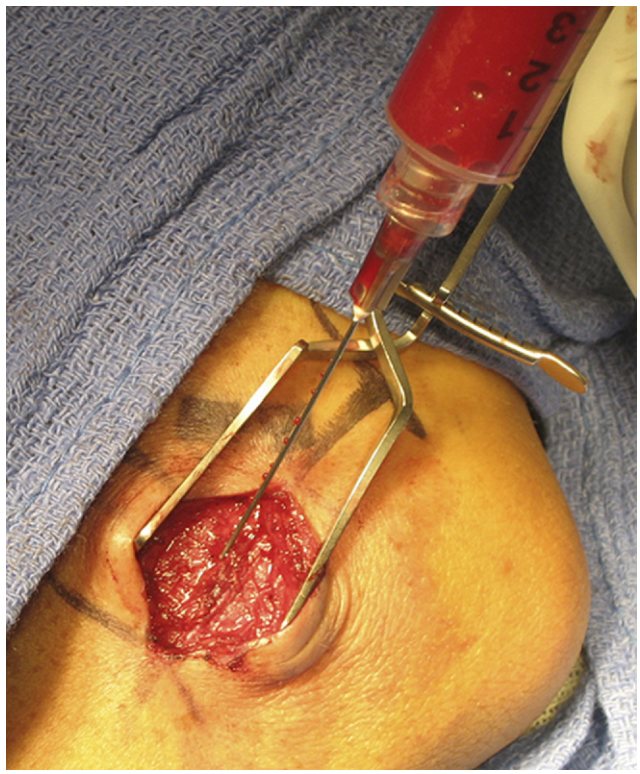

Figure 3 Augmenting tennis elbow surgery with PRP.

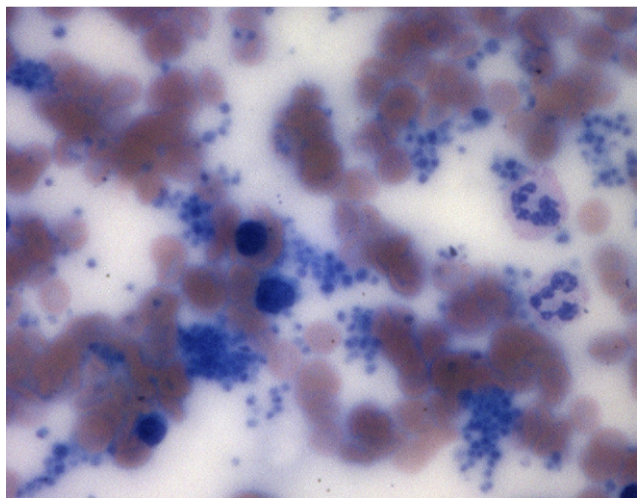

Figure 4 A photomicrograph of PRP; note the presence of WBCs.

Table 1 Classification of PRP

	WBCs	Activation?	Platelet Concentration	
Type 1	Increased	No activation	A, 5x or >	B, < 5x
Type 2	Increased	Activated	A, 5x or >	B, < 5x
Type 3	Minimal or no WBCs	No activation	A, 5x or >	B, < 5x
Type 4	Minimal or no WBCs	Activated	A, 5x or >	B, < 5x

Reprinted with permission from Mishra et al.[13]