

Is It Time to Offer Platelet-Rich Plasma (PRP) in Your Practice?

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Why PRP is Gaining Popularity

Platelet-rich plasma (PRP) therapy is a treatment patients are asking about with increasing frequency. Its popularity may be attributed to famous athletes like Tiger Woods, Rafael Nadal, and Cristiano Ronaldo who have received PRP injections and reported a faster, more complete recovery from their injuries.

PRP is an innovative and promising approach to treating many orthopedic conditions. By drawing a patient's blood, spinning it down, and reinjecting the concentrated platelets into the damaged area, a provider can harness and amplify the body's natural healing ability.

The incorporation of PRP in orthopedic practices is accelerating. This is largely because:

- Broader research has increased the understanding of how PRP works and what is needed to optimize the benefits.
- Clinical studies have shown improved pain and improved function in patients receiving PRP treatment when compared to the current standard of care.
- Orthopedic societies now recognize the positive effect of PRP in various tendinopathies and osteoarthritis.
- Offering PRP provides an additional revenue source for clinics facing mounting reimbursement constraints
- The barrier to entry is low.

The Decision to Add PRP to My Practice

Personally, I decided to incorporate PRP therapy into my own clinic five years ago and it was one of the best decisions I have made. First and foremost, the clinical outcomes following PRP treatment have been very positive. My patients are leading more active lives and enjoying a better quality of life. In addition, the increase in revenue has helped compensate for the barrage of reimbursement cuts over the past several years.

Before I made the decision to implement PRP therapy, I was very hesitant. I simply did not feel that the evidence in the PRP literature was sufficient to support its popularity. I conducted an extensive review of the PRP research and attended conferences where the leading experts in regenerative medicine provided the most recent breakthroughs regarding PRP. My optimism increased as I began to understand the reason why some studies were negative and why others were positive—*not all PRP is created equal!* The key is in the formulation. Once I understood what it was in PRP that makes it effective, I looked for a PRP system that provided the ideal formula. Then I had the confidence to offer my patients this treatment knowing that PRP could truly help them.

What to Gain from the Literature

Looking at PRP literature as a whole, a clear pattern is apparent. Combining studies in which a poor-quality PRP is used with studies in which a high-quality PRP is used dilutes the net positive effect. When taken together, it is natural to conclude that evidence is insufficient. However, the experts suggest a different conclusion:

Not all PRP is created equal.

Once the cellular profile of PRP is understood, the literature finally makes sense:

1. Recent advancements in our scientific understanding outline which components in whole blood augment PRP's healing potential and which ones inhibit it.
2. The components of an ideal PRP formulation are now better understood.
3. Looking over the literature, experts can see why some studies showed that PRP was ineffective—the PRP used was far from ideal.
4. Recent publications in which a more ideal PRP formulation was used achieved positive results.
5. Because this optimal formulation has not been standardized, systemic reviews of the literature cannot exclude the suboptimal formulations without being judged of bias; therefore, many reviews have inconclusive results.

So What Is the Ideal PRP Formulation?

Our understanding of how platelets function and how neighboring cells influence their function has increased dramatically. We now know that red blood cells (RBCs) and neutrophils have an inflammatory and catabolic (degrading) effect within the treatment area and inhibit the healing process.¹ In contrast, monocytes and lymphocytes have an anabolic (regenerative) effect within the treatment area and enhance the platelets' ability to heal.²

Therefore, the ideal PRP treatment would include:

- A dose of platelets large enough to create a healing response
- Minimizing RBCs
- Minimizing neutrophils
- Maximizing monocytes
- Maximizing lymphocytes

References for Ideal Formulation:

1. Amable PR, Carias RB, Teixeira MV, da Cruz Pacheco I, Corrêa do Amaral RJ, Granjeiro JM, Borojevic R. Platelet-rich plasma preparation for regenerative medicine: optimization and quantification of cytokines and growth factors. *Stem Cell Res Ther.* 2013 Jun 7; 4(3):67.
Yoshida, R., Cheng, M., and Murray, M.M. Increasing platelet concentration in platelet-rich plasma inhibits anterior cruciate ligament cell function in three-dimensional culture. *J Orthop Res* 32, 291, 2014, [Assmus B, Tonn T, Seeger FH, Yoon CH, Leistner D, et al. \(2010\) Red blood cell contamination of the final cell product impairs the efficacy of autologous bone marrow mononuclear cell therapy 2010.](#), Sethi D, Sampson S, Sharma MB, Patel R, Ambach M (2018) Bone Marrow Concentrate for Treatment of Knee Osteoarthritis: A Mini Review. *J Orthop Ther: JORT*-191. DOI: 10.29011/25 75-8241. 000091.
2. Lana J, Purita J, Paulus C, et al. [Contributions for classification of platelet rich plasma – proposal of a new classification: MARSPILL](#), *Regenerative Medicine* 2017 12:5, 565-574, Yoshida R, Murray MM. Peripheral blood mononuclear cells enhance the anabolic effects of platelet-rich plasma on anterior cruciate ligament fibroblasts. *J Orthop Res.* 2012;31(1):29-34.

Many PRP systems that produce sub-par formulations are still on the market today. For example, there are over 40 PRP processing systems/protocols mentioned in the literature, but fewer than five can remove >99% RBCs from the PRP sample. Now that the understanding of the cellular content of PRP has improved, newer generation PRP systems (with a more favorable formulation) are being created. When these are being used outcomes are more

favorable. Many successful studies have led to the official recognition of PRP use in orthopedic societies and an increasing popularity in the field today.

Official Recognition of PRP Applications



This figure displays PRP applications that are recognized by AAOS, AOSSM, or ICMS to have a positive effect based upon multiple randomized controlled trials. See references and studies in the box below.

References:

1. Achilles Tendinosis: Biologic Treatments for Sports Injuries II Think Tank-Current Concepts, Future Research, and Barriers to Advancement, Part 1: Biologics Overview, Ligament Injury, Tendinopathy. Robert F. LaPrade, Andrew G. Geeslin, Iain R. Murray, Volker Musahl, Jason P. Zlotnicki, Frank Petrigliano, Barton J. Mann *Am J Sports Med.* 2016 Mar 29 : 0363546516634674. Published online 2016 Mar 29. doi: 10.1177/0363546516634674
Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
<https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>
2. ACL Repair: Biologic Treatments for Sports Injuries II Think Tank-Current Concepts, Future Research, and Barriers to Advancement, Part 1: Biologics Overview, Ligament Injury, Tendinopathy. Robert F. LaPrade, Andrew G. Geeslin, Iain R. Murray, Volker Musahl, Jason P. Zlotnicki, Frank Petrigliano, Barton J. Mann *Am J Sports Med.* 2016 Mar 29 : 0363546516634674. Published online 2016 Mar 29. doi: 10.1177/0363546516634674
Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
3. Ankle Sprain: <https://www.aaos.org/AAOSNow/2014/Apr/clinical/clinical5/?ssopc=1>
4. Hamstring Injury: <https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>
5. Lateral Epicondylitis: Biologic Treatments for Sports Injuries II Think Tank-Current Concepts, Future Research, and Barriers to Advancement, Part 1: Biologics Overview, Ligament Injury, Tendinopathy. Robert F. LaPrade, Andrew G. Geeslin, Iain R. Murray, Volker Musahl, Jason P. Zlotnicki, Frank Petrigliano, Barton J. Mann *Am J Sports Med.* 2016 Mar 29 : 0363546516634674. Published online 2016 Mar 29. doi: 10.1177/0363546516634674
Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
6. Meniscus Repair: <https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>
7. Osteoarthritis: Zlotnicki, J. P., Geeslin, A. G., Murray, I. R., Petrigliano, F. A., LaPrade, R. F., Mann, B. J., & Musahl, V. (2016). Biologic Treatments for Sports Injuries II Think Tank—Current Concepts, Future Research, and Barriers to Advancement, Part 3: Articular Cartilage. *Orthopaedic Journal of Sports Medicine.* <https://doi.org/10.1177/2325967116642433>
Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
<https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>
8. Patellar Tendinosis: Biologic Treatments for Sports Injuries II Think Tank-Current Concepts, Future Research, and Barriers to Advancement, Part 1: Biologics Overview, Ligament Injury, Tendinopathy. Robert F. LaPrade, Andrew G. Geeslin, Iain R. Murray, Volker Musahl, Jason P. Zlotnicki, Frank Petrigliano, Barton J. Mann *Am J Sports Med.* 2016 Mar 29 : 0363546516634674. Published online 2016 Mar 29. doi: 10.1177/0363546516634674
<https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>
9. Plantar Fasciosis: Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
10. Rotator Cuff: Murray, I. R., LaPrade, R. F., Musahl, V., Geeslin, A. G., Zlotnicki, J. P., Mann, B. J., & Petrigliano, F. A. (2016). Biologic Treatments for Sports Injuries II Think Tank—Current Concepts, Future Research, and Barriers to Advancement, Part 2: Rotator Cuff. *Orthopaedic Journal of Sports Medicine.* <https://doi.org/10.1177/2325967116636586>
Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>
<https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>

The official website of the American Academy of Orthopaedic Surgeons (AAOS) contains a summary of the PRP literature entitled, “Where We Are Today” and acknowledges a benefit for:

- Tendinopathy
- Knee osteoarthritis
- Perioperative settings

(<https://www.aaos.org/AAOSNow/2018/Aug/Research/research01/?ssopc=1>)

Similarly, the American Orthopaedic Society for Sports Medicine (AOSSM) published a summary of their 2015 “Think Tank” in three parts. The authors report that PRP shows great promise but call for a consensus on optimal preparation to maximize anabolism (enhanced healing) and minimize catabolism (degradation).

Reference:

Biologic Treatments for Sports Injuries II Think Tank—Current Concepts, Future Research, and Barriers to Advancement, Part 1: Biologics Overview, Ligament Injury, Tendinopathy. Robert F. LaPrade, Andrew G. Geeslin, Iain R. Murray, Volker Musahl, Jason P. Zlotnicki, Frank Petrigliano, Barton J. Mann *Am J Sports Med.* 2016 Mar 29 : 0363546516634674. Published online 2016 Mar 29. doi: 10.1177/0363546516634674; Murray, I. R., LaPrade, R. F., Musahl, V., Geeslin, A. G., Zlotnicki, J. P., Mann, B. J., & Petrigliano, F. A. (2016). Biologic Treatments for Sports Injuries II Think Tank—Current Concepts, Future Research, and Barriers to Advancement, Part 2: Rotator Cuff. *Orthopaedic Journal of Sports Medicine.* <https://doi.org/10.1177/2325967116636586>; Zlotnicki, J. P., Geeslin, A. G., Murray, I. R., Petrigliano, F. A., LaPrade, R. F., Mann, B. J., & Musahl, V. (2016). Biologic Treatments for Sports Injuries II Think Tank—Current Concepts, Future Research, and Barriers to Advancement, Part 3: Articular Cartilage. *Orthopaedic Journal of Sports Medicine.* <https://doi.org/10.1177/2325967116642433>

The International Cellular Medicine Society (ICMS) published guidelines suggesting that PRP was beneficial in the following conditions:

- Lateral Epicondylitis
- Rotator Cuff Repair
- Plantar Fasciitis
- Osteoarthritis
- ACL Repair
- Achilles Tendinitis

(Harmon, Kim, et al. Guidelines for the use of platelet rich plasma. Draft version 1.0. The International Cellular Medicine Society 2011. <http://www.cellmedicinesociety.org>)

Take Away Points from the Literature:

1. Multiple randomized controlled studies have been published which demonstrate that PRP treatment has a positive effect in multiple applications.
2. The number of recognized applications of PRP treatment is likely to increase. There are promising case studies that have prompted experts to design future randomized controlled trials.
3. Orthopedic societies are limited to strict evidence-based parameters in their decision-making. Until a standard definition of PRP emerges, they must include poor-quality PRP in their reviews. It will be some time before the newer studies using high-quality PRP outnumber the older, negative studies. In the meantime, individual providers can recognize that there is recent and ongoing quality research that demonstrates clinical benefit of PRP in treating multiple conditions.
4. PRP literature is finally to a point that clinics should seriously consider adding PRP therapy as a treatment option.

Concerning PRP's Profitability

Another reason to consider incorporating PRP into your practice is profitability. Currently, the average price of a PRP treatment in the U.S. is \$700 (ranging from \$450-\$1200). The profit margin for this procedure is very high compared to most insurance reimbursements. There is no need to purchase expensive medication—the key components that make PRP effective are in the patient's blood. Processing supplies are usually sold as a kit from a PRP company and cost around \$250 (\$150 to \$400 range). This allows for a simple procedure to bring in \$500 per treatment area.

In the setting of diminishing reimbursement in orthopedic practices over the last five years, PRP can provide an additional revenue stream. AAOE reported a trend (from data in 2017) that net collections per Work RVU decreased from \$138 in 2014 to \$100 in 2017. Health care providers responded to the decreased revenue by working harder. In that same period, Work RVUs increased from 10,004 to 11,797. Rather than working harder, shouldn't we be working smarter?

Getting Started

Incorporating PRP into an orthopedic practice is quite easy. Most clinics are already equipped with injection supplies and have providers adept at injection procedures. After that, all that is needed is:

1. Someone to draw the blood (I did the blood draws at first, now my medical assistant does)
2. Someone to prepare the PRP (a sales representative is usually a good resource for training)
3. A centrifuge and a few kits (most PRP companies will offer the centrifuge at a discounted rate or pro bono if you purchase enough kits)

Summary

It may be time to incorporate PRP into your clinic's treatment options. PRP has been proven to be effective for many orthopedic conditions. It can be easily incorporated into any practice with very little extra training or additional resources. Furthermore, it adds a steady revenue stream in a time when reimbursement cuts are rampant. And above all, patient satisfaction increases as a result of more treatment options and better outcomes.

PRP is:

- Proven to be effective
- Profitable
- Easy to implement
- Beneficial for patients

If your experience is anything like mine has been, you will be happy in your decision. Your patients will thank you for it, and it might give your practice a financial boost. If you have questions or would like to receive additional information on how to incorporate PRP into your practice, contact the author at DrRiggs@TheActiveJointInstitute.com.