The Role of Platelet Rich Plasma (PRP) Therapy in Musculoskeletal Medicine – Does it work?

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Ortho Nebraska

SYMPOSIUM

Disclosures

- I have NO financial disclosures or conflicts of interest with the material in this presentation.

Learning Objectives

- Describe the indications and use cases for PRP therapy in musculoskeletal medicine.

- Discuss treatment efficacy and patient outcomes for PRP therapy.

Outline

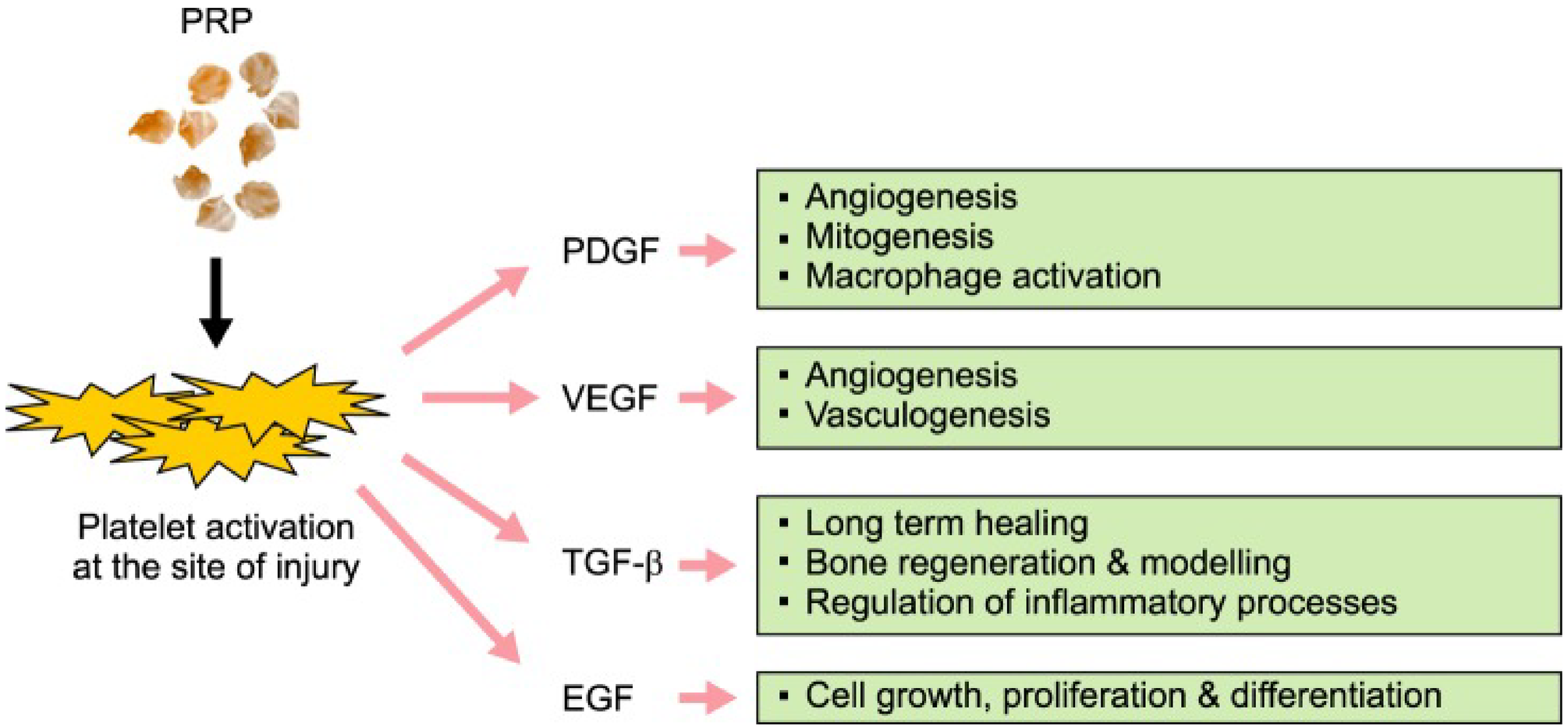
- Orthobiologics
- What is PRP therapy?
- Indications and use cases for PRP therapy in musculoskeletal medicine
- Treatment efficacy
- Patient outcomes
- Future considerations

Orthobiologics in Musculoskeletal Medicine

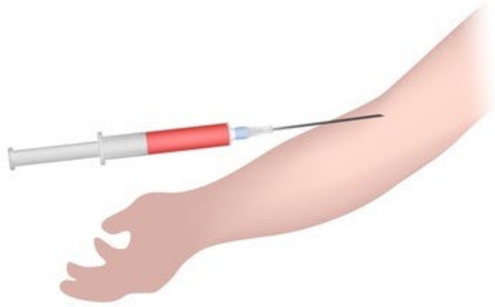
- Surgical vs. Non-surgical treatments/modalities
- Orthobiologics: “regenerative medicine” utilizing biologics (e.g. natural substances) from one’s own body to treat musculoskeletal injuries such as tendons, ligaments, muscles, and joints
- Examples of orthobiologics: viscosupplementation, bone marrow aspirate concentrate, mesenchymal stem cells, **platelet rich plasma**

What is Platelet Rich Plasma (PRP) Therapy?

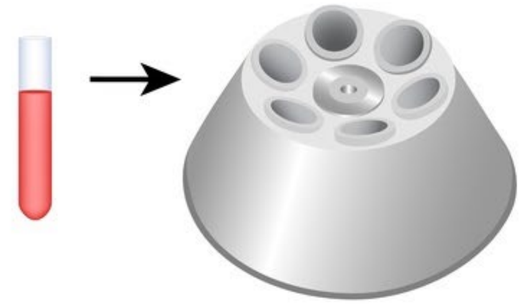
- Injectate therapy derived from patient's own blood
- Centrifuged autologous blood directed to designated target area (muscle, tendon, ligament, joint)
- PRP concentrates large volume of platelets in a small volume of plasma
- Platelets perform several main functions including blood clot formation and **growth factor release to help heal wounds**
- In theory… "jump starting" body's own healing response



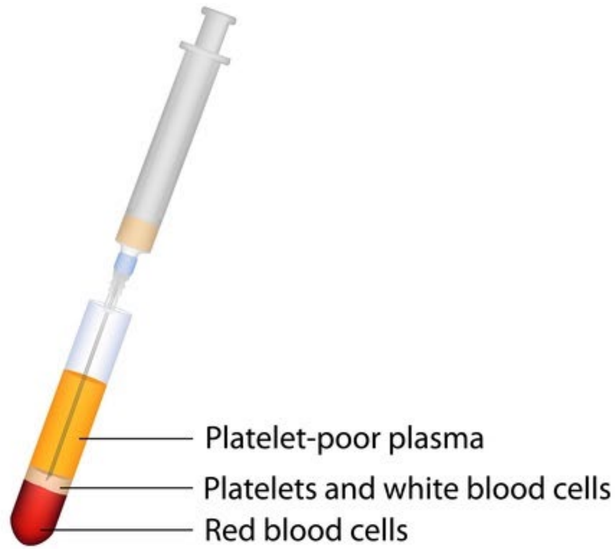
Platelet-Rich Plasma Therapy



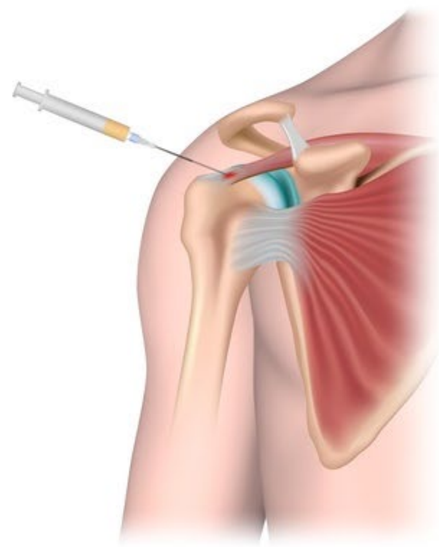
1. Blood drawn from patient



2. Blood components separated by centrifugation



3. Platelet-rich plasma collected for injection



4. Injured area injected with platelet-rich plasma

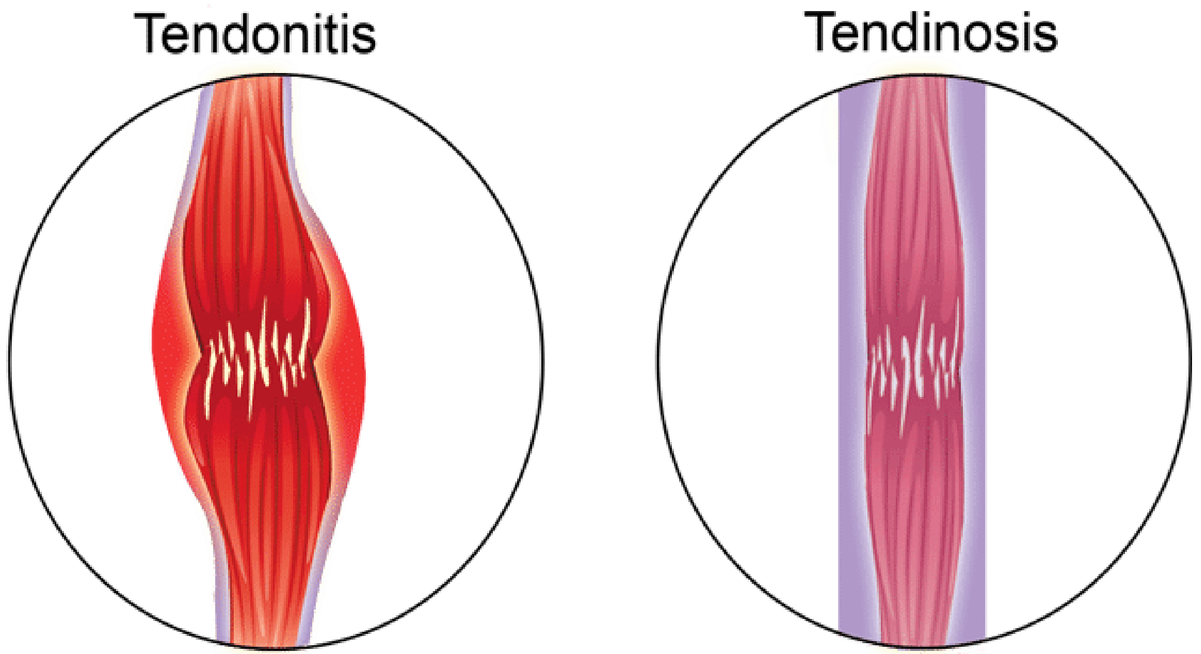
Benefit of Tenotomy?

- Dry needling: needle alone (tendon fenestration only)
  - Some specialized equipment to fenestrate, debride, irrigate and aspirate continuously
- Wet needling: needle with injection (tendon fenestration plus…)
  - ✓ Corticosteroid (?efficacy short-lived) – tendinosis is a **non-inflammatory** condition; underlying tendon abnormality not directly treated with peritendinous injections
  - ✓ Prolotherapy (hyper osmolar dextrose causes local inflammation and may act as a vascular sclerosing agent)
  - ✓ Autologous blood (autologous platelets within the whole blood will increase concentration of growth factors and promote healing)
  - ✓ **Platelet rich plasma ($$$)**
- Simply placing the needle into the tendon may be the primary reason that the tendon improves?

  Repeated passes of the needle through the tendinosis → disrupts chronic degenerative process → bleeding & inflammation → locally increases growth factors and promotes healing

Tendinosis/Tendinopathy

- Chronic, degenerative condition (inflammation **NOT** a predominant feature)
- Presents as pain, decreased exercise tolerance, reduction in function – affected tendon less capable of sustaining tensile load
- Abnormal tendon unable to heal itself properly – "**failed healing response**"
- Secondary to excessive strain, overuse, microtrauma, etc.
- Predisposing factors: calcification, anatomic alignment, poor/inadequate mechanics, improper training, inadequate rest



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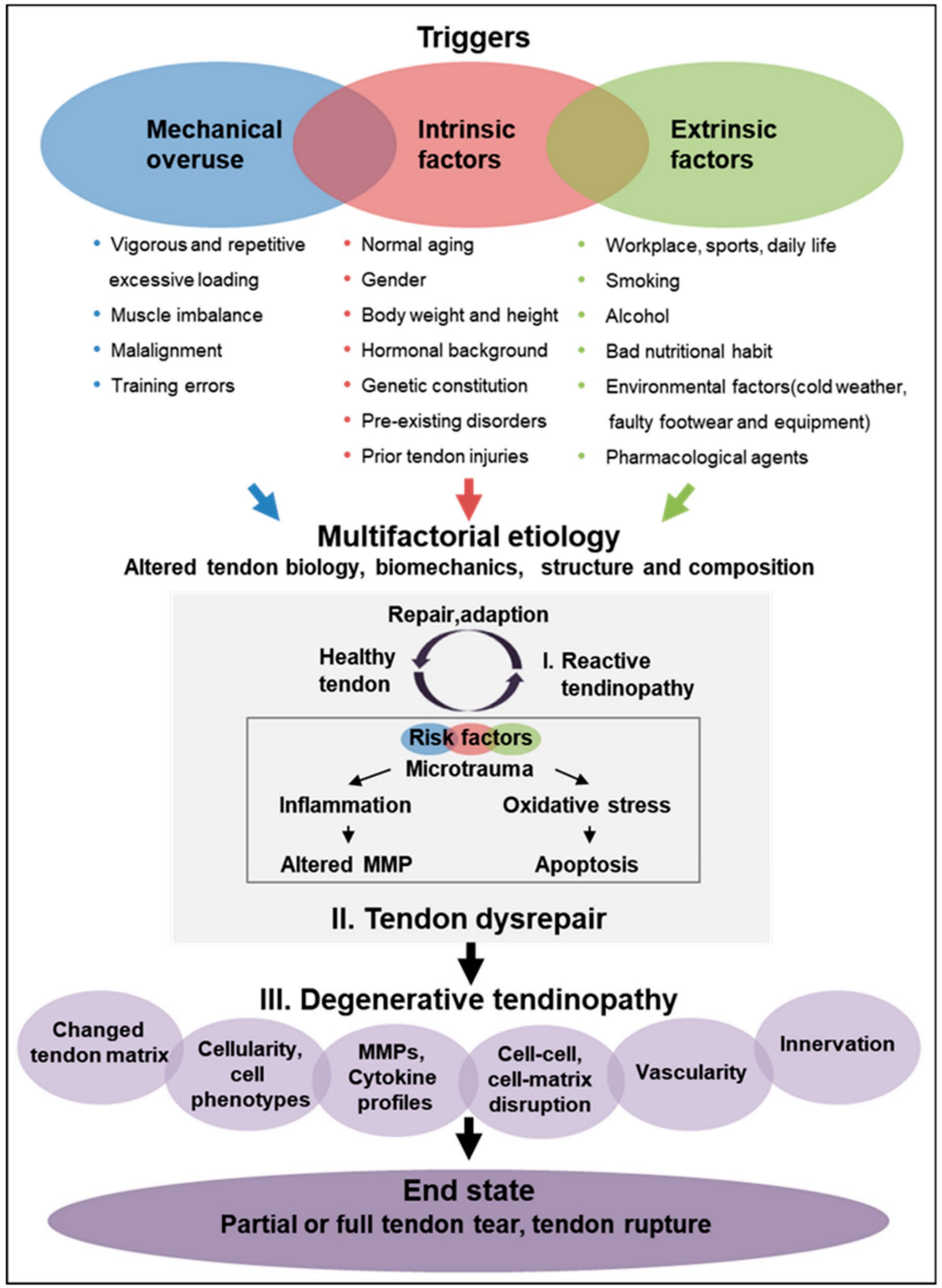

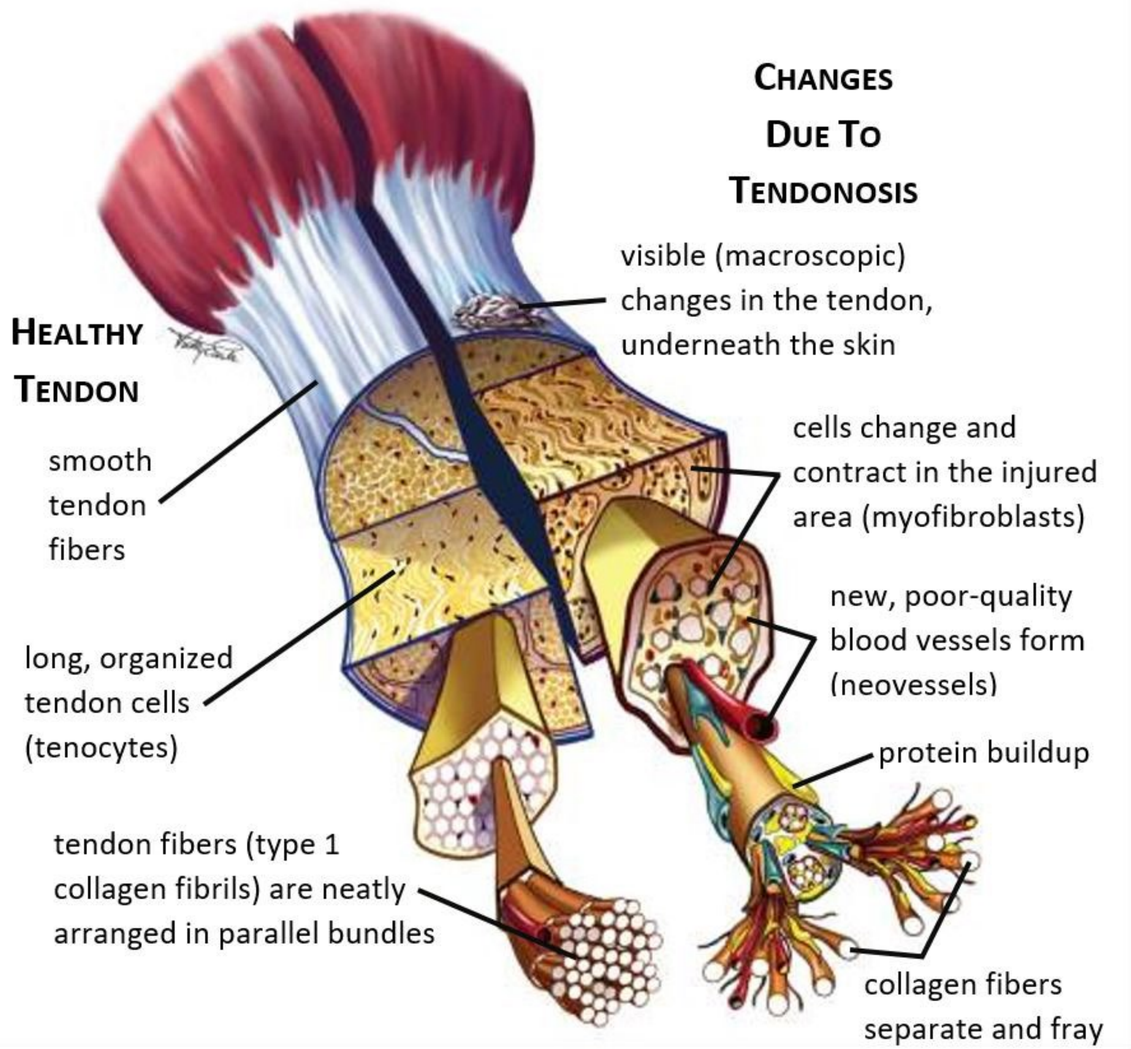

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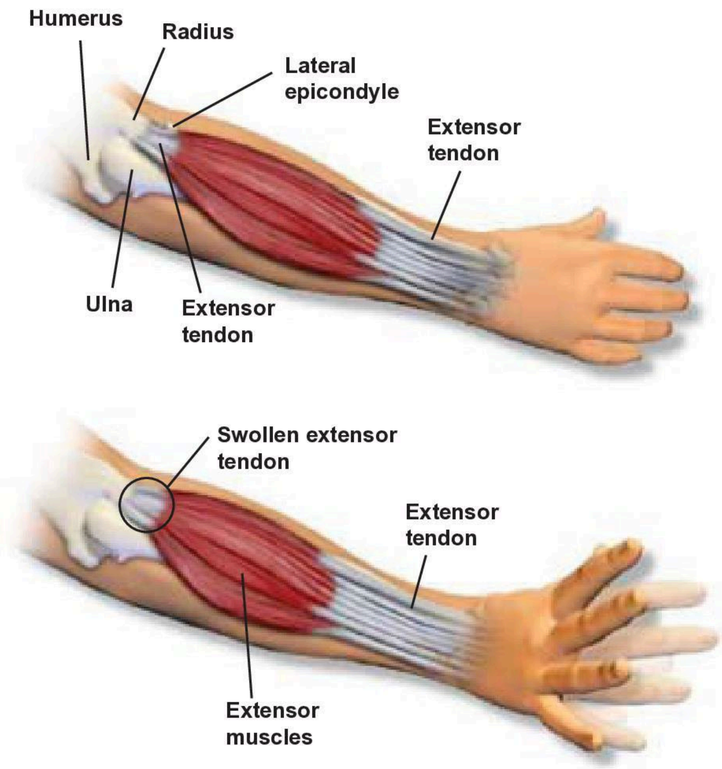
Use of PRP Therapy in Musculoskeletal Medicine

- Most commonly used in cartilage-related conditions, followed by meniscal, tendinous, and glenoid labral pathology
- PRP has the highest-quality evidence for the treatment of lateral epicondylitis and knee osteoarthritis
- Less evidence-supported includes patellar tendinopathy and plantar fasciitis
- Insufficient evidence for rotator cuff tendinopathy, hip osteoarthritis, muscle injuries, Achilles tendinopathy

Lateral Epicondylitis/Tennis Elbow

- Common elbow pain in adults
- Consideration for those who have failed conservative therapies including home exercises, physical therapy, OTC and prescription anti-inflammatories, corticosteroid injections
- Leukocyte-rich PRP (LR-PRP) showed significant clinical benefit with improvement in pain and residual elbow tenderness at 24 weeks compared to local anesthetic
- Demonstrates both short-term and long-term efficacy



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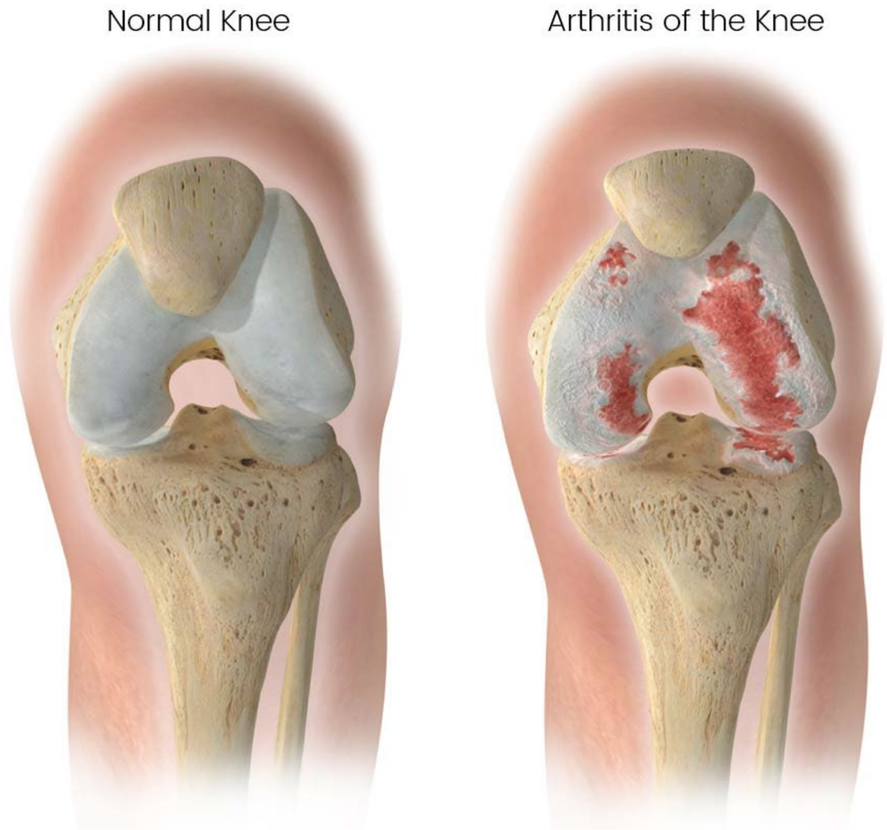
Knee Osteoarthritis

- Non-surgical modalities in the approach of osteoarthritic knees: physical therapy, bracing, OTC/prescription anti-inflammatories, topical anti-inflammatories, corticosteroid injections, viscosupplementation injections
- Leukocyte-poor PRP more efficacious in comparison to leukocyte-rich PRP (deleterious effects on chondrocytes and effects on synoviocytes)
- PRP shown to be more efficacious in comparison to hyaluronic acid
- PRP more effective for mild to moderate osteoarthritis



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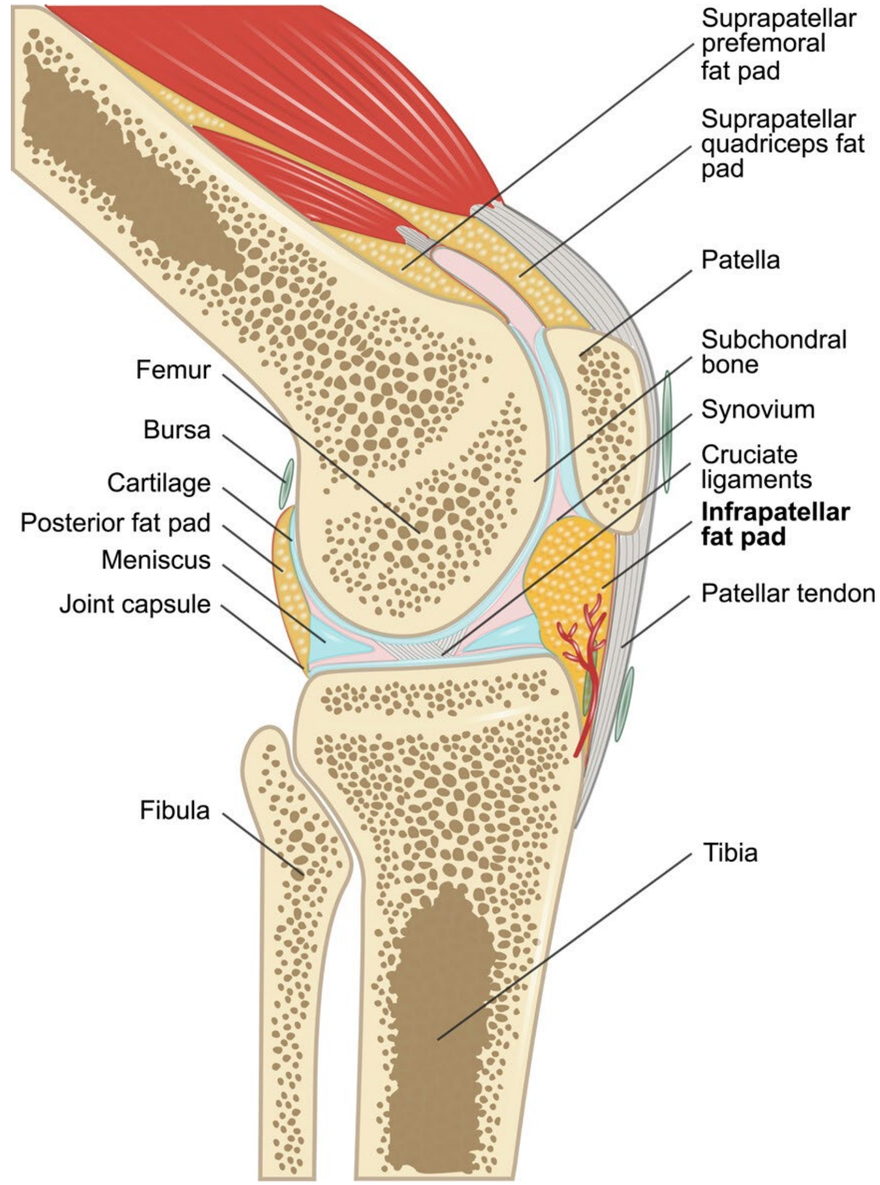
Patellar Tendinopathy

- Most commonly seen in jumping athletics (ex. volleyball, basketball)
- Patellar tendon origin tendinosis – pin point pain localized over the inferior pole of the patella and proximal portion of the patella tendon
- Hydrodissection of Hoffa's fat pad from patella tendon
- Improved pain relief compared to dry needling alone at 12 weeks – consideration of pain relief early
- Compared to extracorporeal shockwave therapy – improved relief at 6 and 12 months



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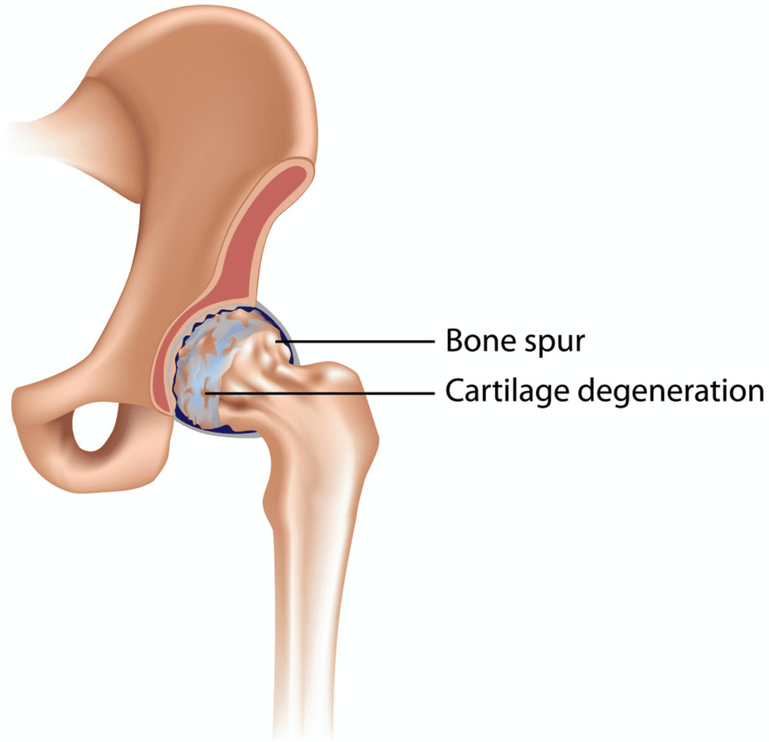
Hip Labral Tear & DJD

- Equivalent findings between hyaluronic acid and PRP
- Early improvement with PRP therapy but with return to baseline
- Initial advantage of PRP with symptom control diminishes as time progresses – PRP and hyaluronic acid with similar efficacy at 12 months
- Potential benefit from combining hyaluronic acid and PRP therapies together?
- No studies have thus far shown any adverse effects of intra-articular PRP therapy into hip joints
- Limited evidence in regard to PRP efficacy with hip impingement syndrome and hip labral tearing



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Other applications to consider…

- GH/AC joint DJD
- Proximal biceps tendinopathy
- Subacromial space/RTC tendinopathy
- Distal biceps tendinopathy
- Chronic nerve impingement syndromes
- CMC joint DJD
- Gluteal tendinopathy (status post abductor repair)
- SI joint
- Obturator internus
- Quadratus femoris
- Proximal hamstring origin

Clinical Recommendations

- Consideration for patients who have failed conservative therapy including but not limited to home exercise program, physical therapy, activity modification, steroidal and non-steroidal anti-inflammatories, bracing, corticosteroid injections
- Varying costs – typically not covered by insurance
- Patients to consider no anti-inflammatory use for a weeks before and after PRP therapy
- For patients not wanting to pursue any type of surgical interventions or perhaps ineligible for surgery

Future Considerations

- More clinical research to be pursued
- Number of injections performed? Timing of injections?
- Patient variables: Age? Smoking history? Blood dyscrasias?
- Chronicity of symptoms? Severity of symptoms?
- Previous surgical history?
- Timing of physical therapy? Progression of physical therapy?
- Sonographic follow up? MRI follow up?
- Preparation of PRP?

References

Moreno-Garcia A, Rodriguez-Merchan EC. Orthobiologics: Current role in Orthopedic Surgery and Traumatology. Arch Bone Jt Surg. 2022 Jul;10(7):536-542. doi: 10.22038/ABJS.2021.52770.2614. PMID: 36032640; PMCID: PMC9382248.

Bugarin A, Schroeder G, Shi BY, Jones KJ, Kremen TJ Jr. Assessment of Characteristics and Methodological Quality of the Top 50 Most Cited Articles on Platelet-Rich Plasma in Musculoskeletal Medicine. Orthop J Sports Med. 2022 May 26;10(5):23259671221093074. doi: 10.1177/23259671221093074. PMID: 35656192; PMCID: PMC9152206.

Jain NK, Gulati M. Platelet-rich plasma: a healing virtuoso. Blood Res. 2016 Mar;51(1):3-5. doi: 10.5045/br.2016.51.1.3. Epub 2016 Mar 25. PMID: 27104183; PMCID: PMC4828525.

Zhang JY, Fabricant PD, Ishmael CR, Wang JC, Petrigliano FA, Jones KJ. Utilization of Platelet-Rich Plasma for Musculoskeletal Injuries: An Analysis of Current Treatment Trends in the United States. Orthop J Sports Med. 2016 Dec 21;4(12):2325967116676241. doi: 10.1177/2325967116676241. PMID: 28210648; PMCID: PMC5302101.

Le ADK, Enweze L, DeBaun MR, Dragoo JL. Current Clinical Recommendations for Use of Platelet-Rich Plasma. Curr Rev Musculoskelet Med. 2018 Dec;11(4):624-634. doi: 10.1007/s12178-018-9527-7. PMID: 30353479; PMCID: PMC6220007.

Le ADK, Enweze L, DeBaun MR, Dragoo JL. Platelet-Rich Plasma. Clin Sports Med. 2019 Jan;38(1):17-44. doi: 10.1016/j.csm.2018.08.001. PMID: 30466721.

Gosens T, Peerbooms JC, van Laar W, den Oudsten BL. Ongoing positive effect of platelet-rich plasma versus corticosteroid injection in lateral epicondylitis: a double-blind randomized controlled trial with 2-year follow-up. Am J Sports Med. 2011 Jun;39(6):1200-8. doi: 10.1177/0363546510397173. Epub 2011 Mar 21. PMID: 21422467.

Peerbooms JC, Sluimer J, Bruijn DJ, Gosens T. Positive effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial: platelet-rich plasma versus corticosteroid injection with a 1-year follow-up. Am J Sports Med. 2010 Feb;38(2):255-62. doi: 10.1177/0363546509355445. PMID: 20448192.

Vaquerizo V, Plasencia MÁ, Arribas I, Seijas R, Padilla S, Orive G, Anitua E. Comparison of intra-articular injections of plasma rich in growth factors (PRGF-Endoret) versus Durolane hyaluronic acid in the treatment of patients with symptomatic osteoarthritis: a randomized controlled trial. Arthroscopy. 2013 Oct;29(10):1635-43. doi: 10.1016/j.arthro.2013.07.264. PMID: 24075613.

Paterson KL, Nicholls M, Bennell KL, Bates D. Intra-articular injection of photo-activated platelet-rich plasma in patients with knee osteoarthritis: a double-blind, randomized controlled pilot study. BMC Musculoskelet Disord. 2016 Feb 9;17:67. doi: 10.1186/s12891-016-0920-3. PMID: 26861957; PMCID: PMC4748460.

Riboh JC, Saltzman BM, Yanke AB, Fortier L, Cole BJ. Effect of Leukocyte Concentration on the Efficacy of Platelet-Rich Plasma in the Treatment of Knee Osteoarthritis. Am J Sports Med. 2016 Mar;44(3):792-800. doi: 10.1177/0363546515580787. Epub 2015 Apr 29. PMID: 25925602.

Dallari D, Stagni C, Rani N, Sabbioni G, Pelotti P, Torricelli P, Tschon M, Giavaresi G. Ultrasound-Guided Injection of Platelet-Rich Plasma and Hyaluronic Acid, Separately and in Combination, for Hip Osteoarthritis: A Randomized Controlled Study. Am J Sports Med. 2016 Mar;44(3):664-71. doi: 10.1177/0363546515620383. Epub 2016 Jan 21. PMID: 26797697.

Lee JJ, Harrison JR, Boachie-Adjei K, Vargas E, Moley PJ. Platelet-Rich Plasma Injections With Needle Tenotomy for Gluteus Medius Tendinopathy: A Registry Study With Prospective Follow-up. Orthop J Sports Med. 2016 Nov 9;4(11):2325967116671692. doi: 10.1177/2325967116671692. PMID: 27868077; PMCID: PMC5105294.

Jacobson JA, Yablon CM, Henning PT, Kazmers IS, Urquhart A, Hallstrom B, Bedi A, Parameswaran A. Greater Trochanteric Pain Syndrome: Percutaneous Tendon Fenestration Versus Platelet-Rich Plasma Injection for Treatment of Gluteal Tendinosis. J Ultrasound Med. 2016 Nov;35(11):2413-2420. doi: 10.7863/ultra.15.11046. Epub 2016 Sep 23. PMID: 27663654

Ahmad Z, Howard D, Brooks RA, Wardale J, Henson FM, Getgood A, Rushton N. The role of platelet rich plasma in musculoskeletal science. JRSM Short Rep. 2012 Jun;3(6):40. doi: 10.1258/shorts.2011.011148. Epub 2012 Jun 19. PMID: 22768374; PMCID: PMC3386662.

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Questions?

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