



EFFECTIVE DATE: 10|01|2020
POLICY LAST UPDATED: 07|06|2022

OVERVIEW

The use of platelet-rich plasma has been proposed as a treatment for various musculoskeletal conditions and as an adjunctive procedure in orthopedic surgeries. The potential benefit of platelet-rich plasma has received considerable interest due to the appeal of a simple, safe, low-cost, and minimally invasive method of applying growth factors.

MEDICAL CRITERIA

Not applicable

PRIOR AUTHORIZATION

Not applicable

POLICY STATEMENT

Medicare Advantage Plans

Use of platelet-rich plasma is not covered for all orthopedic indications as the evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Commercial Products

Use of platelet-rich plasma is not medically necessary for all orthopedic indications as the evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

COVERAGE

Benefits may vary between groups and contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage or Subscriber Agreement for applicable not medically necessary/not covered benefits/coverage.

BACKGROUND

A variety of growth factors have been found to play a role in wound healing, including platelet-derived growth factors, epidermal growth factor, fibroblast growth factors, transforming growth factors, and insulin-like growth factors. Autologous platelets are a rich source of platelet-derived growth factor, transforming growth factors that function as a mitogen for fibroblasts, smooth muscle cells, osteoblasts, and vascular endothelial growth factors. Recombinant platelet-derived growth factor has also been extensively investigated for clinical use in wound healing.

Autologous platelet concentrate suspended in plasma, also known as platelet-rich plasma, can be prepared from samples of centrifuged autologous blood. Exposure to a solution of thrombin and calcium chloride degranulates platelets, releasing the various growth factors. The polymerization of fibrin from fibrinogen creates a platelet gel, which can then be used as an adjunct to surgery with the intent of promoting hemostasis and accelerating healing. In the operating room setting, platelet-rich plasma has been investigated as an adjunct to various periodontal, reconstructive, and orthopedic procedures. For example, bone morphogenetic proteins are a type of transforming growth factors, and thus platelet-rich plasma has been used in conjunction with bone-replacement grafting (using either autologous grafts or bovine-derived xenograft) in periodontal and maxillofacial surgeries. Alternatively, platelet-rich plasma may be injected directly into various tissues. Platelet-rich plasma injections have been proposed as a primary treatment of miscellaneous conditions, such as epicondylitis, plantar fasciitis, and Dupuytren contracture.

Injection of platelet-rich plasma for tendon and ligament pain is theoretically related to prolotherapy. However, prolotherapy differs in that it involves the injection of chemical irritants intended to stimulate inflammatory responses and induce the release of endogenous growth factors.

Platelet-rich plasma is distinguished from fibrin glues or sealants, which have been used as a surgical adjunct to promote local hemostasis at incision sites. Fibrin glue is created from platelet-poor plasma and consists primarily of fibrinogen. Commercial fibrin glues are created from pooled homologous human donors; Tisseel® (Baxter) and Hemaseel® (Haemacure Corp) are examples of commercially available fibrin sealants. Autologous fibrin sealants can be created from platelet-poor plasma. This evidence review does not address the use of fibrin sealants.

Regulatory Status

The U.S. Food and Drug Administration (FDA) regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and Research, under Code of Federal Regulation, title 21, parts 1,270 and 1,271. Blood products such as platelet-rich plasma are included in these regulations. Under these regulations, certain products including blood products such as platelet-rich plasma are exempt and therefore do not follow the traditional FDA regulatory pathway. To date, the FDA has not attempted to regulate activated platelet-rich plasma.

A number of platelet-rich plasma preparation systems are available, many of which were cleared for marketing by the FDA through the 510(k) process for producing platelet-rich preparations intended to be mixed with bone graft materials to enhance the bone grafting properties in orthopedic practices. The use of platelet-rich plasma outside of this setting (eg, an office injection) would be considered off-label. The Aurix System™ (previously called AutoloGel™; Cytomedix) and SafeBlood® (SafeBlood Technologies) are 2 related but distinct autologous blood-derived preparations that can be used at the bedside for immediate application. Both AutoloGel™ and SafeBlood® have been specifically marketed for wound healing. Other devices may be used during surgery (eg, Medtronic Electromedics, Elmd-500 Autotransfusion system, the Plasma Saver device, the SmartPrePO [Harvest Technologies] device). The Magellan™ Autologous Platelet Separator System (Medtronic Sofamor Danek) includes a disposable kit for use with the Magellan™ Autologous Platelet Separator portable tabletop centrifuge. GPS®II (BioMet Biologics), a gravitational platelet separation system, was cleared for marketing by the FDA through the 510(k) process for use as disposable separation tube for centrifugation and a dual cannula tip to mix the platelets and thrombin at the surgical site. Filtration or plasmapheresis may also be used to produce platelet-rich concentrates. The use of different devices and procedures can lead to variable concentrations of activated platelets and associated proteins, increasing variability between studies of clinical efficacy.

Primary Treatment for Tendinopathies

For individuals with tendinopathy who receive platelet-rich plasma injections, the evidence includes multiple randomized controlled trials (RCTs) and systematic reviews with meta-analyses. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related morbidity. Findings from meta-analyses of RCTs have been mixed and have generally found that platelet-rich plasma did not have a statistically and/or clinically significant impact on symptoms (ie, pain) or functional outcomes. Findings from subsequently published RCTs have also been mixed. In RCTs that have found significantly improved pain outcomes for platelet-rich plasma injections, important relevancy gaps and study conduct limitations preclude reaching strong conclusions based on their findings. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Primary Treatment for Non-Tendon Soft Tissue Injury or Inflammation

For individuals with non-tendon soft tissue injury or inflammation (eg, plantar fasciitis) who receive platelet-rich plasma injections, the evidence includes several small RCTs, multiple prospective observational studies, and a systematic review. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related morbidity. The systematic review, which identified 3 RCTs on platelet-

rich plasma for plantar fasciitis, did not pool study findings. Results among the remaining RCTs were inconsistent. The largest RCT showed that treatment using platelet-rich plasma compared with corticosteroid injection resulted in statistically significant improvement in pain and disability, but not quality of life. Larger RCTs are still needed to address important uncertainties in efficacy and safety. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Primary Treatment for Osteochondral Lesions

For individuals with osteochondral lesions who receive platelet-rich plasma injections, the evidence includes an open-labeled quasi-randomized study. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related morbidity. The quasi-randomized study found a statistically significant greater impact on outcomes in the platelet-rich plasma group than in the hyaluronic acid group. Limitations of the evidence base include lack of adequately randomized studies, lack of blinding, lack of sham controls, and comparison only to an intervention of uncertain efficacy. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Primary Treatment for Knee or Hip Osteoarthritis

For individuals with knee or hip osteoarthritis who receive platelet-rich plasma injections, the evidence includes multiple RCTs and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related morbidity. Most trials have compared platelet-rich plasma with hyaluronic acid for knee osteoarthritis. Systematic reviews have generally found that platelet-rich plasma was more effective than placebo or hyaluronic acid in reducing pain and improving function. However, systematic review authors have noted that their findings should be interpreted with caution due to important limitations including significant residual statistical heterogeneity, questionable clinical significance, and high risk of bias in study conduct. RCTs with follow-up durations of at least 12 months published subsequent to the systematic reviews found statistically significantly greater 12-month reductions in pain and function scores, but these findings were also limited by important study conduct flaws including potential inadequate control for selection bias and limited or unclear blinding. Also, benefits were not maintained at 5 years. Using hyaluronic acid as a comparator is questionable, because the evidence demonstrating the benefit of hyaluronic acid treatment for osteoarthritis is not robust. Two systematic reviews evaluating hip osteoarthritis did not report any statistically or clinically significant differences in pain or functional outcomes compared to corticosteroids or placebo. Additional studies comparing platelet-rich plasma with placebo and with alternatives other than hyaluronic acid are needed to determine the efficacy of platelet-rich plasma for knee and hip osteoarthritis. Studies are also needed to determine the optimal protocol for delivering platelet-rich plasma. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Adjunct to Surgery

For individuals with anterior cruciate ligament reconstruction who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes several systematic reviews of multiple RCTs and prospective studies and a retrospective matched case-control study. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. In 2 systematic reviews that conducted a meta-analysis, adjunctive platelet-rich plasma treatment did not result in a significant effect on International Knee Documentation Committee scores, a patient-reported, knee-specific outcome measure that assesses pain and functional activity. Individual trials have shown mixed results. A retrospective matched case-control study found no differences in knee function scores or time to return of activity between platelet-rich plasma and matched-control groups at 2 years; however, the platelet-rich plasma group demonstrated a higher rate of postoperative knee motion loss compared with the control group. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with hip fracture who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes an open-labeled RCT. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. The single

open-labeled RCT failed to show a statistically significant reduction in the need for surgical revision with the addition of platelet-rich plasma treatment. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals with long bone nonunion who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes three RCTs. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. One trial with a substantial risk of bias failed to show significant differences in patient-reported or clinician-assessed functional outcome scores between those who received platelet-rich plasma plus allogenic bone graft and those who received only allogenic bone graft. While the trial showed a statistically significant increase in the proportion of bones that healed in patients receiving platelet-rich plasma in a modified intention-to-treat analysis, the results did not differ in the intention-to-treat analysis. The second RCT, which compared platelet-rich plasma with recombinant human bone morphogenetic protein-7, also failed to show any clinical or radiologic benefits of platelet-rich plasma over morphogenetic protein-7. The third RCT reported no difference in the number of unions or time to union in patients receiving platelet-rich plasma injections versus no treatment. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with rotator cuff repair who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes multiple RCTs and systematic reviews. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. Although systematic reviews consistently found significant reductions in pain with platelet-rich plasma at 12 months, important study conduct and relevance weaknesses limit interpretation of these findings. While the systematic reviews and meta-analyses generally failed to show a statistically and/or clinically significant impact on other outcomes, 1 meta-analysis found a statistically significant reduction in retear rate in a subgroup analysis of 4 RCTs that were at least 24 months in duration. The findings of a subsequently published 10-year follow-up of a small RCT failed to demonstrate the superiority of platelet-rich plasma over control for clinical and radiologic outcomes. The variability in platelet-rich plasma preparation techniques and platelet-rich plasma administration limits the generalizability of the available evidence. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals undergoing spinal fusion who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes a single small RCT and a few observational studies. Relevant outcomes include symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. Studies have generally failed to show a statistically and/or clinically significant impact on symptoms (ie, pain). The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with subacromial decompression surgery who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes a small RCT. Relevant outcome are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. A single small RCT failed to show a reduction in self-assessed or physician-assessed spinal instability scores with platelet-rich plasma injections. However, subjective pain, use of pain medications, and objective measures of range of motion showed clinically significant improvements with platelet-rich plasma. Larger trials are required to confirm these benefits. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with total knee arthroplasty who receive platelet-rich plasma injections plus orthopedic surgery, the evidence includes a systematic review. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, morbid events, resource utilization, and treatment-related morbidity. The review showed no significant differences between the platelet-rich plasma and untreated control groups

in range of motion, functional outcomes, and long-term pain. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

CODING

The following codes are not covered for Medicare Advantage Plans and not medically necessary for Commercial products:

0232T Injection(s), platelet rich plasma, any site, including image guidance, harvesting and preparation when performed

C1734 Orthopedic/device/drug matrix for opposing bone-to-bone or soft tissue-to bone (implantable)

RELATED POLICIES

Autologous Platelet Derived Growth Factors

PUBLISHED

Provider Update, September 2022

Provider Update, August 2021

Provider Update, August 2020

REFERENCES:

1. Crovetti G, Martinelli G, Issi M, et al. Platelet gel for healing cutaneous chronic wounds. *Transfus Apher Sci.* Apr2004; 30(2): 145-51. PMID 15062754
2. Eppley BL, Woodell JE, Higgins J. Platelet quantification and growth factor analysis from platelet-rich plasma: implications for wound healing. *Plast Reconstr Surg.* Nov 2004; 114(6): 1502-8. PMID 15509939
3. Kevy SV, Jacobson MS. Comparison of methods for point of care preparation of autologous platelet gel. *J ExtraCorpor Technol.* Mar 2004; 36(1): 28-35. PMID 15095838
4. Castillo TN, Pouliot MA, Kim HJ, et al. Comparison of growth factor and platelet concentration from commercial platelet-rich plasma separation systems. *Am J Sports Med.* Feb 2011; 39(2): 266-71. PMID 21051428
5. Mazzucco L, Balbo V, Cattana E, et al. Not every PRP-gel is born equal. Evaluation of growth factor availability fortissues through four PRP-gel preparations: Fibrinet, RegenPRP-Kit, Plateltex and one manual procedure. *Vox Sang.* Aug 2009; 97(2): 110-8. PMID 19392780
6. Hsu WK, Mishra A, Rodeo SR, et al. Platelet-rich plasma in orthopaedic applications: evidence-based recommendations for treatment. *J Am Acad Orthop Surg.* Dec 2013; 21(12): 739-48. PMID 24292930
7. Dai W, Yan W, Leng X, et al. Efficacy of Platelet-Rich Plasma Versus Placebo in the Treatment of Tendinopathy: A Meta-analysis of Randomized Controlled Trials. *Clin J Sport Med.* Aug 02 2021. PMID 34342296
8. Muthu S, Patel S, Gobbur A, et al. Platelet-rich plasma therapy ensures pain reduction in the management of lateral epicondylitis - a PRISMA-compliant network meta-analysis of randomized controlled trials. *Expert Opin Biol Ther.* Jan 31 2022: 1-12. PMID 35078375
9. Johal H, Khan M, Yung SP, et al. Impact of Platelet-Rich Plasma Use on Pain in Orthopaedic Surgery: A Systematic Review and Meta-analysis. *Sports Health.* Jul/Aug 2019; 11(4): 355-366. PMID 31136726
10. Miller LE, Parrish WR, Roides B, et al. Efficacy of platelet-rich plasma injections for symptomatic tendinopathy: systematic review and meta-analysis of randomised injection-controlled trials. *BMJ Open Sport Exerc Med.* 2017;3(1): e000237. PMID 29177072
11. Tsikopoulos K, Tsikopoulos I, Simeonidis E, et al. The clinical impact of platelet-rich plasma on tendinopathy compared to placebo or dry needling injections: A meta-analysis. *Phys Ther Sport.* Jan 2016; 17: 87-94. PMID 26621224
12. Balasubramaniam U, Dissanayake R, Annabell L. Efficacy of platelet-rich plasma injections in pain associated with chronic tendinopathy: A systematic review. *Phys Sportsmed.* Jul 2015; 43(3): 253-61. PMID 25599747

13. Andia I, Latorre PM, Gomez MC, et al. Platelet-rich plasma in the conservative treatment of painful tendinopathy: asystematic review and meta-analysis of controlled studies. *Br Med Bull.* Jun 2014; 110(1): 99-115. PMID 24795364
14. Gupta PK, Acharya A, Khanna V, et al. PRP versus steroids in a deadlock for efficacy: long-term stability versus short-term intensity—results from a randomised trial. *Musculoskelet Surg.* Dec 2020; 104(3): 285-294. PMID 31448392
15. Scott A, LaPrade RF, Harmon KG, et al. Platelet-Rich Plasma for Patellar Tendinopathy: A Randomized Controlled Trial of Leukocyte-Rich PRP or Leukocyte-Poor PRP Versus Saline. *Am J Sports Med.* Jun 2019; 47(7): 1654-1661. PMID 31038979
16. Fitzpatrick J, Bulsara MK, O'Donnell J, et al. Leucocyte-Rich Platelet-Rich Plasma Treatment of Gluteus Medius and Minimus Tendinopathy: A Double-Blind Randomized Controlled Trial With 2-Year Follow-up. *Am J Sports Med.* Apr 2019; 47(5): 1130-1137. PMID 30840831
17. Martin JI, Atilano L, Bully P, et al. Needle tenotomy with PRP versus lidocaine in epicondylopathy: clinical and ultrasonographic outcomes over twenty months. *Skeletal Radiol.* Sep 2019; 48(9): 1399-1409. PMID 30826853
18. Kearney RS, Ji C, Warwick J, et al. Effect of Platelet-Rich Plasma Injection vs Sham Injection on Tendon Dysfunction in Patients With Chronic Midportion Achilles Tendinopathy: A Randomized Clinical Trial. *JAMA.* Jul 13 2021; 326(2): 137-144. PMID 34255009
19. Franceschi F, Papalia R, Franceschetti E, et al. Platelet-rich plasma injections for chronic plantar fasciopathy: asystematic review. *Br Med Bull.* Dec 2014; 112(1): 83-95. PMID 25239050
20. Monto RR. Platelet-rich plasma efficacy versus corticosteroid injection treatment for chronic severe plantar fasciitis. *Foot Ankle Int.* Apr 2014; 35(4): 313-8. PMID 24419823
21. Peerbooms JC, Lodder P, den Ouden BL, et al. Positive Effect of Platelet-Rich Plasma on Pain in Plantar Fasciitis: A Double-Blind Multicenter Randomized Controlled Trial. *Am J Sports Med.* Nov 2019; 47(13): 3238-3246. PMID 31603721
22. Shetty SH, Dhond A, Arora M, et al. Platelet-Rich Plasma Has Better Long-Term Results Than Corticosteroids or Placebo for Chronic Plantar Fasciitis: Randomized Control Trial. *J Foot Ankle Surg.* Jan 2019; 58(1): 42-46. PMID 30448183
23. Johnson-Lynn S, Cooney A, Ferguson D, et al. A Feasibility Study Comparing Platelet-Rich Plasma Injection With Saline for the Treatment of Plantar Fasciitis Using a Prospective, Randomized Trial Design. *Foot Ankle Spec.* Apr 2019; 12(2): 153-158. PMID 29779399
24. Tabrizi A, Dindarian S, Mohammadi S. The Effect of Corticosteroid Local Injection Versus Platelet-Rich Plasma for the Treatment of Plantar Fasciitis in Obese Patients: A Single-Blind, Randomized Clinical Trial. *J Foot Ankle Surg.* Jan 2020; 59(1): 64-68. PMID 31882151
25. Mei-Dan O, Carmont MR, Laver L, et al. Platelet-rich plasma or hyaluronate in the management of osteochondral lesions of the talus. *Am J Sports Med.* Mar 2012; 40(3): 534-41. PMID 22253252
26. Anil U, Markus DH, Hurley ET, et al. The efficacy of intra-articular injections in the treatment of knee osteoarthritis: A network meta-analysis of randomized controlled trials. *Knee.* Oct 2021; 32: 173-182. PMID 34500430
27. Trams E, Kulinski K, Kozar-Kaminska K, et al. The Clinical Use of Platelet-Rich Plasma in Knee Disorders and Surgery—A Systematic Review and Meta-Analysis. *Life (Basel).* Jun 25 2020; 10(6). PMID 32630404
28. Laudy AB, Bakker EW, Rekers M, et al. Efficacy of platelet-rich plasma injections in osteoarthritis of the knee: asystematic review and meta-analysis. *Br J Sports Med.* May 2015; 49(10): 657-72. PMID 25416198
29. Chang KV, Hung CY, Aliwarga F, et al. Comparative effectiveness of platelet-rich plasma injections for treating knee joint cartilage degenerative pathology: a systematic review and meta-analysis. *Arch Phys Med Rehabil.* Mar 2014; 95(3): 562-75. PMID 24291594
30. Meheux CJ, McCulloch PC, Lintner DM, et al. Efficacy of Intra-articular Platelet-Rich Plasma Injections in Knee Osteoarthritis: A Systematic Review. *Arthroscopy.* Mar 2016; 32(3): 495-505. PMID 26432430
31. Lai LP, Stitik TP, Foye PM, et al. Use of Platelet-Rich Plasma in Intra-Articular Knee Injections for Osteoarthritis: A Systematic Review. *PM R.* Jun 2015; 7(6): 637-48. PMID 25687110

32. Cole BJ, Karas V, Hussey K, et al. Hyaluronic Acid Versus Platelet-Rich Plasma: A Prospective, Double-Blind Randomized Controlled Trial Comparing Clinical Outcomes and Effects on Intra-articular Biology for the Treatment of Knee Osteoarthritis. *Am J Sports Med.* Feb 2017; 45(2): 339-346. PMID 28146403
33. Duymus TM, Mutlu S, Dernek B, et al. Choice of intra-articular injection in treatment of knee osteoarthritis: platelet-rich plasma, hyaluronic acid or ozone options. *Knee Surg Sports Traumatol Arthrosc.* Feb 2017; 25(2): 485-492. PMID 27056686
34. Kanchanatawan W, Arirachakaran A, Chaijenkij K, et al. Short-term outcomes of platelet-rich plasma injection for treatment of osteoarthritis of the knee. *Knee Surg Sports Traumatol Arthrosc.* May 2016; 24(5): 1665-77. PMID 26387122
35. Xu Z, Luo J, Huang X, et al. Efficacy of Platelet-Rich Plasma in Pain and Self-Report Function in Knee Osteoarthritis: A Best-Evidence Synthesis. *Am J Phys Med Rehabil.* Nov 2017; 96(11): 793-800. PMID 28398969
36. Belk JW, Houck DA, Littlefield CP, et al. Platelet-Rich Plasma Versus Hyaluronic Acid for Hip Osteoarthritis Yields Similarly Beneficial Short-Term Clinical Outcomes: A Systematic Review and Meta-Analysis of Level I and II Randomized Controlled Trials. *Arthroscopy.* Nov 14 2021. PMID 34785294
37. Gazendam A, Ekhtiari S, Bozzo A, et al. Intra-articular saline injection is as effective as corticosteroids, platelet-rich plasma and hyaluronic acid for hip osteoarthritis pain: a systematic review and network meta-analysis of randomised controlled trials. *Br J Sports Med.* Mar 2021; 55(5): 256-261. PMID 32829298
38. Sdeek M, Sabry D, El-Sdeek H, et al. Intra-articular injection of Platelet rich plasma versus Hyaluronic acid for moderate knee osteoarthritis. A prospective, double-blind randomized controlled trial on 189 patients with follow-up for three years. *Acta Orthop Belg.* Dec 2021; 87(4): 729-734. PMID 35172440
39. Reyes-Sosa R, Lugo-Radillo A, Cruz-Santiago L, et al. Clinical comparison of platelet-rich plasma injection and daily celecoxib administration in the treatment of early knee osteoarthritis: a randomized clinical trial. *J Appl Biomed.* 2020; 18(2-3): 41-45. doi: 10.32725/jab.2020.012.
40. Elksnins-Finogejevs A, Vidal L, Peredistijs A. Intra-articular platelet-rich plasma vs corticosteroids in the treatment of moderate knee osteoarthritis: a single-center prospective randomized controlled study with a 1-year follow up. *J Orthop Surg Res.* Jul 10 2020; 15(1): 257. PMID 32650801
41. Dallari D, Stagni C, Rani N, et al. 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.* Mar 2016; 44(3): 664-71. PMID 26797697
42. Trueba Vasavilbaso C, Rosas Bello CD, Medina Lopez E, et al. Benefits of different postoperative treatments in patients undergoing knee arthroscopic debridement. *Open Access Rheumatol.* 2017; 9: 171-179. PMID 29026341
43. Dallari D, Savarino L, Stagni C, et al. Enhanced tibial osteotomy healing with use of bone grafts supplemented with platelet gel or platelet gel and bone marrow stromal cells. *J Bone Joint Surg Am.* Nov 2007; 89(11): 2413-20. PMID 17974883
44. Moraes VY, Lenza M, Tamaoki MJ, et al. Platelet-rich therapies for musculoskeletal soft tissue injuries. *Cochrane Database Syst Rev.* Dec 23 2013; (12): CD010071. PMID 24363098
45. Figueroa D, Figueroa F, Calvo R, et al. Platelet-rich plasma use in anterior cruciate ligament surgery: systematic review of the literature. *Arthroscopy.* May 2015; 31(5): 981-8. PMID 25595696
46. Nin JR, Gasque GM, Azcarate AV, et al. Has platelet-rich plasma any role in anterior cruciate ligament allograft healing?. *Arthroscopy.* Nov 2009; 25(11): 1206-13. PMID 19896041
47. Bailey L, Weldon M, Kleihege J, et al. Platelet-Rich Plasma Augmentation of Meniscal Repair in the Setting of Anterior Cruciate Ligament Reconstruction. *Am J Sports Med.* Oct 2021; 49(12): 3287-3292. PMID 34477016
48. Griffin XL, Achten J, Parsons N, et al. Platelet-rich therapy in the treatment of patients with hip fractures: a single centre, parallel group, participant-blinded, randomised controlled trial. *BMJ Open.* Jun 25 2013; 3(6). PMID 23801709
49. Griffin XL, Wallace D, Parsons N, et al. Platelet rich therapies for long bone healing in adults. *Cochrane Database Syst Rev.* Jul 11 2012; (7): CD009496. PMID 22786528

50. Calori GM, Tagliabue L, Gala L, et al. Application of rhBMP-7 and platelet-rich plasma in the treatment of long bone non-unions: a prospective randomised clinical study on 120 patients. *Injury*. Dec 2008; 39(12): 1391-402. PMID 19027898
51. Samuel G, Menon J, Thimmaiah S, et al. Role of isolated percutaneous autologous platelet concentrate in delayed union of long bones. *Eur J Orthop Surg Traumatol*. Jul 2018; 28(5): 985-990. PMID 29167980
52. Zhao JG, Zhao L, Jiang YX, et al. Platelet-rich plasma in arthroscopic rotator cuff repair: a meta-analysis of randomized controlled trials. *Arthroscopy*. Jan 2015; 31(1): 125-35. PMID 25278352
53. Yang J, Sun Y, Xu P, et al. Can patients get better clinical outcomes by using PRP in rotator cuff repair: a meta-analysis of randomized controlled trials. *J Sports Med Phys Fitness*. Nov 2016; 56(11): 1359-1367. PMID 26473444
54. Chen X, Jones IA, Park C, et al. The Efficacy of Platelet-Rich Plasma on Tendon and Ligament Healing: A Systematic Review and Meta-analysis With Bias Assessment. *Am J Sports Med*. Jul 2018; 46(8): 2020-2032. PMID 29268037
55. Chen X, Jones IA, Togashi R, et al. Use of Platelet-Rich Plasma for the Improvement of Pain and Function in Rotator Cuff Tears: A Systematic Review and Meta-analysis With Bias Assessment. *Am J Sports Med*. Jul 2020; 48(8): 2028-2041. PMID 31743037
56. Li Y, Li T, Li J, et al. Platelet-Rich Plasma Has Better Results for Retear Rate, Pain, and Outcome Than Platelet-Rich Fibrin After Rotator Cuff Repair: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Arthroscopy*. Feb 2022; 38(2): 539-550. PMID 34052384
57. Fu CJ, Sun JB, Bi ZG, et al. Evaluation of platelet-rich plasma and fibrin matrix to assist in healing and repair of rotator cuff injuries: a systematic review and meta-analysis. *Clin Rehabil*. Feb 2017; 31(2): 158-172. PMID 26928856
58. Randelli PS, Stoppani CA, Santarsiero G, et al. Platelet-Rich Plasma in Arthroscopic Rotator Cuff Repair: Clinical and Radiological Results of a Prospective Randomized Controlled Trial Study at 10-Year Follow-Up. *Arthroscopy*. Jan 2022; 38(1): 51-61. PMID 34052372
59. Kubota G, Kamoda H, Orita S, et al. Platelet-rich plasma enhances bone union in posterolateral lumbar fusion: A prospective randomized controlled trial. *Spine J*. Feb 2019; 19(2): e34-e40. PMID 28735763
60. Carreon LY, Glassman SD, Anekstein Y, et al. Platelet gel (AGF) fails to increase fusion rates in instrumented posterolateral fusions. *Spine (Phila Pa 1976)*. May 01 2005; 30(9): E243-6; discussion E247. PMID 15864142
61. Tsai CH, Hsu HC, Chen YJ, et al. Using the growth factors-enriched platelet glue in spinal fusion and its efficiency. *J Spinal Disord Tech*. Jun 2009; 22(4): 246-50. PMID 19494743
62. Everts PA, Devilee RJ, Brown Mahoney C, et al. Exogenous application of platelet-leukocyte gel during open subacromial decompression contributes to improved patient outcome. A prospective randomized double-blind study. *Eur Surg Res*. 2008; 40(2): 203-10. PMID 17998780
63. American Academy of Orthopaedic Surgeons. Management of Osteoarthritis of the Knee (Non-Arthroplasty). 2021; <https://www.aaos.org/globalassets/quality-and-practice-resources/osteoarthritis-of-the-knee/oak3cpg.pdf>. Accessed March 2, 2022.
64. American Academy of Orthopaedic Surgeons. Management of Osteoarthritis of the Hip: Evidence-Based Clinical Practice Guideline. 2017; https://www.aaos.org/globalassets/quality-and-practice-resources/osteoarthritis-of-the-hip/oa-hip-cpg_6-11-19.pdf. Accessed March 1, 2022.
65. American Academy of Orthopaedic Surgeons. Management of Rotator Cuff Injuries Evidence-Based Clinical Practice Guideline. <https://www.orthoguidelines.org/topic?id=1027>. Published March 11, 2019. Accessed March 3, 2022.
66. National Institute for Health and Care Excellence (NICE). Autologous blood injection for tendinopathy [IPG438]. 2013; <https://www.nice.org.uk/guidance/ipg438>. Accessed March 2, 2022.
67. National Institute for Health and Care Excellence (NICE). Autologous blood injection for plantar fasciitis [IPG437]. 2013; <https://www.nice.org.uk/guidance/ipg437>. Accessed March 1, 2022.
68. National Institute for Health and Care Excellence (NICE). Platelet-rich plasma injections for knee osteoarthritis [IPG637]. 2019; <https://www.nice.org.uk/guidance/ipg637>. Accessed March 3, 2022.

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