HEALTH PLANS
UNIVERSITY OF UTAH

Medical Policy

Platelet-Rich Plasma (PRP) for Orthopedic Indications

Policy MP-074

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Disclaimer:

1. Policies are subject to change in accordance with State and Federal notice requirements.
2. Policies outline coverage determinations for U of U Health Plans Commercial, CHIP and Healthy U (Medicaid) plans. Refer to the "Policy" section for more information.
3. Services requiring prior-authorization may not be covered, if prior-authorization is not obtained.
4. This Medical Policy does not guarantee coverage or payment of the service. The service must be a benefit in the member's plan and the member must be eligible for coverage at the time of service. Additional payment guidelines may be applied that are not included in this policy.

Description:

Autologous platelet-derived growth factors also known as platelet-rich plasma (PRP), platelet gel, platelet-rich concentrate, autogenous platelet gel, plasma rich in growth factors (PRGF) or platelet releasate, have been proposed for the treatment of multiple conditions to enhance healing. These therapies are prepared from samples of centrifuged blood obtained from the patient at the time of the procedure.

PRP has been investigated as an adjunct to a variety of periodontal, reconstructive, and orthopedic procedures. Alternatively, PRP may be injected directly into various tissues. PRP injections have been proposed as a primary treatment of miscellaneous conditions such as epicondylitis, plantar fasciitis, and Dupuytren contracture.

The potential benefit of PRP has received considerable interest due to the appeal of a simple, safe, low-cost, and minimally invasive method of applying growth factors.

Policy Statement and Criteria

1. Commercial Plans/CHIP

U of U Health Plans does not cover the use of platelet-rich plasma (PRP) for orthopedic indications or any other indication as it is considered unproven for any indication.

Excluded conditions for which PRP is not covered include but are not limited to the following (not a complete list):

- Achilles tendon ruptures/Achilles tendinopathy
- Alopecia areata (androgenetic alopecia)
- Ankle sprain
- Anterior cruciate ligament surgery
- As adjunctive material to bone graft
- Avascular necrosis of the hip, and the shoulder
- Cerebral palsy
- Chronic wounds
- Crohn's disease-related perianal fistula
- Discogenic low back pain
- Gastrocnemius (calf) tear
- Greater trochanteric pain syndrome
- Hamstring injury
- Hip fractures
- Labral tears of the shoulder and hip
- Lumbar facet joint syndrome
- Osteoarthritis (e.g., hip, knee, and temporomandibular joint (TMJ))
- Osteonecrosis of the jaw
- Plantar fasciitis
- Rotator cuff injuries
- Tendinopathies (e.g., elbow, heel, knee, and shoulder)

2. **Medicaid Plans**

   Coverage is determined by the State of Utah Medicaid program; if Utah State Medicaid has no published coverage position and InterQual criteria are not available, the U of U Health Plans Commercial criteria will apply. For the most up-to-date Medicaid policies and coverage, please visit their website at: https://medicaid.utah.gov/utah-medicaid-official-publications/ or the Utah Medicaid code Look-Up tool

   CPT/HCPCS codes covered by Utah State Medicaid may still require further evaluation to determine medical necessity for coverage.

Clinical Rationale

There exists a significant body of literature related to PRP in the management of orthopedic procedures. The studies suffer from multiple deficiencies whether it be lack of randomization, short duration, inadequate sample size, lack of clinically meaningful endpoints, failure to demonstrate cost effectiveness and others. In addition, many studies have failed to demonstrate a significant difference in outcomes using PRP in various circumstances compared to a sham comparator. Consequently, published

literature though at times suggestive of potential benefit in certain settings is insufficient to draw definitive conclusions regarding effectiveness and safety or true clinical impact on outcomes.

Most of the literature examining applications of platelet growth factors for healing has also been conducted using animal models. Another extensive body of literature has focused on use of PRP for dental applications. However, the clinical studies on use of platelet-rich plasma for other musculoskeletal indications are a heterogeneous body of literature. Several review organizations have looked into PRP as a treatment for various indications. In a 2020 AHRQ technology assessment program, Qu et al. conducted a systematic review of 27 studies (22 randomized control trials [RCT] and five observational) on platelet-rich plasma for wound care in the Medicare population. The assessment was specifically evaluating the effectiveness of PRP in lower extremity diabetic ulcers (15 studies), lower extremity venous ulcers (11 studies), and pressure ulcers (2 studies). Follow up ranged from none to 11 months. Moderate strength of evidence (SOE) supported that PRP increases complete wound closure or healing with a low SOE supporting shortened healing time and reduction of wound size in lower extremity diabetic ulcers. There was insufficient evidence to estimate the effect of PRP on wound healing of lower extremity venous ulcers or pressure ulcers. There were no statistically significant difference in death, total adverse events or serious adverse events between PRP and management without PRP. The author noted limitations of the studies included inadequate description of wound care procedures and wound characteristics; heterogeneity of PRP formulation, concentration and volume; short term follow up; and lack of stratification by comorbidities and other patient characteristics including older adults. It was noted that Medicare eligible older adults were underrepresented in the included studies.

A number of organizations have complete reviews for PRP therapy. A 2017 AHRQ comparative effectiveness review on the treatment of osteoarthritis of the knee included five randomized controlled trials investigating the use of platelet rich plasma (PRP). The studies compared PRP to sham control or analgesic. The longest follow-up was six months. Low strength of evidence (four studies) supported a beneficial effect of PRP compared to saline injections on medium-term (12–26 weeks) pain and quality of life. However, the evidence was insufficient to draw conclusions regarding the effects of PRP on medium-term function and outcomes at shorter or longer times. Two studies reported on adverse events and results were conflicting. One study reported an increase in pain and stiffness with single injection which doubled with two injections. There was a high risk of bias in the studies.

The Platelet-Rich Plasma (PRP) for Knee Osteoarthritis Technology Overview is based on a systematic review of current scientific and clinical research. Through analysis of the current best evidence, this technology overview seeks to evaluate the efficacy of PRP for patients with knee osteoarthritis. The systematic literature review resulted in 54 articles: 36 high-quality and 18 moderate-quality. The findings of these studies were summarized to present findings on PRP versus control/placebo, acetaminophen, non-steroidal anti-inflammatory drugs, corticosteroids, exercise, prolotherapy, autologous conditioned serum, bone marrow aspirate concentrate, hyaluronic acid, and ozone therapy. In addition, the work group highlighted areas that needed additional research when evidence proved lacking on the topic and carefully noted the potential harms associated with an intervention, required resource utilization, acceptability, and feasibility

In 2019, the AAOS went on to issue evidence-based guidelines on the management of rotator cuff injuries. The guideline noted the following recommendations related to the use of platelet-rich plasma in this setting:

1. "There is limited evidence supporting the routine use of platelet-rich plasma for the treatment of cuff tendinopathy or partial tears (Strength of Recommendation: Limited)." The variability of study findings was noted to have contributed to the low strength of recommendation rating."
2. Strong evidence does not support biological augmentation of rotator cuff repair with platelet-derived products on improving patient reported outcomes; however, limited evidence supports the use of liquid platelet rich plasma in the context of decreasing re-tear rates (Strength of Recommendation: Strong)."
3. "In the absence of reliable evidence, it is the consensus of the work group that we do not recommend the routine use of platelet rich plasma in the non-operative management of full-thickness rotator cuff tears. (Strength of Recommendation: Consensus)"

In 2017, the AAOS also issued evidence-based guidelines on the management of OA of the hip. In the section on intra-articular injectables, the guidelines stated that there is strong evidence supporting the use of intra-articular corticosteroids to improve function and reduce pain in the short term for patients with OA of the hip. There was also strong evidence that the use of intra-articular hyaluronic acid does not perform better than placebo in improving function, stiffness, and pain in patients with hip OA. The guidelines also noted that there were no high-quality studies comparing PRP with placebo for the treatment of OA of the hip.

Several specific applications of PRP have been studied with publications showing various limitations in the published literature. This includes the following:

Anterior Cruciate Ligament (ACL) Repair
de Andrade et al. (2021) conducted a systematic review and meta-analysis to evaluate the efficacy of platelet rich plasma (PRP) to improve healing and rehabilitation when used in anterior cruciate ligament reconstruction (ACLR). Nine randomized control trials were included with 525 patients with ages ranged from 14–59 years. The control group did not receive PRP. The primary outcomes measured were graft ligamentization, tibial and femoral tunnel widening, knee laxity, and pain. Follow-ups ranged from 12–96 weeks. The PRP group did not show improved ligamentization of graft, lesser tunnel widening, knee laxity, international knee documentation committee (IKDC) or Tegner scores. PRP was associated with higher Lysholm score and lower visual analog scale for pain, however it was determined to be clinically insignificant. Author noted limitations included heterogeneity in PRP preparation, different rehabilitation protocols, small patient populations and low number of included studies.

Figueroa et al. (2015) conducted a systematic review of the literature to evaluate the efficacy of PRP for the treatment of anterior cruciate ligament (ACL) ruptures. A total of 11 studies (n=516) met inclusion criteria. The comparator was reconstruction without PRP (n=250). Four studies reported a statistically significant difference in healing and two studies showed a tendency toward faster graft maturation but the clinical implication of these results was unclear. One study reported no difference between the groups with the addition of PRP. Regarding tunnel healing/widening, one study showed better clinical outcomes with PRP and five studies showed no benefits with its use. In conclusion, PRP showed no significant improvement in tunnel healing and its clinical improvement in ACL graft maturation is unclear due to the heterogeneity of the studies (e.g. volume and concentration of PRP, number of PRP applications, location of the injection, use of an anticoagulant or activating agent, various surgical techniques and rehabilitation schemes).

Epicondylitis

An ECRI Clinical Evidence Assessment (2021) on platelet-rich plasma therapy (PRP) for lateral epicondylitis (LE) included 2 systematic reviews that included 25 RCTs and 5 additional randomized controlled trials (n = 2,033) to compare PRP with alternative treatments (i.e., saline or corticosteroid injections) or placebo. Pain, function, and adverse events were assessed. Findings revealed that saline injection, PRP injection, and steroid injections all provided comparable pain relief and functional improvement up to 3-months post-treatment. By 3-months, however, PRP provided better pain relief than steroid injection. PRP combined with surgery revealed improved pain in both groups up to 1-year post-treatment. At 24-weeks post-treatment, however, PRP provided better pain control compared to physical therapy. Transient post-injection pain was the most reported adverse reaction and no serious adverse events. The authors concluded that evidence is inconclusive with mixed results for PRP as treatment of LE. Limitations included wide variations in how PRP is prepared and used as well as varied patient characteristics and symptoms of LE.

Chen et al. (2021) conducted a systematic review of sixteen randomized control trials (n=927) to evaluate the effectiveness of platelet-rich plasma (PRP) on pain and functional outcomes for the treatment of lateral epicondylitis. Comparators included autologous whole blood (AWB) (four studies), corticosteroids (nine studies), saline (two studies), bupivacaine (one study), and laser therapy (one study). Nine studies (n=581) were include in a meta-analysis evaluating the efficacy of PRP versus AWB and/or PRP versus corticosteroids. The average patient age was 41.5 years with 56.8% females. The studies were conducted in Denmark, France, Iran, Greece, Netherlands, India, United Kingdom, Germany, Poland, Egypt, Pakistan and Brazil. The mean follow up was 7.5 months. PRP compared to AWB had higher visual analog scale (VAS) scores at three ($p>0.01$) and six months ($p<0.01$) while Mayo Clinic performance index for the elbow (MAYO) scores were statistically equivalent. No significant difference in VAS and Disabilities of the Arm, Shoulder, and Hand (DASH) scores at three months when comparing PRP to corticosteroids with higher VAS and DASH scores for PRP at six months ($p<0.01$). No serious adverse events were reported. Self-resolving pain was reported in two studies. The author noted limitations included heterogeneity of PRP preparation methods and patient reported outcome measures, small patient populations and short term follow-up.

Kemp et al. (2021) conducted a systematic review to evaluate the effectiveness of platelet rich plasma compared to corticosteroid (CS) injection for the treatment of lateral epicondylitis. The five systematic reviews (SR) included a range of 5–20 randomized control trials with 250–1271 patients. Demographic data on the patients was not provided. Patient reported outcome measures were assessed using the following: visual analogue scale for pain (VAS) (five SR), Disabilities of Arm, Shoulder and Hand (DASH) (five SR), Pain Pressure Threshold (PPT) (two SR), Patient-Related Tennis Elbow Evaluation (PRTEE) (three SR), modified Nirschl score for pain (MNS) (one SR), and modified MAYO score (MMS) (one SR). Four of five studies reported improved pain relief and function in short term (2–8 weeks) with CS injection and with PRP in the long term (>8 weeks). Adverse events were not reported. The author noted limitations included inconsistencies in reporting preparation techniques, injection techniques, and concentrations of PRP; varied patient reported outcome measures; small patient populations; and short term follow-up.

In 2020, Gupta et. al., performed a randomized controlled trial to evaluate and compare the 6-week, 3-month and 1-year outcomes with platelet-rich plasma (PRP) and corticosteroid injections in lateral epicondylitis (LE). The authors hypothesized that PRP would prove more effective in relieving pain and improving function. 80 patients with LE were randomized into either receiving PRP (group A) or corticosteroids (group B) injections. Pre-injection visual analogue scale (VAS), disabilities of the arm, shoulder, and hand (DASH) score, Mayo elbow performance score (MEPS) and grip strength score (GSS)

were recorded. Common extensor origins were identified and infiltrated with 3 ml of either PRP or corticosteroid (triamcinolone in 2% xylocaine) using a peppering technique. Follow-up scores and extent of pain relief were recorded and compared. At 6 weeks, there were greater improvements in group B versus A in mean VAS (13.8 vs. 44.5; $p < 0.001$), DASH (64.2 vs. 53.3; $p < 0.001$), MEPS (88.0 vs. 74.5; $p = 0.004$) and GSS (89.3 vs. 73.4; $p = 0.039$). These scores showed a reversed pattern at 3 months when group A outcomes superseded group B (VAS $p = 0.002$; DASH $p < 0.001$; MEPS $p = 0.002$; GSS $p = 0.045$). At 1-year follow-up, group A continued to enjoy better pain relief and function (VAS $p = 0.024$; DASH $p < 0.001$; MEPS $p = 0.009$; GSS $p = 0.028$). Study retention was 93% at 12 weeks and 79% after 1 year. There was no significant difference in mean change in VISA-P score, pain, or global rating of change among the 3 treatment groups at 12 weeks or any other time point. After 1 year, the mean (SD) outcomes for the LR-PRP, LP-PRP, and saline groups were as follows, respectively: VISA-P-58 (29), 71 (20), and 80 (18); pain-4.0 (2.4), 2.4 (2.3), and 2.0 (1.9); global rating of change -4.7 (1.6), 5.6 (1.0), and 5.7 (1.2) ($P > .05$ for all outcomes). The authors concluded combined with an exercise-based rehabilitation program, a single injection of LR-PRP or LP-PRP was no more effective than saline for the improvement of patellar tendinopathy symptoms.

Systematic reviews and meta-analysis of RCT report conflicting outcomes when comparing PRP to other treatment modalities. Simental-Mendìa et al. (2020) conducted a systematic review and meta-analysis of five RCT (n=276) comparing PRP versus placebo (saline solution) for pain and joint function. Follow-up varied from two months to one year. Adverse events included post-injection pain. There was no significant change in pain or functional scores between PRP and placebo injections. Li et al. (2019) conducted a systematic review and meta-analysis of five RCT (n=515) comparing the effectiveness of PRP to corticosteroid injection. Follow up ranged from 4–24 weeks. The effectiveness of PRP and corticosteroid were comparable in the 4–8 week follow-up range. Although PRP showed more improvement in pain and function at 24 weeks, the studies were limited by small patient populations, short term follow up and lack of standard PRP treatment protocols.

In 2019, Li et. al. completed a systematic review and meta-analysis to compare the effectiveness of platelet-rich plasma (PRP) versus corticosteroids for the treatment of patients with lateral elbow epicondylitis. A literature search was performed in EMBASE, Medline, the Cochrane Library and PubMed. Randomized controlled studies comparing PRP with corticosteroids for the treatment of epicondylitis were included. The Cochrane Collaboration's tool for assessing the risk of bias was used to evaluate the methodological quality of the included trials. The Cochrane Collaboration's Review Manager Software was used to perform the meta-analyses. The overall effect size of each anesthetic was calculated as the weighted average of the inverse variance of the study-specific estimates. Seven randomized controlled trials were included in this review. The data from 2 studies were unavailable for meta-analysis, and the systematic review criteria were just achieved. Local corticosteroid injection yielded a significantly superior Disabilities of the Arm, Shoulder and Hand (DASH) score at 4 weeks (WMD, 11.90; 95% CI: 7.72 to 16.08; $P < .00001$; heterogeneity, $\chi = 0$, $I = 0\%$, $P = 1.00$) and 8 weeks (WMD, 6.29; 95% CI: 2.98 to 9.60; $P = .0002$, $\chi = 0$, $I = 0\%$, $P = 1.00$). Otherwise, it was noteworthy that a significantly lower VAS score (WMD, -2.61; 95% CI: -5.18 to -0.04; $P = .05$; heterogeneity, $\chi = 29.85$, $I = 97\%$, $P < .00001$) and DASH score (WMD, -7.73; 95% CI: - 9.99 to -5.46; $P < .00001$, $\chi = 0.20$, $I = 0\%$, $P = .66$) existed in the PRP regimen than in the steroid regimen at the 24-week follow-up. More effective treatments were achieved in the PRP-treated patients than in the patients treated with corticosteroids (WMD, 3.33; 95% CI: 1.81 to 6.14; $P = .000$; heterogeneity, $\chi = 0.43$, $I = 0\%$, $P = .51$). The authors concluded local corticosteroid injections demonstrated favorable outcomes compared with those of local PRP treatments for lateral elbow epicondylitis during the short-term follow-up period (4 weeks and 8 weeks post-treatment). Otherwise, at the long-term follow-up (24 weeks post-treatment), PRP injections had improved pain and function more effectively than corticosteroid injections.

Mi et al. (2017) conducted a systematic review and meta-analysis of eight randomized controlled trials (n=511) to compare the effectiveness of PRP (n=253) to steroid injections (n=258) in reducing pain and improving function of lateral epicondylitis. There was no significant difference in pain relief following PRP injection at 2–4 weeks (p=0.03), 6–8 weeks (p=0.24) and at 12 weeks (p=0.35). Steroid injections exhibited a significantly better improvement in function at 2–4 weeks (p<0.001) and at 6-8 weeks (p<001). PRP was significantly more effective for pain relief at 6 months (p<.001) and at 1 year follow-up (p<001) and function improvement at 12 weeks (p<0.001), 6 months (p<0.001) and 1 year (p<0.001). Three studies reported adverse events which included a higher rate of post-injection pain in the PRP groups. The steroid group had local skin atrophy and minor rash. Limitations of the studies included: small patient populations; heterogeneity of PRP concentrations and dosages; various types and dosages of steroids; heterogeneity of the outcome measures used for pain and function scores; and lack of detail of randomization and blinding of patient and doctors. Additional high-quality, well designed randomized controlled trails with large patient populations are needed to verify the results of this analysis.

Long-Bone Union or Nonunion

An et al. (2021) conducted a meta-analysis of randomized and nonrandomized controlled trials (RCT and NRCT) to assess the efficacy of platelet-rich plasma (PRP) combined with autologous bone grafting compared with autologous bone grafting alone for the treatment of long bone delayed union or non-union. Included were six RCTs and two NRCTs with 420 patients and were performed in China, Iran, Mexico, and Iraq. Mean age of patients varied between 26–38 years with 59%–85% being male. Follow-ups varied from 9–25 months. Patients who received combined treatment of PRP and autologous bone graft were not associated with higher rates of radiographic bone healing (p=0.09) or excellent/good post-treatment limb function (p=0.37). Combined treatment was associated with a shorter healing time (mean difference: -1.35 months; p<0.001). Adverse events were not reported. The author noted limitations included heterogeneity of PRP preparation methods and patient reported outcome measures, small patient populations and short term follow-up.

Lenza et al. (2013) conducted a systematic review to evaluate the effectiveness of PRP as an adjunctive therapy for the union of long bones. Two randomized controlled trials (RCT) (n=148) met inclusion criteria. Outcomes included bone regeneration, adverse events, pain, quality of life and cost. One RCT compared PRP to recombinant human morphogenic bone protein-7 for the treatment of pseudo arthrosis and the second RCT evaluated the effects of platelet-rich plasma, platelet-rich plasma plus bone marrow stromal cells, and no adjuvant treatment. Follow-ups occurred for up to 12 months. Overall, there was no significant difference with the use of PRP.

Osteoarthritis

Hip

Gazendam et al. (2020) conducted a systematic review of eleven randomized control trials (n=1353) to compare the effectiveness (pain reduction and function improvement) of Intra-articular (IA) injections of corticosteroids (CCS), hyaluronic acid (HA) and platelet-rich plasma (PRP) in the treatment of hip osteoarthritis (OA). Patient populations of the studies ranged from 42–305, were 54% female with a mean age of 64±9.5 years. No intervention demonstrated significant improvement compared to saline IA injection at 2–4 and six months for pain or functional outcomes. Pooled data demonstrated that all interventions including placebo (except HA + PRP and the control group) led to clinical improvement of pain and function scores. Twenty-four major adverse events were reported: discontinued due to adverse events (n=20), deep vein thrombosis (n=1), rapid progression of OA (n=1), post hip arthroplasty infection (n=1) and superficial hematoma (n=1). The author noted limitations included heterogeneity of patient reported outcome measures, small patient populations and short term follow-up. No IA

injections demonstrate a statistically significant difference at up to six months post-injection for patients with hip OA.

Hayes (2019) conducted a systematic review of intra-articular (IA) injections of platelet-rich plasma (PRP) for the treatment of hip osteoarthritis (OA). The review included four randomized control trials (RCT) (n=303 patients) comparing intra-articular PRP (IA-PRP) to baseline or to intra-articular hyaluronic acid (IA-HA). Primary outcomes measured were pain relief and functional improvement. Length of follow-up ranged from 16 weeks to 12 months. For pain relief, three studies reported IA-PRP improvement from baseline up to 12 months, but one study reported no difference at 16 weeks. Results were inconsistent when comparing IA-PRP to IA-HA. One study reported no difference, one study reported IA-PRP superior and one study reported IA-HA superior for pain relief. Functional improvement from baseline was reported in three of four studies in IA-PRP, with one study reporting no difference. Three studies found no difference between IA-PRP and IA-HA. Most common adverse event reported was pain that resolved within a few days to weeks. The author noted limitations included the low quality of evidence due to lack of placebo comparisons and methodological and clinical heterogeneity. Additional high-level, well designed human studies with large patient populations utilizing standardized protocols are needed to validate the efficacy and clinical utility of PRP in the management of hip osteoarthritis. Hayes updated the 2019 review on October 19, 2020 which identified four new abstracts including one randomized controlled trial and three systematic reviews and meta-analyses. However, the evidence remains unchanged.

Knee

An ECRI Clinical Evidence Assessment (2020) report on platelet-rich plasma therapy (PRP) for knee osteoarthritis (KOA) was published following systematic review and meta-analysis. The report concentrated on PRP's effectiveness and safety compared with those of hyaluronic acid (HA) and corticosteroids. Pain relief, knee function, and adverse events were assessed. Pain relief: meta-analysis of data from 30 RCTs reported that PRP yielded better pain score improvements than HA, corticosteroids, and placebo at 3, 6, and 12 months. Knee function: PRP had better Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores than HA, corticosteroids, and placebo at 3, 6, and 12 months. No serious AEs occurred. More complications with PRP alone than with PRP plus HA were reported as well as more local AEs with leukocyte rich PRP. The authors concluded that there was insufficient comparative data and evidence is inconclusive. Limitations included varied PRP preparation, injection methods, and number of injections. Time between injections varied (weekly to monthly). Analysis was limited to 3-, 6-, and 12-month outcomes; data were not available for longer follow-up. Other limitations within the evidence base included lack of blinding in some studies, need for long-term follow-up, primarily single-center focus, and no reporting on a treatment's ability to postpone knee replacement.

Systematic reviews and meta-analysis of randomized control trials (RCT) contain overlapping studies and report conflicting outcomes. Limitations of the studies include heterogeneity of grade of osteoarthritis (OA) and outcome measure tools/scales, small patient populations, short term follow up and lack of standard PRP treatment protocols. Dong et al. (2020) conducted a systematic review and meta-analysis of 24 RCT (21 knee OA, three hip OA) (n=2057) comparing PRP versus control (hyaluronic acid, saline, prolotherapy, acetaminophen) for pain and joint function. Follow ups varied from 12 weeks to 18 months. Outcome measures included: Western Ontario and McMaster (WOMAC), Knee Injury and Osteoarthritis Outcome Score (KOOS), Visual Analog Scale (VAS), Harris Hip Score (HHS), and International Knee Documentation Committee (IKDC). Although PRP showed significant improvement in the short term in total WOMAC scores (14 studies), WOMAC pain scores (14 studies), WOMAC stiffness scores (13 studies), WOMAC physical function scores (12 studies), VAS (12 studies), KOOS quality of life

(four studies), IKDC (four studies) and HHS (two studies), there was significant heterogeneity for each test and no benefits at long term follow up. There was no reported differences in the KOOS symptoms outcomes (four studies), KOOS pain (four studies), KOOS function (four studies), and KOOS sport (four studies). Limitations of the studies include: heterogeneity of the studies, outcome measures and PRP regimens; short term follow up, and small patient populations.

Chen et al. (2020) conducted a systematic review and meta-analysis of 14 RCT (n=1350) comparing PRP to hyaluronic acid for the treatment of knee osteoarthritis. Follow ups ranged from three to 60 months. Outcome measures varied from study to study and included visual analog scale (VAS) score, subjective International Knee Documentation Committee (IKDC) score, Western Ontario and McMaster Universities (WOMAC) score, Knee Injury and Osteoarthritis Outcome Score (KOOS), and adverse events. There were no statistically significant differences between the groups in short term outcomes for the VAS (three studies); short-term (three studies) and mid-term outcomes (one study) for subjective IKDC; mid-term WOMAC-Total score (two studies); short-term (three studies) and mid-term (four studies) for the WOMAC-pain; short-term (two studies) and mid-term (three studies) for the WOMAC-stiffness score; mid-term WOMAC-physical function score (three studies); short-term (three studies) and long-term (two studies) KOOS-symptoms score; short-term (three studies), mid-term (one study), and long-term (two studies) KOOS-pain score; short-term (three studies), mid-term (one study), and long term (two studies) KOOS-ADL score; short-term (three studies), mid-term (one study), and long-term (two studies) KOOS-sport score; short-term (three studies), mid-term (one study), and long-term (two studies) KOOSQoL. There was no statistical difference in adverse events between the groups. However, results were favorable for PRP in the mid-term (p=.02) and long-term (p=.0003) VAS score (four studies), long-term (p=.001) IKDC score (six studies), mid-term (p=.01) (four studies) and log-term (p=.001) IKDC score (six studies), mid-term (p=.01) (four studies) and log-term (p=<0.00001) WOMAC-pain score (six studies), long-term (p<0.00001) WOMAC-pain score (six studies), long-term (p<0.00001) WOMAC-stiffness score (five studies), short-term (p=.03) (two studies) and long-term (p=.001) (five studies) WOMAC-physical function, and mid-term (p=.02) KOOS-symptoms (one study). Limitations of the studies included small patient populations, short term follow ups, heterogeneity of the outcome indicators, and lack of standardization of preparation and injection of PRP.

Hohmann et al. (2020) conducted a systematic review and meta-analysis of 12 RCT (n=1248) comparing efficacy of intra-articular knee injections of PRP to hyaluronic acid. Follow ups ranged from 6–12 months. Outcomes were assessed using Western Ontario and McMaster Universities (WOMAC) score, International Knee Documentation Committee (IKDC) score, and visual analog scale (VAS) score and varied from study to study. There were no significant improvements in clinical outcomes at six (p=0.069) or 12 months (p=0.188) (eight studies). PRP showed significant improvement in pooled estimates of pain scores (eight studies) at six months (p=0.001) and 12 months (p=0.001). Limitations of the studies included heterogeneity of outcome measure tools, small patient populations, short term follow up and lack of standard PRP treatment protocols.

Delanois, et al. (2019) conducted a systematic review of studies investigating the management of knee osteoarthritis using platelet-rich plasma injections (PRPs), bone marrow-derived mesenchymal stem cells (BMSCs), adipose-derived mesenchymal stem cells (ADSCs), and amnion-derived mesenchymal stem cells (AMSCs). Eleven randomized control trials investigating PRP were included. The intervention consisted of intra-articular PRP injections ranging from one to three at varying intervals of time. Comparators were oral acetaminophen, oral hyaluronic acid (HA), intra-articular HA, intra-articular corticosteroid, or intra-articular saline. Follow-up ranged from 1–12 months. Studies reported conflicting results about the efficacy of PRP. Because of the poor quality and heterogeneity of the studies, no meta-analysis was able to be performed. The author noted limitations include the small patient populations

and short-term follow-ups. Additional high-level, well designed human studies with large patient populations utilizing standardized protocols are needed to validate the efficacy and clinical utility of PRP in the management of knee osteoarthritis.

Di et al. (2018) conducted a systematic review of seven randomized control trials (RCT) (n=908) comparing the effectiveness of platelet-rich plasma (PRP) to hyaluronic acid (HA) for the treatment of knee osteoarthritis (OA). RCTs were included if they identified knee OA and compared autologous PRP with HA via intra-articular injection. Excluded were studies with unknown data and methodology and those conducted on patients with knee OA with additional diagnosis of pain or swelling associated with knee joint disease, ligament or meniscus injury, arthritis, blood diseases, serious cardiovascular disease, or infection or those receiving immunosuppressive or anticoagulation therapy. Primary outcomes were efficacy and response to treatment as measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (n=4 studies), International Knee Documentation Committee (IKDC) (n=2 studies), Knee Injury and Osteoarthritis Outcome Score (KOOS) (n=3 studies), EuroQol visual analogue scale (EQ VAS) (n=4 studies), and Tegner score (n=1 study). Reported adverse events included mild pain and infiltration, swelling or effusion after injection. The author noted limitations included: risk of selection bias, small sample sizes and lack of placebo groups. Other limitations include the lack of standardized injection protocol and differences in PRP preparation and type (fresh, frozen, leukocyte poor or rich). Multicenter, randomized trials with large patient populations are needed to further assess the efficacy of PRP treatment for patients with knee OA.

Muchedzi and Roberts (2018) conducted a systematic review of the literature to evaluate the evidence of PRP in the treatment of knee osteoarthritis (OA) and following total knee arthroplasty (TKA). Seventeen studies (n=2328) were included: 11 compared intraoperative PRP gel injection vs. control groups (without intraoperative PRP injection) during TKA; and six compared intra-articular PRP injections vs. placebo/control groups in the nonsurgical management of knee OA. Inclusion criteria were randomized control trials (RCTs), pseudorandomized, comparative clinical trials and systematic reviews performed since 2006 using PRP in the management of knee OA and following TKA in patients of any age. Studies were excluded if they were cross sectional studies, case series, case reports, or included patients with previous knee surgery. The primary outcomes measured were patient reported including pain (visual analog scale [VAS]), quality of life scores, and knee function. Secondary outcomes were wound scores, length of hospital stay, and postoperative blood loss. Length of follow-up was classified as short term, medium term and long term. Regarding the effects of PRP on OA there were no statistically significant differences in pain (p=0.013), quality of life (p=0.06), and knee function (p=0.09). No clinical statistical benefits were seen with PRP on reducing blood loss during TKA (p=0.07) or in reducing hospital length of stay (p=0.31). Author-noted limitations included the heterogeneity of the studies (PRP preparation and characteristics, different outcome measures) and missing data elements. Additional high quality, well-designed randomized controlled trials with large patient populations are needed to verify the results of this analysis.

Dai et al. (2017) conducted a systematic review and meta-analysis of randomized controlled trials to evaluate the efficacy and safety of platelet-rich plasma (PRP) injections for the treatment of osteoarthritis of the knee. Ten randomized controlled trials (n=1069) met inclusion criteria. Eight studies compared PRP with hyaluronic acid (HA) and three studies compared PRP with saline. The primary outcome measures were pain and function scores reported by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Follow-ups ranged from 3–12 months. Outcomes at six months (three studies; n=339) showed that PRP compared with HA had similar effects on WOMAC pain scores and functional improvement. At the 12-month follow-up (three studies; n=302) PRP injections were associated with significantly better WOMAC pain scores (p=0.0001) and WOMAC functional scores

($p<0.00001$) compared to HA. PRP also showed better pain relief and functional improvement than saline in one study. There was no significant difference in adverse events of PRP vs. HA (four studies). Author-noted limitations of the studies included the heterogeneity of PRP preparation (e.g., single- vs double-spinning technique, speed, length of centrifugation, use of an activator or not), PRP and HA administration (frequency of injections, injection volume), and HA types. The studies included small, heterogeneous patient populations (age, sex, body mass index, activity level, OA grade) and there was a high risk of bias in eight studies. The short-term follow-ups and few numbers of studies included in the meta-analysis contributed to the low quality of the analysis.

Hayes originally completed a Health Technology Assessment regarding PRP for knee OA in 2017 concluded "one RCT reported significantly better outcomes after intra-articular injection of PRP (IA-PRP) than intra-articular injection of saline (IA-S); however, the results of a single study generally provide an insufficient quantity of evidence to support evidence-based conclusions. A systematic review and subsequently published research suggest IA-PRP may be associated with better pain and function outcomes than IA-HA at 1-year follow-up, but that outcomes may not be significantly different between IA-PRP and IA-HA at shorter durations of follow-up. Data on longer durations of follow-up have not yet been published. Two small RCTs report conflicting findings regarding the comparative efficacy of IA-PRP and IA-CS for patients with severe OA at up to 6 months; however, these 2 studies provide insufficient evidence to support a firm conclusion due to inconsistency." This tech assessment determined that further, more robust studies are needed with longer durations of follow-up, to demonstrate efficacy in the use of PRP injections for knee OA. Subsequent update in 2022 did not modify the previous findings.

In 2023 Hayes, subsequently, performed an evidence analysis research brief on PRP for knee OA (KOA) and found that based on a review of abstracts, there are 15 newly published studies (15 abstracts evaluating PRP for KOA, including 6 randomized controlled trials (RCTs) and 9 systematic reviews with meta-analyses) since the 2016 publication of Comparative Effectiveness Review of Platelet-Rich Plasma for Knee Osteoarthritis: A Review of Reviews that meet study selection criteria. In reviewing updated clinical guidelines and practice statements, the brief found that "all identified guidelines provide generally conflicting or inconsistent recommendations for use of PRP for the treatment of KOA. Three guidelines state that PRP may provide pain reduction and improved function in patients with KOA. Two guidelines strongly recommend against use of PRP for KOA because formulations have not been standardized, and 2 additional guidelines cite insufficient evidence to provide recommendation for or against its use."

The findings of the systematic review and subsequently published research suggest IA-PRP may be associated with better pain and function outcomes than IA-HA at 1-year follow-up, but that outcomes may not be significantly different between IA-PRP and IA-HA at shorter durations of follow-up. Data on longer durations of follow-up have not yet been published.

Two small RCTs report conflicting findings regarding the comparative efficacy of IA-PRP and IA-CS for patients with severe OA at up to 6 months; however, these 2 studies provide insufficient evidence to support a firm conclusion due to inconsistency.

Plantar Fasciitis

Hayes (2018, reviewed 2020) conducted a comparative effectiveness review on PRP for the treatment of Achilles tendon rupture (ATR) and plantar fasciitis. The review included 13 randomized controlled trials. Three studies for the treatment of ATR, two studies using PRP during ATR surgery, and eight studies for the treatment of plantar fasciitis. Comparators included: no PRP; conventional treatment; corticosteroids (CS); endoscopic plantar fasciotomy (EPF); extracorporeal shockwave therapy (ESWT); high-volume injection of saline between the tendon and the tendon sheath (HVI); low dose radiation

(LDR); saline; and stromal vascular fraction (SVF). Follow-ups ranged from 16 weeks to 42 months. The use of PRP during surgical treatment of ATR did not yield better functional outcomes compared to surgery without PRP. The evidence for use of PRP in ATR was limited and did not support PRP over saline. Regarding PRP for the treatment of plantar fasciitis (PF), three randomized controlled trials suggested that PRP was associated with better functional improvement and pain relief at 6–24 months compared with CS. However, differences between PRP and CS were not found in another study with shorter follow-ups. Data for PRP compared with other PF treatments (i.e., conventional treatment, ESWT, EPF, or LDR) were limited and reported no significant differences in functional or pain outcomes. No serious PRP adverse events were reported. Overall, the quality of the evidence was low due to the limited number of studies and lack of comparison to established treatment modalities. The review concluded there is insufficient evidence to establish patient selection criteria for the use of PRP in the treatment of conditions of the Achilles tendon and plantar fascia.

In 2024 Hayes performed a health technology assessment on PRP Injection for the treatment of plantar fasciitis (PF) and found that there is "An overall low-quality body of evidence from 7 randomized controlled trials suggests that a single PRP injection for PF is safe and improves patient-reported pain and foot/ankle function compared with both pretreatment levels and a single injection of corticosteroid. There is substantial uncertainty regarding the optimal PRP preparation protocol, injection and dosing parameters, long-term effectiveness, and effectiveness versus standard therapies other than corticosteroid injection." "After a review of full-text clinical practice guidelines and position statements, guidance appears to confer weak support for PRP injection to relieve pain and improve ankle/foot function in adults with PF." The report found that "two guidelines suggest some patient-oriented benefits of PRP injection for treatment of PF but do not recommend it as a preferable technology, while 1 guideline suggests that there is a lack of high-quality evidence to support its use. Another "guideline, based on expert opinion, is specific to ultrasound-guided PRP injection, whereas the studies evaluated in this report did not use ultrasound guidance." Therefore, "additional well-controlled and blinded studies are needed to address these uncertainties, as well as to determine which patients might benefit from this treatment."

Yang et al. (2017) conducted a systematic review and meta-analysis of nine randomized controlled trials (p=430) to evaluate the safety and efficacy of PRP as a treatment for plantar fasciitis compared to steroid treatments. Outcome measures included the visual analogue scale (VAS), the Foot and Ankle Disability Index (FADI), American Orthopedic Foot and Ankle Society (AOFAS) scale, and the Roles and Maudsley Score (RMS). Control subjects were treated with dexamethasone (one study), triamcinolone (two studies), methylprednisolone (five studies) and an unidentified steroid in one study. A combination of local anesthetics, such as prilocaine or lidocaine, was applied in six studies. Nine studies described the detailed process used to produce PRP. Follow-up times were divided into short periods (2–4 weeks), intermediate periods (4–24 weeks), and long periods (≥ 24 weeks through 48 weeks). No significant differences in the VAS scores were observed between the two groups in the short term (p=0.51) and intermediate term (p=0.30). PRP demonstrated significantly better long-term efficacy than steroid treatments (p=0.03). There were no significant differences in the FADI (p=0.28) (two studies; n=88), AOFAS Scale (p=0.79) (three studies; n=138), and RMS (p=0.56) (two studies; n=138) between the groups at 12 weeks. Author-noted limitations included the small patient populations, heterogeneity of the studies, subjective outcomes (VAS, FADI, AOFAS, RMS), and short-term follow-ups. Another limitation was the heterogeneity of the steroid treatments used. Additional well-designed, long-term randomized controlled trials are needed to establish the role of PRP for the treatment of plantar fasciitis.

Rotator Cuff Repair

Chen et al. (2020) conducted a systematic review and meta-analysis of 18 randomized control trials (RCT) (n=1116) evaluating the effectiveness of PRP (n=545) versus no PRP for rotator cuff tears. Patient populations ranged from 35–120 and follow up ranged from six months to two years. The following outcome measures were used: Constant-Murley (Constant) score (10 studies), University of California, Los Angeles (UCLA) score (6 studies), visual analog scale (VAS) for pain, (10 studies), re-tear rate (11 studies), American Shoulder and Elbow Surgeons (ASES) score (4 studies), and Simple Shoulder Test (SST) (4 studies). PRP significantly improved Constant scores (short and long term and overall [p<0.01]), VAS scores (short term [p<0.01] and overall [p<0.02]) and SST scores (long term [p<=0.01]). No significant differences were reported in ASES score between PRP and no PRP. PRP patients reported higher UCLA scores at short- and long-term follow-ups and overall (p<0.01]). The odds of a re-tear (long term and overall [p<0.01]) were reported as being reduced in the PRP treated group. Functional outcomes did not meet the minimal clinically important difference (MCID) (10% difference threshold). Study limitations include small patient populations, heterogeneity between the types of PRP treatments (activating agents, preparation kits) and volumes that were administered. Other limitations include variability in degree of injury, which rotator cuff tendons were treated, and injection technique. The authors state that even though the findings were statistically significant, PRP may not provide clinically meaningful improvements in pain or function.

An ECRI Health Technology Assessment (2020) on platelet-rich plasma to aid healing after rotator cuff surgery included 1 systematic review (n = 781) and 2 randomized controlled trials (RCTs) (n = 87) to compare rotator cuff surgery with PRP and rotator cuff surgery without PRP. Pain and function were assessed. No studies reported on adverse events, re-treatment rates, or symptom resolution. A single study addressing PRP use after rotator cuff surgery does not support its use. Findings revealed surgery with PRP reduced incomplete tendon healing (measured via imaging) compared with no PRP One RCT reported that patients treated with or without PRP did not differ in shoulder functional status. One RCT reported that Constant scores and pain (VAS) did not differ statistically between surgery with delayed PRP treatment (10- to 14-days post-surgery) and surgery without PRP. The authors concluded that rotator cuff surgery plus PRP yielded small incremental benefits in shoulder function and pain compared with surgery without PRP but are too small to be clinically significant. Limitations include small sample size and moderate risk of bias due to single-center focus.

A 2018 Hayes comparative effectiveness review on PRP for treatment rotator cuff (RC) repairs, tendinopathies, and related conditions identified 1 good-quality systematic review/meta-analysis with findings from 15 RCTs, along with 6 additional primary RCTs, assessing the use of PRP in arthroscopic RC repair. Two RCTs were identified that examined PRP injections for treatment of partial RC tears or RC tendinopathy, and 2 RCTs were identified that examined PRP use with arthroscopic acromioplasty (AA) or needling for calcific tendinitis. Compared with no PRP, the use of PRP in arthroscopic RC repair may provide short-term benefits for functional improvement and pain reduction, but data were conflicting for this finding and benefits did not persist long term. Taken together, these findings provide some preliminary evidence that PRP may accelerate recovery from arthroscopic RC repair in the short term, but PRP treatment does not change long-term functional or pain outcomes. Limited evidence finds no difference in functional improvement with PRP injections for non-arthroscopic treatment of partial RC tears or tendinopathy, but findings were inconsistent with regard to pain. Finally, limited evidence suggests no difference in functional improvement after AA or needling for RC tendinopathy, along with no difference in pain relief after AA. The overall quality rating of this body of evidence is considered low to very low. (Authors Ebert et al. (2017), Pandey et al. (2016), Flury et al. (2016), Verhaegen et al (2016), Carr et al. (2015) which were previously cited in this policy, are included in this review). A 2020 annual review identified two key RCTs. The evidence remains unchanged.

Cai et al. (2016) conducted a systematic review and meta-analysis evaluating arthroscopic repair of full thickness rotator cuff tears with (n=150) and without PRP (n=153). Five randomized controlled trials with 12- month follow-ups met inclusion criteria and were used for meta-analysis. There were no statistically significant differences between the groups for overall outcome scores ($p>0.05$) or use in patients with full-thickness rotator cuff repairs. The PRP-treated group did exhibit better postoperative healing rates than the no-PRP group ($p=0.03$) in small to moderate full-thickness tears but there were no differences in the clinical outcomes. Limitations of the studies include small patient populations; risk of reporting bias; and high level of heterogeneity of surgical techniques, tear size and PRP products and volume used.

Zhao et al. (2015) conducted a systematic review to evaluate the re-tear rate and clinical outcomes of PRP used during arthroscopic full-thickness rotator cuff repair. Eight randomized controlled trials met inclusion criteria and overall, the methodological quality was rated as high. Patient populations ranged from 28–88 and follow-ups ranged from 1–2 years. Significant differences were not seen in the re-tear rates, Constant scores and the University of California at Los Angeles (UCLA) scores. The meta-analysis did not support the use of PRP in arthroscopic repair of these tears. PRP did not increase the tendon healing rate or improve the UCLA and Constant shoulder scores.

Soft Tissue/Tendon Disorders

An ECRI Clinical Evidence Assessment (2021) on platelet-rich plasma (PRP) for patellar tendinopathy assessed 1 systematic review with randomized controlled trials (RCTs) and 2 RCTs not included in the systematic review. PRP safety and effectiveness was compared with alternative therapies. Primary outcomes were Pain, function, and adverse events. The authors reported no significant differences in PRP-treated patients compared with saline-treated patients after 1 year and with dry needling patients after 6 months. PRP-treated patients had greater pain relief than those undergoing extracorporeal shockwave therapy at 1 year and high-volume-image-guided saline injections at 6 months. A meta-analysis of all 4 RCTs found no significant differences for pain. PRP with autologous expanded bone marrow mesenchymal stem cells revealed pain improved in both groups after 6 months, with no differences between groups. The authors reported no significant differences in function, measured using Victorian Institute of Sports Assessment-Patella (VISA-P) scores in PRP-treated patients compared with saline-treated patients after 1 year and with dry needling patients after 6 months. Two other RCTs reported PRP-treated patients had greater function improvement compared with patients undergoing extracorporeal shockwave therapy at 1 year and high-volume-image-guided saline injections at 6 months. A meta-analysis of all 4 RCTs found no significant differences in VISA-P. No adverse events were reported. The authors concluded that PRP injections may improve pain and function in individuals with patellar tendinopathy based on inconclusive evidence. Limitations include small study size, short follow-up period and potential bias risks. Larger RCTs with longer follow-up comparing PRP with other treatments treating patellar tendinopathy and reporting patient-oriented outcomes are needed.

Liu et al. (2019) conducted a meta-analysis of five randomized control trials (n=189) that compared the efficacy of PRP to placebo injections in conjunction with eccentric training as treatment for Achilles tendinopathy (AT). Outcome measurements included the Victorian Institute of Sports Assessment-Achilles (VISA-A), visual analog scale (VAS) or Achilles tendon thickness. No VISA-A differences were observed in the PRP and placebo groups after 12 weeks, 24 weeks, and one year. The VAS scores of the PRP and control groups at six and 24 weeks after treatment were not significantly different. The author noted limitations were the high level of heterogeneity, differing scoring standards and methods, different types of PRP used and limited patient information such as age and disease severity.

Filardo et al. (2018) conducted a systematic review of the literature on the effectiveness of PRP for the following tendon disorders: Achilles tendon (n=24 studies), patellar tendon (n=19 studies), rotator cuff

tendons (n=32 studies), and lateral elbow tendons (n=29 studies). Randomized control trials, prospective comparative trials, retrospective comparative trials, retrospective cohort studies, cohort studies, case series and comparative studies were included. Patellar tendons and lateral elbow tendinopathy "seemed" to show benefit. However, the studies reported heterogeneous findings as well as difficulties in determining indications, results and limitations of PRP treatment. Achilles tendon and rotator cuff pathology showed no beneficial effects. Due to the low quality of the studies, no conclusions could be drawn about the effectiveness of PRP for these conditions. Additional limitations of the studies include poor study designs (lack of control group) and small patient populations.

Franchini et al. (2018) conducted a systematic review and meta-analysis of 36 randomized control trials (n=2073) to evaluate the benefit of platelet-rich plasma (PRP) in non-surgical orthopedic procedures. Disorders included: lateral epicondylitis (n=11 studies), Achilles tendinopathy (n=4 studies), plantar fasciitis (n=14 studies), patellar tendinopathy (n=2 studies), and rotator cuff tendinopathy (n=3 studies). Studies investigating PRP use in surgical orthopedic procedures, platelet-poor plasma and autologous conditioned plasma were excluded. The comparators were local steroid injection (n=19 studies), saline injection (n=6 studies), autologous whole blood (n=4 studies), local anesthetic injection (n=3 studies), dry needling injection (n=3 studies), and other comparators (n=4 studies). Primary outcomes included pain as measured by standard validated pain scale (Visual Analogue Score [VAS]) and functional measurement by any standard validated scale (American Orthopedic Foot and Ankle Society Score [AOFAS] and Disabilities of the Arm, Shoulder and Hand [DASH]). Secondary outcomes included tendon thickness in millimeters (mm) evaluated by ultrasounds. Follow-ups ranged from three weeks to 24 months, however analysis was reported into two-time periods: short-term (within three months from the intervention) and medium-term (from four to six months). Due to the few number of studies reporting on results beyond six months a long term period (12 months) was not evaluated. No significant differences in the VAS scores were observed between the short-term or medium-term groups in elbow tendinopathy, plantar fasciitis or other conditions. Short-term adverse events included post-injection pain, local pain and initial worsening of pain. No adverse events were reported to have occurred in 22 studies. The author noted limitations include heterogeneity of the studies, short term follow-ups, and the lack of standardization for PRP production. The meta-analysis did not support the use of PRP as a conservative treatment in these orthopedic disorders.

In 2024 Hayes performed an evolving evidence review on PRP in the surgical repair of Achilles tendon rupture (ATR). It is thought that administering PRP during and several weeks after surgical treatment will accelerate healing by enhancing tissue repair, potentially shortening recovery time. However, there has not been a standardized PRP treatment protocol universally established, thus, the studies included in this review varied substantially in preparation and delivery of PRP, time since injury, and outcome measures used. Three systematic reviews with meta-analyses were identified and rated fair to poor quality that evaluated the efficacy and/or safety of using PRP in the surgical repair of ATR. Four clinical studies met inclusion criteria ranging from fair to very poor quality. No professional society position statements or clinical practice guidelines addressing the use of PRP in surgical repair of ATR were identified. Despite the heterogeneity of the studies, the review found no clear benefits or advantages with the addition of PRP to surgery in function, pain, or quality of life compared with surgery alone. Also, the lack of benefit is coupled with the potential for additional adverse events caused by the PRP procedure.

In 2016, the Washington State Health Care Authority (WSHCA) conducted a technology assessment to evaluate the safety and efficacy of PRP and/or ABI for the treatment of various musculoskeletal and orthopedic conditions. As part of the technology assessment, a total of 54 RCTs and 8 cohort studies were included and reviewed. Limitations of the studies noted by the Committee generally included small

sample populations, short-term follow-up, inconsistency of measured outcomes, potential for risk bias, and lack of high-quality evidence. The authors concluded there was insufficient evidence to draw strong conclusions regarding safety and efficacy. Moreover, the Committee reported despite its current use, standardization of PRP preparation is lacking, and although the technology to obtain PRP is FDA-approved, PRP is currently not indicated for direct injection.

Total Knee Arthroplasty

Trams et. al., (2020) performed a systematic review and meta-analysis that included 6 RCTs (N=621) evaluating the effects of intraoperative platelet-rich plasma as an adjunct to total knee arthroplasty. Two studies were deemed at high risk of bias. The primary aim of the studies was to assess blood loss during the procedure. While there were significant differences in favor of platelet-rich plasma in the overall effect on blood parameters in comparison to the control groups (standard me an difference, -0.29; 95% CI, -0.46 to - 0.11), no significant differences in range of motion, functional outcomes, or long-term pain were observed.

A randomized, double-blind, triple-parallel, placebo-controlled trial by Lin and colleagues (2019) prospectively compared the efficacy of intra-articular (IA) injections of PRP and hyaluronic acid (HA) with a sham control group (normal saline solution [NS]) for KOA. A total of 87 osteoarthritic knees (53 patients) were assigned to 1 of 3 groups receiving 3 weekly injections of either LP-PRP (31 knees), HA (29 knees), or NS (27 knees). The WOMAC Index score and International Knee Documentation Committee (IKDC) subjective score were collected at baseline and at 1, 2, 6, and 12 months after treatment. All 3 groups showed statistically significant improvements in both outcome measures at 1 month; however, only the PRP group sustained the significant improvement in both the WOMAC and IKDC scores at 12 months, showing improvement of 21% and 40%, respectively. There was no significant difference in both functional outcomes between the HA and NS groups at any time point. Only the PRP group reached the minimal clinically important difference in the WOMAC score at every evaluation. Study limitations included small sample size and that the trial did not include imaging studies for the evaluation of joint cartilage post-injection. The authors concluded that IA injections of LP PRP can provide clinically significant functional improvement for at least 1 year in patients with mi ld to moderate KOA. Future long-term studies of larger sample sizes encompassing all stages of degeneration with the inclusion of imaging evaluation and biomarker analysis of the knee joints are warranted to further elucidate these findings. These findings need to be reproduced in additional large high-quality studies to assess the implications for clinical care.

In conclusion, while some available studies are promising, the majority of evidence on platelet-derived blood or plasma therapies compared to other standard treatment is highly variable with regard to efficacy or improved health outcomes for a wide range of conditions. Higher quality studies with longer follow up as well as standardization of best practices are needed to determine the benefit of th is technology.

Applicable Coding

CPT Codes

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

HCPCS Codes

P9020	Platelet rich plasma, each unit

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