



# Biologic Treatments for Hip Disorders: A Focus On Platelet-Rich Plasma

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The purpose of this systematic article was to assess the role of platelet-rich plasma (PRP) in the treatment of various hip conditions (eg, avascular necrosis, osteoarthritis, femoroacetabular impingement, and labral tears). The Medline, Embase, and PubMed databases were searched on August 5, 2015 for English language studies that addressed PRP use in any hip condition. The studies were systematically screened by 2 reviewers and data abstracted in duplicate. There were 11 eligible studies (5 randomized controlled trials, 1 prospective comparative study, 2 case series, and 3 case reports) reporting on 765 patients. The mean follow-up was 17.9 months (range: 1-48 months). All randomized controlled trials and the prospective comparative study data demonstrated no benefit to PRP use in reviewed hip conditions. All case series' and case reports demonstrated favorable outcomes with PRP use. There was a low complication rate, with 12 reported complications in the 765 (1.6%) patients. Although the use of PRP appears to be safe, there does not appear to be any significant benefit for its use in this patient population.

Oper Tech Orthop 26:82-88 © 2016 Elsevier Inc. All rights reserved.

**KEYWORDS** platelet-rich plasma, hip conditions, femoroacetabular impingement, labral tear, osteoarthritis, avascular necrosis, fracture, osteochondral defect, athletic pubalgia

## Introduction

Hip pain is a common source of dysfunction and there is vast contributing differential diagnosis, with both intra-articular and extra-articular causes. Over the past decade, our understanding of hip pathology has expanded. An example of this is with femoroacetabular impingement (FAI) as described by Ganz et al.<sup>1</sup> This interest in FAI is reflected in the literature. Between 2005 and 2010, the number of publications related to FAI has dramatically increased.<sup>2,3</sup> The understanding of hip pain and the ability to treat these conditions has led to an increase in the use of hip arthroscopy as a treatment modality. A recent article of the American Board of Orthopaedic Surgeons database showed an 18-fold increase in the number of hip arthroscopies performed between 1999 and 2009.<sup>4</sup>

Few diagnoses responsible for hip pain require immediate surgical management. When treating causes of hip pain, nonoperative management should be maximized before offering surgical intervention. Similarly, some patients are not ideal candidates for operative care. Nonoperative care includes nonpharmacologic (ie, activity modification, weight loss, and physiotherapy) and pharmacologic (ie, analgesics, steroids, and nonsteroidal anti-inflammatory drugs) therapies administered topically, orally, or intra-articularly.

Platelet-rich plasma (PRP) is a concentrated autologous platelet product with numerous bioactive molecules and growth factors, although mechanisms of action are not yet completely understood.<sup>5-7</sup> PRP has recently gained significant attention in orthopaedics and sports medicine as a modality to potentially improve the healing environment.<sup>8,9</sup> Growth factors found in PRP are required for tissue healing and repair.<sup>10</sup> The potential ability and relative safety of PRP to improve clinical outcomes has led to its use in multiple conditions. The increasing indications for use of PRP is demonstrated by literature studying its use in the orthopaedic treatment of multiple scenarios including rotator cuff repair, Achilles tendon repair, anterior cruciate ligament

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reconstruction, osteoarthritis (OA) of the knee, and in lateral epicondylitis.<sup>11-17</sup>

This systematic article presents a summary of the literature pertaining to the use of PRP in treating multiple hip conditions (eg, avascular necrosis, OA, FAI, and labral tears). A description of the indications and results of use currently described in the literature are analyzed and critically discussed. We hypothesized that use of PRP in a variety of hip conditions would provide some clinical benefit to affected patients.

## Methods

### Search Strategy

The online databases Medline, PubMed, and EMBASE were searched for literature addressing the use of PRP for the management of intra-articular and extra-articular conditions of the hip. The search terms were designed to be inclusive of all related subject matter, and included “platelet-rich plasma,” “PRP,” “platelet concentrate,” “platelet leukocyte gel,” “hip joint,” and “hip” (Appendix Table 1) and included results from database inception until August 5, 2015.

### Study Screening

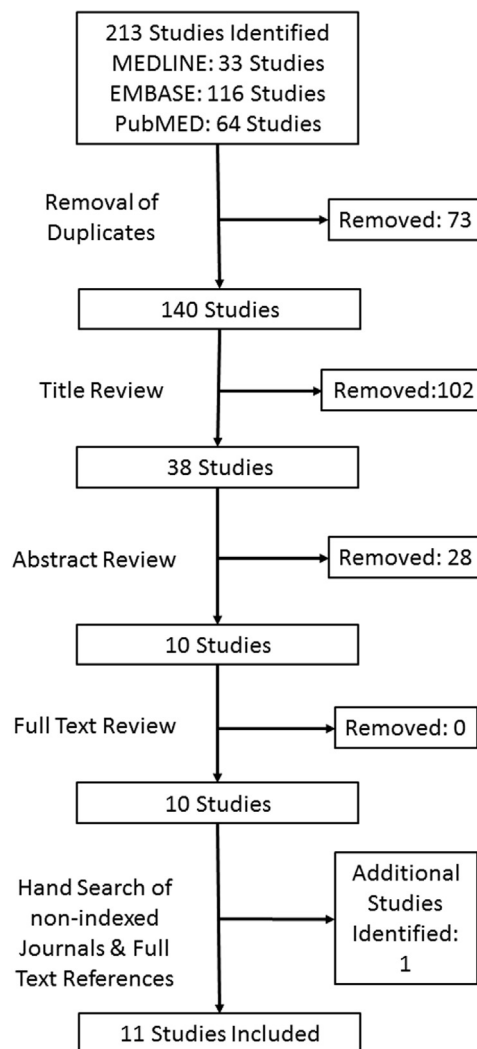
The titles, abstracts, and full-text articles were independently screened by 2 reviewers (D.D. and J.K.). Any disagreements were discussed between reviewers until consensus was reached and a senior author was included for consultation when necessary. The Journal of Hip Preservation Surgery that does not always have articles immediately indexed on search databases was independently searched for additional studies. The references of the eligible, included studies were then screened to capture any additional articles that may have eluded the initial search strategy. The search strategy is outlined in the Figure.

### Assessment of Study Eligibility

Inclusion and exclusion criteria were determined a priori. The inclusion criteria included studies that used isolated PRP, English language studies, human studies, and studies involving any hip condition. Studies of all levels of evidence that reported any patient outcomes were included. The exclusion criteria included animal studies, conference articles, book chapters, review articles, and technical reports.

### Data Abstraction

Totally, 2 reviewers collected data in duplicate and recorded them in a Microsoft Excel 2007 spreadsheet (Microsoft, Redmond, WA). Data regarding study year of publication, author, location of study, and study design were recorded. Demographic data, including age and sex of included patients, the specific hip condition studied, and relevant patient outcomes following PRP therapy were recorded from each study. Patient outcomes that were investigated include pain assessment using the visual analog scale, disease-specific health status scores using the modified Harris Hip Score, Hip



**Figure 1** A systematic review of literature on platelet-rich plasma for hip conditions.

Outcome Score-Activities of Daily Living, Hip Outcome Score-Sport-Specific Subscale, and the Western Ontario and McMaster Universities Arthritis Index, and the requirement for revision surgery. Any complication reported following the use of PRP therapy was recorded as well. The grading of recommendations, assessment, development, and evaluation (GRADE) approach was used to assess the quality and the risk of bias for the studies of randomized control trial (RCT) design included in this article.<sup>18</sup>

### Assessment of Agreement

To assess the inter-reviewer agreement, the kappa ( $\kappa$ ) statistic with accompanying 95% confidence interval (CI) was calculated for the title, abstract, and full-text screening stages. Agreement was categorized a priori as follows:  $\kappa$  of 0.81 or greater was considered excellent agreement;  $\kappa$  of 0.61-0.80, good agreement;  $\kappa$  of 0.41-0.60, moderate agreement;  $\kappa$  of 0.21-0.40, weak agreement; and  $\kappa$  of 0.20 or less, poor agreement.

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