



Regenerative Health Solutions

# Incorporating Platelet-Rich Plasma (PRP) Into Your Medical Practice

## A Guide for Healthcare Professionals

### Regenerative Health Solutions

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# Editorial Commentary: Platelet-Rich Plasma: The Devil Is in the Details, and the Details Need to Be Better Reported

Robert F. LaPrade, M.D., Ph.D., Nathan R. Graden, B.S., and David H. Kahat, B.S.

## Arthroscopy

The Journal of Arthroscopic and Related Surgery, Vol 35, No 11 (November), 2019: pp 3114-3116

The use of biologics may be the next big revolution in sports medicine since the use of the arthroscope. However, we are currently in the infancy of both the understanding of biologics in sports medicine and in the methods we are employing to evaluate their efficacy. As surgeons undertake further studies to elucidate the efficacy of platelet-rich plasma in the treatment of a variety of sports medicine pathologies, adherence to minimum guidelines such as the minimum information for studies evaluating biologics in orthopedics will help to clarify the true benefits of platelet-rich plasma and allow colleagues to reproduce these therapies in their respective practices.

# Can Platelet-rich Plasma Injection Help Avoid Replacement Surgery in Osteoarthritis of the Knee?

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Journal on Recent Advances in Pain, Volume 5 Issue 1 (January–April 2019)

## Introduction

Osteoarthritis (OA) of the knee is a chronic degenerative condition where pain is the predominant symptom. The most important reason for replacement surgery in advanced OA of the knee is pain. But pain may persist even after total knee arthroplasty in about 20% situation. Clinicians are searching an easier alternative to knee arthroplasty.

## Materials and methods

Platelet-rich plasma (PRP) is a new modality of treatment which helps in regeneration and relieves pain. It has been used successfully in injured and degenerated tissues. It has been used successfully in knee OA too. Most studies indicate it as an excellent modality and superior to hyaluronic acid (HA) injection in the knee. Some studies indicate that the combination of PRP and HA is even better than PRP alone.

## Discussion

Inspired by recent studies on PRP, question is raised on whether PRP injection can help avoid replacement surgery? But unless more studies with PRP are conducted on advanced OA, we cannot comment on this based on the available literature.

## Keywords

Osteoarthritis of the knee, Platelet-rich plasma, Total replacement of the knee.

# The Efficacy of Platelet-Rich Plasma and Platelet-Rich Fibrin in Arthroscopic Rotator Cuff Repair: A Meta-analysis of Randomized Controlled Trials

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The American Journal of Sports Medicine, First Published February 21, 2018

## Background

Basic science studies suggest that platelet-rich therapies have a positive effect on tendon repair. However, the clinical evidence is conflicted on whether this translates to increased tendon healing and improved functional outcomes.

## Purpose

To perform a systematic review of randomized controlled trials (RCTs) in the literature to ascertain whether platelet-rich plasma (PRP) or platelet-rich fibrin (PRF) improved patient outcomes in arthroscopic rotator cuff repair.

## Study Design

Meta-analysis.

## Methods

Two independent reviewers performed the literature search based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, with a third author resolving any discrepancies. RCTs comparing PRP or PRF to a control in rotator cuff repair were included. Quality of evidence was assessed using the Jadad score. Clinical outcomes were compared using the risk ratio for dichotomous variables and the mean difference for continuous variables. A P value <.05 was deemed statistically significant.

## Results

Eighteen RCTs with 1147 patients were included in this review. PRP resulted in significantly decreased rates of incomplete tendon healing for all tears combined (17.2% vs 30.5%, respectively;  $P < .05$ ), incomplete tendon healing in small-medium tears (22.4% vs 38.3%, respectively;  $P < .05$ ), and incomplete tendon healing in medium-large tears (12.3% vs 30.5%, respectively;  $P < .05$ ) compared to the control. There was a significant result in favor of PRP for the Constant score (85.6 vs 83.1, respectively;  $P < .05$ ) and the visual analog scale score for pain at 30 days postoperatively (2.9 vs 4.3, respectively;  $P < .05$ ) and at final follow-up (1.2 vs 1.4, respectively;  $P < .05$ ) compared to the control. PRF did not result in a significantly decreased rate of incomplete tendon healing for all tears combined (23.0% vs 24.6%, respectively;  $P = .74$ ) or an improved Constant score (80.8 vs 79.8, respectively;  $P = .27$ ) compared to the control. PRF resulted in a significantly longer operation time (99.1 vs 83.3 minutes, respectively;  $P < .05$ ) compared to the control.

## Conclusion

The current evidence indicates that the use of PRP in rotator cuff repair results in improved healing rates, pain levels, and functional outcomes. In contrast, PRF has been shown to have no benefit in improving tendon healing rates or functional outcomes.

# Platelet-rich Plasma (PRP) for Endometrial Regeneration and Repair (PRP-E)

Patients with intrauterine adhesions (Asherman's Syndrome) and persistent thin endometrial lining in in vitro fertilization (IVF) treatment programs, particularly those resistant to standard therapies, present a significant clinical challenge. The aim of this trial is to assess if intrauterine administration of platelet rich plasma (PRP) improves endometrial lining thickness in patients with thin lining or Asherman's Syndrome.

This study is currently recruiting participants.

<https://clinicaltrials.gov/ct2/show/NCT02825849>

Enrolling 50 patients in a study.

<http://cagivf.com/>

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in collaboration with this company <https://inoviumrejuvenation.com/about-us>

This Physician is working with PRP and infertility.

## **Randy Morris M.D. IVF1 Fertility Clinic**

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# Autologous platelet-rich plasma promotes endometrial growth and improves pregnancy outcome during in vitro fertilization

## Abstract

**Introduction:** This study was to evaluate the effectiveness of PRP in the therapy of infertile women with thin endometrium ( $\leq 7$  mm). **Material and methods:** Five women undergoing in vitro fertilization (IVF) with poor endometrial response still had thin endometrium ( $< 7$  mm) after standard hormone replacement therapy (HRT) and had to cancel embryo transfer cycle. In addition to HRT, intrauterine infusion of PRP was performed. PRP was prepared from autologous blood by centrifugation, and 0.5-1 ml of PRP was infused into the uterine cavity on the 10th day of HRT cycle. If endometrial thickness failed to increase 72 h later, PRP infusion was done 1-2 times in each cycle. Embryos were transferred when the endometrium thickness reached  $> 7$  mm. **Results:** Successful endometrial expansion and pregnancy were observed in all the patients after PRP infusion. Intrauterine PRP infusion represent a new method for the thin endometrium with poor response. **Conclusion:** This article reported that platelet-rich plasma (PRP) was able to promote the endometrial growth and improve pregnancy outcome of patients with thin endometrium.

# Treatment of thin endometrium with autologous platelet-rich plasma: a pilot study.

## Abstract

Endometrium is one of the main factors in pregnancy. During assisted reproductive technology (ART) treatments, some cycles are cancelled due to inadequate endometrial growth. This study was conducted to evaluate the effectiveness of platelet-rich plasma (PRP) in the treatment of thin endometrium. Ten patients with history of inadequate endometrial growth in frozen-thawed embryo transfer (FET) cycles were recruited into the study. Intrauterine infusion of PRP was performed. Endometrial thickness was assessed. Chemical and clinical pregnancies were reported. In all patients, endometrial thickness increased after PRP and embryo transfer was done in all of them. Five patients were pregnant. According to this study, it seems that PRP was effective for endometrial growth in patient with thin endometrium.

# Effects of autologous platelet-rich plasma on implantation and pregnancy in repeated implantation failure: A pilot study

## Abstract

### Background:

Repeated implantation failure (RIF) is a major challenge in reproductive medicine and despite several methods that have been described for management, there is little consensus on the most effective one.

### Objective:

This study was conducted to evaluate the effectiveness of platelet-rich plasma in improvement of pregnancy rate in RIF patients.

### Materials and Methods:

Twenty women with a history of RIF who were candidates for frozen-thawed embryo transfer were recruited in this study. Intrauterine infusion of 0.5 ml of platelet-rich plasma that contained platelet 4-5 times more than peripheral blood sample was performed 48 hrs before blastocyst transfer.

### Results:

Eighteen participants were pregnant with one early miscarriage and one molar pregnancy. Sixteen clinical pregnancies were recorded and their pregnancies are ongoing.

### Conclusion:

According to this study, it seems that platelet-rich plasma is effective in improvement of pregnancy outcome in RIF patients.

# First data on in vitro fertilization and blastocyst formation after intraovarian injection of calcium gluconate-activated autologous platelet rich plasma

## Abstract

Platelets modulate clinically relevant yet incompletely understood tissue regeneration processes, and platelet rich plasma (PRP) has been previously used with some success in various non-reproductive medical contexts. Here, we extended PRP application to ovarian tissue with a view to document impact on ovarian reserve among women attending for infertility treatment. PRP was freshly isolated from patients (n= 4) with diminished ovarian reserve as determined by at least one prior IVF cycle canceled for poor follicular recruitment response or estimated by serum AMH and/or FSH, no menses for  $\geq 1$  year. Immediately following substrate isolation and activation with calcium gluconate, approximately 5 mL of autologous PRP was injected into each ovary under direct transvaginal sonogram guidance. For each study subject, AMH, FSH, and serum estradiol data were recorded at two-week intervals post-PRP and compared to baseline (pre-PRP) values. In this pilot group, mean ( $\pm$ SD) patient age was  $42 \pm 4$  years with infertility duration reported as  $60 \pm 25$  months. Following this protocol of intraovarian PRP administration, increases in serum AMH ( $p = .17$ ), decreases in FSH ( $p < .01$ ), or both, were observed in all cases, sufficient to permit retrieval of  $5.3 \pm 1.3$  MII oocytes. IVF occurred  $78 \pm 22$  (range = 59–110) days after activated PRP injection, and results appeared independent of patient age, infertility duration, baseline platelet concentration or pretreatment antral follicle count. Each patient had at least one blastocyst suitable for cryopreservation. While autologous PRP has been successfully applied therapeutically to various tissues to accelerate healing and wound repair, this is the first description of direct injection of activated PRP into the human ovary of poor prognosis IVF patients. Evidence of improved ovarian function was noted in all who received intraovarian PRP, possibly as early as two months after treatment. Additional research is needed to clarify (and enhance) which PRP components are responsible for altered ovarian function, and to identify predictive characteristics for patients most likely to benefit from this intervention.

# In vitro evidence that platelet-rich plasma stimulates cellular processes involved in endometrial regeneration

## Abstract

### Purpose

The study aims to test the hypothesis that platelet-rich plasma (PRP) stimulates cellular processes involved in endometrial regeneration relevant to clinical management of poor endometrial growth or intrauterine scarring.

### Methods

Human endometrial stromal fibroblasts (eSF), endometrial mesenchymal stem cells (eMSC), bone marrow-derived mesenchymal stem cells (BM-MSC), and Ishikawa endometrial adenocarcinoma cells (IC) were cultured with/without 5% activated (a) PRP, non-activated (na) PRP, aPPP (platelet-poor-plasma), and naPPP. Treatment effects were evaluated with cell proliferation (WST-1), wound healing, and chemotaxis Transwell migration assays. Mesenchymal-to-epithelial transition (MET) was evaluated by cytokeratin and vimentin expression. Differential gene expression of various markers was analyzed by multiplex Q-PCR.

### Results

Activated PRP enhanced migration of all cell types, compared to naPRP, aPPP, naPPP, and vehicle controls, in a time-dependent manner ( $p < 0.05$ ). The WST-1 assay showed increased stromal and mesenchymal cell proliferation by aPRP vs. naPRP, aPPP, and naPPP ( $p < 0.05$ ), while IC proliferation was enhanced by aPRP and aPPP ( $p < 0.05$ ). There was no evidence of MET. Expressions of MMP1, MMP3, MMP7, and MMP26 were increased by aPRP ( $p < 0.05$ ) in eMSC and eSF. Transcripts for inflammation markers/chemokines were upregulated by aPRP vs. aPPP ( $p < 0.05$ ) in eMSC and eSF. No difference in estrogen or progesterone receptor mRNAs was observed.

### Conclusions

This is the first study evaluating the effect of PRP on different human endometrial cells involved in tissue regeneration. These data provide an initial ex vivo proof of principle for autologous PRP to promote endometrial regeneration in clinical situations with compromised endometrial growth and scarring.

This fertility clinic is offering PRP ovarian rejuvenation therapy  
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1625 3rd Avenue, New York, NY



This Facility is offering PRP Infertility Therapy

**PRP Treatment Dallas**

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# The Effectiveness of Autologous Platelet-Rich Plasma (PRP) in the Therapy of Infertile Men with Non-Obstructive Azoospermia

## Abstract

**Introduction:** Non-obstructive azoospermia is a cause of male infertility and despite the advancement in gynecology it is still one of the most challenging conditions to treat. One of the possible treatments for this condition may be Platelet-Rich-Plasma (PRP) due to its wellknown regenerative potential.

**Objectives:** To evaluate the effectiveness of autologous PRP in the therapy of infertile men with nonobstructive Azoospermia.

**Methods:** Seventy-one patients received ½ ml PRP in each testicle which was prepared by centrifuging patient's own blood. FNA parameters and FSH levels of the patients were measured before and after the procedure. Testosterone level was measured before the procedure. All the required data for the study was collected retrospectively from the hospital records.

**Results:** A couple of NOA cases developed normal spermatogenesis. Post-procedure FSH was higher than preprocedural FSH (MD 1.737, p .560). Patients with spermatocytes in the initial FNA report showed a lower percentage of azoospermia than their counterparts (11.4% vs 44.4%).

# This study grows semen samples in the lab with PRP

**Study Type :** Observational

**Actual Enrollment :** 20 participants

**Observational Model:** Case-Only

**Time Perspective:** Prospective

**Official Title:** Effect of Plasma Rich in Growth Factors (PRGF) on Semen Quality

**Actual Study Start Date :** March 2016

**Actual Primary Completion Date :** July 2016

**Actual Study Completion Date :** December 2017



# PRP-therapy: advanced method of female and male infertility treatment

## For Women

### The main indications for PRP-therapy:

- Ovarian failure syndrome – PRP-therapy helps for ovarian rejuvenation and makes it possible to restart menstrual cycle
- Women of advanced maternal age (menopausal and perimenopausal women) – PRP-therapy can help to grow more eggs, which will increase the chances for a positive result in the IVF cycle or for spontaneous pregnancy.
- Patients with endometrial hypoplasia – successful embryo implantation is impossible for them due to a thin layer of the endometrium. PRP-therapy for such women is a real breakthrough, especially in cases when it is not possible to grow endometrium with the help of medicines.
- Chronic endometritis and endometriosis of the uterus
- Asherman's syndrome
- Recurrent failed IVF cycles
- Complications after unsuccessful surgical treatment
- Complications after abortions

In all these cases, PRP-therapy significantly improves embryo implantation in both IVF cycles and natural pregnancy.

## For Men

### **PRP-therapy of the testicles is carried out in the most complicated cases of infertility:**

- There are very few spermatozoa in the sperm (oligozoospermia <10 million / ml)
- Hormone therapy is not recommended
- Hormone therapy did not give results

Usually in such cases, the chances for pregnancy are very small. But we can offer a new innovative treatment - using **PRP-therapy of the testicles!**

The purpose of the procedure is to activate spermatogenesis (sperm production) in the testicles, which is not active enough, that's why sperm quality is reduced and pregnancy in the partner does not appear. When high concentrated platelet-derived factors are injected into the testicular tissues, cell healing and regeneration processes are activated, which supports to the restoration of spermatogenesis.

This procedure is innovative and, due to its recent appearance, still experimental. However, according to currently available data, it succeeds in about 50-60% of cases. In any case, advanced medicine specialists believes this is a breakthrough in reproductive technologies that could potentially give a chance for pregnancy with own eggs – or for the restoration and **activation** of spermatogenesis in men and the opportunity to have their own children in seemingly hopeless situation.