

# PLATELET-RICH PLASMA: *UPDATE 2016:* *EVIDENCE IN ORTHOPEDIC MEDICINE*

*By*

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- ▶ What is “Platelet-Rich Plasma”?
- ▶ Theory or rationale for its use in Orthopedic/MSK Medicine
- ▶ Review / Update of the PRP literature

## GOALS & OBJECTIVES



**CUAL PICTURA ES UN "GUMBO" DE LOUISIANA?**

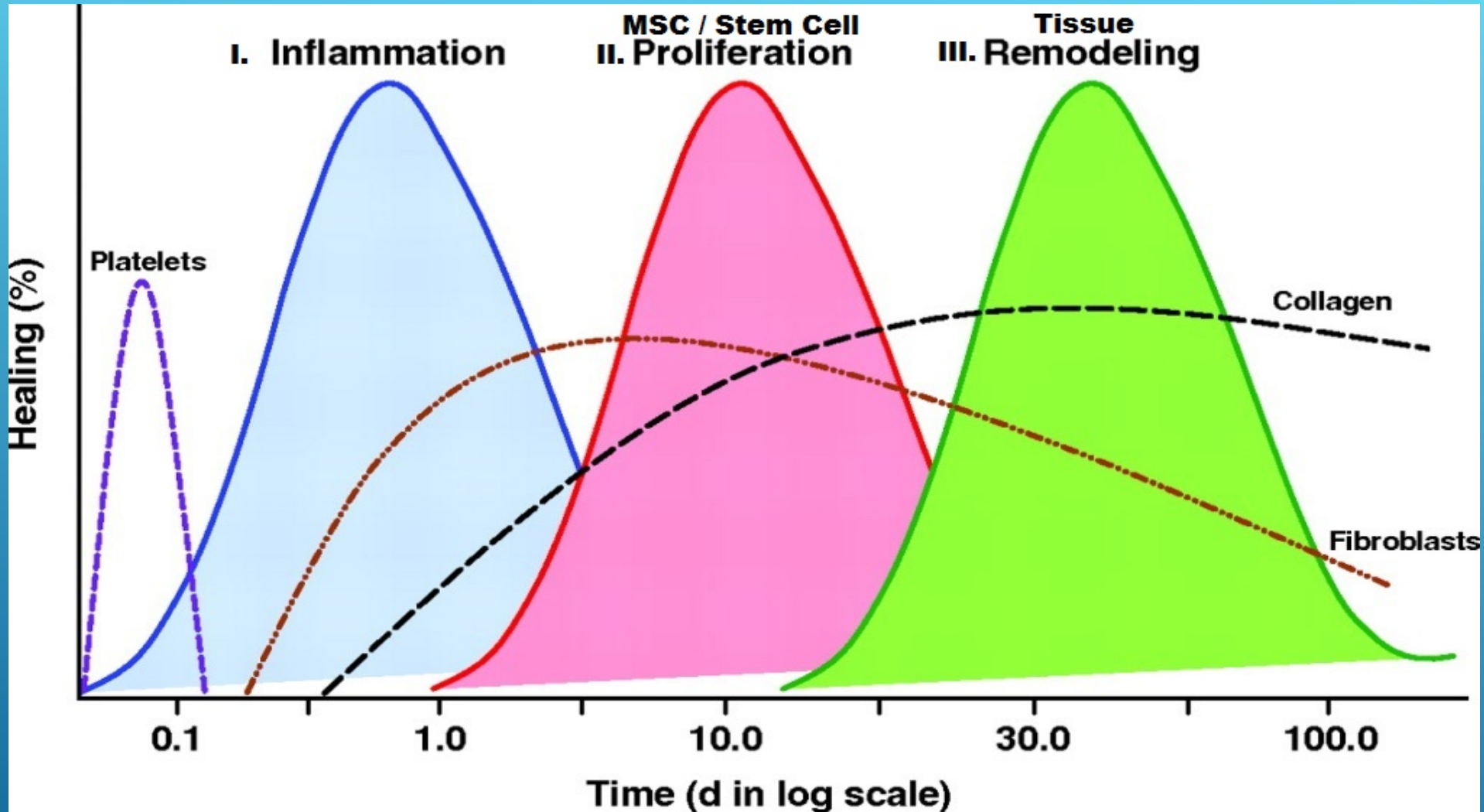
## ▶ What is “Platelet-Rich Plasma” (aka, Platelet-Gumbo)?

- ▶ A preparation derived from whole blood in which autologous platelet-derived growth factors are concentrated in plasma through a centrifugation and separation process.
- ▶ This “growth-factor concentrate” is then injected back into the same patient (autologous) to stimulate healing at the injured location.
- ▶ WBC content of PRP:
  - ▶ “Leukocyte-poor”-PRP (LP-PRP) verses “Leukocyte-rich”-PRP
- ▶ Platelet-concentration of PRP

WHAT IS “PRP”?

- ▶ As PRP is a “growth factor concentrate” the rationale for its use is in the belief it may assist, positively augment and/or accelerate the healing cascade in and around damaged tissues.

WHAT IS THE RATIONALE FOR USING PRP IN  
ORTHOPEDIC/MSK MEDICINE?



# THE STAGES OF HEALING

- ▶ PRP: “platelet-rich plasma” PubMed = 8,526 articles!
- ▶ PRP: early data, evidence – conflicting due to differences in “gumbo” (ingredients in the mixture / processing)
- ▶ PRP data likely will continue to be conflicting until a standard mixture and/or process is adopted, AND, a standard treatment protocol proven; i.e., addition of Dextrose Prolotherapy, etc. **\*\*BIOTENSEGRITY!\*\***
- ▶ This talk = Limited to Level-1 studies and Review Articles for the following:
  - ▶ Knee OA
  - ▶ Lateral Epicondyle / “Tennis Elbow”
  - ▶ Shoulder – Rotator Cuff
  - ▶ Achilles’ Tendon

## PRP: THE EVIDENCE

# PRP Evidence: *KNEE OSTEOARTHRITIS*

## ▶ Meta-Analyses / Reviews:

- ▶ 2016: Journal of Arthroscopy: PRP > HA with improvements up to 12months.

## ▶ Level-1 Evidence, Independent:

- ▶ 2016: Int.J.Mol.Sci.: PRP > HA at lower OA grades and at 3months.
- ▶ 2016: A.J.S.M.: LP-PRP/ACP decreased WOMAC by 78% at 1-yr vs. 7% placebo.
- ▶ 2016: Ar.Orth.TraumaSx: LP-PRP > Acetaminophen out to 24wks.
- ▶ 2016: JSpMedPhFit: PRP > Corticosteroid pain/function at 6months.
- ▶ 2016: KneeS,S,T,Arth: Mild-mod OA, PRP > HA > Ozone at 12months.

**PRP: EVIDENCE IN KNEE OA**



## ▶ *Shoulder PRP in addition to Surgical Intervention: RC Tears:*

### ▶ Meta-Analyses / Reviews:

- ▶ 2015: Warth et al (Arthroscopy): +PRP group—decreased re-tear rates & better outcomes when the PRP was applied “at the tendon-bone interface”.
- ▶ 2015: Cai et al (J.ShoulderElbowSx): +PRP no difference with Full-thickness RC tears, but the failure to heal rate was decreased with +PRP in moderate/small RC tears.
- ▶ 2015: Cross et al (AJSM): LP-PRP promotes normal collagen synthesis & decreases inflammatory cytokines > LR-PRP; neither PRP enhanced collagen formation in severely degenerated tendons.
- ▶ 2016: Fu et al (Clin.Rehab): Do NOT support the use of +PRP in RC injuries.

### ▶ Level-1 Evidence:

- ▶ 2014: Malavolta et al (AJSM): Complete SS tears with retraction; +PRP did NOT promote better clinical outcomes at 24 months.
- ▶ 2015: Jo et al (AJSM): Moderate/Large SS tears; +PRP group DID significantly improve healing quality (decreased re-tear rate & large CSA of SS), but not healing time.

**PRP: EVIDENCE, ROTATOR CUFF SURGERY**

▶ **Shoulder PRP: Tendonopathy & Partial-tears of Rotator Cuff:**

▶ **Meta-Analyses / Reviews: none!**

▶ **Level-1 Evidence: none!**

▶ **Level-2 Evidence: prospective, RCT: only 1!**

▶ **2016: Shams et al (Europ.J.Ortho.Surg.Traum): Subacromial injection of PRP vs CS for the treatment of symptomatic partial rotator cuff tears.**

▶ 40 patients randomized either PRP or CS injection 1x at time point 0.

▶ Assessed at 6wks, 3months, and 6months using VAS, ASES-Scale, Constant-Murley Score, and Simple Shoulder Test.

▶ MRI performed before treatment and 6months after injection.

▶ RESULTS: PRP > CS at all time points but not after 6months.

▶ MRI Results: both groups showed improvement, but no significant difference between groups.

▶ Conclusion: PRP injections showed earlier better results vs. CS, although not after 6months. Thus, PRP could be considered a good alternative to CS injection for partial RC tears.

**PRP: EVIDENCE: RC – PARTIAL TEARS**

# PRP Evidence for Lateral Epicondylitis / “Tennis Elbow”

## ▶ Meta-Analyses / Reviews

- ▶ 2002: Smidt et al (Pain): CS injections – “poor internal validity” & “no beneficial effects or improvements noted beyond short-term (6weeks)”.
- ▶ 2014: de Vos et al (BJSM): “strong evidence that PRP injections are NOT efficacious”
- ▶ 2015: Ford et al (Hand): PRP = Surgery in outcomes for pain improvement & RTW.
- ▶ 2016: Arirachakaran et al (J.Ortho.Traum): PRP > ABI >>> CS for pain and disability scores.
- ▶ 2016: Dong et al (BJSM): Dextrose-Prolotherapy, HA > PRP, ABI, Botox = all recommended; CS is NOT RECOMMENDED!

## ▶ Level-1 Evidence

- ▶ 2015: Brkljac et al (Journal Ortho): PRP improves pain/function in LE failed conservative treatment.
- ▶ 2015: Behera et al (J.Ortho.Surg): LP-PRP provides good improvement in pain/function in recalcitrant LE.
- ▶ 2016: Montalvan et al (Rheum): PRP = Saline injection at 6 and 12-months.
- ▶ 2016: Palacio et al (Rev.Bras.Ortho): PRP=Neocaine=DXM at 3 & 6-months on DASH, PRTEE

**PRP: EVIDENCE, “TENNIS ELBOW”**

# Use of PRP in Achilles' Tendonoses / Tears

## ▶ *Meta-Analyses / Reviews*

- ▶ 2015: Kearney et al / Cochrane Review: 18 studies / 732 patients; “insufficient evidence for the use of any injection treatment”

## ▶ *Level-1 / -2 Evidence*

- ▶ 2010: de Vos et al (JAMA): +PRP = +PRP + Eccentrics
- ▶ 2015: Guelfi et al (FootAnkleSurg): single PRP injection = improvement and no reported rupture out to 6 months.
- ▶ 2016: Lantto et al (AJSM): Achilles' rupture: Surgery = Non-surgical treatment in terms of Achilles' performance score at 18-months, but Surgery > Non-surgical in restoring calf muscle strength, AROM of ankle joint, and QOL scores.
- ▶ 2016: Krogh et al (AJSM): US-guided PRP vs Saline injection; 24 patients; no difference in VISA-A – unable to continue – huge drop-out at 3months.

**PRP: EVIDENCE, ACHILLES' TENDON**

- ▶ **Overall, the “Evidence” to date is mixed...and will likely continue to be so:**
  - ▶ Likely secondary to the heterogeneity of “PRP” itself and how it is used:
    - ▶ Type / content of the “PRP gumbo” used; Number & Frequency; Post-procedure protocol / rehab
- ▶ **The use of PRP in Knee Osteoarthritis**
  - ▶ Overall, majority of studies positive – particularly, for LP-PRP and/in Lower grades of OA.
- ▶ **The use of PRP in Shoulder Pain / Rotator Cuff Tears & Tendonopathy**
  - ▶ PRP adjunctive to RC repair: mixed reviews
  - ▶ PRP for partial tears / RC tendonopathy: very limited data! \*\*potential for study\*\*
- ▶ **The use of PRP in Lateral Epicondyloses / “Tennis Elbow”**
  - ▶ Mixed, but mainly positive: PRP and/or LP-PRP and ABI ....(and of course Dextrose!)
- ▶ **The use of PRP in Achilles’ Tendonopathy & Rupture**
  - ▶ Data thus far mainly supports NOT using PRP for Achilles’

## **SUMMARY:**

# **EVIDENCE FOR PRP IN ORTHOPEDIC / MSK MEDICINE**

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***MUCHAS GRACIAS, AMIGOS!***

# AAOM Educational Opportunities

## *Hands-On Patient Treatment Workshops*

*Guadalajara, Mexico: November 5<sup>th</sup> – 12<sup>th</sup>, 2016*

*Cancun, Mexico: February 4<sup>th</sup> – 11<sup>th</sup>, 2017*

## *34<sup>th</sup> AAOM Annual Meeting & World Congress on IROM*

*Seattle, Washington, USA*

*4/19/2017 – 4/22/2017*



***PREGUNTAS?***