

Platelet Gel Therapy Case Studies

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Abstract

Autologous platelet concentrate gel (also known as Autologous Platelet Gel (APG)) is produced from autologous platelet-rich plasma also known as Autologous Platelet Concentrate (APC+). Like other fibrin tissue adhesives, APC gel has hemostatic and tissue sealing properties, but differs significantly in its ability to improve wound healing and enhance osteogenesis. Autologous platelet gel was developed in the early 1990's as a by product of platelet-rich plasma (PRP) sequestration in cardiac surgery. When PRP is combined with thrombin and calcium, a viscous coagulum (gel) is rapidly formed. This gel was employed primarily as a hemostatic agent and for its tissue sealing properties. Initial clinical successes with this noncommercial material lead to expanded applications in numerous surgical specialties where production of PRP from a single-unit blood draw was performed solely for the purpose of producing APG.

It's a Protein Story

- There are proteins in the blood that start the healing process.
- Patient's blood can be drawn to harvest and concentrate these proteins.
- Placing these proteins on the wound site can speed healing.
- There appears to be a dose response relationship between the protein load and cell proliferation.

Device Description and Preparation

The Platelet Concentrate System consists of an automated, microprocessor controlled dedicated centrifuge with decanting capability and accessory Kits for processing patient blood. The APC+ Processing Kit contains a functionally closed dual chamber sterile processing disposable that allows for the preparation of an autologous concentrated platelet product from a small volume (either 20 or 60mL) of blood. Depending on the volume of concentrated platelets required, either one or two disposables may be processed.

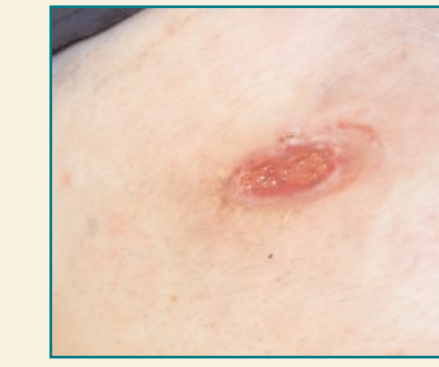
The Process Disposable is placed in the centrifuge and the start button is pressed. During processing, the anticoagulated blood is automatically separated into packed cells and plasma containing platelets (APC+). A floating disk in the blood chamber automatically rises to the top of the packed red cell layer as it builds during centrifugation and separates the red cells from the APC+. The separated APC+ is automatically decanted into the plasma chamber of the Processing Disposable. The floating separation disk minimizes the red cell content in the APC+. The APC+ is then centrifuged further, producing platelet poor plasma (PPP) and a platelet concentrate button. At the completion of the processing cycle, the Processing Disposable is removed from the centrifuge and a specified volume of PPP is aspirated out of the chamber using a sterile syringe and spacer that automatically leaves a sufficient volume of PPP for re-suspending the platelet button that results in a concentrated autologous platelet product (APC+) with platelet levels approximately 4 - 6 times baseline.

Clinical Experience

In select patients, progress toward closure can be realized over a short period of time. Patients that respond to APG typically require very few applications.



Case Photo 1
Predebridement photo of recalcitrant wound, failing 6 months of prior wound care efforts.



Case Photo 2
Post debridement photo and initiation of APG



Case Photo 3
7 days after application of APG



Case Photo 4
No significant progress toward healing in 3 months. Wound appearance prior to APG.



Case Photo 5
Appearance after 2 applications of APG



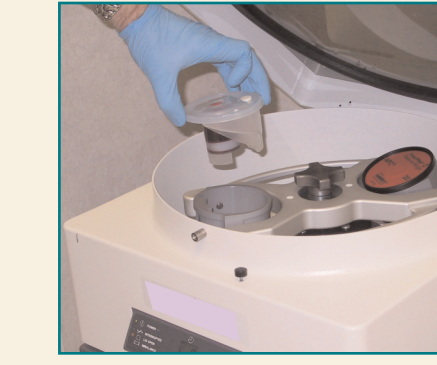
Case Photo 6
Appearance one week later after 3rd APG application



Procedure 1
Patient Blood Draw



Procedure 2
Blood placed in Centrifuge container



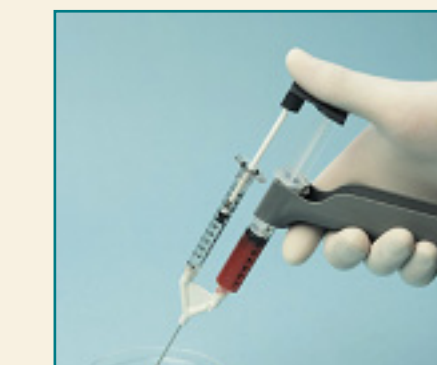
Procedure 3
Centrifuge



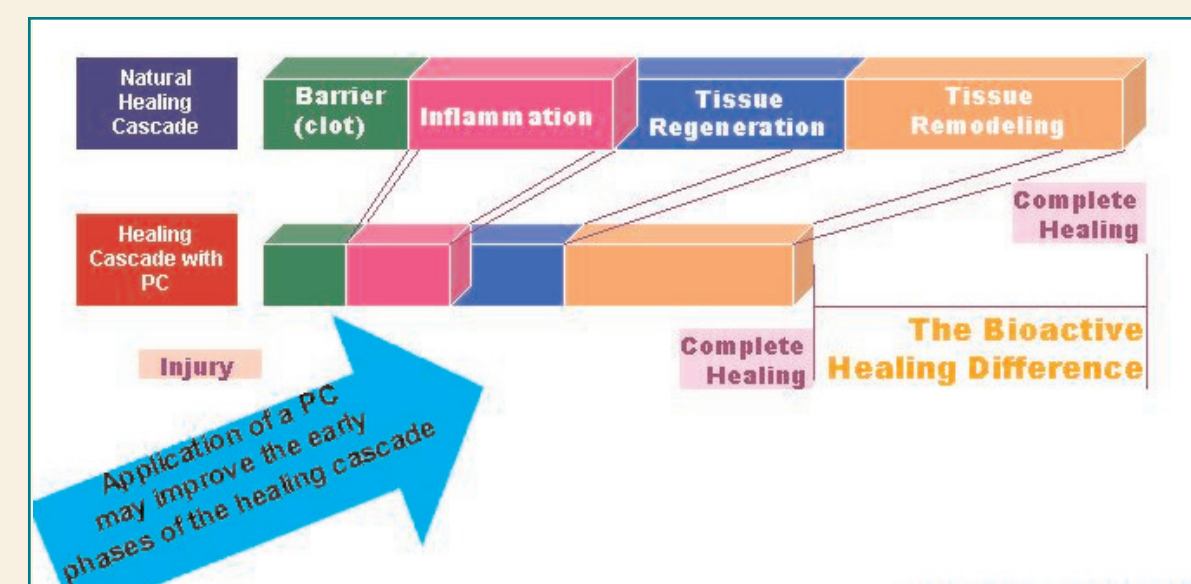
Procedure 4
Platelet Rich Plasma.



Procedure 5
Spray Applicator



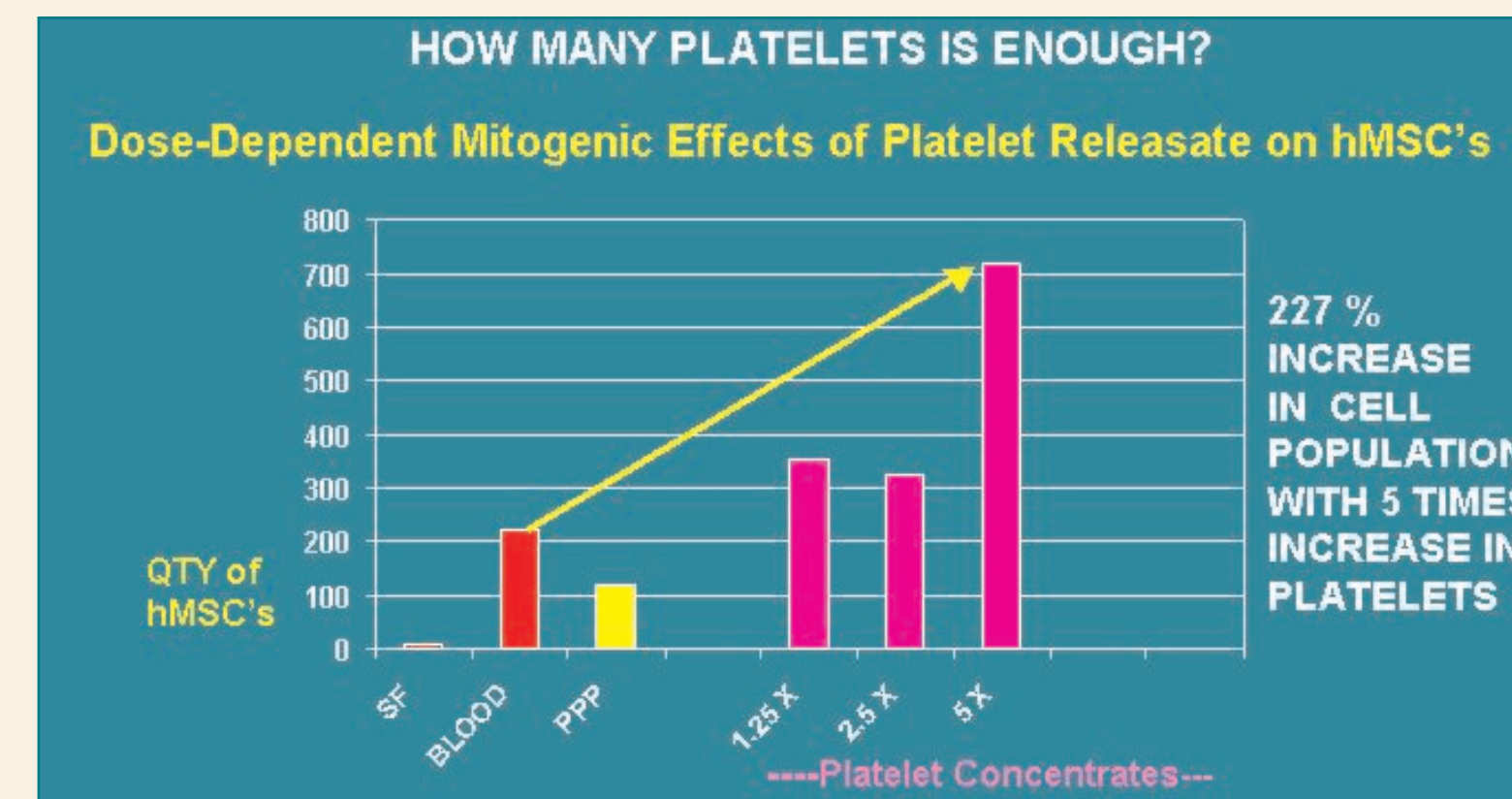
Procedure 6
Liquid Applicator



Delivering a concentration of Autologous Proteins to the wound site can improve the healing rate. Such a concentration of proteins is found in a platelet concentrate.

Smart PRP System: Blood Draw and Platelet Concentrate Product			
VOLUME PROCESSED ANTICOAGULATED BLOOD	PLATELET CONC. YIELD	PLATELET INCREASE ABOVE NATIVE LEVEL	STDev INCREASE ABOVE NATIVE LEVEL
22.5 ML (20 ml blood)	65.2 %	4.4 X in 9 ml	+/-0.6
60 ML (54 ml blood)	80.2 %	4.3 X in 10 ml 6.2 X in 7 ml	+/-0.2

DATA ON FILE: Center for Blood Research, Boston, MA



Conclusions

- Platelet Concentrate and VEGF stimulate chemotactic migration of hMSC's in a dose-dependent manner.
- Platelet Concentrate stimulates proliferation of hMSC's in a dose-dependent manner

Source: Mitogenic Stimulation of Human Mesenchymal Stem Cells by Platelet Releasate Suggests a Mechanism for Enhancement of Bone Repair by Platelet Concentrate, Poster AAOS Meeting 2002.

Haynesworth, SE; Kadiyala, S; Liang, L; Bruder, SP; DePuy AcroMed, DePuy.

Orthopedics, and Case Western Reserve University.