Plasma Solutions, LLC
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Accelerate GF™
Natural Regenerative Medicine Treatments

Technical / Products Preparation

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Who is Plasma Solutions?

Plasma Solutions, LLC is a biologics company that develops, manufactures, and markets regenerative medicine products for the repair, restoration and revitalization of damaged and diseased cellular tissue for (i) musculoskeletal injuries and conditions, (ii) neuropathy, and (iii) chronic non-healing wounds.

- Plasma Solutions uses products such as ACCELERATE GF™ for treating joint and tendon pain, ankle sprains, heel pain and plantar fasciitis.

- Plasma Solutions products are also used to treat a wide range of musculoskeletal conditions in addition to peripheral neuropathies.

- We have also found that our products can be used to treat chronic non-healing wounds and help to prevent amputations in high risk populations.
Today’s Objectives

• Give you the ability to process Accelerate GF

• Explain what makes Accelerate GF different.

• Show you the Science and make you comfortable with it.

• Give you resources

• Show you how to grow your patient base.
What’s a Platelet?

• Also called “thrombocyte”
• Small, disc shaped clear cell fragment
• Lifespan is 5-9 days
• Natural source of growth factors
• Circulate in the blood
• Lead the formation of blood clots
• Essential in healing process
Platelets are activated by damaged tissue. Primary hemostasis and initiation of the clotting cascade are just the beginning of the platelets role in healing.

Upon activation they release Natural anabolic growth factors.

- Platelet derived GF
- Transforming GF
- Basic Fibroblast GF
- Vascular Endothelial GF
- Epidermal GF
- Nerve GF
Plasma

- The liquid portion of your blood
- Mostly water (95%)
- Proteins, Electrolytes, glucose,
- Fibrinogen
- Hormones
- The body’s Protein Reserve
- Protects you from infection and blood disorders.
- Platelet Rich Plasma is simply plasma rich in platelets. This is achieved through centrifugation.
- Platelet concentration is increased from 2 to five times baseline.
- Generally considered golden.
- Platelet Poor Plasma is plasma which is poor or low in platelets. However, this plasma is rich in fibrinogen and proteins.
- A by-product of the centrifugation process.
Plasma Solutions

• Through breakthrough science and technology, we have developed a proprietary method for activating and aggregating platelet rich and platelet poor plasma and increased levels of GF.

• This method has led to patient outcomes that are far more positive than those of competing products.

• Additionally, Plasma Solutions can provide the physician with the ability to customize treatments.
Procedure: Simplicity

- Draw 8.5 - 17cc of the patient’s blood into the tube(s) Plasma Solutions provided vacutainer tubes.
- Rotate the tubes 7 times to mix the anti-coagulant into the blood. Make certain that the patient’s name has been written on the tubes.
- Place the tubes in your Centrifuge and set it to the specifications ordered by the physician. Start the centrifugation.
- When centrifugation is complete, according to protocol, extract the Accelerate GF from the tubes with the preloaded activator/aggregator syringe.
- It’s ready for injection.

Injection

- People hate shots.
- PRP injections are usually pretty painful.
- After the first PRP injection many People don’t want more.
- Most patients say the Plasma Solutions injections are “painless”. Sometimes they don’t know they had the injection.
- Patients don’t mind coming back for More.
Closing Remarks

• Technician vs Technologist

• Building patient loyalty

• Being the Expert Spokesperson

• Support: WHO TO CALL
Table of Contents

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• Plasma product preparation
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History of Plasma-Base Therapy

- M. Ferrari in 1987
- Autologous transfusion component after an open heart operation
- Avoid homologous blood product transfusion
History cont.

National Center for Biotechnology Information

• 5200 Entries

– Orthopaedic
– Sport medicine
– Dentistry
– Otolaryngology
– Neurosurgery
– Ophthalmology
– Urology
– Wound healing
– Cosmetic
– Cardiothoracic
– Maxillofacial surgery
Pathophysiology

- **Platelets**
  - Growth factors
  - Cytokines (inflammation)
  - Infection
  - Osteogenesis
  - Wound healing
  - Maxillofacial surgery

- **Bio-Active Proteins**
  - Macrophages
  - Mesenchymal stem cells
  - Osteoblast
  - Enhance tissue regeneration/healing
Pathophysiology Cont.

- **Platelets**
  - Growth factors
  - Cytokines (inflammation)
  - Infection
  - Osteogenesis
  - Wound healing
  - Maxillofacial surgery

- **Bio-Active Proteins**
  - Macrophages
  - Mesenchymal stem cells
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### Pathophysiology Cont.

<table>
<thead>
<tr>
<th>Dense granules</th>
<th>Lysosomal granules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serotonin</strong></td>
<td><strong>Cathepsin D</strong></td>
</tr>
<tr>
<td><strong>Histamine</strong></td>
<td><strong>Cathepsin E</strong></td>
</tr>
<tr>
<td><strong>ATP</strong></td>
<td><strong>Carboxypeptidase A</strong></td>
</tr>
<tr>
<td><strong>ADP</strong></td>
<td><strong>Carboxypeptidase B</strong></td>
</tr>
<tr>
<td><strong>Calcium</strong></td>
<td><strong>Proline carboxypeptidase</strong></td>
</tr>
<tr>
<td><strong>Magnesium</strong></td>
<td><strong>N-acetyl-0-hexosaminidase</strong></td>
</tr>
<tr>
<td><strong>Pyrophosphate</strong></td>
<td><strong>3-0-g lucuronidase</strong></td>
</tr>
</tbody>
</table>

| Alpha-granules | |
|----------------||
| **Serotonin**  | |
| **Albumin**    | **a-o-mannosidase** |
| **Fibrinogen** | **a-o-galactosidase** |
| **Fibronectin**| **a-L-fucosidase** |
| **Vitronecin** | **a-o-galactosidase** |
| **Osteonectin**| **a-L-fucosidase** |
| **Calcitonin** | **3-0-g lucosidase** |
| **Von Willebrand Factor** | **a-o lucosidase** |
| **Von Willebrand antigen II** | **Acid phosphatase** |
| **Thrombospondin** | **Arylsulfatase** |
| **Platelet factor 4** | |
| **IgG, IgA, IgM** | |
| **Cl inhibitor** | |
| **Plasminogen** | |
| **Plasminogen activator inhibitor-1** | |
| **Platelet-derived** | |
| **collagenase inhibitor** | |
| **High molecular weight kininogen** | |
| **Angiotensinogen** | |
| **Protein S 0<2** | |
| **-Antitrypsin 0<2** | |
| **-Macroglobulin 0<2** | |
| **-Antiplasmin** | |
| **Multimerin** | |
| **Platelet basic protein** | |
| **Thromboglobulin** | |
| **Histidine-rich glycoprotein** | |
| **Connective tissue activating protein III** | |
| **Neutrophil-activating protein II** | |
| **Platelet-derived growth factor** | |
| **Coagulation factor V** | |
| **Coagulation factor VIII** | |
| **Substance P** | |
| **Vasoactive intestinal peptide** | |
| **>300 other proteins** | |
| *(Maguire et al., 2002; Maguire and Fitzgerald, 2003; Copoinger et al., 2004)* | |
PRP Definition and Preparation

**Definition**

Definition
- Higher concentration than baseline
- Subjected to the individual baseline
- 2.5 - 3 times baseline (low))
- 5 - 9 times baseline (high)
- **Optimal level 2.5x**


**Preparation**

- Low platelet count
  - 2 components
- High platelet count
  - 3 components
PRP (Buffy coat)

- Concentration of platelet (2.5X)
  - TGF-b
  - FGF
  - PDGF
  - EGF
  - VEGF
  - CTGF

- WBC
  - Neutrophils
  - 40 Hydrolytic enzymes
  - Lymphocytes
  - T/B cells, NK cells
  - Monocytes/Macrophages
White Blood Cells

Monocyte

Eosinophil

Basophil

Lymphocytes

Neutrophil
Plasma-Base Product Preparation

- **Before Injection**
  - Anticoagulant (ACD)
  - Binds to calcium
  - pH

- **Injection**
  - Buffering the pH
  - Thrombin
  - Calcium chloride
  - Mechanical trauma
Plasma-Base Therapy Indications

- Tendinopathies
- Ligament injuries
- Muscle injuries
- Joints conditions
- Intervertebral discs
- Nerves (irritation)
- Fracture Non-Union
Plasma Solutions Screening Recommendations

- **Absolute Contraindication**
  - Platelet dysfunctionsyndrome
  - Critical thrombocytopenia
  - Hemodynamic instability
  - Septicemia
  - Local infection at the site of the procedure
  - Patient unwilling to accept the risks

- **Relative Contraindications**
  - NSAIDs within 48 hours of procedure
  - Corticosteroid injection within 1 month of procedure
  - Systemic use of corticosteroids with 2 weeks of procedure
  - Tobacco use
  - Fever or illness (recent)
  - Cancer (especially hematopoietic or of bone)
  - HGB < 10g/dl
  - Platelet count < 105/ul
Plasma Solutions Treatment Approach

- Regenerative medicine on-demand
- Customary treatment modalities
- Amendable plasma-base products
Treatment Algorithms

- **Anatomical site**
  - Axial skeletal
  - Cervical, thoracic, lumbar, sacrum

  - Appendicular skeletal
  - Shoulder, elbow, wrist, hand, hip, knee, ankle, foot

- **Tissue involvement**
  - Cartilage (joint), tendon, ligament, muscle, nerve

- **Chronicity**
  - Acute (1-4 days), sub-acute (4 days-3 weeks), chronic (3 weeks >)
Anatomical Landmarks and Injection Techniques

- **Anatomical site**
  - Axial skeletal
  - Cervical, thoracic, lumbar, sacrum
  - Appendicular skeletal
  - Shoulder, elbow, wrist, hand, hip, knee, ankle, foot

- **Tissue involvement**
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Injections Techniques

- Shoulder
- Elbow
- Wrist
- Hip
- Knee
- Ankle
- Spine (C/L)
Normal Anatomical Structures of the Shoulder
Injection Procedure to the Shoulder

1. Gleno-humeral joint
2. Subacromial joint
3. Acromioclavicular joint
Injection Procedures for the Shoulder Ligaments

1. Coracoacromial Ligament
2. Acromioclavicular Ligament
3. Coracohumeral Ligament
4. Articular capsule of shoulder
Injection Procedures to the Shoulder Tendons/Bursa

1. Supraspinatus tendon
2. Infraspinatus tendon
3. Teres minor tendon
4. Sub-acromial bursa
5. Sub-deltoid bursa
Injection Procedures to the Shoulder Tendons/Bursa

1. Subscapularis
2. Biceps Brachii long head
Normal Anatomical Structures of the Elbow
Injection Procedures to the Elbow Joints

1. Radial-capitulum joint
2. Ulna-trocheal joint
Injection Procedures to the Elbow Ligaments

1. Radial collateral ligament
2. Ulnar collateral ligament
1. Ulnar collateral ligament
Injection Procedures for the Elbow Tendons

1. Common extensor tendons
Injection Procedures for the Elbow Tendons

1. Common flexor tendons
Normal Anatomical Structures of the Wrist
Injections Procedure to the Wrist Joints

1. Radial carpal joint
2. Ulnar carpal joint
Injection Procedures for the Wrist Ligaments

1. TFCC ligaments
   a. Dorsal and palmar ulnarcarpal ligaments
Injection Procedures to the Wrist Tendons

1. Common wrist extensor tendons
Injection Procedures to the Wrist Tendons

1. Common wrist flexor tendons
Injection Techniques for Dequervain’s Tendonitis

The needle is placed into the first extensor compartment, directed proximally toward the radial styloid process and sliding in parallel to the abductor and extensor tendons.
Entrapment Syndrome
Normal Anatomical Structures of the Hip
Injections Procedure to the Hip

1. Femoral acetabulum joint
Injections Procedures for the Hip Tendons/Bursa

1. Anterior hip flexors
Injections Procedures for the Hip Tendons/Bursa

1. Trochanteric Bursa
Normal Anatomical Structures of the knee

1. Anterior hip flexors
Injection procedure to the Knee

1. Medical/Lateral compartments of the knee

1. Patella-femoral joint
Normal Anatomical Structures of the Knee
Injection Procedure to the Knee Ligaments

1. Medial/lateral collateral ligament

2. ACL/PCL

3. Medial/lateral meniscus

4. Patella ligament
Injections Procedure to the Knee Tendons

1. Patella tendon

2. Quadriceps tendon
Normal Anatomical Structures of the Ankle
Injection Procedures to the Ankle Joints

1. Tibial-talar joint

1. Sub-talar joint
Injection Procedures to the Ankle Joints

1. Sub-talar joint
Normal Anatomical Structures of the Ankle
Injection Procedures for Ankle Ligaments

1. Anterior tibiofibular ligament

2. Anterior talofibular ligament

3. Calcaneofibular ligament
Normal Anatomical Structures of the Ankle
Injection Procedures for Ankle Ligaments

1. Anterior tibiofibular ligament

2. Anterior talofibular ligament

3. Calcaneofibular ligament
Injection Procedures to the Ankle Tendons

Peroneal longus/bervis
Tibialis posterior
Flexor digitorium longus
Flexor hallucis longus
Achilles tendon
Cervical Facet and Ligament Injection Procedure

Cervical facets

1. Cervical interspinous ligaments
Lumbar Facet and Ligament Injection Procedure

Lumbar facets

2. Lumbar interspinous ligaments