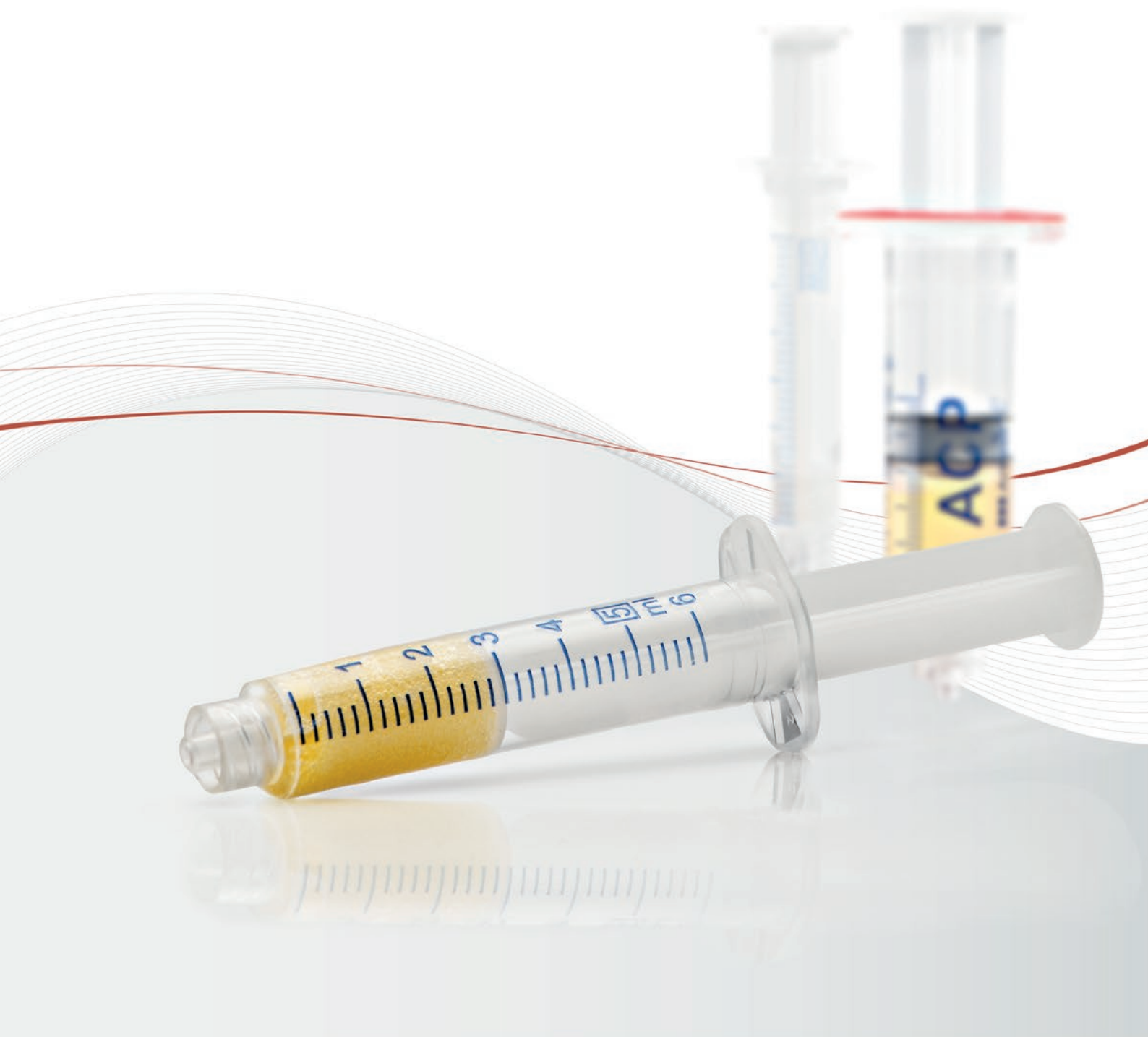


# Arthrex ACP<sup>®</sup> Tendo



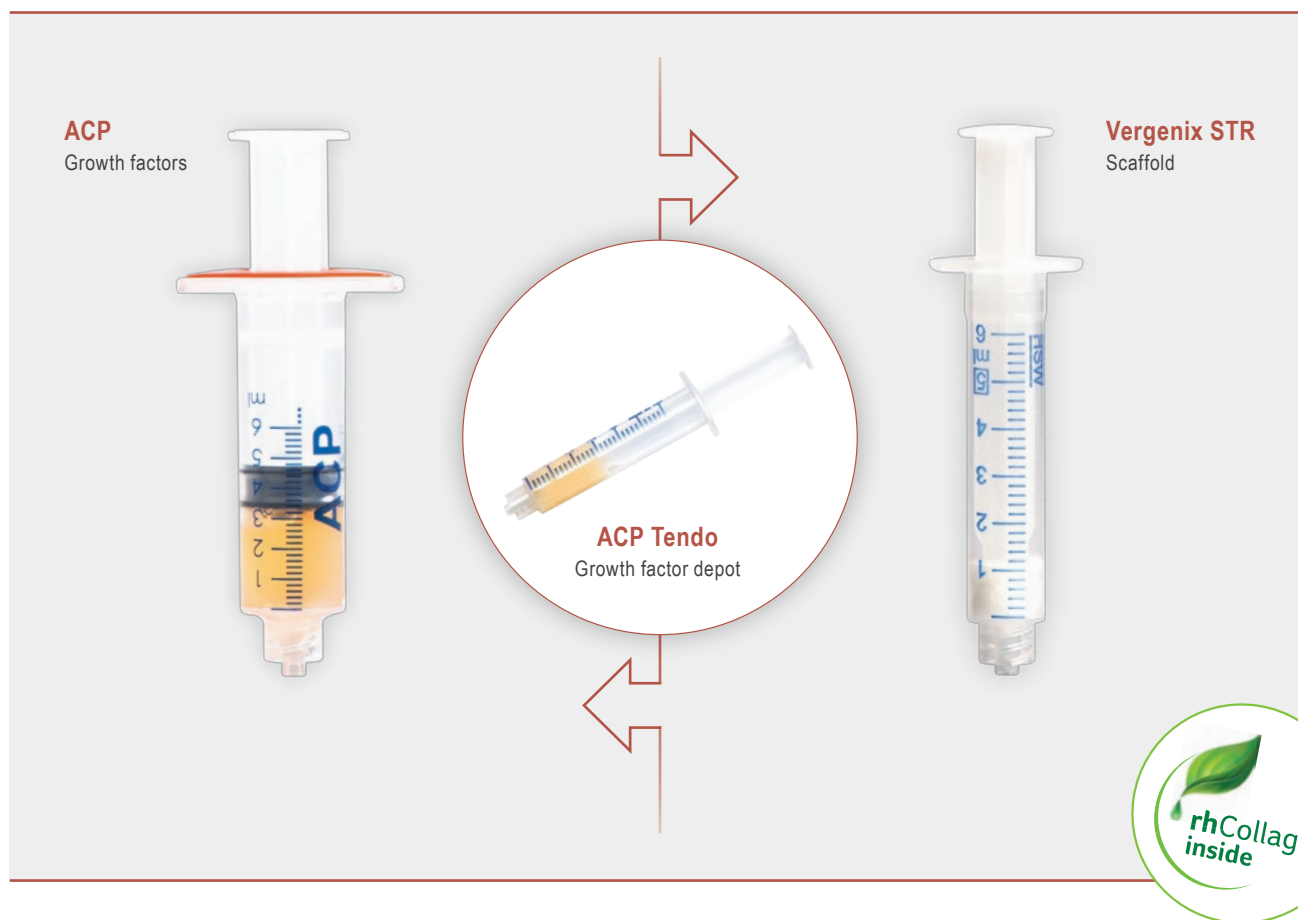
# Arthrex ACP® Tendo

The Next Generation for Treating Tendinopathies

## Introduction

Arthrex ACP Tendo provides a novel, patient-friendly and easy-to-use treatment for tendinopathies. It combines the advantages of autologous conditioned plasma (ACP) with the benefits of an innovative scaffold material, Vergenix STR, based on recombinant human collagen (rhCollagen). The interaction of ACP with the rhCollagen matrix creates a growth factor depot, enabling a prolonged release of growth factors to the injury site for up to 4 weeks, and promotes hemostasis, tissue renewal and regeneration.

## Principle of Arthrex ACP® Tendo



## Indications

ACP Tendo is intended for use in the treatment of tendinopathies, e.g. epicondylitis, patellar tendinopathy, plantar fasciitis.

## Features and Benefits

- Innovative technology – Vergenix STR rhCollagen brings advantages to tissue-extracted collagen
- Growth factor depot – elevated levels of growth factors for a prolonged time
- Single injection – less pain for the patient

# Arthrex ACP<sup>®</sup> Tendo

## Mode of Action

The application of ACP Tendo to the injury site follows a tissue repair cascade that is characterized by the following processes:

### Interaction of ACP and Vergenix STR

- Adhesion of platelets to Vergenix STR
- Activation of platelets by Vergenix STR, resulting in clot formation

### Growth Factor Release at Injury Site

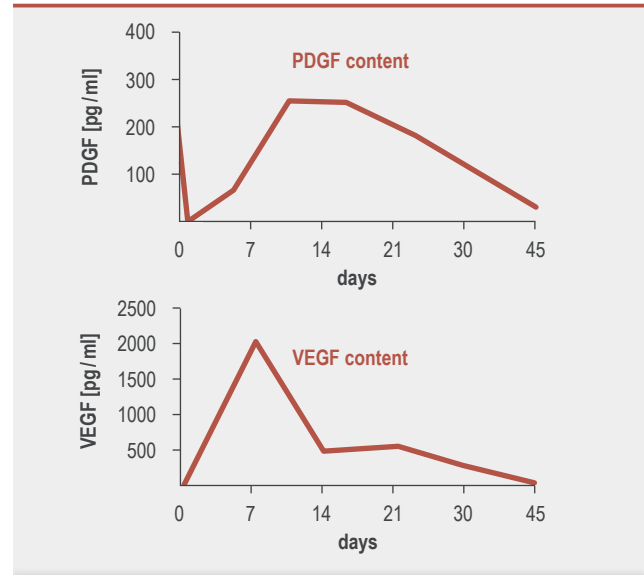
- Elevated levels of growth factors for a prolonged time
- Attenuation of inflammatory signals
- Recruitment of cells necessary for healing and neovascularization

### Scaffold for Tendon Healing

- Adhesion and proliferation of cells needed for tendon healing
- Natural extracellular matrix is formed
- Proliferation and alignment of fibroblasts results in faster maturation and less scar tissue

### Biodegradation and Replacement of Vergenix STR

- Complete maturation of fibrotic tissue
- Arrest of the inflammation process



Growth factor release

Time course of growth factor release in an animal model. Rats were treated with a subcutaneous injection of Vergenix STR/PRP (platelet rich plasma) and growth factor content was measured by ELISA at different time points over the course of several weeks. Top panel: Platelet derived growth factor (PDGF); bottom panel: Vascular endothelial growth factor (VEGF)

## Preparation and Application

ACP is obtained from the patient's blood using the Arthrex double syringe (ACP) system. This is then easily combined with the lyophilized collagen via a syringe adapter. After homogenizing, ACP Tendo (approximately 3 ml) can be injected using a 19 G needle, initiating clot formation in the vicinity of the tendon injury site. Prior to injection of ACP Tendo, the application site can be anesthetized with 1 ml lidocaine or marcaine.



ACP / Vergenix STR

Homogenization

Ready for injection!

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# Arthrex ACP®

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There is a growing interest in the use of autologous blood products, such as platelet-rich plasma (PRP), for a number of orthopedic therapies, as growth factors released by platelets contained in the blood plasma can support the healing process. The unique Arthrex ACP double syringe system offers a time-saving solution for the sterile separation of non-homogenous liquids and, in particular, for the production of an autologous conditioned plasma enriched in platelets and growth factors. Withdrawal of blood from the human body with the Arthrex ACP double syringe system is simple, only requiring a commercially available cannula with a Luer lock connection.

## Arthrex ACP® – Features and Benefits

- Two in one – Unique double syringe system for the preparation of autologous conditioned plasma
- Time saving – ACP preparation can be performed within minutes
- Closed system – Enables use in a clinic or under sterile conditions in an OR
- Safe and easy – The double syringe design allows for easy, convenient and safe handling of ACP

## Mechanism of ACP

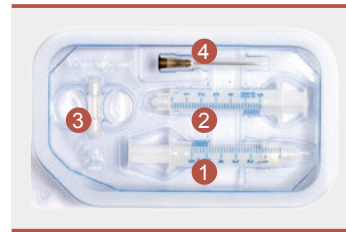
The blood plasma obtained with the Arthrex ACP double syringe system contains a platelet concentration increased by about 2 to 3 times.<sup>1</sup> Platelets are known to release various proteins, including growth factors, when activated. These growth factors are required for healing in a variety of tissue types and they appear to work synergistically.<sup>2,3,4</sup>

## Major Effects of Growth Factors

- Induce proliferation and differentiation of various cell types<sup>5</sup>
- Enhance production of matrix (e.g. collagen, proteoglycan production)<sup>6</sup>
- Stimulate angiogenesis and chemotaxis

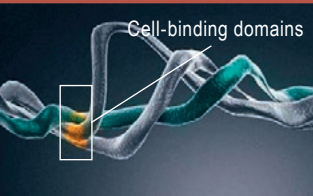
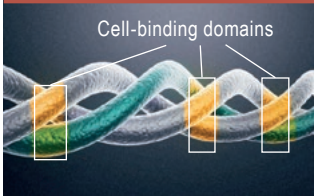
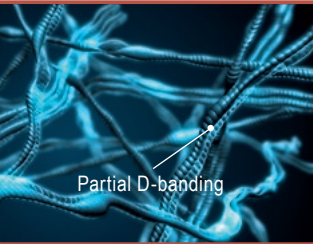





Vergenix STR, produced by a proprietary manufacturing process, is a recombinant human collagen (rhCollagen) extracted from tobacco plants. It is identical to the type I collagen produced by the human body. Collagen plays a crucial role in tissue repair processes and is therefore an ideal scaffold material. However, depending on the source of the collagen, structural differences exist, directly influencing the overall effectiveness of the collagen scaffold in tissue repair and healing processes. For example, only collagen forming a perfect triple helix can provide the optimum amount of cell-binding domains. In addition, the 3D matrix and collagen fiber thickness also influence the cell-binding properties and therefore cell proliferation.



- 1 Vergenix STR syringe
- 2 Empty syringe
- 3 Luer lock connector
- 4 19G needle

Collagen scaffolds based on Vergenix STR rhCollagen offer many advantages when compared to the bovine extracted collagen scaffolds currently available.<sup>7</sup>

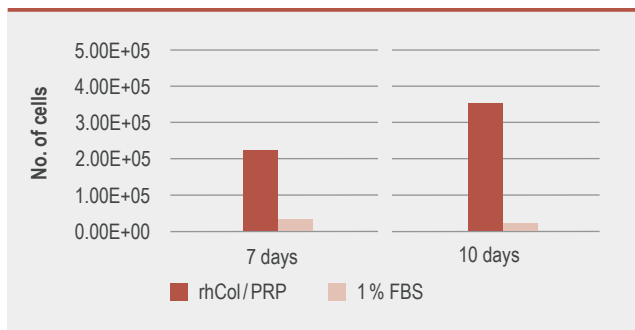
Tissue-Extracted (Bovine/Porcine) <sup>8</sup>	Plant-Derived <sup>9</sup>
 <ul style="list-style-type: none"> <li>■ Partially denatured (crosslinked)</li> <li>■ Low cell-binding domains</li> </ul>	 <ul style="list-style-type: none"> <li>■ Perfect triple helix</li> <li>■ High cell-binding domains</li> </ul>
 <ul style="list-style-type: none"> <li>■ Partially functional 3D matrix</li> <li>■ Thick fibers → low surface area</li> </ul>	 <ul style="list-style-type: none"> <li>■ Fully functional 3D matrix</li> <li>■ Thin fibers → high surface area</li> </ul>
 <ul style="list-style-type: none"> <li>■ Slow cell proliferation and slow tissue repair                             <ul style="list-style-type: none"> <li>• Foreign body response</li> <li>• Edema</li> <li>• Inflammation</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ Fast cell proliferation and fast tissue repair</li> </ul>

## Advantages of Vergenix STR Recombinant Collagen<sup>10</sup>

<b>Bio-Functionality</b>	<b>Superior Homogeneity</b>	<b>Safety and Purity</b>
<ul style="list-style-type: none"> <li>■ Accelerated cell proliferation</li> <li>■ Faster tissue healing</li> </ul>	<ul style="list-style-type: none"> <li>■ Increased stability</li> <li>■ Aligned structures</li> <li>■ Reproducible &amp; thermally stable</li> </ul>	<ul style="list-style-type: none"> <li>■ Non-allergenic</li> <li>■ Non-immunogenic</li> <li>■ No pathogens</li> </ul>

# Studies

## Human Fibroblasts Cell Proliferation Assay\*



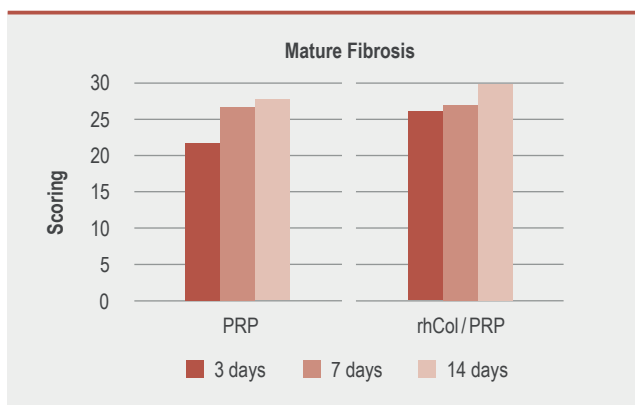
### Design:

- Fibroblasts treated with rhCollagen/PRP or 1% fetal bovine serum (1% FBS)
- Cell proliferation measured 7 and 10 days after seeding using a WST-1 colorimetric assay

### Results:

- rhCollagen/PRP significantly increases cell number after 7 and 10 days compared to cells treated only with 1% fetal bovine serum

## In Vivo Study in a Rat Tendinopathy Model\*

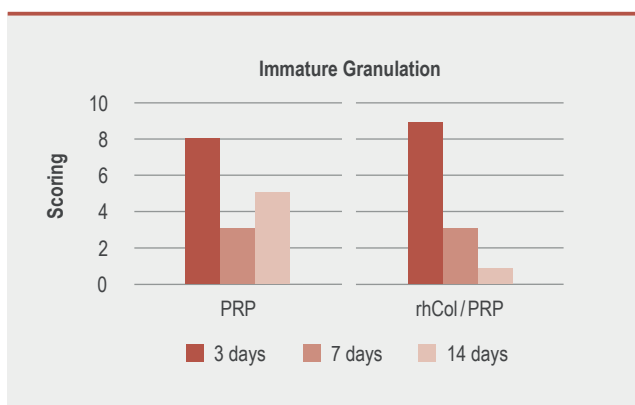


### Design:

- Tendinopathy was induced in the right common calcaneal tendon of male Sprague Dawley rats
- Rats treated with rhCollagen/PRP or PRP alone
- Evaluation time points: 3, 7 and 14 days post-treatment

### Evaluation criteria:

- Mature fibrosis
- Immature granulation tissue
- Mononuclear inflammatory cells
- Granulomatous reaction

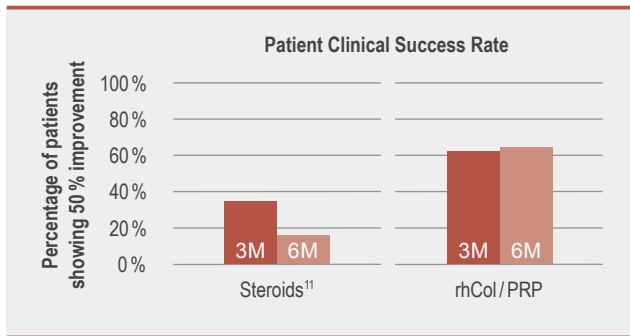


### Results:

- Faster rate of appearance of mature fibrosis with rhCollagen/PRP
- Less immature granulation tissue with rhCollagen/PRP
- A decrease in inflammatory mononuclear cells with rhCollagen/PRP
- No systemic toxicity effects were associated with rhCollagen/PRP or PRP



## Clinical Study – Epicondylitis \*



### Design:

- Prospective, open-label, single-arm, multi-center study with 40 patients
- Each patient received a single injection of rhCollagen/PRP
- Follow-up time points: 1, 2, 3, and 6 months
- Endpoints include:
  - Functional recovery (PRTEE)
  - Arm strength (grip test with dynamometer)
  - Quality of life (SF-12 Questionnaire)

### Results:

- Functional recovery and pain improvement already at the 3-month follow-up for the majority of the patients (N=39; reduction in PRTEE score:  $\geq 25\%$  for 74% of patients;  $\geq 50\%$  reduction for 62% of patients)
- Further functional recovery and pain improvement at the 6-month follow-up (N=36; reduction in PRTEE score:  $\geq 25\%$  for 86% of patients;  $\geq 50\%$  reduction for 64% of patients)
- Significant quality of life improvement starting 2 months post treatment (result obtained via SF-12 Questionnaire)
- Significant improvement in arm strength starting 1 month post treatment (result obtained via grip test)

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\* data on file

This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's Directions For Use.

# Ordering Information

Description	Item Number
Arthrex ACP® kit, series I	ABS-10011
Arthrex ACP® double syringe	ABS-10014
Centrifuge Hettich Rotofix 32 with swing out rotor, 220 V	1206-Art
Centrifuge Hettich Rotofix 32 with swing out rotor 1324, 110 V	1206-01-Art
Bucket with screw cap for centrifuge (spare)	ABS-10022
Screw cap for ABS-10022 (spare)	ABS-10023
Counterweight for centrifugation of ACP double syringe, 15 ml	ABS-10027
Viscous-Gel™ high viscosity ratio applicator with 10 cm mixing tip	ABS-10050
Viscous-Spray™ low viscosity ratio applicator with 3 cm mixing /spray tip	ABS-10051
Fenestrated delivery needle	ABS-20000
Tuohy delivery needle, 17 gauge 16"	ABS-21000
Cart for centrifuge, 45 cm	KU.1079.800
Vergenix STR soft tissue repair matrix	STR-303

*An anticoagulant can be purchased on request.*