

# Autologous Protein Solution (APS) Therapy for Knee Osteoarthritis

Blood-based Biological Therapy

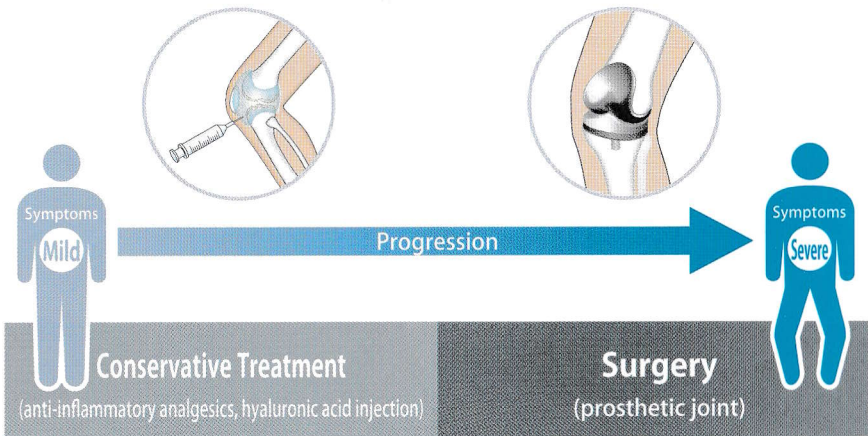


A New Autologous Treatment Option

# A New Option: Biological Therapy

## Conventional Treatment Modalities for Knee Osteoarthritis

Conventional treatment modalities for knee osteoarthritis comprise conservative treatment for mild symptoms such as exercise and pharmacological agents, as well as surgery for severe symptoms. Mild symptoms can be managed by exercise, weight loss, and anti-inflammatory/analgesic drugs (oral or patch). However, when the disease progresses, an intra-articular injection of hyaluronic acid is often used to relieve the pain. In cases where the disease progresses further, the patient may need to have surgery. Although there are several different types of surgery, knee replacement using an artificial joint is most commonly performed.



## What is Biological Therapy?

Biological therapy is a new treatment that uses cells or blood components collected from the patient or donors to treat the disease or repair damaged tissues.

## What is APS Therapy?

### Blood-based Biological Therapy

Although pro-inflammatory cytokines (IL-1, TNF $\alpha$ ) that trigger an inflammatory response are activated in knee joints that are affected by knee osteoarthritis, anti-inflammatory cytokines (IL-1ra, sIL-1R, sTNF-RI, sTNF-RII) that suppress these inflammatory cytokines are also found in our body.

Autologous Protein Solution (APS) contains a high concentration of anti-inflammatory cytokines and growth factors that have been extracted from the blood of the patient. APS is also called next generation Platelet-Rich Plasma (PRP), because it is prepared using a special method to process blood-derived PRP to extract a high concentration of components that are known to be efficacious in the treatment of knee osteoarthritis.



Intra-articular APS injection is expected to lessen inflammation and pain by restoring the balance between pro-inflammatory cytokines and anti-inflammatory cytokines in the joint.

APS therapy has already been adopted as a treatment for knee osteoarthritis in Europe. This therapy, which uses the patient's own blood, can be performed on the same day as the visit, making the procedure less burdensome for patients.

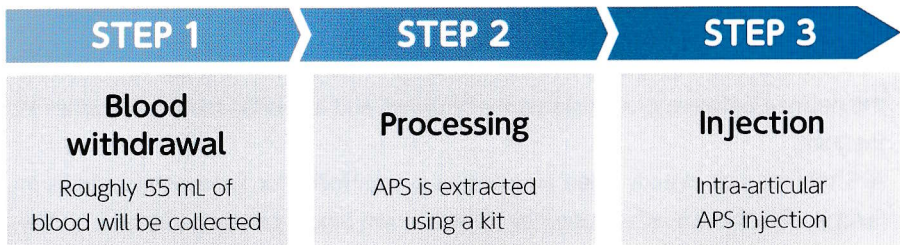
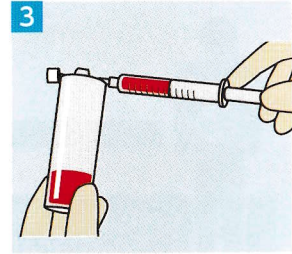
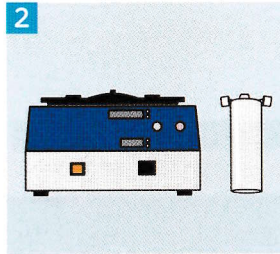
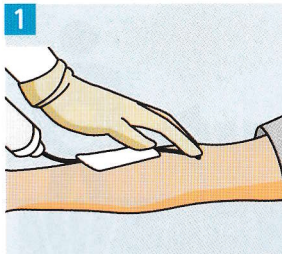
# Treatment Flow and Expected Effects

## Treatment flow

The procedure includes the following three steps:

- 1 A small amount of blood will be collected from the patient
- 2 APS is extracted from the collected blood using a kit
- 3 Intra-articular APS injection into the patient

The treatment will be completed on the day of the visit.



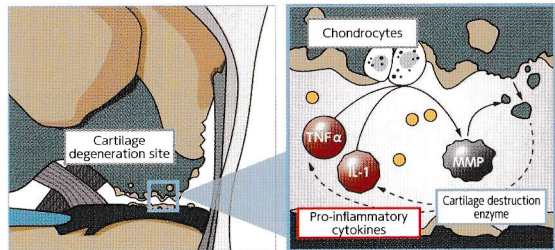
← Day of the visit →

Can be completed in approximately 1 hour

\*The procedure may not be performed, at the physician's discretion.

## Pain and Inflammation of the Knee Joint

Within a knee joint that is affected by knee osteoarthritis (lower right figure), the activities of pro-inflammatory cytokines (IL-1, TNF $\alpha$ ), which cause an inflammatory response by producing enzymes that destroy cartilage are enhanced. Pro-inflammatory cytokines are known to increase the production of enzymes that destroy cartilage (matrix metalloproteinases: MMPs). Substances that trigger an inflammatory response are considered to exacerbate inflammation and increase pain in the joint. Left untreated, the progressive destruction of cartilage will cause a loss of knee joint function, leading to degeneration of the entire cartilage surface.

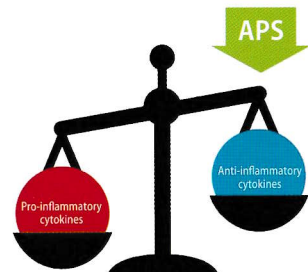


## Mechanism of APS Therapy

In our body, anti-inflammatory cytokines (IL-1ra, sIL-1R, sTNF-RI, sTNF-RII) that suppress inflammation are also present. Anti-inflammatory cytokines block the activity of substances that cause an inflammatory response, which helps to improve the balance in joints where there is a tendency toward cartilage destruction.

APS is a solution containing a high concentration of anti-inflammatory cytokines and growth factors extracted from the blood of the patient.

In APS therapy, direct injection of APS, which is rich in anti-inflammatory substances into the joint where excess pro-inflammatory cytokines are present is used to reduce inflammation/pain and suppress the production of substances that cause the degeneration or destruction of cartilage.



# Frequently Asked Questions for APS Therapy



**Is knee osteoarthritis cured by biological therapy or APS therapy?**



APS therapy is intended to improve the symptoms of joint pain and inflammation. Deterioration of the intra-articular environment is expected to be prevented by the suppression of inflammation.



**How long does the effect of APS therapy last?**



According to overseas clinical reports, in some patients, the effect will last for up to several years after a single injection of APS.



**What is biological therapy?**



Biological therapy is a new treatment option that mainly uses your own cells or blood components. The APS therapy performed at our hospital, which is a biological therapy, has undergone the designated procedures based on the Act on the Safety of Regenerative Medicine\*.

\*Law for the safe implementation of regenerative medicine



**Is APS therapy safe?**



As with common intra-articular injections, joint fluid leakage, joint pain/stiffness/swelling, or a feeling of instability may occur. Many of these symptoms are temporary; however, if the symptoms are severe, please consult your doctor.



### Is an incision of the knee required?

#### No knee incision is required.



In this treatment, APS extracted from the patient will be injected into the knee joint with no incision of the knee. The procedure can be completed on the day of the visit without a need for hospitalization. The procedure is very similar to hyaluronic acid injection.



### How long does the procedure take to work?



Some people may feel the effect 1 week after the injection.



### What are the side effects of APS administration?



Some patients may feel swelling or discomfort after the administration. In such cases, by applying ice to the knee, the most of symptoms usually subside within a few days. Please consult your doctor if the symptoms persist for more than 1 week.



### Are there restrictions on activities after treatment?



It is recommended for the activity level to be minimized, and not to exceed pre-injection levels for 14 days after the treatment.



**Can elderly patients receive the treatment?**



**Elderly patients can receive the treatment.**

Elderly patients can also receive this treatment, because the burden of the treatment is low. However, since surgery may be more appropriate for patients with severe joint destruction regardless of age, it is important to consult your doctor.



**Why is this treatment not covered by health insurance?**



**APS therapy is a new treatment which has not yet been covered by insurance.**

Since the efficacy of the treatment is still being examined in Japan, it has not yet been covered by insurance. However, our clinic provides this therapy as a treatment option for patients who are suffering from debilitating pain and want to do something about it.



**Is this treatment eligible for medical tax credit or for a high-cost medical procedure?**



**Since it is not covered by insurance, it is not eligible for a high-cost medical procedure.**

Although the eligibility for medical tax credit is determined by the local tax office, since this therapy is used for the purpose of treatment, it may be eligible for medical tax credit. Our clinic provides tax receipts, upon request.

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