PPS

Silicone based Centella asiatica 2% cream
Cosmetic surgery

- Remove epidermis, collagen contraction

Wound healing Process

Skin Regeneration (New collagen)

Complete wound healing process

PPS (Post Procedure Solution)
## Transition of post procedure product

<table>
<thead>
<tr>
<th>Action</th>
<th>1&lt;sup&gt;ST&lt;/sup&gt; generation (Antibiotics)</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; generation (Skin rejuvenation)</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; generation (PPS)</th>
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</thead>
<tbody>
<tr>
<td>Action</td>
<td>Anti-microbial &amp; anti-inflammatory</td>
<td>Stimulate tissue formation</td>
<td>Anti-microbial &amp; anti-inflammatory + Stimulate tissue formation + Skin protection</td>
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<tr>
<td>Indication</td>
<td>Wound infection, Infectious disease (folliculitis, etc.)</td>
<td>Cicatriz skin (ulcerous injury, traumatic injury, Etc.)</td>
<td>Post cosmetic procedure</td>
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**PPS act on every step of wound healing process.**

**Because of the function of Centella asiatica, it greatly affect on new tissue formation.**
PPS & Wound Healing Process

[PPS]
• Anti-microbial
• Anti-inflammation
• Prevent prolonging inflammatory phase

[Wound healing process]
Coagulation & early inflammation
12-24 hour after

Late inflammation & Granulation tissue formation
3-7 day after

Proliferation & Remodeling
1-2 week after

[PPS]
• Stimulate granulation tissue formation
• Promote angiogenesis
• Promote re-epithelialization
• Stimulate collagen type 1&3 synthesis
• Prevent hypertrophic & Keloid scar
• Stimulate ECM accumulation

Complete Skin Regeneration
Centella asiatica

- A plant which grows spontaneously

- Wound healing by traditional medicine in asiatic countries.
- Used for more than 3000 years in traditional Chinese, Malaysian and Indian medicine for wound healing, as tonic or slimming agent.
- Treatment of wounds and ulcers as drug in Europe
Functions of Centella asiatica

- Anti-microbial
- Anti-inflammation
- Anti-oxidant
- Promote angiogenesis
- Stimulate collagen type 1 & 3 synthesis
- TGF β Receptor 1 kinase activation
- Increase ECM production
Silicone based Technology

- Stabilization of active ingredient
- Skin protection from detrimental environment
- Inhibition of bacteria multiplication
- Safe on skin
- Non-comedogenic

Offer optimum environment for wound healing

PPS (Post Procedure Solution)
## Comparison of two Ingredients for Skin protection

<table>
<thead>
<tr>
<th></th>
<th>Petrolatum</th>
<th>High molecular silicone</th>
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<tbody>
<tr>
<td><strong>Action Mechanism</strong></td>
<td>Prevention of water loss by Making film on the surface of skin</td>
<td></td>
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</tbody>
</table>
| **Skin protection film**  | • Very oily and glossy.  
• Block the pore (Obstruct skin breathing)  
• Comedogenic               | • Very smooth and silky  
• Unblock pore Skin breathing  
• Non-comedogenic            |
| **Anti-bacterial**        | No reference                                                              | Anti-bacterial                                               |
| **Physicochemical characteristic** | • Extraction and purification from petroleum  
• Unstable in high temperature (Melt under 38 ℃) | • Derived from silica  
• Stable for heat and oxidation                                |
Additional Ingredients

β-Glucan – Control immune system

Biosaccharide gum-1 – Anti-allergic function, Increase cutaneous elasticity

Sodium hyaluronate – Persistent moisturizing, stimulates the migration and mitosis of fibroblasts and epithelial cells.

Glycyrrhizin – Anti-inflammatory action

Betaine (Botanical glycine) – One of the most important component of collagen

ALOE vera gel – Support formation of granulation tissue
Indications

- Post-Laser
  - CO2 Laser, Fraxel Laser, etc.
- Post-IPL
- Post-Mesotherapy, Micro needle therapy
- Post-Peeling
  - Micro dermabrasion
PPS; Post Procedure Solution

Volume: 15ml, 50ml, 150ml

Active ingredients: Centella asiatica, Glycyrrhizin, Beta-Glucan, Arbutin, Aloe vera, Hyaluronic acid, Betaine, Biosaccharide gum-1

Action: Wound healing process promoting

Directions: Apply immediately post-procedure. Use liberally whenever treated area feels or looks dry. (every 2~3 hours for the first day and then every 4~6 hours for the next 7~10 days)
Clinical photos
Case 1

Immediately after Phenol peel
Remove eschar
Case 2

After Phenol peel

0 day
Burn of third degree

12 days after
16 Days After
23 Days After
Clinical study of PPS as post-cosmetic procedure care (wound dressing)

OhKim’s dermatology
M.D. Seung joon Jung
M.D., PhD. Hongjik Kim
Case 1.: 62 Year’s old Nevus (Pigmentid), Seborrheic Keratosis, Lentigo
ND YAG GREEN, IPL
Case 2.

62 years old, woman
Nevus (Pigmentid), Co2 laser
Case 3.

40 years old, woman
Nevus (Pigmentid), Erbium+Co2+IPL

0 day

1 day after

4 days after

14 days after

17 days after
Case 4.

40 years old, woman
Nevus (Pigmentid) on the nose
Erbium+Co2+IPL
Case 5.

40 years old, woman
Nevus (Pigmentid) on the nose
Erbium+Co2+IPL
Centella asiatica; Medical uses

• Treatment of wounds, burns, and ulcerous skin ailments, and prevention of keloid and hypertrophic scars
• Extracts of the plant have been employed to treat second- and third-degree burns.
• Extracts have been used topically to accelerate healing, particularly in cases of chronic postsurgical and post-trauma wounds.

Ref.) WHO monographs on selected medicinal plants, World Health Organization Geneva, 1999
Drugs; TECA

Ref.) Product information of Madecassol, International development and manufacturing (Vidal 1995)

**PROPERTIES:**
- Madecassol has a stimulating action on the biosynthesis of collagen by the fibroblasts of human venous walls and dermis in cellular culture.
- It may therefore contribute to an improved trophicity of the connective tissue.

**INDICATIONS:**
- Local treatment of leg ulcers from venous origin.
- Fibrous or hypertrophic scars.
- Surgical wounds and light burns.

**DRUGS:**
- MADECASSOL® poudre et onguent
- MADECASSOL® NEOMYCINE HYDROCORTISONE
- MADECASSOL® TULGRAS®

PPS (Post Procedure Solution)
TECA and its separated components on the secretion of collagen

- 25 µg.ml⁻¹ for TECA
- (AA) 7.5 µg.ml⁻¹ for asiatic acid
- (MA) madecassic acid
- (AO) 10 for asiaticoside


PPS (Post Procedure Solution)
ECM accumulation

Ref.) Triterpenes from Centella asiatica stimulate extracellular matrix accumulation in rat experimental wounds,

TECA–injected wound chambers were characterized by increased dry weight, DNA, total protein, collagen and uronic acid contents.
Peptidic hydroproline was also increased, showing an increased remodeling of the collagen matrix in the wound.
In addition to collagen, it was also able to stimulate glycosaminoglycan synthesis.

Hydroproline 역시 증가되었으며 이는 상처부위에서 콜라겐 매트릭스의 재생이 증가되었음을 보여주는 것이다. 그것은 또한 GAGs의 생합성도 촉진하였다.
Collagen 1 synthesis

Ref.) Influence of Asiatic Acid, Madecassic Acid, and Asiaticoside on Human Collagen 1 Synthesis. Planta Med. 60 (1994)

Asiatic acid, madecassic acid, and asiaticoside, terpenoids with an ursane skeleton, were tested separately and in combination on skin human fibroblast collagen 1 synthesis in vitro. In the absence of ascorbic acid, the mixture as well as each individual component stimulated collagen 1 synthesis to similar extent.
Normal adult dermal fibroblast cultures were established using the explant method from a skin (lifting) sample obtained from a 50 year-old woman. Fibroblasts were grown to confluence in supplemented E 199 medium and after 24 hours of growth, products were added in serum free medium containing 0.15 mM sodium ascorbate. The media were then collected and type I and III collagen secretion levels determined. Kinetics of type I and III collagen secretion led to determine the effects to asiaticoside and madecassoside after 48 hours for collagen I secretion and 72 hours for collagen III. Asiaticoside and madecassoside, were shown to stimulate collagen secretion. Type I secreted collagen (for 10(4) fibroblasts per 48 hours) was increased for 25–30% with asiaticoside and madecassoside. Interestingly, only Madecassoside was able to increase significantly collagen III secretion.

Ref.) Bonte F, Dumas M, Comparative activity of asiaticoside and madecassoside on type 1 and III collagen synthesis by cultured human fibroblast, Ann Pharm Fr. 1995; 53(1)38–42
More recent in vitro development revealed new properties for each of these molecules and highlighted that Centella asiatica heterosides possess an action of factors controlling the regulation of inflammation. An asiaticoside extract significantly reduced IL-1α liberation. In the present study, the antibacterial activity of a purified triterpene acid extract of Centella asiatica was demonstrated in vitro on Staphylococcus aureus, Streptococcus (group B) Propionibacterium ACNES and Neisseria gonorrhoeae, confirming the specific properties of another family of molecules (genins) from Centella asiatica.

Ref.) Loiseau A.*, Theron E.*, Buche P.*, Girard P** Evidencing the anti-microbial properties of Centella asiatica Laboratoires Roche Nicholas SA Division Serdex
Antioxidant Effect in healing wounds

Asiaticoside derived from the plant Centella asiatica is known to possess good wound healing activity. Enhanced healing activity has been attributed to increased collagen formation and angiogenesis. Since antioxidants have been reported to play a significant role in the wound healing process we studied the effect of asiaticoside on the levels of certain antioxidants in the wound so as to explore the possible involvement of such a mechanism in the asiaticoside induced wound healing. Asiaticoside application (0.2%, topical) twice daily for 7 days to excision-type cutaneous wounds in rats led to increased enzymatic and non-enzymatic antioxidants, namely superoxide dismutase (35%), catalase (67%), glutathione peroxidase (49%), vitamin E (77%) and ascorbic acid (36%) in newly formed tissues. It also resulted in a several fold decrease in lipid peroxide levels (69%) as measured in terms of thiobarbituric acid reactive substance. However, continued application for 14 days showed no significant difference in these antioxidants compared with their values in vehicle treated wound tissue. It appears from the present study that asiaticosides enhanced induction of antioxidant levels at an initial stage of healing which may be an important contributory factor in the healing properties of this substance.

Ref.) Shukla A. Rasik AM, Asiaticoside–induced elevation of antioxidant levels in healing wounds. Pharmacology department, Central Drug Research Institute, Lucknow India.
Promotes Angiogenesis

It promoted angiogenesis in the chick chorioallantoic membrane model at 40μg/disk concentration.

Wound healing effect in delayed healing models

These results indicate that asiaticoside exhibits significant wound healing activity in normal as well as delayed healing models and is the main active constituent of Centella asiatica.