

# Role of Placental Extract in Plastic Surgery

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## Abstract

The placenta is an abundant source of growth factors. The use of placental extract in plastic surgery as topical wound healing agent earlier itself. The placenta is an abundant source of growth factors, including insulin like growth factors (IGFs), epidermal growth factor (EGF), transforming growth factor beta (TGF- $\beta$ ), and vascular endothelial growth factor (VEGF). This promotes its wide variety of application in various medical conditions.

**Keywords:** Placental Extract; Plastic Surgery.

## INTRODUCTION

The placenta is a vital organ that develops during pregnancy and connects the developing fetus to the uterine wall. It serves as a lifeline for the growing baby, providing oxygen and nutrients while removing waste products from the fetal blood stream. The placenta also plays a crucial role in hormone production, helping to maintain a healthy pregnancy. It is typically

delivered shortly after the birth of the baby and is examined by medical professionals to ensure that it is intact and functioning properly. The health and proper function of the placenta is essential for the growth and development of a healthy baby during pregnancy.

The placenta is an abundant source of growth factors, including insulin like growth factors (IGFs), epidermal growth factor (EGF), transforming growth factor beta (TGF- $\beta$ ), and vascular endothelial growth factor (VEGF). IGFs are essential for the development of fetal tissues and play a critical role in regulating fetal growth. EGF stimulates the growth of various tissues, including the placenta itself, while TGF- $\beta$  helps regulate cell growth, differentiation, and apoptosis. VEGF, on the other hand, plays a critical role in the development of the fetal vascular system. The placenta's ability to produce and secrete growth factors is essential for maintaining a healthy pregnancy and promoting fetal growth and development. Research on human placental extract gained a momentum with the description of the preparation of its extract by Russian ophthalmologist Prof. V.P. Filatov.<sup>1</sup>

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Filatov started research on grafting human corneas using the principle of transplantation of preserved material.

### Preparations of Human Placental Extract

Placental extracts are two different types: aqueous extract and hydroalcoholic extract. Modern indigenous aqueous placental extract is prepared by Filatov's procedure. Fresh placentae were stored in ice and portions were tested for HIV antibody and Hepatitis B surface antigen. Single hot and cold aqueous extractions prepared after incubating dissected and minced placenta at 90°C and 60°C respectively. Then sterilization of the extract under saturated steam (pressure 15 lbs/sq inch at 120°C for 40 min). After filtration and addition of 1.5% (v/v) benzyl alcohol as preservative, ampoules filled and sterilized once again under the said condition for 20 min. Methods of application widely vary from subcutaneous, intramuscular, intravenous, intraoperative, bio-covers, and substitutive material to oral administration.<sup>2,4</sup>

### Indications

#### 1. Wound healing

An aqueous extract of human placenta accelerates cellular metabolism thereby providing the energy for the inflammatory changes. It prevents exudate formation, removal of unhealthy tissue and decreases bacterial load that are required for good wound bed preparation.<sup>12</sup> Tissue regeneration occurs. Aqueous extract of placenta contains regenerative nucleotides like PDRNs and NADPH.<sup>13</sup> In addition, it also supplements growth factors and small peptides that help in matrix formation and cell adhesion, thereby promoting wound healing. Placental extract plays a beneficial role as a topical agent in the management of chronic non-healing wounds. It promotes fibrogenesis, neoangiogenesis and epithelialisation.<sup>13</sup> It has anti-inflammatory and antiplatelet aggregation activity by directly modulating prostaglandin (PG) production by suppression of cyclooxygenase (COX).

- Chronic non-healing wounds
- Burn injuries
- Post-surgical dressings
- Bedsores<sup>14</sup>

#### 2. Vitiligo

The hydroalcoholic extract of placenta is effective in vitiligo.<sup>11</sup> Such an extract from human placenta with efficient skin pigmentation activity has been developed based on experimental therapies. Glycosphingolipids, capable of inducing adhesion, spreading and motility of melanoma, is present

in the extract and may lead to skin pigmentation through induction of melanocytes.<sup>10</sup>

#### 3. Skin hydration

The effect of oral intake of porcine placenta extract on skin hydration, skin barrier function and skin elasticity studied. Significant changes noted in the test group than in the placebo group.<sup>8</sup> The barrier function of the stratum corneum is lower in winter than in summer as the corneocytes that comprise it are smaller during the winter season than those found during the summer.<sup>5</sup>

#### 4. Anti Wrinkling

Porcine placenta extract has potential as an anti-wrinkling agent due to its reported anti-wrinkle and elastase inhibitor functions.<sup>6</sup>

#### 5. Alopecia

HP treatment accelerated anagen induction in the hair follicles<sup>7</sup> HP increases hair diameter, because hair thickness is proportional to the volume of the hair matrix.

6. It is used as a cosmetic supplement for skin care and skin pigmentation.<sup>10</sup>
7. Other uses: Fibromyalgia, complex regional pain syndrome, osteoarthritis, knee arthritis, radiation-induced oral mucositis,<sup>9</sup> myopic and senile chorioretinal dystrophies, rheumatic arthritis, urticaria, asthmatic bronchitis, atrophic rhinitis, cerebral arteriosclerosis, local therapy of psoriasis, Post-irradiation cystitis, menopausal symptoms and fatigue in middle-aged women.



Fig. 1: Amniotic membrane application in burn wound

## CONCLUSION

Placental extract is considered to be an excellent source of growth factors. It can be effectively used in conditions like wound healing, alopecia and even in fatigue syndrome. This is also cost effective.

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