

# Effect and Safety Analysis of Poly (L-lactic acid) in Hand Rejuvenation

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**Abstract:** Objective To investigate the efficacy of poly (L-lactic acid) application in the rejuvenation of hands, and to analyze the safety of its application. Methods two subjects with aging problems of the hands were given subcutaneous injections of poly-L-lactic acid for hand filling improvement treatment, a detailed protocol of improving treatment was developed and treated, the status of hand improvement in subjects was followed up after treatment, and standardized hand photographs were taken as a contrast basis. Results after 2 month of young onset hand repair surgery on the two propositi, the veins and prominence of the bones of the hand improved significantly in the two propositi, the darker skin complexion state improved, and the collagen content of the hand improved, with gradual fullness of the fingers in subject 1. Three months after the young onset repair surgery, the skin quality of the hand improved significantly more finely in subject 2, and the darker skin complexion problem had largely disappeared, with the bones remaining intact in the two propositi, The venous prominence problems had largely disappeared, the collagen content of the hands had improved significantly, the finger morphology of patient 1 and the problems of dark finger joints had all improved significantly, and none of the 2 subjects had related complications, and the 2 subjects had high satisfaction with the young treatment of polylactic acid hand. Conclusions the use of poly-L-lactic acid in revision treatment of hand rejuvenation has shown remarkable results and a good safety profile.

**Keywords:** Poly-L-Lactic Acid; Younger Age of Hands; Dermal Filling; Safety Preface; Löviselle

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## Introduction

The occurrence of aging in human skin with aging is one of the body's inescapable normal physiological processes, which is accompanied by changes in human skin morphology and structure, thereby causing corresponding effects on skin appearance, muscle morphology, and so on. In this complex physiological process, changes in the hands are often a manifestation of the chronological age of the human body, and the aging state of the hands is an important basis for evaluating the age of the human body [1]. Aging of the human hand is mainly characterized by changes in texture, elasticity of the superficial skin layers of the hand associated with a reduction in the amount of subcutaneous fat present in the hands, with aging of the hands most prominent on the dorsal aspect of the hands. Since the modern human quest for beauty has made the rejuvenating treatment of human hand aging a hot research field in medical beauty [2], the treatment modalities for the rejuvenation of the hand you can be roughly divided into surgical procedures, injection filling, exfoliation therapy, etc. [3]. PLLA (poly-L-lactic acid) is a biocompatible biodegradable synthetic polymer, and injectable filler using poly-L-lactic acid as a biological subcutaneous filler has been widely used in several fields, poly-L-lactic acid has a certain biological stimulating effect, which will gradually be degraded by the human body after subcutaneous injection filling, Its degradation product lactic acid is finally excreted from the body under the metabolic action of the body in the form of CO<sub>2</sub> with H<sub>2</sub>O, in the body this physiological reaction proceeds, at the same time, it stimulates macrophages, T lymphocytes, etc. to activate a low degree of inflammatory reaction, stimulates the body to synthesize collagen with connective tissue collagen and so on. Subcutaneous injection with poly-L-lactic acid as filler has shown good improvement effects on deeper wrinkles, nasolabial folds, Poikiloderma L, etc. and poly-L-lactic acid stimulates type III collagen produced in humans can

effectively improve skin aging problems, and Goldberg et al conducted a quantitative study on its effect and found that a significant increase in the synthesis of types I and III collagen in humans could be detected as early as 3 months after injection of poly-L-lactic acid [4]. This study aimed to analyze the efficacy and safety of the application of poly-L-lactic acid in the rejuvenation treatment of hands compared with nasolabial treatment, and to systematically evaluate the application value of poly-L-lactic acid.

## **1. Materials and methods**

### **1.1 Clinical data**

In this study, the efficacy and safety of PLLA (Löviselle®, SinoBiom, GXZZ No.20213130276, Specification: 340 mg/bottle) on the rejuvenation of the hand were analyzed in 2 female medical examiners who volunteered to have surgery involving subcutaneous injection of PLLA, 1 was aged 31 years old, the primary improvement site was on the back of the hand versus the dorsal side of the finger, 2 was aged 51 years old, the primary improvement site was on the back of the hand, 2 patients had different degrees of coarseness, darker skin color, and loss of subcutaneous tissue versus fat, Prominent symptoms such as hand veins and bones, 2 persons who came to medical attention were given subcutaneous injections into both hands, and the therapeutic effects on the patients' hands were recorded at certain time intervals. The compounding concentrations of the 2 case products were 340 mg, compounding was 5ml (4ml normal saline + 1ml lidocaine injection).

### **1.2 Therapeutic approaches**

Subject 1: A 25g was used according to the demand and hand status of the medical examiner in  $1 \times 50$  mm blunt needle, 5 ml of compound injection was subcutaneously injected at the center point of 2-3 cm below the dorsum of the wrist, a subcutaneous tunnel degenerative stroke was taken, a single tunnel was 0.2-0.5 ml to make the diffusion of drugs optimal, a total of 5 ml of compound injection ( $340 \text{ mg} \times 4 / 5$ ) was injected into the dorsum of the hand unilaterally; 30G  $\times$  A 4-mm sharp needle-5 ml compounded with a single 0.1-0.15-ml bolus was injected subcutaneously at the midpoint of the metacarpophalangeal and interphalangeal joints, unilaterally ( $340 \text{ mg} \times 1 / 5$ ).The physician injects  $340 \text{ mg} \times 2 / \text{time}$  in both hands, and the entire course is divided into two injections, each separated by 30-45 days.

Subject 2: A 25g was used according to the demand and hand status of the attending physician in  $2 \times$  With a 50 mm blunt needle, 5 ml of compounded injection was subcutaneously injected at a center point 2-3 cm below the dorsum of the wrist, similarly a subcutaneous tunnel was taken for degenerative beating, a single tunnel was 0.2-0.5 ml, a total of 5 ml was injected into the dorsum of the hand unilaterally and  $340 \text{ mg} \times 2 / \text{injection}$  into both hands, and the whole course was divided into two injections, each separated by 30-45 days.

### **1.3 Effects**

After two sessions of subcutaneous poly (L-lactic acid) repair, morphological changes of the hands continued to follow-up and standardized hand photographs were taken for 1-3 months from the two individuals who came to medical attention as the basis of effect evaluation, and the quality and contour of the hand at different times after treatment were compared between the two individuals. During the follow-up period, participants were administered the youth repair satisfaction questionnaire and were given a comprehensive score (on a 10 point scale), and the final score was positively correlated with the satisfaction of the participants.

## **2. Results**

Prior to the initiation of this study, written informed consent was obtained and obtained from the subjects with the understanding of this study. After 1 month of young onset hand repair surgery on the two propositi, the skin of the hand as well as the shape of the hand contour had changed more markedly in the two propositi, the veins and bony prominences of the hand had improved significantly in the two propositi, the darker skin complexion had improved, the collagen content of the hand had improved, and the finger form of subject 1 was Fuller, as shown in Figures 1 – 3, at 3 months after the young onset repair surgery, The skin of the hands of the two individuals who came to medical attention was markedly raised, the

skin was more delicate, the Darker Complexion problem had basically disappeared, the problem of bone and vein prominence had basically disappeared, and the collagen content of the hands was obviously improved, as shown in figures 1-3. After surgery with subcutaneous injection of PLLA, no possible complications such as infection, cysts, induration occurred in any of the 2 medical examiners, demonstrating the safety of PLLA in the rejuvenation of hands. In a follow-up satisfaction survey, the mean score of the 2 medical examiners' satisfaction score of the poly (L-lactic acid) hand rejuvenation treatment was 9.6, and it was seen that patients' satisfaction with this treatment was high.

Figure 1-2: comparison of treatment effects in medical doctor No.1

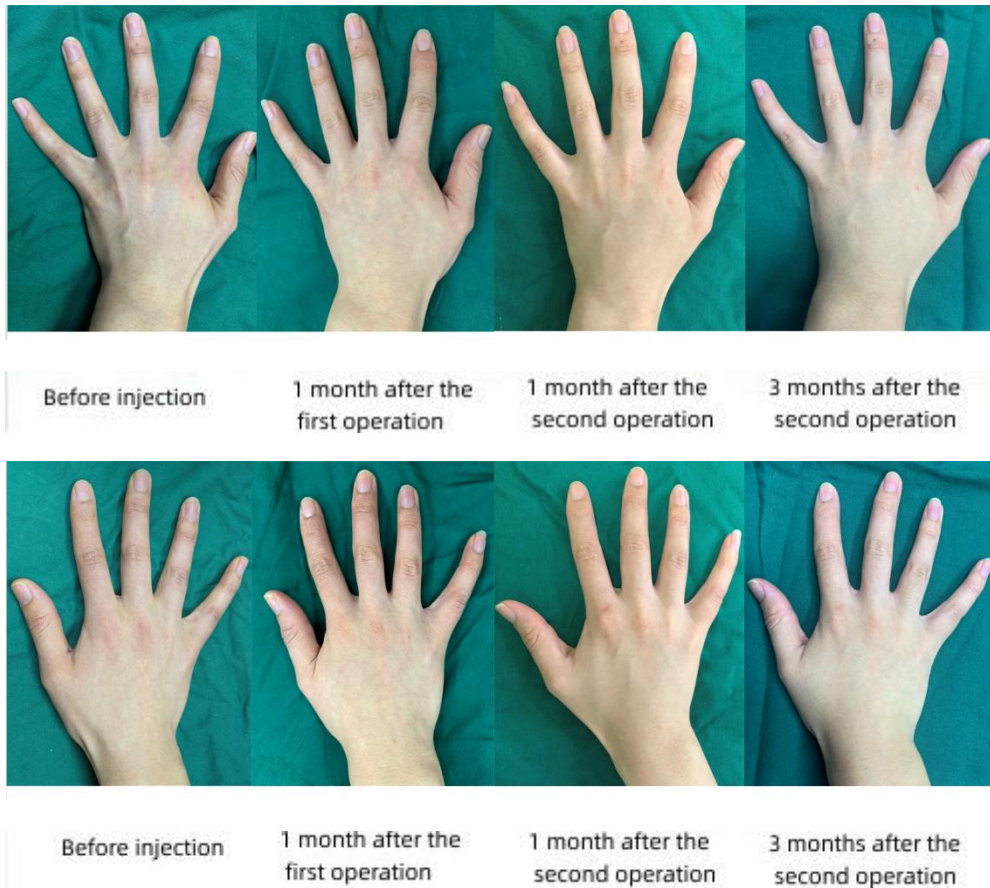


Figure 3: comparison of treatment effects among subjects of No.2



### 3. Discussion

The causes of aging in human skin are complex and diverse, as summarized in, that is, after the human skin is affected by the external environment, free radicals will form, and free radicals can produce some degree of damaging effects on collagens, reactive substances, oxidative cells, etc., within the cell membrane tissue, so that the defense function of the skin

stratum corneum is greatly curtailed, and at the same time, the thickness of the dermal layer is changed, which affects the synthesis and secretion of collagens and cell signaling molecules, However, wrinkle formation, color spots, rough skin and other problems were observed. Currently, with the increasing level of living substances, people's increasing demand for beauty has led to rapid development of various cosmetic medical technologies, and subcutaneous cosmetic plast therapy, which is treated by means of subcutaneous administration, has been widely applied in recent years with outstanding results. Injection of PLLA into the subcutaneous space at the same time as a minor injury to the skin by using a subcutaneous filling method, so that PLLA under the human skin constantly stimulates the regeneration of activated cells, promotes the rate of cell synthesis of collagen with fibrous tissue, enables the reticular fibrous structure layer to be reconstituted, and finally provides an antiaging / rejuvenating improvement to the human skin [5-6]. Poly-L-lactic acid sub ah humans undergo hydrolytic degradation to lactic acid, which is subsequently converted to glucose by a series of metabolic effects or excreted in the form of CO<sub>2</sub> with H<sub>2</sub>O, is non-toxic and has no adverse effects, requires only prophylaxis against infectious problems when treated with subcutaneous filling with poly-L-lactic acid, has a high safety profile, and after subcutaneous filling, the associated inflammatory response under But Its promoting effect on collagen synthesis may last for about 24 months[7], during which time the human hand skin increases in thickness and has a more plump and fair appearance. Some problems such as mild local swelling, bruising caused by the rejuvenation surgery of the poly-L-lactic acid hand can also heal spontaneously within 1 week [8], and the nodules and papules that may appear within a few months after the rejuvenation surgery of the poly-L-lactic acid hand can also be prevented accordingly by dilution of the drug, control of the injection depth, and local massage after injection. The results of this study show that Still maintained a good skin and subcutaneous volume improvement effect for three months after treatment with PLLA and the follow-up can be further studied by extending the sample with extended follow-up observation time targeting the duration of PLLA effect.As well as the small sample size of this study, the conclusions obtained in this study still need to be validated in subsequent large clinical practices, but with the results obtained in this study, poly-L-lactic acid still has a relatively significant effect in the revision treatment of hand rejuvenation, as well as a high safety profile, and it has great clinical application and promise.

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