

## Advantages of Using Blunt Cannulas for Lipolytic Injections in the Treatment of Submental Fat: A Prospective Cohort Study

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**Abstract:** Manufacturers recommend using sharp needle to inject lipolytic injections for Submental fat. To study the advantages of using blunt cannulas for lipolytic injections in the treatment of submental fat. We used sharp needle on one side of the face with the manual injection method, while on the other side, we utilized blunt cannula for dissection and injection. A total of 30 patients completed this study. There was no significant difference between the two treatment methods on the Patient-Reported Submental Fat Rating Scale, indicating that blunt cannula injection can provide the same therapeutic effect as sharp needle injection. There was a significant difference in Patient-Reported Submental Fat Impact Scale and Changes of Submental Fat thickness indicated the blunt cannula improved posttreatment satisfaction. Additionally, most of the patients chose blunt cannula treatment for their next session. In terms of bruising, the blunt cannula group also showed a significant fewer occurrences compared to the sharp needle group. Using a blunt cannula for dissection and injection of the lipolytic agent provides an effective technique.

**Keywords:** Lipolytic Injections; Submental Fat; Blunt Cannula

### 1. Introduction

Submental fat (SMF) accumulation affects individuals regardless of age. There are several ways to manage SMF, generally categorized into surgical and non-surgical methods.

The surgical method typically involves liposuction, a straightforward and effective procedure to remove unwanted fat. However, some patients are concerned about the possibility of uneven skin surfaces or fear surgical complication.(1)

Non-surgical methods are divided into instrumental lipolysis techniques, such as

cryolipolysis, High-Intensity Focused Ultrasound, or Radiofrequency ; and adipocytic solution injection lipolysis.(2,3)

Adipocytic solutions including phosphatidylcholine (PPC), deoxycholate (DC), L-carnitine, collagenase, hyaluronidase, triamcinolone acetonide, and other cocktail mixtures have been used in aesthetic medicine for over 20 years.(4,5)

In the United States, the FDA has approved Kybella® (DC) (Allergan USA, Inc., Irvine, CA) for the treatment of moderate to severe SMF through injection lipolysis. (4). Ronkyla® (DC) was approved for lipolysis in SMF in Taiwan (TFDA).

Since cell membranes are composed of phospholipids, emulsifying these lipids can induce adipocyte lysis. DC emulsifies phospholipids and disrupts cell membranes, leading to adipocyte destruction.(6,7)

The manufacturer's protocol suggests using a 30G, 1.5 inch sharp needle for point-by-point injections spaced 1 cm apart in a grid pattern, with 0.2 mL injected per point. Each injection covers a radius of approximately 1.5 cm, ensuring complete coverage of the target area. Typically, 50 to 60 injections are administered to ensure that the preplatysmal fat is properly targeted while avoiding penetration through the platysma muscle into the deeper postplatysmal fat layer.(4)

However, administering more than 50 injections may increase the risk of bleeding, hematoma, and potential injury the blood vessels or nerves. Additionally, multiple skin punctures raise the risk of solution exposure to the skin surface, potentially causing epidermal damage.(6)

Since each injection is administered in small amounts, the concentration of DC differs across the injection sites. Besides, sharp needles may penetrate through the platysma muscles the make the solution injected into post platysmal area.

Furthermore, submental fullness may result from

not only fat accumulation but also skin laxity. In traditional surgical liposuction, tissue re-adhesion increases skin tightness after fat removal by dissection during procedure. (7,8) Based on the aforementioned, we hypothesized that using a blunt cannula may be a safer and more effective alternative.

## 2. Animal Study

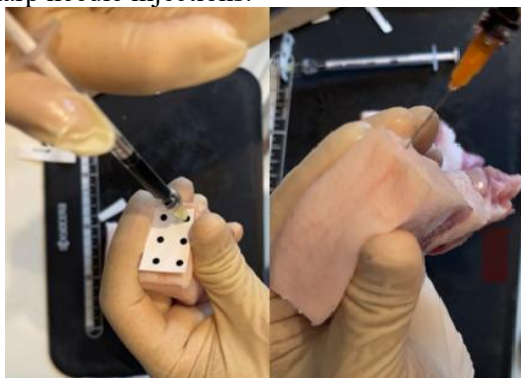
To evaluate our hypothesis, we designed a simple animal experiment. We mixed DC with blue dye (0.9ml DC+0.1ml dye) and injected it into pork fat using both a 30G sharp needle and a 23G, 5 cm blunt needle. The dye distribution was analyzed after sectioning the pork fat tissue. Our observations were as follows:

1. The dye injected with the sharp needle was concentrated at a single point.
2. When the sharp needle penetrated the skin, the dye easily stained the superficial layer.
3. The blunt cannula distributed the dye more evenly and allowed for multiple layers of injection. (figure 1,2)

DC's mechanism is primarily through direct contact with fat cells, meaning that a broader area of contact would enhance the effectiveness. Furthermore, since fat has varying thicknesses, the sharp needle failed to achieve multiple-layer injections. In contrast, the blunt cannula facilitated the injection at multiple layers, minimizing the risk of spilling dye into the epidermis, which could cause damage.

### 2.1 Conclusion from Animal Study

Our study demonstrated that blunt cannula injections distribute DC more widely, evenly, and across multiple layers of fat. It also reduces the risk of DC exposure to the epidermis. This study strengthened our confidence in the superiority of blunt cannula injections over sharp needle injections.



**Figure 1. L't Side Sharp Needle; R't Blunt Cannula**



**Figure 2. Dye Distribution After Section**

## 3. Clinical Study Design

Following our animal study and in accordance with current medical regulations, we designed a clinical study to compare blunt cannula and sharp needle injections of DC for the treatment of SMF.

### 3.1 Study Objective

The study aimed to compare the efficacy and safety of blunt cannula versus sharp needle injections of DC for the treatment of SMF.

### 3.2 Materials and Methods

#### Patient Selection

Between March 2023 to December 2023, 30 female patients aged from 32 to 55 were selected from our clinic in Taichung, Taiwan, for this study. All patients sought treatment for submental fullness and requested injection lipolysis.

#### Exclusion Criteria

Patients were excluded if they had any of the following conditions: psychological disorders, age below 18 or above 60, pregnancy, lactation, autoimmune diseases, acute infections, anticoagulant use, hemorrhagic or platelet disorders, or other contraindications listed in the package insert.

### 3.3 Study Procedure

All 30 patients received one course of DC (Ronkyla) injection (one vial containing 20.12 mg/2 cc sodium deoxycholate; 2 vial per course). Each patient received injections on submental region: one side using a sharp needle and the other using a blunt cannula.

**Sharp Needle Injection (Right Side):** A 30G, 1.5-inch sharp needle was used with a 1 cc syringe for direct injection. Each injection was administered at a depth of 0.5 cm with 0.1 cc of solution.

**Blunt cannula Injection (Left Side):** A 23G sharp needle was used to create an entry point, after which a 23G, 5 cm blunt cannula was used for

linear dissection along 10 lines. The solution was injected slowly and retrogradely (0.2 cc per line).(Figure 3)

**Outcome Measures**

We measured the following outcomes:

**Pain Levels:** Pain during and after the procedure was assessed using the Visual Analog Scale (VAS).

**Complications:** We monitored the incidence of ecchymosis, redness, and swelling after 1 days post-treatment

**Patient-Reported Outcomes:** Changes in the Patient-Reported Submental Fat Rating Scale (PR-SMFRS) and the Patient-Reported Submental Fat Impact Scale (PR-SMFIS) were used to compare improvements between the two methods after 1 month post treatment

**Changes of Submental fat thicknesss :**We use the intersection of a vertical line from both corners of the mouth and a horizontal line at the hyoid bone as a reference point. Ultrasound (Cprobe-5L,Sonostar,China) is employed to measure the distance from the skin to the muscle layer at these two points, representing the thickness of the submental fat thickness (including skin and subcutaneous tissue and fat compartment) on both sides.The changes before and one month after treatment were recorded.

**Procedure Selection:** Since lipolytic injections require multiple sessions, we allowed patients to freely choose their preferred injection method for subsequent treatments.

**Statistical analysis**

We use Paired Sample t-test and The significant threshold was set at 0.05

**Table 1. Experimental Result**

Blunt cannula compare to sharp needle	p value
Pain during procedure	>0.05
Pain after procedure	<0.05
Ecchymosis	<0.05
Redness	>0.05
Swelling	>0.05
PR-SMFRS	>0.05

PR-SMFIS	<0.05
Change of SMF thickness	<0.05
Procedure Selection	<0.05

**3.4 Discussion**

The lack of significant difference in PR-SMFRS ( $p > 0.05$ ) indicates that both treatment procedures can provide equivalent therapeutic outcomes . Moreover, blunt cannula injections promote tissue re-adhesion, thereby increasing skin tightness and simulating a pseudo-liposuction effect. This further enhances the overall aesthetic result .(PR-SMFIS ;  $p < 0.05$ ) . Change of SMF thickness was also significant in ultrasound measurement.( $P < 0.05$ ). Blunt cannula dissection facilitated better tissue adhesion, improved skin tightness, and reduced the risk of solution exposure to the skin surface, eliminating the need for post-procedure massage, which is typically required with sharp needle injections.

Our study revealed that using a blunt cannula for DC injections resulted in a more even distribution of the solution across multiple layers of fat, with fewer complications such as bleeding and ecchymosis. The blunt cannula technique also reduced the risk of vessel injury, as well as epidermal damage from superficial exposure to DC.

While our study supports the use of blunt cannula in SMF treatments, further research is needed to to assess the required extent of dissection . Additionally, more objective imaging (CT or MRI to measure the SMF volume) may be needed in the future to provide a more comprehensive assessment of the improvements.(Figure 4,5)

**4. Conclusion**

Blunt cannula lipolysis injections are a safe and effective alternative to sharp needle techniques, offering enhanced distribution of DC, reduced risks of ecchymosis and hematoma, and improved skin tightness.



**Figure 3. Landmark Point; L't Side Sharp Needle; R't Blunt Cannula; Immediate After Injection**



**Figure 4. 1 Day After Treatment**



**Figure 5. 1 Month After Treatment (Upper: before treatment; low: after treatment)**

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