

# Microcannulas in dermatology: specifications

*Microcânulas em dermatologia: especificações*

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## ABSTRACT

In dermatology, facial fillers are of great importance in the treatment of wrinkles and expression lines, their use being for aesthetic purposes. Their application is usually carried out with needles, which can lead to complications during the procedure. Among them hematomas, ischemia, necrosis, and even blindness. In recent years however, the application of fillers with microcannulas has revolutionized the techniques of application, in this way avoiding the occurrence of complications during and after the procedure. The present paper is aimed at clarifying the nomenclature, characteristics, and dimensions of the cannulas. Keywords: needles; hyaluronic acid; technical specifications

## RESUMO

*Na dermatologia, os preenchimentos faciais são de grande importância no tratamento de rugas e linhas de expressão, sendo utilizados com finalidade estética. Sua aplicação geralmente é feita com agulhas, o que pode levar a complicações durante o procedimento, como hematomas, isquemia, necrose e até mesmo cegueira. Nos últimos anos, porém, a aplicação de preenchimentos com microcânulas tem revolucionado as técnicas de aplicação e assim evitado a ocorrência de complicações durante e após o procedimento. Este trabalho visa esclarecer a nomenclatura, características e dimensões das cânulas. Palavras-chave: agulhas; ácido hialurônico; especificações técnicas*

## INTRODUCTION

Facial fillings are minimally invasive aesthetic procedures that are widely used in the daily dermatology practice. In order to perform these procedures effectively, it is very important to provide patients with less painful techniques and decreased risk of complications. They can be performed with traditional needles that, despite being effective, have some disadvantages: their sharp tips, when introduced into the patient's skin, can damage the wall of small blood vessels, being associated with increased pain, hematomas and risk of intravascular injection.<sup>1-6</sup>

In face of the new needs generated by the development of the dermatology and in an attempt to eliminate – or at least minimize – the complications associated with traditional cutting tip of the traditional hypodermic needle, the microcannulas have been developed aimed at injecting filling substances.<sup>4</sup>

A microcannula is similar to a needle, however it has a blunt tip and a lateral opening located close to the tip, through which filling materials, such as hyaluronic acid, collagen, acidic poly-L-lactic acid, calcium hydroxyapatite (CAHA) and others can be injected, in addition to the transfer of fat.<sup>1</sup>

## Review Article

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In the past, cannulas were stiff and thick. More recently, thin and flexible variations have been developed.

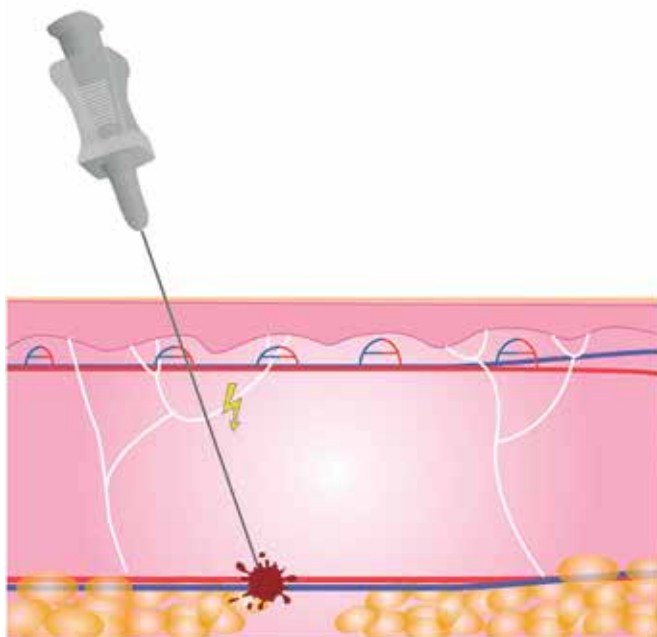
Flexible cannulas allow the uniform distribution of the filling substance and increased filling capacity in the various contours of the facial anatomy.<sup>4,7,8</sup> The microcannula's blunt tip, coupled with a greater flexibility, allows the needle to slide under the dermis with less trauma rather than traumatizing tissues and vessels – as is the case with the traditional hypodermic needle. Moreover, the microcannula's single opening offers wide coverage for each entry point, which reduces the formation of hematomas, intravascular injection and recovery time.<sup>1,3</sup> (Figure 1)

Fulton et al.<sup>2</sup> conducted a comparative study of the use of hypodermic needles and microcannulas to perform dermal fillings, concluding that the use of blunt tip microcannulas has simplified the injection of filling materials and produced less hematomas, ecchymosis and pain, with a faster recovery.

### SAFETY CRITERIA

According to international directives (Inmetro in Brazil and FDA in the USA), the cannula should have the following basic safety characteristics:<sup>9,10</sup>

- specifications on the label, registration number of the competent health organ of each country
- packaging with adequate strength in order to remain closed and sterile, being opened only by the applicator professional
- resistance to corrosion
- absence of irregularities in the tip, opening and entire length of the cannula

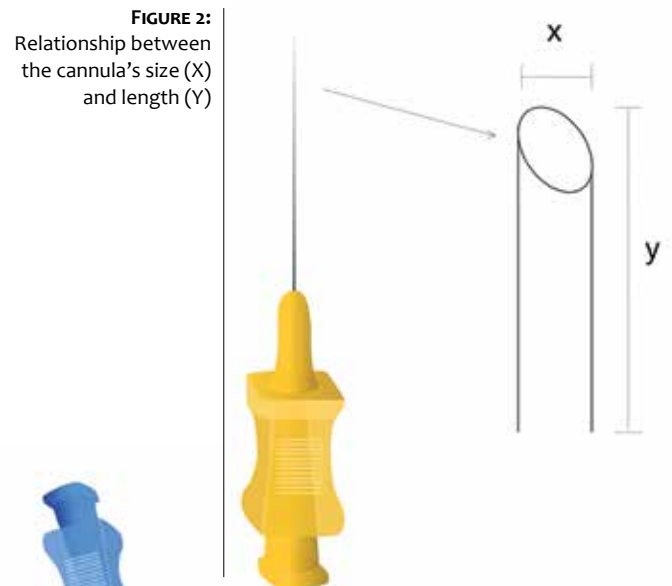


**FIGURE 1:** Difference between needle and cannula when reaching a blood vessel. The cannula's blunt tip does not traumatize the vessel; when it reaches the vessel's wall, it is deflected

Despite the importance of microcannulas in current dermatology, there are no reports in the literature analyzing the essential features of those products. In light of this fact, this paper is aimed at helping to describe and understand the different sizes of microcannulas available in the market, as well as their specifications.

### SPECIFICATIONS, INDICATIONS AND DISCUSSION

Microcannulas are available in various lengths and calibers, allowing to perform different procedures with more safety and effectiveness. Their dimensions can be encoded in different ways, which shall be well understood by the dermatologist. Both the British system (that uses *Birmingham wire gauge* units – to measure the caliber – and inches) and the metric system (that uses mm x mm units), identify the caliber and length of the shaft (Figure 2). These specifications are described on the back of the packaging, according to the country of origin.



For example, in a 20 x 0.7 (22G 1") cannula, the number 20 indicates the length (20mm) and 0.7 the gauge or caliber (0.70mm) in the metric system. Now, in a 22G 1" cannula, the letter G = gauge = caliber (22G ranges from 0.689 to 0.730 or 0.700 mm) and 1" = 1 inch, which is the length measurement when using the British system. Since 1 inch = 25.4 mm, in this example it means 25mm. If this measurement were 1 1/2", it would mean 38mm (25.4mm + 12.6 mm)<sup>9,10</sup> (Tables 1 to 3).

The term/unit gauge (G) is used as a reference of the measurement of the cannula's inner diameter. The number representing the cannula's gauge is inversely related to the lumen of

|  |     |        |
|--|-----|--------|
|  | 18g | 1,2mm  |
|  | 19g | 1,10mm |
|  | 20g | 0,90mm |
|  | 21g | 0,80mm |
|  | 22g | 0,70mm |
|  | 23g | 0,60mm |
|  | 24g | 0,55mm |
|  | 25g | 0,50mm |
|  | 26g | 0,45mm |
|  | 27g | 0,40mm |
|  | 28g | 0,36mm |
|  | 29g | 0,33mm |
|  | 30g | 0,30mm |
|  | 31g | 0,26mm |
|  | 32g | 0,23mm |
|  | 33g | 0,20mm |

**Table 1:** Identification and standardization of needles and cannulas (ISO 9626)

|  |              |           |
|--|--------------|-----------|
|  | 18G X 1"     | 25 X 1.2  |
|  | 18G X 1 1/2" | 38 X 1.2  |
|  | 19G X 1"     | 25 X 1.1  |
|  | 19G X 1 1/2" | 38 X 1.1  |
|  | 20G X 1"     | 25 X 0.9  |
|  | 20G X 1 1/2" | 38 X 0.9  |
|  | 21G X 1"     | 25 X 0.7  |
|  | 21G X 1 1/2" | 38 X 0.7  |
|  | 22G X 1"     | 25 X 0.65 |
|  | 22G X 1 1/2" | 38 X 0.7  |
|  | 23G X 1"     | 25 X 0.65 |
|  | 23G X 1 1/2" | 38 X 0.65 |
|  | 25G X 5/8"   | 16 X 0.5  |
|  | 25G X 1"     | 25 X 0.5  |
|  | 25G X 1 1/2" | 38 X 0.5  |
|  | 26G X 1 1/2" | 13 X 0.45 |
|  | 27G X 1 1/2" | 13 X 0.4  |
|  | 30G X 1 1/2" | 13 X 0.3  |

**Table 2:** International standardization of colors of needles and cannulas (ISO 6009).

| Equivalence between the British and Metric systems |                     |         |          |        |
|--|---------------------|---------|----------|--------|
| British (inch)                                     | Metric (millimeter) |         | 1:1      |        |
|  | From                | To      | Diameter | Length |
| 16 G1 1/2  | 40X16               | 1,60X40 | 1,6      | 40     |
| 18 G1 1/4  | 30X12               | 1,20X30 | 1,2      | 30     |
| 18 G1 1/2  | 40X12               | 1,20X40 | 1,2      | 40     |
| 19 G1  | 25X10               | 1,00X25 | 1        | 25     |
| 20 G1  | 25X9                | 0,90X25 | 0,9      | 25     |
| 20 G1 1/4  | 30X9                | 0,90X30 | 0,9      | 30     |
| 20 G1 1/2  | 40X9                | 0,90X40 | 0,9      | 40     |
| 21 G1  | 25X8                | 0,80X25 | 0,8      | 25     |
| 21 G1 1/4  | 30X8                | 0,80X30 | 0,8      | 30     |
| 21 G1 1/2  | 40X8                | 0,80X40 | 0,8      | 40     |
| 22 G1  | 25X7                | 0,70X25 | 0,7      | 25     |
| 22 G1 1/4  | 30X7                | 0,70X30 | 0,7      | 30     |
| 23 G1  | 25X6                | 0,60X25 | 0,6      | 25     |
| 23 G1 1/4  | 30X6                | 0,60X30 | 0,6      | 30     |
| 23 G1 1/2  | 40X6                | 0,60X40 | 0,6      | 40     |
| 24 G 3/4   | 20X5,5              | 0,55X20 | 0,55     | 20     |
| 25 G 5/8   | 15X5                | 0,50X15 | 0,5      | 15     |
| 25 G 3/4   | 20X5                | 0,50X20 | 0,5      | 20     |
| 25 G 1   | 25X5                | 0,50X25 | 0,5      | 25     |
| 26 G 1/2   | 13X4,5              | 0,45X13 | 0,45     | 13     |
| 26 G 3/8   | 10X4,5              | 0,45X10 | 0,45     | 10     |
| 27 G 1/2   | 13X4,5              | 0,40X13 | 0,38     | 13     |
| 27,5 G 1/2   | 13X3,8              | 0,38X13 | 0,38     | 13     |
| 30 G 1/2   | 13X3                | 0,30X13 | 0,3      | 13     |

**TABLE 3:** Colors, gauges, inches, length and diameter

the cannula, meaning that the smaller the cannula's gauge, the greater its diameter. This number also helps to determine what kind of substance can be infused or sucked. Thicker substances require cannulas with greater inner calibers, meaning smaller gauge units.<sup>9,10</sup>

Microcannulas are available in various thicknesses, ranging from 18G to 33G, according to the ISO 9626 standard (Table 1). Some companies follow an international specific color standard, allowing the identification according to a world standard (ISO 6009)<sup>9,10</sup> (Table 2 and 3).

Currently, the lengths available for each gauge vary according to the manufacturer, the vast majority between 25mm and 90mm. It is important to note that cannulas with greater gauges can bear longer rods. The choice of the length of the cannula should be based on the empirical experience of the dermatologist, taking into account the technique used and the area to be filled.<sup>1</sup>

According to the authors' experience, 25mm-40mm x 0.3mm-0.5mm, 27G-30G microcannulas are used for fillers with low to medium viscosity and concentration, being indicated for fine lines and nose. 25mm-40mm x 0.5mm-0.8mm (21G-25G) cannulas are used for hyaluronic acid (HA) fillers with low to

medium viscosity and concentration, in delicate areas and short distances (nasojugal fold, temporal region and nose). Microcannulas with 40mm-70mm, 0.5mm-0.8mm (21G-25G) are used for HA fillers with medium viscosity and concentration (most versatile size, used in most facial indications). Now microcannulas with 40mm-110mm x 0.7mm-1.2mm (21G-18G) are used for high viscosity and concentration HA fillers (extra length in order to cover the greater treatment area). To inject anesthetic in laser lipolysis or fat graft for delicate volumization, microcannulas with 70mm-110mm x 1.2mm (18G) are used.

It is important to bear in mind that very fine cannulas (0.4mm-0.3mm in diameter) can pierce the vessels' lumen and lead to complications – the use of the 0.3mm (30G) cannula should be primarily avoided in the main areas of risk for filling substances (glabella, lateral third of the eyebrow, and superolateral nasal wall), and in areas that have connection to the ophthalmic artery.<sup>11</sup>

## CONCLUSIONS

The use of microcannulas is an important alternative in the aesthetic filling technique procedures. It offers in many advantages, such as more safety and speed for filling deep planes, possibility of reaching distant areas with a single opening, less pain, physical and psychological trauma, edema and hematoma formation, in addition to a faster recovery. ●

## REFERENCES

1. DeJoseph LM. Cannulas for facial filler placement. *Facial Plast Surg Clin North Am.* 2012;20(2):215-20.
2. Fulton J, Caperton C, Weinkle S, Dewandre L. Filler injections with the blunt-tip microcannula. *J Drugs Dermatol.* 2012;11(9):1098-103.
3. Lazzeri D, Agostini T, Figus M, Nardi M, Pantaloni M, Lazzeri S. Blindness following cosmetic injections of the face. *Plast Reconstr Surg.* 2012;129(4):995-1012.
4. Hexsel D, Soirefmann M, Porto MD, Siega C, Schilling-Souza J, Brum C. Double-blind, randomized, controlled clinical trial to compare safety and efficacy of a metallic cannula with that of a standard needle for soft tissue augmentation of the nasolabial folds. *Dermatol Surg.* 2012;38(2):207-14.
5. Hoffmann K; Juvéderm Voluma Study Investigators Group. Volumizing effects of a smooth, highly cohesive, viscous 20-mg/mL hyaluronic acid volumizing filler: prospective European study. *BMC Dermatol.* 2009;9:9.
6. Coleman SR. Avoidance of arterial occlusion from injection of soft tissue fillers. *Aesthet Surg J.* 2002;22(6):555-7.
7. Mukamal LV, Braz AV. Preenchimento labial com microcânulas. *Surg Cosmet Dermatol* 2011;3(3):257-60.
8. Cymbalista NC, Gacia R, Bechara SJ. Classificação etiopatogênica de olheiras e preenchimento com ácido hialurônico: descrição de uma nova técnica utilizando cânula. *Surg Cosmet Dermatol.* 2012;4(4):315-21.
9. Associação Brasileira de normas técnicas. Rio de Janeiro. NBRISO:9626 07/2003. Tubo para agulha de aço inoxidável para fabricação de dispositivos médicos. Rio de Janeiro, 2003. 4p. Available from: <https://www.target.com.br/pesquisa>
10. Associação Brasileira de normas técnicas, Rio de Janeiro. NBRISO7864. Agulha hipodérmica estéril para uso único. Rio de Janeiro, 2010. 14p. Available from: <https://www.target.com.br/pesquisa>
11. Antonio, C R, Antonio, J R, Garcia, A C, Correia, A A. Preenchimento na região glabellar - dissecando as razões da alta incidência de complicações e cegueira. *Surg Cosmet Dermatol* 2012;4(2):111-3.