A paradigm shift in injecting: MicronJet™ needles

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Hypodermic needles have been used to inject medicines into the skin and deeper for over 150 years. The first hypodermic needle is suggested to have been made by Francis Rynd in Dublin in 1844 [1]. With the current interest in improving skin quality [2] and the availability of products that require placement into the dermis, it is important that medical aesthetic practitioners have the skills and tools to consistently deliver these products intradermally for optimum effect.

The MicronJet™ consists of a series of three medical-grade, miniature, thick-walled, pure silicon crystal, hollow pyramidal intradermal delivery 'needles' (Figure 1a). These are produced using a novel micro electro-mechanical system technology that enables etching and drilling of silicon using plasma technology, resulting in the production of these needles with unprecedented mechanical stability and structural precision. The MicronJet™ Hub has a blue line to allow orientation of the jets to insert into the skin and can be attached to a standard Luer slip or Luer lock syringe (Figure 1b).

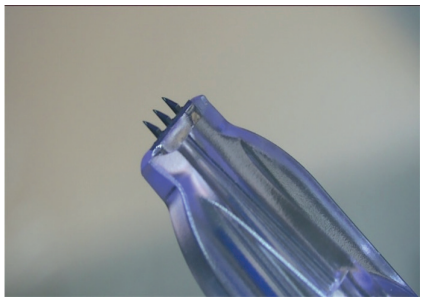

Figure 1a: View of Micron jets.

Figure 1b: MicronJet™ Hub.

The MicronJet™ 600 system use

The area to be injected is marked and cleaned with a proprietary disinfection (Medichlor S) and the product to be injected is drawn up into an appropriate syringe (3ml Luer lock or 1ml Vlow three-dose syringe). As the needles are very short, it is often unnecessary to use any topical anaesthesia.

The MicronJet™ Hub is securely attached to the syringe, the blue line should be facing upwards at every insertion to allow accurate orientation of the pyramidal jets.

The MicronJet™ is inserted into the skin at 45 degrees, although for the scalp we find 90 degrees easier. A 'hooking' motion is required to insert the jets into the skin and then stabilise the jets intradermally with a slight downward pressure. This enables a high consistency and low leakage rate.

Once in the skin the plunger can be depressed to administer a small bleb or measured dose and a high success rate is evaluated by a bleb formation in the dermis. Having made one injection, the device is removed and replaced in the skin at about 0.5–1cm intervals.

A slight back flow of material may be seen if the hub is not adequately stabilised against the skin or is withdrawn too quickly. This is dependent on the product viscosity and resistance of the skin. The thin periorbital skin has less resistance compared to the slightly thicker cheek skin.

The advantages of using the MicronJet™ 600 are that it allows consistent delivery

> "Occasionally technology advances and the tools of our trade are upgraded overnight with dramatic effects"

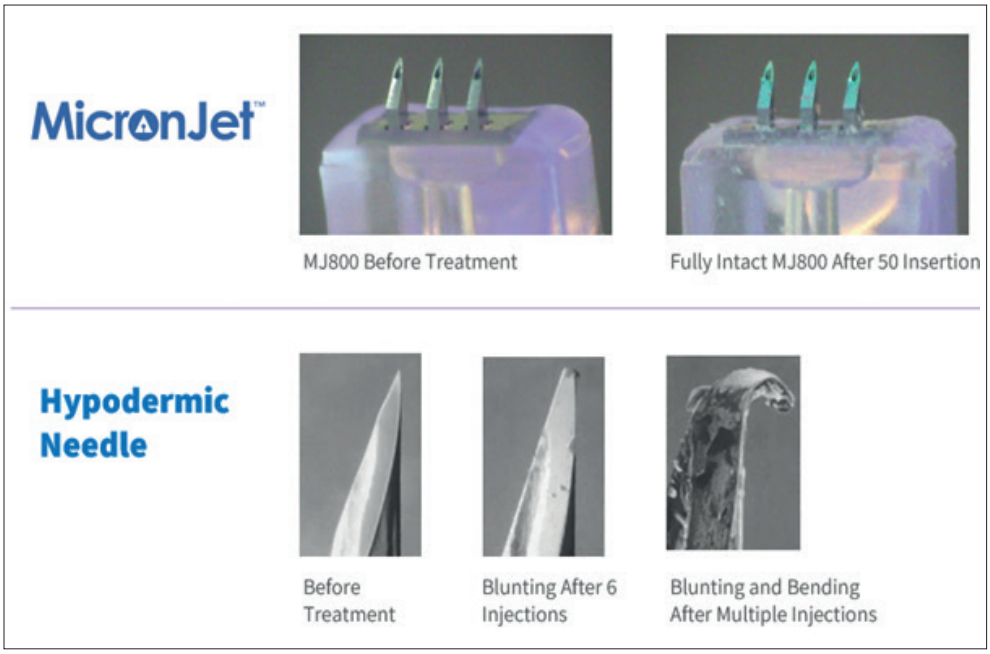

Figure 2: Blunting of hypodermicneedle compared to MicronJet™.

of products intradermally. Histological studies have shown accurate delivery intradermally at 0.4–0.6 mm [3]. The 'jets' can be inserted into the skin multiple times without blunting, compared to traditional needles (Figure 2). The 'Jets' are 0.6mm long and do not reach the capillaries in the papillary dermis. Thus, bruising is very rare unless being particularly heavy handed on very fragile skin.

The small size of the MicronJet™ and ease of use allows injections in sensitive areas, such as the periorbital area, without the risk of bruising. All products and all viscosities can be used to reach this delicate eye area without fear of deeper injection.

We find that with higher viscosity products for a 3ml Luer lock syringe, the use of the scooping technique works well; with a low viscosity (Botulinum toxin) product, the three-dose syringe allows precise volume delivery and the MicronJet™ allows precise depth of delivery. In both cases, there is no bleeding and each injection leaves a small bleb of product.

Injections into the scalp are also easy, pain free and bruise free in a highly vascular area. Thicker body skin (back, or abdomen) may require the longer MicronJet™ 800 (0.8mm needles).

For medical practitioners, this offers many benefits: more than 94% found the device easier to use than a regular needle, prefer the device over a regular needle and would recommend its use [4,5]. It is easy to use, once the technique is mastered, and provides a consistent and predictable depth of injection intradermally. All skin areas may be treated with a variety of products. With increased patient comfort and the reduction of pain and bruising, this leads to increased patient retention.

References

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Declaration of competing interests:
None declared.