The use of the Sterimedix GTI Cannula® (Amar) in the management of facial scars and contour defects

Abstract

Facial scars are common, and patients are requesting more interventions to improve the appearance of their scars and improve any contour deformity associated with the scars. Various treatment modalities have been described to improve the appearance of the scars. The Sterimedix GTI cannula® (Amar), designed by a leading plastic surgeon in the field of fat transfer for restoration of facial volume and rejuvenation, has recently been introduced to the market. Excellent patient satisfaction following the procedure and ease for the operator were achieved in undertaking the process of subcision and fat/filler transfer for volume restoration.

Key words

▸ Cannula ▸ Injection tools ▸ Facial scars ▸ Contour defects

Facial scarring, whether it is caused by trauma, surgery or acne, can lead to considerable psychological sequelae to patients. The size of the scar, as well as the cause of it, have been shown to lead to increased levels of anxiety and self-consciousness (Tebble et al, 2004). In the modern age of social media, patients are more aware of the presence of any facial scars and irregularities, and often seek treatment to improve the appearance and quality of the scars. Worldwide, acne has been estimated to affect up to 90% of adolescents (Stathakis et al, 1997), and in specialist acne clinics, some degree of acne scars have been identified in more than 95% of patients (Layton et al, 1994).

Scarring is a physiological process and any injury to the deeper reticular layer of the dermis results in the formation of scars. These can be broadly categorised into hypertrophic scars, keloid scars and atrophic scars (Gu et al, 2018), with abnormal accumulation of extracellular matrix, mainly abnormal collagen, being the main cause of keloid and hypertrophic scars (Gu et al, 2018). An atrophic scar is sunken, pigmented or hypopigmented, and is often associated with facial acne (Gozali and Zhou, 2015). The inflammation that is associated with moderate to severe acne leads to dermal collagen and fat loss, resulting in the appearance of an atrophic scar (Fabbrocini et al, 2010). Histologically, the loss of collagen, elastin and dermal fat results in the downward pull of the epidermis, creating the sunken appearance of the scar (Yug et al, 2006).

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Treatment options

A plethora of treatment modalities have been described for the management of scars. It is crucial for the treating operator to carefully evaluate the patient and the cause of scarring before embarking on any treatment. It is also vital for the operator to carefully manage the patient's expectations and for the latter to understand what can be achieved. Often, a combination of treatment modalities is required to address the different components of the scars; resurfacing techniques may be required to address the superficial irregularities, fillers and fat grafting to restore volume and surgery for scar excision and revision (O'Daniel, 2011). Management options include intralesional injections (Ahuja and Chatterjee, 2014; Newberry et al, 2018) with triamcinolone acetonide, 5-fluorouracil, bleomycin and verapamil; resurfacing techniques using chemical peels (Cho et al, 2006), dermabrasion (O'Daniel, 2011) and ablative (O'Daniel, 2011) and non-ablative lasers (Tanzi and Alster, 2004; Tanzi et al, 2008), use of fillers (O'Daniel, 2011) and fat grafting (Gu et al, 2018), subcision (Gheisari et al, 2018) and surgery (Newberry et al, 2018).

Fillers

The role of fillers in re-volumising the face has seen a meteoric rise in the last decade. There is now an emerging field where fillers are being used, either on their own or in combination with other treatment modalities, in the management of facial scars. The main aim of the filler is to restore the volume lost, especially following the inflammatory process seen in acne scars. The ideal filler would be able to reconstitute a subcutaneous scaffold, while at the same time stimulate the local tissue for neo-collagenesis (Beer, 2007). A recent review has shown

some evidence supporting the use of poly-L-lactic acid and hyaluronic acid in the management of acne facial scars (Forbat et al, 2017).

Fat grafting

Autologous fat transfer has been shown to be successful in the long term management of facial scars (Negenborn et al, 2016), including acne scars (O'Daniel, 2011). The quality of the scar has also been shown to be significantly improved with fat grafting (Pallua et al, 2014). More recently, the use of condensed nanofat with fat graft and nanofat graft combined with platelet-rich plasma and fractional carbon dioxide laser has been described in improving the quality of facial scars (Tenna et al, 2017; Gu et al, 2018). If processed in the right conditions, fat grafting has the potential of producing a stable, long term outcome, reducing the risks of fat graft resorption (Coleman, 2006).

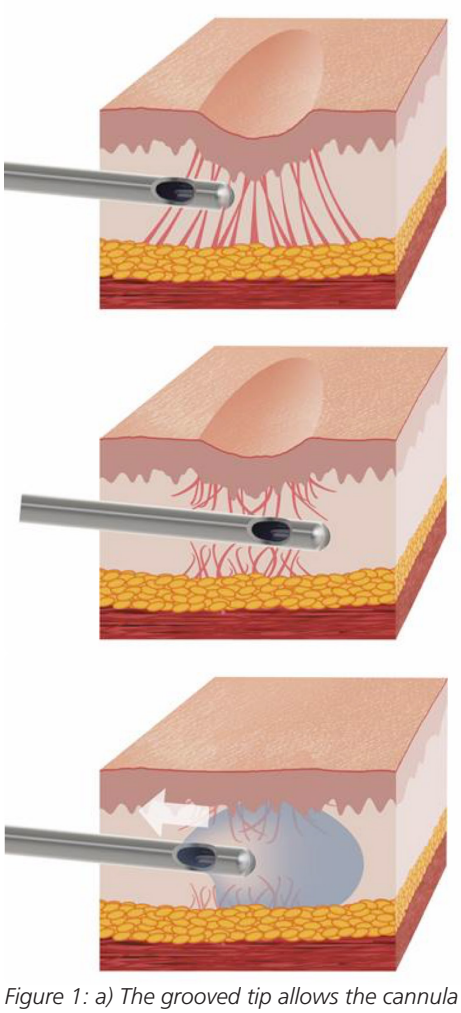

Figure 1: a) The grooved tip allows the cannula to easily move through the scar tissue, while performing a subcision; b) As the tethering bands are divided, the deforming forces on the skin surface are removed; c) The contour deformity can be corrected with filler/fat as the cannula is withdrawn. The arrow at the base of the needle indicates the opening on the cannula and guides the operator in accurately delivering the filler material

Subcision

The depression often seen in superficial scars is the result of the tethering of the skin surface to the deep dermis through compact fibrous bands and the loss of the underlying dermal connective tissue (Barikbin et al, 2017). The division of the these fibrous bands forms the basis of subcision, which is also believed to stimulate connective tissue formation. Various instruments have been devised for the process; these include the Nokor (tri-bevelled) and conventional needles, cataract blades and wires. However, in recent years, the efficiency of subcision has been challenged, as injury to operators, moderate patient satisfaction and potential injury to neurovascular structures have made it a less attractive option (Barikbin et al, 2017). The dissatisfaction has led to the development of blunt cannulas for subcision, in an attempt to reduce the risk of injury to local tissues and the operator, while at the same time improving the end result of the procedure. Various teams have reported on the superior efficiency of using blunt cannulas in performing subcision (Nilforoushzadeh et al, 2015; Barikbin et al, 2017; Gheisari et al, 2018).

The shift from needles to cannulae

When filler materials were first introduced, they were mainly delivered using needles, and this is still being done today. However, there has been a gradual shift towards the use of cannulae in recent years for the delivery of the filler material at the desired anatomical locations, as techniques for facial rejuvenation and re-volumisation have evolved. The use of needles for infiltration has been associated with increased pain, oedema, haematoma, and redness at the site of injection (Hexsel et al, 2012). Infiltration of vessels with filler materials has also been reported (Tansatit et al, 2017), which can lead to life-changing consequences, such as blindness.

The use of blunt tipped cannulae results in less bruising and lower pain scores, and has been gaining in popularity (Fulton et al, 2012). It is still generally felt by some that the use of a sharp needle applied perpendicularly to the supra-periosteal area is safe and allows for a precise delivery of the filler material (van Loghem et al, 2016). However, recent anatomical studies have demonstrated that the use of a cannula is superior and precise at delivering the filler material at the desired anatomical area, with less spilling of the material to the surrounding tissues (Pavicic et al, 2017; van Loghem et al, 2016). Although intra-vascular embolisation can occur with both needles and cannulas (Tansatit et al, 2017; van Loghem et al, 2016), the study by von Loghem et al demonstrated that intra-vascular embolisation can still happen (van Loghem et al, 2016), even if a needle is applied perpendicular to the periosteum, a technique that was previously thought to be safe in reducing the risk of embolisation.

The Sterimedix GTI Cannula® (Amar)

The Sterimedix GTI cannula® (Amar) is a new cannula that has been designed for the treatment of facial scars and contour defects. It came to fruition following a close collaboration between Sterimedix and Dr Olivier Amar, a well-established plastic and reconstructive surgeon based in Chelsea, London. Dr Amar has a vast experience in fat transfer and restoring contour defects, and felt that there was a gap in the operator's armamentarium required for the safe delivery of filler agent and fat to restore contour defects, while at the same time perform subcision and divide any adherent bands that may cause the tethering seen in scars.

In order to restore the contour defects seen in scars, the tethering bands are released using a subcision technique, either with a sharp needle and blade, followed by infiltration of the desired volume to restore the desired contour. The GTI cannula® (Amar) is specifically designed to do both, obviating the need for small blades and needles and additional cannula. The blunt cannula has a unique grooved tip that allows the cannula to pass easily through the fibrous adherent bands, undertaking the subcision process as it passes through (*Figure 1a).* In a conventional non-grooved cannula, often the cannula would not be able to pass through easily and would require considerable force form the operator, which can potential cause more trauma to the surrounding structures, and often bend the cannula itself. As the GTI cannula® (Amar) passes through the fibrous bands, the restricting bands are divided, releasing the tension from the overlying skin (*Figure 1b).* The operator can then accurately deliver the filler agent or fat at the desired location (*Figure 1c*). This would not be possible in a conventional setting, as the operator would need to remove the small blade used for the subcision and then introduce a cannula for the delivery of the filler agent. This would often not be accurate as the area targeted would often fill with blood, while the changeover of instruments is being carried out. The GTI cannula® (Amar) also has a black arrow at the base of the needle, which is in line with the side opening of the cannula. This allows the operator to orientate the cannula and accurately deliver the filer material at the desired location in a much more controlled fashion.

The Sterimedix GTI cannula® (Amar) is a 25 g, 40 mm cannula that comes with a 23 g pre-hole sharp needle. It is designed that it fits like any other cannula on any filler syringe and can also be used with Luer Lock syringes for fat transfer. This cannula is currently being used in a wide variety of clinical situations, as demonstrated in the following five case studies.

Case study 1

A 49-year-old patient presented with a depressed scar to the right side of her forehead following an injury as a child (*Figure 2a*). The initial wound was allowed to head by secondary intention, resulting in a depressed contour

Figure 2a and 2b: Depressed scar to right forehead; Contour deformity to right forehead restored, with minimal bruising

to the forehead. She was managed with the GTI cannula® (Amar), and subcision was performed to release the underlying deforming bands and the contour deformity was restored with non-permanent filler. The final result, immediately after the procedure, shows restoration of the contour and no bruising or haematoma (*Figure 2b*).

Case study 2

The patient presented with a depressed scar on her flank, from the insertion port of a liposuction cannula (*Figure 3a*). With the GTI cannula® (Amar), the tethering bands from the scar tissue were divided and the area was filled with non-permanent filler to improve the appearance (*Figure 3b*).

Figure 3a and 3b: Tethered scar from liposuction cannula; release of the tethered scar, with improvement in appearance

Figure 4a and 4b: Deepened wrinkles to the forehead; rejuvenation of the forehead, with release of the deep wrinkles

Figure 5a and 5b: Acne scars on the right malar area; smoother malar area following subcision with the GTI annula and injection of hyaluronic acid

Figure 6: Re-volumisation of the midface with nanofat grafting using the Sterimedix GTI cannula® (Amar)

Case study 3

A patient presented with deep wrinkles to her forehead, requesting rejuvenation (*Figure 4a*). With the GTI cannula® (Amar), the operator was able to release the underlying dermal attachments creating the scars, and soften the appearance of the wrinkles to the forehead (*Figure 4b*).

Case study 4

The patient presented with multiple acne scars to her face (*Figure 5a*). With the cannula, subcision was performed to divide the underlying scars, and the soft tissue contour was restored with hyaluronic acid to create a smoother appearance (*Figure 5b*).

Case study 5

A 65-year-old patient presented with deflation of the midface. Re-volumisation was carried out with nanofat grafting under local anaesthetic using the Sterimedix GTI cannula® (Amar) (*Figure 6*).

Conclusion

Minor facial scars are common and patients are seeking further treatment to improve their appearance. The use of fillers, fat grafting and subcision are among the various treatment modalities that are currently on the market. The Sterimedix GTI cannula® (Amar) has been designed specifically to allow the operator to safely divide any tethering and deforming structures and to accurately restore the volume defect, thus improving the contour appearance. From the initial case series, increased satisfaction from both the patients and the operator have been noted. JAN

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Key points

- Facial scars are common, and patients are requesting more interventions to improve the appearance of their scars and improve any associated contour deformity
- The Sterimedix GTI cannula® (Amar) has been specifically developed for the treatment of facial scars and contour defects
- Case studies have shown high patient and practitioner satisfaction in using this injection tool to treat scars, contour deformities, deepened wrinkles and acne scars, as well as in re-volumisation of the midface with nanofat grafting

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