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Fig. 5.1 Illustration of the aged face versus the youthful face with markers of changes that occur with aging

be upside down to improve the facial features but in fact even just being positioned supine as shown in the second image in Fig. 5.2 and allowing the tissues to drape over the skeletal structure of the face peripherally towards the hairline and posterior mandible restores a more youthful appearance. Thus, one can postulate that there becomes a wider separation of tissues from the outer borders of the face to the central region leading to accumulation of tissues centrally as well as inferiorly. This separation is created partially by ligament laxity, skin laxity, and fat atrophy leaving pockets of emptied tissue.

This separation of tissues can be addressed using threads. One can consider the threads as being utilized to approximate the tissues that have been displaced



Fig. 5.2 Image of face showing improvement of signs of aging including descended cheeks and jowls when supine (on right) compared to upright (left).

centrally and inferiorly with the tissues of the periphery. Approximation of the displaced tissue closes the gaps, supports the stretched ligaments and skin, and provides a type of “internal splint” or in the case of threads more accurately “suture” to hold tissues in place while collagenesis and remodeling takes place during the subsequent months. How the barbed sutures approximate tissues that has been separated by loss of collagen and volume can be demonstrated in a pig skin model which most closely resembles human skin. Figure 5.3 shows two intact pig skin models that are marked to show that initially the markings are at equal distances from each other. When the pig skin model that is already more plump and appears to have healthier skin has its skin undermined with removal of some tissue, it can be shown that the skin overall becomes thinner and flatter (Fig. 5.4). In addition, the distance between the markings has also now increased in comparison to the intact pig skin model (Fig. 5.5). This is like what happens as aging occurs in human skin. The skin spreads, descends, prolapses, and thins. In fact, analogous to how the

Fig. 5.3 Intact pig skin models with markings at equal distances from each other



Fig. 5.4 Pig skin model with undermined tissue is now thinner, flatter, with distance between markings now greater than the intact pig skin located behind it



Fig. 5.5 Distance between markers is now longer in the pig skin model of aged skin (lower) versus intact pig skin (upper)



Fig. 5.6 Pig skin model with undermined tissue shown with thread placed but not yet pulled tight to approximate the tissues and close the gaps



Fig. 5.7 Distance between the markings on the pig skin model with tissue approximation from threads is again now near equal to distance of the markings on the intact pig skin model



distance between the markings increase in the pig skin model, birthmarks on human skin have been shown to change their relative position on the face with aging. While in the pig skin model, the gaps are completely empty for demonstration purposes, in the human live skin, the gap may not be completely empty but is deficient and has remaining overlying skin that is stretched over the gap. In Fig. 5.6, the pig skin model for aging is shown with a thread inserted under the skin but not yet pulled tight to approximate the tissues closer together. Figure 5.7 shows on this same pig skin model that when the threads are pulled to approximate the tissue closer to one another, the gaps are closed and the skin becomes thicker and more plump again. The distance between the markings on the pig skin model for aging after the threads are pulled is now near equal to the intact pig skin model seen above it in Fig. 5.8. The threads are used to approximate the edges of the gaps, providing the “splint” needed to allow closure and remodeling of the gap. For human skin as well, the threads thus can be used to provide the approximation of tissue needed to allow remodeling, contraction of skin, and repositioning of centrally and inferiorly pro-lapsed tissues closer to the tissues of the periphery of the face.

Fig. 5.8 Pig skin model with threads pulled to approximated tissues together in comparison to intact pig skin model seen behind it



Reference

Wulc AE, et al. Anatomic basis of mid-facial aging. In: Hartstein M, et al., editors. Midfacial rejuvenation. New York, NY: Springer; 2012. p. 15–28.

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Chapter 6

Variations of Threads



There are many different types of threads with different sizes and modifications. They are used for different purposes and different areas of the body (See Table 6.1). In addition, different threads may be more suitable for different face and skin types (See Table 6.2). The kinds of threads available differ by manufacturer although there are similarities between them. Since specific details and names will vary between different companies as well as between different countries, this section will not be an exhaustive account of all the different types available but will be a general overview. The threads discussed will be mono threads, spiral threads, mesh threads, barbed threads, and nose threads. There will also be information about threads of different molecular composition including Polydioxanone (PDO), Polycaprolactone (PCL), and Poly-L-Lactic Acid (PLLA).

6.1 Mono Threads

These are very thin threads generally ranging from 23 to 30 gauge. They are characterized by being smooth and flat rather than barbed or twisted (Fig. 6.1). The length can vary from very short 15 mm to as long as 60 mm. Most commonly they are loaded on sharp needles in order to ease insertion, since usually a large number of them are placed in one area. Some are loaded on a cannula in order to ease placement over bony structures or to decrease risk of bruising in thin skin areas such as near the eye. These are placed generally in the upper subcutaneous layer. They are smooth on the surface having no barbs and no alteration in texture and lie completely flat once inserted. They are useful simply to stimulate collagen thereby improving the skin texture. They do not perform any movement of tissue. They are perhaps the easiest to insert as it is just a matter of simply sliding the needle or cannula under the skin and once the needle or cannula is removed the thread remains in place. There is virtually no risk of dumping. There is, however, more risk of

Table 6.1 Types of threads and their Functions

Type of thread	Common uses and function
Mono thread	For mild collagen stimulation, skin brightening, mild-moderate skin tightening, mild-moderate fat reduction, and cellulite improvement. Multiple sessions needed for more significant improvement in skin thickness may be required. Does not provide any significant repositioning of soft tissue. Can be used in all areas of face and body.
Spiral Thread	For more collagen stimulation than mono threads and mild volumization. Does not provide direct repositioning of soft tissue. Ideal for necklace lines and lip vermillion border. May be used in all areas of the face and body.
Mesh Thread	For significant collagen stimulation and volumization that is comparable to filler efficacy. Can be used in areas where building of volume and definition is desired. Ideal for brow bone, temples, undereye tear troughs, cheeks, nasolabial folds, marionette lines, chin, skin tightening for crepey skin. May be preferable for very thin patients instead of barbed threads.
Barbed/Cog/Molded Thread	For repositioning of soft tissue on face and body as well as significant collagen stimulation. Ideal for eyebrows lifting, cheeks and jowls repositioning, and submental neck laxity improvement.
HIKO or Nose Threads	Specialized threads for nose elevation and definition, only to be used for nose procedures.

Table 6.2 Thread recommendations for different patient face and skin types

Face and skin type	Recommended threads to consider
Thin skin with very little fatty tissue, hollowing more than sagging skin, patient with thin body habitus.	Recommend mesh threads first to thicken skin. These patients may not need barbed thread for cheeks and jowls at all but if still desired or needed the barbed threads will perform better after skin is thickened from the mesh threads. 21 gauge barbed threads if barbed threads desired.
Thick skin, heavy laxity with fat descent or accumulation.	18 gauge barbed threads to lift and reposition tissue at deeper layer. In addition, 21 gauge barbed threads inserted in more superficial fat layer to promote shrinkage of fat layer.
Average thickness skin and moderate laxity.	21 or 19 gauge barbed threads to lift and reposition tissue. 21 gauge if thinner skin and more fat loss.
Early skin aging, mainly for prevention or if collagen desired	Monothreads or spiral threads. Mesh threads as well in localized areas where early signs of aging such as thinning undereye skin.

bruising with the threads that are loaded on sharp needles. These threads are ideal for areas of skin where barbed threads would not be appropriate. They are versatile in that they can be placed in nearly any area of the skin. However, caution must be taken in terms of setting expectations for patients. These will not provide the dramatic changes in face shape or sagging. These threads require multiple applications over several months period in order to optimize improvement in the quality of the skin. It is best to do sessions 1 month apart for at least three sessions or more. It is

Fig. 6.1 Mono thread loaded on needle



Fig. 6.2 Spiral or twist thread loaded on needle



best to use as many threads as possible. They can be placed in a cross hatch pattern to increase the number of threads and provide more coverage. It is recommended that the threads are inserted as close as possible next to each other in order to induce collagen in the skin uniformly. The threads will serve as a scaffold for growth of collagen so more threads will maximize the degree of collagen stimulation.

The mono threads are an alternative for patients who are fearful of having barbed or cog threads placed, however, patient selection and expectation must be handled carefully. For example, anyone with even mildly sagging jowls and expects the jowls to be improved will be disappointed. Instead, mono threads would be best for patients who have very thin skin and no jowls but would like improvement in their skin quality. They would be useful also in patients who have very little fat and such thin skin such that cogged threads may not hold in their skin. The mono threads can be used in these patients to prepare the skin so that it is thicker and may hold barbed or cogged threads better.

These threads are indeed also more versatile because they can be placed on a cannula. When they are loaded on a cannula, a small pilot hole must be made with a needle in order to be able to pass the cannula into the skin. Since these are not loaded on a sharp needle, they can be used in areas that are bony such as for skin over knees, elbows, hands. They can also be used around the eyes such as the upper or lower lid where using needles would be more dangerous and lead to bruising.

6.2 Spiral or Twist Threads

These are like the mono threads, however, instead of lying flat they are usually in a curled shape (Fig. 6.2). They are loaded on a needle and can be seen wrapping around the needle in a tighter curl or spiral pattern such that when the thread is unloaded from the needle it will lay in the skin in a spiral pattern rather than lying flat. This shape allows for placement of more thread material and occupies more space within the skin. Thus, there is a bit more stimulation of collagen and filling than the mono threads. They generally are available in different lengths ranging from 38 to 90 mm and in different thicknesses ranging from 25 to 29 gauge. They are similarly as easy to insert as the mono threads and have very low risk of dumping or irregularity. They are inserted in the same upper subcutaneous layer. Since