Omphaloplasty: X-Shaped Flap Technique

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Introduction

The umbilicus has an important role in the natural and aesthetic appearance of the abdomen [1, 2]. Since the first surgical procedures on the abdominal wall were performed, multiple techniques have been tried to restore the normal anatomy in this region by reconstructing the umbilicus [1, 3–14].

The umbilicus is the only "natural scar" present after birth, and its nature and anatomy have been carefully designed so that it can remain through the entire life in perfect harmony with the body. The normal umbilicus is a depressed scar surrounded by a skin fold, located over the linea alba usually at the level of the iliac crest [15] (Fig. 1). As the body ages, the appearance of the umbilicus changes: from small and vertically oriented in young patients to rounded and transversally oriented and displaced into a lower plane in the elderly and overweight patients (Fig. 2).

Because various pathologies affect this embryological remnant, reconstruction techniques have become a major concern to restore a natural look [1–4, 11, 16, 17]. Moreover, with the advent of abdominoplasty, it has become important to get aesthetically pleasant results [18] since clothing such as underwear or swimwear does not cover this area (Fig. 3). Nowadays, many techniques have been described for better-looking and long-term results [17, 19, 20].

The most frequent cause of abdominal wall anatomy distortion is the change due to pregnancy [21]. These alterations include: hyperpigmentation (mostly over the linea alba) that occurs in up to 90 % [22] of these patients as a result to the natural hormonal effect and over-stretching of the abdominal skin resulting not only in the development of striae [23] but also in disruption of the normal umbilicus anatomy. This is even more evident in Latin/Hispanic patients that tend to have darker skin. When the old umbilicus is placed in its new position over the flap, the pigmentation

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W. Murillo (ed.), *Omphaloplasty*, https://doi.org/10.1007/978-3-319-64313-7_16

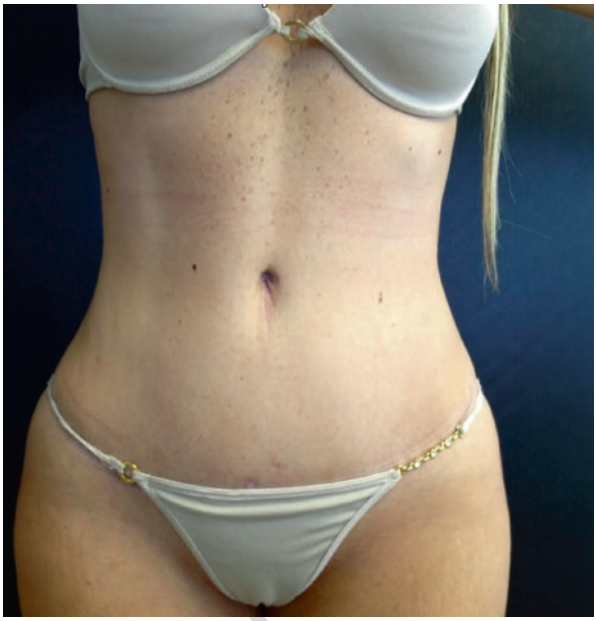

Fig. 1 A 35 year-old female. Aesthetically pleasant umbilical shape and ideal position, note superior skin fold and the vertical position over the linea alba

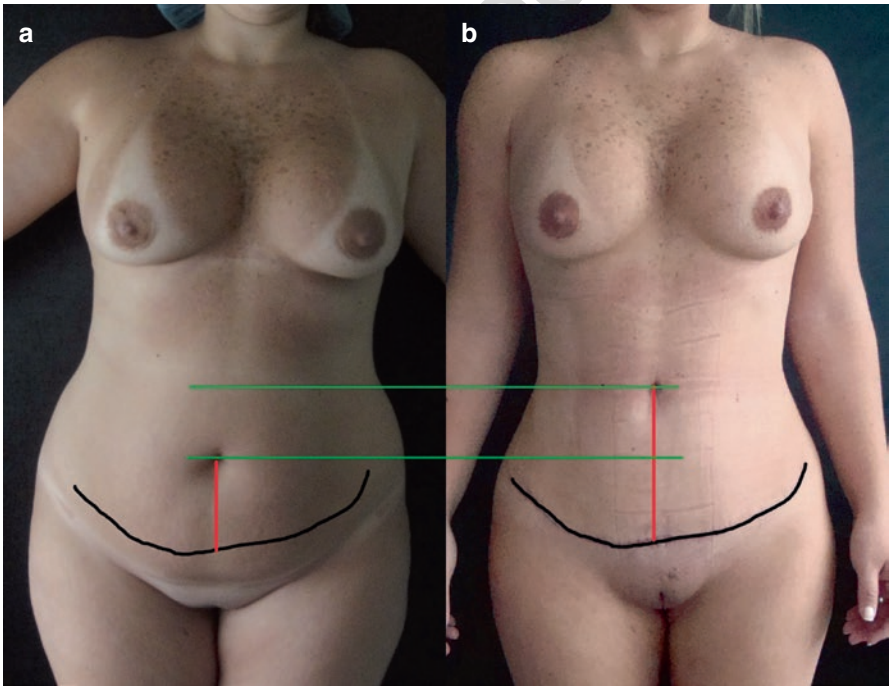

Fig. 2 Umbilical position on an overweight patient, (**a**) pre-operation showing the lowered position measured using a line from the pubis to the umbilicus. (**b**) Post-operation showing a youthful-looking umbilicus. Note the increased pubic-umbilical distance

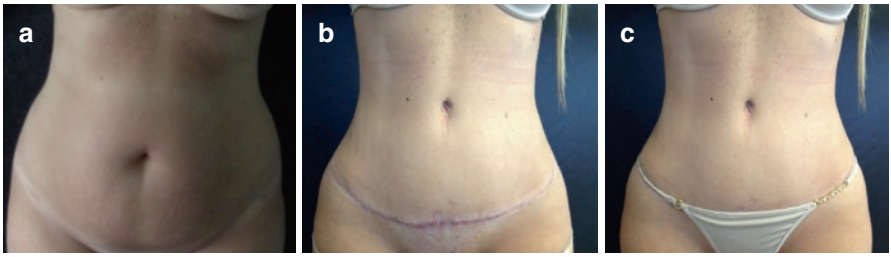

Fig. 3 A 35 year-old woman who underwent 4D dermolipectomy with a 2-week delayed umbilicoplasty. (**a**) Pre-operation, (**b**) Post-operation showing the neo-umbilicus and the lipectomy scar, (**c**) Post-operation with underwear, note that the scar is totally hidden under the underwear

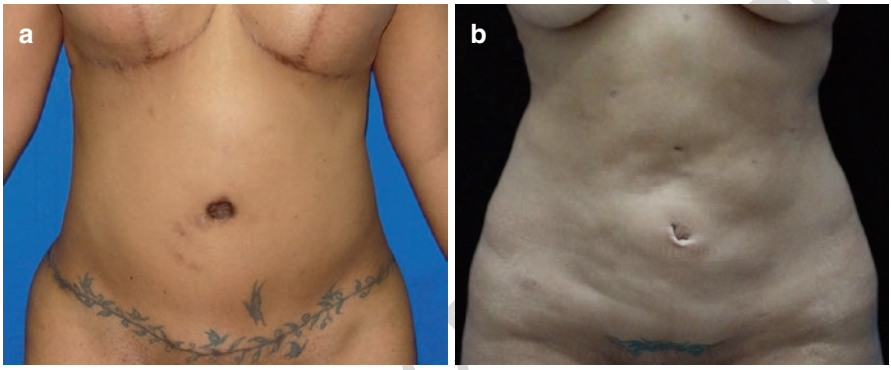

Fig. 4 Poor results achieved with other different umbilicoplasty techniques. (**a**) Hyperpigmented umbilicus compared to the abdominal flap. (**b**) Distorted umbilical anatomy. Note the skin fold rotation and displacement

difference makes the results unnatural and far from the aesthetically desired outcome (Fig. 4a).

Umbilical deformities can also occur as a result of fibrosis' side effects, scarring after other abdominal procedures like liposuction or mini lipectomy (Fig. 4b), presence of hernias, and over-stretching due to pregnancy.

We describe a different and reproducible technique for umbilicoplasty called "X-shaped incision" technique. This technique is mostly associated with abdominoplasty, which allows us to achieve better aesthetic results by placing the neo-umbilicus at a more accurate anatomical position and avoiding the undesirable morphology changes of pregnancy and pigmentation mismatch, since the old umbilicus is cut out and replaced with a new one.

Pre-operative

Preparation includes anesthesiologist evaluation and lab tests according to the AHA (American Heart Association) guidelines [24]. Patients with anemia (serum

hemoglobin <12 mg/dL) are excluded. Markings are performed following lipoabdominoplasty concepts and high definition techniques. Pre-operative photographs are taken.

Markings

Several locations have been proposed for the most aesthetically pleasing umbilical location in women [23, 25]. There is still no consensus and three locations are mostly used. The first is a point over a line between the xyphoid process and the pubis, at a point that is 60 % upwards on this line [15]. The second location is the point where the midline intersects a line between the anterior–superior iliac spines [23]. The third location is 15 cm measured up from the pubic bone [25].

Experience has shown us that it would be better to consider an area in which the umbilicus should be placed rather than a specific point. According to this, we do not use the iliac crest as a point of reference because it has a wide variation in width and height depending on the female bone shape. Instead, we have defined an "Ideal Umbilicus Zone" as the area delimited over the midline (from the xyphoid process to the pubis) between the midpoint and the joint of the two upper thirds with the lower third. Within this line, the umbilicus should be placed in a higher or lower position according to the height of the patient (Fig. 5). Therefore, the longer the torso and the younger the patient, the higher the umbilicus location can be. On the contrary, older patients and patients with breast ptosis (due to the visually shorter torso) might have the umbilicus placed in a lower location.

After defining the best location for the umbilicus, the zones for deep and superficial liposuction are marked (Fig. 6). This allows for extra fat resection after the lipoabdominoplasty.

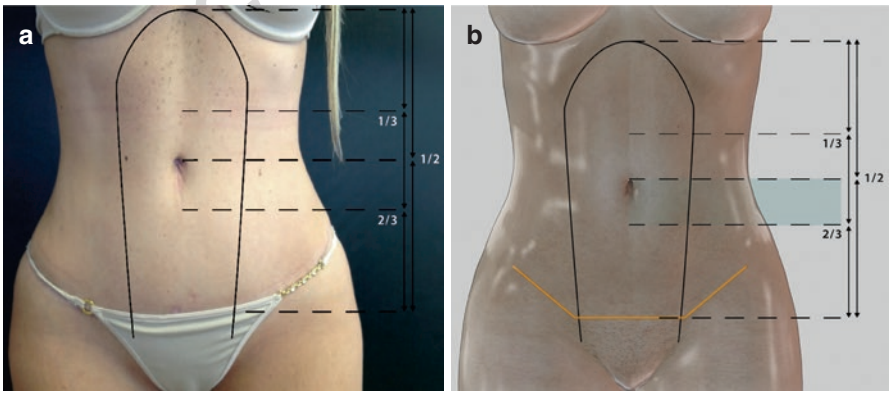

Fig. 5 Ideal zone for the neo-umbilicus placement. Note that there is not a point but an area, so even more natural results are achieved, according to each patient's measurements AU6

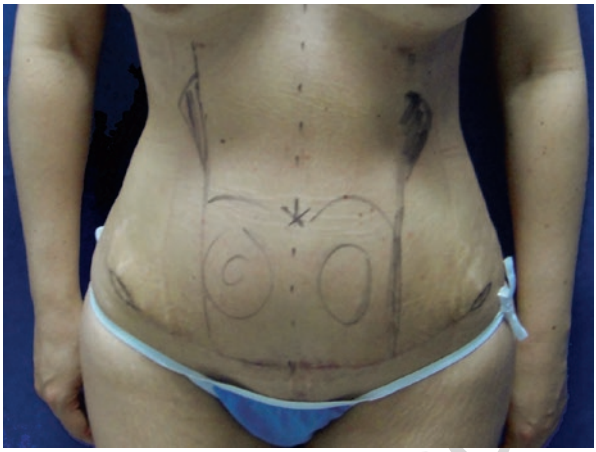

Fig. 6 Pre-surgical marking: the neo-umbilicus position is marked as well the areas for additional liposuction

Surgical Technique

Umbilicoplasty is mostly done following the lipoabdominoplasty procedure (normally by 2 weeks). We prefer delaying the procedure in order to reduce additional trauma to the abdominal flap, avoiding a drop in blood supply to the distal flap. The decision on performing delayed neo-umbilicus depends on the flap tension and the amount of liposuction over the abdominal flap. Both of these factors are evaluated during the procedure. The timing to perform the neo-umbilicoplasty is determined by the removal of the abdominal drain (closed Drain- Blake™ ETHICON, INC Johnson & Johnson) when the drainage is less than 50 mL in a period of 24 h.

After the umbilicus position is marked, a cross (X-shaped) incision, with 60° in the apex angles, is made across the linea alba deep enough to reach the rectus abdominis fascia (Fig. 7). Upper incisions must be 10 mm long and lower ones 5 mm. As a result, four triangular flaps are made: superior, inferior, left, and right. The three lower flaps are sutured with a continuous subcuticular stitch and fixed upwards to the abdominal fascia at the base of the upper flap (Fig. 8). The superior flap is then fixed loosely to the fascia in a perpendicular manner.

Post-Operative

The wound is covered with gauze embedded with topical antibiotic (nitrofurazone) to induce a round umbilicus shape. After week 1, the gauze is removed and a silicone spherical splint or a marble is left in the umbilical hole for 2 extra weeks.

Loose garments and a foam vest are indicated for use from 4 to 6 weeks after the lipoabdominoplasty. After the umbilicoplasty, the garment is used for 2–4 extra weeks (Figs. 9 and 10).

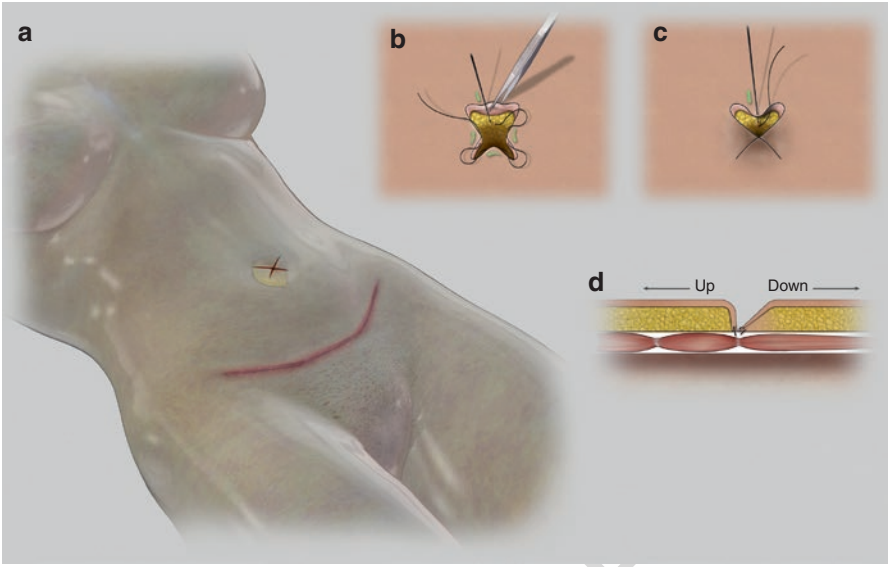

Fig. 7 Butterfly umbilicoplasty technique illustration: (**a**) planning of incisions, (**b**) the three lower flaps are sutured with a continuous subcuticular stitch and fixed upwards to the abdominal fascia, (**c**) the superior flap is fixed loosely to the fascia in a perpendicular manner, (**d**) side view of the suturing showing the loose and perpendicular attachment of the superior flap AU3

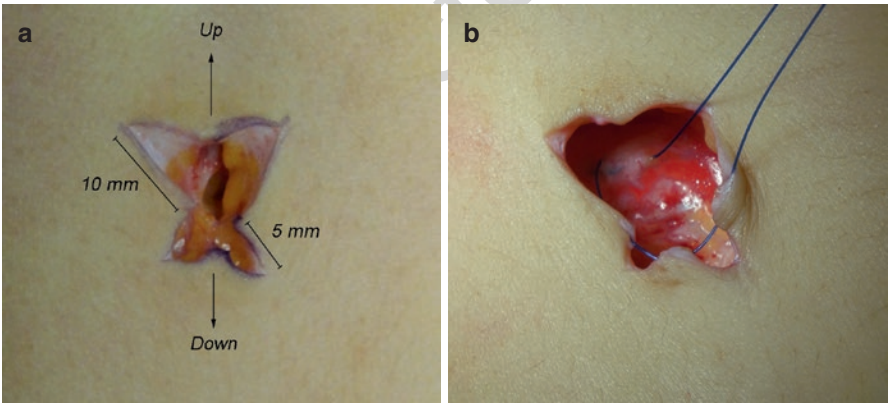

Fig. 8 Butterfly incisions: (**a**) Upper incisions must be 10 mm and lower incisions 5 mm. Note the butterfly-like appearance of the wound. (**b**) Fixation of the three lower flaps to the abdominal fascia using continuous sutures

Conclusion

Many techniques have been described for umbilicoplasty as the primary goal is to achieve a natural and youthful appearance of the umbilicus. However, most publications do not report long-lasting or satisfactory results.

X-shaped umbilicoplasty describes a new way to remake the navel for patients, mainly after full lipoabdominoplasty, but also after tumor resections, hernia reconstructions, or any other procedure involving umbilical deformities.

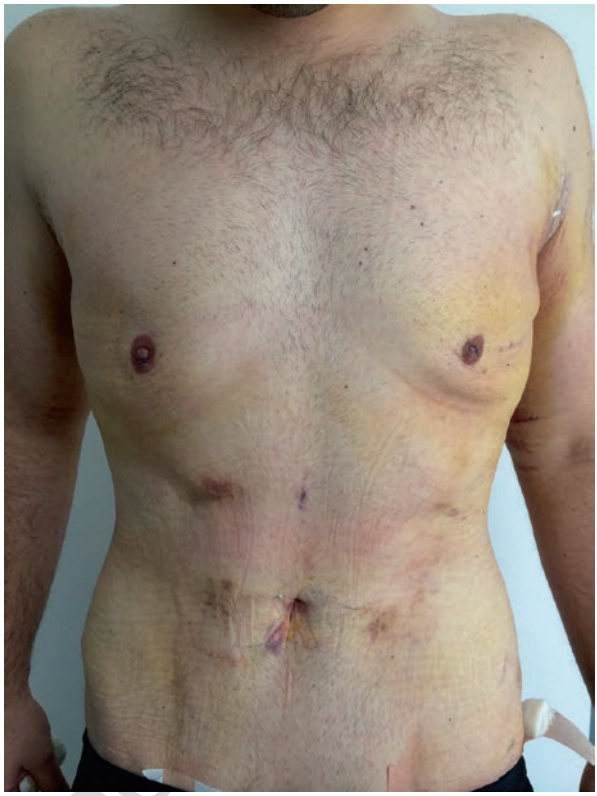

Fig. 9 Neo-umbilicoplasty. A 38 year-old man who underwent Butterfly neo-umbilicoplasty after full lipoabdomino-plasty and liposuction. Final post-operative view after 1 week -

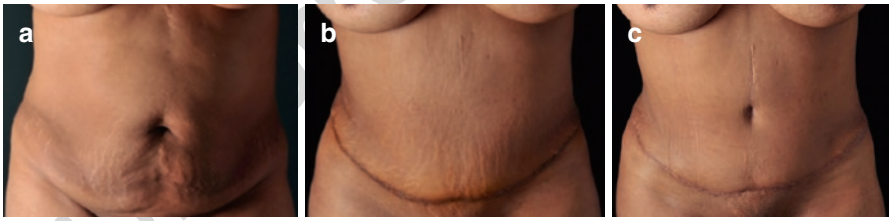

Fig. 10 Neo-umbilicoplasty: (**a**) pre-operative , (**b**) 2-weeks post-operative after abdominoplasty without umbilicoplasty, (**c**) final post-operative view 4 weeks after umbilicoplasty and 6 weeks after abdominoplasty

Delaying umbilicoplasty may improve the flap perfusion and thus reduce the ischemia and necrosis risks of the lipectomy flap. This delay also allows for further liposuction over the flap and/or additional skin resection, if needed. Creation of the new umbilicus can be performed under local anesthesia with minimal morbidity. Most of the scar is on the tip of the flaps and these ends are buried above the muscular fascia. Also, no open wounds are left in this technique so no secondary healing is necessary.

A special issue is how to convince a patient to have two surgeries instead of one, and to remain without a navel for a period of time (~2 weeks). Informing the patient

about the advantages of performing a delayed neo-umbilicoplasty, like the possibility of improve liposculpture with equal or less risk of flap necrosis, better umbilical scar and shape, and improving the final abdominal appearance, usually makes the patient decide to go for a two-stage procedure instead of a single operation.

Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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