Superiorly Based Triangular Flap Umbilicoplasty in Abdominal Dermolipectomy

ABDELMOHSEN K. ABOUELDAHAB, M.D.

The Department of Plastic and Reconstructive Surgery, Faculty of Medicine, Alexandria University

ABSTRACT

The abdomen plays a leading role in the aesthetic image of the upright human body, and the umbilicus is an important structure from both aesthetic and symbolic standpoints. The umbilicus defines the median abdominal sulcus and its absence leads to an unnatural abdominal appearance. Since the development of abdominoplasty there has been a continuing evolution in the performance of umbilical repositioning or reconstruction.

Several techniques have been described, but none of them completely satisfy the aesthetic targets in all patients. Umbilicoplasty techniques vary greatly, in both the manner which the umbilical scar is incised, as well as the manner in which the skin opening in the abdominal flap is opened.

Aim of the Work: To present a refinement of the technique for umbilical relocation in abdominoplasty cases by using a superiorly based triangular abdominal flap to improving aesthetic outcomes.

Patients and Methods: Fifty female patients presented to the plastic surgery clinic at Shaab Medical Center (Kuwait) in the period from October 2010 till July 2013 complaining from variable degrees of abdominal skin laxity.

Results: The post operative course was smooth for all patients, with none experiencing any infection or wound dehiscence.

Conclusion: The umbilicus is the major aesthetic focus of the abdominal wall. Our technique restores a natural, youthful umbilicus with minimal scarring, and a superior hood and demonstrated versatility.

Key Words: Umbilicoplasty – Triangular flap – Hooding – Stenosis – Heart shaped.

INTRODUCTION

The abdomen plays a leading role in the aesthetic image of the upright human body, and the umbilicus is an important structure from both aesthetic and symbolic standpoints. The umbilicus defines the median abdominal sulcus and contributes to the curved shape of the inferior abdomen. Its absence leads to an unnatural abdominal appearance, and an abnormally shaped or misplaced umbilicus may draw undue attention to the central abdomen. The umbilicus is embryonic in origin and itself has been described as a depressed scar surrounded by a natural skin fold that measures 1.5-2cm in diameter and lies anatomically within the midline at the level of the superior iliac crest 10-12cm superior to the pubic hairline [1,2]. Its shape is quite variable, either round or oval, depending on the postnatal scarring of the umbilical cord. It generally is flat and vertically oriented in young individuals and later develops hooding and deepening of the stalk as fat accumulates along the deep fat pocket around the umbilicus [3,4].

Commonly, a wide and deep umbilicus or an exceedingly small umbilicus is considered unattractive. The presence of outward protrusion also is considered unappealing [1]. Appealing umbilicus characteristics include a moderately small umbilical size and an overall vertical orientation.

Since the development of abdominoplasty there has been a continuing evolution in the performance of umbilical repositioning or reconstruction. The goal of umbilical repositioning is to create a naturally appearing morphology and minimal residual scars, achieving an aesthetically pleasing result [5]. Several techniques have been described, but none of them completely satisfy the aesthetic targets in all patients.

Umbilicoplasty techniques vary greatly, in both the manner in which the umbilical scar is incised, as well as the manner in which the skin opening in the abdominal flap is opened and repaired at the aponeurosis and/or the umbilical stump [3-8]. In early abdominoplasties, little or no attention was paid to the umbilical scar, which was frequently excised with an excess of dermal-adipose tissue. For aesthetic reasons, some surgeons began to preserve the umbilical scar, maintaining it in its normal position [7].
Operated abdomens are frequently associated with the stigma of an umbilical scar based on two reasons: the positioning of the scar and/or the transverse aspect of the new umbilicus. Multiple surgical techniques have been described in order to avoid this stigma, including those published by Baroudi [6], in 1975; Avelar [7], in 1978; and recently, D’Assumpçao [8], in 2005.

It was dissatisfaction with the appearance of the post operative umbilical scar that gave impetus to the development of a new technique aimed at providing patients with an improved appearance at the surgical area and greater postoperative satisfaction.

Aim of the work:
To present a refinement of the technique for umbilical relocation in abdominoplasty cases by using a superiorly based triangular abdominal flap to improving aesthetic outcomes while decreasing the complications rate. This technique is a modification of a previous work described by Juri et al. [9].

SUBJECTS AND METHODS

Fifty female patients presented to the plastic surgery clinic at Shaab Medical Center (Kuwait) in the period from October 2010 till July 2013 complaining of variable degrees of abdominal skin laxity with or without muscle diastases. Their age ranged from 24-51 years, all of them were of average Body Mass Index between 23-28, average 24.2. Patients with huge umbilical hernias, or previous history of transumbilical laparoscopic procedures, chronic chest diseases or with history of deep vein thrombosis were excluded from the study.

Preoperative preparation:
Preoperative markings were done with the patient in the standing position. The regular markings for abdominoplasty were drawn with special attention to the midline extending between the symphysis pubis and xiphisternum (Fig. 1). All patients gave their written informed consent prior to the operations and before taking the preoperative documentary photos.

Operative technique:
Under general anesthesia supine position, the procedure started by super wet liposuction following infiltration of tumescent fluids and proceeded till the umbilical dissection.

After the abdominal flap was dissected cephalically, the umbilicus was dissected through a narrow elliptical or circular incision and was isolated from the surrounding skin and soft tissue preserving its stalk vascularity untouched. Stay suture were taken to mark the upper and lower ends to avoid twisting or rotation later on in the procedure. Any existing divarication or rectus muscle diastases were plicated in two layers using strong vicryl and prolene sutures. The amount of skin flap that has to be excised was measured carefully after flexing the operating table that allowed for the proper assessment of the amount of skin ressection that was needed to be achieved.

After excising the excess skin flap, the new location of the umbilicus was marked. Determination of the location was primarily suggested according to the patient’s height and would be either 13,15, or 17 Cms from the symphysis pubis. The exact position was obtained by placing the surgeon’s finger beneath the abdominal flap to detect the original umbilicus location (Figs. 2,3). If the umbilical stalk length was more than 1.5cm it was shortened and fixed to the rectus sheath at 3 and 9 O’clock positions using vicryl 2/0. These sutures secured the position of the umbilicus in the midline, pull the scar deeply and create depth and vertical orientation. The umbilical stalk was incised vertically at 12 O’clock position down to its base, thus creating a V-shaped defect. Externally, the new umbilical location on the abdominal flap was checked again and an equilateral inverted triangle with a length of 1-1.5cm was marked and the sides were incised. The base which was located superiorly was kept intact and the created triangular flap (V-shaped) was dissected and thinned cautiously preserving the fat at the triangular base to protect vascularity and prevent flattening of the umbilicus giving nice superior hooding.

The V-shaped recipient defect of the navel was bridged by the reciprocal, triangular incision of the abdominal flap. The tip of the inverted triangular flap was fixed to the angle of the V-shaped defect of the umbilical stalk and taking a deep bite in the linea alba using 2/0 vicryl helped pull the scar deeply. The tension in the abdominal flap would create the heart-shaped defect, and the triangular flap was then set in the triangular defect of the navel. The side incisions were then sutured in 2 layers completing the closure using 4/0 vicryl and thereby completing the closure (Figs. 4-6). The remaining abdominoplasty skin incision was closed after 2 drains were inserted.

The umbilicus was dressed using tulle gauze dipped into the hollowness of the umbilicus. Sutures were removed after 10-14 days and patients were followed-up every three months for two years.
The patients were asked in each visit about the satisfaction of the abdominoplasty in general and the umbilical shape in particular with paying attention to the size, depth, sensation, visibility of the scar and ease of cleaning. Patients were given a questionnaire sheet to report the score of each point and were asked to give a mark from 1-10 and this was recorded in their files. The umbilical sensation was tested and compared to a near and remote normal sensate areas. The average of all marks were calculated and a total below 3/10 were considered poor results, 4-6/10 were good results and above 6 was excellent results.
Case 1:

Fig. (9): A 32 years old female patient preoperative view.

Fig. (10): Three months postoperative view.

Case 2:

Fig. (11): A 30 years old female patient preoperative view.

Fig. (12): Three months postoperative view.

Case 3:

Fig. (13): A 40 years old female patient preoperative.

Fig. (14): Three months postoperative views.
RESULTS

The mean age of the studied cases ranged between 24 to 51 years with a mean of 36.04±6.85 years. Their weight ranged also between 48 to 124kg, with a mean of 79.54±14.62kg. Table (1) shows mean weight according to age groups.

Table (1): Mean weight (kg) according to age groups.

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-25</td>
<td>2</td>
<td>99.50</td>
<td>3.54</td>
<td>97.00</td>
<td>102.00</td>
</tr>
<tr>
<td>25-29</td>
<td>19</td>
<td>79.42</td>
<td>16.48</td>
<td>58.00</td>
<td>124.00</td>
</tr>
<tr>
<td>30-34</td>
<td>24</td>
<td>75.50</td>
<td>12.20</td>
<td>48.00</td>
<td>100.00</td>
</tr>
<tr>
<td>35-44</td>
<td>5</td>
<td>91.40</td>
<td>7.86</td>
<td>80.00</td>
<td>101.00</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>79.54</td>
<td>14.62</td>
<td>48.00</td>
<td>124.00</td>
</tr>
</tbody>
</table>

The post operative course was smooth for all fifty patients, with none experienced early wound infection or dehiscence. All patients expressed satisfaction with the final appearance of the abdomen that was defined by heart shaped, gently hooded umbilicus demarcating the midline valley and resulting in an appealing, gently rounded abdominal shape.

Patients were followed-up for two years. Twelve patients (24%) showed hyperpigmented scars which improved after six months by local treatment. Three patients (6%) developed stitch sinus in the depth of the umbilical stump that was due to missed deep stitch and resolved with frequent dressing and umbilical care. Five patients (10%) developed mild cicatrical contracture because of the small size of the triangular flap (1cm base width). The sensation of the umbilicus was decreased in 8 patients (16%) with a score of 4 (Table 2).

Table (2): Data of the patients’ score sheet.

<table>
<thead>
<tr>
<th>Umbilical features</th>
<th>Score below 3/10</th>
<th>Score 4-6/10</th>
<th>Score above 7/10</th>
<th>General results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>5 patients</td>
<td>45</td>
<td></td>
<td>Excellent</td>
</tr>
<tr>
<td>depth</td>
<td>7</td>
<td>43</td>
<td></td>
<td>Excellent</td>
</tr>
<tr>
<td>Sensation</td>
<td>8</td>
<td>42</td>
<td></td>
<td>Excellent</td>
</tr>
<tr>
<td>Scar visibility</td>
<td>12</td>
<td>38</td>
<td></td>
<td>Excellent</td>
</tr>
<tr>
<td>Ease of care</td>
<td>5</td>
<td>45</td>
<td></td>
<td>Excellent</td>
</tr>
</tbody>
</table>

The new umbilicus was described by the patients as easy to clean and maintain. Generally, all the patients expressed great satisfaction regarding the size and depth of the umbilicus over the follow-up period.

DISCUSSION

The umbilicus is the most important aesthetic component of the abdominal wall. It requires optimal reconstruction during abdominoplasty because the umbilical scar is the only visible indicator of a performed abdominoplasty. The aesthetic considerations for umbilical repositioning during abdominoplasty are position, depth, shape, and scar location. An anatomic umbilicus should have a normal slant superiorly, a superior hood, a natural shape and no external scars, particularly concentric scars around the umbilical ring which could result in stenosis [3].

Recent evaluation of the ideal umbilicus has shown that youthful and thin individuals would have a small and vertically oriented umbilicus, whereas older or obese individuals would have a rounder, transversely oriented and hooded umbilicus [10-12].

Umbilicoplasty techniques in abdominoplasties, pioneered by Vernon, have been performed for over 80 years. The search for improved outcomes continues to foster the development of newer surgical techniques. The Vernon technique involved a circular excision of the umbilicus with reinsertion through a circular incision on the abdominal flap [13]. The majority of currently existing procedures also employ a circular incision of the umbilical cone to release it from its original position. This procedure inevitably leads to retraction of the circular incision and to stenosis of the neo-umbilical depressed scar.

Recent studies showed that circular techniques have a 7-fold greater relative risk of scar stenosis than non-circular techniques, such as the latest ones using “V”, “Y” or inverted triangle shapes. Moreover, scars may be quite evident with these techniques [7,8,10,14].

Many surgical procedures to reposition the umbilicus during abdominal dermolipectomy have been described. Some authors have proposed using different types of cutaneous incisions to improve the reconstructed umbilical shape and to disguise the periumbilical scar. Others have advised the use of skin grafts, local flaps, or conchal cartilage composite grafts to recreate the anatomic shape of the umbilicus [15-30].

The present technique uses a triangular skin incision in the abdominal flap to deliver the circular or elliptical umbilical stump. The resulting triangular skin flap is used to bridge the gap created in the native umbilicus by vertical incision at 12
umbilicus. Whereas other techniques require extra operation time, and results in a youthful-looking technique is easy to perform, does not lengthen a cephalic-based flap. In comparison to others, this for creating a new umbilicus. Their findings led them to conclude that a caudally-based flap insertion technique was the best method [22].

In our study no skin excision or deep epithelialisation was performed either at the recipient site or at the umbilical stump; only incisions. Therefore, mild cicatrical contracture was encountered only in five patients (10%) early in the study as the base width of the triangular flap was 1cm only. In addition, the techniques serve to anchor the upper abdominal flap to the navel and reduce tension on the lower flap at the pubic line closure which is the portion at greater risk of vascular compromise. The technique can be applied to all patients regardless the patient’s body physique or weight.

A variety of techniques have been developed to create hooding of the umbilicus. This hooding may create a natural-looking umbilicus but could leave more superficial and highly visible incisions [11]. In the present work, preserving the fat at the base of the triangular flap gives nice hooding and protects blood supply and by the effect of gravity later on the hooding become evident.

Lee and Mustoe presented the scarless umbilicoplasty technique which eliminates the possibility of umbilical stenosis and unsightly hypertrophic scars in the periphery of the umbilicus by shortening the stalk of the umbilicus thus hiding the scars in the depth of the umbilicus [11]. In this study, not only did the shortening of the umbilical stalk bury the scars deep in the umbilicus, it also gave the latter its vertical orientation. In addition, most of the previous studies on the subject of umbilicoplasty included only a small number of patients and lacked objective evaluation. The study of Malic et al., in which two different methods for umbilicoplasty techniques were compared is the exception [22]. Their findings led them to conclude that a caudally-based flap insertion technique was the best method for creating a new umbilicus.

The technique described in this report utilizes a cephalic-based flap. In comparison to others, this technique is easy to perform, does not lengthen operation time, and results in a youthful-looking umbilicus. Whereas other techniques require extra skin in the midline and result in more tension on the sutures in the midline, this one does not. Creating a new umbilicus as has been suggested by some authors in the past, is not preferable to the technique described herein as there is greater risk of skin flaps necrosis. Furthermore, such a newly created umbilicus from local flaps has the tendency to flatten again [31-33].

The presented technique effectively hides scars and produces an appealing umbilicus. Complications encountered in this report was mostly related to small dimensions of the triangular flap that resulted in mild cicatrical contracture which was avoided later with forthcoming patients. Also, hyperpigmented scar was encountered in twelve patients (12%) and improved by topical treatment. The technique is easy to learn and simple to perform and requires no complex skin flaps, cartilage graft, or difficult suture placement. This technique can be applied to any patient of any build or size and gives long lasting results. Any size of the umbilicus can be created with the present technique, and the versatility of this procedure allows for a depressed umbilical scar with minimal visible scars. In addition, it can be performed for either obese or thin patients, and different umbilical depths can be created as desired. Patients with umbilical hernia can benefit as the triangular flap can be used to replace the thinned out umbilical skin that may be excised with the hernia sac.

Another advantage of the present technique is that it allows for the triangular flap to be used to seal off the hole in the abdominal flap in case of revision abdominolplasty with relocation of the umbilicus as no skin excision have been performed in the initial procedure. By avoiding stenosis and accentuation of the median sulcus or valley, this technique even helps provide athletes, especially body builders, with the athletic abdominal wall that is coveted.

Conclusion:

Optimum reconstruction of the umbilicus during abdominoplasty is essential. The umbilicus is the major aesthetic focus of the abdominal wall and potentially the only visual indicator that abdominoplasty has been performed. Our technique restores a natural, youthful umbilicus with minimal scarring, a superior hood, inferior retraction and a slope are achieved. The triangular umbilicoplasty technique with a skin flap performed in this study demonstrated versatility, simplicity in implementation, and reproducibility, resulting in an umbilical scar of an appropriate size and position.
REFERENCES


