

# "Scarless" Umbilicoplasty

## *A New Umbilicoplasty Technique and a Review of the English Language Literature*

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**Abstract:** Many techniques have been described for umbilicoplasty after abdominoplasty, but none of these techniques seems ideal. In this report, we wish to report a new "scarless" umbilicoplasty technique, which bears many of the characteristics of an ideal technique: it is easy to perform and results in the complete absence of visible scars and with a preferred vertical orientation. The aesthetic results of this technique are subjectively and objectively evaluated as compared with the classic umbilicoplasty and these results are discussed among the English language literature.

In the period of 2004 to 2005, a series of 138 female patients have had an abdominoplasty with either the classic umbilicoplasty (n = 31) or with our scarless umbilicoplasty (n = 107). After a follow-up period of at least 3 (of 6) months, a questionnaire was sent to all of these patients to evaluate patient satisfaction. Twenty-five patients from the classic umbilicoplasty group responded, 53 patients from the scarless umbilicoplasty group. Age (mean 45 with range, 22–66 years) and body mass index (29 with range, 22–35) did not differ among both groups. Also a random selection of fifteen photos from both groups was analyzed and rated according to the system of Strasser by an independent panel.

There were no major complications in both groups, but in the classic group, there were some cases with hypertrophic scarring. Patients who underwent the scarless umbilicoplasty technique graded the appearance of their umbilicus significantly better on shape, depth, hygiene, and scar. No significant differences were found in grading size and wound healing. Objective evaluation of the photos demonstrated significant better results for the scarless umbilicoplasty technique.

Based on our subjective and objective analysis we conclude that our new technique of the scarless umbilicoplasty features many of the characteristics of the ideal umbilicoplasty: a rather simple and reliable method for creating a natural looking umbilicus when performing an abdominoplasty.

**Key Words:** umbilicoplasty, abdominoplasty, scarless technique, ideal umbilicus, photographic analysis

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The umbilicus is a component that greatly contributes to the aesthetic appearance of the abdominal wall. The umbilicus serves as a natural reference point and anatomically lies at the crossing of the midline and

the line through the superior iliac crests (or just superior to this line).<sup>1–3</sup> Without this natural reference point, the appearance of the abdominal wall is distorted.<sup>1,4–6</sup> The form of the umbilicus changes with age and parity. In the young individual, the umbilicus has mostly a vertical orientation.<sup>5,7–10</sup> With both progressing age and gaining weight, a larger, rounder, and horizontal orientation of the umbilicus develops.

Although beauty is in the eye of each beholder, there is a common sense of the ideal umbilicus; this ideal is defined by its position, size, depth, and shape and in abdominoplasty also by the location and visible presence of scar tissue. Most patients favor a small T- or vertically shaped umbilicus with superior hooding and scar tissue should not be in plain sight.<sup>5,7</sup> Moreover, constriction of the umbilicus should be avoided to prevent hygienically problems. When performing an abdominoplasty, all of the aforementioned items and arguments should be taken into consideration.

Thus far, many techniques for creating a new umbilicus after abdominoplasty have been described (Table 1), probably indicating that the ideal technique still does not exist. In this report, we wish to present our technique for creating an umbilicus after abdominoplasty ("scarless" umbilicoplasty), which bears many of the characteristics of an ideal technique: it is easy to perform and results in the complete absence of visible scars and with a preferred vertical orientation. The technique is described in detail, the aesthetic results of this technique are objectively evaluated as compared with the classic umbilicoplasty, and these results are discussed among the English language literature.

## PATIENTS AND METHODS

### Patients

In the period of 2004 to 2005, a series of 138 female patients have had an abdominoplasty with either the classic umbilicoplasty (n = 31) or with our scarless umbilicoplasty (n = 107). After a follow-up period of at least 3 (of 6) months, a questionnaire was sent to all of these patients to evaluate patient satisfaction. In total, 78 responses (56%) were obtained. Twenty-five patients had had the classic umbilicoplasty, 53 of these patients had had the scarless umbilicoplasty. Mean age of all patients was 45 (range, 22–66), and mean body mass index was 29 (range, 22–35) with no significant differences among both groups. Except for the umbilicoplasty, in all patients the abdominoplasty technique was the same. All patients were discharged from hospital after 1 to 3 days.

### Surgical Abdominoplasty and Umbilicoplasty Technique

#### Classic Technique

Standard skin markings are made in standing position preceding the abdominoplasty. Midline over the abdomen is marked, groin line extending laterally to the iliac crest and an ellipse around the umbilicus are made. The superior line is drawn preoperatively.

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TABLE 1. English Literature on Umbilicoplasty After 1975

Author	Journal	Yr	No. Patients	Article	Technique	Follow-Up (mo)
Castillo PF, et al <sup>16</sup>	<i>Aesthetic Plast Surg</i>	2007	?	Technique description	Reinsertion	?
Rozen SM, et al <sup>17</sup>	<i>Plast Reconstr Surg</i>	2007	20	Technique description	Reinsertion	6–12
Rogliani M, et al <sup>18</sup>	<i>J Plast Reconstr Aesthetic Surg</i>	2007	3	Case report	Reconstruction	6–12
Malic CC, et al <sup>12</sup>	<i>Plast Reconstr Surg</i>	2007	25	Clinical trial	Reinsertion	?
Sevin A, et al <sup>19</sup>	<i>Aesthetic Plast Surg</i>	2006	1	Case report	Reconstruction	12
Uraloglu M, et al <sup>20</sup>	<i>Plast Reconstr Surg</i>	2006	1	Case report	Reconstruction	?
Kakudo N, et al <sup>21</sup>	<i>J Plast Reconstr Aesthetic Surg</i>	2006	1	Case report	Reconstruction	6
Pfulg M, et al <sup>14</sup>	<i>Br J Plast Surg</i>	2005	2	Case report	Reconstruction	24
Özbek S, et al <sup>22</sup>	<i>Br J Plast Surg</i>	2005	1	Case report	Reconstruction	24
Korachi A, et al <sup>23</sup>	<i>Plast Reconstr Surg</i>	2004	1	Case report	Reconstruction	12
Bartsich SA, et al <sup>24</sup>	<i>Plast Reconstr Surg</i>	2003	3	Case report	Reconstruction	12
Masuda R, et al <sup>25</sup>	<i>Aesthetic Plast Surg</i>	2003	2	Case report	Reconstruction	8
Akbas H, et al <sup>10</sup>	<i>Aesthetic Plast Surg</i>	2003	15	Technique description	Reinsertion	2–36
Lee MJ, et al <sup>7</sup>	<i>Plast Reconstr Surg</i>	2002	21	Technique description	Reinsertion	?
Santaneli F, et al <sup>26</sup>	<i>Scand J Plast Reconstr Surg Hand Surg</i>	2002	1	Case report	Reinsertion	24
Shinohara H, et al <sup>27</sup>	<i>Plast Reconstr Surg</i>	2000	2	Case report	Reconstruction	7–8
Ramirez OM <sup>3</sup>	<i>Plast Reconstr Surg</i>	2000	?	Technique description	Reinsertion	?
Cannistra C, et al <sup>28</sup>	<i>Aesthetic Plast Surg</i>	1999	40	Technique description	Reinsertion	?
Franco T, et al <sup>29</sup>	<i>Aesthetic Plast Surg</i>	1999	?	Technique description	Reconstruction	?
Yotsuyangi T, et al <sup>30</sup>	<i>Plast Reconstr Surg</i>	1998	1	Case report	Reconstruction	12
Choudhary S, et al <sup>31</sup>	<i>Br J Plast Surg</i>	1998	?	Technique description	Reinsertion	?
Schoeller T, et al <sup>6</sup>	<i>Plast Reconstr Surg</i>	1998	14	Technique description	Reconstruction	9
Pardo ML, et al <sup>13</sup>	<i>Aesthetic Plast Surg</i>	1997	5	Technique description	Reconstruction	?
Massiha H, et al <sup>32</sup>	<i>Ann Plast Surg</i>	1997	?	Technique description	Reinsertion	?
Baack BR, et al <sup>9</sup>	<i>Plast Reconstr Surg</i>	1996	3	Case report	Reconstruction	2–24
Onishi K, et al <sup>33</sup>	<i>Ann Plast Surg</i>	1995	2	Case report	Reconstruction	6–12
Itoh Y, et al <sup>34</sup>	<i>Ann Plast Surg</i>	1992	9	Case report	Reconstruction	?
Jamra FA <sup>35</sup>	<i>Plast Reconstr Surg</i>	1979	1	Case report	Reconstruction	12
Juri J, et al <sup>8</sup>	<i>Plast Reconstr Surg</i>	1979	?	Technique description	Reinsertion	?

Patient is positioned at the operation table in such a manner that light flexion in hips is possible. A vertical ellipse around the umbilicus is sharply incised. Inferior line is subsequently incised and the abdominal flap is lifted from the rectus fascia. The umbilicus and its stalk are freed from the abdominal flap. The excess of abdominal skin flap is excised and the remaining abdominal flap is mobilized to the caudal part of the suprapubic incision in the midline to determine the new position of implantation of the umbilicus. An elliptical incision corresponding to the size of the umbilicus is made. Rectus fascia is plicated when diastase is present. The abdominal flap is sutured to the inferior line and the umbilical is pulled through the elliptical incision and sutured in place. In case of a long stalk, the stalk can be plicated and shortened by vicryl 3-0 sutures.

### Scarless Technique

Preoperative markings and patient positioning is done in the same manner as with the classic technique. Incision and flap developing also is performed as described above (Fig. 1). The umbilicus and its stalk are freed from the abdominal flap.

Next, the umbilicus is shortened, leaving a stalk with a small (0.5-cm wide) epithelialized part of the umbilicus (Figs. 2, 3). Excess abdominal flap is excised. With positioning sutures the midline of the flap is caudally pulled toward the suprapubic incision and there it is fixated in the midline. The inset of the new position of the umbilicus is determined and a round or elliptical excision of approximately 0.5 cm is made. This excision should

have the same diameter as the epithelialized part of the umbilicus. Around this excision an area of 2 to 3 cm is defatted, the midline can be slightly defatted cranially from the umbilicus to improve outer texture of the abdominal wall. After determining the new location of the umbilicus and excision of a small full thickness part of skin at this location, the upper abdominal flap is reverted again.

Rectus diastasis is now treated by plicating the fascia and the residual umbilicus and stalk are sutured to the rectus sheath using vicryl 3-0 (Fig. 4). At 12-, 3-, 6-, and 9-o'clock the recipient skin of the upper abdominal flap is transcutaneously sutured with interrupted single sutures to the umbilicus using vicryl 4-0 (Fig. 5). In this way no sutures have to be removed from the umbilical pit which can be awkward. Consequently, the superior incision line is sutured to the inferior line, closing the abdominal wall again over 2 suction drains. (For detailed video presentation see: [www.surgytec.com](http://www.surgytec.com).)

### Evaluation

Patient satisfaction was analyzed using a visual analogue scale (VAS score 1–10); opinions about shape, size, depth and hygiene of the umbilicus were questioned either pre- and postoperatively, as well as opinions about scars and wound healing postoperatively.

Objective aesthetic evaluation was performed using pre- and postoperative pictures of a series of 15 randomly chosen

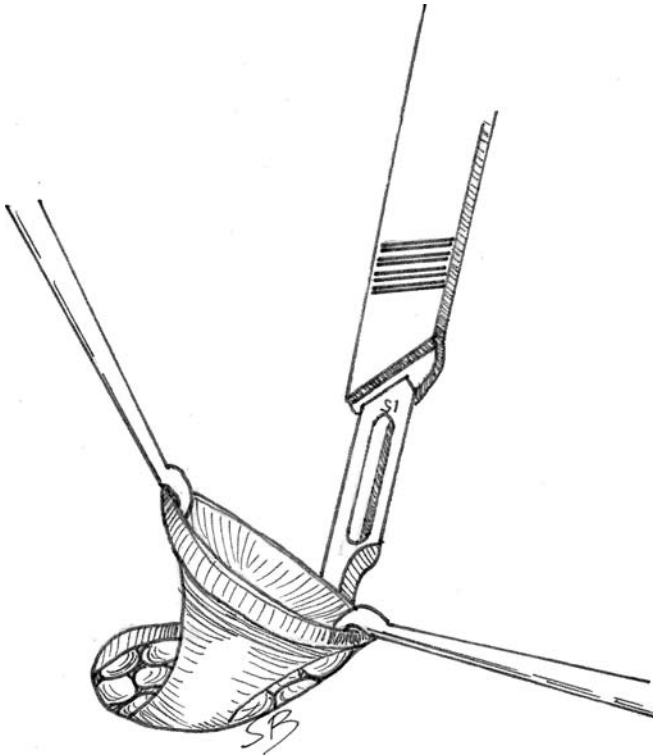


FIGURE 1. Incision around umbilicus.

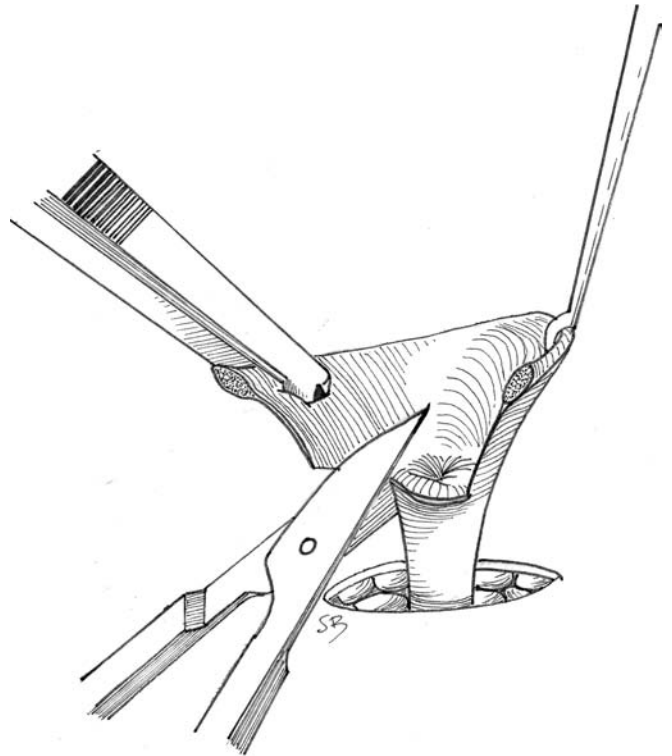


FIGURE 3. Shortening of the umbilicus.

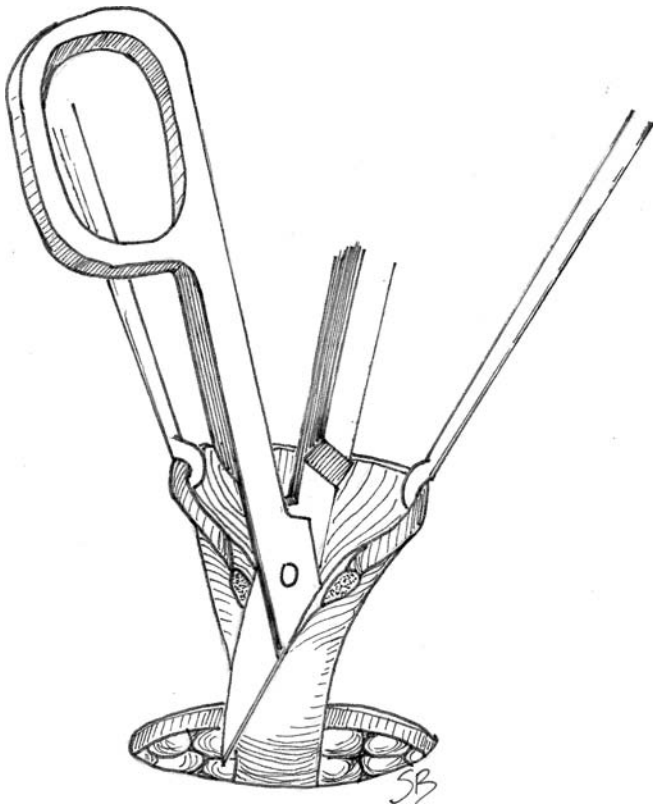


FIGURE 2. Shortening of the umbilicus.

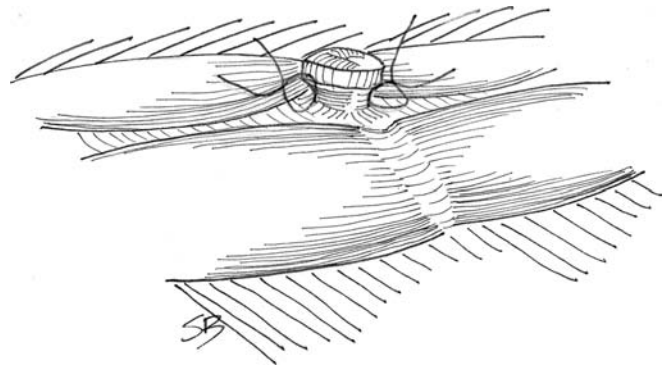


FIGURE 4. Umbilicus sutured to rectus sheath.

patients from either the classic group (mean follow-up 16 weeks, range, 12–24 weeks) or the scarless group (mean follow-up, 15 weeks; range, 12–20 weeks). In all these cases the anteroposterior close-up picture of the new umbilicus was scored on shape, size, depth, scar tissue, and overall appearance with use of the grading system as has been described by Strasser<sup>11</sup> by an independent panel of 2 plastic surgeons, 2 nurses, and 2 laymen. Absence of any flaw is graded as perfect (0 points), a noticeable flaw is graded for 1 point, an obvious and deforming flaw for 5 points, and an obvious and deforming flaw for 15 points. Points in each of all 5 categories (shape, size, depth, scar tissue, and overall appearance) should be added, leading to a final classification of either perfect (0 points), good (1–4 points), mediocre (5–14 points), or a poor result (15 points or more). All complications were recorded from the medical records.

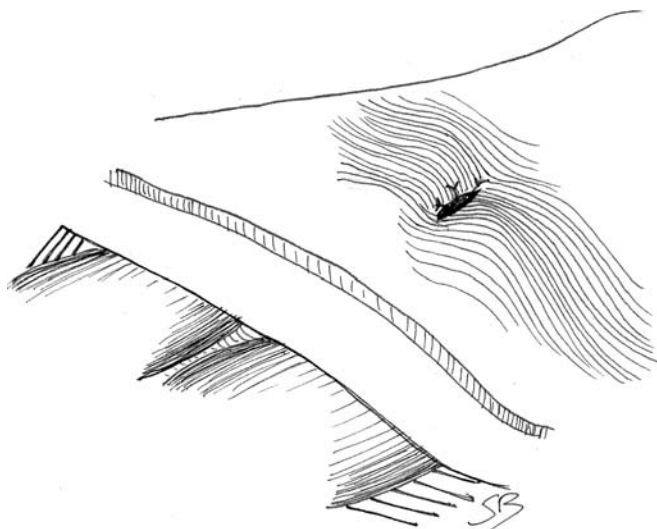


FIGURE 5. Skin sutured to umbilicus.

TABLE 2. VAS-Scoring New Technique Umbilicoplasty

Average Score	Preoperative	Postoperative	Difference
Shape	6.04	7.38	1.34
Size	6.13	7.13	1.00
Depth	5.87	7.19	1.32
Hygiene	6.09	7.72	1.63
General	6.03	7.62	1.59
Wound healing	—	7.38	—
Appearance of scar	—	7.91	—

TABLE 3. VAS-Scoring Classic Umbilicoplasty

Average Score	Preoperative	Postoperative	Difference
Shape	7.12	6.84	-0.28
Size	6.64	6.32	-0.32
Depth	6.72	5.80	-0.92
Hygiene	7.04	6.52	-0.52
General	6.00	6.44	-0.44
Wound healing	—	7.20	—
Appearance of scar	—	6.52	—

RESULTS

Most patients from the scarless umbilicoplasty group (42 of 53 patients, 79%) would choose the same technique for umbilicoplasty again, whereas only 14 of 25 patients in the classic umbilicoplasty group (56%;  $P < 0.05$ , Pearson's  $\chi^2$  test). Shape graded better in the scarless umbilicoplasty group ( $P = 0.033$ , Mann-Whitney  $U$  test; Tables 2, 3). There was no difference between both groups concerning grading size ( $P = 0.163$ , Mann-Whitney  $U$  test). However, depth and hygiene both were graded in favor of the scarless umbilicoplasty group ( $P = 0.012$  and  $P = 0.009$ , respectively; Mann-Whitney  $U$  test). Grades for wound healing were alike ( $P = 0.828$ , Mann-Whitney  $U$  test), scar-appearance was graded in favor of the scarless umbilicoplasty group ( $P = 0.008$ , Mann-Whitney  $U$  test).

TABLE 4. Photographic Analysis Using Strasser Grading System

Technique	Perfect	Good	Mediocre	Poor	Total
Classic	0	2	20	68	90
Scarless	6	12	60	32	90



FIGURE 6. Perfect result after new technique umbilicoplasty.



FIGURE 7. Poor result after new technique umbilicoplasty.

Photographic analysis by an independent panel using the Strasser grading system<sup>11</sup> showed a preference for the new technique ( $P < 0.001$ , Mann-Whitney  $U$  test, see Table 4). Figures 6 and 7 respectively, show a perfect and a poor result on photographic analysis after using the new technique. Figures 8 and 9 show a good result and a poor result on photographic analysis after the classic technique.

In the classic umbilicoplasty group there were 2 patients with cicatrice hypertrophy, 1 patient with umbilicus necrosis and 2 patients with abdominal seromas. In the scarless umbilical group there was no cicatrice hypertrophy, no umbilicus necrosis, and 3 patients were seen with abdominal seromas only ( $P < 0.05$ , Pearson's  $\chi^2$  test for cicatrice hypertrophy). Thirteen patients in both groups reported a numb umbilicus, which they found discomforting and which they considered to be a sexual defect.

DISCUSSION

Analyses of our scarless umbilicoplasty clearly demonstrates that this technique represents many features of an ideal umbilico-



FIGURE 8. Good result after classic technique umbilicoplasty.



FIGURE 9. Poor result after classic technique umbilicoplasty.

plasty technique: a rather simple technique that results in an umbilicus that features many characteristics of the ideal umbilicus and that gives a result that is significantly better than that resulting from the classic umbilicoplasty technique.

In the scarless technique, the shortened, small epithelialized part of the “old” umbilicus is fixed to the rectus fascia, producing (after defatting of the surrounding abdominal flap tissue) an umbilicus with sufficient depth (no protrusion) and with scars hidden in the depth of the newly created umbilicus. This new umbilicus, therefore, will be less disturbing and will have a more natural appearance than an umbilicus produced with the classic technique. The vertically orientated ellipse and defatting of the midline ensures a vertical shape. By fixating the umbilicus to the linea alba a central position is obtained, adventitious to the fixation of the umbilicus is relief of tension in the lower part of the flap. By using this technique, an umbilicus can be created that better answers to the different aspects of the ideal umbilicus.

Our scarless technique actually is a modification of the technique that has been described by Lee and Mustoe.<sup>7</sup> However, our technique rules out the possibility of umbilical stenosis or unsightly hypertrophic scars peripherally of the umbilicus by shortening the stalk of the umbilicus thus hiding the scar in the depth of the umbilicus.

Thus far, many techniques have been described for creating the umbilicus after abdominoplasty, (Table 1: overview of English literature from 1975 on). However, most previous articles on this subject include only a small number of patients and lack objective evaluation, except the study of Malic et al, in which 2 different methods for umbilicoplasty technique were compared.<sup>12</sup> They con-

cluded that a caudally based flap insertion technique would be the best method for creating a new umbilicus.

When comparing our scarless technique to other techniques, our technique is easy to perform, does not lengthen operation time, and results in a youthful-looking umbilicus. All of the other techniques lack uniting all the aesthetic preferences. All umbilicoplasty techniques that leave the abdominal skin intact to prevent scars produce an unnatural large and round umbilicus.<sup>6,7,9</sup> Moreover, these techniques require extra skin in the midline and result in more tension on the sutures in the midline. Creating a new umbilicus, as has been suggested by some authors in the past, is not preferable: when creating a new umbilicus there is a greater risk of necrosis of the skin flaps. Furthermore such a newly created umbilicus from local flaps has the tendency to flatten again.<sup>6,13–15</sup>

Patient satisfaction was high in the “scarless umbilicoplasty group” and when comparing pre- to postoperative ratings an overall increase in scores was seen. The “classic umbilicoplasty group” showed an overall decrease in scores. The photographic analysis additionally objectively underlines the preferred satisfactory results of the umbilicus in the “new-technique group.”

Although no serious complications were observed in both groups, in the classic technique group there were some cases of cicatrice hypertrophy. Strikingly several patients from both groups reported on hypo/insensitivity of the umbilicus, which some marked as “a flaw on their sex life” and others found it “scary.”

Although there may be a sure bias in our retrospective analysis (not all patients have responded to our questionnaire and the number of patients in both groups differs significantly), our study quite clearly demonstrates that our new technique both subjectively and objectively scores better as compared with the classic technique. Therefore, we think that our new technique of the scarless umbilicoplasty features many of the characteristics of the ideal umbilicoplasty: a rather simple and reliable method for creating a natural looking umbilicus when performing an abdominoplasty.

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