Power-Assisted Liposuction and the Pull-Through Technique for the Treatment of Gynecomastia

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Background: Gynecomastia is a common condition affecting many adolescent and adult males. Surgical techniques utilizing a variety of incisions, excisions, suction-assisted lipectomy, ultrasound-assisted liposuction, power-assisted liposuction, or some combination of these methods have been used in the treatment of gynecomastia. This article describes the authors' method of using power-assisted liposuction and the pull-through technique to treat gynecomastia.
Methods: This technique involves the use of power-assisted liposuction to remove fatty breast tissue. The pull-through technique is then performed utilizing several instruments to sever the subdermal attachments of fibroglandular breast tissue; this tissue is removed through the incision used for liposuction. Finally, power-assisted liposuction is performed again to contour the remaining breast tissue. A chart review of 99 consecutive patients (197 breasts) treated between January of 2003 and November of 2006 was performed.
Results: Ninety-six patients (192 breasts) were successfully treated using this technique. Power-assisted liposuction was performed in all cases, and the average volume aspirated per breast was 459 ml (range, 25 to 1400 ml). Using the pull-through technique, the authors were able to remove between 5 and 70 g of tissue per breast. Complications were minimal (1.0 percent of breasts), and no revisions were required.
Conclusions: Since January of 2003, the authors have used this technique to successfully treat 97 percent of their gynecomastia patients. Combining power-assisted liposuction and the pull-through technique has proven to be a versatile approach for the treatment of gynecomastia and consistently produces a naturally contoured male breast while resulting in a single inconspicuous scar. (*Plast. Reconstr. Surg.* 121: 740, 2008.)

Gynecomastia is a benign proliferation of glandular breast tissue causing breast enlargement in males.[1,2] The prevalence of gynecomastia varies greatly among different studies. Among adolescent males, a prevalence ranging from 4 to 69 percent has been reported.[3,4] Prevalence between 32 and 65 percent has been reported among adult males.[5,6] Approximately 25 percent of patients have idiopathic gynecomastia and 25 percent have acute or persistent gynecomastia due to puberty.[7] Other causes of gynecomastia include drugs (10 to 20 percent), cirrhosis or malnutrition (8 percent), primary hypogonadism (8 percent), testicular tumors (3 percent), secondary hypogonadism (2 percent), hyperthyroidism (1.5 percent), and renal disease (1 percent).[7] Gynecomastia results from an absolute or relative imbalance between estrogens, which stimulate development of breast tissue, and androgens, which antagonize this effect.[8,9] Early in the development of gynecomastia, ductal epithelium proliferates and stromal and connective tissue

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hyperplasia and edema occur.[10–12] After this initial period of 1 to 2 years, less epithelial growth occurs, and there is deposition of dense, collagenous fibers causing periductal fibrosis and hyalinization.[10–12] Once this occurs, surgical treatment is required to correct gynecomastia.

Surgical techniques utilizing a variety of incisions, excisions, suction-assisted lipectomy, power-assisted liposuction, ultrasound-assisted liposuction, or some combination of these methods have been used to treat gynecomastia. Recently, several minimal access excisional techniques have been described. In 1996, Morselli[13] described the pull-through technique for treatment of gynecomastia in 11 patients. This technique involved the use of suction-assisted lipectomy to remove fatty breast tissue followed by the use of a clamp to pull the remaining fibroglandular breast tissue through the incisions used for liposuction. In 2003, Hammond et al.[14] combined the use of ultrasound-assisted liposuction with the pull-through technique. They treated 15 patients using this technique and felt that the use of ultrasound-assisted liposuction was more effective at removing dense adipose tissue from within the fibrous parenchymal framework of the breast. In 2004, Bracaglia et al.[15] combined suction-assisted lipectomy and the pull-through technique and reported good results in their series of 45 patients. Ramon et al.[16] described the use of cross-chest power-assisted superficial liposuction and direct pull-through excision of breast parenchyma under endoscopic visualization. Seventeen patients treated with this technique were satisfied with their results.

This article describes our technique combining power-assisted liposuction and the pull-through technique for the treatment of gynecomastia. We utilize several instruments that allow easier excision of fibroglandular breast tissue and make it possible to remove this tissue through a single incision located at the lateral aspect of the inframammary fold. Since first using this technique in January of 2003, we have successfully performed it in 96 of 99 consecutive patients. This technique has been used to treat patients with various degrees of gynecomastia and consistently produces a naturally contoured male breast while resulting in a single inconspicuous scar.

PATIENTS AND METHODS

A chart review of 99 consecutive patients (197 breasts) treated by a single surgeon between January of 2003 and November of 2006 was performed. These procedures were performed at the surgeon's private clinic and Trillium Health Center, in Mississauga, Ontario, Canada. All patients were seen by the senior author on postoperative day 5, 2 weeks postoperatively, 1 month postoperatively, and at 3 months postoperatively. The following data were collected: age, body mass index, volume aspirated per breast using power-assisted liposuction, amount of tissue excised per breast using the pull-through technique, operative time, and number of complications.

Operative Technique

Skin Markings and Infiltration

The patient is marked in the standing position. The areas where liposuction will be performed are topographically marked. We not only treat the breast tissue around the nipple-areola complex but also prefer to treat any area of the chest that has excess fat and breast tissue. We have found that this extended contouring of the chest leads to better breast contour and blending of the nipple-areola complex with the surrounding breast, and prevents the occurrence of a depressed nipple-areola complex.

After the patient has been anesthetized and is placed in the supine position, a 4-mm stab incision is made at the inframammary crease along the anterior axillary line. Infiltration is performed just deep to the skin and then within the breast tissue. Each breast is infiltrated with approximately 500 ml of a solution made with 1000 ml Ringer's lactate solution mixed with 40 ml of 2 percent lidocaine and 1 ml of 1:1000 epinephrine.

Power-Assisted Liposuction for Removal of Fatty Breast Tissue

Using the PAL-600E MicroAire power-assisted lipoplasty device (MicroAire Surgical Instruments, Charlottesville, Va.), power-assisted liposuction is used to reduce breast volume arising mainly from fat. We prefer to use power-assisted liposuction because it aids in passing the liposuction cannula through the fibrous parenchymal framework of the breast. Before performing liposuction, we suture a 4.5-mm Masaki skin protector (Dr. Masaki Clinic, Tokyo, Japan) to the stab incision to protect the surrounding skin from friction injury (Figs. 1 and 2). Using the PAL-R407LL MicroAire helixed tri-port 4-mm cannula (MicroAire Surgical Instruments), liposuction of the entire breast is first carried out in the middle layer of subcutaneous adipose tissue. Next, attention is focused on the breast tissue lying deep to the nipple-areola complex. Liposuction of this area is carried out

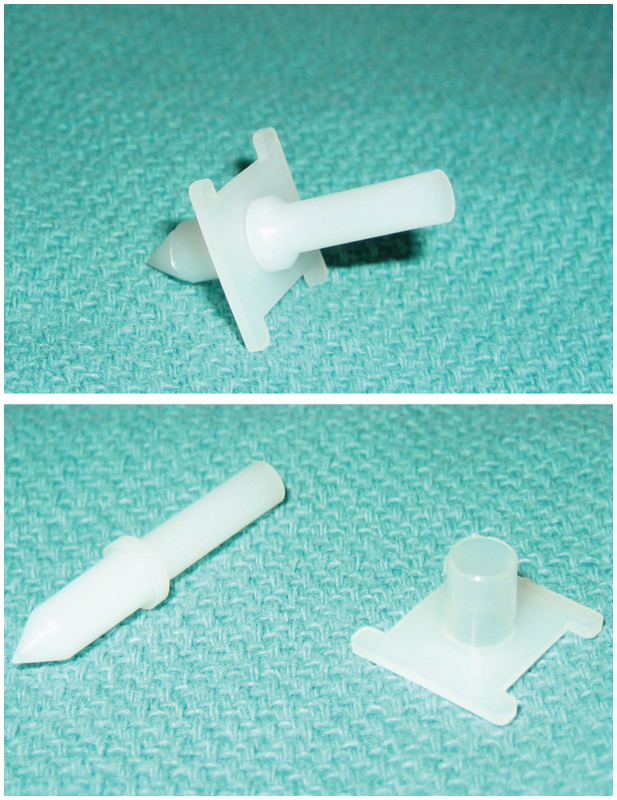

Fig. 1. A 4.5-mm Masaki skin protector with a 4.0-mm obturator is used to protect the skin edges from friction injury during power-assisted liposuction.

in the subdermal plane, which we believe stimulates skin contraction in the postoperative period. Before we perform the pull-through technique, the Masaki skin guards are removed.

Fig. 2. Masaki skin protector in place.

The Pull-Through Technique for Removal of Fibroglandular Breast Tissue

The pull-through technique is performed utilizing several instruments to sever the subdermal attachments of fibrous breast tissue and the connections of the lactiferous ducts to the overlying nipple. This tissue is then removed through the incision used for liposuction. Particular attention is paid to removing subdermal breast tissue deep to the nipple-areola complex. When present, fibroglandular breast tissue is also removed from other areas of the breast. Initially, 19-cm straight Brand tendon tunnel forceps (Instrumentarium, Terrebonne, Quebec, Canada) are introduced through the incision used for liposuction, and fibroglandular breast tissue is removed through this incision using a "grasp and pull" motion while the skin is pinched using the other hand (Fig. 3). When it is difficult to remove fibroglandular breast tissue in this manner, a Toledo V-dissector cannula (Tulip Products, Inc., San Diego, Calif.) and a special-order larger Toledo V-dissector cannula (Wells Johnson Company, Tucson, Ariz.) are used to sever the subdermal attachments of this tissue (Fig. 4). These attachments mainly consist of the lactiferous ducts and the suspensory ligaments of Cooper. The attachments of these structures to the deep fascia are weak and it is unnecessary to perform any sharp dissection in this deep plane. Rarely, curved, ebonized, micro ear scissors (Anthony Products, Inc., Indianapolis, Ind.) (Fig. 5, *above*) or a no. 12 blade scalpel (Fig. 5, *center*) are required to sever these attachments through the incision used for liposuction. Once these subdermal attachments have been severed, the Brand tendon tunnel forceps are again used to remove the breast tissue through the incision. This dissection is performed until the skin of the breast feels smooth and the underlying fibroglandular breast tissue is no longer palpable. Using these instruments, it is possible to remove large amounts of fibroglandular breast tissue (Fig. 5, *below*).

Power-Assisted Liposuction for Contouring Breast Tissue

After the pull-through technique is performed, power-assisted liposuction is used to feather the remaining breast tissue to soften the breast contour and blend the nipple-areola complex with the surrounding breast tissue. This final contouring is also necessary to remove fatty breast tissue that was dislodged after the dense parenchymal framework of the breast was removed using the pull-through technique.

The incisions are closed using an inverted deep dermal 4-0 Monocryl suture (Ethicon, Inc.,

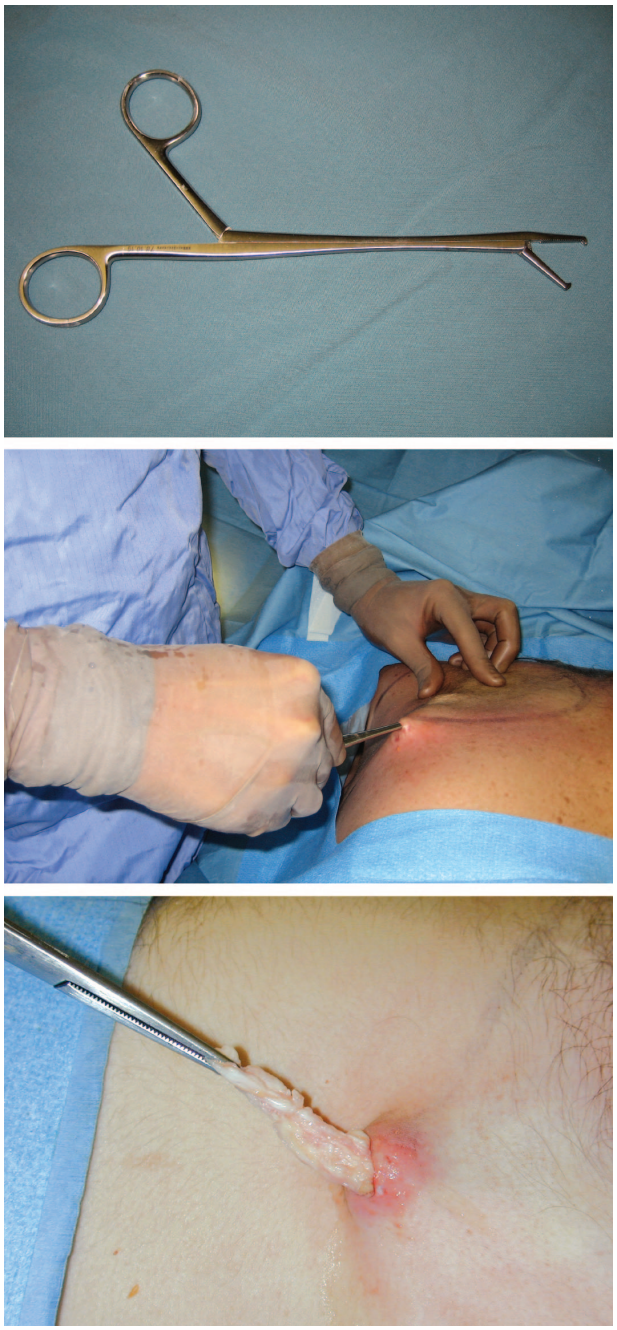

Fig. 3. A 19-cm straight Brand tendon tunnel forceps is introduced through the incision used for liposuction, and fibroglandular breast tissue is removed through this incision using a "grasp and pull" motion while the skin is pinched using the other hand.

Somerville, N.J.). The wounds are dressed with dry gauze, and a pressure garment is applied to the chest wall.

Postoperative Management

The patient must wear a pressure garment day and night for a total of 6 weeks to allow the skin

Fig. 4. A special order Toledo V-dissector cannula is used to sever the subdermal attachments of fibroglandular breast tissue.

of the breast to adhere to the underlying tissues. Patients may return to their normal level of activity 3 weeks postoperatively.

RESULTS

This technique combining power-assisted liposuction and the pull-through technique has been used to treat patients with various degrees of gynecomastia (Figs. 6 through 8). The average patient age was 29 years (range, 17 to 46 years). The average body mass index was 28.0 kg/m^2 (range, 20.6 to 40.0 kg/m^2). Power-assisted liposuction was performed in all cases, and the average volume aspirated per breast was 459 ml (range, 25 to 1400 ml). Using the pull-through technique, we were able to remove between 5 and 70 g of tissue per breast. The average operative time was 60 minutes (range, 39 to 85 minutes).

Using this technique, we were able to treat 96 patients (192 breasts) successfully. In the remaining three patients (five breasts), there was a single, large, solid mass of fibroglandular breast tissue, deep to the nipple-areola complex, responsible

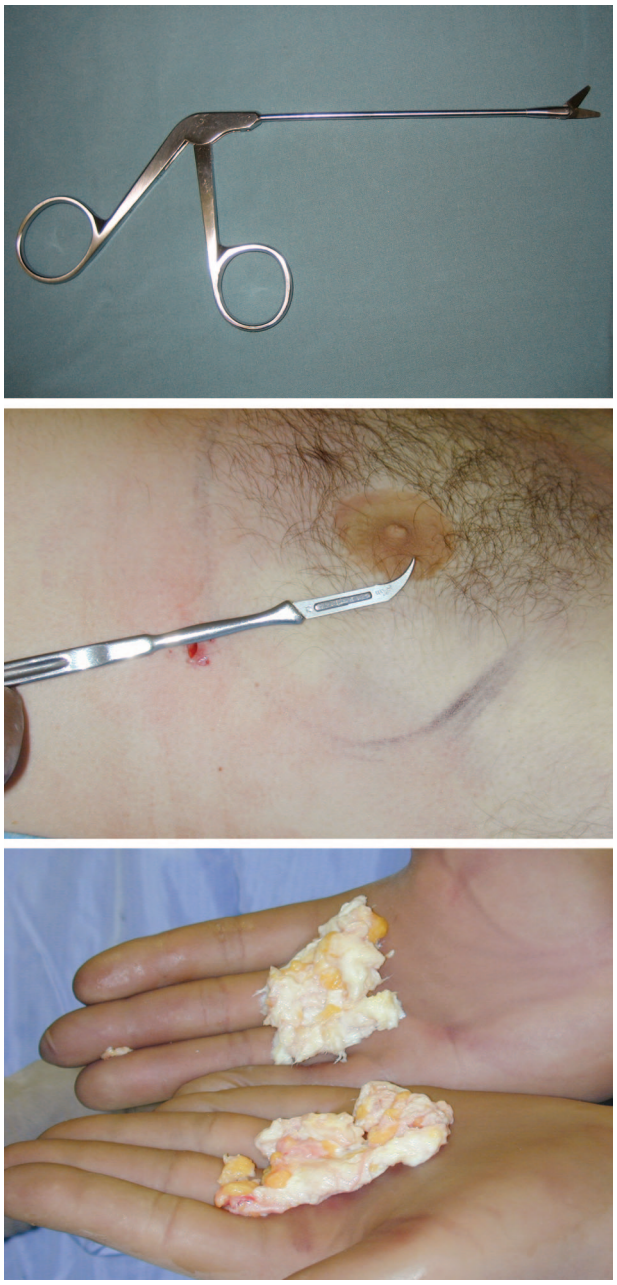

Fig. 5. (*Above*) Curved, ebonized, micro ear scissors can be used to cut fibroglandular breast tissue. (*Center*) A no. 12 blade scalpel is sometimes used to sever the subdermal attachments through the incision used for liposuction. (*Below*) Breast tissue removed using the pull-through technique.

for the appearance of the breast. After attempting power-assisted liposuction and the pull-through technique in these patients, we felt that we were unable to adequately remove the fibroglandular mass deep to the areola. The procedure was modified and an inferior periareolar incision was used to excise the fibroglandular breast tissue adequately. Between 10 and 70 g of tissue per breast was excised through the inferior periareolar incision. The average operative time for these three modified procedures was 67 minutes (range, 60 to 80 minutes).

Among the 96 patients (192 breasts) in this series treated using this technique, complications occurred in two breasts (1.0 percent). Both of these complications were seromas. Needle aspiration was used to successfully treat the seromas. No other complications occurred, and no patients required any revisions for excess skin, poor breast contour, or deformities of the nipples.

At 3-month follow-up, all 96 patients who underwent power-assisted liposuction and the pull-through technique for treatment of gynecomastia expressed their satisfaction with the overall aesthetic result.

DISCUSSION

In 1996, Morselli[13] described the pull-through technique for removing fibroglandular breast tissue used in conjunction with suction-assisted lipectomy. After suction-assisted lipectomy was performed, fibroglandular breast tissue was removed through two incisions, one located at the inframammary crease and the other in the axilla, using a clamp. He reported good results in a series of 11 patients, with no complications. Hammond et al.[14] combined ultrasound-assisted liposuction with the pull-through technique through a single incision located at the inferior areolar margin. Fifteen patients were treated using this technique, and the authors felt that the ultrasound-assisted liposuction was more effective at removing dense adipose tissue from within the fibrous parenchymal framework of the breast. One patient developed a seroma that was treated with aspiration, and another patient sustained a burn at the ultrasound-assisted entrance site that healed spontaneously. Bracaglia et al.[15] combined suction-assisted lipectomy and the pull-through technique using an inframammary crease incision and an incision overlying the sternum. The authors reported good results in 45 patients, with two patients developing hematomas and one patient experiencing slight undercorrection of a breast. Ramon et al.[16] described cross-chest power-assisted superficial liposuction and direct pull-through excision of breast parenchyma under endoscopic visualization using two periareolar incisions. Seventeen patients treated with this technique were satisfied with their results.

In this article, we describe our experience combining power-assisted liposuction with the pull-through technique using a single inframam-

Fig. 6. (*Above*) A 31-year-old man with bilateral gynecomastia. A total of 400 ml was liposuctioned from the right breast, 350 ml was liposuctioned from the left breast, and the pull-through technique was used to remove fibroglandular breast tissue. (*Below*) Results 1 month postoperatively.

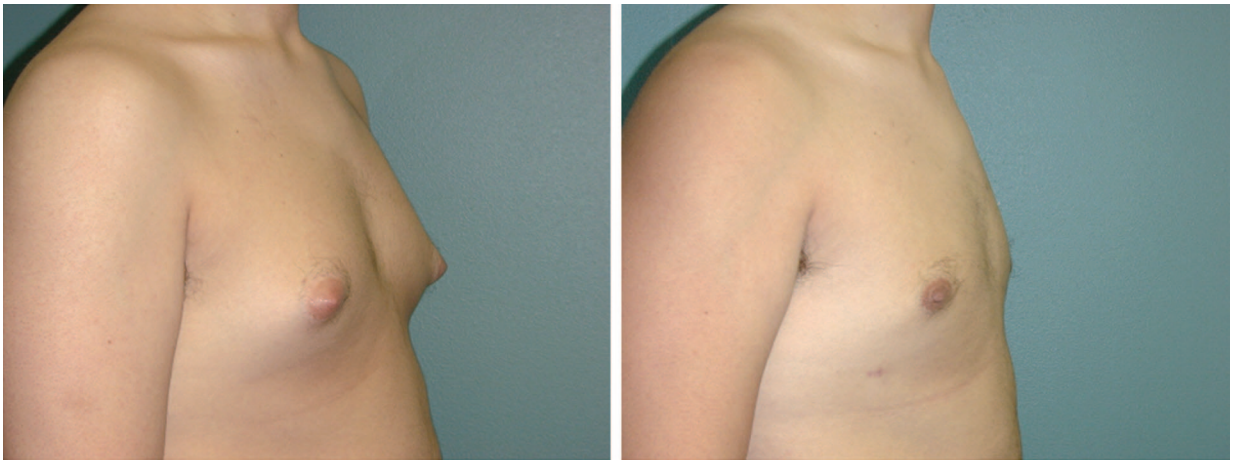

Fig. 7. (*Left*) A 21-year-old man with bilateral gynecomastia. A total of 300 ml was liposuctioned from each breast, and the pull-through technique was used to remove fibroglandular breast tissue. (*Right*) Results 1 month postoperatively.

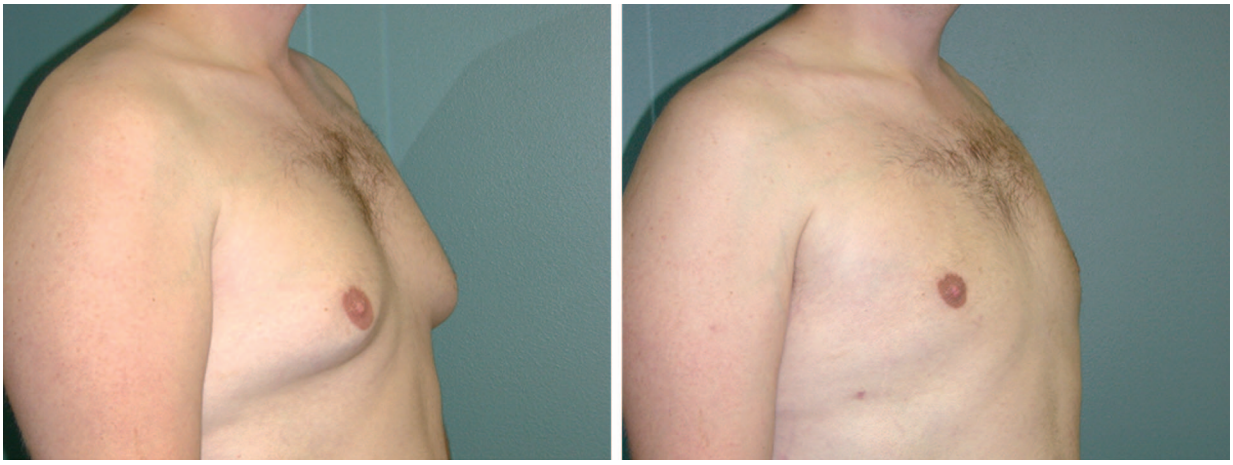

Fig. 8. (*Left*) A 27-year-old man with bilateral gynecomastia. A total of 500 ml was liposuctioned from each breast, and the pull-through technique was used to remove fibroglandular breast tissue. (*Right*) Results 1 month postoperatively.

mary crease incision. Since first using this technique in January of 2003, we have successfully treated 96 of 99 consecutive patients, with only two complications. We believe that this technique has proven to be versatile in treating various degrees of gynecomastia for several reasons. First, the use of power-assisted liposuction decreases the surgeon's effort involved in aspirating adipose tissue through the dense parenchymal framework of the breast, thereby decreasing the time required to perform the procedure. Indeed, several studies[17–19] comparing power-assisted liposuction with suction-assisted lipectomy have shown that power-assisted liposuction results in less operator fatigue and provides a faster rate of fat aspiration. Second, by utilizing several novel instruments to perform the minimal access excision, we have been able to remove fibroglandular breast tissue through a single, small, peripherally located incision that would not otherwise have been possible using only a clamp, scalpel, or scissors. Given that the fibroglandular breast tissue is easily palpable through the breast skin, we find it unnecessary to perform the minimal access excision either under direct vision or with endoscopic visualization, as described by other authors. It is possible to safely perform the minimal access excision using palpation alone without this leading to bleeding complications. Bleeding is also decreased by the use of a tumescent solution containing epinephrine, and placement of drains is unnecessary. Finally, a concave deformity of the nipple-areola complex is a common complication with techniques that use open excision. This complication did not occur in our clinical series, most likely due to the wide area that is treated, which thus prevents overresection deep to the nipple-areola complex.

CONCLUSIONS

Since January of 2003, we have used this technique to successfully treat 97 percent of our patients with gynecomastia. Combining power-assisted liposuction and the pull-through technique has proven to be a versatile approach for the treatment of gynecomastia. It consistently produces a naturally contoured male breast while resulting in a single inconspicuous scar.

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