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Author

Wong, Michael S

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Post-Bariatric Body Contouring Surgery After Weight Loss

Lessons Learned From an Obesity Epidemic in the United States

Michael S. Wong, MD, FACS

Abstract: With the rise in obesity in the United States, there has been a similar increase in bariatric surgery. This has resulted in numerous patients losing significant weight with accompanying circumferential body contouring issues. This has led to an amazing increase in the number of body contouring procedures performed, both traditional excisional techniques as well as new emerging techniques emphasizing tissue preservation, rearrangement, and dermal reshaping. Although China's rates of obesity lag behind the United States, there is a recipe for obesity that will eventually surpass the United States. Thus, China has the opportunity to learn from the United States experience with regards to obesity treatment and contouring procedures after significant weight loss. Time will tell whether China will choose to use similar tissue preservation techniques to address issues of soft tissue ptosis and volume deficiency seen after significant weight loss, make refinements of these techniques, or develop new uniquely Chinese solutions.

Key Words: obesity, post-bariatric body contouring, lower body lift, upper body lift, autoaugmentation

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Obesity is a major problem in the United States (US), with over one third of Americans being obese. Numerous medical problems are associated with obesity including cardiovascular disease, type II diabetes, hypertension, stroke, dyslipidemia, osteoarthritis, sleep apnea and some cancers. Thus, obesity results in significant morbidity and is responsible for more than 300,000 deaths per year with a cost of greater than $100 billion USD per year in 2004[1] that has risen to a staggering US $190.2 billion or nearly 21% of annual medical spending in the United States in 2012.[2]

Although rates of obesity in China lag significantly behind the United States, unfortunately, China is moving in this direction. In fact, as many as 26% of China is now overweight or obese.[3] The primary reason appears to be the adoption of a more Western lifestyle, especially with regards to diet and physical activity. Chinese are switching from a diet of grains, beans and vegetables to consuming over half their calories from cooking oils, pork, poultry, beef, mutton, fish and dairy foods made more readily available with the increase in Western fast food chains. In addition, Chinese are physically less active with more sedentary lifestyles and jobs. China has seen a dramatic increase in the number of automobiles with a decline in the number of bicycles. In 2014, there were 154 million privately owned automobiles,[4] up from 5.54 million in 1990, supported by the dramatic expansion of its highways from 6258 km of highway in 1999 to surpass the United States in 2006 to become the most expansive highway system in the world with over 4 million km of paved roads.[5]

There are now 19 million obese Chinese with obesity increasing at rates of 30-50% per year or 6 to 10 million new obese Chinese people per year. Diabetes is an increasing problem in China with 1 in 10 having the disease. The World Health Organization estimates that diabetes, heart disease, and stroke will cost China US $558 billion between 2006 and 2015.[6]

Unless China aggressively works toward decreasing this growing obesity problem, China will surpass the United States in number of obese within the next few years. With the adoption of Western eating habits, there has also been an importation of Western weight loss programs such as Weight Watchers where they concentrate on making better and healthier food choices as well as encouraging portion control. There are also hospitals and clinics focusing on weight reduction through physical exercise, acupuncture, counseling, and Chinese medicine.[7]

Because many in the United States have recognized the difficulty in maintaining weight loss with more conventional modalities, many have turned toward surgery to assist them in more long-term maintenance of weight loss.[8] Bariatric surgery is on the rise as more recognize as surgical treatment is the only proven method of achieving long-term weight control for the morbidly obese. In the United States, 63,000 gastric bypass surgeries were performed in 2002, peaking at 220,000 procedures performed in 2009. Although the US numbers have declined since this peak to 179,000 in 2013,[9] the number of bariatric surgeries being performed continues to rise worldwide. The Roux-en-Y gastric bypass remains the most common operation performed in the world (45%), followed by sleeve gastrectomy (37%), and the adjustable gastric band (10%).[10]

As patients lose weight, by whatever means, they are becoming healthier by improvement in obesity-related conditions, such as type 2 diabetes, depression, coronary artery disease, and arthritis.[11] Despite this weight loss and objective signs of improved health, patients may develop new issues related to their skin and soft tissue laxity and excess that can affect body image and quality of life.[12]

Massive Weight Loss Deformities

To follow are a few examples of the contour changes commonly seen after significant weight loss. The patient in Figure 1 is a 43-year-old, nulliparous, 5 f. 8 in., 36C brassiere wearing female 2 years after a successful laparoscopic gastric bypass surgery. She lost 160 pounds down to 178 pounds corresponding to a 24 BMI point drop to 27 kg/m^2. In Figure 1A, the upper body demonstrates breast ptosis while the abdomen shows both supraumbilical and infraumbilical skin and fat excess and laxity in addition to significant mons ptosis. There is umbilical hooding due to the weight of her panniculus. Figures 1B and C demonstrate the significant upper body ptosis after her weight loss with several sweeps of tissue accumulating at her hips. With this, she demonstrates typical contour changes and areas of concern.

The patient in Figure 2 is a 33-year-old 5 ft. 2 in., 184.7 lb, BMI of 33.8 kg/m^2 woman 15 months after a laparoscopic gastric bypass surgery who dropped 135 lbs and 24.7 BMI points. She has similar upper and lower body ptosis with more residual subcutaneous fat. The prominent upper abdominal roll seen in all 3 views is a manifestation of her upper body ptosis.

With the increase in severity of these types of weight loss deformities, body contouring surgery numbers addressing these have also increased. Because significant weight loss can affect patient contour in all areas of the body, procedures addressing all body areas have become increasingly popular as reflected in the numbers reported in the American

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From the Department of Surgery, Division of Plastic Surgery, Section of Body Contouring After Weight Loss, University of California Davis, Sacramento, CA.
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Reprints: Michael S. Wong, MD, FACS, Director of Body Contouring After Weight Loss, Plastic Surgery Residency Program Director, Professor of Surgery, University of California Davis, 2221 Stockton Boulevard, Suite 2123 Sacramento, CA 95817. E-mail: mswong@ucdavis.edu.

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FIGURE 1. A 43-year-old, 27.0 BMI woman with upper and lower body ptosis 2 years after laparoscopic gastric bypass surgery.

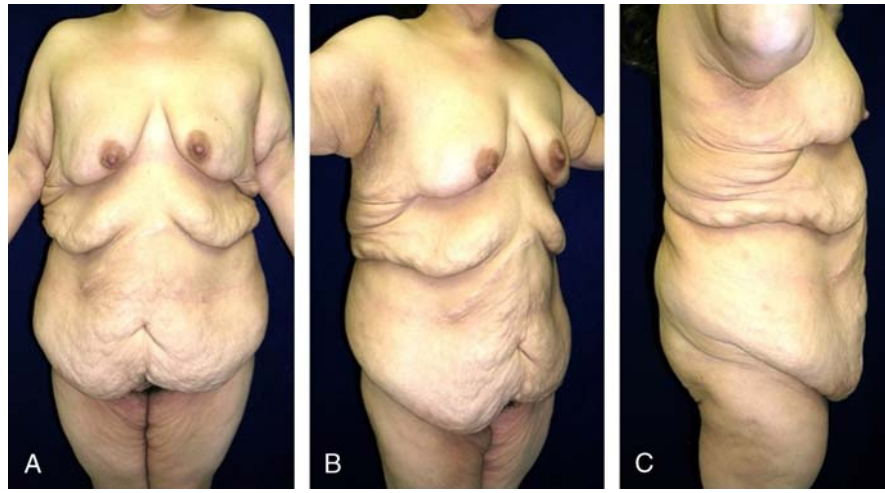

FIGURE 2. A 33-year-old, 33.8 BMI woman with upper and lower body ptosis 15 months after laparoscopic gastric bypass surgery.

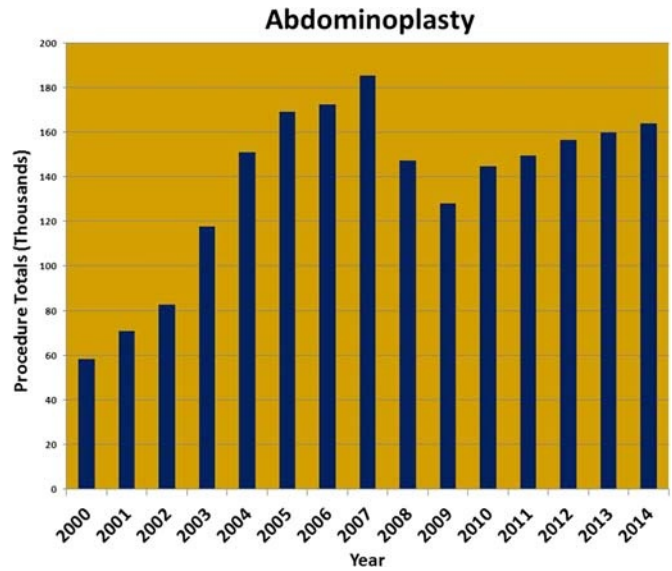

FIGURE 3. Abdominoplasty in the United States. Data from the American Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.

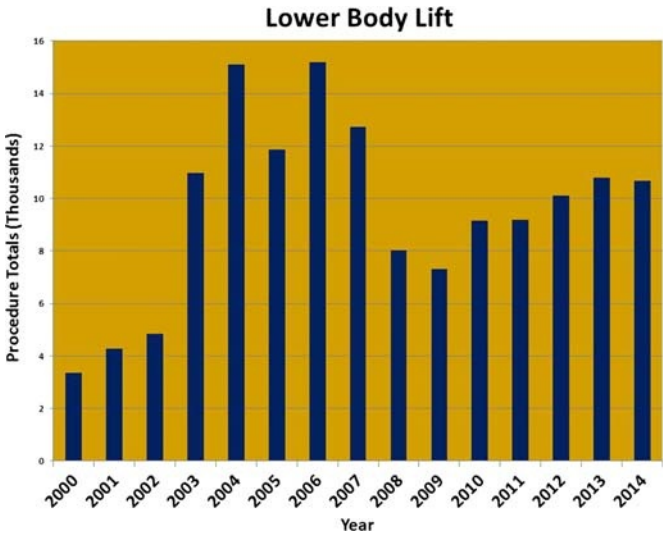

FIGURE 4. Lower body lift in the United States. Data from the American Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.

FIGURE 6. Lower body lift with buttock autoaugmentation, intraoperative view of a right fasciocutaneous flap rotated clockwise and reshaped with sutures.

Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.[13]

Lower Body

The most common area of concern is the abdomen with much attention focused on the panniculus. Thus, panniculectomies and abdominoplasty surgeries have become increasingly popular in the United States with dramatic increases in numbers from 58,000 in 2000 to 185,000 procedures done in 2007[13] (Fig. 3). Much of this 3.2 times increase in the number of procedures being performed in 2007 compared to 2000, or a 217% increase in number of abdominoplasties done over 2000 can be attributed to this group of patients who have lost significant weight. The effects of the US economy can be seen with declines in abdominoplasty numbers seen in the subsequent 2 years.

While the panniculus is frequently prominent in many, some patients may also have concerns of circumferential lower body excess. Partial treatment with an abdominoplasty can accentuate this excess exacerbating a patient's "love handles" or creating a postsurgical "dog ear." In response to circumferential lower body excess, belt lipectomies[14] and lower body lifts[15] have become more common. In 2000, there were 3.4 thousand lower body lifts performed. This increased to 15 thousand procedures done 2006. This is 4.4 times the number of procedures or a 341% increase over 2000[13] (Fig. 4). The decline in procedures in 2005 and between 2007 and 2009 as seen with abdominoplasty procedures is likely due to the down turn in the US economy. With the economic recovery, the continued increase in these procedures is seen.

These excisional procedures of the abdomen have the benefits of tightening the skin envelope, removing skin excess and rhytids associated with skin laxity. This tightening and flattening are welcome changes from the perspective of most patients, particularly in the abdomen and hips. In some patients, however, this flattening phenomenon in the buttock region can be of concern. Already often deflated with associated volume loss, some patients express concern over the potential additional loss of volume and projection associated with these excisional procedures involving the buttock. To address this specific concern, the tissue designated for discard in the standard circumferential excisional procedure, in some circumstances, may be preserved and rearranged to provide a more pleasing contour and shape along with volume enhancement or augmentation, using the patient's own tissues, thus referred to as an autoaugmentation of the buttock.[16] The cross-hatched

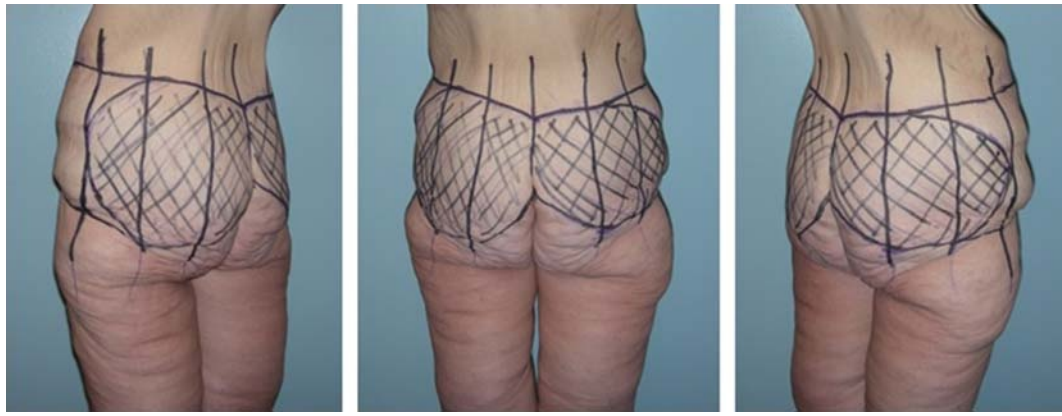

FIGURE 5. Buttock autoaugmentation marks in conjunction with a lower body lift. The cross-hatched tissue is preserved for rotation and reshaping.

FIGURE 7. Preoperative and postoperative month 4 views after lower body lift and buttock autoaugmentation demonstrating improved volume, contour, shape, and projection.

tissue is deepithelialized with the right flap rotated down in a clockwise fashion whereas the left flap is rotated in a counter-clockwise fashion. (Fig. 5) The fasciocutaneous flaps are then shaped with dermal sutures to resemble a buttock implant using the patient's own tissues (Fig. 6). Tissue between the 2 flaps may be removed to emphasize the sacral hollow. The skin is elevated and closed over these preserved fasciocutaneous flaps. This can result in added volume and improved projection and contour (Fig. 7). Although the aesthetic gains are recognized by most plastic surgeons, these improvements may not be as important to many patients.[17]

Upper Body

Breasts are the second most common area of concern after significant weight loss. Patients often notice an increase in skin laxity, deflation, and ptosis of the breasts. Depending on a woman's contour changes and her desired breast volume, there are a variety of procedures available to address her goals. Although not very common after significant weight loss, some women may feel her breasts are still large, and thus may want to proceed with a breast reduction. More commonly, patients with significant weight loss do not like the shape change, often desiring a breast lift or mastopexy. This is seen in the American Society for Aesthetic Plastic Surgery data on mastopexies, with a dramatic increase seen with 126 thousand procedures done in 2007 compared with 45000 in 2000. Thus, 2.8 times more mastopexies were done in 2007 compared with 2000 or a 176% increase in the mastopexies over this time period[13] (Fig. 8). Again there has been a decline in numbers in 2008 and 2009 in response to the economic downturn with a subsequent recovery seen in 2010. Of note, with any breast lift procedure, the resultant breast size is always smaller[18] because redundant skin relative to breast tissue is removed. In addition, there is an increase in density of the breast as the smaller skin envelope is wrapped securely around the residual breast. If a patient is concerned about both contour change and volume loss, she can have a mastopexy and an augmentation, similar to the buttock autoaugmentation. If patient size goals exceed the volume of the available local and regional tissue excess, then implants may be used for volume enhancement. Similar to the autoaugmentation of the buttock, if excess upper body tissue is used

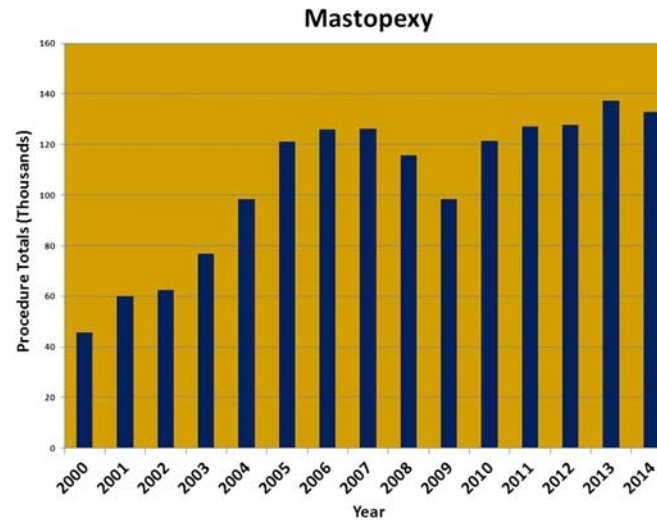

FIGURE 8. Mastopexy in the United States. Data from the American Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.

FIGURE 9. Preoperative back lift marks for planned single stage mastopexy autoaugmentation.

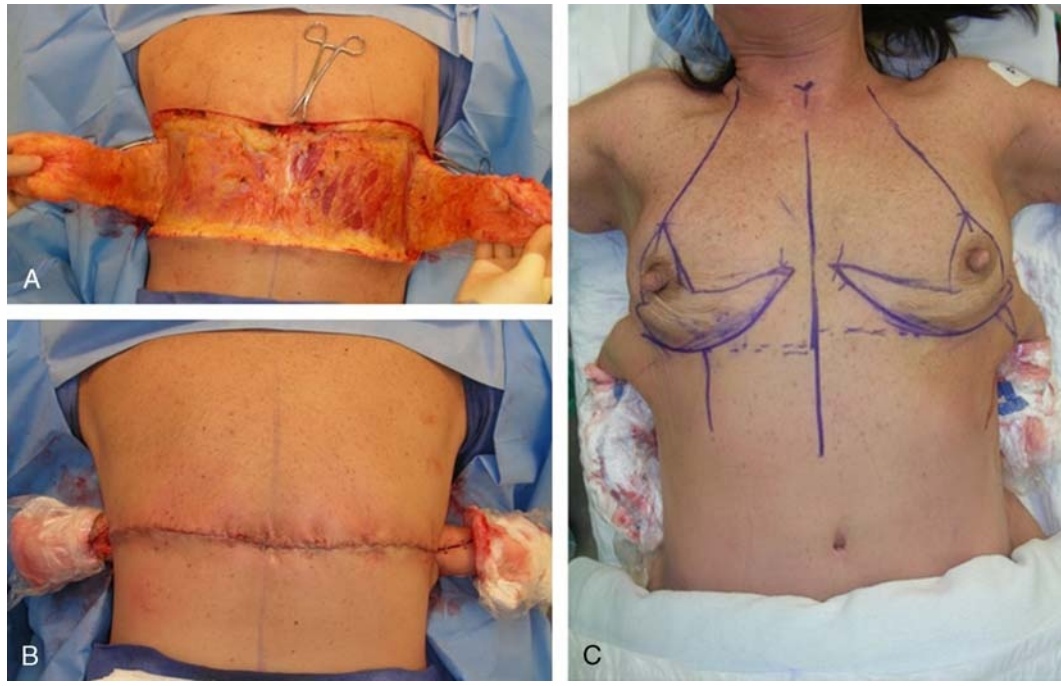

FIGURE 10. A, Patient prone with fasciocutaneous flaps elevated. B, Donor site closed and fasciocutaneous back flaps temporarily closed and dressed in preparation for patient repositioning. C, Patient repositioned supine with bilateral fasciocutaneous flaps available for planned autoaugmentation of the breasts. The right flap will be rotated clockwise while the left flap will be rotated counter clockwise for breast augmentation.

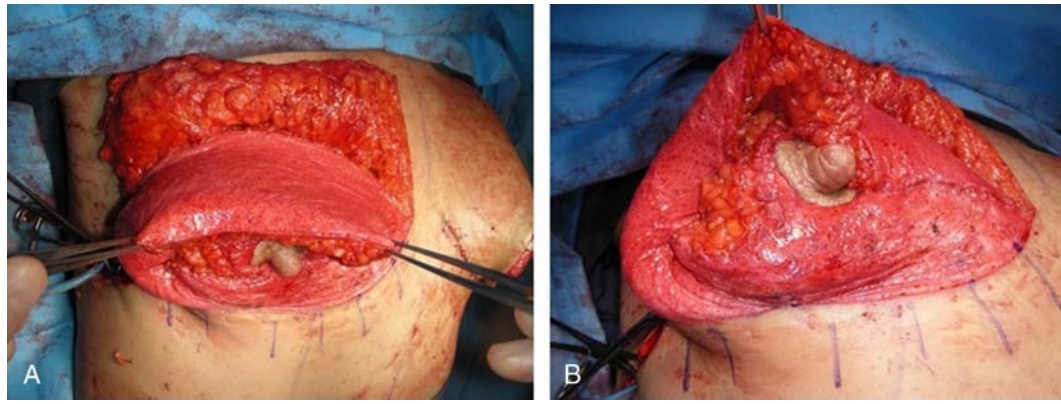

FIGURE 11. Right fasciocutaneous flap based laterally rotated clockwise to add volume to the superior and medial aspects of the breast (A) with inset of distal flap into the medial aspect of the breast, before final dermoglandular shaping (B).

FIGURE 12. Preoperative (upper row) and postoperative (lower row) month 6 images after a single-stage mastopexy autoaugmentation with completion upper body lift showing improved superior and medial fullness (lower left) and donor scar placed in the brassiere line (lower right).

to perform an autologous tissue augmentation of the breasts, implant-related issues may be avoided.[19]

Similar to the lower body, the upper body may also demonstrate circumferential excess. To optimally improve contour of the entire upper body, a breast reshaping procedure may be performed anteriorly with an excision of excess posterior back tissue, thus completing an upper body lift. Like the lower body lift, this may be done in 1 or 2 stages. More volume for autologous augmentation of the breasts may be gained by taking advantage of the patient's circumferential upper body ptosis (Fig. 9). The excess tissue of the back can be preserved for planned rotation toward the ipsilateral breast based on anterolateral intercostal artery perforators (Fig. 10).[20] In this procedure, the tissue removed in the back for the posterior portion of an upper body lift may be used for autoaugmentation of the breasts. To minimize the chance of fat necrosis, careful attention to distal flap perfusion should be assured before incorporation in to the breast mound. The right fasciocutaneous back flap is rotated clockwise, adding more bulk to the superior and medial aspects of the breast while the left flap is rotated counter clockwise (Fig. 11). Skin flaps are redraped over the augmented breast mound to complete the mastopexy autoaugmentation procedure (Fig. 12).[21]

Because significant weight loss also affects the extremities, there have been increases seen in other excisional contouring procedures, such as brachioplasties[13] and medial thighplasties.[13] There were 4.4 times as many brachioplasties performed in 2007 compared with 2000, an amazing 345% increase (Fig. 13). Medial thighplasties similarly saw 4.5 times as many procedures done in 2007 compared with 2002 with a 351% increase in the number of thighplasties performed in 2007 compared with 2002 (Fig. 14). Similar declines in 2008 and recovery in 2010 are seen for both of these procedures, with continued increases seen through 2014.

In summary, the United States is in the middle of an obesity epidemic with two thirds of its population classified as overweight or obese. With the Westernization of China where its population is increasingly becoming more sedentary and having greater access to higher caloric foods, obesity is on the rise. Fully aware of the significant medical problems associated with obesity, China is actively seeking ways to address this increasing weight problem. As seen in the United States, this will result in increasing numbers of Chinese with contour changes resulting in both functional and aesthetic concerns followed by similar increased demand for body contouring surgeries in China. To avoid further volume loss associated with strictly excisional techniques, the concept of tissue preservation, local tissue rearrangement, and reshaping can be applied to areas of the breast and buttock to result in more aesthetically pleasing contour and shape, often allowing for volume enhancement. Time will tell whether China will choose to use similar tissue preservation techniques to address issues of soft tissue ptosis

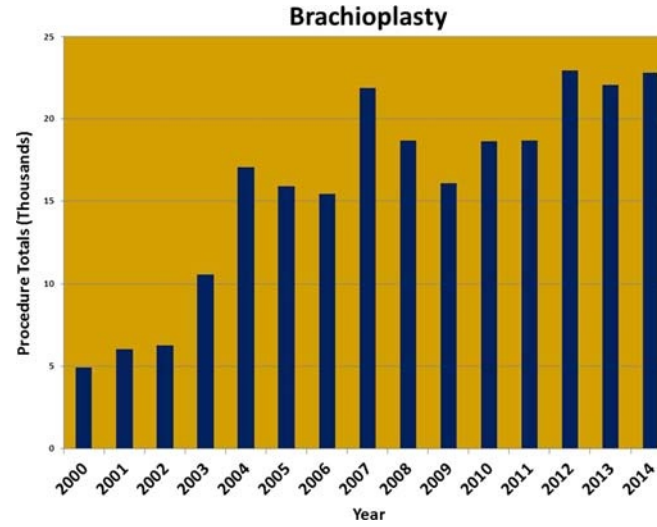

FIGURE 13. Brachioplasty in the United States. Data from the American Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.

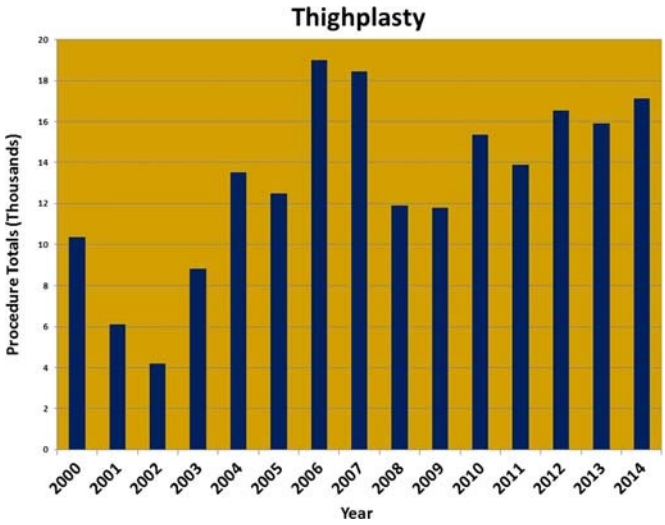

FIGURE 14. Thighplasty in the United States. Data from the American Society for Aesthetic Plastic Surgery Cosmetic Surgery National Data Bank.

and volume deficiency seen after significant weight loss, make refinements of these techniques, or develop new uniquely Chinese solutions.

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