



Review article

Teenagers and Cosmetic Surgery: Focus on Breast Augmentation and Liposuction

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Abstract

Two of the most popular and controversial cosmetic procedures for adolescents are liposuction and breast implants. In this review article, the procedures are discussed. In addition, the physiological and psychological reasons to delay these procedures, including concerns about body dysmorphic disorder and research findings regarding changes in teenagers' body image as they mature, are described. The lack of persuasive empirical research on the mental health benefits of plastic surgery for teenagers is highlighted. Finally, the long-term financial and health implications of implanted medical devices with a limited lifespan are presented. Adolescent medicine providers need to be involved in improving informed decision making for these procedures, aware of the absence of data on the health and mental health risks and benefits of these surgeries for teenagers, and understand the limitations on teenagers' abilities to evaluate risks. © 2008 Society for Adolescent Medicine. All rights reserved.

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The number of adolescents requesting and undergoing cosmetic procedures has increased dramatically over the last decade. The American Society of Plastic Surgeons (ASPS) estimates that more than 333,000 cosmetic procedures were performed on patients 18 years of age or younger in the United States in 2005, compared to approximately 14,000 in 1996 [1]. In 2005, one in four of these were surgical procedures such as nose reshaping, ear surgery, breast augmentation, liposuction, chin augmentation, and abdominoplasty (tummy tucks). ASPS does not report demographic information specifically for adolescent patients. However, among all patients, including adults, children, and teenagers, approximately 90% are female, 20% are racial and ethnic minorities, and there is a considerable income range.

Reconstructive surgery is defined as a procedure to correct a clear abnormality. Reconstructive procedures such as correction of cleft lip or palate, can provide enormous ben-

efit to children and teenagers. In contrast, cosmetic surgery is defined as surgery to improve a "normal" appearance, such as reshaping a nose or augmenting breasts. As cosmetic procedures have become much more pervasive, advertised in the mass media and the subject of numerous prime time television programs, it has become increasingly difficult for health professionals to agree on when it is appropriate or necessary [2,3].

This literature review focuses on data-based articles regarding the risks and benefits, as well as the need for improved standards for screening and informed consent. We reviewed data from all articles on these topics listed in the PubMed and PsycINFO databases from 1985 through June 2007, in addition to books, book chapters, and materials on the Food and Drug Administration (FDA) and plastic surgery medical association Web sites. This literature review focuses on two of the most popular cosmetic surgical procedures performed on teens: breast augmentation and liposuction. Although less popular for children under 18 than ear pinning or nose reshaping, they are more controversial because of higher complication rates, long-term financial and health risks, and concerns about "body

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sculpting” on bodies that are still developing. Despite the rising popularity of cosmetic surgery for teenagers, there are no empirical studies on the cultural and economic factors that are causing the increase.

Breast Augmentation

Although the FDA approved saline breast implants only for women ages 18 and older [4], and silicone gel breast implants for women ages 22 and older [5,6], it is legal for doctors to perform breast augmentation using either type of implant for teens under 18, as an “off-label” (i.e., not approved) use with parental consent [7]. It is FDA policy to approve medical products for specific uses for which they are proven safe and effective, and to allow physicians to determine if they want to use those products for other medical purposes.

It is not possible to determine exactly how many procedures are performed each year on teens, although estimates are available. The ASPS and the American Society for Aesthetic Plastic Surgery (ASAPS) each provide estimates of the number of plastic surgeries performed by their members on children ages 18 and younger. The estimates are based on surveys of their members, vary considerably because of differences in membership criteria, and do not include the many plastic surgeries performed by other physicians. The ASAPS, which includes dermatologists and other disciplines that perform cosmetic surgery and procedures, estimated more than 11,300 breast augmentations for teens 18 and under in 2003 [8]. In contrast, ASPS, which only includes plastic surgeons, reported approximately 4000 procedures for teens ages 18 and younger in the same year. Through 2005, both medical societies reported approximately 3000–4000 breast augmentations for teens 18 and younger [1,9]. Of note, in 2006, ASPS calculated procedures for ages 19 and under. Adding age 19 resulted in more than a doubling in the number of procedures to more than 9100 [1].

Breast augmentation is performed under intravenous or general anesthesia, usually on an outpatient basis. A pocket is created under the breast tissue or in the pectoralis major muscle. The breast implant, a silicone envelope filled with silicone gel or saline, is placed in the pocket and then the soft tissue is closed. According to the literature, postoperative discomfort may last several days. The patient must wear a surgical bra for about 2 weeks and avoid strenuous exercise for 4–6 weeks [10].

Most complications of this procedure are related to the prosthetic device, and increase over the lifetime of the product. The most common is capsular contracture, a tightening or hardening of the scar tissue surrounding the implant, which may cause the breast to feel hard and painful [10]. Other common complications include implant rupture, leaking, and the need for additional surgery. Postoperative bleeding and hematoma formation, reactions to anesthesia,

loss of nipple sensation, and scarring are other complications of surgery. In about 1% of patients, infection develops around the implant.

The medical risks of breast implants increase in the years following surgery. Although little research has been done, it is possible that problems associated with macromastia such as back pain may also occur among women with large breast implants [11]. Breast implants typically last approximately 10 years. The likelihood of capsular contracture and other complications requiring surgery also increase over time, so that an adolescent who undergoes breast augmentation may require repeated surgeries, with the associated risks, throughout her lifetime [12]. In several studies, breast augmentation surgery was found to increase the likelihood of insufficient lactation when a woman tried to breastfeed. Studies consistently indicate that breast implants interfere with mammography, causing a failure to detect approximately 55% of cancerous breast tumors. This is approximately twice the rate of women without implants [13]. Mammography procedures also increase the likelihood of implant rupture and leakage [14].

Liposuction

The two medical societies differ somewhat in their estimates of liposuction procedures performed on adolescents, based on surveys of their members. ASPS and ASAPS estimates of liposuction performed from 2004–2006 vary between 3000 and 6000 per year for adolescents under 18–19 [1,9].

Liposuction is a procedure in which localized deposits of fat are removed to recontour one or more areas. Through a tiny incision, a narrow tube or cannula is inserted and used to remove the fat layer that lies beneath the skin. After the incision is closed, the tunnels left by removal of the fat collapse and contract. The result is a reduction in the contour. When the procedure is small, it can be done under local anesthesia on an outpatient basis. When it is more extensive, general anesthesia and overnight stays are necessary. The acute adverse reactions following suction-assisted lipectomy consists of itching, bruising, and swelling. The patient must wear a compression garment for approximately 1 month to prevent hematoma formation, and bruising may last for 4–6 weeks.

In addition to surgical risks, primary risks of liposuction include infection; damage to skin, nerves, or vital organs; fat or blood emboli; and excessive fluid loss [15]. The different techniques (tumescent, superwet, and ultrasound-assisted liposuction) are associated with additional complications such as skin or deep tissue damage. The American Society of Plastic Surgeons’ advisory states that the likelihood of serious medical complications, such as lidocaine toxicity and fluid accumulation in the lungs, increase with “the number of sites treated and the volume of fat aspirated” [16].

Pubertal Development and Body Image

Physiological and psychological changes occur during puberty, which are important to consider when discussing cosmetic surgery in adolescents. Breast development can continue after age 18. In fact, when the FDA approved silicone gel breast implants only for women ages 22 and older, they pointed out that breast development can continue into the late teens and early 20s [17]. Breast size may also increase with weight gain, and growth charts indicate that the average female gains weight between the ages of 18 and 21.

Normal weight gain may reduce dissatisfaction with breast size and the desire for breast augmentation. In addition, that same weight gain may also increase fat deposits in the areas most likely to be considered for liposuction. Therefore, the likelihood of weight gain in the late teens and early 20s raises important questions about whether decisions about either breast augmentation or liposuction for adolescents should be delayed. For augmentation, the desire for surgery could be reduced as a result of likely weight gain, whereas for liposuction, the benefits of surgery could be short-lived as a result of likely weight gain.

The process of body image development begins at an early age. Parental approval and attention, or parental criticism and neglect, influence how children think about themselves. Children's body image concerns may be further influenced by sociocultural influences such as dolls, television characters, and characters in children's books and movies [18]. Researchers have shown that young women that watch more television programs featuring women with "curvaceously thin" ideal body images are significantly more likely to report that those types of bodies are their personal ideal and also express significantly more positive views of breast augmentation and liposuction [19].

The adolescent body image is continually developing in response to internal and external cues, and the physical changes of puberty occur at a time when teens are especially sensitive to how others look and what others think [10]. Self-esteem and self-worth also develop early, and can either be stable traits or states that are subject to change over time [20]. Research indicates that global self-worth tends to vary over time for students whose self-esteem is primarily dependent on the feedback of others, whereas those whose feelings are primarily dependent on self-approval have a more stable sense of self-esteem. This research has implications for why adolescents want plastic surgery, as well as the extent to which plastic surgery is likely to improve their self-esteem.

A Dutch study examining the psychological benefit of cosmetic surgery among 12- to 22-year-olds, found that satisfaction with the body parts that the patients considered deformed improved 6 months after cosmetic surgery, especially for breast reduction and augmentation patients [21]. However, the no-treatment comparison group of Dutch ad-

olescents with self-reported deformities also felt better about themselves 6 months later, especially among those 18 and older. These results suggest that body image improves among teenagers as they mature, whether or not they undergo cosmetic surgery. Similarly, a longitudinal study of adolescent males and females, ages 11 to 18, found body image satisfaction rates were highest at age 18 in both sexes, and that the satisfaction of individual participants varied as a function of their age and developmental stage [22].

Overall, these studies indicate that dissatisfaction with appearance decreases with age throughout adolescence, and also many adolescents who are very dissatisfied with their appearance will feel more satisfied as they mature, especially after the age of 18, even if they do not undergo cosmetic surgery.

Mental Health and Cosmetic Surgery

The ultimate role of plastic surgery has been described as "To alter the patient's body image, and thus to improve the patient's quality of life [10]." However, research indicates a more complicated relationship between cosmetic surgery and mental health variables such as self-image and quality of life. In general, women report satisfaction with breast augmentation in the year following surgery [12,22]. However, six long-term retrospective studies indicate that breast augmentation patients are significantly more likely to commit suicide, compared to women of similar age who had other plastic surgery or represent the general population [23]. The six studies did not examine whether mental health problems developed before or after surgery, although several of the authors speculate the problems predated surgery.

If mental health issues predate surgery, better screening and referrals are needed. On the other hand, if mental health problems develop or worsen after surgery, it is important to determine why this is occurring.

The research literature on eating disorders provides useful clues about body image and its implications for adolescents' motivation to undergo plastic surgery. Studies indicate that distorted body image and other mental health issues, rather than actual weight problems, are the main incentive for adolescents to go to extreme measures to lose weight [24]. It is logical to consider that similar problems may be influencing the desire for liposuction, and whether girls or women with eating disorders or distorted body image might be especially likely to seek liposuction. Distorted body image and a distorted ideal body image could also result in the desire for breast augmentation. Both the potential effects of surgery on a child's developing body image, and the extent to which psychopathology or distorted body image may result in the pursuit of plastic surgery are important areas for study.

It is generally acknowledged that it is difficult to assess adolescent body image because of the increased self-consciousness and dissatisfaction with physical appearance

that is common at this stage of development [25]. However, several studies attempted to measure the specific body image issues related to adolescents seeking cosmetic surgery. The previously cited study of Dutch adolescents (ages 12–22) presenting for plastic surgery found that these patients did not differ from other adolescents on most self-confidence or mental health measures. However, they were slightly less confident of their physical appearance and romantic appeal, and significantly more dissatisfied with the body part for which they were considering surgery compared to adolescents in the general population [21]. A study of women 18 and older seeking breast augmentation clearly illustrates how the reported dissatisfaction with their bodies may reflect a distorted body ideal among cosmetic surgery patients [26]. Those seeking breast augmentation were less satisfied with their breast size than a matched control sample, but they did not differ significantly in their bra size. The women choosing augmentation reported a larger ideal breast size, with almost all choosing a bra cup size of C or D as ideal, compared to a B or C cup as the ideal size for the matched controls. The largest current size of the augmentation group was 34C, and the largest ideal size was 38D. This indicates that desiring breast augmentation is not necessarily a function of small breast size, but instead may reflect an unusually large ideal size.

Teens seeking cosmetic surgery report greater dissatisfaction with specific body parts, and increased concern about their general appearance which raises questions about the extent to which they may have body-image related pathology such as body dysmorphic disorder (BDD). BDD is defined as “a preoccupation with an imagined or slight defect in appearance that leads to significant impairment in functioning” that usually starts during adolescence [27], with 16 years old as the average age of diagnosis [3]. There are few studies of BDD that include adolescent cosmetic surgery patients. Research indicates that approximately 7% to 15% of cosmetic surgery patients have BDD, and that most BDD patients seek plastic surgery; researchers report that the BDD is unlikely to improve as a result of surgery and may worsen [3]. In contrast, BDD patients are more likely to improve from therapy or psychotropic medication. Several researchers have suggested that an assessment of psychiatric status and history is an important part of the evaluation of an adolescent presenting for cosmetic surgery, with special attention to disorders with a body image component, including eating and somatoform disorders, mood, and anxiety disorders [2]. The Body Dysmorphic Disorder Questionnaire could be used as a screening tool [28].

In addition to screening for BDD, psychological testing could potentially help ensure that teenagers are mature enough to undergo cosmetic surgery. Plastic surgeons describe cautious interviews aimed at determining why the teen wants plastic surgery, saying that they reject patients with unrealistic expectations and those having the surgery to please a boyfriend or parent [29,30]. In contrast, plastic

surgeons state that having surgery based on internal motivations, such as “I will feel better about myself” or “clothes will fit better” are considered appropriate responses, despite the lack of evidence that those goals will be met.

Benefits of Cosmetic Surgery

There are few well-designed studies examining the psychological benefits of cosmetic surgery. There are none that examine long-term benefits among adolescent patients. Postoperative studies of plastic surgery patients are primarily surgeons’ reports of their patients’ satisfaction [2]. The majority of postoperative studies of psychological changes have found psychological benefits; however, these studies had significant methodological shortcomings, such as follow-up of 6 months or less [2]. When the research design was improved, the results have indicated more limited benefits of surgery. For example, one 6-month follow-up study of 45 adult women who completed preoperative and postoperative assessments reported significant improvements in the self-rated body image dissatisfaction only for the feature surgically altered [31]. On average, the women did not report significant changes in their overall body image or satisfaction with their appearance. The impact of surgery might have been even less impressive had there been a comparison group of women undergoing nonsurgical training, enhancements, medication, or therapy to improve their appearance or body image. For example, cognitive behavioral treatments have been used successfully with women with BDD [32,33], and although many psychotropic drugs used for BDD are apparently ineffective, high doses of several serotonin-reuptake inhibitors taken for at least 10–12 weeks were found to result in significant improvement [28].

Two well-designed 2-year follow-up studies of women 18 and older with breast augmentation found that on most measures of self-esteem, self-concept, and quality of life, the subjects showed either no improvement or statistically lower scores 2 years after augmentation compared to prior to augmentation [34]. Their only improvement was their responses regarding the attractiveness of their breasts. If the goal of cosmetic surgery is to “feel better about myself,” the results suggest that many girls and women seeking cosmetic surgery might benefit more from therapeutic approaches aimed at improving self-esteem or general body image or those aimed at decreasing depression.

At this time, there are no well-designed studies that conclusively demonstrate that cosmetic surgery significantly improves body image for the surgically altered feature in the long term. Similarly, there are no conclusive studies that indicate that cosmetic surgery improves overall body image or quality of life for adolescents or adults. Short-term studies suggest that any benefits are likely to be specific to self-concept regarding the specific body part that was surgically altered, rather than a more general improve-

ment in self-esteem, self-concept, or quality of life. However, for surgeries such as breast augmentation and liposuction, any short-term benefits may decrease over time due to weight gain, aging, or common implant complications.

Financial Implications

The financial costs of cosmetic surgery can be substantial, because corrective surgery is rarely covered by health insurance. Many plastic surgeons offer cosmetic surgery on the installment plan [35], and more than one-third of augmentation patients undergo additional surgery to correct problems within 3 years [36,37]. Therefore, many young women who need to have a broken or painful implant removed will be still paying for the initial augmentation surgery and may be unable to afford corrective surgery [38].

Financial costs are higher for silicone gel breast implants compared to saline breast implants. Silicone gel breast implants cost at least \$1000 more per pair. In addition, the FDA urges that women with silicone gel breast implants undergo regular screening with breast coil magnetic resonance imaging (MRI) to determine if the breast implant is broken or leaking. The FDA points out that only 30% of silicone gel implant ruptures are accurately diagnosed by clinical exams, which is why the FDA required implant makers to distribute patient booklets warning women that “you should have your first MRI 3 years after your initial implant surgery and then every 2 years, thereafter” and have implants removed quickly if they are found to be ruptured or leaking. The FDA specified greater financial costs, as well as greater risks, as their reason for limiting approval of silicone gel implants to women age 22 and over, rather than age 18 [39]. Liposuction has fewer long-term complications than breast implants, but like augmentation, may require additional future surgeries to maintain the results. However, unlike the replacement of a deflated or leaking breast implant, repeat liposuction surgeries are not required to avoid an abnormal appearance or potential health problems.

Informed Consent

Research indicates that the general public has an inflated sense of the benefits, and minimized sense of the risks of plastic surgery [40]. This optimistic view may be even greater for adolescents, who are oblivious to the well-established long-term health risks of smoking and other risk behaviors, and tend to focus on the short-term benefits instead. Recent studies of brain development indicate that the region of the brain that inhibits risky behavior is not fully developed until age 25 [41]. A study of high school juniors found considerable interest in cosmetic surgery, based primarily on information from television and teen magazines [42]. These findings suggest that informed consent for adolescents considering cosmetic surgery is especially problematic.

Informed consent forms and the consent process are intended to support the right of self-determination and patient choice [43]. Bioethicists point out that in cosmetic surgery, where both supply and demand for procedures are determined in the marketplace and can be stimulated by manufacturers’ and physicians’ self-interest, the ability of informed consent to meet this purpose may be compromised [43]. In addition to the influence of persuasive and pervasive advertising designed to stimulate demand, it is difficult for a physician to neutrally present both the risks and benefits of an elective procedure that has no medical benefits, which he or she is simultaneously selling. It has been suggested that, like pharmaceutical companies, the manufacturers of cosmetic medical devices should be legally mandated to disclose all information regarding side effects, complications, and any other adverse outcomes along with the promises of beauty in advertisements [43]. The FDA requires that each implant manufacturer provide patient booklets that clearly describe the risks. However, these informed consent publications are lengthy and are more complex than health educators would recommend for either adults or adolescents. Although the booklets are not required by regulatory agencies in other countries, the European Parliament’s Public Health Committee has urged European Union Member States to ban direct advertising to the public for breast implants, require risk information on the labeling, and promote alternatives to breast implants [44].

For adolescents, informed consent for cosmetic surgery follows the legal guidelines of any other medical treatment. If the adolescent is under age 18, parental consent is required. Unfortunately, no specific informed consent procedures exist for adolescents undergoing plastic surgery. As children and adolescents are thought to be even less likely than adults to have read or been informed regarding the issues related to surgery, it has been suggested that true informed consent for pediatric cosmetic surgery should include not only a discussion of risks and benefits, but body image concerns and expectations of surgery [2].

Conclusions and Recommendations

This review paper describes research-based literature on liposuction and breast augmentation among teenagers, and highlights issues regarding the appropriateness of performing cosmetic surgery on patients whose bodies have not reached maturity, the long-term physical effects of these surgeries, and postoperative complications that may arise. This paper also raises concerns about the broader issues of the psychological implications of cosmetic surgery on developing body image, the extent to which distorted body image common among adolescents may result in the pursuit of cosmetic surgery, and the comparative effectiveness of therapy or other treatments to reduce negative body image. Finally, this paper presents concerns about the appropriateness of current standards for obtaining informed consent.

Important areas for future research are the potential effects of surgery on a teen's developing body, the extent to which an adolescent's psychopathology or distorted body image may result in the pursuit of plastic surgery, and the comparative effectiveness of cognitive behavioral therapy and other approaches for adolescents with negative perceptions of their bodies. Because there are no empirical studies on the cultural and economic factors that are causing the increase in cosmetic surgery, differences related to race, age, socioeconomic status, and ethnicity could also be enlightening.

Improved data collection would provide useful information about the number of adolescents 21 and under that are undergoing liposuction and breast augmentation. The two professional associations for plastic surgeons estimate the number of procedures each year, based on annual surveys of their members. Until 2007, both reported data on patients 18 and under and 19–34. Because the age of majority is 18, it would be useful to have data on the number of procedures performed on patients under 18, as well as the presumably larger numbers performed on patients who are 18, 19, 20, and 21. Starting in mid-2007, ASPS now reports breast augmentation for ages 18–19 and for 20–34; however, they use “13–19” and “20–29” categories to report liposuction and all other cosmetic procedures. ASAPS continues to use “18 and under” and “19–34” for all cosmetic procedures.

Plastic surgeons are aware of concerns about teen breast augmentation, and in December 2004 the ASPS released an official statement that “Adolescent candidates for purely cosmetic breast augmentation should be at least 18 years old. The procedure should be delayed until the patient has sufficient emotional and physical maturity to make an informed decision about cosmetic breast augmentation” [45]. The restriction does not apply to “reconstruction” for “deformities” such as asymmetry, which is a common condition. Nevertheless, the reported number of teen breast augmentations has stabilized after that policy statement, and both medical societies have directly responded to media criticism about cosmetic procedures among teens, with ASPS stating that the numbers have stabilized in recent years and ASAPS stating that they have decreased since 2001 [46,47]. If ASPS and ASAPS both revised their age groups for data collection, as recommended above, or if all physicians were required to maintain a registry of teen patients, this would improve data collection regarding the number of teens undergoing cosmetic procedures.

Given normal pubertal development, adolescent medicine providers may recommend that a teenager “wait and see” before undergoing breast augmentation with either saline or silicone gel breast implants. They also may recommend exercise rather than liposuction, because physical activity habits provide life-long health benefits that liposuction does not.

Standardized screening for BDD and psychological problems needs to be implemented. The high rates of teen-

age risk-taking behaviors involving alcohol, drugs, unprotected sex, or reckless driving are examples of how the decisions that adolescents make are difficult for adults to predict or control. However, because adolescents under 18 are not able to have cosmetic surgery without parental consent, and older adolescents are unlikely to be able to afford cosmetic surgery without parental support, parents and physicians have more control over adolescent cosmetic surgery than they have over other adolescent decisions.

Effective screening could potentially improve the process by which decisions are made about whether adolescents should undergo breast augmentation or liposuction. The next steps regarding screening and counseling may include a position paper by organizations that are actively involved in promoting the health and well-being of teenagers.

Although ultimately the decision to perform cosmetic surgery on a teenager is a decision that should be made between the physician, patient, and family, it is clear that additional research in a number of areas is needed before fully informed consent is possible regarding whether the benefits are likely to outweigh the risks for specific types of cosmetic surgery.

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