Medical Coverage Policy

Effective Date.....8/15/2024
Next Review Date.....8/15/2025
Coverage Policy Number..... 0152

Breast Reduction

Table of Contents

Related Coverage Resources

Acupuncture
Breast Reconstruction following Mastectomy or Lumpectomy
Chiropractic Care
Complementary and Alternative Medicine
Physical Therapy
Gynecomastia Surgery
Gender Dysphoria Treatment

INSTRUCTIONS FOR USE

The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgment where appropriate and have discretion in making individual coverage determinations. Where coverage for care or services does not depend on specific circumstances, reimbursement will only be provided if a requested service(s) is submitted in accordance with the relevant criteria outlined in the applicable Coverage Policy, including covered diagnosis and/or procedure code(s). Reimbursement is not allowed for services when billed for conditions or diagnoses that are not covered under this Coverage Policy (see "Coding Information" below). When billing, providers must use the most appropriate codes as of the effective date of the submission. Claims submitted

for services that are not accompanied by covered code(s) under the applicable Coverage Policy will be denied as not covered. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.

Overview

This Coverage Policy addresses breast reduction for symptomatic macromastia and breast reduction surgery on the nondiseased/contralateral breast following a mastectomy or lumpectomy.

Coverage Policy

Coverage for breast reduction varies across plans. Please refer to the customer's benefit plan document for coverage details.

Breast reduction surgery on the nondiseased/contralateral breast when performed to produce a symmetrical appearance following a mastectomy or lumpectomy is considered medically necessary.

If coverage for breast reduction is available, the following conditions of coverage apply.

Breast reduction is considered medically necessary for the treatment of macromastia (i.e., large breasts) in women at least 18 years of age, or with completed breast growth, when ALL the following criteria are met:

- macromastia is causing at least ONE of the following conditions/symptoms that has been unresponsive to medical management:
  - shoulder, upper back/ neck pain, and/or ulnar nerve palsy for which no other etiology has been found on appropriate evaluation
  - intertrigo, dermatitis, eczema, or hidradenitis at the inframammary fold
- preoperative photographs confirm the presence of:
  - significant breast hypertrophy
  - shoulder grooving from bra straps and/or intertrigo (if stated to be present)
- average grams of tissue to be removed per breast are above the 22nd percentile on the Schnur Sliding Scale (see Appendix A) based on the individual's body surface area (BSA) or regardless of BSA, more than 1 kg of breast tissue will be removed per breast

Breast reduction or mastopexy prior to mastectomy is considered medically necessary when a staged procedure is planned prior to a nipple-sparing mastectomy.

Note: The following are considered integral to breast reduction (CPT® code 19318) and not separately reimbursable:

- **Nipple and areola reconstruction (CPT® code 19350)**
- **Suction lipectomy or ultrasonically-assisted suction lipectomy (liposuction) (CPT® code 15877)**

Breast reduction for either of the following indications is considered cosmetic in nature and not medically necessary:

- surgery is being performed to treat psychological symptomatology or psychosocial complaints, in the absence of significant physical findings that meet the above listed criteria
- surgery is being performed for the sole purpose of improving appearance

Correction of benign inverted nipples (CPT® code 19355) is considered cosmetic in nature and not medically necessary.

Suction lipectomy or ultrasonically-assisted suction lipectomy (liposuction) as a sole method of treatment for symptomatic macromastia is considered unproven.

Health Equity Considerations

Health equity is the highest level of health for all people; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which people are born, grow, live, work, and age.

Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include safe housing, transportation, and neighborhoods; racism, discrimination and violence; education, job opportunities and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

Sociodemographic and economic disparities have a role in outcomes related to breast reduction. In a retrospective observational study of 414 women who underwent inpatient bilateral reduction mamamoplasty, comorbidity, age, race, payor status and rural- urban density were evaluated for risk of post op complications. Higher comorbidity index ($p<0.001$), Black race ($p<0.001$) and treatment within a nonmetropolitan or rural county ($p=0.0017$) were significant predictors of increased risk of postoperative complication. Age, comorbidity severity, race and zip code income quartile were also evaluated for risk of extended length of stay. Older age ($p= 0.0078$), increased comorbidity severity ($p< 0.001$) and Black race ($p= 0.0011$) predicted higher risk of extended length of stay, whereas Hispanic race predicted decrease of such risk ($p< 0.001$) (Kim and Ascherman, 2024).

General Background

Macromastia (i.e., female breast hypertrophy) is the development of abnormally large breasts. Normal breast development begins at approximately five weeks' gestation and continues until a woman is in her early twenties, with the rate of development and degree of asymmetry often varying. Spontaneous massive growth of the breasts during puberty and adolescence is thought to be the result of excessive end-organ sensitivity to gonadal hormones. It is more commonly bilateral, often occurs over a brief period, and most commonly affects adolescent girls. Management is individualized and may range from reassurance or the use of supportive brassieres. It is recommended that surgery be delayed until late adolescence to allow complete breast development (Conner and Merritt, 2020; McGrath and Pomerantz, 2012).

The presence of macromastia may cause clinical manifestations when the excessive breast weight adversely affects the supporting structures of the shoulders, neck, and trunk. Increased weight on the shoulders can cause pain, fatigue in the cervical and thoracic spine, which can lead to poor posture, thoracic kyphosis and occipital headaches. Grooving or ulceration of the skin on the shoulders, pressure on the brachial plexus causing neurological symptoms in the arms and skin conditions occurring at the inframammary fold such as intertrigo, dermatitis, eczema, or

hidradenitis (inflammation of the apocrine sweat glands resulting in obstruction of the ducts) may also exist. The presence of these persistent signs and painful symptoms distinguishes macromastia from large, normal breasts and may prompt the need for surgical intervention (American Society of Plastic Surgeons [ASPS], 2011/2021; McGrath and Pomerantz, 2012; Schnur, et al., 1997).

Medical management of conditions/symptoms may include any of the following: weight loss; acupuncture; massage therapy; chiropractic treatment; adequate bra support (proper fit and wide strap support); nonsteroidal anti-inflammatory drugs (NSAIDS)/analgesia; and physical therapy, when a functional impairment exists (Hansen and Chang, 2023; Collins, et al., 2002).

Reduction mammoplasty is the surgical excision of a substantial portion of the breast, including the skin and the underlying glandular tissue, until a clinically normal size is obtained. Relocation of the nipple, which may result in decreased sensation and altered lactation, may also be required during this procedure. Therefore, it has been recommended that surgery should not be performed on an individual until the breasts are fully developed. Complications range from mild to severe and may be early or late. The most common early complication independent of reduction technique is delayed wound healing. Late complications can include, but are not limited to, seroma, scars and pseudoptosis. A BMI ≥30 kg/m^2 and smoking may increase the risk of complications. Persons who are obese or irradiated are more likely to develop infections, and smokers experienced a higher incidence of wound dehiscence than did nonsmokers (Zhang, et al., 2016; McGrath and Pomerantz, 2012; Nahai, et al., 2008; Greydanus, et al., 2006).

Amaral et al. (2011) reported on racial and socioeconomic disparities in reduction mammoplasty. Their analysis of the 2007 Nationwide Inpatient Sample database for differences in race and payer mix revealed that Black and Hispanic patients ($p<0.0001$) were more likely to undergo reduction mammoplasty.

The available techniques for breast reduction differ according to the pattern of skin resection, as well as the method for removing breast tissue and moving the nipple. Factors identified on the preoperative breast evaluation that are used for determining the best approach include preoperative breast size and degree of ptosis, desired postoperative breast size, skin quality, and a history of prior breast surgery. Liposuction for conturing to remove excess fat in the lateral area of the breast at the time of surgery is considered part of the breast reduction procedure (Pu, 2021; Cohen, 2018). Among these, preoperative breast size and estimated breast reduction volume are the most important factors influencing the technique selected. Generally, breast hypertrophy is stratified according to the estimated volume to be resected:

- small reductions remove 200 to 400 grams per side
- moderate reductions remove 400 to 700 grams per side
- large reductions remove 700 to 1200 grams per side
- reductions in patients with gigantomastia involve massive reductions of more than 1200 grams per side

Several methods are available to help surgeons estimate breast resection volumes. The two most common methods are the Schnur sliding scale and the Descamps formula. The Schnur sliding scale estimates resection weight based on the patient's body surface area. The Descamps method estimates resection volume based on a regression analysis (Hansen and Chang, 2023). There is no consensus on which formula to use to calculate body surface area (Redlarski, et. al., 2016).

The Schnur Sliding Scale is an evaluation tool that may be used to determine the appropriate amount of tissue to be removed compared to a patient’s total body surface area (BSA). This can be instrumental in determining if breast reduction is being planned for a purely cosmetic reason or as a medically necessary procedure. In a survey of plastic surgeons, Schnur et al. (1991)

concluded that women whose removed breast weight was less than the 5th percentile sought the procedure for cosmetic reasons and all women whose breast weight was greater than the 22nd percentile sought the procedure for medical reasons. One way to calculate the BSA is: BSA (in m^2) = [height (cm)] $^{0.718}$ X [weight (kilograms [kg])] $^{0.427}$ X .007449.

Generally, most patients do not require hospitalization after breast reduction surgery. An overnight stay with observation may be necessary for some women with medical comorbidities. Patients who experience severe postoperative nausea and vomiting may require extended observation or admission for intravenous fluid therapy and antiemetics (Hansen and Chang, 2023).

Breast tissue regrowth following initial breast reduction in adolescence has been reported (Greydanus, et al., 2006). The growth of the female breast is generally described by five stages referred to as Tanner stages or sexually maturity rating (SMR) stages. A number of clinical correlations are noted with the SMR stages, including the timing of breast reduction at stage V (i.e., mature stage) (DeSilva, et al., 2006). In a review of elective plastic surgical procedures in adolescence, McGrath and Schooler (2004) stated "Breast development is variable but usually plateaus at 15–16 years of age. Reduction mammoplasty is postponed until breast maturity is reached. Occasionally, surgery is considered earlier when severe symptoms are encountered; there is a risk of recurrent hypertrophy, however." In general, breast maturity should have been reached prior to considering breast reduction surgery.

Staged breast reduction in patients with large and ptotic breasts has been shown to decrease rates of major flap necrosis before nipple-sparing mastectomy and preserve the viability of the nipple. Classification of breast ptosis (Regnault, 1976) is based on the relationship of the nipple to the inframammary fold (IMF). In mild, or Grade I ptosis, the nipple is situated within 1 cm of the inframammary fold and is above the lower pole of the breast. In moderate, or Grade II ptosis, the nipple is 1–3 cm below the inframammary fold but is still located above the lowest point of the breast. In severe, or grade III ptosis, the nipple is more than 3 cm below the inframammary fold and is situated at the lowest part of the breast. Studies are primarily in the form of case series and retrospective reviews with small patient populations (Tondu, 2022; Economides et al., 2019; Saliban et al., 2019; Gunnarsson et al., 2017; Spear et al., 2012). Spear et al. (2012) first described the procedure in a case series of 15 patients (24 breasts) who underwent nipple-sparing mastectomy after mastopexy or reduction. Complications occurred in four (17%) of the 24 breasts including skin flap necrosis (n=2 breasts), minimal partial nipple-areola complex necrosis (n=3 breasts) and an expander explanted for infection related to skin flap necrosis (n=1 breast). Successful nipple-sparing mastectomy and prior mastopexy or reduction (without residual effects of the nipple-areola complex or skin flap necrosis) occurred in 14 patients (23 breasts, 96%).

Nipple inversion or retraction is when the nipple is pulled in and points inward instead of out. It can affect one breast or both and can be acquired or congenital. The cause of acquired nipple inversion can be due to benign or malignant causes. Congenital nipple inversion is usually bilateral and is benign (Killelea and Sowden, 2024). Correction of nipple inversion is considered cosmetic in nature and not medically indicated.

Literature Review
Controlled clinical studies assessing the effectiveness of surgical removal of modest amounts of breast tissue in reducing neck, shoulder, and back pain and related disabilities in women are lacking. Despite the lack of controlled studies, reduction mammoplasty has become the standard of care for a subset of individuals with symptomatic macromastia. Evidence suggests that calculating breast reduction in correlation to each patient's body weight and height can have an effect on reducing preoperative signs and persistent physical conditions. (Cunningham, et al.,

2005; Blomqvist, et al., 2004; Souto, et al., 2003; Collins, et al., 2002; Ayhan, et al., 2002; Bruhlmann, et al., 1998).

Chadbourne et al. (2001) conducted a systematic review and meta-analysis of 29 studies of 4173 patients to determine whether reduction mammoplasty improves measurable outcomes in women with breast hypertrophy. Experimental and observational studies were included; no randomized controlled trials were found. Outcomes assessed were postoperative physical signs and symptoms such as shoulder pain, shoulder (bra strap) grooving, and quality-of-life domains, such as physical and psychological functioning, and were expressed primarily as risk differences. The mean body mass index of the patients was 27.5 kg/m^2 in the observational studies and 29.6 kg/m^2 in the experimental studies. The average tissue mass removed per breast was approximately 1400 grams. The authors concluded that reduction mammoplasty was associated with a statistically significant improvement in physical signs and symptoms involving shoulder pain, shoulder grooving, upper/lower back pain, neck pain, intertrigo, breast pain, headache, and pain/numbness in the hands. The quality-of-life parameter of physical functioning was also statistically significant, while psychological functioning was not significant. The evidence suggests that women undergoing reduction mammoplasty for breast hypertrophy have significant postoperative improvement in preoperative signs and symptoms, quality of life, or both.

Breast Reduction by Liposuction
Suction lipectomy or ultrasonically assisted suction lipectomy (liposuction) as a sole procedure has been introduced as an alternative method in reducing breast size. The effectiveness of liposuction, in terms of removing glandular breast tissue, rather than fatty tissue in the breast, remains to be demonstrated. Evidence supporting the effects of this approach on patient outcomes has been limited to retrospective/prospective uncontrolled studies and case series, and there are minimal long-term data comparing this technique to the standard surgical approach (Moskovitz, et al., 2007; Sadove, et al., 2005).

Professional Societies/Organizations

American College of Obstetricians and Gynecologists (ACOG): In a Committee Opinion (2017, reaffirmed 2020), ACOG recognizes that breast reduction surgery in adolescents with large breasts can relieve back, shoulder, and neck pain. Recommendations for timing of surgery include postponing surgery until breast maturity is reached, waiting until there is stability in cup size over 6 months, and waiting until the age of 18 years. The committee states that the timing may be reasonably determined by the severity of symptoms. It is also recommended that an assessment of the adolescent's emotional, physiologic, and physical maturity be conducted.

American Society of Plastic Surgeons (ASPS): In 2022, the American Society of Plastic Surgeons convened a multidisciplinary work group consisting of members of the American Society of Plastic Surgeons, the American Society of Breast Surgeons, the American Physical Therapy Association, and a patient representative to revise the 2012 guidelines for reduction mammaplasty. After evaluating the evidence-based literature, the work group made the following recommendations with level of evidence and strength of recommendation (Perdikis, et al., 2022):

- post-menarche female patients presenting with breast hypertrophy should be offered reduction mammaplasty surgery as first-line therapy over non-operative therapy based solely on the presence of multiple symptoms rather than resection weight (high evidence quality, strong recommendation)
- clinicians should counsel post-menarche patients with symptomatic breast hypertrophy considering reduction mammaplasty that they may have a higher risk of complications if they are older than 50 years old, have a body mass index greater than 35 kg/m^2, or require chronic corticosteroid use (all independent variables) (moderate evidence quality, moderate recommendation)

The 2011 update (reaffirmed 2021) to the 2002 ASPS policy statement, insurance coverage criteria for third-party payors for reduction mammaplasty, recommends that justification for reduction mammaplasty should be based on the probability of relieving the clinical signs and symptoms of macromastia, not the degree of breast hypertrophy present (cup size or amount of tissue removed). Symptomatic breast hypertrophy is defined as a syndrome of persistent neck and shoulder pain, painful shoulder grooving from brassiere straps, chronic intertriginous rash of the inframammary fold, and frequent episodes of headache, backache, and neuropathies caused by heavy breasts caused by an increase in the volume and weight of breast tissue beyond normal proportions. These policy recommendations are based on the 2011 ASPS evidence-based companion guideline for Reduction Mammaplasty.

Medicare Coverage Determinations

	Contractor	Determination Name/Number	Revision Effective Date
NCD	National	No Determination found	
LCD	National Government Services, Inc.	Reduction Mammaplasty/L35001	11/07/2019
LCD	Noridian	Plastic Surgery/L35163 and L37020	10/01/2019

Note: Please review the current Medicare Policy for the most up-to-date information.
(NCD = National Coverage Determination; LCD = Local Coverage Determination)

Appendix

Schnur Sliding Scale

Body Surface Area and Cutoff Weight of Breast Tissue Removed

Breast Reduction (gm)		
Body Surface Area (m^2)	**Lower 5%**	**Lower 22%**
1.35	127	199
1.40	139	218
1.45	152	238
1.50	166	260
1.55	181	284
1.60	198	310
1.65	216	338
1.70	236	370
1.75	258	404
1.80	282	441
1.85	308	482
1.90	336	527
1.95	367	575
2.00	401	628
2.05	439	687
2.10	479	750
2.15	523	819
2.20	572	895
2.25	625	978
2.30	682	1068
2.35	745	1167

Breast Reduction (gm)		
Body Surface Area (m^2)	**Lower 5%**	**Lower 22%**
2.40	814	1275
2.45	890	1393
2.50	972	1522
2.55	1062	1662

Schnur Sliding Scale (Schnur, et al., 1991)

Coding Information

Notes:

1. This list of codes may not be all-inclusive since the American Medical Association (AMA) and Centers for Medicare & Medicaid Services (CMS) code updates may occur more frequently than policy updates.
2. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

CPT®* Codes	Description
19316	**Mastopexy**
19318	**Breast reduction**

Considered integral to and not separately reimbursed when performed with a Medically Necessary breast reduction:

CPT®* Codes	Description
15877	**Suction assisted lipectomy; trunk**
19350	**Nipple/areola reconstruction**

Considered Cosmetic/Not Medically Necessary:

CPT®* Codes	Description
19355	**Correction of inverted nipples**

Considered Unproven when performed as a sole method of treatment for symptomatic macromastia:

CPT®* Codes	Description
15877	**Suction assisted lipectomy; trunk**

References

1. Amaral MH, Dao H, Shin JH. Racial and socioeconomic disparities in reduction mammoplasty: an analysis of nationwide inpatient sample database. Ann Plast Surg. 2011 May;66(5):476-8. doi: 10.1097/SAP.0b013e3182185efa. PMID: 21451367.

2. American College of Obstetricians and Gynecologists (ACOG). Committee Opinion No. 686: Breast and Labial Surgery in Adolescents. Obstet Gynecol. 2017 Jan;129(1):e17-e19. doi: 10.1097/AOG.0000000000001862. PMID: 28002312.

3. American Society of Plastic Surgeons (ASPS). Reduction Mammaplasty Recommended Insurance Coverage for Third-Party Payer Coverage. May 2011. Updated Reaffirmed: Mar 2021. Accessed Jul 9, 2024. Available at URL address: https://www.plasticsurgery.org/for-medical-professionals/health-policy/recommended-insurance-coverage-criteria

4. American Society of Plastic Surgeons. Reconstructive Procedures: Breast Reduction, Reduction Mammaplasty. 2023. Accessed Jun 27, 2023. Available at URL address: https://www.plasticsurgery.org/reconstructive-procedures/breast-reduction

5. Ayhan S, Basterzi Y, Yavuzer R, Latifoglu O, Cenetoglu S, Atabay K, Celebi MC. Histologic profiles of breast reduction specimens. Anesthetic Plast Surg. 2002 May;26(3):203-5.

6. Banikarim C, DeSilva N. Breast disorders in children and adolescents. In: UpToDate, Drutz JE and Middleman AB (Eds.). Feb 10, 2022. UpToDate, Waltham, MA. Accessed Jun 27, 2023.

7. Bellini E, Grieco MP, Raposio E. A journey through liposuction and liposculture: Review. Ann Med Surg (Lond). 2017 Nov 6;24:53-60.

8. Blomqvist L, Brandberg Y. Three-year follow-up on clinical symptoms and health-related quality of life after reduction mammaplasty Plast Reconstr Surg. 2004 Jul;114(1):49-54.

9. Bruhlmann Y, Tschopp H. Breast reduction improves symptoms of macromastia and has a long-lasting effect. Ann Plast Surg. 1998 Sep;41(3):240-5.

10. Centers for Medicare and Medicaid Services (CMS). Local Coverage Determinations (LCDs) alphabetical index. Accessed Jun 27, 2023. Available at URL address: https://www.cms.gov/medicare-coverage-database/reports/local-coverage-final-lcds-alphabetical-report.aspx?lcdStatus=all

11. Centers for Medicare and Medicaid Services (CMS). National Coverage Determinations (NCDs) alphabetical index. Accessed Jun 27, 2023. Available at URL address: https://www.cms.gov/medicare-coverage-database/reports/national-coverage-ncd-report.aspx?chapter=all&sortBy=title

12. Chadbourne EB, Zhang S, Gordon MJ, Ro EY, Ross SD, Schnur PL, Schneider-Redden PR. Clinical outcomes in reduction mammoplasty: a systematic review and meta-analysis of published studies. Mayo Clin Proc. 2001 May;76(5):503-10.

13. Chao JD, Memmel HC, Redding JF, Egan L, Odom LC, Casas LA. Reduction mammaplasty is a functional operation, improving quality of life in symptomatic women: a prospective,

single-center breast reduction outcome study. Plast Reconstr Surg. 2002 Dec;110(7):1644-52.

14. Cohen R. Mastopexy options and techniques. Nahabedian MY, editor. In: Plastic Surgery, Volume 5: Breast, 4th ed. Philadelphia, PA: Elsevier; 2018. Ch 6, 87-107.e1

15. Collins ED, Kerrigan CL, Kim M. The effectiveness of surgical and nonsurgical interventions in relieving the symptoms of macromastia. Plast Reconstr Surg. 2002 Jul;109:1556-66.

16. Conner LN, Merritt DF. Breast Concerns. In: Kliegman RM, Stanton BF, St Geme JW, Schor NF, Behrman RE, editors. Kliegman: Nelson Textbook of Pediatrics. 21th ed. Philadelphia, PA: Elsevier; 2020. Ch 556, Breast Concerns, 2853-57.

17. Cunningham BL, Gear AJ, Kerrigan CL, Collins ED. Analysis of breast reduction complications derived from the BRAVO study. Plast Reconstr Surg. 2005 May;115(6):1597-604.

18. DeSilva NK, Brandt ML. Disorders of the breast in children and adolescents, Part 1: Disorders of growth and infections of the breast. J Pediatr Adolesc Gynecol. 2006 Oct;19(5):345-9.

19. Economides JM, Graziano F, Tousimis E, Willey S, Pittman TA. Expanded Algorithm and Updated Experience with Breast Reconstruction Using a Staged Nipple-Sparing Mastectomy following Mastopexy or Reduction Mammaplasty in the Large or Ptotic Breast. Plast Reconstr Surg. 2019 Apr;143(4):688e-697e. doi: 10.1097/PRS.0000000000005425. Erratum in: Plast Reconstr Surg. 2019 Jun;143(6):1810-1811. PMID: 30921113.

20. Gonzalez MA, Glickman LT, Aladegbami B, Simpson RL. Quality of life after breast reduction surgery: a 10-year retrospective analysis using the Breast Q questionnaire: does breast size matter? Ann Plast Surg. 2012 Oct;69(4):361-3.

21. Greydanus DE, Matytsina L, Gains M. Breast Disorders in Children and Adolescents. Prim Care. 2006 Jun;33(2):455-502.

22. Gunnarsson GL, Bille C, Reitsma LC, Wamberg P, Thomsen JB. Prophylactic Nipple-Sparing Mastectomy and Direct-to-Implant Reconstruction of the Large and Ptotic Breast: Is Preshaping of the Challenging Breast a Key to Success? Plast Reconstr Surg. 2017 Sep;140(3):449-454. doi: 10.1097/PRS.0000000000003621. PMID: 28841601.

23. Hansen J, Chang S. Overview of breast reduction. In: UpToDate, Chagpar AB, Colwell AS (Ed). Last updated Apr 19, 2023. UpToDate, Waltham, MA. Accessed Jul 9, 2024.

24. Haug V, Kadakia N, Wang AT, Dorante MI, Panayi AC, Kauke-Navarro M, Hundeshagen G, Diehm YF, Fischer S, Hirche C, Kneser U, Pomahac B. Racial disparities in short-term outcomes after breast reduction surgery-A National Surgical Quality Improvement Project Analysis with 23,268 patients using Propensity Score Matching. J Plast Reconstr Aesthet Surg. 2022 Jun;75(6):1849-1857. doi: 10.1016/j.bjps.2022.01.001. Epub 2022 Jan 16. PMID: 35131191.

25. Jakubietz RG, Jakubietz DF, Gruenert JG, Schmidt K, Meffert RH, Jakubietz MG. Breast reduction by liposuction in females. Aesthetic Plast Surg. 2011 Jun;35(3):402-7.

26. Kalliainen LK; ASPS Health Policy Committee. ASPS clinical practice guideline summary on reduction mammaplasty. Plast Reconstr Surg. 2012 Oct;130(4):785-9.

27. Killelea B and Sowden M. Nipple inversion. In: UpToDate, Chen W, ed. Feb 7, 2024. UpToDate, Walthem, MA. Accessed Jul 9, 2024.

28. Kim DK, Ascherman JA. Impact of Sociodemographic and Hospital Factors on Inpatient Bilateral Reduction Mammaplasty: A National Inpatient Sample Analysis. Plast Reconstr Surg Glob Open. 2024 Mar 22;12(3):e5682.

29. Kocak E, Carruthers KH, McMahan JD. A reliable method for the preoperative estimation of tissue to be removed during reduction mammaplasty. Plast Reconstr Surg. 2011 Mar;127(3):1059-64.

30. Manahan MA, Buretta KJ, Chang D, Mithani SK, Mallalieu J, Shermak MA. An outcomes analysis of 2142 breast reduction procedures. Ann Plast Surg. 2015 Mar;74(3):289-92.

31. McGrath MH, Pomerantz J. Plastic Surgery. Reduction Mammoplasty. In: Townsend CM, Beuchamp RD, Evers BM, editors. Townsend: Sabiston Textbook of Surgery, 19th ed. Philadelphia, PA: WB Saunders Company. 2012. pg 1932-33. Ch 69.

32. McGrath MH, Schooler WG. Elective plastic surgical procedures in adolescence. Adolesc Med Clin. 2004 Oct;15(3):487-502.

33. Morris MP, Christopher AN, Patel V, Broach RB, Fischer JP, Butler PD. Assessing Disparities in Reduction Mammaplasty: There Is Room for Improvement. Aesthet Surg J. 2021 Jun 14;41(7):NP796-NP803. doi: 10.1093/asj/sjab138. PMID: 33735387.

34. Moskovitz MJ, Baxt SA, Jain AK, Hausman RE. Liposuction breast reduction: a prospective trial in African American women. Plast Reconstr Surg. 2007 Feb;119(2):718-26; discussion 727-8.

35. Nahai FR, Nahai F. MOC-PSSM CME article: Breast reduction. Plast Reconstr Surg. 2008 Jan;121(1 Suppl):1-13.

36. National Comprehensive Cancer Network® (NCCN). NCCN GUIDELINES™ Clinical Practice Guidelines in Oncology™. © Breast Cancer Risk Reduction. Version 2.2024 Mar 11, 2024. National Comprehensive Cancer Network, Inc. 2024, All Rights Reserved. Accessed Jul 9, 2024. Available at URL address: https://www.nccn.org/professionals/physician_gls/pdf/breast_risk.pdf

37. National Comprehensive Cancer Network® (NCCN). NCCN GUIDELINES™ Clinical Practice Guidelines in Oncology™. Genetic/Familial High-risk Assessment: Breast, Ovarian, and Pancreatic. Version 3.2024 Feb 12, 2024. National Comprehensive Cancer Network, Inc. 2022, All Rights Reserved. Accessed Jul 9, 2024. Available at URL address: https://www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf

38. Perdikis G, Dillingham C, Boukovalas S, Ogunleye AA, Casambre F, Dal Cin A, Davidson C, Davies CC, Donnelly KC, Fischer JP, Johnson DJ, Labow BI, Maasarani S, Mullen K, Reiland J, Rohde C, Slezak S, Taylor A, Visvabharathy V, Yoon-Schwartz D. American Society of Plastic Surgeons Evidence-Based Clinical Practice Guideline Revision: Reduction Mammaplasty. Plast Reconstr Surg. 2022 Mar 1;149(3):392e-409e. doi: 10.1097/PRS.0000000000008860. PMID: 35006204.

39. Pu LLQ. Breast Reduction—Medial Pedicle Technique. Pu LLQ and Jewell ML, eds. In: Atlas of Contemporary Aesthetic Breast Surgery, Elsevier Inc. 2021. Ch 18, 249-258.

40. Redlarski G, Palkowski A, Krawczuk M. Body surface area formulae: an alarming ambiguity. Sci Rep. 2016 Jun 21;6:27966. doi: 10.1038/srep27966. PMID: 27323883; PMCID: PMC4914842.

41. Regnault P. Breast ptosis. Definition and treatment. Clin Plast Surg. 1976 Apr;3(2):193-203. PMID: 1261176.

42. Sadove R. New observations in liposuction-only breast reduction. Aesthetic Plast Surg. 2005 Jan-Feb;29(1):28-31.

43. Salibian AA, Frey JD, Karp NS, Choi M. Does Staged Breast Reduction before Nipple-Sparing Mastectomy Decrease Complications? A Matched Cohort Study between Staged and Nonstaged Techniques. Plast Reconstr Surg. 2019 Nov;144(5):1023-1032. doi: 10.1097/PRS.0000000000006121. PMID: 31373992.

44. Schnur PL, Hoehn JG, Ilstrup DM, Cahoy MJ, Chu CP. Reduction mammaplasty: cosmetic or reconstructive procedure? Ann Plast Surg. 1991 Sep;27(3):232-7.

45. Schnur PL, Schnur DP, Petty PM, Hanson TJ, Weaver Al. Reduction mammoplasty: an outcome study. Plast Reconstr Surg. 1997 Sep;100(4):875-83.

46. Singh KA, Losken A. Additional benefits of reduction mammaplasty: a systematic review of the literature. Plast Reconstr Surg. 2012 Mar;129(3):562-70.

47. Souto GC, Giugliani ER, Giugliani C, Schneider MA. The impact of breast reduction surgery on breastfeeding performance. J Hum Lact. 2003 Feb;19(1):43-9;quiz 66-9, 120.

48. Spear SL, Rottman SJ, Seiboth LA, Hannan CM. Breast reconstruction using a staged nipple-sparing mastectomy following mastopexy or reduction. Plast Reconstr Surg. 2012 Mar;129(3):572-581. doi: 10.1097/PRS.0b013e318241285c. PMID: 22373964.

49. Tondu T, Thiessen F, Hubens G, Tjalma W, Blondeel P, Verhoeven V. Delayed two-stage nipple sparing mastectomy and simultaneous expander-to-implant reconstruction of the large and ptotic breast. Gland Surg. 2022 Mar;11(3):524-534. doi: 10.21037/gs-21-734. PMID: 35402205; PMCID: PMC8984988.

50. Zhang MX, Chen CY, Fang QQ, Xu JH, Wang XF, Shi BH, Wu LH, Tan WQ. Risk Factors for Complications after Reduction Mammoplasty: A Meta-Analysis. PLoS One. 2016 Dec 9;11(12):e0167746.

Revision Details

Type of Revision	Summary of Changes	Date
Annual review	• No clinical policy statement changes	8/15/2024