

2 **Augmentation–Mastopexy Using an Autologous**
3 **Parenchymal Sling**

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8 **Abstract**

9 *Background* Mastopexy–augmentation is an important
10 treatment to address breast deflation. Combining these two
11 procedures is technique-sensitive, with a reported high
12 revision rate and propensity for complications. We describe
13 an approach to achieve aesthetic breast correction in an
14 effective, reproducible, and safe manner while minimizing
15 untoward sequelae.

16 *Methods* A vertical mastopexy, using a superior dermo-
17 glandular pedicle, is coupled with a subpectoral breast
18 implant with the support of a longitudinal autologous sling
19 of breast fascia, termed autologous sling augmentation–
20 mastopexy.

21 *Results* Twenty consecutive patients, aged 25–49 years,
22 were treated by this technique, with a follow-up period of at
23 least 1 year. Aesthetic improvement of breast shape, pro-
24 jection, and nipple position were achieved in all patients. No
25 major complications, including infection, necrosis, or
26 implant exposure, occurred. Minor wound-healing deficits at

the inferior aspect of the vertical resection occurred in three 27
patients. One patient required implant exchange early post- 28
operatively because of saline leakage. No revisions were 29
necessary to adjust breast symmetry or nipple position. 30

Conclusion We describe a mastopexy–augmentation 31
technique, based on patient selection, mastopexy resection 32
pattern, and implant size and position, to improve breast 33
aesthetics safely and reproducibly while minimizing com- 34
plications and the need for near-term revision. 35

Keywords Mastopexy–augmentation · Breast · 37
Autologous parenchymal sling 38

The deflated ptotic breast frequently benefits from com- 39
bined mastopexy and augmentation procedures. The mas- 40
topexy repositions the breast mound and nipple superiorly, 41
while the augmentation increases breast volume and further 42
fills the skin envelope. These procedures have been per- 43
formed in concert for nearly 50 years [1, 2], but recently 44
several reports have suggested that mastopexy and aug- 45
mentation performed in unison carry an increased com- 46
plication rate [3]. Several reports advocate caution when 47
performing these procedures simultaneously [4–7]. The 48
purpose of this article is to report our approach to achieve 49
consistent, reproducible results using a vertical mastopexy 50
technique in combination with augmentation using 51
implants no greater than 350 cc. 52

Surgical Technique 53

The autologous sling augmentation–mastopexy technique 54
is ideal for women with mild to moderate ptosis and 55
adequate breast skin quality. Nonsmoking patients aged 56

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57 30–50 years with post-lactational deflation are well-suited
 58 for this technique. Massive weight loss patients are not
 59 good candidates because of a tendency toward greater
 60 deflation and ptosis, poor skin quality, and frequently large
 61 skin resection required. Implant selection takes into
 62 account body habitus and breast width, similar to when a
 63 breast augmentation is performed in isolation. The pros-
 64 thesis can be silicone or saline with a volume no greater
 65 than 350 cc. If the patient desires an augmentation greater
 66 than 350 cc, we recommend a staged procedure.

67 The breasts are marked preoperatively with the patient
 68 in a standing position (Fig. 1). The sternal notch and
 69 midline are marked vertically down to the xiphoid. The
 70 inframammary folds are drawn. The breast meridian is
 71 scribed descending from the clavicular midpoint (typically
 72 6–8 cm from the sternal notch) down onto the anterior and

73 posterior breast surfaces and terminating on the abdominal
 74 skin. The planned nipple position is determined by trans-
 75 posing the inframammary fold position onto the breast and
 76 the superior border of the mosque pattern is placed at this
 77 point, rather than 2 cm cephalad, to account for further
 78 raising of the nipple position upon implant placement. The
 79 nipple position is lower than the traditional Wise pattern
 80 reduction or mastopexy markings. The patient is then
 81 instructed to resist motion while the surgeon deflects the
 82 breast first medially and then laterally and marks a vertical
 83 tangent from the breast meridian onto the deflected breast,
 84 tapering to a point 2 cm superior to the existing infra-
 85 mammary fold. A horizontal line is then drawn 2 cm below
 86 the nipple–areola complex (NAC), within the confines of
 87 the medial and lateral borders. This horizontal divide
 88 serves as the boundary of dermoglandular preservation
 89 above and skin and parenchymal excision below. These
 90 markings are performed bilaterally and were visually
 91 assessed for symmetry, taking into account existing breast
 92 asymmetries.

93 The procedure is performed under general anesthesia or
 94 local/IV sedation. Antibiotics are administered and mech-
 95 anical DVT prophylaxis implemented prior to incision. A cir-
 96 cumareolar incision is made (average diameter = 40 mm),
 97 and the mosque and remainder of the vertical pattern are
 98 incised. The pedicle is deepithelialized, leaving at least 2 cm
 99 of dermoglandular tissue inferior to the lower border of the
 100 areola (Fig. 2). Next, the inferior triangular skin, subcutane-
 101 ous tissue, and a small wedge of breast tissue are excised,
 102 taking care to leave a thickness of breast tissue on the chest

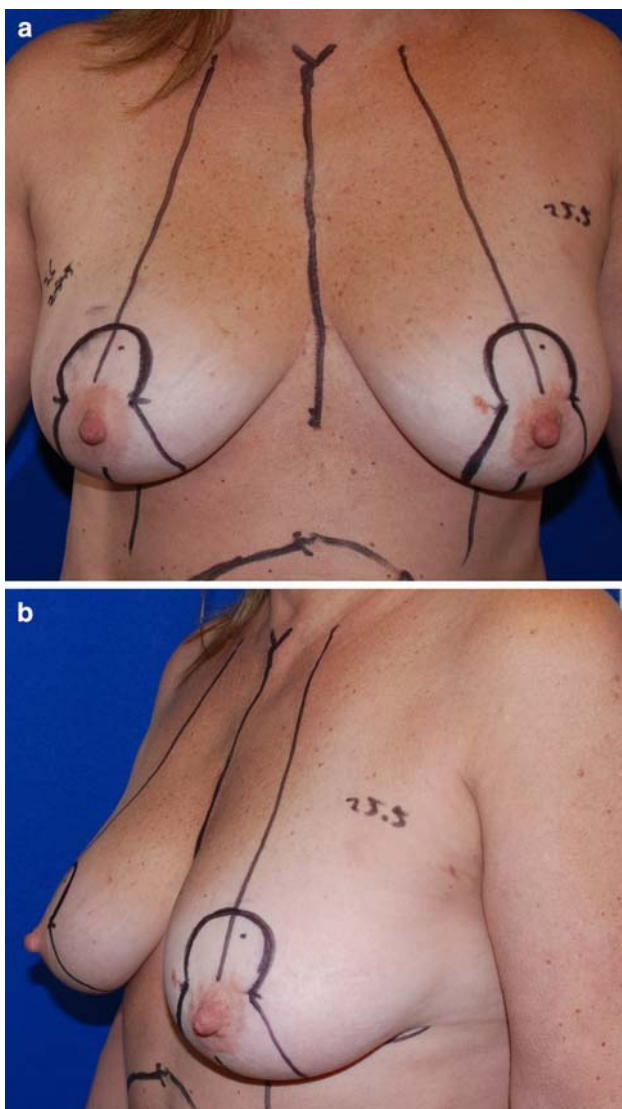


Fig. 1 The breast meridian, sternal midline, and mastectomy pattern are drawn with the patient standing



Fig. 2 The superior dermoglandular pedicle of the mastopexy is deepithelialized

103 wall and without lateral or medial undermining (Fig. 3).
 104 Inferiorly, 2–3 cm of undermining is implemented, taking
 105 the apex of the excised triangle from the skin close to the
 106 dermis as this will be inferior to the new breast position and
 107 raise the inframammary fold. This triangle of inferior pole
 108 skin and breast tissue is typically minimal (20–40 g in this
 109 series).



Fig. 3 An inferior triangle of skin and breast parenchyma is excised

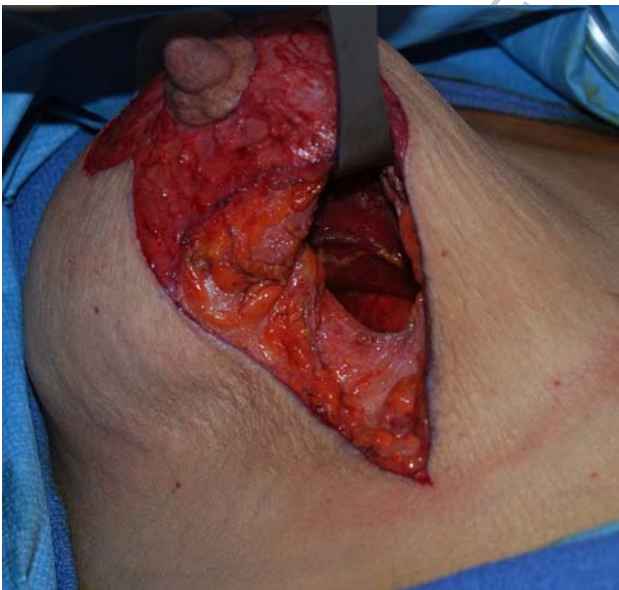


Fig. 4 A sling of breast fascia is identified and incised and a subpectoral implant pocket is created

110 After excising the inferior triangle of skin, fat, and
 111 breast tissue, an access portal to the chest wall is estab-
 112 lished. A 2–3-cm incision is created on the fourth or fifth
 113 rib (identical bilaterally). A subpectoral pocket is raised
 114 extending medially 1 cm from the sternum, superiorly
 115 1–2 cm from the clavicle, and with judicious lateral dis-
 116 section (Fig. 4). From within the submuscular pocket, the
 117 inferomedial aspect of the pectoralis muscle (6–9 o'clock)
 118 is divided from deep to superficial until breast parenchyma
 119 is visualized. This creates a biplanar transition zone where
 120 the implant rests mostly underneath pectoralis but is
 121 directly under glandular tissue inferomedially.

122 The implant is inserted into the pocket and manipulated
 123 into a symmetric position that is verified with the patient
 124 seated upright. The breast tissue overlying the subpectoral
 125 pocket is then closed as the deepest layer with 3-0
 126 absorbable sutures and the knots being superficial to the
 127 implant (Fig. 5). With the implant now secure in its pocket

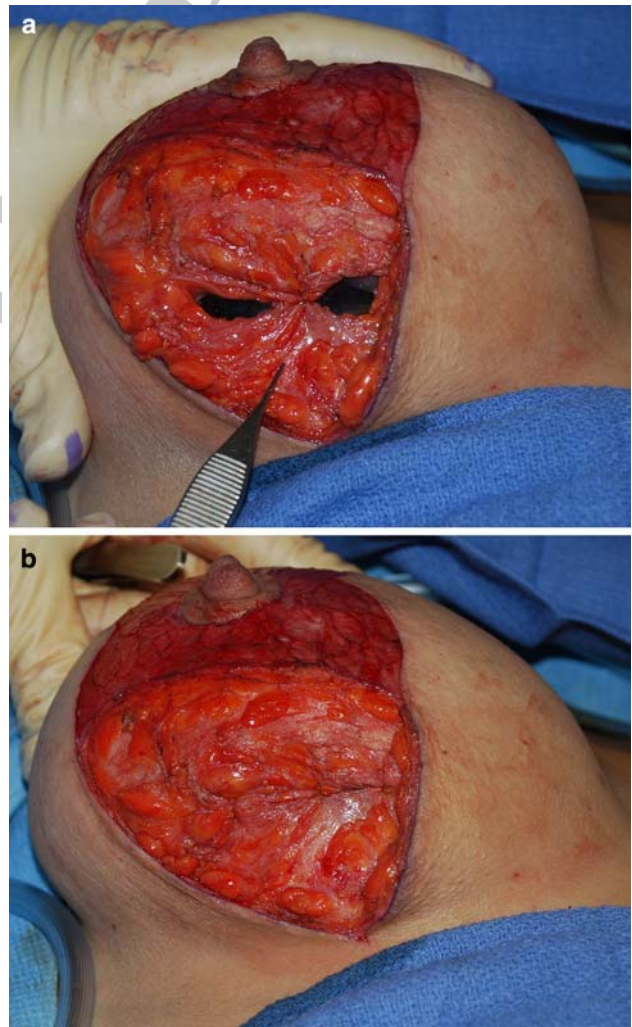


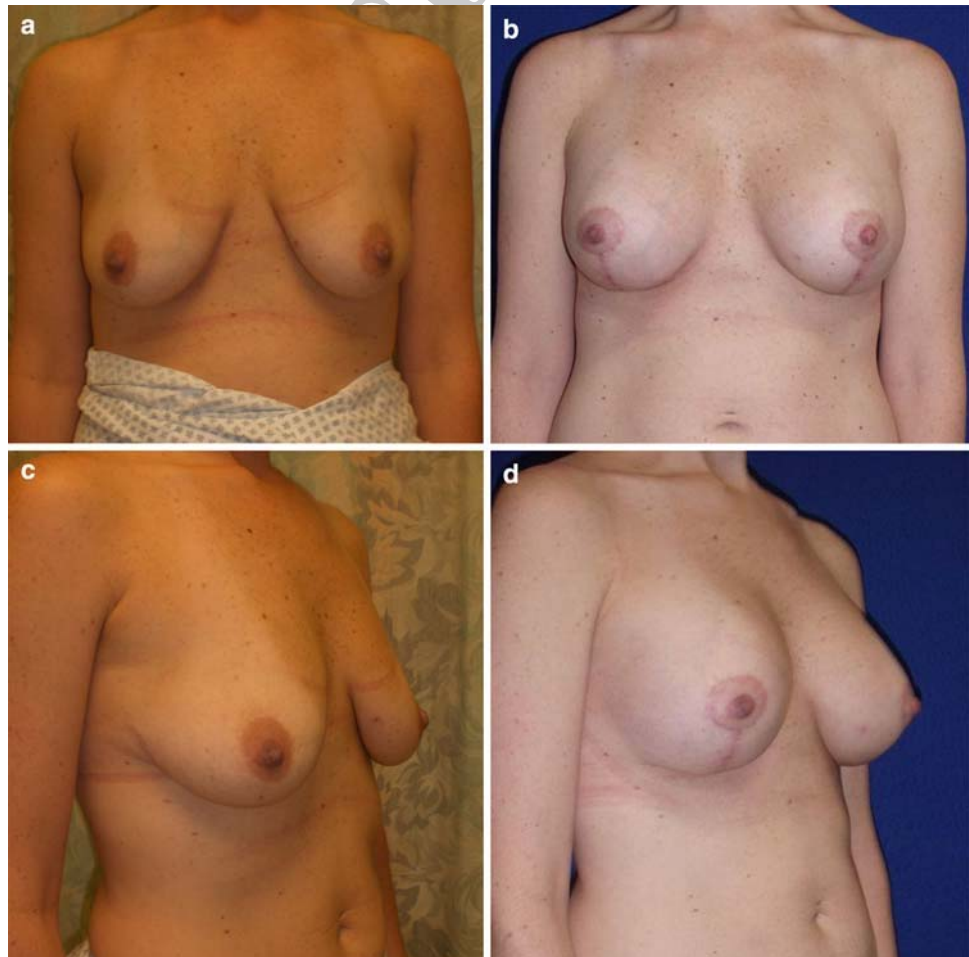
Fig. 5 The autologous fascial sling is closed over the inferior pole of the implant, providing stable coverage

128 and symmetric with the contralateral side, the open mas- 136
 129 topexy flaps are manipulated superomedially into an ideal 137
 130 aesthetic position and tailor-tacked. Attention is paid only 138
 131 on the upper two thirds of the breast mound and nipple at 139
 132 this point, and the lateral and medial breast skin is either 140
 133 tailor-tacked or marked into place. Once judged as aes- 141
 134 thetic and symmetric, the pillars are closed with a 2-0 142
 135 monofilament absorbable suture (Fig. 6). 143



Fig. 6 The medial and lateral pillars are approximated and the nipple position inset

Fig. 7 a, c Preoperative views of a 32-year-old patient with moderate breast ptosis. **b, d** Postoperative views 3 months after mastopexy and augmentation with a 275-cc implant

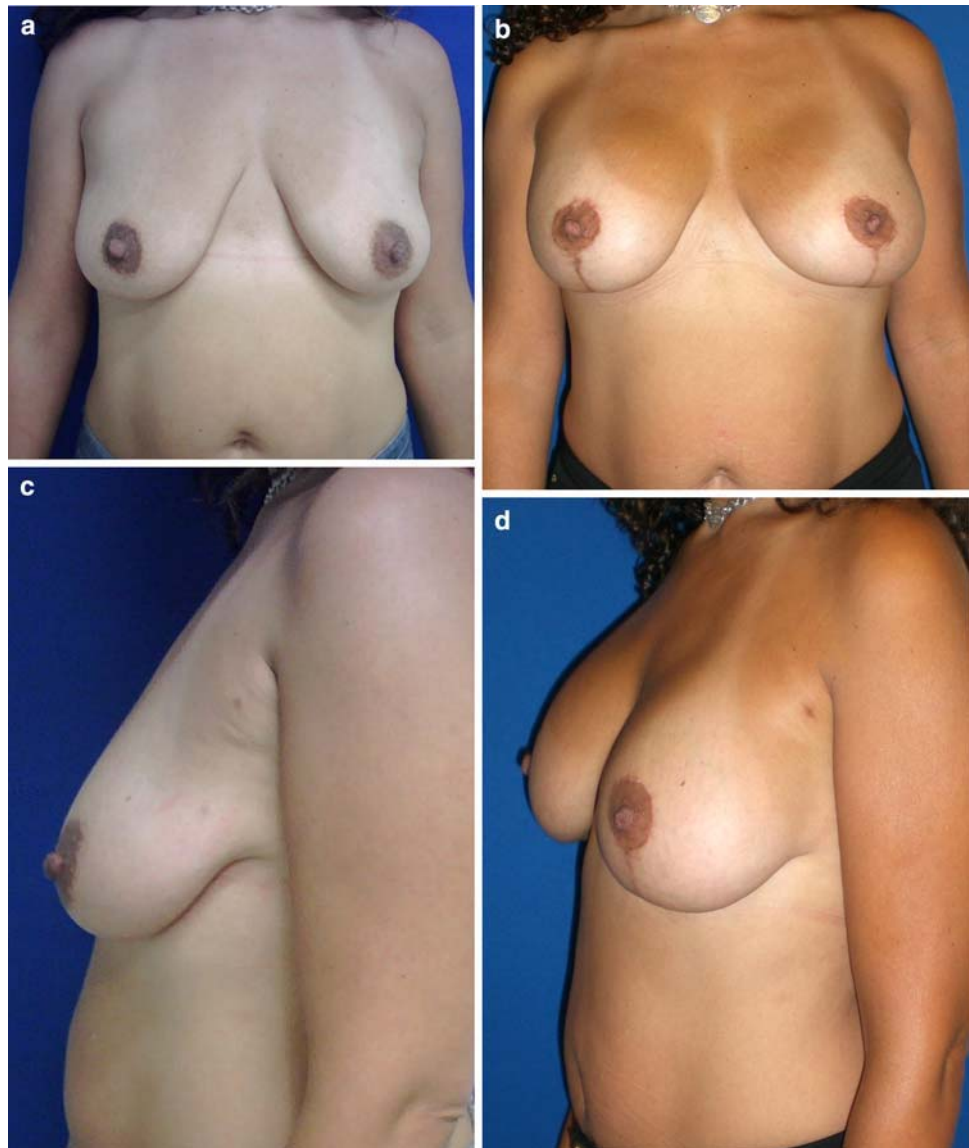


The NAC position is then finalized, occasionally 136
 requiring additional excision of small skin crescents from 137
 the mosque to permit the nipple to lie circular and/or to 138
 achieve symmetry with the contralateral side. Once 139
 appropriately positioned, the NAC is secured with dermal 140
 3-0 braided absorbable sutures. Finally, the inferior aspect 141
 of the incision is addressed where the inframammary fold 142
 is raised. This is closed in a linear fashion or a “J” is 143
 incorporated into the incision if significant puckering is 144
 present. The skin is then closed with a 4-0 running buried 145
 monofilament suture and steristrips are placed perpendic- 146
 ular to the incisions. Two-inch paper tape is used as an 147
 abutment at the new inframammary fold position. 148

Results

The mastopexy–augmentation technique described was 150
 performed in 20 consecutive patients, aged 25–49 years 151
 (average age = 38 years) with mild to moderate ptosis, 152
 relative breast symmetry, and no prior history of breast 153
 surgery. Approximately 20–40 g of dermoglandular tissue 154
 was excised from the inferior quadrant of each breast as 155

Fig. 8 **a, c** Preoperative views of a 42-year-old patient with moderate breast ptosis. **b, d** Postoperative views 12 months after mastopexy and augmentation with a 250-cc implant



156 part of the mastopexy. Symmetry, breast projection, and
 157 nipple projection were judged as good by both patients and
 158 practitioners at both 6-month and 1-year follow-up
 159 (Figs. 7, 8, 9 and 10). There were no cases of hematoma,
 160 nipple–areola necrosis, or implant loss. Minor complica-
 161 tions consisting of partial dehiscence at the inferior aspect
 162 of the mastopexy excision occurred in three patients, each
 163 healing by secondary intention following conservative
 164 measures. One patient required implant exchange because
 165 of saline leakage secondary to port malfunction in the early
 166 postoperative period.

167 Discussion

168 Improving the shape, contour, and fullness of the deflated,
 169 ptotic breast is challenging. Augmentation increases breast

170 volume but does not completely improve the sagging breast
 171 mound and inferior nipple position. Mastopexy repositions
 172 the breast mound and nipple superiorly and removes excess
 173 skin, but does not increase breast size. Both procedures are
 174 necessary to achieve a larger, pert breast with a well-
 175 positioned nipple in a woman with ptotic breasts.

176 However, mastopexy and augmentation impart contra-
 177 dictory forces. The mastopexy lifts the breast superiorly,
 178 transmitting forces inward and upward, while contracting
 179 the skin envelope. Augmentation pushes outward and down
 180 while expanding the skin envelope. Though opposing forces,
 181 in the ideal setting these are synchronized to create the
 182 optimal correction of the deflated breast.

183 Complications of a combined mastopexy–augmentation
 184 are related to the implant, the breast soft tissue, or both.
 185 Phenomena that occur with each procedure individually
 186 can develop when performed in combination. For instance,
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Fig. 9 **a, c** Preoperative views of a 46-year-old patient with moderate breast ptosis. **b, d** Postoperative views 6 months after mastopexy and augmentation with a 325-cc implant



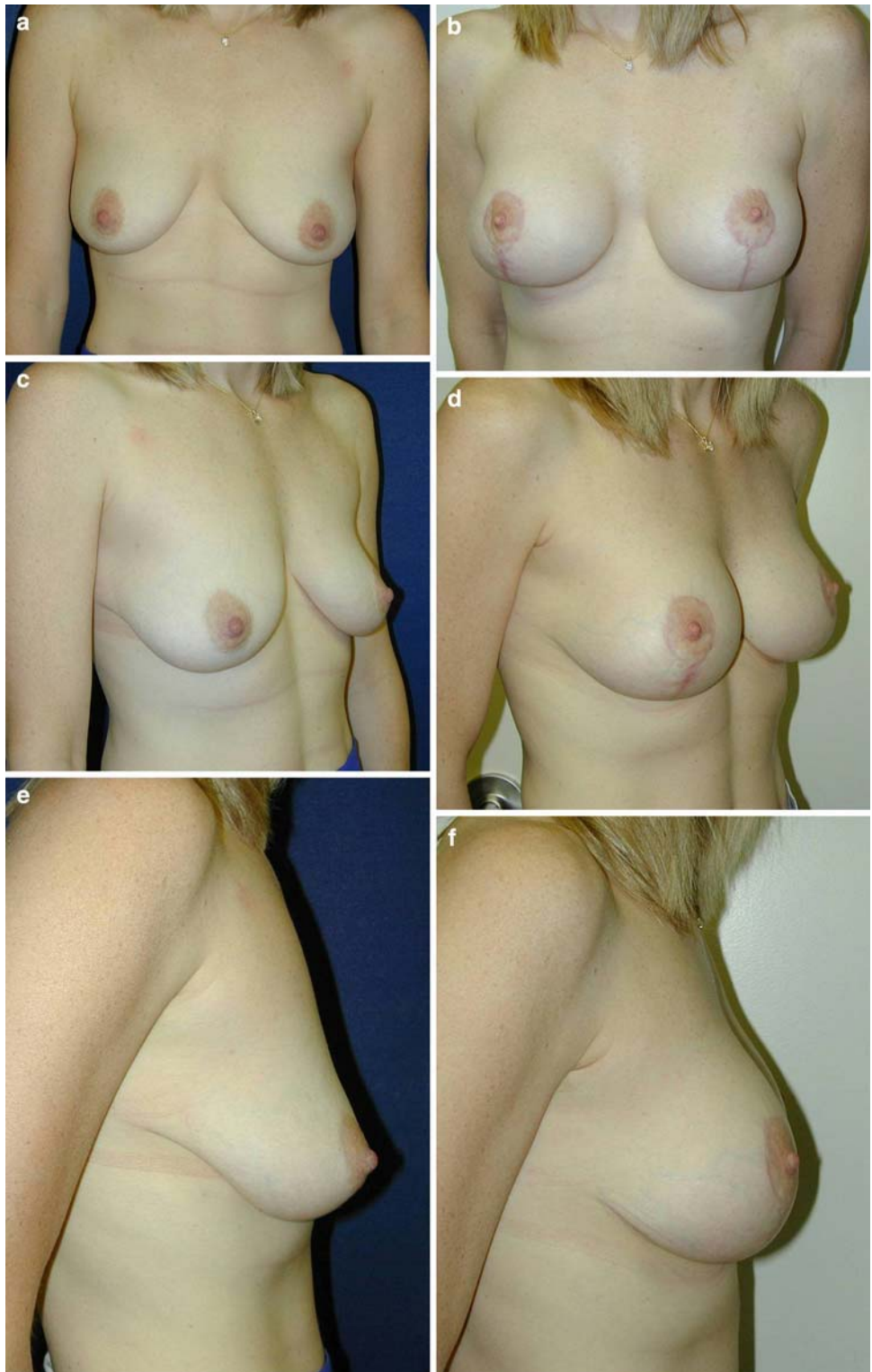
187 implant complications (e.g., capsular contracture, implant
188 size change, implant malposition) and ill effects related to
189 the mastopexy (e.g., recurrent ptosis, poor scars, and nipple
190 malposition) can be compounded when performing mas-
191 topexy and augmentation together. The nipples may be
192 improperly repositioned (e.g., too high or too low) or a
193 differential nipple location can be inadvertently imparted
194 between sides. Proper planning must take into account soft
195 tissue markings, the effect of the mastopexy, and the effect
196 of the implant to avoid the problem of nipple malposition.

197 Mastopexy closure should impart controlled tension to
198 effectively tighten the skin envelope, but with the com-
199 bined outward forces of the implant, the tension should not
200 be so great as to diminish vascularity and portend wound-
201 healing problems or scar widening. The devastating com-
202 plication of nipple loss due to vascular compromise
203 appears to be more prevalent when a mastopexy is per-
204 formed on a previously augmented breast, particularly
205 when the implant is in the subglandular position [8].

We describe a method of mastopexy–augmentation that is
easy to reproduce and safe. More than half of the cases
included in this series were performed by a trainee under the
supervision of the senior author. Complications have inclu-
ded partial dehiscence at the inferior aspect of the mastopexy
excision in three areas and one port malfunction requiring
implant exchange, with the remainder of the cases showing
no implant- or soft tissue-related complications to date.

The keys to success in using the sling mastopexy
include: (1) conservative vertical mastopexy markings, (2)
a low threshold for intraoperative modification of mark-
ings, (3) excising an inferior wedge of skin and breast
parenchyma (leaving a superior dermoglandular pedicle to
the NAC), (4) maintaining parenchymal tissue overlying
the pectoralis fascia, (5) utilizing implants less than or
equal to 350 cc, (6) placing the implant in a subpec-
toral pocket, and (7) reapproximating the ligamentous
parenchymal attachments for complete implant coverage
(so-called “parenchymal sling”).

Fig. 10 a, c, e Preoperative views of a 34-year-old patient with moderate breast ptosis and mild asymmetry. b, d, f Postoperative views 14 months after mastopexy and augmentation with a 250-cc implant



Author Proof

225 The importance of resection of breast parenchyma dur-
 226 ing an augmentation procedure is counterintuitive but
 227 provides a twofold advantage. The first is that resection,
 228 followed by closure of medial and lateral “pillars,” which
 229 consist of full-thickness columns of parenchyma (including

intervening suspensory ligaments of Cooper), dermis, and
 skin, creates a lift with more support compared to a skin-
 only technique. The second advantage is increased mobility
 of the NAC, mitigating the tendency for recurrent ptosis
 and scar widening.

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235 The wedge excision of the inferior pole parenchyma is
 236 partial and spares 1 cm of parenchymal-ligamentous tissue
 237 to provide added autologous implant coverage in the region
 238 inferior to the free border of the pectoralis major muscle.
 239 This coverage serves as structural support, a possible bar-
 240 rier to infection, and added tissue thickness to decrease
 241 implant palpability.

242 In primary mastopexy–augmentation, so long as a con-
 243 servative, systematic approach is taken, a reproducible,
 244 aesthetically pleasing result can be achieved. The keys to
 245 our approach are that it is conservative and modifiable. The
 246 moderately sized implant is protected by layers of pecto-
 247 ralis muscle, Cooper’s ligaments, and breast parenchyma.
 248 Equivalent implant pockets, equal dermoglandular exci-
 249 sions, and fastidious attention to final nipple position
 250 ensure excellent breast symmetry.

251 Conclusion

252 The autologous parenchymal sling augmentation–masto-
 253 pexy is an effective approach to aesthetically improve the
 254 ptotic, involutational breast. Patient selection, implant size,
 255 and operative technique are critical to a successful out-
 256 come. We present our approach to achieve consistent,

reproducible, aesthetic results, while minimizing revisions
 and complications.

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