



## Closure of partial mastectomy

William H. Goodson, III, M.D., F.A.C.S.\*

Department of Surgery, California Pacific Medical Center Research Institute, 2100 Webster St., Suite 401, San Francisco, CA 94115, USA

Manuscript received August 25, 2004; revised manuscript February 1, 2005

### Abstract

A longstanding controversy surrounds whether to close breast parenchyma at the completion of a partial mastectomy for breast cancer. Modification of a technique described 80 years ago finds the middle ground between various opinions and simultaneously addresses 2 issues: (1) approximation of the deep and superficial surfaces of the parenchyma, without sutures within the parenchyma, minimizes “dents;” and (2) a radial suture line preserves the distance from the nipple to the periphery of the breast which minimizes traction on the nipple. © 2006 Excerpta Medica Inc. All rights reserved.

**Keywords:** Breast cancer; Partial mastectomy; Technique; Cosmetic results

As observed by Love and Lindsey [1], closure after a partial mastectomy tends to have one of two long-term results: when parenchyma is closed, there is a tendency toward deviation of the nipple; or, when only skin is closed, some women develop skin dimpling as the scar contracts. They have suggested that women ask their surgeons either to leave breast parenchyma unclosed and accept the long-term risk of a “dent” at the site of the defect in breast tissue, or to close parenchyma with probable deviation of the nipple.

Closure of skin only—leaving parenchyma unclosed—is generally advocated in the United States, for example, by Margolese et al from the National Surgical Adjuvant Breast Project (NSABP) when they outlined their technique for local resection of breast cancer [2]. They stated that “. . . for lesions in the upper half of the breast, reconstruction should specifically be avoided . . . [cosmetic results are] . . . always superior if the cavity is allowed to fill in with fibrin and organize.” This opinion was accepted by the 1990 National Institutes of Health Consensus Panel on Early Breast Cancer [3]; and a recent review sponsored by the American Cancer Society [4] stated, “. . . superior cosmetic effect is usually achieved when the breast tissue is not re-approximated.”

In contrast, closure of parenchyma is often used in Europe. Veronesi closed breast parenchyma in his original technique of quadrantectomy [5]. Aspegren et al endorsed

closure of parenchyma [6]. Intera et al, in their description of intraoperative radiation therapy [7], recommended closure of breast parenchyma “to restore anatomy and thickness” of the breast.

Curiously, this is an old argument. In 1924, Bartlett recommended that after removal of

“. . . cysts without evidence of malignant change . . . Care should be taken to close tightly and accurately the posterior cut edges of the gland, because failure in this step means a defect or furrow where the breast tissue wound is healed . . . The outer edges should be united in a similar manner but this cannot always be accomplished with the degree of perfection desired, because the superficial surface is not a smooth plane. No sutures or ligatures should be buried within the gland itself . . . [8].”

Described below is a blending of these techniques—well-suited for the upper breast—that finds the middle ground between the opposing positions for and against closure of parenchyma. The technique follows the recommendation of Bartlett that no sutures be placed within the parenchyma, uses the curved incision advocated by the NSABP, closes parenchyma as advocated by Europeans, and preserves the distance from the clavicle to the nipple as measured by plastic surgeons to preserve symmetry.

### Technique

Concentric or curved incisions are used as recommend for the upper breast [2]. Tumor is removed with gross margins of

\* Corresponding author. Tel.: +1-415-923-3925; fax: +1-415-776-1977.

E-mail address: goodsow@cpmcri.org

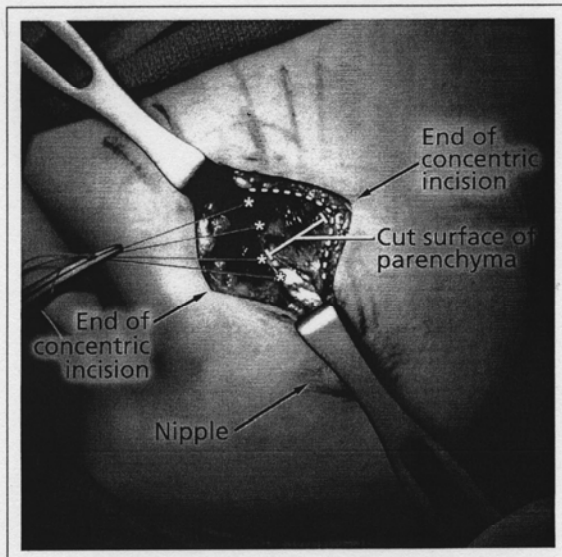


Fig. 1. Closure of a partial mastectomy in the upper outer quadrant of the right breast (11 o'clock position). The skin incision is curved and concentric with the nipple. Retractors approximate the edges of gland tissue to orient closure. Asterisks mark where the deep surface of breast parenchyma has been approximated over the pectoral muscle (see asterisks also in Fig. 2 for placement of deep sutures). The superficial surface of breast parenchyma (dashed line) will be approximated with a second layer of sutures (see Fig. 2 for detail of suture location). No sutures are placed within the breast parenchyma. Skin is closed with subcutaneous and dermal sutures. Lines drawn on the skin help align closure.

1 cm. No skin is removed unless leaving the skin would compromise the superficial margin. Fascia is removed if there is less than 1 cm of tissue under the tumor, anterior to the fascia. Meticulous hemostasis is obtained. Long-acting local anesthetic is infiltrated into the surrounding breast tissue; intercostal blocks are placed when feasible.

Closure has 5 steps: alignment of breast parenchyma, placement of deep sutures, placement of superficial sutures, undermining of thick flaps (when necessary), and closure of skin.

Alignment of breast parenchyma for closure begins by placing 1 retractor in the defect in the breast tissue at the point closest to the nipple. A second retractor is placed at the opposite side of the defect in breast parenchyma (Fig. 1). Simultaneous tension on these 2 retractors defines a line and aligns parenchyma so that, in effect, 2 sides are opposed and ready to suture in a line that is radial relative to the center of the nipple (Fig. 1). The radial suture line guided by this alignment allows the maximal distance between the nipple and the periphery of the breast, and thus avoids nipple retraction.

The first suture line approximates the deep edge of the breast parenchyma as marked with asterisks in Figs. 1 and 2. Usually the deep surface of the parenchyma moves easily over the retro mammary fat, but tissue deep to the parenchyma can be undermined if necessary. Close to the nipple, the deep surface is closed completely to help preserve nip-

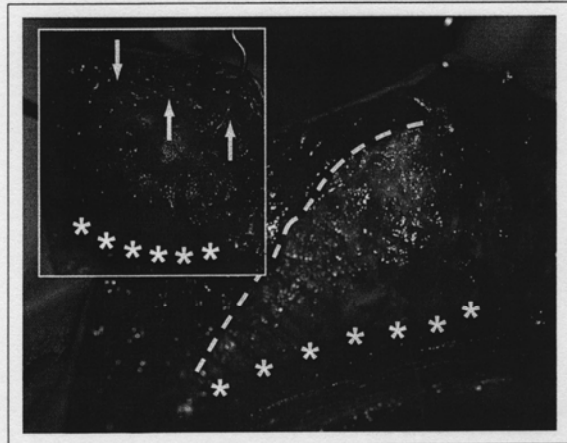


Fig. 2. Cross section of breast showing location for placement of deep sutures (asterisks) and superficial sutures (dashed line). When breast tissue is mostly replaced with fat (inset), there still is usually sufficient tissue strength to hold a suture at the deep surface [8] and often at the superficial surface (arrows).

ple projection. The deep suture line is continued as far toward the periphery as possible. At the breast periphery, it is sometimes better not to close the deep surface, i.e., to close just the superficial surface of the parenchyma as described next.

The superficial surface of the parenchyma is closed with a second layer of sutures at the level marked by the dashed line in Figs. 2 and 1. No sutures are placed in the middle portion of the breast parenchyma. If the resection approaches the periphery of the breast where the parenchyma is thin, only the superficial surface of the parenchyma is closed; it may be preferable to leave the extreme periphery of the parenchyma unclosed (where the parenchyma is thin at the periphery of the breast, the absence of closure is usually not obvious).

Closure of breast parenchyma causes tension on Cooper's ligaments, which typically causes puckering of the skin. Sometimes this is not obvious when the patient is in a supine position. A maneuver that accentuates where skin will pucker when the patient stands is to pull the breast tissue downward, i.e., toward the patient's feet. Areas of puckering seen during this maneuver are loosened by undermining thick flaps at a level just superficial to the second suture line (dashed line in Figs. 1 and 2). This step separates Cooper's ligaments from breast parenchyma in these locations. Skin is undermined until it lies flat with the breast in both the supine and the pulled-down positions.

Subcutaneous tissue and skin are then closed as usual. The breast is supported at all times—including during sleep—for the first several weeks. This support provides nearly complete pain control and minimizes the need for analgesics. Results for the first 3 patients, 3 years after surgery, are shown in Fig. 3 (note that the patient in Fig. 3C had skin removed from the areola to obtain a negative margin).



Fig. 3. Continued

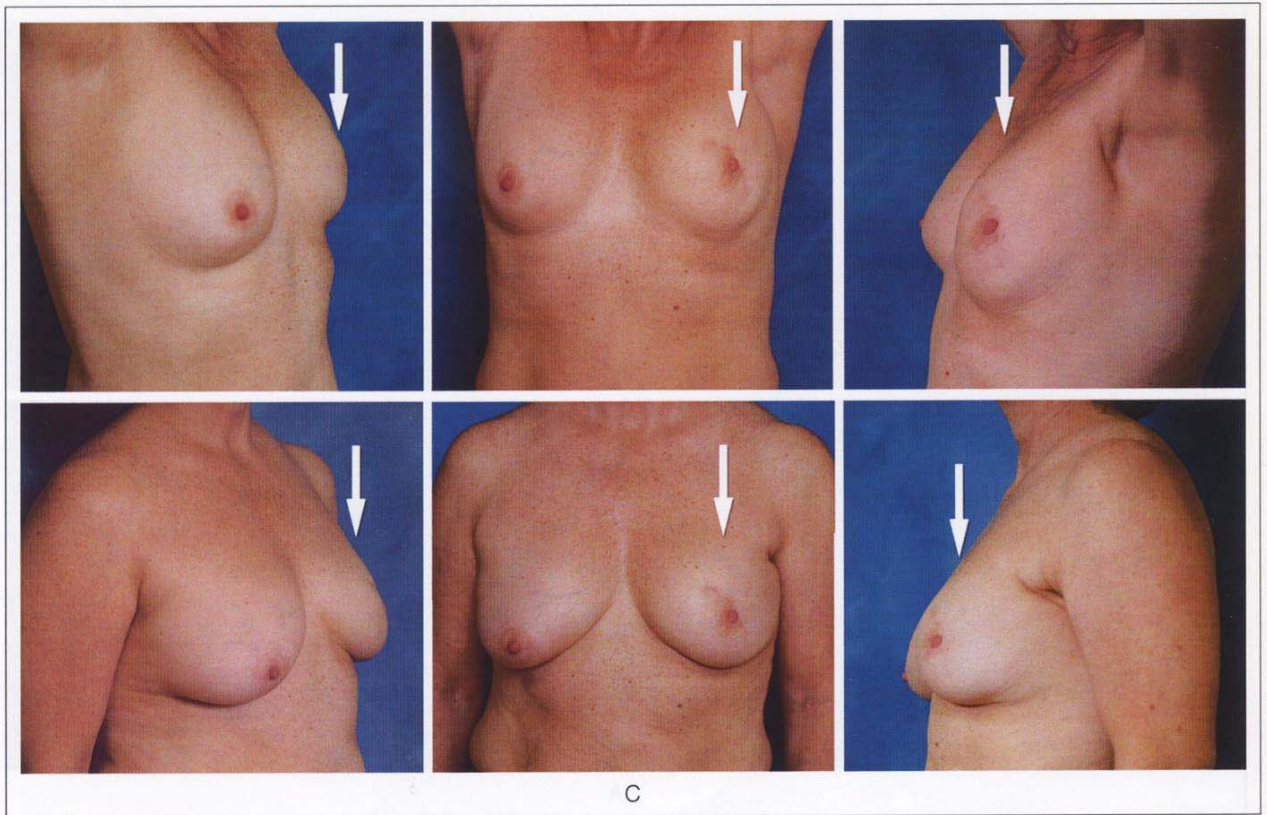


Fig. 3. Nipple position and breast contour three years after radial closure of breast parenchyma for the first three patients. Arrows indicate breasts with surgery. (A) Forty-five months post-surgery; (B) 38 months post-surgery; (C) 34 months postsurgery with partial areolar resection to obtain negative margins. (A possible dent is best assessed in the view where the postoperative breast is seen in profile, i.e., the view where the operated breast [arrow] is farther from the camera [left frames].)

### Comments

This technique simultaneously addresses 3 major issues in completion of partial mastectomy in the upper breast: (1) closure of parenchyma, without sutures within breast parenchyma, reduces the possibility of a “dent” as the scar contracts; (2) a radial suture line minimizes traction on the nipple by preserving the distance from the areola to the periphery of the breast; and (3) a concentric incision is cosmetically superior to a radial skin incision.

More than 2 years of follow-up data are available for 31 women closed with this technique. One patient has developed retraction not explained by either thin tissue over preexisting cosmetic implants or removal of areolar skin to obtain negative margins (Fig. 3C). The patient with retraction had removal of a 3.5-cm invasive ductal carcinoma extending from the areola to the periphery of the upper breast. For an additional 13 women with retro areolar or lower breast cancers, also with 2-year follow-up, a modification of this technique (not shown) preserved nipple projection.

Closure of breast parenchyma after partial mastectomy,

without sutures within the parenchyma, is a useful addition to a surgeon’s therapeutic options.

### References

- [1] Love SM, Lindsey K. *Dr. Susan Love’s Breast Book, Second Edition*. Reading, MA, Addison-Wesley; 1995:364–9.
- [2] Margolese R, Poisson R, Shabata H, et al. The technique of segmental mastectomy (lumpectomy) and axillary dissection: a syllabus from the National Surgical Adjuvant Breast Project Workshops. *Surgery* 1987; 102:828–34.
- [3] Early Stage Breast Cancer, Consensus Statement, NIH Consensus Development Conference. Bethesda, MD: Department of Health and Human Services; 1990:8:1–19.
- [4] Morrow M, Strom EA, Bassett LW, et al. Standard for breast conservation therapy in the management of invasive breast cancer. *CA Cancer J Clin* 2002;52:277–300.
- [5] Veronesi U. Quadrantectomy, axillary dissection, and radiotherapy for carcinoma of the breast. *Surg Rounds* 1984;7:32–35.
- [6] Aspergren K, Holmberg L, Adami HO. Standardization of the surgical technique in breast-conserving treatment of mammary cancer. *Br J Surg* 1988;75:807–10.
- [7] Intra M, Gatti G, Luini A, et al. Surgical technique of intraoperative radiotherapy in conservative treatment of limited-stage breast cancer. *Arch Surg* 2002;137:737–40.
- [8] Bartlett E. Treatment of blue dome cyst. *JAMA* 1924;83:343–8.