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ORIGINAL ARTICLE

Usefulness of breast-conserving surgery using the round block technique or modified round block technique in Japanese females



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Summary *Background:* The round block technique (RBT) is an oncoplastic technique in which only the perimamillary scars remain visible. We have performed RBT in cases that require resection of the breast tissue under the nipple–areola complex (NAC) and a modified round block technique (MRBT) in peripheral cases in which performing resection of the breast tissue under the NAC is unnecessary. We herein report the usefulness of these techniques.

Methods: The study participants consisted of 18 patients who underwent breast-conserving surgery (BCS) using MRBT or RBT between July 2010 and July 2011. In the cases using RBT, de-epithelialization between the outer and inner incision lines was performed and the dermis was cut at the side of the tumor location. For MRBT cases, the dermis was cut in all parts of the inner and outer circles, and the skin between the inner and outer incision lines was resected.

Results: Cosmetic results were found to be excellent in three cases, good in eight cases, fair in five cases, and poor in two cases. In this study, the cosmetic results were unacceptable (fair and poor) in patients who underwent $\geq 25\%$ resection or in whom the resected area was part of the lower portion of the breast.

Conclusion: These techniques are useful for performing BCS in the upper portion of the breast. However, if the excision volume is $>20\%$ or excision of part of the lower portion of the breast is required, other procedures should be considered.

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1. Introduction

Breast-conserving surgery (BCS) is the standard procedure used to treat breast cancer. The primary goal of BCS is to control cancer as effectively as mastectomy, with the additional goal of achieving cosmetic results that are

acceptable to patients. However, achieving good cosmetic results is sometimes difficult. The important factors considered to influence cosmetic results include excision volume, tumor location, and glandular density.¹

Oncoplastic techniques can allow for good cosmesis even after large excisions of breast volume, and many oncoplastic volume displacement techniques for partial mastectomy have been reported.^{1,2} Oncoplastic volume displacement techniques using reduction mammoplasty are best suited for Western females with large-sized breasts and usually require surgery to be performed on the contralateral side for symmetrization. The breast size of most Japanese females is relatively small, and many Japanese breast cancer patients do not wish to undergo contralateral breast surgery. Both these reasons make reduction mammoplasty unsuitable for Japanese patients.

The round block technique (RBT)^{1,3–6} is a mastopexy technique. It is also known as doughnut mastopexy or periareolar mastopexy, which is another oncoplastic volume displacement technique used in BCS. Patients with small-to-medium-sized breasts without any major ptosis and who may not require contralateral breast surgery for symmetrization are considered to be most appropriate to undergo this procedure. The procedure begins by making two concentric periareolar incisions, resulting in a periareolar scar only. The nipple–areola complex (NAC) can be moved using this technique, depending on the distance of the outer incision from the new areola incision. As a result, this technique is thought to be highly appropriate for Japanese patients.

In the original RBT, the dermis is cut only on the side where the tumor is located because the NAC is supplied by dermal vessels from all sides. Therefore, this technique is difficult to perform in patients with tumors located in peripheral areas of the breast. However, Zaha et al⁷ reported the use of a modified round block technique (MRBT) in which the dermis is cut on all sides, to remove tumors located in peripheral areas of the breast. In cases in which the breast excision area does not include the area under

the NAC, an excellent view can be secured because the dermal flap can be made by incising around the entire outer circle. Because the view is very good, not only partial mastectomy, but also breast reshaping, can be performed easily using MRBT. We performed the original RBT in cases requiring resection of the breast tissue under the NAC and the MRBT in peripheral cases that did not require such a resection. The aim of this report is to describe the efficacy, indications, and problems of these oncoplastic techniques in Japanese breast cancer patients.

2. Methods

2.1. Participants

A total of 18 patients were evaluated in this study: 11 patients underwent MRBT and seven patients underwent RBT between July 2010 and July 2011 (Tables 1 and 2). The average age of the patients was 57.2 years (range: 41–79 years). Eight patients who underwent MRBT and seven patients who underwent RBT had undergone sentinel lymph node biopsies in which no metastasis was detected in the sentinel lymph nodes, enabling them to avoid axillary lymph node dissection. Two MRBT patients with lymph node metastasis diagnosed prior to surgery underwent axillary lymph node dissection and one MRBT patient underwent partial mastectomy only. Each surgery was performed by breast surgeons without the aid of plastic surgeons.

Preoperative evaluations were performed by the breast surgery group. This procedure was indicated for patients whose excision volumes were 10–40% of the total breast volume. Because filling large defects in the lower pole of the breast is difficult using only these techniques, patients with cancer in the lower pole of the breast were not included. Furthermore, patients in whom the position of the NAC could be moved in order to maintain the symmetry of the bilateral breasts were selected. We performed MRBT

Table 1 Summary of patients of modified round block technique.

No.	Age (y)	Operation	Location	Breast density ^a	Excision volume (%) ^b	Breast size	Postoperative complication	Cosmetic result ^c
1	70	Bq + SNB	A	Heterogeneously dense	15	Medium		Excellent
2	52	Bq + SNB	A	Extremely dense	20	Medium		Excellent
3	51	Bp + SNB	A	Heterogeneously dense	10	Large		Good
4	41	Bp + Ax	AC	Heterogeneously dense	20	Large		Good
5	60	Bp	C	Heterogeneously dense	20	Small		Good
6	58	Bq + SNB	C	Heterogeneously dense	20	Medium		Good
7	61	Bp + SNB	C	Scattered fibroglandular	15	Medium		Good
8	61	Bp + SNB	AB	Scattered fibroglandular	15	Medium		Fair
9	43	Bp + SNB	AB	Heterogeneously dense	20	Medium		Fair
10	44	Bp + Ax	CD	Heterogeneously dense	20	Medium		Fair
11	68	Bq + SNB, re-excision	C	Scattered fibroglandular	25	Medium	Margin positive	Poor

^a Breast density was classified into four categories based on the Breast Imaging Reporting and Data System (BI-RADS).

^b Excision volume compared to the total breast volume was estimated by using the photograph of preoperative marking of a partial resection area.

^c The cosmetic result was evaluated based on photographs taken 1 year after the operation.

Table 2 Summary of patients of round block technique.

No.	Age (y)	Operation	Location	Breast density ^a	Excision volume (%) ^b	Breast size	Complication	Cosmetic result ^c
1	54	Bp + SNB	DE	Heterogeneously dense	25	Medium	Part of blood-flow insufficiency of NAC	Excellent
2	58	Bp + SNB	ABE	Heterogeneously dense	15	Small		Good
3	41	Bp + SNB	BE	Heterogeneously dense	25	Small	Part of blood-flow insufficiency of NAC	Good
4	68	Bp + SNB	CDE	Scattered fibroglandular	30	Medium		Good
5	60	Bq + SNB	ABE	Scattered fibroglandular	25	Medium	Part of blood-flow insufficiency of NAC	Fair
6	60	Bp + SNB	ABE	Heterogeneously dense	30	Small	Part of blood-flow insufficiency of NAC	Fair
7	79	Bq + SNB	ABE	Scattered fibroglandular	40	Small		Poor

^a Breast density was classified into four categories based on the Breast Imaging Reporting and Data System (BI-RADS).

^b Excision volume compared to the total breast volume was estimated by using the photograph of preoperative marking of a partial resection area.

^c The cosmetic result was evaluated based on photographs taken 1 year after the operation.

in peripheral cases that did not require resection of the breast tissue under the NAC and RBT in cases requiring such a resection.

2.2. Preoperative drawings

After marking the partial resection area, the outer and inner incision lines were marked (Figs. 1 and 2). The distance between the inner and outer incision lines was adjusted to prevent deviation of the NAC. That is, on the excision side, the distance between the inner and outer incision lines was made as small as possible, whereas the distance was larger on the other side. In cases with a small areola diameter, the MRBT approach provides comfortable access to the resected area by designing two concentric circles with different diameters around the nipple.

2.3. Surgical procedure

The initial step involves making incisions along the inner and outer circles. For RBT, de-epithelialization between the outer and inner incision lines was performed, and the dermis was cut at the side of the tumor location. In these cases, the NAC was supplied by dermal vessels from all sides. For MRBT, the dermis was cut in all parts of the inner and outer circles, and the skin between the inner and outer incision lines was resected. In these cases, the NAC remained vascularized by its posterior glandular base. The outside skin from the outer incision was undermined in order to free the breast parenchyma from the skin in a manner similar to performing mastectomy in MRBT cases. Through this incision, any peripheral lesions can be accessed easily. Partial mastectomy was performed through a wider incision, allowing for better control of tumor

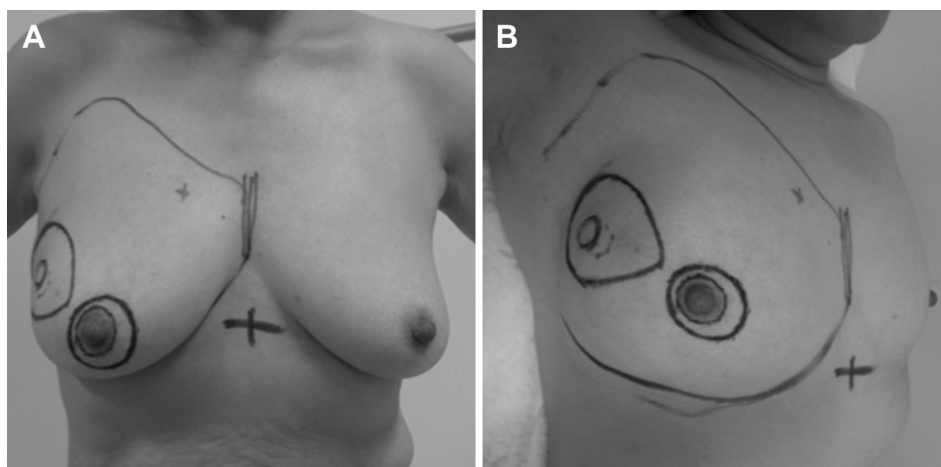


Figure 1 Preoperative drawings in a patient who underwent MRBT (Table 1, Case 6), with the patient in (A) standing position and (B) supine position. The lines mark the partial resection area and the outer and inner incision lines. MRBT = modified round block technique.

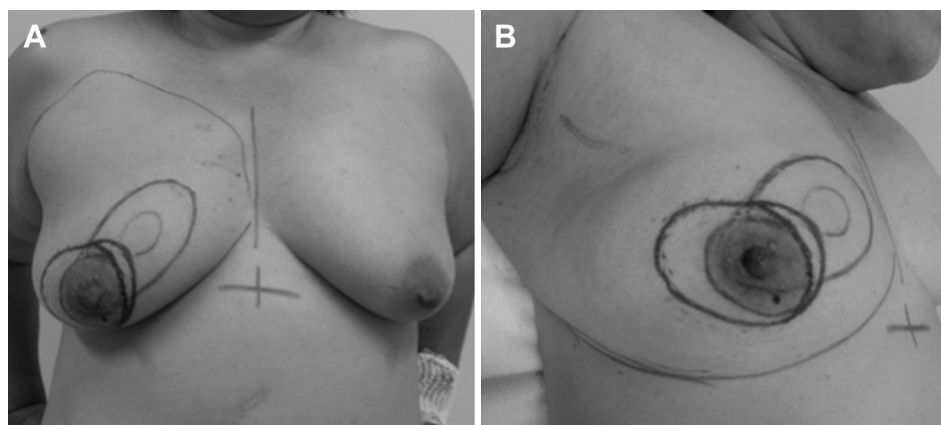


Figure 2 Preoperative drawings in a patient who underwent RBT (Table 2, Case 5), with the patient in a (A) standing position and (B) supine position. The lines mark the partial resection area and the outer and inner incision lines. RBT = round block technique.

removal than when resection is performed through a conventional conservative skin incision. The medial and lateral glandular flaps were then mobilized off the pectoralis muscle and sutured together. After the breast was reshaped appropriately by displacing the residual glands, a purse-string suture was used to reduce the diameter of the larger circle, which was then sutured to the new border of the areola in the MRBT cases (Fig. 3). Because the NAC was supplied by dermal vessels from all sides in the RBT cases, no purse-string sutures were used. Rather, the areola suturing was completed using a single suture 4-0 PDS (Fig. 4) and a running subcuticular suture 4-0 PDS. Only periareolar scars were visible then. Radiation therapy was administered to the breast after wound healing in all patients, except one who underwent partial mastectomy only due to having a phyllodes tumor.

2.4. Assessment of reconstruction

Cosmetic assessments were made based on photographs taken more than 1 year after surgery. Photographs of the

patients' breasts were then taken from frontal, left oblique, and right oblique views without any identifying features. The cosmetic results were evaluated by five independent observers (breast surgeons) as "excellent", "good", "fair", or "poor", using the Harvard Scale established by Harris et al.⁸ The result achieved was considered excellent when the treated breast was almost identical to the untreated breast, good when the treated breast was slightly different from the untreated breast, fair when an obvious difference existed between the two sides without any major distortions, and poor when the treated breast was seriously distorted. The observers were blinded to the identities of the patients.

3. Results

Among our present cases, five patients were considered to have small breasts, 11 medium-size breasts, and two large breasts. The excision volumes ranged from 10% to 40% of the total breast volume (average: 21.7%), as estimated by five independent observers (breast surgeons) using

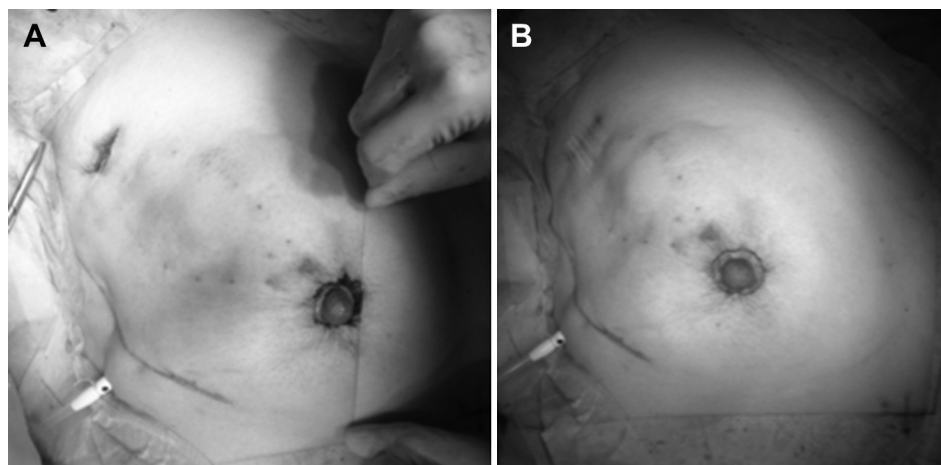


Figure 3 Periareolar incision was approximated in an MRBT case. (A) A purse-string suture was used to reduce the diameter of the larger circle. (B) After suturing to the new border of the areola. MRBT = modified round block technique.

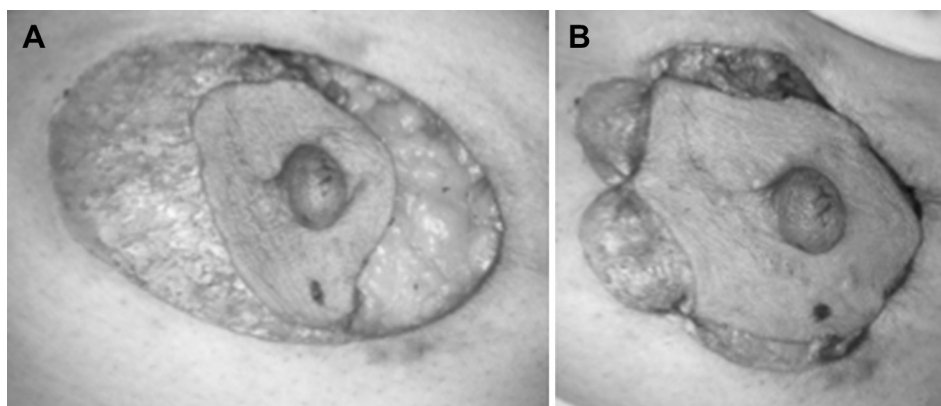


Figure 4 Periareolar incision was approximated in an RBT case. (A, B) No purse-string sutures were used. The areola suturing was completed with a single suture. RBT = round block technique

preoperative photographs of the markings made of the partial resection area. The tumors treated with MRBT were located in the upper peripheral portion, whereas those treated with RBT were located in the central portion. The breast densities were classified as extremely dense in one case, heterogeneously dense in 11 cases, and scattered fibroglandular densities in six cases, based on the Breast Imaging Reporting Data System.⁹

The length of surgery and the amount of blood loss ranged from 48 minutes to 124 minutes (average: 96.5 minutes) and 9 g to 101 g (average: 26.9 g), respectively, in patients who did not undergo axillary dissection, and from 188 minutes to 191 minutes (average: 189.5 minutes) and 67 g to 72 g (average: 69.5 g), respectively, in those who underwent axillary dissection. In the MRBT group, although one patient had to undergo re-excision of the breast due to having a positive margin, no patients experienced any complications, including fat necrosis or necrosis of the NAC. In the RBT group, although four patients exhibited blood flow insufficiency in part of the NAC, the condition was improved with conservative treatment in all cases (Tables 1 and 2).

3.1. Cosmetic results

The cosmetic results observed more than 1 year after surgery in the 18 patients were assessed using photographs (Tables 1 and 2). The results were found to be excellent (Fig. 5) in three cases (16.7%), good in eight cases (44.4%), fair (Fig. 6) in five cases (27.8%), and poor in two cases (11.1%). Unacceptable outcomes (either fair or poor) were observed in seven cases (38.9%). However, of the two patients with poor cosmetic results, one required additional excision due to having a positive margin and the other had an excision area of 40%. None of the patients wished to undergo contralateral breast surgery for symmetrization.

4. Discussion

In European countries, oncoplastic techniques, which combine the surgical principle of oncology with aesthetic and reconstructive plastic surgery, have been popular for more than 20 years, and many oncoplastic techniques have been reported.^{1,2,10–12} Oncoplastic procedures using

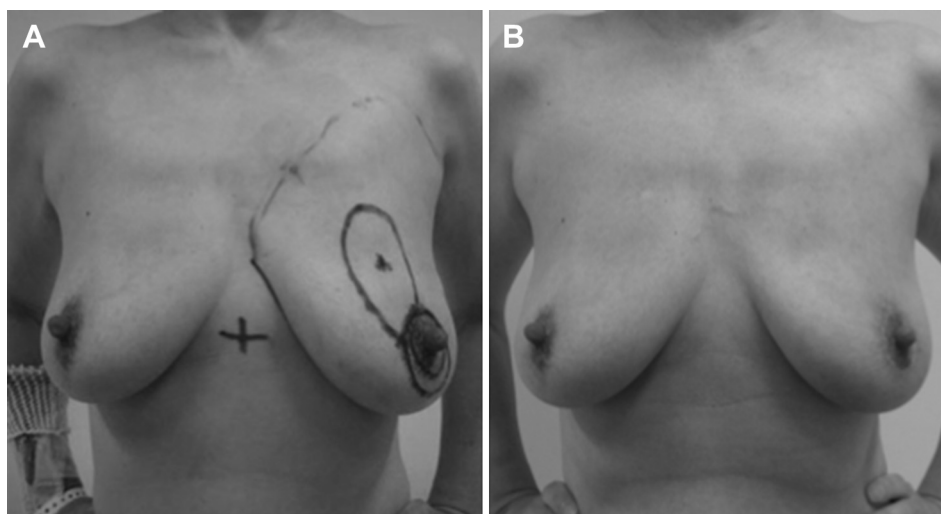


Figure 5 Case with excellent cosmetic results. The excision volume was 20% and the tumor was located in the upper inner quadrant (Table 1, Case 2). (A) Preoperative design. (B) Photograph taken 1 year and 2 months after surgery.

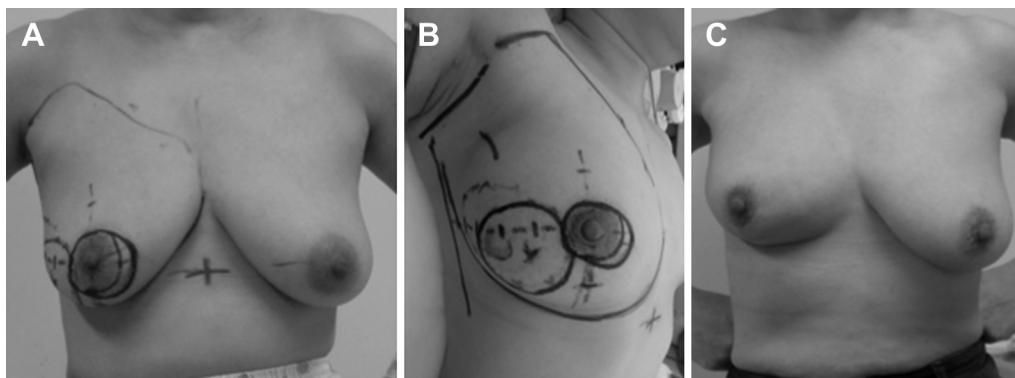


Figure 6 Case with fair cosmetic results. The excision volume was 20% and the tumor was located in the outer quadrant (Table 1, Case 10). Preoperative design with the patient in a (A) standing position and (B) supine position. (C) Photograph taken at 1 year and 9 months after surgery.

reduction mammoplasty techniques are very common for treating breast cancers in patients with large breasts and are commonly used in Western breast cancer patients. However, the reduction mammoplasty technique is often not suitable for Japanese females who have a relatively small-sized breast and do not wish to undergo contralateral breast surgery.

RBT^{1,3-6} is an oncoplastic volume displacement technique in which only perimamillary scars remain visible. This technique is suitable for patients with small-to-medium-sized breasts without any major ptosis who do not require contralateral breast surgery for symmetrization. Consequently, this technique is thought to be highly appropriate for Japanese patients. The areola diameter observed in Japanese females is generally smaller than that observed in Western females. However, using this technique, a sufficient view can be obtained for resection, even when the areola is small. In particular, in MRBT cases in which the breast excision area does not include the area under the NAC, an excellent view can be secured because the dermal flap can be made by incising around the entire outer circle. Because the view is very good, not only partial mastectomy, but also breast reshaping, can be performed easily using this technique. Although the original RBT approach is assumed to be best suited for treating periareolar lesions, it is also possible to adjust the procedure for peripheral tumors using MRBT.

The advantages of RBT and MRBT are that the position of the NAC is correctable and a very good view is acquired. These advantages are greatest for treating breast cancer in the upper inner portion of the breast. However, it is not the volume of the defect that compensates for these techniques. If the resection volume exceeds 20% of the total breast volume or the tumor position makes it difficult to obtain an adequate volume by mobilizing the surrounding tissue, the cosmetic results will be poor.

These techniques are considered in cases of breast cancer whose excision volume is up to 20% in the upper portion. However, because small-to-moderate-sized dense glandular breasts can be mobilized easily by advancing the breast tissue into the excision cavity without the risk of creating fat necrosis, the cosmetic results may be relatively good if the excision volume is >20%. By contrast,

moderate-to-large-sized breasts tend to exhibit poor outcomes due to asymmetrical breast size caused by a shrinking volume if the excision volume is >20%. However, when the form of the breast is kept beautiful even though the sizes of the left and right breast differ considerably, patient satisfaction can be high. Therefore, patients with moderate-to-large-sized breasts may also be indicated for these techniques.

In this study, cosmetic results were unacceptable in patients who underwent $\geq 25\%$ resection or in whom resected areas were located in the lower portion of the breast. Other oncoplastic techniques should also be considered in such cases. In addition, because excision of the breast tissue just under the NAC is required in RBT, four patients in this study exhibited blood flow insufficiency in a portion of the NAC. Although this condition was improved with conservative treatment in all cases, careful attention must be paid during and after surgery.

Based on the results of the present study, in our opinion, RBT and MRBT are useful procedures for performing BCS in the upper portion of the breast. However, if the excision volume is $\geq 25\%$, or part of the region in the lower portion requires excision, RBT and MRBT should be considered in combination with other techniques or procedures.

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