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**Review Article**

## *Nipple Sparing Mastectomy in Breast Cancer Patients*

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**Abstract**

The loss of nipple areolar complex (NAC) can affect the quality of life of the patient. Nipple sparing mastectomy (NSM) removes all of the breast tissue but preserves the skin of the breast and the NAC. These techniques were developed to treat breast cancer patients. Three factors that should be considered include: oncological safety, patient safety, and the cosmetic outcome and quality of life. The prevalence of nipple involvement in breast cancer is up to 58%. Risk factors for nipple involvement include: tumor size > 5 cm, distance between tumor and nipple < 2 to 3 cm, multicentricity of tumor, presence of lymphovascular invasion and presence of lymph node metastasis. The local recurrence rate of cancer is up to 12% with NAC recurrence rate up to 2%. The role of adjuvant RT at the NAC is still being debated. Absolute contraindications to NSM include: tumor invasion to skin and NAC, Paget's disease and inflammatory breast cancer. In the present article we review current evidence for the safety of NSM, as well the surgical technique used in our institution. We conclude that to ensure safety, maintain a low local recurrence, and achieve a good cosmetic outcome and good quality of life, proper selection of patients for NSM is key.

**Keywords:** Nipple sparing mastectomy, Nipple areolar complex, Retroareolar tissue, Necrosis, Nipple involvement

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## INTRODUCTION

Currently, breast cancer treatment aims to treat the disease, reduce local recurrence and increase the quality of life. Breast conserving therapy (BCT) is a standard treatment to treat stages 1 and 2 breast cancer patients. It is found that the treatment outcome is no different from that of mastectomy<sup>1,2</sup>, when BCT is done in conjunction with breast irradiation after surgery. However, mastectomy still plays an important role in cases where cancer is presented as multicentric lesions or diffuse pleomorphic microcalcification, or when there are contraindications to radiation. Toth and Lappert (1991)<sup>3</sup> found no significant differences in local recurrence rates between skin sparing mastectomy (SSM) and mastectomy.

Nipple areolar complex (NAC) often symbolizes femininity. The loss of NAC may adversely affect how a woman feels about herself and how others view her, which may impair the quality of life of the patient. Although nipple reconstruction may alleviate this impairment, it was found that the reconstructed nipple can appear flat, the areola can have a lighter shade, and the sensation can be poor<sup>4</sup>.

Nipple sparing mastectomy (NSM) was developed to deal with these disadvantages. NSM removes all of the breast tissue but preserves the skin of the breast and NAC to enhance the natural look following breast reconstruction. NSM was first performed in 1969 by Freeman<sup>5</sup>, as a prophylactic mastectomy. The technique was later developed to treat breast cancer. Three factors that should be considered before performing NSM include oncological safety, patient safety, and the cosmetic

outcome and quality of life.

### Oncological Safety

The preservation of the NAC has generated controversy in part due to the perceived risk of local recurrence. Welling and Jensen (1973)<sup>6</sup> suggested that NSM may be associated with higher local recurrence from the remaining terminal duct-lobular unit (TDLU) under the areola. Stolier et al. (2008)<sup>7</sup> biopsied the retroareola tissue and found that the terminal duct lobular unit exists in only 9% of cases. Their study also showed that it is impossible to remove all breast tissue in a mastectomy, and at least 5% of breast tissue commonly remains after mastectomy, which contributes towards a local recurrence rate of approximately 1% per year.

Sappey (1885)<sup>8</sup> found that the lymphatic drainage of the breast circles around the NAC before branching out towards the axillary lymph nodes, which might imply that cancer cells in the lymphatics might lodge in the NAC. However, Warwick (1959)<sup>9</sup> in a dye injection study, suggested that the NAC can be spared because only some of the lymphatic drainage enters the NAC while the rest branches to the pectoralis muscle. According to the literature, the prevalence of the presence of nipple cancer cells (i.e., nipple involvement) varies from 0 to 58%<sup>10-20</sup>. On closer look, it was found that the prevalence varied widely due to the differences in the criteria used in the selection of the study sample, the characteristics of cancer, the pathological examination procedures and the definition of nipple involvement (Table 1).

**Table 1** The prevalence of cancer cells detected at the NAC (nipple involvement)

Author	Total number of breast tissue	Total number of tissue having undergone cancer treatment	Percentage of breast tissues with cancer cells
Menon and van Geel et al. 1989 <sup>10</sup>	33	33	58
Verma et al. 1997 <sup>11</sup>	26	26	0
Laronga et al. 1999 <sup>12</sup>	286	286	5.6
Sacchini et al. 2006 <sup>13</sup>	192	68	0
Voltura et al. 2008 <sup>14</sup>	51	34	5.9
Brachtel et al. 2009 <sup>15</sup>	316	232	21
Paepke et al. 2009 <sup>16</sup>	109	109	11.9
Petit et al. 2009 <sup>17</sup>	1001	1001	8.6
De Alcantara Filho et al. 2011 <sup>18</sup>	353	157	3.1
Spear et al. 2011 <sup>19</sup>	162	49	8
Wagner et al. 2012 <sup>20</sup>	54	17	11.8

**Risk factors for nipple involvement include:**

**1. Tumor size.** Morimoto et al. (1985)<sup>21</sup> found that when the tumor size is 2 to 5 cm there is 41% nipple involvement, while if the size is > 5 cm there is 78% involvement.

**2. Distance between the tumor and nipple.** Luttges et al. (1987)<sup>22</sup> found that when the distance between the tumor and nipple is 2 to 3 cm, there is 36% nipple involvement, and Vajcic et al. (2005)<sup>23</sup> found that when the distance between the tumor and the nipple is less than 4 cm there is 19% involvement.

**3. Tumor multicentricity.**

**4. Presence of lympho-vascular invasion in the tumor<sup>23</sup>.**

**5. Presence of lymph node metastasis, extra-nodal extension or lymphatic emboli<sup>24</sup>.**

Studies have shown that the local recurrence rate of cancer in NSM is between 0 to 12% with a NAC recurrence rate between 0 to 1.2% (Table 2)<sup>13-16,18-20,25-26</sup>.

De Alcantara Fiho et al. (2001)<sup>18</sup> from the Memorial Sloan Kettering Cancer Center studied 353 breast cancer patients who had undergone NSM.

These patients had invasive cancer with a size of less than 3 cm, the distance between the tumor and the nipple was at least 1 cm, no lymph node metastasis, no lymphovascular invasion and had no detectable cancer cells in the retroareola tissue. After 10 years of follow-up, there were no local recurrences.

Petit et al. (2012)<sup>26</sup> studied 934 breast cancer patients who underwent NSM. Seven hundred and seventy two of these patients had invasive cancer, and 162 had carcinoma in situ. All of these patients received 16 Gy Electron Intraoperative Radiation Treatment (ELIORT)

at the NAC area. After 50-month follow-up, the local recurrence rate was 4% and the NAC recurrence rate was 1.2%. However, when categorised by type of cancer, carcinoma in situ was found to have a higher local recurrence rate than invasive cancer (4.9% vs 3.6%, respectively). Headon et al. (2016)<sup>27</sup> conducted a meta-analysis of 12,358 NSM cases and found the local recurrence rate to be 2.4%. Risk factors associated with local recurrence in invasive cancer include tumor size, tumor grade, luminal B subtype, HER-2 positive, high KI-67 and regional lymph node metastasis, while similar risk factors for carcinoma in situ include age < 45 years, tumor grade, ER negative, HER-2 positive and high KI-67<sup>26</sup>.

It seems that oncological safety and local recurrence rate in NSM are similar to those of conventional mastectomy. Of the 32 studies related to NSM in breast cancer patients (Table 3), 11 studies were of patients with small lesions and a distance between the tumor and nipple of over 1 to 2 cm<sup>18,28</sup>, and 21 studies were of patients with locally advanced breast cancer and multicentric tumor<sup>29-31</sup>. Five studies from the latter group selected patients with T3-4 lesions with more than 4 metastatic lymph nodes. It can be seen that therefore NSM is currently being used in some advanced breast cancer patients<sup>29-30</sup>. Nonetheless, some advanced breast cancers which absolutely contraindicate the use of NSM are as follows.

1. Tumor invasion to skin and NAC
2. Breast cancer with Paget's disease
3. Inflammatory breast cancer

To safely perform NSM is to be able to detect cancer cells at the NAC even when there are no NAC

**Table 2** Local recurrence rate after NSM

Authors	Total number of patients	Local recurrence rate (%)	NAC recurrence rate (%)	Follow up time (months)
Sacchini et al. 2006 <sup>13</sup>	192	3	0	24.6
Voltura et al. 2008 <sup>14</sup>	51	5.9	0	18
Benediksson and Perbeck et al. 2008 <sup>25</sup>	216	8.5	0	156
Paepke et al. 2009 <sup>16</sup>	109	1.83	0	34
Gerber et al. 2009 <sup>74</sup>	60	11.7	0.9	101
De Alcantara Filho et al. 2011 <sup>18</sup>	353	0	0	10.4
Spear et al. 2011 <sup>19</sup>	162	0	0	24
Wagner et al. 2012 <sup>20</sup>	54	0	0	15
Petit et al. 2012 <sup>26</sup>	934	4	1.18	50

Table 3 Summary of results of studies on NSM

Authors	Total number of patients	F/U time (months)	Stage	RT technique	LRR (%)	NAC recurrence (%)	NAC necrosis (%)	Retained breast tissue
Garber et al. 2003 <sup>36</sup>	60	101	0-IIIB	27% (technique NA)	NA	11.7	NA	NA
Komorowski et al. <sup>37</sup> 2006	38	NA	DCIS, I-III	NA	NA	NA	7.9 (total) 5.3 (partial)	NA
Caruso et al. 2006 <sup>38</sup>	50	66	0-III	6% (technique NA)	2	2	2	Removal of as much as possible of the entire gland
Sacchini et al. 2006 <sup>13</sup>	64	24.6	DCIS,	NA	1.3	0	11	NA
						T1-2		
Benediksson and Perbeck et al. 2008 <sup>25</sup>	216	156	0-III	21.8% (technique NA)	8.5 with RT 28.4 without RT	NA	NA	5mm gland tissue left beneath the NAC
Voltura et al. <sup>39</sup>	34	18	DCIS, T1-3, 29% N+	15% (technique NA)	5.9	0	NA	No nipple coring
Crowe et al. 2008 <sup>40</sup>	83	NA	DCIS, invasive	NA	0	0	1.8 (partial)	Tissue within the nipple is completely removed
Paepke et al. 2009 <sup>41</sup>	96	34	DCIS, T1-3 invasive	NA	0	0	1	NA-skin free of duct and gland tissue
Chen et al. 2009 <sup>42</sup>	40	22	NA	NA	NA	NA	8.7 (total) 15 (partial)	NA
Petit et al. 2009 <sup>17</sup>	1001	20	DCIS, invasive T1-3, 0- >4 positive LN	80% intraoperative RT (ELIOT) to NAC with 16 Gy left beneath areolar, 20% delayed one shot RT to NAC with 16 GY	1.4	0	9	Thin layer of glandular tissue
Babiera and Simmons 2010 <sup>33</sup>	54	15	NA	NA	NA	0	7.2	Dissection should be at a minimum carried to the based the NAC
Sakamoto 2010 <sup>43</sup>	87	52	0-IIIA (15% > 4 positive LN)	30% (technique NA)	0	0	10 (total) 7.9 (partial)	Nipple coring 19% (removal of tissue within the nipple through an additional incision)
Kim et al. 2010 <sup>44</sup>	152	60	0-IIIA	NA	2	1.3	9.6 (total)	12 mm intact dermis beneath the NAC

Table 3 Summary of results of studies on NSM

Authors	Total number of patients	F/U time (months)	Stage	RT technique	LRR (%)	NAC recurrence (%)	NAC necrosis (%)	Retained breast tissue
Djohan et al. 2010 <sup>45</sup>	66	50.4	DCIS, invasive	NA	NA	NA	2.6 (partial)	NA
Harness et al. 2011 <sup>46</sup>	40	18.5	0-IV	27.5% post-operative RT to the mastectomy side, axillary and supraclavicular regions	0	0	5	No breast tissue is left under areola and nipple
Boneti et al. 2011 <sup>35</sup>	281	25.3	I, II	8.5% 50 Gy for tumor > 5cm or > 4 positive LN	6	NA	7.1	Complete removal of breast ductal system
Spear et al. 2011 <sup>19</sup>	53	30	DCIS, invasive	NA	NA	0	2 (total) 2 (partial)	NAC is separated from the underlying breast
De Alcantara Fiho et al. 2011 <sup>18</sup>	157	10.38	0-IIIA	NA	0	0	3.3	5 mm flap beneath the NAC
Moyer et al. 2012 <sup>47</sup>	26	NA	0-III	11.5% adjuvant external beam RT for close margins ( $\leq 1$ mm)	NA	NA	37.5 (partial)	NA
Stanec et al. 2014 <sup>48</sup>	252	63	0-IIIB	NA	3.7	1.2	10.1	Removal of all breast tissue
Shi et al. 2012 <sup>49</sup>	35	68	I-III	50 GY optional depending on the treating physician	5.7	2.8	5.7	NA
Warren Peled et al. 2012 <sup>31</sup>	412	28	0-IV	26.7% (technique NA)	2.4	1.5	1.5 (total) 2 (partial)	Complete excision of all nipple tissue
Sakurai et al. 2013 <sup>50</sup>	788	78	0-IV	No RT	8.2	3.7	0	All fat and glandular tissue removed
Rulli et al. 2013 <sup>51</sup>	77	50	DCIS, invasion T1-2, 0- > 3 positive LN	16.6% 50 Gy thoracic wall for remaining tissue 83.4% no RT for complete tissue removal	3.3	3.3	0	Complete removal or max 5 mm tissue remaining
Coopey et al. 2013 <sup>29</sup>	315	22	DCIS, invasive T1-3, 13.8% positive LN	NA	2.6	0	1.7 (partial)	NA

Table 3 Summary of results of studies on NSM

Authors	Total number of patients	F/U time (months)	Stage	RT technique	LRR (%)	NAC recurrence (%)	NAC necrosis (%)	Retained breast tissue
Burdge et al. 2013 <sup>30</sup>	39	18	IIB-III	100% 50 Gy for tumor > 5mm or > 4 positive LN (if not irradiated before)	10.3	0	NA	NA
Carison et al. 2014 <sup>52</sup>	40	NA	DCIS, I-IV	12.7% (technique NA)	NA	NA	28.2 (partial)	Duct were excised from the undersurface of nipple
Stoller and Levine 2013 <sup>53</sup>	94	NA	DCIS, invasive	NA	NA	NA	0.8 (total) 1.6 (partial)	The NAC was elevated just beneath the level of the deep dermis
Salibian et al. 2013 <sup>54</sup>	118	33.5	DCIS, invasive T1-3	NA	5	NA	3 (total) 11 (partial)	Removal of the entire breast tissue adherent to the areola
Fortunato et al. 2013 <sup>55</sup>	121	26	DCIS, I-III	19% e.g. for close margins (technique NA)	0.8	0	4.3 (total)	Complete removal of the glandular tissue behind the NAC
Tancredi et al. 2013 <sup>56</sup>	58	21.7	Invasive T1-3, N1-3, 5.6% >10 positive LN	NA	3.6	3.6	3.6 (partial)	Removal of all breast parenchyma
Munhoz et al. 2013 <sup>57</sup>	106	65.6	DCIS, invasive T1-2	9.4% (technique NA)	3.7	NA	5 (partial)	NA
Total	2625	10-156 (median 38.4)		0-100%	0-28.4 (median 3.2)	0-3.7 (median 1.4)		

symptoms. From previous studies, the proportion of pathologically detected cancer cells at the NAC in patients who underwent NSM was at 0 to 58%<sup>32</sup>. Factors associated with the presence of cancer cells include the location of the tumor, the number of lymph nodes with metastasis, presence of lymphovascular invasion<sup>33</sup>, the size of tumor, and distance between the tumor and the nipple<sup>34</sup>. In most studies, the retroareolar tissue was biopsied and sent for frozen section examination. If any cancer cell is present, NSM is not performed<sup>17-18,35</sup>. Adjuvant Radiation Therapy after NSM

According to the 32 studies listed Table 3, 15 did not provide adjuvant radiation therapy (RT) to their patients. Ten provided adjuvant RT but did not mention the details of radiation treatment such as radiation dose and the technique of irradiation. Only 7 studies provided the details of treatment, with the proportion of patients receiving adjuvant RT ranging from 6% to 100% (Table 3).

Sakurai et al. (2013)<sup>50</sup> studied 788 patients with stage 0-4 breast cancer who had undergone NSM, but did not receive adjuvant RT.

The local recurrence rate was 8.2% and the NAC recurrence rate was 3.7%. Burdge (2013)<sup>30</sup> and Boneti (2011)<sup>35</sup> provided 50 Gy adjuvant RT at the chest wall in patients with tumor size > 5cm and lymph node metastasis > 4 nodes. In Moyer et al. (2012)<sup>47</sup>, adjuvant RT was provided to patients with resection margin < 1 mm. In other studies, adjuvant RT was provided to patients at the discretion of the physicians.

Petit et al. (2009)<sup>58</sup> studied 201 patients who received two methods of adjuvant RT at the NAC: either via ELIORT, or 2 to 3 days after surgery using 16 Gy, single shot electron beam. The overall local recurrence rate was 1.4%. The local recurrence rates were not significantly different between the 2 radiation methods. Voltura et al. (2008)<sup>39</sup> studied 216 patients who underwent NSM and found that the local recurrence rates were different between those who received adjuvant RT and those who did not, i.e. 8.5% vs. 28.4%, respectively. There was no difference in the NAC necrosis rates between these groups. Petit et al. (2011)<sup>59</sup> suggested that adjuvant RT should be given to patients with a high risk of local recurrence.

Although the role of the adjuvant RT at the NAC is still being debated and there are no clear recommendations, early breast cancer patients with no breast tissue left under the NAC may not need adjuvant RT.



Figure 1 Surgical planning

### Operative Technique

Before surgery, patients should be carefully evaluated and surgical planning should be made by drawing landmarks and incision lines on the patient in the standing position. The surgical plan includes a consideration regarding the appearance of the non-affected breast i.e. the size, the position, the position of the nipple, the size of the nipple, the areola, the inframammary fold, and the mid-sternal line; the location of the biopsy site; and the surgical incisions for both the breast surgery and the axillary lymph nodes surgery (Figure 1).

There are a variety of surgical incisions available for NSM, such as the superolateral radial incision, inferolateral radial incision, superior circumareolar incision, peri-areolar incision, inframammary fold incision and incisions designed to incorporate prior breast scar (Figure 2). According to Chirappappa et al. (2014)<sup>60</sup>, the superolateral radial-incision is the only incision through which both the breast tissue and the axilla lymph nodes



Figure 2 Superolateral radial surgical incision

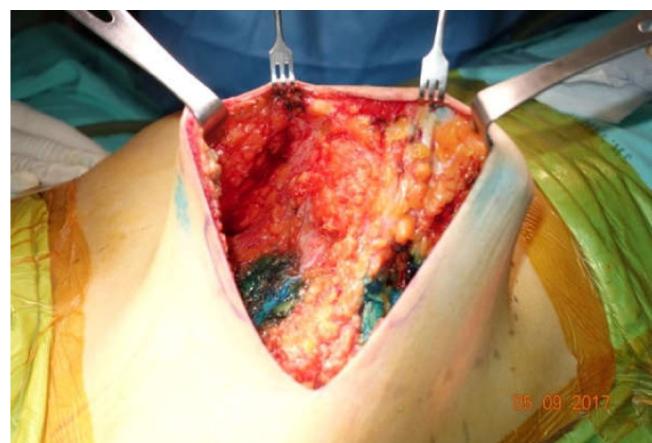
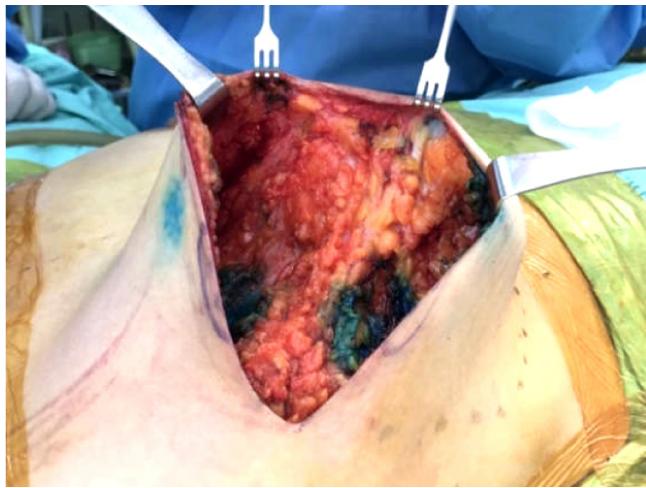


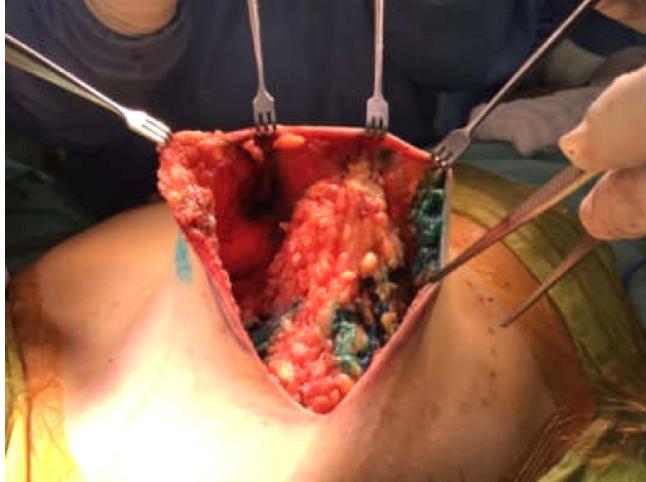
Figure 3 Separation of the upper part of the breast tissue



**Figure 4** Separation of the lower part of the breast tissue



**Figure 7** Retroareolar tissue separation using scissors



**Figure 5** Separation around the NAC



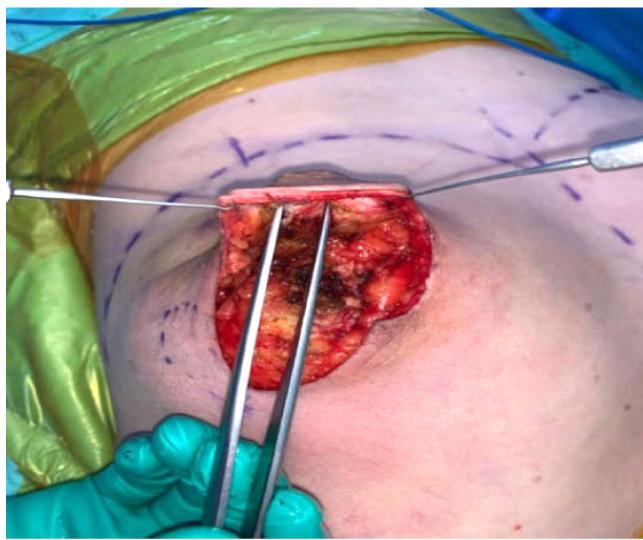
**Figure 6** Preparation for retroareolar tissue incision by turning the nipple inside out

can be concurrently removed.

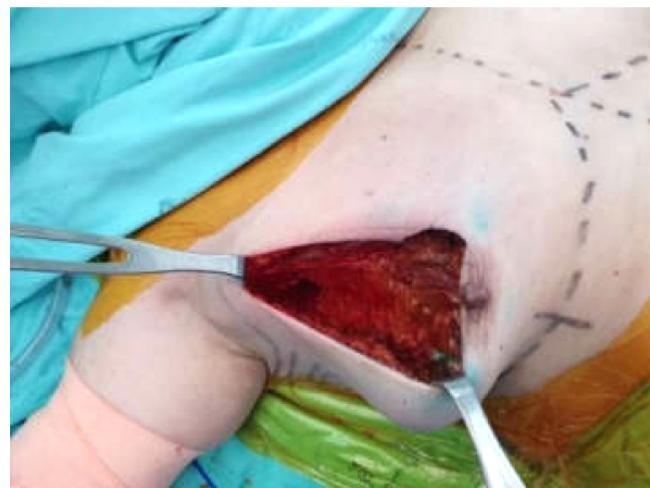
At Ramathibosi Hospital, after the skin is incised, we separate the breast tissue from subcutaneous tissue at the appropriate boundary, similar to that in conventional mastectomy. The superior border is dissected up to the clavicle, the inferior border is dissected down to the inframammary fold, the lateral border is dissected until the anterior border of latissimus dorsi muscle is seen, and the medial border is dissected towards the sternum.

Extra care should be taken when separating the NAC. The separation should start from the upper and the lower part of the breast tissue (Figures 3,4). The breast tissue under the NAC area should be separated only after the separation of the top and the bottom part converges (Figure 5). To remove retroareolar tissue, the nipple should be turned inside out (Figure 6). The retro-areolar tissue should be drawn and scalpel or scissors is used to separate the tissue accordingly (Figure 7). Avoid using electrocautery, as it may cause ischemia of the nipple and areola. According to O'Connell (2015)<sup>61</sup> and Rusby (2007)<sup>62</sup>, most of the TDLU will converge towards the center of the NAC with a bottleneck which is close to the skin. To separate them, the thickness of the NAC skin should be at least 2 mm thick to remove up to 96% of the duct, and still maintain up to 50% of the NAC blood supply. According to the European Institute of Oncology, the NAC should be at least 5 mm thick to prevent NAC ischemia. However, during surgery, ELIORT at NAC should be performed to reduce the risk of local recurrence<sup>17,26</sup>.

The removed retro-areolar tissue should be sent for intraoperative pathological examination (Figures 8,9).



**Figure 8** The NAC after retroareolar tissue has been removed



**Figure 11** Separation of breast tissue to the lateral border



**Figure 9** Retroareolar tissue to be sent for frozen section



**Figure 12** Separation of breast tissue to the superior border



**Figure 10** Separation of breast tissue to the medial border



**Figure 13** Separation of breast tissue to the inferior border



**Figure 14** Dissected breast tissue and the marking and labeling of all sides for pathology



**Figure 15** Condition of the skin and NAC overlying the breast after complete breast removal

If cancer cells are detected, the NAC must be removed. Lohsiriwat et al. (2004)<sup>63</sup> found that the sensitivity of the frozen section to detect cancer at the retro-areolar tissue was 88% and the negative predictive value was 93%. However, there is a false-negative rate of 9%<sup>18</sup>, and in some institutions, it is common to wait for permanent pathological examination results before deciding whether to remove the NAC.

Finally, the remaining breast tissue should be separated till termination at the dissection landmarks on all sides, as mentioned previously. The breast tissue is eventually removed from the pectoralis muscle. The breast specimen should be marked at the appropriate boundary of all sides before definitive pathological examination (Figures 10-15).

### Complications

Complications following NSM include<sup>60</sup>:

1. NAC necrosis: partial or total necrosis
2. Skin flap necrosis
3. Hematoma
4. Seroma
5. Infection

### NAC Necrosis

NAC necrosis can occur in 2% to 20% of cases<sup>64</sup>. It most often occurs during the first 3 weeks after surgery. Partial NAC necrosis can occur in 0 to 28% of cases, and can be managed by routine wound dressing until complete healing. Total NAC necrosis can occur in 0.2% to 7.4% of cases<sup>60,65-70</sup>. The survival of the NAC depends on the blood vessels which fed from under the NAC. Risk factors for NAC necrosis are as follows.

1. Age over 45 year
2. Comorbidity such as diabetes mellitus and hypertension
3. History of smoking
4. Previous radiation at NAC
5. Type of surgical incision: specifically, periareolar, superior circumareolar incision, where the length of the incision is greater than 1/3 of the NAC circumference
6. Breast reconstruction with implant
7. The volume of resected breast tissue > 750 cc

Other complications are similar to those seen in conventional mastectomy, which include skin flap necrosis, hematoma, seroma, and infection

### Cosmetic Outcome and Quality of Life

Mastectomy can have a negative psychological impact on the patient. In 2009, Didier et al.<sup>71</sup> studied the patient's self-image. It was found that the NAC maintains its shape following NSM better than following nipple reconstruction. Nonetheless, patients felt like they have become disabled.

Petit et al. (2009)<sup>17</sup> studied 1001 patients who underwent NSM. They asked patients to rate various aesthetic features including color, shape, and the symmetry of the NAC, on a scale between 0 and 10. The overall average rating was 7 to 8. The nipple sensation after NSM was also evaluated by rating on a scale between 0 to 10, which was found to be 2 points on average. Only 15% of patients regain partial nipple sensation 1 year following surgery. Yueh et al. (2009)<sup>72</sup> also obtained a similar rating of 2.8 out of 10 regarding nipple sensation, which included pain sensation, touch sensation, temperature sensation and nipple erection.

Wagner et al. (2012)<sup>20</sup> assessed nipple sensation

by measuring the time it takes from touching the nipple until the nipple has become fully erect. A significant increase in duration was found following surgery, from an average of 9.5 seconds before surgery, to an average of 25 seconds 6 months after surgery, and an average of 23 seconds 12 months after surgery. Van Verschuer et al. (2016)<sup>73</sup> assessed nipple sensation following NSM by using the Semmes Weinstein monofilament technique, with a rating between 0 to 5. They found that the sensation is lowered after NSM compared to the controlled group; i.e. 1.9 points versus 4.7 points, respectively.

The following principles should be considered when assessing the patient's suitability for the NSM<sup>60,65</sup>:

1. The patient should be 45 years or younger with no smoking history.
2. The patient has never received radiation therapy or chemotherapy.
3. The distance between the tumor and the nipple is > 2 to 4 centimeters.
4. The NAC is normal on inspection, with no nipple retraction, no discharge, and no erosion or ulceration.
5. No History of Paget's disease or inflammatory breast cancer.
6. No microcalcification below NAC on breast imaging.
7. No cancer cells detected in the retroareolar tissue from frozen section pathological examination.

Chirappapha et al. performed NSM at Ramathibodi Hospital on 52 patients between 2007 and 2015. They found one nipple involvement from frozen section examination, and the NAC was removed. There were 3 local recurrences at the NAC. With a follow-up time of 24 months, 35 patients regained some NAC sensation 6 months after surgery, 44% of the patients regained partial sensation, and only 1 patient regained full sensation. A year later, 7 out of 10 patients partially regained their NAC sensation.

## CONCLUSIONS

Breast cancer surgery should primarily consider oncological safety to ensure low local recurrence and best overall survival. Careful selection of patients for nipple sparing mastectomy (NSM) is crucial for ensuring safety, maintaining a comparable local recurrence rate to that of conventional mastectomy, and for optimizing aesthetic features and quality of life.

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## CONFLICT OF INTEREST

All authors have no financial and personal relationships with people or organizations that could inappropriately influence (bias) their work.

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## บทคัดย่อ การผ่าตัดเต้านมออกทั้งหมดแบบอนุรักษ์หัวนมและลานนม

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**ความเป็นมา:** หัวนมและลานนมนั้นเป็นส่วนสำคัญ ซึ่งหาผู้หญิงที่ได้รับการผ่าตัดเต้านมออกทั้งหมด รวมไปถึงผ่าตัดหัวนมและลานนมออกไปจะทำให้ผู้หญิงบางรายสูญเสียความมั่นใจ ไปจนถึงมีผลกระทบต่อ คุณภาพชีวิตได้ ซึ่งเดิมเคยมีการผ่าตัดเสริมสร้างหัวนมขึ้นมาใหม่ แต่พบว่าหัวนมที่เสริมสร้างขึ้นมาใหม่นั้นมีสี ที่จางกว่า แบบกว่า และมีความรู้สึกที่คล่อง ด้วยเหตุผลนี้จึงได้มีการพัฒนาผ่าตัดเต้านมออกทั้งหมดแบบอนุรักษ์หัวนมและลานนม ซึ่งเป็นการผ่าตัดเต้านมออกทั้งหมดโดยที่ยังเก็บผิวหนัง หัวนมและลานนมของผู้ป่วยไว้ โดยการผ่าตัดดังกล่าวนี้นั้นก็เริ่มมีการพัฒนามาใช้ในการรักษาผู้ป่วยมะเร็งเต้านมด้วย โดยต้องคำนึงถึงปัจจัย 3 อย่าง ดังนี้ ความปลอดภัยด้านมะเร็ง ความปลอดภัยของผู้ป่วย และความสวยงามรวมไปถึงคุณภาพชีวิตของผู้ป่วย

**ความปลอดภัยด้านมะเร็ง:** การอนุรักษ์หัวนมและลานนมในการผ่าตัดมะเร็งเต้านมนั้นพบว่าอาจส่งผลต่อการกลับมาเป็นซ้ำของมะเร็ง เนื่องจากการอนุรักษ์หัวนมและลานนมนั้นจะบังคับเหลือท่อน้ำนมบางส่วนที่บริเวณหัวนมซึ่งอาจเป็นบริเวณที่บักมีมะเร็งเหลืออยู่ แต่จากการศึกษาวิจัยพบว่า โอกาสที่จะพบว่ามีมะเร็งบริเวณหัวนมนั้น มีร้อยละ 0-58 โดยพบว่าปัจจัยที่มีปัจจัยที่มีผลต่อการหัวนม ไม่ต่ำกว่า 0.58 โดยพบว่าปัจจัยที่มีผลต่อการหัวนม มีดังต่อไปนี้ ขนาดของมะเร็ง ระยะห่างของมะเร็งและหัวนม ลักษณะของมะเร็งชนิดกระจายทั่วเต้านม (Multicentricity) มะเร็งเต้านมชนิดที่มีการลุกลามมาข้างท่อน้ำเหลืองและหลอดเลือด และมะเร็งเต้านมชนิดที่มีการแพร่กระจายมาข้างต่อมน้ำเหลือง โดยพบว่าอัตราการกลับมาเป็นซ้ำของมะเร็งมีประมาณร้อยละ 0-11.7 และอัตราการกลับมาเป็นซ้ำของมะเร็งบริเวณหัวนม มีประมาณร้อยละ 0-1.18 ซึ่งจากงานวิจัยได้แนะนำให้มีการพยายามรักษาหัวนมและลานนม เพื่อลดอัตราการกลับมาเป็นซ้ำ แต่ประเด็นดังกล่าวนี้ยังเป็นข้อถกเถียงกันอยู่

**ข้อห้ามในการผ่าตัดเต้านมออกทั้งหมดแบบอนุรักษ์หัวนมและลานนม:** การผ่าตัดเต้านมออกทั้งหมดแบบอนุรักษ์หัวนมและลานนมนั้นมีข้อห้ามในการผ่าตัดดังต่อไปนี้ มะเร็งมีการลุกลามมาบังบริเวณผิวหนังหัวนมและลานนม ผู้ป่วยเป็นโรคพาเจ็ต (Paget's disease) และผู้ป่วยเป็นมะเร็งเต้านมชนิดการอักเสบ (Inflammatory breast cancer) นอกจากนี้ระหว่างการผ่าตัดนั้นจะทำการผ่าตัดเนื้อเยื่อใต้หัวนมไปส่งตรวจทางพยาธิวิทยา หากพบว่ามีเซลล์มะเร็งหลงเหลืออยู่ จะไม่สามารถทำการผ่าตัดแบบอนุรักษ์หัวนมและลานนมได้

**วิธีการผ่าตัด:** ก่อนการผ่าตัดผู้ป่วยจะได้รับการวางแผนก่อนการผ่าตัด หลังจากนั้นจะทำการลงมือผ่าตัดตามบริเวณที่วางแผนไว้ และทำการผ่าตัดผิวหนังแยกออกจากเนื้อเต้านม โดยเริ่มจากบริเวณด้านบนและด้านล่าง จนเสร็จก่อน แล้วจึงค่อยมาแยกเนื้อเยื่อบริเวณหัวนมและลานนม และทำการแยกเนื้อเยื่อใต้หัวนมออกทั้งหมดตามขอบเขตที่วางแผนไว้ หลังจากทำการแยกเนื้อเยื่อใต้หัวนมออกหมดแล้วนั้น จะทำการปริ้นหัวนมขึ้นและใช้กรรไกรหรือมีดทำการฝานเนื้อเยื่อใต้หัวนมนำไปส่งตรวจทางพยาธิวิทยา ซึ่งหากพบว่ามีเซลล์มะเร็งหลงเหลืออยู่ จะไม่สามารถทำการผ่าตัดแบบอนุรักษ์หัวนมและลานนมได้ จะต้องทำการผ่าตัดเอาหัวนมและลานนมออกแต่หากไม่พบว่ามีเซลล์มะเร็งหลงเหลืออยู่ ก็สามารถทำการผ่าตัดแบบอนุรักษ์หัวนมและลานนมได้

**ภาวะแทรกซ้อนหลังการผ่าตัดแบบอนุรักษ์หัวนมและลานนม:** ภาวะแทรกซ้อนหลังการผ่าตัดแบบอนุรักษ์หัวนมและลานนมนั้นสามารถพบได้แก่ การขาดเลือดของหัวนมและลานนม การขาดเลือดของผิวหนังเต้านม ภาวะคั่งของเลือดได้แพลงผ่าตัด ภาวะคั่งของน้ำเหลืองได้แพลงผ่าตัด และภาวะการติดเชื้อ ซึ่งพบว่าการขาดเลือดของหัวนมและลานนมนั้นพบได้ร้อยละ 2-20 โดยปัจจัยเสี่ยงที่สามารถทำให้เกิดขาดเลือดของหัวนมและลานนมนั้น ได้แก่ ผู้ป่วยที่อายุมากกว่า 45 ปี มีโรคประจำตัว มีประวัติสูบบุหรี่ ผู้ป่วยเคยได้รับการฉายรังสีมาก่อน รวมไปถึงแนวของแพลงผ่าตัด

**ความสวยงามและคุณภาพชีวิตของผู้ป่วย:** การผ่าตัดเต้านมออกทั้งหมดนั้นมีผลกระทบต่อจิตใจผู้ป่วยในบางราย เนื่องจากผู้ป่วยจะรู้สึกว่าการมีเต้านม หัวนมและลานนมอยู่นั้นจะบ่งบอกความเป็นผู้หญิง ซึ่งจากการศึกษาวิจัยพบว่าผู้ป่วยที่ได้รับการผ่าตัดแบบอนุรักษ์หัวนมและลานนมไว้ได้นั้นจะมีความพึงพอใจกว่าการผ่าตัดเสริมสร้างหัวนมขึ้นมาใหม่นั้น เนื่องจากมีสีและรูปร่างที่เป็นธรรมชาติกว่า และมีความรู้สึกที่ใกล้เคียงปกติ

**สรุปผลการศึกษา:** การผ่าตัดเต้านมออกทั้งหมดแบบอนุรักษ์หัวนมและลานนมนั้น ถือเป็นการรักษาที่ได้มาตรฐานใกล้เคียงกับการผ่าตัดเต้านมออกทั้งหมดปกติ ทั้งทางด้านความปลอดภัยด้านมะเร็ง ความปลอดภัยของผู้ป่วย และความสวยงามรวมไปถึงคุณภาพชีวิตของผู้ป่วย หากเลือกผู้ป่วยให้เหมาะสม