CURRENT ONCOLOGY
A Canadian Cancer Research Journal

PRACTICE GUIDELINE

Position statement on defining and standardizing an oncoplastic approach to breast-conserving surgery in Canada

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ABSTRACT

Although mastectomy is an effective procedure, it can have a negative effect on body image, sense of attractiveness, and sexuality. As opposed to the combination of breast oncologic surgery and plastic surgery, whose primary focus is on replacing lost volume, breast-conserving oncoplastic surgery (OPS) redistributes remaining breast tissue in a manner that requires vision, anatomic knowledge, and an appreciation of esthetics, symmetry, and breast function. Modern surgical treatment of breast cancer can be realized only with breast and plastic surgeons working together using oncoplastic techniques to deliver superior cosmetic and cancer outcomes alike. Using this collaborative approach, oncologic and plastic surgeons in Canada have a significant opportunity to improve the care of their breast cancer patients. We propose a tri-level classification for volume displacement procedures to act as a rubric for the training of general surgeons and oncologic breast surgeons in oncoplastic breast-conserving therapy techniques. It is our position that OPS enhances outcomes for many women with breast cancer and should become part of the standard repertoire of procedures used by Canadian oncologic surgeons treating breast cancer.

Key Words Oncoplastic surgery, breast cancer, breast-conserving surgery, surgical oncology, position statements

***Curr Oncol*. 2019 June;26(3):e405-e409** **www.current-oncology.com**

BACKGROUND AND DEFINITION

The surgical options for breast cancer fall into two main categories: mastectomy or breast-conserving surgery (BCS). Although mastectomy is an effective procedure, it can have a negative effect on body image, sense of attractiveness, and sexuality[1]. The standard general surgical training for breast conservation is to leave the lumpectomy cavity open to be filled with a postoperative seroma to preserve the normal breast contour in the short term before cavity consolidation with scar tissue[2]. Although that approach might be sufficient for small resections, it is not effective for large-volume excisions or for tumours located in cosmetically unfavourable areas of the breast, because it will usually result in significant breast deformity or deviation of the nipple (or both) that is magnified by postoperative radiotherapy[3]. Conversely, hesitation on the part of the breast surgeon to remove large amounts of tissue so as to prevent a deformity could result in positive margins, potentially ultimately leading to mastectomy.

In the late 1980s, several European surgical teams introduced the concept of using plastic surgery techniques for complex BCS cases in which the patients were at high risk of a negative cosmetic result, incorporating immediate reshaping of the breast at the time of tumour excision. The term "oncoplastic surgery" (OPS) was coined by German surgeon Dr. Werner Audretsh in 1996 and has gained wide recognition, particularly in Europe. The philosophy of OPS holds that, whenever surgery is performed on the breast, consideration of both cancer and esthetics (including obliteration of deformity, centralization of the nipple, and preservation of bilateral symmetry) must be critical components of the breast cancer treatment[4]. Since its introduction, OPS has enabled surgeons to successfully remove greater volumes of tissue, while even patients with multicentric disease are able to undergo breast conservation with superior cosmesis and long-term oncologic safety[5].

Modern surgical treatment of breast cancer requires that breast and plastic surgeons working integratively, using OPS techniques to deliver superior cosmetic and

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cancer outcomes alike. Despite the wide acceptance of OPS in Europe, awareness and use of OPS is disappointingly low across Canada[6,7]. However, there is a desire within the Canadian breast and general surgical community to propose initiatives and actions that could improve access to OPS. In the present paper, we describe the perspectives of a group of Canadian OPS surgeons about the key elements that are required to achieve that goal, with a focus on collaboration.

Proposed Levels of Competency in Breast-Conserving OPS in Canada

Oncoplastic surgery is based on two broad methods:

- Volume-displacement techniques using dermoglandular or glandular transposition, redistribution, and rotation of breast tissue into the lumpectomy cavity, which can include nipple centralization and elevation
- Volume-replacement techniques using autologous flap reconstruction to compensate the volume loss after tumour resection (such as latissimus dorsi and abdominally based flaps[8]) or implant-based reconstructions that can be accomplished in several ways

In the European model of OPS, diverse OPS techniques are practiced by general and breast surgeons under the umbrella of those two categories. However, it is our position that, in Canada, volume-replacement techniques normally fall under the scope of practice of the plastic surgeon and that surgeons who intend to perform those types of reconstruction should undergo specialized, formal plastic surgery training. For the purposes of training in OPS in Canada, we propose our own classification of breast-conserving OPS, concentrating on volume-displacement techniques that can be accommodated into the existing scope of practice of breast surgeons or general surgeons dedicated to breast surgery.

We propose that OPS volume-displacement techniques be divided into 3 levels according to complexity and extent of skill and training required to perform each of the procedures (Table I). This Canadian classification has been modified from the original bi-level classification proposed by the French surgeon Krishna Clough[3,9].

Level 1 OPS

Level 1 techniques are simple lumpectomy defect-closure techniques that any general surgeon who performs breast surgery is capable of easily acquiring. Those techniques include dual plane undermining, nipple undermining, glandular advancement, and lumpectomy defect closure without skin resection. Nipple–areolar complex elevation or centralization can be used to correct the nipple asymmetry that can occur when the central volume of the breast has to be mobilized toward the defect. Level 1 OPS procedures are indicated for resections that involve less than 15% of breast volume, which will encompass most breast-conserving surgeries in the era of screening mammography.

Level 2 OPS

Level 2 OPS techniques are required when the volume excised will be 15%–25% of the breast or when the tumour is in a cosmetically sensitive location (upper inner quadrant or lower pole of the breast). In both of those situations, standard lumpectomy would cause significant volume loss and deformity. Level 2 techniques incorporate the skills used in level 1 procedures while taking advantage of existing mild-to-moderate ptosis or hypertrophic or large-volume breasts.

Components of level 2 OPS include purposeful skin excision, glandular rotations, pre-emptive nipple recentralization, and de-epithelialization techniques that preserve the blood supply to the nipple–areolar complex and parenchyma. In the appropriate patient, those techniques allow the surgeon to resect larger volumes and potentially multifocal tumours with clear margins and minimal-to-no deformity. Competency in level 2 techniques require a familiarity with the methods of assessing breast ptosis, breast size, and volume of resection required, plus an understanding of the blood supply risks to glandular tissue and the nipple–areolar complex. In general, level 2 OPS techniques should encompass approximately 15%–20% of all breast-conserving procedures.

Level 3 OPS

Level 3 OPS procedures rely on the use of various reduction mammoplasty techniques to remove large volumes of breast tissue (while retaining sufficient tissue to create a breast mound) in women who would traditionally have been treated with mastectomy. These procedures are indicated in patients with large breasts who require a large resection, but who wish to avoid mastectomy. The resection volume is greater than 25% and can be as high as 60%. Using those mammoplasty techniques, patients with tumours that are large (>5 cm), multifocal, or multicentric can often receive a resection with not only clear, but often very large, margins. The key technical principle is to use various designs of glandular pedicles coupled with large mobilizations, transpositions, and rotations of residual breast tissue to fill a massive defect and to maintain the blood supply to the nipple–areolar complex. Those techniques are particularly applicable to tumours that are sited in the usual areas of glandular resection in standard breast reductions. A contralateral symmetry procedure of equal magnitude and similar technique can be performed during the same operation or later.

Training Timeframes

In general, levels 1 and 2 OPS can be learned and performed independently by many breast surgeons within a relatively short amount of time; level 3 techniques require more advanced training and usually take even a dedicated breast surgeon many years to master. In large-volume breast practices, OPS level 3 is performed in only about 10%–15% of patients undergoing BCS. In Canada, those procedures are most commonly performed collaboratively with a plastic surgeon who might be balancing the normal contralateral breast and, if required, assisting with the oncoplastic closure of the cancerous breast.

OPS Versus Esthetics

Not for every patient requires OPS, but a commitment by the breast surgeon to maximizing the esthetic outcome is necessary.

TABLE I Classification of oncoplastic breast procedures, proposed training methodology, and time to competence[a]

Oncoplastic surgery category	Breast volume removed (%)	Definition and examples	Minimum components of training expectation within Canada	Time to competence[b]
Level 1	<15	■ Dual plane undermining, nipple undermining, glandular advancement and lumpectomy defect closure ■ Oncoplastic breast surgery lecture or hands-on training course	General surgery residency	Days
Level 2	15–25	■ Glandular rotations, skin excision, de-epithelialization, and nipple areolar complex recentralization; round block (Benelli) mastopexy, crescent mastopexy, racquet mastopexy; hemibatwing and batwing, or V or J mammoplasty	Formal oncoplastic fellowship training (which includes collaboration with plastic surgeons) *OR all of the following:* Multiple oncoplastic surgery hands-on training courses Preoperative and intraoperative joint collaboration and consultation with plastic surgeons Ongoing continuing medical education in oncoplastic surgery Mentorship by experienced oncoplastic surgeons	Months to years
Level 3	>25 up to 60[c]	■ Reduction mammoplasty procedures with contralateral balancing procedures (Wise-pattern reduction, vertical mammoplasty)	Formal oncoplastic fellowship (which includes collaboration with plastic surgeons) or plastic surgery training *OR all of the following:* Multiple oncoplastic surgery hands-on training courses Preoperative and intraoperative joint collaboration and consultation with plastic surgeons Ongoing continuing medical education in oncoplastic surgery Mentorship by experienced oncoplastic surgeons	Years

[a] Modified from the bi-level classification of Clough and colleagues[3].
[b] For the average surgeon trained in a general surgical residency.
[c] For extremely large breasts.

Unlike some authors, we do not believe that all BCS should be oncoplastic[10]. Oncoplastic surgery is not indicated for tumour resections involving less than 15% of the breast volume, because a simple lumpectomy with minimum undermining of surrounding breast tissue and glandular closure will suffice and provide acceptable cosmetic results in most cases. In addition, patients who have fatty replaced breasts or who are smokers should avoid excessive undermining and glandular rearrangements because of the higher risk of fat necrosis[3,5]. Such necrosis can present as calcifications on surveillance imaging or as a palpable mass many months after resection; it can lead not only to additional biopsies but also to concerns about recurrence in an already anxious patient.

But even if OPS is not offered, the principle of maximizing the esthetic outcome in every patient remains. At minimum, thoughtful incision planning can go a long way to improving cosmesis. Scars around the areola and at the lateral, axillary, or inframammary fold can be used in suitable cases to avoid scar visibility. As much as possible, incisions high on the superior aspect of the breast should be avoided so as to minimize the number of scars should the patient be in need of an unexpected mastectomy down the road. Transverse or circumareolar skin incisions in the inferior pole of the breast should also be avoided because they tend to pull the nipple down and to create a "bird beak" effect with poor cosmetic outcomes[3,9]. By placing the incision vertically, the natural lateral laxity and weight of the breast is used to fill the defect, and the nipple position is maintained[10].

It is our opinion that, unless clinical and tumour factors are preventing breast conservation or the breast cancer patient has a strong preference for mastectomy, every attempt should be made to conserve the breast. If the patient does require a mastectomy for oncologic or personal reasons, access to immediate breast reconstruction should be offered for all suitable cases[10–12]. Correctly applied, ideal mastectomy and immediate reconstruction have dramatically improved patient outcomes, and crucial to their use is the concept that the reconstruction itself has to be seen as an integral part of mastectomy planning. Reconstruction options have to be considered early in patients undergoing

mastectomy, whether immediate or delayed, and surgery has to be planned appropriately.

For the breast surgeon, understanding the full range of available mastectomy techniques and how they best apply to various oncologic and reconstruction options will give the patient the best oncologic and cosmetic outcomes. Different skin- and nipple-sparing mastectomy techniques can be selected depending on patient morphology, breast ptosis, and type of reconstruction planned. When applicable, the use of an inframammary incision with immediate implant reconstruction has major esthetic advantages. Nipple preservation is now considered for all mastectomy-and-immediate-reconstruction cases when oncologically appropriate and confers significant psychosexual benefits[10]. Vertical or Wise-pattern mastectomy technique for the patient with large breasts can be ideal for autologous free-flap reconstruction, providing adequate access for microsurgery while maintaining an optimum skin envelope. Even the traditional simple mastectomy has to be performed with thought and planning. Creating low-lying scars, flat surfaces for a prosthesis, and avoiding dog-ears will improve outcomes even without reconstruction.

Training for OPS in Canada

Practicing Canadian surgeons currently performing OPS have generally developed their skills through courses taken internationally and through personal experience, because the related training has been an unmet need in Canada. In the last few years, two formal OPS fellowships for general surgeons in Canada have emerged at Western University and the University of Ottawa[6,7]. In addition, the authors of this paper began offering full-day OPS workshops starting in 2016 (https://oncoplasticpartnershipworkshop.ca/). As a group of academic and community OPS-trained surgeons, we created the workshops with the goals both of increasing awareness and of training Canadian general and breast surgeons to use OPS techniques as an integral part of the optimal surgical management for breast cancer. These hands-on cadaveric workshops are currently offered every few months in conjunction with national or regional general surgery or breast cancer conferences. Once surgeons participate in this course, they are automatically enrolled in an online community of OPS surgeons where they can submit cases and participate in ongoing live point-of-care discussions, feedback, and mentorship with the faculty group and previous graduates of the course.

In contrast to volume-replacement procedures, OPS redistributes and displaces the remaining breast tissue in a manner that requires vision, anatomic knowledge, and an appreciation of esthetics, symmetry, and breast function. Those skills can take many years for the average breast surgeon to master, even after a traditional breast or surgical oncology fellowship. A commitment to oncologic and esthetic outcomes by the oncologic breast surgeon and a commitment to working collaboratively with the plastic surgeon are both needed. The breast surgeon must document and monitor aspects of the patient's breast not normally taught in general surgery, such as breast size, density, degree of ptosis, contour, symmetry, and volume. Breast surgeons have to be able to predict the esthetic changes that could occur as a result of the oncologic surgery and radiation. To continuously improve their OPS skills, breast surgeons must develop the habit of taking photographs of the patient's breasts before and after surgery to evaluate cosmetic outcomes and patient satisfaction with the cosmesis of the surgery.

It's Not About Turf Wars

Internationally, there is general agreement that the use of OPS techniques has many positive advantages in BCS. The aim is a partnership with plastic surgeons in an integrated model of surgical care delivery. Increasing the skills of breast surgeons in esthetic principles will only improve outcomes for patients with breast cancer. Nevertheless, some controversy about the best team approach persists. Plastic surgeons are pioneers and have undeniable leadership in the field of breast reconstruction using volume-replacement techniques such as autologous flap or prosthetic-based reconstruction. Canadian plastic surgeons have been opposed in principle to the addition of the suffix "plastic" to emerging surgical techniques in a variety of subspecialties. That opposition has created concern and what we believe to be a misunderstanding about the intent of OPS in the BCS milieu, where level 3 OPS has instead *expanded* the role of the plastic surgeon into a novel niche of patient care.

The focus of the present paper is therefore on achieving the optimal esthetic outcome during BCS. The goal of OPS is not to substitute plastic surgeons in Canada with "new" OPS surgeons. Rather, the goal of the OPS mindset is to work collaboratively and amicably with plastic surgeons in an integrated surgical care delivery model for patients with breast cancer. Especially for complex OPS surgeries, we propose that Canadian breast surgeons work collaboratively with their plastic surgery colleagues, break down professional silos, share skills and experiences, and work collaboratively to benefit their patients.

It's About Time: Raising the Bar for Breast Cancer Surgery in Canada

The evidence that poor esthetic outcomes after breast surgery adversely affect quality of life led breast oncologic and plastic surgeons to seek out and refine surgical techniques that would preserve the size, volume, shape, and cosmetic appearance of breasts treated for breast cancer. Through that collaborative approach, oncologic and plastic surgeons in Canada have a significant opportunity to improve the care of their patients with breast cancer. Historically, most surgeons felt that a post-lumpectomy breast deformity or routine mastectomy was a small price to pay for curing breast cancer. With recent advances in modern breast cancer management that allow women to look forward to a long, healthy life after their breast cancer diagnosis, it is more important than ever to offer them a treatment option that preserves their quality of life and their sense of attractiveness and femininity. Oncoplastic surgery techniques allow the surgeon not only to completely excise the disease, but also to maintain or improve cosmesis and often avoid a mastectomy altogether. An OPS approach for breast cancer has been the standard of care in Europe and the United States for more than a decade[12].

It is our position that OPS enhances outcomes for many women with breast cancer and should become part of the standard repertoire of procedures used by Canadian oncologic surgeons treating breast cancer. Application of OPS techniques will allow Canadian patients to achieve an optimal quality of life after breast cancer treatment. We propose that all breast surgeons wishing to remain relevant and prepared to deliver high-quality surgical care for breast cancer must have OPS skills in their surgical armamentarium. In 2018, our Canadian patients deserve nothing less.

CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology*'s policy on disclosing conflicts of interest, and we declare that we have none.

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