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Learning Outcomes Following Sequential Video-Based and Cadaveric Training in Oncoplastic Breast Surgery: A Pre-post Educational Study

Swagata Bramhachari [1], Meena Kumari [1], Padma Bhatia [2], Aryan K. Chilvery [1], Shyam Lal [1], Sheetal Kotgirwar [3], Ankit Jain [4]

1. General Surgery, All India Institute of Medical Sciences Bhopal, Bhopal, IND 2. Community Medicine, Gandhi Medical College, Bhopal, IND 3. Anatomy, All India Institute of Medical Sciences Bhopal, Bhopal, IND 4. Surgical Oncology, All India Institute of Medical Sciences Bhopal, Bhopal, IND

Corresponding author: Meena Kumari, meena.generalsurg@aiimsbhopal.edu.in

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Abstract

Introduction: Oncoplastic breast surgery requires technical skills that are difficult to acquire during conventional postgraduate training. We evaluated learning outcomes after a two-day workshop that sequenced video-based didactic teaching and supervised cadaveric training and described the change observed after each component.

Methods: This single-group pre-post educational study included 46 practicing general surgeons and surgical residents. Cognitive (18 single-best-answer items) and affective (eight five-point Likert items) outcomes were assessed at baseline (T1), after the Day 1 video-based module (T2), and after the Day 2 cadaveric session (T3). Self-reported procedural ability was rated on a 32-item self-assessment instrument before and after the cadaveric session. Paired t-tests or Wilcoxon signed-rank tests and the Friedman test were used. The primary outcome was the change in knowledge score from T1 to T3; all other comparisons were descriptive.

Results: Knowledge scores (primary outcome) increased from 9.72 (SD 3.15) at baseline to 12.13 (SD 2.20) at the end of the program (mean gain 2.41, 95% CI 1.46 to 3.37; $p < 0.001$). Most of this change was observed after the video-based module (1.87, 95% CI 1.25 to 2.49); no significant further change was detected after cadaveric training (0.54, 95% CI −0.33 to 1.41; $p = 0.216$), although a modest gain cannot be excluded. Affective scores increased to a similar extent after both components (4.63 and 4.57 points; $p = 0.921$ for the difference), from 17.28 to 26.48 of 40 overall. Self-reported procedural ability increased after cadaveric training from 67.74 to 74.83 on 128 (mean gain 7.09, 95% CI 5.67 to 8.50; $p < 0.001$). Residents gained more knowledge than practicing surgeons (3.90 versus 1.16 points; $p = 0.004$). Lack of frozen-section services was the most frequently reported barrier to breast conservation (23.9%).

Conclusions: Participation in a two-day sequential video-based and cadaveric oncoplastic breast surgery program was associated with short-term improvement in objective knowledge, confidence, and self-reported procedural ability. Because the design was uncontrolled and the components were delivered in a fixed order, these changes cannot be attributed to either component. Controlled studies with objective skill assessment and delayed follow-up are needed.

Categories: General Surgery, Medical Education, Oncology
Keywords: breast cancer, breast reconstruction surgery, cadaveric simulation, hands-on workshop, surgical education

Introduction

Breast cancer, the leading cancer among women, is managed through a multi-disciplinary approach with surgical management as the primary treatment, which has evolved from mastectomy to breast conservation. Oncoplastic breast surgery incorporates oncologic safety with techniques that improve the cosmetic appearance of the breast and quality of life [1]. The intricacy of these complex procedures requires surgeons to possess advanced technical skills and a thorough understanding of breast anatomy, reconstructive principles, and aesthetic outcomes [2]. However, opportunities to develop such skills during conventional postgraduate surgical training are often limited due to limited operating exposure and patient safety concerns [3]. This can be overcome by live operative demonstration, instructional videos, and surgical simulation using computer-based simulations and animal and cadaveric labs [4, 5].

Structured cadaveric and simulation-based training bridges the gap between theory and operative skills [6, 7]. Hands-on cadaveric training offers a realistic and risk-free learning environment that enables trainees to understand three-dimensional anatomy and refine complex operative techniques with confidence [3, 5].

Unlike virtual or silicone models, hands-on cadaveric dissection provides realistic tissue handling and tactile feedback and an in-depth understanding of the spatial relationships between anatomical features, closely

approximating real-time intraoperative settings [5].

As such, integrating hands-on cadaveric training into higher surgical training programs is desirable for preparing young breast surgeons to deliver high-quality care to patients with breast cancer [5]. Simulation-based training may also offer opportunities to develop non-technical skills such as teamwork. It will also help trainees cultivate qualities such as adaptability, teamwork, and professionalism [3, 5].

Adoption of breast conservation and oncoplastic surgery in India remains limited, and structured training opportunities are scarce [8, 9]. Despite the growing incorporation of simulation-based training across surgical disciplines, supported by reviews of simulation-based education, evidence on the role and effectiveness of hands-on cadaveric training in oncoplastic breast surgery remains limited in India [10-12].

Video-based instruction is a complementary, low-cost, and reproducible modality. Curated operative videos with expert narration can convey procedural steps, anatomical relationships, and decision-making and have been used to supplement cadaveric teaching [13]. Systematic reviews report improvement in knowledge or skill after video-based surgical education in most included studies [14, 15]. However, how video-based and cadaveric teaching contribute when delivered in sequence within a single program, and which learning domains each influences, have not been examined in oncoplastic breast surgery.

With an emphasis on change in the cognitive, psychomotor, and affective domains of surgical education, this study describes the short-term learning outcomes associated with a two-day blended training program in oncoplastic breast surgery.

The primary objective was to measure the change in objective knowledge, assessed with an 18-item single-best-answer test, from baseline (T1) to the end of the program (T3). We hypothesized that the mean knowledge score at T3 would be higher than at T1. The secondary objectives, all descriptive, were to (i) describe change in affective scores (confidence, perceived readiness, and attitude) across T1, T2, and T3; (ii) describe change in self-reported procedural ability between T2 and T3; (iii) describe the change observed after each component (T1 to T2 and T2 to T3) within the fixed sequence, recognizing that this sequence precludes attribution to, or comparison of, either component; (iv) assess participant satisfaction and perceived educational value; and (v) explore barriers to, and receptiveness toward, adopting oncoplastic breast surgery in routine practice.

Materials And Methods

Study design and setting

A single-group pre-post educational study was conducted during a two-day Indian Council of Medical Research (ICMR)-funded oncoplastic breast surgery workshop, organized as part of a higher surgical education program. The workshop was jointly conducted by the Departments of General Surgery and Anatomy at All India Institute of Medical Sciences (AIIMS), a tertiary care teaching hospital in Bhopal, Madhya Pradesh, India.

Participants and eligibility

All participants who registered for the cadaveric workshop on oncoplastic breast surgery and completed the assessment questionnaires at all three time points were included in the study. Forty-six participants comprising practicing general surgeons and surgical residents were included in the study. All 46 registered participants attended both days and completed all three assessments; none were excluded.

Ethical considerations

The study involved analysis of anonymized educational assessment data collected during a training program. Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Confidentiality was maintained throughout the study, and the study was approved by the institutional ethical committee prior to data analysis.

Sample size and sampling technique

As this was an educational intervention conducted during a cadaveric workshop, formal sample size calculation was not performed. Convenience sampling was employed, and all eligible participants meeting the inclusion criteria and completing the required assessments (n=46) were enrolled in the study. With 46 paired observations, the study had 80% power at a two-sided alpha of 0.05 to detect a paired standardized effect (dz) of approximately 0.42; smaller effects could not be reliably detected.

Methodology

A two-day oncoplastic breast surgery workshop, comprising a video-based didactic module on Day 1 and a supervised hands-on cadaveric training session on Day 2, was conducted. The questionnaire collected socio-demographic data and assessed baseline knowledge, skills, and attitudes regarding oncoplastic breast

surgery.

Educational interventions

Day 1: Video-Based Didactic Module

The educational intervention consisted of planned video-based lectures presented by expert faculty in oncoplastic breast surgery. Breast anatomy, fundamental oncologic principles, oncoplastic concepts, flap design, volume displacement techniques, and reconstructive concerns were the main topics of discussion. Teaching was delivered using curated operative videos accompanied by expert narration and interactive discussions. This component primarily targeted the cognitive domain of learning. Day 1 comprised seven contact hours, consisting of curated operative videos with expert narration (30 minutes each), didactic lectures of 15 minutes, and moderated panel discussions of 45 minutes. The operative videos were recordings of the faculty's own cases, recorded with patient consent.

Day 2: Cadaveric Hands-On Training

The Day 2 intervention involved supervised, hands-on cadaveric training in a dissection hall in the Department of Anatomy. The session lasted five hours. Planning and skin incision marking were first performed on a silicone model, and the same plan was then executed on the cadavers. Participants practiced oncoplastic breast surgery techniques in small groups on five formalin-fixed female cadavers (nine participants at each of four tables and ten at the fifth) under the direct supervision of 10 faculty members (faculty-to-participant ratio approximately 1:5), with approximately 60 minutes of hands-on time per participant. The techniques performed were round-block, batwing, Grisotti, Wise-pattern therapeutic mammoplasty, and chest-wall perforator flaps. Emphasis was given to the identification of anatomical landmarks, incision placement, tissue handling, flap mobilization, closure techniques, and oncologic considerations.

Development and validation of the questionnaire

The study team developed the assessment questionnaires based on the workshop objectives and relevant literature. The instruments comprised an 18-item knowledge test, an eight-item affective scale, and a 32-item self-assessment of procedural ability (Appendices). Five subject experts (one from general surgery, two from surgical oncology, and two from plastic surgery) independently reviewed the items for relevance, clarity, comprehensibility, and appropriateness. The team revised the instruments in response to their comments before administering them to participants. A content validity index was not calculated.

Assessment tools and outcome measures

Educational outcomes were assessed with structured questionnaires administered at three sequential time points. A baseline assessment (T1) was done before the video-based module. A second assessment (T2) was administered at the end of Day 1, which was used both as the post-intervention measure for the video module and as the pre-intervention baseline for the cadaveric session. No separate Day 2 pretest was administered. A final assessment (T3) was done after the cadaveric session. Cognitive and affective outcomes were assessed at all three sequential time points (T1, T2, and T3) using identical items. The identical questionnaire, with items in the same order, was administered at each time point as a Google Form (Google Inc., Mountain View, CA, USA) accessed through a QR code in the hall, and was completed individually under faculty invigilation, with 30 minutes allowed for each assessment. No answers, scores, or item-level feedback were given between assessments, and the answer key was not discussed until after T3. Psychomotor outcomes were assessed by participant self-rating at T2 and T3 only. The T2 assessment, obtained after completion of the video-based teaching and immediately before cadaveric training, served as the pre-cadaveric baseline, while T3, administered after cadaveric training, represented the post-cadaveric assessment.

Cognitive performance was assessed using 18 single-best-answer items scored as correct (one) or incorrect (zero), yielding a maximum score of 18 for each assessment.

Affective outcomes were assessed using eight participant-rated items covering confidence and self-efficacy, perceived readiness and comfort, and attitudes toward cadaveric training. Each item used a five-point Likert scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Item scores were summed to generate an affective total ranging from 8 to 40, with higher scores indicating more favorable confidence/readiness and attitudes. Self-reported procedural ability was assessed using a 32-item participant self-assessment instrument grouped into incision placement, tissue handling, flap mobilization, closure technique, and other technical/oncological skills. Each item was rated from 0=unable to perform, 1=requires complete guidance, 2=can perform with considerable assistance, 3=can perform with minimal assistance, to 4=can perform independently. The summed procedural score ranged from 0 to 128, with higher scores indicating greater self-perceived procedural ability. This instrument measured perceived capability rather than objectively observed technical competence.

Participant characteristics, previous exposure to oncoplastic breast surgery, perceived barriers to breast conservation, willingness to undertake cadaveric training, and post-workshop feedback were also collected. Feedback responses used a five-point scale from strongly disagree (-2) to strongly agree (+2). The flowchart of this study is shown in Figure *1*.

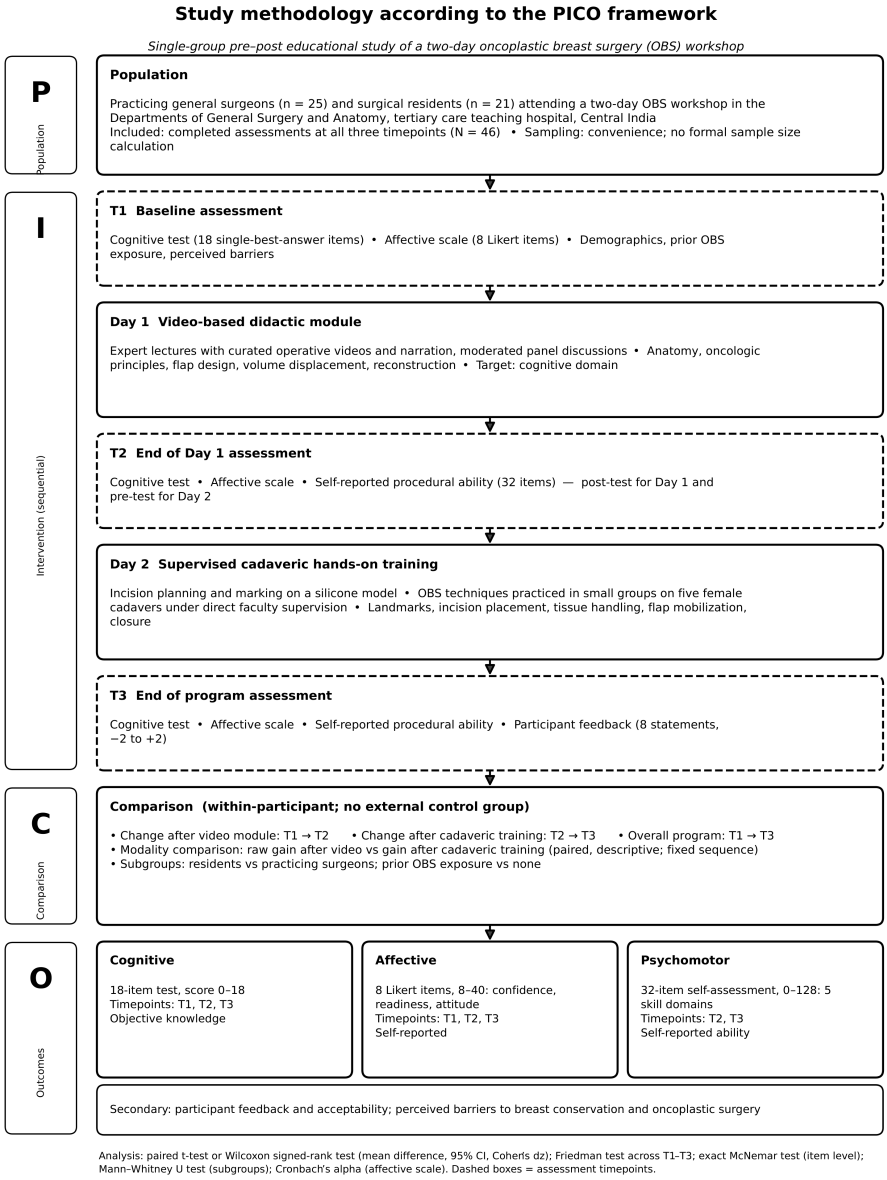


FIGURE 1: Flowchart of the study

PICO: Population, Intervention, Control, and Outcomes; OBS: oncoplastic breast surgery

Statistical analysis

Data were entered into Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and analyzed using R software (The R Core Team, R Foundation for Statistical Computing, Vienna, Austria). Continuous variables were summarized as mean (standard deviation), and categorical variables as frequency and percentage. The primary analysis was the comparison of knowledge scores between T1 and T3; all other comparisons were secondary and descriptive. The distribution of paired differences was assessed with the Shapiro-Wilk test; paired comparisons used the paired t-test where that distribution was approximately normal and the Wilcoxon signed-rank test otherwise, with both reported where they diverged. Mean differences are given with 95% CIs, and effect sizes are Cohen's dz or the matched-pairs rank-biserial correlation. Change across the three sequential timepoints was examined with the Friedman test. Internal consistency of the affective scale at each timepoint was estimated with Cronbach's alpha. Item-level change in the cognitive test was assessed with the exact McNemar test. The change observed after each stage was described using raw score

gain, defined as the change in points between consecutive time points (T1 to T2 after the video module and T2 to T3 after cadaveric training). As a secondary, descriptive analysis, the two stage-wise gains were compared with a paired test to show whether change in each domain was spread evenly across the program or concentrated in one stage. Because the components were delivered in a fixed order without a control group, and the knowledge test was aligned with the Day 1 curriculum, this comparison cannot separate the contribution of each component from the effects of sequence, repeated testing, and test content; it therefore does not estimate the relative effectiveness of either modality and is not interpreted as evidence that one is superior. Raw score change was used in preference to normalized gain because it is directly interpretable on the original assessment scale and avoids instability associated with normalized gain when baseline scores approach the maximum attainable score. Subgroup comparisons by training grade and prior oncoplastic breast surgery exposure used the Mann-Whitney U test. A two-sided p-value below 0.05 was considered significant. No adjustment was made for multiple comparisons; sub-domain and item-level analyses are therefore exploratory and should be interpreted as hypothesis-generating rather than confirmatory.

Results

Participant characteristics

All 46 participants had paired educational assessment data. Twenty-nine (63.0%) were men and 17 (37.0%) were women. Twenty-five (54.3%) were general surgeons and 21 (45.7%) were surgical residents. Thirty-four (73.9%) practiced in government medical colleges. Thirty-one participants (67.4%) reported no prior exposure to oncoplastic breast surgery, although 41 (89.1%) were familiar with the concepts of breast conservation and oncoplastic reconstruction. Forty-four (95.7%) expressed interest in cadaveric training opportunities, and the same proportion reported willingness to perform oncoplastic procedures if trained (Table *1*).

Characteristic	n (%)
Male sex	29 (63.0)
Female sex	17 (37.0)
General surgeon	25 (54.3)
Surgical resident	21 (45.7)
Government medical college practice	34 (73.9)
Private medical college practice	12 (26.1)
No prior exposure to oncoplastic breast surgery	31 (67.4)
Familiar with breast conservation/oncoplastic concepts	41 (89.1)
Interested in cadaveric oncoplasty training	44 (95.7)
Willing to perform oncoplastic procedures if trained	44 (95.7)

TABLE 1: Baseline characteristics of participants (N=46)

Cognitive domain

Knowledge scores, the primary outcome, increased from 9.72 (SD 3.15) at baseline to 12.13 (SD 2.20) at the end of the program, a mean gain of 2.41 points (95% CI 1.46-3.37; $p < 0.001$; $dz = 0.75$), corresponding to an increase in mean accuracy from 54.0% to 67.4%. Scores changed significantly across the three time points (Friedman $\chi^2 = 25.64$, $p < 0.001$), and most of this change was observed after the video-based module. Mean scores increased from 9.72 (SD 3.15) at baseline to 11.59 (SD 2.50) after the video module, an improvement of 1.87 points (95% CI 1.25-2.49; $p<0.001$; $dz=0.89$). After cadaveric training, scores increased from 11.59 to 12.13 (SD 2.20). This additional change of 0.54 points was not statistically significant (95% CI −0.33 to 1.41; $p = 0.216$; $dz = 0.19$); the interval is compatible with no change but also with a gain of up to about 1.4 points.

Item-level analysis showed that improvement varied across topics. Eight items improved significantly from baseline to the end of the program. The largest improvements were seen in knowledge of level I oncoplasty volume thresholds (32.6% to 76.1%; $p < 0.001$), indications for sentinel lymph node biopsy (26.1% to 76.1%; $p < 0.001$), reconstruction after mastectomy in patients requiring radiotherapy (34.8% to 65.2%; $p = 0.013$), nipple-areola complex reconstruction in an irradiated reconstructed breast (28.3% to 63.0%; $p = 0.002$), and identification of oncoplastic breast surgical techniques (41.3% to 71.7%; $p = 0.009$). Performance decreased significantly for two items: general considerations for oncoplasty (84.8% to 65.2%; $p = 0.012$) and

identification of the batwing technique (84.8% to 60.9%; p = 0.027). Both items had relatively high baseline scores (Table 2).

Comparison	Score, mean (SD)	Score, mean (SD)	Mean difference (95% CI)	p-value	dz
T1 baseline → T2 after video module	9.72 (3.15)	11.59 (2.50)	1.87 (1.25 to 2.49)	<0.001	0.89
T2 after video → T3 after cadaveric training	11.59 (2.50)	12.13 (2.20)	0.54 (-0.33 to 1.41)	0.216	0.19
T1 baseline → T3 end of program	9.72 (3.15)	12.13 (2.20)	2.41 (1.46 to 3.37)	<0.001	0.75

TABLE 2: Cognitive domain scores across three sequential timepoints (18 single-best-answer items, range 0-18; n = 46).

dz, Cohen's effect size for paired data; Wilcoxon signed-rank testing gave the same conclusions throughout.

Affective domain

Affective scores improved significantly after both stages. The total score rose from 17.28 (SD 6.02) at baseline to 21.91 (SD 4.26) after the video module (difference 4.63, 95% CI 3.66 to 5.60; p < 0.001; dz = 1.42) and to 26.48 (SD 3.39) after cadaveric training (difference 4.57, 95% CI 3.54 to 5.60; p < 0.001; dz = 1.32), an overall gain of 9.20 points (95% CI 7.69 to 10.70; p < 0.001; dz = 1.81), the largest effect observed in the study. All three sub-domains improved at both stages (Table 3). Perceived readiness and comfort showed the greatest incremental gain after cadaveric training, rising by 2.52 points on a 12-point range (95% CI 1.86 to 3.19; p < 0.001), whereas attitude toward cadaveric training improved most after the video module, by 2.15 points on an 8-point range (95% CI 1.64 to 2.66; p < 0.001) before participants had any cadaveric exposure. Cronbach's alpha of the eight-item scale was 0.91 at baseline, 0.79 after the video module, and 0.62 after cadaveric training; the lower value at T3 is consistent with compressed score variance as responses approached the upper end of the scale (Table 3).

Sub-domain (range)	T1 mean (SD)	T2 mean (SD)	T3 mean (SD)	T1→T2 diff (p)	T2→T3 diff (p)	T1→T3 diff (p)
Confidence and self-efficacy (3-15)	6.70 (2.28)	7.93 (1.78)	9.04 (1.84)	1.24 (<0.001)	1.11 (<0.001)	2.35 (<0.001)
Perceived readiness and comfort (3-15)	6.22 (2.36)	7.46 (2.08)	9.98 (1.60)	1.24 (<0.001)	2.52 (<0.001)	3.76 (<0.001)
Attitude to cadaveric training (2-10)	4.37 (1.76)	6.52 (1.15)	7.46 (1.00)	2.15 (<0.001)	0.93 (<0.001)	3.09 (<0.001)
Total affective score (8-40)	17.28 (6.02)	21.91 (4.26)	26.48 (3.39)	4.63 (<0.001)	4.57 (<0.001)	9.20 (<0.001)

TABLE 3: Affective domain scores across three sequential timepoints (eight five-point Likert items; n = 46).

T1, baseline; T2, after video-based module; T3, after cadaveric training; all comparisons significant by both paired t-test and Wilcoxon signed-rank test.

Psychomotor domain

Total self-reported psychomotor scores (procedural ability) improved from 67.74 (SD 18.39) to 74.83 (SD 19.61), a mean gain of 7.09 points (95% CI 5.67 to 8.50; p < 0.001; dz = 1.49). All five skill domains improved significantly (Table 4), the largest absolute gain being in incision placement (1.83 points, 95% CI 1.32 to 2.33; p < 0.001) and the smallest in tissue handling (1.11 points, 95% CI 0.71 to 1.51; p < 0.001). Every participant's total score rose, although change was not uniform at the level of individual domains or items: six participants declined in at least one domain, and 63 of 1,472 item ratings (4.3%) fell between the two assessments, most often in closure technique (Table 4).

Skill domain (range)	Pre, mean (SD)	Post, mean (SD)	Mean difference (95% CI)	p-value	dz
Incision placement (0-28)	16.63 (3.70)	18.46 (3.76)	1.83 (1.32 to 2.33)	<0.001	1.08
Tissue handling (0-20)	11.30 (3.22)	12.41 (3.17)	1.11 (0.71 to 1.51)	<0.001	0.83
Flap mobilization (0-24)	11.35 (4.13)	12.76 (4.82)	1.41 (0.91 to 1.92)	<0.001	0.83
Closure technique (0-24)	11.57 (4.20)	12.76 (4.16)	1.20 (0.67 to 1.72)	<0.001	0.67
Other technical and oncological skills (0-32)	16.89 (4.26)	18.43 (4.66)	1.54 (1.06 to 2.02)	<0.001	0.96
Total psychomotor score (0-128)	67.74 (18.39)	74.83 (19.61)	7.09 (5.67 to 8.50)	<0.001	1.49

TABLE 4: Self-reported psychomotor (procedural ability) scores before and after supervised cadaveric hands-on training.

32-item participant self-assessment instrument, each item anchored 0 = unable to perform to 4 = can perform independently; n = 46); p-values from the Wilcoxon signed-rank test; 95% CIs from the paired t distribution; dz shown for reference.

Change observed after each component (descriptive)

As the two components were delivered in a fixed sequence, the change after each is described separately, without attributing the observed effects to either component. The mean cognitive gain observed after the video module (T1 to T2) was 1.87 points (SD 2.09), compared with 0.54 points (SD 2.93) after cadaveric training (T2 to T3); the gain after the first stage exceeded that after the second by 1.33 points (95% CI 0.15 to 2.50; unadjusted p = 0.028). This difference describes when the cognitive change occurred within the fixed sequence and is not evidence that video-based teaching is superior to cadaveric training, because the order of delivery, a testing effect at the first re-exposure, and the alignment of the test with the Day 1 curriculum may each have contributed to it. In the affective domain, gains were similar after the two stages: 4.63 points (SD 3.26) after the video module and 4.57 points (SD 3.47) after cadaveric training (mean difference 0.07 points, 95% CI −1.25 to 1.38; p = 0.921) (Table *5*).

Domain	T1→T2 (after video module), mean gain (SD)	T2→T3 (after cadaveric training), mean gain (SD)	Difference between stage-wise gains (95%CI)	p-value
Cognitive	1.87 (2.09)	0.54(2.93)	1.33(0.15to2.50)	0.028
Affective	4.63 (3.26)	4.57(3.47)	0.07(−1.25to1.38)	0.921

TABLE 5: Raw score change after each stage of the fixed sequence (descriptive; n = 46).

P-values are unadjusted and do not indicate the superiority of either modality.

Subgroup analysis

Surgical residents gained substantially more than practicing general surgeons in the cognitive domain, with a mean gain across the program of 3.90 points (SD 3.16) against 1.16 points (SD 2.72) (p = 0.004). Residents had lower baseline knowledge scores than practicing surgeons (7.52 (SD 2.62) versus 11.56 (SD 2.27); p < 0.001), and their scores at the end of the program remained lower (11.43 (SD 2.29) versus 12.72 (SD 1.97); p = 0.037). Self-reported psychomotor gain, by contrast, was similar in the two groups at 7.76 points (SD 4.87) among residents and 6.52 points (SD 4.68) among practicing surgeons (p = 0.347). Prior exposure to oncoplastic surgery did not predict cognitive gain, which was 1.80 points (SD 3.03) in those with prior exposure and 2.71 points (SD 3.30) in those without (p = 0.451).

Barriers or receptiveness

At baseline, 36 participants (78.3%) reported reservations regarding breast conservation or oncoplastic reconstruction. The most frequently selected participant-perceived barrier was lack of frozen-section services for margin assessment (11/46, 23.9%), followed by lack of familiarity with oncoplastic techniques (9/46, 19.6%) and limited training opportunities/exposure during residency or fellowship (7/46, 15.2%) (Figure *2*).

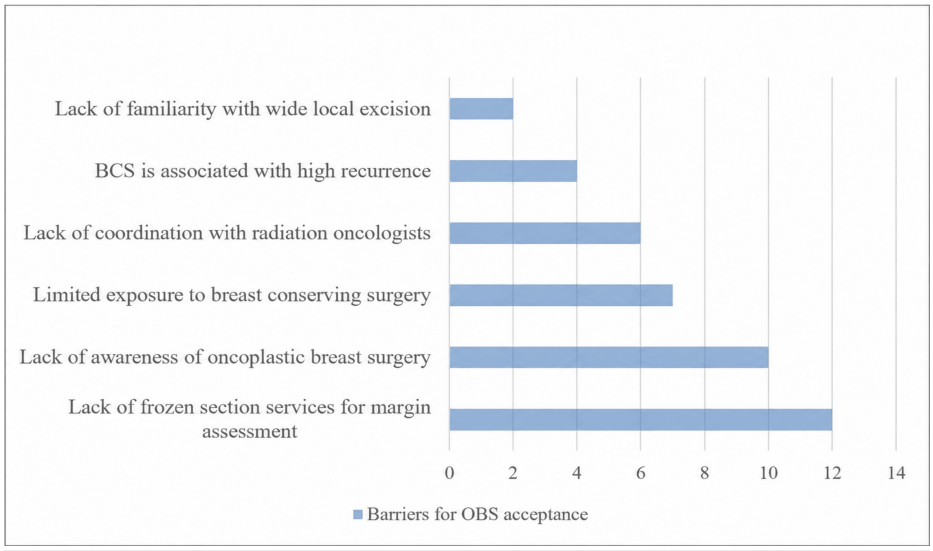


FIGURE 2: Participant-perceived barriers to breast conservation and oncoplastic reconstruction at baseline (n = 46)

BCS, breast-conserving surgery; OBS, oncoplastic breast surgery

Participant feedback

Responses were received for all eight feedback statements, with no missing data (Table *6*), and agreement was high for statements on the educational value of the program. Agreement was highest for the principle that resection and reconstruction should be planned by a multidisciplinary panel and that patients should be informed of reconstruction options, each endorsed by 44 of 46 participants (95.7%). Forty-three participants (93.5%) agreed that adequate oncological resection is the first priority in reconstructive breast surgery and, equally, that the lectures, videos, panel discussions, and workshop enhanced overall learning. Forty-two (91.3%) agreed that selected level I and level II oncoplastic procedures can be performed by breast or onco-surgeons where plastic surgery backup is unavailable. The lowest level of agreement, at 35 participants (76.1%), was for holding regular accredited oncoplastic workshops (Table *6*).

Feedback statement	Mean (SD)	Agree or strongly agree, n (%)
Adequate oncological resection is the first priority in reconstructive breast surgery	+1.67 (0.73)	43 (93.5)
Patients should be informed about breast reconstruction options	+1.67 (0.63)	44 (95.7)
Resection and reconstruction should be planned by a multidisciplinary panel	+1.74 (0.53)	44 (95.7)
Selected level I and II OBS can be performed by breast or onco-surgeons without plastic surgery backup	+1.63 (0.71)	42 (91.3)
Although attractive, OBS is less practical in the central Indian population	+1.11 (1.08)	39 (84.8)
CMEs and workshops on OBS should be held regularly by an accredited body	+0.96 (1.01)	35 (76.1)
The lectures, videos, panel discussions and workshop enhanced my learning	+1.70 (0.66)	43 (93.5)
The CME and workshop enhanced my understanding of reconstructive options	+1.39 (0.88)	42 (91.3)

TABLE 6: Participant feedback after the two-day program (n = 46).

Likert Score from -2 (strongly disagree) to +2 (strongly agree); OBS, oncoplastic breast surgery; CME, continuing medical education.

Discussion

Participation in this two-day oncoplastic breast surgery workshop was associated with short-term improvement in objective knowledge, confidence, and self-reported procedural ability. Within the fixed sequence, most of the observed cognitive change occurred after the video-based component. No statistically significant additional cognitive gain was detected after cadaveric training (0.54 points; 95% CI −0.33 to 1.41); this interval is compatible with no change but also with a gain of up to about 1.4 points, approximately 8% of the test range, so a cognitive contribution of the cadaveric session cannot be excluded. Self-reported procedural ability increased after the hands-on session, and affective scores rose by a similar amount after each stage. Our knowledge is among the first evaluations of a noncoplastic workshop to measure all three domains at three sequential time points and thereby describe the change observed after each component rather than only for the program as a whole.

This stage-wise pattern should be read as an observation within a fixed sequence rather than as a difference between teaching modalities. It may reflect the order of delivery, a testing effect at the first re-exposure, or the closer alignment of the knowledge test with the Day 1 curriculum, rather than a property of either method. The cadaveric session was associated with an increase in self-reported procedural ability and with the largest affective sub-domain gain observed after that session: perceived readiness and comfort rose by 2.52 of a possible 12 points after hands-on training against 1.24 after videoteaching, even though total affective gain was similar for the two stages. Because cadaveric laboratory time is expensive, capacity-limited, and dependent on a body donation program, whereas curated operative video is inexpensive and reproducible, whether a sequence in which video teaching front-loads conceptual knowledge allows cadaveric time to be used more efficiently is a hypothesis that should be tested in controlled, ideally randomized, studies. The most consistent criticism of the cadaver simulation literature is that it often evaluates reaction rather than learning. In a systematic review of 51 studies, 22 assessed impact using subjective measures alone, only five measured change in learner knowledge, and a single study examined patient outcome [10]. Measured against the Kirkpatrick hierarchy [16], only the cognitive outcome of the present study is an objective Level 2 measure; the affective and procedural outcomes were self-reported, and the procedural score reflects perceived procedural ability rather than objectively observed technical competence. That review concluded that cadaveric simulation induces short-term skill acquisition when measured objectively [10], and cadaveric and hands-on oncoplastic courses have been reported to support learning in other settings [6, 7]. The increase in self-reported ability observed here (dz=1.49) is directionally consistent with that evidence but cannot confirm objective skill acquisition. Psychomotor skill generally requires a longer learning curve than knowledge acquisition, and a single supervised session would not be expected to produce durable technical competence.

Our cognitive findings align with systematic reviews showing that video-based surgical education is associated with significant gains in knowledge or skill in the majority of studies [14, 15] and with a randomized trial reporting higher learning gain with video-based instruction than with conventional operating room teaching [17]. One caution applies specifically to the stage-wise comparison. Because the same instrument was administered three times, any testing effect would be largest at the first re-exposure, which is precisely the T1-to-T2 interval where our positive finding lies. Repeated testing would therefore tend to inflate the change observed after the first stage, so the 1.33-point difference between the stage-wise gains may overstate any true difference. In addition, the 18-item test sampled content taught during the Day 1 didactic session, so the instrument was better aligned with the video module than with the hands-on session, and the cognitive comparison should be read as descriptive. The two cognitive items that deteriorated over the program merit comment. Both concerned material on which participants already scored above 84% at baseline, and both required discrimination between visually similar techniques. Post-course decline on high-baseline items is a recognized consequence of introducing competing technical vocabulary in a short, intensive program: teaching that adds nuance can unsettle an answer that was previously given confidently on pattern recognition alone. An alternative reading is that these two items are simply unreliable, and we cannot exclude it from these data; the keyed answers warrant re-examination by the expert panel before the instrument is reused. Either way, the finding argues for reinforcement of this content rather than its removal.

The affective results deserve interpretation beyond confidence for their own sake. Adoption of oncoplastic surgery in Indian practice is constrained less by equipment than by surgeon willingness to attempt volume displacement, where mastectomy is the familiar default and late presentation is common [2]. Our baseline data show this concretely: 78.3% of participants held reservations about breast conservation and oncoplastic reconstruction, and the reasons they gave were predominantly systemic and educational rather than oncological, headed by absent frozen section services and unfamiliarity with the techniques themselves.

Capacity-building programs in the subcontinent have reported that increased surgeon confidence translated into a substantial shift towards breast conservation in subsequent practice [5]. Confidence gained in such programs may therefore lie on the path to changed practice, although the present design cannot demonstrate that link.

That residents gained more than three times as much knowledge (3.90 versus 1.16 points) as practicing surgeons, while the two groups reported similar gains in procedural ability, is worth noting for participant selection. Practicing surgeons began with substantially higher knowledge scores (11.56 versus 7.52 of 18; $p < 0.001$) and had less room to improve, so a ceiling effect, together with regression to the mean, may account for part of this difference. The absence of any graded difference in self-reported psychomotor gain is the more interesting result: self-reported gains after cadaveric training were similar in established surgeons and trainees, suggesting that such places need not be restricted to trainees. This is consistent with international reviews of oncoplastic training that describe structured, graded curricula [1, 4]. Indian competency-based postgraduate surgical training could be strengthened by structured, assessable oncoplastic modules of this kind. A two-day format built around five cadavers and a silicon model is reproducible at any center with an anatomy department and a body donation program, a practical advantage over fellowship-based models that cannot readily scale to national need. Consultants and residents were analyzed together in the primary results because the workshop was delivered to them jointly and the intervention was identical for both; the subgroup analysis above examines whether that pooling conceals a differential response and finds a difference only in the cognitive domain. Nonetheless, the two groups differ in experience, and future studies should stratify or analyze them separately.

Strengths and limitations

The strengths of this study include its multidomain evaluation of a single educational program using paired assessments rather than satisfaction data alone; measurement at three time points, which allows the change after each stage to be described; reporting of confidence intervals and effect sizes alongside p-values, with agreement between parametric and non-parametric tests; and complete paired data for all analyzed participants. However, several limitations remain. This was a single-center study using convenience sampling without a control group, and the modest sample included participants with heterogeneous prior surgical experience. No formal sample size calculation was performed; the study could reliably detect only moderate or larger paired effects (dz of approximately 0.42 or more), so smaller changes, including any cognitive change after cadaveric training, may have been missed. Content validation of the instruments relied on expert review without a content validity index. Most importantly, procedural outcomes were based on participant self-assessment rather than independent faculty-rated performance using an objective structured technical assessment; therefore, improvement represents increased perceived procedural ability and cannot establish acquisition of operative competence. Self-ratings are susceptible to response-shift, social-desirability, and courtesy bias, particularly immediately after a faculty-led workshop. Immediate post-training testing may overestimate durable learning, and the study did not evaluate long-term retention, transfer to supervised clinical procedures, independent operative performance, or patient outcomes. Because video teaching preceded cadaveric training, the incremental cognitive gains of the two stages cannot be interpreted as a randomized head-to-head comparison.

Implications for training and future research

Whether a staged pathway, in which video-based modules for pre-course knowledge acquisition are followed by focused cadaveric stations for procedural rehearsal, improves learning or resource use is a hypothesis for future controlled evaluation. Future studies should replace or complement self-assessment with standardized faculty-rated objective-structured assessment of technical skills, report inter-rater reliability, include delayed reassessment, and incorporate supervised workplace-based measures.

Conclusions

A two-day blended oncoplastic breast surgery program combining video-based teaching with supervised cadaveric simulation was associated with significant short-term improvement in objective knowledge, confidence and perceived readiness, and self-reported procedural ability. Within the fixed sequence, most of the knowledge change was observed after the first (video-based) stage, and self-reported procedural ability and perceived readiness rose after the second (cadaveric) stage; because the design was uncontrolled, these changes cannot be attributed to either component. These findings suggest that video-based and cadaveric teaching may serve complementary educational roles and support further evaluation of a staged training model in which foundational knowledge is established before supervised hands-on training. However, because procedural outcomes were self-reported, the present study does not demonstrate objective technical competence or transfer to operative practice. Future controlled studies using independent objective skill assessment, delayed retention testing, and workplace-based evaluation are needed to determine whether these short-term educational gains translate into sustained clinical performance.

Appendices

Oncoplastic breast surgery workshop questionnaire

Participant ID: _____ Date: _____

Assessment timepoint: □ T1 Before video teaching □ T2 After video teaching / before cadaveric training □ T3 After cadaveric training

Demographic and practice information was administered at T1. The same cognitive and affective items were administered at T1, T2, and T3. The self-reported procedural ability scale was administered at T2 and T3.

A. Demographic and practice information

Select one answer.

1. Gender

□ Male

□ Female

2. Type of Surgeon

□ General Surgeon

□ Surgical Resident

3. How long have you been practising breast oncology?

□ 0-3 years

□ 3-6 years

□ 7-10 years

□ >10 years

4. Place of practice

□ Government Medical Institute

□ Private Medical Institute

5. Do you have prior exposure to oncoplasty breast surgery?

□ Yes

□ No

6. On average, how many breast cancer patients do you deal with in a month?

□ 1-5

□ 5-10

□ >10

7. Are you familiar with concepts of breast conservation surgery and oncoplastic breast reconstruction in breast cancer?

□ Yes

□ No

8. Do you have previous video-based training experience

□ Yes

□ No

9. Do you have any reservations against breast conservation surgery and oncoplastic breast reconstruction?

□ Yes

□ No

10. What are the reasons for your reservation against breast conservation surgery?

□ Breast conservation surgery is associated with higher risk of recurrence and treatment failure

□ Lack of familiarity or confidence to perform wide local excision

□ Lack of frozen section services for margin assessment in your institute

□ Lack of familiarity with oncoplastic breast surgical techniques

□ Absence of plastic surgeon facilities

□ Lack of coordination with radiation oncologists, leading to delay in irradiation

□ Lack of training opportunities and limited exposure to breast conservation surgery during surgical residency/fellowship

11. What surgery would you perform in early breast carcinoma?

□ Wide local excision of tumor alone

□ Modified radical mastectomy alone

□ Wide local excision of tumor with breast reconstruction

□ Modified radical mastectomy with breast reconstruction

12. How do you prefer to address the excision cavity after performing wide local excision of breast tumor?

□ Leave the cavity and close the skin to form a seroma

□ Close the cavity by opposing the cavity walls

□ Utilize oncoplastic procedures to close the cavity and create an aesthetic breast mound

13. If you had cadaveric training opportunities in breast oncoplastic surgeries, would you like to opt for it?

□ Yes

□ No

14. Are you willing to perform oncoplastic procedures if trained?

□ Yes

□ No

15. Are you confident in identifying indications of breast conservation surgery?

□ Agree

□ Neutral

□ Disagree

B. Cognitive knowledge

· Administered the same 18 items at T1, T2, and T3.

· Select one answer per item.

1. Who is considered the father of oncoplastic surgery?

□ A. Audretsch

□ B. William Stewart Halsted

□ C. Joseph Matthews

□ D. Reybard

2. All are true in the context of oncoplastic breast surgery except

□ A. It stresses the importance of achieving the best possible aesthetic result in the context of resecting the tumor with adequate oncological margins

□ B. The goal is to retain as much of the natural size and contour of the breast

□ C. When oncoplastic breast surgery techniques are considered, it is the absolute breast volume that will be resected that is important

□ D. None of the above

3. Which of the following is a consideration for oncoplasty?

□ A. A significant area of skin to be removed with the tumor

□ B. A large volume resection is to be expected

□ C. The tumor is in an area associated with poor cosmetic outcomes

□ D. All above are indications

4. Which is the single most important factor predicting the potential for breast deformity after oncoplastic techniques?

□ A. Excision volume

□ B. Tumour size

□ C. Postoperative radiotherapy

□ D. Location of tumour in the breast

5. Over how much resection of breast volume will there be a clear risk of deformity?

□ A. 15%

□ B. 20%

□ C. 30%

□ D. 10%

6. Identify

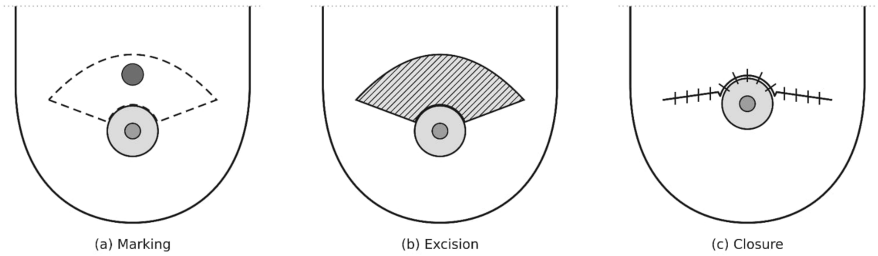


FIGURE 3: Question 6

This schematic illustration was created by the authors with code generated by Claude (Anthropic, San Francisco, CA; model Claude Opus 5.5). This illustration has been verified for scientific integrity by the authors.

□ A. Batwing

□ B. Periareolar

□ C. Grissotti

□ D. Benelli

7. Batwing will be preferred in which of the following

□ A. Upper outer quadrant

□ B. Upper inner quadrant

□ C. Lower outer quadrant

□ D. Lower inner quadrant

8. Identify

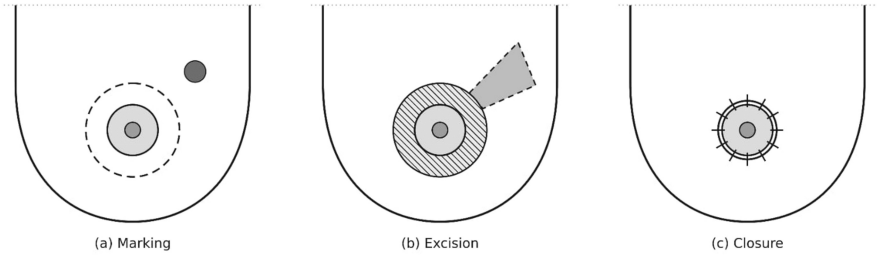


FIGURE 4: Question 8

This schematic illustration was created by the authors with code generated by Claude (Anthropic, San Francisco, CA; model Claude Opus 5.5). This illustration has been verified for scientific integrity by the authors.

□ A. Round block

□ B. Benelli

□ C. Batwing

□ D. Hemi batwing

9. Which is the wrong plane for placement of immediate breast implants after nipple sparing mastectomy

□ A. Subpectoral

□ B. Prepectoral

□ C. Dual plane

□ D. Subglandular

10. Breast implants can be put after which of the following procedures?

□ A. Nipple-sparing mastectomy

□ B. Skin-sparing mastectomy

□ C. Modified radical mastectomy

□ D. All of the above

11. Among the following, who is not an appropriate candidate for skin-sparing mastectomy?

□ A. Solitary, 3 cm x 2 cm tumor in upper outer quadrant of breast (cT2N0M0)

□ B. Solitary, 4 cm x 3 cm tumor in lower outer quadrant of breast with axillary LN (cT2N1M0)

□ C. Invasive ductal carcinoma with extensive DCIS

□ D. 4 cm x 3 cm invasive carcinoma with overlying skin involvement

12. Which of the following is false about nipple-sparing mastectomy?

□ A. Provides superior aesthetic results due to preservation of nipple

□ B. Associated with risk of nipple necrosis

□ C. Nipple-sparing mastectomy is equivalent to conventional mastectomy in terms of oncological outcomes

□ D. Robotic nipple-sparing mastectomy is associated with lower complication rates in comparison to open nipple-sparing mastectomy

13. Which is the most ideal condition for sentinel lymph node biopsy (SLNB)

□ A. cN0 early breast cancer

□ B. cN0 post neoadjuvant chemotherapy (NACT) becoming ycN0

□ C. cN1 post NACT becoming ycN0

□ D. cN1 and cN0 early breast cancer

14. What is the safest method of nipple-areola complex (NAC) reconstruction in a patient with a radiated implant-reconstructed breast?

□ A. 3D NAC tattooing

□ B. Labial graft

□ C. Nipple share

□ D. C-V flap

□ E. Skate flap with skin graft

15. Up to what amount of breast volume can be removed in level 1 oncoplasty?

□ A. Less than 5%

□ B. Up to 20%

□ C. Up to 35%

16. Which of the following is considered the workhorse pedicle flap for breast reconstruction?

□ A. DIEP

□ B. LD flap

□ C. PMMC flap

□ D. Gluteal flap

17. Dominant blood supply of LD flap?

□ A. Radial artery

□ B. Lateral thoracic artery

□ C. Thoracodorsal artery

□ D. Posterior intercostal arteries

18. Which method will you use to reconstruct the breast after modified radical mastectomy (MRM) if the patient is to undergo radiotherapy?

□ A. DIEP

□ B. LDMC

□ C. Local flap

□ D. Skin graft

C. Affective domain

· Administered at T1, T2, and T3.

· Select one response for each statement: 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.

Confidence and self-efficacy

1. I feel confident in my ability to perform oncoplastic breast surgery techniques.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

2. I feel confident in my decision-making regarding the choice of oncoplastic technique for a given case.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

3. I feel confident in planning flap design and volume-displacement techniques for breast reconstruction.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

Readiness and comfort

4. I feel ready to perform oncoplastic breast surgery techniques independently.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

5. I feel comfortable applying the techniques taught/practiced so far in real clinical practice.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

6. I feel ready to counsel patients about oncoplastic breast surgery options.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

Attitude toward cadaveric training

7. I believe cadaveric training is a valuable method for acquiring oncoplastic breast surgery skills.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

8. I would recommend cadaveric training to my colleagues for learning oncoplastic breast surgery.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

Affective total: _____ / 40

D. Self-rated procedural ability (Psychomotor)

· Administer at T2 and T3.

· Rate your current ability for each task.

0 = Unable to perform; 1 = Requires complete guidance; 2 = Can perform with considerable assistance; 3 = Can perform with minimal assistance; 4 = Can perform independently.

Incision placement

Q1. Identify relevant anatomical landmarks before marking the incision.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q2. Select an incision appropriate to tumour location and planned resection.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q3. Mark the tumour and proposed excision on the breast.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q4. Plan an incision that permits adequate oncological access.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q5. Position the incision to preserve the nipple-areola complex when appropriate.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q6. Plan an incision with consideration of the expected cosmetic result.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q7. Modify incision markings to suit the breast size and tumour location.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Incision placement subtotal: _____ / 28

Tissue handling

Q8. Handle breast skin and parenchyma without excessive traction.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q9. Dissect tissue in the intended anatomical plane.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q10. Preserve tissue vascularity during dissection.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q11. Maintain orientation of the excised specimen.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q12. Identify and protect important adjacent structures.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Tissue handling subtotal: _____ / 20

Flap mobilization

Q13. Choose an appropriate local tissue displacement technique.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q14. Develop a parenchymal flap in the appropriate plane.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q15. Mobilize tissue sufficiently to fill the resection defect.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q16. Maintain flap vascularity during mobilization.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q17. Rotate or advance the flap without undue tension.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q18. Assess breast contour and symmetry after flap positioning.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Flap mobilization subtotal: _____ / 24

Closure technique

Q19. Approximate deep breast tissue to reduce dead space.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q20. Close the parenchymal defect without excessive tension.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q21. Reposition the nipple-areola complex when indicated.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q22. Close the dermal layer with appropriate tissue alignment.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q23. Complete skin closure with attention to scar placement.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q24. Assess final contour, wound tension and tissue perfusion.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Closure technique subtotal: _____ / 24

Other technical and oncological skills

Q25. Plan resection while maintaining the intended oncological margin.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q26. Orient and label the specimen for pathological assessment.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q27. Recognize when a wider excision or change in plan is required.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q28. Choose a suitable approach for a defect in a different breast quadrant.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q29. Recognize a flap with compromised perfusion.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q30. Plan a safe response to an intraoperative technical difficulty.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q31. Explain the planned oncoplastic steps to the supervising surgeon.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Q32. Integrate oncological safety and cosmetic considerations in the operative plan.

□ 0 Unable □ 1 Complete guidance □ 2 Considerable assistance □ 3 Minimal assistance □ 4 Independent

Other technical and oncological skills subtotal: _____ / 32

Overall procedural ability score: _____ / 128

E. Post-workshop feedback

· Administered at T3.

· Select one response for each statement:

Strongly agree, Agree, Neutral, Disagree, or Strongly disagree.

1. Adequate oncological resection should remain the first priority when planning breast reconstruction.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

2. Patients with breast cancer should be informed about breast reconstruction options.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

3. Resection and reconstruction plans should be discussed by a multidisciplinary team.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

4. Breast surgeons or oncosurgeons can perform selected level I and II oncoplastic procedures when plastic surgery support is unavailable.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

5. Oncoplastic breast surgery may be difficult to implement in the Central Indian patient population.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

6. Accredited continuing medical education programs and workshops on oncoplastic breast surgery should be offered regularly.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

7. The lectures, videos, panel discussions, and hands-on workshop supported my learning.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

8. The program improved my understanding of reconstruction options in breast surgery.

□ Strongly agree □ Agree □ Neutral □ Disagree □ Strongly disagree

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Meena Kumari, Swagata Bramhachari, Shyam Lal, Sheetal Kotgirwar, Padma Bhatia, Aryan K. Chilvery

Acquisition, analysis, or interpretation of data: Meena Kumari, Swagata Bramhachari, Shyam Lal, Sheetal Kotgirwar, Padma Bhatia, Aryan K. Chilvery, Ankit Jain

Drafting of the manuscript: Meena Kumari, Swagata Bramhachari, Shyam Lal, Sheetal Kotgirwar, Padma Bhatia, Aryan K. Chilvery, Ankit Jain

Critical review of the manuscript for important intellectual content: Meena Kumari, Swagata Bramhachari, Shyam Lal, Sheetal Kotgirwar, Padma Bhatia, Aryan K. Chilvery, Ankit Jain

Supervision: Meena Kumari, Swagata Bramhachari, Shyam Lal, Padma Bhatia

Disclosures

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