The Case Against Medial Pectoral Releases

A Retrospective Review of 315 Primary Breast Augmentation Patients

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Abstract: Although medial pectoral releases have been recommended as an important component of retropectoral breast augmentation surgery, there has been no study that documents the benefit or need for this potentially harmful surgical maneuver. In this study, 315 patients were retrospectively reviewed to determine the effect of medial pectoral muscle releases on breast implant position, visibility, and palpability. Five patients had incomplete data, leaving 310 patients available for photographic and clinical analysis at an average of 25.7 weeks postoperatively (range 5.61–91.6 weeks). All patients received textured, saline-filled, round, retropectoral implants. Group I (n = 163) had partial medial pectoral releases to the level of the superior aspect of the areola. Group II (n = 152) had no releases; however, retropectoral pocket dissection was extended medially to the arc of the median raphe, where the tendinous origins of the pectoralis major muscle are firmly anchored to the anterior aspect of the sternum. To assess implant position, the ratio of the intermammary space to the lateral breast protrusion (IMS/LBP) was compared for all patients. There was a greater decrease in the average IMS/LBP ratio in group II compared with group I, (P = 0.0315). This indicates that subpectoral mobilization to the arc of the median raphe afforded a proportionally decreased intermammary space, better medial envelope fill, and less lateral implant displacement when compared with medial pectoral releases. Five patients (3%, P = 0.014) developed breast implant visibility and palpability on the medial aspect of the breast mounds, and 2 patients (1.2%) developed hematomas in group I. One patient (0.6%) developed implant distortion with muscle flexion in group II. To explain these results, 6 pectoral muscles were dissected in 3 female cadavers. Above the fifth rib and below the clavicular head, the secure, tendinous origin of the pectoralis major muscle arises from the central anterior aspect of the sternum forming an "arc of the median raphe." This anatomic feature allows pectoral muscle mobilization medially, negating the need for division. Maintaining the integrity of the pectoral muscle affords decreased implant visibility and palpability medially and decreased patient morbidity while delivering possibly improved esthetic proportions by decreasing the intermammary space.

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Medial pectoral releases have historically been recommended as an important, if not crucial, component of breast augmentation surgery to prevent implant distortion with pectoral flexion, lateral displacement, and also to prevent windowshading or the "double double" effect.[1–4] Medial pectoral releases have also been recommended to provide adequate medial envelope fill and a decreased intermammary space.[5–8]

Although the purported beneficial effects of medial pectoral muscle releases seem intuitive, these assumptions have not been prospectively tested or retrospectively reviewed. In addition, the potentially harmful effects of medial pectoral muscle division such as implant visibility and rippling and an increased rate of hematoma formation have received little attention in the literature. Several recent articles have recommended no pectoral muscle division medial to the medial aspect of the inframammary fold, which represents a major technical change without explanation.[9–12]

The purpose of this study is to see whether the hazards of medial pectoral division could be avoided without compromising esthetic results or causing lateral implant displacement. In addition to the retrospective patient review, clinically relevant structural details related to the pectoral muscle anatomy were defined in the anatomy laboratory.

PATIENTS AND METHODS

Three hundred fifteen patients were retrospectively reviewed between June 1996 and December 2001, to assess the need for and effects of medial pectoral releases. Five patients had incomplete data, leaving 310 patients available for analysis at an average of 25.7 weeks postoperatively (range 5.61–to 91.6 weeks). All patients were primary breast augmentation patients and received McGhan style 168 (INAMED Corporation, Santa Barbara, CA) textured, saline-filled, round, retropec-

toral implants. Routine clinical follow-up was scheduled at 1 week, 6 weeks, and 8 months postoperatively for all patients.

All patients before March 29, 2000 (group I, n = 163) had partial medial pectoral releases extending along the inframammary fold and continuing medially along the lateral sternal margin to the level of the superior aspect of the areola as described by previous authorities.[1–8] All patients from March 29, 2000 forward (group II, n = 152) had no pectoral releases; however, additional pectoral mobilization was carried out to the arc of the median raphe. Anterior–posterior photographs and direct breast and chest measurements were taken for all patients preoperatively and at 6 weeks and 8 months postoperatively using published techniques[13] and as

illustrated in Figure 1. All photographic analysis to measure the IMS (intermammary space) and LBP (lateral breast protrusion) was performed by 2 medical technicians unaware of the surgical procedure, identity of the patient, or date of the procedure. All direct patient examinations to obtain the chest girth and bust measurements were performed by the author prior to the initiation of this study.

FIGURE 2. Photographic measurements used to calculate the intermammary space/lateral breast protrusion (IMS/LBP) ratio (above left). The IMS/LBP ratio: Increases if the implants displace laterally (above right); decreases if the implants displace medially (below left); greatly decreases if implants larger than the base width of the breast are used (below right).
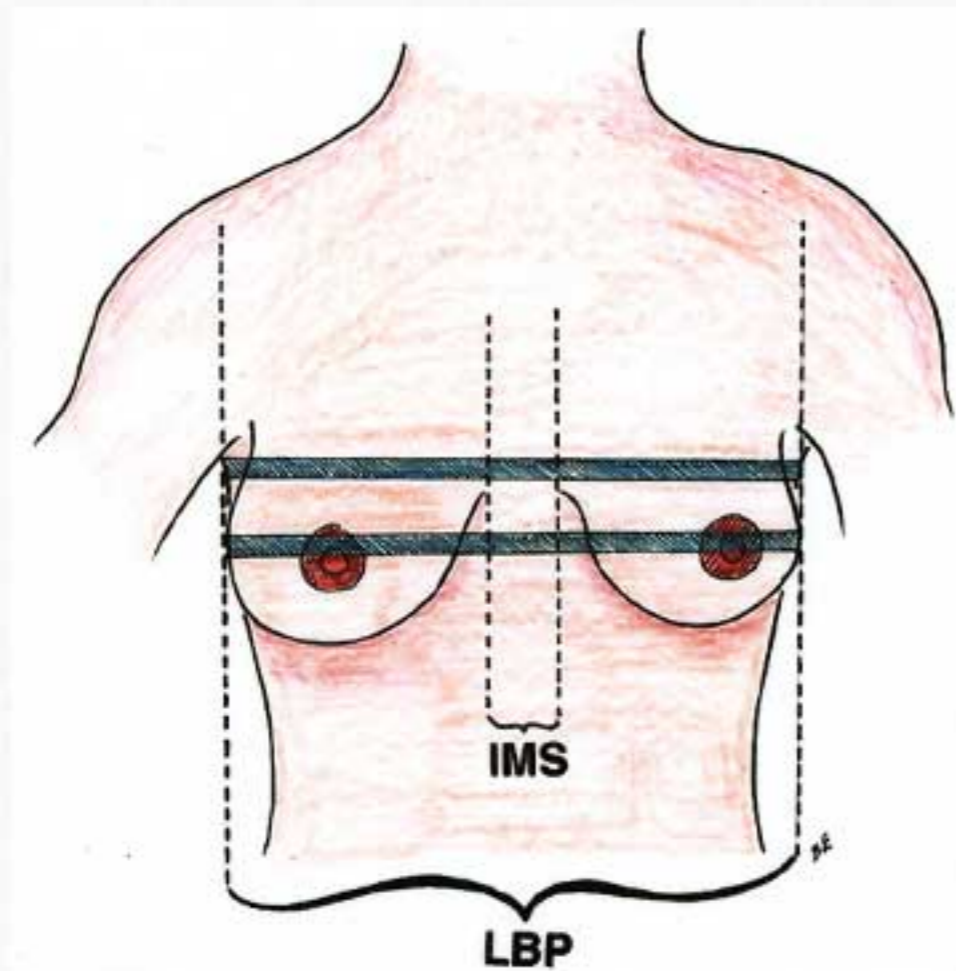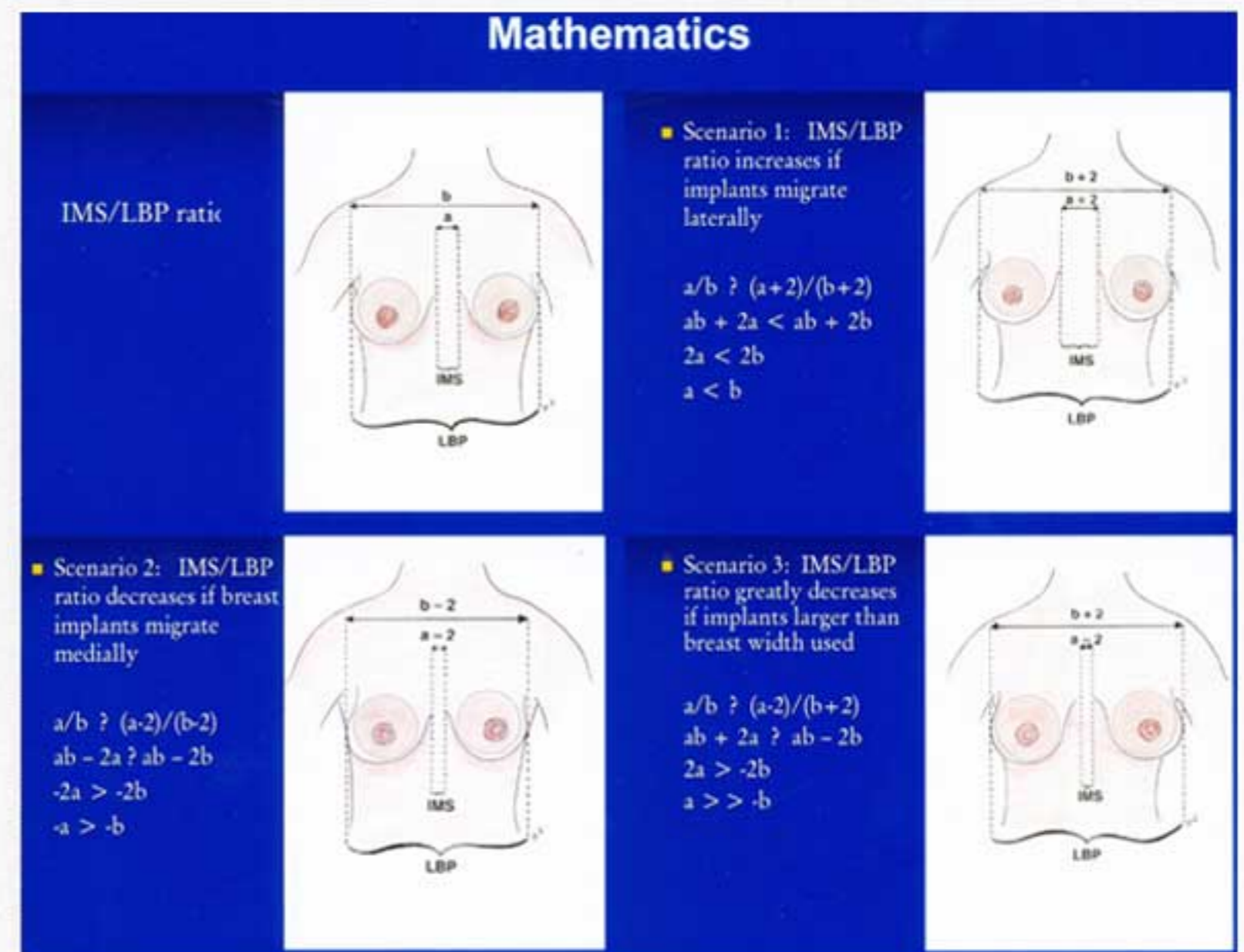

FIGURE 1. Method of obtaining pre- and postoperative chest and bust measurements. Upper tape: chest girth. Lower tape: bust. IMS, intermammary space; LBP, lateral breast protrusion.

TABLE 1. Patient Demographics

| | Patient Demographics Group I, n = 160 | | | | Patient Demographics Group II, n = 150 | | | | |
Variable	Average	Standard Deviation	Minimum	Maximum	Average	Standard Deviation	Minimum	Maximum	Statistically Significant Difference
Height (m)	64.13	2.89	51	71	64.12	2.13	60	69	
Weight (lbs)	121.47	14.19	89	166	120.14	14.77	95	160	
Age (yrs)	28.95	7.17	18	51	27.67	7.99	18	48	
Implant Size (cc)	337.61*	43.21	230	450	355.2*	29.91	300	420	$p < 0.005$
Pre Bust (cm)	34.13	2.46	28.75	42.75	33.8	1.86	30	39.5	
Post Bust (cm)	36.84	2.21	32	43.5	36.87	1.59	33.5	40.5	
Bust Increase (post-pre)	2.77	1.08	−3.25[†]	6	2.95	0.95	0.5	6	
Pre Ratio	0.155	0.077	0.036	0.712	0.166	0.0534	0.061	0.311	
Post Ratio	0.11	0.047	0.026	0.265	0.102	0.0468	0.01	0.26	
Ratio Decrease (pre-post)	0.044*	0.075	−0.112	0.648	0.061*	0.064	−0.057	0.226	$p = 0.0315$
Weeks Follow-up	27.4*	9.89	6.23	91.6	21.2*	5.58	5.61	47	$p < 0.005$

*, Statistically significant difference between groups I and II.

THE IMS/LBP RATIO

To objectively assess implant position in relation to the torso, the intermammary space to lateral breast protrusion (IMS/LBP) ratio was measured and calculated from photographs of each patient preoperatively and postoperatively as illustrated in Figure 2. The IMS/LBP ratio increases if the implants migrate laterally, decreases if the implants migrate medially, and greatly decreases if implants larger than the base width of the breast are used. Implants larger than the base width of the breast were not used in this study.

RESULTS

There were no statistically significant differences in patient demographics between groups I and II except for slightly increased average breast implant size in group II (355 mL vs. 338 mL, $P < 0.005$), and longer average follow-up in group I (27 weeks vs. 21 weeks, $P < 0.005$, Table 1).

There were no statistically significant differences found between groups I and II regarding the average preoperative IMS/LBP ratio or the average postoperative IMS/LBP ratio. However, there was a greater decrease in the average IMS/LBP ratio in group II compared with group I (0.061 vs. 0.044, $P = 0.0315$, Table 1). In group I, 5 patients (3%, $P = 0.014$) developed implant visibility and palpability on the medial breast mound, and 2 patients (1.2%) developed hematomas requiring operative evacuation. One patient (0.6%) developed implant distortion with muscle flexion in group II.

ANATOMY

To further define the medial pectoral muscle anatomy relative to breast implant surgery, 6 pectoral muscles were dissected in 3 female cadavers.

FIGURE 3. Cadaver dissections showing a narrow median raphe between pectoral muscles (left). The breasts and the subcutaneous tissue have been removed from this specimen. The tendinous origins of the pectoralis major muscle from the central anterior aspect of the sternum (middle) form the arc of the median raphe. In this specimen, the right pectoral muscle has been turned over like the page of a book, revealing the sternocostal junctions. The pointer shows the clavicular head. The first and second intercostal perforators are demonstrated, and are located above the normal extent of breast pocket dissection. The arc of the median raphe is approximately 1 inch medial to the sternocostal junctions (middle and right).

Case Studies – Narrow IMS

Case Studies – Average IMS

Case Studies – Wide IMS

FIGURE 4. Comparisons of patients with and without medial pectoral releases for patients with narrow (above), average (middle), and wide (below) intermammary spaces (IMS).

The median raphe separating the left pectoral muscle from the right pectoral muscle was narrow in all specimens,

as the pectoral muscle fibers from each side were almost touching (Fig. 3).

Above the fifth rib and below the clavicular head, the sharpie-like tendinous origins of the pectoralis major muscle were anchored to the central anterior aspect of the sternum, not to the lateral aspect of the sternum (Fig. 3).

The medial boundary of the blunt subpectoral muscle dissection occurred at the arc of the median raphe, which in all 6 pectoral dissections was approximately one inch medial to the sternocostal junctions. Below the clavicular head and above the fifth rib, blunt submuscular dissection tore few if any muscle fibers.

DISCUSSION

This is the first study that relates the details of the pectoral muscle anatomy to esthetic outcome in primary breast augmentation surgery. Mobilization of the pectoralis major muscle to the arc of the median raphe delivered adequate and predictable medial envelope fill, a predictable and acceptable intermammary space, a very low incidence of implant distortion or displacement, and elimination of medial pole rippling. The findings were clinically apparent during the study.

The hypothesis of this study was that mobilization of the pectoral muscle medially could deliver equivalent esthetic results as medial pectoral releases, and that lateral implant displacement could be avoided. The fact that the IMS/LBP ratio decreased more in group II was an unexpected finding. This possibly indicates that better esthetic proportions and that a decreased IMS can be achieved without pectoral releases.

Recent publications have mentioned limiting pectoral muscle division to the inframammary fold, and this study supports that recommendation.[9-12] This represents a change from previous publications.[1-8] Medial pectoral releases should no longer be considered an essential component of augmentation mammoplasty, as esthetic outcomes are similar and with statistically significantly reduced morbidity without medial pectoral releases. Emphasis should be placed on

dissection of the pectoral origin to the arc of the median raphe and not on partial or complete pectoral muscle division. This surgical maneuver predictably affords good esthetic results in patients with narrow, average, and wide intermammary spaces (Fig. 4).

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