



## Our Experience in Prepectoral Implant Based Breast Reconstruction

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### Abstract

**Background:** Evolution of meshes and implants available for breast reconstruction have led to an increase in the use of the prepectoral reconstruction technique, which is associated with superior clinical, aesthetic and cost outcomes when compared to the subpectoral method. In this paper, we describe our experience using a simple algorithm in prepectoral breast reconstruction, which can be adopted in clinical practice.

**Method:** We classified the breast into three categories according to size and ptosis. We applied the classification to 30 patients (10 random patient selection of each category) who underwent bilateral immediate prepectoral implant based breast reconstruction with ADM. The data was collected and statistically analyzed on SPSS.

**Results:** Each category was tested with 10 bilateral cases, showed less complications in group 1 and 2. However, group 3 involved more complications that possibly caused of large volume breasts and high BMI.

**Conclusion:** Our early experience demonstrates that first and second types are suitable for implant based prepectoral breast reconstruction while the third type benefits with a dermal sling for additional support.

**Keywords:** Mammoplasty; Algorithms; Mastectomy breast implant

### Introduction

Breast cancer remains an extremely prevalent disease with approximately 50,000 new breast cancers diagnosed each year in the UK alone. The explosion of new meshes and implants onto the market has led to an increase in the number of implant based breast reconstructions both in Europe and the US [1].

The classical technique used for breast reconstruction is the subpectoral breast reconstruction method and involves securing the mesh to the elevated pectoralis muscle, forming a mesh-muscle cover for the implant [2]. However, subpectoral breast reconstruction is associated with its own demerits including animation, increased post-operative pain, and shoulder dysfunction, disruption of pectoral muscle function and implant dystopia or capsular contracture [3].

The prepectoral technique provides an alternative to the classical subpectoral method, eliminating the need for dissection of the pectoralis major by placing the prosthesis completely in front of the muscle [4]. It utilizes the Acellular Dermal Matrix (ADM), a biomaterial comprising components of the extracellular matrix derived from animal tissue, to act as a framework when incorporated at a pre-pectoral level, forming an internal bra and allowing preservation of chest wall muscles [5].

Current indications for prepectoral reconstruction include immediate reconstruction, delayed reconstruction and revision surgery with initial outcomes seeming very promising [6]. One prospective multicenter study following 100 prepectoral breast reconstructions using the Braxon® dermal matrix showed only 2% implant loss due to nipple necrosis or wound break down with no observed rotation or loss of shoulder range of motion in a mean follow up time of 17.9 months [7].

Furthermore, in addition to prepectoral technique being minimally invasive whilst restoring body image, reported benefits of ADM include aesthetic outcome (better inframammary fold definition, greater projection, more natural look), shorter timescale to the final result and reduced cost to the patient and healthcare economy (potentially one procedure, fewer outpatient visits) [1].

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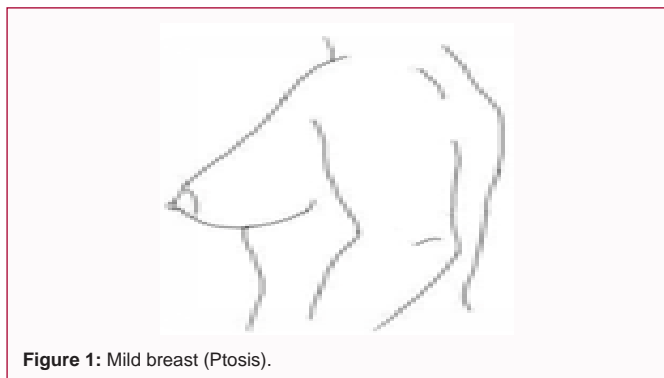


Figure 1: Mild breast (Ptosis).

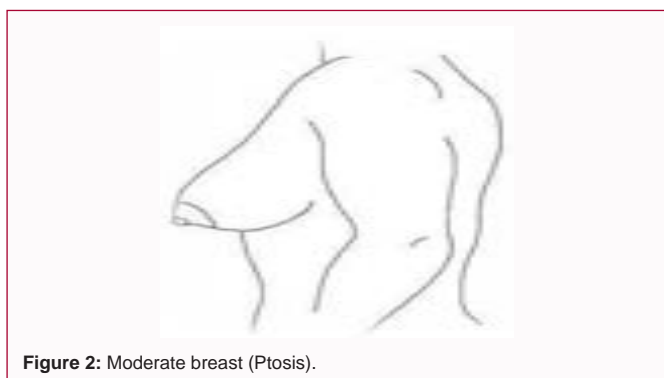


Figure 2: Moderate breast (Ptosis).

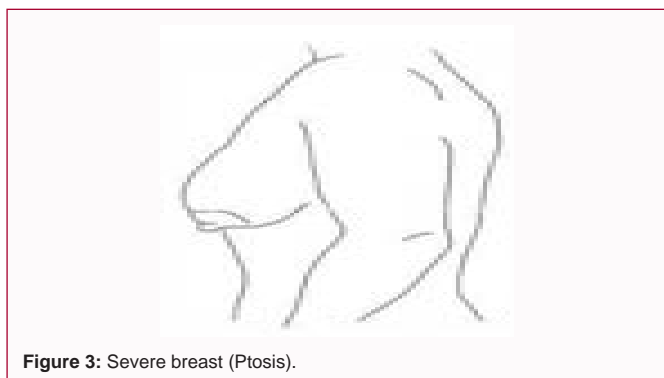


Figure 3: Severe breast (Ptosis).

In this paper, we describe a simple algorithm, which can be adopted in clinical practice.

## Materials and Methods

Taking into consideration the Regnault classification and a proposed algorithm for surgical treatment of breast ptosis, we classified the breasts into three categories, shown in Table 1, with surgical intervention being determined based on the size, grade of ptosis (Figures 1-3) [2].

We applied this classification to our patients who underwent implant based prepectoral breast reconstruction. All patients had single fixed volume implant reconstruction with Braxon' pre-shaped mesh. All our patients had immediate reconstruction and were hospitalized in average for 2 days.

We analyzed the post-operative complications of these cases, dividing them into four main categories: implant loss, seroma requiring aspiration, hematomas and wound related problems including surgical Skin Site Infection (SSI) and skin necrosis.

Afterwards, we retrospectively linked the outcome and the

complications of the 60 cases (follow up period 4 months to 4 years) with the proposed categories of prepectoral reconstruction.

## Results

There were thirty patients in total (N=60), with twenty in each category. The overall average age was 58 years and the average BMI was 29.8. Type II were the common type of breasts encountered and the average resected specimen weighed about 350 grams. Patients with type III breasts were patients with large BMI and resection of specimens were more than 500 grams (Table 2).

Patients with type I breasts had a median implant size of 185 cc (120-240).

Patients with type II breasts had a median implant size 360 cc (260-500).

Patients with type III breasts underwent wise pattern incision with dermal sling and implant reconstruction with a median implant size 550 cc (530-615).

There were no post-operative complications in Type I. In Type II, 1 patient developed a seroma requiring aspiration. The overall post-operative complication rate in Type III was with 1 patient undergoing an implant loss, 2 patients developing a seroma requiring aspiration and 1 patient developing wound related complications (Table 3).

## Discussion

It appears during the initial learning curve the prepectoral technique is more suitable for Type I and Type II breasts with negligible complication rate while Type III appears to have a greater rate of complications. However, none of the patients had hematoma, which could be attributed to lack of muscle dissection.

Our experience reveals that the simple algorithm can be adopted to the clinical practice of implant based prepectoral breast reconstruction, with use of the preshaped mesh (Braxon') offering support in small to medium breasts and dermal sling providing additional support in large breasts.

It should be noted that women who benefit most from this procedure are in relatively good health, have small to medium sized breasts that are not overly ptotic and desire to maintain current volumes. However, in patients with mammary hypertrophy the mastectomy skin flaps are often thicker making prepectoral placement feasible while in thinner skin flaps, ADM or secondary autologous, fat grafting would be utilized to refine the aesthetic outcome [8].

Despite this our early experience shows that all types can have implant based prepectoral breast reconstruction with the 3<sup>rd</sup> type requiring additional support. From our results, it appears during the initial learning curve the prepectoral technique is more suitable for Type I and Type II breasts with negligible complication rate while Type III appears to have a greater rate of complications compared to Type I and Type II. However, none of the patients had hematoma, which could be attributed to lack of muscle dissection.

Similarly, a recent study by Sbitamy et al. found there to be no significant difference in the overall post-operative complications between pre-pectoral and submuscular reconstruction surgery [4]. This is further supported by a study by Becker et al. [9] in 2015 who found that whilst prepectoral breast surgery was associated with a good aesthetic outcome and minimal complication rates.

**Table 1:** Classification of breasts based on breast size and ptosis.

Type	Ptosis	Bra cup size	Anticipated weight of mastectomy specimen	Suitable
I	Grade 1 (Mild)	A-B	Less than 250 g	Yes
II	Grade 2 (Moderate)	C-D	250g to 500 g	Yes
III	Grade 3 (Severe)	With double cups DD	More than 500 g	Yes with dermal sling

**Table 2:** BMI variations on Type I, Type II and Type III.

Group	Age		BMI	Implant size cc
1	35 years to 75 years (53)	10 unilateral	18.5-24 (23.4)	120 cc -240 cc (185)
2	32 years to 77 years (62)	6 unilateral 2 bilateral	19.1-35 9(32)	260 cc -500 cc (360)
3	31 years to 65 years (58)	8 unilateral 1 bilateral	27-37(34)	530 cc-615 cc (550)

**Table 3:** Wound related complications on patient's development.

Complications	Group1	Group 2	Group 3
Implant loss	-	-	1
Seroma requiring aspiration	-	1	2
Wound related problems - skin necrosis	-	-	1
Haematoma	-	-	-

Furthermore, ADM does not increase the risk of capsular contracture post radiotherapy and there is emerging data to suggest it may potentially reduce the severity of capsular contracture [10].

The prepectoral procedure results in diminished post-operative pain, quicker recovery time, improved mobility and more rapid return to baseline physical activity [11,12]. However, our cohort was small, and we did not offer the procedure in patients who were anticipated to have post-operative radiotherapy as there is minimal knowledge in this field. As the technique continues to progress, more long term data will become available to assess aesthetic outcome, to continually improve the safety and care of women completing their battles with breast cancer and maintain their sense of femininity through reconstruction [13,14].

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