



# Impact of Animation Deformity on Patient-Reported Breast Reconstruction Outcomes: A Subpectoral vs. Prepectoral Planes Comparison

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## Introduction

The ideal plane for implant-based breast reconstruction (IBR) has gained increased attention as prepectoral reconstruction became popularized to avoid animation deformity (AD) typically associated with subpectoral (SP) reconstruction. Prepectoral (PP) IBR is limited by mastectomy flap quality with limited and/or inconclusive data on the impact on surgical and patient-reported outcomes (PRO)<sup>1,2,3</sup>, including specifically the effect of AD on overall breast reconstruction satisfaction. This study aims to investigate the role of AD on overall patient satisfaction by comparing patient-reported outcomes (PRO) between two-stage prepectoral vs. subpectoral reconstruction.

## Methods

### Study Design

- Retrospective study** of women who completed two-stage IBR (subpectoral, N=160 and 253 breasts, prepectoral, N=111 and 190 breasts)
- Demographics, comorbidities and complications data collected
- Eligible patients asked to complete BREAST-Q Animation Deformity scale and Reconstruction Post-operative modules (raw sum score converted to equivalent scale score 0 – 100)

### BREAST-Q

#### Animation Deformity

- Perception of appearance of upper breast with activity
- Abnormal movement of implant

#### Psychosocial Well-being

- Confidence in social setting
- Self-worth, body-acceptance

#### Sexual Well-being

- Sexual confidence
- Satisfaction with sex life
- Comfort/ease during sex

#### Satisfaction with Breasts

- Self-perception of naturalness of breasts
- Matching, size, shape of breasts
- Comfort with clothing

#### Physical Well-being Chest

- Pain, tightness, pulling
- Difficulty sleeping
- Difficulty lifting/moving arms

### Complications

#### Hematoma

#### Seroma

#### Infection

- Major (IV antibiotics, inpatient)
- Minor (PO antibiotics)

#### Wound dehiscence

#### Incision/NAC necrosis

- Major (full thickness)
- Minor (partial thickness)

#### Explant

#### Unplanned procedures

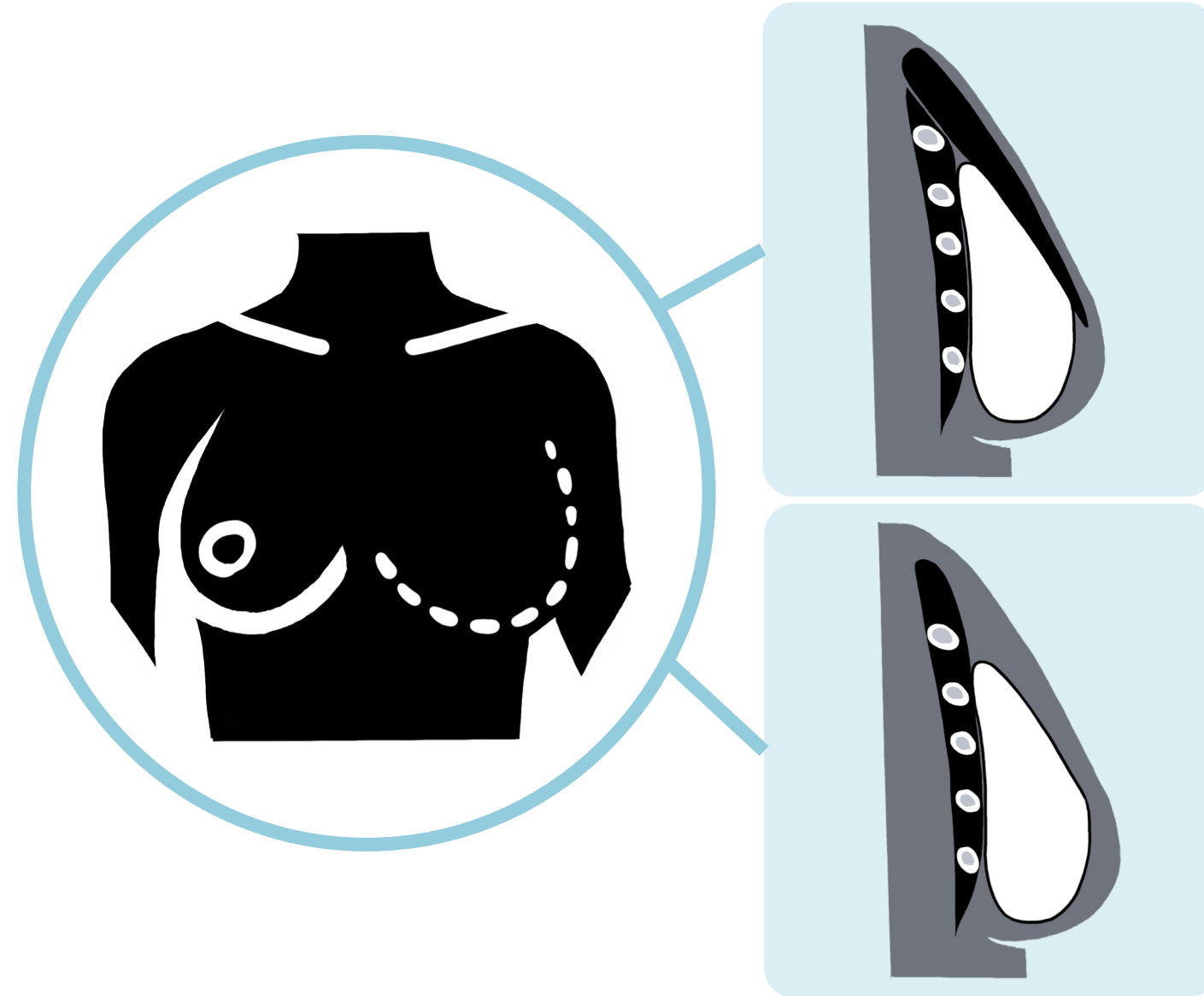
- Outside of TE placement, implant exchange
- Fat grafting, recontouring, excisions

#### Prosthetic visibility/rippling

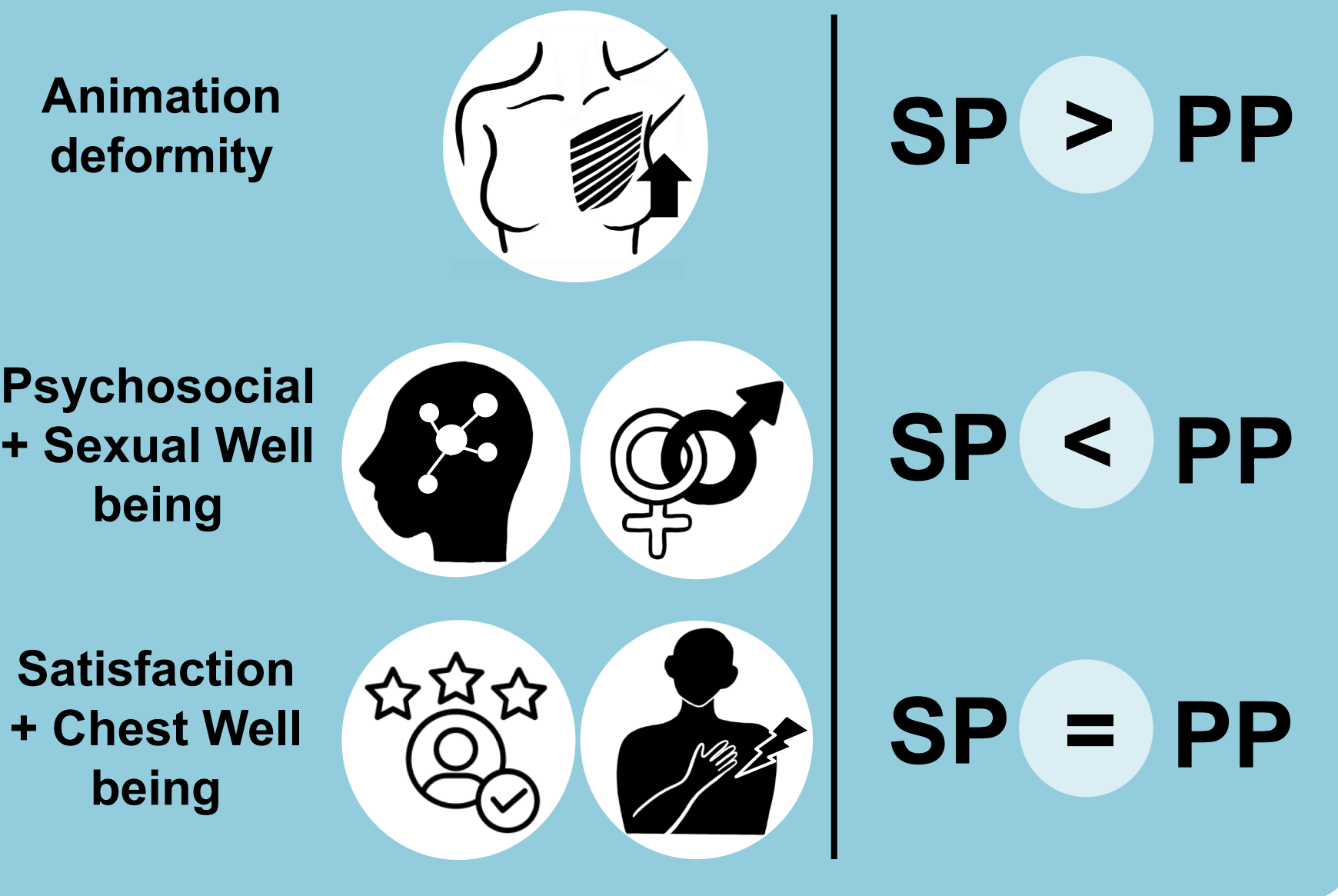
#### Conversion to autologous

## Visual Abstract

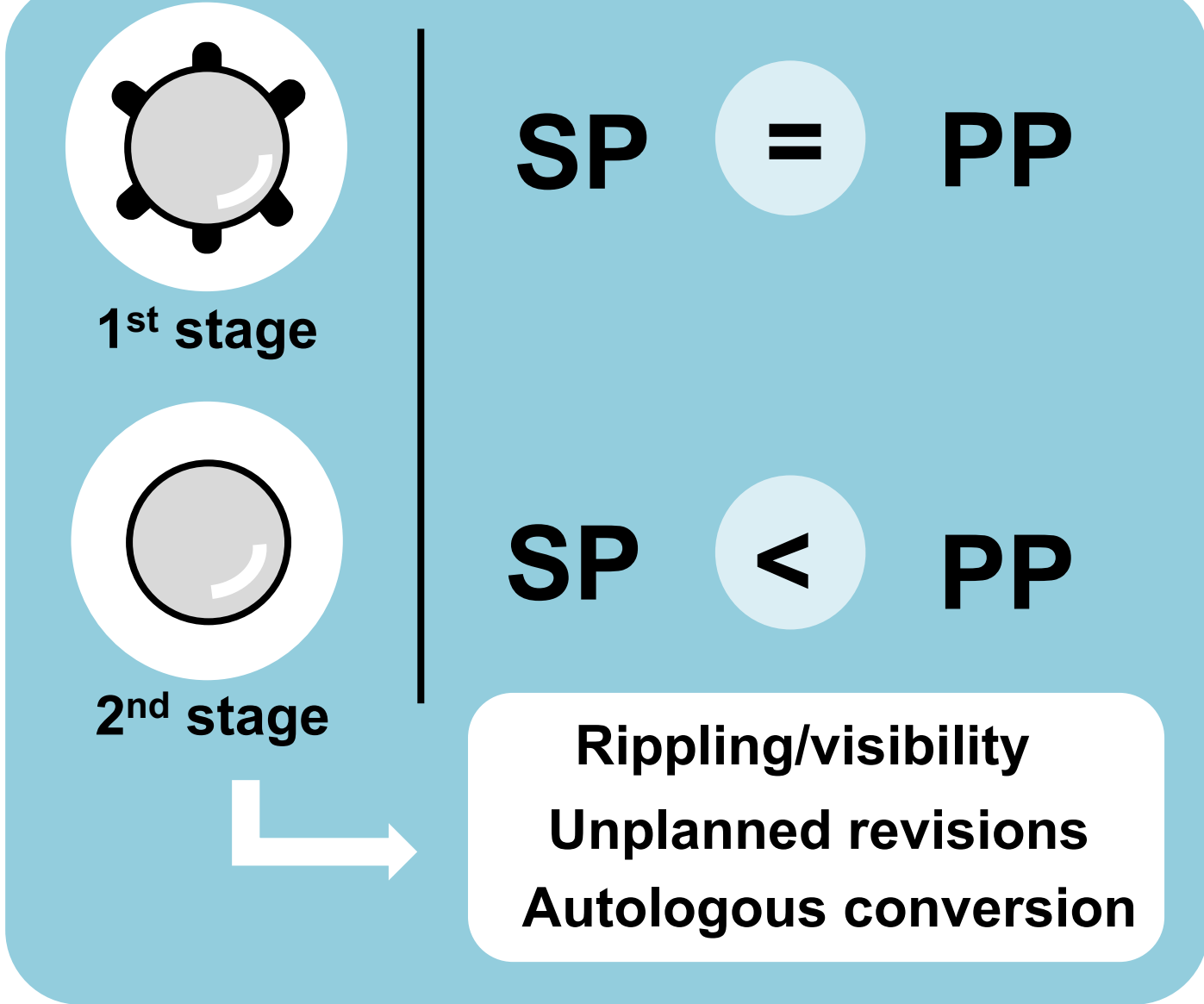
Ideal IBR plane remains individualized surgical decision with poor understanding of impact of AD on patient satisfaction



Patient Reported Outcomes (PRO)



Post-Operative Complications

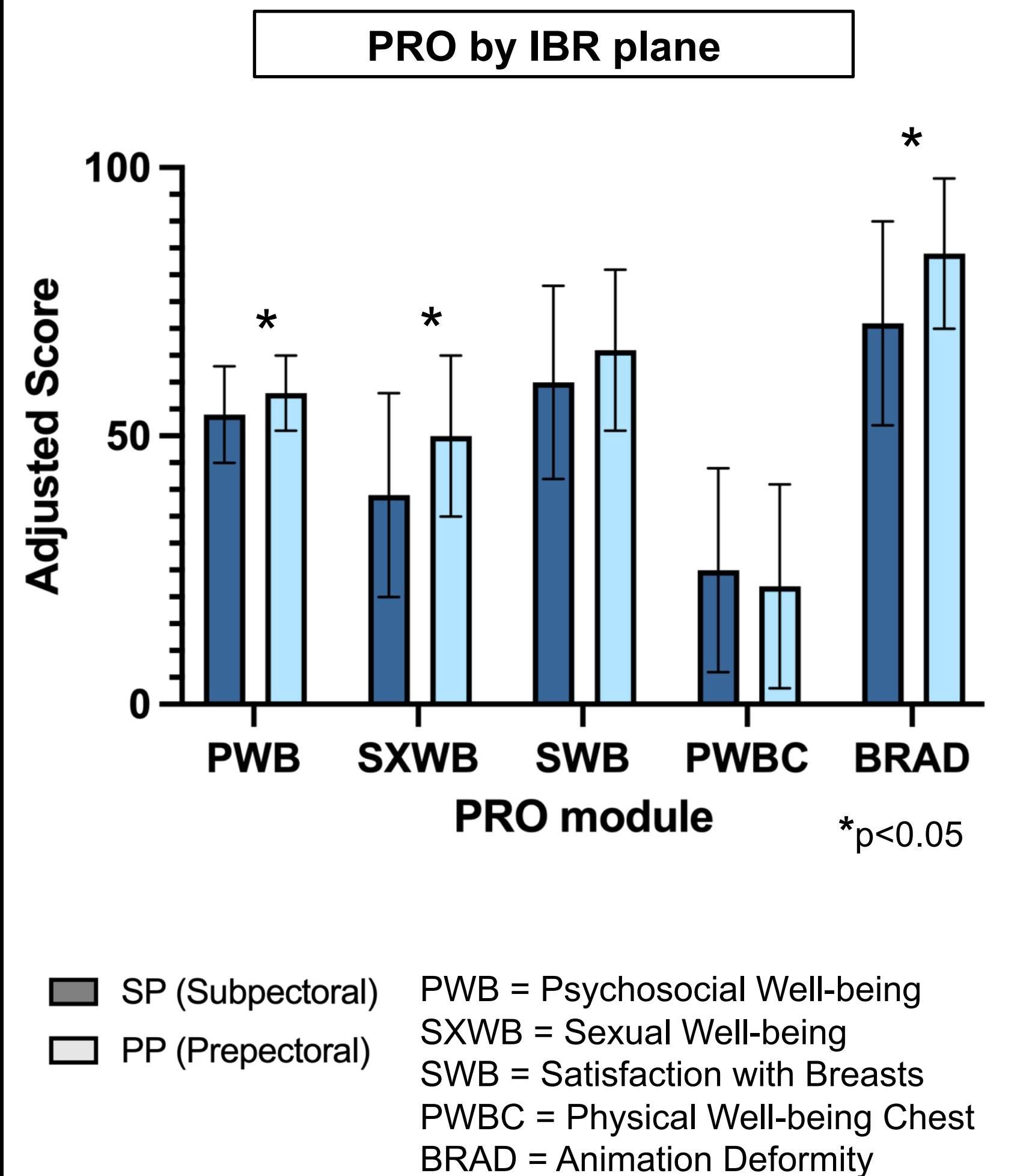


## Results

### Demographics

| By Patient                         |                         |                         |                      |
|------------------------------------|-------------------------|-------------------------|----------------------|
| Characteristic                     | 0, N = 160 <sup>1</sup> | 1, N = 111 <sup>1</sup> | p-value <sup>2</sup> |
| <b>Race</b>                        |                         |                         | 0.067                |
| White                              | 128 (80%)               | 100 (90%)               |                      |
| Asian                              | 11 (6.9%)               | 1 (0.9%)                |                      |
| Black or African American          | 9 (5.6%)                | 6 (5.4%)                |                      |
| American Indian or Native American | 0 (0%)                  | 1 (0.9%)                |                      |
| Mixed Race                         | 4 (2.5%)                | 1 (0.9%)                |                      |
| Other                              | 7 (4.4%)                | 2 (1.8%)                |                      |
| N/A (no data)                      | 1 (0.6%)                | 0 (0%)                  |                      |
| <b>Ethnicity</b>                   |                         |                         | 0.15                 |
| Not Hispanic                       | 148 (93%)               | 108 (97%)               |                      |
| Hispanic                           | 8 (5.0%)                | 3 (2.7%)                |                      |
| N/A (no data)                      | 4 (2.5%)                | 0 (0%)                  |                      |
| <b>BMI</b>                         | 24.3 (22.0, 27.4)       | 23.8 (21.8, 26.5)       | 0.5                  |
| <b>HTN</b>                         | 18 (11%)                | 10 (9.0%)               | 0.7                  |
| <b>DM</b>                          | 5 (3.1%)                | 1 (0.9%)                | 0.4                  |
| <b>Smoker</b>                      |                         |                         | 0.091                |
| Never                              | 111 (69%)               | 91 (82%)                |                      |
| Prior smoker                       | 39 (24%)                | 17 (15%)                |                      |
| Current smoker                     | 9 (5.6%)                | 3 (2.7%)                |                      |
| N/A (no data)                      | 1 (0.6%)                | 0 (0%)                  |                      |
| <b>Age at Index Surgery</b>        | 47 (41, 53)             | 44 (40, 51)             | 0.071                |
| <b>Chemotherapy</b>                |                         |                         | >0.9                 |
| Neoadjuvant                        | 42 (26%)                | 29 (26%)                |                      |
| Adjuvant                           | 31 (19%)                | 26 (23%)                | 0.5                  |
| <b>Laterality</b>                  |                         |                         | <b>0.030</b>         |
| Bilateral                          | 93 (58%)                | 79 (71%)                |                      |
| Unilateral                         | 67 (42%)                | 32 (29%)                |                      |
| <b>n (%)</b>                       |                         |                         |                      |
| <b>By Breast</b>                   |                         |                         |                      |
| Characteristic                     | 0, N = 253 <sup>1</sup> | 1, N = 190 <sup>1</sup> | p-value <sup>2</sup> |
| <b>Radiation</b>                   |                         |                         |                      |
| Neoadjuvant                        | 19 (7.5%)               | 9 (4.7%)                | 0.3                  |
| Adjuvant                           | 54 (21%)                | 30 (16%)                | 0.14                 |
| <b>Mastectomy Weight (g)</b>       | 438 (290, 610)          | 390 (293, 579)          | 0.13                 |
| <b>n (%)</b>                       |                         |                         |                      |

### Patient-Reported Outcomes (PRO)



### Complications

| First stage                         |                         |                         |                      |
|-------------------------------------|-------------------------|-------------------------|----------------------|
| Characteristic                      | 0, N = 253 <sup>1</sup> | 1, N = 190 <sup>1</sup> | p-value <sup>2</sup> |
| <b>Complications</b>                | 49 (19%)                | 48 (25%)                | 0.2                  |
| Hematoma                            | 5 (2.0%)                | 9 (4.7%)                | 0.11                 |
| Seroma                              | 8 (3.2%)                | 10 (5.3%)               | 0.3                  |
| <b>Infection</b>                    |                         |                         |                      |
| Minor                               | 1 (0.4%)                | 4 (2.1%)                | 0.2                  |
| Major                               | 8 (3.2%)                | 8 (4.2%)                | 0.6                  |
| <b>Wound dehiscence</b>             | 5 (2.0%)                | 2 (1.1%)                | 0.7                  |
| <b>Necrosis</b>                     |                         |                         |                      |
| Minor                               | 8 (3.2%)                | 6 (3.2%)                | >0.9                 |
| Major                               | 12 (4.7%)               | 3 (1.6%)                | 0.11                 |
| <b>Expander visibility/rippling</b> | 7 (2.8%)                | 14 (7.4%)               | 0.040                |
| <b>Expander explant</b>             | 10 (4.0%)               | 8 (4.2%)                | >0.9                 |
| <b>Unplanned Procedures</b>         | 6 (2.4%)                | 5 (2.6%)                | >0.9                 |
| <b>n (%)</b>                        |                         |                         |                      |
| Second stage                        |                         |                         |                      |
| Characteristic                      | 0, N = 242 <sup>1</sup> | 1, N = 185 <sup>1</sup> | p-value <sup>2</sup> |
| <b>Complications</b>                | 40 (17%)                | 79 (43%)                | <b>&lt;0.001</b>     |
| Hematoma                            | 2 (0.8%)                | 0 (0%)                  | 0.5                  |
| Seroma                              | 2 (0.8%)                | 1 (0.5%)                | >0.9                 |
| <b>Infection</b>                    |                         |                         |                      |
| Minor                               | 1 (0.4%)                | 3 (1.6%)                | 0.3                  |
| Major                               | 2 (0.8%)                | 4 (2.2%)                | 0.4                  |
| <b>Wound dehiscence</b>             | 5 (2.1%)                | 5 (2.7%)                | 0.8                  |
| <b>Necrosis</b>                     |                         |                         |                      |
| Minor                               | 1 (0.4%)                | 2 (1.1%)                | 0.6                  |
| Major                               | —                       | —                       | —                    |
| <b>Implant visibility/rippling</b>  | 34 (14%)                | 67 (36%)                | <b>&lt;0.001</b>     |
| <b>Implant explant</b>              | 7 (2.9%)                | 7 (3.8%)                | 0.8                  |
| <b>Unplanned Procedures</b>         | 46 (19%)                | 51 (28%)                | <b>0.047</b>         |
| <b>Conversion to Autologous</b>     | 6 (2.5%)                | 15 (8.1%)               | <b>0.011</b>         |
| <b>n (%)</b>                        |                         |                         |                      |

## Results (cont'd)

### Complications (cont'd)

Multivariate Analysis

Complications after Exchange

| Characteristic  | OR <sup>1</sup> | 95% CI <sup>1</sup> | p-value |
|-----------------|-----------------|---------------------|---------|
| Plane           |                 |                     |         |
| Subpectoral     | —               | —                   |         |
| Prepectoral     | 3.85            | 2.46, 6.12          | <0.001  |
| BMI             | 0.95            | 0.90, 1.00          | 0.059   |
| Neoadjuvant XRT | 2.31            | 0.93, 5.57          | 0.064   |
| Adjuvant XRT    | 0.91            | 0.49, 1.64          | 0.8     |

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval  
XRT = radiation therapy

Conversion to Autologous Reconstruction (Post-Exchange)

| Characteristic  | OR <sup>1</sup> | 95% CI <sup>1</sup> | p-value |
|-----------------|-----------------|---------------------|---------|
| Plane           |                 |                     |         |
| Subpectoral     | —               | —                   |         |
| Prepectoral     | 3.26            | 1.43, 7.98          | 0.007   |
| BMI             | 1.08            | 1.00, 1.16          | 0.046   |
| Neoadjuvant XRT | 2.75            | 0.60, 9.34          | 0.14    |
| Adjuvant XRT    | 2.30            | 0.89, 5.56          | 0.070   |

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval  
XRT = radiation therapy

Implant Visibility/Rippling (Post-Exchange)

| Characteristic  | OR <sup>1</sup> | 95% CI <sup>1</sup> | p-value |
|-----------------|-----------------|---------------------|---------|
| Plane           |                 |                     |         |
| Subpectoral     | —               | —                   |         |
| Prepectoral     | 3.38            | 2.11, 5.50          | <0.001  |
| BMI             | 0.92            | 0.86, 0.97          | 0.005   |
| Neoadjuvant XRT | 0.88            | 0.28, 2.35          | 0.8     |
| Adjuvant XRT    | 0.49            | 0.23, 0.96          | 0.048   |

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval  
XRT = radiation therapy

Unplanned Procedures (Post-Exchange)

| Characteristic  | OR <sup>1</sup> | 95% CI <sup>1</sup> | p-value |
|-----------------|-----------------|---------------------|---------|
| Plane           |                 |                     |         |
| Subpectoral     | —               | —                   |         |
| Prepectoral     | 1.60            | 1.01, 2.54          | 0.044   |
| BMI             | 1.01            | 0.96, 1.06          | 0.8     |
| Neoadjuvant XRT | 1.32            | 0.50, 3.19          | 0.5     |
| Adjuvant XRT    | 0.57            | 0.28, 1.08          | 0.10    |

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval  
XRT = radiation therapy

## Conclusions and Future Steps

- PP TE/implant-based reconstruction (IBR) is associated with ↑post-exchange rippling/visibility, unplanned procedures, and conversion to autologous flap reconstruction
- SP TE/implant-based reconstruction is associated with ↓AD scale scores (↑AD) compared to PP
- There is no significant difference in Satisfaction with Breasts and Physical Well-being Chest scores between SP and PP cohorts, however PP is associated with significantly ↑Psychosocial and Sexual Well-being scores
- Increase sample size
- Achieve longer term follow up
- Investigate correlation between objective measures of AD and patient-reported BREAST-Q AD module

## Works Cited

- Asaad M, et al. Surgical and Patient-Reported Outcomes of 694 Two-Stage Prepectoral versus Subpectoral Breast Reconstructions. *Plast Reconstr Surg.* 2023 Oct 1;152(4S):43S-54S.
- Ostapenko E, et al. Prepectoral Versus Subpectoral Implant-Based Breast Reconstruction: A Systemic Review and Meta-analysis. *Ann Surg Oncol.* 2023 Jan;30(1):126-136.
- Ching AH, et al. Quality of life, pain of prepectoral and subpectoral implant-based breast reconstruction with a discussion on cost: A systematic review and meta-analysis. *J Plast Reconstr Aesthet Surg.* 2022 Aug;75(8):2550-2560.