



# Long-term Outcomes Of Prepectoral vs. Subpectoral Implant-based Breast Reconstruction Following Post-mastectomy Radiotherapy: A Prospective Comparison

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## Background

- Prepectoral implant-based reconstruction (IBR) has gained adoption due to animation deformity and longer recovery associated with subpectoral IBR.<sup>1</sup>
- Postmastectomy radiotherapy (PMRT) is increasingly used for locoregional control, but presents well-established risks to IBR.<sup>2</sup>
- Choice of reconstructive plane may impact PMRT-related complications in IBR, but there is a lack of prospective data.<sup>3</sup>
- This study aims to evaluate patient-reported outcomes (PRO), aesthetic outcomes, and complications rates between prepectoral and subpectoral IBR in the setting of PMRT using data from the prospective, randomized, multicenter FABREC trial.

## Methods

Data obtained from the Study of Radiation Fractionation on Patient Outcomes After Breast Reconstruction (FABREC)<sup>4</sup>

- Prospective study of women who underwent immediate IBR and scheduled to receive PMRT
- Patients recruited from 16 institutions in the U.S. between March 18, 2018 and November 3, 2021
- Total 380 patients enrolled: 224 Prepectoral, 156 Subpectoral



### Patient Reported Outcomes

Patients completed Functional Assessment of Cancer Therapy–Breast (FACT – B) & BREAST-Q Reconstruction module at 6 & 18 months post-PMRT



### Aesthetic Outcomes

Aesthetic outcomes evaluated by blinded reviewers at 6 & 18 months post-PMRT



### Complications

Complications included infection, explantation, delayed wound healing, and unplanned reoperation

## Results

### Demographics

| Patient Characteristics   | Pre-pectoral | Sub-pectoral |
|---------------------------|--------------|--------------|
| Total                     | 224          | 156          |
| Patient Characteristics   |              |              |
| Age                       | p = 0.47     |              |
| <40                       | 46 (20.5)    | 36 (23.1)    |
| 40-50                     | 96 (42.9)    | 74 (47.4)    |
| 51-60                     | 56 (25.0)    | 34 (21.8)    |
| 60+                       | 26 (11.6)    | 12 (7.7)     |
| Race                      | p = 0.25     |              |
| White                     | 179 (79.9)   | 122 (78.2)   |
| Black or African American | 5 (2.2)      | 9 (5.8)      |
| Asian                     | 18 (8.0)     | 14 (9.0)     |
| Other                     | 22 (9.8)     | 11 (7.1)     |
| Ethnicity                 | p = 0.25     |              |
| Non-Hispanic              | 201 (89.7)   | 134 (85.9)   |
| Hispanic or Latino        | 23 (10.3)    | 22 (14.1)    |
| BMI                       | p = 0.046    |              |
| <20                       | 13 (5.8)     | 9 (5.8)      |
| 20.0 - 24.9               | 75 (33.6)    | 75 (48.1)    |
| 25.0 - 29.9               | 74 (33.2)    | 39 (25.0)    |
| 30.0-34.9                 | 41 (18.4)    | 18 (11.5)    |
| >= 35.0                   | 20 (9.0)     | 15 (9.6)     |
| Missing                   | 1            | 0            |
| Laterality                | p = 0.047    |              |
| Right                     | 118 (52.7)   | 66 (42.3)    |
| Left                      | 106 (47.3)   | 90 (57.7)    |
| Hormone receptor positive | p = 0.02     |              |
| Positive                  | 197 (87.9)   | 123 (78.8)   |
| Negative                  | 27 (12.1)    | 33 (21.2)    |
| Device irradiated         | p = 0.01     |              |
| Expander                  | 168 (75.0)   | 134 (85.9)   |
| Implant                   | 56 (25.0)    | 22 (14.1)    |

Table 1. Demographics

- Other clinical characteristics were not significant



### Aesthetic Outcomes

| Aesthetic score (6 months)    | Estimate | 95% CL       |
|-------------------------------|----------|--------------|
| Location (ref=pre-pectoral)   |          |              |
| Sub-pectoral*                 | -0.26    | -0.42, -0.11 |
| Study Arm (ref=CONVENT)       |          |              |
| HYPO                          | -0.02    | -0.18, 0.13  |
| Age *                         | -0.02    | -0.02, -0.01 |
| BMI *                         | -0.02    | -0.03, -0.01 |
| Neoadjuvant chemotherapy      |          |              |
| Yes                           | -0.10    | -0.26, 0.06  |
| Neoadjuvant endocrine therapy |          |              |
| Yes                           | 0.07     | -0.12, 0.25  |
| Aesthetic score (18 months)   | Estimate | 95% CL       |
| Location (ref=pre-pectoral)   |          |              |
| Sub-pectoral                  | -0.02    | -0.20, 0.17  |
| Study Arm (ref=CONVENT)       |          |              |
| HYPO                          | -0.17    | -0.35, 0.01  |
| Age*                          | -0.02    | -0.02, -0.01 |
| BMI                           | 0.00     | -0.02, 0.01  |
| Neoadjuvant chemotherapy      |          |              |
| Yes                           | -0.12    | -0.31, 0.07  |
| Neoadjuvant endocrine therapy |          |              |
| Yes                           | 0.14     | -0.08, 0.36  |

Table 2. Aesthetic outcomes

\* p < 0.05



### Patient-Reported Outcomes

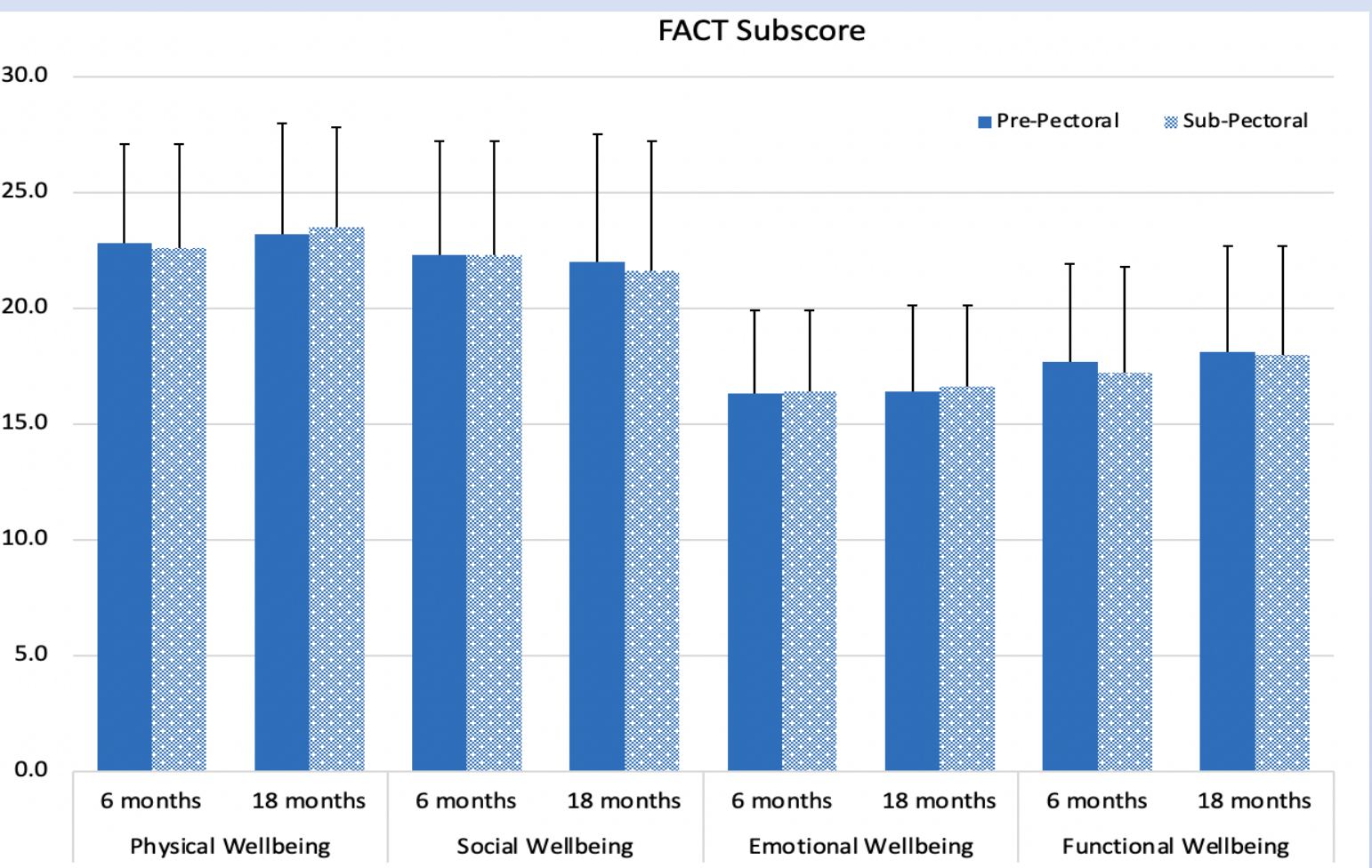


Figure 1. FACT- B Patient Reported Outcomes

- No significant difference in FACT-B scores between prepectoral and subpectoral IBR at 6 or 18 months
- Neoadjuvant endocrine therapy associated with lower FACT-B scores at 18 months ( $p = 0.03$ )

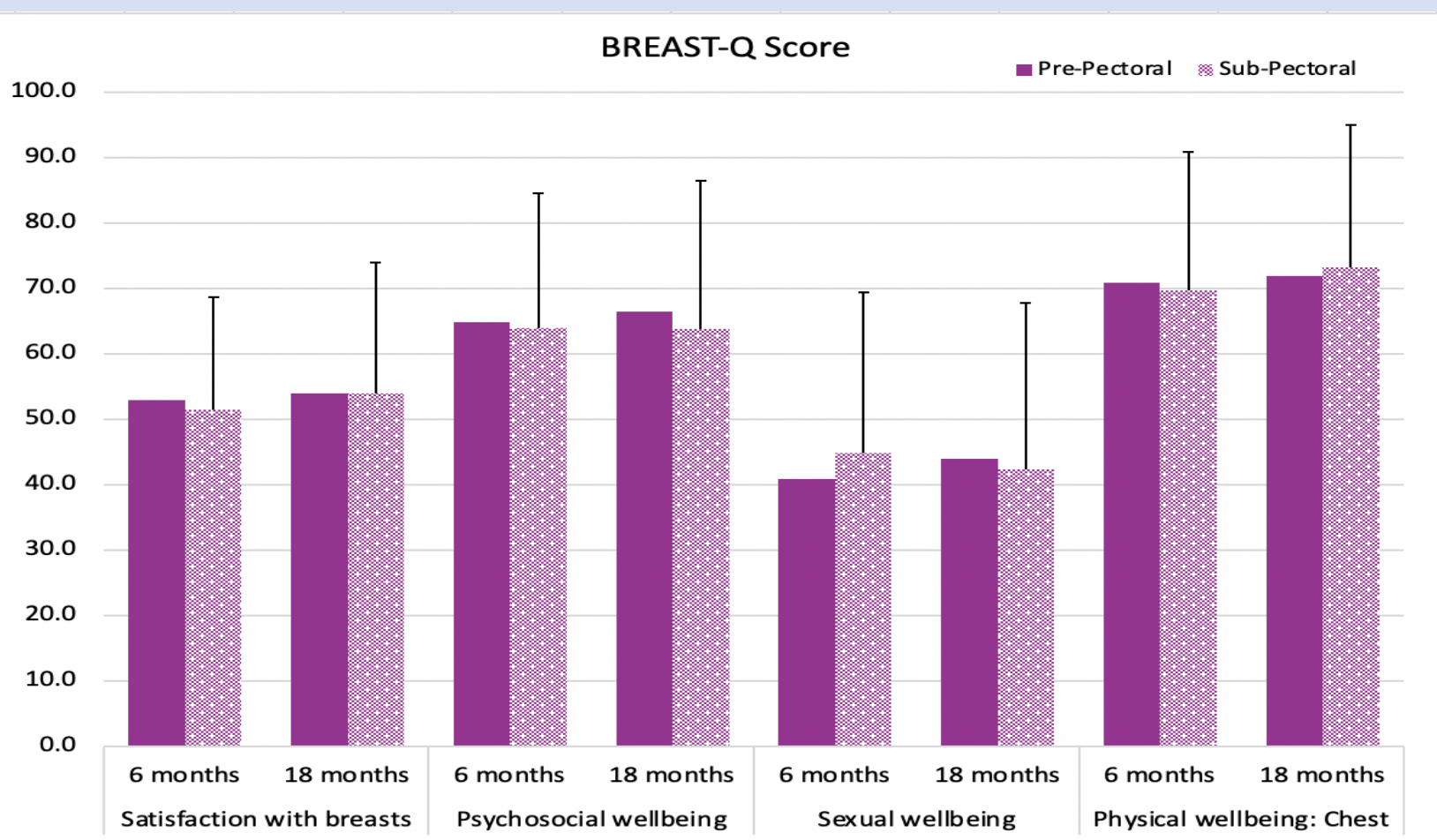


Figure 2. BREAST-Q Patient Reported Outcomes

- No significant difference in BREAST-Q between prepectoral and subpectoral IBR at 6 or 18 months
- Lower BMI associated with higher Satisfaction with Breasts (6 months,  $p = 0.01$ ), Psychosocial Well-being (6 months,  $p = 0.01$ ), & Sexual Well-being scores (6 & 18 months ( $p = 0.01$ ,  $p = 0.03$ ))
- Older age associated with higher Psychosocial Well-being score at 6 months ( $p = 0.00$ )



### Complications

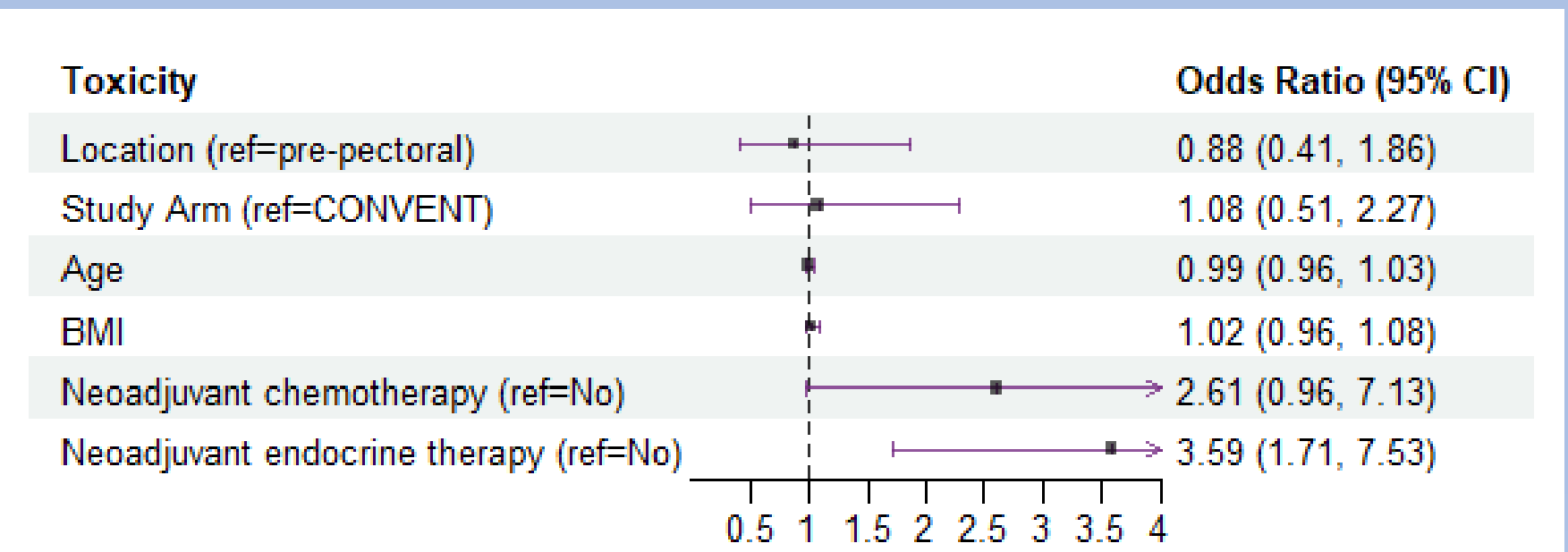


Figure 3. Complications forest plot model

- Comparable complication rates between subpectoral & prepectoral
- Neoadjuvant endocrine therapy associated with higher complications ( $p = 0.0007$ )

## Conclusions

- In patients undergoing PMRT, prepectoral and subpectoral IBR yield comparable patient-reported outcomes as measured by FACT-B and BREAST-Q.
- Although prepectoral IBR is associated with higher early post-radiation aesthetic outcomes, this difference is not sustained.
- There is no significant difference in complication rates between prepectoral and subpectoral IBR after PMRT.
- Long-term outcomes in IBR following PMRT appear to be influenced more by individual patient characteristics and clinical factors rather than by reconstructive plane selection.

## Limitations & Future Steps

- Follow-up assessments timed relative to PMRT rather than reconstructive surgery.
- Variations in surgical technique among participating institutions
- FABREC trial randomized to radiation fractionation and not reconstructive plane
- Future prospective RCT directly comparing prepectoral vs. subpectoral IBR after PMRT with longer-term follow up would provide an ideal study.

## References

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