

# Implant Cohesivity in Direct-to-Implant Breast Reconstruction: Association with Complications, Rippling, and Revision Burden

Alina Yizhuo Shen, M.M.Sc., Renee Gao, BS, Michael Turgeon, MD, Hannah D. Shi, BA, BS, Goutam Gadiraju, BS, Alex Dong, BS, Yibin Zhang, BS, Justin Broyles, MD, MPH

Brigham and Women's Hospital, Department of Plastic and Reconstructive Surgery



## Background

Pre-pectoral direct-to-implant (DTI) breast reconstruction has become increasingly common, yet the relationship between implant cohesivity and long-term outcomes remains poorly defined.

## Objectives

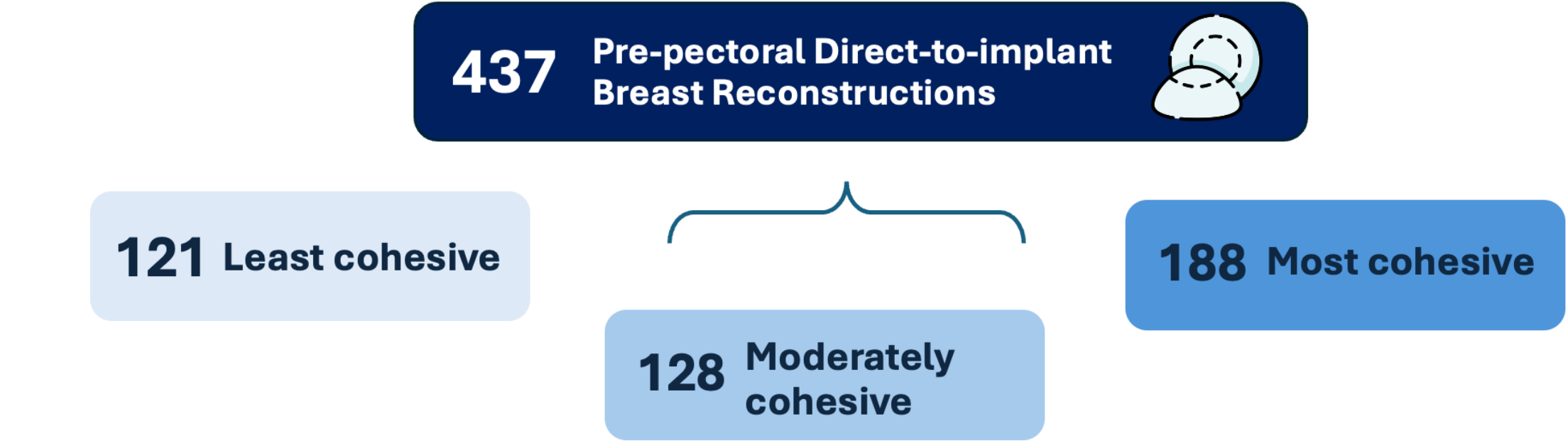
This study evaluates whether implant cohesivity influences complication rates, aesthetic outcomes, and revision burden.

## Methods

- A retrospective cohort study was conducted of patients undergoing pre-pectoral DTI breast reconstruction from January 2020 to December 2024.
- Patients were stratified by initial implant cohesivity (least, moderately, or most cohesive). Multivariable regression models were performed, and a Cochran-Armitage test assessed exchange trends by cohesivity.

## Results

- Among 437 reconstructions (121 least cohesive, 128 moderately cohesive, 188 most cohesive), median follow-up time was 470 (290-811) days.
- Most cohesive implants predicted lower odds of any complication (OR 0.28, CI 0.30-0.90,  $p < 0.01$ ).
- Increased implant cohesivity was associated with reduced odds of rippling, while medium and most cohesive implants conferred protection against capsular contracture (OR 0.28 CI 0.12-0.66  $p < 0.01$ ; OR 0.40 CI 0.18-0.89 0.40 CI  $p = 0.03$ ).
- Patients reconstructed with most cohesive implants required less fat grafting to address implant rippling (OR 0.23, 95% CI 0.05–0.95,  $p = 0.023$ ).
- When implant exchange occurred, there was a significant trend toward replacement with higher cohesivity implants ( $p < 0.001$ ).
- Cohesivity was not associated with increased risk of cosmetic or medical revision overall.



## Higher cohesivity confers to less complications

| Rippling                  | Odds Ratio | Lower 95% CI | Higher 95% CI | P-value          | Contracture               | Odds Ratio | Lower 95% CI | Higher 95% CI | P-value          |
|---------------------------|------------|--------------|---------------|------------------|---------------------------|------------|--------------|---------------|------------------|
| (Intercept)               | --         | --           | --            | --               | (Intercept)               | --         | --           | --            | --               |
| Moderately Cohesive       | 0.965      | 0.482        | 1.934         | 0.898            | Moderately Cohesive       | 0.281      | 0.119        | 0.662         | <b>0.004</b>     |
| Most Cohesive             | 0.342      | 0.177        | 0.550         | <b>&lt;0.001</b> | Most Cohesive             | 0.401      | 0.179        | 0.900         | <b>0.027</b>     |
| Age                       | 0.970      | 0.942        | 0.997         | <b>0.008</b>     | Age                       | 0.989      | 0.953        | 1.026         | 0.556            |
| Hypertension              | 1.438      | 0.638        | 3.237         | 0.283            | Hypertension              | 0.810      | 0.194        | 3.391         | 0.773            |
| BMI                       | 0.931      | 0.880        | 0.975         | <b>0.001</b>     | BMI                       | 0.956      | 0.904        | 1.010         | 0.110            |
| Diabetes                  | 0.509      | 0.134        | 1.926         | 0.232            | Pre-mastectomy radiation  | 4.021      | 1.636        | 9.884         | <b>0.002</b>     |
| Smoker                    | 1.103      | 0.595        | 2.049         | 0.695            | Post-mastectomy radiation | 4.648      | 2.103        | 10.273        | <b>&gt;0.001</b> |
| Pre-mastectomy radiation  | 0.727      | 0.195        | 2.706         | 0.507            | Diabetes                  | 2.366      | 0.643        | 8.701         | 0.195            |
| Post-mastectomy radiation | 0.475      | 0.208        | 1.083         | <b>0.025</b>     | Smoker                    | 1.183      | 0.512        | 2.734         | 0.693            |
| Chemotherapy              | 0.873      | 0.436        | 1.746         | 0.621            |                           |            |              |               |                  |

## Higher cohesivity confers lower rates of fat grafting

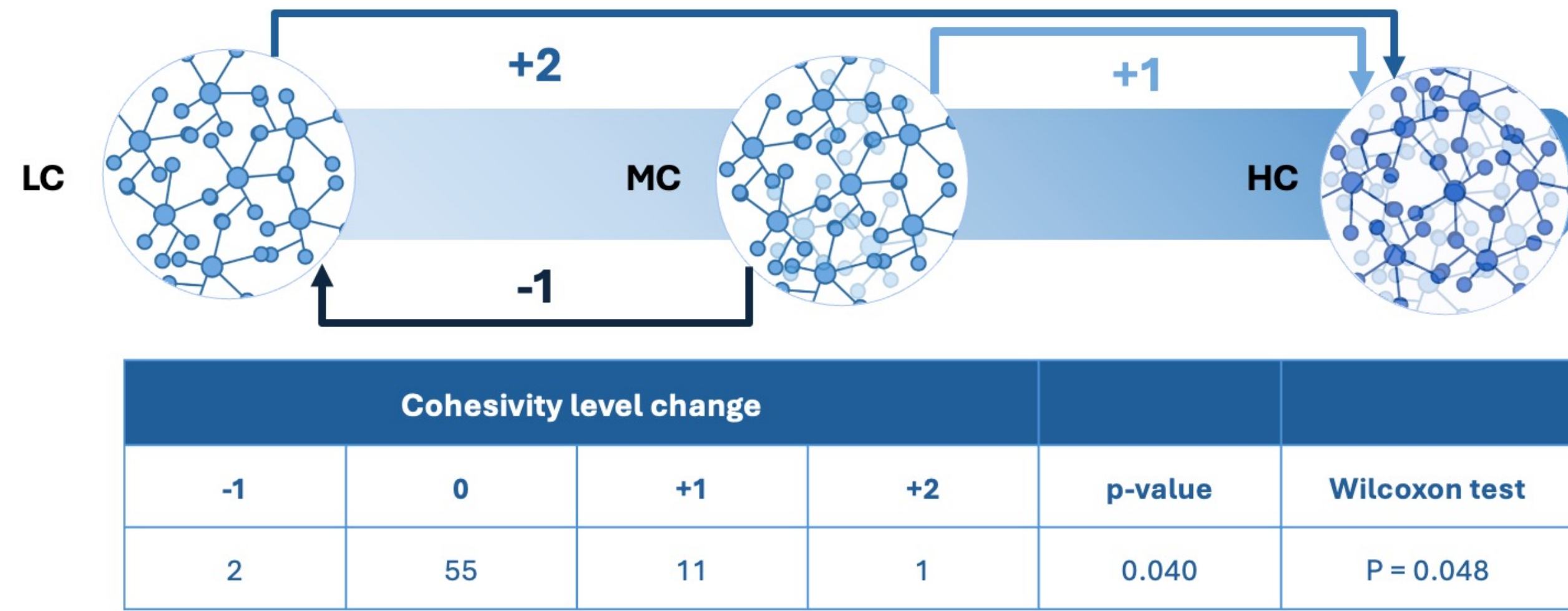
| Fat Grafting              | Odds Ratio | Lower 95% CI | Higher 95% CI | P-value      |
|---------------------------|------------|--------------|---------------|--------------|
| (Intercept)               | --         | --           | --            | --           |
| Moderately Cohesive       | 1.362      | 0.520        | 3.565         | 0.529        |
| Most Cohesive             | 0.234      | 0.067        | 0.821         | <b>0.023</b> |
| Hypertension              | 2.514      | 0.846        | 7.469         | 0.097        |
| BMI                       | 1.048      | 0.973        | 1.129         | 0.215        |
| Diabetes                  | ~0.000     | 0.000        | $\infty$      | 0.988        |
| Smoker                    | 1.835      | 0.789        | 4.269         | 0.159        |
| Pre-mastectomy radiation  | 1.858      | 0.364        | 9.485         | 0.456        |
| Post-mastectomy radiation | 2.041      | 0.528        | 7.895         | 0.301        |
| Chemotherapy              | 0.325      | 0.086        | 1.226         | 0.097        |

## Radiation Subgroup Analysis

| Number of revision        | Odds Ratio   | Lower 95% CI | Higher 95% CI | P-value      | Contracture               | Odds Ratio   | Lower 95% CI | Higher 95% CI | P-value      |
|---------------------------|--------------|--------------|---------------|--------------|---------------------------|--------------|--------------|---------------|--------------|
| (Intercept)               | --           | --           | --            | --           | (Intercept)               | --           | --           | --            | --           |
| Moderately Cohesive       | 1.017        | 0.765        | 1.353         | 0.906        | Moderately Cohesive       | <b>0.224</b> | <b>0.058</b> | <b>0.866</b>  | <b>0.030</b> |
| Most Cohesive             | 0.996        | 0.792        | 1.253         | 0.974        | Most Cohesive             | 1.024        | 0.333        | 3.147         | 0.967        |
| Hypertension              | 1.119        | 0.822        | 1.523         | 0.474        | Hypertension              | 0.981        | 0.931        | 1.035         | 0.492        |
| BMI                       | 1.005        | 0.984        | 1.027         | 0.640        | BMI                       | 0.938        | 0.848        | 1.037         | 0.213        |
| Diabetes                  | <b>1.822</b> | <b>1.237</b> | <b>2.683</b>  | <b>0.002</b> | Diabetes                  | <b>5.437</b> | <b>1.023</b> | <b>28.900</b> | <b>0.047</b> |
| Smoker                    | 0.973        | 0.791        | 1.195         | 0.791        | Smoker                    | 2.123        | 0.489        | 9.220         | 0.315        |
| Pre-mastectomy radiation  | 0.932        | 0.551        | 1.578         | 0.794        | Pre-mastectomy radiation  | 1.058        | 0.348        | 3.210         | 0.921        |
| Post-mastectomy radiation | <b>1.524</b> | <b>1.162</b> | <b>1.999</b>  | <b>0.002</b> | Post-mastectomy radiation | 2.122        | 0.634        | 7.097         | 0.222        |
| Chemotherapy              | <b>0.754</b> | <b>0.593</b> | <b>0.959</b>  | <b>0.021</b> | Chemotherapy              | <b>0.224</b> | <b>0.058</b> | <b>0.866</b>  | <b>0.030</b> |

## Conclusions

- Higher cohesivity provided protection against rippling, contracture, and need for fat grafting
- When implant exchanges occurred, surgeons strongly favored replacing with higher cohesivity devices
- Protective effects of higher cohesivity against contracture still evident within radiation subgroup
- High cohesivity implants may optimize long-term reconstructive outcomes.



Upward shift in cohesivity during implant exchange

## References

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