

A DIEP Dive Into Patient Risk Factors for Hernia and Bulge Development: A Meta-Regression



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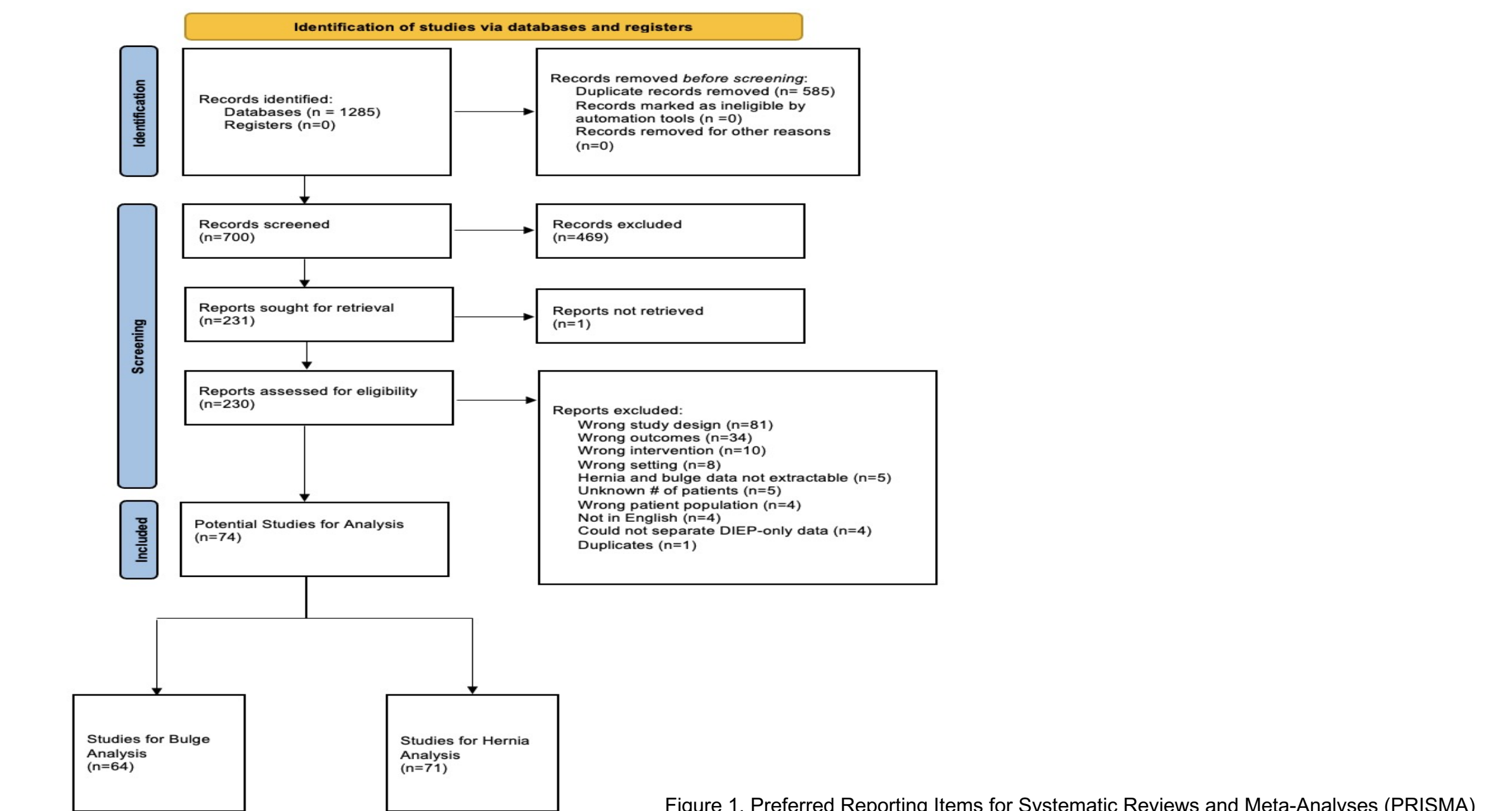
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Introduction

- Following mastectomy, alloplastic breast reconstruction is the most commonly used method in the U.S. However, more patients are electing for autologous reconstruction due to perceived superior cosmetic outcomes [1]
- Deep inferior epigastric (DIEP) flaps have largely replaced transverse rectus abdominus (TRAM) flap as the new gold standard for post-mastectomy autologous breast reconstruction [1].
- Compared to TRAM flaps, DIEP flaps are associated with shorter hospital stays, less postoperative pain, less donor site morbidity and are less costly [2-6].
- However, bulge or hernia occurs in up to 4-6% of DIEP flaps postoperatively [7-9].
- OBJECTIVE:** The aim of this study is to investigate patient and operative risk factors for hernia and bulge development in DIEP flaps, as well as the effects of prophylactic mesh placement on these postoperative complications.

Methods

- Meta-regressions were run on the proportion of patients experiencing hernia or bulge to assess for patient risk factors and the role of prophylactic mesh placement using R version 4.2.1 and the ‘meta’ package [10]. Proportions were transformed using the Freeman-Tukey double arcsine method.
- Queried across PubMed, Scopus, Google Scholar, CINAHL Complete, Ovid, and Cochrane using PRISMA guidelines [11].



Results

Quantitative Analysis

Table 1: Patient characteristics and risk of hernia development.			
Factor	β	SE(β)	<i>p</i> [†]
Age	0.0059	0.0023	0.0117
BMI	0.0015	0.0026	0.5598
Active Smoker	0.0011	0.0012	0.3793
HTN	0.0022	0.0018	0.2223
Pregnancy Hx	-0.0015	0.0004	0.0001
Prior Abdominal Surgery	0.0008	0.0004	0.046
Chemotherapy Hx	-0.0001	0.0006	0.8343
Radiation Hx	-0.0001	0.0006	0.9255

[†]Bold cells indicate statistically significant findings (*p*<0.05)
Abbreviations: BMI, body mass index; HTN, hypertension; Hx, history; No., number.

Table 3: Patient characteristics and risk of bulge development.			
Factor	β	SE(β)	<i>p</i> [†]
Age	0.0035	0.0035	0.3129
BMI	-0.0048	0.0031	0.1205
Active Smoker	0.0032	0.0014	0.0262
HTN	-0.0024	0.0015	0.1073
Pregnancy Hx	0.0019	0.0004	<0.0001
Prior Abdominal Surgery	0.0004	0.0005	0.389
Chemotherapy Hx	0.0002	0.0007	0.7455
Radiation Hx	0.0002	0.0006	0.7805

[†]Bold cells indicate statistically significant findings (*p*<0.05)
Abbreviations: BMI, body mass index; HTN, hypertension; Hx, history; No., number.

Table 2: Operative characteristics and risk of hernia development.			
Factor	β	SE(β)	<i>p</i> [†]
Unilateral Flap	0.0001	0.0003	0.7769
Bilateral Flap	0.0001	0.0003	0.8407
Lateral Perforator Vessel	-0.0009	0.0007	0.2360
Medial Perforator Vessel	0.0011	0.0006	0.0754
Single Perforator harvested	-0.0002	0.0005	0.6354
2+ Perforators Harvested	0.0004	0.0004	0.2587
Mesh (Any vs None)	0.0122	0.026	0.6392

[†]Bold cells indicate statistically significant findings (*p*<0.05)

Table 4: Operative characteristics and risk of bulge development.			
Factor	β	SE(β)	<i>p</i> [†]
Unilateral Flap	0.0003	0.0005	0.4661
Bilateral Flap	-0.0008	0.0005	0.1355
Lateral Perforator Vessel	0.0006	0.0014	0.6721
Medial Perforator Vessel	0.0005	0.0012	0.6759
Single Perforator harvested	-0.0001	0.0007	0.8402
2+ Perforators Harvested	-0.0001	0.0007	0.8622
Mesh (Any vs None)	0.0067	0.0334	0.8418

[†]Bold cells indicate statistically significant findings (*p*<0.05)

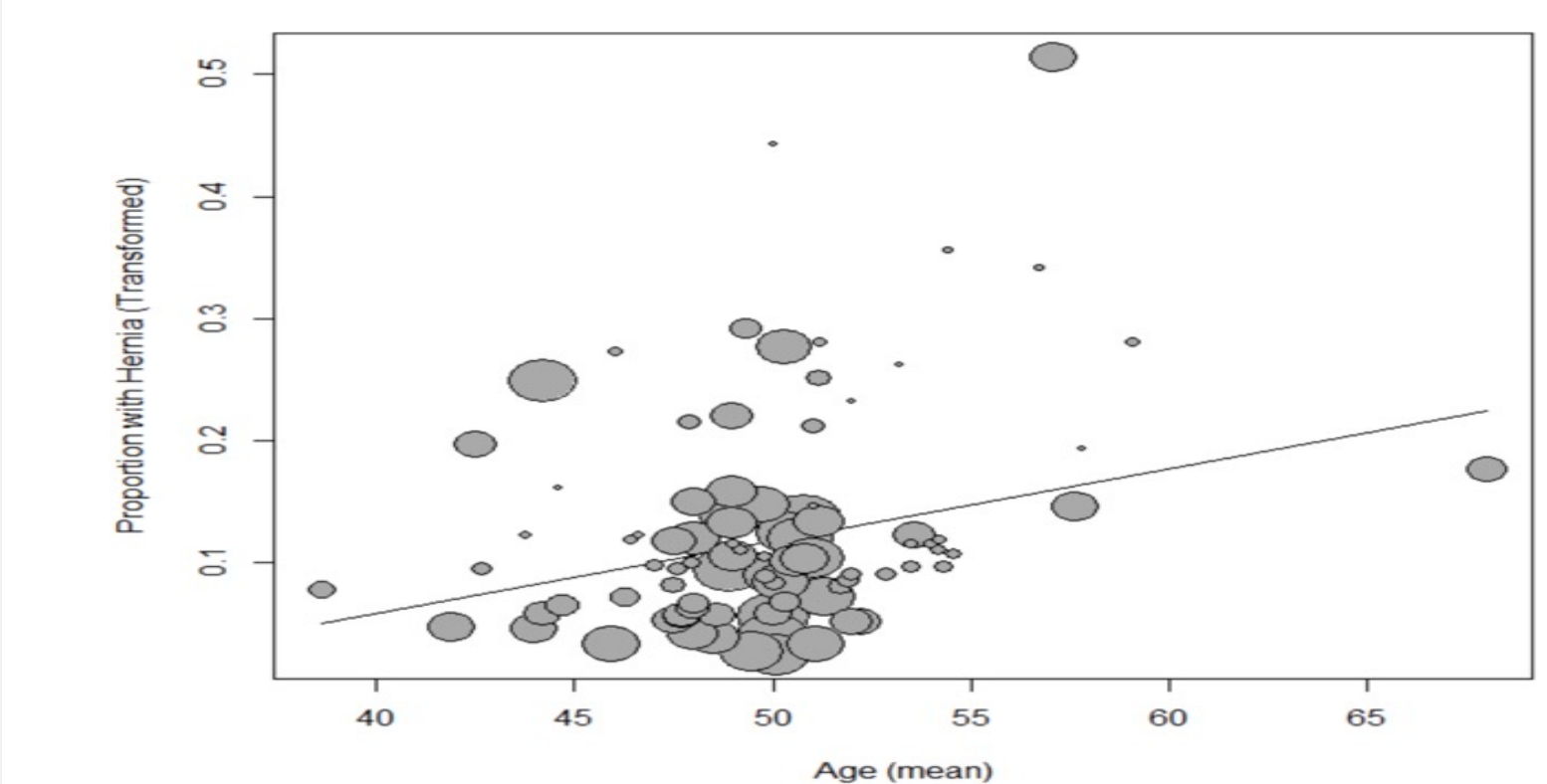


Figure 2. Advanced age associated with increased rates of hernia (β=0.0059, *p*=0.0117).

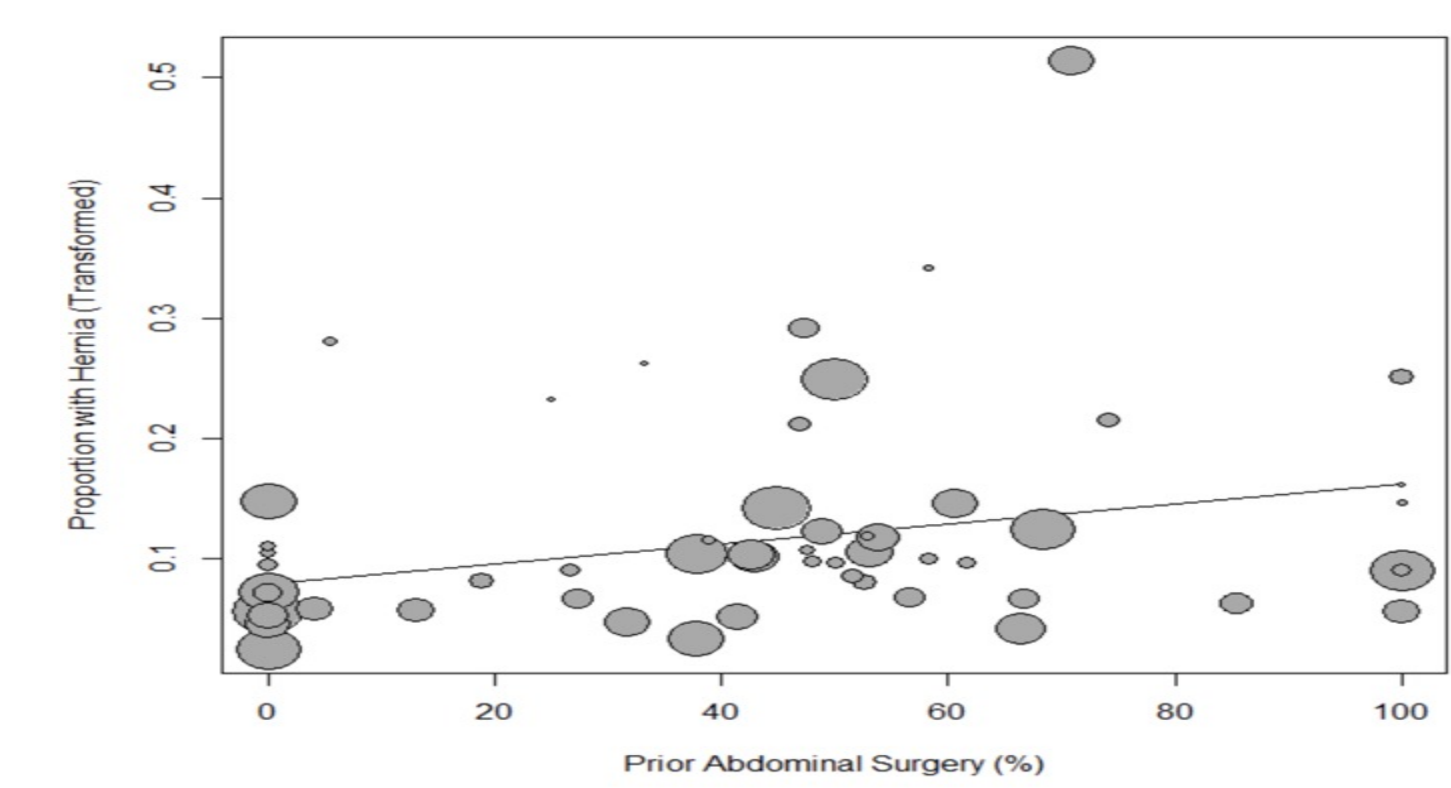


Figure 3. Prior abdominal surgery associated with increased rates of hernia (β=0.0008, *p*=0.046).

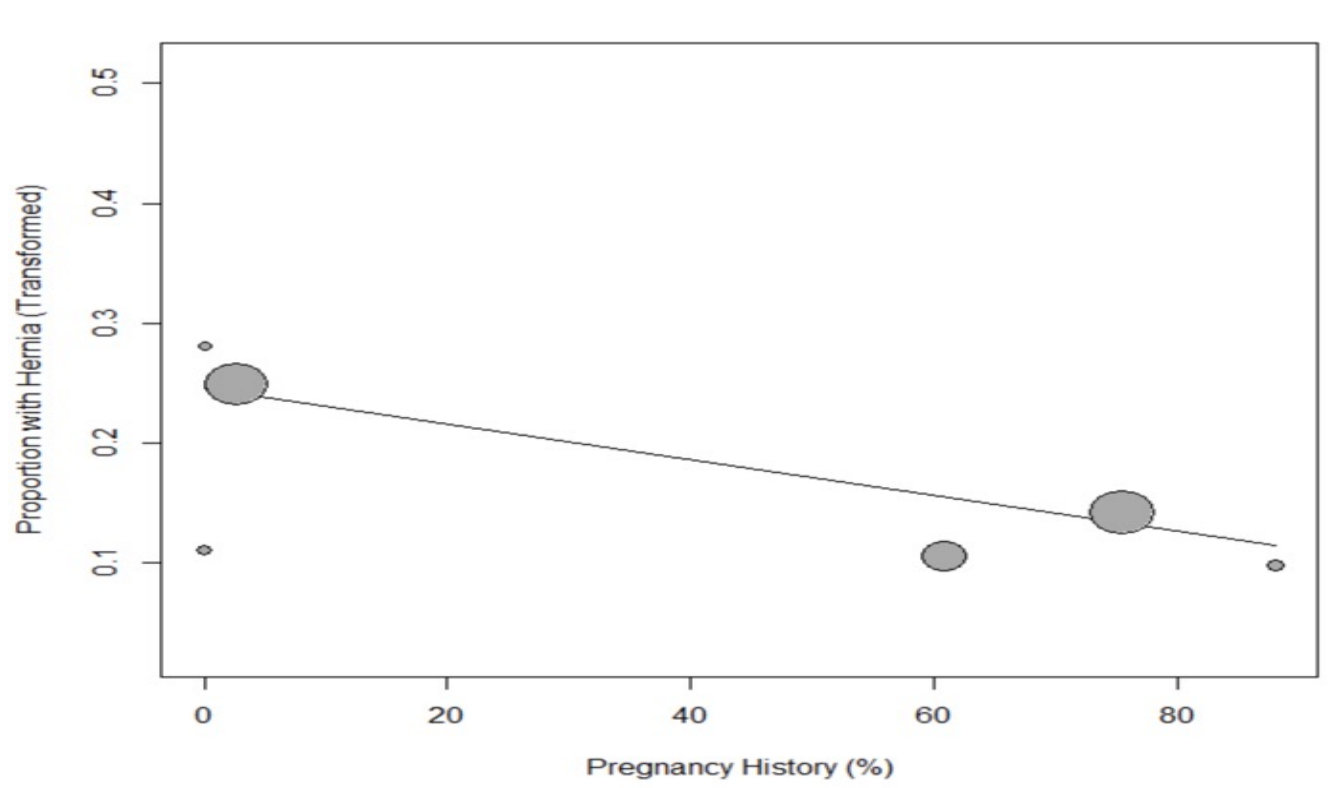


Figure 4. Pregnancy history associated with decreased rates of hernia (β=-0.0015, *p*=0.0001).

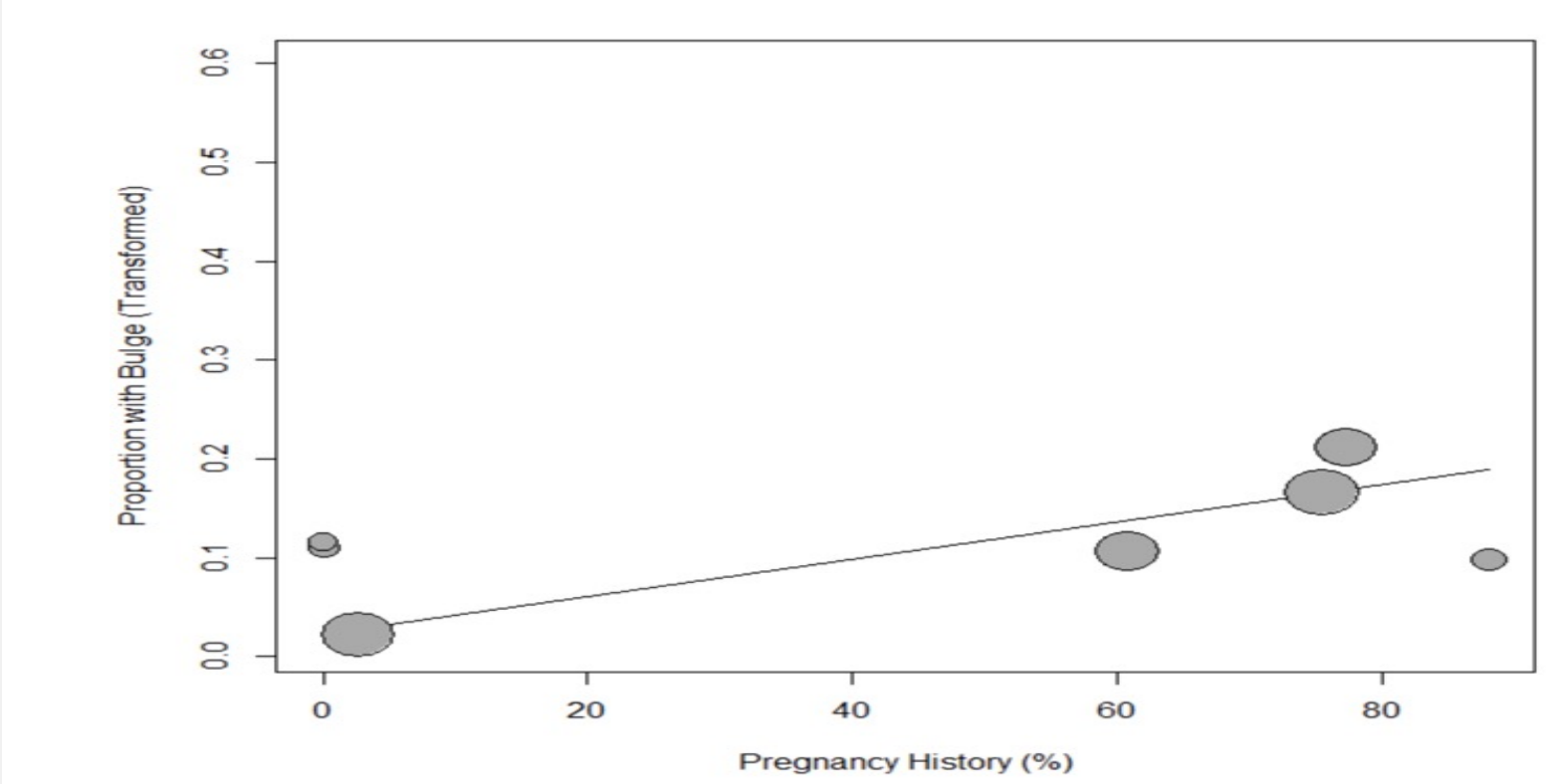


Figure 5. Pregnancy history associated with increased rates of bulge (β=0.0019, *p*=0.0001).

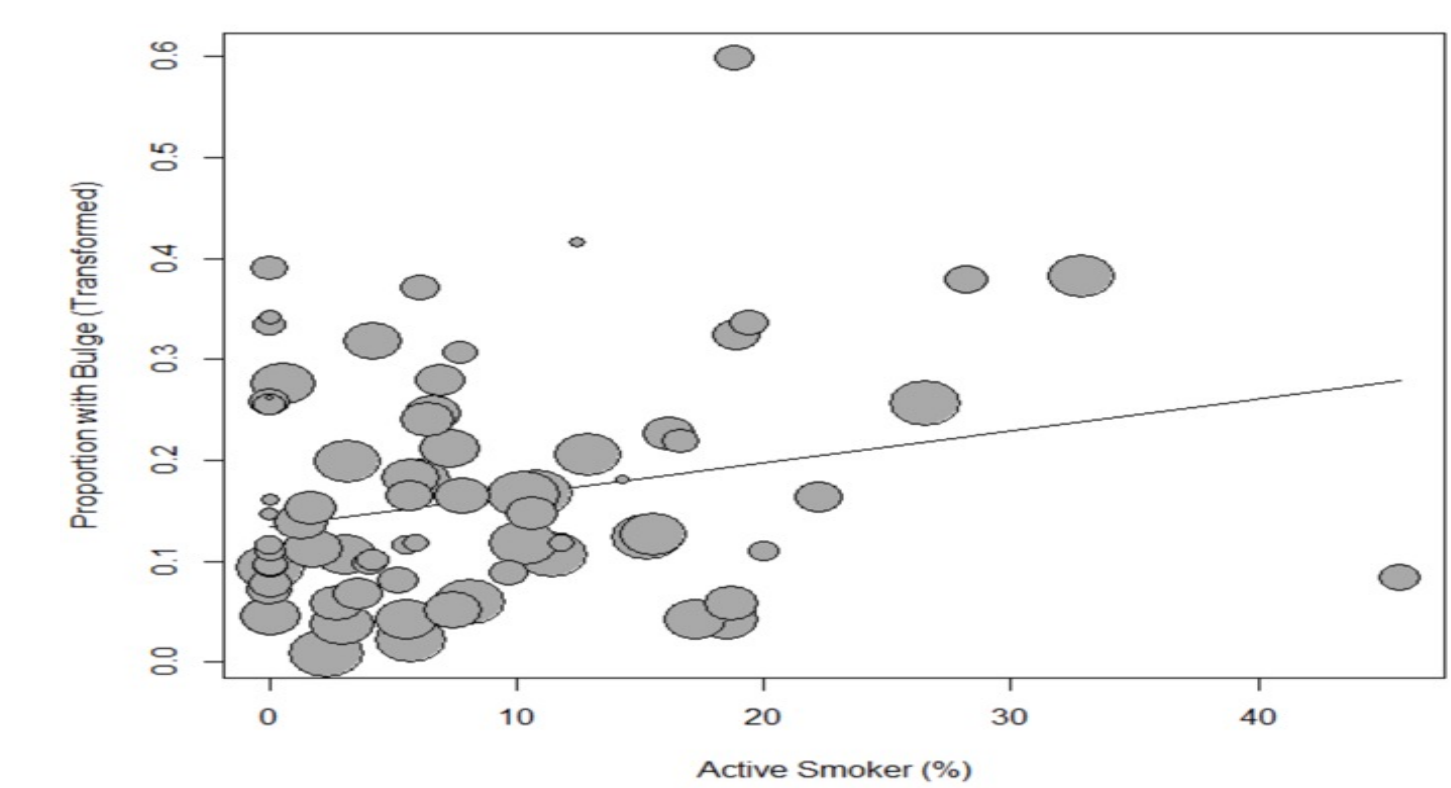


Figure 6. Active smoking associated with increased rates of bulge (β=0.0032, *p*=0.0262).

Results (continued)

Qualitative Analysis

- An Egger’s (weighted regression) test was used to assess for publication bias on each of the analyses run in this study [12]. Active smoking status may not be accurately reported in the literature (*p*=0.023).
- Quality assessment was performed using The American Society of Plastic Surgeons (ASPS) Rating Levels of Evidence and Grading Recommendations Evidence Rating Scale for Therapeutic Studies [13].

Conclusion

Understanding the co-morbidities associated with hernia or bulge following DIEP flap breast reconstruction, such as advanced age, prior abdominal surgery, pregnancy history, and active smoking status, allows surgeons to proactively identify high-risk patients and better prepare for potential future repair. This study found no association between mesh and hernia or bulge.

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