Comparative Analysis of Abdominoplasty With and Without Concurrent Hernia Repair: An Assessment of a Reconstructive Problem in a Cosmetic Patient Population

Charles A. Messa IV MBA, Harrison D. Davis BS, Theodore E. Harbath-Morales BS, Chris Amro MD, Robyn B. Broach PhD, John P. Fischer MD, MPH

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The Problem: Umbilical Hernia

- **2%** of adult population
  - Common in the aesthetic patient

- **Approx. 6-14% of all abdominal wall hernias** in adults\(^1\)
  - \(~ 175,000\) umbilical hernia/year\(^2\)
    - True prevalence unknown

- **Shared risk factors:**
  - Fascial laxity and **rectus diastasis**
  - Multiple pregnancies, previous surgery, & massive weight loss
    - Increased intrabdominal pressure

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Diastasis Rectus Abdominis

- **Separation of rectus abdominis**
  - Thinning and widening of linea alba

- **33%-60%** of postpartum women\(^1\)
  - >35% of women with diastasis will develop umbilical hernia\(^1\)

- **Functional and aesthetic issues** parallels with umbilical hernia
  - ↓ Abdominal wall strength, body image, and QoL.
  - Abdominal skin excess & fascial laxity

- **Predisposes to hernia formation**\(^2\)
  - Weakening of tendon

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Common Intersecting Disease States

Rectus Diastasis

- 33%-60% of postpartum women
- ↑ risk of hernia – thinning and widening of abdominal wall

Umbilical and Ventral Hernia

- 2% of the adult population
- 3:1 ratio of female: male

Intersection and complementary domains
- PRS poised to address
Abdominoplasty

- Optimal treatment for correction of:
  - Abdominal skin excess
  - Tissue adiposity
  - Rectus diastasis

- Diversification of abdominoplasty candidates
  - Postpartum, massive weight loss, and functional deficits

- Performed in conjunction with other body contouring procedures

- Correct both aesthetic and functional issues
  - Significant improvement in QoL\(^1\) and function\(^2\)

Convergence of PRS Principles

**Reconstruction:**
- Umbilical Hernia
- + Rectus
- Diastasis
  - Function
  - Sustainability

**Aesthetic:**
- Abdominoplasty
  - Skin Excess
  - Tissue Adiposity
  - Contour

**Abdominoplasty with Umbilical Hernia Repair**
Abdominoplasty with Umbilical Hernia

• Reported advantageous outcomes
  • Low recurrence rate and improvement in small series

• **Risks:**
  • Damage to umbilical blood supply
  • Recurrence and wound healing complications

• **Knowledge gaps:**
  • Lack of comparative assessment
  • Standardized operative technique
  • Single vs staged procedure

• Risk assessment and improve pre-operative consultation

Aim

To compare clinical outcomes in patients undergoing abdominoplasty with concurrent hernia repair and abdominoplasty alone.
Full abdominoplasty performed by J.P.F. from January 2015 – June 2022 (N = 145)

Abdominoplasty with Umbilical or small Ventral Hernia Repair (N=86)

Excluded (N):
- Large (>200cm²) VHR with CS and/or mesh (N=4)
- UHR repair with mesh (N=3)
- Non-PRS concomitant procedures (N=3)
- Inadequate follow-up (< 6 months) (N=8)

Final Study Cohort: Abdominoplasty with Umbilical Hernia Repair (N=68)

Excluded (N):
- Non-PRS concomitant procedure
  - Hysterectomy (n=4)
  - Salpingectomy (n=2)
- Inadequate follow-up (< 6 months (N=15)

Abdominoplasty Alone (N = 59)

Final Control Cohort: Abdominoplasty Alone (N = 38)
Study Design

- **Traditional abdominoplasty**
  - Cosmetic abdominoplasty with dissection above and below umbilicus and rectus diastasis repair
    - with/without concomitant umbilical/paraumbilical hernia
- **Primary Outcome:**
  - Cosmetic complications: hypertrophic scarring, asymmetry, recurrent skin excess.
  - Surgical site occurrences (SSO): delayed healing, SSO, SSI, fat necrosis
- **Secondary outcome:**
  - Hernia recurrence and re-operation rate
- **Univariate and multivariate analysis**

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Surgical Technique: Hernia Repair

Identification of defect and rectus diastasis

Defect dissected from umbilical structures

Pre-peritoneal fat reduced and defect closed 2-0 Maxon

Fascial defect closed primarily: continuous 2-0 Maxon

Perfused umbilicus, hernia repaired
## Demographics

<table>
<thead>
<tr>
<th></th>
<th>Abdominoplasty with Hernia Repair</th>
<th>Abdominoplasty Alone</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients (n=106)</strong></td>
<td>68 (64%)</td>
<td>38 (36%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td>45.1 (39.7-57.5)</td>
<td>44.3 (37.9-53.4)</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>BMI (kg/m(^2))</strong></td>
<td>27.2 (24.5-29.7)</td>
<td>26.3 (23.8-30.4)</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>Gender (F)</strong></td>
<td>63 (93%)</td>
<td>36 (95%)</td>
<td>0.58</td>
</tr>
<tr>
<td><strong>Hypertension</strong></td>
<td>8 (12%)</td>
<td>8 (21%)</td>
<td>0.20</td>
</tr>
<tr>
<td><strong>Diabetes Mellitus</strong></td>
<td>6 (9%)</td>
<td>2 (5%)</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Smoking History</strong></td>
<td>11 (16%)</td>
<td>10 (26%)</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Previous Open Abdominal Surgery</strong></td>
<td>13 (19%)</td>
<td>4 (10%)</td>
<td>0.09</td>
</tr>
</tbody>
</table>
# Patient Characteristics

<table>
<thead>
<tr>
<th>Number of Pregnancies</th>
<th>MWL: Bariatric Surgery</th>
<th>MWL: Diet and Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abdominoplasty with Hernia Repair (n=68)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 0: 1 (2%)</td>
<td>7 (10%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>• 2-3: 47 (77%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 4+: 8 (12%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Abdominoplasty Alone (n=38)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 0: 3 (7%)</td>
<td>9 (23%)</td>
<td>5 (11%)</td>
</tr>
<tr>
<td>• 2-3: 15 (40%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 4+: 6 (16%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P-value</strong></td>
<td>0.31</td>
<td>0.08</td>
</tr>
</tbody>
</table>
Hernia Characteristics

- All pre-peritoneal \textbf{W1} (<4cm)

<table>
<thead>
<tr>
<th>Defect Location</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supraumbilical</td>
<td>8 (12%)</td>
</tr>
<tr>
<td>Umbilical/Paraumbilical</td>
<td>57 (84%)</td>
</tr>
<tr>
<td>Infraumbilical</td>
<td>3 (4%)</td>
</tr>
</tbody>
</table>

## Operative Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Abdominoplasty with Hernia (n=68)</th>
<th>Abdominoplasty Alone (n=38)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liposuction</strong></td>
<td>53 (79%)</td>
<td>38 (100%)</td>
<td>0.006</td>
</tr>
<tr>
<td><strong>ASA Classification</strong></td>
<td></td>
<td></td>
<td>0.27</td>
</tr>
<tr>
<td>1</td>
<td>12 (18%)</td>
<td>7 (18%)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>53 (79%)</td>
<td>21 (71%)</td>
<td></td>
</tr>
<tr>
<td><strong>Concurrent Body Contouring Procedures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brachioplasty</td>
<td>0</td>
<td>6 (15%)</td>
<td></td>
</tr>
<tr>
<td>Thigh-Lift</td>
<td>0</td>
<td>7 (18%)</td>
<td></td>
</tr>
<tr>
<td>Mastopexy</td>
<td>6 (9%)</td>
<td>7 (18%)</td>
<td></td>
</tr>
<tr>
<td>Breast Augmentation</td>
<td>0</td>
<td>4 (10%)</td>
<td></td>
</tr>
<tr>
<td>Augmentation-Mastopexy</td>
<td>4 (7%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Length of Procedure (minutes)</strong></td>
<td>105 (87 - 138)</td>
<td>126.5 (95.5 - 187)</td>
<td>0.037</td>
</tr>
<tr>
<td><strong>Number of Drains</strong></td>
<td>2</td>
<td>2 (1-2)</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>Mean Days with Drains</strong></td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
## Clinical Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Abdominoplasty with Hernia (n=68)</th>
<th>Abdominoplasty alone (n=38)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median Follow-up (months)</strong></td>
<td>17.1 (7 – 27)</td>
<td>15.3 (7.2- 34)</td>
<td>0.76</td>
</tr>
<tr>
<td><strong>Median Length of Stay (days)</strong></td>
<td>0 (0-1)</td>
<td>0 (0-1)</td>
<td>0.188</td>
</tr>
<tr>
<td><strong>Surgical Site Occurrences</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delayed Healing</td>
<td>6 (8%)</td>
<td>5 (13%)</td>
<td>0.93</td>
</tr>
<tr>
<td>Wound Dehiscence</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
<td>0.20</td>
</tr>
<tr>
<td>Seroma</td>
<td>2 (3%)</td>
<td>1 (2%)</td>
<td>0.79</td>
</tr>
<tr>
<td>Surgical Site Infection (SSI)</td>
<td>3 (4%)</td>
<td>2 (5%)</td>
<td>0.63</td>
</tr>
<tr>
<td>Fat Necrosis</td>
<td>1 (1%)</td>
<td>0</td>
<td>0.43</td>
</tr>
<tr>
<td>VTE</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Umbilical Necrosis</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>
Clinical Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Abdominoplasty with Hernia</th>
<th>Abdominoplasty Alone</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cosmetic Complications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertrophic Scarring</td>
<td>3 (4%)</td>
<td>3 (7%)</td>
<td>0.94</td>
</tr>
<tr>
<td>Asymmetry</td>
<td>2 (2%)</td>
<td>1 (2%)</td>
<td>0.64</td>
</tr>
<tr>
<td>Recurrent Skin Excess</td>
<td>1 (1%)</td>
<td>2 (5%)</td>
<td>0.55</td>
</tr>
<tr>
<td><strong>Long-term Post-Operative Outcomes (&gt; 60 days)</strong></td>
<td>Abdominoplasty with Hernia</td>
<td>Abdominoplasty alone</td>
<td>P-value</td>
</tr>
<tr>
<td>Hernia Recurrence</td>
<td>1 (1.4%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mean Time to Hernia Recurrence</td>
<td>12.2 months</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Readmission</td>
<td>2 (2.8%)</td>
<td>0</td>
<td>0.25</td>
</tr>
<tr>
<td>Revision/Reoperation</td>
<td>6 (8.8%)</td>
<td>4 (10%)</td>
<td>0.76</td>
</tr>
<tr>
<td>Scar Revision</td>
<td>2 (3%)</td>
<td>2 (5%)</td>
<td></td>
</tr>
<tr>
<td>Incision and Drainage</td>
<td>4 (5.8%)</td>
<td>2 (5%)</td>
<td></td>
</tr>
</tbody>
</table>
### Logistic Regression

#### Odds Ratio by Post-Operative Outcome

- **Length of Stay**
  - Odds Ratio: 0.325 [0.16-0.81]
  - p-value: 0.188

- **Surgical Site Occurrences**
  - Odds Ratio: 1.02 [0.31-3.36]
  - p-value: 0.978

- **Cosmetic Complications**
  - Odds Ratio: 0.80 [0.14-4.57]
  - p-value: 0.805

**No significant differences:**
- Cosmetic complications, SSO, or length of stay.
- Operative time (p=0.501)

### Controlled for:
- Age
- BMI
- DM
- Previous pregnancies
- Type of concurrent procedure
Post-Operative Result

32yo, G2P2, lipo-abdominoplasty + umbilical hernia repair, 10 months follow-up

**AHQ:** Significant post-operative improvement
Post-Operative Result

37yo, G2P2, lipo-abdominoplasty + umbilical hernia repair, neoumbilicoplasty, and mastopexy, 7 months follow-up
Benefits of Abdominoplasty with Hernia Repair

- No difference in cosmetic complications or SSO
  - Re-operation
  - Readmission

- Improved abdominal aesthetic with abdominoplasty

- Hernia-free state with improved function
  - Low hernia recurrence rate after 1.5 years
Limitations

- **Single institution, retrospective review**
  - Operative time: small sample size, increased BCPs in non-hernia group
  - Accept limitation of single surgeon experience = reduce operative variation

- **Future directions:**
  - 1:1 matched comparison
  - Outcome analysis: primary repair vs mesh
  - Quality of Life analysis
    - BODY-Q, Abdominal Hernia-Q
Conclusion

• Commonality of umbilical and VH in the aesthetic patient
  • Relationship between diastasis and hernia
  • Specialty of PRS uniquely positioned to address both reconstructive and aesthetic components

• Highlight the safety and efficacy of abdominoplasty with umbilical hernia repair
  ✓ No difference in cosmetic complications
  ✓ No difference in reoperation or revisionary surgery
  ✓ Low recurrence rate, with suture-based repair of defects <4cm

• Improved abdominal aesthetic and reduced long-term functional morbidity
  • Mitigate the risk of entering a cycle of hernia recurrence and minimize future interventions
Conclusion

• Contribute to the existing body of literature supporting abdominoplasty with concomitant small umbilical hernia repair
  • Identify an **ideal patient population** vs. patients without umbilical hernia

• Improve pre-operative counseling and patient selection
  • Improve our understanding of problem to enhance outcomes
Thank you

- John P. Fischer MD, MPH
- Joseph M. Serletti, MD
- Robyn B. Broach, PhD
- Harrison D. Davis BS
- Theodore E. Harbath-Morales BS
- Chris Amro, MD