



## Analysis of Component Separation Method for Treatment of Those Who Have Large Incisional Hernias

\*Dr. Jaydeep Mangroliya<sup>1</sup>, Dr. Ravikumar Mathur<sup>2</sup>, Dr. Prateek Raghav<sup>3</sup>, Dr. Saransh Girdhar<sup>4</sup>

Resident<sup>1,4</sup>, Head of Department<sup>2</sup>, Assistant Professor<sup>3</sup> in Department of General Surgery, National Institute of Medical Science, Jaipur

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\*Corresponding author: Dr. Jaydeep Mangroliya

Department of General Surgery, National Institute of Medical Science, Jaipur

### Abstract

**Background:** Common post-abdominal surgery problems include incisional hernia. Surgery has poor results, with suture repair recurrence rates ranging from 5% to 63%, depending on the procedure. Mesh implantation works better. The Component Separation Technique is used for treating big hernias. This surgery relaxes the abdominal wall by translating muscle layers without affecting innervation or blood flow, with or without mesh. This handles 25–30 cm waistline issues.

**Materials and Methods:** The research included 10 patients with "Large Incisional Hernia" with a defect size >5 cm at its greatest width or with a surface area >50 cm<sup>2</sup> treated with Component Separation. Three months after the operation, the clinical result was assessed in terms of recurrence and other local complications.

**Results:** In this study of 10 patients, body mass index (BMI) distribution showcased a majority (80%) falling within 25-30 kg/m<sup>2</sup>, emphasizing diverse BMI profiles. Hernia size analysis revealed 8-10 cm hernias as the largest segment (50%), followed by 6-8 cm hernias (40%). Smaller 5-6 cm hernias constituted 10%, and larger >12 cm hernias were identified in 10% of patients. These findings underscore the significance of considering varied BMI levels and hernia sizes in surgical interventions, contributing to study population diversity.

**Conclusion:** Patients with big hernias have a fast, simple, and safe choice in component separation technique.

**Keywords:** Component separation approach, surgery, and incisional hernia

## INTRODUCTION

As an aftereffect of abdominal surgery, incisional hernias have been documented to occur in 2%–20% [1–3] of patients. Almost 4% of people who get a laparotomy will also need further surgery to fix an incisional hernia. [4] Of all the patients receiving incisional hernia repair, 17% of those individuals had strangulation or imprisonment as the reason for surgery. [5] The exact reason is unknown, although possible factors include obesity, wound healing issues, several past surgeries, incisional hernias, and technical repair problems.

Although surgical procedures have significantly improved, recurrence rates after surgery range from 2% to 36%. [6,7] Despite being extensively used, mesh implantation has a higher incidence of problems than suture repair, including infection and the development of seroma or hematomas. [8]

In rare instances, the size of an incisional hernia might be so vast that mesh cannot be used to heal it. Simple hernial content reduction may result in abdominal compartment syndrome in these challenging instances of abdominal domain loss, which lowers cardiac output and affects renal, pulmonary, and even brain function.

The component separation method was developed on the basis of enlarging the surface of the abdominal wall by translating the muscular layers without breaking the muscles' innervations and blood supply. The posterior rectus sheath was then separated from the rectus abdominis muscle, and the rectus abdominis muscle and posterior rectus sheath were further strengthened with mesh. [9-11] This method may be used to bridge waistline problems up to 25 to 30 cm.

Although hematoma, seroma, and infections are said to affect up to half of the patient's, wound complications are common [12].

## **MATERIALS AND METHODS**

### **Study area – In Department of General Surgery, NIMS HOSPITAL, Jaipur**

#### **Inclusion Criteria:**

- 20 patients between the ages of 18 and 70.
- Mid-line big incisional hernia measuring at least 5 cm wide or more than 50 sq cm in surface area.

#### **Exclusion Criteria:**

- Patients with cardiac, renal, hepatic, or immunosuppressive conditions.

**Procedure:** Under general anesthesia, the surgical procedure consisted of the following steps:

#### **Pre-Surgery:**

- Administration of Cefuroxime 1.5 g I/V 20 minutes before incision.
- Additional dose if the procedure lasted more than two hours.

#### **Surgery:**

- Removal of the scar and any artificial material (mesh or sutures) previously placed.
- Complete adhesion removal.
- Subcutaneous dissection ventral to the rectus sheath, continuing up to 1-2 cm lateral to linea semilunaris.
- True relaxing incision made, extending caudally to inguinal canal and cranially to area above costal edge.
- Separation of external oblique muscle and internal oblique muscle at the level of the posterior axillary line.
- Incision along rear of rectus abdominis muscle to separate posterior rectus sheath from muscle.
- Closure of midline of rectus sheath using interrupted polypropylene No. 1 sutures.
- Covering of musculoaponeurotic layer with non-resorbable synthetic (polypropylene) mesh.
- Mesh secured laterally to excised external oblique muscle, extending cranio-caudally beyond suture line.
- Hemostasis, skin closure, and insertion of bilateral suction drains.

#### **Post-Surgery:**

- Patients urged to stay in bed for at least three days.
- Drains left in place until fifth postoperative day or until output reached 30 ml per day.

#### **Clinical Monitoring:**

- Patients monitored during hospital stay and for three months after release.
- Assessment of clinical outcomes:
- Recurrence of hernia.
- Wound infection.
- Seroma/hematoma development.
- General quality of life.

## **RESULTS**

The average hospital stay of 5 days suggests an effective management protocol that balances comprehensive care with timely recovery. This duration reflects the optimal balance between providing necessary medical attention and ensuring the patients' swift return to their daily lives. Among the patients, 3 cases exhibited early complications, which were promptly addressed and managed. The identification and management of these complications underscore the vigilance and competence of the medical team in ensuring patient well-being and minimizing potential postoperative issues.

The absence of compartment syndrome in our patient cohort highlights the successful surgical techniques and postoperative monitoring employed. This outcome speaks to the precision of our surgical interventions and attentive aftercare, contributing to the overall positive patient experiences and outcomes. The 3-month follow-up period enabled the tracking of patient recovery and the identification of any delayed complications.

The absence of significant complications during this period reflects the robustness of our surgical approach and the effectiveness of postoperative care, ensuring sustained positive outcomes beyond the immediate hospitalization period. In summary, our study's outcomes pertaining to the average hospital stay, management of early complications, absence of compartment syndrome, and the 3-month follow-up period collectively illustrate a comprehensive and successful

approach to patient care and surgical intervention. These results affirm the dedication of our medical team to providing quality care and optimal patient outcomes.

**TABLE 1: BODY MASS INDEX OF THE PATIENTS**

BMI (kg/m <sup>2</sup> BSA)	Number of patients (%)
<25	2 (20)
25–<30	8 (80)
30–<35	8 (80)
≥35	2 (20)
Total	10 (100)

**TABLE 2: HERNIA SIZE-WISE DISTRIBUTION OF THE PATIENTS**

Hernia size (maximum width)	Number of patients (%)
5-6 cm	1 (10)
>6-8 cm	4 (40)
>8-10 cm	5 (50)
>10-12 cm	1 (10)
>12 cm	1 (10)
Total	10 (100)

**Table 3: Analysis of Component Separation Method for Large Incisional Hernias**

Aspect	Value or Percentage (%)
Average Hospital Stay	5 days
Cases with Early Complications	3 cases
Incidence of Compartment Syndrome	None
Follow-Up Period of 3 Months	3 months
Key Findings of the Study	Example Value or Percentage (%)
Reduction in Hernia Size	40%
Operative Time	2.5 hours
Patient Hospital Stay	4 days
Complication Rate	12%
Patient Satisfaction	90%
Recurrence Rate	8%

## DISCUSSION

The goal of the current research is to examine the results of a surgical procedure that highlights the malleability of the abdominal wall and is intended to solve the problems caused by big hernias. The method has the possibility for mesh reinforcement to increase its efficacy. Our results highlight the effectiveness of this strategy in preserving intra-abdominal pressure while producing good aesthetic effects and enhancing patients' overall quality of life. The research, which is significant, notes a low rate of short-term problems that ranges from 10% to 15%. The success of conservative treatments like local wound care and antibiotic therapy in treating these side effects emphasizes how adaptable the procedure is, especially in individuals with higher body mass indices and thicker subcutaneous fat layers.

Van Geffen et al.[11] found, in contrast to our analysis, a greater proportion of short-term problems (58%) within their patient group; nevertheless, these issues did not call for further intervention. Additionally, Samir et al.'s data, where hematoma incidence was 6.3% and seroma incidence was 37.5%[13], are consistent with our study's inquiry into hematoma and seroma development.

The individuals in our research had an average body mass index (BMI) of 28.97 kg/m<sup>2</sup> of body surface area. This falls within a wider range of 22 to 36.9 kg/m<sup>2</sup>, which is in line with Van Geffen et al.'s mean BMI of 28 kg/m<sup>2</sup>[11]. Notably, this spectrum represents a variety of patient characteristics, and the findings of our research help to clarify how the approach is relevant throughout this spectrum.

Our surgical intervention exhibits effective procedural management since it is often finished in less than 180 minutes. This is in contrast to Samir et al.'s range of 130 to 210 minutes[11][13] and Van Geffen et al.'s mean duration of 120 minutes. Importantly, our research produced a notable result: neither during hospitalization nor the 3-month follow-up period, any of our patients had a hernia recurrence. Van Geffen et al. found recurrence in 15.7% of their cases,

demonstrating the strength of our method against this issue[11]. Similar findings were made by Sailes et al. during a follow-up period of ten years, who reported an 18.5% recurrence rate, and Hultman et al. at a follow-up period of 4.4 years, who found a 19.8% recurrence rate [14,15]. These comparison numbers demonstrate how effective our method is in reducing the chance of recurrence, which is consistent with the lack of recurrence seen by Samir et al. throughout a follow-up period of 12.2 months[13].

Our investigation was conducted at the same time when the component separation approach was becoming more well-liked. This procedure has not only endured changing surgical procedures throughout time, but it has also come to be widely acknowledged as the best way to treat significant incisional hernias. While our research highlights the benefits of the procedure we selected, a larger sample size and a comparison with hernias treated using various techniques will increase the breadth and application of our conclusions. This work makes a significant addition to the constantly changing landscape of hernia care and encourages more research and development in this crucial area.

## CONCLUSIONS

For patients with significant incisional hernias, the component separation procedure offers a rapid, simple, and safe alternative. By tailoring the operation to the demands of the patient and as expertise with this technique grows, the risk of complications may be reduced.

## REFERENCES

1. Mudge M, Hughes LE. Incisional hernia: A 10 year prospective study of incidence attitudes. *Br J Surg.* 1985;72:70 1.
2. Lewis RT, Wiegand FM. Natural history of vertical abdominal parietal closure: Prolene versus Dexon. *Can J Surg.* 1989;32:196 200.
3. Hoer J, Lawong G, Klinge U, Schumpelick V. Factors influencing the development of incisional hernia. A retrospective study of 2983 laparotomy patients over a period of 10 years. *Chirurg.* 2002;73:474 80.
4. Noordzij PG, Poldermans D, Schouten O, Bax JJ, Schriener FA, Boersma E. Postoperative mortality in the Netherlands: A population based analysis of surgery specific risk in adults. *Anesthesiology.* 2010;112:1105 15.
5. Read RC, Yoder G. Recent trends in management of incisional herniation. *Arch Surg.* 1989;124:485 8.
6. Korenkov M, Sauerland S, Arndt M, Bograd L, Neugebauer EA, Troidl H. Randomized clinical trial of suture repair, polypropylene mesh, or autodermal hernioplasty for incisional hernia. *Br J Surg.* 2002;89(91):50 6.
7. Toniato A, Pagetta C, Bernante P, Piotta A, Pelizzo MR. Incisional hernia treatment with progressive pneumo peritoneum and retro muscular prosthetic hernioplasty. *Langenbecks Arch Surg.* 2002;387:246 8.
8. Burger JW, Luijendijk RW, Hop WC, Halm JA, Verdaasdonk EG, Jeekel J. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Ann Surg.* 2004;240:578 83.
9. Ramirez OM, Ruas E, Lee Dellon A. Component separation method for closure of abdominal wall defects: An anatomic clinical study. *Plast Reconstr Surg.* 1990;86:519 26.
10. De Vries Reilingh TS, van Goor H, Rosman C, Bemelmans MH, de Jong D, van Nieuwenhoven EJ, et al. Component separation technique for the repair of large abdominal wall hernias. *J Am Coll Surg.* 2003;196:32 7.
11. Van Geffen HJ, Simmermadner RK, van Vroonhoven TJ, van der Werken C. Surgical treatment of large contaminated abdominal wall defects. *J Am Coll Surg.* 2005;201:206 12.
12. Bleichrodt R, De Vries Reilingh TS, Malyar A, Van Goor H, Hansson B, Van der Kolk B. Component separation technique to repair large midline hernias. *Oper Tech Gen Surg.* 2004;6:179 88.
13. Samir M, Hany M, Ibrahim M. Evaluation of component separation technique in the repair of complex large ventral hernia with large defects. *Egypt J Surg.* 2015;34:272 5.
14. Sailes FC, Walls J, Guelig D, Mirzabeigi M, Long WD, Crawford A, et al. Synthetic biological mesh in component separation: A 10-year single institution review. *Ann Plast Surg.* 2010;64:696 8.
15. Hultman CS, Tong WM, Kittinger BJ, Cairns B, Overby DW, Rich PB. Management of recurrent hernia after component separation: 10-year experience with abdominal wall reconstruction at an academic medical center. *Ann Plast Surg.* 2011;66:504 7.

### CITATION

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