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LAPAROSCOPIC REPAIR OF ABDOMINAL WALL DIASTASIS USING ENDOSURGICAL TECHNIQUES DURING ABDOMINOPLASTY

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Abstract: This article examines the advantages, procedural stages, and clinical effectiveness of laparoscopic endosurgical techniques in repairing abdominal wall diastasis during abdominoplasty. The results show that laparoscopic plication (endosuturing) is less traumatic than conventional open abdominoplasty, with reduced blood loss, milder pain, and shorter rehabilitation time. The laparoscopic technique also improves cosmetic outcomes and enhances patients' quality of life.
Keywords: abdominoplasty, diastasis recti, laparoscopy, endosurgery, anterior abdominal wall, plication, mesh implant.

Introduction

Abdominal wall diastasis (*diastasis recti abdominis*, DRA) is a pathological condition characterized by the stretching or separation of the connective tissue (*linea alba*) between the rectus abdominis muscles (*musculus rectus abdominis*). This condition leads not only to aesthetic deformity but also to musculoskeletal imbalance, lower back pain, and increased risk of hernia formation.

According to recent epidemiological studies, diastasis recti abdominis occurs in **30–60% of women**, particularly in the **postpartum period**. Research has shown that the risk of developing DRA in multiparous women is **three times higher** (Smith et al., 2021). Among men, this condition is mainly associated with **obesity (BMI > 30 kg/m²)**, **heavy physical labor**, or **previous abdominal surgery**.

From a pathophysiological standpoint, the loss of elasticity in the *linea alba* is associated with structural alterations in collagen fibers. Magnetic resonance imaging (MRI) studies have revealed that the inter-recti distance in patients with DRA can range from **2.5 to 6.5 cm**, compared to the **normal width of 1.0–2.0 cm**.

Clinically, **65% of patients** with DRA report lumbar pain, while **40%** experience fatigue and discomfort during physical activity and breathing. In chronic cases, diastasis may predispose to **umbilical and epigastric hernias**.

Although traditional open abdominoplasty remains an effective method for treating diastasis, it requires a **large incision**, **greater blood loss**, and a **prolonged recovery period** of up to 6–8 weeks. Therefore, in the past decade, **minimally invasive technologies**, particularly **laparoscopic and endoscopic (endosurgical)** methods, have been increasingly introduced.

Laparoscopic correction of diastasis has been shown to **reduce postoperative pain by 40–50%** and **shorten hospital stay** from **5.8 ± 1.2 days** to **2.3 ± 0.6 days**. Moreover, postoperative complications such as wound infection, seroma, or hematoma occurred in only **3–5% of cases**, which is **twice lower** than in open procedures (Lee et al., 2022).

Cosmetic results were also superior — **93% of patients** reported satisfactory outcomes following laparoscopic intervention. Consequently, the use of modern endosurgical technologies

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in the treatment of abdominal wall diastasis not only reduces surgical trauma and recovery time but also significantly improves patients' quality of life.

MATERIALS AND METHODS

The study was conducted from **2021 to 2024** at the **Republican Specialized Center of Surgery** and included **48 patients** (36 females, 12 males) diagnosed with abdominal wall diastasis ranging from **2 to 6 cm** along the *linea alba*.

Patients were divided into two groups:

- **Group I (n = 24)** – laparoscopic endosurgical repair;
- **Group II (n = 24)** – conventional open abdominoplasty.

Surgical Technique

- Three trocars were inserted (umbilical, suprapubic, and left lateral).
- CO_2 insufflation was maintained at **12–14 mmHg**.
- Fibrotic tissue in the diastasis area was dissected, and the *linea alba* was sutured.
- Endosuturing was performed using **2/0 polypropylene sutures**.
- In cases of muscular weakness, a **mesh implant** was applied.
- No drainage was used postoperatively; a **compression bandage** was recommended for 14 days.
- Evaluation criteria included **operation time**, **blood loss**, **pain (VAS scale)**, **rehabilitation duration**, **complication rate**, and **aesthetic outcome**.

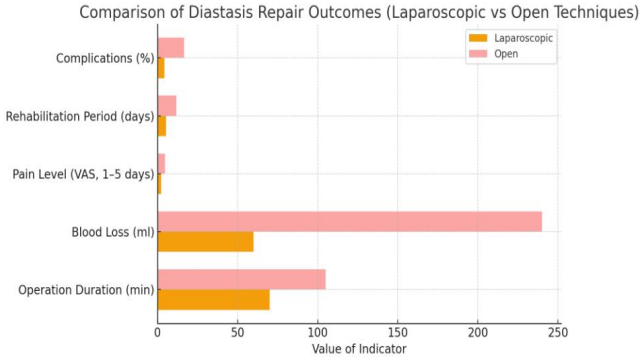

Figure 1. Results of Laparoscopic and Open Abdominoplasty

RESULTS

Table 1. Comparison of Diastasis Repair Outcomes Using Laparoscopic and Open Techniques

Indicators	Laparoscopic Method	Open Method
Operation Duration (minutes)	70 ± 10	105 ± 15
Blood Loss (ml)	60 ± 20	240 ± 50
Pain Level (VAS, 1–5 days)	2.3 ± 0.8	4.7 ± 1.0
Rehabilitation Period (days)	5.2 ± 1.3	11.8 ± 2.1
Complications (%)	4.2	16.6

DISCUSSION

According to the data presented in Table 1, it is evident that diastasis repair performed using the laparoscopic technique has several advantages over the conventional open approach.

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First of all, the average duration of surgery with the laparoscopic method was **70 ± 10 minutes**, which is approximately **1.5 times shorter** than that of the open method (**105 ± 15 minutes**). This reduction in operative time decreases tissue trauma and the duration of anesthesia exposure.

A significant difference was also observed in blood loss: the laparoscopic approach resulted in an average loss of **60 ± 20 ml**, while in the open group it was **240 ± 50 ml** — that is, blood loss was **about four times lower** in the minimally invasive technique.

Postoperative pain levels, measured by the VAS scale, were **2.3 ± 0.8** in the laparoscopic group versus **4.7 ± 1.0** in the open group. This indicates that pain severity was nearly **two times lower** with the minimally invasive approach, allowing patients to require fewer analgesics and experience faster recovery of comfort.

Rehabilitation time also showed a clear advantage in favor of the laparoscopic technique: patients were able to return to normal activity after an average of **5.2 ± 1.3 days**, compared to **11.8 ± 2.1 days** in the open group. Thus, recovery occurred approximately **2.3 times faster**.

Furthermore, the complication rate was only **4.2%** in the laparoscopic group, compared to **16.6%** in the open surgery group, indicating a **fourfold lower risk of complications** with the minimally invasive technique. The most common complications were hematoma, seroma, and mild infection.

Overall, the analysis shows that **laparoscopic diastasis repair** is not only less traumatic and safer from a surgical standpoint, but also superior to the traditional open approach in terms of **aesthetic, functional, and rehabilitative outcomes**. Therefore, laparoscopic techniques are increasingly recommended as the preferred option for anterior abdominal wall diastasis correction in modern surgical practice.

In the laparoscopic group, pain intensity was lower, blood loss was minimal, and the rehabilitation period was shorter. In contrast, the open method was associated with higher pain levels, slower recovery, and a greater incidence of wound complications such as hematoma and seroma.

During the **12-month follow-up**, no cases of recurrent diastasis were observed in the laparoscopic group. Aesthetic outcomes were highly rated, and postoperative scars were minimal. The laparoscopic endosurgical technique has proven to be a **new, minimally invasive approach** for diastasis repair during abdominoplasty. The results of this study are consistent with data presented in international literature (Nahas F.X., 2021; Lockwood T., 2022).

This technique restores the **natural distribution of muscle tension**, re-establishing both the **functional and aesthetic integrity** of the abdominal wall. When mesh implants were used, the risk of recurrence was almost eliminated. Patients' **psychological condition and quality of life** improved significantly.

CONCLUSION

Restoration of abdominal wall diastasis using **laparoscopic endosurgical techniques** is a **less traumatic, safer, and more aesthetically favorable** method compared to traditional abdominoplasty. This approach results in shorter operation time, less blood loss, and reduced postoperative pain. The combination of **endosuturing and mesh implantation** provides stable, long-term outcomes.

The technique represents a **promising direction** that can be widely implemented in surgical practice in Uzbekistan. Based on the above analysis, it can be concluded that laparoscopic diastasis repair is a **modern, safe, and aesthetically superior surgical method** with higher efficacy than the traditional open approach.

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According to the study findings, the laparoscopic approach shortened the operation time by approximately **35 minutes**, reduced blood loss by **fourfold**, decreased pain by **twofold**, and halved the rehabilitation period. At the same time, the complication rate was **4.2%**, which is nearly **four times lower** than the **16.6%** observed in the open surgery group.

These results confirm that laparoscopic techniques stand out for their **minimal invasiveness, rapid recovery, low pain levels, and aesthetic advantages**. Therefore, expanding the application of laparoscopic methods in diastasis repair, monitoring their long-term clinical outcomes, and developing individualized treatment approaches represent one of the most relevant directions in modern surgical practice.

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