

ESTOIH STUDY* SUMMARY

ESTOIH¹⁻⁴ study examined the impact of the short stitch technique for midline abdominal closure on the incidence of incisional hernia. The study compared the short stitch technique against the standard loop closure using **Monomax**[®].

- a) It reported **low complication rates** at short and long-term (Surgical Site Infection (SSI) and Incisional Hernia (IH) rate) either in short and long stitch group compared with previous literature.^{1, 2}
- b) These low complication rates can be attributed to the use of **Monomax**[®].^{1, 2}
- c) **Monomax**[®] in combination with short stitches seems to be the best option to reduce IH rates.^{2, 3}
- d) ESTOIH study shows for the first time that using **Monomax**[®] helps to reduce the rate of IH and other complications despite using traditional long stitch technique.^{2, 3}



* ESTOIH

Effects of the short stitch technique for midline abdominal closure on incisional hernia randomized clinical trial.





Effects of the Short-Stitch Technique for Midline Abdominal Closure on Incisional Hernia: Results from the Randomised-Controlled ESTOIH Trial¹⁻³

Aim

To investigate the effects of the short stitch technique on hernia development compared to traditional loop closure of midline laparotomy by using **Monomax®**.

Materials & Methods

Multi-centric, Double-blinded, controlled, parallel-group, trial with 1:1 randomization.

 9 centres in Germany and Austria	 30 days, 1 year, 3 years and 5 years	 425 patients	 Elective primary laparotomy with an incision ≥ 15 cm
Parameter	Long stitch (n=215)	Short stitch (n=210)	
Suture Material	Monomax® 1, 150 cm loop, HR48	Monomax® 2/0, 150 cm, HR26	
Stitch interval	10 mm	5 mm	
Median wound to stitch site distance	10 mm	5 - 8 mm	
Suture / wound length ratio	4:1	≥5:1	
Knots (recommended)	At least 6 knots at the end of the suture line.	A self-locking knot at the beginning and at the end of the suture line.	

The low IH rate stands out with previously published data:

The SSI rate was remarkably low across treatment groups:

Technique	IH rate - 1 year follow up			SSI rate 30 days post-op		
	MILLBOURN ⁴	STITCH ⁵	ESTOIH ²	MILLBOURN ⁴	STITCH ⁵	ESTOIH ¹
Long stitch	18 %	21 %	6.4 %	10.5 %	23 %	5.7 %
Short stitch	5.6 % sign.	13 % sign.	3.3 % n. sign.	5.2 % sign.	20 % n. sign.	3.7 % n. sign.

ESTOIH trial did not find direct correlation between wound infections and the occurrence of IH. Interestingly, STITCH trial had yielded higher SSI rates despite using Triclosan-coated suture material (PDS II Plus®).

sign. = significant difference | n. sign. = non-significant difference

Monomax® may have contributed to low IH rates:

- The increased elasticity might help to reduce the occurrence of button-hole hernia at the wound edges (2) and reduces tension on the fascia (3).
- The delayed resorbability of the suture material is thought to support scar formation and wound healing over time, leading to fewer delayed hernias (3). In summary, Monomax® suture material seems to support the healing of the fascia by its high elasticity, high basic strength retention and long-lasting resorption time (2).

In the ESTOIH study, the non-significant difference in hernia development between the treatment groups found 1 year after laparotomy closure remained discernible after 3 years.

Technique	IH rate – 3 years follow up ³
Long stitch	10.45 % (21/201)
Short stitch	7.58 % (15/198) n. sign.

n.sign. = non-significant difference

These results stand out compared with previous published data from Millbourn et al.¹ and STITCH² trial, which reported higher hernia rates for both suture techniques.

Total IH rate in ESTOIH study ^{2, 3}	
1 Year Follow Up	3 Years Follow Up
6.19% (20/323)	13.19% (36/273)

CONCLUSIONS

- Using **Monomax[®]** low IH rates were observed independent of the stitch technique used for abdominal wall closure.^{2, 3}
- Monomax[®] helps to **improve the rate of IH and other complications** despite using traditional long stitch technique.²
- The **6.19% hernia rate at 1 year** and **13.19 % at 3 years** across the treatment groups is lower compared to previous findings.^{2, 3}
- Given that the majority of earlier studies used poly-dioxanone-based sutures, the low hernia rates in the ESTOIH trial may be attributed in part to the distinctive **properties of Monomax[®]** sutures applied in both treatment arms.^{2, 3}

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2. Fortelny RH, Andrade D, Schirren M, Baumann P, Riedl S, Reisensohn C et al. Effects of the short stitch technique for midline abdominal closure on incisional hernia (ESTOIH): randomized clinical trial. *Br J Surg*. 2022 Aug;109(9):839-845.
3. Fortelny RH, Hofmann A, Baumann P, Riedl S, Kewer JL, Hoelderle J, et al. Three-year follow-up analysis of the short-stitch versus long-stitch technique for elective midline abdominal closure randomized-controlled (ESTOIH) trial. *Hernia*. 2024; 28(4):1283-1291.
4. Millbourn D, Cengiz Y, Israelsson LA. Effect of stitch length on wound complications after closure of midline incisions: a randomized controlled trial. *Arch Surg* 2009;144(11):1056-1059.
5. Deerenberg EB, Harlaar JJ, Steyerberg EW, Lont HE, van Doorn HC, Heisterkamp J et al. Small bites versus large bites for closure of abdominal midline incisions (STITCH): a double-blind, multicentre, randomized controlled trial. *Lancet* 2015;386(10000):1254-1260.



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