

Chapter 4

The Bassini and Darning repair for inguinal hernia: A Review

Kumar Hari Rajah^{1*}

¹Associate Professor of Surgery, Taylor's University School of Medicine and Health Science, 47500 Subang Jaya, Malaysia.

*Corresponding Author.

Abstract

Inguinal hernia repair is among the most commonly performed surgical procedures globally. While mesh-based techniques are the standard of care for most adult patients, tissue-based repairs remain significant in specific clinical contexts, such as contaminated surgical fields, resource-limited environments, and patient preference. Among traditional tissue repairs, the Bassini repair and darning repair retain clinical importance. Edoardo Bassini transformed hernia surgery in the late nineteenth century by introducing anatomical reconstruction of the posterior wall of the inguinal canal, which significantly reduced recurrence rates compared to earlier methods. The darning repair, particularly the Moloney darn, was subsequently developed as a tension-reducing tissue repair that uses nonabsorbable sutures to create a mesh-like support between the conjoint tendon and inguinal ligament. This chapter explores the indications, outcomes, advantages, disadvantages, and current role of Bassini and darning repairs in adults with inguinal hernia. Current evidence indicates that while both techniques are effective for selected patients, darning repair generally results in lower postoperative pain and tension, whereas Bassini repair offers robust anatomical reconstruction but may be associated with higher recurrence rates under excessive tension. Despite the prevalence of mesh repairs, both methods remain valuable components of the hernia surgeon's repertoire.

Keywords: Bassini, Modified Bassini, Darn, Moloney, Inguinal hernia, Chronic pain, and Recurrence.

Introduction

Edoardo Bassini introduced a technique for managing inguinal hernia in adults, which entails repairing the posterior wall of the inguinal canal. This procedure involves incising the cremasteric fascia, followed by the reduction of the hernia sac and incision of the transversalis fascia. Subsequently, the internal oblique, transversus abdominis, and transversalis fascia are approximated to the inguinal ligament and iliopubic tract (Johnson et al., 2004; O'Neill et al., 2016; Woods & Neumayer, 2008). The Bassini repair can be conducted under local or regional anesthesia, utilizing non-absorbable sutures. Typically, 5 to 8 stitches are employed, which are tied on the muscle. In cases where tension is present over the repair, a vertical incision may be made over the anterior rectus sheath to serve as a relaxing incision (Nicolò, 2018; Ramshaw & Chiu, 2018; Terranova et al., 2001). The modified Bassini repair omits the incision of the fascia transversalis, with the conjoint tendon being sutured to the inguinal ligament and iliopubic tract. This modification minimizes excessive dissection, reduces tension in the repair, and decreases operative time (Jessie & Ritz, 2020).

The darn repair technique for inguinal hernia involves creating a lattice-like reinforcement that distributes stress across multiple suture loops, thereby strengthening the posterior wall of the inguinal canal. This method is based on reconstructing the posterior inguinal wall using a woven network of non-absorbable sutures. By placing a continuous polypropylene or nylon suture between the inguinal ligament and the conjoint tendon, multiple overlapping suture loops are formed, resulting in a mesh-like structure. This technique is considered tension-free as it does not require forcible approximation of tissues. The fibroblastic response that ensues leads to additional reinforcement through collagen deposition around the suture material. The success of the darning repair relies on the creation of a scaffold that effectively distributes forces across the inguinal floor. The woven suture network functions similarly to a prosthetic mesh, yet it avoids the implantation of foreign synthetic sheets (Abrahamson, 2001).

This chapter seeks to evaluate the Bassini and Darning techniques for inguinal hernia repair in the surgical treatment of adult inguinal hernias. A comparison is made between the Bassini and Darning repairs and other mesh-based techniques, such as the Lichtenstein method,

with a focus on complications, chronic pain, and recurrence rates. A thorough literature review was performed using databases including PubMed, Google Scholar, Semantic Scholar, and Cochrane to identify original research studies, observational studies, clinical trials, clinical reviews, review articles, systematic reviews, and meta-analyses from 1980 to 2026. The search utilized keywords such as “Bassini,” “Modified Bassini,” “Darning,” “Moloney,” “Inguinal hernia,” “chronic pain,” and “recurrence.” All articles were in English, and additional sources were identified through manual cross-checking. Case reports, commentaries, and editorials were excluded, while all studies involving adult patients were incorporated into this chapter.

Discussion

The Bassini and Modified Bassini hernia repair

Tse et al. conducted a retrospective cohort study examining the Bassini technique for inguinal hernia repair. The study included 203 patients, with 10.8% experiencing wound hematoma or seroma and 8.4% developing urinary retention. The incidence of chronic pain was reported at 10.3%, and the recurrence rate was 3.7%. These findings suggest that the Bassini repair may be a viable option for patients who prefer to avoid mesh-based hernia repair (Tse et al., 2021). In a separate randomized trial, Paul et al. compared the Modified Bassini repair with the Shouldice repair. The study involved 265 patients, with 125 undergoing the modified Bassini repair and 119 receiving the Shouldice repair. No significant differences were observed in postoperative hematoma and seroma formation between the groups; however, the recurrence rate was notably higher in the modified Bassini group compared to the Shouldice group (7.6% vs. 1.9%) after a follow-up period of 3.3 years (Paul et al., 1994). Kassab et al. conducted a prospective study on the Bassini repair for inguinal hernia treatment, reporting a recurrence rate of 2.89% (Kassab et al., 2013).

Maggiore et al. conducted a comparative study of the Bassini and Lichtenstein repairs for managing inguinal hernia, involving 738 patients. Of these, 381 underwent the Bassini repair, while 357 underwent the Lichtenstein repair. The study found that postoperative hematoma and urinary retention were more prevalent in the Bassini repair group, although recurrence rates were comparable between the two groups (Maggiore et al., n.d.). In another study, Shi et al. compared the Bassini and Lichtenstein repairs for adult inguinal hernia treatment, including 552 patients, with 269 undergoing the Bassini repair and 283 undergoing the Lichtenstein repair. The Bassini repair was linked to prolonged postoperative pain (25.7% vs. 18.5%) and a higher recurrence rate (8.9% vs. 2.3%). Additionally, it was associated with a longer operating time but reduced costs (Shi et al., 2010). Miyazaki et al. conducted a retrospective study comparing the Bassini repair with the mesh plug repair for adult inguinal hernia, involving 231 patients. Among them, 118 underwent the Bassini repair and 113 the mesh plug repair. The study reported no differences in postoperative complications between the procedures, but the recurrence rate was higher in the Bassini group (7.6% vs. 0.9%) (Miyazaki et al., 2001).

Harjai et al. conducted a prospective randomized controlled trial to compare the modified Bassini repair with the Lichtenstein repair for inguinal hernia. The study comprised 196 patients, with 118 undergoing the Bassini repair and 98 undergoing the Lichtenstein repair. The Bassini repair was associated with a longer operating duration and an extended time to return to work. No significant differences in recurrence rates were observed between the two procedures (Harjai et al., 2007). Naveen et al. conducted a randomized comparative study focusing on rural patients undergoing the modified Bassini repair and the Lichtenstein repair for inguinal hernia. This study included 70 patients, with 35 patients in each repair group. The modified Bassini repair was linked to a slightly higher incidence of hematoma formation and recurrence rate, whereas the Lichtenstein repair was associated with a higher rate of seroma formation (Naveen & Srinath, 2014). Palermo et al. performed a randomized controlled trial to assess immediate complications between the Bassini repair and the Lichtenstein repair. The Bassini repair was associated with a greater number of postoperative complications and a longer duration to return to work compared to the Lichtenstein repair (Palermo et al., 2015).

Malik et al. conducted a retrospective study to compare the Modified Bassini repair with the Lichtenstein repair for inguinal hernia in adults. The study encompassed 800 patients, with 408 undergoing the Modified Bassini repair and 392 undergoing the Lichtenstein repair. The findings indicated that post-operative pain and recurrence rates were higher with the Modified Bassini repair than with the Lichtenstein repair (Malik et al., 2009). Zahoor et al. performed a comparative study on the Modified Bassini repair and the Lichtenstein repair for treating inguinal hernia in young adults. This study included 82 patients: 34 underwent the Bassini repair and 48 underwent the Lichtenstein repair. The results showed no differences in post-operative complications, chronic pain, and recurrence between the two procedures (Zahoor et al., 2024). Witkowski et al. carried out a randomized prospective study comparing the mesh plug and Bassini repair for inguinal hernia. This study included 140 patients, with 70 undergoing the Bassini repair and 70 undergoing the mesh plug repair. While no differences were observed in postoperative complications, the Bassini repair was associated with a longer operative time and a higher recurrence rate (20.5% vs. 9.4%) (Witkowski et al., 2000).

The Darning Inguinal Hernia Repair

Olasehinde et al. conducted a retrospective study examining darning repair for inguinal hernia in adults. The study encompassed 132 patients with surgical site infection observed in 4.5% of cases. The chronic pain rate was 3%, and after a 15-month follow-up, the recurrence rate was 1.5% (Olasehinde et al., 2015). Finch et al. performed a systematic review and meta-analysis of randomized controlled trials comparing open darn repair with open mesh-based inguinal hernia repair. This analysis included 10 studies with a total of 3024 patients, revealing no differences in recurrence rates between the procedures (RD-0.00, 95% CI, 0.01-0.01). Additionally, no differences were found in surgical site infection (OR-0.74, 95% CI, 0.44-1.26), hematoma formation (OR-1.16, 95% CI, 0.68-1.97), seroma formation (OR-0.69, 95% CI, 0.36-1.33), length of hospital stay (MD-0.09, 95% CI, 0.44-0.26), and operative time (MD-0.61, 95% CI, 4.47-5.68) (Finch et al., 2019).

Kucuk et al. conducted a prospective randomized comparative study to evaluate the efficacy of the darn repair versus the Lichtenstein repair for inguinal hernia in adults. The study included 306 patients, with 176 undergoing the darn repair and 130 undergoing the Lichtenstein repair. The results indicated no significant differences in postoperative complications, operative time, or recurrence rates between the two procedures (Kucuk et al., 2010). Udo et al. also investigated the outcomes of the darn repair for inguinal hernia in adults. In their study, 65 patients underwent the darn repair, with a wound hematoma occurrence of 1.5%, and no recurrences were observed (Udo et al., 2014). Similarly, Essawy et al. examined the outcomes of the darn method for inguinal hernia repair in adults. Their study involved 40

patients, with a wound infection rate of 7.5% and a seroma rate of 12.5%. No recurrences were noted after a follow-up period of six months (Essawy et al., 2019).

Ahmad et al. conducted a retrospective study on open darn repair for inguinal hernia in a remote setting, involving 2000 patients. The study reported a superficial surgical site infection rate of 4.5%, hematoma formation in 8% of patients, and seroma formation in 15%. After a 5-year follow-up, the recurrence rate was found to be 0.15% (Ahmad et al., 2018). Kaynak et al. compared darn repair with Lichtenstein repair for inguinal hernia in adults, involving 651 patients, with 297 undergoing darn repair and 354 undergoing Lichtenstein repair. The study found no differences in postoperative complications, chronic pain, or recurrence rates between the two procedures (Kaynak et al., 2007). Maksoud et al. conducted a prospective randomized controlled trial comparing darn repair and Lichtenstein repair, involving 227 patients, with 108 undergoing darn repair and 118 undergoing Lichtenstein repair. While no differences were observed in postoperative complications and recurrence rates, the darn repair was associated with a longer operating time compared to the Lichtenstein repair (Abd El Maksoud et al., 2014).

Boonnithi et al. conducted a prospective clinical trial to compare the efficacy of the darn repair, Bassini repair, and Lichtenstein repair for inguinal hernia in adults. The study included 197 patients, with 70 undergoing the darn repair, 68 the Bassini repair, and 59 the Lichtenstein repair. Postoperative hematoma formation was observed in 1.4% of patients who underwent the darn repair, 5.9% of those who underwent the Bassini repair, and 5.1% of those who underwent the Lichtenstein repair. Recurrence occurred in one patient who underwent the Bassini repair, while no recurrences were reported in patients who underwent the darn and Lichtenstein repairs (Boonnithi & Kongkham, 2010).

Table 1: Comparison of Complications and Recurrence Rates Between Bassini Repair and Darning Repair for Inguinal Hernia

Study	Study Type	Bassini repair	Darning repair	Findings
Tse et al., 2021	Retrospective study	Recurrence: 3.7% (7/205 repairs). Postoperative complications included hematoma/seroma (10.8%), urinary retention (8.4%), testicular ischemia (2%), and pain-related problems (10.3%), mostly transient.	Not evaluated	Bassini repair demonstrated acceptable long-term durability with relatively low recurrence and manageable complications.
Kassab et al., 2013	Prospective study	Greater postoperative pain requiring analgesia, more wound infections and hematomas; recurrence reported up to 4.76% at 1 year.	Lower postoperative pain, fewer wound complications, recurrence 0% at 1 year.	Darning repair showed less morbidity and lower recurrence than Bassini repair.
Palermo et al., 2015	Randomized clinical study	Tissue repair was associated with increased tension and postoperative discomfort compared with Darning repair.	Lower tension repair was associated with less postoperative discomfort and earlier mobilization.	Darning repair was favored for reduced postoperative pain and recovery time
Olasehinde et al., 2015	Retrospective study	Not studied.	Surgical site infection: 4.5%; chronic groin pain: 3.0%; recurrence: 1.5% during mean follow-up of 15 months.	Darning repair was considered safe and effective with low recurrence and chronic pain rates.
Finch et al., 2019	Systematic review and meta-analysis	Not studied directly.	Systematic review found no significant differences in recurrence, surgical-site infection, hematoma, neuralgia, urinary retention, or return to normal activities compared with mesh repair. Evidence for chronic pain was inconclusive.	Darning repair appears to be a credible non-mesh alternative with low recurrence and acceptable complication rates.

Conclusion

Bassini repair and darn repair are two historically significant tissue-based techniques for adult inguinal hernia repair. The Bassini repair established foundational principles of anatomical reconstruction, significantly advancing the field of hernia surgery. Subsequently, the darn repair addressed a primary limitation of the Bassini method by reducing tissue tension through a mesh-like suture framework. Although both techniques have largely been replaced by tension-free mesh repairs in contemporary practice, they retain value in specific clinical contexts. Current evidence indicates that darn repair may result in reduced postoperative pain and similar recurrence rates compared to Bassini repair. However, outcomes are highly contingent upon patient selection, tissue quality, and the surgeon's expertise. As global surgery increasingly prioritizes cost-effectiveness and accessibility, understanding these classical techniques remains crucial for modern surgeons.

Declaration

Conflict of interest: There is no conflict of interest.

References

- [1] Abd El Maksoud, W., Abd El Salam, M., & Ahmed, H. H. (2014). Comparative study between Lichtenstein procedure and modified darn repair in treating primary inguinal hernia: A prospective randomized controlled trial. *Hernia*, 18(2), 231–236. <https://doi.org/10.1007/s10029-012-1039-6>
- [2] Abrahamson, J. (2001). The darn repair. In *Abdominal Wall Hernias: Principles and Management* (pp. 361-364). New York, NY: Springer New York.
- [3] Ahmad, S., Ahmed, N., Singha, J. L., Rayhan, F., Hassan, A. F. U., Hossain, M. A., & Islam, M. (2018). Open Maloney Repair for Adult Inguinal Hernia: 5 Years Experience in A Remote District. *Journal of Shaheed Suhrawardy Medical College*, 10(1), 6–10. <https://doi.org/10.3329/jssmc.v10i1.38896>
- [4] Boonnithi, N., & Kongkham, K. (2010). A prospective clinical trial comparing darn vs Bassini vs Lichtenstein inguinal Herniorrhaphy. *The THAI journal of SURGERY*, 31(4).
- [5] Essawy, A., Ibrahim, M., Ashraf Mohamed Thabet, E., Erfan, M., & Fathi Ismail Mohammed, I. (2019.). Outcome of Darning Method of Inguinal Hernia Repair. Print)Online) *Fayoum University Medical Journal*, Ismail et Al, 2019(1), 15–23.
- [6] Finch, D. A., Misra, V. A., & Hajibandeh, S. (2019). Open darn repair vs open mesh repair of inguinal hernia: a systematic review and meta-analysis of randomised and non-randomised studies. In *Hernia* (Vol. 23, Number 3, pp. 523–539). Springer-Verlag France. <https://doi.org/10.1007/s10029-019-01892-1>
- [7] Harjai, M. M., Nagpal, B. M., Singh, P., & Singh, Y. (2007). A prospective randomized controlled study of Lichtenstein's tension free versus modified Bassini repair in the management of groin hernias. *Medical Journal Armed Forces India*, 63(1), 40–43. [https://doi.org/10.1016/S0377-1237\(07\)80106-7](https://doi.org/10.1016/S0377-1237(07)80106-7)
- [8] Jessie, F., & Ritz, T. (2020). The Tension-Free Repairs without Mesh: Desarda and Modified Bassini Techniques. In *Techniques and Innovation in Hernia Surgery*. IntechOpen. <https://doi.org/10.5772/intechopen.88955> Ritz, F. J. T. (2020).
- [9] Johnson, J., Roth, J. S., Hazey, J. W., & Pofahl, W. E. (2004). The history of open inguinal hernia repair. *Current Surgery*, 61(1), 49–52. <https://doi.org/10.1016/j.cursur.2003.06.004>
- [10] Kassab, P., Franciulli, E. F., Wroclawski, C. K., Ilias, E. J., Castro, O. A., & Malheiros, C. A. (2013). Meshless treatment of open inguinal hernia repair: a prospective study. *Einstein (Sao Paulo, Brazil)*, 11(2), 186–189. <https://doi.org/10.1590/s1679-45082013000200009>
- [11] Kaynak, B., Celik, F., Guner, A., Guler, K., Kaya, M. A., & Celik, M. (2007). Moloney darn repair versus Lichtenstein mesh hernioplasty for open inguinal hernia repair. *Surgery Today*, 37(11), 958–960. <https://doi.org/10.1007/s00595-007-3543-3>
- [12] Kucuk, H. F., Sikar, H. E., Kurt, N., Uzun, H., Eser, M., Tural, F., & Tuncer, Y. (2010). Lichtenstein or darn procedure in inguinal hernia repair: A prospective randomized comparative study. *Hernia*, 14(4), 357–360. <https://doi.org/10.1007/s10029-010-0663-2>
- [13] Maggiore, D., Müller, G., & Hafanaki, J. (2001). Bassini vs Lichtenstein: two basic techniques for inguinal hernia treatment. *Hernia : the journal of hernias and abdominal wall surgery*, 5(1), 21–24. <https://doi.org/10.1007/BF01576160>
- [14] Malik, A. M., Khan, A., Jawaid, A., Laghari, A. A., & Talpur, K. A. (2009). A comparative analysis between non-mesh (Bassini's) and mesh (Lichtenstein) repair of primary inguinal hernia. *J Ayub Med Coll Abbottabad*, 21(1), 17–20.
- [15] Miyazaki, K., Nakamura, F., Narita, Y., Dohke, M., Kashimura, N., Matsunami, O., & Katoh, H. (2001). Comparison of Bassini repair and mesh-plug repair for primary inguinal hernia: a retrospective study. *Surgery Today*, 31(7), 610–614. <https://doi.org/10.1007/s005950170095>
- [16] Naveen, N., & Srinath, R. (2014). A comparative study between modified Bassini's repair and Lichtenstein mesh repair of inguinal hernias in a rural population. *Journal of Clinical and Diagnostic Research*, 8(2), 88–91. <https://doi.org/10.7860/JCDR/2014/7431.4016>
- [17] Nicolò, E. (2018). Bassini Repair. In *The Art of Hernia Surgery: A Step-by-Step Guide* (pp. 225–238). Springer International Publishing. https://doi.org/10.1007/978-3-319-72626-7_23

- [18] Olasehinde, O., Adisa, A., Agbakwuru, E., Etoneyaku, A., Kolawole, O., & Mosanya, A. (2015). A 5-year review of darnning technique of inguinal hernia repair. *Nigerian Journal of Surgery*, 21(1), 52. <https://doi.org/10.4103/1117-6806.152722>
- [19] O'Neill, S. M., Chen, D. C., & Amid, P. K. (2016). Groin hernia repair: Open techniques. In *Hernia Surgery: Current Principles* (pp. 437–449). Springer International Publishing. https://doi.org/10.1007/978-3-319-27470-6_42
- [20] Palermo, M., Acquafresca, P. A., Bruno, M., & Tarsitano, F. (2015). Hernioplasty with and without mesh: analysis of the immediate complications in a randomized controlled clinical trial. *Arquivos Brasileiros de Cirurgia Digestiva: ABCD = Brazilian Archives of Digestive Surgery*, 28(3), 157–160. <https://doi.org/10.1590/S0102-67202015000300002>
- [21] Paul, A., Troidl, H., Williams, J. I., Rixen, D., & Langen, R. (1994). Randomized trial of modified Bassini versus Shouldice inguinal hernia repair. The Cologne Hernia Study Group. *The British journal of surgery*, 81(10), 1531–1534. <https://doi.org/10.1002/bjs.1800811045>
- [22] Ramshaw, B., & Chiu, S. (2018). Open Non-mesh Inguinal Hernia Repair. In *Surgical Principles in Inguinal Hernia Repair: A Comprehensive Guide to Anatomy and Operative Techniques* (pp. 33–38). Springer International Publishing. https://doi.org/10.1007/978-3-319-92892-0_5
- [23] Shi, Y., Su, Z., Li, L., Liu, H., & Jing, C. (2010). Comparing the effects of Bassini versus tension-free hernioplasty: 3 years' follow-up. *Frontiers of Medicine in China*, 4(4), 463–468. <https://doi.org/10.1007/s11684-010-0050-5>
- [24] Terranova, O., De Santis, L., & Ciardo, L. (2001). The Bassini Operation. In *Abdominal Wall Hernias: Principles and Management* (pp. 354–360). New York, NY: Springer New York.
- [25] Tse, W., Johns, W., Maher, J., Rivers, J., & Miller, T. (2021). Bassini inguinal hernia repair: Obsolete or still a viable surgical option? A single-center cohort study. *International Journal of Surgery Open*, 36. <https://doi.org/10.1016/j.ijso.2021.100415>
- [26] Udo, I. A., & Akpanudo, E. Darning: An Effective and Safe Technique for Open Inguinal Hernia Repair in Resource-Limited Settings. *W.J.Biomed Res.*1(2),29-33:2014
- [27] Witkowski, P., Pirski, M. I., Adamonis, W., Smietanski, M., Draczkowski, T., & Sledzinski, Z. (2000). Mesh plug versus Bassini operation: a randomized prospective study. *Hernia*, 4(4), 305–310.
- [28] Woods, B., & Neumayer, L. (2008). Open Repair of Inguinal Hernia: An Evidence-Based Review. In *Surgical Clinics of North America* (Vol. 88, Number 1, pp. 139–155). <https://doi.org/10.1016/j.suc.2007.11.005>
- [29] Zahoor, A., Charokar, K., & Singh, P. (2024). A comparative study of modified Bassini's repair and Lichtenstein repair for indirect inguinal hernia in a young age population. *International Surgery Journal*, 11(12), 2047–2054. <https://doi.org/10.18203/2349-2902.isj20243545>