

# Physiological repair of inguinal hernia-A new technique (Study of 860 patients)

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## ABSTRACT

**INTRODUCTION:** The author has developed a new operation technique based on physiological principle that provides dynamic posterior wall for inguinal hernia repair. Results of the first series of 400 patients were published in 2001.<sup>[1]</sup> Now the author has described the results of second series of 860 patients having 920 hernias with follow up for more than 7 years.

**METHODS:** An un-detached strip of the external oblique aponeurosis (EOA) is sutured to the inguinal ligament below and the muscle arch above, behind the cord, to form a new posterior wall. External oblique muscle gives additional strength to the weakened muscle arch to keep this strip physiologically dynamic. In this prospective study, 920 inguinal hernia repairs were performed between August 1990 and December 2003 in 860 patients. Follow up was done for 7 years. The main outcome measure was early and late morbidity and especially recurrence in a long term follow up.

**RESULTS:** Mean patient age was 50.5 years (range, 18 - 90). 851 (98.95%) patients were operated under local or regional anesthesia. 838 (97.4%) patients were ambulatory with limited movements in 6 hours and free movements in 18-24 hours. 792(92%) patients had a hospital stay of one night and 840(97.6%) patients returned to normal activities within 1-2 weeks. Hematoma formation requiring drainage was observed in 1 patient, while seven patients had wound oedema during the postoperative period which subsided on its own. Follow-up was completed in 623 patients (72.5 %) by clinical examination or questionnaire. The median follow-up period was 7.8 years (range, 1 - 12 years). There was no recurrence of the hernia or postoperative neuralgia.

**CONCLUSIONS:** This operation is simple to perform, does not require foreign body like mesh or complicated dissection of the inguinal floor as in Bassini/Shouldice. It has shown excellent results with virtually zero recurrence rates.

**KEY WORDS:** Inguinal hernia, Herniorrhaphy, Physiological repair, Recurrence

## INTRODUCTION

An editorial in *Annals of Surgery*, January 2001, raised the question of whether the changed techniques of hernia repair in recent years, mainly implanted mesh, have caused a rise in the incidence of chronic groin pain from 1% to 28.7% after hernia repairs. The recurrence rate after hernia repair done by expert surgeons is less than 2%, but in the hands of junior surgeons, it is still much higher <sup>[2,3]</sup>. The problem of our age is to find an operation that is simple, does not require implantation of a foreign body like mesh, has a recurrence rate of less than 1-2% and does not produce major complications during or after surgery in the hands of non-consultant staff. Nicholson, in his leading article on inguinal hernia repair in *British Journal of Surgery* (1999) states that: "With over 80 000 groin hernia operations carried out in the UK alone each year, and a deepening crisis in surgical manpower resulting from increased surgical sub specialization and greater public and political demands for quality in surgical practice, inguinal hernia repair will remain for the foreseeable future a procedure likely to be delegated to non-consultant staff. It is essential therefore that we design safe and simple pathways for managing these patients."

The author's technique seems to provide such a hernia repair. It is based on the concept of providing a strong, mobile, and physiologically dynamic posterior wall. The present study is conducted to show the results of a larger series of 860 patients with follow up of more than 7 years. This series includes only 220 patients of the previously published series.

## PATIENTS AND METHODS

860 patients having 920 inguinal hernias, between 18 to 90 years of age (mean age 50.5 years), were operated on between August 1990 and December 2003. Patients were not selected in any way and all the patients admitted under the care of the author for hernia repair were operated by this technique. 549 patients were operated on under spinal anaesthesia, 302 under local anaesthesia and 9 had a general anesthetic. Sutures were removed on the eighth day. Ampiclox (ampicillin and cloxacillin) and Diclofenac were given for a week due to social and hygienic conditions at home. Pain, ambulation and return to normal activities were assessed by using the Short Form 36 questionnaire and a visual analog scale. Pain was described as none, mild, moderate, severe and very severe. Movements from bed to bathroom inside the room were termed as limited movements and movements outside of the room were termed as free movements. The author followed up patients personally at 15 days, 1, 3 months, and later every year. 598 patients attended the clinic for follow up for 7 years. Appearance of a bulge in the groin on coughing was treated as a recurrence, which was confirmed by clinical examination. A questionnaire was sent to 25 patients who could not attend the clinic for follow up regularly or left the follow up in between.

**OPERATIVE TECHNIQUE:** A regular oblique inguinal incision is taken. The EOA is cut to open the inguinal canal. Herniotomy is done as usual and the hernia sac is inverted or excised. The medial leaf of the EOA is sutured to the inguinal ligament from the pubic

tubercle to the abdominal ring using 1/0 polypropylene interrupted sutures. The first 1-2 sutures are taken in the anterior rectus sheath. The last suture is taken so as to narrow the abdominal ring sufficiently without constricting the spermatic cord (Fig.1).

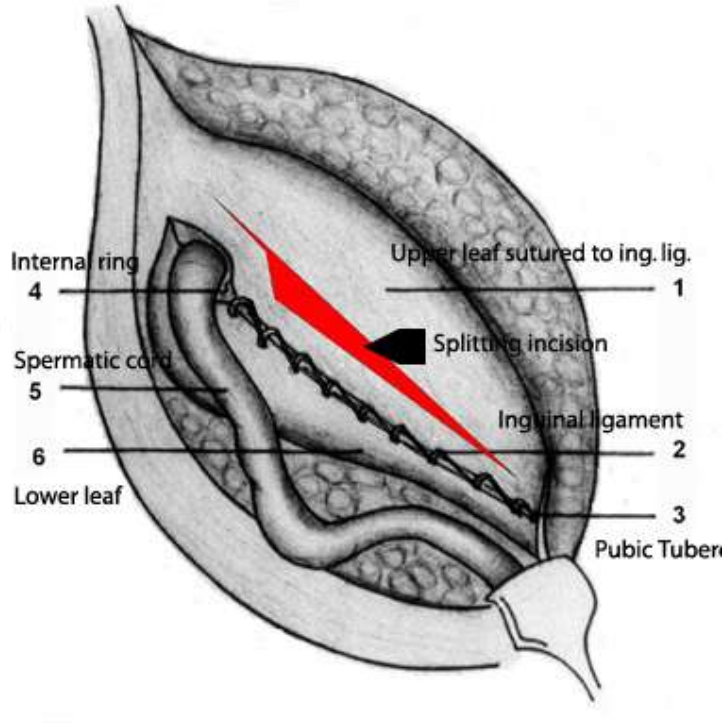


FIG.1

A splitting incision is made in this sutured medial leaf, partially separating a strip of a width of 1.5 to 2 cms. This splitting incision is extended medially up to the rectus sheath and laterally 1-2 cms beyond the abdominal ring. The medial insertion and lateral continuation of this strip is kept intact. A strip of the EOA, is now available, the lower border of which is already sutured to the inguinal ligament. The upper free border of the strip is now sutured to the internal oblique or muscle arch lying close to it with 1/0 polypropylene interrupted sutures throughout its length (Fig.2).

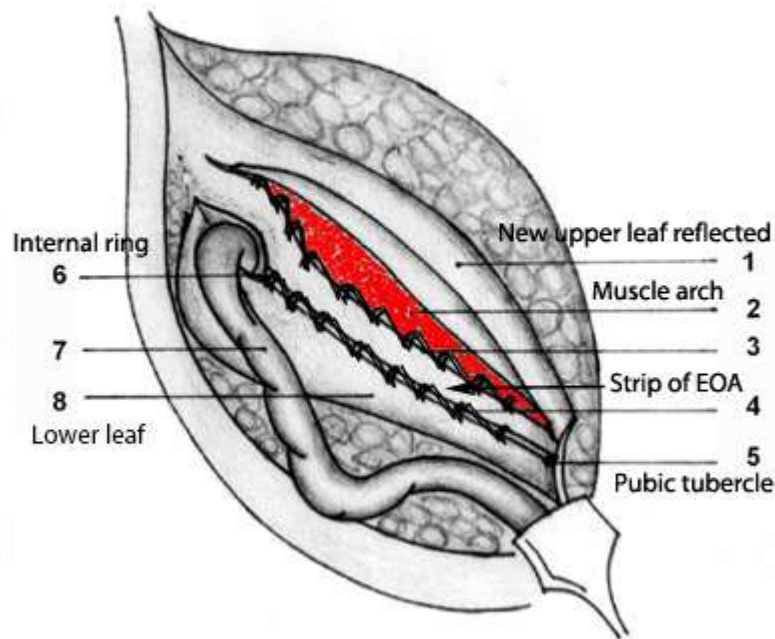


FIG.2

The aponeurotic portion of the internal oblique muscle is used for suturing to this strip wherever and whenever possible without tension; otherwise, it is not a must for the success of the operation. This will result in the strip of the EOA being placed behind the cord to form a new posterior wall of the inguinal canal. At this stage the patient is asked to cough and the increased tension in the strip is clearly visible. The spermatic cord is placed in the inguinal canal and the lateral leaf of the EOA is sutured to the newly formed medial leaf of the EOA in front of the cord, as usual, again using 1/0 polypropylene interrupted sutures. Undermining of the newly formed medial leaf on both of its surfaces and excision of the bulky cremasteric muscle (if required) facilitates its approximation to the lateral leaf without tension. The first stitch is taken between the lateral corner of the splitting incision and lateral leaf of the EOA. This is followed by closure of the superficial fascia and the skin as usual.

## RESULTS

Inguinal hernia was indirect in 44.35 % of cases (408 patients), direct in 34.57 % (318 patients), pantaloon (mixed) type in 0.65 % (6 patients), obstructed in 3.48% (32 patients) and recurrent in 16.95% cases(156 patients). 792(92%) patients required a stay of 18-24 hours, 60(7%) for 24-48 hours and 8 (1%) stayed for more than 48 hours. 845(98.25%) patients were ambulatory with limited movements up to bathroom within 6-8 hours and had free movements within 18-24 hours. 840(97.6%) of patients returned to normal activities like bending, kneeling, or stooping, climbing one or more flights of stairs, carrying groceries or attending office duties or doing normal routine pre-operative non vigorous activities within 4-14 days. 620 (72%) patients had mild pain locally for 2 days, 206 (24%) for 4 days and 34 (4%) patients had mild pain

for 7-15 days. No patient had severe or very severe pain. Seven patients had wound oedema during the postoperative period which subsided on its own. Five patients had mild skin infection and one patient had Hematoma that was drained. A total of 860 (100%) returned for a follow up visit after 15 days and one month; 847 (98.5%) for 3 months; 752 (87.5%) for 1 year; 683 (79.4%) for 3 years and 623 (72.5%) patients were followed up for more than 7 years. The median follow up period was 7.8 years. There were no recurrences or late complications. It was observed that the aponeurotic extensions from the transverses abdominis aponeurotic arch were absent or deficient and the posterior wall was weak and flabby in all the patients. The aponeurotic strip of the EOA gave a strong and physiologically dynamic posterior wall in all these patients. 99% of patients operated under local or low epidural anesthesia showed dynamic nature of the strip when the patient was asked to cough on the operation table. It was also observed that the muscle arch, which was inactive or less active, showed good movements or improved movements after the repair was done. This was obviously due to the new anchorage to the inguinal ligament it received through the strip.

## DISCUSSION

The transversalis fascia acts as a barrier to prevent hernia because it is supported in the posterior wall by aponeurotic extensions from the muscle arch. The transversalis fascia alone cannot withstand the raised intra-abdominal pressure for a longer period if the aponeurotic element in the posterior wall is absent or deficient. Strong musculo-aponeurotic structures around the inguinal canal still give protection to prevent the herniation in such individuals. This protection is lost if those muscles are weak. The weak and physiologically adynamic posterior wall of inguinal canal in such individuals leads to hernia formation <sup>[4]</sup>. Therefore, the aim of hernia repair should be to provide a strong, mobile, and physiologically dynamic posterior wall.

Bassini, Halsted, McVay, and Shouldice had advised excision of the transversalis fascia requiring extensive dissection. Amid et al <sup>[5]</sup> reported that to use already weakened muscles and transversalis fascia, particularly under tension, is a violation of the most basic principles of surgery. Weak muscles used in those repairs fail to give a strong and physiologically dynamic posterior wall. Hay et al <sup>[6]</sup> compared the Shouldice to the Bassini and Cooper's ligament repair and found in a study of 1578 hernias with a mean follow up of 8.5 years, a recurrence rate of 6 % compared with Bassini 8.6 %, and Cooper's ligament repair 11 %. Panos et al <sup>[7]</sup> and Kingsnorth et al <sup>[2]</sup> stated that the reported recurrence rates from smaller hospitals seem to be worse than those from specialist centers. The operation described by Lichtenstein is simple and safe. But the mesh prosthesis has its drawbacks. The slightest movement of the mesh from the sutured area is a leading cause of failure of mesh repair of inguinal hernias <sup>[8]</sup>. Mesh works as a mechanical barrier. It does not give mobile and physiologically dynamic posterior wall.

The aging process is minimum in the tendons and aponeurosis, so a strip of the external oblique, which is tendo-aponeurotic, is the best alternative to the mesh. The author has used the thinned out portion of the external oblique with good results.

Double breasting of EOA was described by Zimmerman for repairs of inguinal hernias [9]. In Andrew's imbrications operation (Wyllys Andrews operation, Chicago Med. Rec. N Y 9:67, 1895), the entire medial leaf of the external oblique together with the muscle arch is sutured to the inguinal ligament and the lateral leaf is used to cover the cord in front. The author's operation differs from the Andrew's technique because the procedure of strengthening the posterior wall of the inguinal canal is different and the mechanism of action involved is also different.

**MECHANISM OF ACTION:** Contraction of the external oblique muscle creates lateral tension in this strip while contraction of the internal oblique / conjoined muscle pulls this strip upwards and laterally creating tension above and laterally, making the strip a shield to prevent any herniation. This additional strength given by the external oblique muscle to the weakened conjoined muscle to create tension in the strip and prevent re-herniation is the essence of this operation. Tension created in this strip is graded as per the force of muscle contractions. Stronger intra-abdominal blows result in stronger abdominal muscle contractions and stronger muscle contractions result in increased tension in this strip to give graded protection. The strip or the suture line is without any tension at rest. Thus, a strong and physiologically dynamic posterior wall is prepared in this operation.

**CONCLUSIONS:** The author's technique is simple and easy to do and learn. It does not require complicated dissection or suturing. There is no tension on the suture line. It does not require any foreign material and does not use weakened muscles or transversalis fascia for repair. The results are superior to those previously published in the field of hernia surgery. This prospective cohort study is conducted by the author alone and therefore may be subject to a personal bias.

**PERSONAL COMMUNICATION:** Since its first publication in 2001, the author received communication from the following surgeons in Poland, Cuba, Korea, Albania and India of clinical trials being conducted by them that had shown similar results without recurrence till date.

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2] Hospital General Docente Enrique Cabrera. (Department of General Surgery) Calle Aldabo No. 11117. Altahabana. Municipio Boyeros. Ciudad Habana, Cuba. Contact: Pedro Lopez (Professor of Surgery); Email: lopezp@infomed.sld.cu,

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4] Seoul Surgery Clinic, 237-1 Haksungdong, Wonju, Kangwondo, Korea 220-964 Contact: Kishik Kye, M.D.; Email: kskye@hanafos.com,

5] Civil Hospital. City of Fier, Department of General Surgery, Albania. Contact: Robert Metaj, M.D. (Chief surgeon); Email: metajrobert@yahoo.com,

6] Surgeons working in different medical institutions in many cities of India, like Calcutta, Chennai, Sholapur, Dhavangiri, Kanpur, Karad, Meerut, Belgaum, Baroda, Nanded etc. had conducted trials of this technique for thesis purposes of their post graduate students.

Following surgeons from different countries communicated and showed interest in this technique but there was no follow up communication later and the contact is lost.

1] J. Olejnik, Chirurgika Klinika, FN Akad. Derera, Limbova 5; 833 05 Brtislava (Slovakia), 2] Cornelius Lemke, Friedrich Schiller University, Institute of Anatomy, D-07740 Jena, Germany, 3] Dr. Y. Bayon, Sofradim production, 116 Avenue Du Formans , 01600 Trevoux, France, 4] Peter Bruncak, M.D. District Hospital, Nam, Republiky 14, 984 39 Lucenec (Slovakia), 5] Dr. Abel Santana, Gonzalez-Chavez, EMAIL: abel@ventila.mtz.sld.cu, 6] R.Elamiyal, Al-Arab Medical University, Benghazi, Libiya, 7] Filipe Delgado, Hospital Pediatrico Docente "William Soler" Apartado No. 8019, Habana-8, Cuba, 8] Miller Junny, EMAIL: MILLERJUNNY@cs.com ,

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## LEGENDS

**FIG. 1.** Medial leaf of EOA is sutured to the inguinal ligament with splitting incision taken

1=Medial leaf; 2=Continuous absorbable sutures taken to suture the medial leaf to the inguinal ligament; 3=Pubic tubercle; 4=Abdominal ring; 5=Spermatic cord; 6= Lateral leaf.

**FIG. 2.** Undetached strip of external oblique aponeurosis forming the posterior wall of inguinal canal.

1=Reflected medial leaf after a strip has been separated; 2= Internal oblique muscle seen through the splitting incision made in the medial leaf; 3= Continuous absorbable sutures between the upper border of the strip and conjoined muscle or internal oblique muscle; 4= Continuous absorbable sutures between the lower border of the strip and the inguinal ligament; 5=Pubic tubercle; 6= Abdominal ring; 7=Spermatic cord; and 8= Lateral leaf.