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A Comparative Study Between Desarda Repair And Lichtenstein's Tension Free Hernioplasty In The Management Of Inguinal Hernias

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I. INTRODUCTION

A Hernia means 'To bud' or 'To protrude'[Greek] or 'Rupture'[Latin]. Hernia is defined as " an abnormal protrusion of the whole or a part of a viscous through a normal or abnormal opening with the sac covering it ".

Inguinal Hernia is the most common type of hernia (73%) because the muscular anatomy in the inguinal region is weak and also due to the presence of natural weaknesses like deep ring and cord structures. Indirect hernia is more common than direct type.

Other types of hernias are Femoral, Umbilical, Epigastric, Obturator, Spigelian, Lumbar etc.

It has been said that the history of groin hernias is the history of surgery itself[1]. Hernia repair is one of the most commonly performed general surgical procedures worldwide[2]. Mesh based techniques particularly the Lichtenstein's tension free hernioplasty and Laparoscopic repairs were advocated for the treatment of symptomatic inguinal hernias in adults by the European Hernia Society[3]. Lichtenstein's technique is currently the most popular and accepted technique among open mesh based techniques. It has minimal perioperative morbidity and is considered the standard of care.

However problems like Foreign body sensation, Wound infection, Cord fibrosis, Chronic pain, mesh sepsis [4] etc are a concern. Also Prosthetic mesh is somewhat expensive, especially in developing countries like India.

Dr. Mohan P. Desarda reported a novel technique of tissue based repair with less recurrence. It provides a strong and physiologically dynamic posterior wall without the use of any prosthesis. Here , in place of mesh an undetached strip of external oblique is stitched to the posterior wall to strengthen it. The technique requires less complicated dissection or suturing, no mesh is needed, easy to learn and has results similar if not better than Lichtenstein repair[5].

This study was undertaken to compare the results of Desarda repair with Lichtenstein's Tension free Hernioplasty in Govt. Rajaji Hospital, Madurai.

II. AIM AND OBJECTIVE

- The study was undertaken to compare the Post – operative outcome of Desarda Repair with Lichtenstein's tension free Hernioplasty in Inguinal Hernia patients who are admitted to GRH Madurai.

III. REVIEW OF LITERATURE

ANATOMY OF INGUINAL CANAL :

The anterior abdominal wall consists of nine layers[6]from outwards to in

1) Skin
2) Camper's Fascia
3) Scarpa's Fascia
4) External Oblique muscle
5) Internal Oblique muscle
6) Transversus abdominis muscle
7) Fascia Transversalis
8) Pre- peritoneal fat
9) Peritoneum

The inguinal canal is an oblique intermuscular passage in the lower part of the anterior abdominal wall, situated just above the medial half of the inguinal ligament. It is about 4 cm(1.5 inches) long and is directed downwards, forwards and medially. It extends from the deep inguinal ring to the superficial inguinal ring[7].

The deep inguinal ring is an oval opening in the Fascia Transversalis, situated 1.2 cm above the mid inguinal point, and immediately lateral to the stem of the inferior epigastric artery. In males, prolongation of the connective tissue occurs from the margins of the ring to the cord structures and is called the internal spermatic fascia[8]. The superficial inguinal ring is a triangular gap in the external oblique aponeurosis. The base is formed by the pubic crest. The two sides are formed by the lateral and medial margins. They are called the crura[7]. The lower border or the inferior crus of the ring is the cord like medial end of the inguinal ligament which is attached to the pubic tubercle. The medial border or the superior crus is flat and is

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attached to the front of the pubic symphysis where it decussates with its fellow of the opposite side[9].

The size of the superficial inguinal ring is larger in males than in females. It admits the tip of the little finger[9].

The spermatic cord with the ilioinguinal nerve in males or the round ligament with the ilioinguinal nerve in females emerge out of the superficial ring.[9]

In males, a fascial prolongation of the margins of the ring called the external spermatic fascia passes down over the spermatic cord into the scrotum[9].

BOUNDARIES OF INGUINAL CANAL[7] :

The Anterior Wall:

In its whole Exent:

Skin, Superficial Fascia and External Oblique Aponeurosis.

In its lateral one – third :

The fleshy fibres of the internal oblique muscle.

The Posterior Wall:

In its whole Extent :

The Fascia transversalis, The Extraperitoneal tissue and the Parietal Peritoneum.

In its Medial Two-third :

The conjoint tendon and the reflected part of the inguinal ligament.

Roof :

It is formed by the arched fibres of the internal oblique and transversus abdominis muscles.

Floor:

It is formed by the grooved upper surface of the inguinal ligament and at the medial end by the lacunar ligament.

The inguinal canal is larger in the male than in the female.

STRUCTURES PASSING THROUGH THE CANAL[7] :

- The Spermatic Cords in males
- The Round ligament of the uterus in the females.

CONSTITUENTS OF THE SPERMATIC CORD[7]:

- The ductus deferens
- The testicular and cremasteric arteries, artery to vas deferens
- The pampiniform plexus of veins
- Lymph vessels from the testis
- The genital branch of the genitofemoral nerve
- Remains of the processus vaginalis.

The ilioinguinal nerve lies inferolateral to the cord.

COVERINGS OF SPERMATIC CORD[7] :

From within outwards, these are as follows;

1)The Internal Spermatic Fascia, derived from the fascia transversalis

2)The Cremasteric Fascia, derived from the Internal oblique and Transversus abdominis muscles

3)The External Spermatic Fascia, derived from the External oblique aponeurosis.

The integrity of the inguinal canal depends upon the strength of the anterior wall in the lateral part and the posterior wall in the medial part, provided the abdominal muscles are of good tone and their aponeuroses unyielding[8].

The conjoint tendon lies posterior to the superficial inguinal ring and helps to strengthen this region.

The aponeurosis of the transversus abdominis muscle extends downwards from the arched muscle to become inserted into a variable length of Cooper's ligament between the pubic tubercle and the femoral vein. It is intimately adherent to the underlying fascia transversalis.

The strength of the posterior wall of the inguinal canal will vary with the extent of this aponeurosis[8].

Laterally, the transversalis fascia is strengthened by the presence in front of it of tendinous and sometimes muscular fibres of the transverses abdominis muscle.

These fibres constitute the **Interfoveolar ligament.** They arch down from the lower border of transversus around the vas to the inguinal ligament and constitute the functional medial edge of the deep ring[8].

The fascia transversalis binds together the muscle and aponeurotic fascicles into a continuous layer and reinforces the weak areas where aponeurotic areas are sparse. This layer is responsible for the structural integrity of the abdominal wall and by definition, a hernia results from a defect in the transversalis fascia.

MECHANISM OF INGUINAL CANAL[7]:

1)Obliquity of the Inguinal Canal:

The two inguinal rings do not lie opposite each other. Therefore, when the intraabdominal pressure rises, the anterior and posterior walls of the canal are approximated, thus obliterating the passage. This is the Flap Valve Mechanism.

2)The Superficial inguinal ring is guarded from behind by the conjoint tendon and by the reflected part of the inguinal ligament.

3)The Deep inguinal ring is guarded from the front by the fleshy fibres of the Internal oblique.

4)Shutter Mechanism of the Internal Oblique :

When the internal oblique contracts, the roof of the inguinal canal is approximated to the floor, like

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

a shutter. The arching fibres of the Transversus Abdominis also take part in this mechanism.
5)Ball – Valve Mechanism:
Contraction of the cremaster helps the spermatic cord to plug the superficial inguinal ring.
6)Slit – Valve Mechanism:
Contraction of the External Oblique helps in Approximation of the two crura of the superficial inguinal ring. This greatly increases the Integrity of the superficial inguinal ring.
7)Hormones may play a role in maintaining the tone of the inguinal musculature.

DEVELOPMENT OF INGUINAL CANAL[7]:

Inguinal Canal represents the passage of Gubernaculum through the abdominal wall. It extends from the caudal end of the developing gonad(in the lumbar region) to the labioscrotal swelling.

In early life, the canal is very short. As the pelvis increases in width, the deep inguinal ring is shifted laterally, and the adult dimensions of the canal are attained.

The predisposition of man to inguinal hernia is due to the evolutionary changes that have taken place in the inguinal region as a result of his upright posture. These evolutionary changes are;
1)The iliac crest has grown forwards into the lower digitations of the external oblique muscle, so that the inguinal ligament can no more be operated by fleshy fibres of muscle which now help in balancing the body. In all other mammals, external oblique has no attachment to the iliac crest.
2)The internal oblique and transverses initially originated from the anterior border of ilium and the sheath of iliopsoas,and act as a powerful sphincter of the inguinal canal. The shift of their origin to the inguinal ligament and iliac crest has minimized their role.
3)Due to peculiar growth of hip bones and pelvis,the crural passage(between hip bone and inguinal ligament) in man has become much wider than any other mammal. This predisposes to Femoral hernia.

EXTERNAL OBLIQUE MUSCLE:

Origin:
The muscle arises from eight fleshy slips from the outer surfaces of the middle of the shaft of the lower eight ribs. The fibres run downwards, forwards and medially[7].
Insertion:
1)Most of the fibres end in a Broad Aponeurosis, through which they are inserted from above downwards into the Xiphoid process, Linea Alba, Pubic Sypmphysis, Pubic Crest and the Pectineal line of the Pubis.
2)The lower fibres of the muscle are inserted directly into the anterior two thirds of the outer lip of the iliac crest[7].

Nerve Supply :
By the lower Six Thoracic nerves[7].
Points of Interest:
1)The upper four slips of the muscle interdigitate with the origin of the Serratus anterior and the lower four slips with the origin of the Lattisimus Dorsi.
2)The junction of the muscle fibres with the aponeurosis lies; a) medial to a vertical line drawn from the ninth costal cartilage in the upper part.b)Below a line joining the anterior Superior iliac spine and Umbilicus. Above the ninth costal cartilage, this line curves upwards and medially.
3) Between the Anterior superior iliac spine and the Pubic tubercle, the aponeurosis has a free inferior border that is folded on itself to form the inguinal ligament.
4) Between the Linea Semilunaris and the Linea Alba, thee aponeurosis helps in forming the anterior wall of rectus sheath.
5) Just above the Pubic crest, the aponeurosis of the External oblique, presents a triangular apeeture called the superficial inguinal ring.
6)The muscle has free posterior and upper borders.
7)The intercrural fibres are seen in the lower part of the aponeurosis. They arise from the anterior superior iliac spine and lateral part of the inguinal ligament and run upwards and medially – in a direction opposite to the direction of the external oblique fibres. These help prevent the separation of the crura of the superficial inguinal ring[9].
8) The aponeurosis is supposed to have a superficial and deep parts – the fibres of the superficial part running obliquely upwards and those of the deep part running at right angled downwards[8].
9) The fibres continue across the midline after decussation.
10) The fibres from the deep layer pass to the superficial layer on the contralateral side of the abdominal wall and vice versa[8].
11) The free horizontal border of this aponeurosis extends from the fifth rib to the xiphisternum. It is the only structure in the anterior rectus sheath above the costal margin[8].
12) The free posterior border of the muscle forms the anterior boundary of the Lumbar triangle of Petit that is floored in by the internal oblique and bounded behind by the anterior border of the lattisimus dorsi and below by the iliac crest[8].

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

INGUINAL LIGAMENT[7]:

a) It is also known as the Poupart's ligament.
b) It is formed by the lower border of the external oblique aponeurosis which is thickened and folded back on itself.
c) It extends from the anterior superior iliac spine to the Pubic tubercle.(Fig 12).
d) It's lateral half is rounded and oblique. It's medial half is grooved upwards and is more horizontal.
e) The Fascia Lata is attached to the lower border. Traction of this fascia makes the ligament convex downwards.
f) The upper surface of the ligament gives origin to the Internal Oblique fromits lateral two-thirds, to the Transverses abdominis from the lateral one-third and to the Cremaster muscle from its middle part.
g) The upper grooved surface of the medial half of the inguinal ligament forms the floor of the inguinal canal and lodges the spermatic cord or round ligament of the uterus.
h) The Pectineal part of the inguinal ligament or the Lacunar Ligament(Fig 12) is triangular. Anteriorly, it is attached to the medial end of the inguinal ligament. Posteriorly ,it is attached to the pectin pubis. It is horizontal in position and supports the spermatic cord. The apex is attached to the pubic tubercle. The base is directed laterally. It forms the medial boundary of the femoral ring. It is reinforced by the pectineal fascia. It has two surfaces – abdominal or upper surface forming the floor of the medial part of the inguinal canal and a Femoral or lower surface[7,9].
i) The pectineal ligament or the Ligament of Astley – Cooper(Fig 12) is a condensation of the transversalis fascia and periosteum of the superior pubic ramus lateral to the pubic tubercle. It is an extension from the posterior part of the base of the lacunar ligament. It is attached to the pecten pubis. It joins the iliopubic tract and lacunar ligaments at their medial insertions. It is considered the posterior margin of the femoral canal. It can be used as a mooring point for sutures while repairing the posterior wall of the inguinal canal in hernias[7,9].
j) The reflected part of the inguinal ligament is also called the Ligamentum Colles. It consists of fibres that upwards and medially from the lateral crus of the superficial inguinal ring. It lies behind the superficial inguinal ring and in front of the conjoint tendon. It's fibres interlace with those of the opposite side at the linea alba[7].
k) Intercrural fibres arise from middle of inguinal ligament, and arch over the superficial ring to keep its crura together[7].
l) The Iliopubic tract of Thompson is derived from the fascia transversalis. It stretches from the anterior superior iliac spine to the pubis.
m)It lies posterior to and adjacent to the inguinal ligament laterally. As it trajects medially, it gets separated from the inguinal ligament and forms the inferior border of the internal ring. bridges across the femoral vessels, and reinforces the anterior margin of the femoral sheath[6].
n) The iliopubic tract if well developed(as in majority of cases) can be used for hernia repair.

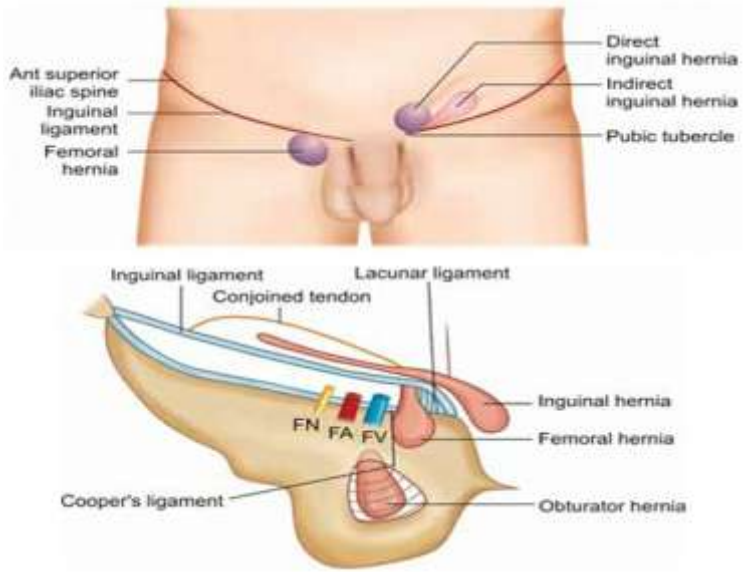


Fig 12 – Inguinal Ligament, Lacunar Ligament and Cooper's Ligament

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

MYOPECTINEAL ORIFICE OF FRUCHAUD: (Fig 13).

In 1956, H.Fruchaud, a French surgeon, described an oval shaped area in the groin protected only by the combined lamina of the aponeurosis of the transversus abdominis and the fascia transversalis where all groin hernias occur and is called the Myopectineal orifice.

It is bounded;

Superiorly – by the arching fibres of the internal oblique and the transversus abominis muscles

Medially –by the lateral border of the rectus muscle

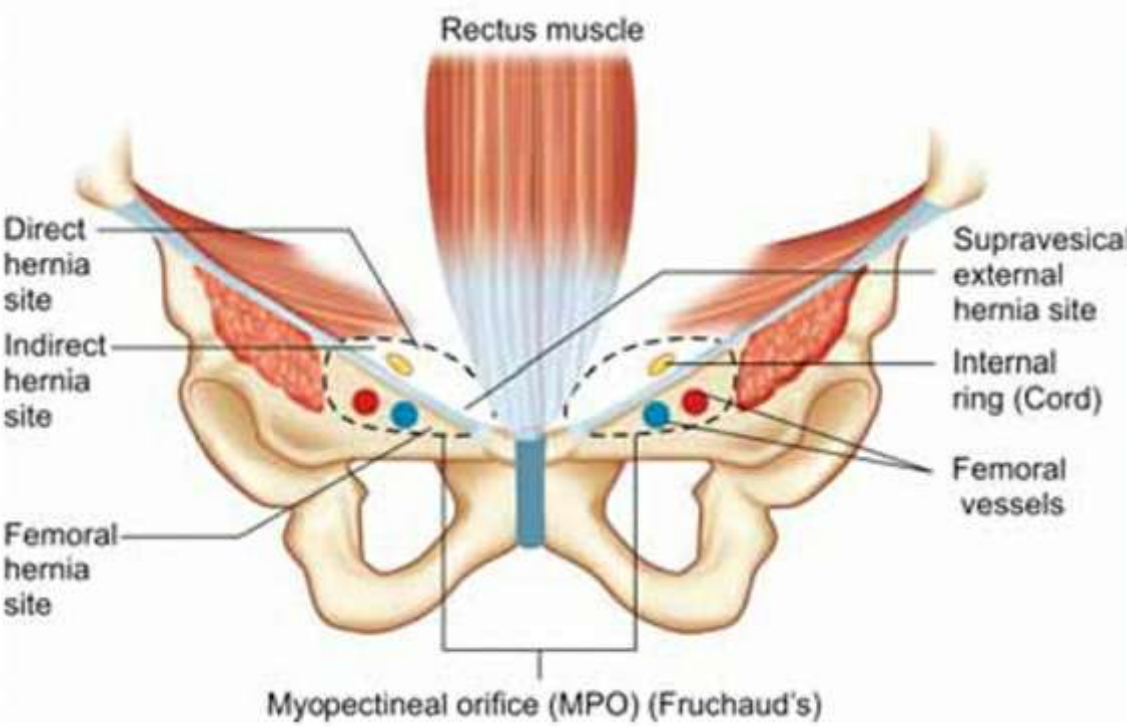
Inferiorly – by Cooper's ligament

Laterally – by Iliopsoas muscle.

The inguinal ligament and the iliopubic tract divide the MPO into two;

a)Superior compartment containing the inguinal canal. It can be divided into medial and lateral compartments.

b)Inferior compartment containing the femoral canal[6].



- Myopectineal Orifice Of Fruchaud

Nerve Supply Of Anterior Abdominal Wall:

ROOT VALUE: T7 TO L1

NERVES:

1) The anterior cutaneous nerves are seven in number. They are derived from the lower five intercostal nerves , the subcostal nerve and the iliohypogastric nerve.
2) Intercostal nerves run between the Internal Oblique and Transversus abdominis.
3) Then they pierce the posterior lamina of the internal oblique aponeurosis to enter the rectus sheath.
4) Within the sheath ,they pass behind the rectus abdominis , then pierce the rectus muscle and the anterior wall of the rectus sheath close to the median plane , divide into medial and lateral branches and supply the skin of the front of the abdomen[7].
5) They are arranged in serial order. T7 near the xiphoid process , T10 at the level of the umbilicus and the Iliohypogastric nerve 2.5 cm above the superficial inguinal ring, and others at proportionate distances between them[7].
6) Subcostal Nerve supplies the Pyramidalis muscle.
7) Iliohypogastric nerve emerges from the lateral edge of the psoas muscle and becomes cutaneous 2.5 cm above the superficial inguinal ring[7].
8) It supplies the skin in the suprapubic region with sensory fibres[6].
9) The ilioinguinal nerve, although a content of the canal, does not enter the canal through the deep ring.
10) It pierces the internal oblique muscle, i.e it

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

slips into the canal from the side , not from the back.

11) The terminal part of the Ilioinguinal nerve emerges through the superficial inguinal ring, pierces the external spermatic fascia and descends to supply the skin of the external genitalia and the upper part of the medial side of the thigh[6,7].

Fig 17, 18 – IlioInguinal Nerve

12) A common variant is for the ilioinguinal and iliohypogastric nerves to exit around the superficial inguinal ring as a single entity.
13) The Genitofemoral nerve (L1,L2) runs along the anterior aspect of the psoas muscle and divide before reaching the internal ring. The genital branch penetrates the iliopubic tract lateral to the deep ring and then enters the ring to join the cord. It supplies the anterior scrotum with sensory fibres, the cremaster muscle with motor fibres and is the efferent limb for the cremasteric reflex. The femoral branch courses beneath the inguinal ligament to provide sensation to the anteromedial thigh and is the afferent limb for the cremasteric reflex[6].
14) The lateral cutaneous nerves are derived from the lower two intercostal nerves. Each nerve has a large anterior and small posterior branch , both of which emerge between the lower digitations of the external oblique muscle and supply the skin of the side of the abdomen. The larger anterior branches also supply the external oblique muscle[7].
15) The lateral cutaneous branches of the subcostal and the iliohypogastric nerves descend over the iliac crest and supply the skin of the anterosuperior part of the gluteal region[7].
16) The lateral femoral cutaneous nerve arises from L2-L3, emerges lateral to the psoas muscle at L4, and crosses the iliacus muscle obliquely toward the anterior superior iliac spine. It then passes inferior to the inguinal ligament where it divides to supply the lateral thigh[6].

ARTERIES:

1) The anterior cutaneous arteries are the branches of the superior and inferior epigastric arteries , and accompany the anterior cutaneous nerves.
2) The lateral cutaneous arteries are branches of the lower intercostals arteries and accompany the lateral cutaneous nerves.
3) The superficial inguinal arteries arise from the femoral artery and supply the skin over the lower part of the abdomen. They are the superficial epigastric artery, the superficial external pudendal artery and the superficial circumflex iliac artery[7].

INFERIOR EPIGASTRIC ARTERY :

The inferior epigastric artery along with the vein cross over the iliopubic tract along the medial aspect of the internal ring and ascend along the posterior surface of the rectus muscles , invested in a fold of peritoneum called lateral umbilical ligament.

Near its takeoff, it gives two branches – the cremasteric and pubic.

The cremasteric branch penetrates the transversalis fascia and joins the spermatic cord.

The pubic branch courses in a vertical fashion inferiorly, crossing Cooper's ligament , and anastomoses with the Obturator artery forming a circle – the CORONA MORTIS - before entering the obturator foramen. Injury to this circle, usually sustained while working in the area of Cooper's ligament , may cause copious bleeding[6].

VEINS :

1)The veins also accompany the arteries.

2)The superficial inguinal veins drain into the GSV[6].

LYMPHATICS:

Above the level of the umbilicus , the lypmhatics drain into the axillary lymph nodes, while below the level of the umbilicus, the lymphtics drain into the superficial inguinal nodes[7].

ACTIONS OF THE MAIN MUSCLES OF THE ANTERIOR ABDOMINAL WALL [6,7,8,9]:

1) The muscles provide a firm but elastic support for the abdominal viscera against gravity . This is chiefly due to the tone of the muscles.
2) They can compress the abdominal viscera and help in forceful acts of expulsion like micturition, defeacation, parturition, vomiting etc.
3) They can compress the lower part of the thorax and help in forceful acts of expiration like, coughing, sneezing, blowing, shouting etc.
4) Lateral flexion of the trunk on one side is brought about by contraction of one side abdominal muscles.
5) Rotation of the trunk is brought about by a combined action of one side external oblique with opposite internal oblique.

The area on and deep to the posterior wall that is bounded by the inferior epigastric artery laterally, the lateral border if the rectus abdominis medially and below by the inguinal ligament is the

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Inguinal triangle of Hasselbach[8]. (Fig 24).

Hasselbach's triangle is divided into medial and lateral halves by the obliterated umbilical artery.

By definition, a hernial sac passing lateral to the artery i.e through the deep ring is an indirect inguinal hernia and one which passes medially is a direct inguinal hernia. The direct hernia can be medial or lateral[8]. (Fig 25, 26, 27).

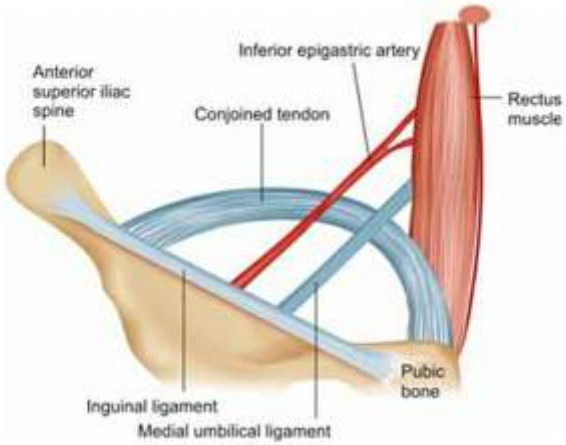


Fig 24 – Hasselbach's Triangle

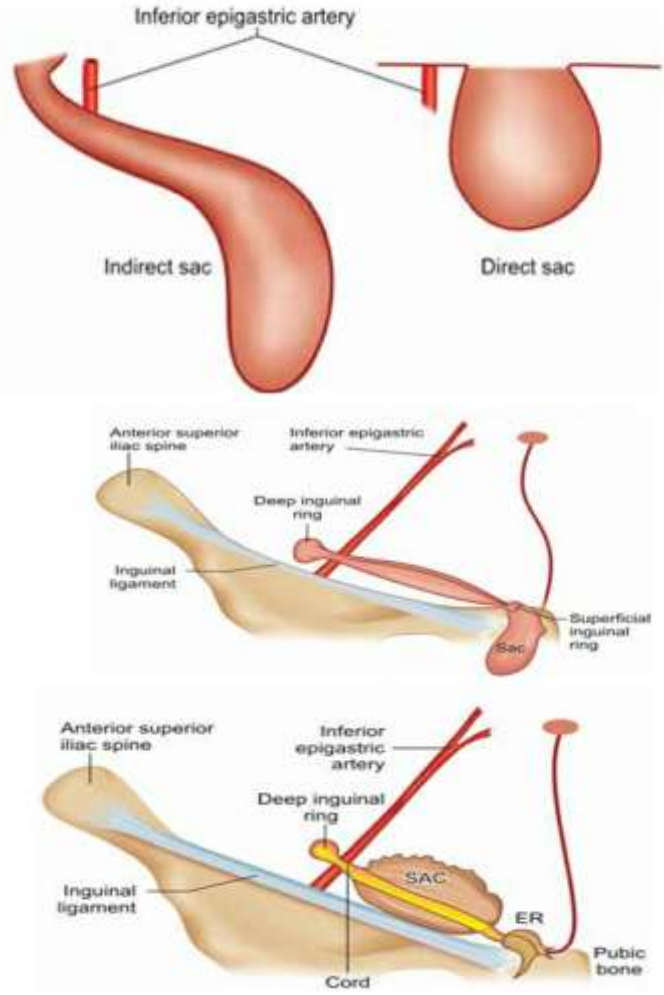


Fig 25, 26, 27 – Indirect and Direct Hernia

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

COVERINGS OF INDIRECT SAC[7]: (Fig 28).
1) Extra peritoneal tissue
2) Internal spermatic fascia
3) Cremasteric fascia
4) External spermatic fascia
5) Skin.

COVERINGS OF LATERAL DIRECT SAC[7]: (Fig 28).
1) Extra peritoneal tissue
2) Fascia transversalis
3) Cremasteric Fascia
4) External spermatic fascia
5) Skin

COVERINGS OF MEDIAL DIRECT SAC[7]: (Fig 28).
1) Extraperitoneal tissue
2) Fascia transversalis
3) Conjoint tendon
4) External spermatic fascia
5) Skin.

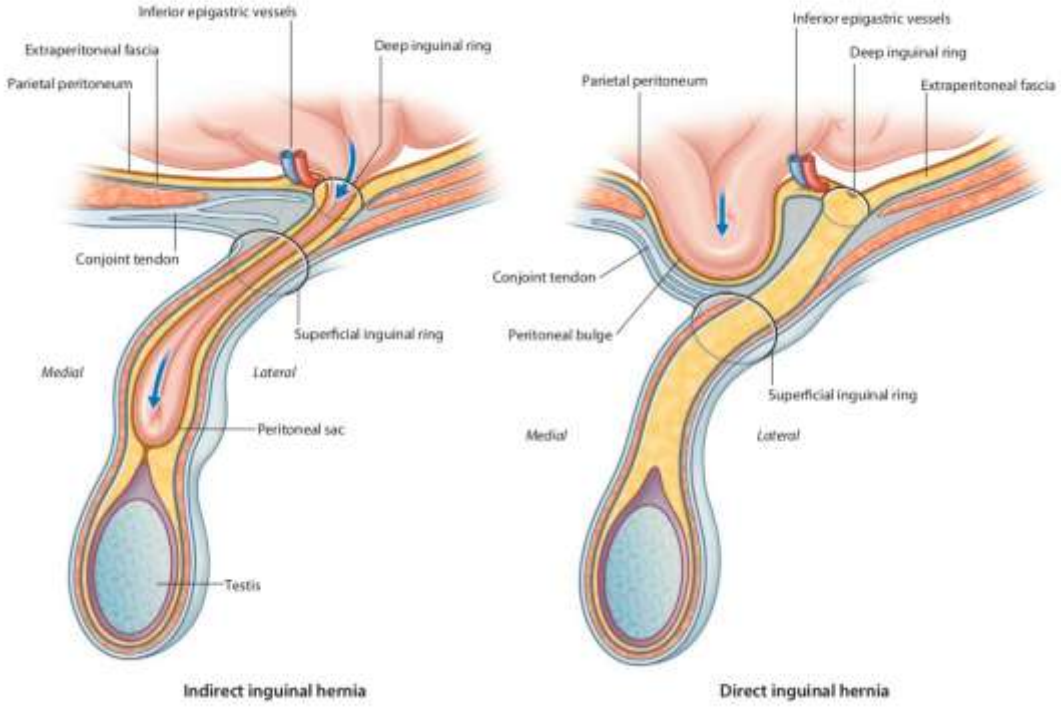


Fig 28 – Coverings OF Various Hernia Sacs

AETIOLOGY OF HERNIA:
1) Straining
2) Lifting of Heavy weight
3) Chronic cough
4) Chronic constipation
5) Urinary causes like BPH, Carcinoma prostate, Stricture, Phimosis etc
6) Obesity
7) Repeated pregnancy
8) Smoking
9) Ascites
10) Post – appendectomy
11) Familial Collagen disorder – Prune Belly Syndrome
12) Collagen deficiency causing acquired hernias – Metastatic Emphysema of REED.

CONNECTIVE TISSUE DISORDERS ASSOCIATED WITH GROIN HERNIATION[10]:
1) Osteogenesis Imperfecta
2) Cutis Laxa
3) Ehler-Danlos syndrome
4) Marfan's syndrome
5) Congenital Hip Dislocation in children
6) Polycystic Kidney disease
7) Alpha – 1 Antitrypsin deficiency
8) William's syndrome
9) Robinow's syndrome
10) Serpentine fibula syndrome
11) Alport's syndrome
12) Tel – Hashomer Camptodactyly syndrome
13) Leriche's syndrome
14) Testicular Feminization syndrome.
15) Rokitansky – Kuster – Mayer syndrome
16) Goldenhar's syndrome
17) Menke's syndrome

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

18) Kawasaki disease
19) Beckwith – Wiedemann syndrome
20) Alopecia – Photophobia syndrome.

PARTS OF HERNIA:

1) Sac
2) Covering
3) Content

Sac is a diverticulum of peritoneum. It contains mouth, neck , body and fundus.

CLINICAL CLASSIFICATION OF HERNIA:

1) Reducible hernia
2) Irreducible hernia
3) Obstructed hernia
4) Inflamed hernia
5) Strangulated hernia.

REPAIR OF HERNIA:

Evidence of surgical repair of inguinal hernias date back to the ancient Egyptian and Greek Civilizations. Early management often involved a conservative approach, with operations being reserved only for complications.

Surgery often involved routine excision of the testicles, and wounds were closed with cauterization or left to granulate on their own. Both mortality and recurrence rates were high.

From the 1700s to 1800s ,many physicians including Hesselbach, Cooper, Camper, Scarpa, Richter and Gimbernat identified vital components of the inguinal region. These combined with aseptic techniques led many surgeons to perform sac dissection, high ligation and closure of the internal ring[10].

The first prosthetic material used was Marlex mesh by Usher in 1958[10]. The posterior wall was opened and Marlex mesh was sutured to the undersurface of the medial margin defect and to the shelving edge of the inguinal ligaments. Some tails were created in the mesh that went around the spermatic cord and were secured to the inguinal ligament.

In the early 1980s, Lichtenstein popularized the tension free repair, supplanting previous tissue based repairs with the widespread acceptance of prosthetic materials for inguinal floor reconstruction. This technique was superior because prosthetic materials could restore the strength of the transversalis fascia, thereby avoiding tension in the defect closure. Superior results were reproducible regardless of the hernia size and type, and they were achievable among expert and non-expert surgeons alike[10].

Currently, repair of hernia may be open or laparoscopic.

Open repairs may be;
1)Pure tissue repairs :
Shouldice, Modified Bassini's, Mcvay repair etc
2)Prosthetic repairs:
Lichtenstein, Rives, Gilbert, Stoppa etc.
Laparoscopic repairs may be Transabdominal Pre-peritoneal repair (TAPP) or Totally Extraperitoneal repair(TEP).

Lichtenstein Tension Free Hernioplasty:

The need for a prosthetic repair was first proposed by Billroth who stated that " If only the proper material could be created to artificially produce tissue of density and toughness of fascia and tendon, the secret of the radical cure for hernia could be discovered"[10].

The Lichtenstein group popularized the routine use of mesh in 1984 and coined the term , "Tension free Hernioplasty". The previous generation's fear of infection and rejection of prosthesis was removed by Nyhus, who stated in 1989 that , " My concerns relative to the potentially increased incidents of infection or rejection of polypropylene mesh have not been warranted till date"[10].

In the tension free hernioplasty, instead of suturing anatomic structures that are not in apposition, the entire inguinal floor is reinforced by insertion of a sheet of mesh. The prosthesis that is placed between the transversalis fascia and the external oblique aponeurosis extends well beyond the Hasselbach's triangle in order to provide sufficient mesh- tissue interface.

On increased intra-abdominal pressure, the external oblique aponeurosis contracts against the mesh, thus protecting the inguinal canal. Thus the procedure addresses both the hazarduous suture – line tension and the metabolic causes of hernia. The operation is therefore therapeutic as well as prophylactic. It protects the entire groin from all future mechanical and metabolic adverse effects.[10]

Position : Supine
Anaesthesia : Regional or Local.
Technique[6,10,11] :

1) A 5-6 cm skin incision which starts from the pubic tubercle and extends laterally within the langer line, gives an excellent exposure of the pubic tubercle and the internal ring. (Fig 29).

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

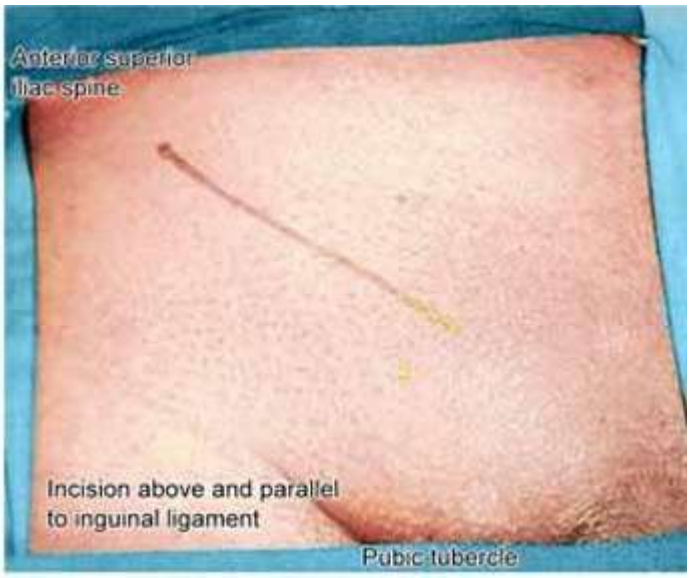
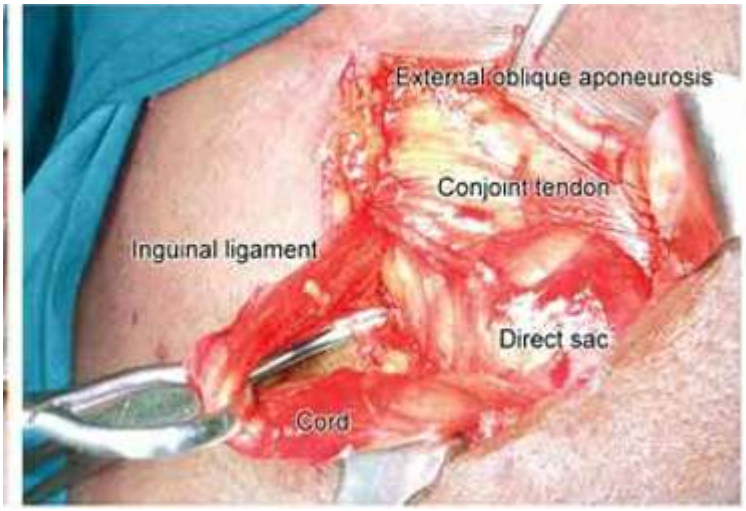


Fig 29 – Skin Incision

2) The external Oblique aponeurosis is opened and it is separated from the cord structures and the internal oblique muscle.
3) The cord with its cremaster covering is separated from the floor of the inguinal canal and the pubic bone for a distance of approximately 2 cm beyond the pubic tubercle.(Fig 32, 33).
4) The internal ring is explored for indirect hernial sacs by incising the cremasteric sheath at the level of the deep ring. (Fig 34).



International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

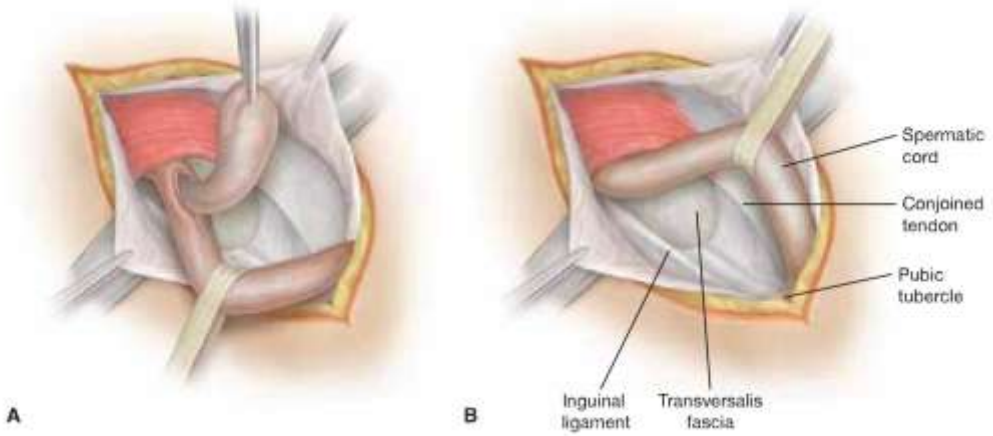


Fig 32, 33- Seperation Of Cord Structures From Sac

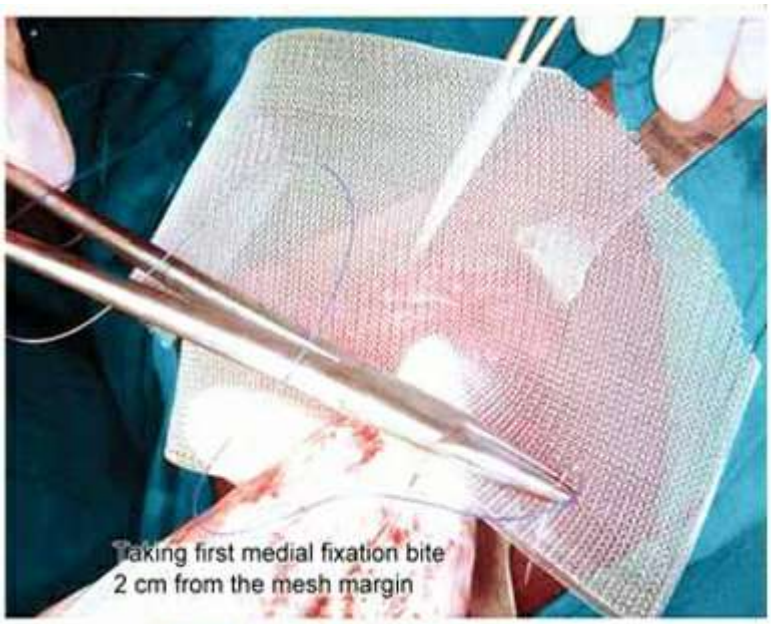
Fig 34 – Exploration for Indirect Sacs

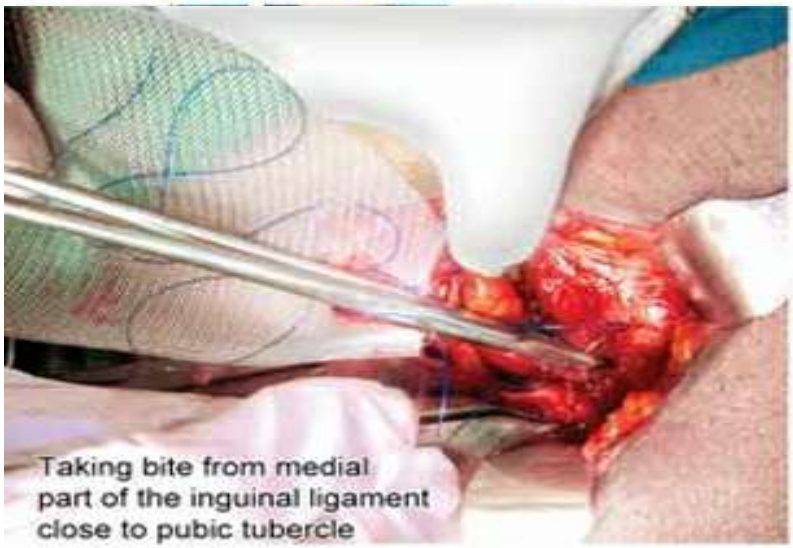
5) Indirect sacs are freed from the cord to a point beyond the neck of the sac and are inverted into the preperitoneal space with or without ligation depending on the surgeons preference.(Fig 35).

Fig 35 – Inversion of sac.

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

6) The wall of the excess distal sac is excised.
7) Findings are confirmed in case of indirect / direct sac.
8) A sheet of 8*16 cm mesh is used. Monofilament polypropylene meshes are preferred because their surface texture promotes fibroplasias and their monofilament structure do not perpetuate or harbor infection.
9) The mesh is cut in the shape of a footprint, with a lower, sharp angle to fit into the angle between the inguinal ligament and the rectus sheath and an upper, wide angle to spread over the rectus sheath.
10) With the cord retracted, the sharper corner is sutured with a non- absorbable suture material to the insertion of the rectus sheath to the pubic bone and overlapping the bone by 1-2 cm. (The periosteum is avoided). The overlapping mesh is sutured to the retcus.





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Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Fig 36, 37, 38 – Taking the Medial Bites

11) This is a crucial step to prevent recurrence.(Fig 36, 37, 38).
12) This suture is continued as a continuous suture attaching the mesh to the inguinal ligament upto a point just lateral to the internal ring. Suturing the mesh beyond this point is unnecessary and may injure the femoral nerve. (Fig 39).

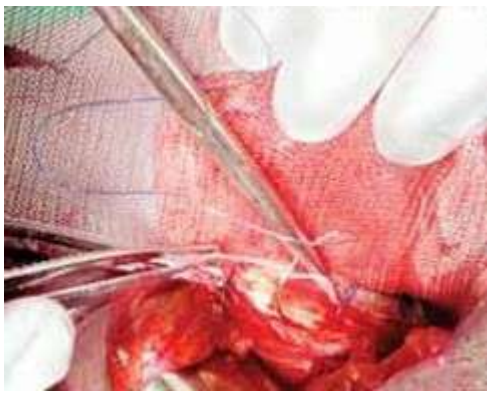


Fig 39 – Suturing to Inguinal Ligament

13) If there is a concurrent femoral hernia, the mesh can be fixed also to the Cooper's ligament 1-2 cm below the suture line with the inguinal ligament in order to close the femoral ring.
14) A slit is made in the lateral end of the mesh, creating two tails, a wide one (two-thirds above) and a narrower one(one-thirds below).
15) The wider upper one is crossed and placed over the narrower one and sutured.(Fig 40).

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

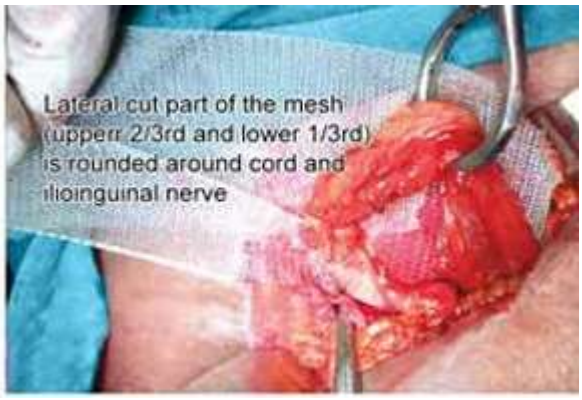
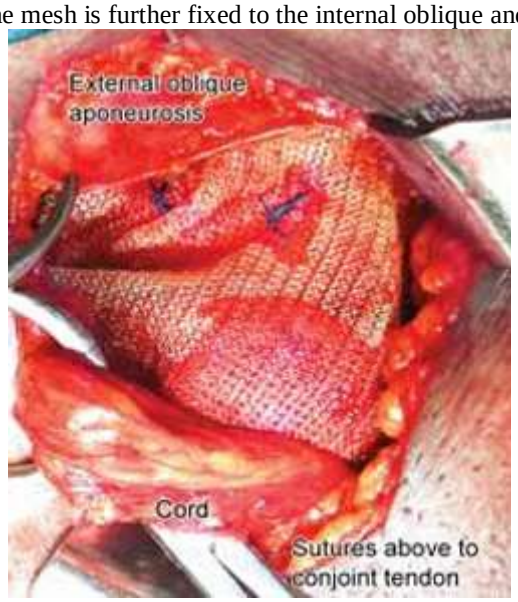


Fig 40 – Fish- Tailing

16) The mesh is further fixed to the internal oblique and the rectus sheath. (Fig 41, 42).



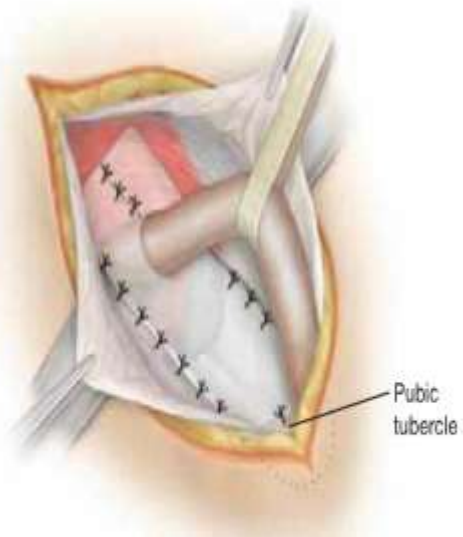


Fig 41, 42 – The Completed Mesh

17) The wound is closed in layers.(Fig 43).

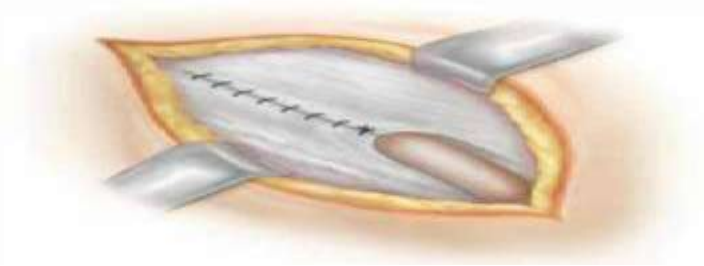


Fig 43 – EO Closure

Technical Aspects Of Lichtenstein's Repair[10] :

1) Use a large sheet of mesh that extends medial to the pubic tubercle, above the Hasselbach's triangle and lateral to the internal ring.
2) Cross the tails of the mesh behind the spermatic cord.
3) Secure the upper edge of the mesh to the rectus sheath and internal oblique aponeurosis.
4) Keep the mesh in a relaxed, tented or sagittal position.
5) Visualize and protect the Ilioinguinal, Iliohypogastric and genitofemoral nerves

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

during the operation.

Based on RCTs, tension free hernioplasty with mesh is superior to Bassini's and Shouldice repairs.

DESARDA'S PURE TISSUE REPAIR:

Inguinal structures, as living entities, that move and function cannot really be appreciated either by dissection on cadavers or operations on patients either under general or spinal anaesthesia[12]. The first recorded observation of dynamic activity in the internal ring of a living non-anaesthetized human being was done in only one patient by Tobin et al[13].

Peacock EE states that little is known about the muscular activity in the internal ring because conventional repair of groin hernia does not adequately expose the muscle fibres[14].

The posterior inguinal wall is composed of condensed transversalis fascia along with the aponeurotic extensions from the transversus abdominis aponeurotic arch. These aponeurotic extensions give mechanical strength to the posterior inguinal wall to resist internal andominal blows. The strength of the posterior inguinal wall is directly related to the number of aponeurotic fibres it contains and there is great variation in the normal anatomy. In 47% of the individuals, the the endo-abdominal fascia of the posterior wall gets full cover from the aponeurotic extensions. But, in 53% of the individuals, there is negligible aponeurotic extensions[15,16].

The spaces between the muscle arch, cremasteric muscle, incurved part of the inguinal ligamentand the posterior inguinal wall is filled with interparietal fibrocollagenous tissue(cremasteric fascia). Read, stated that some metabolic changes in the collagen metabolism in this area result in loss of strength of this connective tissue that loosens the muscles from each other resulting in proportionate loss of their performance and protection[17].

STEPS[5]:

1) All steps are similar upto splitting of External Oblique aponeurosis and separation of cord structures. (Fig 44)
2) The sac is inverted into the peritoneal space. Excess sac is ligated and excised.

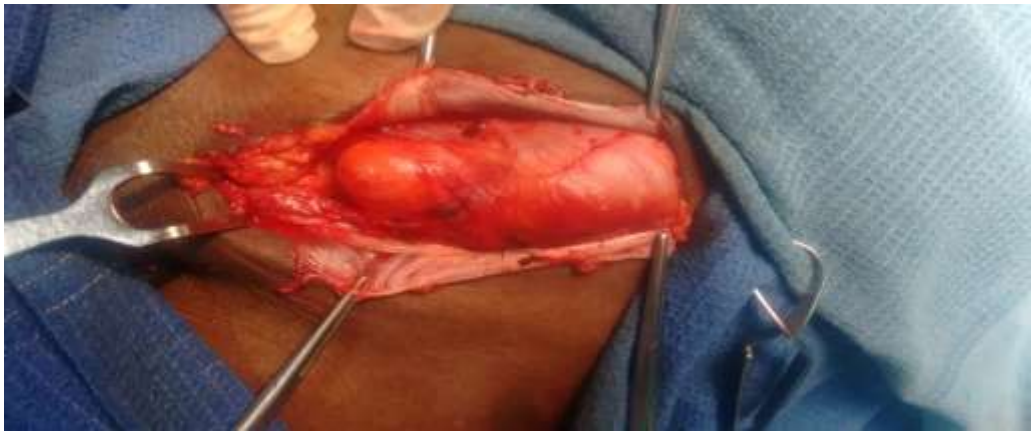


Fig 44 – Exposure Of Sac (Funiculectomy done in this case)

3) The medial leaf of the External oblique aponeurosis is sutured with the inguinal ligament from the pubic tubercle to the deep ring using 1-0 ethilon or prolene interrupted sutures.
4) Each suture is passed through the inguinal ligament, fascia transversalis and the EO aponeurosis.(Fig 45).

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Fig 45 – Suturing of Upper flap to Inguinal Ligament

5) A splitting incision is made in this sutured leaf, partially separating a strip . This incision is extended medially upto the pubic symphysis and laterally 1-2 cm beyond the deep ring.(Fig 46).

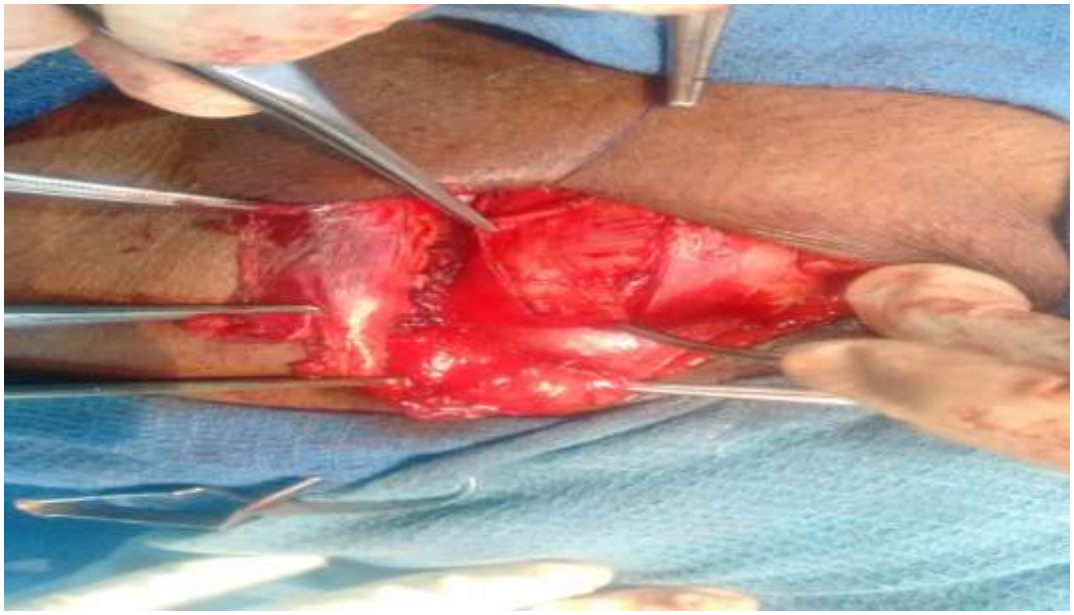


Fig 46 – Splitting Incision made

6) A strip of the external oblique is now available, the lower border of which is already sutured to the inguinal ligament.
7) The upper free border of this strip is sutured to the internal oblique or conjoint muscle with 1-0 prolene or ethilon interrupted sutures.(Fig 47).

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

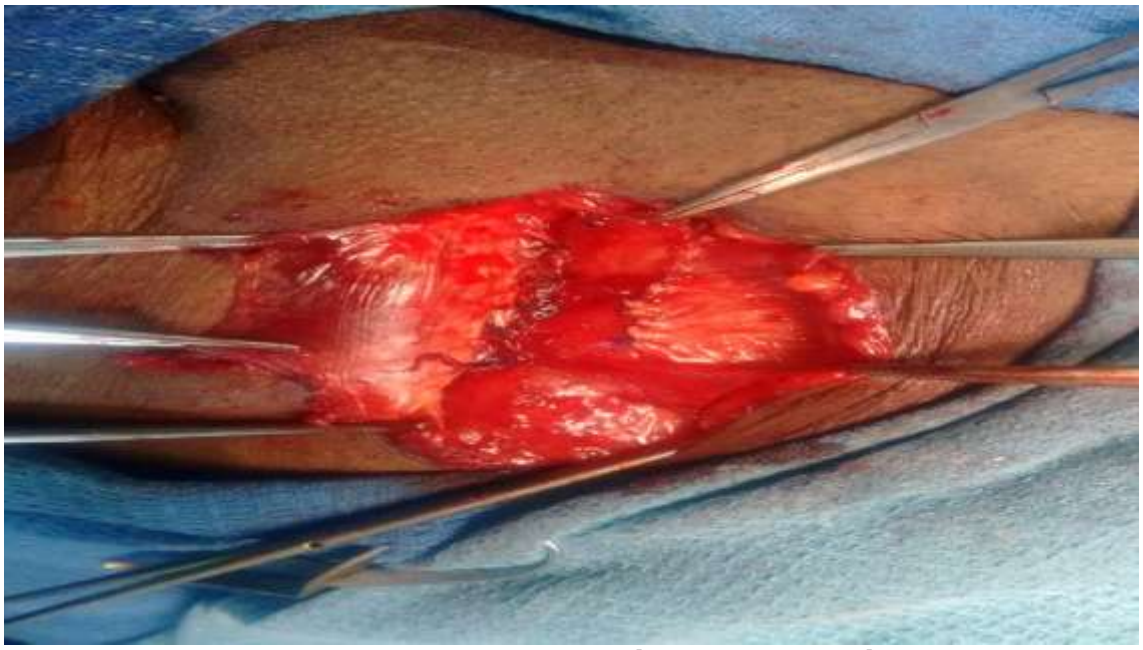


Fig 47 – Suturing OF new Upper Flap to Conjoint Tendon

8) This will result in the strip of the external oblique being placed behind the cord to form a new posterior wall of the inguinal canal.
9) At this stage , the patient is asked to cough and the increased tension exerted by the external oblique muscle to support the weakened internal oblique and transversus muscle is clearly visible. This increased tension is the essence of this operation.
10) The spermatic cord is placed in the inguinal canal and the lateral leaf of the external oblique is sutured to the newly formed medial leaf in the usual manner using 1-0 ethilon or prolene interrupted sutures.(Fig 48).

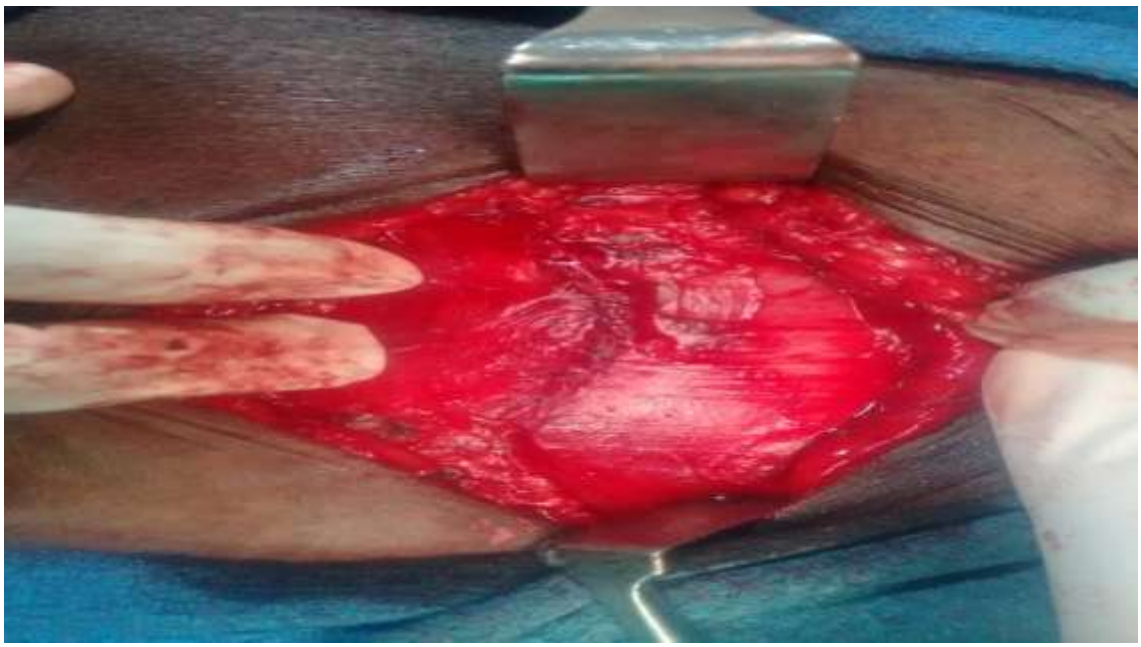


Fig 48 – Closure of EO aponeurosis

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Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

11) Wound is closed in layers. (Fig 49).

Fig 49 – Wound Closure

12) The role of the external oblique aponeurosis in anterior-posterior compression of the inguinal canal to prevent herniation is restored by providing a strong and physiologically dynamic posterior wall.(Fig 50).

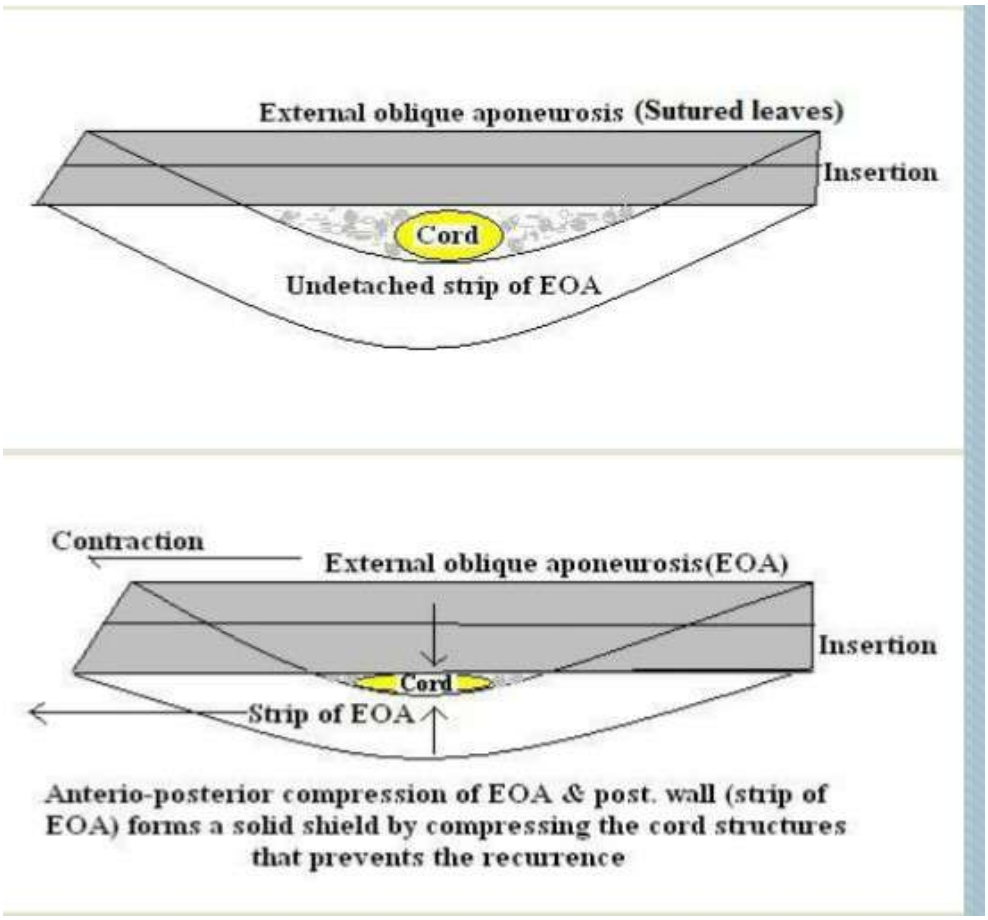


Fig 50 – Mechanism Of action of External Oblique in Desarda's Repair

Mohan P Desarda operated on 200 cases and dissected the inguinal canals under local anaesthesia[18]. He found that in a majority of patients, the muscles around the inguinal canal were weak, with loss of tone and movements , and therefore failed to provide protection against herniation. The posterior wall of the inguinal canal was also weak, containing only adipose tissue, without aponeurotic extensions. This is replaced by a strong and physiologically dynamic aponeurosis

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

of the external oblique. Good or improved movement of the muscle arch , was seen after repair in all patients.The author had zero cases of recurrences.

Ahmed E. Ahmed et all compared 65 patients who underwent Lichtenstein's tension free hernioplasty with 65 patients who underwent Desarda's repair. In this, patients with Desarda's repair had lower operative time, early return to basic and work activity, shorter hospital stay and lesser postoperative pain than Lichtenstein's repair[19].

Youssef et al in a similar study reported that Desarda repair had a shorter operating time and earlier return to normal gait as compared to mesh repair[20].

Desarda in a clinical trial compared his technique to Lichtenstein's repair and reported no reccurence in his technique as compared to 4 recurrences in the mesh group[21].

Obaid Syed compared 100 patients who underwent Lichtenstein's repair with 100 patients who underwent Desarda's repair. There was no statistically significant difference between both the groups in any parameters except that patients who underwent Desarda's repair had statistically significant lesser incidence of chronic inguinal pain[22].

Mitura et all compared 50 patients who underwent Lichtenstein's tension free hernioplasty with 50 patients who underwent Desarda's repair and concluded that there was no statistical significance between both groups in any parameter and that the Desarda repair is as effective as the Lichtenstein's repair[23].

Gedam et all compared 92 patients who underwent Desarda's repair with 95 patients who underwent Lichtenstein's repair and concluded that patients who underwent Desarda's repair returned to daily activities sooner[24].

Rushabh et all compared 28 patients who underwent Desarda's repair with 28 patients who underwent Lichtenstein's tension free hernioplasty. The patients who underwent Desarda's repair reported statistically significant lesser incidence of groin pain and earlier return to normal activities[25].

IV. MATERIALS AND METHODS

Primary Objectives

- To derive conclusions about post – operative results and rate of recurrences in Desarda's repair and conventional mesh repair in the management of inguinal hernias.

Eligibility criteria

A.Inclusion criteria:

- Age > 18 years &< 65 years.
- Those presenting with uncomplicated inguinal/inguinoscrotal hernia.
- Patients who consented for inclusion in the study according to designated proforma .

B.Exclusion criteria:

- Age < 18 years and > 65 years.
- Patients with complicated hernias.
- Patients with Bilateral hernias.
- Patients with femoral hernias.
- Patients having hernia with hydrocele.
- Comorbid conditions.
- Immunocompromised states.
- Coagulopathy.
- Patients who did not consent to the procedure**.**

Methodology

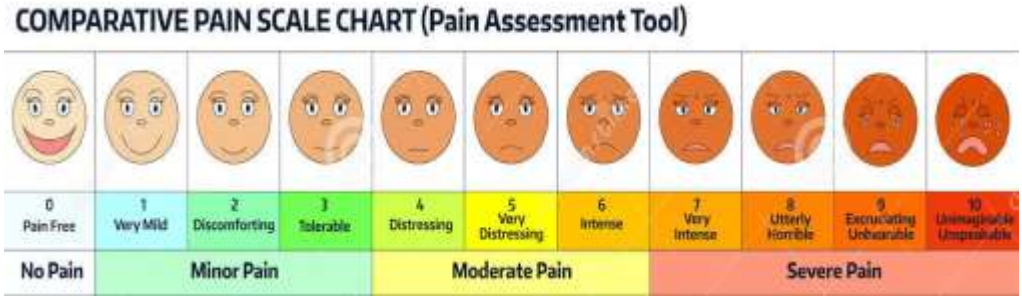
- From January 2017 to January 2018, patients presenting with inguinal hernias in GRH Madurai will be recruited in this study.
- The patients were seen in surgical speciality OP in emergency and routine hours and were diagnosed on the basis of history & clinical examination.
- After obtaining consent, patients would be required to fill in a proforma (which is given below). After that patients would be randomly divided into two groups. In the first group hernia repair will be performed by conventional tension free Lichtenstein's hernioplasty using prolene mesh. In the second group , hernia repair will be done by the Desarda's technique.

Both groups will be analyzed for,

- POST-OPERATIVE COMPLICATIONS:
- Pain
- Hematoma formation
- Seroma formation
- Superficial/deep wound/mesh infection
- Scrotal edema
- Loss or change in sensation in the operated groin
- Return to daily activities
- Foreign body sensation
- 2. RECURRENCE – It is a palpable hernia on examination on the same side of the repair.

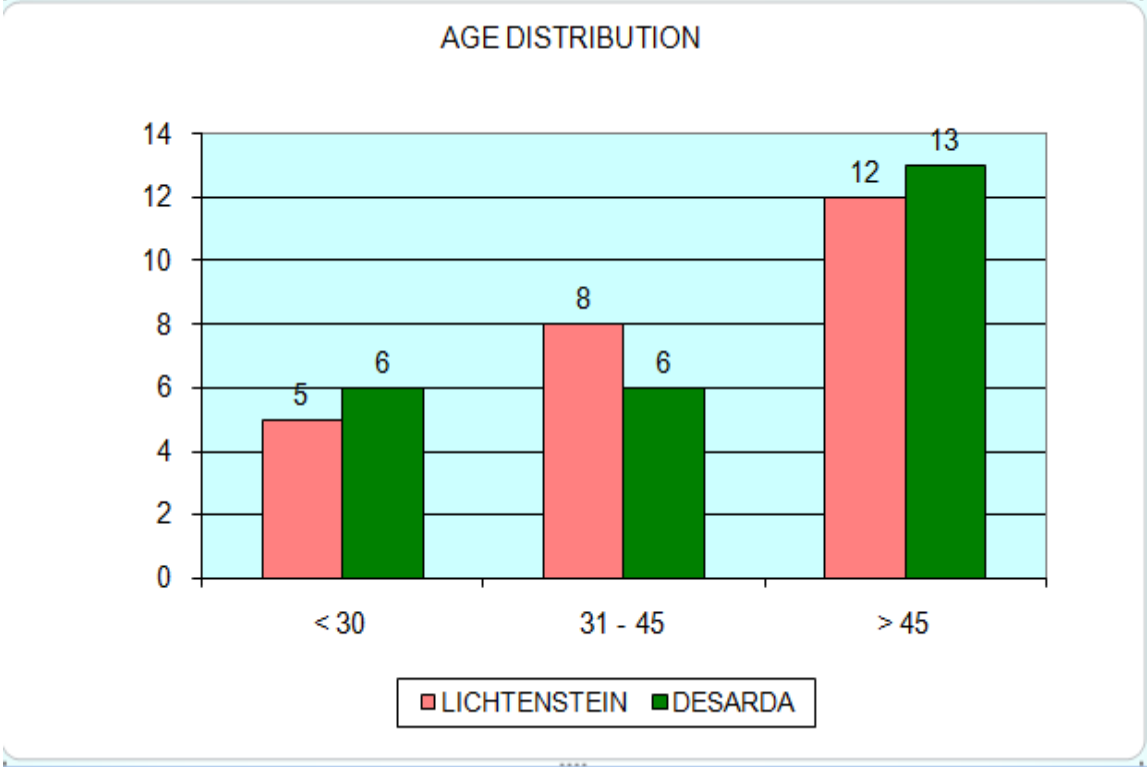
International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

VISUAL ANALOG SCORE USED FOR POSTOPERATIVE PAIN ASSESSMENT



V. RESULTS

1. AGE DISTRIBUTION:

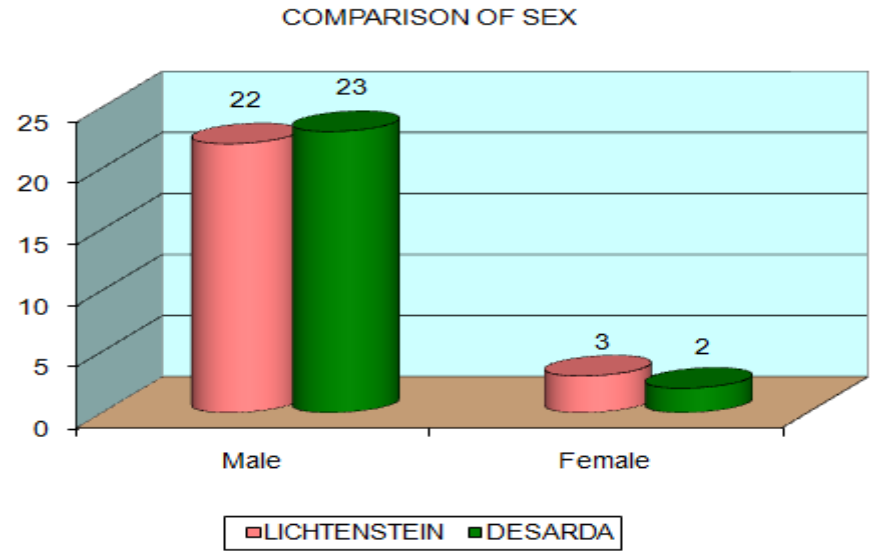


Age	LICHTENSTEIN	DESARDA
≤ 30	5	6
31 – 45	8	6
> 45	12	13
Total	25	25
Mean	43	43.32
S.D	13.128	13.353
P'	0.932	Not sig

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

The mean age group was similar in both groups(43 years). There was no statistical significance.

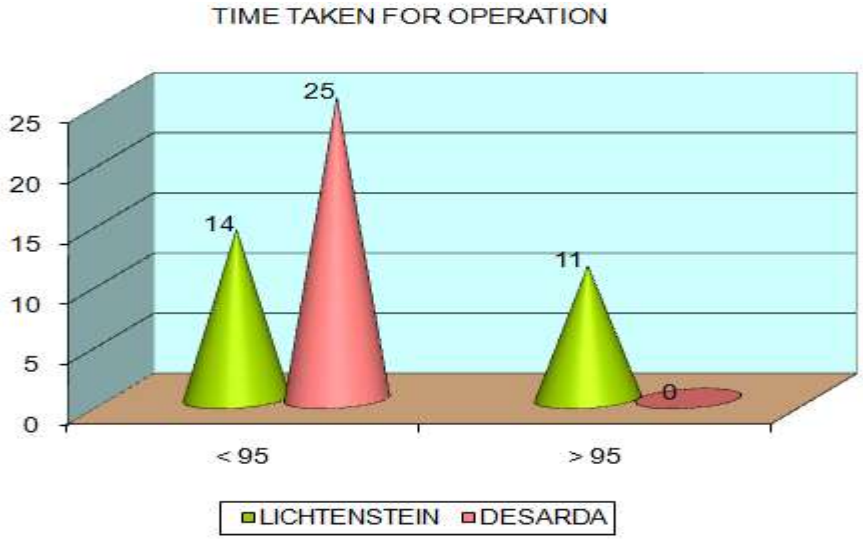
2. SEX DISTRIBUTION:



Sex	LICHTENSTEIN	DESARDA
Male	22	23
Female	3	2
Total	25	25
P'	0.836	Not sig

In the Lichtenstein's repair group, 22 patients were males and 3 patients were females and in the Desarda's repair group, 23 patients were males and 2 patients were females.

3. TIME TAKEN FOR OPERATION:

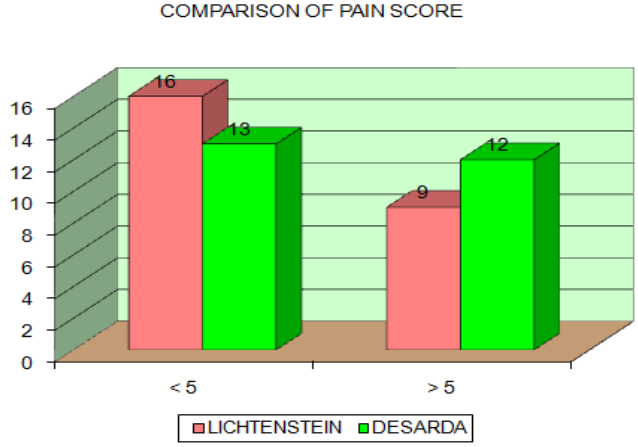


International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Time taken for operation	LICHTENSTEIN	DESARDA
< 95	14	25
≥ 95	11	0
Total	25	25
Mean	90	45
S.D	12.99	9.014
P'	<0.001	Significant

The mean time taken for operation in the Lichtenstein's repair group was 90 minutes whereas it was only 45 minutes in the Desarda's repair group, which is statistically significant.

4. POSTOPERATIVE PAIN COMPARED USING VISUAL ANALOG SCORE:



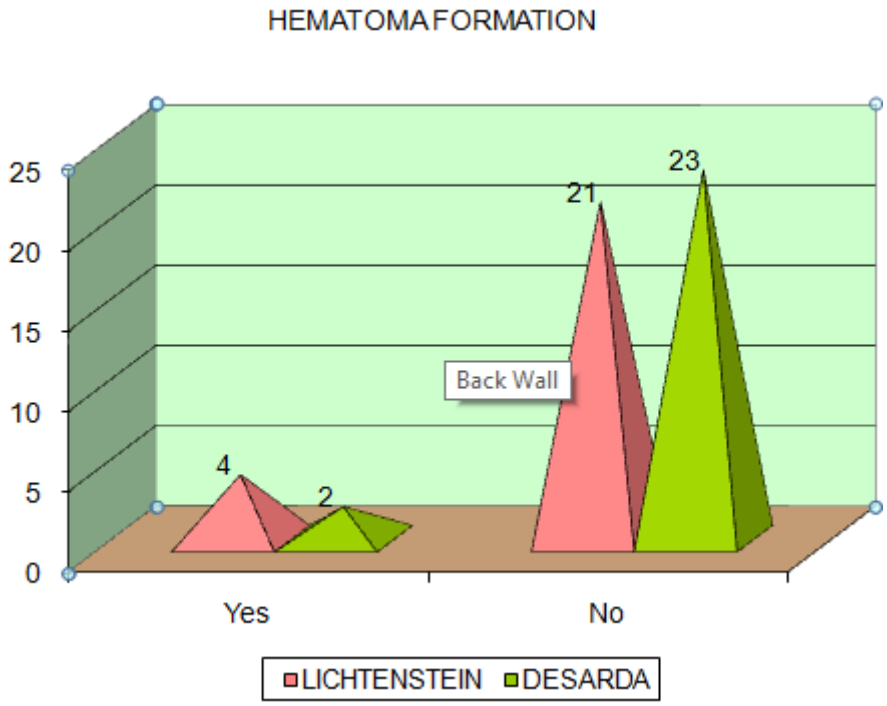
Pain Score	LICHTENSTEIN	DESARDA
< 5	16	13
≥ 5	9	12
Total	25	25
Mean	4	4.48
S.D	1.78	1.759
P'	0.342	Not sig

The mean postoperative pain score was similar in both the groups, when measured at POD -1 and POD – 3. Both groups required NSAID analgesia.

5. HAEMATOMA FORMATION :

It is defined as localized collection of blood at surgical site, found on aspiration of swelling (if present) on incision site or expressed after removal of staplers. It was observed for upto 30 days.

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018



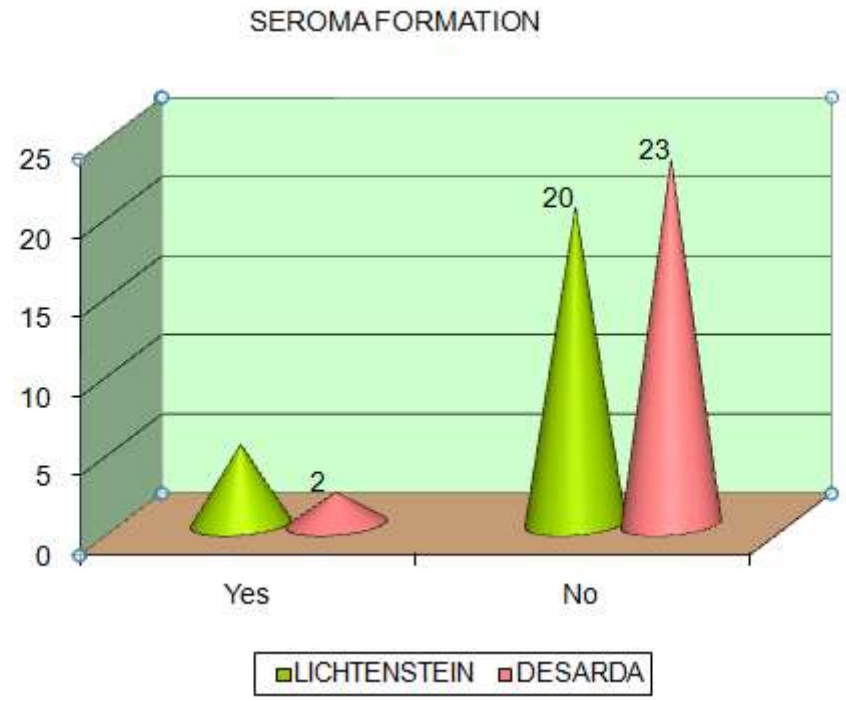
Hematoma formation	LICHTENSTEIN	DESARDA
Yes	4	2
No	21	23
Total	25	25
Percentage	16%	8%

Haematoma formation occurred in 4 cases in Lichtenstein's repair group whereas it occurred only in 2 cases in Desarda's repair group(significant).

6. SEROMA FORMATION :

It is defined as collection of serous fluid pocket at the site of incision as a result of tissue dissection, found on aspiration of fluctuant swelling at wound site or expressed after stapler removal. It was observed for upto 30 days.

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018



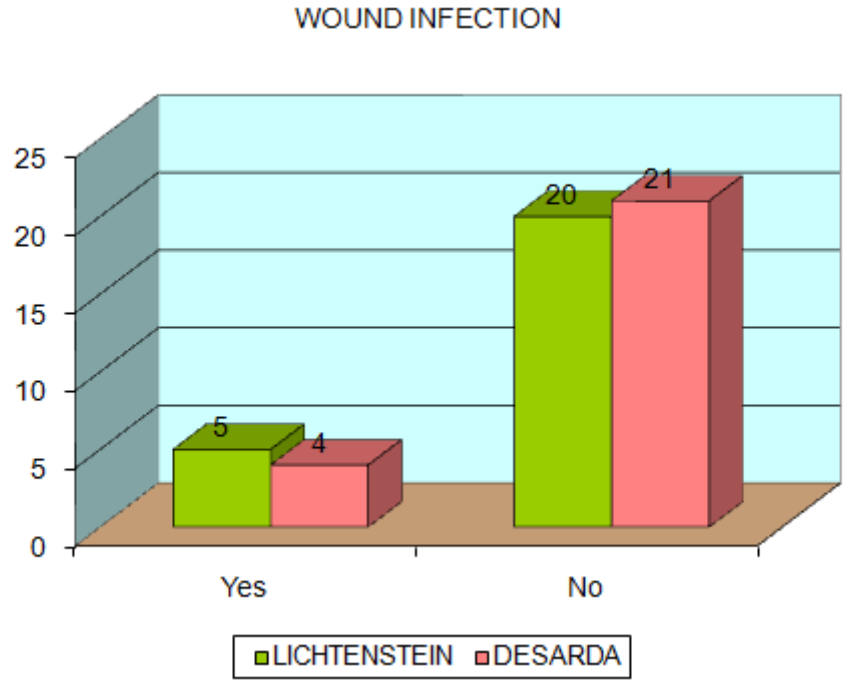
Seroma formation	LICHTENSTEIN	DESARDA
Yes	5	2
No	20	23
Total	25	25
Percentage	20%	8%

Seroma formation occurred in 5 cases in Lichtenstein's repair group and in only 2 cases in Desarda's repair group(significant).

7. WOUND INFECTION:

It is identified by the collection of purulent material at the site of incision, associated with tenderness, erythema and edema at the incision site. It was observed for upto 6 months.

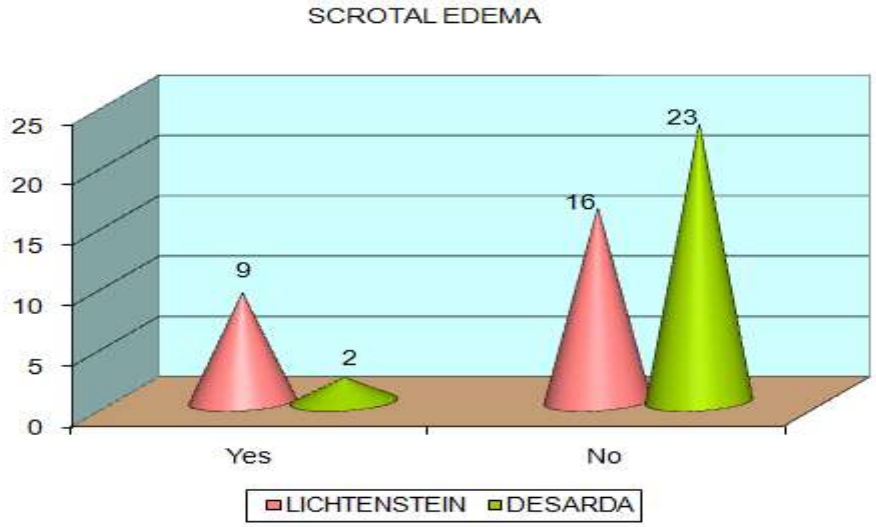
International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018



Wound infection	LICHTENSTEIN	DESARDA
Yes	5	4
No	20	21
Total	25	25
Percentage	20%	16%

Wound infection occurred in 5 cases in Lichtenstein's repair group and in 4 cases in desarda's repair group.

8. SCROTAL EDEMA:
It was observed for upto POD – 3.



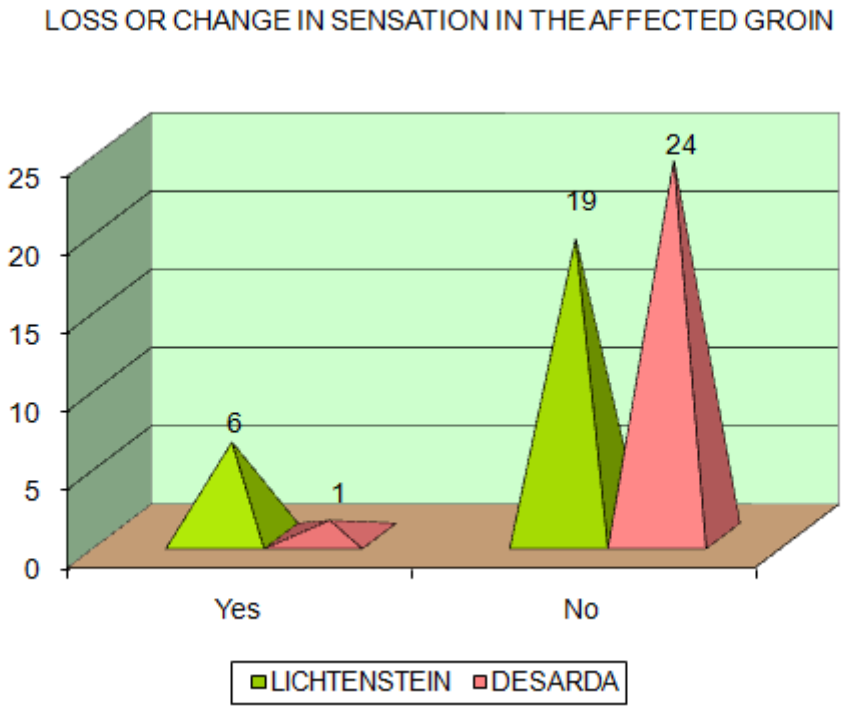
International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Scrotal edema.	LICHTENSTEIN	DESARDA
Yes	9	2
No	16	23
Total	25	25
Percentage	36%	8%

Scrotal edema occurred in 9 patients in Lichtenstein's repair group and in 2 patients in Desarda's repair group(significant). The higher percentage in Lichtenstein's repair is probably due to the excessive handling of the cord structures during mesh placement.

9. LOSS OR CHANGE IN SENSATION IN THE AFFECTED GROIN :

Touch sensation over the operated groin was compared with the opposite side to look for Hyperasthesia or allodynia. It was done on POD -1 and POD -3.



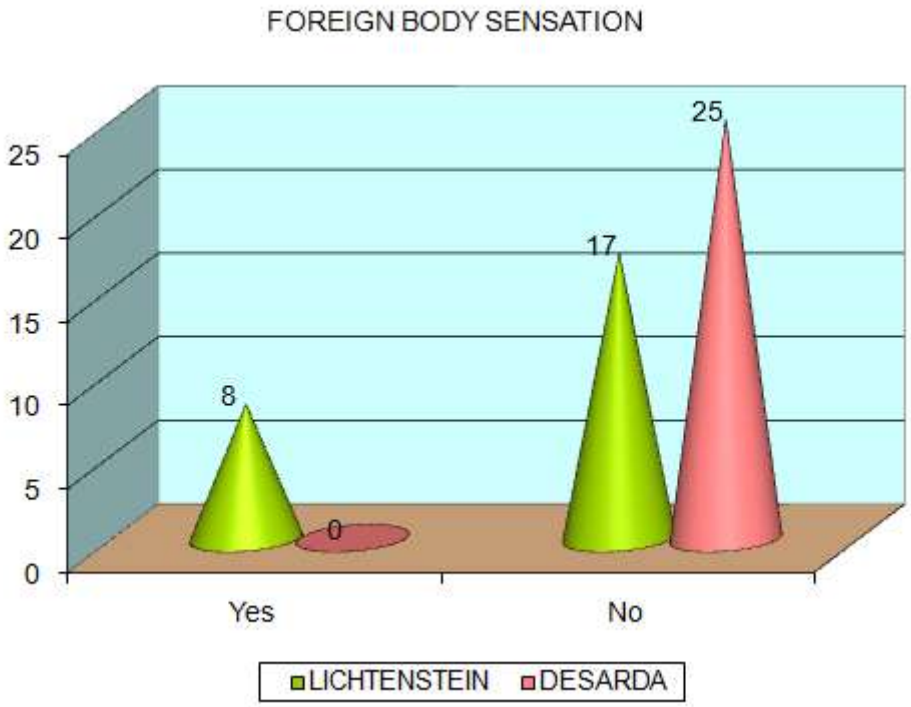
Loss or change in sensation in the affected groin.	LICHTENSTEIN	DESARDA
Yes	6	1
No	19	24
Total	25	25
Percentage	24%	4%

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

Loss or change in sensation in the affected groin was reported by 6 patients in the Lichtenstein's repair group and by 1 patient in the Desarda's repair group(significant). It is probably due to injury/ entrapment of any of the nerves of the groin.

10. FOREIGN BODY SENSATION:

Patient was asked if any perception of a foreign body being implanted in the operated groin was present. It was studied upto 3 months.



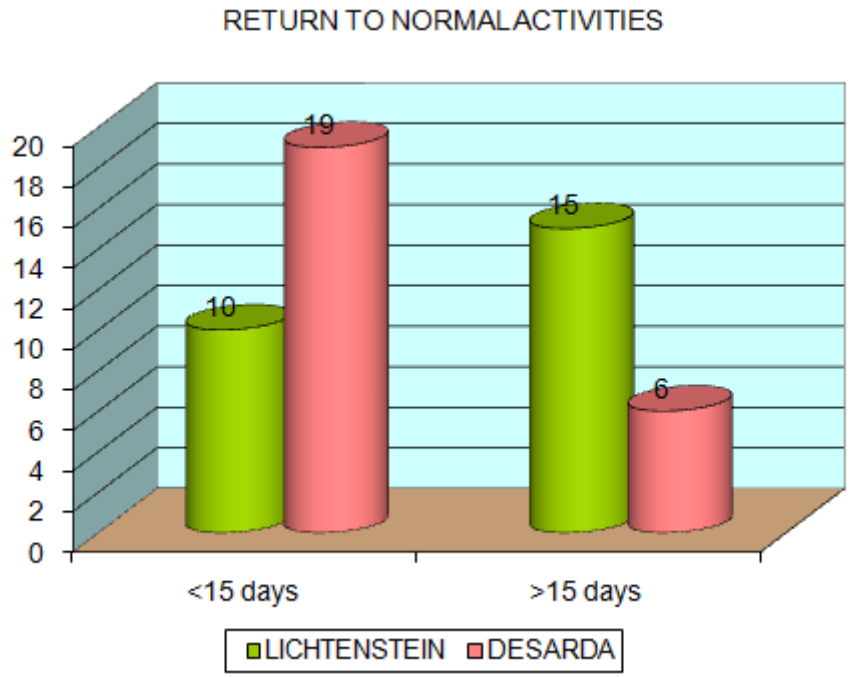
Foreign body sensation	LICHTENSTEIN	DESARDA
Yes	8	0
No	17	25
Total	25	25
Percentage	32%	0%

Foreign body sensation was reported by 8 patients in the Lichtenstein's repair group and by none of the patients in the Desarda's repair group(significant). It is inevitable since we are introducing a prosthetic material into the patient's body.

11. RETURN TO NORMAL ACTIVITIES:

The patient was asked when did he/she return to activities of daily living completely without any discomfort or external help.

International Journal Dental and Medical Sciences Research
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

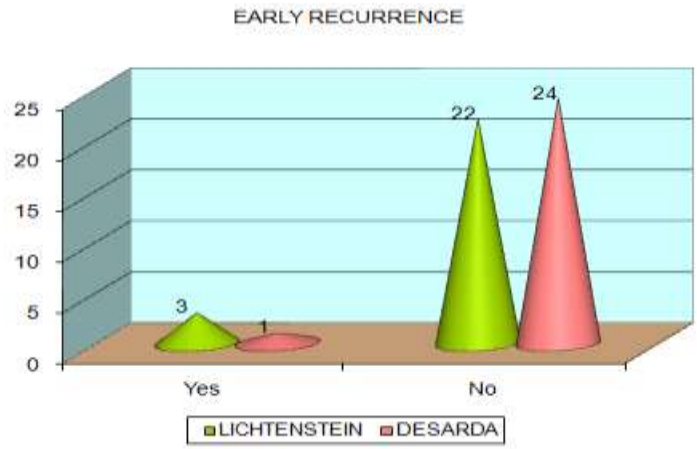


Return To Normal activities	LICHTENSTEIN	DESARDA
<15 days	10	19
>15 days	15	6
Total	25	25
Percentage	40%	76%

19 patients returned to normal activites within 15 days in the Desarda's repair group, whereas only 10 patients returned to normal activities within 15 days in the Lichtenstein'srepair group(significant).

12. EARLY RECURRENCE:

Recurence is defined as a palpable bulge on the operated site. Our patients were followed up for 6 months.



EARLY RECURRENCE –	LICHTENSTEIN	DESARDA
Yes	3	1
No	22	24
Total	25	25
Percentage	12%	4%

In 6 months, three patients of the Lichtenstein's repair group developed recurrence whereas only one patient developed recurrence in the Desarda's repair group(significant).

VI. DISUSSION

- In our study the mean age group of surgery in both groups was 43 years with majority of the cases being males, once again proving that inguinal hernia is common in males.
- The mean time taken for operation is 90 minutes in Lichtenstein's repair whereas it is only 45 minutes in Desarda's repair. This is understandable since excess dissection and mesh fixation is not necessary in Desarda's repair.
- There was no significant difference between the two groups in the magnitude of postoperative pain and the incidence of wound infection, reflecting that these two parameters , at least to some extent do not depend on the surgical technique. NSAID analgesia was sufficient in both groups. Further studies are needed to find out how to avoid postoperative pain and wound infection.
- Desarda's technique was associated with a statistically significant less incidence of Haematoma formation, Seroma formation, Scrotal edema and Change in groin sensation. This is because there is less handling of tissues here when compared with Lichtenstein's repair.
- None of the patients who underwent Desarda's repair complained of Foreign body sensation whereas 8 patients who underwent Lichtenstein's repair complained so. This is understandable because we are introducing a foreign prosthetic material (mesh) in Lichtenstein's repair which also causes fibrosis locally.
- Desarda's repair was asccociated with an earlier return to normal activities than Lichtenstein's repair. This may be due to the shorter operative time.
- In 6 months, three patients of the Lichtenstein's repair group developed recurrence whereas only one patient developed recurrence in the Desarda's repair group. This might be because, Desarda's repair is technically easier to do with shorter learning curve.

VII. CONCLUSION

Thus, Desarda's repair is associated With shorter operative time, lesser incidence of Haematoma formation, Seroma formation, scrotal edema, loss of groin sensation, foreign body sensation and recurrence rates. The results are comparable with other studies mentioned above.

Desarda' repair can be used as a safe alternative to Lichtenstein's repair. This study suffers from the limitation that there is no way to measure the pressure increase that occurs in the groin following Desarda's repair during raised intra-abdominal strains. Thus it requires further evaluation. Also further studies are needed to validate Desarda's repair in the setting of Complicated hernias, Femoral hernias and Hernia with Hydrocele.

Thus , there is no "best" form of hernia repair. I end my study with the words of Sir. John Bruce of Edinburgh – "The final words on hernia repair will probably never be written ".

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PROFORMA

Name :- I. P. No

Age :- Unit

Sex :- D.O.A

Occupation :- D.O.D

Address :-
Phone no :

DIAGNOSIS:
PRESENTING COMPLAINTS

Swelling
Pain
Co existing co morbidities
Treatment history

GENERAL PHYSICAL EXAMINATION
1. General survey
2. Body build and nourishment
3. Appearance
4. Dehydration: Mild/ Moderate/ Severe/ Nil
5. Anaemia/ Jaundice/ Clubbing/ Cyanosis/ Lymphadenopathy/ Pedal edema
6. Pulse
7. Temperature
8. Respiratory rate
9.Blood pressure

LOCAL EXAMINATION - groin.

1. INSPECTION
2. PALPATION
SYSTEMIC EXAMINATION

Cardiovascular system
Respiratory system
Central nervous system
Abdomen

Genito-urinary system

Per/rectal examination

ஆராய்ச்சிதகவல்அறிக்கை

மதுரைஅரசுஇராசாசிமருத்துவமனையில்வரும்நோயாளிக்குள்

வயிற்றில்ஒருஆராய்ச்சிஇங்குநடைபெற்றுவருகிறது .
நீங்களும்இந்த ஆராய்ச்சியில்பங்கேற்கவிரும்பிகிறோம் .

உங்களைசிலசிறப்புபரிசோதனைக்குஉட்படுத்திஅதன்தகவல்களைஆராய்வோம் . அதனால்தங்களதுநோயின்ஆய்வரிகையோஅல்லதுசிகிச்சையோபாதிப்பு ஏற்படாதுஎன்பதைதெரிவித்துகொள்கிறேன் .

முடிவுகளைவெளியிடும்போதுஅல்லதுஆராய்ச்சியின்போதோதங்களதுபெயரோ அல்லதுஅடையாளங்களோவெளியிடமாட்டோம்என்பதை தெரிவித்துகொள்கிறோம்.

இந்தஆராய்ச்சியில் பங்கேற்பதுதங்களுடையவிருப்பத்தின்பேரில்தான்நடக்கும் . . மேலும்நீங்கள்எந்நேரமும்இந்தஆராய்ச்சியில்இருந்துபின்வாங்கலாம்என்பதையும்தெரிவித்துகொள்கிறோம் .

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இந்தசிறப்புபரிசோதனைமுடிவுகளைஆராய்ச்சியின்போது அல்லதுஆராய்ச்சியின்முடிவின்போதுதங்களுக்குஅறிவிப்போம்என்பதையும்தெரிவித்துகொள்கிறோம்.

ஆராய்ச்சியாளரின் பங்கேற்பாளர் கையொப்பம் கையொப்பம்

	LICHTENSTEIN'S REPAIR						
S.No	Name	Age	Sex	Time taken for operation	Pain Score	Haematoma formation	Seroma formation
1	Hariharan	49	M	75	2		Yes
2	Ramcharan	53	M	85	5	Yes	
3	Vignesh	37	M	105	2		
4	Chandrasekar	57	M	110	6		Yes
5	Prasad	19	M	100	3	Yes	
6	Rakesh	39	M	75	3		
7	Akash	47	M	75	4		
8	Karthik	61	M	85	5	Yes	
9	Gokulakrishnan	56	M	100	3		
10	Madhumitha	33	F	105	2		
11	Kirubakaran	24	M	110	3		
12	Jithin Mohan	48	M	80	4		
13	Aadithya	36	M	95	7		
14	Vathsalyan	63	M	80	5		
15	Kumar	25	M	85	2		
16	Sanjey	57	M	105	6		Yes
17	Satheesh	43	M	110	4		
18	Monisha	51	F	100	2		
19	Gokul Krishna	56	M	70	3		Yes
20	Balaji	29	M	75	5		
21	Sujay	40	M	85	8		
22	Ganesh	32	M	80	7		
23	Anand	43	M	95	3		Yes
24	Hepsi	56	F	80	2	Yes	
25	Vikram	21	M	85	4		

	LICHTENSTEIN'S REPAIR						
S.No	Name	Wound infection	Scrotal edema.	Loss or change in sensation in the affected groin.	Foreign body sensation	Return to Normal Activities within 15 days	EARLY RECURRENCE –
1	Hariharan				Yes		

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Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018

2	Ramcharan			Yes		Yes	
3	Vignesh		Yes		Yes		
4	Chandrasekar						
5	Prasad		Yes			Yes	
6	Rakesh				Yes		
7	Akash					Yes	
8	Karthik		Yes		Yes		
9	Gokulakrishnan			Yes		Yes	
10	Madhumitha	Yes	Yes		Yes		
11	Kirubakaran			Yes			
12	Jithin Mohan		Yes			Yes	
13	Aadithya	Yes					
14	Vathsalyan		Yes	Yes	Yes		
15	Kumar	Yes				Yes	Yes
16	Sanjey		Yes				
17	Satheesh			Yes		Yes	
18	Monisha	Yes			Yes		Yes
19	Gokul Krishna						
20	Balaji		Yes			Yes	
21	Sujay						
22	Ganesh			Yes		Yes	
23	Anand				Yes		Yes
24	Hepsi					Yes	
25	Vikram		Yes				

Desarda's repair:

S.No	Name	Age	Sex	Time taken for operation	Haematoma Formation	Pain Score	Seroma formation
1	Dhanasekar	49	M	45		2	
2	Bronson	53	M	55		6	
3	Thalabathi	37	M	35		5	
4	Hemakumar	57	M	40		7	
5	Santhoshkumar	19	M	45		4	
6	Albert	39	M	55	Yes	3	
7	Karunya	47	F	40		4	
8	Sarvess	61	M	45		5	
9	Prasanna	56	M	50		6	
10	Venakatesh	27	M	45		2	Yes
11	Prasanth	24	M	40		3	Yes
12	Poongavanam	48	M	35		4	
13	Jeevanandham	32	M	30		7	
14	Srinivasan	63	M	60		5	
15	Sudharson	25	M	35		2	
16	Srinivasagopalan	57	M	40		6	
17	Senthil	43	M	45		3	
18	Velavan	51	M	55		5	

19	Anjali	51	F	45	Yes	4	
20	Aaquil	29	M	55		5	
21	Sharath	40	M	60		8	
22	Devendiran	55	M	40		7	
23	Sreeram	43	M	35		3	
24	Bharath	56	M	60		2	
25	Ashok	21	M	35		4	

S.No	Name	Wound infection	Scrotal edema.	Loss or change in sensation in the affected groin.	Foreign body sensation	Return to normal activities within 15 days	EARLY RECURRENCE –
1	Dhanasekar					Yes	
2	Bronson	Yes				Yes	
3	Thalabathi						
4	Hemakumar					Yes	
5	Santhoshkumar					Yes	
6	Albert					Yes	
7	Karunya	Yes					
8	Sarvess					Yes	
9	Prasanna					yes	
10	Venakatesh					Yes	Yes
11	Prasanth						
12	Poongavanam					Yes	
13	Jeevanandham			Yes		Yes	
14	Srinivasan					Yes	
15	Sudharson	Yes				Yes	
16	Srinivasagoplan					Yes	
17	Senthil					Yes	
18	Velavan		Yes				
19	Anjali					Yes	
20	Aaquil					Yes	
21	Sharath					Yes	
22	Devendiran						
23	Sreeram					Yes	
24	Bharath	Yes				Yes	
25			Yes				

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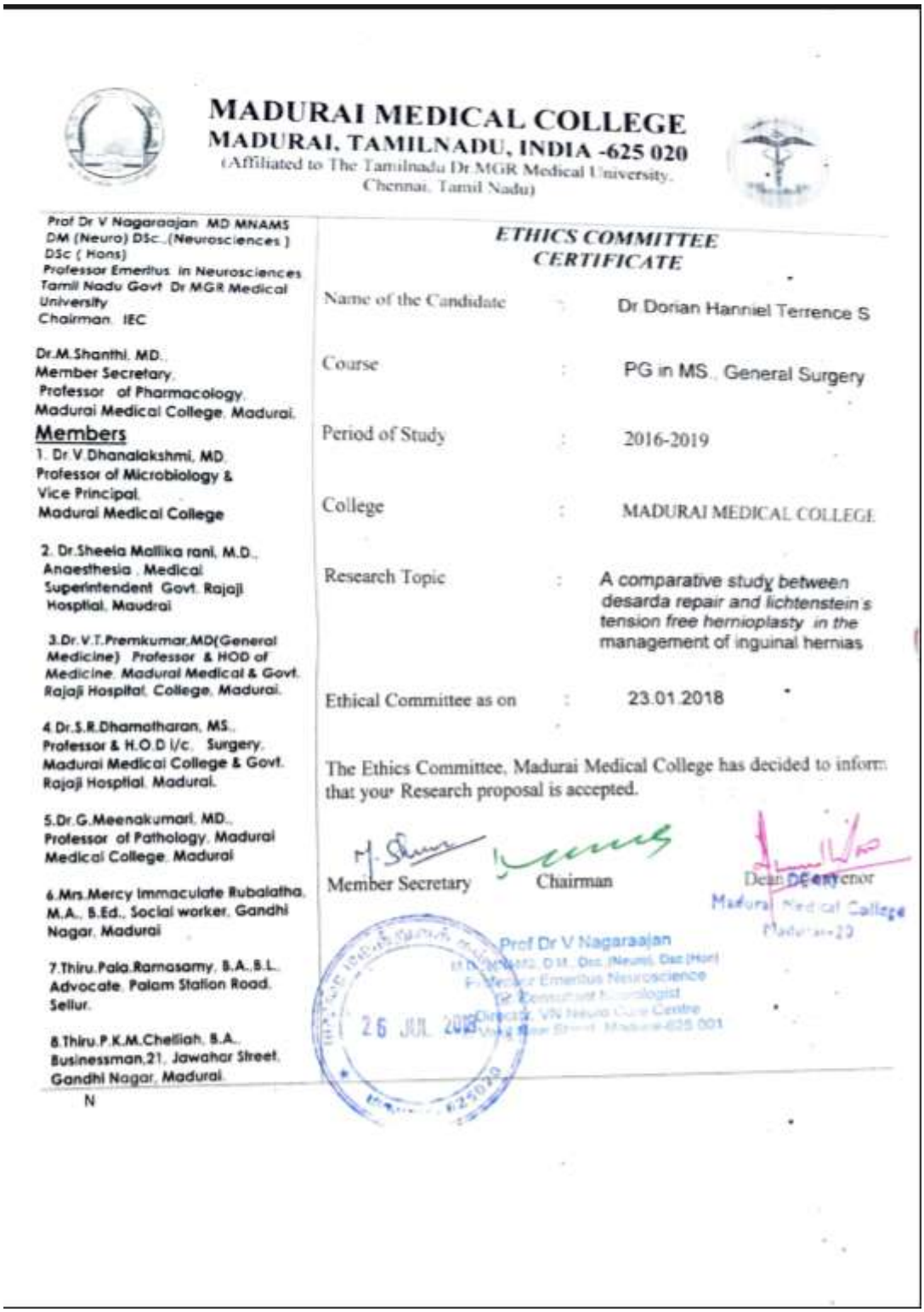
Volume 3, Issue 2, Mar-Apr. 2021 pp 825-860 www.ijdmsrjournal.com ISSN: 2582-6018



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N

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr Dorian Hanniel Terrence S
Course	:	PG in MS., General Surgery
Period of Study	:	2016-2019
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	A comparative study between desarda repair and lichtenstein's tension free hernioplasty in the management of inguinal hernias
Ethical Committee as on	:	23.01.2018

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman

Dean/Dean Nominee
Madurai Medical College
Madurai-20

Prof Dr V Nagaraajan
Professor Emeritus Neuroscience
Director, VN Neuro Care Centre

26 JUL 2018

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