

Inguinal Hernia - Quiz:

1. This section of the quiz is composed of 8 questions relating to the development of the inguinal canal.

1) What is the inguinal canal created by:

An outpouching of peritoneum called the processus vaginalis

2) What guides the descent of the testes:

The gubernaculum

3) What does the gubernaculum form in a female:

The round ligament of the uterus

4) The processus vaginalis regresses to form which structure in a male:

The tunica vaginalis

5) If the processus vaginalis doesn't regress which type of hernia can form:

Indirect (congenital) hernia

6) What is protrusion of the peritoneum into the labia majora termed:

Canal of Nuck

7) During male development which collection of structures pass along the inguinal canal to form the testes:

The spermatic cord which includes the ductus deferens, vessels and nerves

8) What structure extends into the labia majora:

The round ligament of the uterus

2. This section of the quiz is composed of 5 multiple-choice questions related to the anatomy of the inguinal canal – choose an answer from the list. Options may be used once, several times or not at all.

| | | |
|-----------------------|---------------------------|--------------------|
| Transversus abdominis | Iliohypogastric nerve | conjoint tendon |
| Internal Oblique | Transversalis fascia | Ilioinguinal nerve |
| Genitofemoral nerve | superficial inguinal ring | External oblique |

1) What passes through the deep inguinal ring:

Genitofemoral nerve

2) What is present within the layer of external oblique:

Superficial inguinal ring

3) What forms the medial 1/3rd of the posterior wall of the inguinal canal:

Conjoint tendon

4) What forms the lateral 1/3rd of anterior wall of the inguinal canal:

Internal Oblique

5) What structures form the two boundaries named below of the inguinal canal:

Anterior wall: **External oblique and Internal oblique**

Posterior wall: **Transversalis fascia and conjoint tendon**

3. This section of the quiz is composed of 5 questions relating to the mechanisms of the inguinal canal:

1) Which three mechanisms must work to maintain the integrity of the inguinal canal:

- A. Inner shutter
- B. Outer shutter
- C. Strength of the transversalis fascia and support of both the deep and superficial inguinal rings

2) What structures are involved in the inner shutter mechanism:

Transversus abdominis and the transversalis fascia

3) What structures are involved in the outer shutter mechanism:

Internal oblique and transversus abdominis

4) What jeopardises the integrity of the inguinal canal:

Weakness in transversalis fascia of the posterior wall

5) What can cause the oblique passage of the inguinal canal to be lost:

Enlargement of the deep and superficial inguinal rings

4. This section of the quiz is composed of 5 questions relating to the classification of inguinal hernias:

1) Why are inguinal hernias more common in males than females:

Due to the development of the gubernaculum, which thickens as it progresses through the abdominal wall as the testes descend

2) What is an inguinal hernia defined as:

A protrusion of the peritoneum and/or viscera through a weakened region of the abdominal wall into the inguinal canal

3) Name the two classifications for inguinal hernias:

A: Indirect (congenital) inguinal hernia

B: Direct (acquired) inguinal hernia

4) Anatomically in relation to which structure is an inguinal hernia defined:

inferior epigastric vessels

5) What other three classifications are there for an indirect (congenital) inguinal hernia:

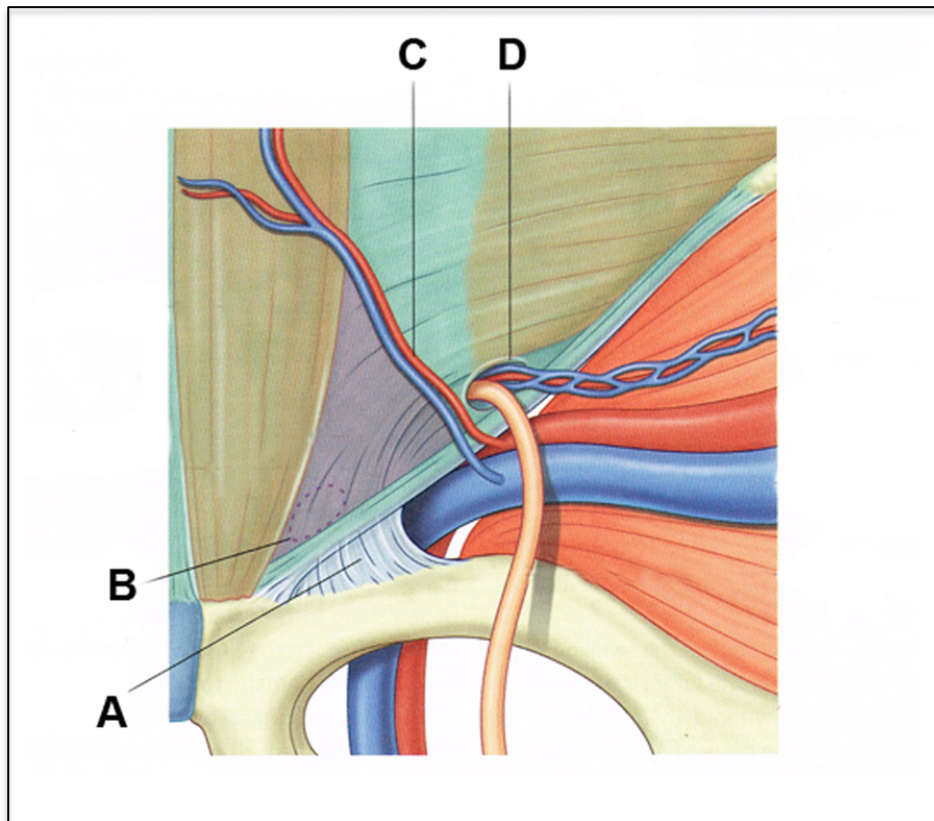
A: Bubonocele

B: Funicular

C: Complete (or scrotal)

5. This section of the quiz is composed of 5 pictorial questions:

Question A.



(i) Identify structure A:

A: **Lacunar ligament**

(ii) Identify structure B:

B: **Superficial inguinal ring**

(iii) What passes through structure B in a male:

Spermatic cord

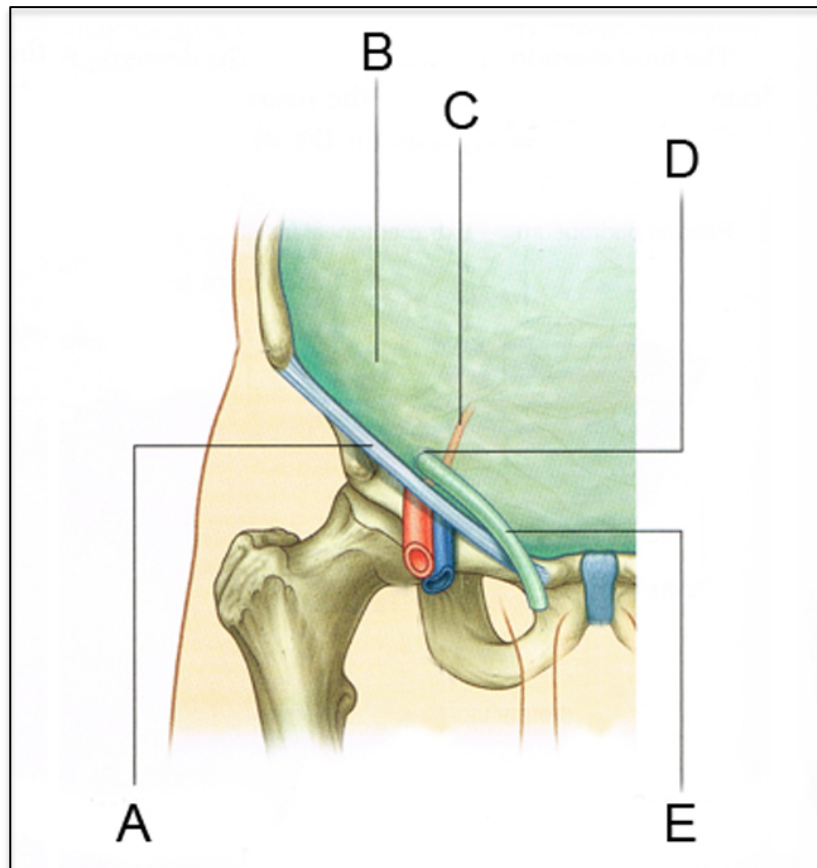
(iv) Identify structure C:

C: **Inferior epigastric artery**

(v) Identify structure D:

D: **Deep inguinal ring**

Question B.



(i) Identify structure A:

A: **Inguinal ligament**

(ii) Identify structure B:

B: **Transversalis fascia**

(iii) In the inguinal canal what boundary does B form:

Posterior wall of the inguinal canal

(iv) Identify structure C:

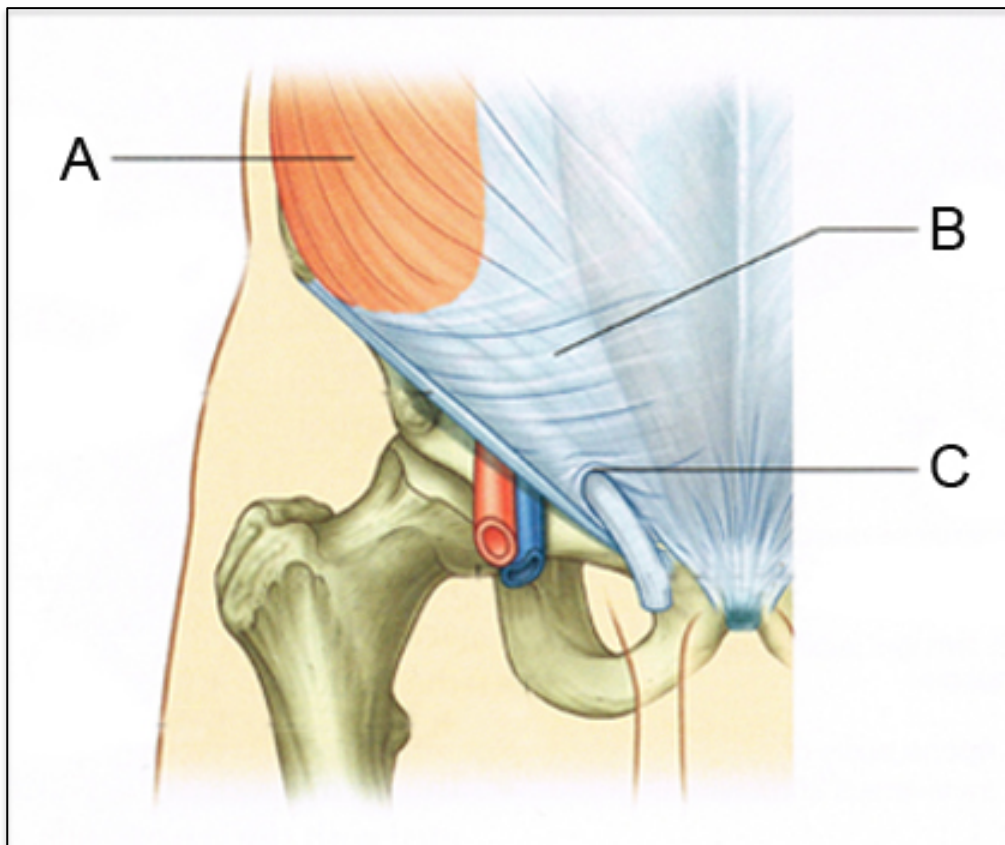
C: **Inferior epigastric artery**

(v) Identify structure D and E:

D: **Deep inguinal ring**

E: **Spermatic cord**

Question C.



(i) Identify structure A:

A: **External oblique muscle**

(ii) Identify structure B:

B: **Aponeurosis of external oblique**

(iii) In the inguinal canal what boundary does B form:

Anterior wall of the inguinal canal

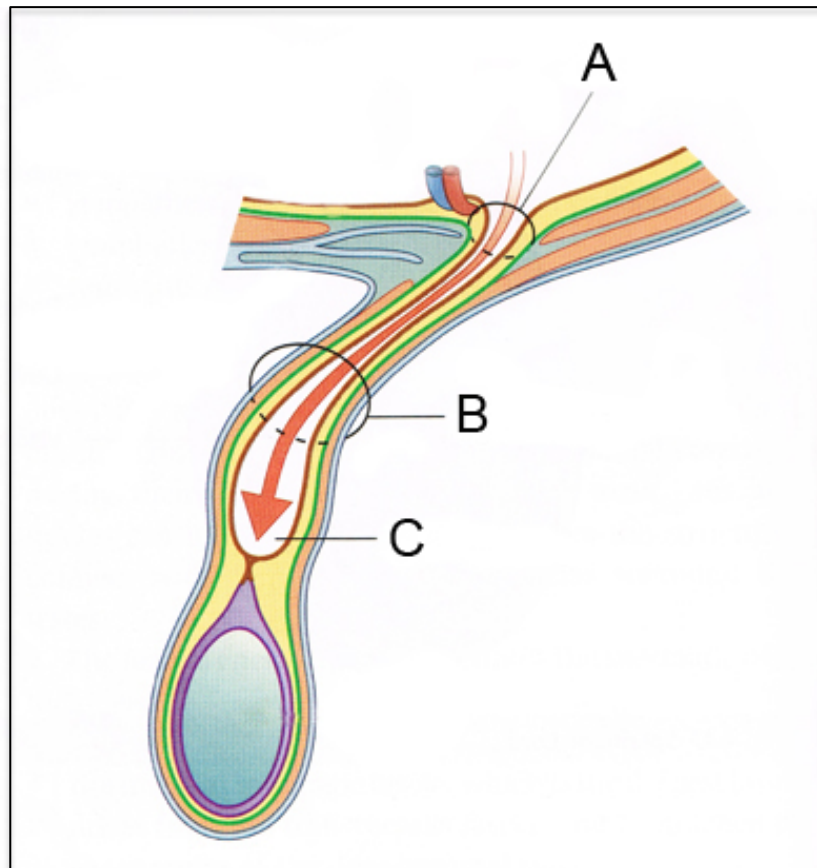
(iv) Identify structure C:

C: **Superficial inguinal ring**

(v) Through which structure does an indirect (congenital) inguinal hernia protrude:

Deep inguinal ring

Question D.



(i) Identify structure A:

A: **Deep inguinal ring**

(ii) Identify structure B:

B: **Superficial inguinal ring**

(iii) Which type of hernia is presented here:

Indirect (congenital) inguinal hernia

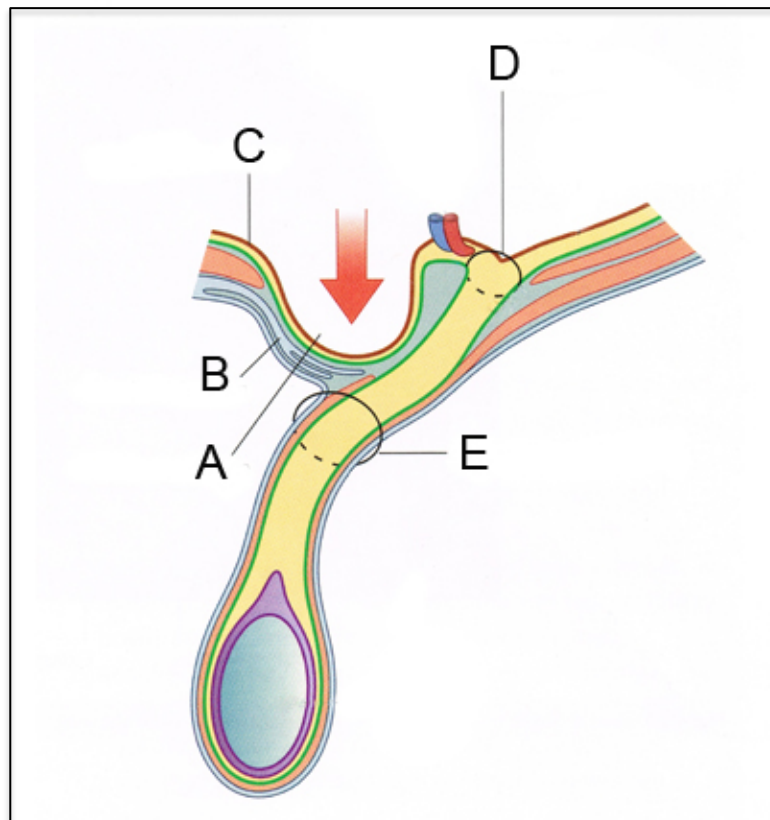
(iv) Identify space C:

C: **Peritoneal sac**

(v) Name the three types of Indirect (congenital) inguinal hernias:

A: **Bubonocele** B: **Funicular** C: **Complete (or scrotal)**

Question E.



(i) Identify protrusion A:

A: **Peritoneal bulge**

(ii) Identify structure B:

B: **Conjoint tendon**

(iii) Which type of hernia is presented here:

Direct (acquired) inguinal hernia

(iv) Identify structure C:

C: **Parietal peritoneum**

(v) Identify structure D and E:

D: **Deep inguinal ring**

E: **Superficial inguinal ring**

6. This section of the quiz is composed of 10 questions relating to the formation of inguinal hernias:

1) What is the most common inguinal hernia and **why**:

Indirect (congenital) inguinal hernia

Related to the embryonic development of the processus vaginalis remaining open or patent

2) Which inguinal hernia is most common in women:

Indirect (congenital) inguinal hernia

3) Where does the protrusion occur in an indirect (congenital) inguinal hernia:

Deep inguinal ring

4) Where does the protrusion occur in a direct (acquired) inguinal hernia:

Weakened posterior abdominal wall of the transversalis fascia

5) With a direct (acquired) inguinal hernia in relation to what structure does the protrusion occur:

inferior epigastric vessels

6) Through which structure can a direct (acquired) hernia also protrude:

Superficial inguinal ring

7) What are the three boundaries of the inguinal triangle:

Medially: **Lateral margin of the rectus sheath**

Laterally: **Inferior epigastric artery**

Inferiorly: **Inguinal ligament**

8) In females the protrusion in an indirect (congenital) inguinal hernia can extend into which region:

Labia majora, termed the Canal of Nuck

9) With an indirect (congenital) inguinal hernia the protrusion occurs in what position in to the inferior epigastric vessels:

Laterally

10) What is an inguinal hernia classified as when both the viscera and the peritoneal sac lie within the inguinal canal:

Sliding hernia

7. This section of the quiz is composed of 5 questions relating to the clinical classification of inguinal hernias:

1) What are the two clinical classifications of inguinal hernias:

A: Reducible

B: Irreducible or incarcerated

2) What inguinal hernia can develop into a strangulated hernia:

Irreducible or incarcerated

3) What can develop as a consequence of a strangulated hernia:

Ischaemia

4) Name the three inguinal hernias classified in relation to their contents:

A: Maydl's

B: Richter's

C: Littre's hernias

5) Which classification is the most commonly used to allow surgeons to define the anatomical type of hernia and to match the repair to the defect found:

Nyhus (1991)

Describe the basis of this classification:

Based on the integrity of the posterior wall and the deep inguinal ring

8. This section of the quiz is composed of 8 questions relating to the clinical presentation and diagnosis of inguinal hernias:

1) What are the two most common symptoms of an inguinal hernia:

A: Protrusion within the groin

B: Mild to moderate discomfort that increases through activity

2) What five symptoms would a patient present if the hernia was strangulated:

A: Fever

B: Vomiting and/or nausea

C: Rapid heart rate

D: Pain that quickly intensifies

E: Loss of appetite

3) During a physical exam which two examinations could you perform:

i: Whilst the patient is standing they are asked to cough whilst observing any noticeable transient protrusion or lump present, which can be palpable.

ii: With the patient in the supine position the abdominal region should be examined to access further for any protrusion or lump

4) If a strangulated hernia is suspected how could you access this (A) and what would you advise (B):

A) Assessment via an ultrasound examination, an abdominal X-ray, MRI and computerized tomography (CT) scans or a herniography

B) Emergency surgery to restore blood supply to the trapped tissue

5) How can an Indirect (congenital) inguinal hernia be diagnosed:

By palpating the inguinal rings

6) How can a direct (acquired) inguinal hernia be diagnosed:

By placing the index finger over the inguinal triangle and palpating this region, whilst asking the patient to cough

7) Name three disorders of the groin region can be mistaken for an inguinal hernia:

Any three below can be used:

Femoral hernias

Hydrocele

Spermatic cord hydrocele

Varicocele

Abscess

Undescended testis

aneurysm

Saphena varix,

Soft-tissue tumour

8) If the inguinal hernia cannot be accurately or easily diagnosed, what further analysis can be carried out to determine this:

Ultrasound examination, an abdominal X-ray, MRI and computerized tomography (CT) scans and a herniography.

9. This section of the quiz is composed of 10 questions relating to the repair of inguinal hernias:

1) What treatment is recommended with asymptomatic or minimally symptomatic hernias

Conservative treatment (surgical intervention is not necessary)

2) If a strangulated inguinal hernia is present which repair would be recommended (A) and which would not be recommended (B):

A: Open repair

B: Laparoscopic repair

3) Open repairs can be divided further into which two groups:

A. Herniorrhaphy - tissue (sutured)

B. Hernioplasty - prosthetic (mesh)

4) Laparoscopic repair can be divided further into which two common groups:

A. Transabdominal preperitoneal approach (TAPP)

B. Totally extraperitoneal approach (TEP)

5) Name one open repair technique that should be used where there is a contamination risk:

Any one of the following:

Marcy

Bassini

Halsted

Andrews

Shouldice

McVay

6) Which is the most commonly used open technique and an anterior approach:

Lichtenstein tension-free repair

7) Name two open techniques that approach from the posterior aspect:

- A. Gilbert umbrella plug
- B. Kugel patch

8) Which open repair is recommended for both indirect (congenital) and direct (acquired) inguinal hernias:

The Prolene Hernia System (PHS)

9) What is the basic principle during laparoscopic repair:

The placement of the mesh in the preperitoneal space

10) Which four aspects would be considered when accessing whether an open or laparoscopic repair is appropriate:

- A: Whether the hernia is direct or indirect
- B: The size of the inguinal hernia
- C: Whether it is incarcerated or strangulated
- D: Whether it is a recurrent or primary hernia

10. Write short notes on the following 5 questions:

1) Inguinal canal:

Lies between the deep inguinal ring (transversalis fascia) and the superficial inguinal ring (external oblique)

Boundaries:

Floor is the inguinal ligament

Posterior wall from the transversalis fascia

Anterior wall from external oblique and internal oblique

Roof is formed by internal oblique and transversus abdominis

Contents: found in both males and females is the ilioinguinal nerve, lymphatics, vessels

Females: Round ligament of the uterus

Males: Spermatic cord

2) Formation of an indirect (congenital) inguinal hernia:

Protrusion of the peritoneal sac occurs through the deep inguinal ring, lateral to the inferior epigastric vessels and passing into the inguinal canal.

In males, this peritoneal sac, formed by the processus vaginalis and the fascial coverings of the spermatic cord, can often pass through the superficial inguinal ring, however this is dependent on whether the entire processus vaginalis remains.

In females a peritoneal protrusion can also extend into the labia majora, which is termed the Canal of Nuck. In both cases, the protrusion of the peritoneal sac acquires the three coverings of fascia derived from the anterior abdominal wall.

There are three types of indirect (congenital) inguinal hernias:

- Bubonocele
- Funicular
- Complete (or scrotal)

3) Formation of a direct (acquired) inguinal hernia:

A direct inguinal hernia is described as a protrusion of the peritoneum through a weakened posterior abdominal wall of the transversalis fascia and into medial region of the inguinal canal.

The peritoneal sac protrudes medially in relation to the inferior epigastric vessels and within the inguinal triangle also known as Hesselbach's triangle.

Subsequently a direct inguinal hernia does not protrude through the entire length of the inguinal canal but can protrude through the superficial inguinal ring, acquiring the external spermatic fascia and very rarely extending into the scrotum lateral to the spermatic cord.

4) Briefly describe open repair surgery for inguinal hernias:

These can be divided into tissue (sutured/tension) and prosthetic (mesh/tension-free) repairs and are referred to as either a herniorrhaphy or a hernioplasty.

Herniorrhaphy involves the repair of the posterior wall of the inguinal canal, behind the spermatic cord and the repair of the aponeurosis of external oblique in front of the spermatic cord using sutures. Examples of herniorrhaphy include the Bassini, Shouldice and McVay methods of repair.

Hernioplasty involves the repair of the posterior wall of the inguinal canal using a synthetic mesh to reinforce it. Examples of hernioplasty include an anterior approach; Lichtenstein tension-free repair, which is the commonly used and posterior approaches which include the Gilbert umbrella plug method and Kugel patch.

The Prolene Hernia System: Recommended for both direct and indirect hernias

5) Briefly describe laparoscopic repair for inguinal hernias:

Laparoscopic repairs require several small incisions, are done under general anesthesia and require more time compared with the open repair technique. Those surgeons experienced in it only carry out this technique.

The basic principle of these repairs is the placement of the mesh in the preperitoneal space. The methods of repair can be divided into groups based on either accessing the abdomen or without entering the abdominal cavity, with the most commonly used being:

Transabdominal preperitoneal repair (TAPP)

Total extraperitoneal repair (TEP).

The TAPP approach repairs the defect from within the abdomen, accessing the preperitoneal space through an incision in the peritoneum where a polypropylene mesh is attached using tacks. The TEP approach repairs the defect from the extraperitoneal space with non-absorbable mesh using tacks.

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