

HERNIA

Professor

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LEARNING OBJECTIVES

To know and understand:

- ★ **Basic anatomy of the abdominal wall and its weaknesses**
- ★ **Causes of abdominal hernia**
- ★ **Types of hernia and classifications**
- ★ **Clinical history and examination finding in hernia**

STRANGULATED INCISIONAL HERNIA



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A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall.

Types of hernia by complexity

- Occult - not detectable clinically; may cause severe pain
- Reducible - a swelling which appears and disappears
- Irreducible - a swelling which cannot be replaced in the abdomen, high risk of complications
- Strangulated - painful swelling with vascular compromise, requires urgent surgery
- Infarcted - when contents of the hernia have become gangrenous, high mortality

Causes of hernia

- Basic design weakness
- Weakness due to structures entering and leaving the abdomen
- Developmental failures
- Genetic weakness of collagen
- Sharp and blunt trauma
- Weakness due to ageing and pregnancy
- Primary neurological and muscle diseases
- ? Excessive intra-abdominal pressure

Aetiology

- Multi-factorial process
- Technique is not the sole cause
- Primary fascial pathology due to¹⁻²:
 - Abnormal collagen metabolism and production (found even in sites remote from hernia)
 - Increased matrix metalloproteinase (MMP) activity
- Secondary fascial pathology due to:
 - loss of normal tissue architecture
 - replacement of fascial planes with scar
- Mechanotransduction
 - mechanical forces (coughing, straining, stretching) induce changes in fibroblast function³⁻⁴
 - loss of this during primary healing leads to weaker tissue
 - early laparotomy failure has significant incidence of recurrent hernia

1. Read RC. Hernia 2006;10(6):454–5.

2. Peacock J. Fascia and muscle. Wound repair. 3rd edition. Philadelphia:W.B. Saunders; 1984. p. 332–62

3. Skutek M. Eur J Appl Physiol 2001;86(1):48–52

4. Katsumi A. J Biol Chem 2005;280(17):16546–9

Collagen I and III

- Collagen Type I - mature collagen, greatest strength component of ECM
- Collagen Type III - immature isoform, weaker, less crosslinking
- Low ratios of CI:CIII have been demonstrated in scar plates of recurrent hernias

1. Read RC. Hernia 2006;10(6):454–5.

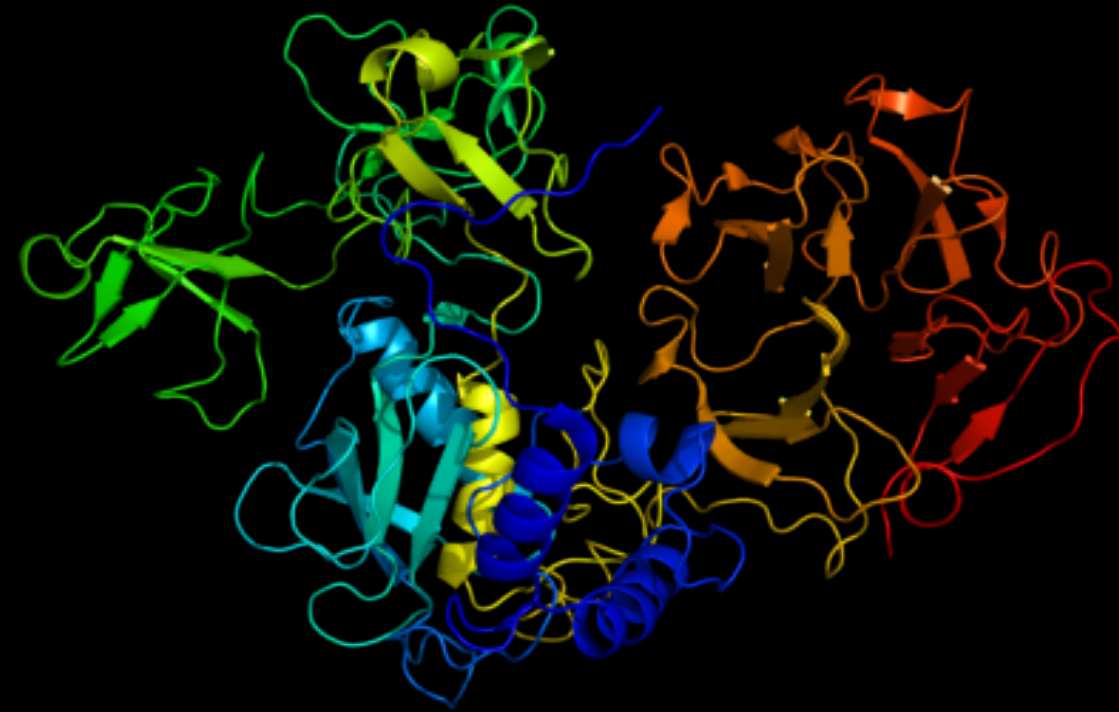
2. Peacock J. Fascia and muscle. Wound repair. 3rd edition. Philadelphia:W.B. Saunders; 1984. p. 332–62

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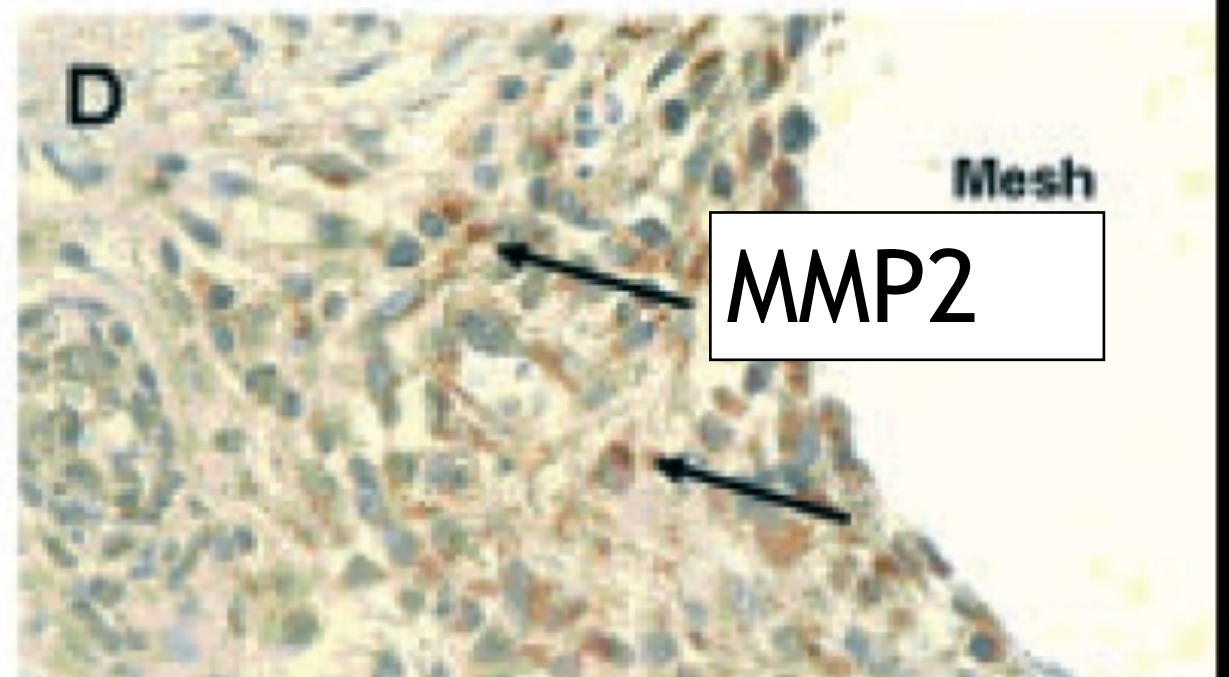
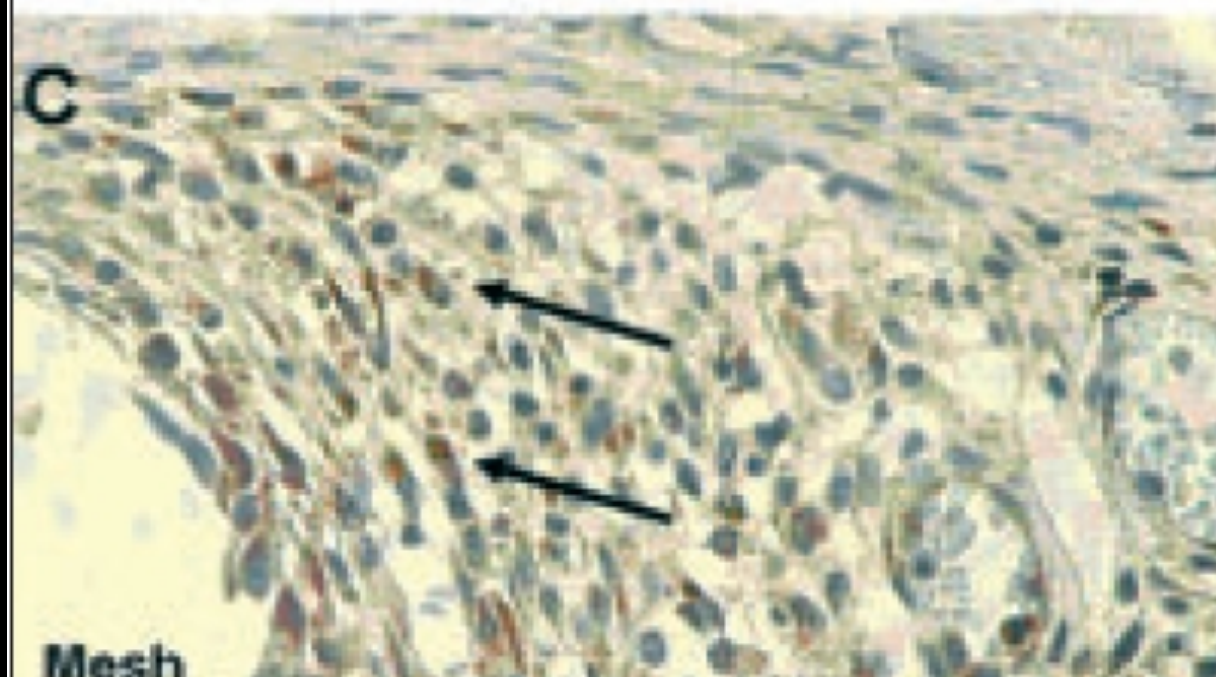
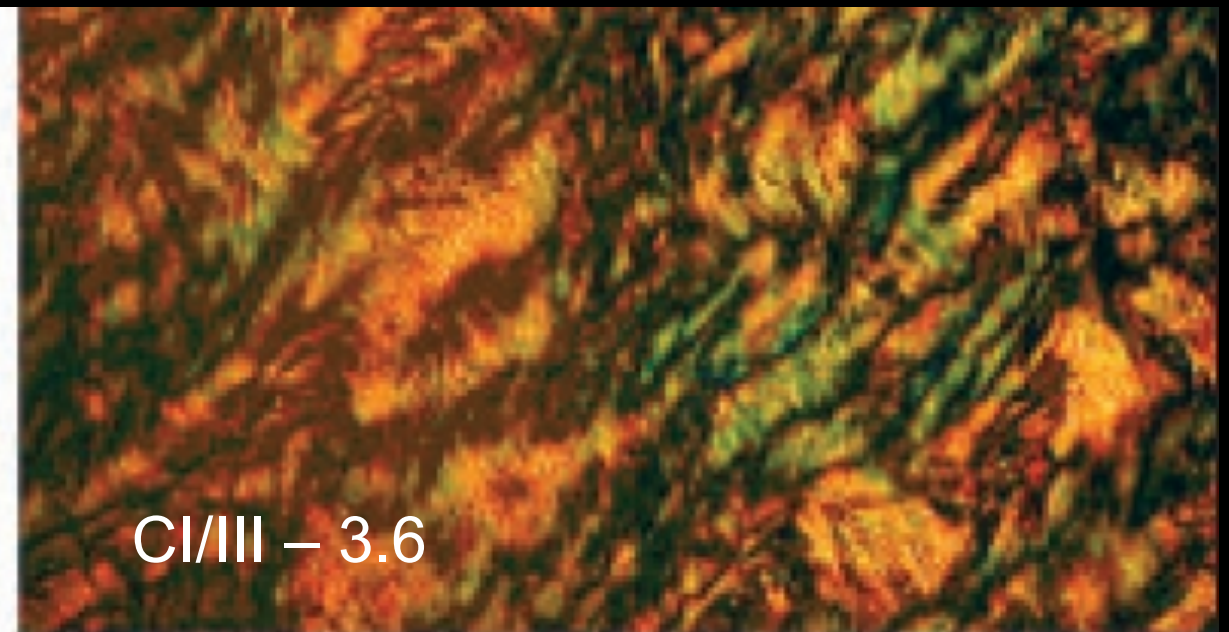
MMP-2

- Encoded by *MMP2* gene
- Involved with tissue remodeling
- Breakdown collagen and other extracellular matrix proteins
- Found to be elevated in patients with recurrent hernias¹



1. Smigielski J. Eur J Clin Invest. 2011 Feb 8. Epub
2. Shumpelick. Recurrent Hernias. Page 66-68. 2007.

Collagen and MMP2s



- Checks
- ■ Reducibility
- ■ Cough impulse
- ■ Tenderness
- ■ Overlying skin colour changes
- ■ Multiple defects/contralateral side
- ■ Signs of previous repair
- ■ Scrotal content for groin hernia
- ■ Associated pathology

Clinical history and diagnosis in hernia cases

Patients are usually aware of a lump on the abdominal wall under the skin.

The hernia is usually painless but patients may complain of an aching or heavy feeling.

Sharp, intermittent pains suggest pinching of tissue. Severe pain should alert the surgeon to a high risk of strangulation.

One should determine whether the hernia reduces spontaneously or needs to be helped.

The patient should be asked about symptoms which might suggest bowel obstruction.

Examination

- A swelling with a cough impulse is not necessarily a hernia
- A swelling with no cough impulse may still be a hernia

Investigations

- Plain x-ray - of little value
- Ultrasound scan - low cost, operator dependent
- CT scan - incisional hernia
- MRI scan - good in sportsman's groin with pain
- Contrast radiology - especially for inguinal hernia
- Laparoscopy - useful to identify occult contra lateral inguinal hernia

Emergency Hernia Surgery

- Emergency
Strangulated
Incarcerated
Obstructed
- Urgent
tender
irreducible

Management

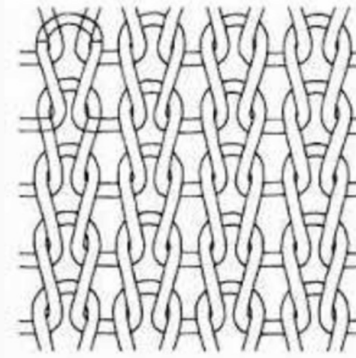
- Not all hernias require surgical repair
- Small hernias can be more dangerous than large
- Pain, tenderness and skin colour changes imply high risk of strangulation
- Femoral hernia should always be repaired

All surgical repairs follow the same basic principles:

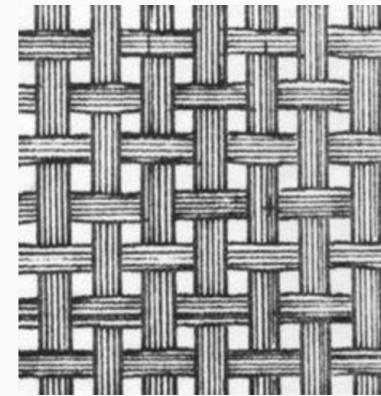
1. Reduction of the hernia content into the abdominal cavity with removal of any non-viable tissue and bowel repair if necessary;
2. Excision and closure of a peritoneal sac if present or replacing it deep to the muscles;
3. Reapproximation of the walls of the neck of the hernia if possible;
4. Permanent reinforcement of the abdominal wall defect with sutures or mesh

Mesh characteristics

- Woven, knitted or sheet
- Synthetic or biological - mainly synthetic
- Light, medium or heavyweight - lightweight becoming more popular
- Large pore, small pore - large pore causes less fibrosis and pain
- Intraperitoneal use or not - non-adhesive mesh on one side
- Non-absorbable or absorbable - mainly non-absorbable



The basic difference between woven and knit fabrics is in the yarn or thread that composes them. A knit fabric is made up of a single yarn, looped continuously to produce a braided look.



Multiple yarns comprise a woven fabric, crossing each other at right angles to form the grain.

All meshes provoke a fibrous reaction

More dense or heavyweight meshes provoke a greater reaction leading to collagen contraction and stiffening and mesh shrinkage.

This can lead to tissue tension and pain, a common complication of mesh repair.

It can also lead to hernia recurrence if the mesh no longer covers the defect.

EMERGENCY HERNIA SURGERY

- Femoral
- Inguinal
- Umbilical
- Spigelian
- Obturator
- Incisional
- Parastomal
- Groin disruption

Epidemiology (Adults)

Hernia

%

- | | |
|--------------|----|
| • Inguinal | 80 |
| • Incisional | 10 |
| • Femoral | 5 |
| • Umbilical | 4 |
| • Epigastric | <1 |
| • Other | <1 |

Epidemiology

Hernia	Male %	Female %
• Inguinal	96	45
• Femoral	2	39
• Umbilical	1	15
• Other	1	1

Right-sided groin hernias are more common than on the left

EMERGENCY HERNIA SURGERY

Case Study 1

- 85 years Female 55Kg
- Painful red and tender Right groin lump ? Femoral
- Abdominal distension and vomiting
- Hypotensive, AKI, Septic
- High lactate
- Small bowel dilatation on AXR

Management ?

What operation?

EMERGENCY HERNIA SURGERY

Case Study 2

- 65 years Female 55Kg
- Painful tender Right groin lump ? Inguinal ? femoral
- Soft abdomen, non distended, non tender
- No history of vomiting
- Normotensive
- U & E's normal
- Normal lactate

Management ?

What operation?

EMERGENCY HERNIA SURGERY

Case Study 3

- 75 years Male 75Kg
- Painful tender Right groin lump ? Inguinal
- Tender distended abdomen
- History of vomiting
- Hypotensive
- AKI
- High lactate

Strangulated loop of small bowel at open inguinal exploration

What operation?

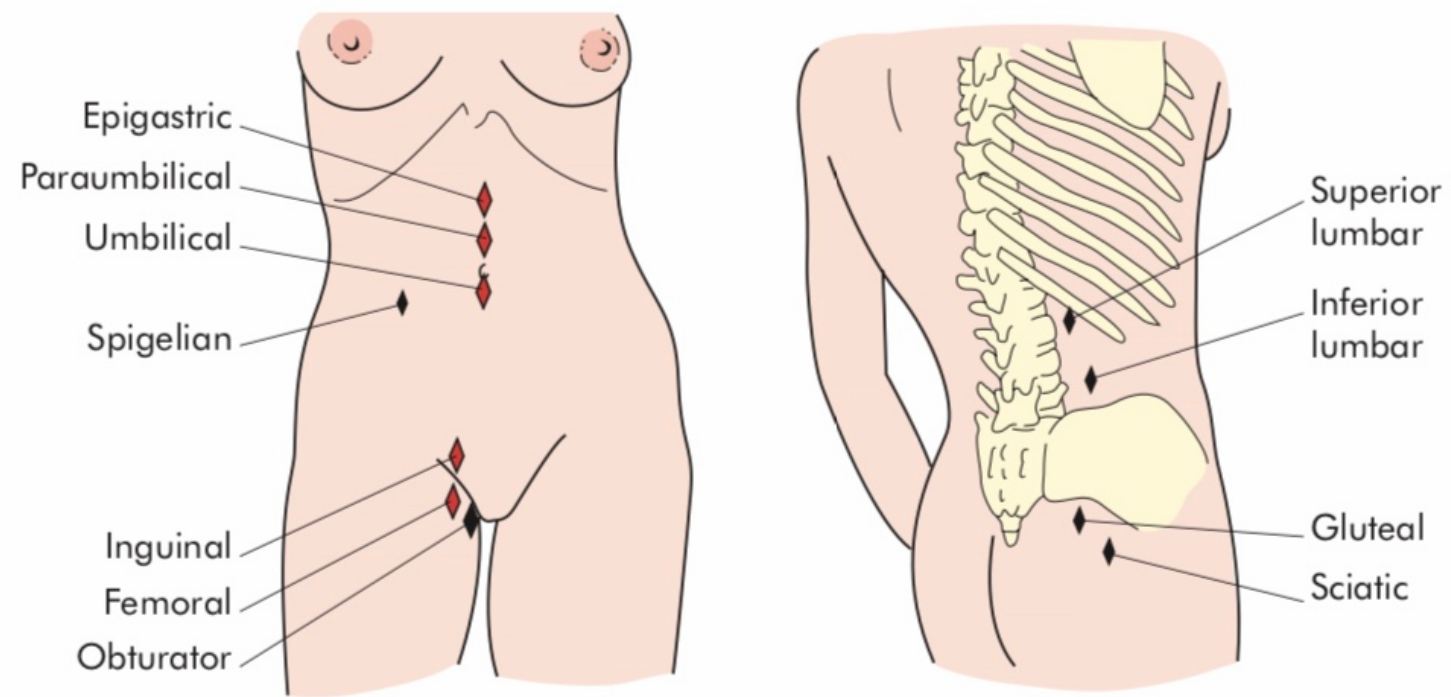


Figure 60.9 Diagram to show the sites of abdominal wall hernias, common in red and rare in black. Incisional and parastomal hernias can be found at various sites.