AUTHENTIC
OCCUPATIONAL
MEDICINE

Where do Hernias Come From?

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October 1, 2025

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What's Behind the Bulge: Exploring Hernia Causation

OR

BATTLE OF THE BULGE: STANDING IN THE BREECH

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FIRST, Definition:

"A *protrusion* (BULGE) of abdominal contents through an *opening* (BREECH) in the wall of the cavity in which it is contained"

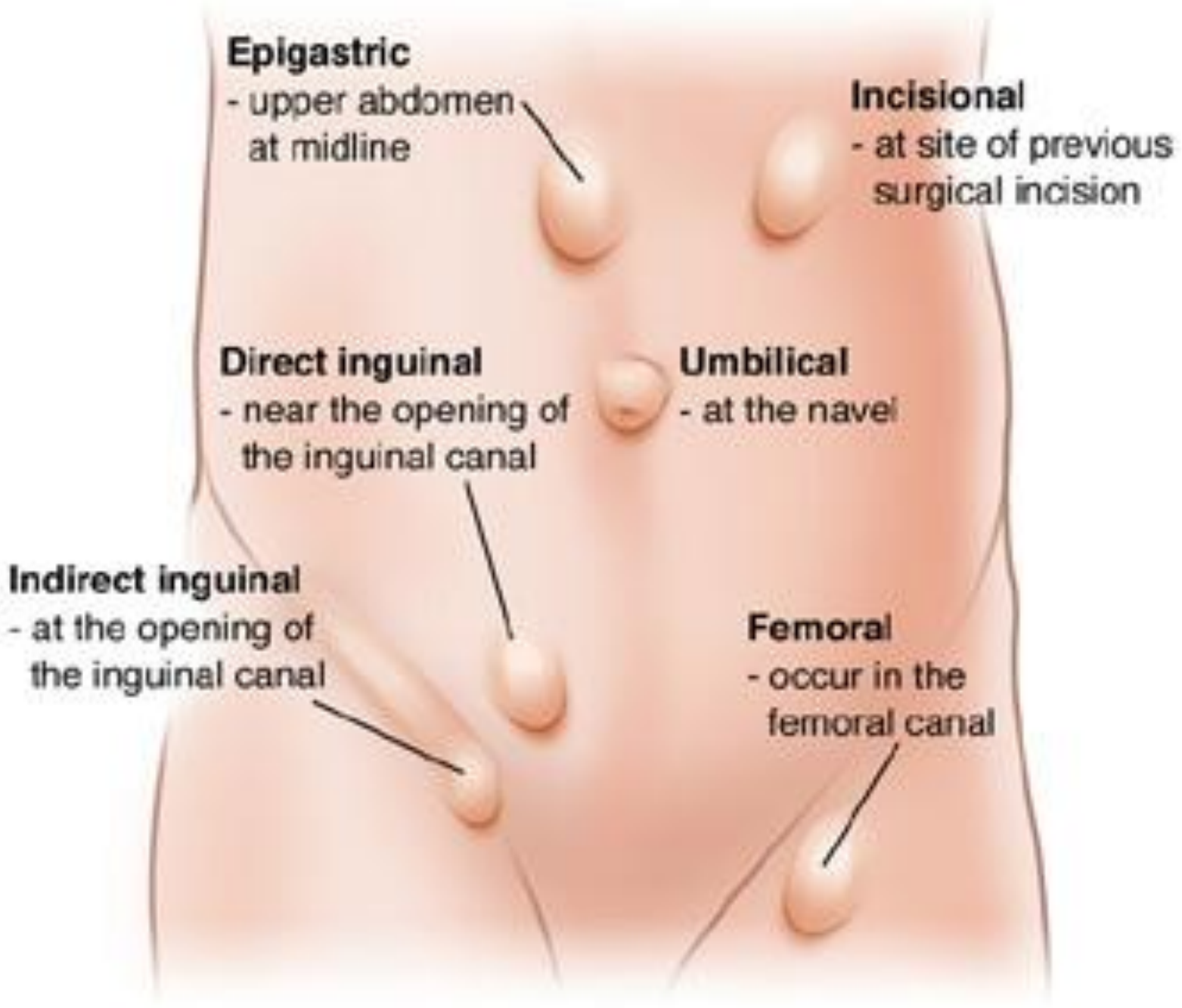
But, what makes it a hernia – the opening in the wall, or the contents that protrude through it?

ANSWER: The Breech = The Condition

The Bulge = A Manifestation

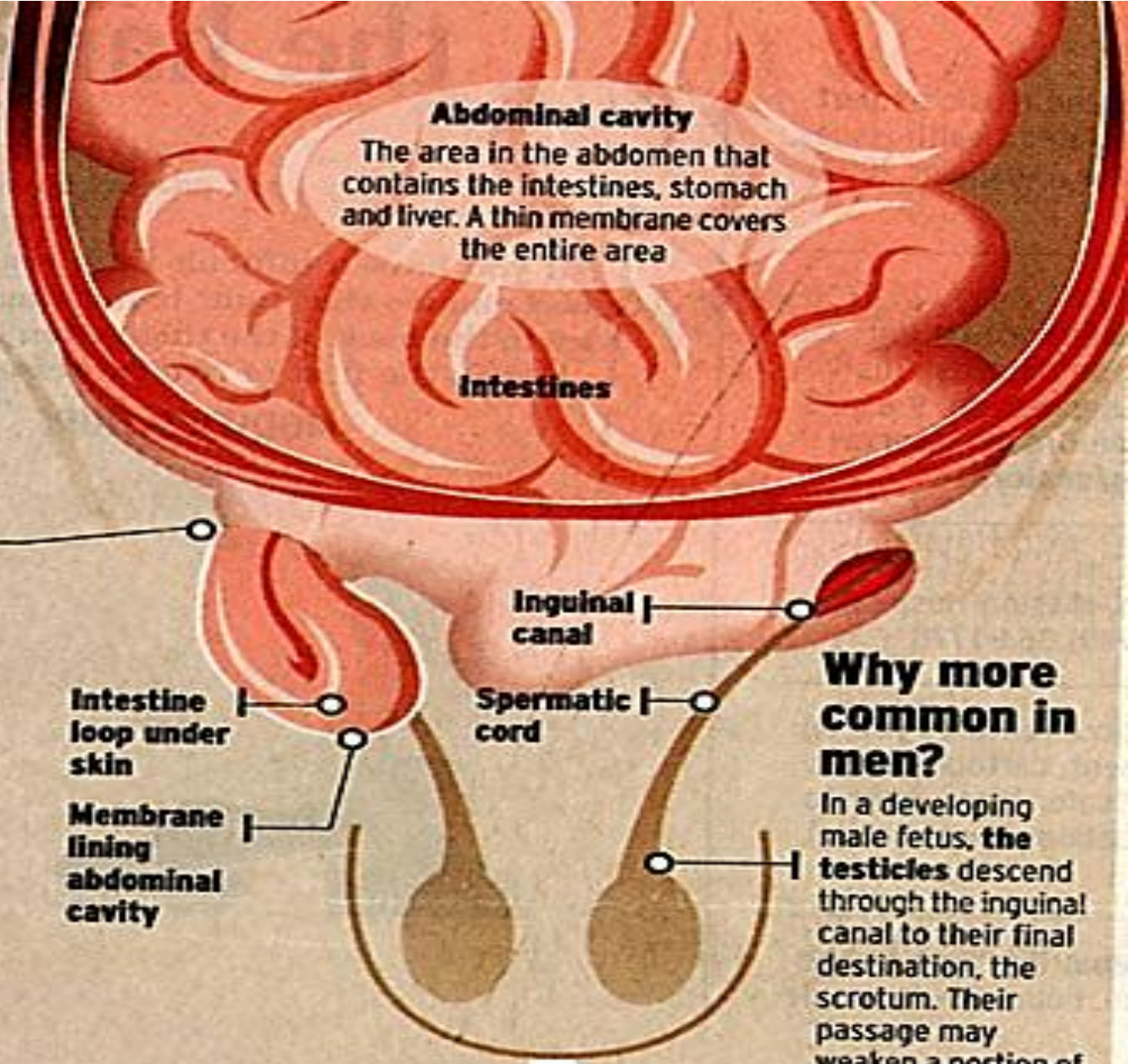
Groin Hernias (they matter most in WC)

- Two types:
  - Those that occur above the abdominocrural crease are described as **inguinal**
  - those below are **femoral** hernia
- **Inguinal** hernia are further divided into **direct** type (hernia starts medially and protrudes outward and forward) or **indirect** (hernia starts laterally and protrudes obliquely or tangentially toward or into the scrotum)


Epigastric
- upper abdomen at midline
Incisional
- at site of previous surgical incision
Direct inguinal
- near the opening of the inguinal canal
Umbilical
- at the navel
Indirect inguinal
- at the opening of the inguinal canal
Femoral
- occur in the femoral canal

What is a hernia?

A condition in which part of the intestines or other tissues protrude through a weak spot in the abdominal wall. It feels like a lump in the groin and can be painful. A doctor detects it in a physical exam during which he may ask a patient to cough.

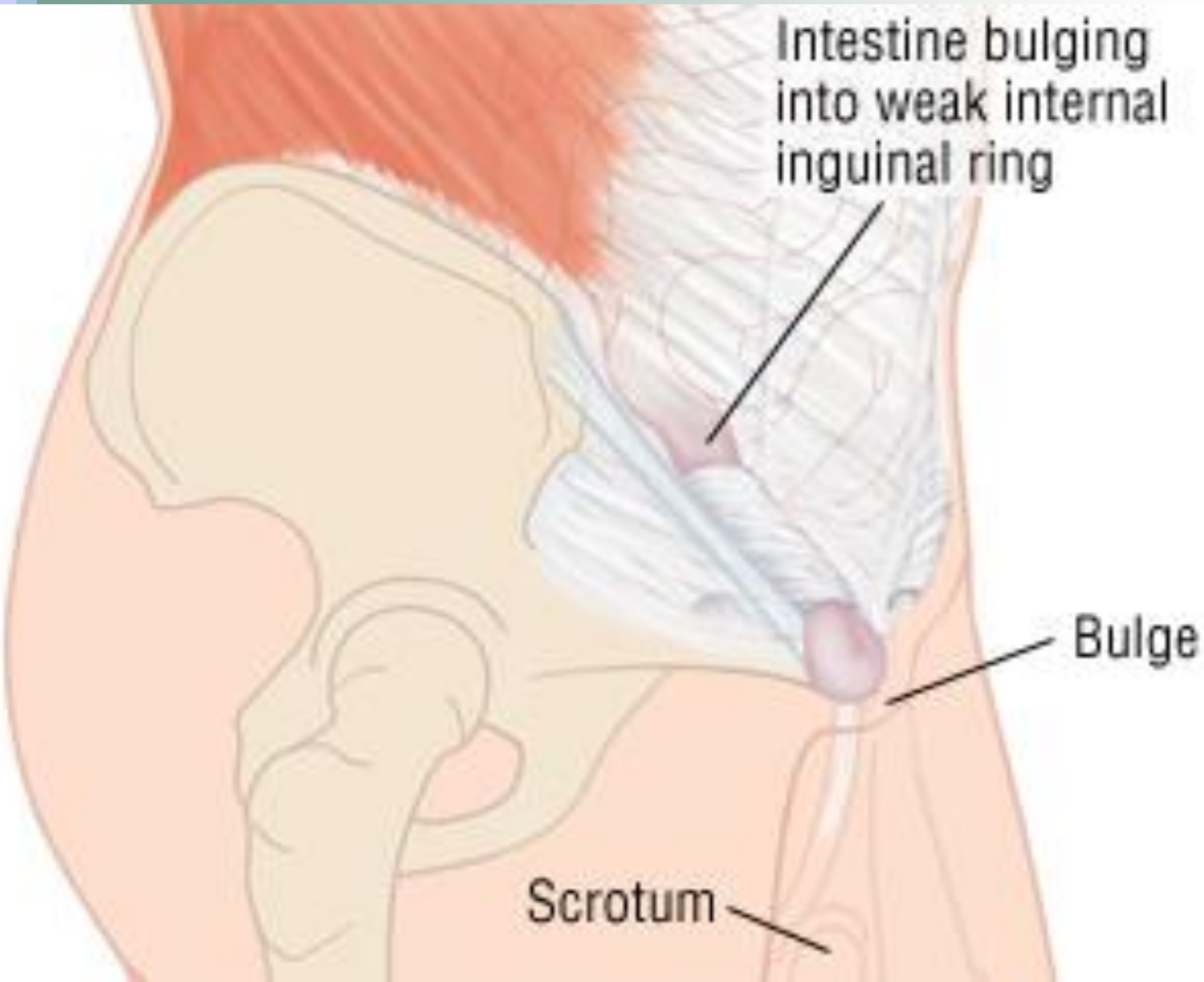


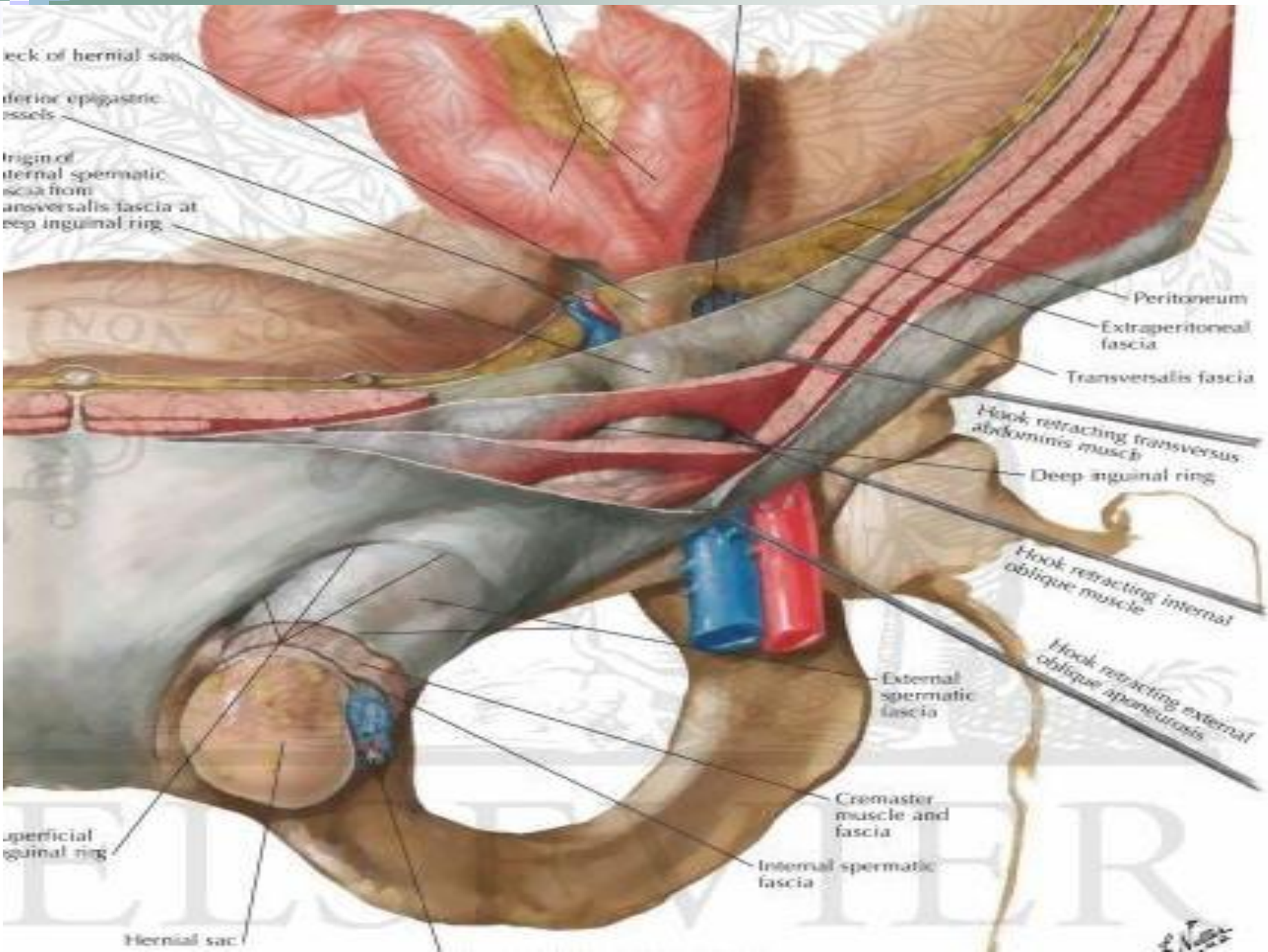
What causes it?

The weakness in the abdominal wall can be congenital. Injuries and certain abdominal operations may increase hernia risk. Other risk factors: chronic constipation leading to straining during bowel movements or urination, [redacted], excess weight, pregnancy, chronic coughing, chronic sneezing, family history of hernias and premature birth.

Why more common in men?

In a developing male fetus, **the testicles** descend through the inguinal canal to their final destination, the scrotum. Their passage may weaken a portion of the abdominal wall and the path may never completely seal itself.


Intestine bulging into weak internal inguinal ring
Bulge
Scrotum


eck of hernial sac
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eep inguinal ring
Peritoneum
Extraperitoneal fascia
Transversalis fascia
Hook retracting transversus abdominis muscle
Deep inguinal ring
Hook retracting internal oblique muscle
Hook retracting external oblique aponeurosis
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Internal spermatic fascia
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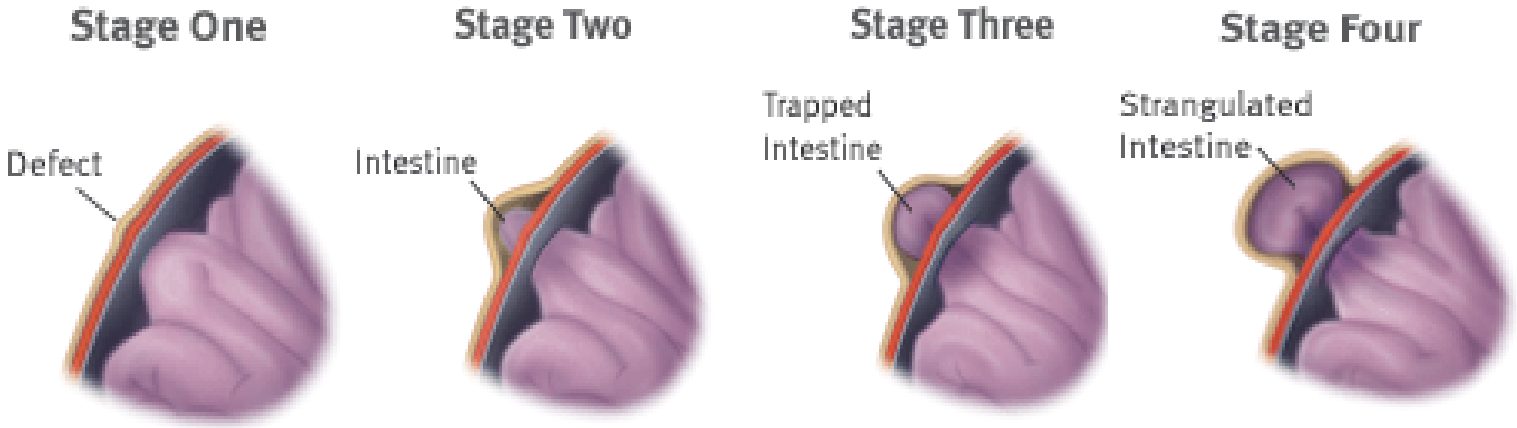
Hernial sac



Wall Weakens
The abdominal lining bulges out through a weak area and begins to form a hernia sac. The sac may contain fat, intestine, or other tissues. At this point the hernia may or may not cause a visible bulge.

Intestine Pushes into the Sac
As the intestine pushes further into the sac, it forms a visible bulge. The bulge may flatten when you lie down or push against it. This is called a reducible hernia and does not cause any immediate danger.

Intestine May Become Trapped
The sac containing the intestine may become trapped (incarcerated). If this happens, you won't be able to flatten the bulge. You may also have pain. Prompt treatment may be needed.

Intestine May Be Strangulated
If the intestine is tightly trapped, it becomes strangulated. The strangulated area loses blood supply and may die. This can cause severe pain and block the intestine. Emergency surgery is needed to relieve the blockage.

"OK to just leave well enough alone?"

- 1/3 hernias cause no/few symptoms when found
- Surgery will reduce risk it could strangle (but that's uncommon anyway) . . . AND:
- *10-20% stay or become painful AFTER surgery*
- What becomes of painless hernias if left alone?
  - two recent randomized trials (from the US and the UK) have compared surgery with observation
  - After 2 years, no difference found in either trial
- This means:
  - YES, you can *leave well enough alone* if your hernia doesn't hurt (FIX IT when it does)
  - YES, you may start work with an unrepaired painless hernia
  - BUT ANY HERNIA IS ALREADY SURGICAL!!!

“Watchful Waiting”

- While it’s a fine idea,
  - It is NOT treatment
- Only surgery will remedy a hernia

Who gets them?

- Lifetime risk of inguinal hernia: 27% of men and 3% of women
- Demographics of *accepted* work claims:
- 96.8% were males and 3.2% were females
- The average age 41.0 years old
- (12.3%) were recurrent cases

Where Do People ***Think*** Hernias Come From?

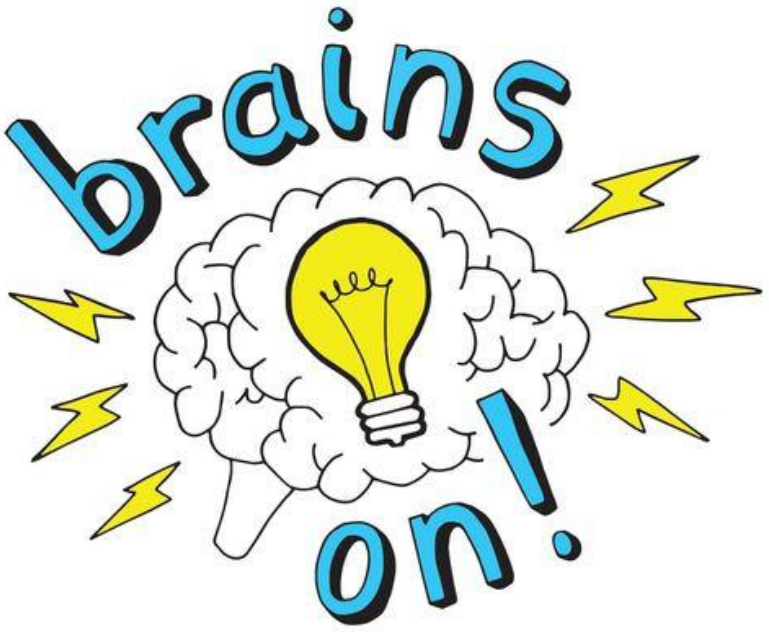
(Rutkow, 1997) random survey of 1000 Americans:

- 98% believed heavy lifting could cause hernia
- 60% felt that accident could be causative
- 54% felt that coughing could produce a hernia
- 54% thought obesity could contribute to hernia
- 2% felt smoking had an impact
- 62% knew you could have one from birth

Since then, Similar Results from Surveys Around the World!

- Saudi Arabia in 2022
- Ireland in 2024

Did THIS hernia come from working?



3 Magic Questions in Occupational Disease Causality! a.k.a. Bradford-Hill Criteria for Dummies (like me!)

- **CAN IT?** Can work cause this type of hernia to arise? Is it possible? PATHOPHYSIOLOGY
- **DOES IT?** Does this type of hernia occur more often among large groups of people who do this particular job? EPIDEMIOLOGY
- **DID IT?** Did this case likely come about in that way, in terms of the facts and circumstances? CHRONOLOGY for example

CAN IT?

Problems w Theory of Increased Intra-abdominal Pressure (IIP)

- It does increase with *certain types* of lifts
- But IIP while lifting comes and goes fast
  - Protective mechanisms exist for *brief* IPP
- *Sustained* IIP defeats these mechanisms
  - Umbilical hernias strongly linked to sustained IPP in pregnancy, abdominal obesity
- Obesity NOT associated with inguinal hernias despite the IPP it causes

Some Physiology Research *Favors* Work-Relatedness

- In 1959, Davis - report on five healthy adult males with monitored at internal pressures (esophagus, stomach, rectum) while lifting weights in various positions.
- *"There is but little pressure change within either trunk cavity when weights are lifted in the erect posture. (Data) show that there is a considerable increase in pressure when stooping . . ."*
- *"The intraabdominal pressures are largest in the stooping and prone (face down) positions" while lifting*

Some Physiology Research *Goes Against W*ork-Relatedness

- Deeper cris-crossed muscle fibers (internal oblique and transversus abdominus) will *automatically* contract when the muscles of the abdomen tighten. This acts as a shutter on the posterior wall to protect it from herniation, and is called the *Shutter Mechanism*.
- Contraction also narrows the internal inguinal ring, termed the *Closure Mechanism*.
- Sudden efforts automatically activate these mechanisms, but gradual, long-term increased intra-abdominal pressure, such as pregnancy, does **NOT**

Some Pathology Research *Goes Against* Work-Relatedness

Pans (1997):

- Biomechanical, physiologically oriented study on groin connective tissue characteristics used fresh samples of groin tissue harvested from individuals undergoing hernia repair and subjected them to various biomechanical stresses.
- "Presently reported biomechanical alterations seem to be the cause and not the consequence of hernias . . . This is therefore in keeping with other authors' thoughts that **inherent connective tissue pathology probably plays a role in the genesis of groin hernia.**"

DOES IT?

Most Epidemiologic Research that favors W-R suffers from poor design!

Kang 1999: “Although the rate ratios for hernias varied significantly within occupations and industries, the highest rate ratios found were in those industries and occupations involving manual labor.”

Self-Perpetuating Myth?

- “Using 1994 DOL data . . . This provides support for the hypothesis that the hernias are work-related, especially in work involving strenuous, heavy manual labor.”
- Of course, what gets reported to DOL????
- Recall man-in-the-street interviews found 98% believed heavy lifting could cause hernia; OSHA record keeper decisions will reflect this bias!

Weak Epidemiology Research Will Favor W-R

- Flich (1992) studied inguinal hernia in relation to level of physical work activity
- Concluded that positive relationship.
- “The results of this study show that physical effort, as a risk factor, is closely related to the appearance of inguinal hernias. A person whose work involves lifting or other strenuous exertion has a higher risk than those whose jobs are less strenuous.”
- DIDN’T CONTROL FOR CONFOUNDERS

Good Epidemiology Studies Must Control for Confounders (Personal Risks) for Inguinal Hernia

- Family history
- Smoking / Chronic Cough
  - Especially if Chronic Obstructive Pulmonary Disease - COPD
- Bladder obstruction d/t enlarged prostate
- (Obesity DOESN'T increase rates)

Everyone likes Fresh Danish!

Occup Environ Med. 2012 Nov;69(11):802-9. doi: 10.1136/oemed-2012-100787. Epub 2012 Aug 30.

Impact of occupational mechanical exposures on risk of lateral and medial inguinal hernia requiring surgical repair.

Vad MV[1], Frost P, Bay-Nielsen M, Svendsen SW.

Author information

- [1]Danish Ramazzini Centre, Department of Occupational Medicine, Herning Regional Hospital, Gl. Landevej 61, DK-7400 Herning, Denmark.

Scand J Work Environ Health. 2013 Jan;39(1):5-26. doi: 10.5271/sjweh.3305.

Risk and prognosis of inguinal hernia I
n relation to occupational mechanical exposures—
a systematic review of the epidemiologic evidence.

Danish Ramazzini CentreDanish Ramazzini Centre

What do you get when you put all the studies together?

2013 Danish analysis of world's literature

- Review of all 23 occupational epidemiologic hernia studies published by 2011 (meta-analysis)
- "Insufficient evidence to draw meaningful conclusions about (i) the existence of causal associations between specific occupational mechanical exposures and the development of inguinal hernia, and (ii) the influence of these exposures on prognosis after inguinal hernia repair with respect to hernia recurrence and persistent pain"



More Danish Data

- Did not find that the chance of needing reoperation following a successful hernia repair was related to occupational mechanical exposures

Danish 2012 Study Cohort of 1,545,987 men observed 5 years

- In general, the risk of direct hernia repair was unrelated to the exposures
- The risk of indirect hernia repair ("lateral") increased mostly by more years of standing at work (less so by lifting), but with Odds Ratios of only "up to around 1.4."



Application of this study to the next case your queue . . .

- 1.4 Odds Ratio indicates a *WEAK* association
- Authors used it to calculate a Preventive Fraction of 15% (meaning if all occupational factors are eliminated, incidence of hernias drops 15%)
- For any one hernia case – is this MATERIAL or IMMATERIAL?

Even this huge study
had flaws . . .

Could not control for risk factors of smoking, physical activity off-work, treatment bias

OR

Genetics

(Other Studies)

- “There is no evidence to support the idea that single or recurrent strenuous events or early return to work related activity should result in the formation or recurrence of an inguinal hernia.”
- “Although immediate pain at the time of an intensive or recurrent activity followed by a new diagnosis of a hernia supports a link between the activity and the hernia occurrence, it is likely that a congenital or acquired weakness in the connective tissue or muscles of the patient meant that hernia occurrence was almost inevitable.”

(Cont: meta-analysis)

"Most often there is no urgency about the operation and seldom is there need to stop work while awaiting surgery."

"There is no medical evidence to suggest that work generally aggravates a hernia, makes the surgery more difficult or less successful, or increases the complications following surgery."

DID IT?

Well, what about *THIS* case?

Meade/McCarthy Standards – LIRC 1918 & 1927

- Guidelines to consider an incident as causative of the hernia.
  - Sufficient accident in terms of the weight and particularly the posture involved
  - Immediate disabling pain, enough for him to seek medical attention on the day of the accident
  - Immediate development of a bulge
  - Immediate notification of employer

Meade v. Wisconsin Motor Manufacturing Co., 168 Wis. 250 (1918)

Dec. 3, 1918 · Wisconsin Supreme Court

168 Wis. 250

*

Meade, Respondent, vs. Wisconsin Motor Manufacturing Company and others, Appellants

November 8

HEADNOTES

Workmen's compensation: Hernia: Proof required.

1. In compensation cases it may be assumed, as matter of common knowledge, that inguinal hernia is rarely caused by accident, but is generally the result of inherited or acquired weakness.

2. A requirement by the industrial commission that where compensation is claimed in cases of hernia there must be definite proof that the hernia was produced by accident, and to that end that the claimant must prove that the accident was such as could produce hernia, that the hernia appeared immediately after the accident, and that it was followed by pain immediately disabling the claimant, is *held* not unreasonable; and a finding by the commission in this case that the claimant had failed to make such proof is *held* to have been warranted.

“Mere Manifestation” as an ALTERNATIVE explanation

- The NATURAL HISTORY of inguinal canals with congenital failure to fully close quadrupled the risk needing hernia surgery compared with normal closure
- Unclosed in 31% of men, 9% of women
- Rate of hernia surgery 12% in 5.5 years if unclosed, compared with 3% if closed

While awaiting surgery . . .

- **Is he capable of working? If so and he requires restrictions, please indicate what restrictions are necessary as a consequence of the work-related condition.**
- **Response:** Yes. He may work without restrictions until he undergoes surgery. Restricting his work at this point would not "heal" or treat the hernia in any way. He will not make it worse by continuing to work. It should be fixed without any needless delay, but normal activity in the meanwhile does not increase the risk, only the unacceptably long passage of time would.