


Welcome to the Wisconsin Worker's Compensation Forum

Where Do Hernias Come From?

October 4, 2017

DISCLOSURES

•No disclosures or relevant financial relationships to report



Where do Hernias Come From?

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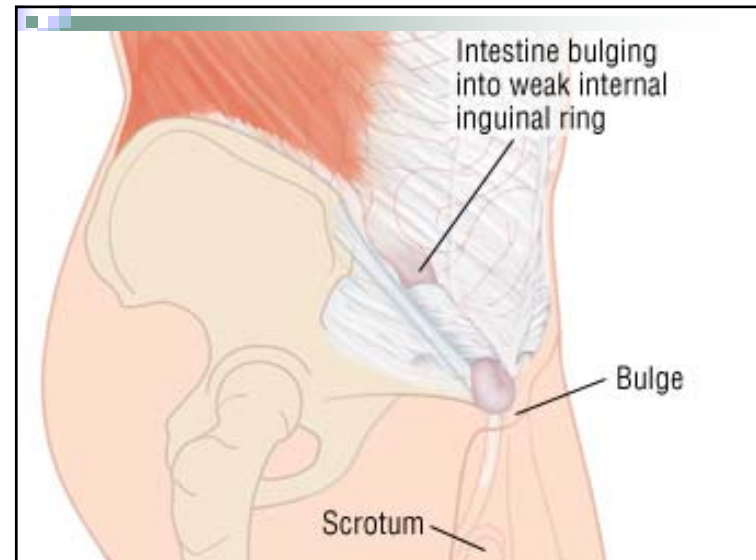
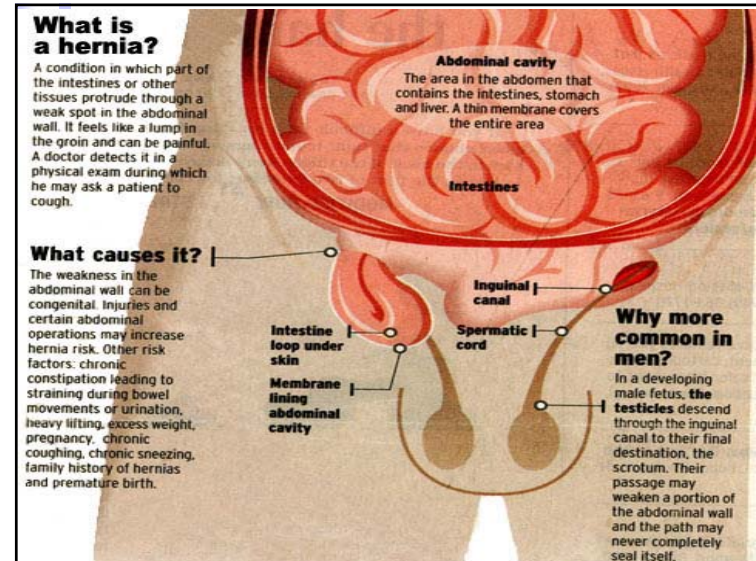
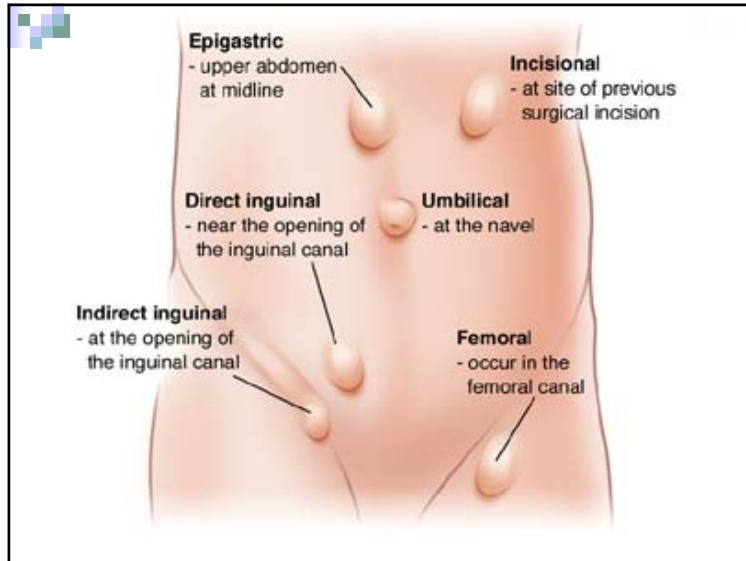
Definition

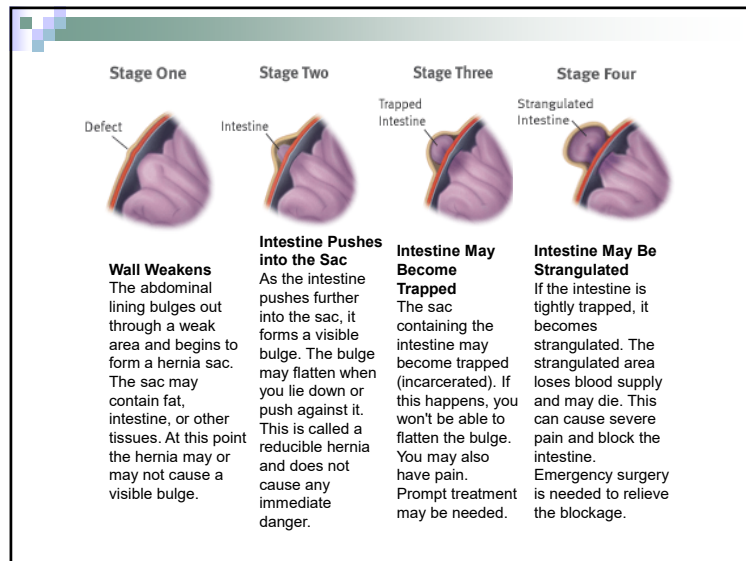
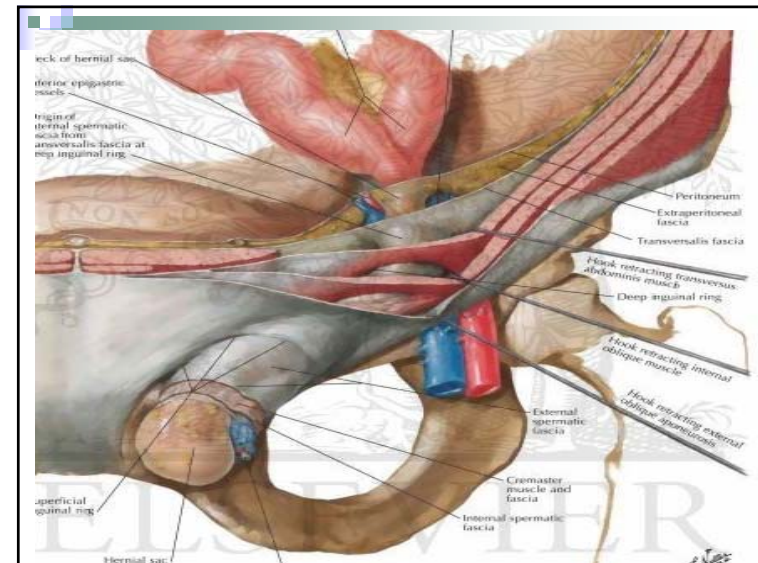
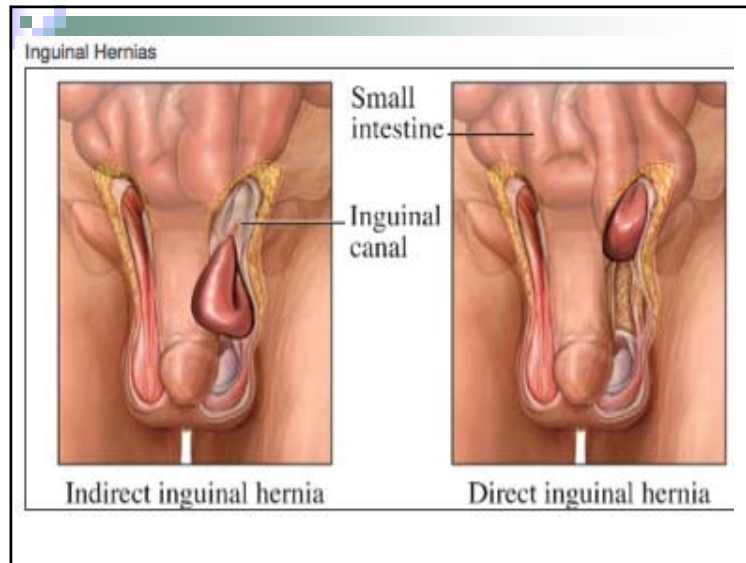
“A protrusion of abdominal contents through an opening in the wall of the cavity in which it is contained”

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

Groin Hernias

- 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)





“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

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 re-current 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

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, and that there is a direct relationship between the magnitude of the weight and the height of the pressure induced”*
- *“The intraabdominal pressures are largest in the stooping and prone (face down) positions”*

Some Physiology Research Goes Against Work-Relatedness



- Deeper criss-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 1994: “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 Favors 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

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](#), [Frost P](#), [Bay-Nielsen M](#), [Svendsen SW](#).

Author information

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

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

[Danish Ramazzini Centre](#) Danish 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 with ton-years, frequent-heavy-lifting-years, and esp. standing-years, but with ORs 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 and
physical activity off-work

(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.

Obesity NOT Related to Groin Herinas in Epidemiology Research

- Abramson 1976 undertook a cross sectional survey community health survey in a neighborhood of western Jerusalem. "The presence of hernia was low in men in the presence of obesity"
- Liem (1997) surveyed six hospitals in the Netherlands also found that obesity was protective for hernia development.

Physical Activity Good or Bad? Take your pick

- Liem: total physical activity was not associated with hernia and more notably that a high level of sports activities was associated with less inguinal hernia
- Vasquez (1999) the only positive risk factor **was** level of physical effort.

DID IT?

Well, what about *THIS* case?

Meade/McCarthy Standards – LIRC 1918 & 1927

- This meets guidelines to consider this 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

Factors that would FAVOR work relatedness from lifting, if present:

1. Inguinal hernia versus any other type (exception, certain incisional hernias)
2. Direct inguinal hernia versus indirect
3. All of the Meade/McCarthy standards are met (sufficient accident, immediate bulge, immediate disabling pain, immediate notification)
4. No past history of a non— work-related hernia on EITHER side
 - (cont next slide)



cont

5. If no incident had happened, but there was ongoing workplace exposure to heavy lifting COMBINED with forward bending, or lifting while leaning on top of a work surface (example, leaning under the hood of a car to pull out heavy parts)

“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

Cases - #1 “On the pit crew”

- 33 yo millwright
- while using a lever bar and a hook to retrieve a 30- to 35-pound diecast machine part, which had fallen into a pit, he had the sudden onset of pain in his left groin. Had to stop work mid-shift
- He noticed a bulge when he went to the bathroom at work.
- He reported it on the same day to his employer and sought medical attention, diagnosis of inguinal hernia (surgery pending).

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.

Case #2 – 37 yo woman bilateral inguinal hernias

- Felt lower abdominal discomfort in April about 30 - 40 minutes after lifting poly wrap roll. In May, her doctor diagnosed first left, and then eventually, bilateral hernias (“Left=WR, Right not”)
- BMI = 37
- Ergo eval - light category of effort per the Dictionary of Occupational Titles, but rarely lifts 38# poly

Highly uncommon situation

- 2% of females develop any type of groin hernia, c/w 13% of males (during observation 1973-93 NHANES)
- A rare type of groin hernia, the femoral hernia, occurs almost exclusively in women . . . but:
 - She has inguinal hernia not femoral hernia.
 - Instead of the type of hernia fairly specific to women, the femoral hernia, has the kind 7X more common in men
- Beyond that, she has an inguinal hernia on each side



2 Hernias – Coincidence? Or related?



- Statistically, the indirect type of inguinal hernia is the most common of the two in women
- Although still rare, indirect inguinal hernias far outnumber direct hernias in women
- Presence of an indirect inguinal hernia always indicates an abnormality of fetal development, in which the internal inguinal ring stayed open
- Odds instead that she has a direct hernia on either side, while having bilateral hernias, is smaller still (unlikely coincidence)
- Instead, having the simultaneous inguinal hernias means that in her pre-birth development, her internal inguinal rings did not close on either side

- Has four children



- Pregnancy increased the intra-abdominal pressure and basically pushed the herniation through the internal inguinal rings on both sides.
- Not related to work, even if related to labor!

Case 3 – 58 yo male, DOI 7/2012

- “I had to lift up the ends of chassis frames to tuck foam wrap under the corners”
- “I always kept my back straight doing it”
- “I told my Line Leader I felt a pop in my groin, he sent me to HR. They said let us know how you’re doing, but no paperwork”
- “Kept working, job slowed, and then when busy again in 9/2014, this thing kept popping out!”

Case 3 (cont)

- “They transferred me to another location, heavier work, had to ask for help.”
- “I couldn’t keep up, they fired me. Got another job, couldn’t do that, so I went to ER” (7/2/2014)
- Surgery 7/14/2014: “pantaloon hernia with small indirect component w colon and weak inguinal floor leading into a very patulous, deep inguinal ring... very damaged inguinal floor”

Case 3 (cont)

- Mesh repair failed at 5 months post op