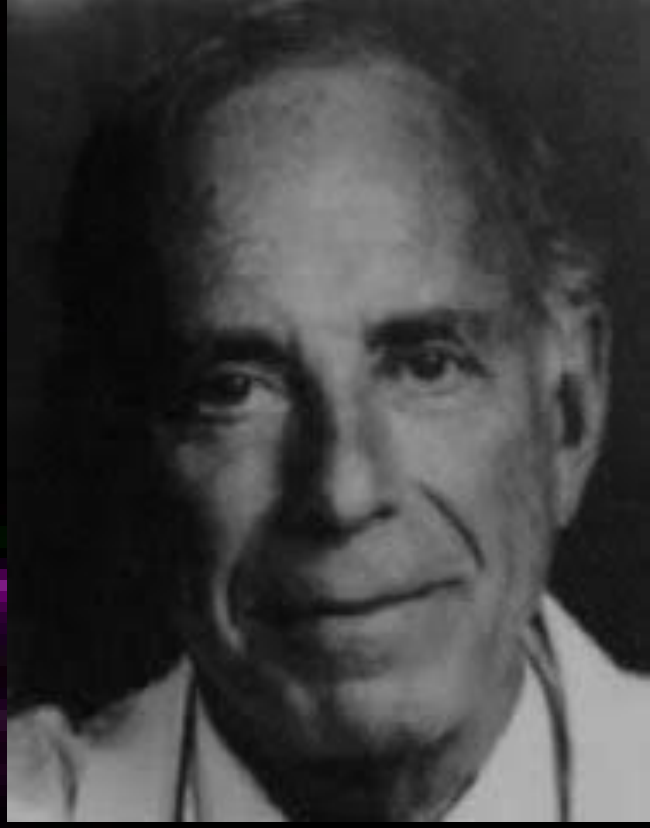
Lichtenstein Repair of Inguinal Hernias -Revisited



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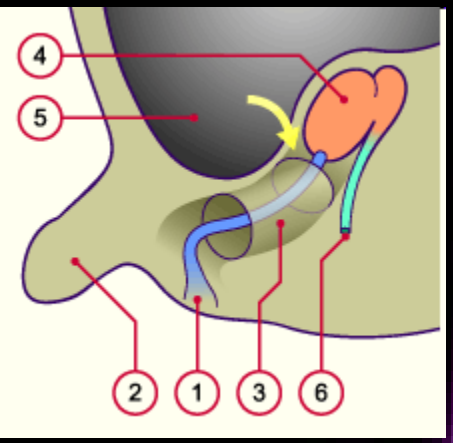
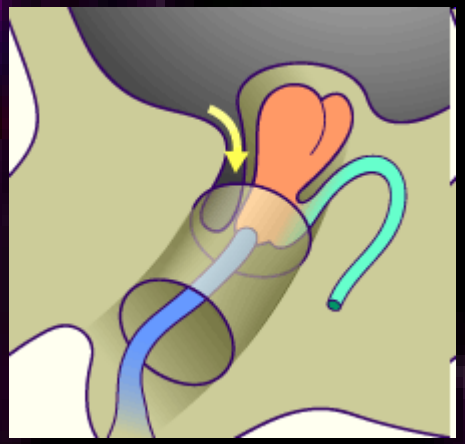
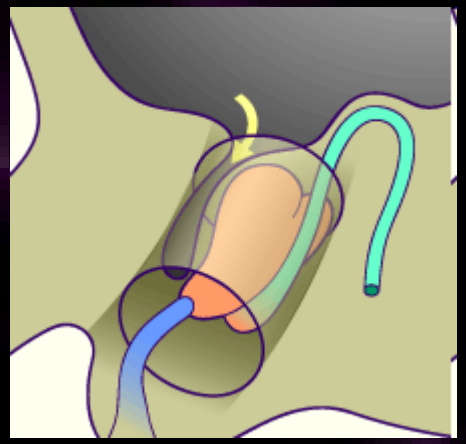
THE “PROBLEM” CALLED THE HUMAN INGUINAL REGION



2 MONTHS

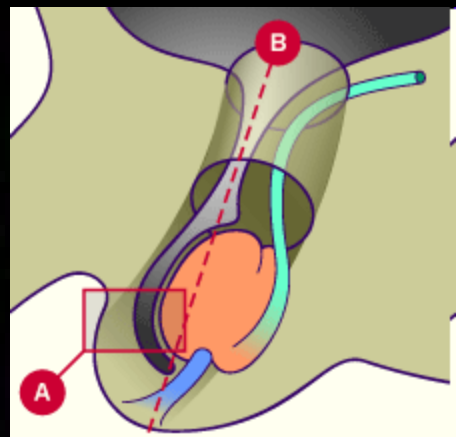


3 MONTHS



7 MONTHS

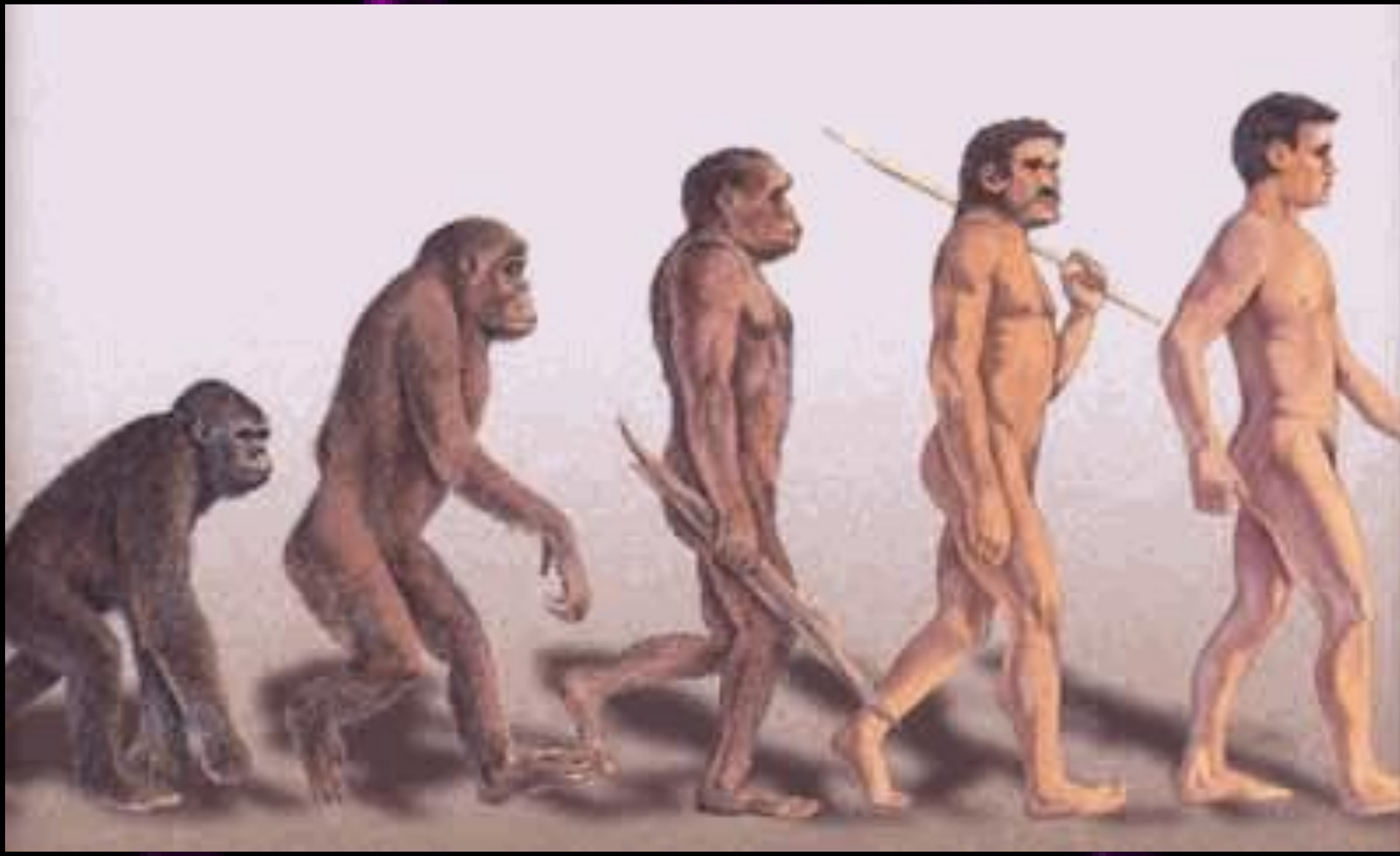
9 MONTHS



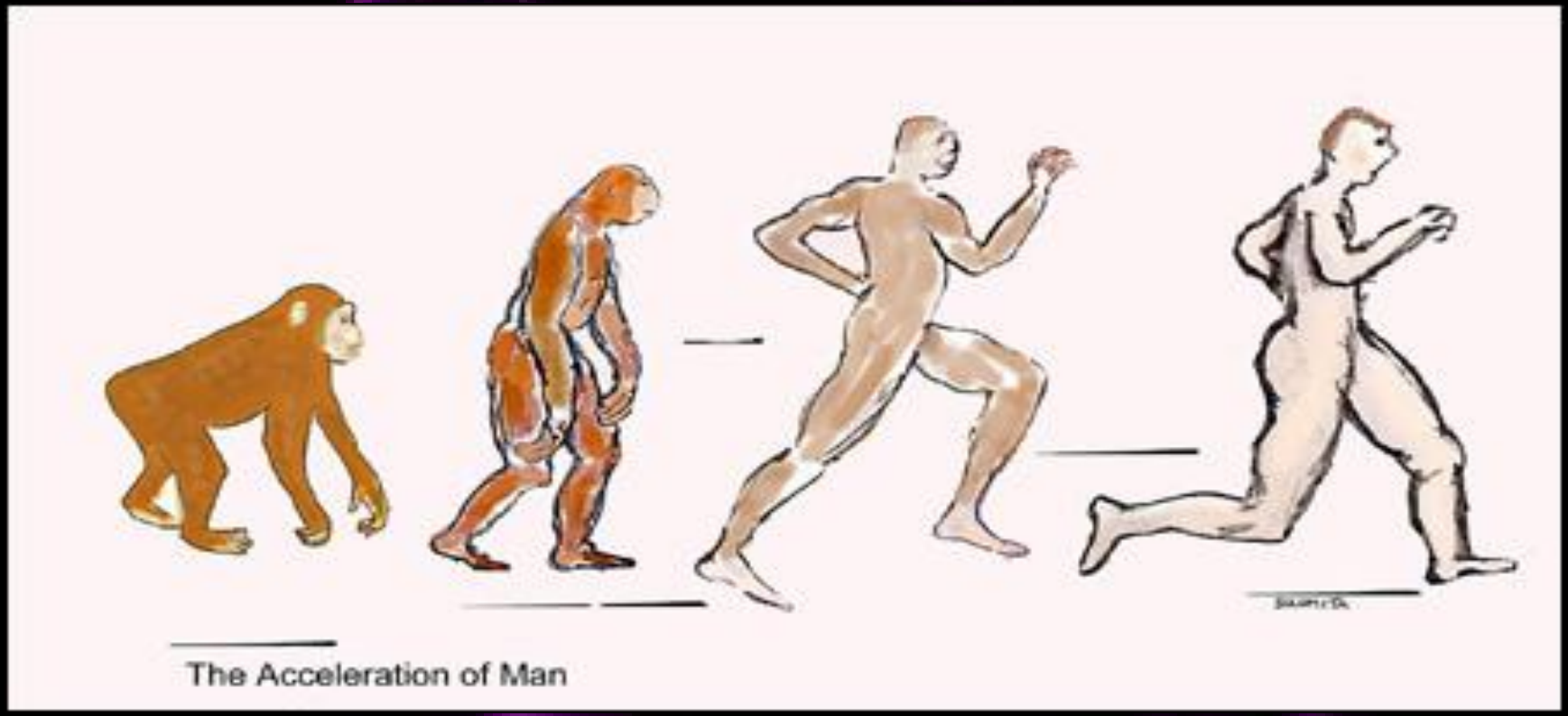
1. GUBERNACULUM TESTIS
2. PENILE APPENDAGE
3. POTENTIAL INGUINAL CANAL
4. TESTIS
5. COELOMIC CAVITY
6. VAS DEFERENS

PROBLEM OF EMBRYOLOGY

PROBLEM OF EVOLUTION

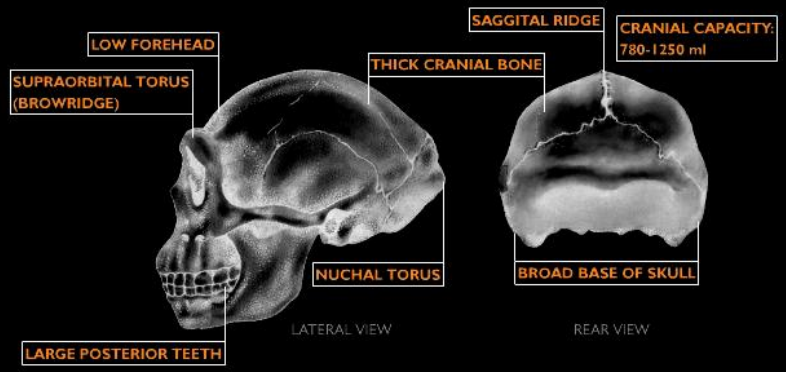


PROBLEM OF EVOLUTION
Born from a need to "Run" food down on the plains of Africa



AND IN DOING SO, THE HOMO ERECTUS DEVELOPED THE "NUCHAL RIDGE" OF FAST FOUR-LEGGED ANIMALS TO KEEP THE HEAD STEADY WHILE RUNNING.

PROBLEM OF EVOLUTION
Born from a need to "Run" food down on the plains of Africa



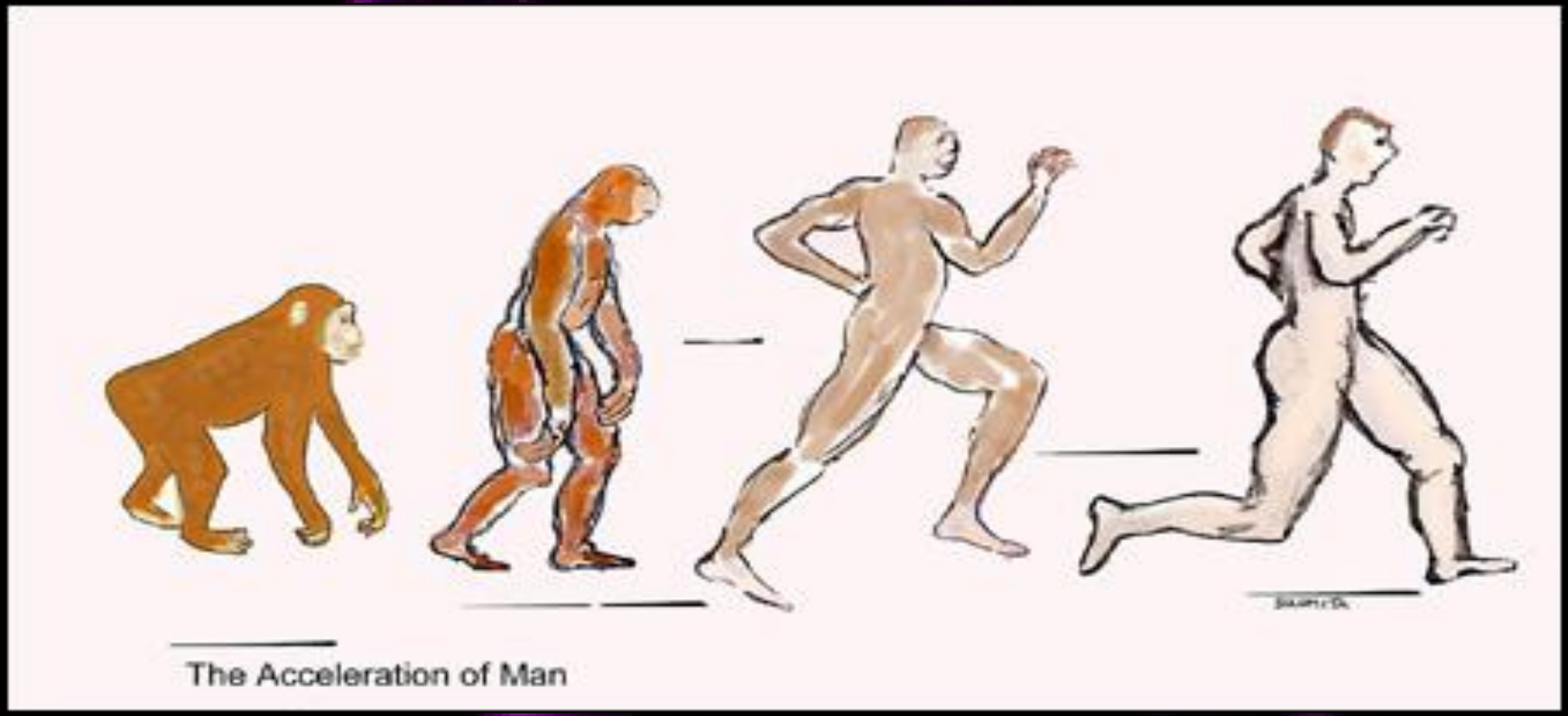
Homo erectus

- Two or 3 million years ago, when H. erectus came out of the trees and roamed the grassy savannas of Africa, running became a very handy thing for getting food. Four-legged animals can move like missiles, but tall, two-legged creatures move like pogo sticks.

  To be fast and steady, you need a head that oscillates up and down, but doesn't pitch back and forth or bobble from side to side. The nuchal ligament is one of several features that allowed early humans to run with steady heads held high.

PROBLEM OF EVOLUTION

Born from a need to “Run” food down on the plains of Africa



BUT ALSO PROBABLY OPENED UP AND WEAKENED THE GROIN.

PROBLEM OF EVOLUTION

Born from a need to “Run” food down on the plains of Africa

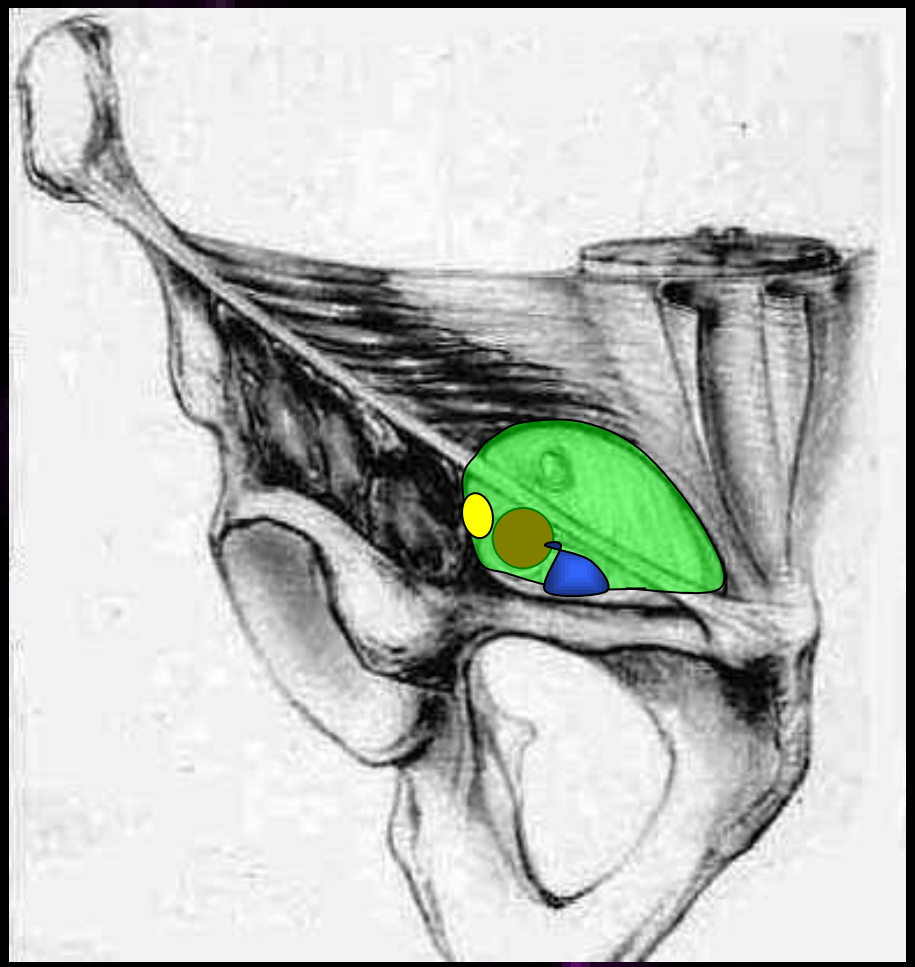
-THE “STRETCH” LEADING TO A WEAKNESS AT THE GROIN NOT ADEQUATELY COVERED BY MUSCLES OR LIGAMENTS CALLED-

“THE MYOPECTINEAL ORIFICE”

THE MYOPECTINEAL ORIFICE

The MPO is bordered:

1. Above by the arching fibers of the internal oblique and transversus abdominus Muscles,
2. Medially (towards the center or to the right) by the Rectus Abdominus Muscle and its Fascial Rectus Sheath,
3. Inferiorly by Coopers Ligament, and
4. Laterally by the Ileopsoas Muscle.



Henri Fruchaud 1894-1960

- French anatomist and surgeon
- Described the Myopectineal Orifice
- Mentor to Stoppa and Rives

So
The Hernia Surgeons
Learnt to
MOVE BACKWARDS
To
MOVE FORWARDS!!

HERNIA TIMELINE & SHIFT

Use of the Posterior mesh

Stoppa 1987

Ger 1990

Combination Mesh

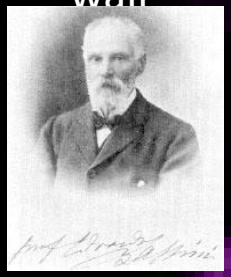
Gilbert 1991

Laparoscopy

Ger 1982

McKernon; Laws 1993.
TEP

Repair of the posterior wall



Bassini 1880

Shouldice 1945

tightening of the external inguinal ring

Susruta B.C./A.D.
Stromayr 1559
Czerny 1877,

Use of Mesh

Lichtenstein 1984

Recurrence Rate after a Lichtenstein Repair

- The recurrence rate for Lichtenstein hernioplasty at specialist clinics in the United States is consistently less than 1%.
- In an audit of Lichtenstein hernioplasty performed with local anesthesia by surgical residents, the recurrence rate was 2.1% over a 10-year follow-up period.

https://www.medscape.com/answers/1534281-69914/what-is-the-recurrence-rate-following-open-inguinal-hernia-repair

Recurrence after a Lichtenstein hernioplasty

- Recurrence in Lichtenstein hernioplasty may be due to
  - Inaccurate execution of the technique (inadequate size or improper fixation of the mesh) or
  - To an overlooked hernia at the primary operation.

https://www.medscape.com/answers/1534281-69914/what-is-the-recurrence-rate-following-open-inguinal-hernia-repair

Recurrence after a Lichtenstein hernioplasty

- Recurrence may be more frequent in the presence of comorbid conditions
  - chronic obstructive pulmonary disease or
  - obesity or
  - with the use of steroids.

https://www.medscape.com/answers/1534281-69914/what-is-the-recurrence-rate-following-open-inguinal-hernia-repair

Recurrence after a Lichtenstein hernioplasty

- Recurrence may be more frequent in the presence of failure of technique
  - the use of too-small pieces of mesh placed flat under tension,
  - failure to achieve adequate overlap (medially, 2 cm beyond the pubic tubercle; laterally, 5-6 cm beyond the internal ring), or
  - failure to cross the tails of the mesh
  - the existence of a femoral hernia in women.

https://www.medscape.com/answers/1534281-69914/what-is-the-recurrence-rate-following-open-inguinal-hernia-repair

MESH CONTRACTION

- Contraction is a well-documented phenomenon occurring within two months of mesh implantation. Its etiology is unknown, but it is suggested to occur as a result of inadequate tissue ingrowth into the mesh and has been associated with hernia recurrence.
- The materials used were eight PE and eight PP meshes measuring 10 x 10 cm.

Relationship between tissue ingrowth and mesh contraction. Gonzalez R et al World J Surg. 2005 Aug;29(8):1038-43.

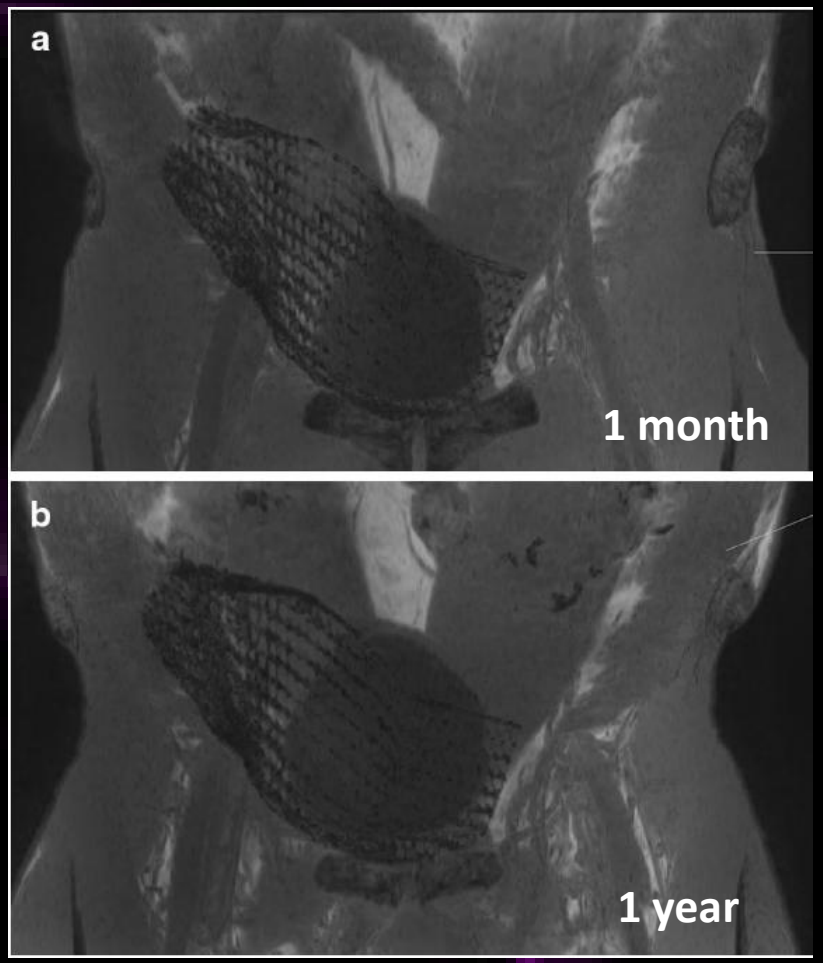
MESH CONTRACTION

- There was no difference in histologic inflammatory and fibroblastic reactions between mesh types. There was a significant correlation between tissue ingrowth force and mesh size ($p = 0.03$, 95% CI: 0.05-0.84).
- Our results confirm those from previous studies in that mesh materials undergo significant contraction after suture fixation to the fascia.

Relationship between tissue ingrowth and mesh contraction. Gonzalez R et al World J Surg. 2005 Aug;29(8):1038-43.

MESH CONTRACTION

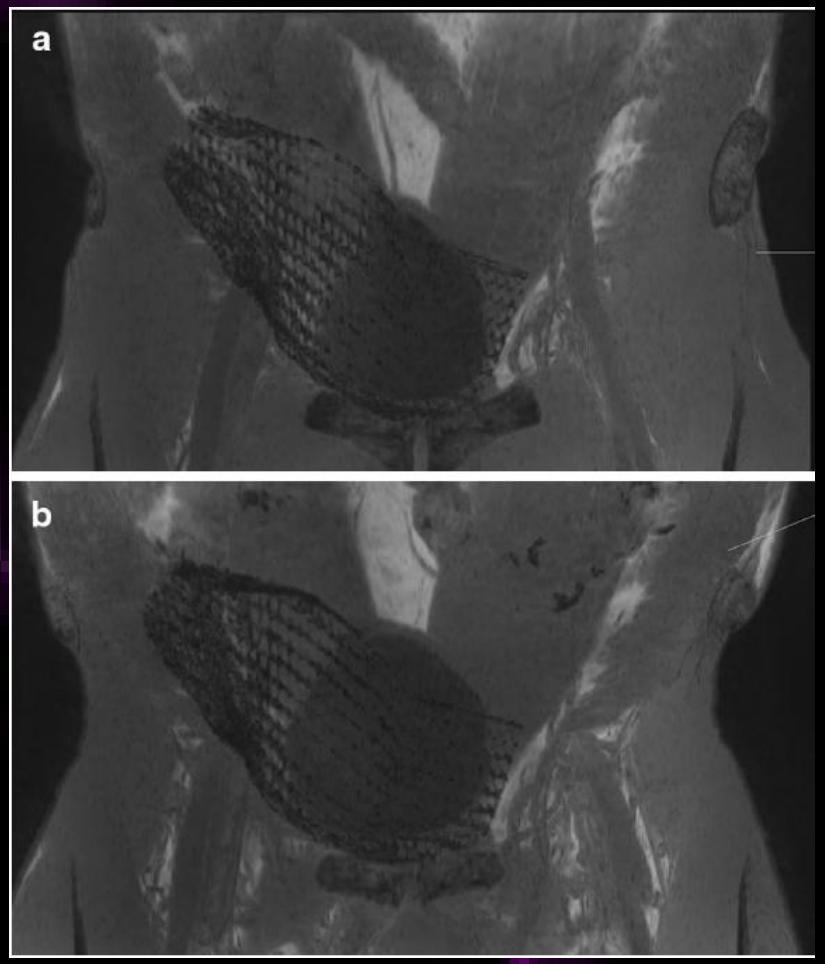
- The IRONMAN STUDY evaluated implant properties in a mechanically stable anatomical region - after TAPP repair of primary unilateral inguinal hernias in men with clinical and MRI examinations 4 weeks and 1 year after surgery.



Lechner, M., Meissnitzer, M., Borhanian, K. et al. Hernia (2019). https://doi.org/10.1007/s10029-019-02019-2https://rdcu.be/bO2OJ

MESH CONTRACTION

- In conclusion, the mesh used for this analysis shows no statistically or clinically relevant changes in
  - Shape,
  - Position and
  - Configuration
- between 4 weeks and 12 months after implantation in TAPP technique.



Lechner, M., Meissnitzer, M., Borhanian, K. et al. Hernia (2019). https://doi.org/10.1007/s10029-019-02019-2https://rdcu.be/bO2OJ

SURGICAL RISK FACTORS FOR RECURRENCE

- Despite all the progress made in inguinal hernia surgery (meshes and laparoendoscopic operative techniques), the proportion of recurrent inguinal hernias among the total patient collective with inguinal hernias is still from 12% to 13%.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- There is a discrepancy in the literature between the low recurrence rates reported in individual studies and the still relatively high recurrence rates identified in a nonselective total patient collective in registers.
- This is mainly due to the fact that many studies have a maximum follow-up time of only 1–5 years, during which only about 40% of recurrences present , whereas the register studies with nonselective patient collectives also include those recurrences developing later.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Mesh Characteristics.
- Four meta-analyses revealed that the use of “lightweight, large-pore meshes” in Lichtenstein operation did not lead to a higher recurrence rate.
- A meta-analysis of nine studies with 3133 inguinal hernia operations found that lightweight, largepore, and partially absorbable meshes did not result in a higher recurrence rate compared to nonabsorbable meshes.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Suture Characteristics
- A study from the Swedish Hernia Register assessed the effects of different mesh fixation suture materials on the risk of recurrence after Lichtenstein inguinal hernioplasty.
- With regard to the recurrence risk, long-term absorbable sutures are an excellent alternative to permanent sutures for mesh fixation in Lichtenstein inguinal hernioplasty.
- Short-term absorbable sutures represent an independent risk factor for recurrence and should therefore be avoided

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Size of the Mesh
- A systematic review and meta-analysis to determine the importance of mesh size in Lichtenstein repair. found in 29 studies that a mesh larger than 90 cm^2 was used.
- The pooled proportion of recurrence for small meshes was 0.0019 [95% confidence interval (CI) = 0.007–0.0036], favouring larger meshes to reduce the chance of recurrence. Although there is no evidence, it seems that larger meshes reduce recurrence rates

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Management of the indirect sac.
- In a study of the Swedish Hernia Register, the 5-year cumulative incidence of reoperation for recurrence after open inguinal hernia repair was 1.7% for hernia sac excision, 1.7% for division, and 2.7% for invagination.
- Lichtenstein repair combined with hernia sac excision had a 5-year cumulative reoperation incidence for recurrence of only 1.0%.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Management of the direct sac.
- Analyses of registers showed that the recurrence rate after the primary operation of direct inguinal hernia was significantly higher than after indirect inguinal hernia (5.2% vs. 2.7%; $p < 0.001$).

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Management of the direct sac.
- Unlike an indirect inguinal hernia, which after excision of the hernia sac from the inguinal canal has a curtain-like closure, the direct hernia sac will persist unless further measures are taken often with seroma formation.
- There is a risk that because of pressure exerted on this area the mesh will be pushed in further, thus resulting in recurrence.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Management of the direct sac.
- Therefore, the transversalis fascia lining this region should be inverted and either sutured to Cooper's ligament or ligated. This results in the complete reduction of the sac , thus helping to prevent seroma formation and recurrence.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Management of the direct sac.
- The most plausible explanation for the development of a direct recurrence after Lichtenstein inguinal hernia repair is insufficient medial mesh fixation and overlap over the pubic tubercle.
- It may be possible to reduce the recurrence rate after Lichtenstein repair by more than half by paying increased attention to this specific aspect of the operation.

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Sliding hernia.
- Among male patients, the sliding inguinal hernias have a higher cumulative reoperation rate for recurrence compared to nonsliding inguinal hernias (6.0% vs. 4.2%; log rank p = 0.001)

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Speed of Surgery
- In a study of the Swedish Hernia Register, the relative risk of reoperation for recurrence of all patients operated on in less than 36 min was 26% higher than that of all patients with an operating time of more than 66 min (1.26; 95% CI = 1.11–1.43).
- The authors concluded that a significant decrease in reoperation for recurrence with increasing operating time exhorts the hernia surgeon to avoid speed and to maintain thoroughness throughout the procedure

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Center volume
- Centers reporting fewer than 50 procedures a year in the Danish Hernia Database had a significantly higher cumulative reoperation rate for recurrence compared to centers reporting more than 50 procedures a year (9.97% vs. 6.06%; $p < 0.001$)

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

SURGICAL RISK FACTORS FOR RECURRENCE

- Surgeon volume
- Surgeon volume of less than 25 cases per year for open inguinal hernia repair was independently associated with higher rates of reoperation for recurrence.
- In the Herniamed Hernia Register, univariable analysis (1.03% vs. 0.73%; p = 0.047) and multivariable analysis (OR = 1.494; 95% CI = 1.065–2.115; p = 0.023) revealed that low-volume surgeons (<25 procedures per year) had a significantly higher recurrence rate after laparoendoscopic inguinal hernia repair (≥25 procedures per year).
- **No similar data for Lichtenstein.**

Surgical risk factors for recurrence in inguinal hernia repair – a review of the literature. Henning Niebuhr and Ferdinand Köckerling. Innov Surg Sci 2017; 2(2): 53–59.

CHRONIC PAIN AFTER LICHTENSTEIN

- 8%–16% of patients undergoing inguinal hernia repair experience chronic pain to a degree that impairs their daily lives 6 months postoperatively.

Predictive risk factors for persistent postherniotomy pain.
Aasvang EK et al, Anesthesiology. 2010 Apr; 112(4):957-69.

CHRONIC PAIN AFTER LICHTENSTEIN

- The Lichtenstein repair is known to cause discomfort and disabling pain in some patients.
- However, laparoscopic repair has a lower risk of chronic pain but some patients do complain of it.

Chronic pain after inguinal hernia repair with the ONSTEP versus the Lichtenstein technique, results of a double-blinded multicenter randomized clinical trial.
Andresen K et al,Langenbecks Arch Surg. 2017 Mar; 402(2):213-218.
Mesh fixation methods and chronic pain after transabdominal preperitoneal (TAPP) inguinal hernia surgery: a comparison between fibrin sealant and tacks.
Andresen K et al, Surg Endosc. 2017 Oct; 31(10):4077-4084.

CHRONIC PAIN AFTER LICHTENSTEIN

- Lightweight meshes seem to lower the risk of chronic pain following the Lichtenstein repair technique.
- The choice of fixation method for the mesh can influence the risk of pain.

Systematic review and meta-analysis of the use of lightweight versus heavyweight mesh in open inguinal hernia repair. Sajid MS, Leaver C, Baig MK, Sains P. Br J Surg. 2012 Jan; 99(1):29-37.

Glue versus suture fixation of mesh during open repair of inguinal hernias: a systematic review and meta-analysis. Colvin HS, Rao A, Cavali M, Campanelli G, Amin AI. World J Surg. 2013 Oct; 37(10):2282-92.

CHRONIC PAIN AFTER LICHTENSTEIN

- The nerves can be in the way when placing the mesh, can be caught or injured during fixation, and can be injured by accident or by dissection in the operative field.
- It is recommended, in the recently published World Guidelines for inguinal hernia repair, to identify the nerves but not to do a planned resection;
- However, if the nerves are in the way when placing the mesh, a “pragmatic resection” is recommended.

International guidelines for groin hernia management. HerniaSurge Group. Hernia. 2018 Feb; 22(1):1-165.

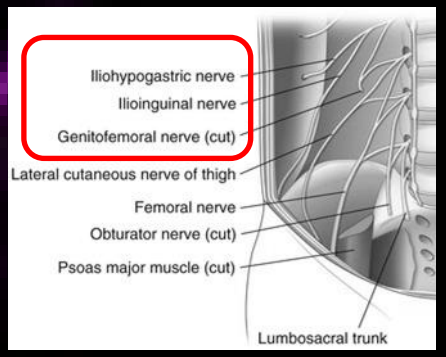
MANAGEMENT OF CHRONIC PAIN AFTER LICHTENSTEIN

THE SCALED APPROACH

Watchful waiting

Systemic painkillers, escalating to blocks

Surgery including a Triple Neurectomy and Removal of the Mesh



https://clinicalgate.com/hip-and-pelvis

Management of chronic pain after hernia repair
Kristoffer Andresen and Jacob Rosenberg. J Pain Res. 2018; 11: 675–681.