SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Ospedaliero – Universitaria di Ferrara

UNIVERSITÀ DEGLI STUDI DI FERRARA
- EX LABORE FRUCTUS -

Chirurgia della parete addominale: dalle tecniche senza protesi alla laparoscopia.

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Società Medico Chirurgica di Ferrara dal 1846

IL PAZIENTE CON ERNIA INGUINALE E LAPAROCELE: NUOVE TECNICHE CHIRURGICHE

VENERDI' 8 maggio 2015

Aula Magna Nuovo Arcispedale S. Anna
Cona, Ferrara

Il Segretario
Prof. C. Feo

Il Presidente
Prof. R. Manfredini

per Medici, Biologi, Farmacisti, Professioni Sanitarie
Sono disponibili attestati di partecipazione per gli studenti in Medicina

Segreteria Organizzativa MCR:
MCR C so Isonzo 53 - 44121 Ferrara Tel. 0532.242418 e-mail info@mcrferrara.org

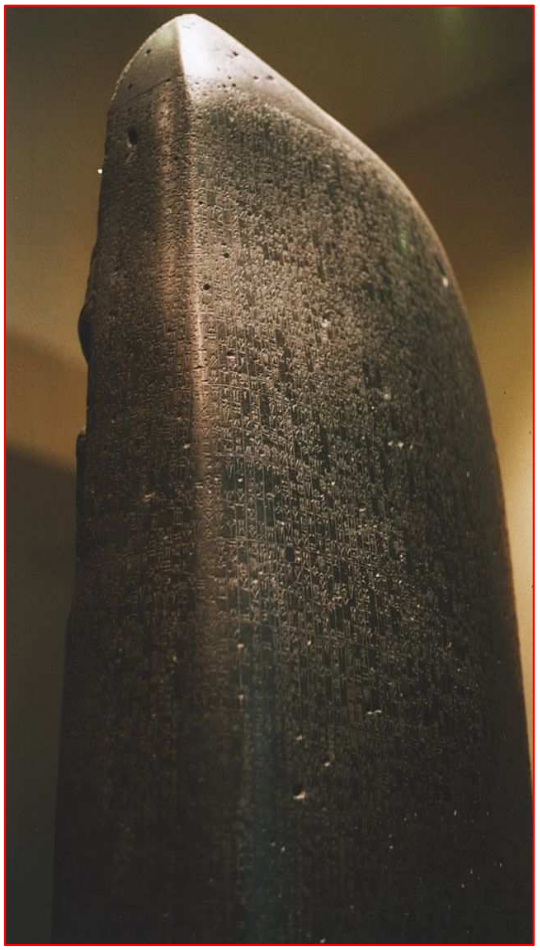
Chirurgia della parete addominale

Ernia

- *Protrusione di un organo o tessuto al di fuori della cavità che lo contiene*

Chirurgia della parete addominale

- I descrizione di una riduzione erniaria
- Codice di Hammurabi di Babilonia 1700 a.C.
- scoperto dall'archeologo francese Jaques de Morgan nell'inverno 1901-1902 fra le rovine della città di Susa (l'odierna Shush)



Chirurgia d'Urgenza Ferrara

Chirurgia della parete addominale

- Pagina del papiro Ebers

- Il **Papiro Ebers** databile al regno di **Amenofi I** (ca. 1550 aC) acquisita a Tebe da **Georg Ebers** 1873-1874

Chirurgia della parete addominale

- Celso I Sec. d. C.: descrizione di tecnica personale per la riduzione dell' ernia

Chirurgia della parete addominale

- In epoca romana la cauterizzazione della lacuna muscolo-aponeurotica rappresenta il trattamento di scelta

- Nei secoli successivi si passa alla legatura del sacco erniario e del funicolo in toto

Chirurgia della parete addominale

Chirurgia dell'ernia nel XVI Sec.(Stromayr, 1559)

Chirurgia della parete addominale

- Medioevo: primi studi anatomici sui cadaveri
  - riconoscimento e rispetto delle strutture anatomiche
- XVII secolo: messa al bando dei cosiddetti "castratori erniari"
- XVII-XVIII secolo: ideazione ed adozione dei cinti erniari come terapia di scelta

Chirurgia della parete addominale

- XVIII e XIX secolo: basi anatomiche e fisiologiche per il trattamento chirurgico

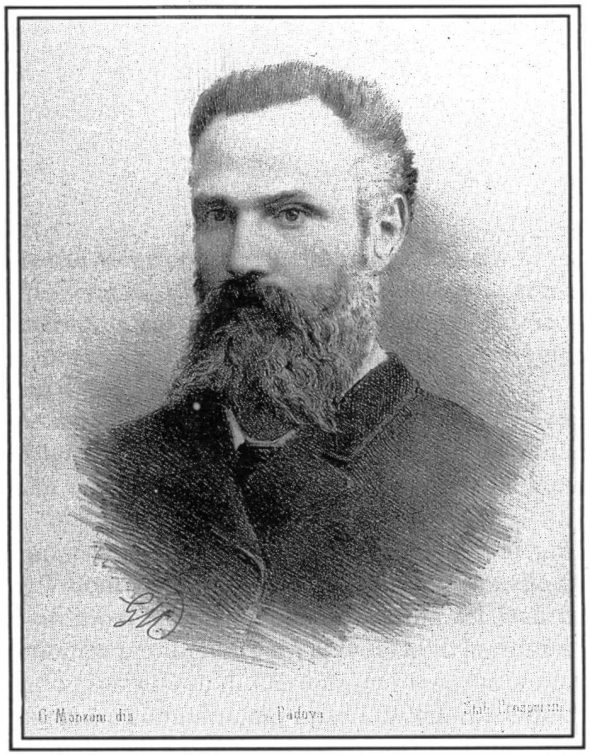
Antonio Scarpa (1752-1832) "Sull' ernia memorie anatomo-chirurgiche" Milano 1809

Astley Paston Cooper (1768-1841) "The anatomy and surgical treatment of inguinal and congenital hernia" Londra 1804

Chirurgia della parete addominale

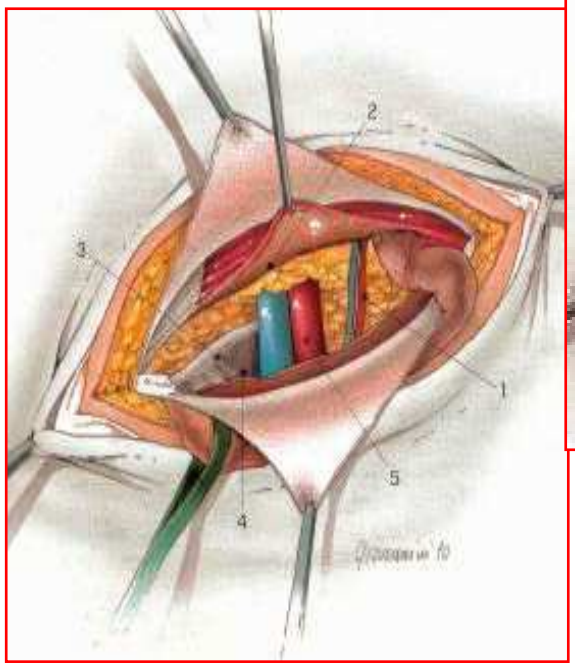
- Edoardo Bassini (1844-1924)

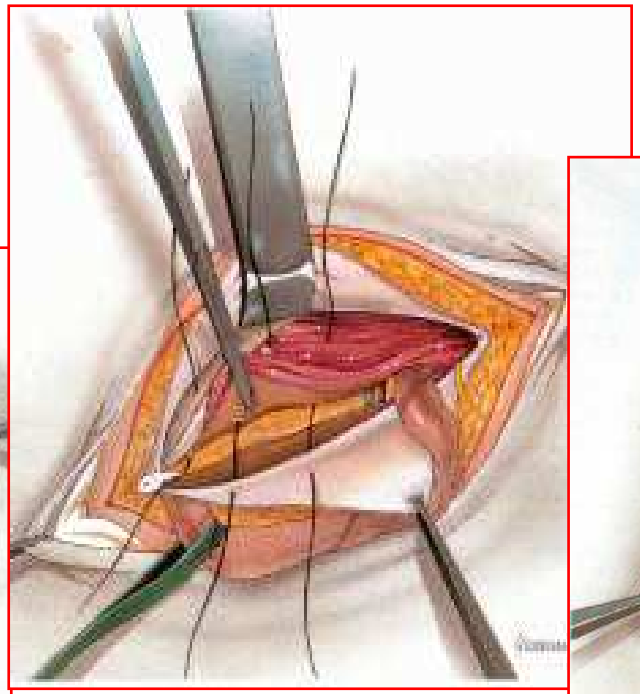
Allievo di Luigi Porta
Clinico Chirurgo di Pavia
ed insigne anatomico,
mette a frutto gli insegnamenti del Maestro ed esegue per la prima volta l' intervento di plastica erniaria
con tecnica personale
il 24-12-1884

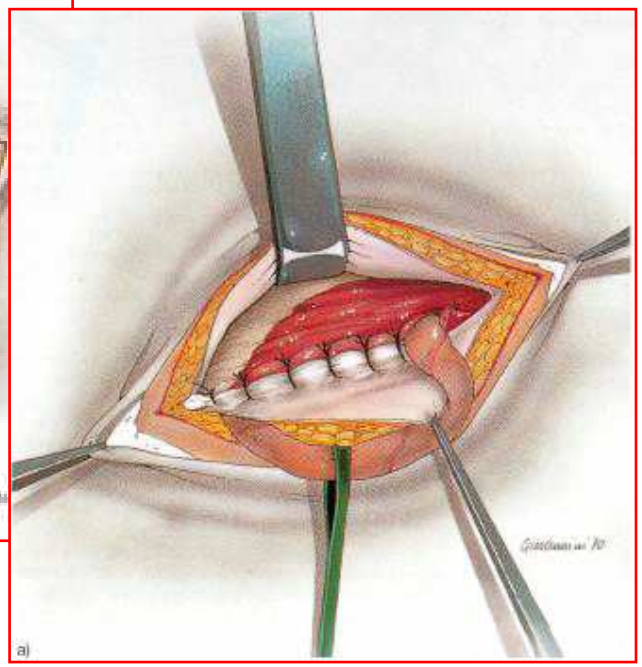


Chirurgia non protesica dell'ernia

Tecnica di Bassini







Chirurgia della parete addominale

- 1885 e 1886: ripetizione della tecnica
- 1887: relazione sui primi 42 casi (Congresso Nazionale di Chirurgia di Genova)
- 1889: pubblicazione "Nuovo metodo operativo per la cura dell'ernia inguinale"

Chirurgia della parete addominale

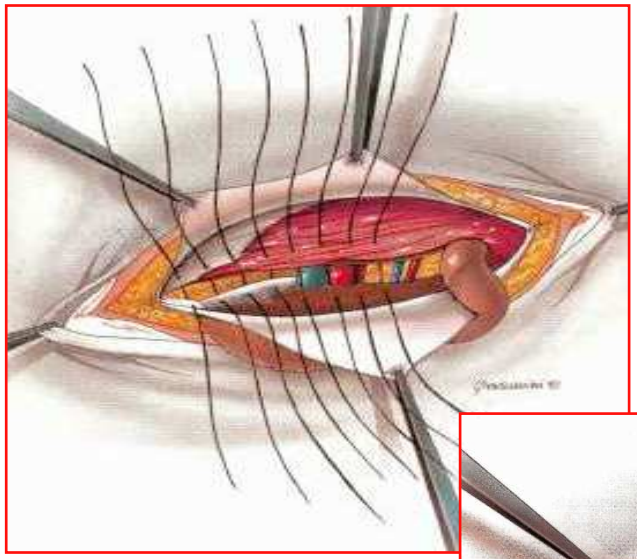
- Risultati della tecnica di Bassini
  - Recidive a 3 anni 3,8%
- Altre tecniche (Wood, Czerny)
  - Recidiva ad 1 anno 30-40%
  - Recidiva a 4 anni praticamente 100%

Chirurgia non protesica dell'ernia

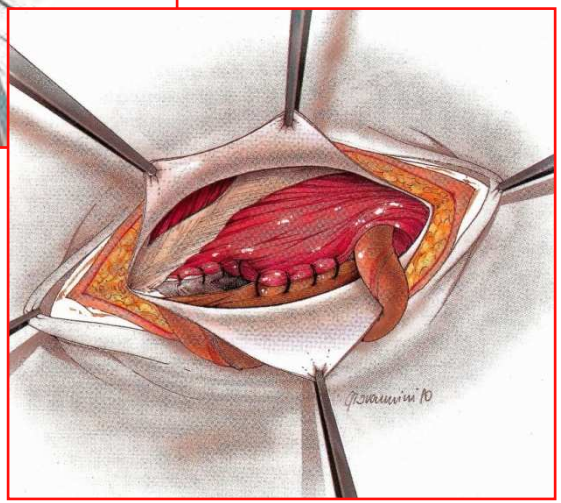
- Nessuno è in grado di ottenere gli stessi risultati di Bassini
- Molti AA sono spinti a ricercare modifiche alla tecnica originale per migliorarne i risultati

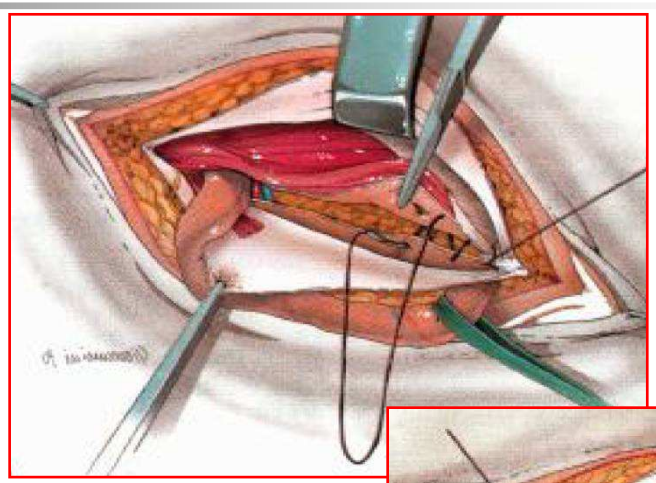
- Halsted
- Mc Vay
- Shouldice

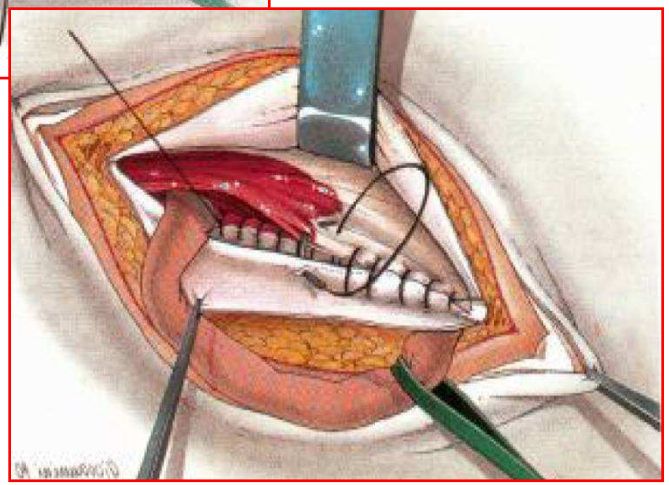
Chirurgia non protesica dell'ernia



Chester B. McVay 1942







Edward Earle Shouldice 1952

Chirurgia d'Urgenza Ferrara

Chirurgia non protesica dell'ernia

- La tecnica di Shouldice rimane una eccellente opzione avendo prodotto i migliori e più duraturi risultati nei confronti di tutte le procedure non protesiche

- Merito di questa tecnica è stata inoltre l'introduzione della anestesia locale e la precoce deambulazione

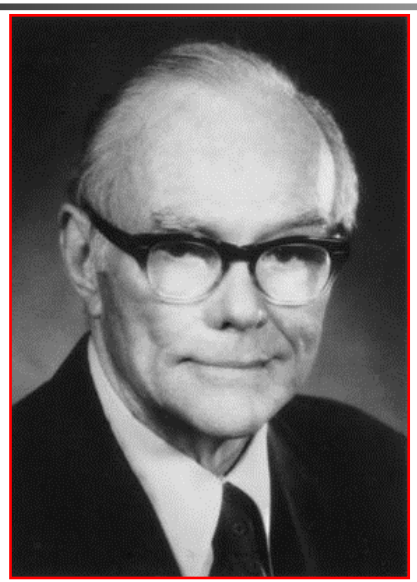
Chirurgia della parete addominale

- Chirurgia protesica: ha più di un secolo
  - Il problema è stato poter disporre di biomateriali adatti allo scopo

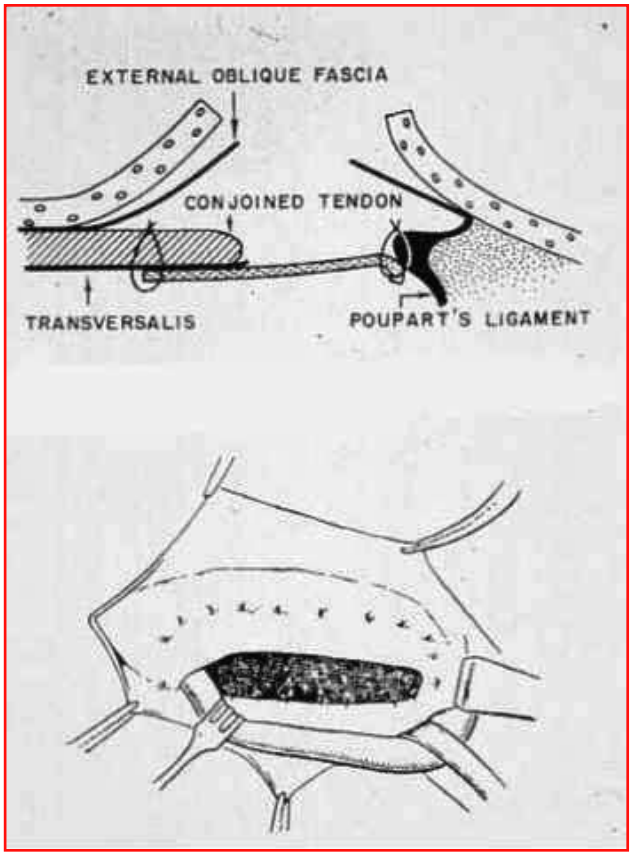
The Ideal Characteristics of Synthetic Biomaterials

No physical modification by tissue fluids	Chemically inert
Does not incite inflammatory or foreign body reaction	Does not produce allergy or hypersensitivity
Noncarcinogenic	Resistant to mechanical strains
Can be fabrication to the form required	Can be sterilized

Prosthetic Hernia Surgery



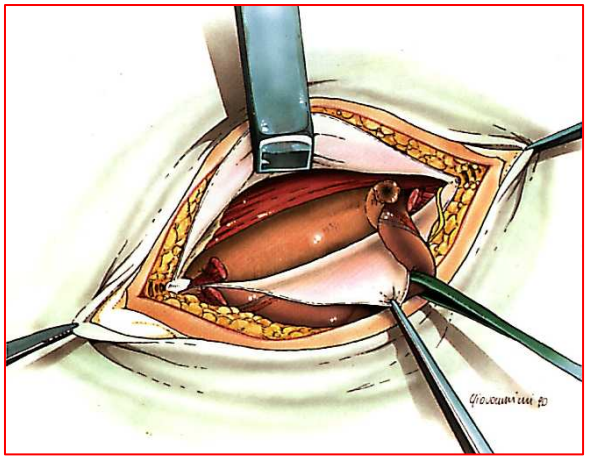
Francis Usher (1908 -1980)
1958: first report of
"tension-eliminating"
prosthetic technique
with Marlex® mesh graft



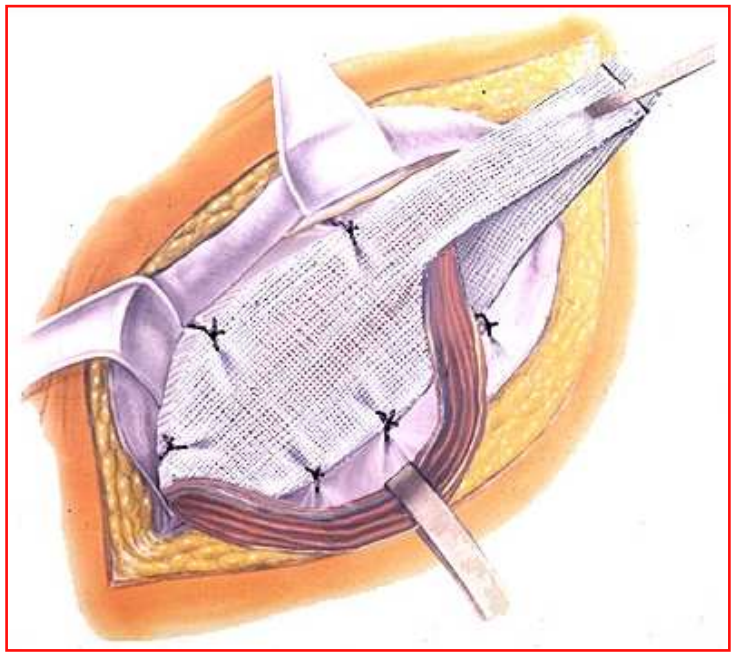
Usher FC, Cogan JE, Lowry TI. A new technique for the repair of inguinal and incisional hernias. Arch Surg 1960;81:187-194

The Lichtenstein Technique

- Mesh repair popularised by Lichtenstein – published a series of 1000 patients with no recurrences in 1-5 yr follow-up
  - Mesh repair for **ALL** hernias
  - Local anaesthetic
  - Day case surgery
  - Same day ambulation

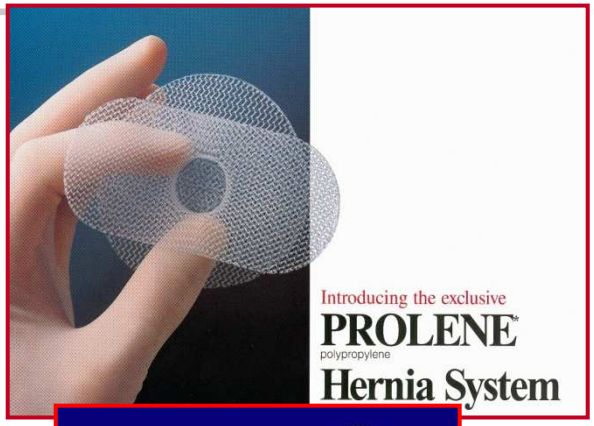


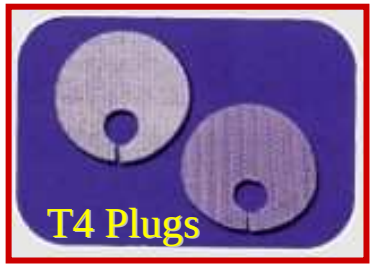
Lichtenstein IL, Shulman AG, Amid PK
The tension free hernioplasty.
Am J Surg 1989;157 (2):188-193

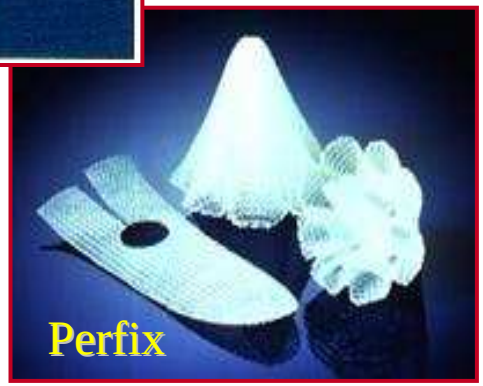


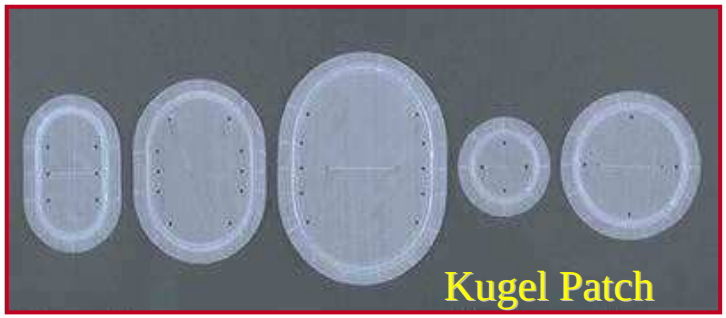
1984 I.L. Lichtenstein
"tension-free" herniorraphy

Devices for Open Prosthetic Hernia Repair

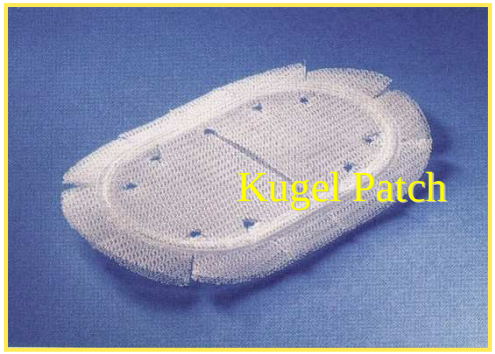


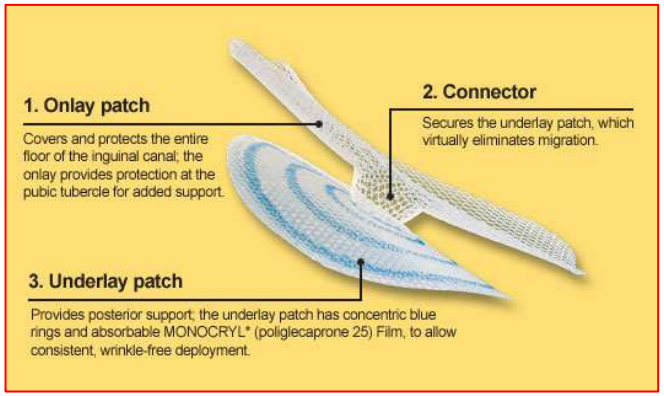




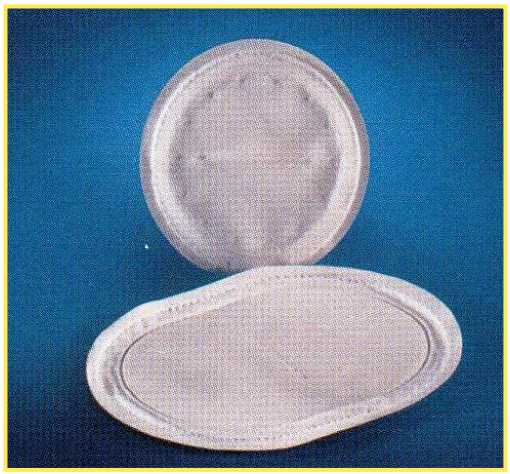


Devices for Open Prosthetic Hernia Repair

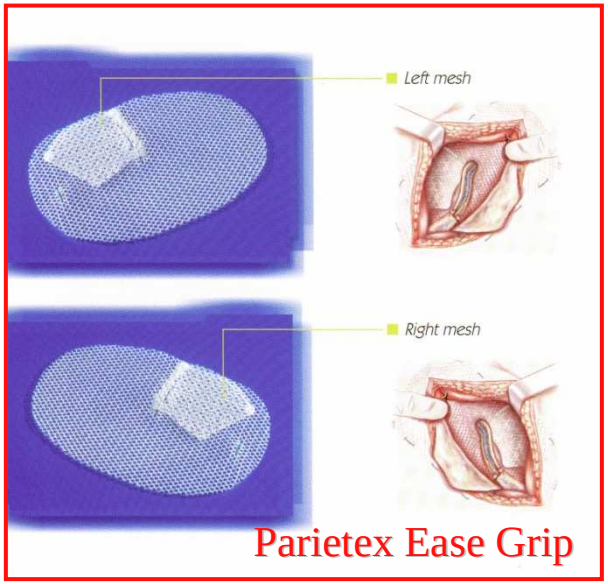




UHS Ultrapro Hernia System®



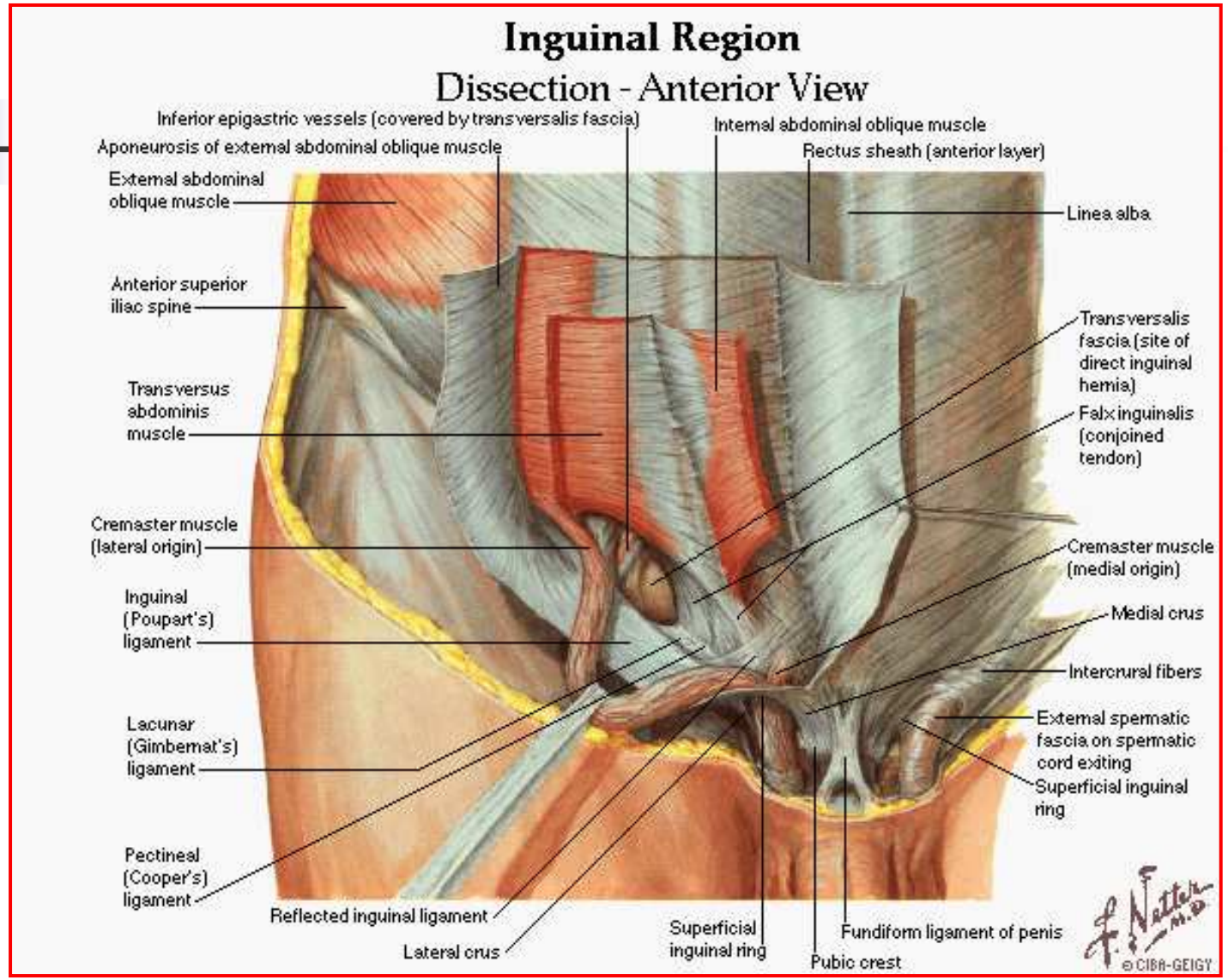
Composix Kugel Patch



History of Preperitoneal Approach

TABLE 18.1. METHODS OF ANATOMIC REPAIR OF A DEFECT WITH A PREPERITONEAL APPROACH TO HEMIOPLASTY

Author	Type of Hernia	Method of Repair
Annandale (1876)	Indirect	Ligation of hernial sac
	Direct	Ligation of hernial sac
	Femoral	Obscure
Tait (1883)	Groin	Obscure
Maunsell (1887)	Femoral	Suture of pectineus fascia and pectineal line to Poupart's ligament
Tait (1891)	Indirect	Suture of fascial defect, "external column of ring to inner column"
	Femoral	Obscure
Bates (1913)	Indirect	Suture of transversalis fascia of internal ring
Cheatle (1920)	Indirect	Occlusion of internal ring by suture
	Femoral	Flap periosteum of pubis to Poupart's ligament
Cheatle (1921)	Indirect	High ligation of sac only
	Femoral	Flap periosteum of pubis to Poupart's ligament
Henry (1936)	Indirect	Plastic to internal ring—transversalis fascia to fascia deep surface internal oblique muscle
	Femoral	Flap of pectineus fascia to Poupart's ligament
Jennings et al. (1942)	Indirect	Plastic closure of internal ring—suture of transversalis fascial sling lateral to the cord
Musgrove and McCready (1949)	Femoral	Suture of Poupart's ligament to Cooper's ligament
McEvedy PG (1950)	Femoral	Suture of conjoined tendon to Cooper's ligament
Riba and Menn[a] (1952)	Indirect	Plastic closure of internal ring—suture of transversalis fascial sling
	Direct	Suture of transversalis fascia to Cooper's ligament
Hull and Ganey (1953)	Femoral	Suture of Poupart's ligament to Cooper's ligament or pectineus fascia flap technique of Henry
Mikkelsen and Berne (1954)	Femoral	Suture of transversalis fascia and transversus aponeurosis to Cooper's ligament
	Small, indirect	Plastic repair of internal ring—transversalis fascia
	Large, indirect	Similar to femoral closure
Mouzas and Diggory (1956)	Femoral	Suture of conjoined tendon to Cooper's ligament
McEvedy BV (1958)	Femoral	As described by his father in 1950
	Indirect	Suture of inguinal ligament to transversalis fascia and reinforced by


Inguinal Region
Dissection - Anterior View
Inferior epigastric vessels (covered by transversalis fascia)
Aponeurosis of external abdominal oblique muscle
External abdominal oblique muscle
Anterior superior iliac spine
Transversus abdominis muscle
Cremaster muscle (lateral origin)
Inguinal (Poupart's) ligament
Lacunar (Gimbernat's) ligament
Pectineal (Cooper's) ligament
Reflected inguinal ligament
Lateral crus
Internal abdominal oblique muscle
Rectus sheath (anterior layer)
Linea alba
Transversalis fascia (site of direct inguinal hernia)
Falx inguinalis (conjoined tendon)
Cremaster muscle (medial origin)
Medial crus
Intercrural fibers
External spermatic fascia on spermatic cord exiting
Superficial inguinal ring
Superficial inguinal ring
Pubic crest
Fundiform ligament of penis
F. Netter M.D.
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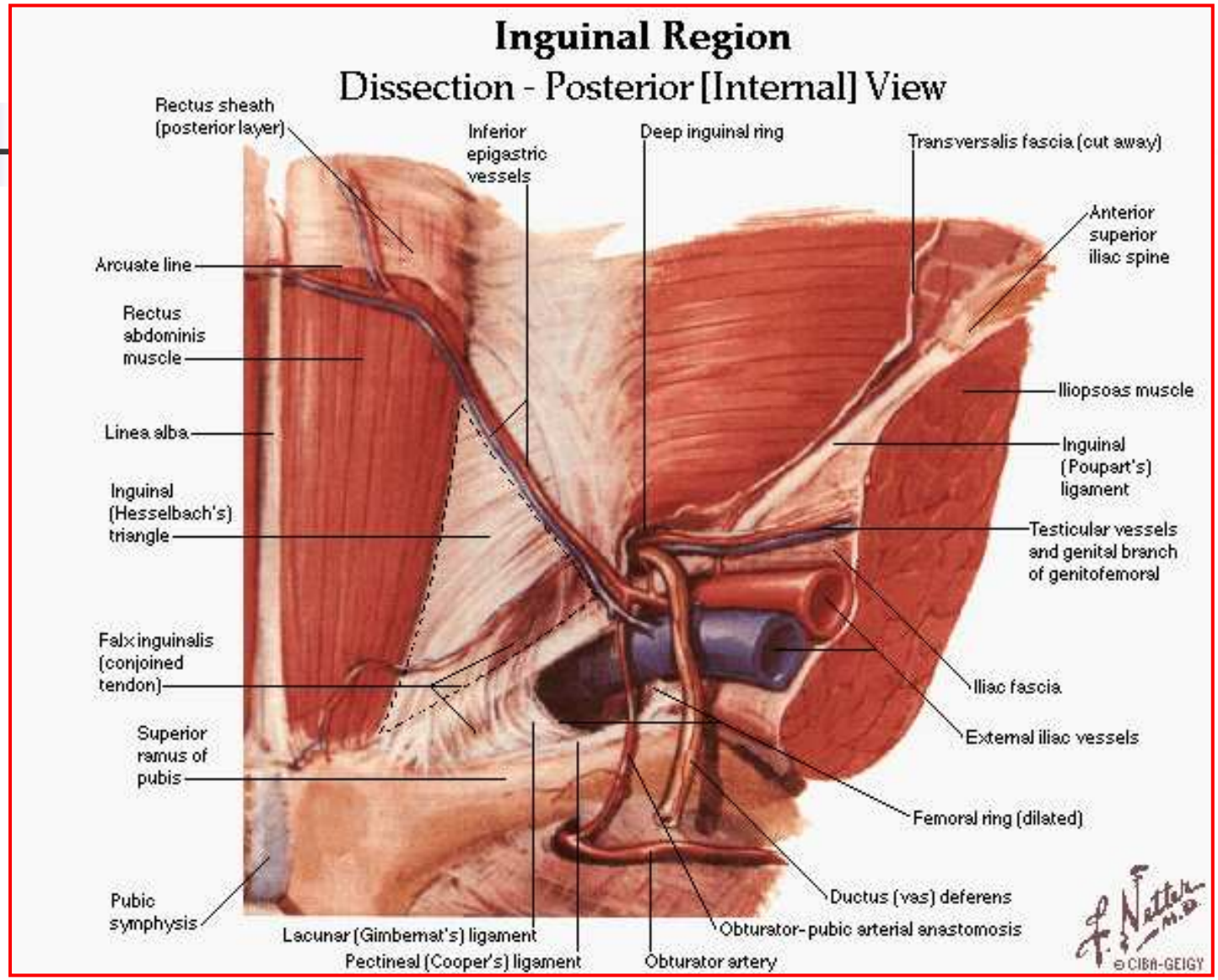
Inguinal Region
Dissection - Posterior [Internal] View
Rectus sheath (posterior layer)
Inferior epigastric vessels
Deep inguinal ring
Transversalis fascia (cut away)
Anterior superior iliac spine
Arcuate line
Rectus abdominis muscle
Iliopsoas muscle
Linea alba
Inguinal (Poupart's) ligament
Inguinal (Hesselbach's) triangle
Testicular vessels and genital branch of genitofemoral
Falx inguinalis (conjoined tendon)
Iliac fascia
External iliac vessels
Superior ramus of pubis
Femoral ring (dilated)
Ductus (vas) deferens
Pubic symphysis
Obturator-pubic arterial anastomosis
Lacunar (Gimbernat's) ligament
Pectineal (Cooper's) ligament
Obturator artery
F. Netter M.D.
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History of Preperitoneal Approach

		conjoined tendon to Cooper's ligament
Nyhus et al. (1959)	Direct	Suture of conjoined tendon to Cooper's ligament
	Indirect	Suture of transversalis fascial sling medial to the cord
	Direct	Suture of transversalis fascia or conjoined tendon or both to Cooper's ligament
	Femoral	Suture of transversalis fascia to Cooper's ligament
Nyhus et al. (1960)	Indirect	Suture of transversalis fascial sling medial or lateral to the cord or both
	Direct	Suture of transversalis fascia, arch of transversus abdominis aponeurosis, or both to iliopubic tract
	Femoral	Suture of iliopubic tract to Cooper's ligament
Sheehan (1961)	Femoral	Suture of transversalis fascia and conjoined tendon to Cooper's ligament
Smith (1962)	Medial, recurrent	Suture of transversalis fascia to Poupart's ligament
	Lateral, recurrent	Same
Estrin et al. (1963)	Femoral	Suture of transversalis fascia to Cooper's ligament
	Indirect	Suture of transversalis fascia to inguinal ligament
	Direct	Suture of transversalis fascia to Cooper's ligament
Stoppa et al. (1972)	Indirect, direct	Preperitoneal insertion of large Dacron prosthesis without fascial repair
Stoppa et al. (1984)	Femoral, recurrent	Same
Ger (1990)	Indirect	Laparoscopic closure neck of sac
Greenburg (1995) (Current)	All types plus recurrent	Similar to Nyhus (below)
Nyhus (1995) (Current)	Small, indirect (type II)	Suture of transversalis fascial sling medial to the cord
	Large, indirect (type IIIB)	Suture of transversalis fascia and transversus abdominis aponeurosis to iliopubic tract medial to cord. Occasionally, 1 or 2 sutures placed between transversalis fascial sling and iliopubic tract lateral to cord to ensure adequate closure of internal ring. Cord at level of femoral vessels. If massive, use components of direct repair as well. Buttress with Marlex mesh.
	Direct (type IIIA)	Suture of transversalis fascia and transversus abdominis aponeurosis to iliopubic tract.
	Femoral (type IIIC)	Suture of iliopubic tract to Cooper's ligament
	Recurrent (type IV)	Repair defect, and buttress with Marlex mesh

[a]Performed in conjunction with retropubic prostatectomy.
For complete references, see Nyhus LM. The peritoneal approach and iliopubic tract repair of inguinal hernias. In: Nyhus LM, Condon RE, eds. *Hernia,* Fourth edition. Philadelphia: J.B. Lippincott Company, 1995:153–174.

Preperitoneal Approach

- Advantages:
  - Recurrent hernia – different approach avoids operating on distorted anatomy / scar tissue
  - May repair bilateral hernias through Pfannenstiel or midline incisions
  - Avoid missed hernias

Preperitoneal Approach

Ger R (1982) The management of certain abdominal herniae by intra-abdominal closure of the neck of the sac. Preliminary communication. Ann R Coll Surg Engl 64:342–344

Ger R (1990) Management of indirect inguinal hernias by laparoscopic closure of the neck of the sac. Am J Surg 159:370–373

Ger R, Mishrick A, Hurwitz J, Ramero C, Oddsen R (1993) Management of groin hernias by laparoscopy World J Surg 17:46–50

Ralph Ger

Preperitoneal Approach

Development

- Ger 1977
  - 24 repairs
  - Transabdominal/stapled
  - Good results/limited follow up
- Shultz and Corbitt 1990
  - Plug technique
- Corbitt 1991
  - Preperitoneal mesh
- McKernan and Laws 1993
  - TEP procedure

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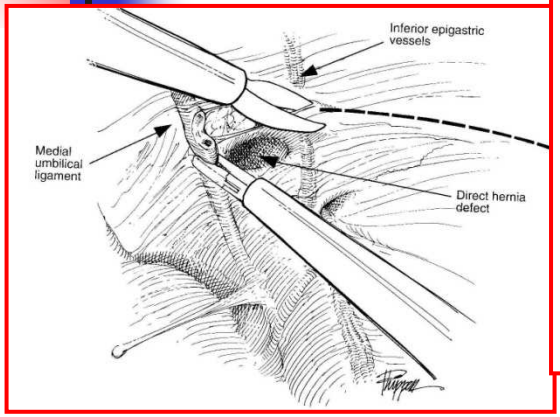
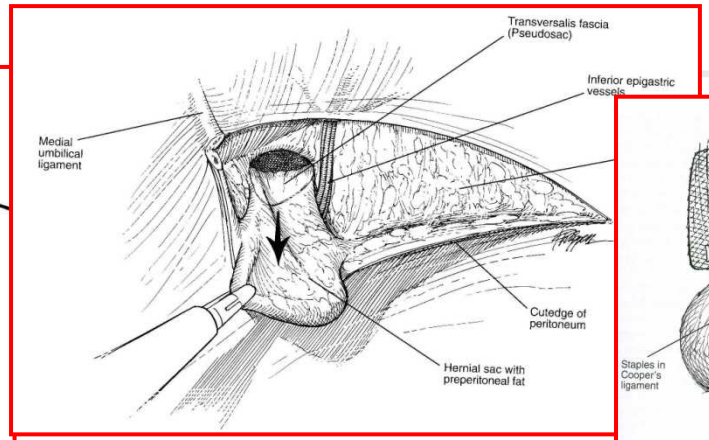
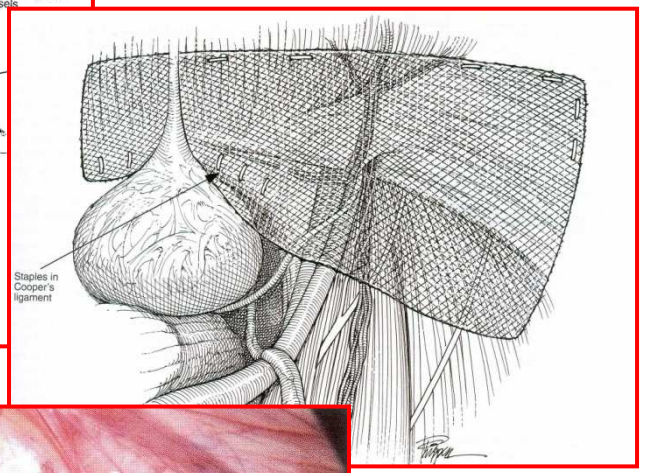
Laparoscopic Approach







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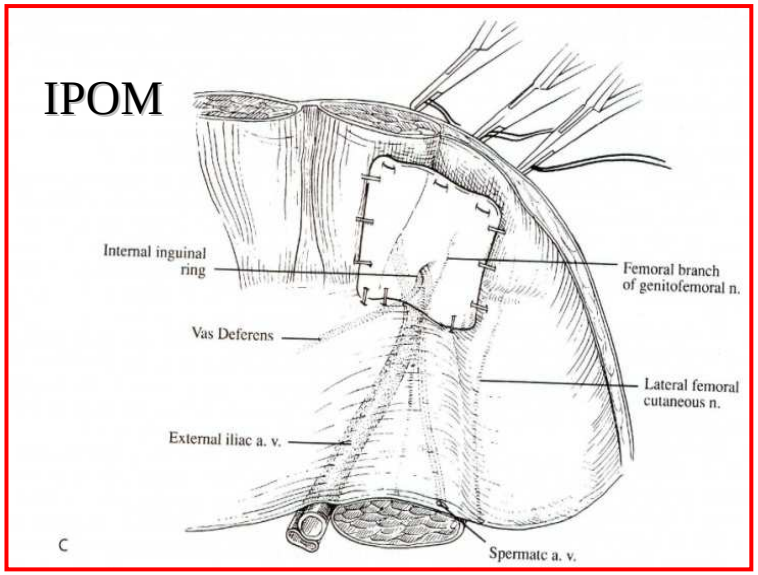
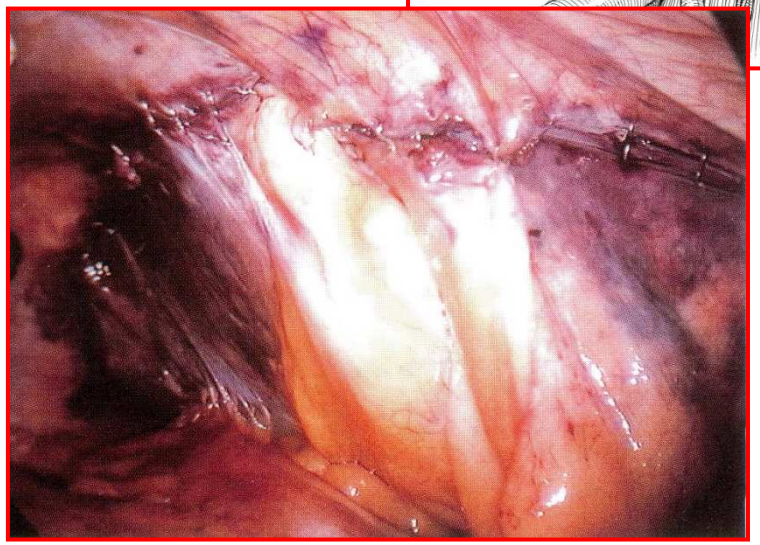


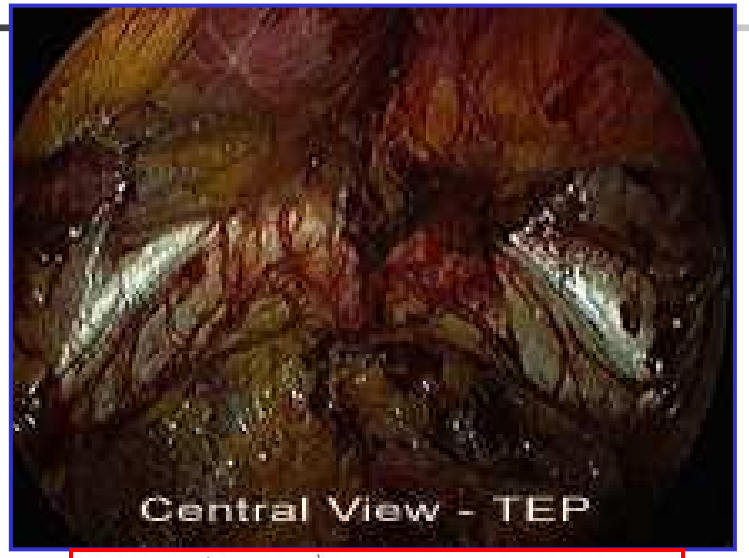


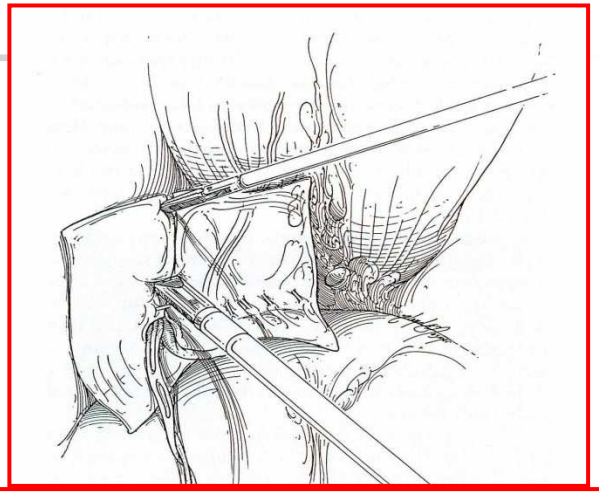
TAPP

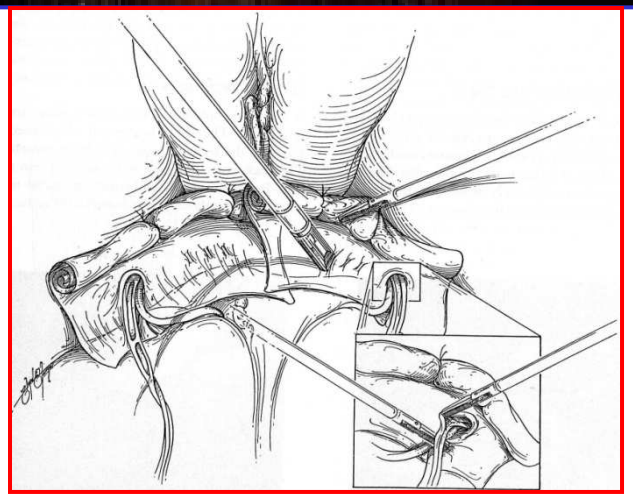
Chirurgia d'Urgenza Ferrara

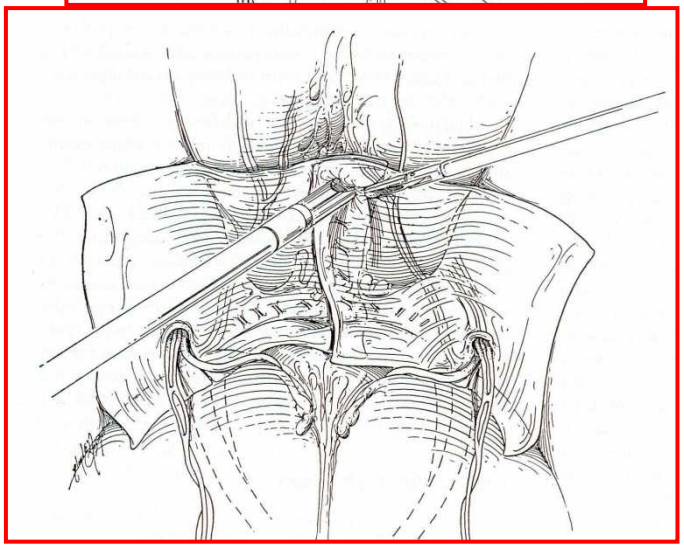
Laparoscopic Approach

TEP

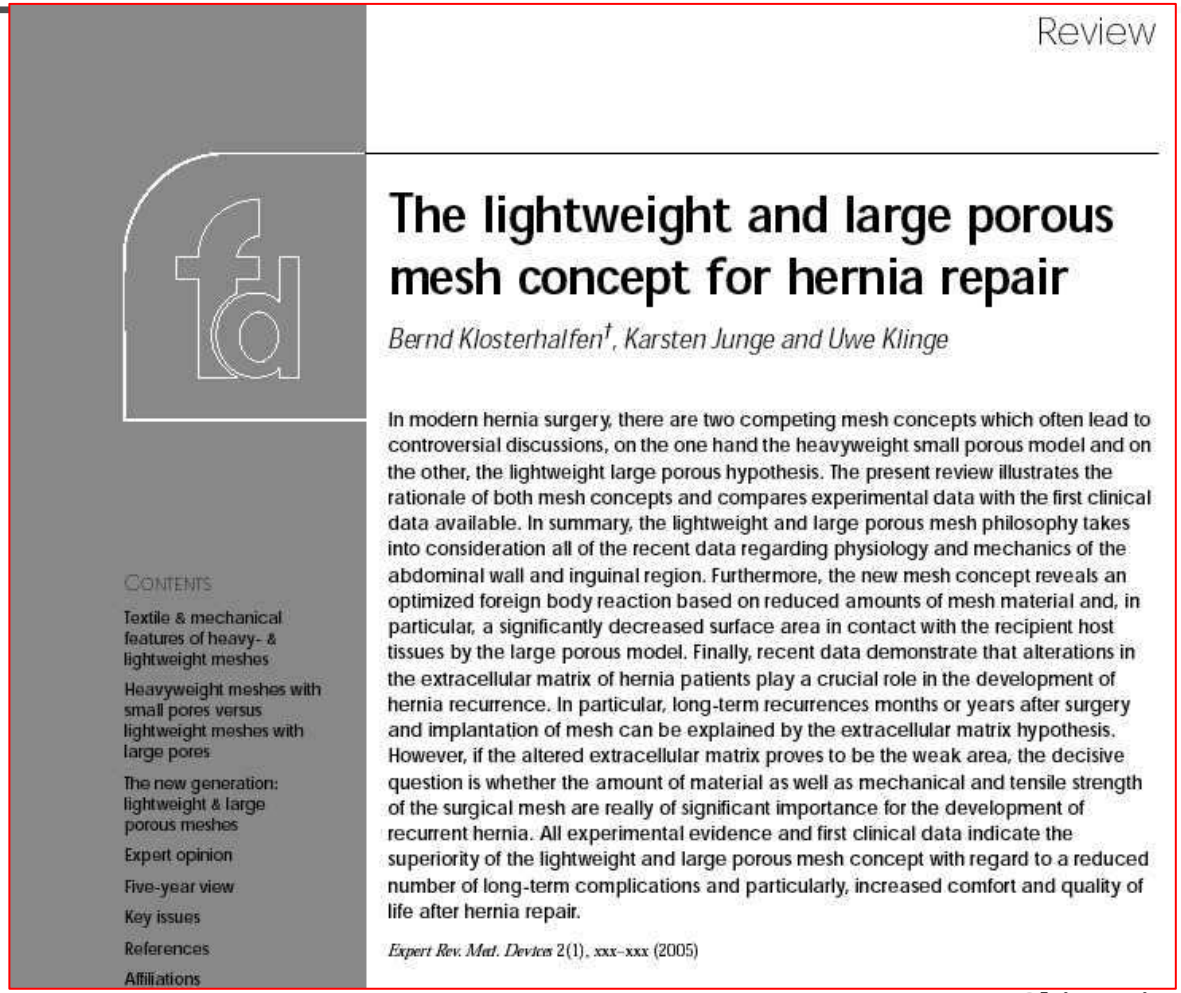








The Mesh Evolution



Review

The lightweight and large porous mesh concept for hernia repair

Bernd Klosterhalfen†, Karsten Junge and Uwe Klinge

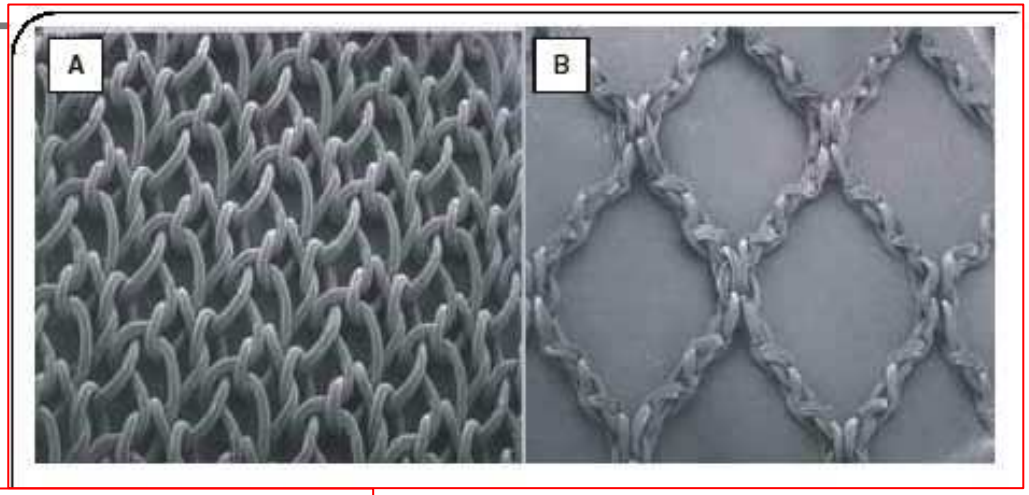
In modern hernia surgery, there are two competing mesh concepts which often lead to controversial discussions, on the one hand the heavyweight small porous model and on the other, the lightweight large porous hypothesis. The present review illustrates the rationale of both mesh concepts and compares experimental data with the first clinical data available. In summary, the lightweight and large porous mesh philosophy takes into consideration all of the recent data regarding physiology and mechanics of the abdominal wall and inguinal region. Furthermore, the new mesh concept reveals an optimized foreign body reaction based on reduced amounts of mesh material and, in particular, a significantly decreased surface area in contact with the recipient host tissues by the large porous model. Finally, recent data demonstrate that alterations in the extracellular matrix of hernia patients play a crucial role in the development of hernia recurrence. In particular, long-term recurrences months or years after surgery and implantation of mesh can be explained by the extracellular matrix hypothesis. However, if the altered extracellular matrix proves to be the weak area, the decisive question is whether the amount of material as well as mechanical and tensile strength of the surgical mesh are really of significant importance for the development of recurrent hernia. All experimental evidence and first clinical data indicate the superiority of the lightweight and large porous mesh concept with regard to a reduced number of long-term complications and particularly, increased comfort and quality of life after hernia repair.

Expert Rev. Med. Devices 2(1), xxx–xxx (2005)

CONTENTS

The Meshes Evolution

Lightweight
vs
heavyweight



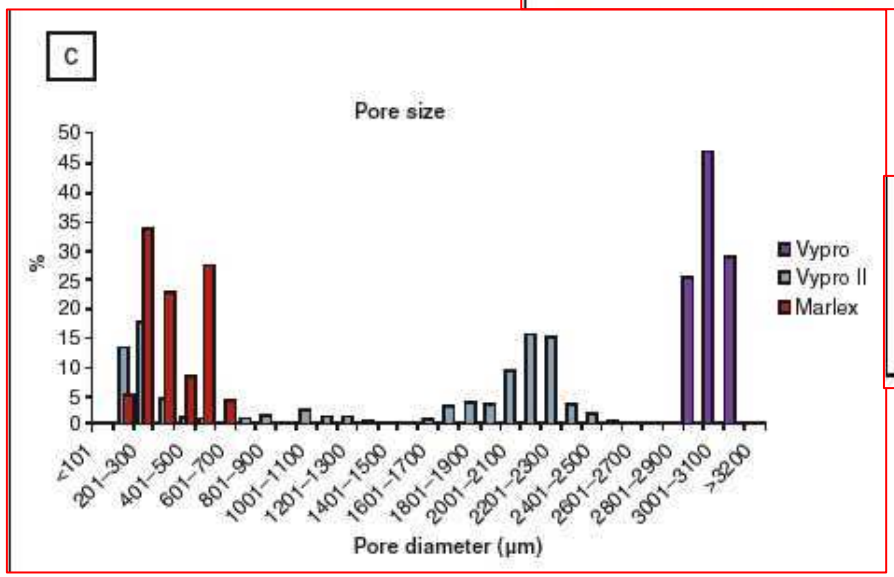


Figure 1. Typical textile structure of the heavyweight small porous mesh Marlex® (A) and the lightweight large porous mesh Vypro® (B) in scanning electron microscopy (127x). (C) Pore size analysis of Vypro, Vyproll® and Marlex; Vypro exhibits pore sizes between 3 and 5 mm (before absorption of the Vicryl® part), Vyproll between 1 and 2.5 mm (again before absorption of the Vicryl part) and Marlex between 0.2 and 0.7 mm.

Ultrapro® Mesh

Lightweight large porous partial absorbable mesh (PP + Polyglecaprone 25)

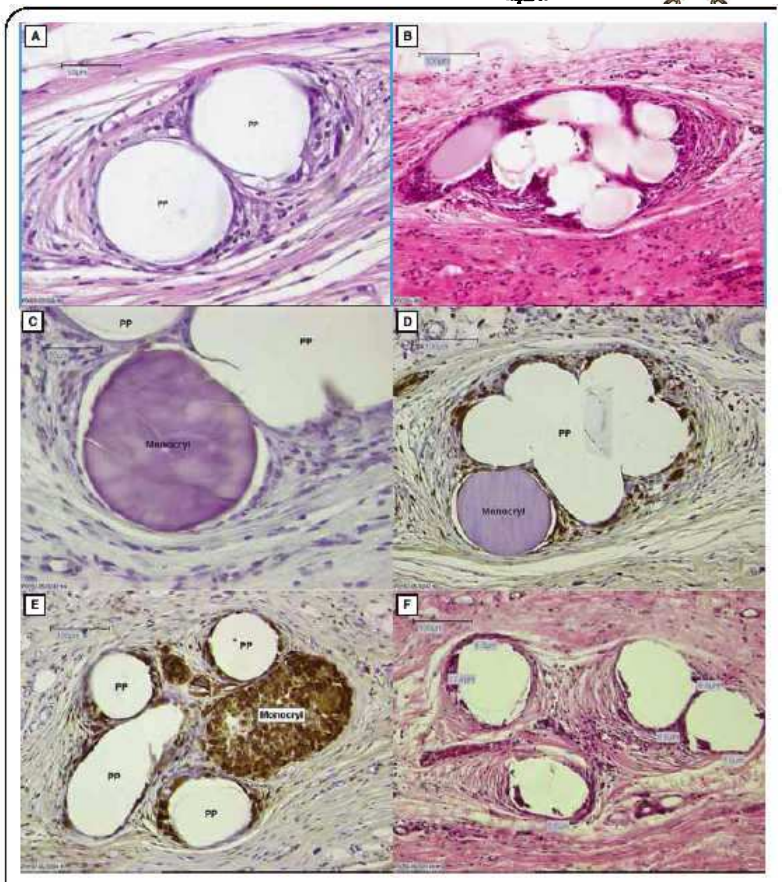
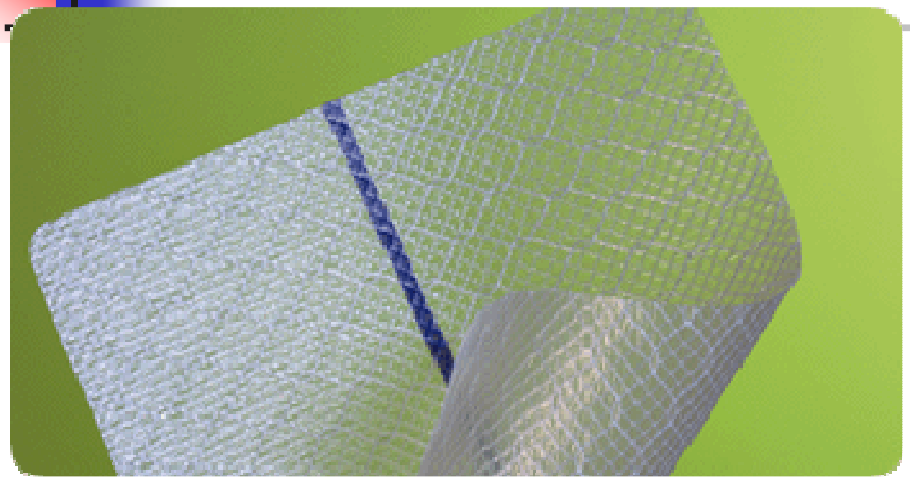
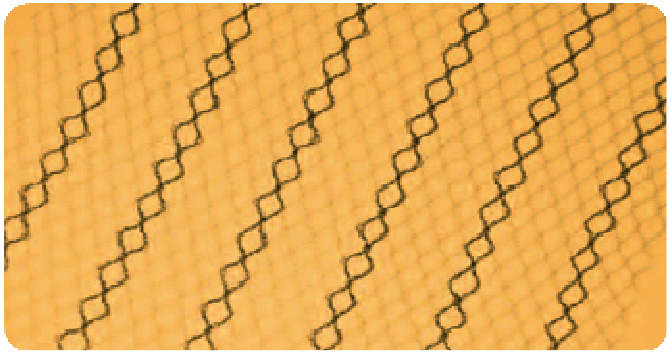


Figure 6. Members of the lightweight and large porous mesh family. **(A)** Lightweight and large porous PP mesh without surface modification 182 days post implantation in Whiter rats with a minor FBR and fibrotic tissue reaction around the mesh fibers (hematoxylin and eosin, 200×). **(B)** TiMesh® light 182 days after implantation in the same experimental setting; note the still persisting foreign body reaction which is at least equal to that of unmodified polypropylene (hematoxylin and eosin; 100x). **(C)** UltraPro® after 42 days; note the polypropylene and Monocryl® composite (hematoxylin and eosin, 200×). **(D)** Macrophage response on the interface of UltraPro 42 days after implantation with a reduced macrophage response to the Monocryl part (CD68, 100×). **(E)** UltraPro 84 days after implantation; the Monocryl part is absorbed by macrophages, but without increased inflammatory reaction and fibrosis (CD68, 100x). **(F)** UltraPro 182 days after implantation; remaining PP fibers with a remaining granuloma thickness of few µm (hematoxylin and eosin, 100×).

The Meshes Evolution



ETHICON PHYSIO*MESH*™



ULTRAPRO® Mesh

PROCEED® Surgical Mesh

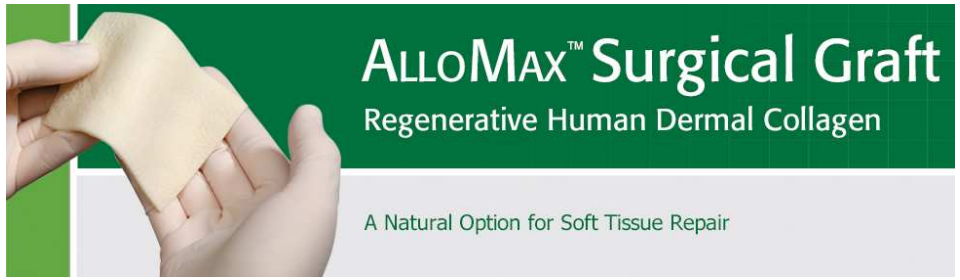
The Meshes Evolution

Symbotex™ Composite Mesh

Chirurgia d'Urgenza Ferrara

The Meshes Evolution

The Meshes Evolution



Permacol™ Surgical Implant

Laparocele - Definizione

- I laparoceli sono soluzioni di continuo muscolo-aponeurotiche della parete addominale **secondarie ad incisioni chirurgiche o traumi penetranti** dell'addome

- Sono escluse da questa definizione le soluzioni di continuo spontanee (diastasi dei retti), o da denervazione chirurgica

EMC-Chirurgie 1 (2004) 601-619

Etiopatogenesi dei Laparoceli
Dimensioni del problema

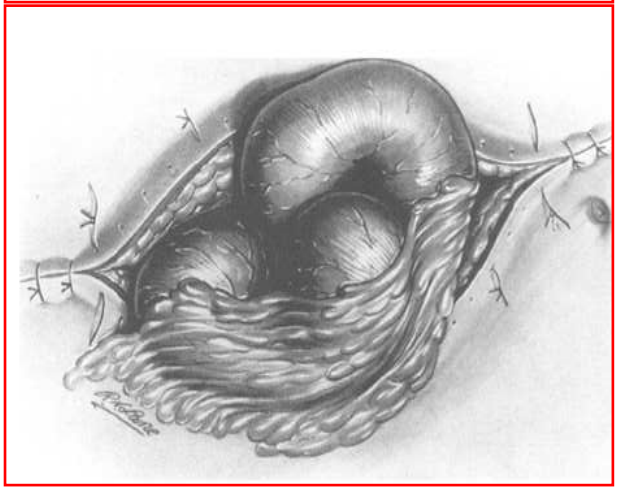
One hundred years of abdominal wound dehiscence and nothing has changed

D. van Geldere

Department of Surgery, Ziekenhuis Amstelveen, Amstelveen, The Netherlands

Hernia (2000) 4: 302-304

The burst abdomen is one of the most impressive postoperative complications in abdominal surgery (Fig. 1).



. All factors were recognized early in the last century

[Abel 1898, Madelung 1905]. The reported incidence, however, has not diminished significantly.

Dimensioni del problema

- La chiusura di una laparotomia continua ad essere fonte di complicazioni con una incidenza che dagli anni 50’ ad oggi è rimasta immutata
- 0,5-3% di eviscerazione
  - *Niggebrugge: Eur J Surg 1995 ; Lancet 1999*
- 9-19% incidenza di laparocele
  - *Israelsson: Br J Surg 1993; Eur J Surg 1996 - Rath: Hernia 2000*

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Hernia (2012) 16:179–183
DOI 10.1007/s10029-011-0879-9

ORIGINAL ARTICLE

Epidemiology and cost of ventral hernia repair: making the case for hernia research

B. K. Poulose · J. Shelton · S. Phillips · D. Moore · W. Nealon · D. Penson · W. Beck · M. D. Holzman

Methods Inpatient non-federal discharges for VHR were identified from the 2001–2006 Healthcare Cost and Utilization Project, supplemented by the Center for Disease Control 2006 National Survey of Ambulatory Surgery for outpatient estimates. The total number of VHRs performed in the US was estimated along with associated costs. Costs were standardized to 2010 US dollars using the Consumer Price Index and reported as mean with 95% confidence intervals (95% CI).

Results The number of inpatient VHRs increased from 126,548 in 2001 to 154,278 in 2006. Including 193,543 outpatient operations, an estimated 348,000 VHRs were performed for 2006. Inpatient costs consistently rose with 2006 costs estimated at US $15,899 (95% CI $15,394–$16,404) per operation. Estimated cost for outpatient VHR was US $3,873 (95% CI $2,788–$4,958). The total cost of VHR for 2006 was US $3.2 billion.

Conclusions VHRs continue to rise in incidence and cost. By reducing recurrence rate alone, a cost saving of US $32 million dollars for each 1% reduction in operations would result. Further research is necessary for improved understanding of ventral hernia etiology and treatment and is critical to cost effective healthcare.

Fattori eziologici

- Fattori predisponenti di tipo sistemico
- Fattori predisponenti locali
- Fattori correlati al sito laparotomico
- Fattori correlati alla tecnica di sutura

Fattori eziologici

Fattori correlati alla tecnica di sutura

- La prima causa di deiscenza è iatrogena

Sanders: Arch of Surg 1977 - Israelsson: Eur J Surg 1998;
Eur J Vasc Endovasc Surg 1999

- Cause meccaniche di deiscenza laparotomica
  - rottura del filo di sutura
  - scivolamento del/dei nodi
  - sezione della fascia da parte della sutura

Sanders: Arch Surg 1977 - Leaper: Eur Surg Res 1976

The most important is by Israelsson et al[41]. In a prospective study, hernia rates decreased from 23.7% when the SLWL was < 4 to a hernia rate of 9% when it was ≥ 4. These results apply to midline incisions. Kendall et al proved that the inherent strength of the lateral paramedian incision was independent of SLWL ratio[19].

Israelsson LA, Jonsson T. Suture length to wound length ratio and healing of midline laparotomy incisions. Br J Surg 1993; 80(10):1284-6.

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La Sintesi delle Laparotomie

Hernia (2015) 19:1–24
DOI 10.1007/s10029-014-1342-5

REVIEW

European Hernia Society guidelines on the closure of abdominal wall incisions

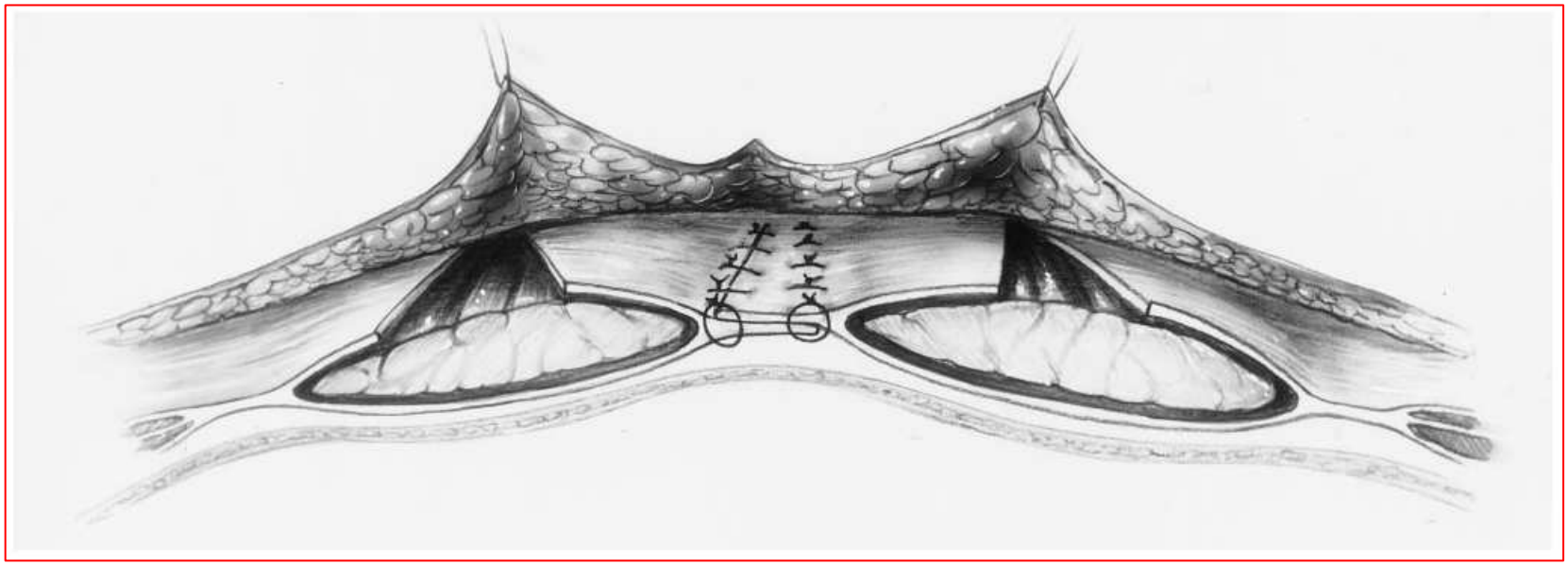
F. E. Muysoms · S. A. Antoniou · K. Bury · G. Campanelli · J. Conze · D. Cuccurullo · A. C. de Beaux · E. B. Deerenberg · B. East · R. H. Fortelny · J.-F. Gillion · N. A. Henriksen · L. Israelsson · A. Jairam · A. Jänes · J. Jeekel · M. López-Cano · M. Miserez · S. Morales-Conde · D. L. Sanders · M. P. Simons · M. Śmietański · L. Venclauskas · F. Berrevoet

Chirurgia d'Urgenza Ferrara

Laparocele -Tecnica Chirurgica

- Chirurgia open
  - non protesica
  - protesica
- Chirurgia laparoscopica
  - protesica

Open non protesica



Judd-Mayo overlap & Gibson relaxing incisions

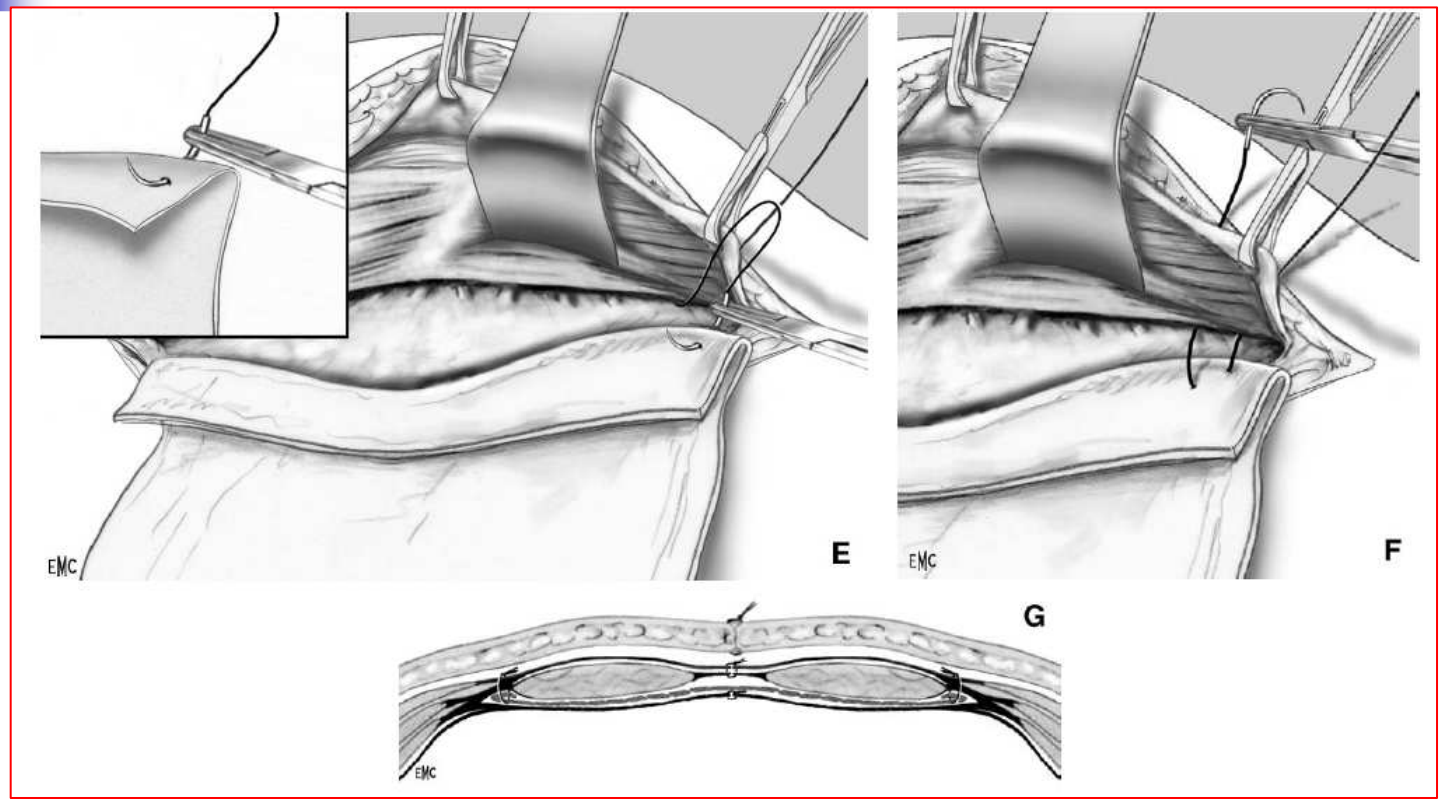
Risultati

Table 1 Results of 'simple' reconstruction of incisional hernias (fascia duplication/adaptation)

Author, country	Year	*n*	Follow-up		Recurrence rate (%)
			Time (years)	Ratio (%)	
Langer, Sweden [31]	1985	72	7.0	74	31
George, U.K. [20]	1986	81	1.1	100	46
Van der Linden, Netherlands [56]	1988	47	3.3	100	55
Read, USA [45]	1989	169	5.0	89	25
Manninen, Finland [38]	1991	57	4.5	92	34
Hesselink, Netherlands [22]	1993	231	2.9	98	36
Geçim, Turkey [19]	1996	109	3.6	100	45
Luijendijk, Netherlands [35]	1997	68	Varying		54
Paul, Germany [43]	1997	111	5.7	84	53
Anthony, USA [5]	2000	48	3.8	100	54
Luijendijk, Netherlands [36]	2000	97	2.2	84	46

Langenbeck's Arch Surg (2001) 386:65–73
DOI 10.1007/s004230000182

Chirurgia Open Protesica



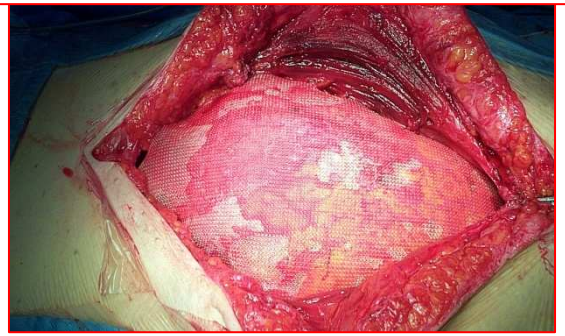
Impianto retromuscolare prefasciale (Rives 1973)
(Protesi in poliestere)

Risultati

Langenbeck's Arch Surg (2001) 386:65–73
DOI 10.1007/s004230000182

Table 3 Results of subfascial prosthetic repair (sublay)

Author, country	Year	*n*	Prosthesis	Follow-up time, years (rate, %)	Results (%)			
					Mortality	Wound healing disorders	Recurrence	Removal
Adloff, France [2]	1987	130	Mersilene	3 (80)	1.5	5	5	3
Rives, France [46]	1987	168	Mersilene	6 (82)	4.5	26	6	?
Stoppa, France [50]	1989	368	Mersilene	5 (65)	1.8	15	15	0
Amid, USA [4]	1996	75	Marlex	? (100)	0	1	1	0
Schumpelick, Germany [48]	1996	82	Marlex	5.3 (87)	0	49	7	?
Sugerman, USA [51]	1996	98	Marlex	1.7 (99)	1.0		4	1.0
Temudon, USA [53]	1996	50	Prolene	2 (100)	0	12	4	4
Leber, USA [32]	1998	82	Marlex Prolene or Mersilene	6.7 (88)	0	6	20	0
Feleshtinskii, Ukraina [18]	1999	57	Polyuretan or Marlex	1–5 (95)	1,7	4	2	0
Petersen, Germany [44]	2000	50	Gore-Tex or Prolene	1.5 (96)	0	6	10	4
Luijendijk, Netherlands [36]	2000	84	Marlex or Prolene	2.2 (81)	0	4	23	0



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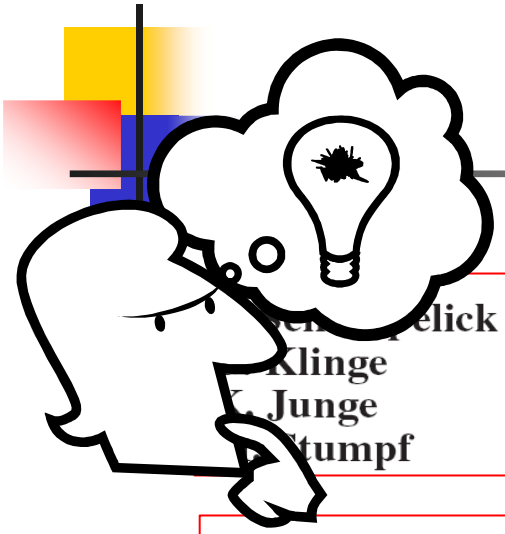
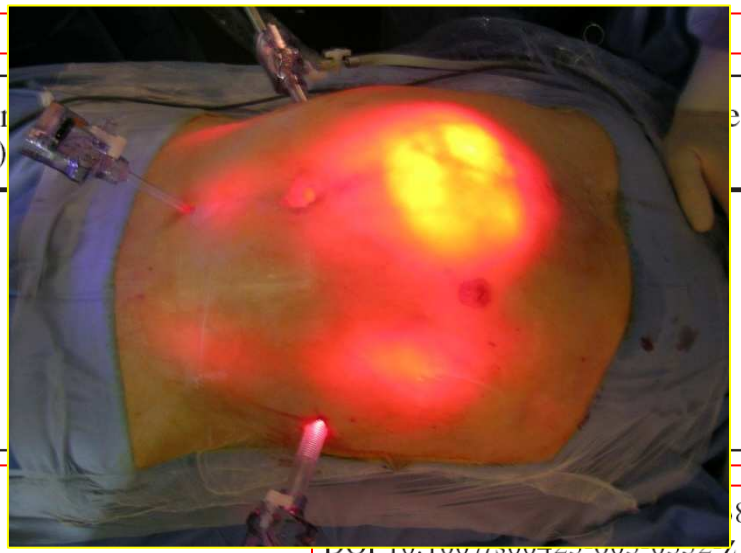
Risultati



elick
Klinge
Junge
tumpf

Incisional abdominal hernia:
the open mesh repair

Reference	Position	Over (cm)	rate
Park et al. [12]	Onlay	1.5	
Luijendijk et al. [9]	Sublay	2	
Langer et al. [7]	Sublay	5	
Schumpelick et al. [14]	Sublay	5	
McLanahan et al. [11]	Sublay	6	
Toniato et al. [18]	Sublay	6	



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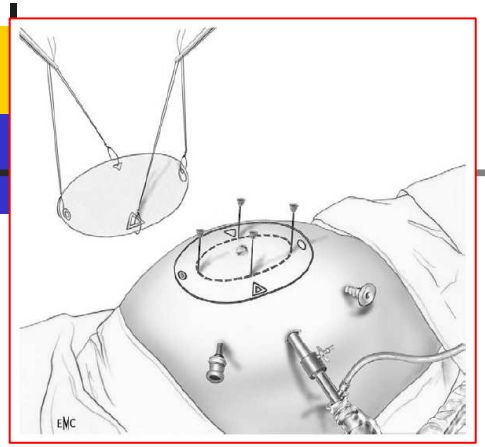

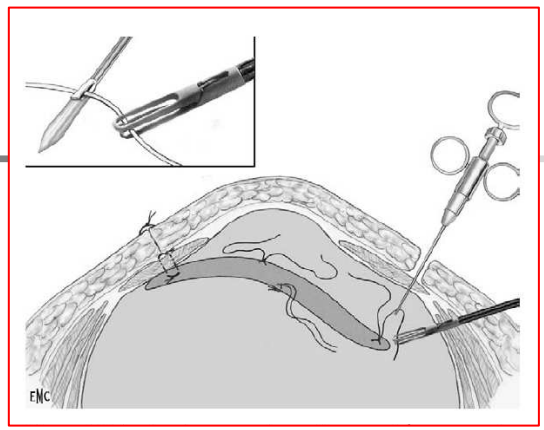

Chirurgia Laparoscopica

Langenbeck's Arch Surg (2001) 386:65–73
DOI 10.1007/s004230000182

Table 5 Results of laparoscopic hernioplasty

Author, Country	Year	*n*	Prosthetic	Follow-up time, months (rate, %)	Results (%)			
					Mortality	Wounds healing disorders	Recurrenc	Removal
LeBlanc, USA [33]	1994	30	ePTFE	10 (100)	0	3.3	0	0
Bärlehner, Germany [6]	1996	53	Surgipro	8 (100)	0	5.7	7.5	0
Park, USA [42]	1996	30	ePTFE, Prolene	8 (100)	0	3.3	3.3	0
Holzman, USA [23]	1997	21	Marlex	20 (90)	0	4.7	9.5	0
Costanza, USA [16]	1998	31	ePTFE	18 (n.a.)	0	3.1	3.1	3.1
Toy, USA [55]	1998	144	ePTFE	7 (94)	0	3.7	4.4	0.7
Sanders, USA [47]	1999	11	Dualmesh	13	0	0	9	0
Chari, USA [11]	2000	14	ePTFE	n.a.	0	7.1	n.a.	7.1
Szymanski, USA [52]	2000	44	Prolene	7 (73)	0	0	5	0
Heniford, USA [21]	2000	407	ePTFE	23 (n.a.)	0	4.2	3.4	0.9
Chowbey, India [15]	2000	202	Polypropylene	2.9 years (89.2)	?	18	1.0	0

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Chirurgia d'Urgenza Ferrara

Quali Indicazioni all'Approccio Laparoscopico ?

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