The Complete Treatment of Pelvic Floor Prolapse by Laparoscopy

R Botchorishvili, A Wattiez, G Mage, M Canis, B Rabischong, K Jardon, C Rivoire, JL Pouly, H Manhes, MA Bruhat
“Each year, pelvic floor dysfunction affects between 300,000 and 400,000 American women so severely that they require surgery. Approximately 30% of the operations performed are re-operations. The high prevalence of this problem indicates the need for preventive strategies, and the common occurrence of re-operation indicates the need for treatment improvement.”
Long-term follow-up studies in pelvic floor dysfunction: the Holy Grail or a realistic aim?

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Note that this paper on Hilton P. Long-term follow-up studies in pelvic floor dysfunction: the Holy Grail or a realistic aim? BJOG 2008;115:135–143.

Éditorial

Pourquoi la promotofixation coelioscopique a-t-elle pris autant de retard chez les gynécologues ?

Why are gynaecologists so much behind in practising laparoscopic transvaginal hysteropexy?

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Adresse e-mail : pemol@ch-versailles.fr

12 novembre 2008

Fig. 1. Répartition des voies d'abord pour la pexy coelioscopique 2006–2007.

Fig. 2. Répartition des différentes voies d'abord pour les hystérectomies 2006–2007.
FIGURE 118-4. Types of vaginal pessaries. (A) Smith’s; (B) Hodge’s; (C) Hodge’s with web support; (D) Risser; (E) Gehring; (F) ring with web support; (G) ring; (H) cube; (I) Gelhorn, rigid; (J) Gelhorn, flexible; (K) Inflatoball; (L) doughnut.
Importance of fascia: the «hammock» theory
De Lancey, Richardson
“hammock” or “trampoline” theory
DeLancey, Richardson
Importance of fascia: the "hammock" theory
De Lancey, Richardson

Paravaginal defect
Importance of fascia: the «hammock» theory
De Lancey, Richardson

Both front and back ends of the hammock support are damaged
Importance of fascia: the «hammock» theory

De Lancey, Richardson
Pubocervical fascia defects that contribute to cystocele
Importance of fascia: the «hammock» theory

De Lancey, Richardson
Rectovaginal fascia

Dénonviliers
The rectovaginal fascia supports the posterior compartment analogous to the pubocervical fascia in the anterior compartment.
Recto-vaginal defects that contribute to rectocele

Richardson
Young women with genital prolapse have a low collagen concentration.


**METHODS:** Punch biopsies from the paraurethral ligaments were obtained during the operation from 22 women undergoing surgery for genital prolapse. As controls, similar biopsies were taken from 13 women who underwent gynecologic surgery for other benign reasons. Collagen concentration as hydroxyproline and its extractability by pepsin digestion were studied.

**RESULTS:** Women, younger than 53 years, with genital prolapse had a 30% lower collagen concentration than age-matched controls, which reached significance, $P = 0.01$.

It did, however, decrease significantly with age in both prolapse patient and control groups. Morphology supported these findings with a less-dense extracellular matrix composition subepithelially in genital prolapse compared to a healthy control.

**CONCLUSION:** young women with genital prolapse have a decreased collagen concentration, suggesting a different organization of the endopelvic connective tissue extracellular matrix.
Impact of menopause on collagen subtypes in the arcus tendineous fasciae pelvis
P. A. Moalli MD, PhD, L. C. Talarico BS, V. W. Sung MD, W. L. Klingensmith BS, S. H. Shand BS, L. A. Meyn MS and S. C. Watkins PhD
Interaction between fascias and muscles.

- Fascias and ligaments
- Muscles

Paramore RH. The uterus as a floating organ; 1918
LA muscles

MRI study
DeLancey
The hidden epidemic of pelvic floor dysfunction: Achievable goals for improved prevention and treatment
John O.L. DeLancey
Utero-sacral ligaments
Terminologia Anatomica versus unofficial descriptions and nomenclature of the fasciae and ligaments of the female pelvis:
A dissection-based comparative study. Alfredo Ercoli, PhD,a Vincent Delmas, MD,b Francesco Fantani, MD,c Pierre Gadonneix, MD,d Marcello Ceccaroni, MD,a Anna Fagotti, MD,c Salvatore Mancuso, MD,a Giovanni Scambia, MDc,*
Uterosacral ligament: description of anatomic relationships to optimize surgical safety


“The cervical and intermediate portions of the uterosacral ligament supported more than 17 kg of weight before failure.”
**Fig. 4.10. Direction des résultantes (R) et des contraintes de pression (A) et de résistance (B) (coupe frontale).**

1. pression latérale
2. paramètre
3. paracervix
The role of apical vaginal support in the appearance of anterior and posterior vaginal prolapse.


When the POP-Q examination is performed with simulated apical support, the critical role of level I vaginal support on the position of the anterior and posterior vagina, particularly the anterior vagina, becomes apparent.
Interaction among apical support, levator ani impairment, and anterior vaginal wall prolapse.


A biomechanical model of the anterior vaginal wall and its support system

The change in the sagittal profile of the anterior vaginal wall during a maximal Valsalva was predicted for different combinations of pubovisceral muscle and connective tissue impairment.
Interaction among apical support, levator ani impairment, and anterior vaginal wall prolapse.

Uterosacral ligament in postmenopausal women with or without pelvic organ prolapse.

Gabriel B, and all.

Int Urogynecol J Pelvic Floor Dysfunct. 2005 Nov-Dec; 16(6): 475-9
Pelvic Diaphragm of Female
Superior View

- Inguinal (Poupart's) ligament
- Deep dorsal vein of clitoris
- Transverse perineal ligament
- Obturator canal
- Pubococcygeus and puborectalis muscles part of levator ani muscle
- Tendinous arch of levator ani muscle
- (Ischio-) coccygeus muscle
- Piriformis muscle
- Coccyx
- Sacral promontory
- Anterior sacrococcygeal ligament
- Levator plate (median raphe) of levator ani muscle
- Ischial spine
- Obturator fascia (of obturator internus muscle)
- Rectum
- Urethra
- Vagina
- Pubic symphysis
Posterior suspension to the lumbo-sacral disk; abdominal method of replacement of the utero-sacral ligaments.

[La suspension postérieure au disque lombo-sacré; technique de remplacement des ligaments utéro-sacrés par voie abdominale]

AMELINE, A; HUGUIER, J
Gynecologie Et Obstetrique
Volume 56, Issue 1 ,
January - March 1957, Pages 94-98
“SCALI” Technique
1974

A. WATTIEZ CLERMONT-FERRAND, 1992,

Nezhat C.H.; Nezhat F.; Nezhat C.
Laparoscopic sacral colpopexy for vaginal vault prolapse
Obstetrics and Gynecology, Volume 84, Issue 5, 1994, Pages 885-888
Interest of laparoscopy

- Possible approach of all compartments
- Possible use of prothesis with minimal risk of complications
- Treatment of incontinence
- And all advantages of laparoscopy
Technical advantages of laparoscopy

Angle of instruments

Logical line: eye-instrument-tissue

Magnification of the vision

Lecture of anatomic plane

Dynamic progression of the dissection

Virtualisation of difficulties

Positive pressure

Anatomic defects are opened

Quality of the repair is showed
Anatomy

Vagina

Rectum

Levator ani muscles
Sacral promontory
TECHNIQUE OF REFERENCE

Variety of techniques

STANDARD technique since 1998

- **Supracervical hysterectomy**
  - if none before, no opening of the vagina

- **Vesicovaginal mesh**

- **Rectovaginal mesh fixed to the LAM**

- **Promontofixation**

- **Reziuplastie with mesh**

- **Burch colposuspension or TVT-O**
Uterine conservation
Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence.


Department of Obstetrics and Gynecology, Loyola University Medical Center, Maywood, Ill, USA.

RESULTS: Of 322 women who underwent randomization, 157 were assigned to Burch colposuspension and 165 to the control group. Three months after surgery, 23.8 percent of the women in the Burch group and 44.1 percent of the controls met one or more of the criteria for stress incontinence (P<0.001).

There was no significant difference between the Burch group and the control group in the frequency of urge incontinence (32.7 percent vs. 38.4 percent, P=0.48).

After surgery, women in the control group were more likely to report bothersome symptoms of stress incontinence than those in the Burch group who had stress incontinence (24.5 percent vs. 6.1 percent, P<0.001).

CONCLUSIONS: In women without stress incontinence who are undergoing abdominal sacrocolpopexy for prolapse, Burch colposuspension significantly reduced postoperative symptoms of stress incontinence without increasing other lower urinary tract symptoms.
Results

serie of Clermont-Ferrand
LAPAROSCOPIC PROMONTOFIXATION
Experience of CLERMONT-FERRAND

- Retrospective study
  01/01/1995 - 31/03/2006

- 271 patients operated

- 228 patientes studied

- Mean follow up - 25 months (1 - 11 years):

- 43 lost
■ Surgeon dependent, variable from 4% to 15%

■ No risk factors clearly identified

■ Risk factors:
  ■ Uterine conservation?
  ■ Absence of the anterior reparation: PVR, Retziuplasty?
  ■ Absence of the fixation to the LAM?
TREATMENT OF THE RECURRENCE

- Possible by laparoscopy in the majority of cases
- Putting the mesh under tension, shortening
- Reattachement to the promontory
- Completing the treatment: PVR, Retziuplasty, fixation to the LAM
- Hysterectomy+++
## Anterior prolapse

**131 patients - standard technique**

<table>
<thead>
<tr>
<th></th>
<th>Pre-operative</th>
<th>1 month post-op</th>
<th>long term (1 to 6 years)</th>
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</thead>
<tbody>
<tr>
<td>C0</td>
<td>2 (1%)</td>
<td>102 (80%)</td>
<td>47 (44%)</td>
</tr>
<tr>
<td>C1</td>
<td>5 (4%)</td>
<td>21 (17%)</td>
<td>41 (38%)</td>
</tr>
<tr>
<td>C2</td>
<td>18 (14%)</td>
<td>4 (3%)</td>
<td>12 (11%)</td>
</tr>
<tr>
<td>C3</td>
<td>62 (47%)</td>
<td>0</td>
<td>7 (6%)</td>
</tr>
<tr>
<td>C4</td>
<td>44 (34%)</td>
<td>0</td>
<td>1 (1%)</td>
</tr>
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</table>
Apical prolapse
131 patients- standard technique

<table>
<thead>
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<th>long term (1 to 6 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-V0</td>
<td>1 (1%)</td>
<td>113 (89%)</td>
<td>80 (74%)</td>
</tr>
<tr>
<td>H-V1</td>
<td>3 (2%)</td>
<td>10 (8%)</td>
<td>14 (13%)</td>
</tr>
<tr>
<td>H-V2</td>
<td>40 (31%)</td>
<td>3 (2%)</td>
<td>8 (7%)</td>
</tr>
<tr>
<td>H-V3</td>
<td>62 (47%)</td>
<td>1 (1%)</td>
<td>6 (6%)</td>
</tr>
<tr>
<td>H-V4</td>
<td>25 (19%)</td>
<td>0</td>
<td>0</td>
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# Posterior prolapse

131 patients - standard technique

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<th>long term (1 to 6 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0</td>
<td>6 (5%)</td>
<td>99 (78%)</td>
<td>71 (66%)</td>
</tr>
<tr>
<td>R1</td>
<td>60 (46%)</td>
<td>26 (20%)</td>
<td>25 (23%)</td>
</tr>
<tr>
<td>R2</td>
<td>36 (27%)</td>
<td>2 (2%)</td>
<td>11 (10%)</td>
</tr>
<tr>
<td>R3</td>
<td>25 (19%)</td>
<td>0</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>R4</td>
<td>4 (3%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Global satisfaction from operation:

- Very satisfied: 105 (80%)
- Moderately satisfied: 23 (18%)
- Non satisfied: 3 (2%)
RECURRENT
131 patients- standard technique

survival without recurrence

Kaplan-Meier curve of prolapse symptoms recurrence

Davila GW, Drutz H, Deprest J.

The occurrence of healing abnormalities after graft implantation is becoming increasingly recognized as a potentially serious problem.

As the use of grafts in reconstructive surgery is expanded, surgeons are encouraged to familiarize themselves with currently published data, and determine whether a graft should, or should not be, utilized during a reconstructive procedure, and if so, the type of graft best indicated in each specific clinical situation.
<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Delay</th>
<th>Mesh</th>
<th>Suture</th>
<th>Technique</th>
<th>Complication</th>
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<td>Mersuture</td>
<td>Vaginal cuff susp, Burch</td>
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<td>Ethibond</td>
<td>SCH, Burch</td>
<td>uterine perf</td>
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<td>N° 3</td>
<td>50</td>
<td>27</td>
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<td>Vicryl /Ethibond</td>
<td>TH</td>
<td>-</td>
</tr>
<tr>
<td>N° 4</td>
<td>44</td>
<td>8</td>
<td>Mersilene</td>
<td>Vicryl col</td>
<td>SCH, Burch</td>
<td>-</td>
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<td>N° 5</td>
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<td>22</td>
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<td>SCH, Burch</td>
<td>-</td>
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<tr>
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<td>1</td>
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<td>Ethibond</td>
<td>Vaginal cuff susp</td>
<td>vaginal perf</td>
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<td>N° 7</td>
<td>49</td>
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<td>Ethibond</td>
<td>SCH, Burch</td>
<td>-</td>
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<td>TH</td>
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<td>17</td>
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<td>Vicryl/Ethibond</td>
<td>TH, Burch</td>
<td>-</td>
</tr>
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<td>N° 10</td>
<td>64</td>
<td>22</td>
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<td>Vicryl/Ethibond</td>
<td>TH, Burch</td>
<td>-</td>
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<tr>
<td>N° 11</td>
<td>71</td>
<td>8</td>
<td>Surgipromesh</td>
<td>Ethibond</td>
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<td>-</td>
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<tr>
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<tr>
<td></td>
<td>56</td>
<td>13</td>
<td>Polyester</td>
<td>multifilament,</td>
<td>TH : 6/24</td>
<td>Perforation</td>
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<td></td>
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<td>-54</td>
<td>non resorbable</td>
<td>non resorbable</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SCH : 5/160</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vagina : 3/45</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
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<td>- 7%</td>
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</table>
Table 1: Overview of patients with mesh infection after abdominal sacrocolpomy

<table>
<thead>
<tr>
<th>Patient</th>
<th>Suture/Mesh</th>
<th>Time to diagnosis (months)</th>
<th>Treatment/number of attempts</th>
<th>Concomitant Surgery</th>
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<tbody>
<tr>
<td>1</td>
<td>Ethibond/PTFE</td>
<td>14</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>2</td>
<td>Ethibond/PTFE</td>
<td>14</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>3</td>
<td>Ethibond/PTFE</td>
<td>60</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>4</td>
<td>Ethibond/PTFE</td>
<td>4</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>5</td>
<td>Ethibond/Prolene</td>
<td>7</td>
<td>Vaginal, laparoscopy(2)</td>
<td>PVR</td>
</tr>
<tr>
<td>6</td>
<td>Ethibond/PTFE</td>
<td>3</td>
<td>Vaginal(1)</td>
<td>Hysterectomy, Burch</td>
</tr>
<tr>
<td>7</td>
<td>Ethibond/PTFE</td>
<td>3</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>8</td>
<td>Ethibond/Prolene</td>
<td>9</td>
<td>Vaginal(1), abdominal</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>9</td>
<td>Ethibond/Prolene</td>
<td>4</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>10</td>
<td>Ethibond/PTFE</td>
<td>1</td>
<td>Vaginal(1)</td>
<td>Hysterectomy, Burch, Halban, PVR</td>
</tr>
<tr>
<td>11</td>
<td>Ethibond/PTFE</td>
<td>3</td>
<td>Vaginal(1)</td>
<td>Halban, Burch</td>
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<td>12</td>
<td>Ethibond/PTFE</td>
<td>4</td>
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<td>Halban</td>
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<tr>
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<td>5</td>
<td>Vaginal(1)</td>
<td>Halban</td>
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<tr>
<td>14</td>
<td>Ethibond/PTFE</td>
<td>6</td>
<td>Vaginal(1)</td>
<td>Halban, Burch</td>
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<tr>
<td>15</td>
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<tr>
<td>16</td>
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<td>Laparotomy(1)</td>
<td>None</td>
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<tr>
<td>17</td>
<td>Ethibond/Prolene</td>
<td>12</td>
<td>Vaginal(1)</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>18</td>
<td>Ethibond/Prolene</td>
<td>11</td>
<td>Vaginal(1), laparotomy</td>
<td>PVR</td>
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<tr>
<td>19</td>
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<td>Hysterectomy, Halban</td>
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<tr>
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<td>6</td>
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<td>22</td>
<td>Vaginal(1)</td>
<td>None</td>
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<tr>
<td>22</td>
<td>Ethibond/PTFE</td>
<td>10</td>
<td>Vaginal(1)</td>
<td>None</td>
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</tbody>
</table>

PVR: paravaginal repair, Burch: Burch extraperitoneal meshpexy, Halban: Halban enterococele repair, PTF: polytetrafluoroethylene

*In cases where multiple attempts were made, the last approach was the one that was successful.
<table>
<thead>
<tr>
<th>Case</th>
<th>Horm</th>
<th>Treatm</th>
<th>Traitements, treatment route , N of attempts</th>
<th>N total</th>
<th>Prolapse recidive treatment</th>
<th>N visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>N° 1</td>
<td>YES</td>
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<td>Resection+Suture Vaginaly(2), Complet ablation Laparosc (1)</td>
<td>3</td>
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<td>N° 2</td>
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<td></td>
<td>Resection+Suture Vaginaly (1)</td>
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<td>-</td>
<td>4/5</td>
</tr>
<tr>
<td>N° 3</td>
<td>NO</td>
<td></td>
<td>Abl part Laparosc (1), Abl comp Laparosc+Vag (1), suture Vag (2)</td>
<td>4</td>
<td>-</td>
<td>16/36</td>
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<tr>
<td>N° 4</td>
<td>NO</td>
<td></td>
<td>Complet ablation, Laparotomv (1)</td>
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<tr>
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<tr>
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<td>-</td>
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<tr>
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<td>6</td>
<td>Prom Laparosc</td>
<td>24/96</td>
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<tr>
<td>N° 8</td>
<td>NO, local</td>
<td></td>
<td>Resect+Sut Vag (3), Abl part Laparosc (1), Ablation compl? Vaginaly (1)</td>
<td>5</td>
<td>-</td>
<td>12/25</td>
</tr>
<tr>
<td>N° 9</td>
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<td></td>
<td>Resect+Sut Vag (3), Abl part Laparosc (1), Abl part Laparosc+Lap(1)</td>
<td>5</td>
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<td>-</td>
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<td>N° 10</td>
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<td>Resection+suture Vaginaly (1), Complet ablation Laparosc+Vaginaly (1)</td>
<td>2</td>
<td>-</td>
<td>15/37</td>
</tr>
<tr>
<td>N° 11</td>
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<td></td>
<td>Resection+suture Vaginaly (2), Complet ablation Laparosc (1)</td>
<td>3</td>
<td>-</td>
<td>7/48</td>
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<tr>
<td>N° 12</td>
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<td>Suture vaginaly (2), Complet ablation Vaginaly (1)</td>
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<td>-</td>
<td>20/96</td>
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<td>N° 13</td>
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<td>Partial ablation Vaginaly (1), Complet ablationVaginaly (1)</td>
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<td>-</td>
<td>6/76</td>
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<td>N° 14</td>
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<td>Resection+suture Vaginaly (1), Complet ablation ? Vaginaly +Lap (1)</td>
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<td>9/60</td>
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<td>NO : 7/14</td>
<td>50 %</td>
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<td>Simple Suture Vaginaly (1)</td>
<td>3/14</td>
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<td></td>
<td></td>
<td></td>
<td>Laparotomy :</td>
<td>3/14</td>
<td>-</td>
<td>3,3/y</td>
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</tbody>
</table>

Mesh erosions : 14 /264 (5,3%)
Synthetic grafts: Porosity

- Fibroblasts: 20-50 nm
- Microbes: 9-15 nm
- Macrophages: 16-25 nm
- Interstice: Threshold of 10 micrometers

 LINK: Threshold of 75 micrometers

Synthetic grafts: Porosity
Impact of hospital and surgeon volumes on outcomes following pelvic reconstructive surgery in the United States.

Sung VW, Rogers ML, Myers DL, Clark MA.
Division of Urogynecology and Pelvic Reconstructive Surgery, Department of Obstetrics and Gynecology, Brown Medical School, Providence, RI, USA.

OBJECTIVE: to estimate the effect of hospital and surgeon volumes on outcomes following urogynecologic surgery.

STUDY DESIGN: retrospective cohort study of women who underwent urogynecologic procedures between 1998 and 2003 from the Nationwide Inpatient Sample.

<table>
<thead>
<tr>
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<th>HOSPITAL VOLUME</th>
<th>SURGEON VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>&lt;92</td>
<td>&lt;8</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>92-185</td>
<td>8-18</td>
</tr>
<tr>
<td>HIGH</td>
<td>&gt;185</td>
<td>&gt;18</td>
</tr>
</tbody>
</table>

RESULTS: There were 310,759 women and 2986 hospitals. Women who had procedures at low-volume hospitals were 2.75 (95% CI 2.33-3.16) times more likely to die and 1.63 (95% CI 1.44-1.83) times more likely to have a nonroutine discharge, compared to those at high-volume hospitals.
SUCCESS

Is not the position you stand, but the direction in which you look.
Laparoscopic treatment of genital prolapse:
- is feasible, effective and reproducible with a small rate of complications after an adequate learning,
- give excellent anatomical results,
- should be applied with para-vaginal prosthetic reparation and routinely associated with a surgical treatment for stress incontinence

-Knowledge of retroperitoneal anatomy, of ergonomic rules and laparoscopic sutures is mandatory