Surgical Treatment of POP

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ICI 7

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Committee 15
Pelvic Organ Prolapse Surgery ICI 2021

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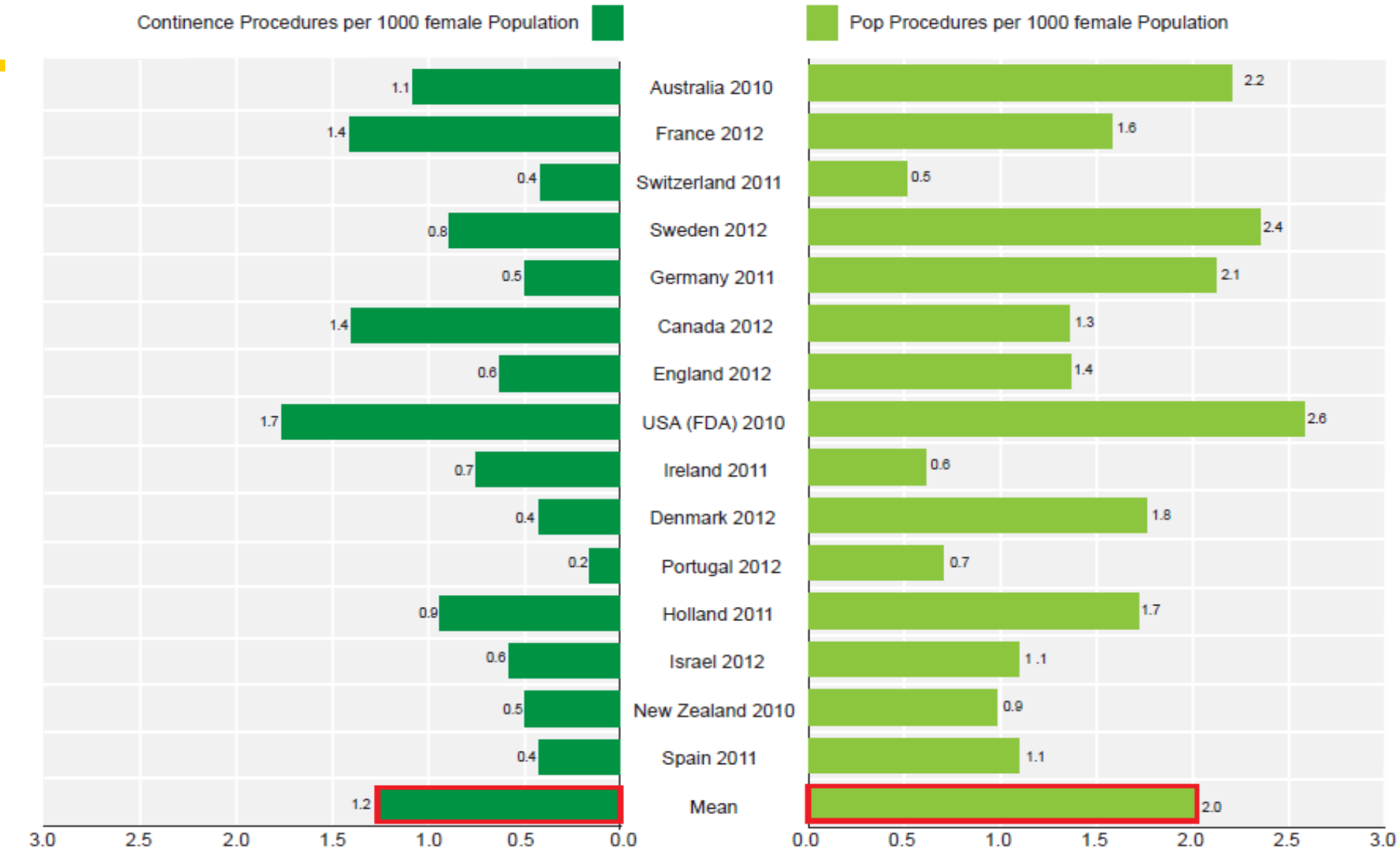
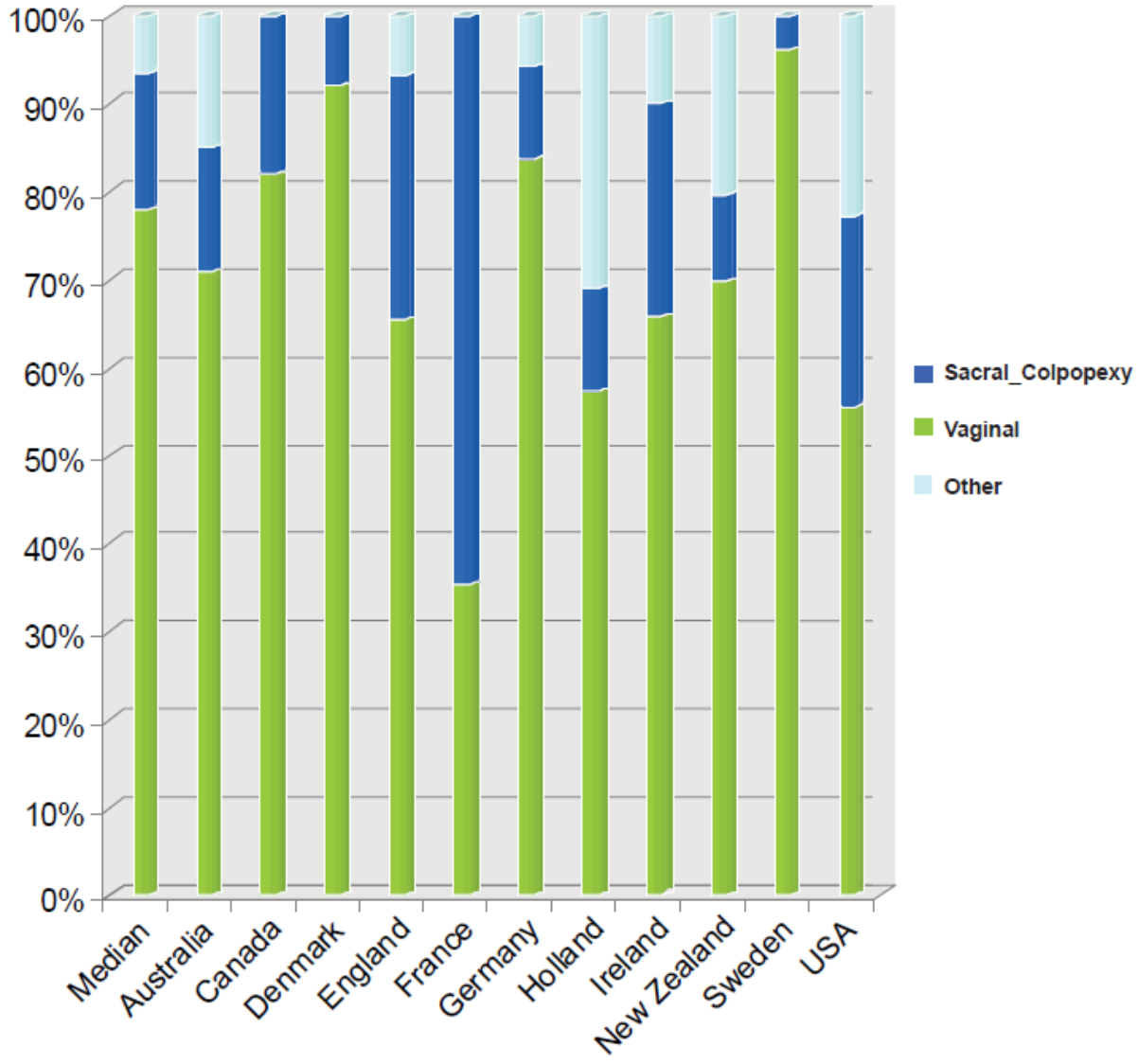
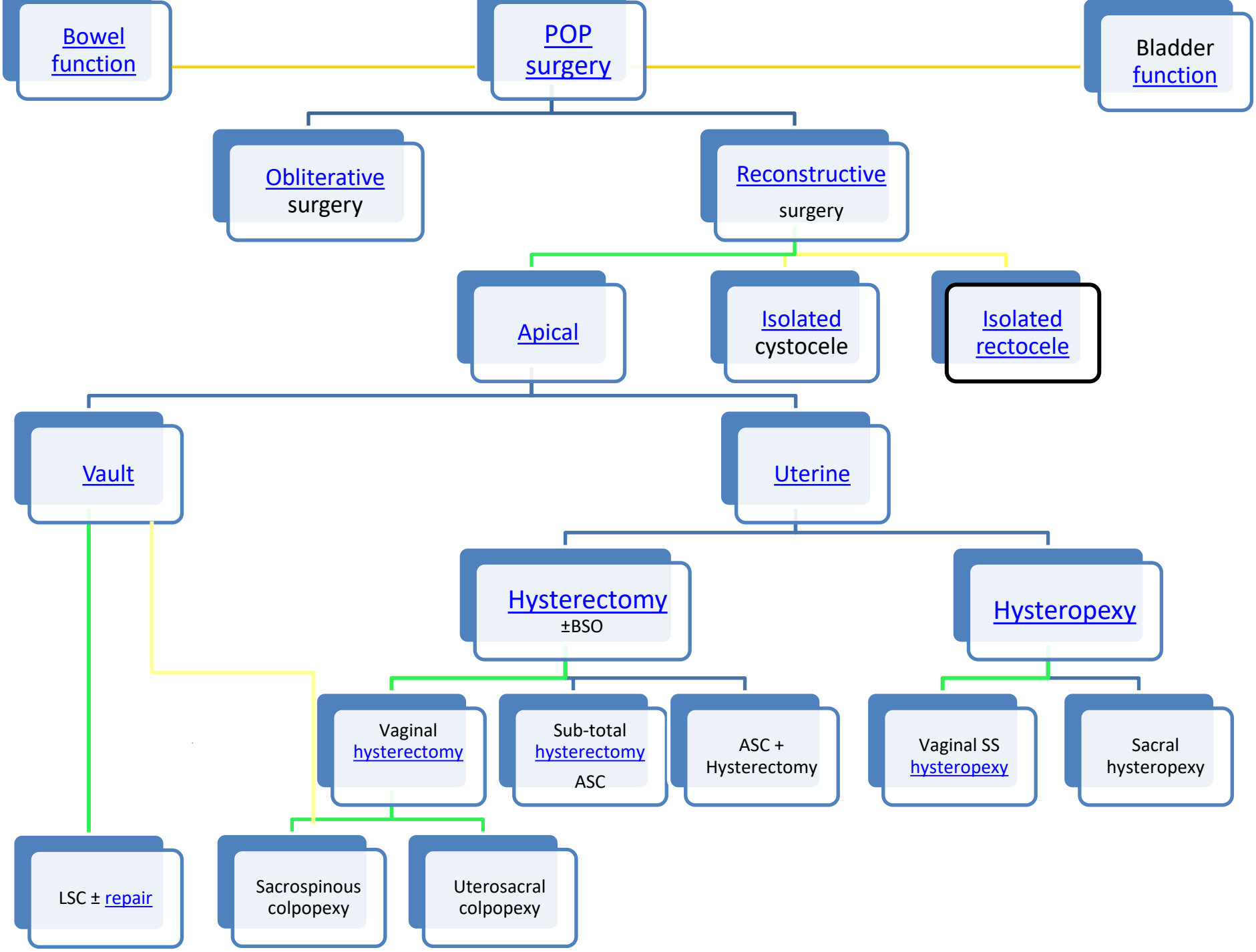
No COI

Incidence of POP& continence surgery 2012 Haya AmJOG 2015



Distribution of Apical Repairs (Haya AJOG 2015)




Bowel function
POP surgery
Bladder function
Obliterative surgery
Reconstructive surgery
Apical
Isolated cystocele
Isolated rectocele
Vault
Uterine
Hysterectomy ±BSO
Hysteropexy
Vaginal hysterectomy
Sub-total hysterectomy ASC
ASC + Hysterectomy
Vaginal SS hysteropexy
Sacral hysteropexy
LSC ± repair
Sacrospinous colpopexy
Uterosacral colpopexy

Obliterative surgery
(colpocleisis)

- Represent 2-3% POP interventions USA
- more common USA> Europe, Australasia
- Usually performed elderly, medically compromised and not sexually active
- *Advantages:* low morbidity, quick recovery, good results
- *Disadvantage:* sacrifice sexual activity

Outcomes of Vaginal Prolapse Surgery
The Role of Apical Support

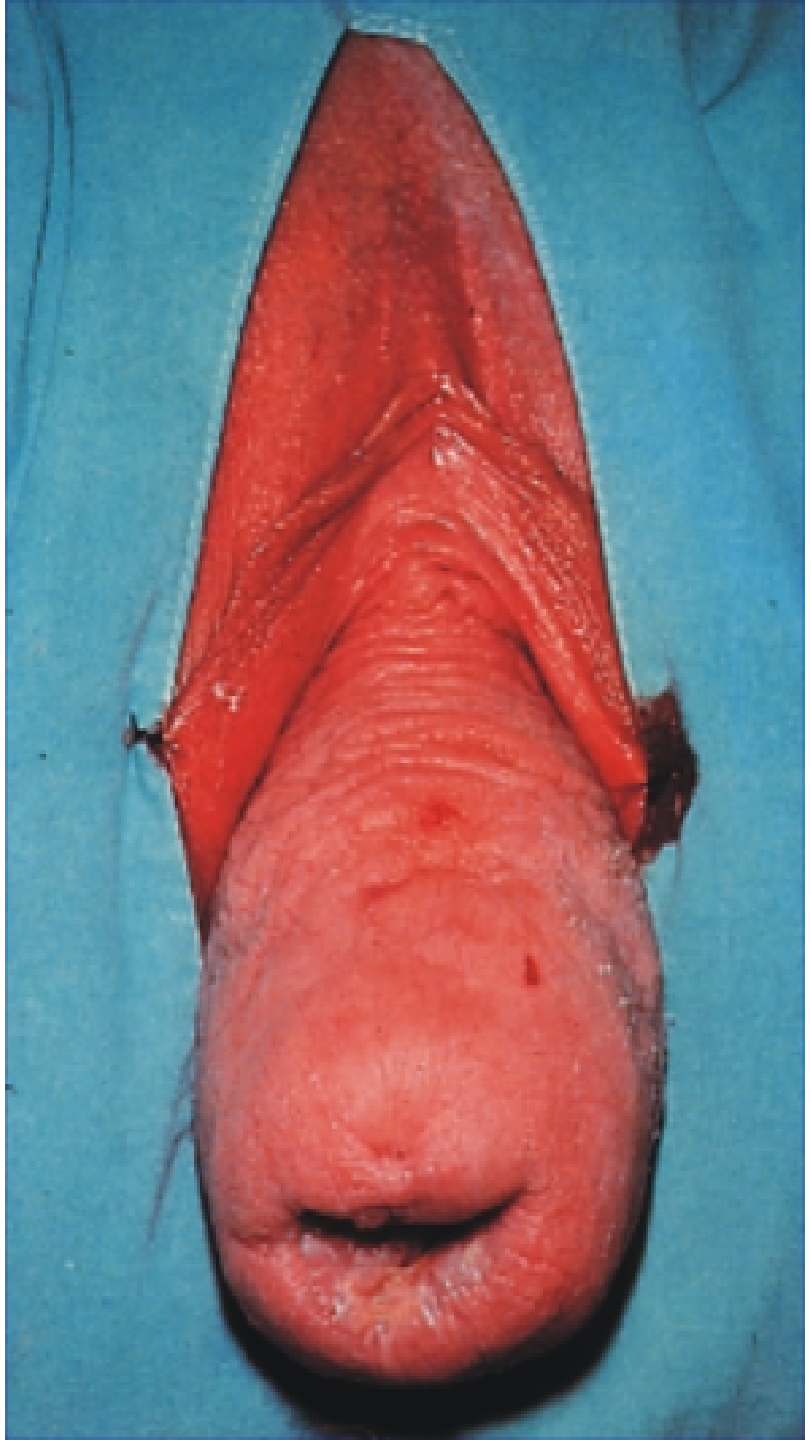
Karyn S. Eilber Obstet Gynecol 2013

Procedure 1999	% surgery 10 yrs later
Ant colporrhaphy (AC)	20.2
Ant colporrhaphy + apical	11.2
Post colporrhaphy (PC)	15.0
Post colporrhaphy + apical	10.2

Data demonstrates apical support should be considered at POP surgery

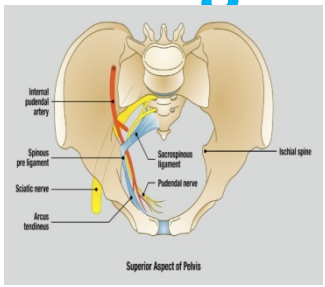
AC + apical repair ↓ reoperation rate by ½ at 10 years

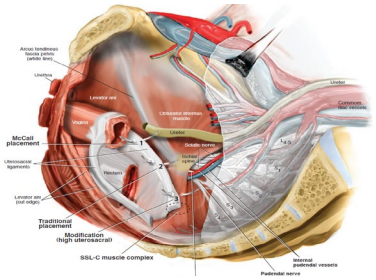
PC + apical repair ↓ reoperation rate by 1/3 at 10 years

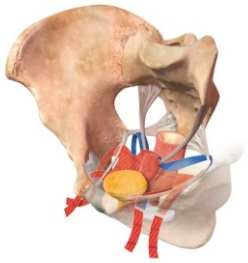


Apical compartment prolapse (2016)

Vaginal approach

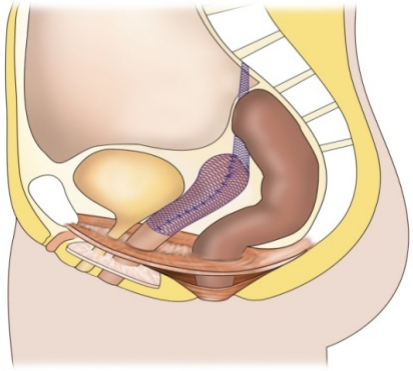






6 trials compared vaginal surgery (sacrospinous or uterosacral suspension, transvaginal mesh to ASC

Abdominal sacral colpopexy (ASC)



ASC: ↓ awareness of prolapse, prolapse on exam, reoperation prolapse, less urinary leakage and painful intercourse

Vaginal surgery: 21mins quicker

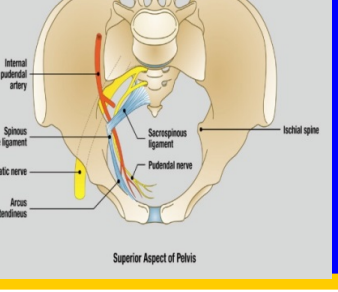
Apical compartment prolapse (2016)

Outcomes	Sacral colpopexy	Vaginal surgery	Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)
Awareness of prolapse	**65 per 1000**	**137 per 1000** (69 to 274)	**RR 2.11** (1.06 to 4.21)	277 (3 studies)	⊕⊕⊖⊖ **low**[1,2]
Re-operation Prolapse	**41 per 1000**	**110 per 1000** (55 to 220)	**RR 2.68** (1.34 to 5.36)	385 (4 studies)	⊕⊕⊕⊖ **moderate**[3]
Recurrent prolapse on examination	**232 per 1000**	**438 per 1000** (309 to 626)	**RR 1.89** (1.33 to 2.7)	390 (4 studies)	⊕⊕⊖⊖ **low**[1,4]
Stress urinary incontinence	**139 per 1000**	**259 per 1000** (163 to 409)	**RR 1.86** (1.17 to 2.94)	263 (3 studies)	⊕⊕⊕⊖ **moderate**[1]
dyspareunia	**91 per 1000**	**230 per 1000** (106 to 501)	**RR 2.53** (1.17 to 5.5)	106 (3 studies)	⊕⊕⊖⊖ **low**[1,5]
Operating time (minutes)		operating time **21.49 lower** (28 to 14.98 lower)		403 (4 studies)	⊕⊕⊕⊖ **moderate**[1]
Cost (US dollars)		cost (us dollars) i **3471.97 higher** (-3336.2 to 3607.74 higher)		277 (3 studies)	⊕⊕⊖⊖ **low**[1,6]

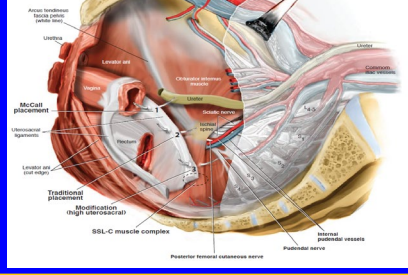
Apical mesh V native tissue repair 2016

Outcomes	Vaginal colpopexy	Vaginal mesh	Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)
Awareness of prolapse	**179 per 1000**	**193 per 1000** (63 to 589)	**RR 1.08** (0.35 to 3.3)	54 (1 study)	⊕⊕⊕⊖ **moderate**[1]
Recurrent prolapse examination	**522 per 1000**	**183 per 1000** (52 to 673)	**0.35** (0.1 to 1.29)	283 (3 studies)	⊕⊖⊖⊖ **very low**[2,3,4]
Reoperation Prolapse	**46 per 1000**	**36 per 1000** (16 to 80)	**RR 0.77** (0.34 to 1.73)	497 (5 studies)	⊕⊕⊕⊖ **moderate**[2]
Bladder injury	**14 per 1000**	**41 per 1000** (12 to 135)	**RR 3.0** (0.91 to 9.89)	445 (4 studies)	⊕⊕⊕⊖ **moderate**[2]
Stress urinary incontinence (de novo)	**219 per 1000**	**300 per 1000** (206 to 436)	**RR 1.37** (0.94 to 1.99)	295 (4 studies)	⊕⊕⊕⊖ **moderate**[2]
dyspareunia	**43 per 1000**	**58 per 1000** (25 to 133)	**RR 1.35** (0.59 to 3.1)	435 (4 studies)	⊕⊕⊕⊖ **moderate**[2]

Mesh & native tissue repair similar except for mesh erosion rate 18%



SSF (186) vs HUSL (187) Barber Jama 2014



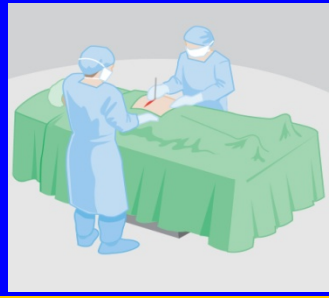
No difference detected at 2 yrs

- Success rate
  - 60% vs 59% NS
- Adverse events
  - 16.5% vs 16.8% NS

Vaginal based native tissue repairs are satisfactory alternatives for those not suitable for sacral colpopexy

MISC vs OSC

De Sa IUJ 2016



Outcomes	MISC	OSC	Odds Ratio	No. of participants (studies)	Quality of the evidence (GRADE)
Overall Complications	103 per 1000	161 per 1000	OR 0.91 (0.53 to 1.57)	2354 (7 trials)	⊕⊖⊖⊖ Very low
Intraoperative complications	26 per 1000	39 per 1000	OR 0.83 (0.51 to 1.34)	2303 (6 Trials)	⊕⊕⊕⊖ low
Operating time	Operating time was 87.5 mins higher in the MISC (56.9 to 116.34)			183 (2 Trials)	⊕⊕⊕⊖ very low
Transfusion rate	9 per 1000	22 per 1000	OR 0.41 (0.2 to 0.83)	2303 (6 trials)	⊕⊕⊕⊖ low
Mesh erosion	4 per 1000	5 per 1000	OR 0.98 (0.38 to 1.1)	2176 (6 RCTs)	⊕⊕⊕⊖ very low
Length of stay days	MD 1.6 days shorter in MISC (-1.9 to -1.2)			1472 (4 trials)	⊕⊕⊕⊖ very low

Lap vs Robotic SC

RCT

Paraiso 2011 12/12

- = &↑ objective & functional outcomes
- ↓operating time (199 +/-46 vs 265 +/-50 min)
- ↓NSAIDS (11days versus 20 days)
- Sig. cheaper (MD -$1936 95%CI 417 to 3454)

Anger 2014 6 month

- = & ↑ objective & functional outcomes
- ↓operating time (178 +/-46 vs 203 +/-50 min)
- ↓pain score 1 week (2.6 versus 3.5)
- Sig. cheaper ($12000 versus $21000)

Laparoscopic approach associated with significant leaning curve
LoE3

Lap vs Robotic SC

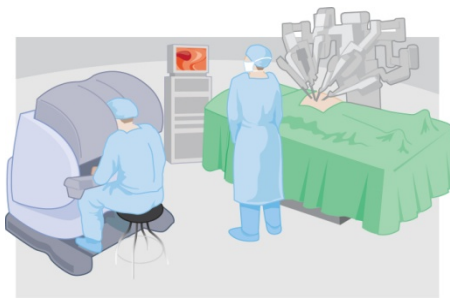
Paraiso 2011, Anger 2014

- Both improved and equal anatomical and functional outcomes
- Robotic surgery 40-70 minutes longer
- Robotic surgery more pain post operatively
- Robotic surgery more expensive than laparoscopic approach

Laparoscopic approach associated with significant leaning curve
LoE3

Lap vs Robotic SC

RCT



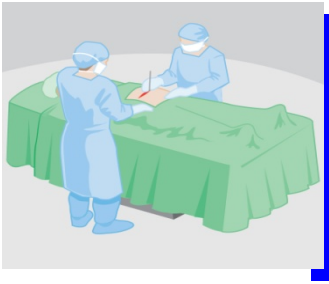
Van Zanten 2019

- RSC &RSRP
- OT ↓25% after 28 cases
- Proficiency (intra-operative complications CUSUM analysis) 78 cases

Linder 2016

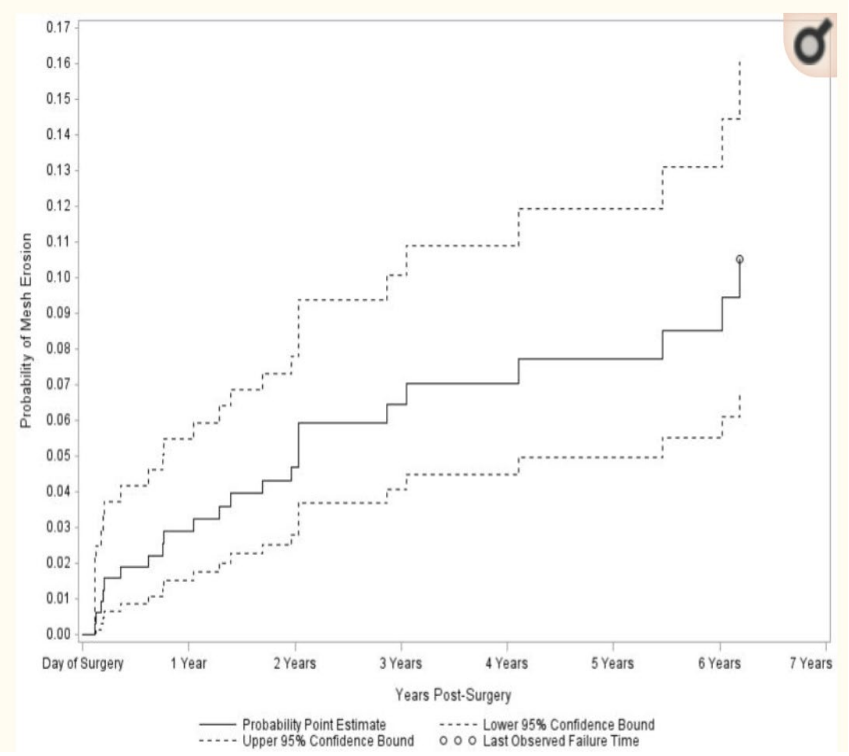
- 145 Mayo Rochester
- OT time 5.3h to 3.6hr 7 yrs
- OT plateaued 60 cases
- C-D ≥2 intra-op 55 cases
- Post &intra-operative complications 84 cases

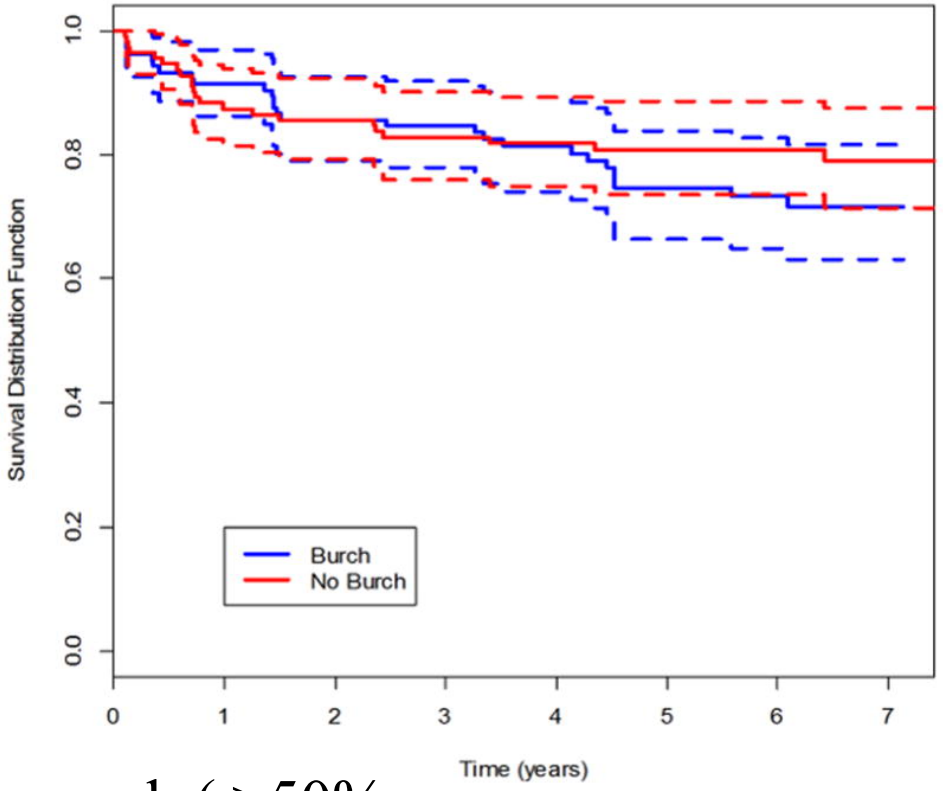
Learning curve Lap & Robotic SC similar!!



E-Care 7 year anatomic outcome

Nygaard 2014 JAMA





39% monofilament macroporous mesh (>50% multifilament mesh)

36% concomitant hysterectomy (5x > mesh exposure)

48% permanent sutures

LSC 7 year review

Pacquee 2019 Obstet Gynecol

- 331 85% response
- Polypropylene mesh 80% vault, 20% SCH
- 84% improvement on PFIC
- Anatomic failure vault 8%, anterior 22% post 28%
- Reoperation rate 17.8%
  - Graft complications 7%: recommended non permanent sutures
  - SUI 7%
  - Prolapse 3.3%
  - High anatomic failure consider concomitant repairs

Sacral colpopexy
Monofilament mesh, absorbable suture

3-6 yrs van Zante RSC (IUJ)

- 148
- 3.1% mesh exposure

Baines UK 2019 (IUJ)

- 600 LSC
- 0.7% mesh exposure

Vault Prolapse ICI 2021 Summary

Apical prolapse	GoE
• Apical suspension at AC or PC significantly reduces the need for subsequent prolapse surgery	B
Vault prolapse (post hysterectomy)	
• Sacral colpopexy has significant anatomical and functional advantages when compared with a broad group of vaginal surgery (±mesh)	A
• Vaginal apical suspensions appropriate those not suitable for SC (Delphi)	C
• Transvaginal apical mesh confers no advantage when compared to NTR	A
• Uterosacral & sacrospinous colpopexy have similar efficacy for apical prolapse	B
• LSC has advantages over both robotic and open approach however the learning curve with both laparoscopic and robotic approach is significant	B
• macroporous monofilament polypropylene mesh + absorbable sutures ↓ risk mesh exposure longterm and are recommended at sacral colpopexy	B

Relative Contraindications to Uterine Preserving Surgery

Uterine abnormalities
Fibroids, adenomyosis, endometrial pathology sampling
Current or recent cervical dysplasia
Abnormal menstrual bleeding
Post-menopausal bleeding
Cervical elongation
Familial cancer BRAC1&2: ↑risk ovarian cancer and theoretical risk fallopian tube and serous endometrial cancer
Hereditary Non-Polyposis Colorectal Cancer (Lynch Syndrome): 60% lifetime risk endometrial cancer
Tamoxifen therapy
Obesity: up to 3-fold increased risk endometrial cancer
Unable to comply with routine gynaecology surveillance

Uterine preservation or hysterectomy & subsequent cancer

- Life time risk relevant Cancer

  Cervical 0.6% Uterine 2.7% Ovarian 1.4%

  Pearce 2015 AACR

- Routine BSO 10x↓ small risk of ovarian cancer without ↑Morbidity when stratified for age

  Jacoby 2011 Acrh Int Med Parker 2013 Obstet Gynecol 2013

- Bilateral salpingectomy in those retaining ovaries ↓ ovarian Ca (OR 0.51, 95% CI 0.35-0.75)

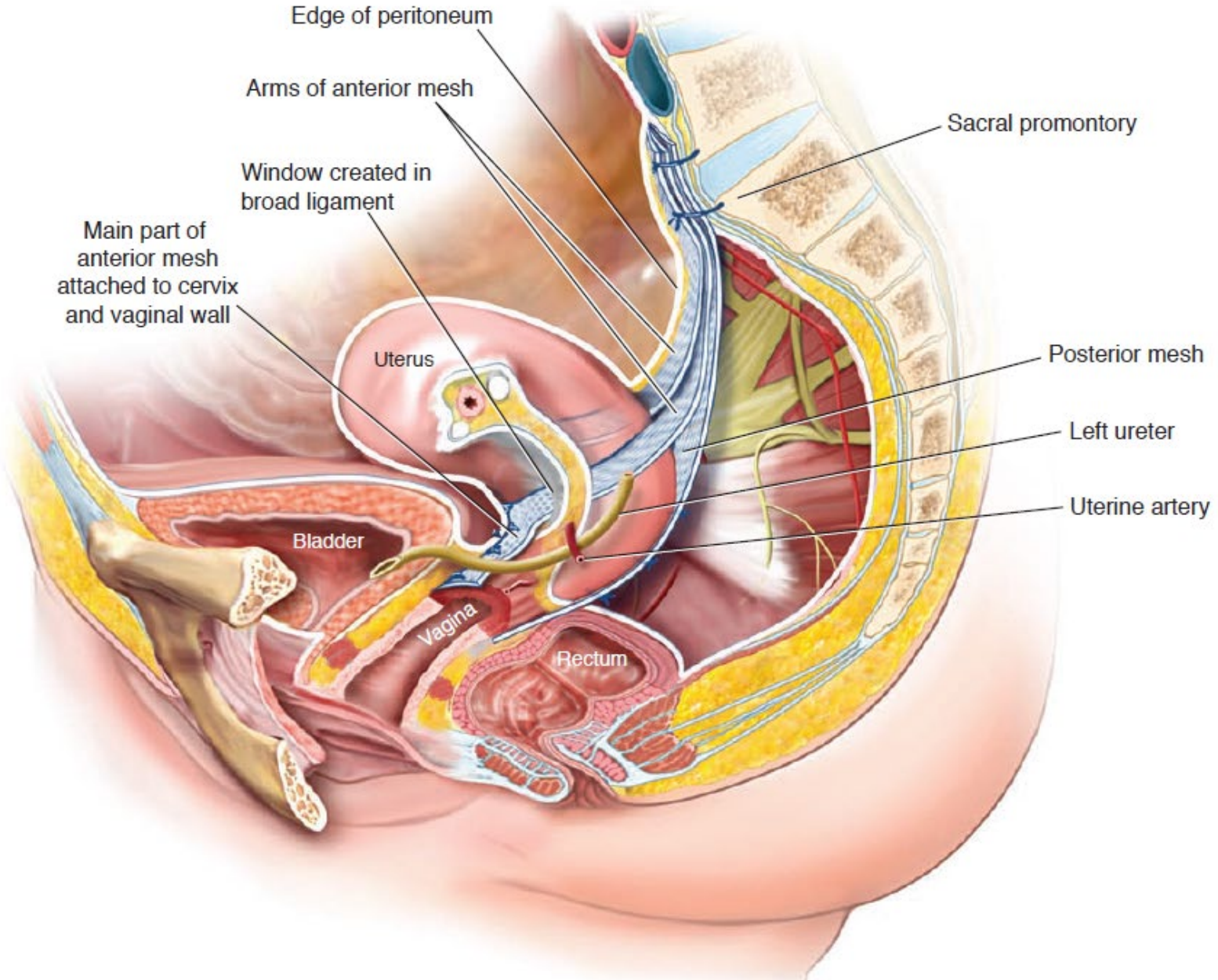
  Yoon 2016 Eur J Cancer

Sacrospinous Hysteropexy vs SS Hysterectomy & NTR

Reference	Study type and surgery	Review months	Success N (%) < stage/grade 2		Reoperation prolapse		Complications
			Hysteropexy	Hysterectomy	Hysteropexy	Hysterectomy	
Schulten 2019[33] RCT	SSHP vs TVH/USLS	60	101/102 (99)*	94/102 (92)*	3/102 (3)	7/102 (7)	
Detollenaere 2015[31] RCT	SSHP vs TVH/USLS	12	102/102 (100)*	96/100 (96)*	1/102 (1)	4/102 (4)	Death: 0 vs 1 Reop bleeding: 0 vs 1
Dietz 2010[30] RCT	SSHP vs TVH/USLS	12	27/34 (79)**	30/31 (97)**	4/35 (11)	2/31 (6)	1 ureteral obstruction - TVH
Jeng 2005[34] RCT	SSHP vs TVH	6	MD	MD	MD	MD	Buttock pain 15%
Plair 2021 Retro cohort	Ant SSHP vs TVH/USLS or SSLF	8	46/50 (92)***	89/97 (92%)***	1 (2) surgery 2 (4) pessary	0 3 (3) pessary	Bladder injury: 0 vs 2 Ureteral kink/injury: 1 vs 1 Transfusion: 1 vs 4
Lo 2015[38] Retro cohort	SSHP vs TVH/SSLF	86	13/26 (50)	86/120 (72)	0/26	2/120 (2)	Vault infection, inpatient care: 0 vs 1
Hefni 2003[35] Pros cohort	SSHP vs TVH/SSLF	33	57/61 (94)~	46/48 (96)~	3/61 (5)	2/48 (4)	Buttock pain 3% vs 4% Transfusion 0 vs 4%
Van Brummen 2003[37]	Retro Cohort SSHP vs TVH	19	39/44 (89)	28/30 (93)	3/57 (5)	3/52 (6)	Hemorrhage: 2% vs 7% Nerve injury: 2% vs 0
Maher 01[36] Retro	SSHP vs TVH/SSLF	26 vs 33	20/27 (74)	21/29 (72)	2/27 (7)	2/29 (7)	Buttock pain 6% vs 3% Dyspareunia 7% vs 3%
Hefni 2006[39] Retro	SSHP vs TVH/SSLF	57	60/65 (92)~	114/117 (97)~	MD	MD	Buttock pain 7% Dyspareunia: 2
Total			**363/409 (88.8)**	**508/574 (88.5)**	**16/358 (4.5)**	**18/382 (3.8)**	
			MD 0.3% (-0.1%,2.9%),p=0.8		**MD 0.2%(-.1%, 2.5%) p=0.9**		

Vaginal Mesh Hysteropexy versus Vaginal Hysterectomy and Vaginal Mesh Repair

Reference	Study type and surgery	Review (months)	Success N (%) < stage 2		Complications	Mesh exposure N(%)	
			Hysteropexy	Hysterectomy		HP	Hyst
Chu 2011[47] Retro Cohort	(Perigee/Apogee) SSHP/graft vs TVH/VMR	9	50/52 (96)	39/39 (100)	Abnormal sensation: 3 vs 3 Transfusion: 0 vs 1	2/52 (4)	5/39 (13)
Neuman 2007[15] Retro cohort	(post IVS) SSHP/graft vs TVH/VMR	29	32/35 (91)*	42/44 (95)*	None	4/35 (11)	6/44 (14)
Vu 2012[49] Retro	(Uphold) SSHP/graft vs TVH/VMR	12	52/53 (98)	22/24 (96)	Left labial numbness: 1	1/53 (2)	2/24 (8)
Huang 2015[48] Retro	(Total Prolift) SSHP/graft vs TVH/VMR	30	74/78 (95)	23/24 (96)	Dyspareunia: 1 vs 0 Vaginal pain: 2 vs 0 op mesh exposure: 2 vs 3	6/78 (8)	5/24 (21)
Ker 2018[105] Prospective	(Uphold) SSHP/graft vs TVH/VMR	6	64/66 (97)	30/30 (100)	Dyspareunia: 2 vs 3 Hematoma: 0 vs 2	1/66 (2)	0/30
TOTAL			**272/284 (96)**	**156/161 (97)**		**14/ 284 (5)**	**18/161 (11)**
P value			**-1.1% (-4.6%, 2.9%) p=0.5**			**-6.1%(-12%, -0.8%)**	

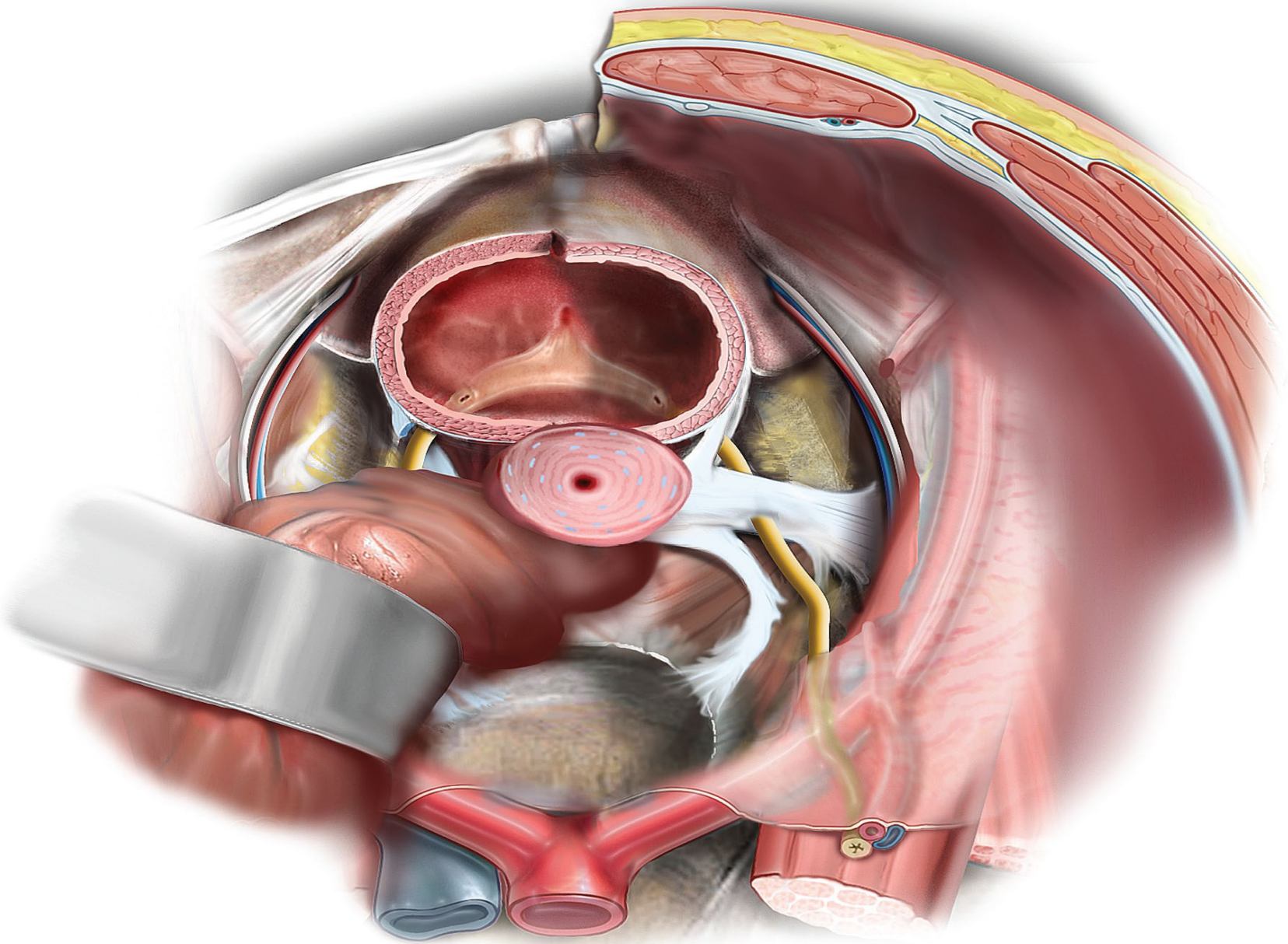

Edge of peritoneum
Arms of anterior mesh
Window created in broad ligament
Main part of anterior mesh attached to cervix and vaginal wall
Sacral promontory
Uterus
Posterior mesh
Left ureter
Uterine artery
Bladder
Vagina
Rectum

Sacral Hysteropexy versus Hysterectomy and Uterosacral Suspension

Reference	Study type and surgery	Review months	Success N (%) < stage 2		Reoperation prolapse (includes planned reoperation)		Complications	Mesh exposure N (%)	
			HP	Hyst	HP	Hyst		HP	Hyst
Roovers 2004[51]	RCT ASHP vs TVH/USLS	12	26/41 (63)	25/41 (61)	9/41 (22)	1/41 (2)	Transfusion: 1 vs 2 Bowel injury: 0 vs 1 Vault abscess: 2 vs 0 Reop: 3 vs 1	2/41 (5)	n/a
Jeon 2008[55]	Retro Cohort ASHP vs TAH/USLS	36	35/35 (100)	52/70 (74)	MD	MD	Ureteral obstruction: 0 vs 1 SBO: 0 vs 1	0/35	n/a
Rahmanou 2014[52]	RCT LSHP vs TVH/USLS	12	MD	MD	8/40 (20)	7/39 (18)	None	0/40	n/a
Lone 2018[53]	Pros Cohort LSHP vs TVH/midline USLS	24	MD	MD	2/44 (5)*	3/81 (4)	Bowel injury: 2 vs 0 Bladder injury: 0 vs 2	0/44	n/a
Sukur 2020[54]	Retro cohort LSHP vs TVH/midline USLS	48	MD	MD	3/46 (7)	10/86 (12)	MD	MD	n/a
Total			**61/76 (80)**	**77/111 (69)**	**22/171 (13)**	**21/247 (9)**		**2/160 (1)**	**n/a**
P value			**11% (-2%, 23%) p=0.09**		**4.4% (-2%,11%) p=0.2.**				

Sacral Hysteropexy vs Hysterectomy SC

Author, Year	Study type and surgery	Review (mo)	Success N (%) < stage 2		Reoperation prolapse		Mesh exposure N (%)	
			HP	Hyst	HP	Hyst	HP	Hyst
Costantini, 2005[195]	Prospective Cohort ASHP vs TAH/SCP	51	31/34 (91)*	35/38 (92)*	0/34 (0)	0/38 (0)	0/34	3/38 (8)
Costantini, 2013[196]	Prospective Cohort ASHP vs TAH/SCP	12	32/32 (100)**	36/36 (100)**	0/32 (0)	0/36 (0)	MD	MD
Jeon, 2008[198]	Retrospective Cohort ASH vs TAH/SCP	36	35/35 (100)	60/63 (95)	MD	MD	0/35	5/63 (8)
Bai, 2005[197]	Retrospective Cohort ASHP vs TAH/SCP	12	10/10 (100)^	18/19 (95)^	MD	MD	0/10	3/19 (16)
Costantini, 1998[200]	Retrospective ASHP vs TAH/SCP	32	7/7 (100)	8/9 (89)	MD	MD	0/7	0/9
Pan, 2015[168]	Retrospective Cohort LSHP vs TLH/LSCP	33	47/65 (72)~	30/34 (88)~	10/66 (15)†	0/34 (0)†	0/65	0/34
Iliano, 2020	Prospective Cohort LSHP vs LSH/LSCP	65	47/54 (87)	77/82(94)	0/54(0)	0/82 (0)	2/54	6/82
Gagyor 2021	Retro LSHPvs TLHLSCP	12	30/38 (79)		MD	MD	1/38	3/233
Total			**254/293 (87%)**	**302/327 (92)**	**12/242 (5)**	**0/234**	**3/259 1.2%)**	**21/292 (7.2%)**
P value			**P = 0.02**		**P = 0.001**		**P = 0.001**	



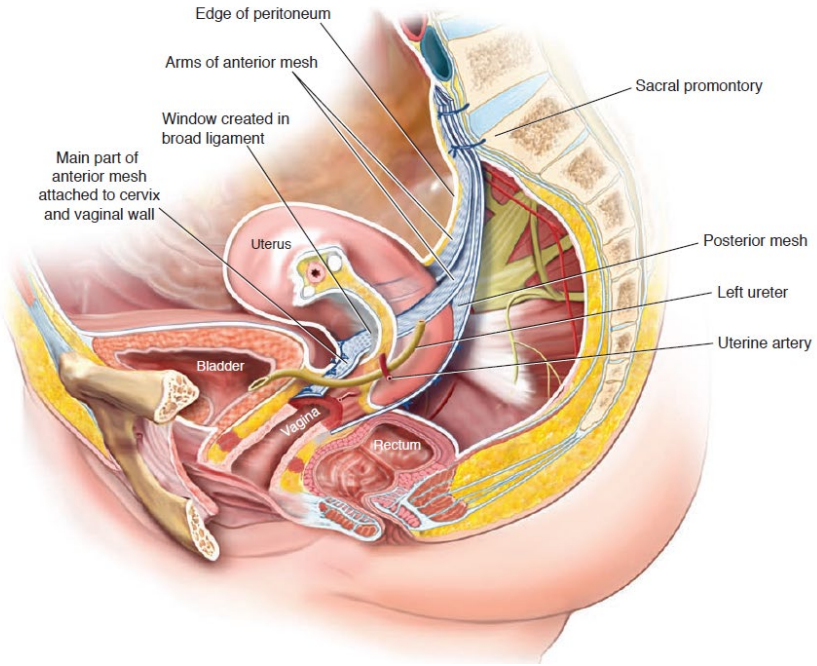
Supracervical Hyst vs total hyst SC

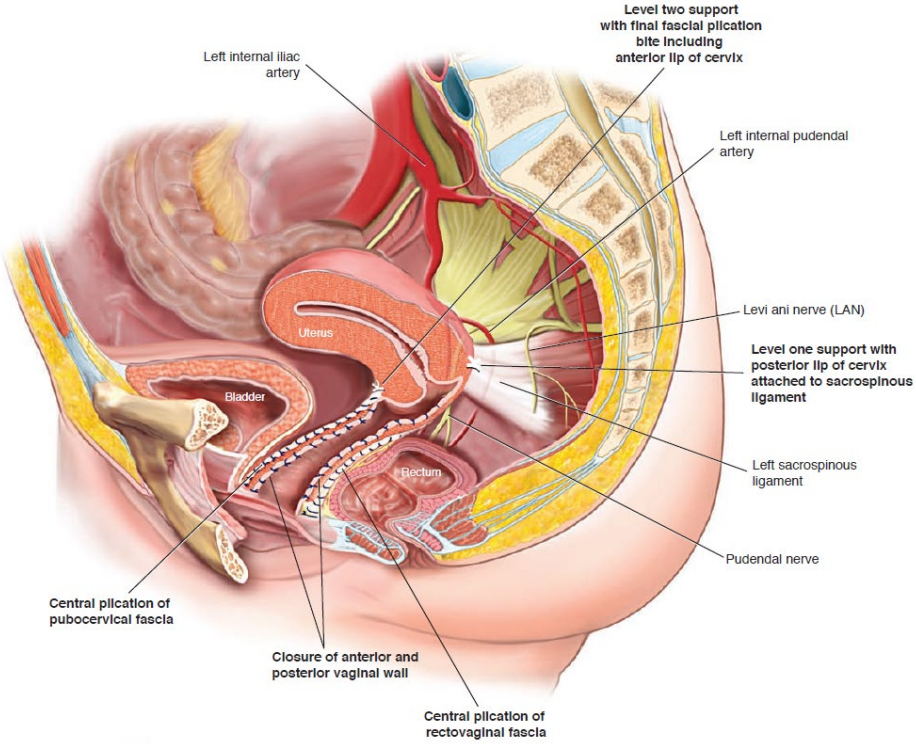
Myers 2015 Int J Urogynecol

- Retrospective 1 year review robotic SC
- 43 THSC vs 40 Supracervical Hyst SC
- On examination recurrent prolapse

41.9 % vs 20.0 %, OR 2.8, 95 % CI, 1.1-7.7 (Loe 3)

Sacrohysteropexy vs SSHP needs further evaluation





Hysteropexy vs Hysterectomy; 3 large database data

California Dallas 2018	Hysteropexy 42.340	Hysterectomy 51,490
Reop POP	4.4%	3.0%
POP+Apical Apical Anterior	3.3% 2.2%	1.9% 1.3%
Periop Complication Transfusion Infection/ Sepsis Urological injury	 1.5% 0.4% 0.3%	 2.5% 0.9% 0.9%

2. 310,000 French 2008-2014 (all POP surgery)

4.4% reoperation, 55% vaginal, 40% abdo 5% combined

Hyst 0.51 & Abdo approach 0.62 ↓ pOP surgery Mairesse 2020

3. Danish trial HSP416 manchester 2786, hyst 4045,

5yr reop HSP 30% Manchester 7% hyst 11%

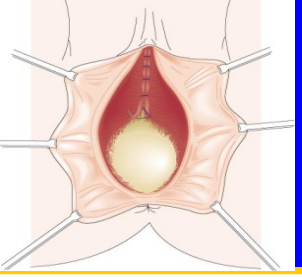
Lots preop differences in groups(Husby 2019)

Mesh erosion rate SCP ± Hysterectomy

Reference	Review months	SCP surgery	Mesh	No hyst Cuff intact	Total Hyst	Sub-total Hyst	P value
Jeon, 2008[55]	36	Open	TEFLON Marlex	0/35	5/63		
Jeon, 2009[79]	66	Open	TEFLON Marlex PP)	0/31	4/26		
Cundiff 2008[75]	24	Open	Mersilene(PE) PP Gortex,	8/239	12/83		
Wu, 2006[80]	15	Open	GORETEX MERSILENE PP	10/212	7/101		
Costantini, 2005[56]	51	Open	MARLEX(PP)	0/34	3/38		
Bai 2005[59]	12	Open	Synthetic mesh	0/20	3/19		
Bensiger, 2005[81]	12	Open	PP	0/35	4/49	0/37	
Brizzolara 2003[82]	35	Open	80% PP 20% allografts	0/64	1/60		
Culligan 2002[83]	24	Open	Synthetic mesh	3/234	3/11		
Cvach 2012[58]	17	Open	70% PP 30% Porcine	0/16	3/9 (33)		
Ginath 2013[84]	7	Open	PP	2/82		1/195	
Total Open SCP				**23/1002 (2.3%)**	**45/459 (9.8%)**	**1/232 (0.4%)**	**<0.0001**
Stepanian 2008[85]	12	Lap	PP	2/272	3/130		
Tan Kim, 2011[76]	15	Lap ±RA	PP	5/110	13/57*	1/21	
Osmundsen 2012[86]	3	RA Lap	PP		8/49	0/31	
Bojahr 2012[62]	8	Lap	PP	0/19	MD	0/151	
Warner 2012[77]	6	Lap	PP	1/95	9/187*	0/92	
Crane 2014[87]	2	RA Lap	PP	6/118	3/79	0/33	
Myers 2015[88]	12	RA Lap	PP		3/40	1/43	
Pan 2015[17]	33	Lap	PP	0/65	0/34		
Gracia 2015[61]	12	Lap	PP	0/15		0/30	
Nosti 2016[78]	9	Lap ±RA	PP		2/123**	1/59	
Davidson 2018[89]	6	Lap ±RA	PP		1/45*	2/116	
Iliano 2020[60]	65	Lap ±RA	PP	2/54	6/82		
van Zanten 2019[90]	48	RA Lap	PP	1/34		2/61	
Campagna 2019[91]	12	Lap	Titan coated PP	1/59	2/18	0/131	
Culligan 2020[92]	66	RA Lap	PP	0/76		0/240	
Gagor 2021	12	Lap	PP	0/38	0/38	1/195	
Campagna 2021	24	Lap	PP	0/78		0/58	
Total for Lap SCP				**18/1033 (1.7%)**	**50/882 (5.7%)**	**8/1261 (0.7%)**	**<0.0001**
Total				**41/2035 (2.0%)**	**95/1341 (7.1%)**	**9/1493 (0.6%)**	**<0.0001**

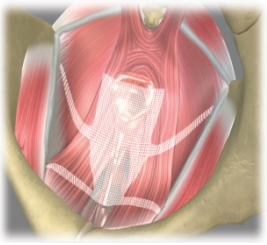
Uterine Prolapse ICI 2021 Summary

Uterine prolapse	GoE
• Relative contraindications to uterine preservation are listed in the Table 6.	C
• Salpingectomy ↓risk of ovarian Ca in women retaining ovaries at the time of hysterectomy	B
• Opportunistic salpingectomy which is not able to be performed at vaginal hysteropexy should be included in the shared decision making process (Delphi)	C
• BSO at hysterectomy in post-menopausal women ↓rate of ovarian Ca without ↑ morbidity	B
• Vaginal hysteropexy is equally effective as vaginal hysterectomy with apical suspension and is associated with reduced blood loss and operating time	B
• Large database studies demonstrated lower reoperation rates for recurrent prolapse and slightly higher complication rates in the hysterectomy group compared to hysteropexy.	C
• Vaginal hysterectomy with apical suspension and sacrohysteropexy similar outcomes	C
• Sacrohysteropexy (SHP) lower success rates than sacrocolpopexy with total hysterectomy.	C
• Sacral colpopexy with total hysterectomy is not recommended due to high rate of mesh exposure	B
• While Supracervical hysterectomy & sacrocolpopexy has a lower rate of mesh exposure than total hysterectomy & further evaluation is required of this intervention	C

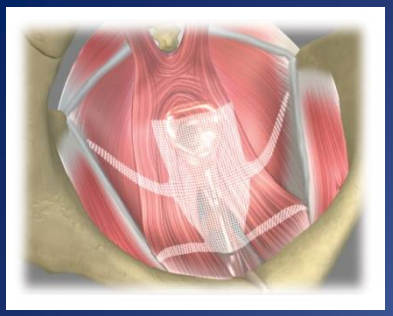


Native tissue vs permanent mesh

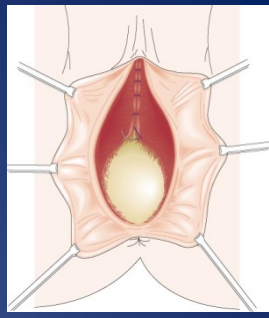
Maher et al Cochrane review 2016



Outcomes	Native tissue	Permanent mesh	Relative effect (95% CI)	No. of participants (studies)	Quality of the evidence (GRADE)
Awareness of prolapse	**229 per 1000**	**130 per 1000** (101 to 167)	**RR 0.57** (0.44 to 0.73)	1133 (9 studies)	⊕⊖⊖⊖ moderate
Recurrent anterior compartment prolapse	405 per 1000	134 per 1000 (101 to 178)	RR 0.33 (0.25 to 0.44)	1808 (15 studies)	⊕⊕⊕⊖ low
Repeat surgery prolapse	40 per 1000	18 per 1000 (10 to 32)	RR 0.44 (0.24 to 0.81)	1461 (11 studies)	⊕⊕⊕⊖ moderate
Repeat surgery for prolapse, SUI or mesh exposure	54 per 1000	93 per 1000 (66 to 131)	RR 1.71 (1.21 to 2.42)	1527 (12 studies)	⊕⊖⊖⊖ moderate
Apical or posterior compartment prolapse	95 per 1000	176 per 1000 (96 to 321)	RR 1.85 (1.01 to 3.37)	300 (2 studies)	⊕⊕⊕⊖ low
SUI de novo (1-3 yrs)	68 per 1000	106 per 1000 (69 to 160)	RR 1.55 (1.02 to 2.35)	939 (6 studies)	⊕⊕⊕⊖ low
Dysparenia de novo (1-2yrs)	38 per 1000	71 per 1000 (36 to 139)	RR 1.86 (0.94 to 3.66)	583 (8 studies)	⊕⊕⊕⊖ moderate



Anterior compartment: mesh vs native tissue



Advantages Mesh

↓awareness prolapse

↓ prolapse on exam

↓Reoperation for POP

Disadvantages Mesh

↑ Operating time: (18mins)

↑blood loss (small 65mls)

↑ POP apical/ posterior RR: 1.89

↑de novo SUI RR: 1.75

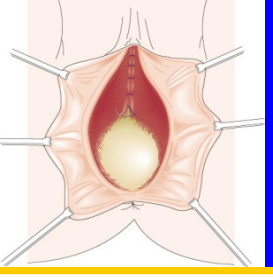
mesh exposure: 11.6%

reoperation exposure: 6.6%

↑total reoperation: 2X

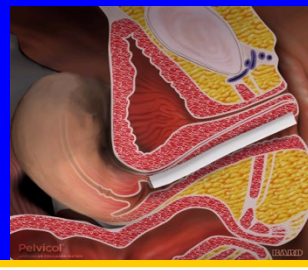
No difference: QoL or dyspareunia

Mo

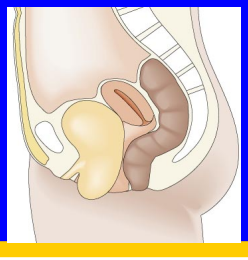


Native tissue vs Biological graft

Maher et al Cochrane review 2016



Outcomes	Native tissue	Biological graft	Relative effect (95% CI)	No. of participants (studies)	Quality of the evidence (GRADE)
Awareness of prolapse	**105 per 1000**	**135 per 1000** (51 to 353)	**RR 1.29** (0.49 to 3.36)	439 (3 studies)	⊕⊖⊖⊖ Low
Recurrent anterior compartment prolapse	**333 per 1000**	**246 per 1000** (183 to 330)	**RR 0.74** (0.55 to 0.99)	646 (7 studies)	⊕⊕⊕⊖ low
Repeat surgery prolapse	**51 per 1000**	**50 per 1000** (26 to 97)	**RR 0.98** (0.51 to 1.89)	650 (7 studies)	⊕⊕⊕⊖ low
Operating time (mins)		operating time **10.35 higher** (6.24 to 14.45 higher)		113 (2 studies)	⊕⊕⊕⊖ low
SUI	**425 per 1000**	**293 per 1000** (161 to 540)	**RR 0.69** (0.38 to 1.27)	218 (2 studies)	⊕⊕⊕⊖ low
Dysparenia de novo (1-2yrs)	**138 per 1000**	**158 per 1000** (70 to 322)	**OR 1.17** (0.47 to 2.96)	151 (2 studies)	⊕⊕⊕⊖ low



Anterior Compartment prolapse

- AC generally procedure of choice anterior compartment prolapse
- permanent mesh repair may have a role in recurrent prolapse if patient fully understands the risk/benefit profile of the intervention

Posterior compartment findings ICI 2021

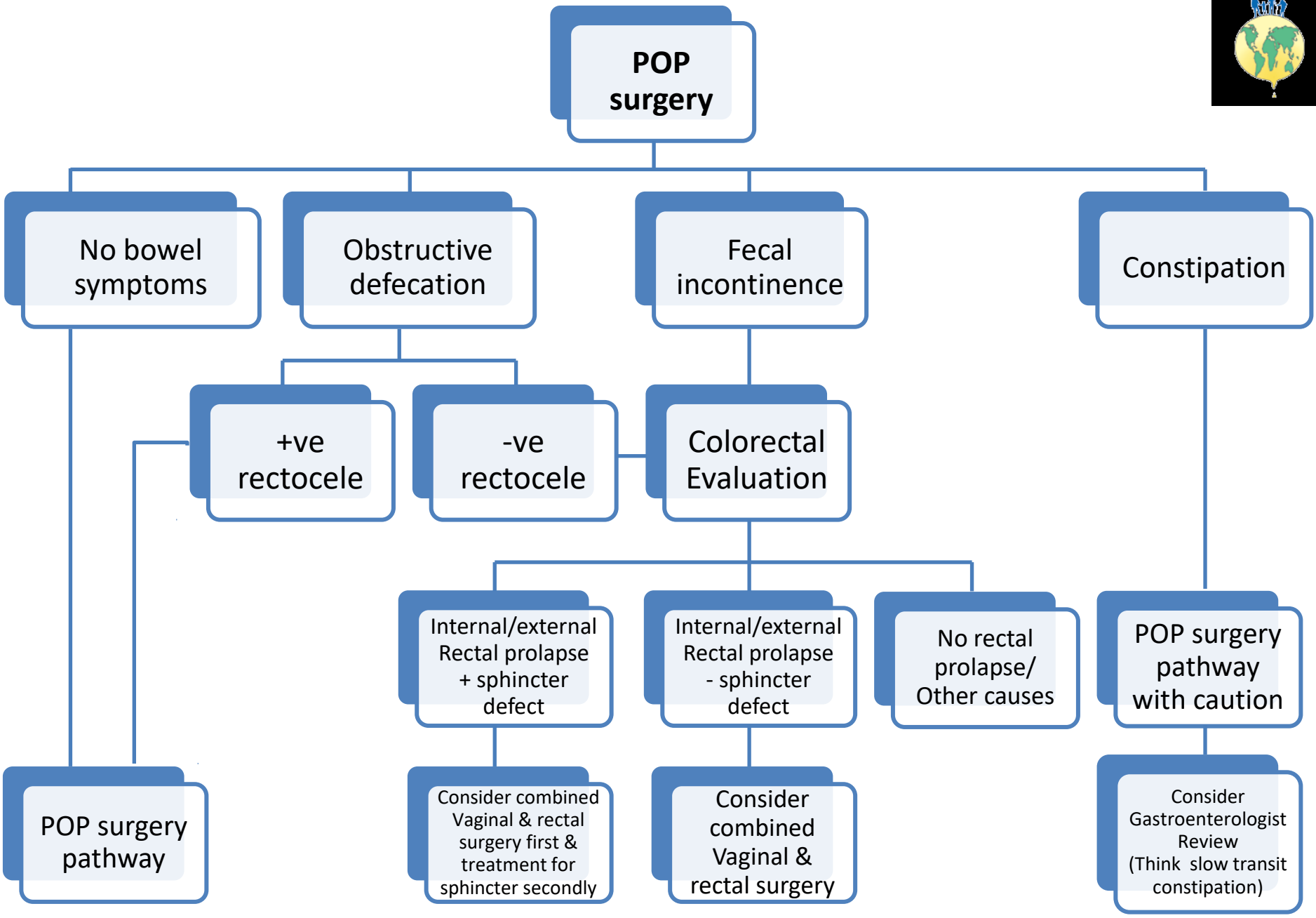
Posterior vaginal repair superior to transanal repair

- Lower rate rectoenterocele RR 0.24 95%CI 0.09-0.64
- Higher blood loss and postoperative narcotic use
- Obstructed defecation & dyspareunia similar

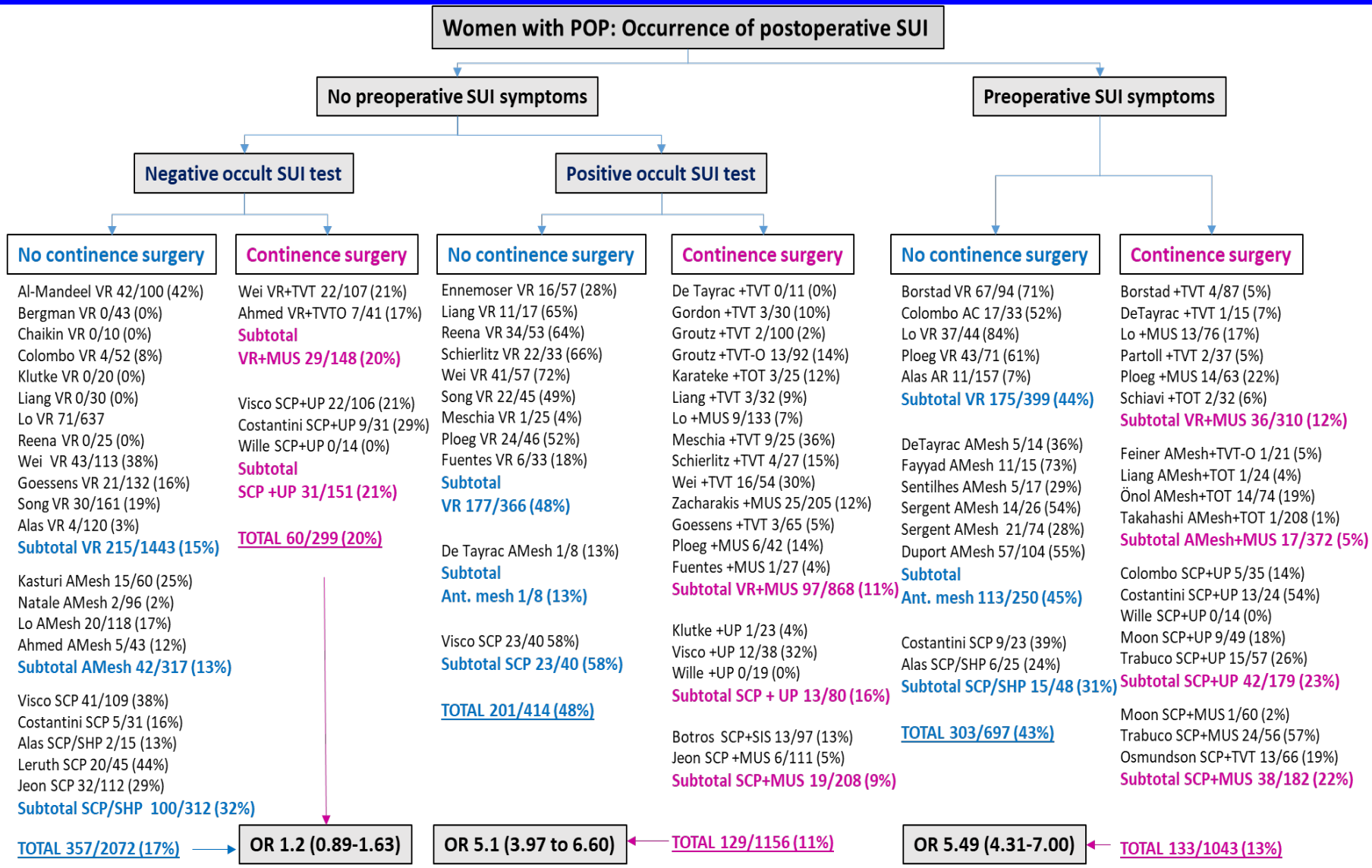
(Olsen 1997; Brown 2002; Boyles 2003; Brubaker 2005)

Posterior compartment ICI 2021

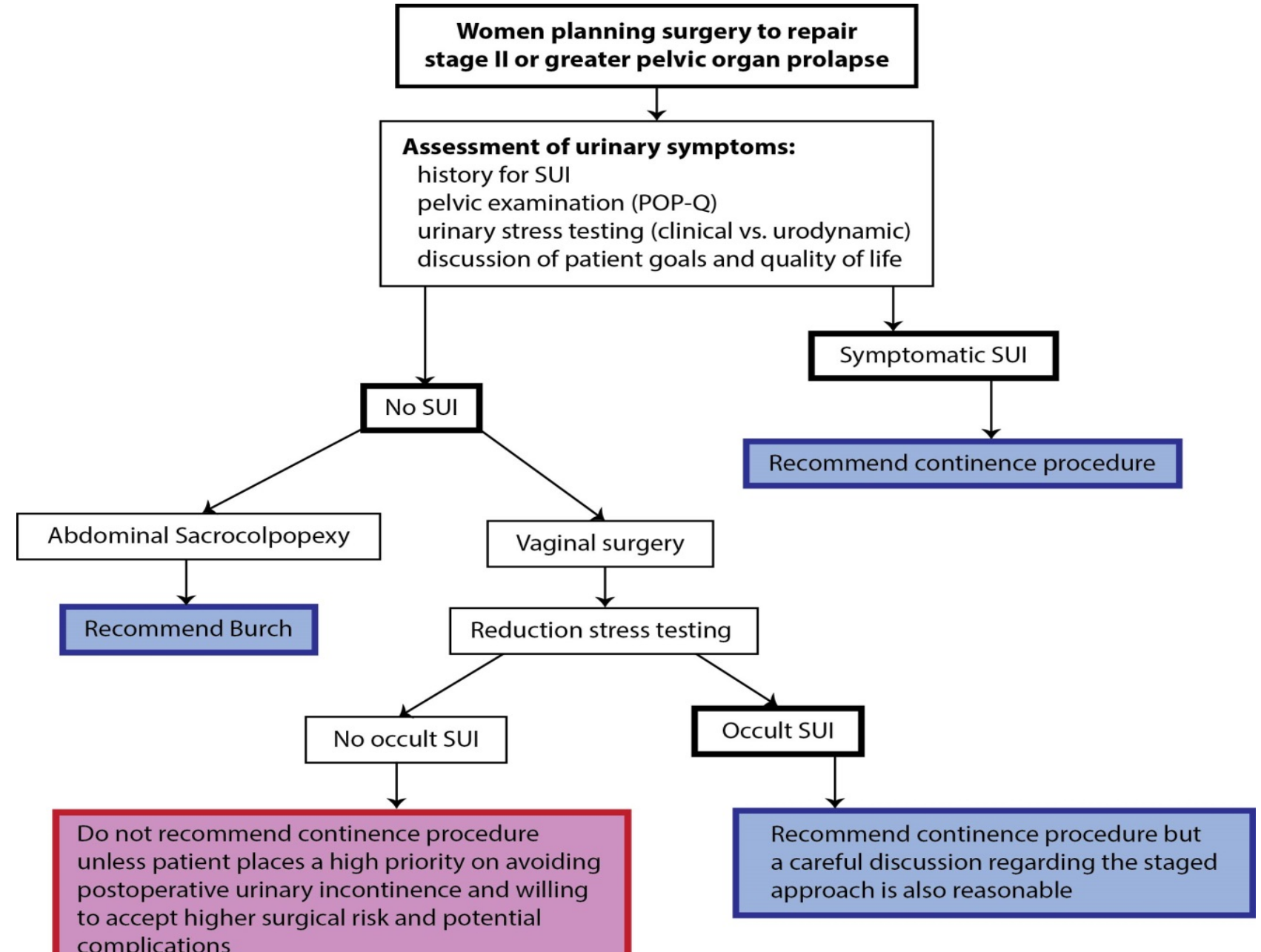
- Fascial plication >objective outcome to site-specific repair. GoE C
- ↑ dyspareunia levatorplasty (GoE C)
- Transvaginal approach superior transanal approach (GoE A)
- No evidence any benefit mesh or xenograft repair for posterior vaginal wall prolapse. (GoE B)
- No data demonstrates ventral rectopexy with or without graft attachment to the posterior vaginal effective rectocoele. (GoE D)
- Limited LoE 3 combined rectal & vaginal prolapse benefit from colorectal & gynecologist collaborating closely. (GoE C)


POP surgery
No bowel symptoms
Obstructive defecation
Fecal incontinence
Constipation
+ve rectocele
-ve rectocele
Colorectal Evaluation
Internal/external Rectal prolapse + sphincter defect
Internal/external Rectal prolapse - sphincter defect
No rectal prolapse/ Other causes
POP surgery pathway with caution
POP surgery pathway
Consider combined Vaginal & rectal surgery first & treatment for sphincter secondly
Consider combined Vaginal & rectal surgery
Consider Gastroenterologist Review (Think slow transit constipation)

POP Surgery & bladder function



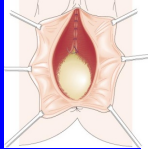
POP Surgery & bladder function



POP Surgery & bladder function

Prolapse surgery and lower urinary tract functions 2021	GoE
• POP + SUI consider POP and continence surgery	A
• POP + occult SUI consider POP & continence surgery (consider staged procedure)	B
• POP without occult SUI does not require concomitant continence surgery.	B
• Preoperative OAB resolves in approximately 50% post prolapse surgery although the impact of concomitant non- surgical treatment on this date has not been clarified.	D
• The rate of reported denovo OAB varies widely 2-32% with further clarification required.	C
• Rates of Urinary retention following POP surgery varies from 0-34% and is nearly always temporary.	C
• Pre-operative urinary retention resolves in as many as 90% post prolapse surgery	C

Sexual function biologic graft vs NTR



RCT	Sexual Activity		De novo dyspareunia		Total dyspareunia		PISQ-1Score or other	
	BG	NT	BG	NT	BG	NT	BG	NT
Paraiso 2006	Pre 17/32 Post 16/32	Pre 17/37 Post 19/33			Pre 12/32 Post 3/32	Pre 13/37 Post 9/33	Pre 33 (8) Post 37 (5)	Pre 29 (8) Post 36 (5)
Meschia2007 [21]	Pre 12/65 Post MD	Pre 11/74 Post MD -	-	-	Pre MD Post 7/47	Pre MD Post 5/48		
Guerette 2009 [58]	MD	MD	0/20	1/16	Pre MD Post 3/20	Pre MD Post 3/16	Pre 16 Post MD	Pre 13.9 Post MD
Feldner 2010, 2012	Pre op 23/29 Post op -	Pre op 22/27 Post op -	-	-	Pre MD Post 5/29	Pre MD Post 4/27	FSFI Pre 5.5 (7.2) Post 24.9 (7.5)	FSFI Pre 15.3 (6.8) Post 24.2 (7)
Dahlgren 2011	Pre 33/69 Post 35/69	Pre 29/64 Post 34/64	-	-	Pre 19/69 Post 6/65	Pre 9/64 Post 8/60	-	-
Menefee 2011	-	-	2/26	3/24	-	-	Change 1 (-35 to 24)	Change 0 (-32 to 16)
Sung 2012	Pre 50/75 Post MD	Pre 54/75 Post MD	-	-	Pre MD Post 7/56	Pre MD Post 4/57	-	-
Robert 2014							Pre 31 (7) Post 38 (10)	Pre 33 (8) Post 38 (8)
Damiani 2016	-	-	0/28	0/59	Pre op 6/28 Post op 9/28	Pre 12/59 Post 3/59	-	-
Glazener 2016 [55] Trial 2	Pre 135/337 Post 152/312	Pre 119/339 Post 138/313	-	-	Pre 21/186 Post 8/165	Pre 20/175 Post 9/149	ICIQ-VS Pre 22.8 (9.1) Post 9 (9.1)	ICIQ-VS Pre 21.7 (8.7) Post 7.1 (6.9)
Total	**Pre 270/607 (44.5%) Post203/413 (49.2%)**	**Pre 252/484 (52%) Post 191/410 (46.6%)**	**2/74 (2.7%)**	**3/99 (3%)**	**Pre 58/315 (18.4%) Post 48/442 (11.4%)**	**Pre 54/334 (16.2%) Post 45/449 (10%)**	**No difference**	
	RR 1.1 (0.91, 1.21) p=0.50)		**RR 0.9 (0.2,5.2) p=0.9**		**RR 1.1 (0.7, 1.6) p=0.68)**			

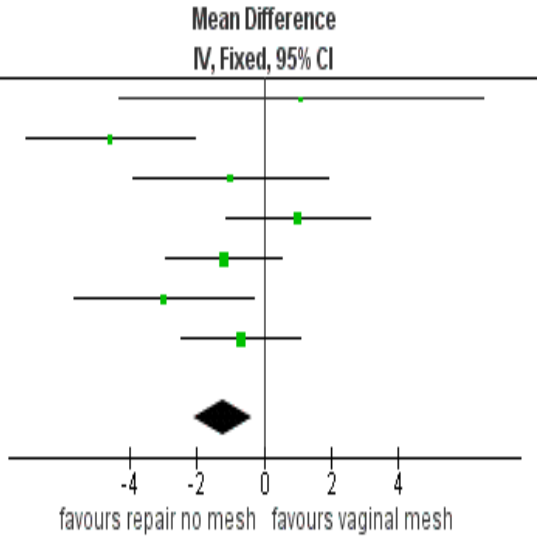
RCT	Sexual Activity		De novo dyspareunia		Total dyspareunia	
	TVM	NT	TVM	NT	TVM	NT
Altman 2011	Pre 80/200 Post MD	Pre 73/189 Post MD	-	-	Pre MD Post 8/110	Pre MD Post 2/101
Vollebregt 2011	Pre 32/50 Post MD	Pre 31/48 Post MD	3/20	2/21	MD	MD
Sivaslioglu 2008	MD	MD	2/43	0/42	MD	MD
Ngyuyen 2008	Pre 27/37 Post 23/37	Pre 28/38 Post 26/37	2/23	4/26	Pre MD- Post 6/27	Pre MD- Post 6/28
Sokol 2012 1 yr Gutman 3yr	Pre op 14/25 Post 13/25	Pre 11/26 Post 14/26	1/11 3/12	3/14 1/11	Pre 3/17 Post 8/12	Pre 3/18 Post 8/10
Rudnicki 2014 1yr Rudnick(3yr)	Pre MD Post 36/76	Pre MD Post 48/78	2/76	0/76	-	-
El-Nazer 2012	Pre 17/20 Post 18/20	Pre 18/20 Post 17/20	0/18	1/17	Prep 7/17 Post 7/18	Pre 8/18 Post 8/17
deTayrac 2013 1yr Allegre 2019 (7yr)	Pre 28/75 Post 31/75	Pre 21/72 Post 28/72	3/13	1/14	Pre 10/28 Post 6/22	Pre 3/21 Post 5/24
Lamblin 2014	Pre 15/33 Post18/33	Pre 12/35 Post 15/34	1/34	1/33	-	-
Delroy 2013 Dias 2016	Pre 21/40 Post 23/40 Pre 21/43	Pre 19/39 Post 19/39 Pre 23/43	- 2/43	- 4/43	Pre MD– Post 2/21	Pre MD – Post 4/19
Menefee 2011	-	-	2/28	3/24	-	-
Carey 2009	Pre 34/69 Post 30/63	Pre 36/70 Post 33/62	5/18	5/12	Pre 11/34 Post 12/30	Pre 20/36 Post 13/33
Withagen 2011.[47] [48] (1 yr) Milani 2018.[49] (7 yr)	Pre 52/93 Post 53/93 Post 30/66	Pre 49/97 Post 51/97 Post 30/72	3/37	3/29	Pre 13/52 Post 9/53 Post 13/64	Pre 16/49 Post 12/51 Post 12/72
Dos Reis Brandão da Silveira 2015	Pre 25/88 Post 25/88	Pre 14/81 Post 14/81	-	-	Pre MD- Post 3/88	Pre MD Post 5/81
Svabik 2014 [52]	-	-	-	-	Post 2/36	Post 1/34
de Tayrac 2008 [53]	Pre op 8/24 Post 9/24	Pre op 12/25 Post op -	-	-	-	-
Damiani 2016 [54]	-	-	4/30	0/59	Pre 5/30 Post 6/30	Pre 12/59 Post 3/59
Glazener 2016 [55] Primary POP	Pre 148/399 Post 169/360	Pre 152/407 Post 175/360	-	-	Pre 13/197 Post 9/173	Pre 18/217 Post 8/186
Glazener 2016 [55] Recurrent POP	Pre 26/50 Post 20/41	Pre 16/53 Post 18/45	-	-	Pre 5/32 Post 3/23	Pre 1/22 Post 0/18
Glazener 2016 [55] Trial 4 Recurrent POP	Pre 14/41 Post 16/39	Pre 6/24 Post 6/20	-	-	Pre 0/20 Post 1/18	Pre 0/8 Post 0/6
Nager et al 2019 [57]	Pre 30/88 Post 26/88	Pre 40/87 Post 31/87	2/57	3/52	Pre 10/26 Post 5/26	Pre 17/37 Post 5/31
Total*	**Pre 620/1437 (43.1%) Post 561/1206 (46.5%)**	**Pre 586/1408 (41.6%) Post 539/1154 (46.7%)**	**32/451 (7.1%)**	**30/462 (6.5%)**	**Pre 77/453 (17%) Post 86/769 (11%)**	**Pre 98/485 (20.2%) Post 77/776 (9.9%)**
	RR 1.0 (0.91,1.09) P=0.92		**RR 1.1 (0.7,1.8) p=0.61**		**RR 1.13 (0.84, 1.51) P=0.42**	

vaginal mesh repair vs NTR PISQ

Study or Subgroup	vaginal mesh Mean	SD	Total	vaginal repair (no mesh) Mean	SD	Total	Weight	Mean Difference IV, Fixed, 95% CI
de Tayrac 2008	13.6	9.3	21	12.5	9.3	24	2.6%	1.10 [-4.35, 6.55]
de Tayrac 2013	31	5.3	39	35.6	5.8	36	12.0%	-4.60 [-7.12, -2.08]
Iglesia 2010	34	6	32	35	6	33	9.0%	-1.00 [-3.92, 1.92]
Nguyen 2008	34	6	37	33	3	38	16.5%	1.00 [-1.16, 3.16]
Rudnicki 2014	11.9	5.5	76	13.1	5.6	78	24.9%	-1.20 [-2.95, 0.55]
Svabik 2014	32.6	6.3	36	35.6	5.1	34	10.7%	-3.00 [-5.68, -0.32]
Whittagen 2011	34	6.7	93	34.7	5.7	97	24.4%	-0.70 [-2.47, 1.07]
Total (95% CI)			**334**			**340**	**100.0%**	**-1.24 [-2.11, -0.37]**

Heterogeneity: Chi² = 13.72, df = 6 (P = 0.03); I² = 56%

Test for overall effect: Z = 2.78 (P = 0.005)



POP Surgery & sexual function

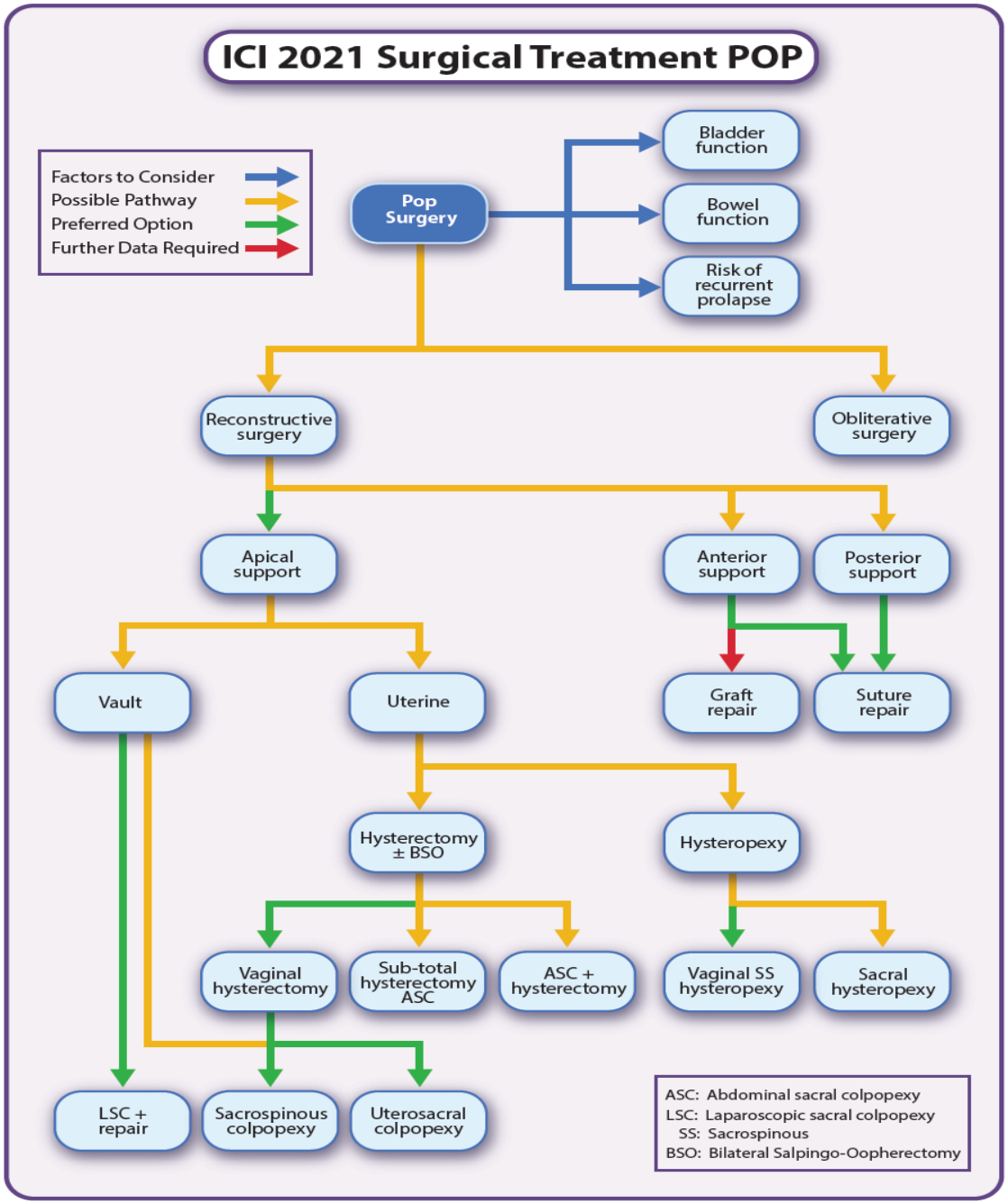
Prolapse surgery and sexual function	
• Sexual function measured with validated PISQ has lower sexual satisfaction than non mesh vaginal repair while the rates of denovo dyspareunia and total dyspareunia are similar	B
• Synthetic transvaginal mesh has higher rate of dyspareunia compared to sacrocolpopexy	C
• Sacrocolpopexy has a non-significant tendency to lower rates of de novo and total dyspareunia as compared to vaginal native tissue repairs	C
• When comparing vaginal biologic grafts to vaginal native tissue repairs, there are similar decreases in postoperative dyspareunia and similar changes in sexual function	C
• When reporting prolapse surgery outcomes pre and postoperative sexual activity, dyspareunia and use of validated sexual function questionnaire and rate denovo dyspareunia preferrable	C

Risk Factors recurrent prolapse

Outcomes	Multivariate evidence	Risk quantification	GoE
Patient factors			
Age	<60 yrs	OR 3.2-4.1(672, 675)	GoE B
BMI/Weight (Kgs)	Conflicting		
Family history	Conflicting		
Stage 3-4 prolapse	Yes	RR 2.0-3.9(672-674)	GoE A
Prior Pelvic floor Surgery	Conflicting		
Levator defect			
Size Genital Hiatus	Conflicting data		
Poor levator strength	Not risk factor		GoE C
Levator defects	Conflicting data		
Type collagen	Not risk factor		
Perioperative Factors			
Surgeon factors			
Less experienced			
Recurrent prolapse	↑ LVS	2.7-11.9(689, 690)	GoE C
Complications	No evidence		
HVS vs LVS			
Recurrent prolapse	No evidence		
Complications	↑LVS	RR 1.4 to 2.4(655, 693, 694)	GoE B
Perioperative Physio	Not protective		GoE A

POP surgery & complications

Prolapse surgery Complications	
• Vaginal mesh repairs have a higher rate of complications than native tissue repairs	A
Concerning vaginal surgery	
• If a synthetic mesh is utilised it is recommended that it be macroporous monofilament polypropylene and hysterectomy avoided	B
• Bowel preparation prior to surgery is not recommended	B
• It is recommended to avoid excessive excision of vaginal skin removal	C
Concerning sacrocolpopexy	
• A macroporous monofilament polypropylene mesh recommended	B
• Concomitant total hysterectomy not recommended	B
• Laparoscopy preferred approach	B
• Delayed absorbable sutures preferenced for securing mesh to the vaginal	C
• Closure peritoneum recommended (Delphi)	C
Expert Opinion Recommendations	
• Cessation smoking pre-operatively	C
• Comply with prevention of nosocomial infections	C
• Antibiotic and thromboembolic prophylaxis	C
• Treat UTIs preoperatively	C


ICI 2021 Surgical Treatment POP
Factors to Consider
Possible Pathway
Preferred Option
Further Data Required
Pop Surgery
Bladder function
Bowel function
Risk of recurrent prolapse
Reconstructive surgery
Obliterative surgery
Apical support
Anterior support
Posterior support
Vault
Uterine
Graft repair
Suture repair
Hysterectomy ± BSO
Hysteropexy
Vaginal hysterectomy
Sub-total hysterectomy ASC
ASC + hysterectomy
Vaginal SS hysteropexy
Sacral hysteropexy
LSC + repair
Sacrospinous colpopexy
Uterosacral colpopexy
ASC: Abdominal sacral colpopexy
LSC: Laparoscopic sacral colpopexy
SS: Sacrospinous
BSO: Bilateral Salpingo-Oopherectomy

Further research required POP surgery

Management of Uterine prolapse

- hysterectomy versus hysteropexy
- Abdominal versus vaginal hysteropexy
- safety & efficacy sacral colpopexy in uterine prolapse

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