Original article

Posterior Fornix Syndrome: Comparison of original (2004) and modified (2015) post-PIVS anatomic and symptomatic results- a personal journey

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Background: Posterior Fornix Syndrome (PFS) surgery was first reported by Petros in 1993. Farnsworth 2001 and Goeschen 2004 confirmed the reliability of his strategy. *Aim:* 2009 we started a second prospective observational study with a modified infracoccygeal sling procedure (PIVS). The purpose of this second study was to find out, whether in comparison to the technique 1997 the cure rates for symptoms and/or prolapse recurrence improved. *Methods:* 198 patients with symptomatic pelvic organ prolapse (POP) in various grades underwent P-IVS operation between Jannuary 2009 and December 2012. In contrast to 2004 additionally the PIVS tape was fixed to the sacrospinous ligament on both sides. 66 patients with stress urinary incontinence obtained a concomitant suburethral transobturator sling (TOT), 96 patients an anterior transobturator 4-arm mesh (ATOM). These procedures were not performed in 2004. Furthermore, not only patients with previous hysterectomy as in 2004, but also with existing uterus are included in this study. All patients had follow-up for at least 1 year. *Results:* Compared with our data from 2004 there was no further improvement in functional or symptomatic cure rates such as frequency, nocturia, urgency with or without incontinence, pelvic pain, abnormal bladder emptying, stress incontinence, stool outlet obstruction and/or fecal incontinence. The success rate was still in the same high level. However, modified surgery lead to a statistical significant decrease of POP recurrence. At 1 year follow up 99% of patients presented a normal anatomy, whereas in 2004 only 90% were cured. Regarding the complication rate no significant difference was observed. *Conclusions:* The results from 2015 demonstrate that total pelvic reconstruction with bilateral SSLF of P-IVS tape in combination with ATOM and TOT, if necessary, reduces the POP recurrence rate significantly, whereas the high cure rate of symptoms remains at the same level.

Keywords: Posterior fornix syndrome; POP; Pelvic pain; Urinary and faecal incontinence; LUTS; Uterosacral ligaments; Pelvic ligaments; Posterior IVS; Integral theory.

INTRODUCTION

Since decades it has been described in the German literature that various typical bladder and rectum problems can be caused by damaged suspension or support of the pelvic organs. 1946 Heinrich Martius[1] published in the first edition of his gynecological Textbook, that "*there is a strong correlation between pelvic organ prolapse and symptoms like bladder emptying problems with residual urine, urge, frequency, nocturia, stool-outlet-obstruction, bladder and fecal incontinence and chronic dragging pelvic pain*". In 1960 he pointed out in his Textbook "Gynecological Operations", "*that after birth nearly every woman has at least a slight descent of her pelvic organs. Some have major, some minor prolapse; however, there is no relationship between the quantum of prolapse and the experiencing of symptoms*". He concluded that "*This problem can only be solved by a sufficient operation enabling restoration of the natural anatomy*".

Unfortunately, Martius's concepts have incomprehensibly been forgotten in Europe and have remained totally unknown in the English literature. Independently from Martius, Petros and Ulmsten, as part of their 1993 Integral Theory[2] which introduced the midurethral sling operation, also described the "Posterior Fornix Syndrome" (PFS) with symptoms comprising pelvic pain, nocturia, urgency, frequency and abnormal emptying. They reported a significant cure rate of posterior fornix symptoms following repair of the uterosacral ligaments.[2] Between 1993 and 1997, still ignorant of Martius's work in the German literature, Petros substantiated Martius´s statements by scientific research as part of his ongoing development of the Integral Theory.[3-8] The Integral Theory differed from Martius's work in that it was a universal theory which described the role of ligaments in the causation of POP, pain, bladder and bowel symptoms and described the mechanisms thereof.[3-8]

The author of the present article was trained by Gerhard Martius, the son of Heinrich Martius, and later by Peter Petros both in the theory and the use of polyproylene slings to repair damaged suspensory ligaments according to the Theory.[3-5]

The reaction to my initial results with these surgical methods[3-5] from "leading opinion leaders" is best described in the words of the famous American Economist, John Kenneth Galbraith who described how "intellectual dissenters become the object of witch hunts pursued with medieval fury". These "leading opinion leaders" who since decades falsely imposed their views on patients, that they must live with their problems or could only get help from drugs, physical or psychotherapeutical therapy - vehemently attacked my attempts to cure what they considered was incurable. In 2001 for example one, Hansjörg Melchior, President of the Medical Society of Incontinence Help Germany was quoted in a famous, widely read German Newspaper (Süddeutsche Zeitung Nr. 138, Tuesday 19. June 2001) with these headlines:

> *Title: Knife against bladder weakness: In case of urge incontinence most experts rail against surgical intervention and recommend the application of drugs. However, Goeschen is convinced that most patients can benefit from new operation techniques.*
>
> *"Bullshit" denounced Hansjörg Melchior, President of the Medical Society of Incontinence Help Germany. "It is even a medical **malpractice** to operate in case of urge incontinence. The operation may increase the suffering. Every surgeon needs something new to boost his profile".*

On the other side of the world, in 2002 Farnsworth[10] published his first data from patients with "PFS" after surgical repair of posthysterectomy vaginal vault prolapse. During 1998 and 2000, he performed the posterior intravaginal slingplasty (PIVS), first reported by Petros 1997,[5] in 93 pa-

tients with evident vault prolapse (grade 2 or 3) and associated symptoms, including urgency, nocturia and pelvic pain. The one year follow up of his prospective observational study showed a symptomatic cure rate for prolapse of 91%, urgency 79%, nocturia 82% and pelvic pain 78%.

In 2001 myself et al performed a prospective PIVS observational study, published in 2004.[10] This study was based on 83 patients with prior hysterectomy and at least grade 2 vault prolapse with posterior fornix symptoms. At follow up 1 year after the operation, the symptomatic cure rates for urgency were 78%, nocturia 78%, pelvic pain 71%, emptying problems of the bladder 81% and quality of life 86%, with 10% anatomical failure.

In order to improve the anatomical results we changed our surgical technique in 2005. In case of concomitant anterior wall prolapse we combined the posterior IVS with insertion of an anterior transobturator 4-arm mesh (ATOM4). From 2007 onwards, using a special instrument, we additionally fixed the posterior tape and the posterior ATOM-arms to the sacrospinous ligaments on both sides.

After establishing the new surgical strategy in more than 300 patients during 2007 and 2008 we started a second prospective observational study in 2009. The purpose of this second PFS study was to find out, whether in comparison to the technique 2001 the cure rates 1) for symptoms and/or 2) prolapse recurrence have changed and 3) to compare our findings with the data of the recent literature.

PATIENTS AND METHODS

This study is based on 198 patients with symptomatic POP suffering from posterior fornix symptoms such as frequency, nocturia, urgency with or without incontinence, pelvic pain, abnormal bladder emptying, stress incontinence, stool outlet obstruction and/or fecal incontinence during Jan 2009 and Dec 2012 (Table 1).

The grade of prolapse was assessed using the Halfway Classification System according to Baden-Walker.[12] Grade 1 was defined as prolapse to the mid-vagina, grade 2 prolapse extending to the introitus, grade 3 everting beyond the introitus, and grade 4 total protrusion.

All patients presented a clinically evident fornix prolapse: 15 patients grade 1, 39 patients grade 2, 107 patients grade 3 and 37 patients grade 4 (Table 2).

TABLE 1. – Distribution of symptoms in the two groups: Patients after „hysterectomy =HX“ and with „no hysterectomy = NoHX“.

	No HX n=132 (100%)	**HX n=66 (100%)**
Frequency, urge	N=81 (61%)	N=46 (70%)
nocturia	N=42 (32%)	N=21 (32%)
Pelvic pain	N=132 (100%)	N=66 (100%)
Bladder emptying problem	N=40 (30%)	N=28 (42%)
Urge incontinence	N=25 (19%)	N=30 (45%)
Stress incontinence	N=40 (30%)	N=26 (39%)
Stool outlet problems	N=35 (35%)	N=26 (40%)
Fecal incontinence	N=31 (23%)	N=25 (38%)

TABLE 2. – Distribution of prolapse grades in all patients n = 198 (100%).

	Grade 1	**Grade 2**	**Grade 3**	**Grade 4**
Pre-op n=198	n=15 (7,5%)	n=39 (19,5%)	n=107 (54%)	n=37 (19%)

The following definitions for symptoms and its cure rates have been used:

Frequency, Urge: Micturition more than 8 times per day, **Cure:** 1-8 per day

Nocturia: Micturition two or more times per night (ICS[13]), **Cure:** less than 2 times.

Bladder emptying difficulty: Presence of at least one of these symptoms[14]

- Do you feel that your bladder isn't emptying properly?
- Do you ever have difficulty starting off your stream?
- Is it a slow stream?
- Does it stop and start involuntarily?

Cure: no symptoms., **Improved:** more than 50% better, **Unchanged:** same or less than 51% better

Residual urine: Cure: less than 10ml. **Improved:** 10 – 50ml. **Unchanged:** more than 50ml

Urge incontinence: At least one episode per day of wetting prior to arrival at the toilet. **Cure:** no wet episodes. **Improved:** less than 50% wed episodes per week. **Unchanged:** same frequency or more than 50%.

Stress urinary incontinence: Complaint of involuntary leakage on effort, sneezing, coughing. **Cure:** continent at any time. **Improved:** few drops leakage. **Unchanged:** more than few drops

Stool outlet obstruction: Feeling of incomplete emptying, constipation (less than 3 stools per week), hard pellety stools, straining at stool, pain during evacuation, assisted digital evacuation. **Cure:** normal defecation **Improved:** more than 50% better **Unchanged:** less than 50% better

Fecal incontinence: Loss of liquid or solid faeces more than once per week. **Cure:** continent **Improved:** more than 50% better **Unchanged:** less than 50% better

Pelvic pain:

- Low abdominal dragging pain
- Low sacral pain
- Deep dyspareunia ache

Cure: no pain **Improved:** more than 50% better **Unchanged:** less than 50% better

Quality of life: How much is your quality of life influenced by your problems?

1 = no restrictions
2 = mild restrictions
3 = clearly restrictions
4 = It has a strong influence on my quality of life
5 = I cannot leave the house

Tremendous improvement: 1 and 2, **Little or no effect:** 3 to 5.

The mean patient age was 62 years (range 43-93), the mean weight 68kg (range 52-113kg). All patients were examined and operated personally by the author. In all cases a cystotonometry including measuring the residual urine followed by an ultrasound check was performed by the author one day before the operation. The amount of residual urine was calculated by ultrasound according to Fischer and Kölbl 1995.[15]

Surgery In all 198 patients a posterior intravaginal slingplasty (pIVS) according to Peter Petros[5] was performed with repair of all 3 DeLancey levels[16] following the surgical principles described by Petros.[17] Additionally the tape was fixed to the sacrospinous ligament on both sides with a prolene suture using a special minimally invasive instrument. Levels 2 ('bridge' repair) and 3 (approximation of perineal bodies) were repaired as required. Patients with stress urinary incontinence (n=66) had a suburethral transobturator sling. In cases of concomitant anterior wall prolapse (n=96) the posterior IVS was combined with insertion of an anterior transobturator 4-arm mesh (ATOM4). The posterior ATOM-arms were attached to the sacrospinous ligaments bilaterally as well.

In contrast to our first study 2004[6] we incorporated patients with (n=66 group "HX") and without previous hys-

terectomy (n=132 group "NO HX"), in order to compare the results.

Inclusion criteria were POP in combination with at least two of the above mentioned symptoms (Table 1) and a follow up of at least one year.

Exclusion criteria were patients with endometriosis, proven organ infection or other obvious pathology explaining symptoms.

Follow up including vaginal examination and ultrasound was performed 5-7 days, 4-6 month and 1 year after the operation, again by the author. At any time the above mentioned associated symptoms were recorded using a standardized questionnaire.

Statistics Pearson chi-square test, Fisher's exact test and Wilcoxon signed rank tests were used to analyze categorical variables and functional results. A p value less than 0.01 was considered to be statistically significant.

RESULTS

The mean operating time entirely for pIVS was 65 minutes (range 51-105 min), in cases with concomitant ATOM4 89 minutes (range 75-115 min). Intra- and postoperatively no serious bleeding was observed. No patient required a blood transfusion. Other severe complications such as rectal perforation, embolic problems, pyrexia did not occur.

The mean hospital stay was 5 days (range 3-9 days). All patients were treated with 600mg Ibuprofen postoperatively every 6 hours, and the following days on demand. One urinary tract infection was observed, within the first week after surgery. This patient was treated with broad-spectrum antibiotics and recovered soon and completely. In 6 patients (3 with and 3 without) TOT a permanent catheter was reinserted for 2-5 days. After at least 5 days the micturition was normal in all cases. Two extraperitoneal haematomas in the cranial rectovaginal space evacuated spontanously. No second surgical intervention was necessary.

Frequency

Table 3 shows that 81% NOHX- and 79% HX-patients had a normal micturition frequency one year after the operation ($p < 0,001$).

TABLE 3. – Daily micturition frequency before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

		< 9	9 to 12	>12
NOHX n=81	pre OP		30 (37%)	51 (63%)
NOHX	one year after OP	66 (81%) *	11 (14%)	4 (5%)
HX n=46	pre OP		18 (39%)	28 (61%)
HX	one year after OP	36 (79%) *	7 (14%)	3 (7%)

Nocturia

One year after surgery only 19% HX- and 21% NOHX-patients had to go to the toilette more than once per night, whereas in 81% (HX) and 79% (NOHX) the situation was normal p<0,001 (Table 4).

TABLE 4. – Micturition frequency during the night before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

		< 2	2 to 4	>4
NOHX n=42	pre OP		24 (56%)	18 (44%)
NOHX	one year after OP	33 (79%) *	6 (14%)	3 (7%)
HX n=46	pre OP		18 (86%)	3 (14%)
HX	one year after OP	17 (81%) *	3 (14%)	1 (5%)

Bladder emptying problems

One year after surgery 80% NOHX and 79% HX patients were cured (Table 5), 12,5% respectively 11% improved and only 7,5% respectively 10% unchanged ($p < 0,001$).

TABLE 5. – Bladder emptying problems before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		normal	improved	unchanged
NOHX n=40	one year after OP	32 (80%) *	5 (12,5%)	3 (7,5%)
HX	one year after OP	22 (79%) *	3 (11%)	3 (10%)

Residual urine

Ultrasound examination selected 23 NOHX and 21 HX patients with more than 50ml residual urine (median = 71ml, range 52 until 210ml) (Table 6). One year after surgery 65% NOHX and 60% HX patients were cured, 26% respectively 30% improved and only 9% respectively 10% unchanged ($p < 0,001$).

TABLE 6. – Residual urine before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		<10 ml	11-50 ml	51-150 ml
NOHX n=23	one year after OP	15 (65%) *	6 (26%)	2 (9%)
HX	one year after OP	13 (60%) *	6 (30%)	2 (10%)

Urge incontinence

One year after surgery 80% NOHX and 80% HX patients were cured (Table 7), 12% respectively 10% improved and only 8% respectively 10% unchanged ($p < 0,001$).

TABLE 7. – Urge incontinence before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		normal	improved	unchanged
NOHX n=25	one year after OP	20 (80%) *	3 (12%)	2 (8%)
HX n=30	one year after OP	24 (80%) *	3 (10%)	3 (10%)

Stress urinary incontinence

One year after surgery 95% NOHX and 92% HX patients were continent (Table 8), 5% respectively 8% improved and no patient unchanged ($p < 0,001$).

TABLE 8. – Stress urinary incontinence before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		normal	improved	unchanged
NOHX n=40	one year after OP	38 (95%) *	2 (5%)	
HX n=30	one year after OP	24 (92%) *	2 (8%)	

Stool outlet obstruction

One year after surgery in 79% NOHX and 81% HX patients the evacuation was normal (Table 9), in 15% respectively 16% improved and in only 6% respectively 3% unchanged ($p < 0,001$).

TABLE 9. – Stool outlet obstruction before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		normal	improved	unchanged
NOHX n=33	one year after OP	26 (79%) *	5 (15%) *	2 (6%) *
HX n=26	one year after OP	21 (81%) *	4 (16%) *	1 (3%) *

Faecal incontinence

One year after surgery 81% NOHX and 79% HX patients were continent (Table 10), 13% respectively 16% improved and only 6%) respectively 5% unchanged ($p < 0,001$).

TABLE 10. – Fecal incontinence before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		normal	improved	unchanged
NOHX n=31	one year after OP	25 (81%) *	4 (13%) *	2 (6%) *
HX n=25	one year after OP	20 (79%) *	4 (16%) *	1 (5%) *

Pelvic pain

One year after surgery 81% NOHX and 79% HX patients were cured (Table 11), 12% respectively 15% improved and only 7% respectively 6% unchanged ($p < 0,001$).

TABLE 11. – Chronic pelvic pain before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		cured	improved	unchanged
NOHX n=132	one year after OP	107 (81%) *	16 (12%) *	9 (7%)*
HX n=66	one year after OP	52 (79%) *	10 (15%) *	4 (6%)*

Quality of life

In 86% NOHX- and 85% HX-patients quality of live has improved tremendously one year after surgery (Table 12). Only 14% respectively 15% reported little or no effect ($p < 0,001$).

TABLE 12. – Quality of life before and 1 year after operation in patients without (NOHX) and with (HX) previous hysterectomy. * difference statistically significant p<0,001.

post op		Tremendous improved	Little or no effect
NOHX n=132	one year after OP	113 (86%) *	19 (14%) *
HX n=66	one year after OP	56 (85%) *	10 (15%) *

Anatomical results

Alltogether 196 out of 198 patients (99%) had a normal vaginal anatomy one year after the operation. 2 out of 132 NOHX-patients (1,5%) with grade 3 posterior wall prolapse and without reconstruction of the anterior wall developed de novo a high grade 2 cystocele postoperatively. Repair of the cystocele one year after the first operation lead to normal results. Compared to the HX-group this result was not statistical significant.

No TOT tape erosion was observed. 2 (1%) small mesh erosions at the anterior wall could be repaired in local anaestesia.

DISCUSSION

In 1946 Martius[1] already pointed out, that "*in 30% of women who had given birth, a POP emerge and that there is no relationship between the quantum of prolapse and the experiencing of symptoms*". Recent observational studies indicate that the prevalence of menopausal patients with POP has increased over the years and ranges now from 31 to 41.1%[18, 19] and lifetime risk of undergoing POP between 11 and 19%[20, 21] because of increased life expectancy.

In the past most POP studies concentrated mainly on altered anatomy. However, we all know patients with major POP, but absence of symptoms and no desire for therapy. Unfortunately the older and current generation of urogynecologists learned from their teachers to recommend an operation to all women with at least grade 2 prolapse. As they had no preoperative symptoms and no eversion of the prolapse, this practice frequently leads to complications so the women feel much worse than before. This practice has to be a thing of the past.

Therefore, in the present study entirely patients with symptomatic POP and a follow up of at least one year are included.

Regarding the symptoms: frequency, nocturia, urge and pelvic pain about 80% of the patients were cured one year after the operation. Concerning dysfunction of bladder and rectum such as stress urinary and fecal incontinence, bladder emptying problems with residual urine, obstructive defecation sugery lead to complete restitution in a range of 60% to 95%. The difference before and after treatment was statistically highly significant. Compared with our data from 2004[10] there was no difference in symptomatic and functional cure rates (Table 13). This is a very important result, because according to the Integral Theory the rationale for the posterior tape is not only the renewal of USL, but also reattachment of the uterus or vagina to the levator plate in order to allow the backward force to open and close bladder and rectum. If the tape is fixed to SSL, this mechanism could be blocked. However, the results show, that Integral Theory still works and the function of the levator plate is not negatively affected by our modified procedure.

In contrast to our first study 2004[10] we incorporated patients with and without previous hysterectomy, in order to compare the results. In literature conflicting data still exist regarding the effectiveness of POP surgery with and without uterine preservation.[22-27] Dietz et al. report that uterine preservation is associated with more apical prolapse recurrences than vaginal hysterectomy at the time of POP-repair.[22] These results conflict with data by Maher et al., who found vaginal sacrospinous hysteropexy to be equally effective for vaginal hysterectomy combined with sacrospinous fixation.[23]

In our study no patient underwent concomitant hysterectomy. However, if the hypothesis is valid that uterus preservation deteriorates the outcome, we would expect better anatomical results in the group with no uterus. However, this was not the fact. We had no recurrence in both groups. Only 2 of the uterus- and none of the no-uterus-group developed a de novo cystocele.

Complications and recurrences are more likely in patients with higher POP grades. A complete protrusion of all pelvic organs, an "enteroptosis", is surgically the greatest challenge. Therefore, when comparing success rates, it is important to take the distribution of POP severity into consideration. According to Swift[28] and Nygaard et al.[29] in normal population only 2-2,5% women provide a grade III and none grade IV prolapse.

By contrast, patients planned for POP surgery present an everting grade III or IV prolapse in 25,5%[30] up to 63%.[31] The distribution in our study for grade III and IV was 62% 2004 and 73% 2015 (Table 13). Despite the high quantity of grade III and IV patients in our recent study the anatomical results are significantly better than 2004.[10] What is the explanation for that?

TABLE 13. – Comparison of symptomatic cure rates 2004 and 2015 for frequency, nocturia, pelvic pain, emptying problems of the bladder and quality of life.

Cure rate	frequency	nocturia	emptying	pelvic pain	quality of life
2004	78%	78%	81%	71%	86%
2015	81%	81%	79%	79%	85%

Our strategy is to reconstruct, on the base of Petros Integral Theory[32] and DeLancey´s three level repair,[16] all damaged compartments simultanously using artificial mesh for damaged ligaments or fascia. This can only be done vaginally.

Bojahr[30] fixed the vaginal or uterine prolapse laparoscopically to the promontorium. His relatively high recurrence or de novo rate is probably due to the fact, that abdominal procedures only allow the repair of the suspension system. In most POP cases, this is not enough, because the supporting base normally is insuffient as well.[33]

Therefore, it is not surprising that Sivaslioglu[34] in a retrospective study comparing vaginal PIVS with abdominal sacrocolpopexy, came to the conclusion that PIVS causes significantly better anatomical and symptomatic results. Moreover, the recent literature shows, that isolated defects in the anterior, apical or posterior compartments are very rare.[20, 35, 36] That means, if in case of complex pelvic floor defects entirely one part undergoes reconstruction, a shifting of pressure occurs causing a prolapse at another place.

As complex reconstruction can only be done vaginally, the next question is: Which vaginal technique is the best?

A multicenter randomized trial, published 2013 by Barber,[31] demonstrates that surgical success rates after sacrospinous ligament fixation (SSLF)[37, 38] or uterosacral ligament vaginal vault suspension (ULS)[39] ranged between 60.5% and 59.2% respectively. In our opinion, these not convincing data are mainly due to to the fact, that damaged tissue was approximated to damaged tissue and not reinforced by artifical mesh. However, recurrence of POP is not only caused by weakness of tissue, but also by disruption of the wound before it has cross-bonded sufficiently. Therefore, in the first few weeks the healing wound has little strength and will give way again without reinforcement. Furthermore, unilateral SSLF pulls the vagina to one side. This potentionally weakens the contralateral side, creating the possibility for enterocele formation.

Our good anatomical results are the consequence of mesh usage with fixation at the SSL bilaterally.

It is well known since decades, that the anterior vaginal compartment is mainly exposed to the abdominal pressure and gravity. Therefore, according to the recent literature, the recurrence rate in this area is the highest among all compartments.[31] Weber et al.[40] and Sand et al.[41] reported anterior colporrhaphy to be successful in the management of cystocele in only 30% and 57% respectively. Thus, an isolated anterior colporrhaphy cannot be recommended any longer. Barber et al.[31] found an anterior recurrence rate of 13,7% after SSLF without mesh-reinforcement. The 2011 Cochrane meta-analysis[42] indicates that the use of transobturator mesh had a significant lower recurrence rate compared with anterior colporrhaphy alone, however is still in a level of 14% vs. 49%.

TABLE 13. – Distribution of prolapse grade in a normal population (Swift, Nygaard) and in prolapse patients with problems (Bojahr, Barber et al, Goeschen).

	grade I (%)	grade II (%)	grade III (%)	grade IV (%)	Normal >1 year after OP (%)
Swift[23]	51	46,5	2,5	0	
Nygaard[24]	34	64	2	0	
Bojahr[25]	23,5	51	24,5	1	77,6
Barber[26]					
USL		37,3	59	3,7	59,2
SSLF		39,3	54,8	5,9	60,5
Goeschen[6] 2004		38	52	10	90
Goeschen 2015 n=198	7,5	19,5	54	19	99

TABLE 14. – Distribution of POP grade in patients with anterior wall deficiency (AWP) n = 96 (100%).

	grade I (%)	grade II (%)	grade III (%)	grade IV (%)
Goeschen 2015 AWP n=96	0	16 (16,5)	61 (63,5)	19 (20)

This means: Mesh support without SSLF and SSLF without mesh lead to better results in the anterior compartment than traditional colporrhaphy. It follows that a combination of both must be the best.

Of our patients 96 (49%) presented a concomitant anterior wall prolapse (AWP) (Table 14), in 83,5% the anterior wall was beyond the hymen. In these patients we reconstructed the posterior wall as already described and inserted aditionally a transobturator 4-arm-mesh, girdled the posterior arms around the cervix or vault and sutured the arms bilaterally to the sacrospinous ligaments. Compared to the recent literature this procedure lead to excellent anatomical results. After 1 year we had no apical or posterior recurrence and only 2 de novo cases anteriorly. In comparison to 2004 we cured 99% in 2015, an improvement of 9% points. This difference is statistically significant and seems to be the logical consequence of synergistic effects.

Still controversial in literature is, whether concomitant incontinence surgery in POP patients is recommendable or not. In the cochrane review 2011 Maher et al. (42) concluded, that the value of a continence procedure in addition to a prolapse operation in women who are continent pre-operatively remains uncertain. On the other hand, studies from Schierlitz (43) and Meschia (44) show, that adding TVT to prolapse operation this group was far more likely to be continent.

Our concept was and is to check all POP patients preoperatively for occult or obvious SUI using cystotonometry and so called simulated operations (45). We recruited 33% POP patients with SUI, in which we performed a concomitant paraurethral TOT.

In comparison to the recent literature with cure rates of 87% on average after TOT (46) we obtained excellent continence rates of 95% for NOHX and 92% for HX patients. No serious complications emerged.

CONCLUSION

In comparison with 2004 our recent data demonstrate, that symptomatic cure rates due to PFS remained at the same high level, even though patients were included

- with almost twice as much major prolapse grade 3-4,
- with and without previous hysterectomy
- and with modified surgical technique.

These variables had no negative effect on functional or symptomatic cure rates. However, the modified surgery, meanwhile confirmed by Caliskan et al.,[47] lead to a statistically significant improvement of the anatomy and decrease of recurrence rate.

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Multidisciplinary UroGyneProcto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in *Pelviperineology* are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons** or **other Specialists**, with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

THE COLORECTAL SURGEON'S OPINION

Goeschen's article describes the results of the posterior fornix syndrome treatment by a modified posterior IVS pelvic reconstruction. It reported a significant reduction in recurrence of POP at one year compared with posterior IVS only, while maintaining similar cure rates of pelvic pain and urological and proctological symptoms (nocturia, urgency, difficult bladder emptying, obstructed defecation, fecal incontinence). This paper is quite intriguing for the proctologist's traditional opinions on the posterior compartment dysfunctions.

Fecal incontinence has a 38% incidence in patients following hysterectomy, significantly higher than those with their uterus intact (23%), while fecal outlet obstruction presents roughly similar percentages, 35% vs 40% respectively. This confirms, according to the *Integral Theory*, that preservation of the uterus is of the outmost importance to support fibro-muscular vaginal structures in the posterior compartment, and therefore in the long-term to prevent vaginal prolapse, urinary and faecal incontinence. Other factors, in addition to the musculo-fascial weakening, could however contribute to obstructed defecation as various degrees of rectal mucous prolapse, intussusception, symptomatic rectocele, enterocele. The percentages of success as far as the posterior compartment, appear to be significant. For fecal incontinence success rate in patients with or without prior hysterectomy was 79% vs 81%, in obstructed defecation 81 vs. 79%. The study does not show clearly what kind of functional and morphological assessments were performed at the anorectal level, such as scores for incontinence and constipation, proctoscopy, endoanal ultrasound, anorectal manometry, defecography to highlight the extent of any prolapse and intussusception and to assess the integrity of the sphincters. These conditions in the long-term may lead to relapse and supposedly to complete rectal prolapse.

According to the *Integral System* proposed by Petros, the connective tissue plays a role in the ano-rectal opening and closure, and consequently in idiopathic fecal incontinence. The pubococcygeal muscle and the perineal body anchor the anterior wall of the rectum during defecation, while both the pubo-urethral ligaments (PUL) do the same with the levator plate (LP) during muscle contraction, and similarly, during the anorectal closure, the utero-sacral ligaments (USL) with the longitudinal muscle of the anus (LMA). When PUL and USL are damaged, LP and LMA respectively lack structural support at the insertion points, and dysfunction of opening and closing of the anus may occur. When forces directed inferiorly do not form the anorectal angle, fecal incontinence may result. Lax ligaments can also weaken the force directed posteriorly required during the contraction of the muscles for opening the anorectal canal, so causing obstructed defecation. In some way these concepts could clarify many aspects of the etiology and pathogenesis of the so called idiopathic constipation.

Therefore, according to the *Integral System*, symptoms of the posterior compartment such as obstructed defecation and fecal incontinence can be treated by reinforcing the anchoring points of the LP and LMA to the USL and PUL. With regard to fecal incontinence the impact of damage to the pelvic musculature and the external anal sphincter would seem to be smaller since just the reinforcement of the USL results in an improvement of symptoms in 80% of cases. The complex lesions of the pelvic floor rarely involve a single compartment, and therefore it appears consistent with the principles of the *Integral System* to correct all the defects, in order to avoid the onset of problems in the areas not covered. The *Integral System* emphasizes the role of connective tissue as the most vulnerable element in the pelvic floor, and the need of its involvement in issues related to any surgical corrections.

Also in the past, theories were developed trying to unify the pelvic floor dysfunctions. According to the "Unifying concept of pelvic floor disorders and incontinence"[1] the central problem was varying degrees of denervation of the pelvic floor muscles, triggered by predisposing factors such as childbirth and chronic straining, as documented with biopsies of muscle tissue and electrophysiological studies. Shafik was the first author to realize the functional interactions among the pelvic organs, starting from research on the phyisioanatomy of the pelvic floor muscles. He demonstrated the important role of the longitudinal muscle in the mechanism of defecation, as was later taken over by the *Integral Theory*.[2-4]

Pelvic floor anatomy and function are still difficult to interpret. As well, it is not easy to formulate guidelines for a diagnostic-therapeutic orientation shared and accepted by all surgeons. Short-term results of total reconstruction of the pelvic floor in the treatment of POP are encouraging, with percentages around 80% for FI and ODS correction. It will be interesting also to see the long-term results. For the colorectal surgeon transabdominal (LS or LT) recto- and colpo-pexies seem to have a lower morbidity and a lower incidence of recurrence, so the practical application of the principles of the *Integral System* need to be encouraged in the proctologic field, where, at the moment the role of conservative treatment (rehabilitation, SNS) is highly regarded both in constipation and in fecal incontinence.

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