

Interactive clinical teaching/discussion module

Application of the Integral System to the management of complex pelvic floor cases

WILLIAM LYNCH, PETER PETROS (pp@kvinno.com)

University of NSW, Kensington, Sydney

Background The Integral System is an entirely anatomical method which attributes causation of prolapse, bladder and bowel symptoms to laxity in four suspensory ligaments of the vagina and the perineal body. Its components are

1. A patient administered validated questionnaire to detect abnormal symptoms (Appendix). Positive symptoms are annotated onto the algorithm.
2. A diagnostic pictorial algorithm (Figure 1) guides diagnosis of damaged ligaments and surgery.
3. Simulated operations (Figure 2), specific ligaments are digitally supported to check the diagnosis suggested by figure 1.
4. Site specific ligament repair inserts polypropylene tapes which shorten and strengthen one of 4 lax suspensory ligaments or perineal body (Figures 3).

The algorithm, examination and simulated operation charts are available free online from www.integraltheory.org.

Comments. The report being placed online (www.pelvip erineology.org), comments and questions to the authors are invited.

Patient. Ms JC aged 74. presented with a 5 year history of urine loss with coughing, laughing, exercise, urgency, urge incontinence up to twice per day, nocturia 6-7 times/night and bladder emptying difficulty.

There was no pelvic pain and no history of previous surgery. She was assessed using the questionnaire, algorithm (Figure 1) and simulated operation chart (Figure 2).

Diagnosis. The symptoms from the questionnaire (see Appendix) were entered into the diagnostic algorithm (Figure 1), which showed potential ligamentous defects in the anterior, middle and posterior ligaments of the vagina.

On examination

Anterior zone Lax hammock; urine loss on coughing controlled by unilateral upward pressure at midurethra,

Middle zone 2nd degree high cystocele with cardinal ligament defect.

Posterior zone 1st degree uterine prolapse.

Simulated operations (Figure 2) were performed in the clinic to confirm the algorithm's indicated diagnosis.

These tests are always performed with a full bladder, checking the diagnosis by digitally supporting specific ligament insertion sites to check for change in symptoms.

There was relief of USI (urinary stress incontinence) by supporting the pubourethral ligaments (positive midurethral cough test). Relief of urgency was achieved by supporting the pubourethral ligaments, uterosacral ligaments (apex) with the lower blade of a bivalve speculum and digital support of the bladder base (cardinal ligaments).

Operation 24th May 2013

Immediately prior to surgery, the 9 potential anatomical defects (Figure 1) were checked while the patient was on the operating table, as frequently anatomical defects are detected which were not present in the outpatient examination.

The damaged ligaments were repaired on 24th May 2013 using the TFS system: a minimally invasive, single incision tensioned sling system to repair pubourethral, cardinal and uterosacral ligaments (Figures 3, 4). The patient was operated on in the afternoon and discharged the next day on paracetamol only. She was advised to "listen to her body", rest where required and avoid any lifting for at least 6 weeks. She could, however, undertake light household duties, drive her car and go shopping after a week.

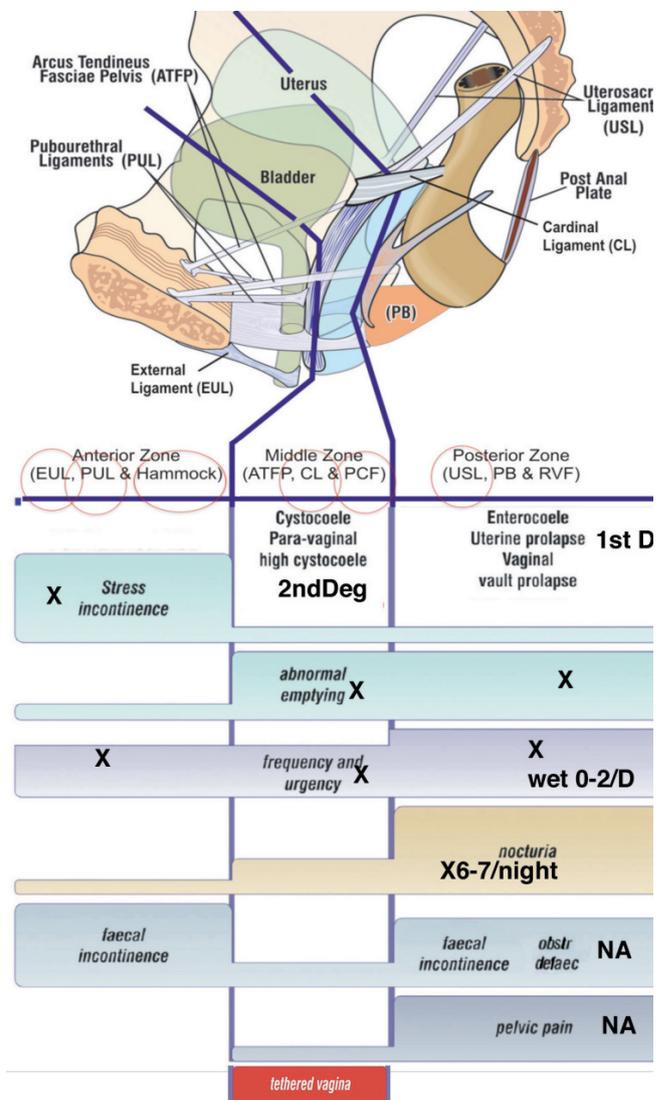
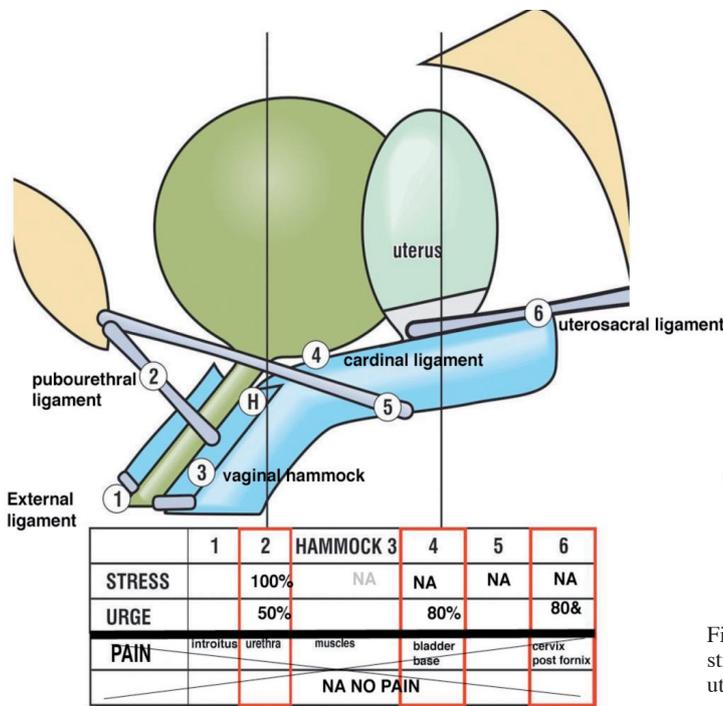


Figure 1. - Diagnostic pictorial algorithm relates symptoms to specific ligament damage in 3 zones of the vagina. The positive answers to questions from the questionnaire were ticked in the algorithm as are the specific anatomical defects diagnosed on vaginal examination (red circles).



% SIGNIFIES % RELIEF OF SYMPTOMS ON APPLYING PRESSURE OVER SPECIFIC LIGAMENTS

Figure 2. - The simulated operation chart. Supporting specific ligaments may relieve urine loss with coughing (pubourethral ligament) or urgency. These are annotated as % relief of the urgency symptom on supporting the pubourethral, (retropubic) cardinal (support of bladder base) or uterosacral ligaments (apex) digitally or with the lower part of a bivalve speculum. In this instance, relief of urgency by supporting the insertion sites of pubourethral ligament "1", cardinal ligament "2", uterosacral ligaments "6" indicated that they may have a role in the causation of urgency and so need to be reconstructed. Specific painful "trigger points" are detailed in the pain section of the chart, but were not relevant for Mrs JC.

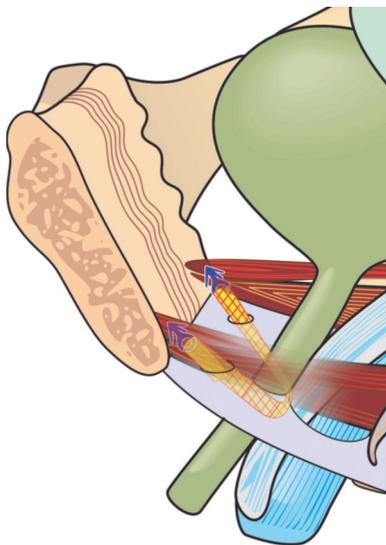


Figure 3. - Midurethral TFS sling reinforces the pubourethral ligament. The anchors are retropubic and insert behind the perineal membrane into the soft tissues in the lower 1/3 of the posterior part of the symphysis at the insertion point of the pubourethral ligaments.

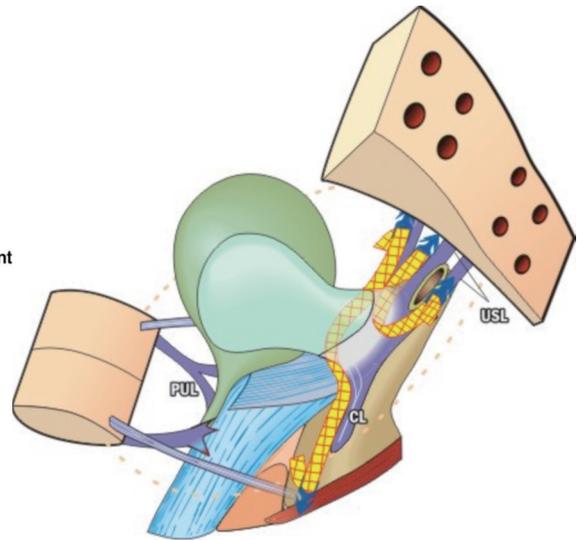


Figure 4. - Cardinal and Uterosacral TFS. The TFS shortens and strengthens the cardinal and uterosacral ligaments. It suspends the uterus apex and rectum and reglues the rectovaginal fascia to the posterior cervical ring. The cardinal ligament TFS resuspends the uterus and vagina to the pelvic side wall and reglues the anterior vaginal wall to the anterior cervical ring.

Post-operative notes 25.5.13

The patient was discharged the day after surgery.
 "Bit of a sore tail. More to one side. Getting better."
 "No USI." "Nocturia x 3-4 " "Emptying better than before."
 "Not so much urge. Can hang on. "

Post-operative notes 30.5.13

"No bleeding. Pale pink." "No USI." "Nocturia now x1-2."
 "Emptying fully now. Don't have to go back." "Getting better No analgesia."

Post-operative notes 20.10.13

"No USI." "Nocturia x1, occasionally x2". "Emptying fully." "No urgency or UI".

General comment by patient. There was immediate cure as regards urine loss with effort and major improvement in urgency, emptying and nocturia within a few days. There was very little post-operative pain and gradual further improvement of bladder symptoms over the next few weeks.

Comments from the surgeon. This patient had major symptoms associated with minimal prolapse. Symptoms were cured using the same operations as used for major 3rd & 4th degree organ prolapse by applying the Integral System which is summarized in Figure 2. The algorithm links specific symptoms and prolapse to specific damaged ligaments in 3 zones of the vagina, anterior (external meatus to bladder neck), middle (bladder neck to cervix) and posterior (cervix to perineal body).

The TFS works by tightening loose suspensory ligaments. These are essentially the insertion points of the three directional forces which activate urethral/anorectal closure and opening.

"Repair the structure and you will restore the function" - Integral System.

APPENDIX

Patient Questionnaire

Self administered patient questionnaire

Part I Personal Details

Name: _____ Date: _____
 Address: _____ Date of birth : 27.5.39
 Weight : _____ kg Telephone: _____
 Number of vaginal deliveries (4)
 Number of caesarean sections (0)

Part II Symptoms

Describe in your own words your main urinary symptoms and duration:

Urine loss coughing, jumping, running. Sometimes wets prior to arrival toilet.
Gets up 3-6/night. Always wears thick pads.

All sections: tick appropriate square. Write extra details if you wish.

A. Stress Incontinence (SI) Symptoms		No	Yes some-times	Yes 50% or more
Do you lose urine during:				
(A)	Sneezing	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> *
(A)	Coughing	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> *
(A)	Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> *
	(1) Walking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(A)	(2) Stooping, squatting or getting up from a chair	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(P,M) Symptoms of deficient emptying				
(3)	Do you feel that your bladder isn't emptying properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(3)	Do you ever have difficulty starting off your stream?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(3)	Is it a slow stream?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(3)	Does it stop and start involuntarily?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

* Note to physician: the filter '50% or more' (column 3) has a proven correlation for SI being caused by anterior zone defect. For all other symptoms a 'sometimes' notation is sufficient to attribute a symptom to a particular zone. 'A', 'M' and 'P' indicate the zone of causation and where the symptoms should be transcribed on the Diagnostic Summary Sheet (fig 3-03). Numbers in parentheses refer to notes at the end of the questionnaire.

Urge symptoms:		No	Yes some-times	Yes 50% or more
Do you ever have an uncontrollable desire to pass urine?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If so, do you wet before arriving at toilet?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If so, how many times a day do you wet? (Write number)				
	Good day	0		
	Bad day	2		
How much?	A few drops	No	Yes	
	A teaspoon full	No	Yes	
	A tablespoon or more	No	Yes	<input checked="" type="checkbox"/>
(4)	Do you have pain while passing urine?	No	Yes	
(P)	How many times during the night do you get up to pass urine?	X 6-7		
	How many times do you pass urine during the day? (Write number)	15		
(A, M)(5)	In the morning do you wet immediately on getting out of bed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(A) (5a)	Did you wet the bed as a child but not after puberty?	<input checked="" type="checkbox"/> No	Yes	
(P) (5b)	Did your problems begin soon after puberty?	<input checked="" type="checkbox"/> No	Yes	
(P) (5c)	Are your symptoms worse before a period ?	NA	No	Yes

<i>Bowel symptoms:</i>			
(A,P) (6a) Do you have difficulty evacuating your bowels?	<input checked="" type="checkbox"/> No	Yes	
(A,P) (6b) Do you ever soil yourself (faeces)?	<input checked="" type="checkbox"/> No	Yes	
wind	<input checked="" type="checkbox"/> No	Yes	
liquid faeces	No	Yes	
solid faeces	No	Yes	
<i>Social inconvenience:</i>			
(A,P) (7) Are you 'moist' with urine much of the time?	No	Yes	<input checked="" type="checkbox"/>
(8) Do you leave puddles on the floor?	<input checked="" type="checkbox"/> No	Yes	
Do you lose urine in bed at night?	<input checked="" type="checkbox"/> No	Yes	
Do you wear a pad or liner on going out? (Circle) Never /sometimes /always			<input checked="" type="checkbox"/>
If so, how many pads/liners per day? (Write number)	2		
<i>Previous operations: (circle the answer which matches)</i>			
(P) (9) Have you had a hysterectomy?	<input checked="" type="checkbox"/> No	Yes	
If so, when? (write date) _ _ _ _			
(10) Have you had previous surgery for incontinence?	<input checked="" type="checkbox"/> No	Yes	
If so, when? (write date) _ _ _ _			
Are you <u>better</u> or <u>worse</u> since? (Circle)	Worse	Better	
(10) Have you had previous vaginal surgery?	<input checked="" type="checkbox"/> No	Yes	
If so, when? (write date) _ _ _ _			
(P)(11) <i>Pelvic pain</i>	No	Yes some- times	Yes 50% or more
Do you have deep pain on intercourse?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you have a pain down at the bottom of your spine?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you have a pain down at the bottom of your abdomen?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Do you have pain at the entrance to your vagina?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Quality of life grading</i>			
Please circle a grading between 1 and 5 to describe the effect that incontinence has on your normal activities. 1 is low impact, 5 is high impact.			
1 = normal			
2 = mild, no effect on lifestyle			
<input checked="" type="checkbox"/> 3 = can't drink, must locate toilets on going out			
4 = always wears pads, very restricted social life			
5 = totally housebound.			

Explanatory Code for Physicians - Significance of '50% filter' (column 3)

Symptoms vary because control is a non-linear interaction of 'mechanical' and 'neurological' phenomena. Therefore when transcribing the response data to the Diagnostic Summary Sheet (figure 3-03), a 'sometimes' response is taken as a positive indication. The exception is stress incontinence (column 3). A tick in column 3 is required for a positive response because of proven correlation of the 50% filter with pad test results. The significance of the 50% filter for the other symptoms has yet to be tested statistically.

Explanatory Notes for the Numbers Preceding the Questionnaire Responses

- 1) This is usually caused by low urethral pressure (ISD) but may be from lax posterior zone.
- 2) If there is minimal SI with coughing, it is termed 'paradoxical leakage'. In age group >70 yrs generally due to PUL (pubourethral ligament) defect. Exclude tethered vagina syndrome in patients with previous vaginal surgery if a tight scar at bladder neck.
- 3) USL (uterosacral ligament) cystocele, but also after excessive bladder neck elevation, or tight suburethral sling.
- 4) Exclude UTI, chlamydia, etc.
- 5) Generally PUL defect even with previous operation, but exclude tethered vagina if tight scar at bladder neck.
- 5a) This condition runs in families. It indicates congenital PUL weakness.
- 5b) & 5c) The cervix softens to allow menstruation to pass, weakening the anchoring point of USL.
- 6a) Posterior zone defect (perineal body/ rectocele/USL) and sometimes PUL.
- 6b) Defective PUL/USL and/or anal mucosal prolapse (descending perineal syndrome).
- 7) Low urethral pressure - usually with lax suburethral vagina (80%), but can be caused by lax posterior zone (20%).
- 8) This may be defective PUL, but may be also due to USL defect.
- 9) Suspect posterior zone defect especially in age group > 60 years.
- 10) Think of tethered vagina syndrome in patients with positive answers for '5' and '2' who have scarring or tightness at bladder neck.
- 11) Posterior zone defect.
- 12) Vulvar vestibulitis which may also be caused by posterior zone defect.