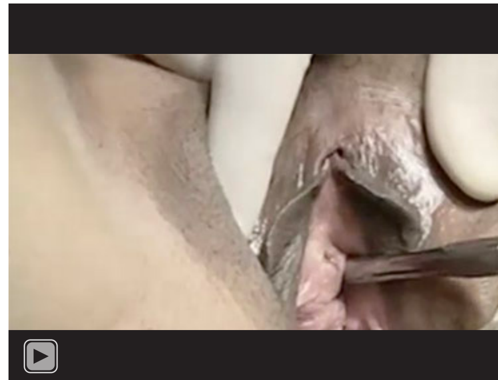
Supplementary

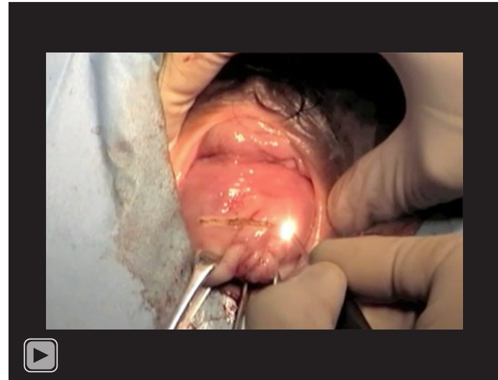
Video S1 Overview.

Video S2 Diagnostic algorithm.

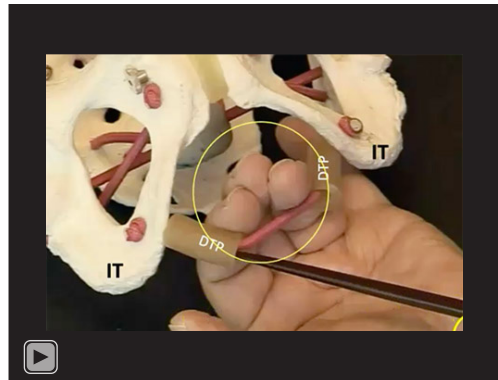
Video S3 Integral Theory System Questionnaire.



Video S4 Hemostat support of PUL for diagnosis of stress incontinence by permission of Professor Paolo Palma.



Video S5 Role of both cardinal and uterosacral ligaments for uterine support by permission of Professor Yuki Sekiguchi.



Video S6 Structural support of perineal body.

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Appendix 1 Explanatory notes for the clinician

A, **M or P** indicate the zone of damage, **A**nterior, **M**iddle, **P**osterior.
TVS indicates tightness in bladder neck area of vagina "**T**ethered **V**agina syndrome".
Significance of filters, (none, sometimes, more than 50%)
Symptoms vary: 'sometimes' indicates something is wrong; it needs marking as positive when transcribing to the pictorial algorithm.

1 May be from lax EUL / hammock (urethral sealing mechanism). If so, often the patients report leakage "like a bubble of air escaping". 2 Pubourethral ligament damage. In the age group >70 years with no previous surgery, some urine loss may occur on getting off a chair, with minimal loss on coughing, generally due to PUL (pubourethral ligament) atrophy. If previous vaginal surgery or Burch, it can be Tethered Vagina Syndrome. Check Q.5.
3. USL laxity (enterocele, apical prolapse) may be slight. Cystocoele associated with USL laxity, but can occur after excessive bladder neck elevation or an overtight midurethral sling.
4 Exclude UTI; also, cystocele for repeated UTIs, occasionally, chlamydia. Any zone defect may cause urgency: **A** = "mixed" incontinence (urge plus SUI); **M** = cystocele (cardinal ligament); **P** = uterine/apical prolapse (USL laxity). **Nocturia and chronic pelvic pain are specific for USL defect.**
5. Exclude Tethered Vagina Syndrome (TVS) which is iatrogenic, middle zone tightness, from previous vaginal surgery or overtight Burch (tight scar at bladder neck). Classical symptom is massive urine loss immediately on getting out of bed in the morning. There is usually minimal SUI with coughing and minimal descent of bladder base on straining with ultrasound; with Burch, look for upward slope of distal vagina. Excess vaginal scarring (TVS) from Obstetric Fistula is a key cause of ongoing massive incontinence after fistula cure.
6. Congenital PUL weakness - persisting incontinence after bedwetting as a child, also in males. This condition runs in families.
7. Indicates borderline USL defect worsened by softening of the cervix at onset of menstruation to allow egress of blood loosens USL anchoring point. Other pelvic symptoms may occur (urge, nocturia, chronic pelvic pain).
8a. Posterior zone defect (USL). If defecation requires digital support of the perineal body, look for low rectocoele, perineocele, descending perineal syndrome (DPS). DPS is caused by weak or elongated deep transverse perinei ligaments which attach PB to medial side of descending ramus at the junction of the upper 2/3 and lower 1/3.
8b. Defective USL and /or anal mucosal prolapse. PUL as cause if patient has BOTH SUI and FI or if cough FI can be controlled by a finger or hemostat applied immediately behind the symphysis.
9. Hysterectomy. Look for posterior fornix syndrome (PFS) symptoms - PFS often appears in severe form after the menopause.
10. Chronic pelvic pain is specific for USL defect. It co-occurs in multiple sites, all of which can be relieved at the same time with a positive speculum test.

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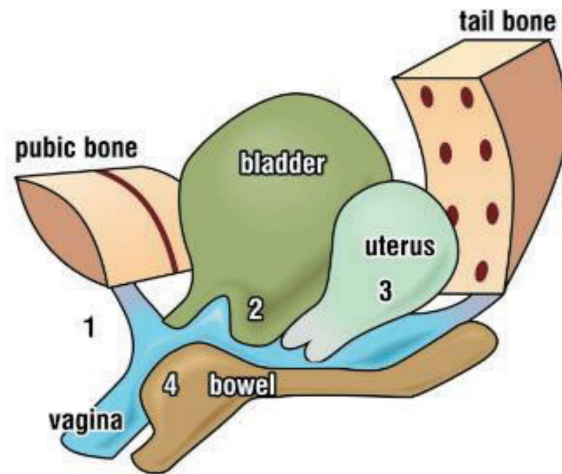
Appendix 2 Clear copy of the Diagnostic Algorithm of the Integral Theory



Anterior ligaments (PUL & EUL)

Middle ligaments (ATFP & CL)

Posterior ligaments (USL & PB)

cystocoele

rectocoele

uterine/apical prolapse

stress incontinence

abnormal emptying

frequency and urgency

nocturia

faecal incontinence

faecal incontinence

obstructed defecation

pelvic pain

tethered vagina

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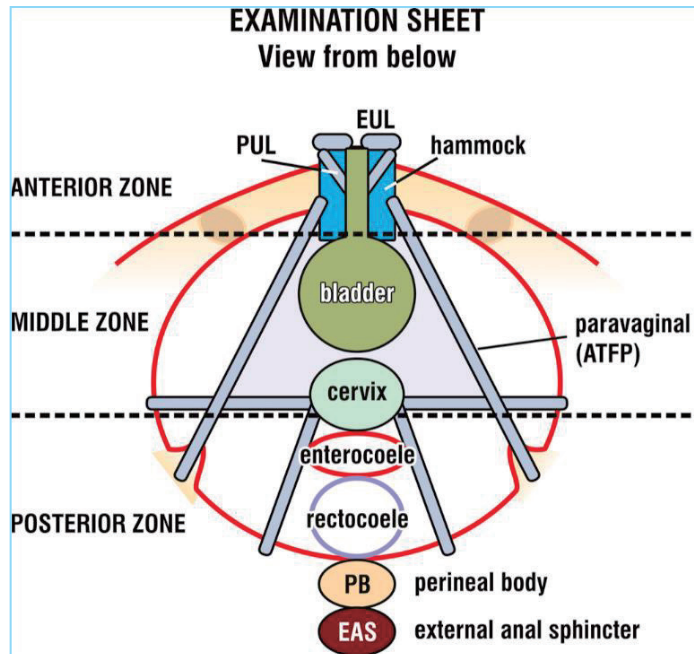
Appendix 3 Clear copy of the examination sheet



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Appendix 4 Clear copy of the ITSQ Pelvic Floor Symptom Questionnaire

Date:

Name		**Date of birth**	
		Weight	
Address			
Telephone		**Email address**	
Number of **VAGINAL** Deliveries *(N means none)*	**N/**	Number of **CAESAREAN** Sections *(N means none)*	**N/**

Describe in your own words your main symptoms and their duration.

FOR ALL SECTIONS *mark the appropriate box with an* ***'x'*** *– Write extra details if you wish.*

		No	Yes sometimes	Yes 50% or more
1.	**(A) S.I. SYMPTOMS** **(A)** Do you lose urine during sneezing, coughing, exercise?			
	(A) During intercourse?			
	(A) Stooping, squatting or getting up off a chair?			
1b	**(A)** Walking?			
2	**(M,P) SYMPTOMS OF DEFICIENT EMPTYING** **(M,P)** Do you feel that your bladder isn't emptying properly?			
	(M,P) Do you ever have difficulty starting off your stream?			
3.	**(M,P)** Is it a slow stream?			
	(M,P) Does it stop and start involuntarily?			
	(A,M,P) URGE SYMPTOMS **(A,M,P)** Do you ever have an uncontrollable urge to pass urine?			
	If so, do you wet before arriving at the toilet?			
	If so, how many times do you wet? *(Write the number of times)* average day **( )** good day **( )** bad day **( )**			
	How much? *Circle 1, 2, 3 or 4.* 1. a few drops 2. teaspoon 3. tablespoon or more 4. Wets floor			
	(A,M,P) FREQUENCY SYMPTOMS **How many times** do you pass urine during **THE DAY**? *(Write the number of times)* average day **( )** good day **( )** bad day **( )**			
	(P) **How many times** do you get up during **THE NIGHT** to pass urine? *(Write the number of times)* average night **( )** good night **( )** bad night **( )**			
	Choose either Yes or No		**No**	**Yes**
4.	**INFECTION** Do you have pain while passing urine?			

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5.	**(TV) SUSPECT TETHERED VAGINA** **(TV)** Any previous **VAGINAL** surgery or **BURCH** operation? *Circle either Vaginal or Burch above*. When? **( )**			
	If so, do you lose urine uncontrollably immediately on getting out bed in the morning?			
6.	**CONGENITAL** (A) Did you have bladder problems as a child? ***If so, tell us about it.***			
	(P) Did you have problems of pain or frequency or getting up at night after puberty?			
7.	**HORMONAL** **(P)** Are your pain, urge, emptying symptoms worse before or during a period?			
8a.	**BOWEL SYMPTOMS** **Constipation** **(P)** Do you have difficulty evacuating your faeces?			
	(Perin. Body) Do you have to manually assist when you empty your bowels?			
8b.	**Faecal incontinence** **(A,P)** Do you ever soil yourself (faeces)? *Indicate how often soiling occurs from any of the following in a 24-hour period.* wind **( )** liquid faeces **( )** solid faeces **( )** each day**( )** each week **( )** each month **( )**			
9.	**(M,P) PROLAPSE** **(M,P)** Do you feel a lump protruding from your vagina **without pushing?**			
	Do you feel the lump **on pushing coughing or lifting?**			
	(P) Have you had a HYSTERECTOMY? If **'YES'** when? **( )**			
10.	**Pelvic Pain**	**No**	**Yes Some-times**	**Yes 50% or more**
	(P) Do you have deep pain on intercourse?			
	(P) Do you have a pain down at the bottom of your spine?			
	(P) Do you have a pain down at the bottom of your abdomen?			
	(P) Do you have pain or burning at the entrance to the vagina?			
11.	**(QOL) QUALITY OF LIFE** **(A)** Are you **'moist'** with urine much of the time?			
	(A,M,P) Do you leave puddles on the floor with urge?			
	(A,M,P) Do you lose urine in bed at night?			
	Do you wear a pad or liner on going out? How many pads/liners used per day? *(write number)* **( )**			

Grading

We use a grading of **1-5** to describe limitation of normal activities by your incontinence problem.

Circle or indicate the number below which best describes how you feel about this condition.

1	2	3	4	5
normal	**mild** No effect on lifestyle	**significant** Can't drink, must locate toilets when out	**restrictive** Must always wear pads, very restricted social life	**totally housebound**

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12. In the next section, we ask you to perform a simple test to see if your pain, urge, nocturia are related to loose ligaments in the back part of your vagina. This test is not compulsory, but it can give information about your condition which may help you. Buy some **large menstrual tampons** from the pharmacy. *Without discomfort*, insert one or if possible two tampons into the back part of the vagina. **It is important that you have a full bladder when the test is done.** Then fill in the squares below. *NOTE: If you get up at night to pass urine more than once (nocturia), go to bed with the tampon inside and see if it makes any difference to your nocturia.*			
(P) AFTER INSERTION OF TAMPON/S	**CHANGE IN SYMPTOMS**		
	None	**Yes 25%**	**Yes 50% or more**
1. Feeling of urgency			
2. Bladder pain			
3. Pelvic or vaginal pain			
4. Nocturia (write the number of times)			

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Appendix 5 Further references which surgically validate the predictive value of the diagnostic system

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