Committee 8 A

Physical Examination

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I. INTRODUCTION

Urinary incontinence (UI) may be a social concern for individuals of all ages and both sexes. This chapter addresses primarily the role of physical examination in adult women who present with complaints of urinary incontinence. During the initial encounter the patient's history, urinary symptoms, urinalysis, and physical examination are all considered before initiating further evaluation or instituting therapy. In addition to urinary complaints, women may have symptoms relating to bowel function, sexual function, and pelvic organ prolapse (POP). Jackson et.al. evaluated 247 women with either UI or POP. Thirty one percent of women with UI and 7% with POP had concurrent anal incontinence (AI) [1]. In a report from Sweden, 62% of 21 consecutive women undergoing a Burch colposuspension for genuine stress urinary incontinence had concurrent fecal incontinence [2]. In a Norwegian study of women presenting with a complaint of urinary incontinence (UI), 38% of the women were found to have significant prolapse and 19% reported fecal incontinence [3]. All these aspects of the pelvic floor and pelvic floor function must be included to plan a comprehensive treatment strategy.

Presently there are few scientific data documenting the parameters of a normal pelvic examination in women of various ages and with various obstetrical histories. The components of the examination have not been universally agreed upon. It seems intuitive the examination should include an assessment of the bony architecture, pelvic floor muscle tone and muscle mass, connective tissue support, the epithelial lining of the vagina, the size, location, and mobility of the uterus, the adnexal structures, and innervation of the pelvic floor structures.

Since the first edition of this book, Samuelsson and colleagues studied the prevalence of genital prolapse and possible related factors in a general population of Swedish women ages 20-59 [4]. The prevalence of prolapse was 31%; however, only 2% of all women had a prolapse that reached the introitus. Increasing age, decreasing muscle strength, and parity were all associated with the presence of prolapse. The anterior compartment was the most frequently affected vaginal segment. DeLancey and Hurd reported that when matched for age and parity women with pelvic organ prolapse have a larger genital hiatus than women with no prolapse [5]. In addition, they found women with recurrent prolapse after pelvic surgery have a larger genital hiatus than women cured by surgery. Howard and associates tested vesical neck descent in 3 groups of women during a cough and during Valsalva's maneuver [6]. They found incontinent women have similar vesical neck mobility with both maneuvers. Continent women have less vesical neck descent with a cough than with Valsalva's maneuver.

There are few data linking bladder, bowel, or sexual function to variations in the examination of women seeking routine gynecologic care. Data on women with complaints of urinary incontinence do not include detailed, specific information about their pelvic examinations. No data exists documenting outcomes of surgical management with specific observations on preoperative physical findings such as support of the urethra and bladder, muscle function, and quantified effects of estrogen hormone on the genitourinary epithelium.

Recognizing these shortcomings in our knowledge of what is normal and how findings change with age, we presume that function and physical examination findings are related in certain individuals. For example, women with genuine stress urinary incontinence and

poor support of the urethrovesical junction may respond to surgical therapy which corrects the poor support and consequently improves the function of the urethra and urethrovesical junction. On the other hand, women with genuine stress incontinence and normal support of the urethra may not respond as well to the same surgical procedure and may require a different surgical intervention [7] In some situations, women are cured of their stress urinary incontinence, but acquire significant pelvic support defects such as enterocele, cystocele, or vaginal vault prolapse subsequent to their surgery for stress urinary incontinence [1] [8-13] Not only do women develop postoperative support defects, they may also acquire functional complaints with urgency and emptying phase abnormalities (Table 1 [10-14] and Table 2 [9].

Weber and associates evaluated sexual function and vaginal anatomy in 165 women before and after surgery for pelvic organ prolapse and urinary incontinence [15]. Forty-one percent were not sexually active before or after because they had no partner, had medical illnesses, or for various other reasons. In those who were sexually active, they found no clinically significant change in vaginal dimensions. Furthermore, sexual function and satisfaction improved or did not change in most women postoperatively. The exception was dyspareunia in 38% of women who had a combination of a Burch retropubic repair and a posterior colporrhaphy. But, we recognize that posterior colporrhaphy itself has a high degree of patient dissatisfaction and this is the reason for the current interest in the defect specific posterior repair [16]

It seems self evident that, women who meet the criteria for surgical therapy for genuine stress urinary incontinence should be evaluated for co-existing pelvic organ prolapse and defecatory dysfunction. They may require attention to all anatomic and function abnormalities in order to be treated in a comprehensive manner.

Table 1 : Functional and Anatomic Outcomes of Colposuspension and Paravaginal Repair

Author	No.Patients	years follow up	% cure S.U.I	% new or persistent cystoceles	% other pelvic support defects	% *de novo* D.I.
Stanton SL Cardozo LD [14]	88	1	87 obj.	11	—	6
Alcalay M Stanton SL Monga A [16]	109 of possible 366	10-20	69 obj.	7.4	27%	15
*Galloway NTM [10]	50	>3	84 obj.	—	8%	14%
**Colombo Maggioni Caruso [13]	284	>3	86 obj.	—	Approx. 30%	—
Shull BL Baden WF [12]	149	>1.5	97 subj.	5.4	10%	4%

** 44% cured with no complications ** 54% cured with no complications*

Table 2 : Anatomic Support Defects Following Colposuspension

	%Cystocele		%Rectocele		%Enterocele		%Uterine Prolapse	
	Preop	Postop	Preop	Postop	Preop	Postop	Preop	Postop
Group 1								
Mild	50	37	52	54	17	21	23	27
Marked	22	2	14	12	—	5	1	5
Group 2								
Mild	52	29	46	40	1	2	36	15
Marked	43	3	17	29	—	20	—	47

Group 1 - 96 patients who did not require additional surgery for genital prolapse after colposuspension.
Group 2 - 35 patients who did require further surgery for genital prolapse following colposuspension. [9]

Kjølhede and associates performed a prospective observational study of 21 women who underwent a retropubic colposuspension for genuine stress urinary incontinence [17]. No concomitant prolapse repair was performed. In a median time of 2 years following the colposuspension, 29% of the women had undergone subsequent surgery for pelvic organ prolapse. They concluded the colposuspension seemed to accelerate the deterioration of associated pelvic floor support defects.

Historically, one of the major deterrents to the scientific study of pelvic organ prolapse has been the lack of an accepted, objective, and validated system for describing the spectrum of pelvic support in individual patients and in study populations. In recognition of this problem, the International Continence Society (ICS) established an international, multi-disciplinary terminology standardization committee for prolapse in 1993. The committee devised a site-specific quantitative description of support that locates 6 defined points around the vagina (2 anterior, 2 posterior, and 2 apical) with respect to their relationship to the hymen (Figure 1).

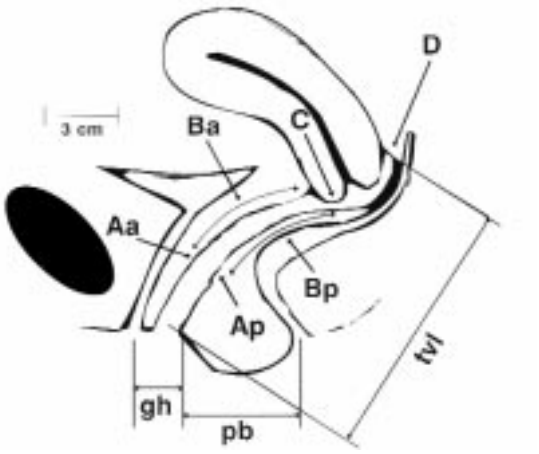

Figure 1 : Six sites (points Aa, Ba, C, D, Bp, and Ap), genital hiatus (gh), perineal body (pb), and total vaginal length (tvl)used for pelvic organ support quantitation.

Once measurements are obtained, subjects are assigned to one of five ordinal stages as follows:

Stage 0 - no prolapse is demonstrated, i.e., all points are at their highest possible level above the hymen;

Stage I - the criteria for Stage 0 are not met but the most distal portion of the prolapse is more than 1 cm above the level of the hymen;

Stage II - the most distal portion of the prolapse is 1 cm or less proximal to or distal to the plane of the hymen;

Stage III - the most distal portion of the prolapse is more than 1 cm below the plane of the hymen but protrudes no further than two centimeters less than the total vaginal length in cm; and

Stage IV - essentially complete eversion of the total length of the lower genital tract is demonstrated. In addition, the system calls for three other measurements: the anterior-posterior length of the genital hiatus and the perineal body and the total vaginal length (Figure 2).

Prior to its acceptance, reproducibility studies in six centers in the United States and Europe were completed, documenting the inter- and intra-rater reliability and clinical utility of the system in 240 women [18-22].

More recently, several authors have compared the severity of pelvic organ prolapse between examinations performed in the lithotomy position and other positions. Swift and Herring directly compared pelvic organ prolapse quantification (POPQ) measurements in the same patients examined in the dorsal lithotomy position with measurements made while the patients were in the upright position. They found a high degree of correlation between values obtained in the two positions and no significant differences in the stage of prolapse [23]. Barber and associates examined one hundred eighty-nine consecutive women in the dorsal lithotomy position and also in a birthing chair at a 45° angle in relation to the horizontal [24]. The degree of pelvic organ prolapse was assessed using the POPQ. Twenty six percent of women had a higher stage of pelvic organ prolapse when examined at a 45° angle in the birthing chair and only 4% a lower stage. There was a statistically significant increase in the degree of prolapse at all POPQ measurements except for measurement of total vaginal length. They concluded that overall a higher degree of prolapse was found in women examined at a 45° angle in the birthing chair. They also speculated that the 45° position predisposes to the greater degree of prolapse than does the standing position because sitting in the birthing chair opens the pelvic outlet and maximizes the effects of pushing. Consequently, when you can not reproduce the woman's complaints of pelvic organ prolapse when she is in the dorsal lithotomy position, consider examining her while she sits at a 45° angle.

The standardization document was formally adopted by the ICS in 1995 and by the American Urogynecologic Society and the Society of Gynecologic Surgeons in 1996. It was published in 1996 [25] and is reproduced in its entirety in **Appendix I.** A 17 minute public domain video demonstrating the POPQ exam is available through the American Urogynecologic Society (www.augs.org: 2025 M Street NW, Suite 800, Washington, DC 20036-3309; phone 202-367-1167; fax 202-367-2167).

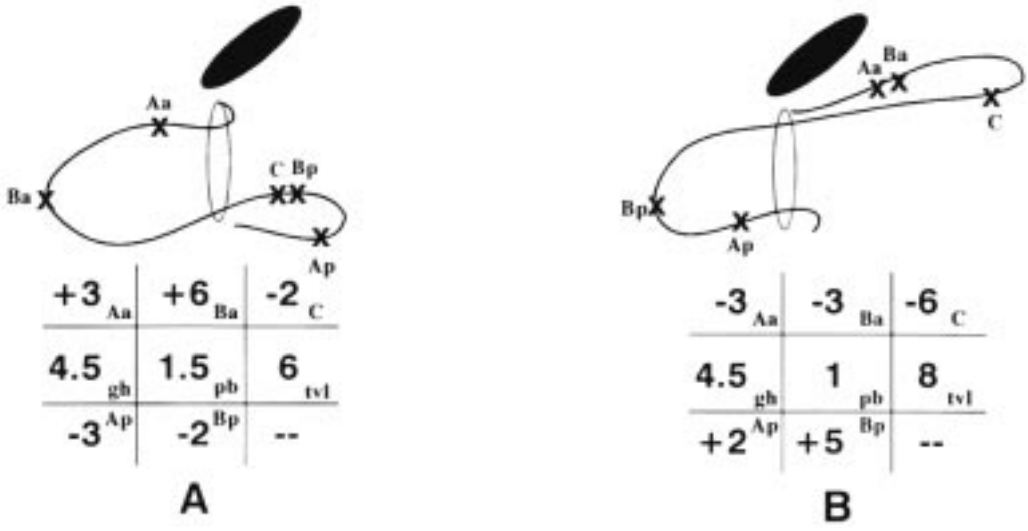

Figure 2 : Grid and line diagram of predominant anterior support defect. Leading point of prolapse is upper anterior vaginal wall, point Ba (+6). There is significant elongation of bulging anterior wall. Point Aa is maximally distal (+3) and vaginal cuff scar is 2 cm above hymen (C = -2). Cuff scar has undergone 4 cm of descent because it would be at -6 (total vaginal length) if it were perfectly supported. In this example total vaginal lenght is not maximum depth of vagina with elongated anterior vaginal wall maximally reduced but rather depth of vaginal at cuff with point C reduced to its normal full extent, as specified in text. This represents stage III Ba prolapse. B, Predominant posterior support defect. Leading point of prolapse is upper posterior vaginal wall, point Bp (+5). Point Ap is 2 cm distal to hymen (+2) and vaginal cuff scar is 6 cm above hymen (-6). Cuff has undergone only 2 cm of descent because it would be at -8 (total vaginal lenght) if it were perfectly supported. This represents stage III Bp prolapse.

The ICS POP Quantification and Staging system reliably describes the topographic position of six vaginal sites and gives information regarding perineal descent and the change in axis of the levator plate based on increases in genital hiatus and perineal body measurements. As such it is a useful tool to enhance communication among clinicians and researchers, to follow objectively changes in an individual patient over time, and to assess the success and durability of various surgical and non-surgical treatments. However, it does not identify the specific defect(s) in the pelvic support structures and mechanisms responsible for the topographic changes and cannot determine the surgical steps necessary for successful repair. Multiple ancillary procedures, including supplementary physical examination techniques, endoscopy, imaging procedures, photography, pelvic neuro-muscle testing, and intraoperative identification of discrete fascial defects [26], [27], play important roles in the formulation of a surgical strategy.

In men with urinary incontinence there frequently is an association between urethral obstruction such as prostatic enlargement, or the relief of obstruction, such as prostatectomy, and the onset of incontinence. In children congenital anomalies may be diagnosed such as spinal cord disease or abnormalities in the location of the urethral meatus. The frail, elderly population may be on medications which predispose to urinary incontinence or they may have co-existing morbidity with changes in mental status or ambulation which predispose to urinary incontinence.

II. PHYSICAL EXAMINATION

1. General clinical

The clinical assessment of patients with urinary incontinence should consist of a detailed history, a frequency/volume chart, and a physical examination. Leakage should be demonstrated objectively [28], [29].

a) History

The general history should include questions relevant to neurological and congenital abnormalities as well as information on previous urinary infections and relevant surgery. Information must be obtained on medications with known or possible effects on the lower urinary tract. The general history should also include assessment of menstrual, sexual and bowel function and obstetric history.

The urinary history (Table 3) must consist of symptoms related to both the storage and the evacuation functions of the lower urinary tract. Many physicians have found it helpful to have the patient complete a urologic questionnaire.

This consultation has produced a working document which may be useful in evaluation of quality of life issues. ***(Note to publisher - please reference the chapter and page for Jenny Donovan=s QOL document)***

b) Frequency/volume chart

The frequency/volume chart is a specific urodynamic

Table 3 : Urologic history

- Duration and characteristics of UI
- Frequency, timing, and amount of continent and incontinent voids
- Precipitants and associated symptoms of incontinence
- Other lower urinary tract symptoms
- Fluid intake pattern
- Alterations in bowel habit or sexual function
- Previous treatment and its effects on UI
- Use of pads, briefs, or other protective devices [29].

investigation recording fluid intake and urine output per 24-hour period. The chart gives objective information on the number of voidings, the distribution of voidings between daytime and nighttime and each voided volume. The chart can also be used to record episodes of urgency and leakage and the number of incontinence pads used. The frequency/volume chart is very useful in the assessment of voiding disorders and in the follow-up treatment [28]. In patients with a high urine output per 24-hour period, it is also helpful to record the fluid intake per time. Constantly small voided volumes during day and night should arouse suspicion of a low compliance bladder. Low volumes only during daytime may be a sign of hypersensitivity (psychogenic) or of hypermobility.

c) Physical examination

Record height and weight so the body mass index (Kg/M^2) can be calculated. Perform an abdominal examination to evaluate the condition of the skin and surgical incisions and the presence of any hernias or abnormal masses (including full bladder).

2. Female

a) Pelvic examination

The external genitalia should be examined for dermatologic lesions and evidence of irritative or inflammatory conditions. The internal genitalia should be examined for estrogen deficiency, abnormal vaginal secretions or urine, pelvic organ prolapse and abnormal pelvic masses. The well-estrogenized vagina has a thickened epithelium, with transverse rugae in its lower two-thirds. The poorly-estrogenized vagina has a thinned epithelium with loss of transverse rugae [30]. A number of authors have shown that vaginal pH levels are generally 5 or less in women with no infection and other definitive signs of good estrogen effect. The use of a pH indicator paper may help you evaluate the estrogen status in women with no vaginal infection [31]. The appearance of vaginal secretions may suggest a vaginal infection; urine within the vagina suggests genitourinary fistula, hypospadius or ectopic ureter. The anterior, superior, and posterior segments of the vagina should be examined for pelvic organ prolapse. The examiner can use a mirror to demonstrate the findings to the patient. The patient can confirm the examiner has identified the extent of prolapse she experiences (Figure 3).

When the patient tells you she normally has a greater amount of prolapse that you presently see, you should have her stand erect and perform any provocative maneuvers which normally are associated with her symptoms. After a period of time, repeat the examination while the patient is standing. In all women a digital rectal examination is also performed to assess sphincter tone (both resting and active) and to detect fecal impaction or a rectal mass.

Bimanual examination is performed to determine the size of the uterus and of the ovaries. Some women have co-existent pelvic disease which may require attention

Figure 3 : The examiner using a hand held mirror to demonstrate physical findings to the patient.

in addition to the urinary incontinence. When hysterectomy or oophorectomy is indicated, there is no adverse effect on surgical success with a colposuspension procedure. Pelvic masses are rarely the cause of urinary incontinence.

Urethral diverticula are occasionally congenital but most are acquired. They may have either a simple or complex sacculation. Many patients with urethral diverticula are asymptomatic and need no treatment. Symptomatic patients report recurrent cystitis, frequency, dysuria, dyspareunia, urinary incontinence and voiding difficulties. On clinical examination a suburethral mass may be palpable; the urethra is usually tender; and, if the sacculation communicates with the urethra, it may be possible to express a purulent exudate from the urethra. Occasionally, a stone may develop within the diverticulum [32]

b) Pelvic organ prolapse

Stress UI and pelvic organ prolapse (POP) are separate clinical entities which often coexist [1]. Significant protrusions of the vagina can obstruct voiding and defecation. Surgical repair of one pelvic support defect without repair of concurrent asymptomatic pelvic support defects appears to predispose to accentuation of unrepaired defects and new symptoms [9] [11-13] [17]

• ***Anterior vaginal wall descent.*** The well-supported anterior vaginal wall should not cross the longitudinal axis of the vaginal canal [33], [34]. Hypermobility of the urethrovesical junction is demonstrated by having the patient perform a maximum Valsalva effort. In women with hypermobility the increase in intra-abdominal pressure causes descent of the urethrovesical junction (bladder neck). On vaginal examination there may be loss of the transverse crease between the lower and middle thirds of the anterior vaginal wall and descent of the anterior vaginal wall (Figure 4).

Anterolateral protrusion into the vaginal canal may represent unilateral or bilateral detachment of the pubocervical fascia along the anterolateral vagina sulcus from its attachment to the arcus tendineus fascia pelvis (white line) [35]. Central protrusions of the anterior vaginal wall may represent defects in the pubocervical fascia below the trigone and base of the bladder. Advanced prolapse of the upper anterior vaginal wall may obstruct a well-supported bladder neck (Figure 5).

• ***Apical vaginal wall descent.*** Descent of the cervix, or of the vaginal apex following hysterectomy, below the level of the ischial spines is evidence of a defective vaginal suspension mechanism. In some women, the intravaginal portion of the cervix may become elongated and cause the cervix to extend into the lower vaginal canal, simulating prolapse; however the fundus may have good support. In other women the uterus may prolapse fully outside the hymen as uterine procidentia (Figure 6). Following hysterectomy the vaginal cuff may be well supported (Figure 7) or may prolapse fully outside the hymen along with other vaginal segments (Figures 8 and 9A & B).

• ***Posterior vaginal wall descent***. The well-supported posterior vaginal wall should not cross the longitudinal axis of the vaginal canal. Posterior protrusions into the vaginal canal are most commonly caused by defects in the rectovaginal fascia allowing protrusions of the small bowel (enterocele) and/or rectum (rectocele). Normally, the anterior vaginal wall lies upon the posterior vaginal wall. Therefore, protrusions of the posterior vaginal wall can affect the function of the urethra and bladder which lie upon the anterior vaginal wall. For example, distal loss of support in the posterior segment may result in a bulge which compresses the urethra and affects voiding (Figure 10).

3. Male physical examination

The assessment and treatment algorithm focuses on the abdominal examination, digital rectal examination and neurologic testing of the perineum and lower extremities. The examination should also include external genitalia, location of the urethral meatus, retractability of the foreskin and evidence of congenital malformation. Abdominal palpation should be performed to evaluate bladder distention, specially in elderly incontinent men, who may have overflow leakage due to obstruction. Post-void residual volume should be measured in those patients.

Rectal examination should include palpation of the prostate to assess size, symmetry and consistency of the gland and its relation to the pelvic sidewall and the rectum. Detrusor instability with urge and urge incontinence are common symptoms in prostatic disease. Prostatic carcinoma must be excluded.

Incontinence combined with evacuation problems in a man often requires further investigation including urodynamics. It may be helpful to ask these patients to measure the voiding time for the first voided 100 ml on several different occasions.

Urinary incontinence is rare in men without a history of previous trauma or prostatic or pelvic surgery; therefore, neurogenic bladder dysfunction must be considered in men with no history of surgery or trauma. In those patients evaluation of perineal sensation and lower extremity reflexes is important.

Post-void dribbling is often provoked by an obstructing disease such as BPH or urethral stricture but can also be a symptom of a urethral diverticulum. Post-void residual urine volume and careful palpation of the genitalia are recommended to be performed in these patients.

Figure 4 : The anterior vaginal segment prolapses to the hymen. A vertical scar is present from previous surgery.

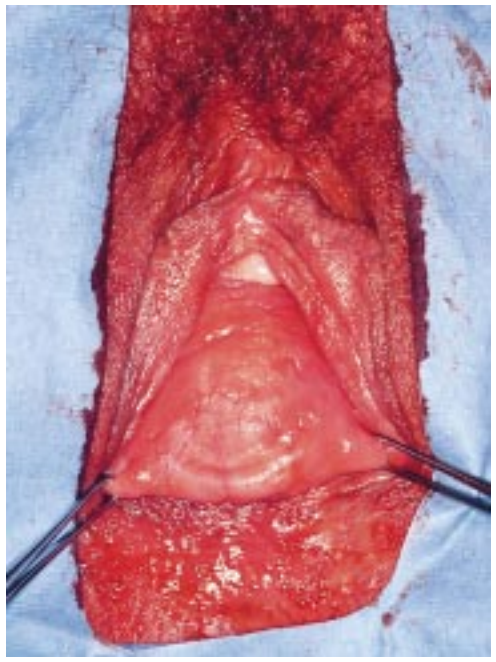

Figure 5 : The anterior vagina prolapses outside the hymen while the urethra has good support from a prior urethropexy.

Figure 6 : The uterus prolapses fully outside the hymen, uterine procidentia.

Figure 7 : The post-hysterectomy vaginal cuff has dimples at the 3 o'clock and 9 o'clock positions, the sites of the cardinal-uterosacral ligament suspension.

Figure 8 : Following hysterectomy the vaginal cuff may prolapse fully outside the hymen along with other vaginal segments .

Figure 9A : An erect patient with complete eversion of the vagina.

Figure 9B : A view of the same patient as seen when standing behind her.

Figure 10 : The posterior vaginal segment balloons anteriorly and may affect voiding secondary to pressure in the urethra.

4. Physical examination – children

a) General examination

Evaluate the back and the spine for skin lesions, skeletal deformities, scars from trauma or from previous surgery. The presence of a subcutaneous fatty mass, cutaneous vascular malformation, tuft of hair, skin dimple, hyperpigmented area, hemangioma or sinus tract on the lower back may be associated with an occult spinal dysraphism, warranting further neurologic evaluation. Palpation of the coccyx may confirm absence of sacral vertebrae.

b) Pelvic examination

The labia majora and minora, introitus and perineum are examined looking for abnormalities such as bifid clitoris and labia minora adhesions. In the latter, incontinence occurs only a few minutes after voiding with no nighttime wetting. On the other hand, when the labia minora are widely separated in the inferior part or when the anus is displaced in the posterior position it may indicate a weakened, denervated perineal body.

An infrequent cause of incontinence is ectopic ureter. The most common site in girls is the posterior or lateral wall of the urethra followed by vaginal vestibule, uterus and cervix. Also look for urethral stenosis, meatal hypospadius, epispadius, or a duplicated urethra. In males it is imperative to retract the foreskin and examine the urethral meatus.

The digital rectal examination is performed to evaluate fecal impactation, rectal masses, and the external anal sphincter. The examiner evaluates motor innervation by asking the child to voluntary contract and relax the anal sphincter around the examinerɔs finger. Since the abdominal straining may mimic sphincter contraction, it is useful if the examiner rests the other hand on the childɔs abdomen to detect straining.

5. Neurologic examination

A simple neurologic examination should be performed on all patients, and includes three components: (1) an assessment of anal sphincter tone, (2) an evaluation of voluntary anal contraction, and (3) an evaluation for intact perineal sensation. When abnormalities are noted, or in individuals suspected of having neurologic diseases or dysfunction, an extended neurologic examination should be performed.

An extended neurologic examination is divided into four parts: Mental Status, Sensory Function, Motor Function, and Deep Tendon Reflexes [28].

a) Mental Status is evaluated by observing the level of consciousness, orientation, speech pattern, memory, and comprehension. Urinary dysfunction may be associated with mental status changes resulting from stroke, brain tumor, degenerative neurologic diseases, or acute or chronic infection of the central nervous system.

b) Sensory Function Evaluation. Test lumbo-sacral dermatomes for position, vibration, pinprick, light touch, and temperature.

Important sensory dermatomes are L1 (base of penis, upper scrotum), L1-L2 (mid-scrotum, labia-minora), L3 (front of knee), S1 (sole and lateral area of the foot), S1-S3 (perineum and circumanal skin), and S2-S4 (sacral nerve roots which innervate both the external urethral and the anal sphincter). The sensory examination includes cutaneous sacral reflexes.

The anal reflex (S2-S5) is stimulated by light stroking of the mucocutaneous junction of the circumanal skin causing a visible contraction. Absence of this reflex suggests sacral nerve disease. In children, the disorder may be congenital. In adult women, absence of the reflex may be a consequence of trauma from vaginal childbirth.

Assess sphincter tone and volitional contraction. The presence of voluntary anal sphincter contraction indicates functioning pelvic floor innervation and sphincter muscle. Absence or decrease of the anal sphincter tone and voluntary anal contraction indicates a possible sacral or peripheral lesion. If the anal sphincter tone is present in the absence of voluntary anal contraction there may be a supra sacral lesion.

The bulbocavernous reflex (BCR) tests the innervation of all perineal striated muscles. [29] It is a local sacral spinal cord reflex arc reflecting activity in S2-S4. The BCR is elicited by squeezing the penis glands, or clitoris, which causes a reflex contraction of the external anal sphincter. Absence of the BCR could indicate sacral nerve damage. It is absent in people with a complete lower motor neuron lesion.

c) Motor Function, Look for coordination, facial asymmetry, paresis, plegias, tremor, mobility state (cane walker, wheelchair), muscle bulk for atrophy. The tibialis anterior (L4-L5), and the toe extensor (L1, S1) may be tested by dorsiflexion, plantar flexion and toe extension.

d) Deep tendon reflexes reflect the integrity of upper motor neuron (UMN) and lower motor neuron (LMN) function. The UMN lesions usually are associated with detrusor overactivity (hyper-reflexia). LMN damage results in an areflexic bladder. Hyperactive deep tendon reflexes and hypoactive deep tendon reflexes are suggestive of a UMN and LMN dysfunction respectively.

You may evaluate these deep tendon reflexes: quadriceps (L3-L4) and Achilles= tendon (L5 - S1-S2). Children with complete spinal cord lesions above the conus

medullaris (UMN/ Supra sacral/ Suprasegmental) may have hyperactive deep tendon reflexes, hyper-reflexic bladder, skeletal spasticity, pathologic toe sign (Babinski), ankle clonus, and absent skin sensation below the level of the lesion. Complete spinal cord lesions at or below the level of the conus medullaris (LMN/ Sacral/ segmental) may present absent deep tendon reflexes, areflexic bladder, skeletal flaccidity, absent Babinskiəs sign, absent ankle clonus, and absent skin sensation below the level of the lesion.

6. Pelvic floor muscle strength

The continence mechanisms imply that integrity of the levator ani and external urethral sphincter is necessary to maintain continence [37, 38]. It is therefore important to test the contractility of these muscles. Once the patient understands Ahow≅ to contract the pelvic floor muscles correctly, the evaluation is carried out during a maximum contraction [39].

a) Definitions:

Strength is defined as the maximum force or tension generated by a muscle or muscle group [40]. It reflects the power, endurance and functional status of the muscle.

Weakness is defined as failure to generate the expected force.

Fatigue is defined as failure to maintain the expected force with continued or repeated contraction [41].

When considering methods/devices used to measure pelvic muscle Astrength≅, cost and availability should be recognized as important factors. In this chapter only four methods are discussed (Table 4). Factors to be investigated are listed in Table 5.

b) Observation

• ***Method*****:** This qualitative measure can detect an in-drawing of the anus, lifting of the posterior vaginal wall and narrowing of the vaginal introitus (females); an in-drawing of the anus and slight lifting of the penis (males).

• ***Advantages*****:** Suitable for both sexes and all age groups, where an internal evaluation may be in-appropriate. Inexpensive. Able to detect reflex contraction with cough, and bulbocavernosus reflex. Observe accessory muscle activity.

• ***Disadvantages*****:** Subjective. Cannot distinguish right and left sides independently. Generally observing activity of the superficial perineal muscles, and assuming levators are resonding in a like manner. Difficult to observe when the patient is standing.

c) Digital palpation

• ***Method:*** - *females*. Palpation of the right and left levator ani, per vaginam. Palpation of the perineal body.

- males. Palpation of the right and left puborectalis, per ano-rectum. Palpation of the perineal body.

- Advantages: Suitable for both sexes. Inexpensive. Able to differentiate right from left. Quantitative - using modified Oxford scale or other systems [42-43]. Able to measure strength and endurance. Can detect reflex contraction with cough and patients=s ability to hold contraction during a cough. Can be used when the patient is standing.

- Disadvantages: Subjective. Not sensitive.

Table 4 : **Methods of measurement**

Observation
Digital palpation
Perineometer
Q-tip

Table 5 : **Factors to be investigated:**

1. Right and left sided symmetry of muscle bulk
1. Right and left sided strength/endurance
2. Reflex response **with cough**
2. Functional contractility **i.e. with lifting, coughing**
3. Over-all strength
4. Displacement with contraction of muscle group. Elevation of perineal body by pubococcygeus muscles; constricting of the anus with external anal sphincter.

d) Perineometer

• ***Method*****:** Manometric measure of change in a vaginal/anal pressure probe. Sensitivity depends on the device.

- Advantages: Relatively inexpensive. Able to measure strength and endurance. Quantitative [35]. Can be used when the patient is standing.

- Disadvantages: Unable to distinguish right from left. Pressure changes may be caused by increase in intraabdominal pressure, due to co-contraction of the abdominal muscles. No AGold Standard≅ device; different results with different probe sizes and materials. [44]

e) Cotton swab (Q-tip) test

• ***Method*****:** Q-tip inserted into urethra (female). Downward, posterior movement of stem (measured on a goniometer) is dependent on the strength of the contrac-

tion of the pubococcygeus muscles, and mobility of the urethra. [45]

• ***Advantages:*** Inexpensive. Can measure strength and endurance.

• ***Disadvantages*:** Lacks sensitivity and specificity. Invasive. Females only.

The information learned from assessment of pelvic floor muscle strength has the following practical applications:

The patient has good pelvic floor muscles that need skill training to help maintain continence. DeLancey and associates have described knack teaching [46] [47]

The patient has weak muscles that are capable of contracting but need strength and skill training. An effective exercise program should increase resting tone (Type I fibers) as well as improve the ability of fast twitch (Type II) fibers to respond to increases in intra-abdominal pressure [48]

The patient has no perceptible contractions and needs further evaluation (EMG, MRI, neurophysiologic testing) or passive contraction therapy i.e., functional electrostimulation.

7. OTHERS TESTS

a) Provocative stress testing. If stress UI is suspected, provocative stress testing (direct visualization) can be performed by having the individual relax and then cough vigorously while the examiner observes for urine loss from the urethra. Optimally these tests should be done when the patientɔs bladder is full, but they should not be performed when the patient has a precipitant urge to void. They can be done in the standing or lithotomy position. If instantaneous leakage occurs with cough, then stress UI is likely; if leakage is delayed or persists after the cough, detrusor over activity should be suspected. If the test is initially performed in the lithotomy position and no leakage is observed, the test is repeated in the standing position, since the yield is increased when the test is repeated in the upright position. If bladder filling is needed to perform stress testing, this may be conveniently performed in conjunction with the catheterization being done for PVR measurement. Patients with very little urine in their bladder who leak urine during Valsalva maneuvers should be suspected of having intrinsic sphincter deficiency [49]

Bonney's original stress test was performed to demonstrate urinary leakage during coughing. [50] Subsequent modifications of the test require support of the urethrovesical junction during coughing in women who leak during a stress test. These modifications are not reliable in selecting a surgical procedure or in predicting cure.

b) Urethrovesical junction (bladder neck) mobility.

Urethrovesical junction (bladder neck) mobility should be assessed in all women with urinary incontinence. It is generally felt that women with genuine incontinence fall into several categories based **on assessment** of urethral support and urethral function. ***A 2x2 table helps to record urethral support and function (Table 6).***

Table 6 : Urethral Support and Function

Urethra	**Good**	**Bad**	
Support			
Function			

The choice of therapy may be affected by the assessment of bladder neck mobility.

One method of assessing bladder neck mobility is by visual inspection. When the patient is in lithotomy position, the urethral meatus is horizontal to the floor in a woman with good bladder neck support. When she increases intra-abdominal pressure you can observe for posterior rotation of the anterior vagina and deflection of the meatus toward the ceiling, both signs of some loss of support. You may ask her to contract the pelvic muscles to determine if urethral support improves with muscle contraction, a sign pelvic floor training may be therapeutic.

A simple office procedure to quantify bladder neck mobility is the cotton swab or Q-tip test [51] A sterile, lubricated cotton or dacron swab (Q-tip) is inserted into the urethra until it lies just within the urethrovesical junction. Using a goinometer, the angle circumscribed by the distal end of the swab is measured relative to the horizontal while the woman is performing a maximum Valsalva effort. Urethrovesical junction hypermobility is defined by a maximum strain axis exceeding +30 degrees from the horizontal (Figures 11A, 11B).

Q-tip testing does not diagnose any form of incontinence. It may be useful in differentiating stress UI due to hypermobility from that due to intrinsic sphincter deficiency. Other tests to document bladder neck mobility are used, including bead-chain cystourethrography, ultrasonography, and videocystourethrography. The chapter on imaging of the urinary tract addresses the place of these techniques.

c) Post Void Residual. Post void residual (PVR) measurement is recommended for patients with UI. Specific PVR measurement can be accomplished within a few minutes of voiding either by catheterization or by ultrasound.

Review of the literature fails to show a specific maximum PVR this is considered normal, nor is there any

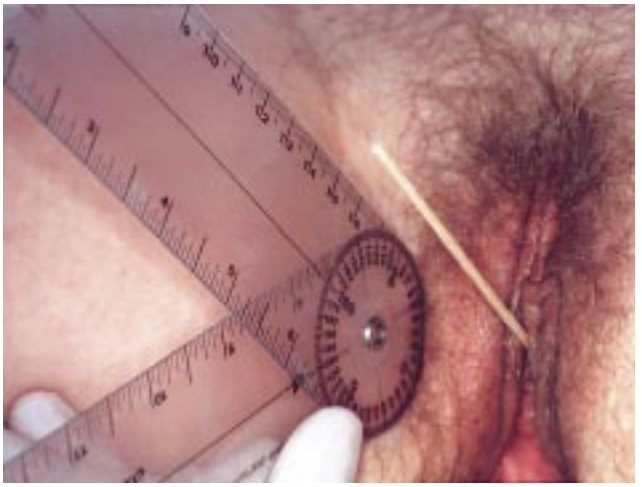

Figure 11a : A cotton tip swab (Q-tip) is located in the urethra. The angle of deflection from the horizontal is being measured with a goniometer.

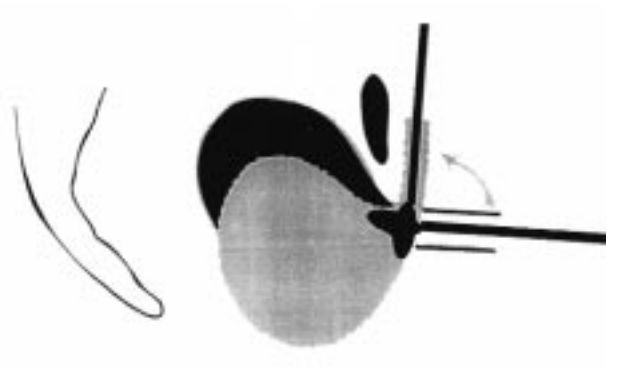

Figure 11b : A schematic representation of the cotton tip swab and the arc it will traverse with urethral mobility.

documentation of the minimal PVR that is considered abnormal. The AHCPR guidelines state that, in general, a PVR less than 50 mL is considered adequate bladder emptying and over 200 mL is considered inadequate emptying. Since PVR may vary, one measurement of PVR may not be sufficient [22].

Women with pelvic organ prolapse may have to reduce their prolapse in order to void. Women with pelvic organ prolapse and a large PVR should be evaluated for voiding phase dysfunction (e.g., outlet obstruction, detrusor hypofunction).

8. Recommendation of the Committee (Table 7)

a) Each person being evaluated for urinary incontinence should have a physical examination which includes:

• assessment of mobility and cognitive status

• abdominal examination

• sacral neurologic examination for sensory and motor function and appropriate reflex activity

• pelvic floor muscle assessment

b) Other tests:

- Attempt to demonstrate incontinence.

- Post void residual assessment.

c) In physical examination of women assess pelvic organ support

In women with pelvic organ prolapse, a standardized, validated system of pelvic organ prolapse should be the basis for the detailed pelvic examination. The ICS approved Pelvic Organ Prolapse Quantification system is an example you may use.

9. Future Research

There are 5 specific recommendations on future research regarding the physical examination of people with urinary incontinence:

a) Document natural history of changes in pelvic support and bowel and bladder function with increasing age.

b) Correlate physical examination findings with bowel and bladder function.

c) Validate findings of physical examination that are predictive of success, failure, and complications of therapy for urinary incontinence.

d) Document effects of surgical therapy for urinary incontinence on post operative pelvic support.

e) Identify the most accurate physical examination technique to correlate with other evaluation techniques.

Table 7: Recommendations for physical examination of each group of patients

Specific Groups				
Children	**Female**	**Male**	**Frail Elderly as per other adults**	**Neuropatic**
Psychomotor development	Pelvic examination: *-External genitalia- Vaginal epithelium*	Lower back Digital rectalsystematic examination	General examination	Complete neurologic examination
Examine lower back for spinal abnormality	*-Bladder neck mobility -Evidence of fistula or diverticulum—*	Sphincter tone Scrotum Urethral meatus	looking for co-morbid conditions, *i.e. heart failure*	Observe voiding
External genitalia for abnormalities				
Observe voiding	*-Size of uterus and ovaries -Support of the anterior, apical, and posterior segments of the vagina -Digital rectal examination*		Manual dexterity	

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