Expert Review Sims Speculum Examination

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Abstract
Sims Speculum Examination is an important skill for medical students and doctors. This article presents a comprehensive, concise and evidence-based approach to the use of the Sims Speculum which is consistent with The Principles of Clinical Examination [1]. We describe the signs of pelvic organ prolapse and based on a review of the literature, the precision and accuracy of these signs is discussed. Word Count: 2147

Key words: Sims speculum, pelvic organ prolapse.

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Introduction

The Sims Speculum

The Sims speculum (see Figure 1) is a U-shaped instrument used to examine the vaginal walls particularly for evidence of pelvic organ prolapse.

Vaginal Prolapse

Prolapse may be defined as the protrusion of an organ or structure beyond its usual anatomical confines [2]. Pelvic organ prolapse is a common problem, affecting an estimated 50% of parous women, with 11% undergoing surgical procedures, either for prolapse itself, or urinary or bowel symptoms [3] Prolapse is frequently associated with a feeling of fullness or discomfort in the vagina, or a sensation of a lump coming out of the vagina. These symptoms are particularly prominent on standing and are often worse at the end of the day [4]. The patient may also report urinary symptoms or bowel symptoms such as urinary incontinence or a sensation of incomplete bowel evacuation. Urinary stress incontinence (USI) is defined as incontinence associated with a rise in intra-abdominal pressure, for example on laughing or coughing, and frequently occurs in patients with a cystocele or urethrocele [5].

Anatomy

The pelvic floor consists of muscular and fascial structures that provide support to the pelvic viscera and the external openings of the vagina, urethra and rectum. The uterus and vagina are suspended from the pelvic sidewalls by endopelvic fascial attachments that support the vagina at three levels.

Level 1: The cervix and upper third of the vagina are supported by the cardinal (transverse cervical) and uterosacral ligaments. These are attached to the cervix and suspend the uterus from the pelvic sidewall and sacrum respectively (Figure 2 and Figure 3) [5]

Level 2: The mid portion of the vagina is attached by endofascial condensation (endopelvic fascia) laterally to the pelvic sidewalls.

Level 3: The lower third of the vagina is supported by the levator ani muscles and the perineal body (Figure 3) [5].

The levator ani muscles form the floor of the pelvis from attachments on the bony pelvic walls and incorporate the perineal body in the perineum. The levator ani, together with its associated fascia, is termed the pelvic diaphragm. The axis of the vagina is also important. It normally lies in a horizontal plane, flat on the levator muscles. This protects it during coughing and other activities that increase intra-abdominal pressure [6].

Figure 1 Two views of the Sims speculum: A U-shaped instrument with two right angle bends giving two arms, one longer and one shorter. The external surface is hollow while the inner surface and ends are curved for contact with the vaginal walls. Different sized speculums are available, the choice of size usually being made following a bimanual examination.

The Pelvic Floor and Pelvic Organ Prolapse

Normal functioning of the pelvic floor is dependent on three factors: the correct anatomical position of the muscles, their degree of contraction at rest, and the additional integrity of the pelvic fascia [6]. Contraction of the pelvic floor muscles should normally result in the anterior and upward displacement of the pelvic organs such that the urethra, anus and vagina close, thus maintaining continence [6]. Causes of pelvic organ prolapse may be broadly divided into two categories: those associated with weakening support of the pelvic organs and those linked to increased strain on the pelvic supports, as outlined in Table 1 [5]. Of these parity, and particularly the number of vaginal deliveries, appear to be the most important associations [7].

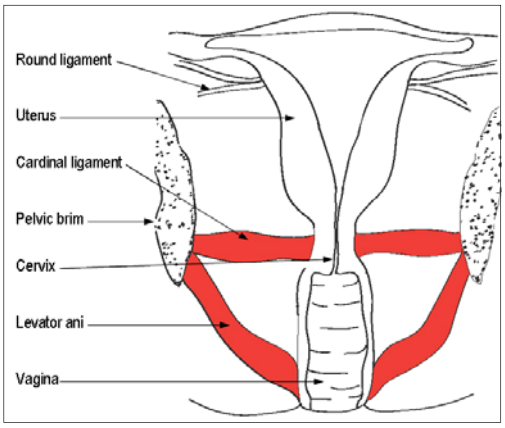

Figure 2 Support of the cervix and uterus by the cardinal ligaments. A coronal view of the pelvis, showing the cardinal liagaments (in red) suspending the cervix and uterus from the pelvic sidewall. Levator ani is also visible bilaterally (again highlighted in red).

Damage occurring at the different levels of vaginal support causes different subtypes of prolapse, the commonest being cystocele [8]. It is important, therefore, to have an appreciation of this anatomy in order to understand the various forms of pelvic organ prolapse and their aetiology, as described in Table 2 [2].

Literature Search

The pubmed database was searched using the Medical Subject Headings (MeSH) terms: 'physical examination', 'pelvic organ prolapse', and 'urinary incontinence, stress'. The pubmed database was also searched using the free term 'Sims speculum'

Clinical prediction guides were searched for the MeSH term 'pelvic organ prolapse'

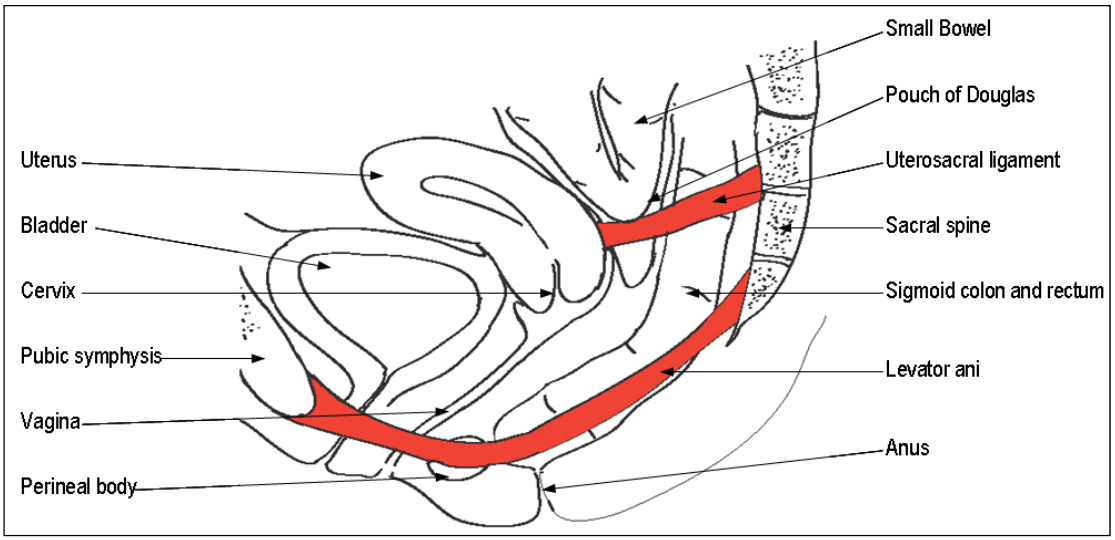

Figure 3 Support of the vagina by levator ani and the uterus by uterosacral ligaments. A sagittal view of the pelvis showing suspension of the uterus by the uterosacral ligament (in red) with its attachments to the cervix and sacrum. Also shown is levator ani (again highlighted in red) supporting the lower third of the vagina.

The Rational Clinical Examination Series of the Journal of the American Medical Association; the British Medical Journal Clinical Evidence, clinicalevidence.com; and the National Health Service Clinical Knowledge Summaries, cks.library.nhs.uk were searched with the terms 'Sims speculum', 'prolapse' and 'stress incontinence'

Selection criteria were papers written in English, concerning humans, and available through the Oxford University e-resources.

Additional articles were sought by reviewing the abstracts of selected papers and other JCE expert reviews.

The following textbooks were reviewed:

Orient JM Sapira's Art and Science of Bedside Diagnosis 3rd edition 2007
McGee SR Evidence-Based Physical Diagnosis 3rd Ed 2005
Douglas G, Nicol F and Robertson C Macleod's Clinical Examination 12th edition
Impey L & Child T Obstetrics and Gynaecology 3rd edition 2008
Monga A Baker P Gynaecology by Ten Teachers 18th edition 2006.

Preparation

The Royal College of Obstetricians and Gynaecologists provides specific guidance on conducting gynaecological examinations, which should be referred to in advance [9]. Clinical examination should ideally take place in a warm environment which is private and has good illumination. You need the following equipment: Sims speculum, lubricant, and gloves.

Wash your hands, introduce yourself to the patient and confirm the patient's identity (if this has not been done already). The procedure must be explained to the patient in full and informed consent obtained. This must be documented in the notes with your full name and designation. A positive experience of pelvic examination is closely associated with the patient's sense of remaining in control over the situation, which should be achieved by careful explanation of the procedure and assurance that the examination may be terminated at any time according to the patient's wishes [10].

The patient should be offered a chaperone, regardless of the gender of the examiner. If this is not possible, it should be explained to the patient and an offer made for an alternative date. In addition an entry should be made in the notes to document that a chaperone was offered, their identity, and whether the offer was accepted by the patient [11].

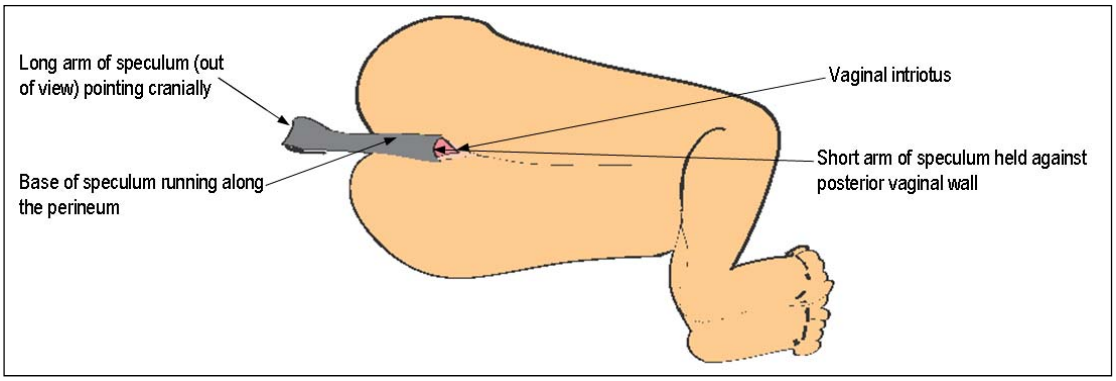

Figure 4 Examination of the anterior wall. This shows the correct position of both the patient and the Sims speculum when examining the anterior vaginal wall. Typically the short arm of the speculum is inserted against the posterior wall while the long arm is held posterior to the vaginal introitus pointing cranially. However the decision regarding which arm of the speculum to insert into the vagina (long or short arm) should be made after bimanual examination assessment. The base of the speculum is seen running along the perineum in this diagram.

The patient should be left in private to undress [12]. Full exposure from the waist down is required, and the patient should be instructed to remove her underwear. As the Sims speculum examination is often performed in an older patient population, assistance with undressing and positioning may be required. This can often be provided by a relative, chaperone or the examiner if requested by the patient. A sheet should be provided and used to cover the patient to maintain their privacy before and after the examination [12].

A full assessment for pelvic organ prolapse includes examination of the abdomen [13] and bimanual pelvic examination [12]. A description of these is beyond the scope of this article. Specifically the examiner should inspect for Pfannenstiel or midline laparotomy scar which may suggest a history of hysterectomy [5] (although there are many other possible reasons for the presence of a lower abdominal scar), and attempt to exclude abdominal and/or pelvic masses which may be important in the aetiology of prolapse or USI, such as a distended bladder secondary to urinary retention or a mass secondary to malignancy.

No specific recommendations have been made by the International Continence Society (ICS) regarding the position of the patient for the examination of pelvic organ prolapse [4] and different clinicians have their own preferences, which may affect their findings, particularly regarding prolapse severity [14]. Consensus opinion is that the Sims speculum examination should be conducted with the patient in the left lateral position, or 'Sims position' [5].

Standing to the patient's right side ask them to lie on their left side with their hips and knees flexed to 90 degrees.

Inspection

Begin the examination by inspecting the vaginal introitus for a protruding mass. If so, look for evidence of ulceration, vaginal discharge or bleeding [5].

Examination of the Anterior Vaginal Wall

Orientate the Sims Speculum in the horizontal plane with both arms of the speculum pointing cranially and the longer arm lying posterior to the vaginal introitus. Hold the long arm of the Sims Speculum in the palm of the left hand, then lubricate the short arm and insert it into the vagina such that the short arm is introduced parallel to and against the posterior vaginal wall [5] (see Figure 4). Note that the decision regarding which arm of the speculum to insert into the vagina (long or short arm) is normally made following bimanual examination assessment.

With the speculum held against the posterior vaginal wall, inspect the anterior wall of the vagina for bulging. This could be either cystocele, urethrocele, cyst or tumour, however this may be difficult to differentiate clinically. A mass descending from above suggests a uterocele or vaginal vault prolapse. Now ask the patient to 'bear down', this increases intrabdominal pressure and may exaggerate the signs [5].

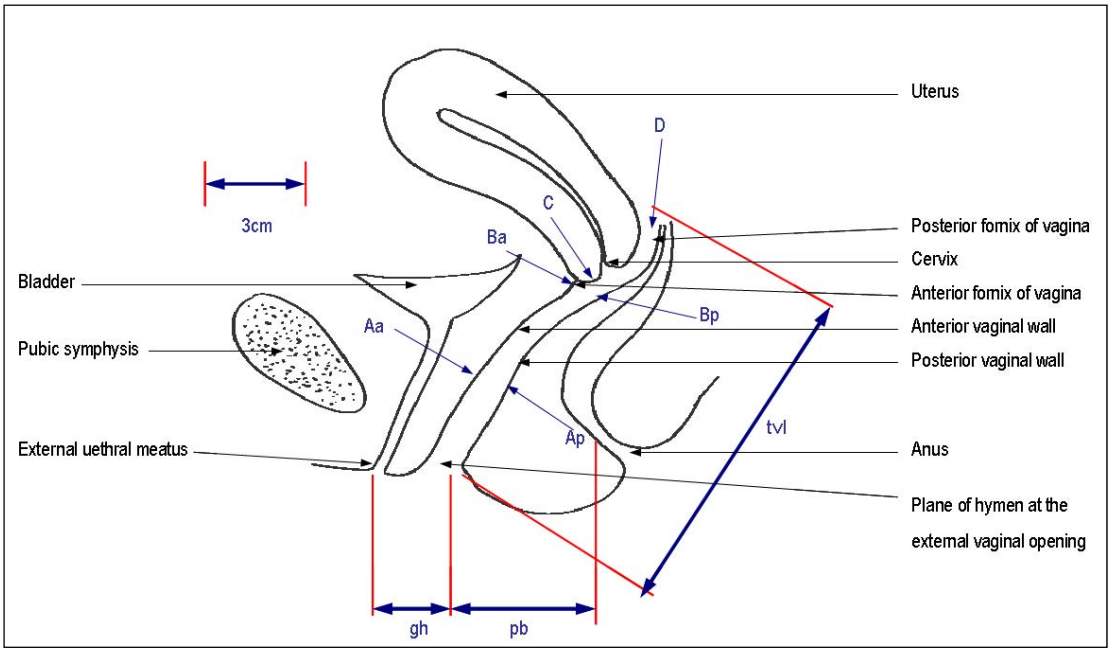

Figure 5 Sagittal section through the pelvis showing the POP-Q system components as defined in Table 4.

Examination of the Posterior Vaginal Wall

With the speculum remaining in the vagina rotate it 180 degrees clockwise such that the short arm applies pressure against the anterior vaginal wall to allow inspection of the posterior wall. Alternatively the speculum may be slowly withdrawn from the vagina before rotating and re-inserting against the anterior vaginal wall in order to avoid discomfort associated with rotating the speculum inside the vagina. Look for bulging of the posterior vaginal wall which may be seen in an enterocele or rectocele. Again ask the patient to 'bear down' to exaggerate signs [5].

To differentiate an enterocele from rectocele insert a gloved finger into the rectum and look for bulging of the posterior vaginal wall which is seen with a rectocele, but not in an enterocele [5].

Describing a Prolapse and Grading its Severity.

If a prolapse is present it should be classified, as per Table 2, and its severity should be graded. The traditional three grade method is based on the relationship between the most distal part of the prolapse on straining and the vaginal introitus [2]. See Table 3 for definitions.

This method is adequate for most routine clinical assessments but a more sophisticated system exists which allows monitoring, either for progression, or for improvement following intervention, particularly when a patient is examined by several different clinicians. The Pelvic Organ Prolapse Quantification (POP-Q) classification system is now used in clinical practice (Figure 5, Table 4, Table 5). The evidence base for POP-Q is discussed in evidence box 1.

Special Tests

Cough Test for Urinary Stress Incontinence (USI)

USI and prolapse often occur together; a weak pelvic floor permitting the bladder neck to descend into the pelvis [5]. As a result a rise in abdominal pressure will no longer be transmitted simultaneously to the urethra and bladder, allowing urine to leak from the bladder. In addition weakened pelvic supports will also reduce the ability to close the urethra by conscious levator ani contraction, thus resulting in the symptoms and signs of USI [5]. While prolapse and USI often coexist, anterior wall prolapse can directly result in urine retention by kinking the urethra. If untreated this may progress to renal impairment [5]. This process may also mask an underlying USI, which may suddenly become apparent following surgical correction of the prolapse [15]. It is therefore important to routinely assess the patient for signs of

both urine retention and USI during the Sims speculum examination.

When asking the patient to bear down as part of the examination of the anterior and posterior walls (as outlined above), the examiner may also witness the signs of stress incontinence as urine leaks through the urethral opening anteriorly. If an anterior wall prolapse is visible on examination, insert a finger into the vagina and reduce the anterior wall prolapse, then ask the patient to strain or cough. This may reveal underlying USI if urine is seen to leak anteriorly following reduction of the prolapse [5].

The link between prolapse and urinary tract pathology is discussed in Evidence Box 2

Completing the examination

Thank the patient and make them comfortable. Draw the curtain and give them privacy to redress.

Currently imaging is not necessarily routine in clinical practice, and physical examination remains the mainstay in the diagnosis of prolapse [3]. The additional value of imaging is discussed in Evidence Box 3. If there are prominent urinary symptoms or signs appropriate investigations should be offered as outlined in Table 6.

Acknowledgements

Figure 1 with kind permission from Springer Science+Business Media B.V, and Professor M.E. Vierhout

Figures 2-4 adapted from Impey L, Child T. Obstetrics and gynaecology, 3rd edition. Wiley-Blackwell; 2008. Figure 1.6 page 7, and figures 7.1(a) and (b) page 55. Permission for use kindly granted by Wiley-Blackwell and Mr L. Impey

Figure 5 adapted from http://www.springerimages.com/Images/MedicineAndPublicHealth/1-10.1007_s00192-005-1347-9-0. Original figure taken from: Vierhout ME, Stoutjesdijk J, Spruijt J. A comparison of preoperative and intraoperative evaluation of patients undergoing pelvic reconstructive surgery for pelvic organ prolapse using the Pelvic Organ Prolapse Quantification System. Int. Urogynaecol. J. Pelvic Floor Dysfunct. 2006 Jan;17(1):46-9. Epub 2005 Jul 29

Conflicts of Interest: None declared.

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Cause	Mechanism
Weakened support of pelvic organs	
Parity and vaginal delivery	Mechanical damage to pelvic floor structures especially pudendal nerve injury. Factors such as prolonged labour, instrumental delivery and bearing down before the cervix is fully dilated all increase the risk.
Oestrogen deficiency	Postmenopausal atrophy of the vaginal walls and ligaments which support the pelvic floor
Iatrogenic	Hysterectomy is a risk factor, particularly for vaginal vault prolapse
Genetic	Collagen weakness e.g. Marfan's syndrome, family history etc.
Increased strain on supports	
Obesity	Increased mass on the pelvic floor.
Pelvic masses	Including malignancy which should be examined for by abdominal and bimanual examination.
Chronic cough	Raised intra-abdominal pressure.

Table 1 The causes of pelvic organ prolapse [5].

Prolapse subtype	Description	Specific structural defects
Apical vaginal prolapse		
Uterovaginal	Uterus (including cervix) descends with inversion of vaginal apex	Damage to cardinal and uterosacral ligaments.
Vaginal vault prolapse	Inversion of vaginal apex	Unsupported vaginal apex post hysterectomy, involving the above structures
Posterior vaginal wall prolapse		
Rectocele	Descent of the rectum	Levator ani weakess and damage to rectovaginal fascia
Enterocele	Descent of small bowel	Levator ani weakess
Anterior vaginal wall prolapse		
Urethrocele	Descent of urethra	Levator ani weakess
Cystocele	Descent of bladder	Levator ani weakess and damage to pubocervical fascia
Cystourethrocele	Both bladder and urethra descend	Levator ani weakess and damage to pubocervical fascia

Table 2 Classification of pelvic organ prolapse and individual pelvic floor defects involved [2]

Degree	Position of most distal part of the prolapse on straining
1st	Lies within the vagina
2nd	Lies at the level of the vaginal intriotus
3rd	Extends beyond the vaginal introitus. This form of prolapse is also referred to as a procidentia

Table 3 A three stage description of pelvic organ prolapse severity [2].

Point	Details
Fixed Point of Reference	
Hymen	The 6 defined points below should be measured according to distance in cm from the hymen. Plane of hymen = 0. Example: A point 3 cm below hymen= +3, a point 3 cm above the hymen= -3 The hymen itself may no longer be visible, but the plane of the hymen lies at the level of the external vaginal opening (vaginal introitus)
Defined points	
Anterior vaginal wall	
Point Aa	Midline of anterior vaginal wall and 3cm proximal to external urethral meatus. This should be equivalent to the position of the urethra-vesical crease. Point Aa may vary relative to the position of the hymen in the range -3cm to +3cm
Point Ba	Measured relative to point Aa it is the most distal point of the upper anterior vaginal wall (either the anterior vaginal fornix, or vaginal cuff if post-hysterectomy). In the absence of a prolapse point Ba should be -8cm
Superior Vagina	
Point C	Most distal edge of the cervix. Post hysterectomy this is the most distal edge of the vaginal cuff (hysterectomy scar)
Point D	Only in women with a remaining cervix. This refers to the location of the posterior fornix and represents the level of the uterosacral ligament as it attaches to the proximal posterior cervix. It may differentiate failure of cervical suspension from cervical elongation.
Posterior vaginal wall	
Point Ap	Midline of posterior vaginal wall and 3cm proximal to hymen
Point Bp	Measured relative to point Ap it is the most distal position of the upper posterior vaginal wall (either the posterior vaginal fornix, or the vaginal cuff post-hystorectomy). In the absence of prolapse point Bp should be -3cm.
Other measurements and defined landmarks	
Genital Hiatus	Measurement taken from the midline of external urethral meatus to midline of posterior hymen
Perineal body	Measured from the posterior genital hiatus to the midanal opening
Total Vaginal Length	Greatest vaginal depth. Must be measured when point C or D has been manually reduced to its normal anatomical position.

Table 4 Components of the Pelvic Organ Prolapse Quantification System (POP-Q) [4]

Stages	Description
Stage 0	Points Aa, Ap, Ba, Bp all -3cm. Either point C or D is ≤ -(X-2)cm
Stage I	Criteria for Stage 0 not met, leading edge of prolapse < -1cm
Stage II	Leading edge prolapse > -1cm but < +1cm
Stage III	Leading edge of prolapse > +1cm but < +(X-2)cm
Stage IV	Leading edge of prolapse > +(X-2)cm

X = total vaginal length in cm
Measurements are made relative to the level of the hymen in cm, + being more distal and – being more proximal.

Table 5 An alternative staging system for prolapse based on POP-Q measurements [4, 16]

Investigation	Information yielded
Urine dipstick	Leucocytes and nitrites for infection. Glycosuria for underlying diabetes mellitus causing urinary symptoms. Haematuria or proteinuria for bladder carcinoma or calculi
Urine diary	Volume and timing of fluid input and output recorded by patient Gives information about bladder capacity and urinary frequency.
Post-micturition ultrasound	Urinary retention
Urodynamic studies	The tests routinely performed include uroflowmetry, post-void residual measurement and cystometry. In addition, urethral pressure profilometry and videourodynamic investigations may be undertaken.
Cystometry	Cystometry involves measuring the pressure/volume relationship of the bladder during filling and voiding and is a most useful test of bladder function.
CT urogram	Can detect and characterise solid renal masses as well as renal tract calculi, renal and perirenal infections and associated complications.
Cystoscopy	Direct visualisation of the bladder cavity. Particularly useful if bladder malignancy suspected.

Table 6 Investigating urinary symptoms [5]

Question: Is the POP-Q system valid in the left lateral position? Reference: Digesu et al 2009. **Population:** 218 women referred to urogynaecology outpatients for either pelvic organ prolapse, or lower urinary tract symptoms. **Details of study:** Patients examined by two separate clinicians in the left lateral position, with empty bladder and on maximum valsava. Prolapse quantified according to POP-Q system. Prolapse initially assessed digitally and graded according to a traditional 4-grade descriptive system. Patients then re-examined by each clinician using POP-Q. Inter-observer agreement calculated according to Cohen's kappa coeffieient from 0 (no agreement) to 1 (total agreement). Patients also examined in the dorsal lithotomy position according to the POP-Q system. Poor inter-observer reliability (kappa coefficient only 0.54) for basic digital prolapse assessment. POP-Q showed high reliability (kappa coefficient 0.88). High agreement between POP-Q findings in both left lateral and dorsal lithotomy positions. **Conclusion:** POP-Q is more reliable than a traditional four-grade assessment system. POP-Q is valid and reproducible in the left lateral position.

Evidence box 1: Application of POP-Q to prolapse examination in the left lateral (Sims) position [16]

Question: What is the prevalence of voiding difficulty and is there an association with prolapse? Reference(s): Haylen et al 2007. **Population:** 592 women referred to urogynecology clinic for assessment of lower urinary tract symptoms. **Details of study:** Assessed clinically for evidence of stress incontinence on coughing. Prolapse assessment included examination in the left lateral position with Sim's speculum. Voiding flow and volume assessed with uroflowmetry and residual urine volumes by transvaginal ultrasound. Voiding difficulty defined as voiding flow rate below the 10th centile or residual volume more than 30ml. Voiding difficulty increased significantly with age, and with increasing degree of prolapse severity. **Prevalence:** In this study group: USI 72%, prolapse 61%, voiding difficulty 39% **Conclusion:** Significant relationship between voiding difficulty and increasing grades of pelvic organ prolapse. Prolapse appears to be the most important underlying factor in the increasing prevalence of voiding difficulty with age.

Question: Does prolapse repair precipitate the symptoms of stress incontinence? Reference(s): Misrai et al 2008 **Population:** 120 women with symptomatic pelvic organ prolapse undergoing laparoscopic sacral colpoplexy. **Details of study:** All patients examined for occult stress incontinence by clinical examination with manual reduction of prolapse, and urodynamic studies to determine intrinsic sphincter efficiency. Patients with either concomitant or occult stress incontinence excluded from subsequent analysis, leaving 53 patients. Patients underwent laparoscopic sacral colpoplexy for prolapse repair. Assessed following surgery for evidence of urinary incontinence according to symptoms, clinical examination, uroflowmetry and urodynamics. 13% of the 53 patients developed new stress incontinence at a median of 2.1 months after surgery. 7.5% required further surgery for this new incontinence. **Prevalence** In study group: 13% new onset stress incontinence after prolapse repair. **Conclusion:** De novo stress incontinence occurs in a small but significant number of women following surgical prolapse repair, despite a thorough pre-operative assessment.

Evidence Box 2: Link between prolapse and urinary tract pathology [17, 15]

Question: How does dynamic cystoproctography compare with physical examination in the diagnosis of pelvic organ prolapse? Reference: Kevin et al 1999. **Population:** 170 women with symptoms of pelvic floor dysfunction. **Details of the study:** Evidence of rectocele, enterocele, sigmoidocele, cystocele or vaginal vault prolapse sought after opacification of the small bowel, bladder vagina and rectum in turn. Lateral radiographs of the pelvis were obtained both in the seated position at rest, and on straining. Patients were then assessed by physical examination in the upright position on straining. Prolapse was clinically quantified according to a simplified four-grade system relative to the level of the hymen, and by POP-Q also in 74% of the subjects. The majority of rectoceles and cystoceles revealed by cystoproctography were also detected on physical examination (77% and 83% respectively). Only half of enteroceles discovered on imaging were picked up on physical examination. None of the radiographically-detected sigmiodoceles could be found on clinical examination Results showed variable correlation between cystoproctography and physical examination findings, as summarised in the table below:

Rectocele			Enterocele			Cystocele		
Found on CP (n)	Found on PE		Found on CP (n)	Found on PE		Found on CP (n)	Found on PE	
	n	%		n	%		n	%
155	119	77	47	24	51	159	132	83

CP =dynamic cystoproctography PE = physical examination

. **Conclusion:** Physical examination is limited in its success. Lack of accurate information from physical examination may affect a clinician's ability to identify prolapse.

Question: How good is T2-weighted MRI in evaluating pelvic organ prolapse when compared with clinical findings? Reference: Gousse et al 2000. **Population:** 100 women, 65 with and 35 without a pre-existing diagnosis of prolapse. **Details of the study:** Women studied for evidence of prolapse using dynamic pelvic T2-weighted MRI. All underwent physical examination by a urologist. Both MRI imaging and physical examination results compared to intraoperative findings. **Gold standard:** Intraoperative findings. **Sensitivity, specificity, PPV and NPV:** Summarised in table below:

Prolapse type	**Sensitivity %**		**Specificity %**		**Positive predictive value %**		**Negative predictive value &**	
	MRI	**Physical examination**	**MRI**	**Physical examination**	**MRI**	**Physical examination**	**MRI**	**Physical examination**
Urethrocele	100	100	83	75	93	94	100	100
Cystocele	97	100	100	83	100	97	86	100
Vault prolapse	100	100	83	54	91	33	100	100
Uterine prolapse	87	83	100	100	100	100	25	20
Enterocele	73	87	83	80	84	91	71	83
Rectocele	97	76	50	50	94	96	66	10

Conclusion: MRI proved useful in the assessment of pelvic organ prolapse, providing good anatomical detail. However MRI was less useful in the assessment of enterocele and performed poorly compared to clinical examination in patients with this prolapse subtype. Although a useful additional tool in prolapse assessment, MRI is not necessarily superior to, and should not replace careful clinical examination. It should be noted that pelvic examination was performed by a urologist and not a gynaecologist, and therefore examination technique and the potential impact of this on study outcomes should be taken into consideration when interpreting these results.

Evidence Box 3: Comparison of clinical examination and investigations for pelvic organ prolapse [3, 18]