Examination of the cervix

Introduction

With progress in diagnostic imaging, the value of gynaecological examination has been questioned (Spence, 2011). Indeed performed poorly, vaginal and speculum examinations are invasive procedures which furnish little information. However, when carried out appropriately and competently, examination can provide vital information to guide diagnosis and treatment. The cervix in particular is affected by a number of pathologies which are not amenable to imaging and cervical changes can provide useful pointers in certain situations in pregnancy. Examination is therefore often mandatory to avoid missing important clinical conditions (Butler et al, 2011).

The cervix is the cylindrical lower portion of the uterus which forms a passage between the uterine and vaginal cavities. It is constricted by the internal os superiorly and at the external os inferiorly. Around half its length projects into the vaginal cavity (the ectocervix) and is amenable to clinical examination. The endocervical canal is lined by columnar epithelium. This meets the squamous epithelium of the ectocervix at the external os to form the squamocolumnar junction or 'transformation zone' – the area most commonly affected by abnormal cell changes.

Technique for examination of the cervix

Examination of the cervix can be carried out through visual inspection using a speculum or palpation during vaginal examination. A chaperone should be offered wherever possible in line with General Medical Council (2013) guidance.

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Speculum examination

The patient should be lying on her back with hips and knees flexed. A bi-valved (Cusco's) speculum should be warmed, lubricated and inserted into the vagina sideways (with the blades opening laterally) in a closed position. As the speculum is gently advanced towards the posterior fornix it is rotated 90° so that the clasp is at 12 o'clock. The speculum should be introduced aiming 45° downward, in line with the angle of the vagina in the supine position. The blades are then gently opened so that the cervix is visualized. If the cervix is not visible the speculum can be withdrawn a few centimetres, closed and repositioned before reopening the blades. Asking the woman to cough and to elevate her pelvis by placing her fists under her buttocks may help.

Swabs or a cervical screening test may be taken if required. During a speculum examination, swabs for chlamydia or gonorrhoea should be inserted into the cervical os and rotated within the endocervix. These samples must be sent in specific media and it is important that the appropriate test kit is used. The cervical appearance should be noted along with any contact bleeding or discharge. Occasionally, for example with a retroverted uterus, previous cervical surgery or where a pelvic mass is distorting anatomy, the cervix may be 'elusive' despite optimal positioning of the woman and the speculum. In this case a bimanual examination may help locate the cervix before reintroducing the speculum.

Taking a cervical screening test

Cervical screening aims to detect pre-malignant cells in the cervix. Lubricant should be kept to a minimum as it may interfere with analysis of the cervical cells by causing gel clumping. However, it is vital that the woman does not find the procedure too uncomfortable as this may put her off having repeat screening. A cervical sampling broom (*Figure 1*) is inserted into the endocervix so that the shorter outer bristles are in contact with the ectocervix and transformation zone. The brush is rotated five times. The brush is then rinsed in preservative solution by pushing it against the bottom of the vial five times.

Vaginal examination

Vaginal examination is performed by inserting gloved and lubricated index and middle fingers into the vagina. Gentle examination is important, particularly in cases of vaginismus. A bimanual technique is used whereby the non-examining hand simultaneously palpates the suprapubic lower abdomen. The cervix is identified

Figure 1. Cusco's speculum, cervical sampling broom and vial for cervical screening.

and its consistency noted. If severe discomfort results from gentle mobilization of the cervix this indicates cervical excitation which may indicate pelvic infection or haemoperitoneum (for example in ectopic pregnancy).

Normal variants

Inspection

The cervix is usually smooth and pink (*Figure 2*). A small amount of clear mucoid secretion is normal. The external os may be small and round in nullipara or larger and slit-like in multipara. In postmenopausal women an atrophic appearance is common. In women using an intrauterine contraceptive device, the coloured threads should be seen protruding from the external os and should also be palpable.

A cervical ectropion may be seen in pregnancy, the proliferative phase of the menstrual cycle, oral contraceptive pill use or as a normal variant, particularly in younger women. High levels of oestrogens cause the columnar epithelium of the endocervical canal to encroach on the ectocervix. The appearance is that of a 'raw' area encircling the external os which may bleed on contact and can be a benign cause of post-coital bleeding.

Nabothian cysts are another common benign condition of the cervix in which mucus builds up in areas where squamous epithelium has grown over the cervical crypts of the columnar epithelium. These smooth, firm cysts on the cervical surface are usually a few millimetres in diameter, although can be larger, and require no treatment.

Palpation

The cervix is felt as a smooth firm mass at the top of the vagina with a palpable indentation at the external os. A cervix pointing posteriorly usually denotes an anteverted uterus, the most common position, and one pointing anteriorly denotes retroversion.

During pregnancy hormonal influences render the consistency of the cervix softer. Before and during labour, smooth muscle, collagen and elastin fibres realign causing further softening and cervical 'effacement' – thinning and shortening of the cervix. This is followed by dilatation. The position of the cervix also changes from posterior to anterior as labour progresses. Both effacement and dilatation are essential elements of examination to detect the onset of labour and monitor its progress.

Cervical pathology in the non-pregnant woman

Post-coital bleeding

Examination of the cervix is mandatory in women presenting with post-coital bleeding to rule out cervical pathology. An ectropion may provide reassurance or a cervical polyp may be seen (*Figure 3*). Although the incidence of malignant change in such polyps is as low as 0.1% (Berzolla et al, 2007), if symptomatic these can often be removed using polyp forceps and sent for histological examination. Large or suspicious looking polyps may require removal in theatre. Gross erosion, ulceration or a mass should raise suspicion of cervical cancer.

Structural abnormalities

Structural abnormalities of the reproductive tract may result from failure of the Mullerian ducts to fuse and, at their most remarkable, may result in the formation of two uteri, vaginas and cervices. Other rare embryological abnormalities can lead to complete absence of the cervix or partial agenesis. It is prudent to note previous surgical history (such as total hysterectomy) before vaginal examination so that an iatrogenic absence of the cervix can be noted.

Infection

Cervicitis, inflammation of the cervix, is often caused by sexually transmitted infections, commonly *Chlamydia trachomatis* or *Neisseria gonorrhoeae*. This is characterized by a mucopurulent discharge. Concomitant cervical excitation may be a sign of pelvic inflammatory disease. Cervical erythema and oedema may be present as well as contact bleeding. Ulceration may be seen in herpes simplex infection.

Figure 2. The normal cervix.

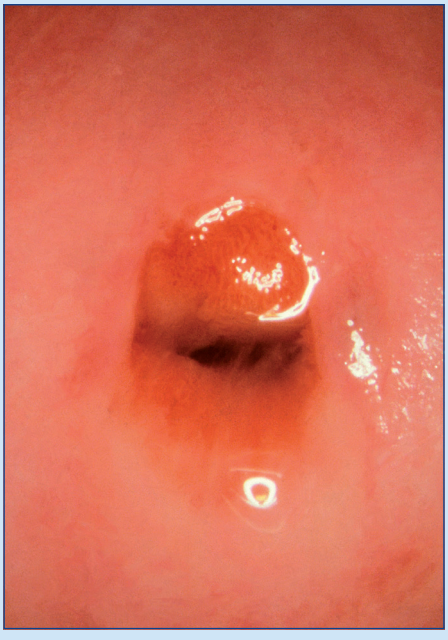
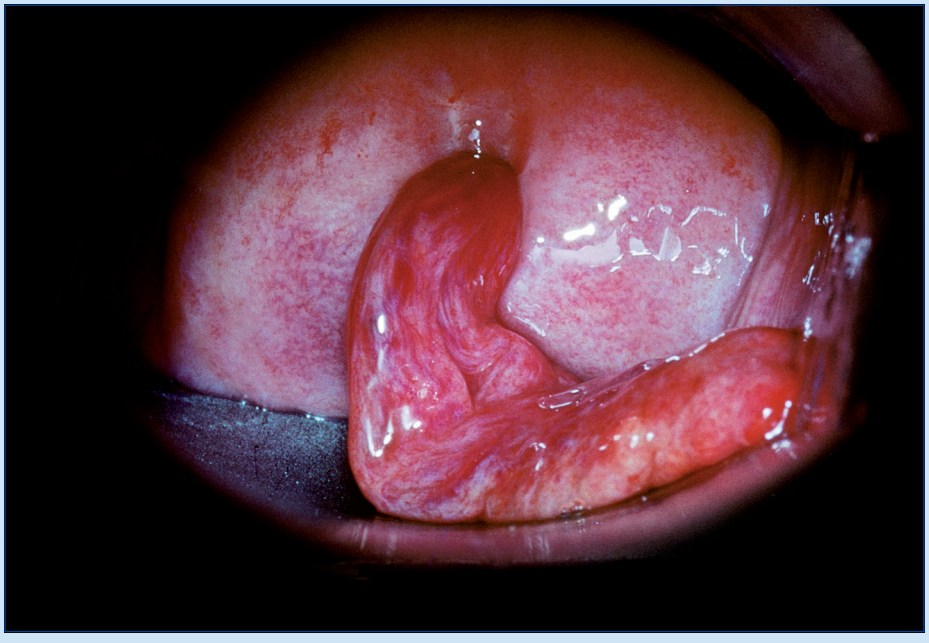


Figure 3. A large cervical polyp viewed through an endoscope.



The strawberry cervix describes the classical appearance of the cervix in infection with *Trichomonas vaginalis*. The erythematous appearance with punctate haemorrhages is pathognomonic of this condition, although only present in 2% of these patients (Petrin et al, 1998).

Other pathology

Cervical fibroids account for only 3% of leiomyomata (Jain, 2011). When present, speculum examination can be very difficult as a result of anatomical distortion. Occasionally a pedunculated submucous fibroid may extrude through the cervical os to be visible during speculum examination and may become necrotic. Such findings have been known to be missed in patients with known fibroids attending with menorrhagia where it has been deemed that further speculum examination would not be clinically useful.

Endometriosis affecting the cervix is rare and often asymptomatic, although postcoital bleeding, dysmenorrhoea or dyspareunia may be present. These 'powder burn' lesions can be red, blue or black and are usually several millimetres in diameter. Although management is often conservative, biopsy may be required to rule out other pathology and they may provide a clue to pelvic endometriosis.

Colposcopy

Colposcopy is a procedure where a magnified view of the cervix is obtained during speculum examination to detect malignant and premalignant conditions. Acetic acid applied to the cervix renders areas of cervical intraepithelial neoplasia 'aceto-white'. Iodine solution is then applied to stain normal epithelium brown – there is no uptake in cervical intraepithelial neoplasia or malignancy (Moore et al, 2010).

The cervix in the pregnant woman

Miscarriage and ectopic pregnancy

Gynaecological examination may be necessary in patients attending with bleeding or pain in early pregnancy. Cervical excitation may be a sign of ectopic pregnancy and may be present during septic miscarriage. Bleeding in the presence of an open os usually denotes an inevitable miscarriage. Distension of the os by blood or products of conception may cause 'cervical shock' – a vaso-vagal reaction with a reflex bradycardia. If material is seen within the os this can be removed with sponge-holding forceps and tissue sent for histological examination. If the os is closed, ultrasound may be required to confirm the location of the pregnancy and assess viability.

Examinations on labour ward or maternity assessment units

Speculum examinations are often performed on labour ward and in maternity assessment units on pregnant women attending with abdominal pain or bleeding. Cervical change which may indicate preterm labour should be noted along with the quantity of any bleeding or any local cause. Occasionally a shortened cervix may be suspected from clinical examination in the second trimester which prompts ultrasound assessment. Given that half of the cervix is supravaginal, transvaginal ultrasound assessment (*Figure 4*) is now the gold standard in assessing cervical length, although this requires specific expertise which may not be available in all units. The value of managing this condition with cervical cerclage to prevent preterm delivery is uncertain and is currently only recommended in the presence of certain risk factors (Royal College of Obstetricians and Gynaecologists, 2011).

The labouring cervix

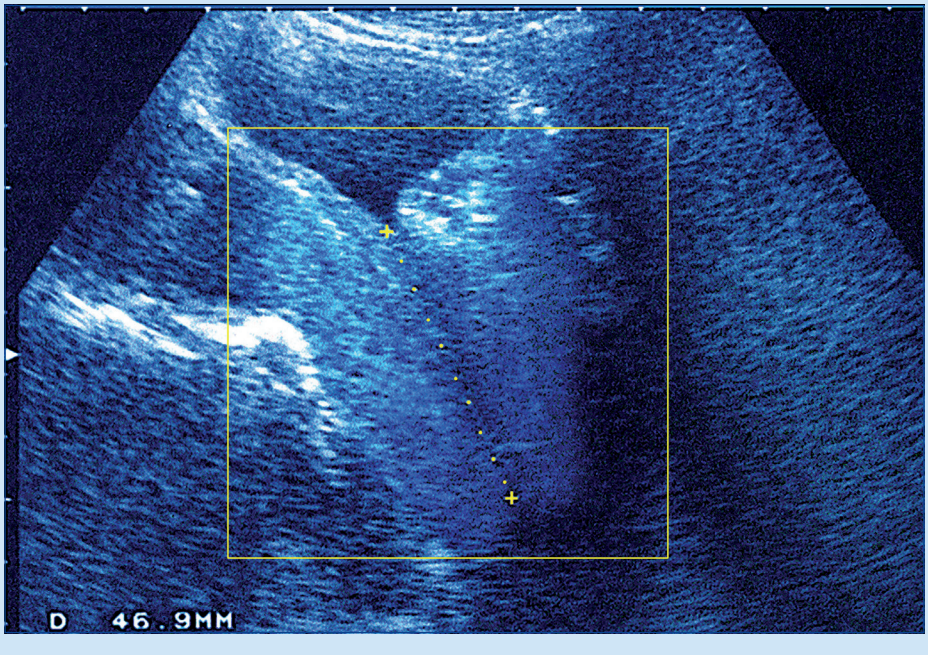
Labour is defined as the onset of regular contractions with progressive cervical change. The active phase of the first stage of labour is entered when the cervix is 4 cm dilated. Dilatation is determined by inserting one or two fingers into the internal os and assessing how open the cervix is in centimetres. Note should be made of the position (posterior, mid-position, anterior), consistency (firm, medium, soft) and length of the cervix. In primiparas effacement is usually followed by dilatation, but the two may occur concurrently in multiparas. Note should also be made of the station of the fetal head in relation to the ischial spines (station zero). This is classified in negative centimetres above the spines and positive centimetres below.

Cervical assessment is also used to monitor progress in labour. In the UK it is usually offered every 4 hours in the active first stage of labour. Delay is diagnosed when there is cervical dilatation of less than 2 cm in 4 hours, or simply a slowing in progress of labour in multiparas (National Institute for Health and Care Excellence, 2008a). The second stage of labour is diagnosed when the cervix is 10 cm or 'fully' dilated.

The Bishop score

The Bishop score is a tool for assessing cervical ripeness and is used during induction of labour to plan treatment and assess progress. It comprises the five features

Figure 4. Transvaginal ultrasound of the uterine cervix in pregnancy (boxed).



shown in *Table 1*. Official guidance states that a Bishop score of 8 or more indicates cervical ripeness (National Institute for Health and Care Excellence, 2008b), although intervention to progress the induction, such as artificial rupture of membranes, can be achieved with lower scores.

The post-partum cervix

The post-delivery cervix appears oedematous, floppy, bruised and is often friable. If cervical trauma is suspected as the cause of obstetric haemorrhage all aspects of the cervical lips should be examined using sponge-holding forceps with adequate illumination and vaginal wall retraction. Within hours of delivery the cervix reforms. The internal os closes after a few days and the cervix returns to its normal constitution during the 6-week puerperium.

When not to examine the cervix

Vaginal examination is an invasive procedure. Theoretical risks of unnecessary examination include introduction of infection, given the known change in microbiological flora following digital examination (Imseis et al, 1999), and prostaglandin release through cervical stimulation in threatened preterm labour. Therefore before any examination its necessity should be carefully considered.

Digital examination should be avoided in the case of low lying placenta, for fear of disturbing the placenta and causing haemorrhage. In addition during expectant management of rupture of membranes, vaginal examination should be avoided to reduce the risk of infection. Evidence exists that visual examination of the cervix correlates with digital examination and in these circumstances speculum examination can be performed to assess the cervix (Pereira et al, 2005).

Conclusions

While the utility of bimanual pelvic examination has been found to be limited in its assessment of the upper genital tract (Padilla et al, 2005), certain conditions of the cervix are more directly amenable to examination by speculum and palpation. Speculum examination allows for microbiological sampling and cervical screening tests to be performed. In addition, examination of the cervix plays a vital role in monitoring the onset and progress of labour. Simple measures, such as avoiding the use of stirrups during positioning (Seehusen et al, 2006), improve the experience of this invasive examination for women. Nevertheless the need for each examination should be carefully considered to ensure that it will yield useful information before it is performed. **BJHM**

Table 1. The modified Bishop score

	Modified Bishop score			
Cervical feature	0	1	2	3
Dilation (cm)	<1	1–2	2–4	>4
Length of cervix (cm)	>4	2–4	1–2	<1
Station (relative to the ischial spines)	-3	-2	-1/0	+1/+2
Consistency	Firm	Average	Soft	–
Position	Posterior	Mid/anterior	–	–

From National Institute for Health and Care Excellence (2008b)

KEY POINTS

- The necessity and appropriateness of gynaecological examination should be carefully considered in each patient.
- The cervix is assessed visually using a speculum and palpated during vaginal examination.
- Pathologies of the cervix which may be detected on examination include structural abnormalities, benign and malignant growths, and evidence of infection.
- In pregnancy note should be made of the length, consistency, position and dilatation of the cervix.
- Conditions in which cervical assessment should generally be avoided include placenta praevia and during expectant management of spontaneous rupture of membranes.

Conflict of interest: none.

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