**BASIC ANATOMY**

An understanding of basic anatomy of the pelvis is important to fully understand the normal structures and identify any pathology. (Figs 1.1–1.4) will provide a good reference when working through the textbook.

**GENERAL EXAMINATION**

General examination is extremely important for both gynaecology and obstetric patients and is often overlooked. Ensure the patient is comfortable and not unduly exposed. The following general assessment should be made:

- general wellbeing
- body mass index

- cardiovascular system, including pulse, blood pressure, cardiac murmurs and clinical signs of anaemia or oedema
- respiratory system
- neurological examination if indicated by history

This should then help to guide your differential diagnosis, and therefore your further investigations.

**OBSTETRIC EXAMINATION**

As per all examination techniques, the general obstetric examination follows the systemic review by:

- observation
- inspection
- palpation
- auscultation

**Observation**

Obstetric patients should not be examined flat on their backs because of the risk of postural supine hypotensive syndrome; when lying flat, the pregnant uterus compresses the aorta and reduces blood flow back to the maternal heart which can cause the woman to feel faint.

On general observation you must assess whether she appears comfortable at rest? Is there any indication of pain or distress? Does she look systemically well or unwell? This review should help alert possible immediate cause for concern.

**Inspection**

- Abdominal mass.
- Stigmata of pregnancy.
- Surgical scars.
Basic anatomy and examination

**Abdominal mass**
Inspect for any abdominal masses. A gravid (pregnant) uterus can often be seen per abdomen from approximately 12 to 14 weeks’ gestation. The shape and size of the abdomen should be noted. Are there any additional masses visualized, for example, an umbilical hernia.

**Stigmata of pregnancy**
Striae gravidarum (stretch marks) are caused by pregnancy hormones that stimulate the splitting of the dermis and can occur relatively early in pregnancy. New striae appear red and sometimes inflamed and can be sore and itchy; old striae from previous pregnancies are pale and silvery. They usually appear on the lower abdomen, upper thighs, buttocks and breasts.

Increased skin pigmentation can occur in pregnancy and results in the linea nigra – midline pigmentation from the xiphisternum to the symphysis pubis. Other areas that can undergo pigmentation in pregnancy include the nipples, the vulva, the umbilicus and recent abdominal scars.

**Surgical scars**
It is important to examine carefully for surgical scars as they can often be well-healed. Previous caesarean section scars are transverse suprapubic scars often hidden in the pubic hairline. Minimal access laparoscopy scars will usually have an umbilical scar site and additional abdominal sites. If scars are noted, it is important to confirm what surgical procedures have been performed (history taking).

**Palpation**
Before palpating the abdomen always enquire about areas of tenderness and palpate these areas last. On obstetric palpation there are a number of features which are being assessed:
- uterine size
- number of fetuses
- fetal lie, presentation, engagement and position

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**Fig. 1.3** External anatomy.

**Fig. 1.4** Anatomy of pelvic floor muscles.
Uterine size

Uterine size is assessed by palpation and is a skill that is acquired and improved with increased experience. A rough guide to the uterine size and corresponding gestation can be made from assessment of the fundal height in relation to the following anatomical landmarks: the symphysis pubis (12 weeks), umbilicus (20 weeks) and xiphisternum (36 weeks; see Fig. 1.5). The fundus of the uterus is not palpable abdominally until 12 weeks’ gestation. By 36 weeks the fundus should be approximately at the level of the xiphisternum, following which it drops down as the fetal head engages into the maternal pelvis.

When palpating the uterine fundus, always start at the xiphisternum and work towards the umbilicus using the medial border of the left hand or the fingertips. This technique should ensure that you always palpate the upper extent of a pelvic mass. Measuring the distance from the fundus to the symphysis pubis in centimetres [symphysis fundal height (SFH)] is a more objective method of assessing fundal height than using topography alone. After 24 weeks’ gestation, the SFH measurement ± 3 cm should equal the gestation (e.g., at 34 weeks’ gestation the SFH should be between 31 and 37 cm). This is a crude measurement technique and varies in precision between measurers, but is used to highlight patients measuring small for dates (e.g., growth-restricted babies) and large for dates (possible increased amniotic fluid levels).

Clinical assessment of liquor volume is not as accurate as objective assessment using ultrasound. However, subjective assessment can alert the examiner to the possibility of reduced or increased liquor volume and instigation of the necessary investigations. Reduced liquor volume might be suggested when the uterus is small for dates with easily palpable fetal parts producing an irregular firm outline to the uterus. Increased liquor volume causes a large-for-dates uterus that is smooth and rounded and in which the fetal parts are almost impossible to distinguish. If there are concerns regarding uterine size, an ultrasound scan should be ordered to assess fetus growth and amniotic fluid index.

Number of fetuses

The number of fetuses present can be calculated by assessing the number of fetal poles present. ‘Fetal pole’ is the term used to denote the head or the breech (buttocks). In a singleton pregnancy, two poles should be palpable unless the presenting part is deeply engaged in the pelvis. In multiple pregnancies, the number of poles present minus one should be palpable. For example, four poles are present in a twin pregnancy and only three should be palpable as one is usually tucked away out of reach. More commonly, the patient has already had an ultrasound scan detailing the number of fetuses.

Fetal lie, presentation, engagement and position

The fetal ‘lie’ is the relationship between the long axis of the fetus and the long axis of the uterus. This can be longitudinal, transverse or oblique (Fig. 1.6).

The fetal ‘presentation’ is the part of the fetus that presents to the maternal pelvis. If the head (also known as the ‘vertex’) is situated over the pelvis, this is termed a cephalic presentation. In a breech presentation the buttocks occupy the lower segment, and in an oblique lie the shoulder generally presents (Fig. 1.7). Any presentation other than a vertex presentation is called a ‘malpresentation’.

The fetal head is said to be engaged when the widest diameter of the head (the biparietal diameter) has passed through the pelvic brim. Abdominal palpation of the head...
is assessed in fifths and is measured by palpating the angle between the head and the symphysis pubis (Fig. 1.8). When three or more fifths of the head are palpable abdominally the head is not engaged because the widest diameter of the head has not entered the pelvic brim. When two or fewer fifths of the head are palpable the head is clinically engaged. This should equate to the station found on vaginal examination.

The position of the presenting part is defined as the relationship of the denominator of the presenting part to the maternal pelvis. The denominator changes according to the presenting part: the occiput in a cephalic presentation, the mentum (chin) in a face presentation and the sacrum in a breech presentation. For example, if the fetal presentation is directly face downwards, the position is occiput anterior (direct occiput anterior). It is possible to assess position on abdominal palpation by determining the position of the fetal back (see Fig. 1.9), but this requires experience and practice (see Table 1.1). The position of the presenting part can be assessed more accurately by vaginal examination.
Obstetric examination

Auscultation

In an obstetric patient the fetal heart should be auscultated using a Pinard or a Sonicaid. After 28 weeks it is appropriate for cardiotocography monitoring to be used to monitor both the fetal heart and contractions of the uterus.

Obstetric pelvic examination

Obstetric pelvic examination is not routinely performed at appointments, but indications for doing so include assessment in labour, assessment of membrane rupture and per vaginal bleeding, for example. The examination should include:

- external inspection of the vulva
- internal inspection of the vagina and cervix
- vaginal examination if indicated

ETHICS

It is crucial that before any intimate examination is performed informed consent is taken from the woman and a chaperone is advised. Routine presence of a chaperone is advised whether a male or female clinician.

External examination

The blood flow through the vulva and vagina increases dramatically in pregnancy. The vulva might look swollen and oedematous secondary to engorgement. The presence of vulval varicosities should be noted. Look for presence of vaginal discharge, leaking amniotic fluid or any bleeding.
In certain ethnic groups, it may be appropriate to assess the vaginal introitus for signs of female genital mutilation.

**Internal inspection of the vagina and cervix**

Examination of the vagina and cervix with a sterile Cusco's speculum should be performed using an aseptic technique. Increased vaginal and cervical secretions are normal in pregnancy. Inspection of the cervix might reveal amniotic fluid draining through the cervical os. Digital examination in the presence of ruptured membranes is likely to increase the risk of ascending infection and is, therefore, usually avoided unless there are regular uterine contractions. Exclusion of cervical pathology is important in the presence of bleeding, such as a cervical polyp or ectropion.

**Vaginal examination**

This should be performed under aseptic conditions in the presence of intact membranes. Once the cervix has been identified, the following characteristics should be determined:

- dilatation
- length
- position of cervix
- consistency
- station of presenting part
- position of presenting part

Cervical dilatation is assessed in centimetres using the examining fingers. One finger-breadth is roughly 1–1.5 cm. Full dilatation of the cervix is equivalent to 10-cm dilatation. When not in established labour, the normal length of the cervix is about 3 cm. Shortening occurs as the cervix effaces, becoming part of the lower segment of the uterus, in the presence of regular uterine contractions (Fig. 1.10). Softening of the cervix occurs as pregnancy progresses, aiding cervical effacement and dilatation. The consistency of the cervix can be described as firm, mid-consistency or soft. The position describes where the cervix is situated in the anteroposterior plane of the pelvis. As the cervix becomes effaced and dilated, it tends to become more anterior in position.

The 'station' of the presenting part is determined by how much the presenting part has descended into the pelvis. The station is defined as the number of centimetres above or below a fixed point in the maternal pelvis, the ischial spines. This should equate to the engagement found on abdominal palpation (see Fig. 1.8).

Using the aforementioned characteristics, Bishop devised a scoring system (the Bishop score) to evaluate the ‘ripeness’ or favourability of the cervix (Table 1.2). This

<table>
<thead>
<tr>
<th>Types of reason</th>
<th>Description</th>
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<tbody>
<tr>
<td>Maternal reasons</td>
<td>Maternal obesity</td>
</tr>
<tr>
<td></td>
<td>Muscular anterior abdominal wall</td>
</tr>
<tr>
<td>Uterine reasons</td>
<td>Anterior uterine wall fibroids</td>
</tr>
<tr>
<td></td>
<td>Uterine contraction/Braxton Hicks contraction</td>
</tr>
<tr>
<td>Fetoplacental reasons</td>
<td>Anterior placenta</td>
</tr>
<tr>
<td></td>
<td>Increased liquor volume</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cervical characteristic</th>
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<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dilatation (cm)</td>
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<td>1–2</td>
<td>3–4</td>
<td>&gt;4</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Station (cm)</td>
<td>3</td>
<td>2</td>
<td>1 or 0</td>
<td>+1 or +2</td>
</tr>
<tr>
<td>Consistency</td>
<td>Firm</td>
<td>Medium</td>
<td>Soft</td>
<td></td>
</tr>
<tr>
<td>Position</td>
<td>Posterior</td>
<td>Mid</td>
<td>Anterior</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1.10 Effacement of the cervix.
system is used as an objective tool when inducing labour to assess the cervix. The higher the score, the more favourable the cervix and the more likely that induction of labour will be successful.

**Defining the position of the presenting part**
With a cephalic presentation, the anterior and posterior fontanelles and the sagittal sutures should be identified. The posterior fontanelle is Y shaped and is formed when the three sutures between the occipital and parietal bones meet. The anterior fontanelle is larger, diamond-shaped and formed by the four sutures between the meeting of the parietal and temporal bones (Fig. 1.11). The position of the presenting part can be defined as shown in Fig. 1.12. The presence of caput and moulding should also be assessed. Caput is the subcutaneous swelling on the fetal scalp that can be felt during labour and this increases if the labour is prolonged with failure of the cervix to dilate. ‘Moulding’ is the term used to describe the overlapping of the skull bones that occurs as labour progresses.

**Observation and inspection**
- Abdominal distention
- Abdominal mass
- Surgical scars

Observations and inspections follow the same technique as above for obstetric examination.

During inspection an abdominal mass may suggest a gravid uterus, but other causes should be considered including a pelvic mass, ascites or hernia.

**Palpation**
Before palpating the abdomen always enquire about areas of tenderness and palpate these areas last.

Using the palm of the hand, gently palpate the four quadrants of the abdomen for areas of tenderness, and for evaluating whether this is generalized or focussed. Assess whether the tenderness is deep or superficial and if you are eliciting any guarding or signs of peritonism.

Palpate for any abdominal mass and if found assess for:
- size
- shape
- position
- mobility
- consistency
- tenderness
Basic anatomy and examination

For example, fibroids can be palpated during an abdominopelvic examination, which classically appear as an enlarged, firm and irregular pelvic mass that is mobile and usually nontender.

You should ascertain whether the mass is arising from the pelvis. If you cannot palpate the lower aspect of the mass, it is probably arising from the pelvis. Percussion can help outline the borders of a mass in an obese patient. The size of a pelvic mass can be described similar to a pregnant abdomen (e.g., ‘20-week size’ is equivalent to umbilical level).

Gynaecological pelvic examination
- External inspection of the vulva.
- Internal inspection of the vagina and cervix via a speculum.
- Bimanual examination of the pelvis.

The most common position for carrying out a pelvic examination is the dorsal position with the woman lying on her back with her knees flexed. Make sure that the patient is as comfortable as possible and only exposed appropriately. If the patient is a virgo intacta, external inspection only may be appropriate.

External examination of the vulva
Examine the anatomy of the vulva for inflammation, ulceration, swellings and lesions, atrophic changes and tissue discolouration. Parting the labia with the left hand, inspect the clitoris and urethral orifice (see Fig. 1.3). The presence of abnormal discharge on the vulva should be noted. A deficient or scarred perineum is a clue to previous trauma due to vaginal delivery. Vaginal or uterine prolapse through the introitus is assessed with and without the patient bearing down and stress incontinence might be demonstrated when the patient coughs.

![Diagram of pelvis positions](image-url)
Internal inspection of the vagina and cervix

To inspect the vagina and cervix, a speculum is used – either the Cusco’s speculum (bivalve) or the Sims speculum (Fig. 1.13) with adequate gel for lubrication. Patients should be advised prior to assessment that speculum examination may be uncomfortable.

The Cusco’s speculum is used with the patient in the dorsal position and consists of two blades hinged open at the vaginal introitus. When the blades are opened, the anterior and posterior walls of the vagina are separated allowing the vaginal fornices and cervix to be visualized.

The Sims speculum is used to inspect the anterior and posterior walls of the vagina and is an excellent tool for assessing uterovaginal prolapse. With the patient in the left lateral position the Sims blade is inserted into the vagina and used to retract either the anterior or the posterior walls. Uterovaginal prolapse can then be assessed with the patient bearing down. The vaginal tissue should be examined along with the cervix. Examine for any abnormalities of the vaginal tissue such as atrophy, inflammation or lesions. Ensure the cervix appears normal with no visible growths, ulcers or polyps.

Bimanual examination

A bimanual examination is performed to further elicit any pelvic masses or tenderness and assess the uterus.

It is usual to perform an internal examination using the lubricated index and middle fingers of the right hand. In nulliparous and postmenopausal women it might be necessary to use only the index finger. Palpation of the vaginal walls is important to exclude scarring, cysts and tumours that can easily be missed on inspection. The vaginal fornices should be examined for scarring, thickening and swellings that will suggest pelvic pathology. The size, shape, position, consistency, angle and mobility of the cervix should be assessed. Moving the cervix from side to side might elicit cervical motion tenderness and elevating the cervix anteriorly, thereby stretching the uterosacral ligaments, might cause pain in the presence of endometriosis.

The fingers of the right hand are then used to elevate or steady the uterus while the left hand palpates abdominally. An anteverted uterus is usually palpable between the two hands. A retroverted uterus is usually felt as a swelling in the posterior fornix. The different combinations of version and flexion of the uterus are shown in Fig. 1.14. The size, position, consistency, outline and mobility of the uterus should all be noted. To examine the adnexa, the fingers of the right hand should be positioned in one of the lateral fornices and the adnexal region palpated between the two hands. Normal premenopausal ovaries are not always palpable depending on the size of the patient. Fallopian tubes and postmenopausal ovaries should not be palpable. If an adnexal mass is discovered, then its size, shape, consistency, mobility and whether it is fixed to the uterus or not should all be noted. The presence and degree of tenderness should be noted.

Fig. 1.13 Speculums: (A) Cusco’s speculum; (B) Sims vaginal speculum.

Fig. 1.14 Positions of the uterus.

Chapter Summary

Knowledge of basic pelvic anatomy and examination techniques is essential in obstetrics and gynaecology to identify, diagnose and manage both normal and pathological presentations.