Perineal trauma after childbirth affects millions of women worldwide. Approximately 85% of women sustain some form of perineal trauma following vaginal delivery. Short and long-term morbidity associated with perineal repair can lead to major physical, psychological and social problems affecting the woman’s ability to care for her newborn baby and other members of the family. Perineal trauma may occur spontaneously during vaginal birth or when a surgical incision (episiotomy) is intentionally performed to enlarge the diameter of the vaginal outlet. Measures to reduce trauma to the lower genital tract, knowledge of anatomy of the pelvic floor and perineum, and techniques to repair trauma are integral components of obstetric care.

The overall risk of obstetric anal sphincter injury (OASIS) is 1% of all vaginal deliveries. However ‘occult’ OASIS (i.e. defects in the anal sphincter detected by anal endosonography) has been defined in 33% of primiparous women following vaginal delivery. The most plausible explanation for what was previously believed to be an occult OASIS is either an injury that has been missed, recognized but not reported or wrongly classified as a second degree tear. With increased awareness and focused training, the clinical detection of OASIS has increased. In centres where mediolateral episiotomies are practised, OASIS occurs in 1.7% (2.9% in primiparae) compared to 12% (19% in primiparae) in centres practising midline episiotomy.

**ANATOMY**

The perineum corresponds to the outlet of the pelvis and is somewhat lozenge shaped. Anteriorly, it is bound by the pubic arch, posteriorly by the coccyx, and laterally by the ischiopubic rami, ischial tuberosities and sacrotuberous ligaments. The perineum can be divided into two triangular parts by drawing an arbitrary line transversely between the ischial tuberosities. The anterior triangle, which contains the external urogenital organs, is known as the **urogenital triangle** and the posterior triangle, which contains the termination of the anal canal, is known as the **anal triangle**. The muscles of the pelvic floor and perineum are shown in Figure 23-1. The perineal body is composed of dense connective tissue to which is attached the bulbospongiosus muscle anteriorly, the superficial transverse perineal muscles laterally and the anal sphincter complex posteriorly. Also attached to the perineal body is the recto-vaginal septum and fascia. The anal sphincter complex consists of the external anal sphincter (EAS) and internal anal sphincter (IAS) separated by the conjoint longitudinal coat (Figure 23-2). The IAS is a thickened continuation of the circular smooth muscle of the bowel.

**PERINEAL TRAUMA**

In order to standardize definitions of perineal tears, the following classification is recommended:

- **First degree** – injury to perineal skin only
- **Second degree** – injury to perineum involving perineal muscles but not involving the anal sphincter
- **Third degree** – injury to perineum involving the anal sphincter complex:
  - 3a: Less than 50% of EAS thickness torn
  - 3b: More than 50% of EAS thickness torn
  - 3c: Both EAS and IAS torn
- **Fourth degree** – injury to perineum involving the anal sphincter complex (EAS and IAS) and anal epithelium. If the tear involves only the anorectal epithelium with an intact anal sphincter complex this has to be documented as a separate entity of a button-hole tear and not a fourth degree tear. If there is any doubt about whether the grade is a 3a or 3b, it should be classified as a 3b.

**EPISIOTOMY**

The traditional teaching that episiotomy was protective against more severe perineal lacerations has not been substantiated. Thus, the
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Studies that routine mediolateral episiotomy during instrumental delivery reduces the risk of third and fourth degree tears, there are no randomized trials.

- To obtain more room for obstetrical manoeuvres such as those associated with shoulder dystocia, assisted breech delivery and delivery of the second twin.

Liberal use of ‘prophylactic’ episiotomy is no longer recommended. However, there are still valid reasons to perform an episiotomy:

- To reduce the occurrence of multiple lacerations in the presence of a thick or rigid perineum.
- To shorten the second stage in cases of fetal distress and where prolonged ‘bearing down’ may be harmful for the mother (e.g. severe hypertensive or cardiac disease).
- In selected cases of assisted vaginal delivery with forceps and, less frequently, for vacuum assisted delivery. Although there is increasing evidence from observational studies that routine mediolateral episiotomy during instrumental delivery reduces the risk of third and fourth degree tears, there are no randomized trials.

There are two main types of episiotomy:

- **Midline episiotomy.** Two fingers are placed in the vagina between the fetal head and the perineum and, using straight scissors, the incision is made from the fourchette through the perineal body up to but not including the EAS. Advantages of these...
midline episiotomy are that it does not cut through the belly of the muscle, the two sides of the incised area are anatomically balanced making surgical repair easier, and blood loss is less than with mediolateral episiotomy. A major drawback is the propensity for extension through the EAS and into the rectum. For this reason many practitioners avoid the midline technique and it is not recommended in the UK.8

- **Mediolateral episiotomy.** The incision is made starting at the midline of the posterior fourchette and aimed towards the ischial tuberosity to avoid the anal sphincter. The incision is usually about 4 cm long. In addition to the skin and subcutaneous tissues the bulbocavernosus and the transverse perineal muscles are cut. Whether the incision is to the right or left depends on operator preference.

### REPAIR OF PERINEAL TRAUMA

‘But sometimes it happens by an unlucky and deplorable accident, that the perineum is rent, so that the privity and fundament is all in one… Let it be strongly stitched together with three or four stitches or more, according to the length of the separation, and taking at each stitch good hold of the flesh, that so it may not break out…’

Francois Mauriceau
The Diseases of Women with Childbed and in Childbed. Translated by Hugh Chamberlen. London: John Darby, 1683, p316

### Episiotomy and Second Degree Tears

The principles involved in repairing both episiotomies and second degree tears are similar. First, it is essential to assess the full extent of trauma by doing a vaginal and rectal examination. Unless this careful appraisal is carried out, partial or complete tears of the anal sphincter can be missed. Although the repair of these tears was previously carried out using the interrupted technique, the continuous suturing technique for perineal skin closure has been shown to be associated with less short-term pain. Moreover, if the continuous technique is used for all layers (vagina, perineal muscles and skin), the reduction in pain is even greater. The perineal muscles should be repaired using absorbable polyglactin material, which is available in standard and rapidly absorbable forms. A recent Cochrane review has shown that there are few differences in short-term and long-term pain, between standard and rapidly absorbing synthetic sutures but more women need standard sutures to be removed.10

### Technique

- Using 2/0 absorbable polyglactin 910 material (Vicryl rapide®) the first stitch is inserted above the apex of the vaginal trauma to secure any bleeding points that might not be visible. The vaginal trauma is closed using a loose, continuous, non-locking technique making sure that each stitch is inserted not too wide, otherwise the vagina may be narrowed. Suturing is continued down to the hymenal remnants and the needle is inserted through the skin at the fourchette to emerge in the centre of the perineal wound (Fig 23-3a).

- The muscle layer is then approximated after assessing the depth of the trauma and the perineal muscles (deep and superficial) are approximated with continuous non-locking stitches. If the trauma is deep, two layers of continuous stitches can be inserted through the perineal muscles (Fig 23-3b).

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**FIGURE 23-3** Repair of episiotomy. (a) Loose, continuous non-locking suture to the vaginal wall. (b) Loose, continuous non-locking suture to the perineal muscles. (c) Closure of skin using a loose subcutaneous suture.
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should be repaired with mattress sutures using 3/0 PDS (Polydioxanone) or modern braided sutures such as 2/0 Vicryl (polyglactin – Vicryl®) (Figure 23-5b).

• A vaginal examination is carried out to ensure that the vagina is not narrowed and a rectal examination carried out to ensure that sutures have not been placed in the anal canal.11

Repair of Episiotomy Dehiscence

Breakdown of episiotomy repair occurs due to poor technique and/or infection. Small areas of breakdown, provided there is adequate drainage, can be treated by antibiotics and sitz baths. These minor breakdowns will then granulate and heal-in nicely in the ensuing days and weeks. More extensive breakdown of episiotomy repair can be treated initially with antibiotics and sitz baths and, when signs of active infection have subsided, a secondary repair can be undertaken.12,13 This will require regional anaesthesia and careful surgical debridement of the wound. The principles of repair involve using the minimum number of sutures and knots. Interrupted skin sutures should be placed.

OBSTETRIC ANAL SPHINCTER TRAUMA (3RD AND 4TH DEGREE TEARS)

Technique

• Ideally the repair should be performed in the operating theatre with appropriate assistance, lighting, equipment and positioning.

• Regional anaesthesia, either spinal or epidural, is optimal as this allows relaxation of the sphincter and better identification and approximation of the separated ends of the muscle.

• The torn anorectal epithelium is closed with continuous 3/0 Vicryl suture (Fig 23-4a).

• The IAS tends to retract and can be identified lateral to the torn anal epithelium. It should be repaired with mattress sutures using 3/0 PDS (Polydioxanone) or modern braided sutures such as 2/0 Vicryl (polyglactin – Vicryl®) (Figure 23-5b).

• The torn ends of the EAS are grasped using Allis forceps. It is not uncommon for the sphincter to be torn off to the side rather than in the midline. Therefore, one end of the sphincter may have retracted into a recess on one side. Having grasped each end of the torn muscle with Allis forceps, the muscle is mobilized.

• When the EAS is only partially torn (Grade 3a and some 3b) then an end-to-end repair should be performed using 2 or 3 mattress sutures instead of haemostatic ‘figure-of-eight’ sutures (Fig 23-4a). If there is a full thickness EAS tear (some 3b, 3c or fourth degree), either an overlapping or end-to-end method can be used with equivalent

• To suture the perineal skin the needle is brought out at the inferior end of the wound, just under the skin surface. The skin sutures are placed below the skin surface in the subcutaneous tissue thus avoiding the profusion of nerve endings. Bites of tissue are taken from each side of the wound edges until the hymenal remnants are reached. A loop or Aberdeen knot is placed in the vagina behind the hymenal remnants (Fig 23-3c).
the external sphincter the remainder of the tear is closed using the same principles and suture material outlined in the repair of episiotomy.

- Broad-spectrum antibiotics are given intraoperatively (intravenously) and continued orally for 3 days.
- Stool softeners (Lactulose) should be prescribed for the first 10 to 14 days postpartum.
- All women who have had obstetric anal sphincter repair should be reviewed 6–12 weeks postpartum by a consultant obstetrician and gynaecologist. If a woman is experiencing incontinence or pain at follow up, referral to a specialist gynaecologist or colorectal surgeon for endoanal ultrasoundography (Fig 23-5a, b) and anorectal manometry should be considered.2

LACERATIONS

In addition to perineal tears, lacerations of the vulva and vagina are common.

Periurethral and Periclitoral Lacerations

Small periurethral and periclitoral lacerations are common, particularly in the nulliparous woman when episiotomy is not performed and pressure from the delivering head is transferred to the anterior perineum by the intact posterior perineum. However, these lacerations are usually small and the edges come together when the woman’s legs are positioned normally following delivery. If there is light bleeding, pressure with a pad for 1–2 minutes will usually arrest the bleeding. If there is significant bleeding these lacerations should be repaired with a fine continuous suture. It may be necessary to place a urethral catheter to guide the placement of sutures.

Vaginal Lacerations

Vaginal lacerations are common and usually involve the lower two-thirds of the posterolateral vaginal sulci. They may also occur as an extension of an episiotomy. Lacerations in the anterior sulcus of the vagina are less frequent, but can be associated with a narrow subpubic arch and elevation of the forces before the occiput has descended completely below the symphysis pubis. Lacerations of the upper third of the vagina are rare and more often associated with forceps rotation delivery. This can produce
Lower Genital Tract Trauma

One of the main problems with repair of vaginal lacerations can be exposure and access. Regional or general anaesthesia may be required. Assistance, retractors and good light are necessary. If you still cannot see the upper extent of the laceration place a suture as high as you can and use this as a tractor to bring the apex of the laceration into view (Fig 23-6). A continuous or, if very vascular, a continuous locking suture is used. In the case of extensive and high vaginal lacerations it may be necessary to pack the vagina tightly following suture for haemostasis and to avoid haematoma formation. If so, a Foley catheter is placed in the bladder and both this and the pack can be removed in 12–24 hours. In such cases broad-spectrum antibiotic coverage is advisable.

Cervical Lacerations

Cervical lacerations are relatively rare and in most cases do not bleed and require no treatment. The cervix can usually be inspected by applying ring (sponge) forceps to the anterior and posterior lips. If the posterior lip is not accessible apply one forcep to the anterior lip and a second one just lateral at the 2 o’clock position. The anterior forcep is then removed and ‘leapfrogged’ over the other forcep to the 4 o’clock position. In this manner the entire cervix can be closely inspected. Lacerations usually occur laterally and if they are less than 2 cm and not bleeding, they do not require a suture. If they are bleeding or large, place ring forceps on either side of the laceration and repair with a continuous locking suture (Fig 23-7). The cervix is extremely vascular and even with a continuous locking suture oozing may continue, while additional sutures only produce further bleeding points. In these cases apply ring forceps over the oozing areas and leave them in place for 4 hours, after which they can be removed. Surprisingly, this can be done with minimal disruption to the woman in the early postpartum period.

Annular Detachment of the Cervix

Annular detachment of the cervix is an extremely rare condition associated with cervical dystocia from a rigid or scarred cervix causing an annular detachment of the lower portion of the cervix in its entirety, such that a doughnut-shaped portion of the cervix is detached in front of the fetal head. In an earlier edition of this text Chassar Moir graphically described such a case:
‘I recall the family doctor who came to the front door to greet the obstetrician. In his outstretched hand he held a detached cervix and in a scared voice he explained, “Just as I was about to put on the forceps this thing came away in my hand”. Interestingly, this patient later came under my charge in a future confinement. Her cervix was minutely examined but showed no apparent abnormality’.

In modern obstetrics annular detachment of the cervix is virtually never seen but small ‘bucket-handle’ tears and small areas of detachment of the anterior lip of the cervix may occur with prolonged late first stage and second stages of labour. Unless it is bleeding this requires no treatment and, like Chassar Moir’s case described above, the postpartum cervix looks normal.

HAEMATOMAS

Postpartum vulvo-vaginal haematomas can be classified as vulval, paravaginal, broad ligament and retroperitoneal. Predisposing causes include prolonged second stage of labour, instrumental delivery, pudendal nerve block and vulval varicosities. Haematomas may be associated with incomplete suturing of vaginal lacerations or episiotomy. In many cases there is no obvious trauma, the delivery is spontaneous and the vaginal epithelium overlying the damaged blood vessel is intact.

Clinical Presentation

- **Vulval** haematomas have an obvious clinical presentation with an acutely painful, tender, purple swelling in the area of the labium majus. These may extend into the lower vagina and into the ischiorectal fossa.
- **Paravaginal** haematomas are not visible externally and usually present with a combination of some or all of the following factors – pain, restlessness, inability to void and rectal tenesmus. A gentle one-finger vaginal examination will usually reveal the tender mass bulging into the vagina.
- **Broad ligament** and **retroperitoneal** haematomas occur when a vessel ruptures above the levator ani muscle. The bleeding extends into the supravaginal space between the leaves of the broad ligament and may track retroperitoneally, even as high as the kidneys. This type of haematoma may be associated with deep cervical lacerations extending into the lower uterine segment or with an occult rupture of the lateral aspect of the lower uterine segment. Large broad ligament haematomas can be felt on bimanual examination and push the uterus to one side. Extensive broad ligament and retroperitoneal haematomas can cause profound hypovolaemic shock and may rupture into the peritoneal cavity. Diagnosis may be aided, if available, by ultrasound or MRI examination.

Management

Small vulval haematomas (≤ 5 cm) may be treated conservatively with analgesia, observation and ice packs. However, if the pain is not adequately controlled and if there is enlargement they have to be incised and evacuated. Paravaginal haematomas also need incision and evacuation. This requires regional or general anaesthesia. The incision is made over the area of maximum dis-tension and the clot evacuated. Seek and ligate discreet bleeding points, although frequently none are found. Oozing areas may be oversewn with figure-of-eight sutures. Tamponade for 2–3 minutes should help identify any bleeding points or persistently oozing areas that require suture. The vagina is then tightly packed with gauze moistened with lubricating gel or antiseptic cream. A Foley catheter is placed in the bladder and both of these can be removed in 12–24 hours.

Broad ligament and retroperitoneal haematomas may be self-limiting and will absorb in the coming weeks. Provided the patient is stable they may be initially treated conservatively with intravenous crystalloid, cross-matched blood, analgesia and observation. If available, it is wise to muster the personnel and equipment for angiographic embolization of branches of the internal iliac arteries. Should there be signs of progressive bleeding this can then be implemented and is often very effective. If angiographic embolization facilities are not available laparotomy is required and the haematoma is evacuated followed by ligation of bleeding points. A careful check should be made to confirm or deny uterine rupture as the source of the haematoma. This may require repair of the uterine rupture, or even hysterectomy.

REFERENCES