

CHAPTER 95

CIRCUMCISION

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Introduction

Circumcision, the partial or complete removal of the male foreskin, is one of the most commonly performed surgical procedures.¹ It has been practiced since antiquity. The first record of male circumcision dates from the Sixth Dynasty of the Egyptian pharaohs, around 2420 BC.¹

Circumcision for nonclinical reasons (nontherapeutic or prophylactic) has wide variations around the world. The United States has the highest rate of neonatal circumcision. In the past, about 90% of newborn boys were circumcised, but the rate has steadily declined, and currently is around 60–70%. More than 1 million neonatal male circumcisions are performed annually in the United States, and about 30% of all males are circumcised worldwide.^{2,3} However, circumcision is very uncommon in northern European countries, Central and South America, and Asia. After Gairdner⁴ published his landmark article in 1949, circumcision rates in the United Kingdom fell from about 30% to less than 10%.

Male circumcision is almost universally practiced in North Africa and most parts of West Africa. It is less common in East, Southern, and Central Africa, where its prevalence varies from country to country.

Circumcision Controversy

Less than 1% of all circumcisions are surgically indicated (see section “Indications for Circumcision”). Several medical bodies have long asserted the doubtful benefits of male circumcision in preventing known infection.^{5–10}

The often referred benefit of circumcision in preventing penile cancer in men may be negligible, as this cancer is rare in most populations.^{1,6} Male circumcision has been linked, however, to a low prevalence of cervical cancer in women living with circumcised spouses.⁷ Circumcision excises the most erogenous part of the male anatomy, and its critics argue that this diminishes sexual performance and enjoyment for both partners.^{1,11,12}

For surgeons in Africa and other countries where the practice of circumcision is entrenched, the question is not whether circumcision should be practiced. The challenge should be to ensure that circumcision is safely performed and to promote the teaching of its safe application in the community.

The Foreskin and Its Functions

Most boys have a nonretractile foreskin (phimosis) at birth.^{1,4,13,14} The inner foreskin is attached to the glans. Foreskin adhesions break down and form smegma pearls, or “white cysts under the foreskin,” which are then extruded. The process of retractability is spontaneous and does not require manipulation. The majority of boys will have a retractile foreskin by 10 years of age and 95% by 16–17 years of age.^{4,13,14}

The prepuce has several possible functions:

- It prevents meatal ulceration.
- The foreskin is a complex and important sensory organ. It has a high concentration of encapsulated sensory receptors, mostly Meissner corpuscles containing nerve endings, similar to those found in the

fingertips and lips. The unique sensory innervation of the prepuce establishes its function as an erogenous tissue.^{15–17}

- The foreskin may have an immunological function, containing many Langerhans cells that produce langerin.
- As an easily available source of live human fibroblasts, the foreskin has become a favourite tissue source for cell-culture biologists doing basic scientific research.
- The prepuce has a useful function in reconstructive surgery due to its many advantages, including easy harvest, high viability, elasticity, and stem cells.

Indications for Circumcision

There are few surgical indications for circumcision, which altogether, according to one report,¹⁶ constitute about 1% of all circumcisions performed.

Balanitis xerotica obliterans (BXO) is a lesion akin to lichen sclerosus et atrophicus; it is the cause of true scarring of the foreskin. It is rare before the age of 5 years, is associated with discomfort on voiding, and presents with a white firm scarring of the foreskin tip. The aetiology is unknown but may be of viral origin. This condition may also affect the glans and urethra. The techniques of intralesional steroid injection, long-term antibiotics, carbon dioxide laser therapy, and a radial preputioplasty alone or with intralesional injection of steroids have all been described in the literature. There are, however, no randomised trials to ascertain the efficacy and the long-term outcome of these techniques. There is a strong association between BXO in adults and penile carcinoma. Circumcision may be indicated.

Paraphimosis occurs when a tight retracted prepuce cannot be reduced, and thus forms a tight constricting band proximal to the glans. Although quite uncommon, this condition is an emergency because the ballooned glans penis is a painful condition and could be rendered ischaemic if left unreleased. Gentle compression with a saline-soaked swab followed by reduction of the prepuce over the glans is usually successful. Alternatives include multiple punctures in the oedematous foreskin or injection of hyaluronidase prior to compression reduction. A nitrous oxide and oxygen mixture is usually helpful and is available in some paediatric accident and emergency departments. Rarely, general anaesthesia may be required. A dorsal slit might be required for recurrent episodes or in acute conditions. Due to poor cosmesis after dorsal slit, or if there is scarring following reduction of paraphimosis, circumcision may be indicated. Circumcision is contraindicated in the acute situation.

Balanoposthitis is an inflammation of both the glans and foreskin. It may present with swelling and erythema of the distal penis and foreskin in association with discharge, bleeding from the prepuce, dysuria, and occasionally urinary retention. It occurs in about 4% of uncircumcised boys between 2 and 5 years of age.¹⁸ The aetiology is unclear, although infection, contact allergy, and contact irritation have been described. Although balanoposthitis may be recurrent, the episodes decrease

in frequency in older boys and reflect foreskin maturation. Simple bathing, appropriate antibiotics, and/or steroid treatment will suffice as treatment. Circumcision may be considered if recurrent severe episodes of inflammation occur.

Circumcision could be considered in boys with recurrent urinary tract infections (UTIs) and urogenital abnormality.¹ It has been shown that in children younger than 1 year of age, UTIs are more common in uncircumcised males.^{19,20} As this may have a detrimental effect on a child with high-grade vesicoureteric reflux or obstructive uropathy, circumcision could be considered in this age group.

A hooded foreskin is an abnormal dorsal hemiforeskin that is deficient ventrally and may or may not be associated with hypospadias. A hooded foreskin without hypospadias is a cosmetic abnormality. A modified circumcision or a foreskin reconstruction is a possible consideration for treatment. Hooded foreskin with hypospadias needs treatment with correction of the hypospadias (see Chapter 94).

Contraindications to Circumcision

Circumcision is contraindicated in patients with hypospadias, in whom the foreskin is often used for repair of the proximally placed ventral urethral meatus (see Chapter 94).

Disorders of sex development should similarly be left uncircumcised until the proper gender assignment has been clarified.²¹

Other conditions for which a circumcision should be prevented are conditions such as a ventral or dorsal chordee with or without hypospadias; megameatus with an intact prepuce; megalourethra; and a webbed, small, or inconspicuous or buried penis.

Circumcision Procedure

Four principal factors are common to all forms of circumcision: asepsis, excision of adequate outer and inner preputial layers, proper haemostasis, and protection of glans penis. Circumcision may be complete or partial.

Complete circumcision may be performed in the newborn period by using the Gomco clamp, the PlastiBell, or the Mogen clamp. After the newborn period, surgical circumcision is recommended. General surgical guidelines include complete sterile dissection, complete separation of the glanular adhesions, and exclusion of hypospadias.

Bleeding is a common complication after circumcision unless meticulous haemostasis with bipolar diathermy is performed. Monopolar diathermy is contraindicated.

Facilities

The premises in which circumcisions are carried out must be suitable for the purpose. In particular, if general anaesthesia is used, full resuscitation facilities must be available.

Analgesia and Anaesthesia

Neonatal circumcision should always be performed with appropriate anaesthesia. The complicated innervation of the penis explains why a dorsal penile nerve block provides incomplete pain relief for neonatal circumcision. A eutectic mixture of local anaesthetics (EMLA), contraindicated on open wounds and mucous membranes, can cause methemoglobinemia. Nonpharmacological methods (nonnutritive suckling, rocking, massaging, cuddling) or systemic analgesia with paracetamol are inadequate. Caudal analgesia is effective in anaesthetised boys but has not been studied in neonatal awake circumcisions.^{1,18,22}

Methods

The most ideal method for circumcision has not yet been devised. However, circumcision should usually be done by using surgical techniques rather than the clamp method.

The open method developed from surgical standardisation of the ritual excision performed by traditional itinerant circumcision practitioners. Basically, it consists of protection of the penile glans and shaft from inadvertent injury, circumferential crushing of the foreskin at

the corona to prevent bleeding, and safe excision of the foreskin distal to the crush. Three commonly used variations of the open method—the dorsal slit, the sleeve, and the guillotine methods—remain the predominant methods of circumcision.

The *dorsal slit method* involves the crushing and division of the two layers of the prepuce dorsum to enable the operator to free the prepuce circumferentially down to the corona. The slit is then extended to the corona and the prepuce is excised under direct vision, leaving a 2–3 mm skirt of prepuce rim.

The *sleeve method* is performed by excising each of the two layers of the prepuce under direct vision, starting with the outer layer to allow effective haemostasis as the bleeding vessels are ligated.

The *guillotine method* entails a circumferential release of the adherent prepuce, which is then pulled taut over the glans. The penis is retracted as far as possible, and a bone cutter or strong pair of artery forceps applied to crush the prepuce distal to the retracted glans penis for up to 10 minutes before the skin distal to the crush is trimmed off. It is a blind procedure.

Neonatal Circumcision

It is important to ensure safety and appropriate analgesia. The open dissection, Gomco, Plastibell, and the Mogen circumcision methods remain the most commonly used. For each baby to be circumcised, the surgeon should let the parents choose the procedure (except if it is medically indicated). Informed consent should be obtained. Whatever method of circumcision is employed, use of diathermy is contraindicated because it may lead to penile necrosis when employing a metallic circumcision device.^{22,23}

The Gomco clamp (Figure 95.1), Mogen clamp, and the Plastibell (Figure 95.2) are the three commonly used kits for performing neonatal circumcision. They can be bulky. If the surgeon is not used to these clamps, they can present significant complications. The Gomco and Mogen clamps also need sterilisation.



Figure 95.1: Gomco circumcision kit.



Figure 95.2: Plastibell circumcision kit.

The Plastibell, invented in 1956 by Kariher,²⁵ was fashioned after an earlier prototype. It is made entirely of plastic, comprising a protective bell with a ring grooved circumferentially. The bell is designed to fit over the glans while the ring is positioned under the foreskin around the corona. The conical end of the bell ends in an elongated detachable tab—a handle that is essential for stability during the circumcision, after which it is broken off.

1. The Plastibell ring is introduced under the prepuce following either a minimal dorsal slit or stretching of the prepuce opening.
2. The foreskin is pulled up to fit snugly over the ring up to a premarked position over the corona and then secured into place with the accompanying suture tied securely with a nonyielding ligature to crush the foreskin into the groove.
3. The prepuce skin distal to the ligature is trimmed off and the ring is left to fall off, often between 4 and 14 days, from ischaemic necrosis of the skin caught in the groove.

The Plastibell device, which comes in a sterile pack, is used for up to 60% of childhood circumcisions in the United States.²⁷ Youth, teen, and adult Plastibell devices are also available in Europe. It is the most popular circumcision kit in Nigeria, and is often specifically requested as “the ring method” by mothers wanting to circumcise their babies.

There is no formal way to measure what size is appropriate for each individual, so selection is based on the most likely fit. In its present format, the Plastibell ring protects the glans while the suture line helps ensure that the frenulum cannot be cut. There is also virtually no blood loss, and, in skilled hands, it can even be used on haemophilic boys, a distinct advantage over all other methods.²⁷ The Plastibell is an ideal tool for use by medical personnel, such as midwives, junior doctors, and family practitioners relatively unskilled in surgery because the only real skill required is the ability to tie a surgical knot that will not come undone over a period of about 10 days. It creates an acceptable, smooth, bloodless margin. The device is easy to use. It does not have many parts and its disposable presentation allows for many cases to be quickly performed over a short period of time.

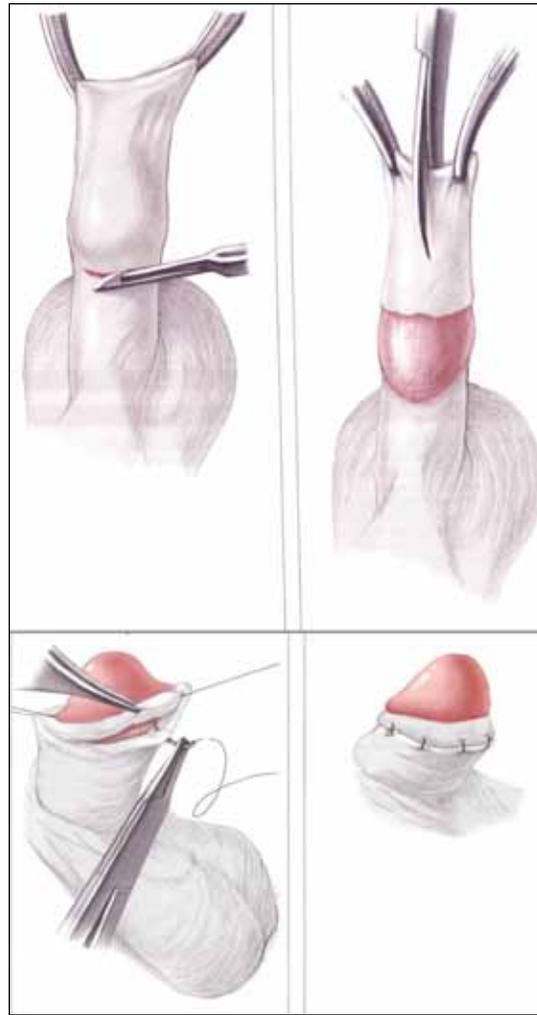
The long period of retention and/or usage of the wrong size of the Plastibell ring account for many of the complications associated with this device.²⁸ This device is more associated with infections than other devices³⁰ because the ischaemic foreskin becomes progressively more susceptible to bacterial invasion. Most of these infections are mild and are treated with dressings and antibiotics.³⁰ Some, however, are catastrophic with supervening cellulitis and sometimes necrotising fasciitis and Fournier’s gangrene.^{31,32} Glanular ischaemia, penile amputation, traumatic bladder rupture, and even death may occur.

Proximal migration and prolonged retention of the Plastibell ring have been associated with penile skin necrosis and urethrocutaneous fistula from the sustained pressure effect of the rigid plastic ring encasing the penile shaft eroding into the relatively subcutaneous penile urethra.³³ The Plastibell may occlude the urethra if wrongly applied and thus cause acute urinary retention. One report²³ found a 3% complication rate and a satisfaction rate of 96%. Due to these problems, it has been suggested that the Plastibell could be safely removed after 24 hours to obviate the many problems associated with prolonged retention.

Complete Circumcision after the Newborn Period

The steps in complete circumcision after the newborn period are outlined below (Figure 95.3).

1. The prepuce is widened with dissecting forceps and the coronal sulcus is exposed, removing any preputial adhesions.
2. The frenulum is clamped, separated from the prepuce, and reconstructed with two stitches.
3. The prepuce is repositioned and traction is applied by using two small artery forceps. The appropriate level of excision is marked on the skin just distal to coronal sulcus (gleams through the skin), drawing it obliquely, below from the back and above to the front.
4. A skin incision is made at the marked level, cutting only the outer cutaneous layer.
5. The prepuce is retracted and the inner layer is incised 2 mm proximal to the coronal sulcus.



Source: Hadidi AT, Azmy AF, eds. Hypospadias Surgery: An Illustrated Guide, 1st ed. Springer Verlag, 2004. Reproduced with kind permission of Springer Verlag.

Figure 95.3: Complete circumcision.

6. Careful meticulous haemostasis is performed by using bipolar diathermy.

7. The inner and outer preputial layers are sutured together.

Partial Circumcision

Partial circumcision is performed in societies that want to preserve the foreskin. In such a case, some two-thirds of the prepuce must be left to cover the glans. The success of this operation essentially lies in the skin incision. The prepuce should be incised immediately below the stenotic ring to ensure that the scarred prepuce is completely removed.

Postcircumcision Care

The circumcision wound should be gently wrapped in petrolatum-soaked gauze for at least 24 hours; many mothers are reassured by the presence of a dressing over the wound. Thereafter, the dressing should be gently removed and the wound left open to dry. Antibiotics are not usually indicated for circumcision. Oral acetaminophen or paracetamol should be sufficient for analgesia. Oral promethazine may be required for a day or two if the baby is irritable. It is preferable to give a written set of instructions to mothers of circumcised babies detailing postoperative care. Follow-up is usually poor after the wound has healed, and thus, many delayed problems are discovered much later in childhood and at routine inspection.

After partial circumcision, gauze with local anaesthetic ointment is applied, and warm baths are encouraged from the 4th postoperative day, with cautious retraction of the remaining prepuce.

Complications

Complications of circumcision are few in skilled hands. Most circumcisions worldwide, however, are performed by junior trainees, general practitioners, and nurses. In Nigeria and most parts of Africa, medical personnel perform circumcision only in the big cities, whereas the majority of the population dwelling in the rural hinterland still rely on unskilled traditional circumcision by native doctors.³⁴ Many times, these doctors are itinerant, with little consideration for anaesthesia, haemostasis, or asepsis. The world literature on circumcision is rife with details of mutilation, sepsis, and sometimes death from this procedure.^{28,35,36} Bailey et al. reported a 25% overall rate of adverse events following adult circumcisions in Kenya, with 6% of patients suffering permanent adverse sequelae.³⁷

Early complications of circumcision include bleeding, infection, glanular laceration and partial amputation, urethrocutaneous fistula, and failure to remove enough skin. Other complications that may arise later include skin-bridge, implantation dermoid cyst, and meatal stenosis. With care, most of these complications are preventable. It is therefore a part of the duties of paediatric surgeons in Africa to advocate for a standardisation of and formal training for circumcision to reduce its associated morbidity and mortality.

Bleeding

Bleeding is the most common complication, occurring in up to 10% of all circumcisions. The bleeding is usually brisk and should stop with digital pressure applied for a few minutes; otherwise, a few well-placed sutures would suffice. Techniques of haemostasis, such as the use of adrenaline pack, are discouraged to prevent systemic effects of this drug, which can be absorbed through the operation site. Significant bleeding may occur, however, in babies with underlying bleeding disorder, and this may be severe enough to warrant hospitalisation and blood transfusion. Babies have been known to bleed to death from massive blood loss in this situation.

Laceration and Amputation

One series over four years in the United States reported 105 serious clamp-related complications, including laceration, penile amputation, and urethral injury. About 20 serious injuries are reported per year in the United States, with repeated warnings from the US Food and Drug Administration (FDA) between 1992 and 2002.^{38,39} The Plastibell may lead to penile injuries from prolonged retention or proximal migration of its ring (Figure 95.4). Many more cases of significant penile trauma (Figures 95.5 and 95.6) have been recorded from circumcisions performed by native doctors and unskilled personnel in Africa.

Redundant Skin

Failure to remove enough skin is cosmetically unsightly and is the top reason for parental dissatisfaction.

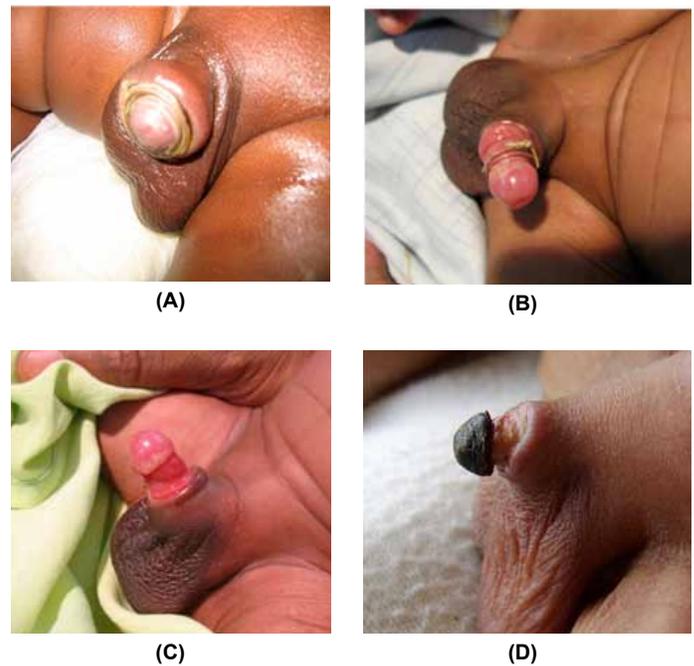
Sepsis and Other Complications

- Infection remains an unacceptable complication of circumcision.
- Meatal stenosis may occur if the premeatal glans is traumatised during circumcision.
- Chordee can be produced by a dense scar on the ventrum of the penis.
- Hesitancy and dysuria are seen in as many as 60% of older boys. Urinary retention may occur, leading to urosepsis, systemic infection, acute renal failure, or even bladder rupture.

Death may rarely occur after circumcision from haemorrhage, infection, or anaesthetic complications. Deaths have occurred in “initiation schools” for ritual circumcision, in South Africa.

Sexual and Psychological Consequences of Circumcision

A study testing subjects 4–7 years old shortly before and after circumcision reported that the procedure was “perceived by the child as an aggressive attack upon his body, which damaged, mutilated and, in



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Figure 95.4: Complications from Plastibell circumcision: (A) prolonged retention of Plastibell (infant could not void urine); (B) penile skin loss resulting from proximal migration and prolonged retention of Plastibell ring; (C) after removal of the retaining ring in (B); (D) glanular necrosis from retained Plastibell.



Source: J Pediatr Urol 2010; 6:23–27; reproduced with kind permission from Elsevier.

Figure 95.6: Urethrocutaneous fistula from open circumcision.



Figure 95.5: Partial penile amputation following circumcision by a traditional practitioner.

some cases, totally destroyed him.” It resulted in increased aggressiveness and weakened the ego, causing withdrawal and reduced functioning and adaptation. In another study, children were observed to be “terribly frightened” during the procedure, leading to increased aggressive behaviour and nightmares afterwards. In a study of children in Turkey, most of whom underwent traditional circumcision at home, 66% did not remember anything, whereas 33% reported some bad sensations, such as fear, pain, and shame about the procedure.

An interesting psychological consequence of circumcision is *the perceived superiority* that may be felt by circumcised individuals or groups, which may create prejudice, discrimination regarding marriageability and property inheritance, and sometimes violence against noncircumcised individuals.^{40,41} Many opinions on psychological complications can be found in the literature.⁴²

Ethical Issues

This section is reproduced in part from the British Medical Association (BMA) document, *The law and ethics of male circumcision*.⁴³

Male circumcision is generally assumed to be lawful provided that:

- it is believed to be in the child’s best interests;
- it is performed competently; and
- there is valid *informed* consent.

Informed Consent/Assent and Refusal

Competent children may decide for themselves (assent). Different countries have different age restrictions. The wishes that children express must be taken into account. If parents disagree, nontherapeutic circumcision must not be carried out without the leave of a court. Consent should be confirmed in writing.

Best Interests

The views that children express are important in determining what is in their best interests. Parental preference must be weighed in terms of the child’s interests. The child’s lifestyle and likely upbringing are relevant factors to take into account. Parents must explain and justify requests for circumcision in terms of the child’s interests. Parents do not have the right to demand a surgical procedure unless there is equivocal evidence of benefit and that the child would be harmed if the surgery is delayed and not performed. The need to belong to a particular religious or cultural group is relevant and needs to be considered. The question, however, arises, if the ritual could not be performed at a later time to give the child opportunity to decide for himself or herself.

Health Issues

In settings where circumcision is not universally practiced, parents seeking circumcision for their son for reasons of hygiene or health benefits should be fully informed of the lack of consensus within the profession over such benefits. The BMA considers there is insufficient evidence concerning health benefit from nontherapeutic circumcision. There is no urgent need to perform the circumcision before the consenting age.

Standards

The General Medical Council advises that circumcisers must “have the necessary skills and experience both to perform the operation and use appropriate measures, including anaesthesia, to minimise pain and discomfort.” There is no legal requirement for nontherapeutic circumcisions to be undertaken by registered health professionals.

Conscientious Objection

Doctors are under no obligation to comply with a request to circumcise a child. Where the procedure is not therapeutic but a matter of patient or parental choice, there is no ethical obligation to refer on.

Key Summary Points

1. Circumcision is the most ancient surgical procedure known and has generated more controversy than any other operation.
2. The prevalence of circumcision in different populations varies, with approximately 80% of the world’s population being uncircumcised.
3. Medical indications for circumcision develop in only 3–5% of boys.
4. Pathological phimosis occurs in less than 1.5% of boys at the age of 17, and is an indication for circumcision.
5. Recurrent paraphimosis and recurrent balanitis, especially in diabetic boys, are indications for circumcision.
6. Other valid medical indications are condylomata acuminata involving the foreskin and glans, and recurrent injury (or tears) of the prepuce.
7. The incidence of typical surgical complications after infant circumcision is high and reported from Africa as being greater than 20%.
8. The procedure should be performed only on infants who are stable and healthy, and adequate anaesthesia and analgesia should be provided.
9. Where circumcision is universally practiced, efforts should be made to teach safe methods to reduce the burden of complications.

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