

1. Overview of Female Genital Fistula

1.1. Definition and Epidemiology

A fistula is an abnormal communication between two epithelial surfaces, which can occur between two hollow or tubular internal organs or between an internal hollow organ and the outer epithelial layer of the body. More specifically, a genital fistula is a communication of the urethra, bladder, ureter and/or rectum with the uterus, cervix and/or vagina. Such communications are therefore genitourinary and/or rectovaginal.

Unrelieved prolonged obstructed labour is the main cause of obstetric vesicovaginal fistulas and rectovaginal fistulas.⁵ Rectovaginal fistulas are rarely seen in isolation, as they tend to be concurrent with vesicovaginal fistulas in more severe cases of obstructed labour. Combined fistulas occur in 5%–10% of cases.⁶

Prolonged obstructed labour is estimated to lead to the delivery of a stillborn baby in around 90%–95% of women who have an obstetric fistula.⁷ Women in neglected obstructed labour are also at risk of dying themselves, from complications such as uterine rupture, sepsis or postpartum haemorrhage. When a woman survives, the impact of unrelieved obstructed labour often leads to the development of an obstetric fistula, causing her to be incontinent of urine and/or faeces. If untreated, the injury will remain for the rest of a woman's life, causing immense suffering and isolation.

Obstetric fistula most commonly occurs in Sub-Saharan Africa and Southeast Asia.⁸ Since the obstetric fistula patient population is hard to reach⁹ and as the condition tends to occur mostly in countries where there is a scarcity of health facilities, many cases will remain undiagnosed and under-reported. Therefore, robust, recent and reliable incidence and prevalence rates of obstetric fistula are notoriously difficult to obtain.¹⁰ There are many estimates of the prevalence of fistula,¹¹ however the most commonly quoted estimate is that around two million women suffer from obstetric fistula worldwide, with 50,000 to 100,000 new cases each year.¹²

⁵ L.L. Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem. *Lancet* (2006).

⁶ B. Hancock, A. Browning. *Practical Obstetric Fistula Surgery*. London: Royal Society of Medicine Press Ltd (2009).

⁷ Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem; M. Muleta, S. Rasmussen, T. Kiserud. Obstetric Fistula in 14,928 Ethiopian Women. *Acta Obstet Gynecol Scand* (2010).

⁸ G. Slinger, L. Trautvetter. Addressing the Fistula Treatment Gap and Rising to the 2030 Challenge. *Int J Gynecol Obstet* (2020); Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem.

⁹ M.A. Lyimo, I.H. Moshia. Reasons for Delay in Seeking Treatment among Women with Obstetric Fistula in Tanzania: A Qualitative Study. *BMC Womens Health* (2019).

¹⁰ A.S. El-Azab, H.A. Abolella, M. Farouk. Update on Vesicovaginal Fistula: A Systematic Review. *Arab J Urol* (2019); Ö. Tunçalp, V. Tripathi, E. Landry, C.K. Stanton, S. Ahmed. Measuring the Incidence and Prevalence of Obstetric Fistula: Approaches, Needs and Recommendations. *Bull World Health Organ.* (2015); C. Stanton, S.A. Holtz, S. Ahmed. Challenges in Measuring Obstetric Fistula. *Int J Gynecol Obstet* (2007).

¹¹ A.J. Adler, C. Ronsmans, C. Calvert, V. Filippi. Estimating the Prevalence of Obstetric Fistula: A Systematic Review and Meta-Analysis. *BMC Pregnancy Childbirth* (2013).

¹² K. Waaldijk, Y.D. Armiya'u. The Obstetric Fistula: A Major Public Health Problem Still Unsolved. *Int Urogynecol J* (1993); G. Lewis, L. De Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*. WHO (2006); UNFPA. *Second Meeting of the Working Group for the Prevention and Treatment of Obstetric Fistula* (2002).

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1.1. Definition and Epidemiology 1.2. Aetiopathogenesis

Iatrogenic injury is the leading cause of female genital tract fistulas in high-income countries, and it is less often the sequelae of obstetric injury.¹³ However, the numbers of iatrogenic fistula cases in Sub-Saharan Africa and Southeast Asia are also increasing. This increase is likely to be the result of a combination of factors, including insufficient medical and obstetric training and supervision, inappropriate labour management and decision-making, increased caesarean sections, as well as more accurate reporting of iatrogenic injuries. To further help with the latter, T.J. Raassen *et al.* have developed a useful and clear categorisation system for iatrogenic fistula with the following distinctions: *definitely iatrogenic*, *probably iatrogenic* and *likely iatrogenic*.¹⁴ It is also important to note that, women presenting late at health facilities are also more susceptible to iatrogenic injury as maternal reproductive tract tissues are much more fragile from the prolonged, obstructed labour.

1.2. Aetiopathogenesis

Prolonged obstructed labour is the main aetiological factor for the development of genital fistula, causing an 'obstetric fistula'.

In such cases, the uterine contractions cause the foetal head or presenting part to increasingly compress the soft maternal tissues of the genital tract against the bony pelvis, mainly against the back of the pubic bones. This leads to ischaemic necrosis of the intervening soft tissues between the bladder/urethra and affected part of the genital tract. After the delivery, which usually results in a stillbirth, the necrotic tissue sloughs off, forming a direct communication between two or more anatomical structures.

The process takes place over days or weeks and results in an obstetric fistula. The most common site of injury is at the urethrovesical junction, resulting from the foetal head being deeply impacted and stuck in the maternal pelvis during cephalopelvic disproportion or malposition of the foetal head. The extent of the damage will depend on the duration of obstructed labour and the position of the foetal head or corresponding presenting part.

The longer the labour is obstructed, the more extensive the resulting injuries that affect the soft tissues of the maternal genital tract and associated nerves. Fistulas can involve the bladder base, the whole of the anterior vaginal wall and/or much of the urethra, with rectal involvement leading to a concomitant rectovaginal fistula in more severe cases.

¹³ C.J. Hillary, N.I Osman, P. Hilton, C.R. Chapple. The Aetiology, Treatment, and Outcome of Urogenital Fistulae Managed in Well- and Low-Resourced Countries: A Systematic Review. *Eur Urol* (2016).

¹⁴ N. Tasnim, K. Bangash, O. Amin, S. Luqman, H. Hina. Rising Trends in Iatrogenic Urogenital Fistula: A New Challenge. *Int J Gynecol Obstet* (2020); T.J. Raassen, C.J. Ngongo, M.M. Mahendeka. Iatrogenic Genitourinary Fistula: An 18-Year Retrospective Review of 805 Injuries. *Int Urogynecol J* (2014); J. Wright, F. Ayenachew, K.D. Ballard. The Changing Face of Obstetric Fistula Surgery in Ethiopia. *Int J Womens Health* (2016).

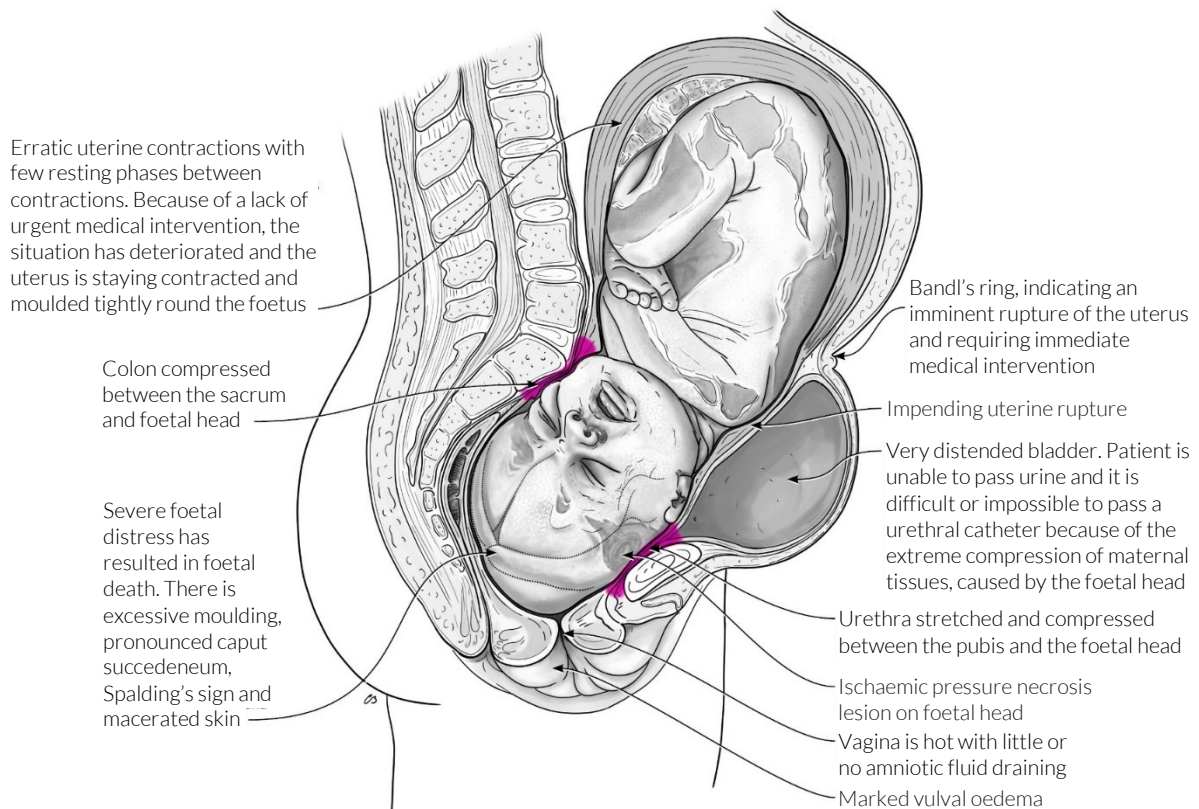


Figure 1. Maternal and foetal sequelae of prolonged obstructed labour. General maternal signs and symptoms include fever, sepsis, distress, pain, agitation and exhaustion. Due to the sustained compression of the L4–5 nerves and S1 roots, maternal footdrop is also likely to occur following delivery. Purple shading represents ischaemic necrosis of maternal tissues from the pressure of the foetal head during unrelieved obstructed labour. These purple areas are at high risk of becoming obstetric fistula(s).

1.3. Aetiological Factors

Aetiological factors of genital fistulas and related trauma are outlined under obstetric and nonobstetric causes below.

1.3.1. Obstetric Causes

It is estimated that 90.4%–92.2%¹⁵ of female genital fistulas are related to childbirth.

1. Obstetric Fistula

- Prolonged obstructed labour (most common¹⁶)

¹⁵ M. Maheu-Giroux, V. Filippi, S. Samadoulougou, *et al.* Prevalence of Symptoms of Vaginal Fistula in 19 Sub-Saharan Africa Countries: A Meta-Analysis of National Household Survey Data. *Lancet Global Health* (2015); T.J. Raassen, E.G. Verdaasdonk, M.E. Vierhout. Prospective Results after First-Time Surgery for Obstetric Fistulas in East African Women. *Int Urogynecol J Pelvic Floor Dysfunct* (2008); P. Hilton, A. Ward. Epidemiological and Surgical Aspects of Urogenital Fistulae: A Review of 25 Years' Experience in Southeast Nigeria. *Int Urogynecol J Pelvic Floor Dysfunct* (1998).

¹⁶ J. Kelly, H.R. Winter. Reflections on the Knowledge Base for Obstetric Fistula. *Int J Gynecol Obstet* (2007).

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1.3. Aetiological Factors

2. **Perineal Tears** (included as they are usually due to birth trauma and, depending on the degree, can cause flatal and faecal incontinence, and are therefore also treated by fistula surgeons).

Factors associated with an increased risk of developing perineal tears include:

- Rapid uncontrolled vaginal delivery
- Instrumental or assisted vaginal delivery
- Foetal macrosomia (potential shoulder dystocia during vaginal delivery)

3. **Iatrogenic Fistula**

- Caesarean section, with or without hysterectomy¹⁷ (more common in patients who suffer delays, for example in accessing an appropriate health facility and/or in receiving an emergency caesarean section after arrival)
- Instrumental or assisted, e.g. vacuum or forceps delivery
- Destructive vaginal delivery procedures
- Manual removal of placenta
- Defibulation in preparation for childbirth
- Episiotomy
- Symphysiotomy
- Curettage (rarely)

1.3.2. Nonobstetric Causes

1. **Iatrogenic**, e.g. caused surgically during elective gynaecological operations such as hysterectomy or through traumatic injury, e.g. in dilatation and curettage
2. **Traumatic**
 - Coital/sexual violence¹⁸
 - As a result of an accident
 - Female genital mutilation/cutting (FGM/C)
 - Insertion of foreign bodies
3. **Malignancy**, e.g. advanced cervical cancers
4. **Radiotherapy**
5. **Traditional intravaginal practices** like gishiri cutting, hot iron metal, insertion of products or items
6. **Inflammatory conditions**, e.g. irritable bowel syndrome, Crohn's disease
7. **Infection**
 - Tuberculosis
 - Lymphogranuloma venerum

¹⁷ M. Mpunga Mafu, D.F. Banze, D. Nembunzu, *et al.* Frequency and Management of Non-Obstetric Fistula in the Democratic Republic of Congo: Experience from the Fistula Care Plus Project. *Trop Med Int Health* (2020).

¹⁸ M. Onsrud, S. Sjøveian, D. Mukwege. Sexual Violence-Related Fistulas in the Democratic Republic of Congo. *Int J Gynecol Obstet* (2009); A.O. Longombe, K.M. Claude, J. Ruminjo. Fistula and Traumatic Genital Injury from Sexual Violence in a Conflict Setting in Eastern Congo: Case Studies. *Reprod Health Matters* (2008); M. Muleta, G. Williams. Postcoital Injuries Treated at the Addis Ababa Fistula Hospital, 1991–97. *Lancet* (1999).

- HIV
- Schistosomiasis

8. **Congenital** (rare), including exstrophy of the bladder (ectopia vesicae), epispadias, ectopic ureters

1.4. Risk Factors

The factors that put women and girls at increased risk¹⁹ of developing an obstetric fistula, both directly and indirectly are:

- Lack of availability or access to safe delivery services and emergency obstetric care with trained, skilled birth attendants and medical teams.
- Poverty, illiteracy, lack of formal education and gender inequality.
- Home delivery with unskilled birth attendants and rural geographic location.
- Barriers to accessing family planning and antenatal, delivery and postnatal care.
- Small, short or stunted stature of mother.
- Rachitic maternal pelvis.

1.5. Fistula Prevention

1.5.1. Clinical Prevention

To prevent obstetric fistula it is vital to increase the availability of and access to quality maternal health services, including emergency obstetric care. This should cover the entire pregnancy and postnatal period and, critically, births should be attended by a skilled healthcare professional, with close surveillance in labour using the partogram and timely transfer of the patient to a higher-level facility in the event of obstructed labour. In the case of iatrogenic fistulas, it is essential that surgeons and other health professionals receive quality training, particularly in gynaecological and obstetric procedures, good support and adequate facility capacity.²⁰

If a woman presents after prolonged obstructed labour, conservative management with bladder catheterisation may lead to spontaneous healing of a potential or fresh vesicovaginal fistula (see 2.2.1. Conservative Management for At-Risk and Fresh Vesicovaginal Fistula Cases; page 17). If conservative management is not successful, a trained, skilled fistula surgeon should repair the fistula as early as possible, thereby providing timely and quality treatment as well as minimising unnecessary suffering. Most fistula surgeons usually prefer to wait 3 months after the formation of a fistula before attempting a repair, to allow for healing of affected tissues.

If a fistula surgeon is not available, then the patient should be referred appropriately. It is imperative that only trained, skilled fistula surgeons provide fistula repairs, as the first attempt has the best

¹⁹ P.M. Tebeu, J.N. Fomulu, S. Khaddaj, L. de Bernis, T. Delvaux, C.H. Rochat. Risk Factors for Obstetric Fistula: A Clinical Review. *Int Urogynecol J* (2012); L. Hawkins, R.F. Spitzer, A. Christoffersen-Deb, J. Leah, H. Mabeya. Characteristics and Surgical Success of Patients Presenting for Repair of Obstetric Fistula in Western Kenya. *Int J Gynecol Obstet* (2013); Raassen, Verdaasdonk, Vierhout. Prospective Results after First-Time Surgery for Obstetric Fistulas in East African Women; L.L. Wall, J.A. Karshima, C. Kirschner, S.D. Arrowsmith. The Obstetric Vesicovaginal Fistula: Characteristics of 899 Patients from Jos, Nigeria. *Am J Obstet Gynecol* (2004).

²⁰ P. Hilton. Trends in the Aetiology of Urogenital Fistula: A Case of 'Retrogressive Evolution'? *Int Urogynecol J* (2016).

chance of success.²¹ Substandard repairs seriously reduce the likelihood of subsequent surgery having good outcomes.

The provision of and access to (free) family planning and birth spacing services is important, to both prevent obstetric fistula and reduce the likelihood of a recurrence in women who have had a previous repair. Women who have had an obstetric fistula, with or without repair, should have an elective caesarean section in all subsequent pregnancies. This prevents reoccurrence of an obstetric fistula and ensures good maternal and newborn health outcomes. Women who have had an iatrogenic fistula or perineal tear may be advised that in subsequent pregnancies they can attempt a vaginal delivery, which should only ever take place in a facility equipped to provide comprehensive emergency obstetric care.

1.5.2. Educational Prevention

Raising the status of women and girls and advancing gender equality is at the heart of obstetric fistula prevention. This starts with equal opportunities to access and complete free, equitable and quality primary and secondary education²² to allow girls to reach their personal and professional potential. Receiving the same education as their male peers can enable women and girls to develop a strong sense of gender equality, awareness of their (human) rights and empower them to claim those rights.

Another essential cornerstone of fistula prevention is to improve the level of health education amongst all members of society, with particular emphasis on the need for adequate maternal and reproductive health care.²³ It is vitally important to involve those who have most of the decision-making power in the household and/or the community, including men and older people. Health education can be delivered by a range of groups and individuals, such as community health workers, sensitisation teams and fistula ambassadors, who are often former patients who have recovered from obstetric fistula.

Free and comprehensive health education should address:

- Prevention, identification and treatment of obstetric fistula.
- Comprehensive sex, reproductive and general health education, including options in the case of an unplanned pregnancy.
- The risks of unattended home deliveries (e.g. obstetric fistula, postpartum haemorrhage, maternal and neonatal mortality, etc) and the importance of giving birth in an appropriate healthcare facility, or at least having a skilled healthcare professional in attendance with the possibility of a timely transfer to a hospital.

²¹ Hancock and Browning. *Practical Obstetric Fistula Surgery*.

²² W. Rosa, ed. Appendix: Transforming Our World: The 2030 Agenda for Sustainable Development. In: *A New Era in Global Health*. Springer (2018).

²³ M.N. Wegner, J. Ruminjo, J.E. Sinclair, L. Pessa, M. Mehta. Improving Community Knowledge of Obstetric Fistula Prevention and Treatment. *Int J Gynecol Obstet* (2007).

- Options for family planning, including delaying pregnancy²⁴ and birth spacing.
- Making plans for safe childbirth in an adequate health facility.

1.6. Obstetric Fistula Classification Systems

To be effective, a classification system for obstetric fistula should be descriptive, indicative of the operative technique and can ideally be prognostic to help predict the surgical outcome. The system should be a reliable tool to facilitate communication and to help surgeons identify suitable cases according to their surgical ability.

In current practice, there is no universally accepted, standardised obstetric fistula classification system and several are used;²⁵ however, the most commonly used are those developed by Kees Waaldijk²⁶ and Judith Goh.²⁷ For ease of communication, fistula surgeons should use one system consistently for record keeping, case selection, audits and studies.

There are also some commonly used terms to describe fistulas that do not constitute a classification system but are descriptive and therefore useful for communication. The descriptions can be based on the site, size and extent of scarring of the fistula:

Site

- Urethra–vaginal: occur within 3.5 cm of the external urethral meatus.
- Juxtaurethral: most common site of a fistula and is at the urethrovesical junction.
- Midvaginal: 4 cm or more from the external urethral orifice.
- Juxtacervical: adjacent to the cervix, more common in multiparous women and post caesarean section.²⁸
- Intracervical: between the bladder and the cervical canal and almost always the consequence of a caesarean section.
- Circumferential: most commonly the bladder has been completely separated from the urethra so there is a disruption in the continuity of the urinary tract. The back of the pubic bone can easily be palpated through the vagina at the site of the gap between the urethra and the bladder.
- Ureterovaginal: where one or even both ureters drain into the genital tract. These are usually iatrogenic after a caesarean section and/or hysterectomy.
- Vault: occur at the vaginal vault after an elective or emergency hysterectomy.

²⁴ A.O. Tsui, A.A. Creanga, S. Ahmed. The Role of Delayed Childbearing in the Prevention of Obstetric Fistulas. *Int J Gynecol Obstet* (2007).

²⁵ J.B. Lawson. Tropical Gynaecology: Birth-Canal Injuries. *Proc R Soc Med* (1968); Lewis G. and de Bernis L. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*.

²⁶ K. Waaldijk. Surgical Classification of Obstetric Fistulas. *Int J Gynecol Obstet* (1995).

²⁷ J.T. Goh. A New Classification for Female Genital Tract Fistula. *Aust N Z J Obstet Gynaecol* (2004).

²⁸ A.M. Sih, D.M. Kopp, J.H. Tang. Association between Parity and Fistula Location in Women with Obstetric Fistula: A Multivariate Regression Analysis. *BJOG* (2016).

Size/diameter

- Tiny: admitting only a small probe.
- Small: <1.5 cm.
- Medium: 1.5–3 cm.
- Large: >3 cm, may involve loss of most of the anterior vaginal wall and a circumferential loss of the urethrovesical junction.
- Extensive: major loss of bladder and urethra with a large gap in between.

Scarring

The extent of scarring can range from minimal to extreme. In the former, the fistula margins are soft and mobile, whereas in the latter, the margins are rigid and fixed. It can also affect the lateral and posterior wall of the vagina, causing complete stenosis in extreme cases. Stenosis can affect the proximal or distal vagina or can extend throughout. The most common site is midvagina.²⁹

1.6.1. Waaldijk Classification System³⁰

Kees Waaldijk's classification system for vesicovaginal and rectovaginal fistulas is based on damage to the continence mechanism, 0–5 cm from the meatus, circumferential loss and size. It can be used to determine what type of operation will be needed and gives an indication of the prognosis.

Genitourinary Fistulas (Vesicovaginal Fistulas)

Classification of fistulas according to anatomic/physiologic location

Type I	Fistulas not involving the continence/closing mechanism		
Type II	Fistulas involving the continence/closing mechanism	A Without (sub)total urethra involvement	a Without circumferential defect
			b With circumferential defect
		B With (sub)total urethra involvement	a Without circumferential defect
			b With circumferential defect
Type III	Miscellaneous, e.g. fistulas involving the ureter and other exceptional fistulas		

Additional classification of fistulas according to size

Small	<2 cm
Medium	2–3 cm
Large	4–5 cm
Extensive	≥6 cm

²⁹ Hancock and Browning. *Practical Obstetric Fistula Surgery*.

³⁰ Waaldijk. *Surgical Classification of Obstetric Fistulas*.

Using the classification system to predict surgical principles

Type of fistula	Bladder/urethra direction of closure	Pubocervical fascia	Anterior vaginal wall closure
Type I	Any, use common sense	No special measures	Adapt to fistula margins
Type II Aa	Transverse	Transverse repair with or without fixation	Transverse adaptation
Type II Ab	Circumferential end-to-end	Re-fixation	Transverse adaptation
Type II Ba	Longitudinal, with transverse urethral tissue	Fixation	Flap
Type II Bb	Longitudinal, with circumferential nonurethral tissue	Re-fixation	Flap
Type III	Not applicable	Not applicable	Not applicable

Genito-Anorectal Fistulas (Rectovaginal Fistulas)

Classification of fistulas according to anatomic/physiologic location

Type I	Proximal fistulas not involving the continence/closing mechanism	a Without rectum stricture
		b With rectum stricture (common)
		c With circumferential defect (not common)
Type II	Distal fistulas involving the continence/closing mechanism	a Without sphincter ani involvement
		b With sphincter ani involvement
Type III	Miscellaneous, e.g. intestine-uterine fistulas after instrumental abortion	

Additional classification of fistulas according to size

Small	<2 cm
Medium	2-3 cm
Large	4-5 cm
Extensive	≥6 cm

Using the classification system to predict surgical principles

Type	Surgical principles
Type I a	Transverse closure of rectum
Type I b	Transverse closure of rectum with disruption of rectal stricture
Type I c	End-to-end anastomosis (after disruption of strictures); exceptionally, combined abdominovaginal approach with colostomy
Type II a	Longitudinal closure of anorectum
Type II b	Meticulous reconstruction of all the structures involved
Type III	Depends on the situation

1.6.2. Goh Classification System³¹

Judith Goh's classification system is based on the length of the urethra (types 1–4), the size of the fistula (a–c) and the extent of scarring (i–iii).

Genitourinary Fistulas (Vesicovaginal Fistulas)

Site (distance between external urinary meatus and distal edge of fistula)	
Type 1	>3.5 cm
Type 2	2.5–3.5 cm
Type 3	1.5 to just less than 2.5 cm
Type 4	<1.5 cm
Size (length of the largest diameter)	
(a)	<1.5 cm
(b)	1.5–3 cm
(c)	>3 cm
Scarring characteristics	
i	None or only mild fibrosis (around fistula and/or vagina) and/or vaginal length >6 cm with normal vaginal capacity
ii	Moderate or severe fibrosis (around fistula and/or vagina) and/or reduced vaginal length and/or reduced vaginal capacity
iii	Special consideration, e.g. radiation damage, ureteric involvement, circumferential fistula, previous repair

³¹ Goh. A New Classification for Female Genital Tract Fistula.

Genito-Anorectal Fistulas (Rectovaginal Fistulas)

Site (distance between distal edge of fistula and hymen)	
Type 1	>3 cm
Type 2	2.5–3 cm
Type 3	1.5 to just less than 2.5 cm
Type 4	<1.5 cm
Size (length of the largest diameter)	
(a)	<1.5 cm
(b)	1.5–3 cm
(c)	>3 cm
Scarring characteristics	
i	None or mild fibrosis around the fistula and/or vagina, vaginal capacity >6 cm
ii	Moderate or severe fibrosis, vaginal capacity <6 cm
iii	Special consideration, e.g. radiation damage, inflammatory disease, malignancy, previous repair

1.6.3. Prognosis

Studies have been carried out using both the Waaldijk and Goh classification systems to predict outcomes.³² Essentially, for both systems, as the fistula type increases (e.g. Waaldijk type I to type II Bb and Goh type 1ai to type 4ciii), the prognosis worsens.³³ These classification systems mostly concentrate on the fistula characteristics that affect prognosis, such as involvement and length of the urethra, the size of the fistula and the extent of scarring. These systems are similar to other classification systems, such as for cancer; nevertheless, other factors that potentially contribute to outcomes tend not to be taken into account, such as patient characteristics and comorbidities, surgeon skill, perioperative procedures and care.³⁴ Classification systems may also be enhanced by an explicit prognostic score, which can help with decision-making and planning repairs.³⁵ Scoring systems for prediction of healing and continence using a 5% interval on a scale from 5% to 95% are used by some fistula surgeons,³⁶ ideally, any scoring system should be used in conjunction with the classification system of choice.

³² K. Waaldijk. The Immediate Management of Fresh Obstetric Fistulas. *Am J Obstet Gynecol* (2004); J.T. Goh, A. Browning, B. Berhan, A. Chang. Predicting the Risk of Failure of Closure of Obstetric Fistula and Residual Urinary Incontinence Using a Classification System. *Int Urogynecol J Pelvic Floor Dysfunct* (2008).

³³ V. Frajzyngier, G. Li, E. Larson, J. Ruminjo, M.A. Barone. Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula. *Am J Obstet Gynecol* (2013).

³⁴ Frajzyngier, *et al.* Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula.

³⁵ Frajzyngier, *et al.* Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula; S.D. Arrowsmith. Urinary Diversion in the Vesico-Vaginal Fistula Patient: General Considerations Regarding Feasibility, Safety, and Follow-Up. *Int J Gynecol Obstet* (2007).

³⁶ K. Waaldijk. *Obstetric Trauma Surgery Art and Science* (2018).