Mastering the Techniques in Hysteroscopy

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Osama Shawki
Sushma Deshmukh
Luis Alonso Pacheco
Mastering the Techniques in
HYSTEROSCOPY

System requirements:

- Operating System – Windows Vista or above
- Recommended Web Browser – Google Chrome & Mozilla Firefox
- Essential plugins – Java & Flash player
  - Facing problems in viewing content – it may be your system does not have java enabled.
  - If Videos don’t show up – it may be the system requires Flash Player or need to manage flash setting. To learn more about flash setting click on the link in the ‘help’ section.
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Dedicated to
To my mother, who gave me life...
To my father, who guided me through it...
To her who blesses my everyday...
To my Sun-shine... my boys...

Osama Shawki

Dedicated to
Lord Ganesha
The God of wisdom and knowledge
Who blessed my life
In the form of
My parents, the divine touch —
Dr PR Deshmukh and Dr Sarojini Deshmukh
My brothers, who inspired me all along the way —
Dr Satish and Dr Sanjay
My sons Sushant and Suyash
My inner strength
My husband Dr Sudhir — my die-hard supporter!

Sushma Deshmukh

Dedicated to
My parents Luis Luz and Maria Luz because they instilled in me
the values of hard work and education.
My mentor Dr Miguel Rodrigo because he opened
my eyes to the world of hysteroscopy.
My wife especially because anything good in my life has been because
of her love and her continued support.
My children Alvaro and Carla for always making me smile.

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Welcome all my friends to the greatest temple in the universe.
Welcome to the place where everybody of you enjoyed free accommodation, all inclusive for nine months.
Welcome to the house that provided you the most tender bed to sleep, the softest pillow to relax your head and the most protection ever.
The cavity of the uterus....
Let me take you into the mysterious journey inside the place of creation.
The place that all humanity evolved from.
The mysterious cave in which every human spent his or her beginning.
No wonder that science of endoscopy took us into all cavities of bodies, but the womb is the most exciting. Whenever we talk about endoscopic surgery for gynecology, our mind always goes for laparoscopy.
Unfortunately, hysteroscopy received the least attention from the gynecologists. Ironically, the abdominal cavity is not our home as gynecologists. We are just visitors into the abdomen. However, our home is the cavity of the womb. Would you not agree with me that most feminine health issues arise from the cavity of the uterus and very few from outside? So, ironically, the gynecologists paid less attention for that valuable part.
It is quite curious to investigate why development of hysteroscopic surgery stayed for long time behind laparoscopic surgery. The answer is quite simple. Laparoscopic approach and insertion of telescopes and instruments were much simpler and easier for the surgeons.
Moreover, in laparoscopy, you can insert many instruments from many puncture sites. You also get to enjoy the privilege of assistance and a cameraman to achieve excellent vision and field of surgery.
However, the case is much different in hysteroscopy.
The uterus is a muscular, vascular, contracting organ that allows very difficult access and more difficulty to maintain distension.
The cavity is very small in size as compared to abdominal cavity and also has a very restricted field to move around. Additionally, there is limitation for the number of instruments to use.
A hysteroscopist has to take care of controlling the camera, instruments, distension and everything by himself using his only two hands.
This situation does not exist in the luxurious laparoscopic techniques.
In my personal opinion, all these factors were handicap and put enormous load for training and gaining hysteroscopy skills.
That explains the setback and slow satisfaction upon hysteroscopy.
Over the past few decades, modern development and innovation in technology of optics, design of sheaths and fluid distension machines, all facilitated easy and better hysteroscopy practice.
Parallel to that, there has been a growing interest and enthusiasm upon hysteroscopy among the gynecologists all over the world.
Ability to see well and maintain good view inside the cavity have encouraged many gynecologists to implement routine hysteroscopy as office procedures.
Gynecologists realized the enormous value for diagnosis and treatment through the cervical canal to the cavity of the uterus.
Treatment of intrauterine pathology became a standard approach by hysteroscopy. This textbook carries the vision of the most experienced ones in this field.

My aim while designing a new textbook on hysteroscopy was not only to add more science, but was also to inject skills and crystalize the experience of the top experts.

I am absolutely confident that by the time you finish this book and digest its contents, you will start a new phase of your practice.

Osama Shawki MD
Preface

The world is changing very fast with the ‘Digital Microchip Technology’. It has given magical touch to all fields. Medical field is blessed with this modern technology too. One of the greatest transformations within the history of surgery has been the paradigmatic shift away from open surgery and into the realm of operative video hysterolaparoscopy approach. It has rejuvenated the forgotten old instrument of hysteroscope. The extraordinary strides in energy systems, optics, instruments and surgical techniques are ‘revolutional to this century’. And all eye-popping technological advances started proliferating in an astonishing way.

It was a great responsibility for me to design and edit this international edition with Dr Osama Shawki from Egypt and Dr Luis Alanso from Spain. For the beginners, this textbook is motivational for learning this wonderful technique of hysteroscopy. For masters, this book is for updating as well as opening newer challenges. This textbook is designed in such a way that it gives complete knowledge about the uterus, i.e. anatomy, physiology, instruments and gadgets and its applications along with the current and recent advances in hysteroscopy. There are many sections in this book dedicated to each problem, and various opinions and methods to solve it by stalwarts in hysteroscopy. It also includes the tips and tricks to master hysteroscopy. This book is blessed with many gifted international as well as national figures of India, who are specialized in hysteroscopic surgeries.

Dr Osama Shawki, the renowned hysteroscopist of the world, redefined hysteroscopy in a very simple and skillful way, also releasing his fabulous videos. Dr Luis Alonso Pacheco, who is the editor of ‘Hysteroscopy’ newsletter (released regularly all over world), also took great pains to weave the hi-tech hysteroscopist of the world in one string.

Sushma Deshmukh MD DGO
Preface

Gynecological surgery has changed in the last few years mainly due to the development of new technologies. There has been a radical and profound change that has allowed us to develop more effective therapies to treat different uterine pathologies. Sometimes it is difficult to get updated, and to know about different tools, techniques and approaches. Those quick changes require new and effective kinds of continuous training.

This book is an example of how hysteroscopy has changed in the past. It has been a revolution instead of an evolution. Everyday more and more gynecologists are getting interested in hysteroscopy. Our mission as experts in hysteroscopy is to share our knowledge with the readers. Teaching is the opportunity for us to transmit everything we have learned during our daily practice.

But, we should not forget that we are doctors and we treat people. We have to help the needy, and be kind with our patients. We have to be conscious of what we say and how we say it. Our training is our best tool. We have to be always updated and choose the best option for our patients.

There is an ancient Roman maxim 'Primum non nocere,' which means 'first, do no harm.' This is the oldest rule concerning the practice of traditional medicine. I have always adhered to this principle and I encourage you too to do so.

Enjoy hysteroscopy!!

Luis Alonso Pacheco MD
To write an international edition on hysteroscopy was a thrilling experience for me. But this textbook witnesses hard work, burning of midnight oil, persistence, struggle, adversity, rejections, sacrifices and so many other things. But conquering all hurdles, after all, the dream came true.

We wanted to put all the current and recent advances, and the upcoming research work in this book. Great work by Dr Osama Shawki and Dr Luis Alonso Pacheco for involving many international faculties. In this beautiful odyssey, Dr Osama Shawki, my inspiration and Dr Luis Alonso, my wonderful friend were with me always. Tons of thanks to them!

Actually, the real pillar behind this textbook is the Group Chairman of Jaypee Brothers Medical Publishers, Mr JP Vij. It was his dream to have an international edition on hysteroscopy. Because of his persistent endeavor, this book has seen the light of today. In today’s world, operative video hysteroscopy is a concept that now seems almost prosaic in its self-evident appeal. All international and national faculties involved in this book also contributed their views and original research in a systematic way within the prescribed time limit. Thanks to all of them from the bottom of my heart.

I would like to mention the names of Dr Sandeep Mahajan, Dr Alhad Mohite, and Dr Deepali Kadam, who helped me a lot by providing good sonographic images. My thorough supporter is my husband Dr Sudhir. Since the last one year, I was working on this book. Without his encouragement, it would not have been possible. My sons, Sushant and Suyash are always with me. These three people whole-heartedly supported me scarifying their precious time. My mother Dr Sarojini Deshmukh and my father Dr PR Deshmukh are the main energy sources for me. I am surrounded by my admirers, my treasures—my brothers Dr Satish and Dr Sanjay, sisters-in-law Dr Snehal and Dr Sonali, my nephews and niece Indrajeet, Raj, Adhirath and Isha, my friends and, of course, my patients.

My computer assistant Mrs Vandana needs a special mention. Special thanks to Mr Avinash Kokate, who has given inputs to design the cover page.

We would also like to thank Mr Ankit Vij (Group President), Ms Chetna Malhotra Vohra (Associate Director-Content Strategy), Ms Angima Shree (Senior Development Editor), Mr Prasun Bhattacharya and Dr Shyam from Nagpur branch, and the entire production team of Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India for their continuous work and commitment to this project. And the list goes on…

Because of all these affectionate people, I could pen this book.

Last but not the least, special thanks to Dr Osama and Dr Luis for the videos.
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To know hysteroscopy
Understand uterus thoroughly
Learn embryology, anatomy
Remember practical aspects of physiology
Study normal/abnormal endometrial histology
Dating of endometrium, one should study.
Then get ready to apply.
INTRODUCTION

Female reproductive system comprises of gonads (ova-
rries), reproductive tract (fallopian tubes, uterus, and vagi-
na), and external genitalia. External genitalia, vagina, and
vaginal portion of cervix can be directly examined during
physical examination for any abnormality. On the other
hand, ovaries, tubes, and uterus are situated deep inside
pelvis. Therefore, finger of examining doctor was the only
way to inspect their abnormalities without opening the
abdomen, before the noninvasive imaging techniques or
laparoscopy were invented. Ultrasonography, aptly known
as third eye of obstetrician and gynecologist along with
other imaging techniques are noninvasive indirect ways
which can help in diagnosis. Laparoscopy is direct way
for diagnosis and treatment as well, but unlike hystero-
scopy, it cannot visualize inside of uterus. Hence, hyster-
oscopy has a special place in diagnosis and treatment of
uterine and to some extent tubal disorders in association
with imaging and laparoscopy. It uses natural opening, i.e.
cervix to enter, making diagnostic hysteroscopy an office
procedure unlike diagnostic laparoscopy.

Uterus is very important functioning end-organ in
female reproductive system. When one wants to start the
journey of uterine cavity with the help of hysteroscope, it
is mandatory that one should know the organ, its origin, its
relation with adjacent organs and possible deviations from
normal path in detail so as to make use of this journey for
diagnosis and treatment fruitful. Purpose of this topic is to
go through anatomy and embryology of female internal
genitalia, mainly uterus and fallopian tubes as prereq-
quisite to be a hysteroscopy expert. This chapter provides
an overview of clinically significant issues in structure of
uterus and tubes, how they develop and the developmen-
tal abnormalities.

ANATOMY OF UTERUS AND TUBES

Uterus is a pear-shaped muscular organ with cavity situ-
ated in female pelvis between bladder anteriorly and
rectum posteriorly. Its size changes depending on the
phase of female's life, such as before and after puberty,
during and after pregnancy, in nulliparous and multipa-
rous, before and after menopause. Typical size of nonpreg-
nant uterus during reproductive years is 7–8 cm in length,
5 cm in width in upper part and 2.5 cm in lower part and
4 cm in thickness. It weighs 30–40 g and the volume is
80–200 mL. It communicates with peritoneum through
tubes and to vagina through cervix.

It is divided into three parts (1) fundus, (2) body, and
(3) cervix (Fig. 1). The part above the openings of fallopian
tubes is called as fundus. The part below is body of uterus
till a constriction on outer surface (called isthmus) which
corresponds to internal os. Below that level till opening in
vagina is cervix. It is suspended with the help of ligaments
making angle between body and cervix (flexion) and with
vagina (version) (Fig. 1). More commonly fundus is point-
ing anteriorly (anteverted, anteflexed), sometimes poste-
riorly (retroverted, retroflexed). This position can change
physiologically because of full bladder or rectum and
pathologically because of infection, tumors or weakness
of ligaments. It is important to know the position before
entering the cavity to avoid injury.

The anterior surface of uterus is in relation with blad-
der, posterior with sigmoid colon. There are coils of small
intestine in relation to fundus. Laterally there are tubes, round ligaments, and ovaries on either sides (Figs. 2A and B).

The organ is having three layers: (1) serosa, (2) myometrium (muscle), and (3) endometrium (internal lining).

**Serosal Layer**

Serosa is visceral peritoneum forming outermost coat. It completely covers fundus, body, and cervix posteriorly while reflects on posterior surface of bladder from level of isthmus anteriorly making cervix devoid of it. On the fundus and body, this layer is firmly attached while on post aspect of cervix it is loosely attached. These twofolds of peritoneum (broad ligaments) cover tubes and round ligaments on both sides and then reflect on pelvic walls (Fig. 3).

**Muscular Layer**

Muscle mass of uterus is unique. It has three layers of smooth muscles. The outermost is longitudinal in nature. It covers isthmus, body, and fundus. In intermediate layer, the fibers are arranged in crisscross manner. They are predominant in body and fundus. They act as living ligatures around blood vessels traversing through them, controlling blood loss during menstruation and delivery. The innermost layer is made of circular muscle fibers, which
is predominant in cervix and cornual portion of fallopian tubes (Fig. 4). The muscle cells increase in number and size during pregnancy so as to accommodate the growing fetus. During labor and puerperium, along with contraction, there is retraction, i.e. permanent shortening of muscle cells leading to expulsion of products of conception and decrease in size of uterus. Cervical muscle fibers also work in such a way that the canal is closed during pregnancy to retain the fetus. It opens because of upward and outward pull of longitudinal fibers attached to circular fibers of cervix. The canal again closes after uterus is empty. Just imagine if these properties were absent, the life of females would have been so miserable carrying uterus of full term size throughout her life after first delivery without a second chance! Nature has created such a wonderful organ. Let us understand its wonders further.

**Endometrium Layer**

Cavity of nonpregnant uterus is anteroposteriorly flat making shape “H” in cross section, indicating need to instil fluid while doing various procedures like hysteroscopy to visualize it. The uterine cavity is triangular in shape, when seen from the front, the length is approximately 4–5 cm and the lumen communicates with the lumina of the two fallopian tubes at the two cornua and with the vagina through endocervical canal at the internal os. Uterine cavity is no more than a slit when seen from side (Fig. 5).

The lining of cavity, i.e. endometrium is a specialized lining having two layers, basal and functional. Basal layer is responsible for regeneration of endometrium after each menstruation. Damage to this layer by infection or instrumentation can lead to impaired formation of functional layer. The raw surface then may lead to adhesion between surfaces of cavity, a condition known as Asherman’s syndrome. Functional layer is having capacity to undergo various changes in response to estrogen and progesterone hormones during reproductive phase of life (Figs. 6A to C). It is lined by ciliated columnar epithelium which looks pale red having orifices of tubular endometrial glands when seen under magnification. These tubular glands are arranged perpendicular to surface and supported by specialized stroma, which is also responsive to the hormones. These glands synthesize and secrete substances essential for survival and development of fetus. The functional layer of endometrium along with stroma is responsible for successful implantation and continuation of pregnancy. Cervical epithelium is cylindrical ciliated with numerous ridges in upper two-thirds. This epithelium is also having effect of hormones on its secretion. The epithelium lower down loses cilia and gradually changes to stratified squamous. This change is also affected by estrogen.

**Isthmus**

The isthmus is an annular zone which lies between the cervix and body of uterus also called the lower uterine
segment. It corresponds to the level of the internal os of the cervix. It is around 0.5–1 cm in length and very narrow in nulliparous woman. The mucosa is smooth compared to the highly folded endocervix.

**Cervix**

The cervix is cylindrical in shape measuring 2.5–3.5 cm in height and 2 cm in diameter. Half of the cervix projects into the vagina (portio vaginalis) while half is above vaginal attachment (supravaginal cervix). The terminus of the cervix is round and has a circular or transverse opening; the external os. There are two lips, the anterior shorter and thicker and posterior which is longer and thinner.

The upper part of the cervix is composed mainly of involuntary muscle, many of the fibers being continuous with those in the corpus. The lower half has a thin peripheral layer of muscle (the external cervical muscle) is otherwise entirely composed of fibrous and collagenous tissues.

The mucous membrane lining the canal (endocervix) is thrown into folds which consist of anterior and posterior columns from which radiate circumferential folds to give the appearance of tree trunk and branches, hence the

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**Figs. 6A to C:** Cyclical endometrial changes: (A) Menses (B) Proliferative phase (C) Secretory phase.
name arborvitae (Fig. 3). The irregularity of surface can make the passage of sound difficult in young nulliparous women. The endocervix is covered by a single layer of tall columnar epithelium. The mucosa is whitish pink and deeply clefted to form the plicae palmatae. Retention cysts are frequently visible within the canal. The vaginal part of cervix is covered with the squamous epithelium continuous with that of the vagina.

**Blood Supply**

Main blood supply to uterus is through uterine arteries, branches of internal iliac. The ovarian arteries, after supplying ovaries and tubes also anastomose with uterine artery. After traversing through base of broad ligament across the ureter, uterine artery enters uterus laterally near isthmus. It gives circumferential branches throughout body of uterus called as arcuate arteries. They give branches called as radial arteries as they travel perpendicular to muscles. Radial arteries give two types of branches: (1) basal, supplying basal layer of endometrium and (2) spiral, supplying functional layer. Spiral arterioles are responsive to hormones (Figs. 7A and B). For example, they proliferate because of estrogen and dilate, coil because of progesterone.

**Nerve Supply**

Sympathetic supply is through T5, T6 (motor), and T10, T11, T12, and L1 (sensory). Parasympathetic is via S3 and S4. Both reach uterus through branches of inferior hypogastric plexus. We should remember that cervix and body is relatively insensitive to touch, cut and burn, but holding and dilating cervix as well as distending cavity while doing hysteroscopy causes pain.

**Lymphatics**

Primary drainage is in parametrial nodes, after which cervix drains in obturator, internal iliac and external iliac nodes. Body drains in sacral and external iliac nodes. External genitalia drain in inguinal group of nodes. All lymphatics from pelvis then goes to common iliac nodes to reach lumbar group of aortic nodes (Fig. 8).
Fallopian Tubes

Fallopian tubes are two in number, one each at superior angle of uterus, in upper margin of broad ligament. The average length is 10 cm which is divided into three parts. Near uterine cornu is isthmus, which is having narrow diameter, then is wider part infundibulum which turns in funnel-like part ampulla. There are fimbriae at ampullary end of tube, one of them keeps tube in contact with ovary to facilitate entry of ovum in tube at the time of ovulation.

There are three coats like uterus: (1) serous, (2) muscular, and (3) mucous. Serous layer is apex of broad ligament, i.e. visceral peritoneum. Muscular layer has two parts, external longitudinal and internal circular. Endothelium is ciliary columnar having folds. It is continuous with endometrium at cornual end and peritoneum at ampullary end. The blood supply is through branches of ovarian artery.

Once we are familiar with normal structure, we can immediately pick up abnormalities which can be congenital or acquired. Scope of this topic is to understand embryology and the congenital anomalies that are typically encountered.

Changes in Uterus with Age and Parity

In childhood the cervix is longer than the corpus uteri, the proportion being 2:1. At one stage in intrauterine development the proportions are 5:1 or 6:1. At and after puberty, the corpus grows faster than the cervix, and later represents only one-third of the total length of the mature uterus, sometimes only one-quarter of the parous uterus (Fig. 9). After climacteric the uterus atrophies, its overall length is reduced and its walls become thinner, less muscular more fibrous. The cervix shrinks so that the vaginal portion no longer projects and the external os becomes more or less flushed with the vaginal walls.

Positions of the Uterus

When viewed from side, the adult uterus is seen to bend on itself (anteflexed/retroflexed) or at cervix (anteverted/retroverted). The normal position of the uterus is antevrted on the bladder (Figs. 10A to D).
Characteristically, the uterus is anteverted over the urinary bladder. As a result of childbearing and stretching of main ligamentous supports, the uterus may be displaced backwards toward the sacrum (retroversion). Occasionally, uterus is flexed posteriorly on itself (retroflexion). At the time of examination of patient, it is important to know accurate anterior or posterior displacement of uterus as it helps in performing a successful hysteroscopic examination.

**EMBRYOLOGY OF UTERUS AND TUBES**

Genotype of the fetus is decided at the time of fertilization but phenotype depends on prevailing biochemical and hormonal influence initiated because of expression of concerned genes. Precursors of both, male and female genitalia (mesonephric and paramesonephric duct, respectively) coexist in fetus in early weeks of intrauterine life. After 6 weeks differentiation starts which depends on presence or absence of “Y” chromosome, expression of genes on “X” chromosome, and release or non-release of growth specific factors and hormones (Fig. 11).

In female fetus, there is absence of “Y” chromosome, lack of anti-Müllerian factor and as developing gonad is ovary, testosterone is not secreted so there is regression of mesonephric duct (It is interesting to note here that anti-Müllerian hormone levels go on decreasing in male fetus after birth and it is found in rising levels in female fetus after birth till adolescence and again decrease after menopause). In presence of two “X” chromosomes, development of paramesonephric duct takes place, from which develop tubes, uterus, and upper two-thirds of vagina. There are three stages in this development:

1. Organogenesis or formation of Müllerian duct
2. Fusion of both ducts in center
3. Resorption of septum within two ducts.

At 6 weeks of embryonic development a groove appears on the lateral surface of metanephros. This groove indents the superficial epithelium and advances caudally, originally named as a Müllerian duct but officially as a paramesonephric duct. Near the cloaca of the embryo the two ducts swing towards the midplane and fuse into a cylindrical mass called the genital cord (at 7 weeks) (Figs. 12A and B).

By 10th week development of external genitalia and fusion of ducts is complete. Resorption of septum is
completed by 20th week, but uterine horn and fimbrial development continues even after birth.

Initially, early uterus is bicornuate. After a period the cranial walls of the slanting segments bulge in a cranial direction, so the original angular junction becomes flat and finally dome is formed (Figs. 13A to C).

In 7th prenatal month, the uterine epithelium, i.e. endometrium is formed. But it is in dormant state till puberty. The myometrium formed at 3 months by mesenchyme of the genital cord condensing into smooth muscle tubes that invests the endometrium. The parametrium differentiates from the exterior of the genital cord into a peritoneal covering.

Abnormalities in this process results in congenital anomalies of reproductive tract Müllerian duct anomalies (MDA). There are no risk factors identified except intrauterine exposure to diethylstilbestrol (DES), which was previously used during pregnancy to prevent abortion.

Because of developmental proximity, these anomalies may be associated with renal anomalies. Most of the times they remain asymptomatic till puberty. The manifestations vary depending upon type and severity of abnormality. MDA should be ruled out when patient is presented with any of following:

- Cryptomenorrhea
- Pelvic mass
- Dysmenorrhea
- Infertility
- Recurrent pregnancy loss
- Continuation of pregnancy after suction evacuation
- Intrauterine growth restriction
- Preterm labor
- Malpresentation
- Obstructed labor
- Retained placenta
- Failure of tubectomy

Incidence of MDA varies from 4% to 7%. It is more common in women with infertility and abortions than in general population. Because of its effect on reproductive life, exact diagnosis is very important to choose treatment options and predict prognosis.

There are two main classification schemes suggested for these anomalies such as the American Society for Reproductive Medicine (ASRM) and the European Society of Human Reproduction and Embryology (ESHRE) and the European Society for Gynecological Endoscopy (ESGE) classifications.

Fig. 14: American Society for Reproductive Medicine (ASRM) classification. (DES: Diethylstilbestrol).
American Society for Reproductive Medicine

In practice since 1988 (Fig. 14), based on clinical findings:
- Hypoplasia
- Unicorne uterus
- Uterus didelphy
- Bicornuate uterus
- Septate uterus
- Arcuate uterus
- DES drug related.

European Society of Human Reproduction and Embryology (ESHRE)/the European Society for Gynecological Endoscopy (ESGE) Classification

Revised to consider defect in formation, fusion or resorption as basis (Fig. 15). Consideration is given to normal variations in size instead of absolute figures while diagnosing partial or complete septum. Severity increases with number of group.

0. Normal uterus
1. Dysmorphic uterus—"T" shaped and infantalis—outline normal, shape of cavity abnormal
2. Septate—partial or complete—less than or more than half of myometrial thickness
3. Dysfused—outline and cavity both abnormal—partial or complete
4. Unilaterally formed uterus—rudimentary horn with or without cavity on other side
5. Aplastic or dysplastic uterus
6. Unclassified.

Fig. 15: The European Society of Human Reproduction and Embryology (ESHRE) or the European Society for Gynecological Endoscopy (ESGE) classification.

SUMMARY

- Understanding of anatomy and embryology is important for hysteroscopy.
- Three parts of female reproductive system are: (1) gonads, (2) reproductive tract, and (3) external genitalia.
- Three parts of reproductive tract are: (1) fallopian tubes, (2) uterus, and (3) vagina.
- Hysteroscopy is useful to study interior of cervix, body of uterus, and fallopian tubes.
- Three parts of uterus are: (1) fundus, (2) body, and (3) cervix.
- Three layers of uterus are: (1) serosa, (2) myometrium, and (3) endometrium.
- Three layers of musculature of uterus are: (1) longitudinal, (2) crisscross, (3) and circular.
- Three types of branching of uterine artery are: (1) arcuate, (2) radial, and (3) spiral.
- Three things required for development of female reproductive system are: (1) two "X" chromosomes, (2) absent anti-Müllerian factor, and (3) absent testosterone.
- Three types of developmental defects are: (1) formation, (2) fusion, and (3) resorption defect.