Section

I

Colposcopy

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CHAPTER

1

Introduction

Colposcopy (ancient Greek word, *Kolpos*—'sheath, vagina' and *skopein*—'to look at') is a diagnostic procedure to have a magnified view of cervix and vagina. Many precancerous and cancerous lesions of the cervix have discernible characteristics which can be easily detected by using colposcopy.

HISTORY OF INVENTION OF COLPOSCOPE

Father of colposcopy is Hans Hinselmann. He was born on 6th August 1884 at Neumunster, Germany. In the year 1908, he qualified for practicing colposcopy and he developed interest in gynecology. He later became an Associate Professor in 1921 at University of Hamburg. Here he started a very thorough research in order to examine the portio and vulva better firstly with von Eicken's frontal lens with magnification of 1, 2 and then with the help of Leitz's technique. He improved the instrument now called *colposcope*. Initially, it was difficult to perform colposcopy due to the distance from focus was not more than 80 mm; he tried to pull out the uterine cervix for examination, which was clumsy. This made Hinselmann to create a colposcope with focal distance of 150 mm (Leitz) and then of 190 mm (Zeiss). Those days, the concept of precancerous lesions was not very clear. A size of pigeon's egg was considered an early cervical cancer. By means of his instrument, Hinselmann was able to dedicate himself to detect cervical cancer in the form of a point. In 1928, Walter Schiller, histologist, found that dysplasia and carcinomatous structures do not contain glycogen and this led to the method of detecting an early carcinoma by smearing the portio with Lugol iodium iodurate solution (Auguste Lugol 1788–1851). This solution is till date used as Lugol's solution. Hinselmann incorporated this in his colposcopy procedure.

Fig. 1.1: Binocular colposcope

COLPOSCOPE (Fig. 1.1)

A colposcope is a low power, stereoscopic binocular field microscope with a powerful variable intensity light source that illuminates the area being examined. The colposcope first discovered had binocular lens, a light source, green or blue filter, and objective lens.

The filter is used to remove red light so as to facilitate the visualization of blood vessels by making them appear dark.

DIGITAL VIDEO COLPOSCOPE (Fig. 1.2)

Nowadays we are using a video colposcope which is useful for real-time teaching and documentation.

With a modern CCD camera attached to a digitalizing port, it is possible to create high resolution digital images of the colposcopy findings. Magnification used is up to 40×, lower magnification yields a wider view and greater depth of field for examination of cervix. With higher magnification, the field of view becomes smaller, but reveals finer features such as abnormal blood vessels. A focal distance of 250 to 300 mm is adequate.

Fig. 1.2: Digital video colposcope

Indications for Colposcopy

1. Suspicious looking cervix
2. LSIL or HSIL on cytology
3. Persistent low-grade abnormality on cytology
4. Persistent unsatisfactory report on cytology
5. Infection with oncogenic HPV
6. VIA (visual inspection on acetic acid) positives
7. VILI (visual inspection on Lugol's iodine) positives
8. Hyperkeratosis on cervix (thick white patch)
9. Condyloma

Patient Selection

Inclusion criteria:

- Incurable leucorrhoea
- Postmenopausal bleeding
- Intermenstrual spotting
- Postcoital bleeding
- Early sexual exposure
- Immunocompromised status
- Abnormal cytology
- High-risk HPV infection

Exclusion criteria: Menstruation.

Patient Evaluation

A detailed history of the patient is mandatory which includes:

- Age of marriage
- Age of first sexual intercourse
- Number of pregnancies including abortions, live births, fetal demises, etc.
- Last menstrual period
- Menstrual history
- Any previous cytology/HPV report
- Allergies
- Any significant medical history
- Type of discharge whether foul smelling, itching
- Any history of dyspaneuria
- History of burning micturition
- History of vaginal douching
- Other medications
- Prior cervical procedure
- History of smoking

CHAPTER

2

Instruments and Procedures

INSTRUMENT TROLLEY (Fig. 2.1)

- Cusco's self-retaining vaginal speculum of different sizes
- Endocervical speculum
- Sponge holder
- Normal saline
- 5% acetic acid
- Lugol's iodine
- Cervical punch biopsy forceps
- ECC (endocervical curettage)
- Container with formalin for the biopsy specimen
- Gloves
- Cotton balls
- Monsel's paste (to stop bleeding).

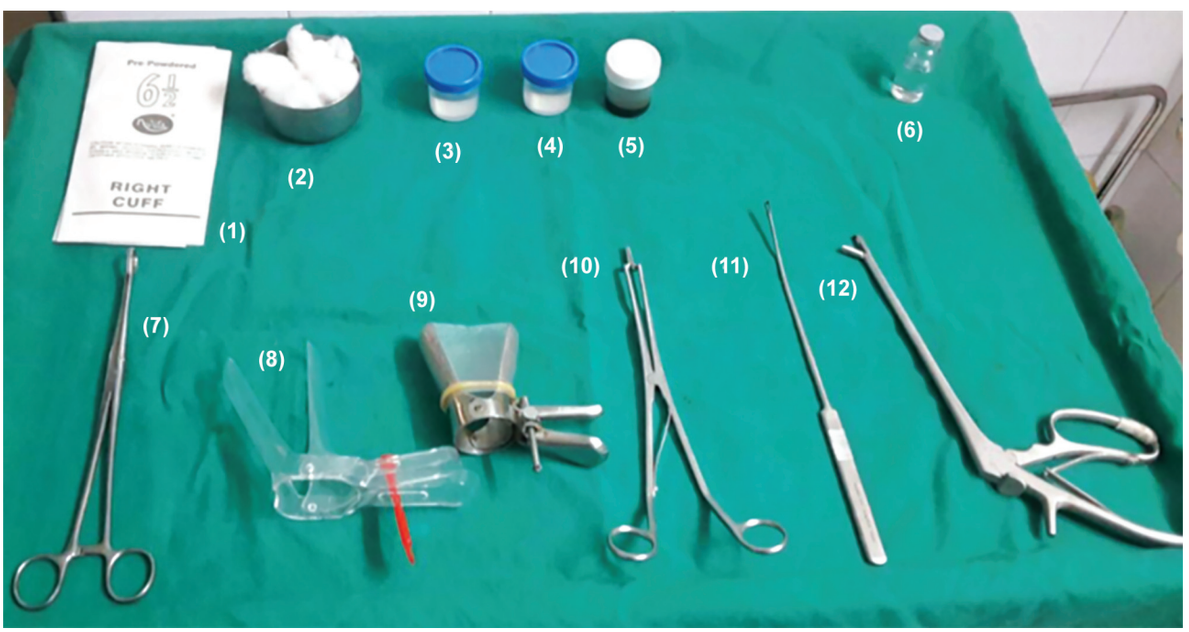


Fig. 2.1: Instruments used for colposcopy: (1) Gloves, (2) cotton ball, (3) normal saline, (4) 5% acetic acid, (5) Lugol's iodine, (6) specimen collection bottle, (7) sponge holder, (8) disposable speculum used in camps, (9) Cusco's speculum with condom for lax vagina, (10) cervical speculum, (11) endocervical curettage (ECC), and (12) Tischler's punch biopsy forceps

PROCEDURE

The following steps are followed:

1. Position of the Patient

Patient is given dorsal lithotomy position. Legs are in stirrups and the buttocks are to the lower edge of table.

2. Insertion of Vaginal Self-retaining Cusco's Speculum

Bivalve self-retaining Cusco's speculum is inserted in the vagina and fixed in such a manner that the cervix is localized in the center.

Fig. 2.2: Cusco's speculum

Tips to be followed:

a. Many a times, it has been observed that in multiparous women with lax vagina, the visualization of cervix is not easy due to the laxity of the vaginal mucosa. This can be corrected by using a Cusco's speculum (Fig. 2.2) with a cover of latex condom whose tip is cut, which serves to keep the vaginal mucosa away from the point of visualization.

b. Due to the varied positions of uterus, the localization and fixing of the cervix is many a times difficult, especially so in multiparous woman, anxious woman keeping her vagina tight, nulliparous woman with tight vagina muscles, pervious surgeries leading to adhesions, and pulling up of the uterus. In such cases, it is advisable to use different sizes of speculum (Fig. 2.3).

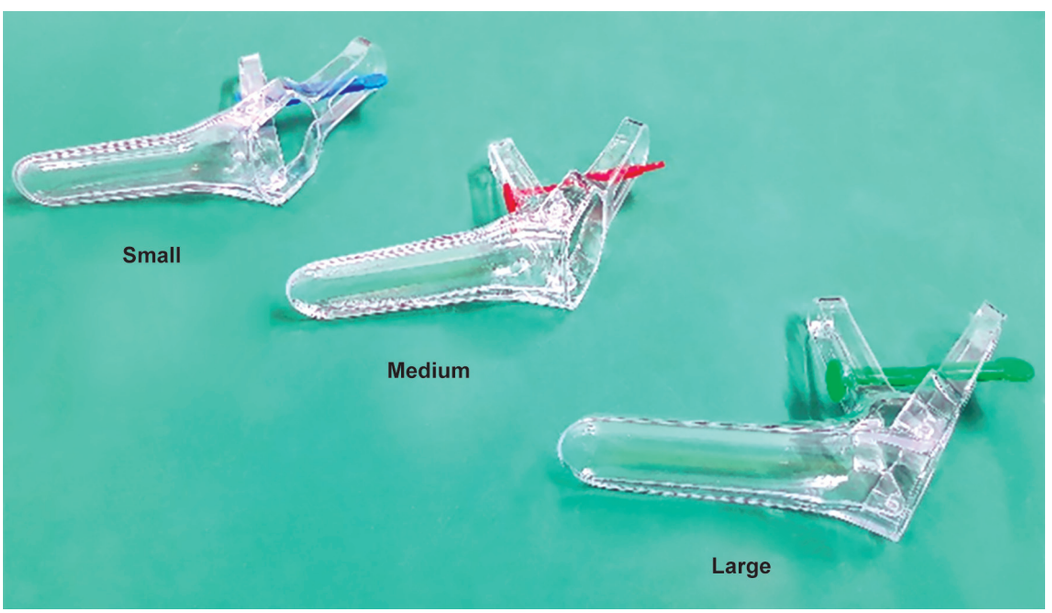


Fig. 2.3: Different sizes of speculum

c. Maneuvering and pushing the vaginal fornix to the side where you want to localize the cervix with blunt instrument say tip of sponge holder (Fig. 2.4), further helps in getting the desirable view of the cervix. Never maneuver by gripping the cervix, as there is a possibility of disturbing the epithelial cells of the cervix. For proper central fixation, give a gentle push on the contralateral fornix without touching the cervix thereby causing minimum damage to the cervical cells.

Fig. 2.4: Maneuvering the vaginal fornix

d. Be very gentle in opening the blades of the Cusco's speculum. Many a times, iatrogenic trauma (Fig. 2.5) and bleeding of the cervix have been encountered, especially in case of grade 1 prolapse of the uterus, supravaginal elongation of cervix.

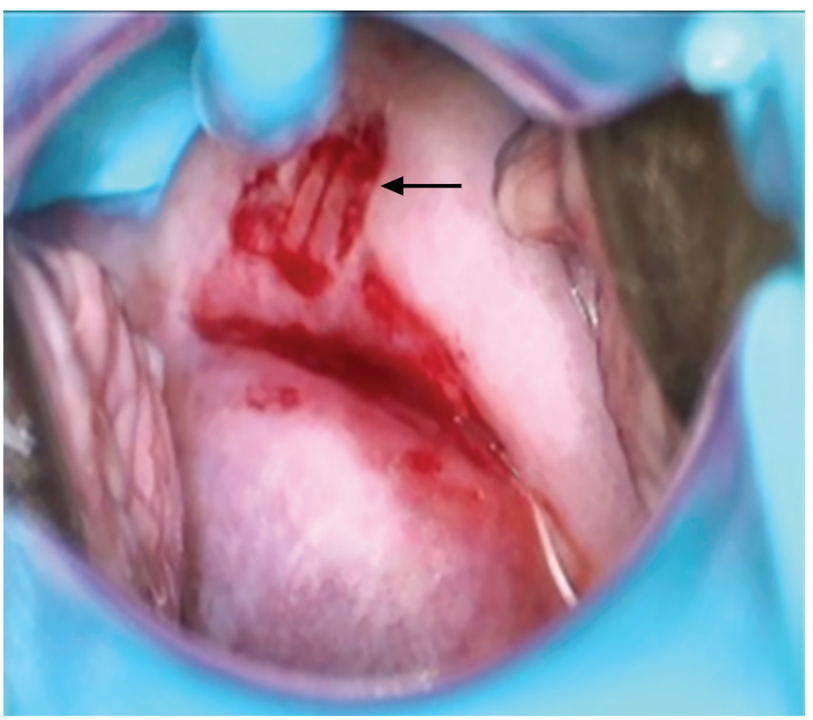


Fig. 2.5: Iatrogenic trauma while inserting Cusco's speculum

Do not start the procedure, if the entire cervix is not visualized properly, or else we can miss out many important findings (Fig. 2.6). Proper fixation is very important for correct visualization of cervix and central fixation.

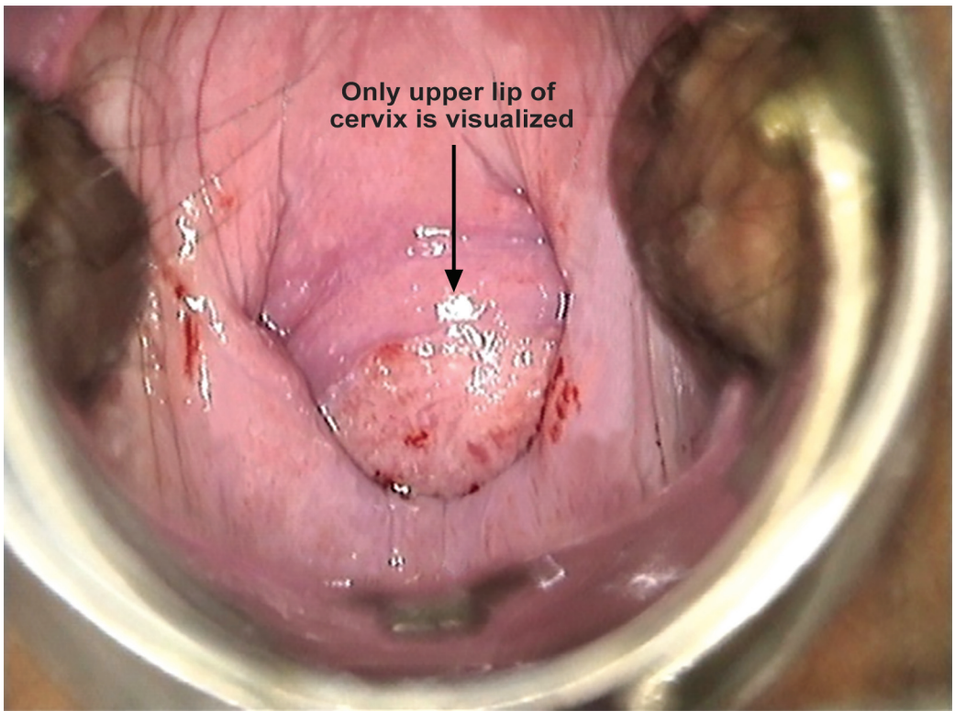


Fig. 2.6: Visualization of incomplete cervix

e. Correct magnification is necessary (Fig. 2.7).

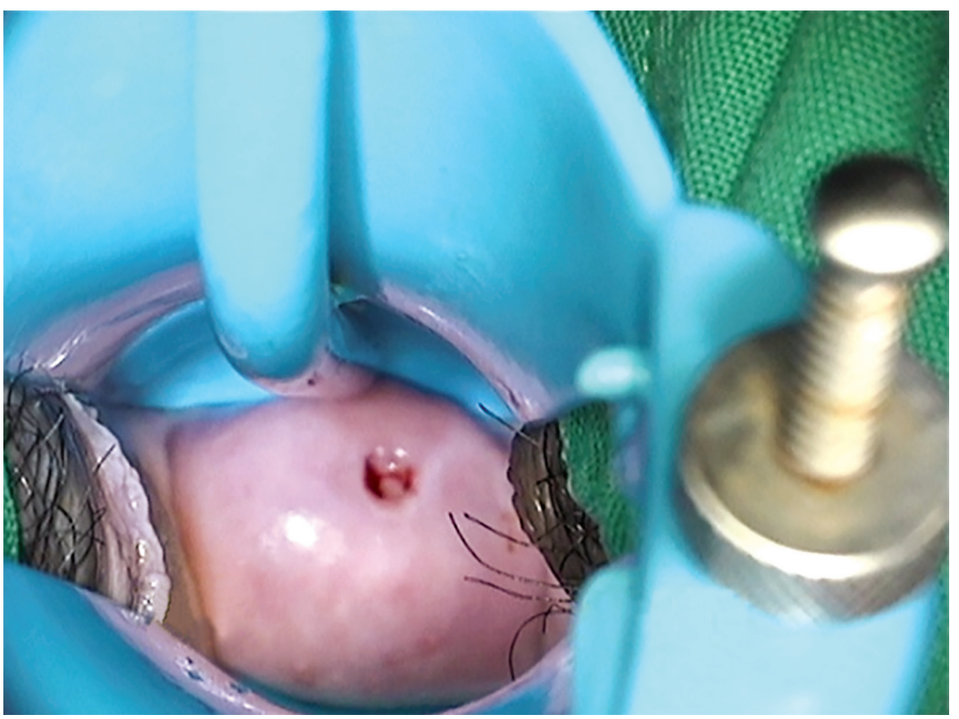
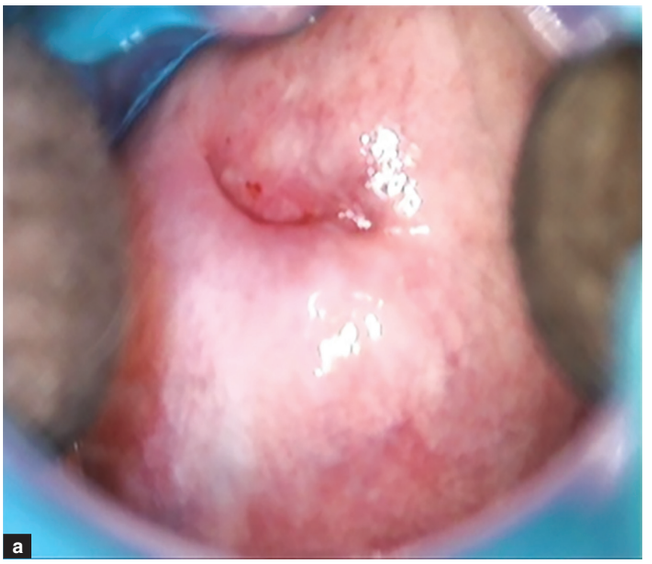
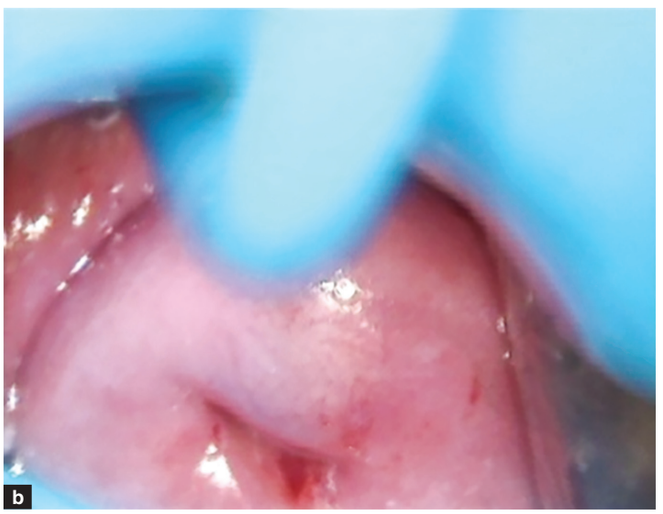
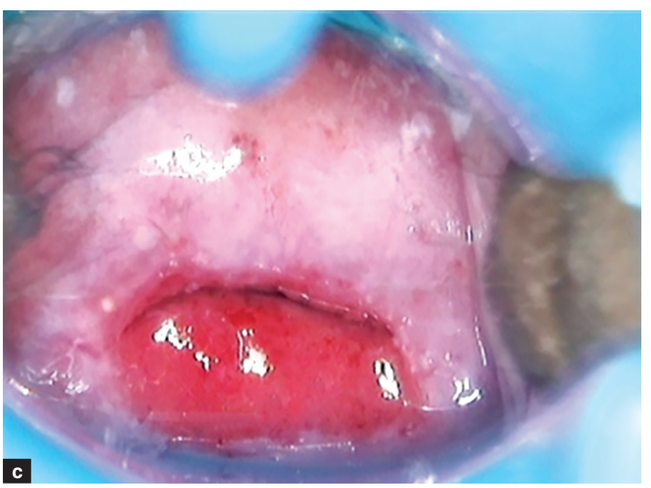


Fig. 2.7: Correct zoom in of the picture with right magnification for good quality study. Always the rim of the speculum should be minimally visualized in video colposcopy

f. Central fixation of cervix is very important before starting the procedure. The common images found during the fixing of the cervix are shown in Figs 2.8a to c.



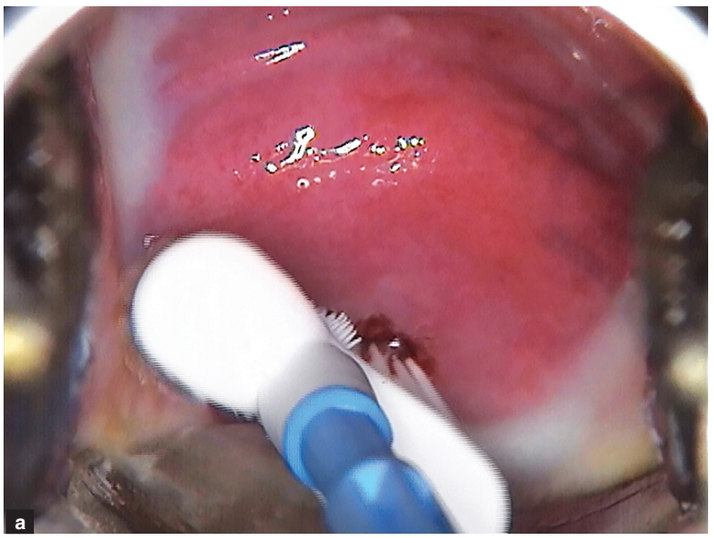


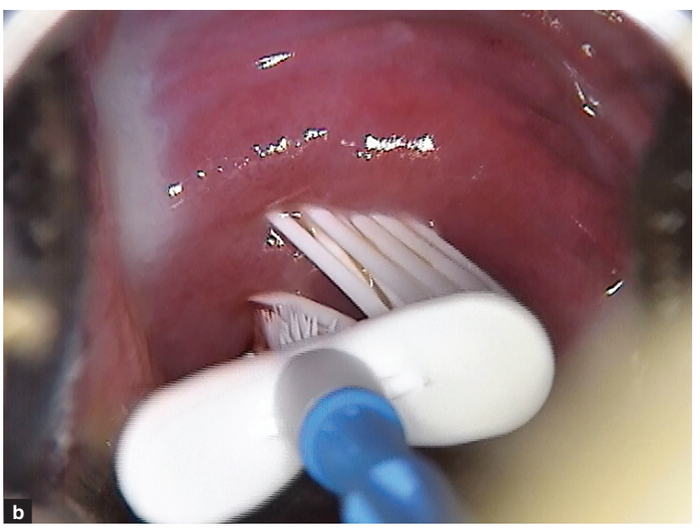


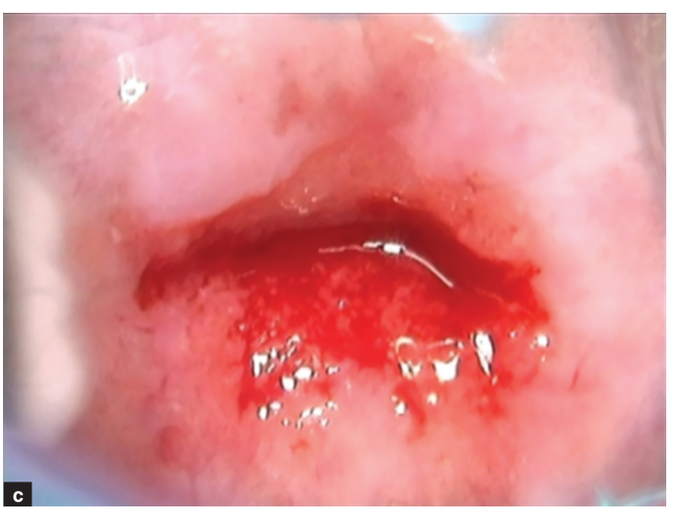
Figs 2.8a to c: (a) Central fixation of cervix with both lips of cervix well visualized; (b) Improper fixation of cervix, lower lip not seen; (c) Lower lip is not seen

g. Cervical scrape can be taken before doing colposcopy for HPV, cytology (Figs 2.9a to c).

Tips: Usually slight-to-moderate bleeding is observed after cervical scraping, hence it is advisable to gently scrape the cervical epithelium with the cervical cell sampler brush.







Figs 2.9a to c: Cervical scrape

h. Cleaning the cervix gently with normal saline to remove the cervical discharge. The extra fluid that is accumulated has to be removed (Figs 2.10a and b).

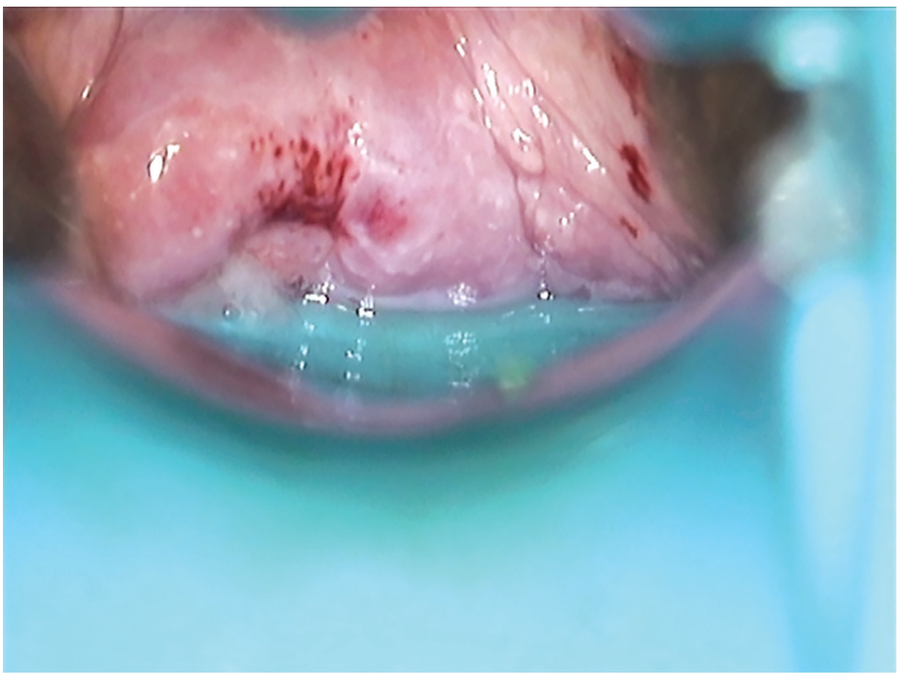


Fig. 2.10a: Improper fixation. Cervix has to be fixed in the centre and the extra fluid should be removed

Fig. 2.10b: Central fixation of cervix

3. On Cleaning with Normal Saline

Following features are seen (Fig. 2.11):

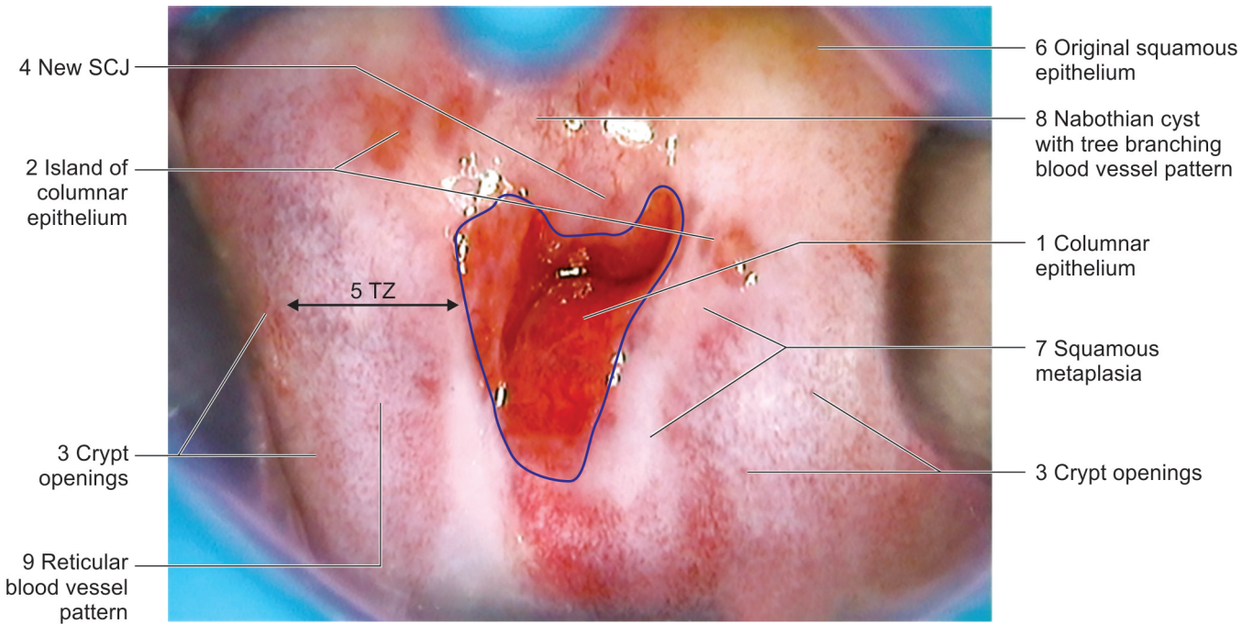


Fig. 2.11: Procedure with normal saline

1. *Columnar epithelium:* This appears as grape-like reddish epithelium. Since columnar epithelia are single-layered, the underlying stromal blood vessels are clearly visible as reddish colour.
2. *Islands of columnar epithelium* are sometimes visible as small patch of columnar epithelium, identified by its colour and grape like texture.
3. *Crypt opening:* To identify the original SCJ, we have to look out for distal crypt opening which appears as depression. Arbitrarily joining the distal crypts gives us an idea of old/original SCJ prior to occurrence of metaplasia.
4. *New SCJ:* Appears as sharp demarcation boundary between the columnar and squamous epithelia. The new SCJ is more highlighted as white line on application of acetic acid (Fig. 2.12).
5. *Transformation zone (TZ):* Between the original arbitrary SCJ and new SCJ. This signifies the metaplastic epithelium. More will be dealt in the terminology chapter (Chapter 3).
6. *Original squamous epithelium:* Squamous epithelium being multilayered appears pinkish red. The original squamous epithelium is usually located distal to the distal crypt openings.
7. *Squamous metaplasia:* Appears thin translucent whitish highlighted more on application of 5% acetic acid.
8. *Nabothian cyst:* Several retention cysts are seen on the cervix at the area of metaplastic epithelium, called nabothian cysts. These retention cysts develop as a result of the occlusion of the endocervical crypt openings by the overlying metaplastic squamous epithelium. The buried columnar cells in the endocervical crypts continue to secrete mucus, which later develops into retention cysts called nabothian cysts (Figs 2.13a and b). They appear as whitish swellings on the ectocervix.
9. *Reticular blood vessel pattern:* The stromal blood vessels appear as reticular mesh pattern seen usually on the squamous epithelium, near SCJ.

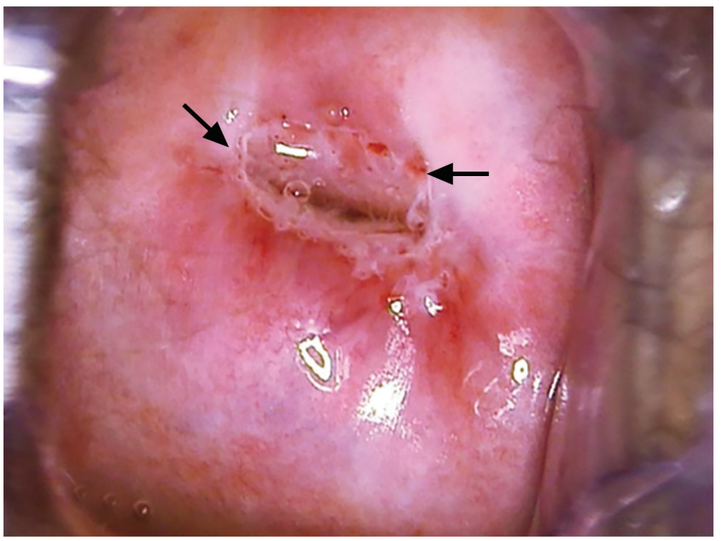
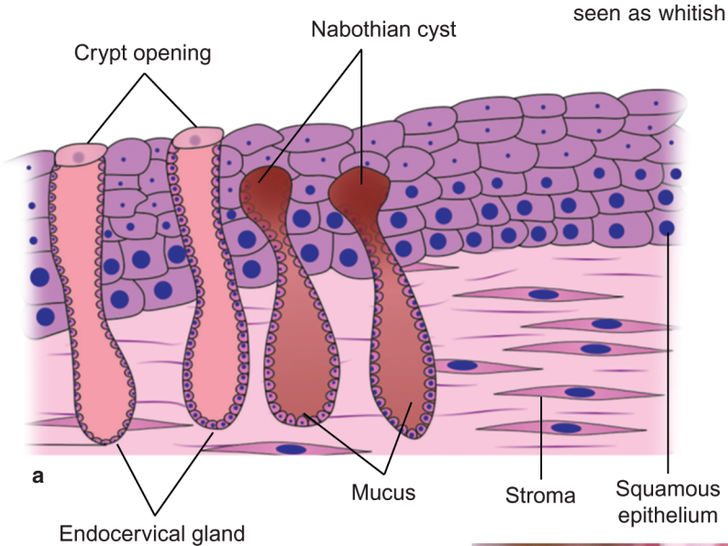
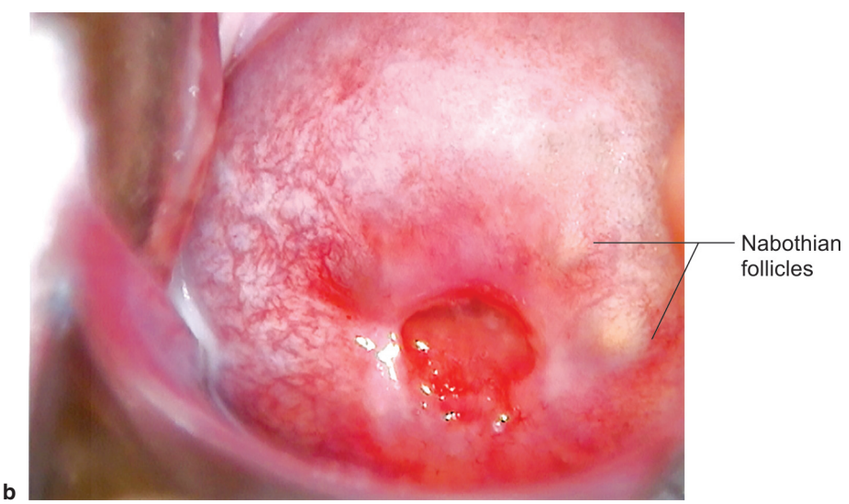


Fig. 2.12: Squamocolumnar junction (SCJ) (on acetic acid application) seen as whitish line around the external os





Figs 2.13a and b: Nabothian cyst

4. Blue-Green Filter

The blood vessel pattern gets perfectly highlighted with blue-green filter (Fig. 2.14). Usually, a typical blood vessel pattern is noted on the cervix, the knowledge of which is important to identify the abnormal vascular

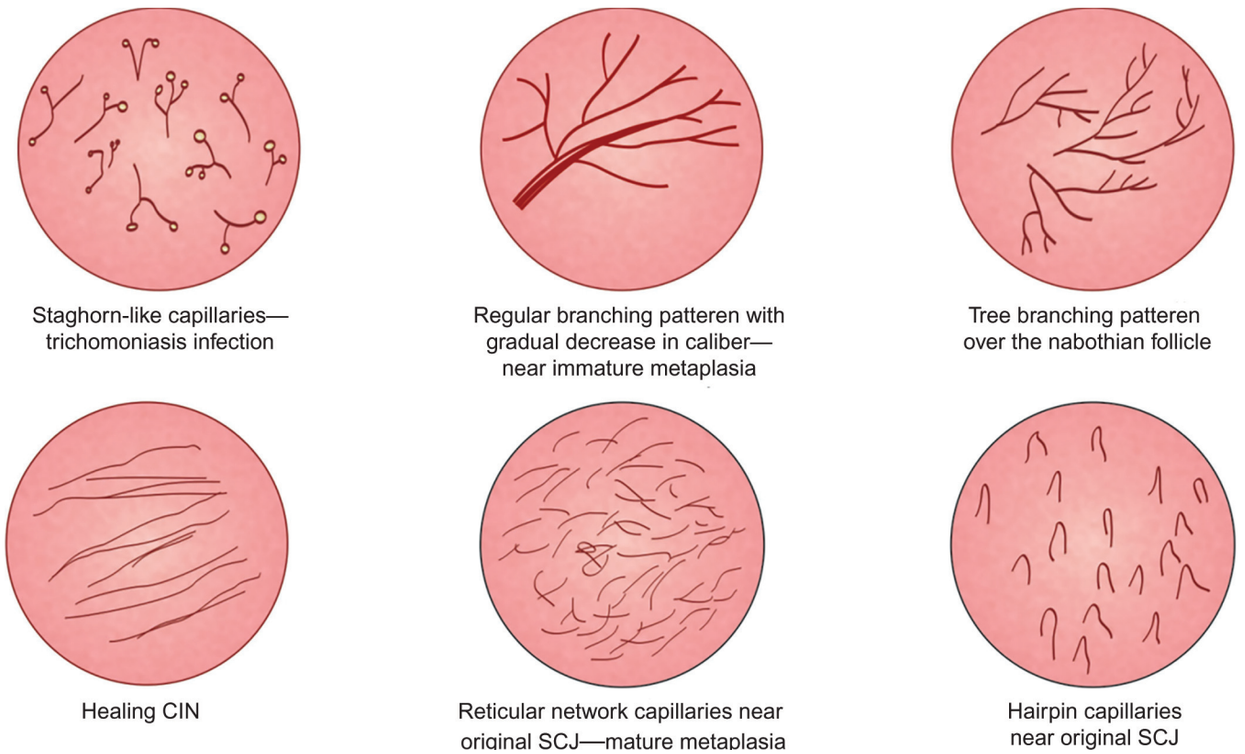


Fig. 2.14: Vascular patterns

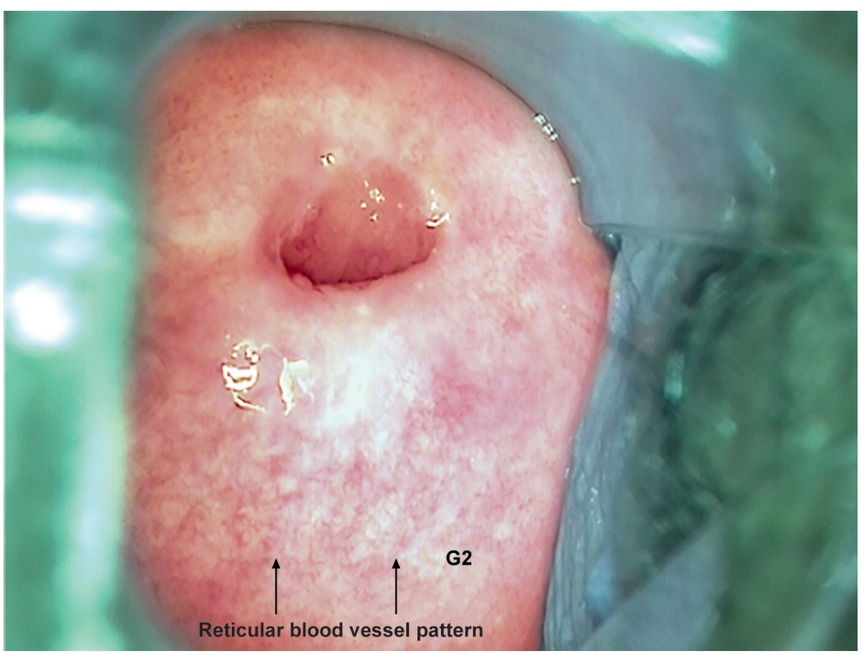


Fig. 2.15: Reticular blood vessel pattern

pattern. These are the stromal blood vessels forming a pattern. They are highlighted in blue-green filter. The two common types of vascular patterns noted are reticular (Fig. 2.15) and hairpin-shaped patterns (Fig. 2.16). Regular tree branching pattern (Figs 2.17 and 2.18) is seen on the nabothian follicles. Parallel vascular pattern (Figs 2.19a and b) is seen on the healing tissues. In infection with trichomoniasis (Fig. 2.20), the hairpin shape vessels assumes staghorn-like shapes.

Irregular blood vessels on blue-green filter: Mosaics and punctations are to be appreciated and noted. The explanation with images are shown in separate chapter.

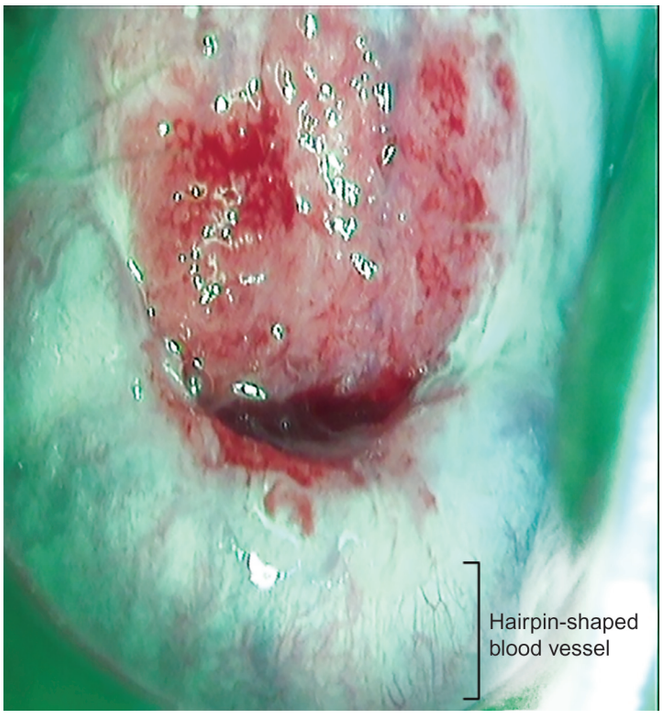


Fig. 2.16: Hairpin blood vessel pattern

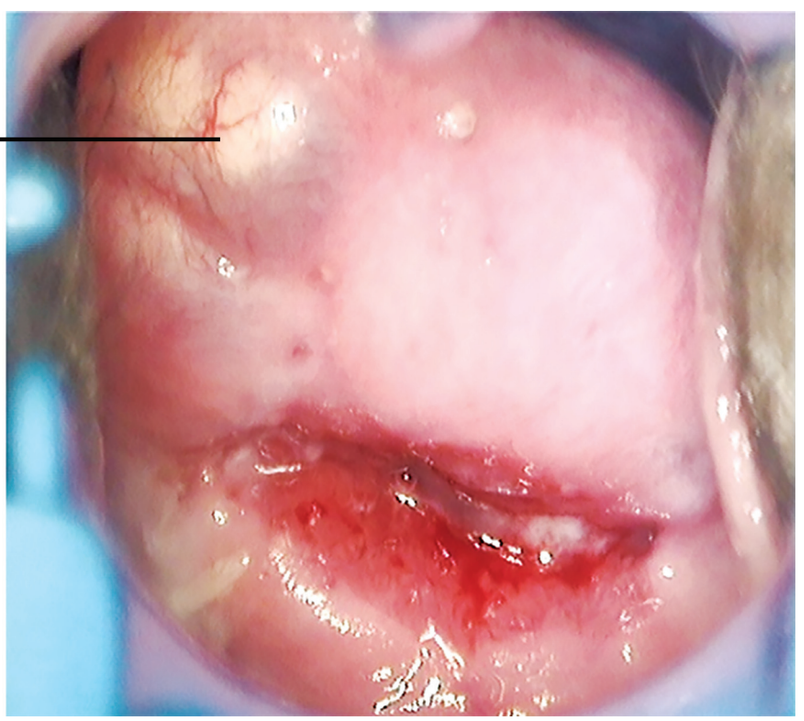


Fig. 2.17: Tree branching pattern

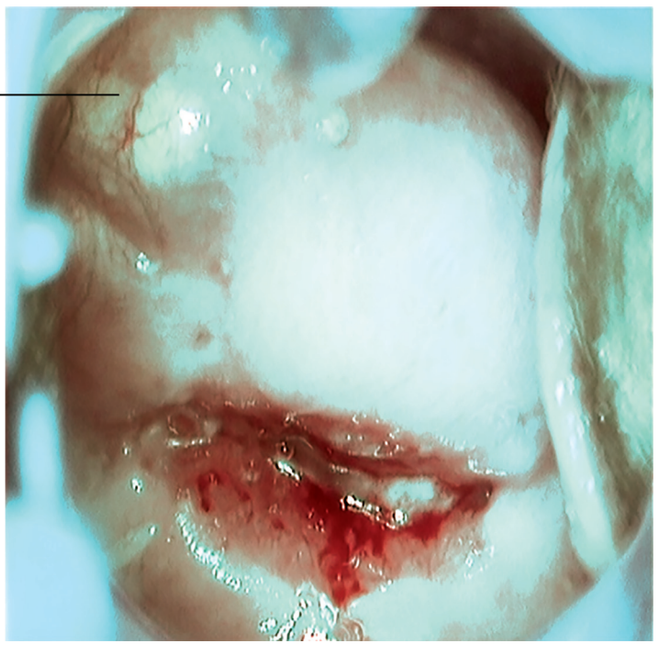


Fig. 2.18: Tree branching pattern

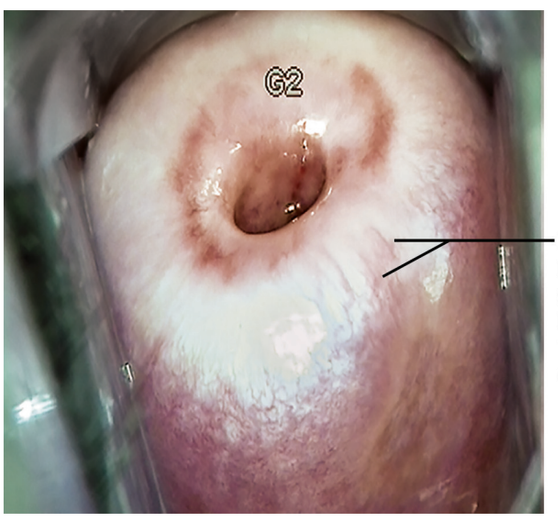


Fig. 2.19a: Parallel vascular pattern

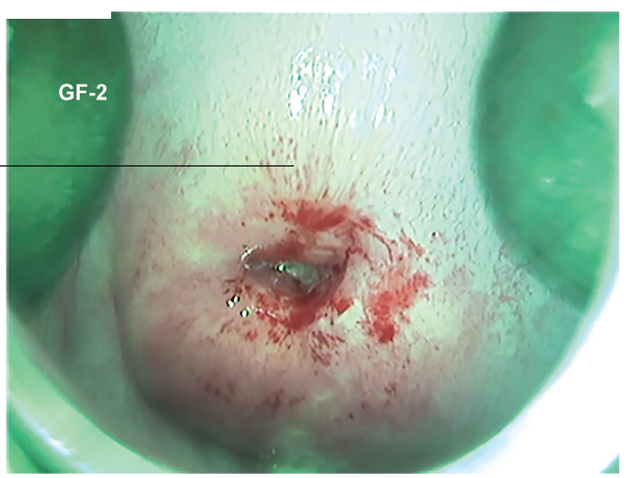


Fig. 2.19b: Healing blood vessels in blue-green filter

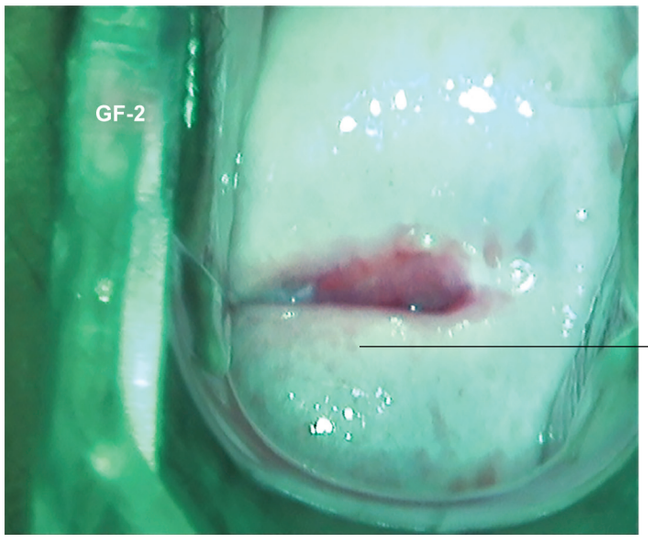


Fig. 2.20: Trichomoniasis infection

Abnormal Blood Vessel Patterns

On HSIL and microinvasive lesion, we often see abnormal vessel pattern (Fig. 2.21a).

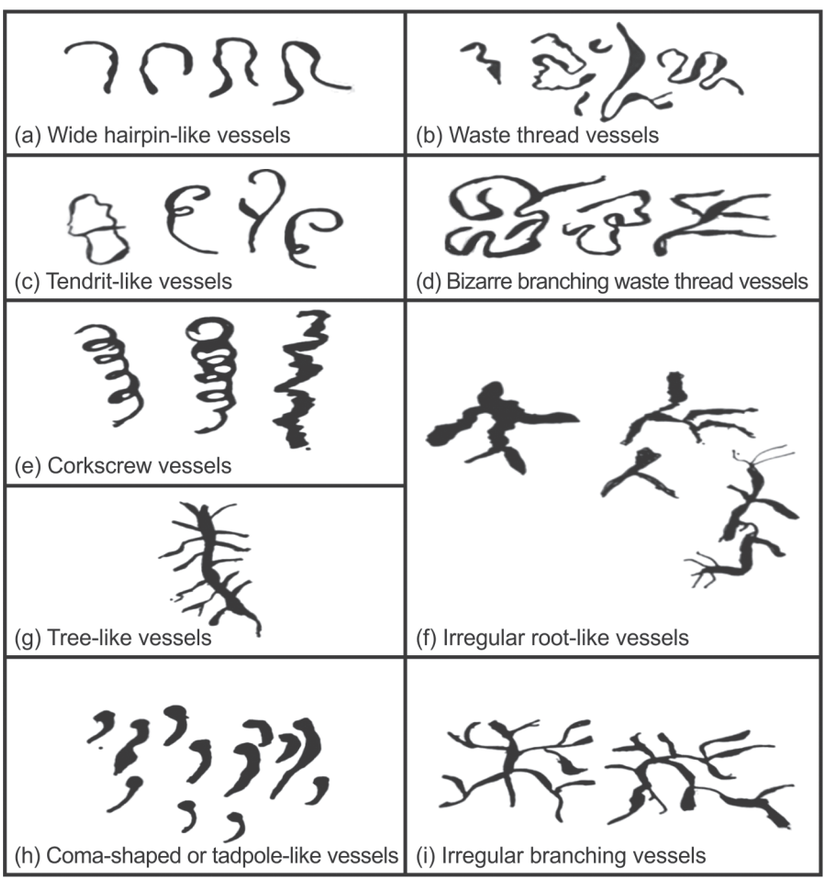


Fig. 2.21a: Abnormal blood vessel patterns

Different types of abnormal blood vessel patterns (Figs 2.21b to f)

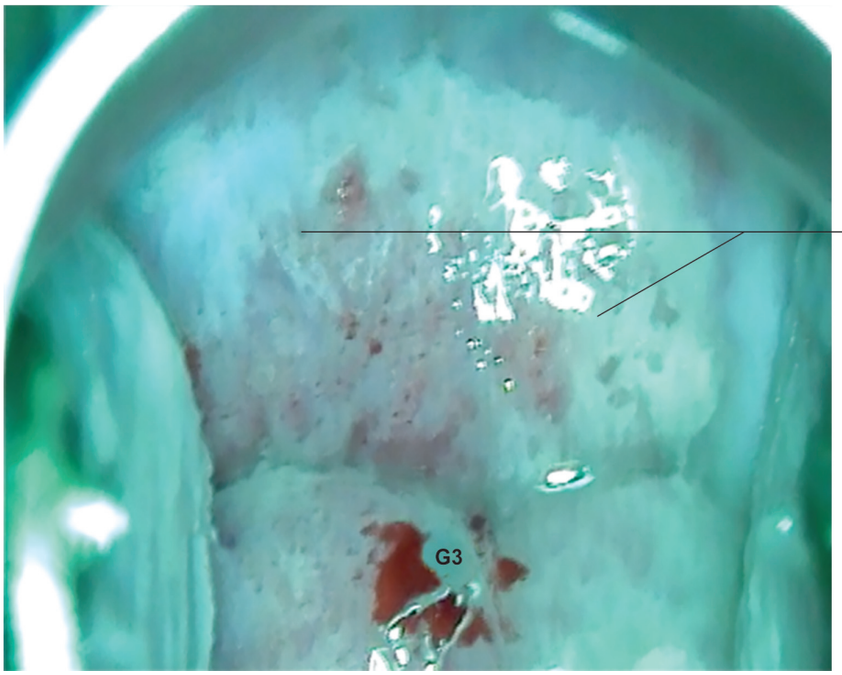


Fig. 2.21b: Coma-shaped abnormal vessel

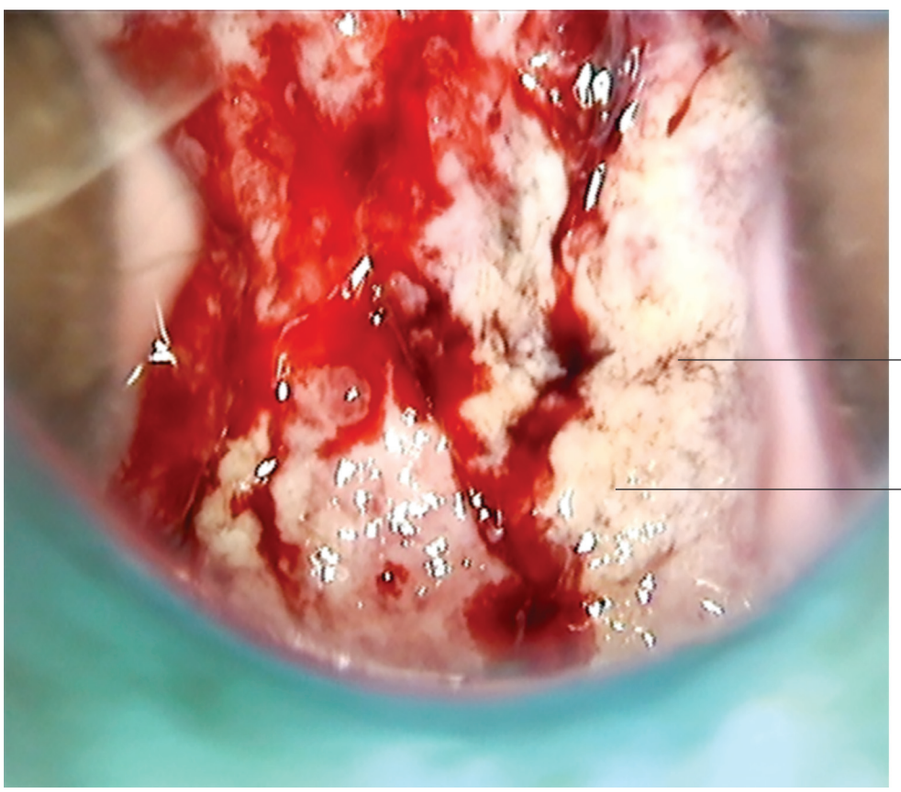


Fig. 2.21c: Tendril-like vessel

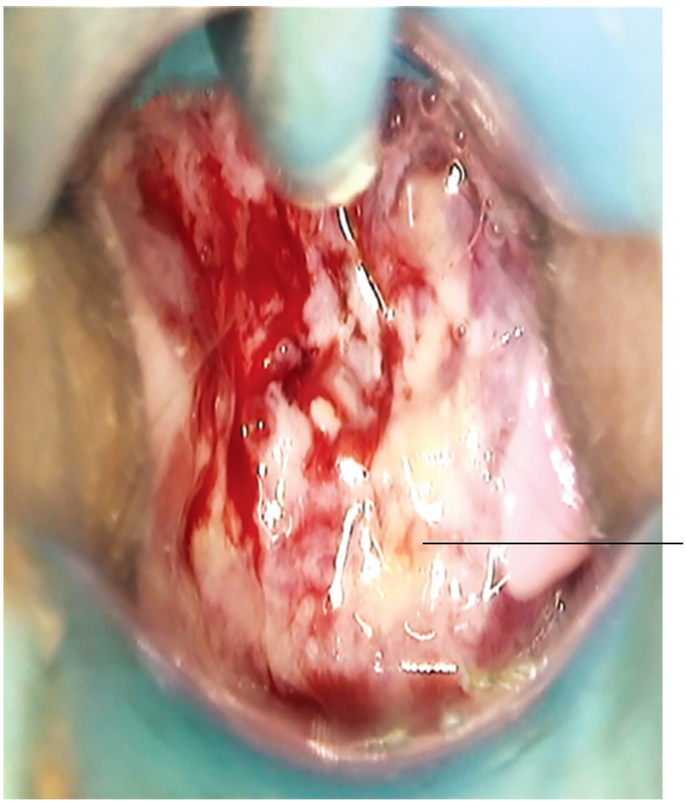


Fig. 2.21d: Corkscrew blood vessel

Fig. 2.21e: Waste thread blood vessel

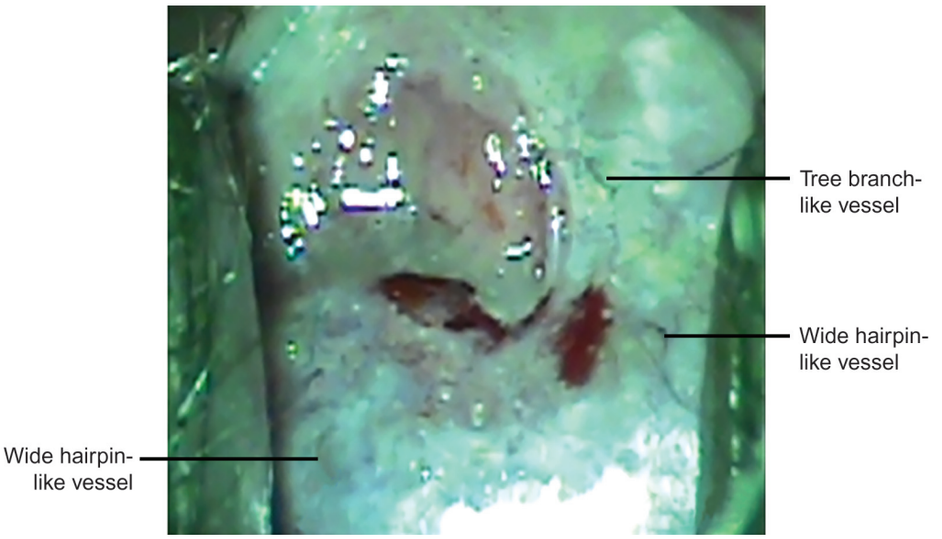


Fig. 2.21f: Tree branch and hairpin blood vessel

5. 5% Acetic Acid Application

Acetic Acid Test

3–5% acetic acid is gently applied on the cervix. There should be a generous and liberal application of acetic acid all around the cervix for about one complete minute. The cervix should be literally bathed in the pool of acetic acid using cotton balls soaked with acetic acid and held with a sponge holder (Fig. 2.22). Observation should be for next one minute, so total of 2 minutes—1 min for application and 1 min for observation.

Preparation of 5% acetic acid—1 ml glacial acetic acid with 19 ml distilled water for routine OPD purpose. For camp setting—5 ml glacial acetic acid with 95 ml distilled water. It should be a fresh preparation and has to be discarded after 24 hrs.

Fig. 2.22: Application of 5% acetic acid

Points to Observe

- New SCJ, which is very nicely noticed as a sharp line or margin
- Distal crypt openings to mark the limit of original SCJ
- Metaplastic epithelium
- Transformation zone
- Abnormal acetowhite lesions (if any): Its margins, its position with respect to new SCJ and TZ, its surface contour, texture, its luster, how soon has it become acetowhite and how long does it retains its acetowhiteness, intensity of acetowhiteness whether pale white, oyster egg white, or chalk white, density of the lesion, whether any lesions within the lesions or umbilication noted, any cuffed crypt noted.
- Columnar epithelium

Tips

a. After application of acetic acid, patients experience a slight burning sensation. Patients have to be adequately counselled prior to the application of acetic acid to avoid discomfort.
b. Some colposcopists have adopted the practice of spraying the cervix with acetic acid using a syringe fitted with wide bore long needle. It is very useful in camps to avoid autoclaving of the instruments used.

c. In postmenopausal woman, due to the thin atrophic epithelium, the cervix appears pale white. The reporting can be misleading due to tiny petechial hemorrhage developed after application of acetic acid. One should have an adequate experience in performing colposcopy in postmenopausal women before reporting the case to avoid over or under reporting.

Principle

Acetic acid coagulates the intracellular proteins thus obscuring the passage of light, thus turning acetowhite.

Columnar epithelium, mature squamous metaplasia and original squamous epithelium do not turn acetowhite since there are very less intracellular proteins.

In case of immature squamous metaplasia, the cells are dividing cells with high nucleocytoplasmic ratio. On application of 5% acetic acid, immature metaplastic tissue turns acetowhite, which is thin, transparent, shiny, without any geographical pattern with finger-like or feathery margins. They can arise focally anywhere on the columnar epithelium. The acetowhiteness disappears very quickly.

In case of CIN lesions, the acetowhite lesions have set geographical pattern arising from SCJ within the transformation zone distributed centrifugally. Low grade lesions have feathery but distinct margins. They are milky white. High grade lesions have distinct margins, sometimes elevated rolled out margins, with distinct oyster egg white or chalky white. Low grade lesions appear late and disappears fast, whereas the high grade lesions appear instantly and disappear late.

Sometimes the columnar epithelium appears white due to the metaplastic changes occurring on them. SCJ appears as a distinct thin acetowhite line.

Physiological VIA positive conditions (Figs 2.23a to g):

1. NEW SCJ
2. Metaplastic epithelium
3. Columnar epithelium covered with squamous metaplasia.
4. Satellite lesions, which is acetowhite within or outside the TZ zone.
5. Congenital TZ
6. Hyperkeratotic patches.

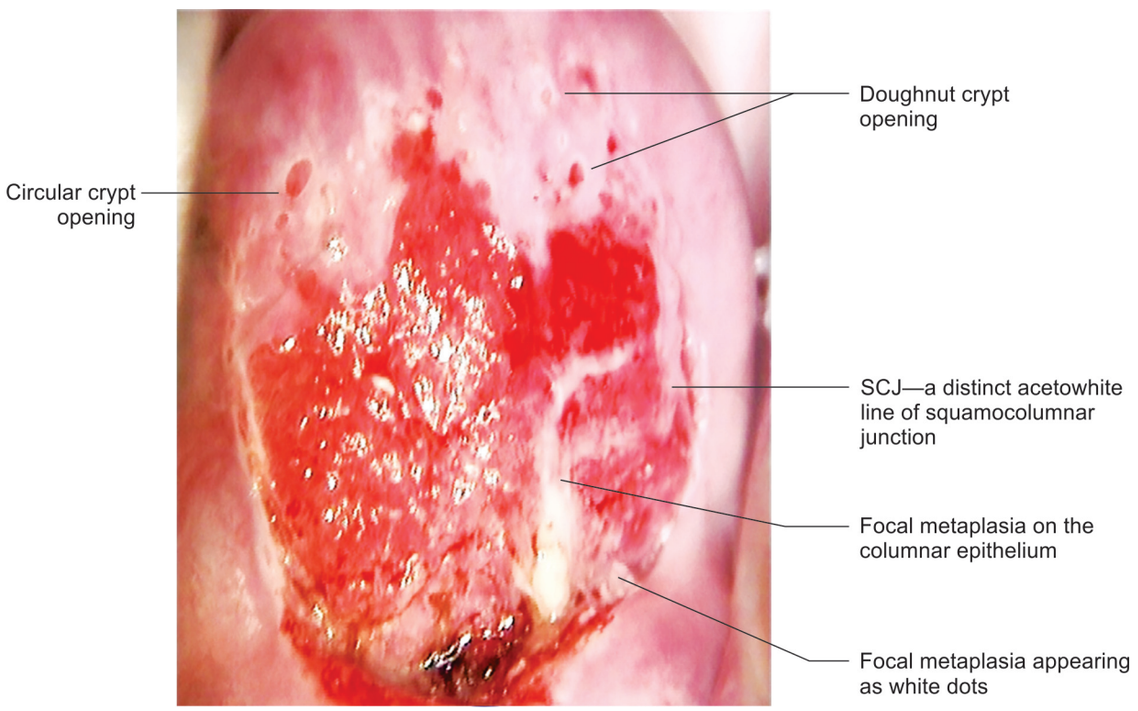


Fig. 2.23a

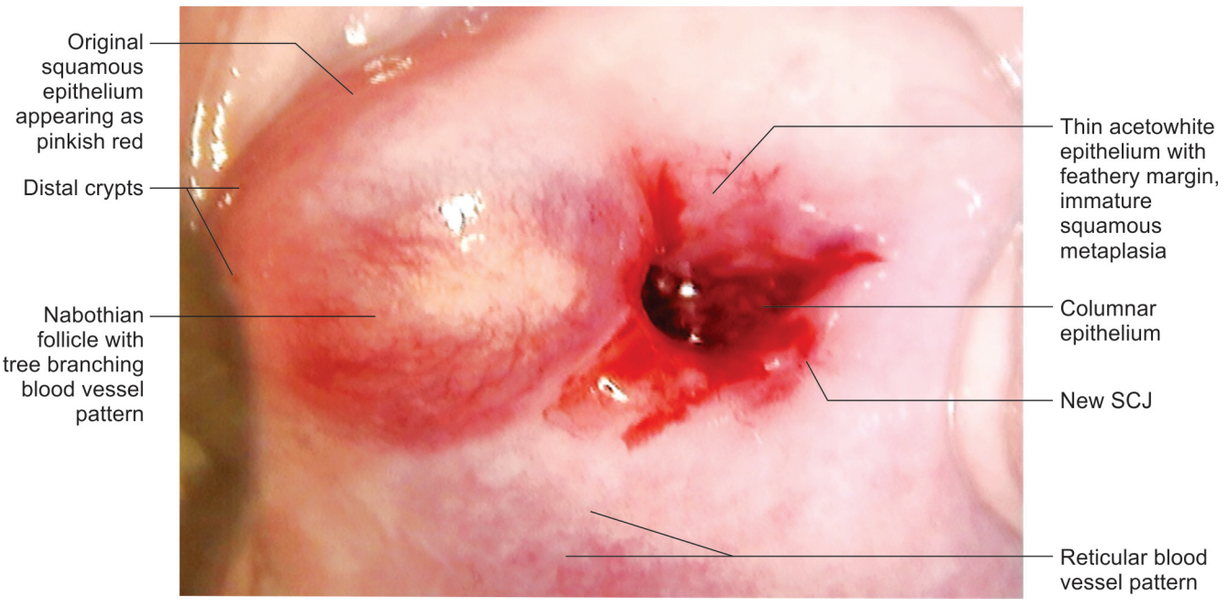


Fig. 2.23b

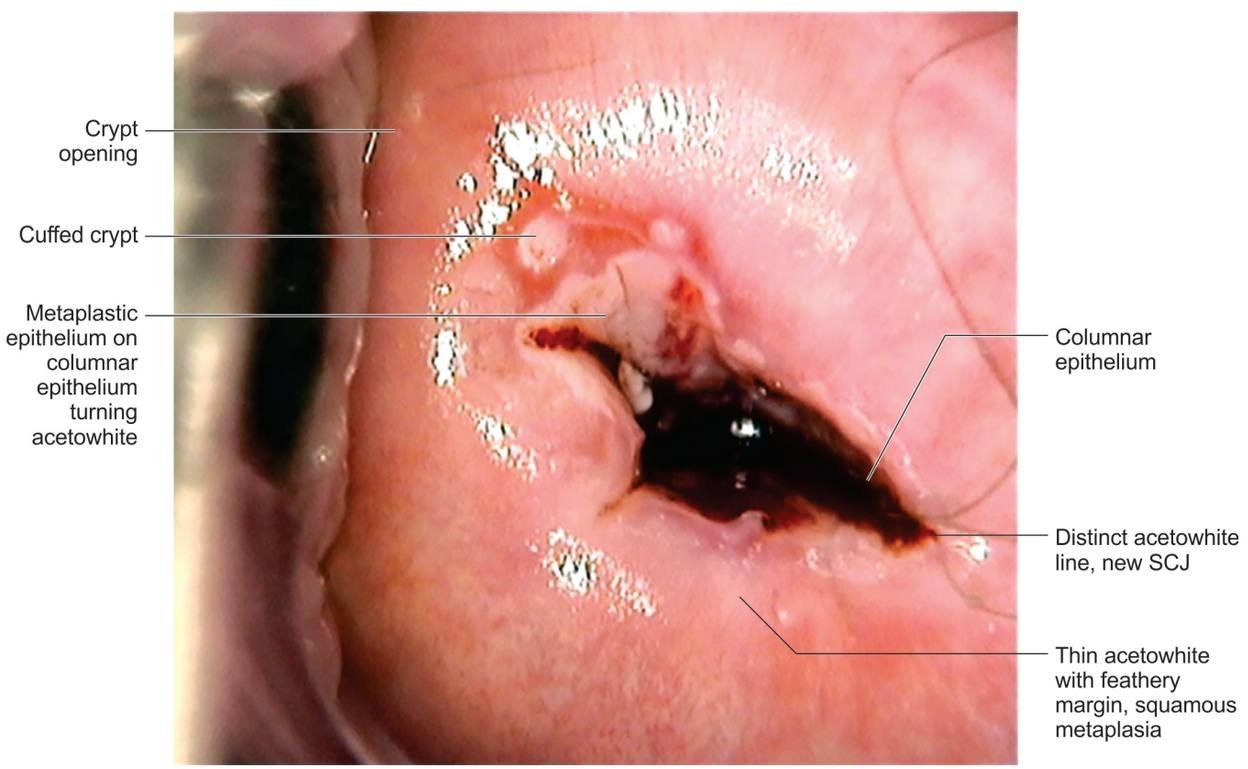


Fig. 2.23c: Cuffed crypts may be a pathagnomonic features of HSIL, hence better to take biopsy to r/o lesions

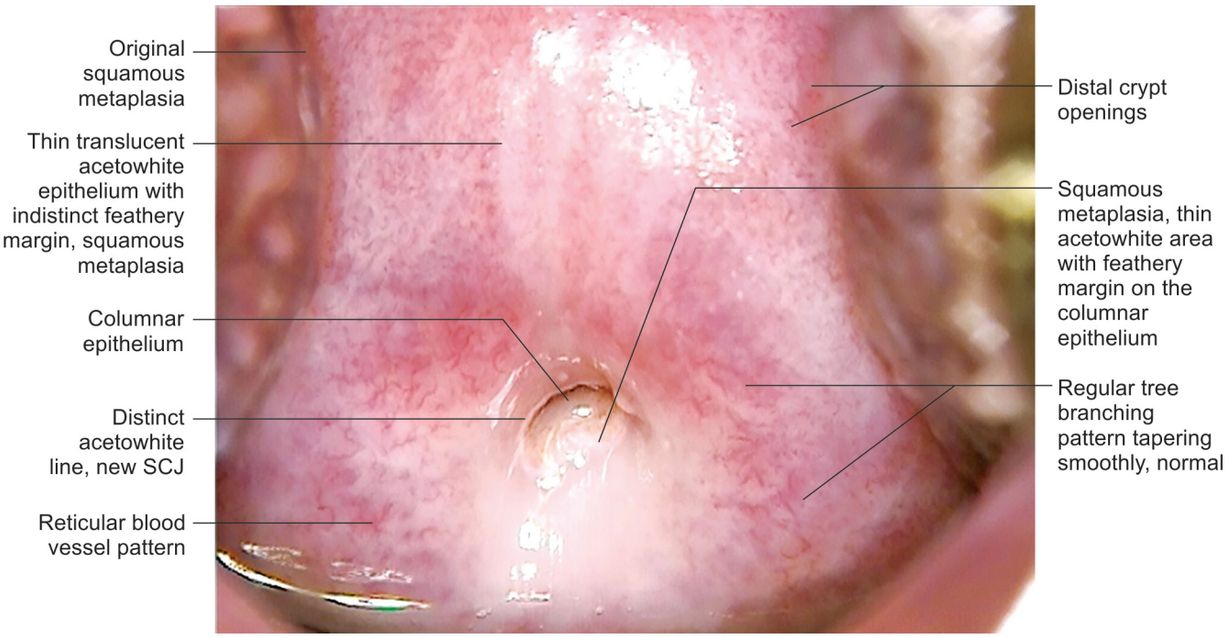


Fig. 2.23d

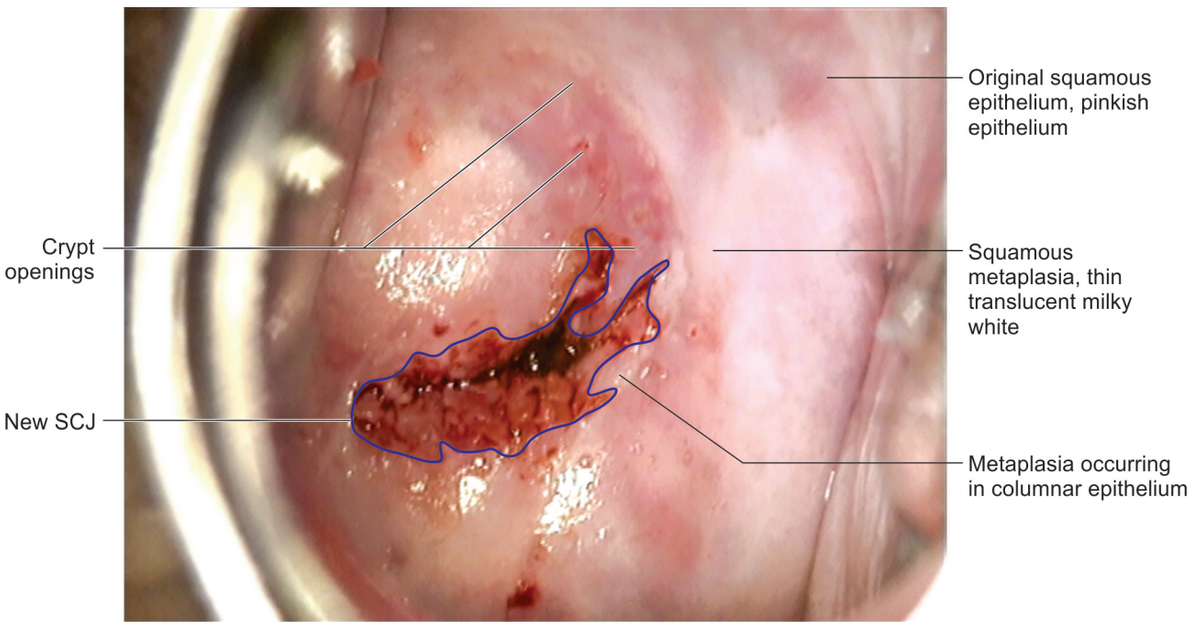


Fig. 2.23e

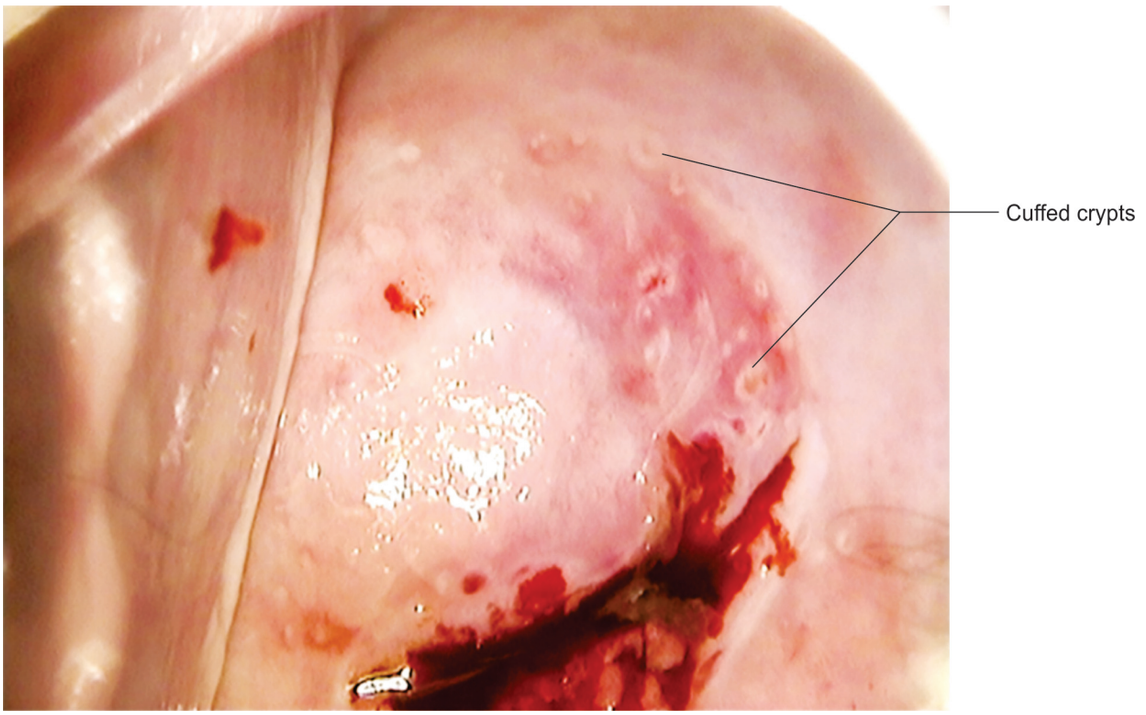


Fig. 2.23f

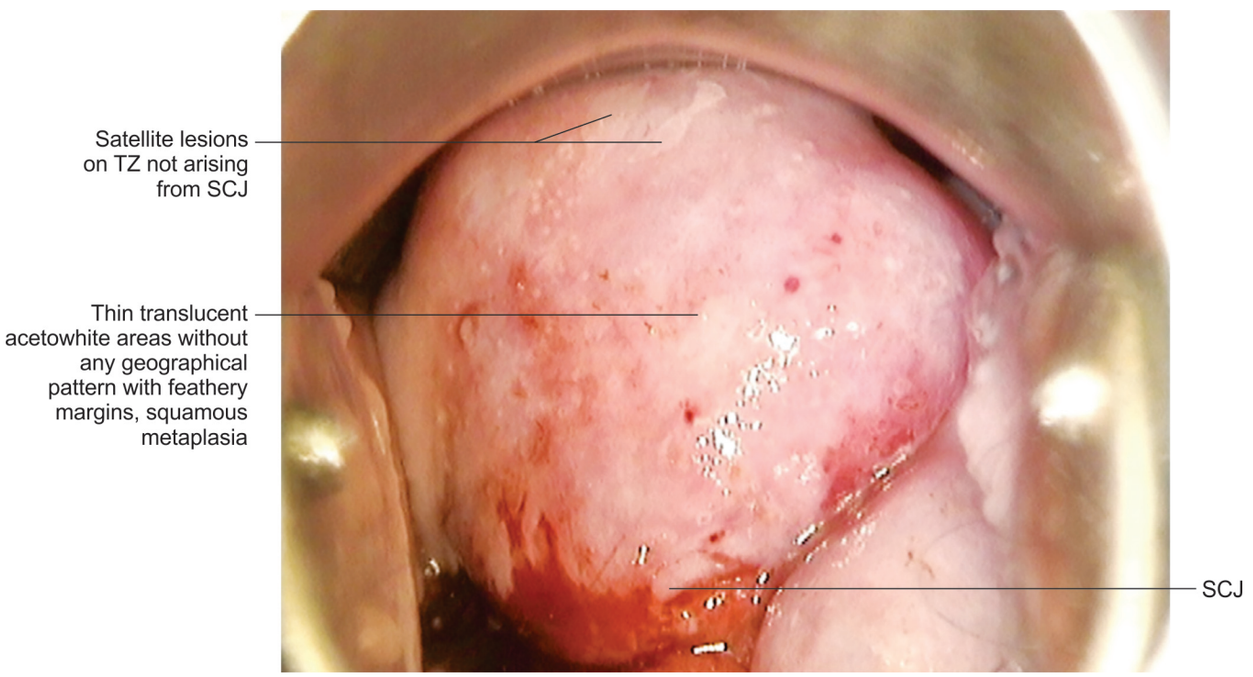


Fig. 2.23g

Pathological VIA positive conditions (Figs 2.24a to f):

1. LSIL
2. HSIL
3. Invasive CA
4. Microcondylomatous lesion

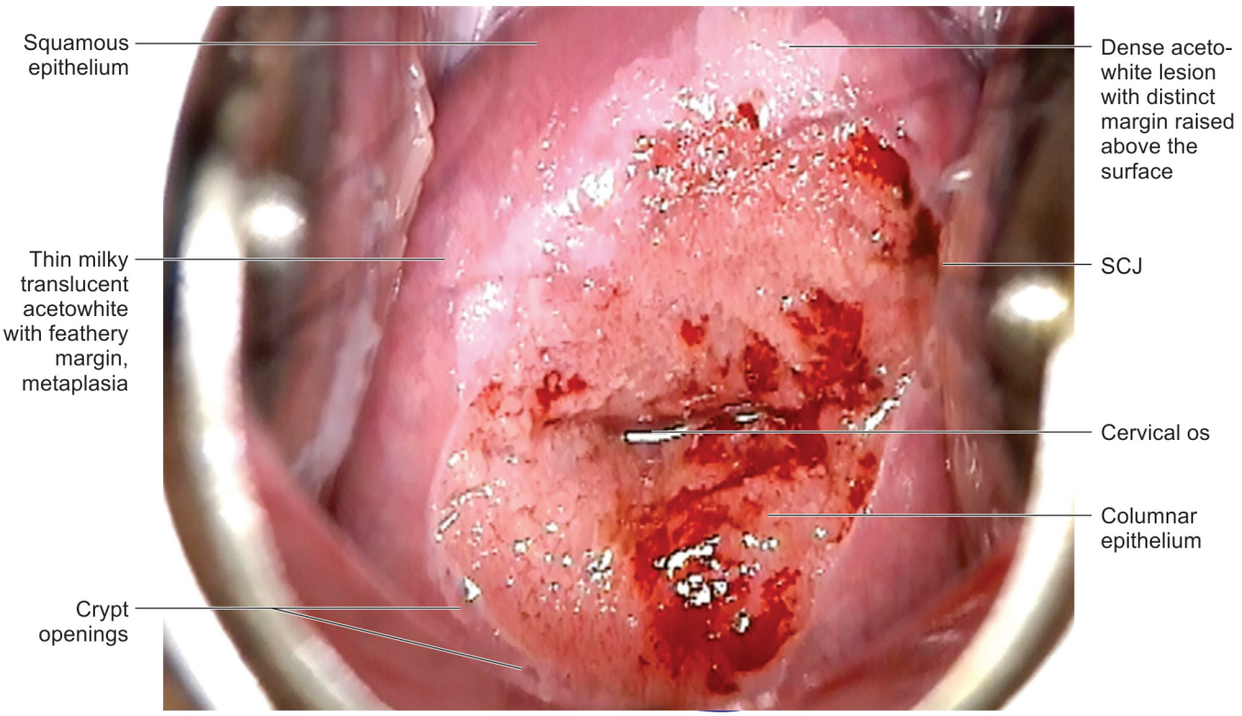


Fig. 2.24a: Lesion at 1 O'clock position

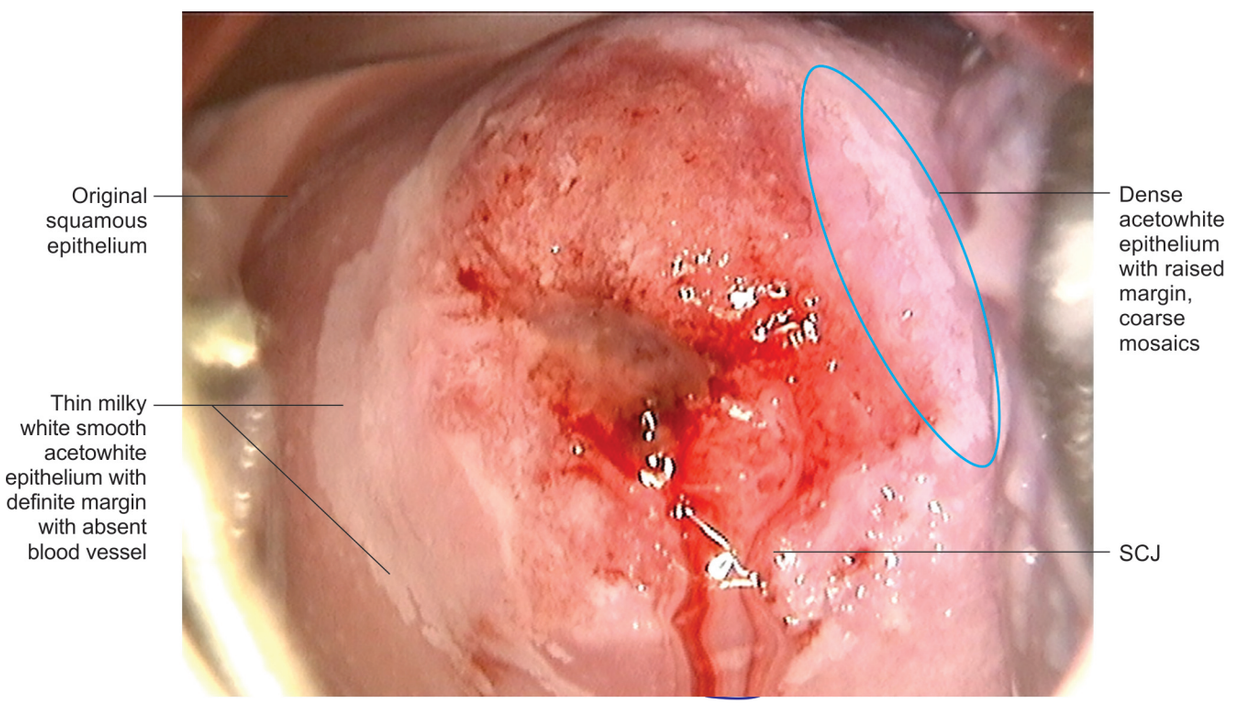


Fig. 2.24b: Circumferential lesions

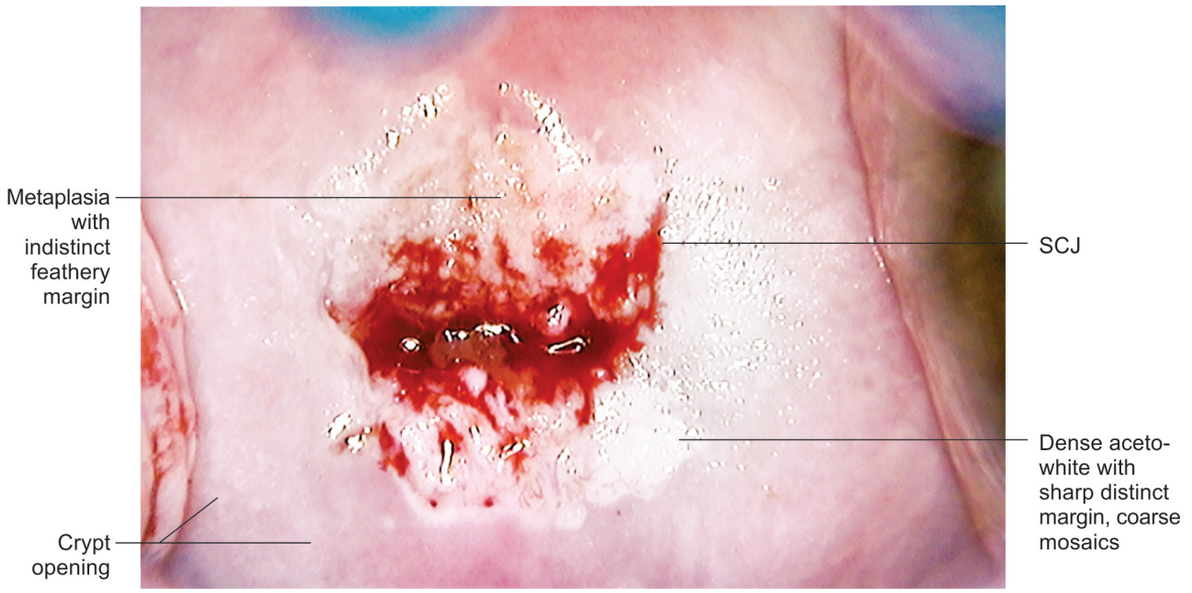


Fig. 2.24c: Lesion at 5 O'clock position

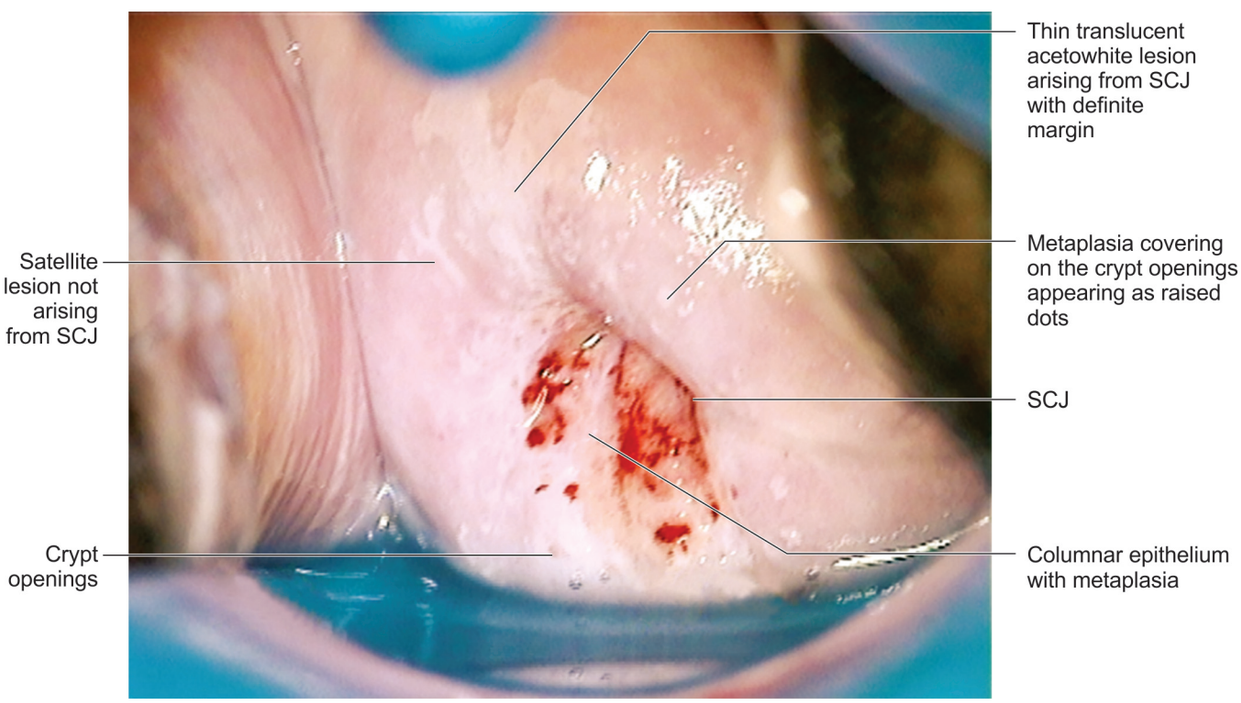


Fig. 2.24d: Lesion at 12 O' clock position and satellite lesion

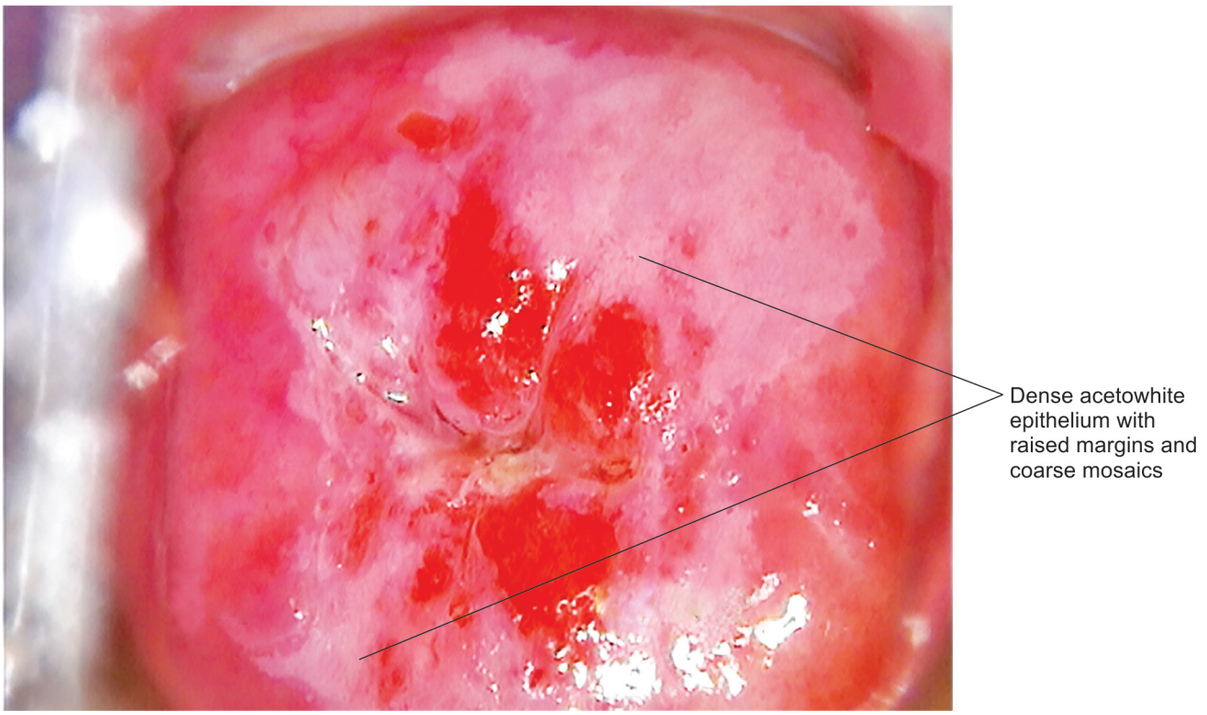


Fig. 2.24e: HSIL lesion

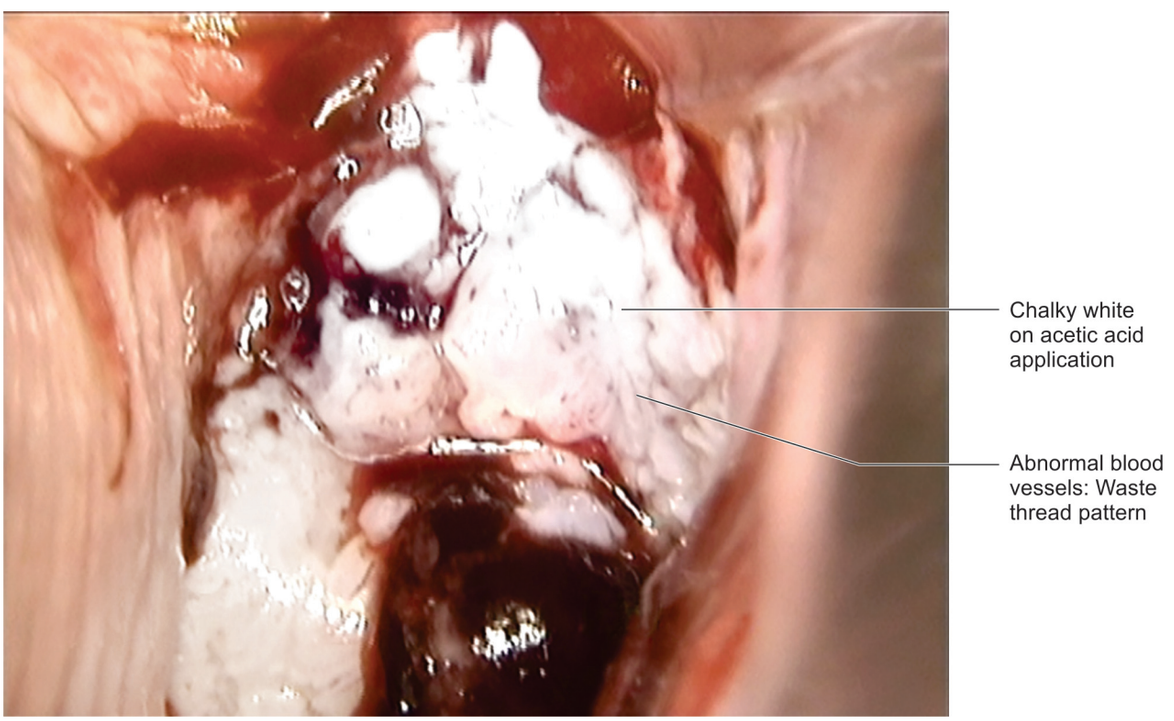


Fig. 2.24f: Rags sign seen in invasive SCC

6. Lugol's Iodine Application

Principle

Stratified squamous epithelia have glycogen in their superficial cells. On application of Lugol's iodine, these cells take up iodine and turn mahogany brown or dark brown. The cells which do not contain glycogen do not turn brown, they remain unstained or variegated patchy appearance.

Physiological conditions where Lugol's iodine is taken up and turns mahogany brown—original squamous epithelium, mature squamous metaplasia.

Physiological conditions where Lugol's iodine is not taken up—columnar epithelium, immature squamous epithelium, nabothian follice, menopausal epithelium (Figs 2.25a to f).

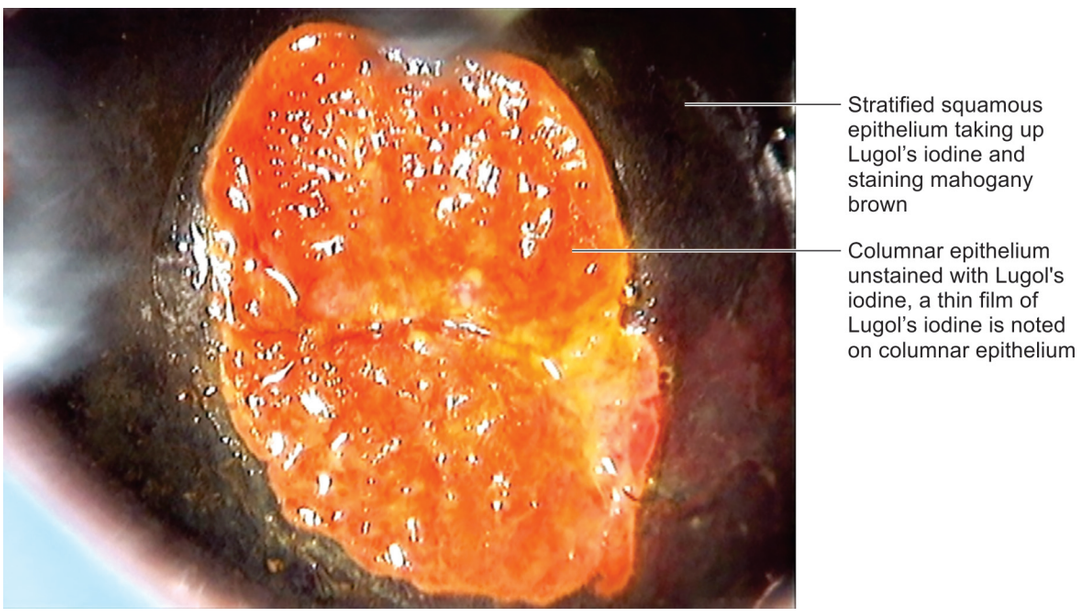


Fig. 2.25a: VILI negetive

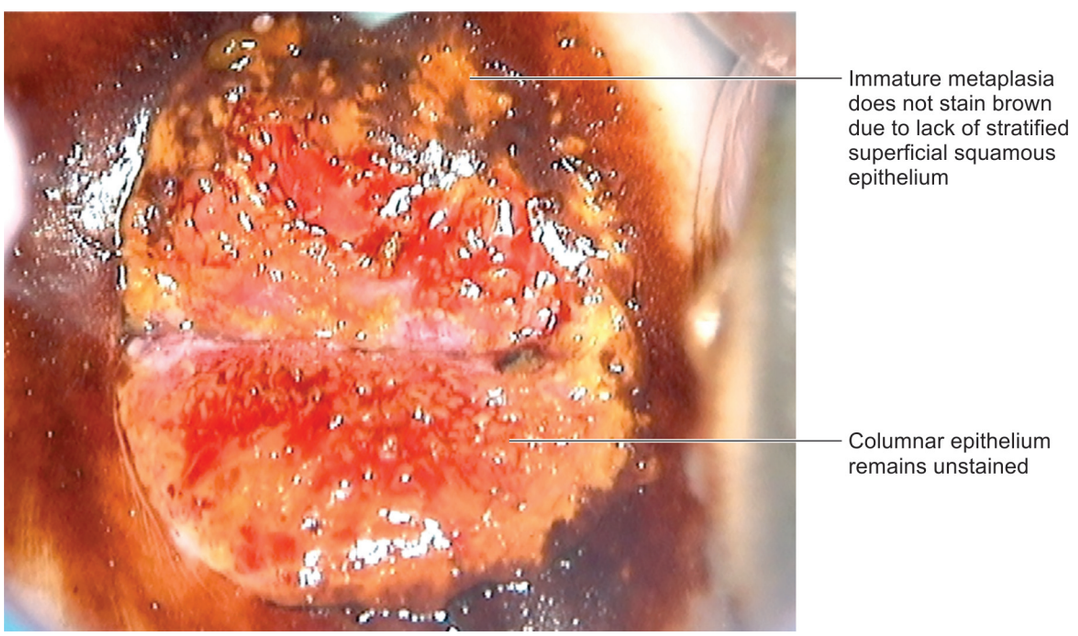


Fig. 2.25b: Physiological VILI positive due to immature squamous metaplasia

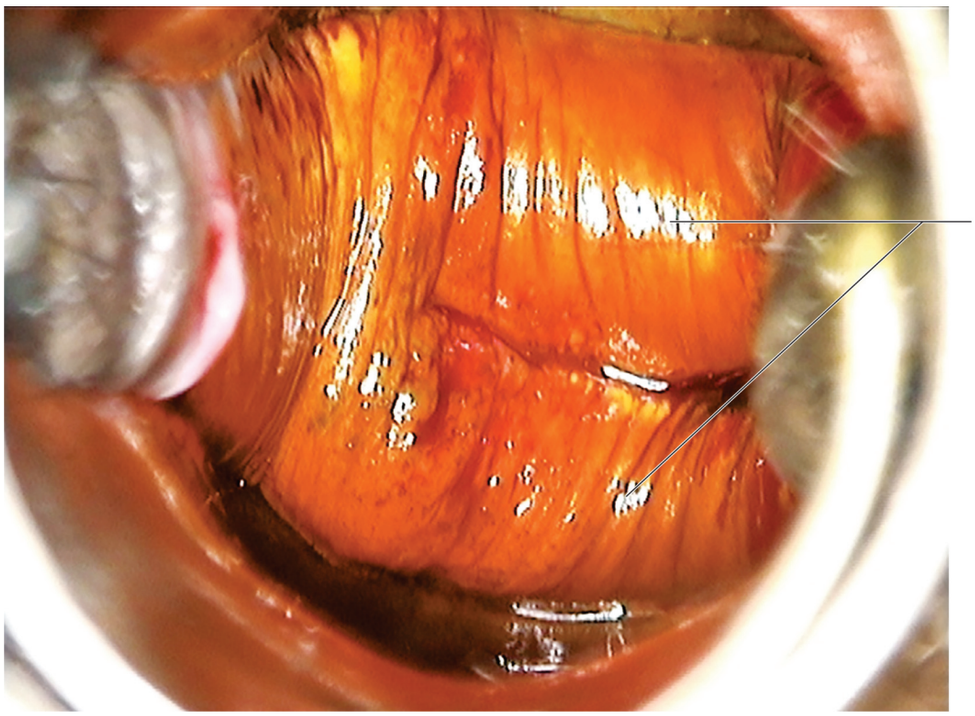


Fig. 2.25c: Physiological VILI positive in menopausal age group

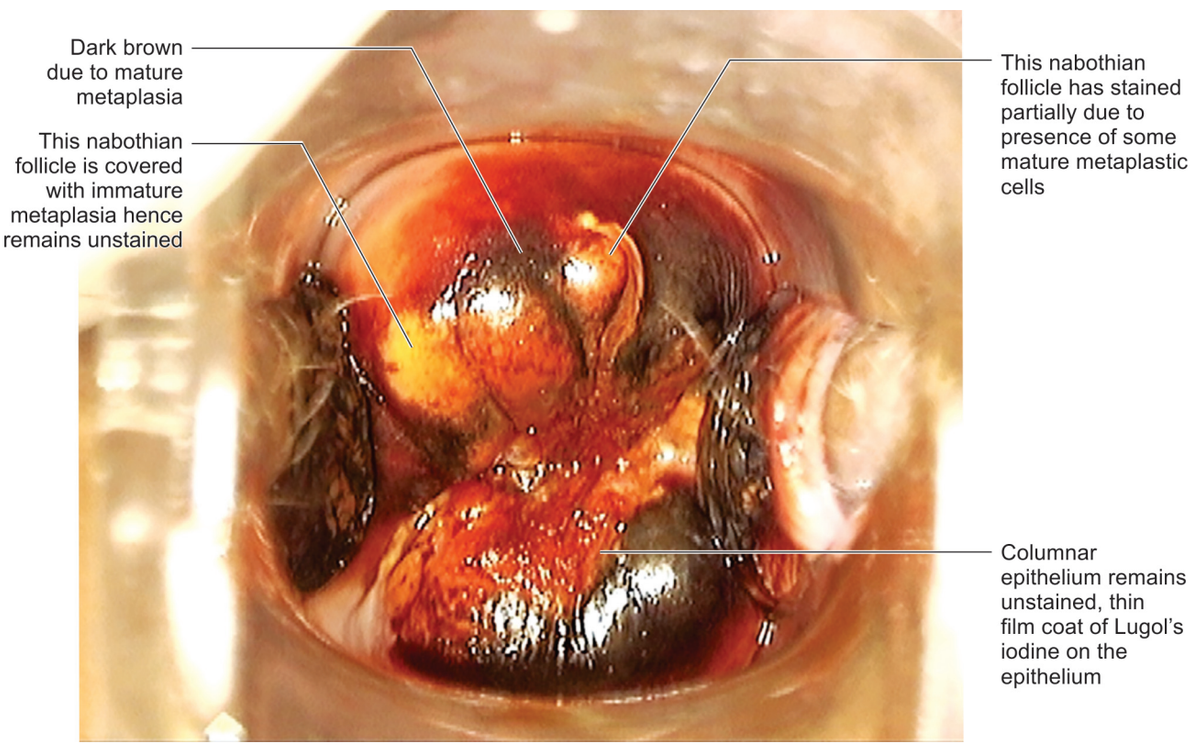


Fig. 2.25d: Nabothian follicles

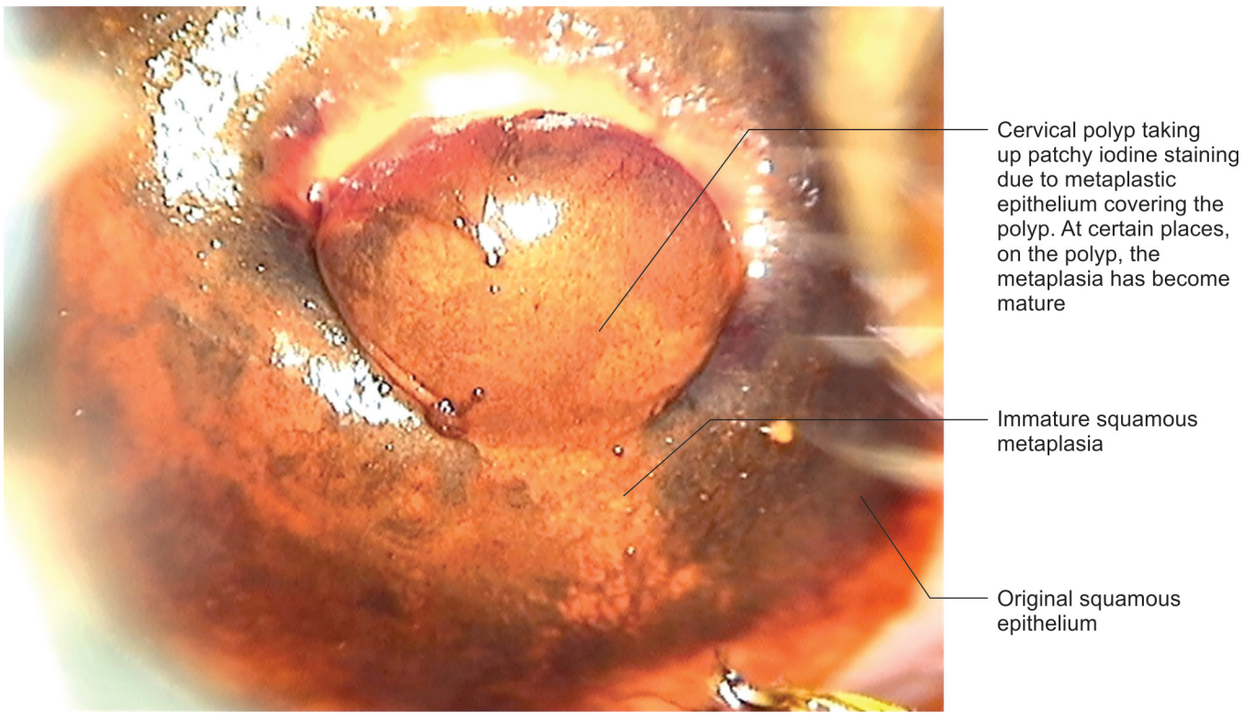


Fig. 2.25e: Cervical polyp

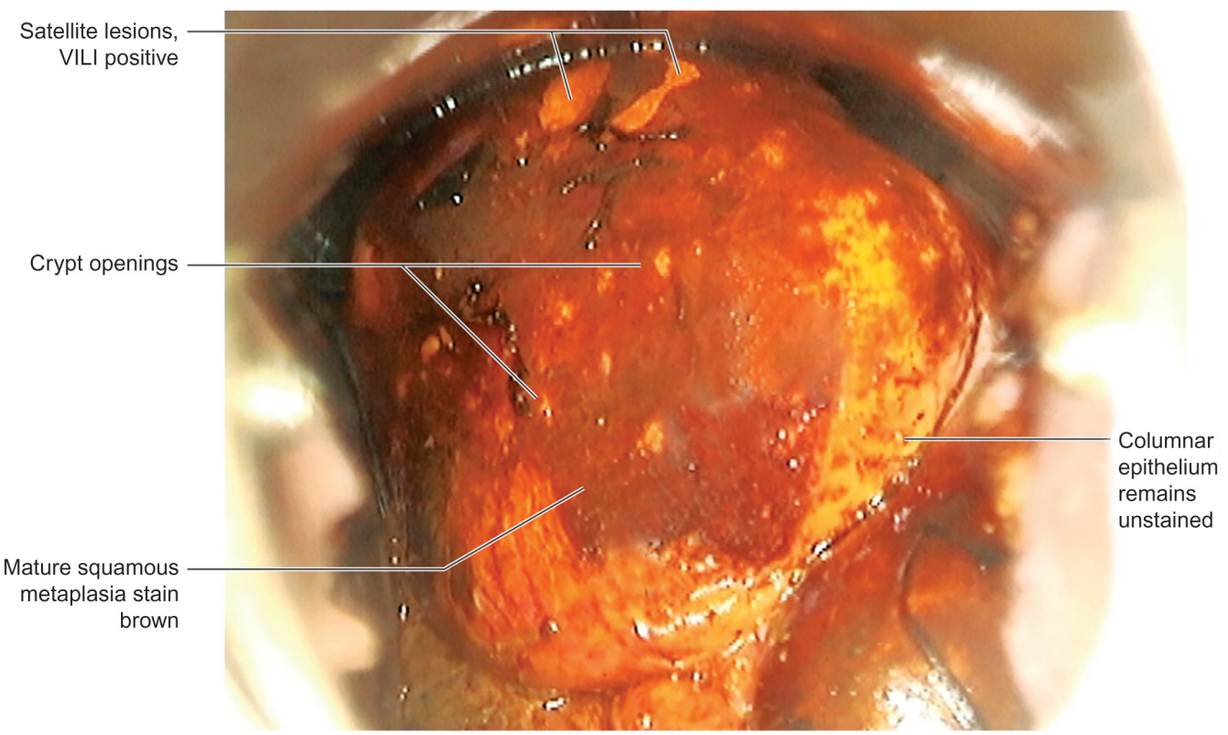


Fig. 2.25f: Satellite lesions not taking up Lugol's iodine

Pathological conditions not taking up Lugol's iodine (VILI positive): CIN lesions—due to the lack of superficial stratified cells in the dividing cells of CIN lesions which are usually basal, parabasal or intermediate cells, these lesions do not stain brown. Depending on the severity of the CIN lesions, they either remain unstained or take up partial variegated Lugol's stains, higher grade lesions, such as microinvasive CA, stain as mustard yellow.

Trichomonial infections cause denudation of the superficial cells which do not get stained giving rise to leopard skin pattern.

Satellite lesions, not arising from SCJ within or away from TZ, do not stain with Lugol's iodine and are VILI positive (Figs 2.26a to i).

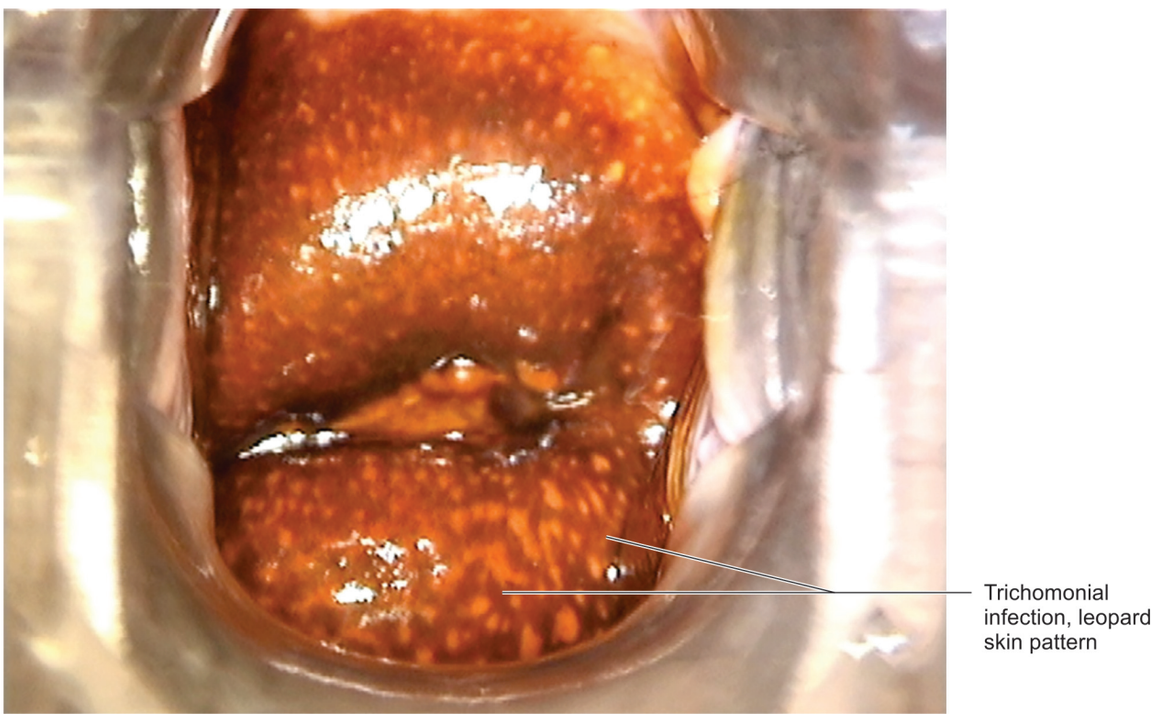


Fig. 2.26a: Leopard skin patches

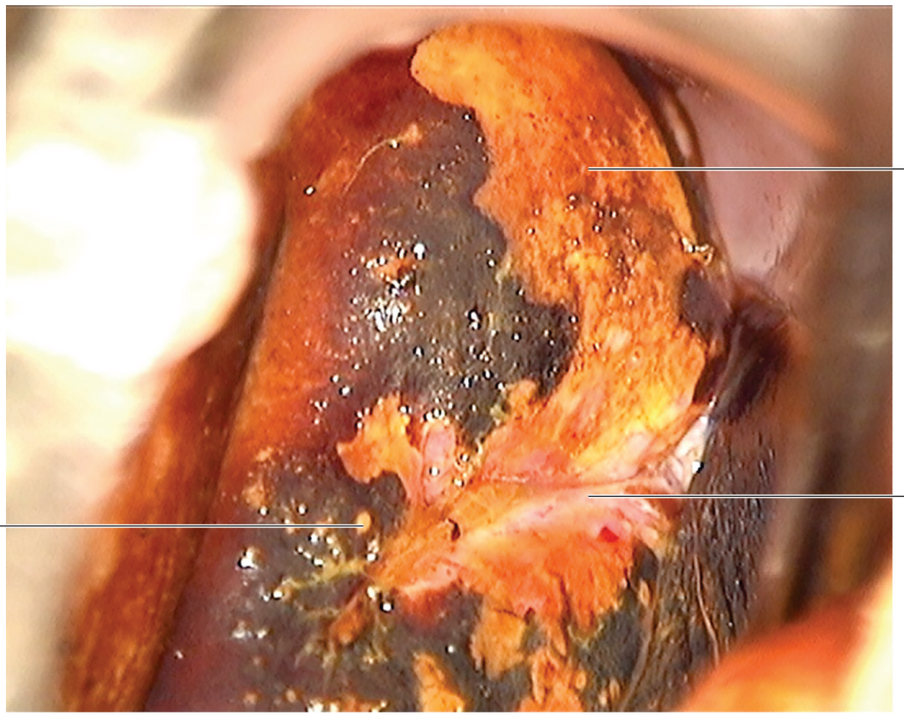


Fig. 2.26b: VILI positive

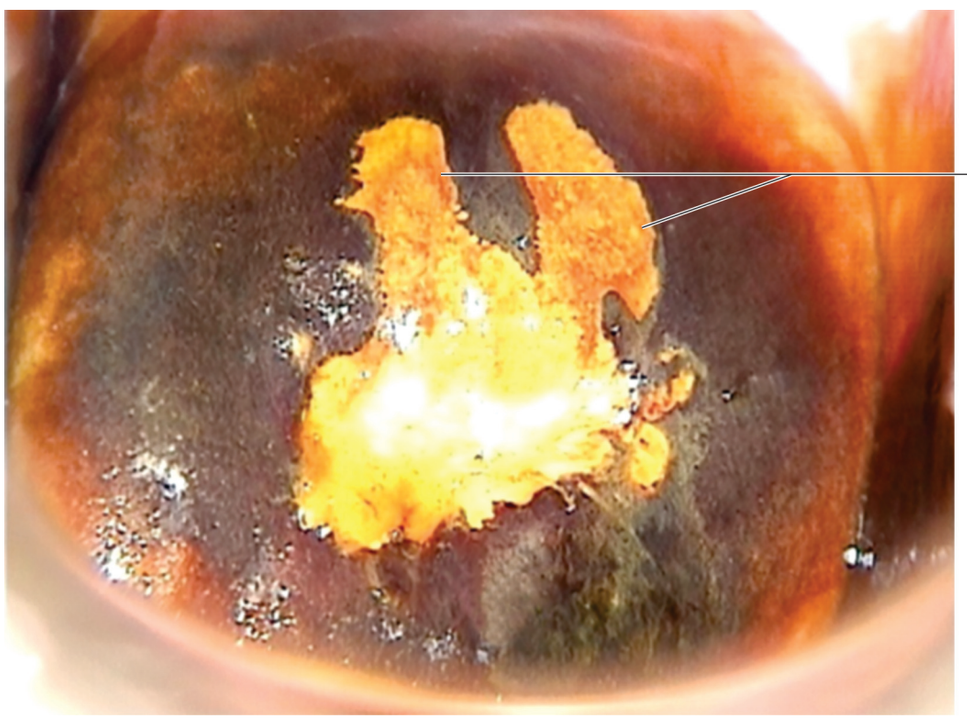


Fig. 2.26c: VILI positive

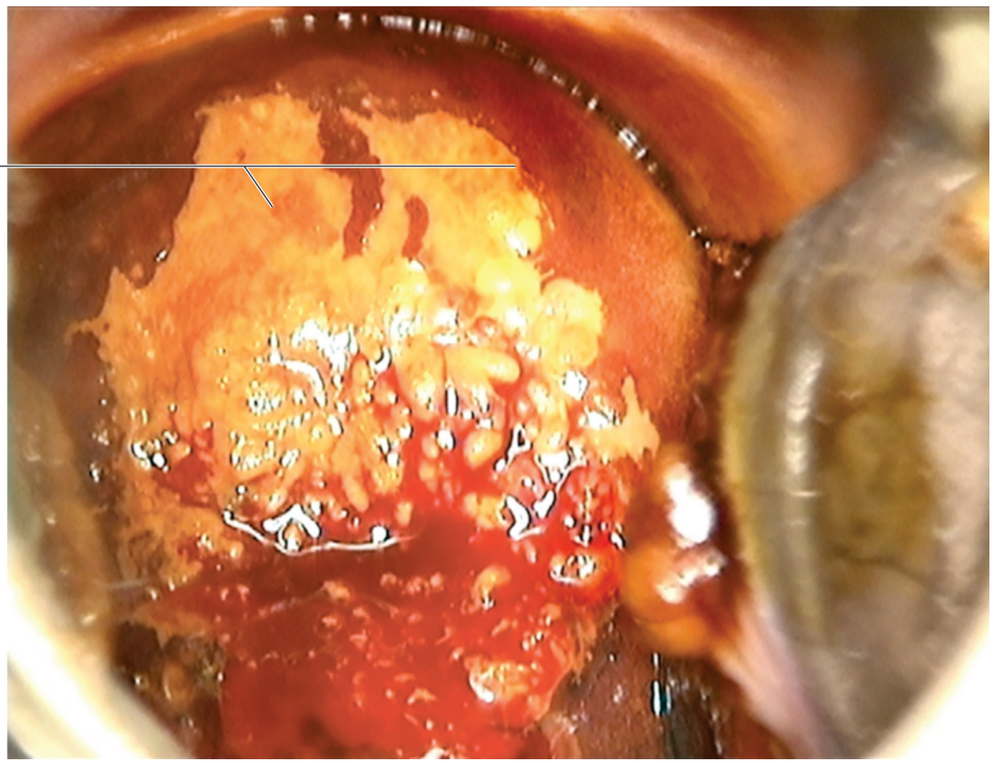


Fig. 2.26d: VILI positive

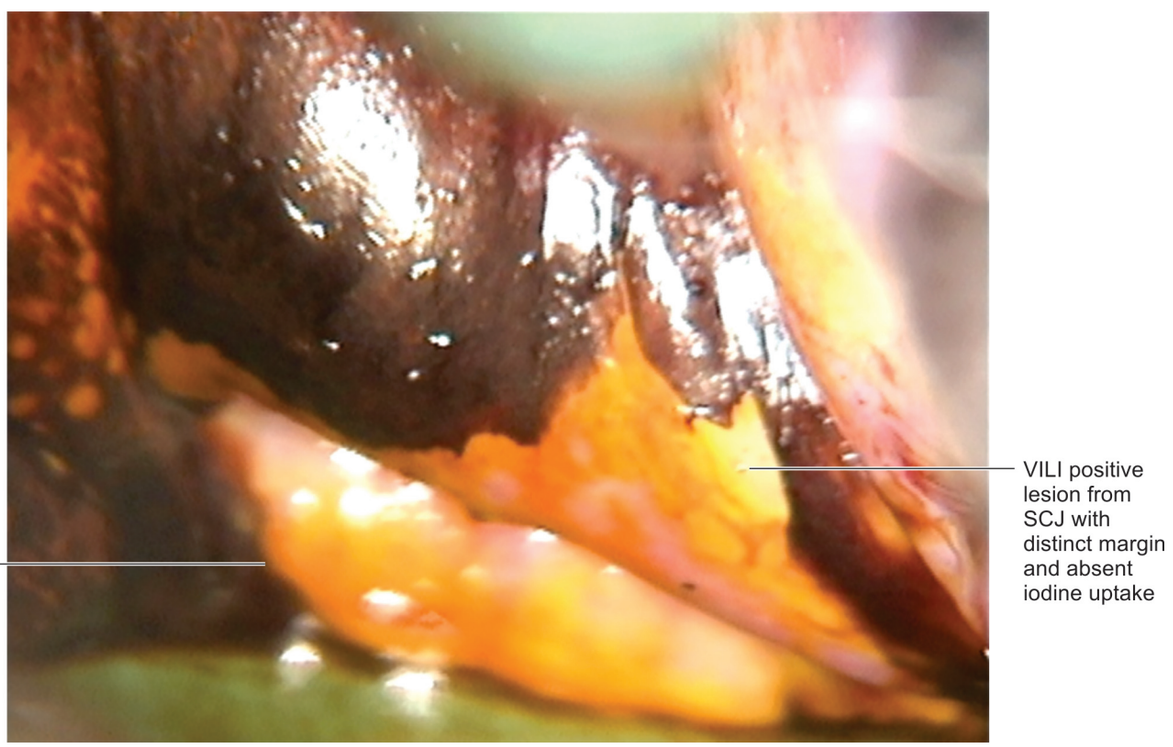


Fig. 2.26e: VILI positive

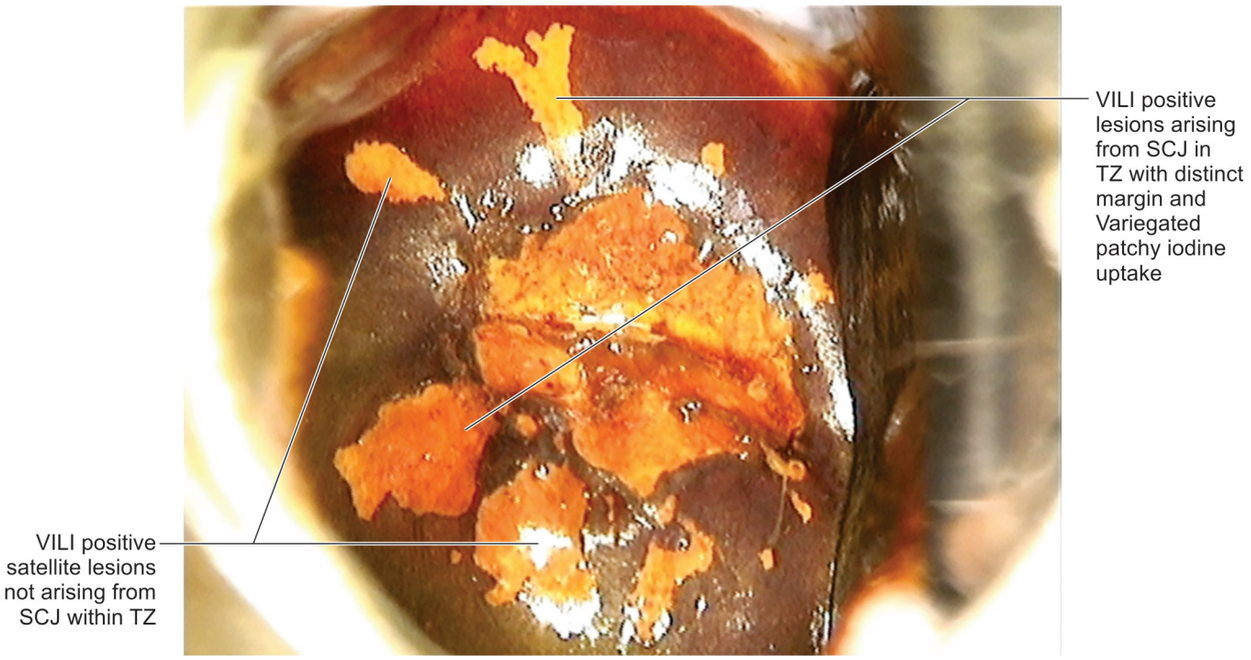


Fig. 2.26f: VILI positive

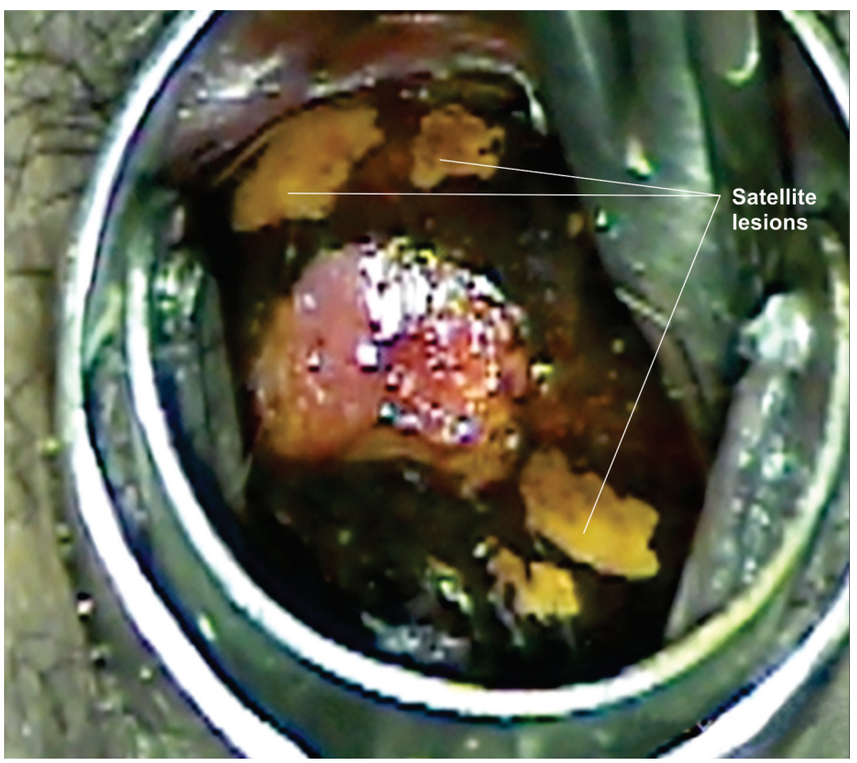


Fig. 2.26g: Satellite lesions

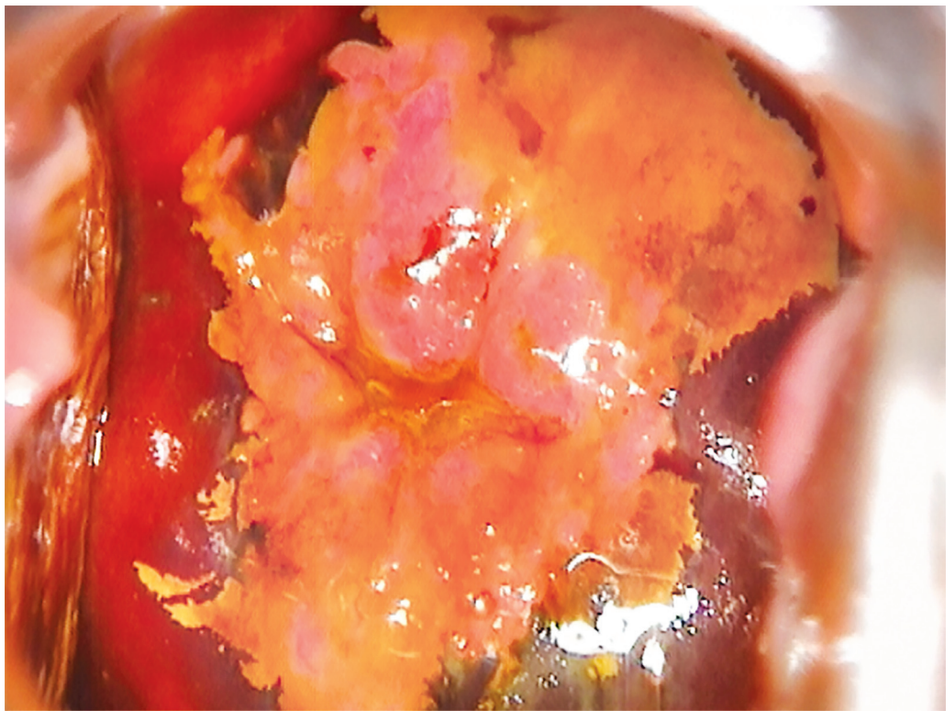


Fig. 2.26h: Mustard staining in invasive cancer

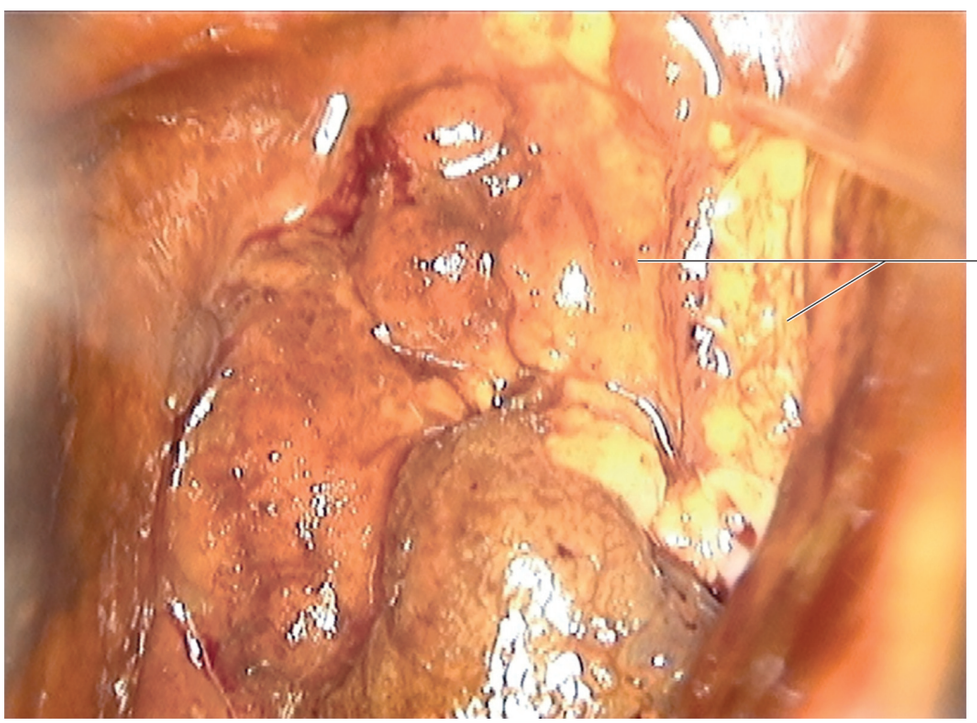


Fig. 2.26i: Mustard staining in invasive cancer

Thus to sum up the terminology:

- *VILI negative:* Uptake of Lugol's iodine to turn into mahogany brown colour.
- *VILI positive:* There is no Lugol's iodine uptake hence they remain unstained or turn yellow, seen in physiological or pathological conditions.

CHAPTER

3

Explanations of Different Terminologies

1. SQUAMOUS EPITHELIUM

A mature stratified squamous epithelium is composed of four layers (Figs 3.1a and b): (1) Basal layer; (2) parabasal layers; (3) intermediate layer; and (4) superficial layer.

Basal and parabasal cells are round cells with large nucleus in comparison to cytoplasm, intermediate cells are polygonal in shape with abundant cytoplasm and small round nuclei forming basket weave pattern, superficial cells are flattened with pyknotic nuclei and transparent cytoplasm.

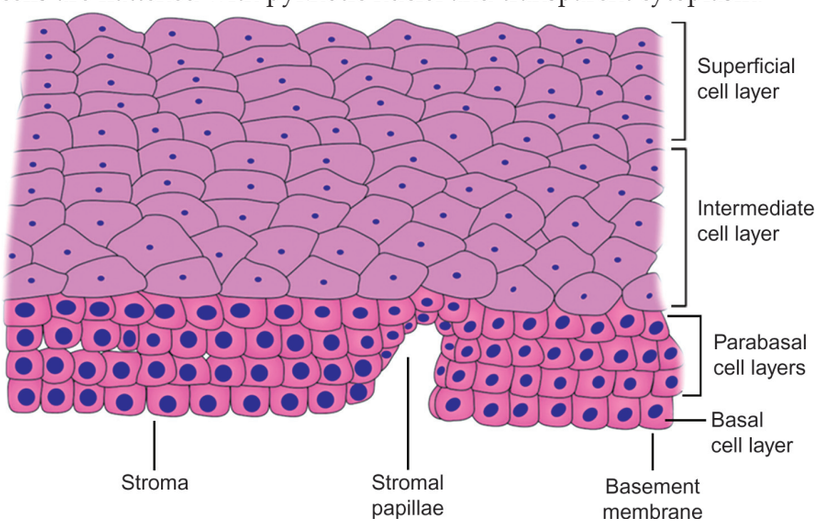


Fig. 3.1a: Stratified squamous epithelium

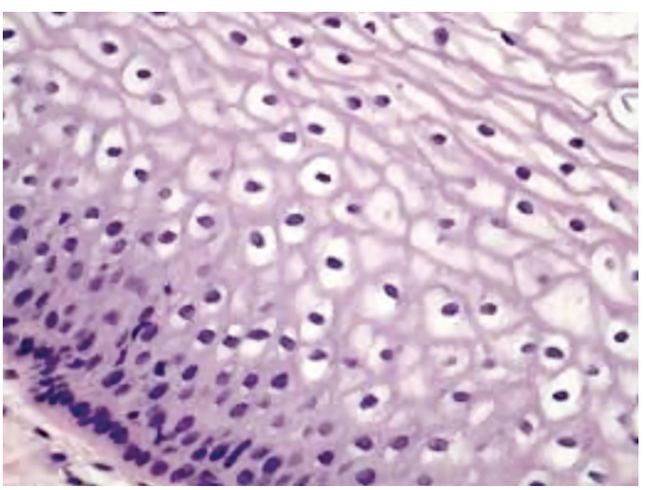


Fig. 3.1b: Histology of squamous epithelium

Basal layer: It is a single layer of round basal cells with a large dark staining nuclei and a little cytoplasm. It rests on the basement membrane, which separates epithelial layer from stroma containing connective tissue and blood vessels. Usually, the basement membrane is straight, but sometimes it has short projections called stromal papillae into the epithelial cells. These stromal papillae carry along with them branches of blood vessels. The stromal papillae (Figs 3.1a and b) are found at regular intervals.

The part of epithelium between the two papillae is called the rete pegs (Fig. 3.2). Rete pegs carries importance and significance in the pathology of CIN in identifying the mosaic pattern.

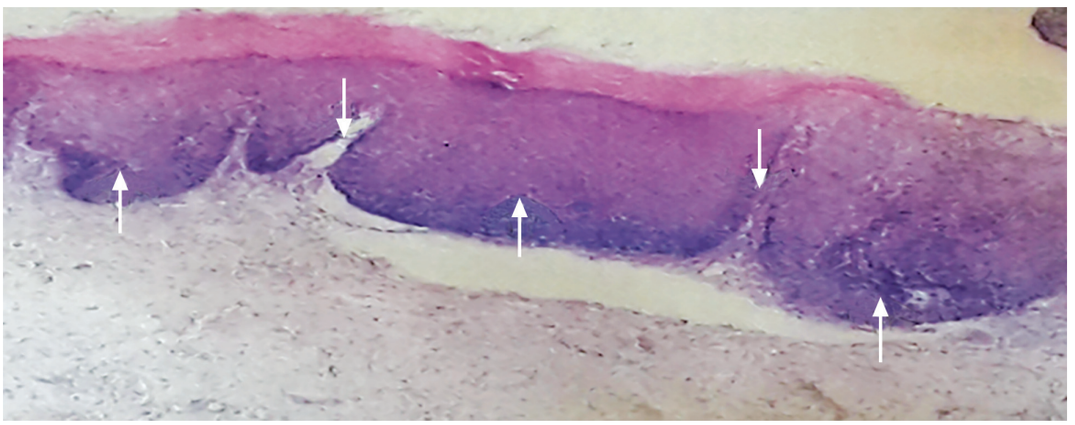


Fig. 3.2: Rete pegs (arrows upward) and stromal papillae (arrows downward)

Parabasal layers: These are two to three layers situated above the basal layer. They are relatively rounded and have dark staining nuclei with basophilic cytoplasm.

Intermediate layer: The parabasal layer further differentiates into intermediate layer of polygonal cells with abundant cytoplasm and small round nuclei. They form a basketweave pattern. They contain glycogen in their cytoplasm.

Superficial layer: The cells of the intermediate layer matures to form large markedly flattened cells with dense pyknotic nuclei and transparent cytoplasm. There is increase in size of the cells with reduction of nuclear size. The superficial cell layer has abundant glycogen in the cytoplasm, responsible for staining as dark mahogany brown on application of Lugol's iodine and magenta with periodic acid-Schiff stain in histological sections.

Stratification of the intermediate and superficial cell layers occurs with inclusion of glycogen in the cellular cytoplasm, this is sign of maturation. Hence, mature squamous epithelium is called stratified squamous epithelium. It is estrogen dependent. Usually, the cytoplasm of the epithelial cells does not have keratin, so-called stratified nonkeratinized squamous epithelium. Many a times, we find keratin inclusion bodies in the cytoplasm of the superficial cells; this is called stratified keratinized squamous epithelium. Sometimes due to irritation to some objects or chemicals, we find hyperkeratotic thick white patch on the cervix which can be covering the high grade lesion beneath it. Hence, every white patch has to be thoroughly scrutinized.

Usually, ectocervix appears pink, shiny, and smooth. Due to multilayered cellular structure, the underlying stroma is very less visible giving it a pink colour. Since maturation of the superficial layer is estrogen dependent; the cervix during early reproductive age group will show all the features of stratified squamous epithelium.

The epithelium of premenopausal and menopausal women will appear dull, opaque and less shiny, lusterless as the epithelium lack superficial and intermediate cell layers with only basal and parabasal cell layers. Due to lack of estrogen, they are fragile and atrophic; more prone to trauma and giving rise to tiny petechial hemorrhage while taking smear or doing colposcopy examination.

2. COLUMNAR EPITHELIUM

Usually, the endocervix is lined by columnar epithelium. It is made up of single layer of tall cells with dark staining nuclei close to the basement membrane. This layer is thrown into multiple folds within the lumen of the cervical canal giving rise to papillary projections. The invagination of the columnar epithelium gives rise to crypts. The mouth of crypts is called crypt opening. These crypts are, many a times, referred to as endocervical glands which secretes mucus.

The cervical mucus secretion is secreted by the cells and is released into the endocervical canal from the crypt opening. Since the columnar epithelium is single layered, the stroma along with its blood vessels underneath the cells is clearly visible in red color. Also the layer is thrown into manifold giving it a grape-like appearance. The cell cytoplasms do not have glycogen, so they remain unstained on Lugol's iodine test (Figs 3.3a and b).

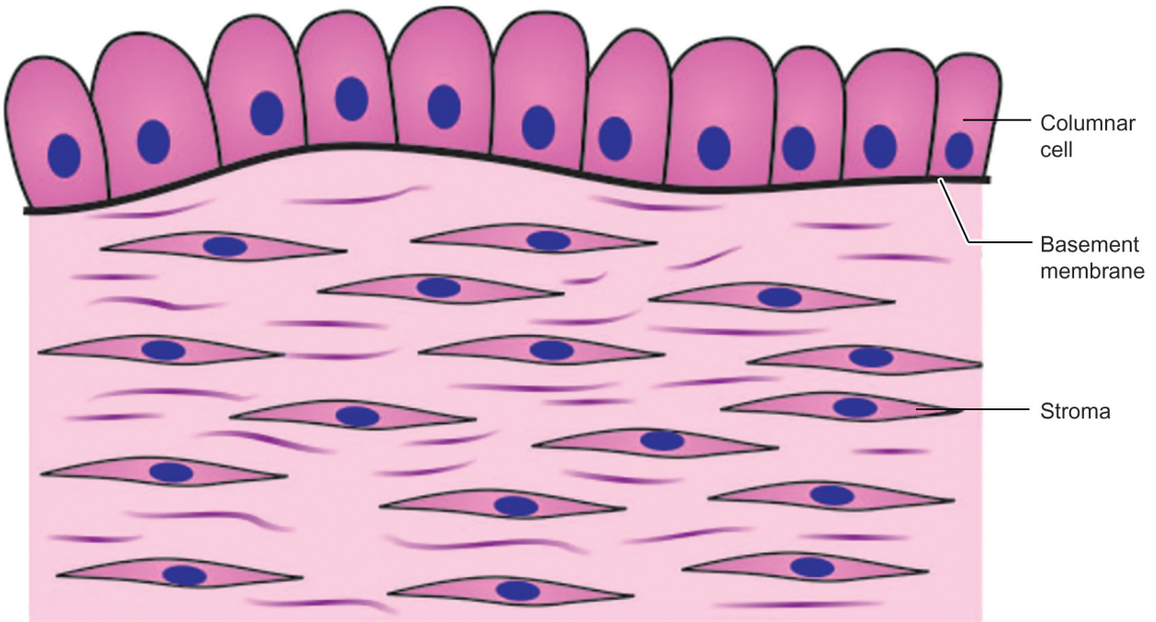


Fig. 3.3a: Columnar epithelium

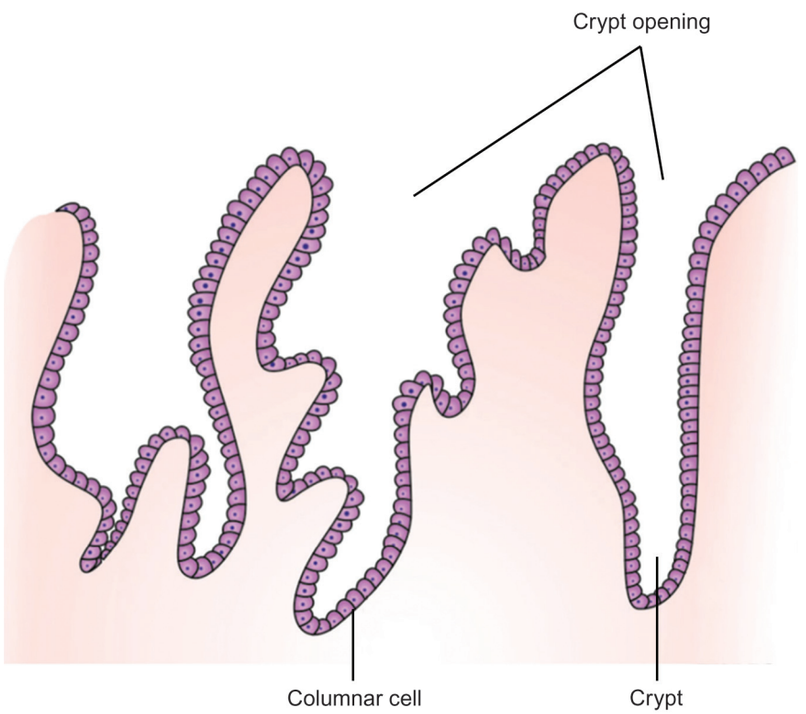


Fig. 3.3b: Columnar epithelium thrown into folds to form crypts

3. SQUAMOCOLUMNAR JUNCTION (SCJ) (Fig. 3.4)

This is the junction of squamous epithelium and columnar epithelium.

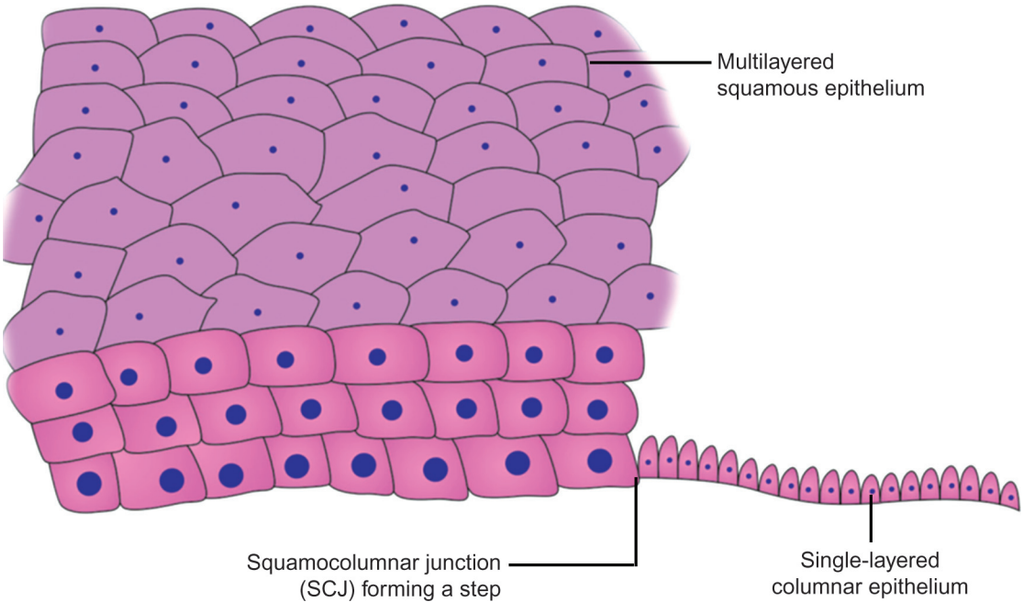
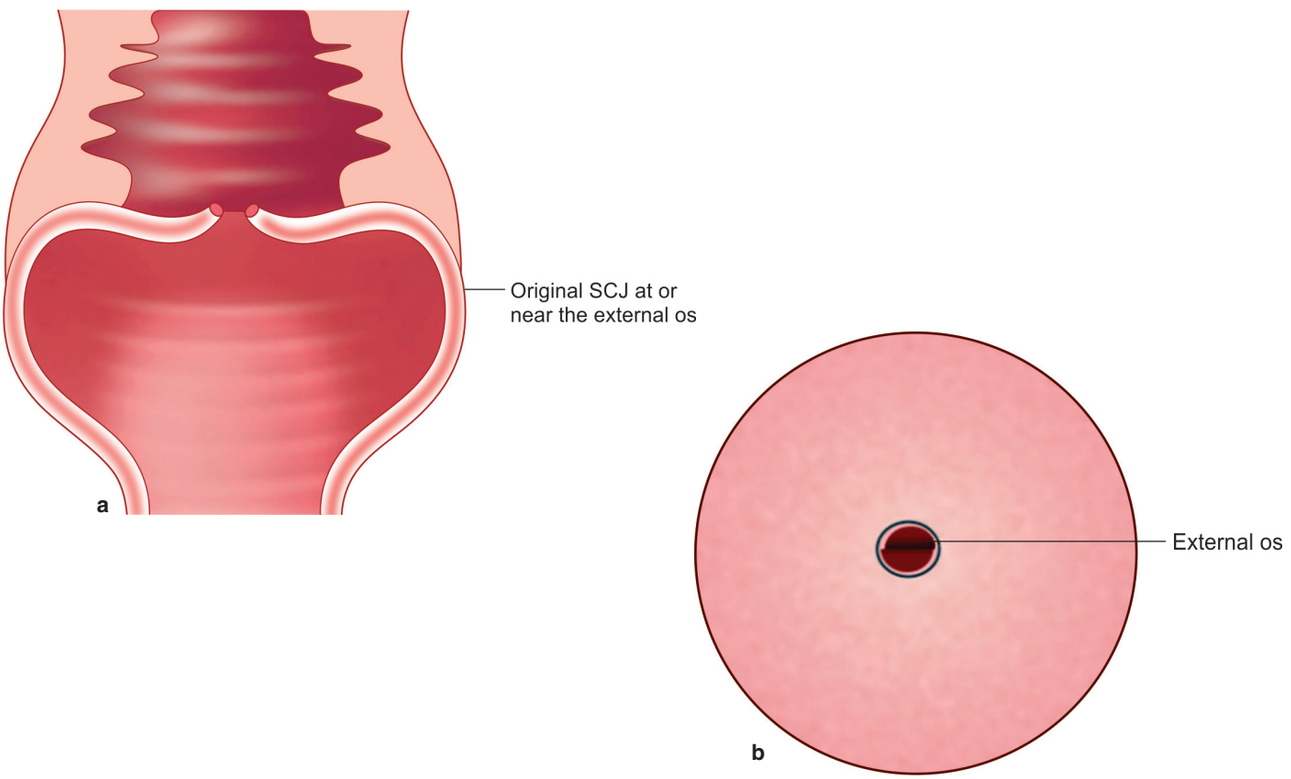


Fig. 3.4: Squamocolumnar junction (SCJ)

Prepubertal

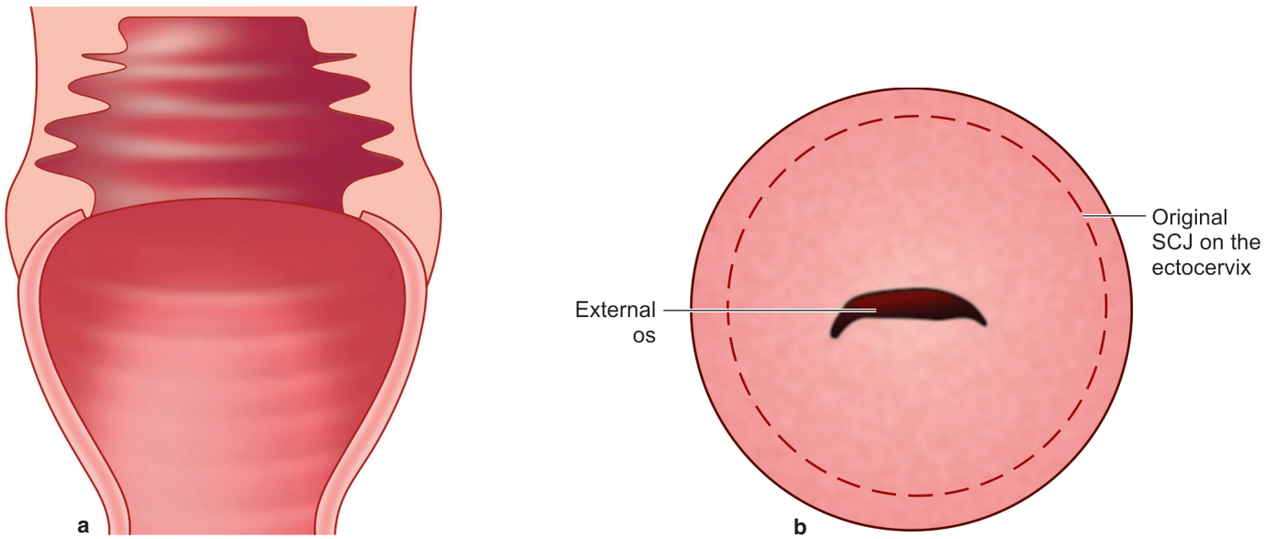
Usually, the original SCJ is located within the cervical canal during the prepubertal period (Figs 3.5a and b).



Figs 3.5a and b: Prepubertal SCJ

Pubertal

During menarche, due to influence of estrogen hormones, there is growth of endocervical columnar epithelium. This overgrowth of columnar epithelium leads to eversion of the columnar cells on the ectocervix. The SCJ shifts to periphery (Figs 3.6a to c).



Figs 3.6a and b: Pubertal SCJ

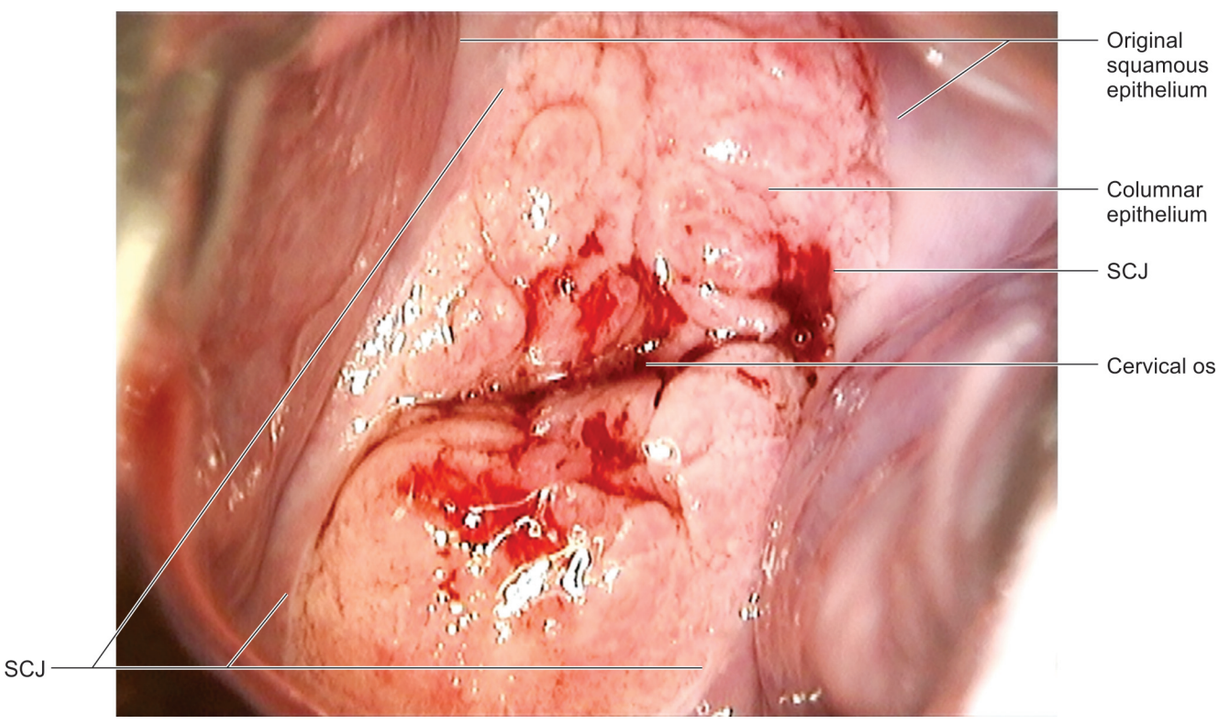
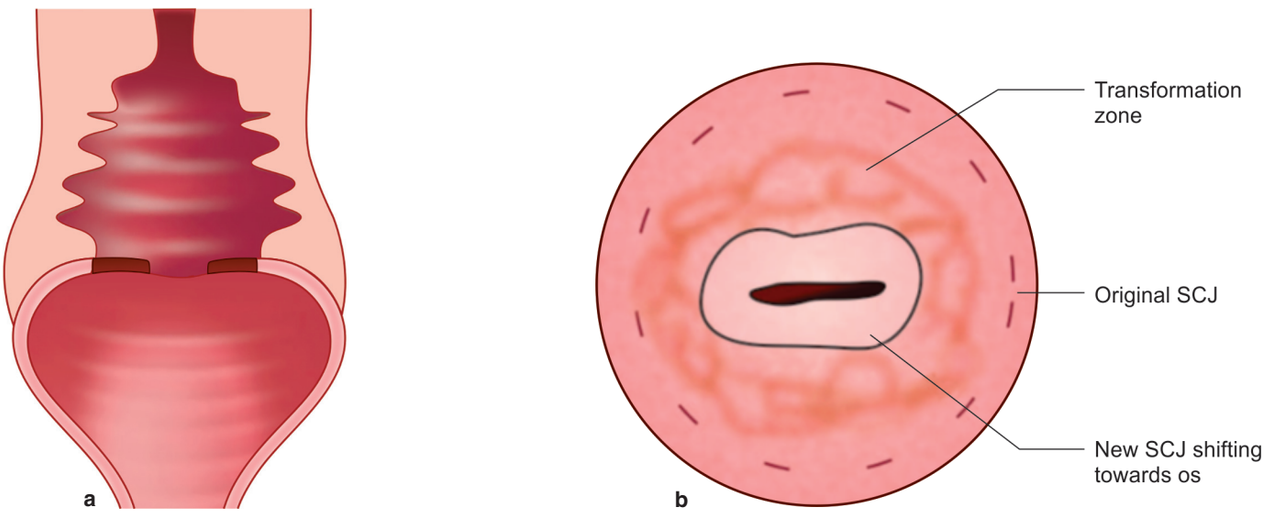


Fig. 3.6c: Ectopy cervix

Reproductive Age Group (Figs 3.7a to c)

Columnar epithelium, being single layered, cannot withstand the brunt of acidic pH. The reserve cells, which are pluripotent cells located beneath the columnar epithelium, become active and start multiplying to create multilayered squamous epithelium, thus the single-layered columnar epithelium is transformed to multilayered squamous epithelium. This phenomenon is called metaplasia.



Figs 3.7a and b: Reproductive age SCJ

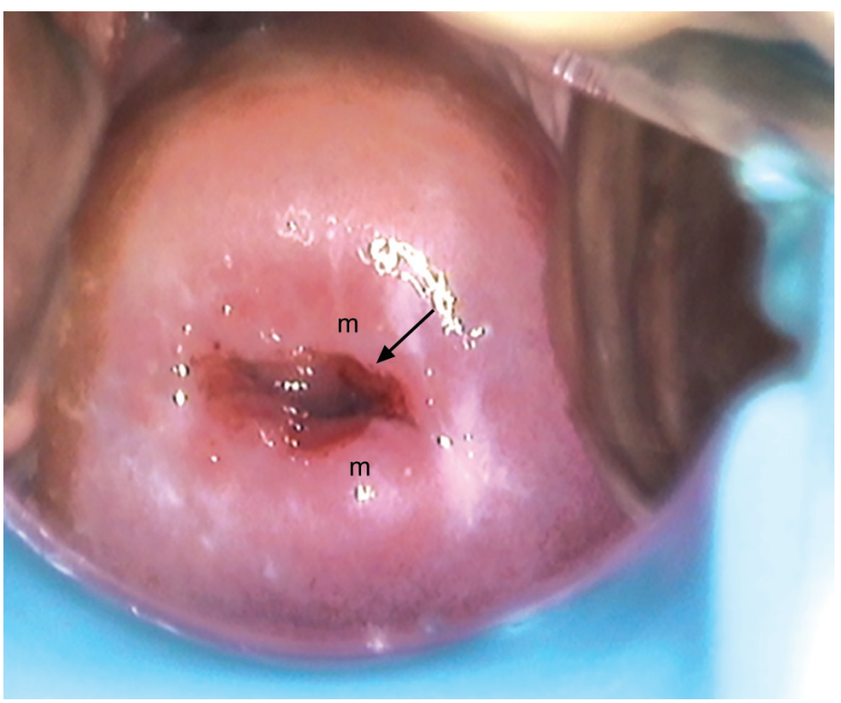
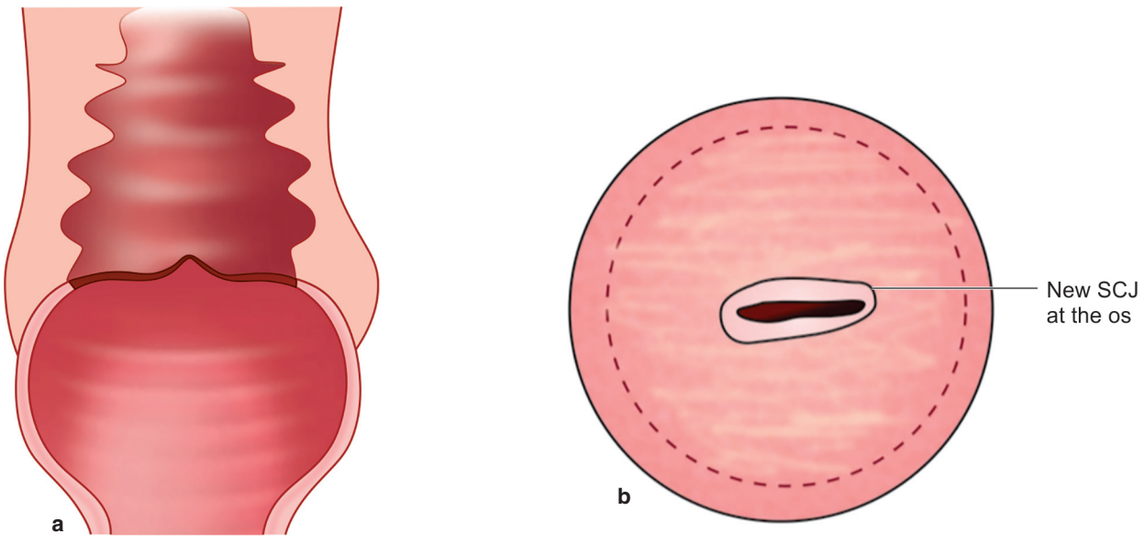


Fig. 3.7c: Reproductive age: SCJ (→) can be seen nearing the os, with columnar epithelium appearing reddish, metaplasia (m) as thin translucent finger-like projections pointing centripetally.

Perimenopausal (Figs 3.8a to c)

The new SCJ is at the external os.



Figs 3.8a and b: Perimenopausal SCJ

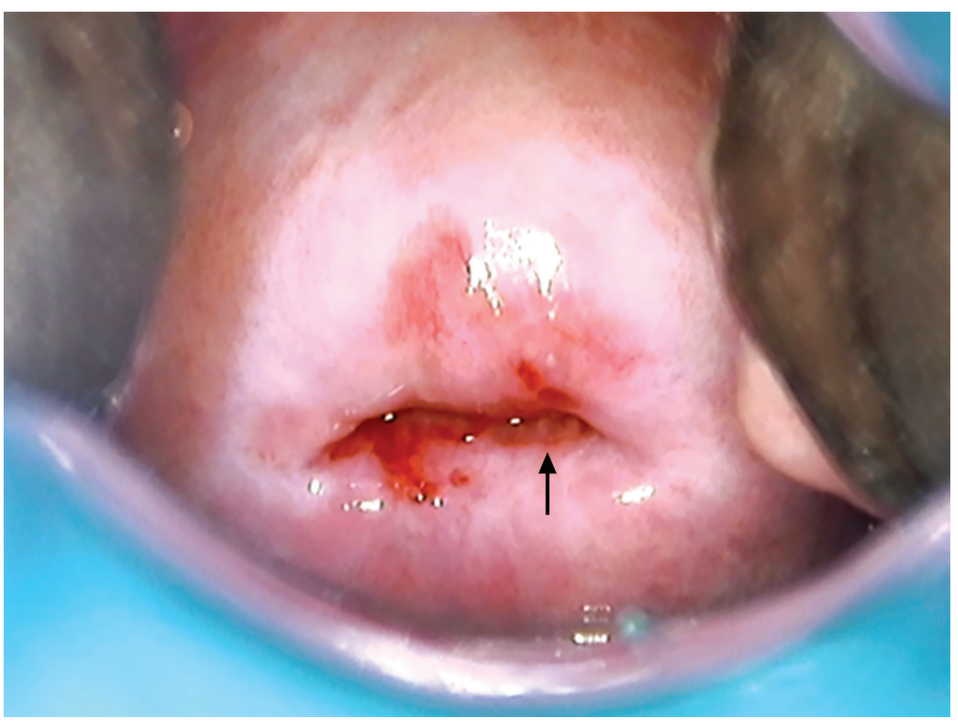
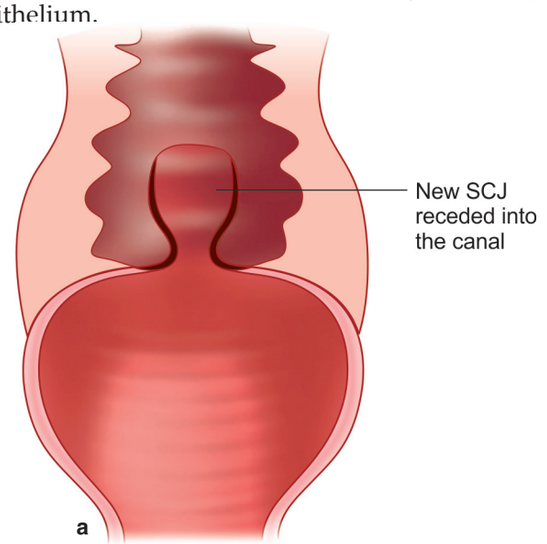
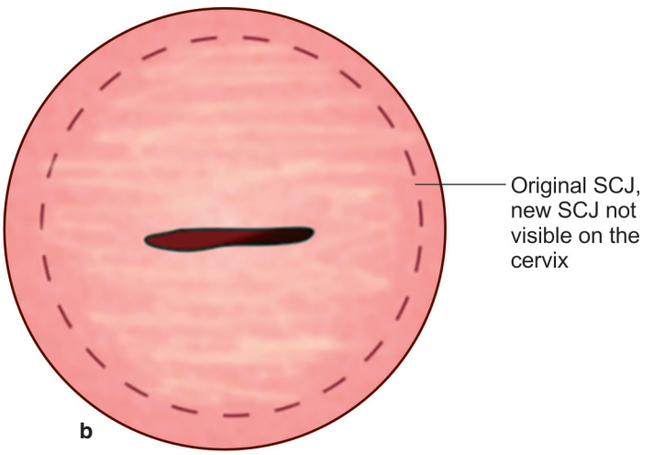


Fig. 3.8c: Perimenopausal age SCJ (→) seen completely at the os

Menopausal Age (Figs 3.9a to d)

The new SCJ is receded into the endocervical canal and is not visible. Sometimes we have to use an endocervical speculum to locate and trace it. Usually, at this age, the ectocervix is covered by mature metaplastic squamous epithelium.





Figs 3.9a to c: Menopausal age SCJ

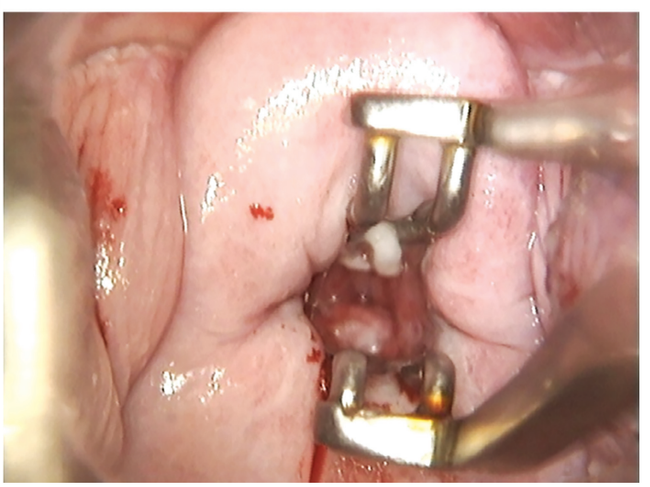


Fig. 3.9d: TZ 3, SCJ visualized on endocervical speculum examination in menopausal age

4. ORIGINAL SCJ/OLD SCJ

Original SCJ/old SCJ is the junction of squamous and metaplastic epithelium. It can be delineated by identifying the distal crypt opening on the ectocervix and tracing them.

5. NEW SCJ

New SCJ is the junction of squamous metaplastic epithelium and columnar epithelium. It is always seen shifting towards the external os.

6. TRANSFORMATION ZONE (TZ)

It is the area between the original/old SCJ and the new SCJ.

Different Types of TZ

TZ type 1: When the new SCJ is completely visible on the ectocervix.

TZ type 2: When the new SCJ is visible on or near the cervical os and is partially visible. Slight maneuvering is required for complete visibility of SCJ.

TZ type 3: When the new SCJ has regressed into the endocervix and is usually not visible even on endocervical speculum examination.

Transformation Zone Type 1 (Figs 3.10a to g)

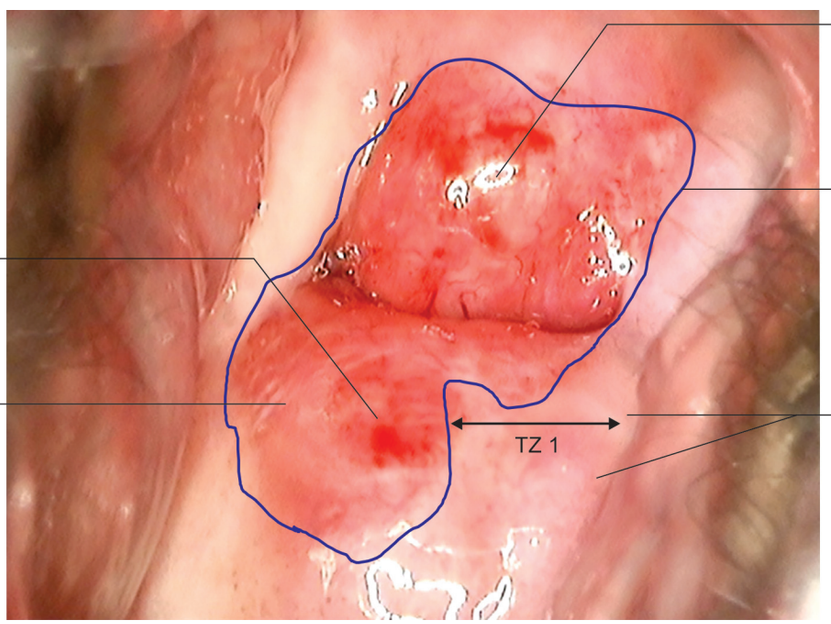


Fig. 3.10a

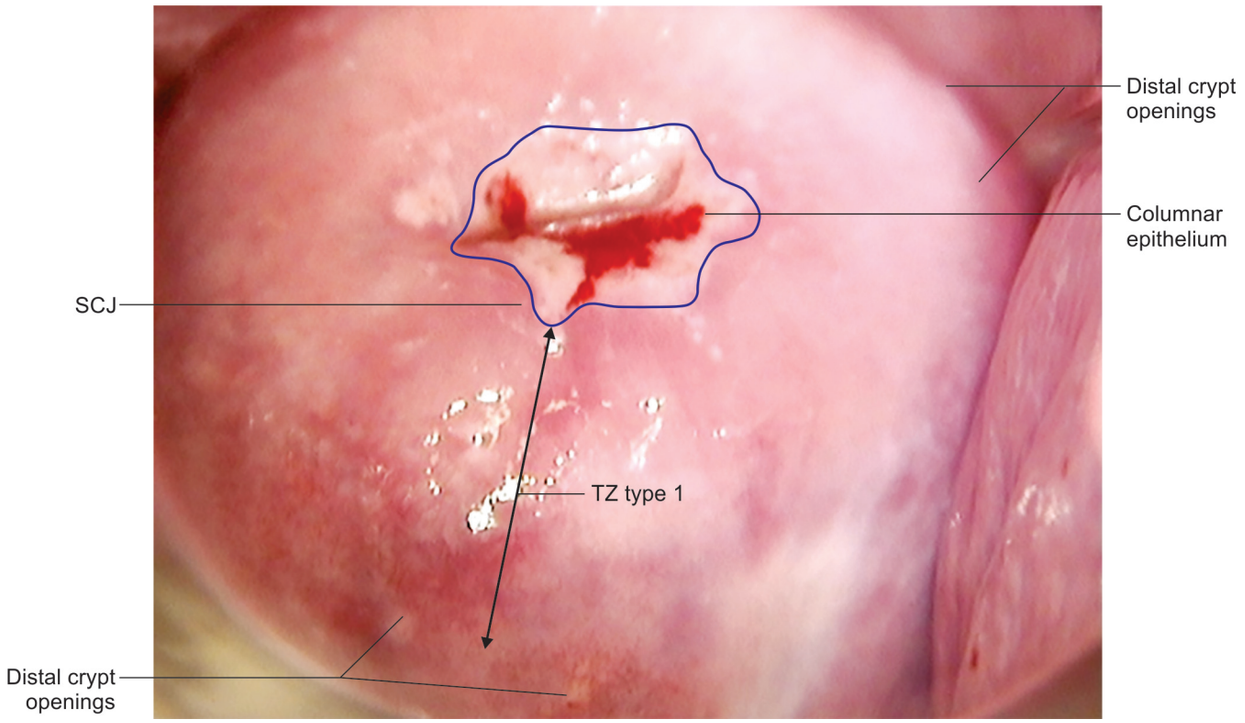


Fig. 3.10b

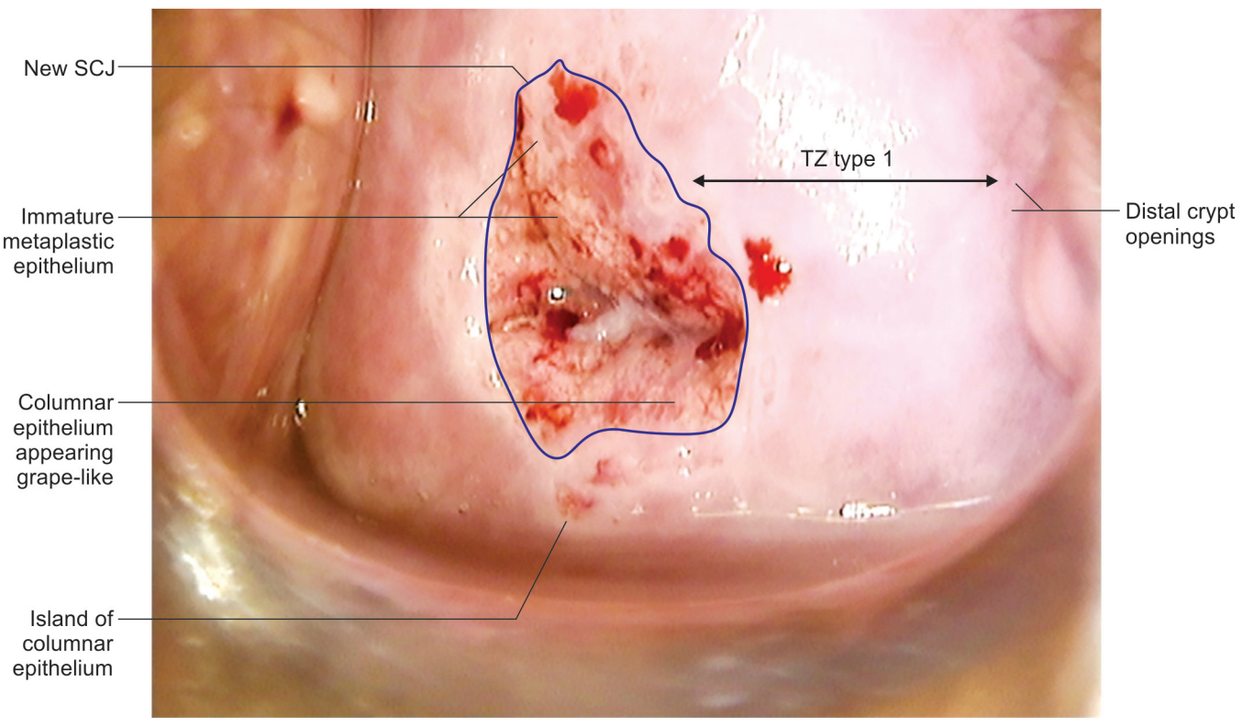


Fig. 3.10c

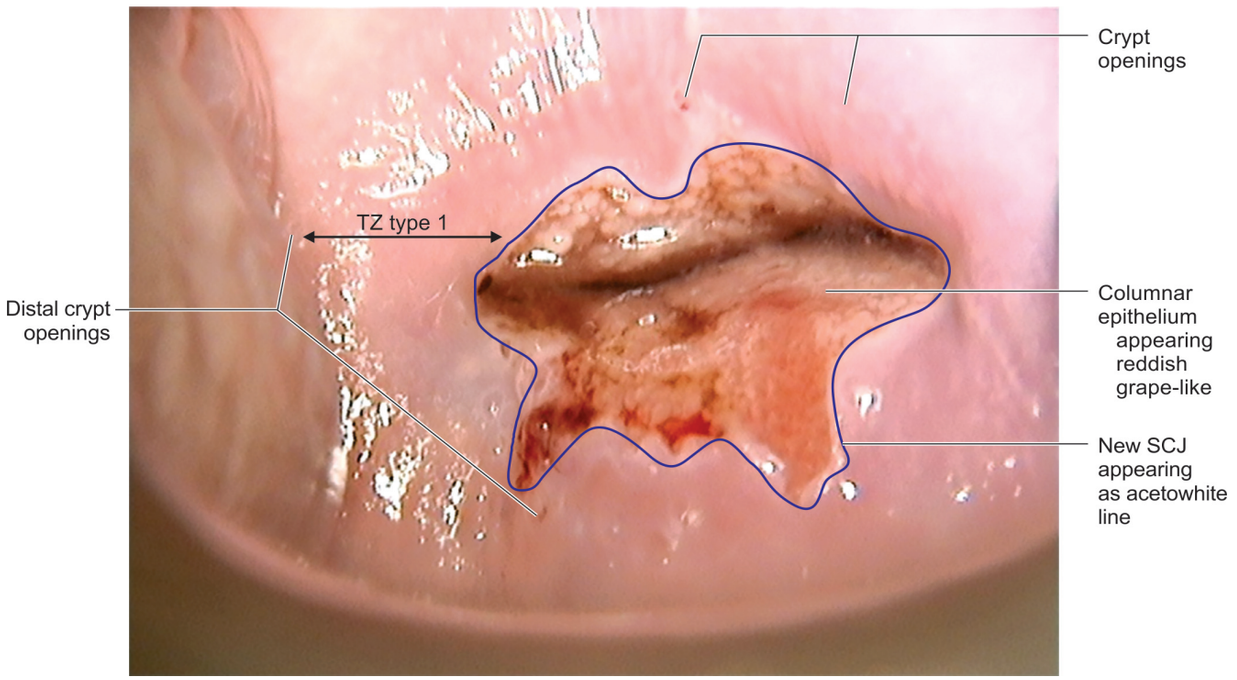


Fig. 3.10d

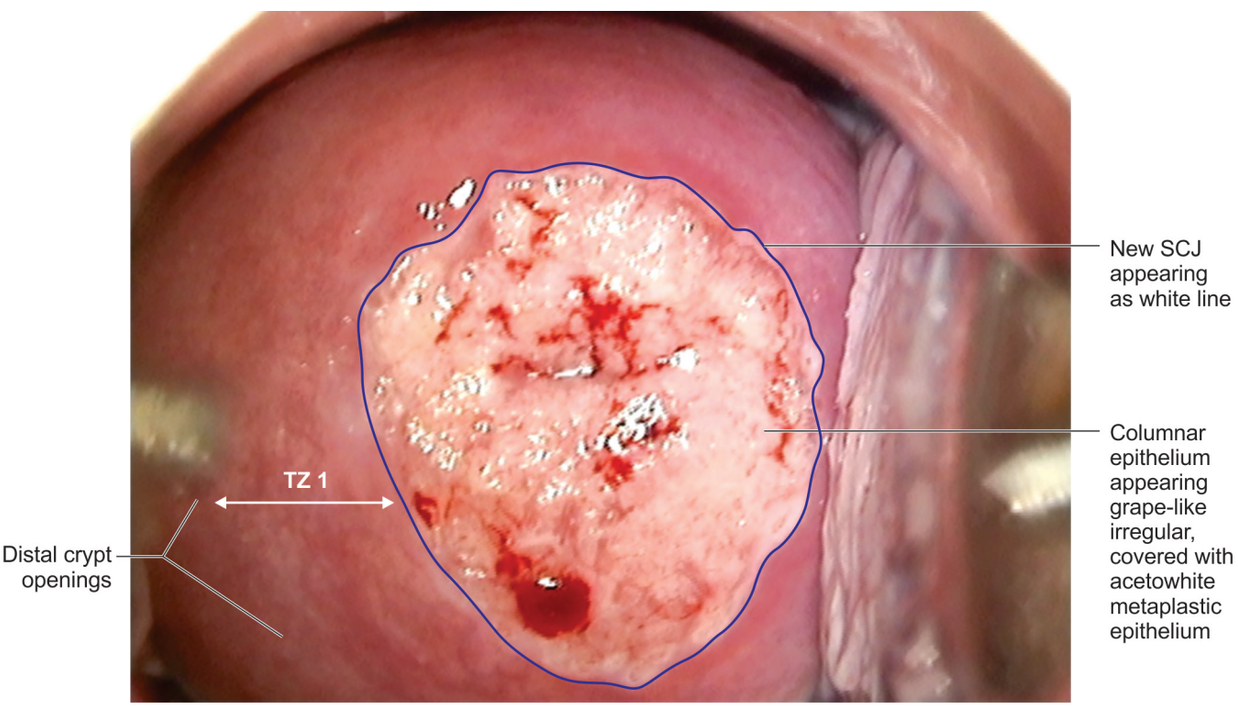


Fig. 3.10e

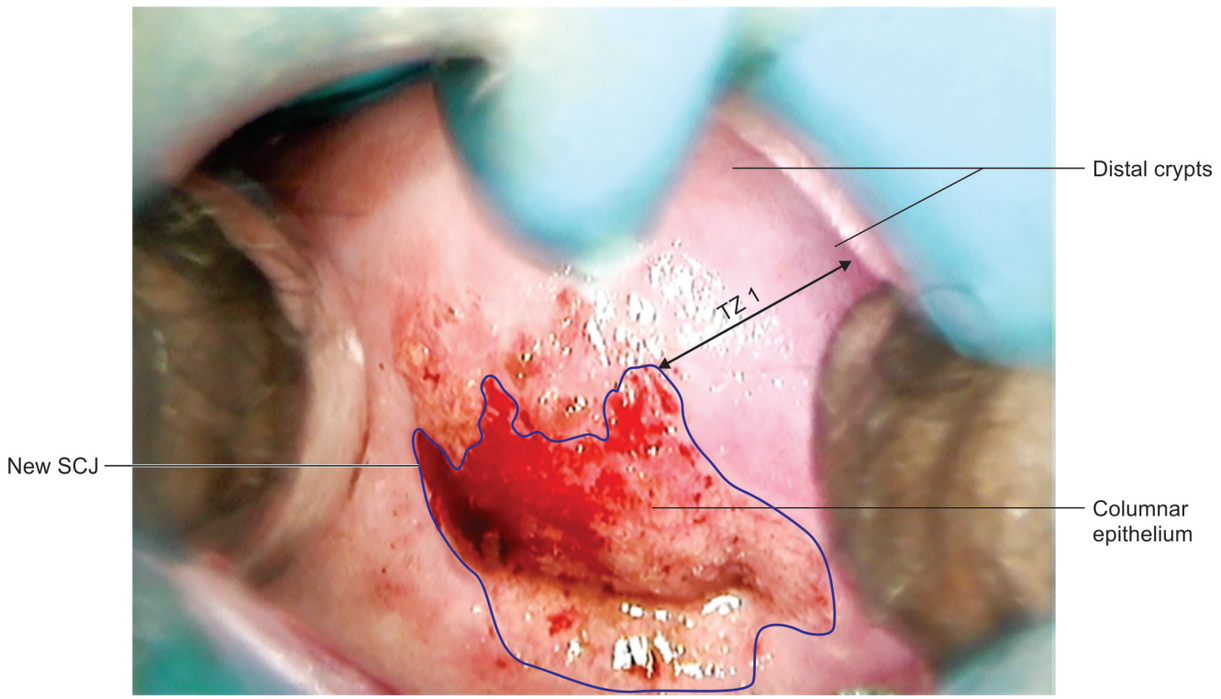


Fig. 3.10f

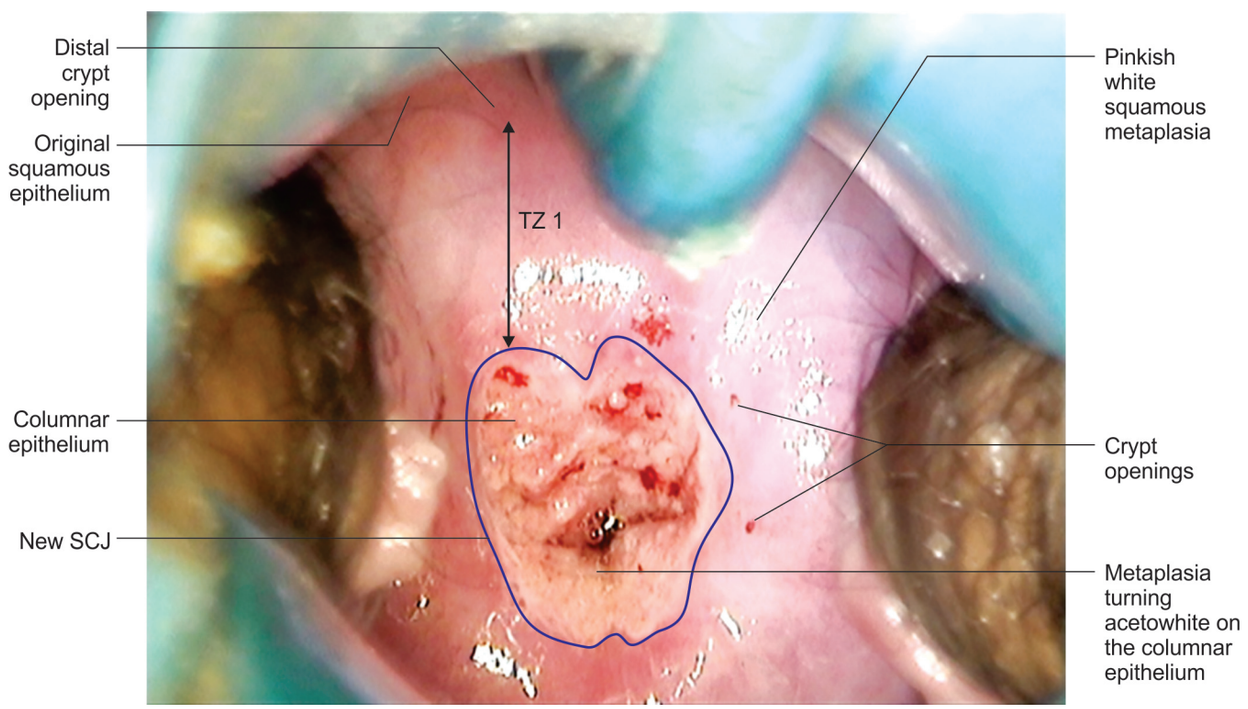


Fig. 3.10g

Transformation Zone Type 2 (Figs 3.11a to h)

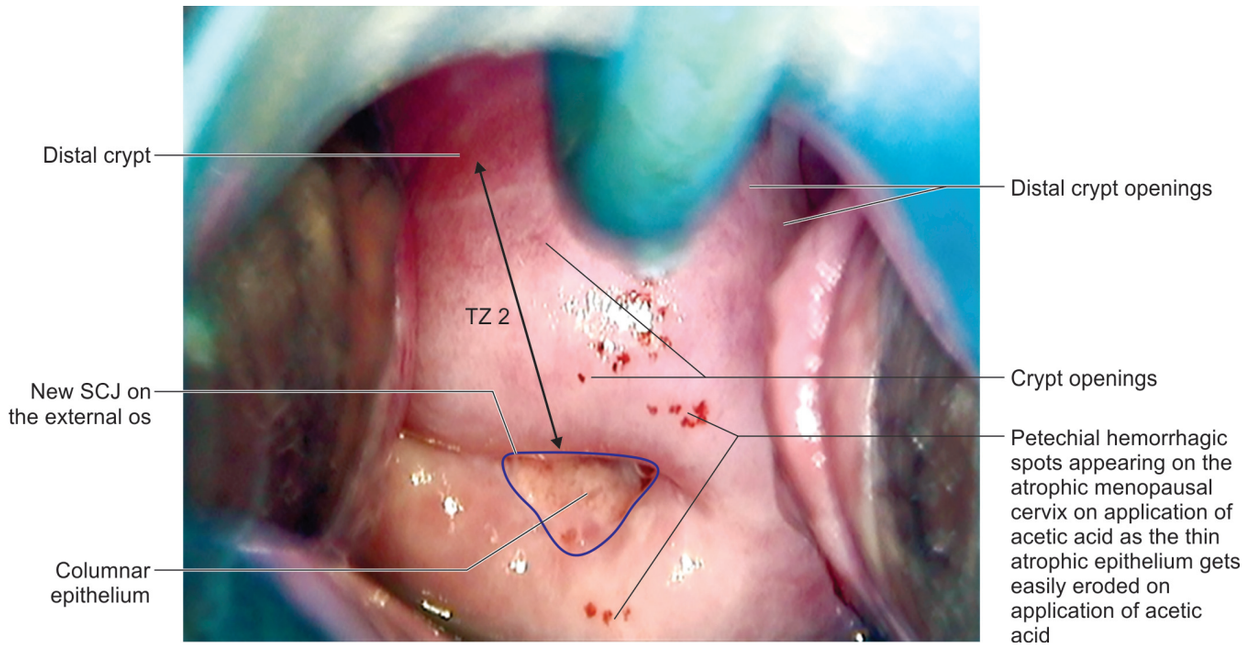


Fig. 3.11a

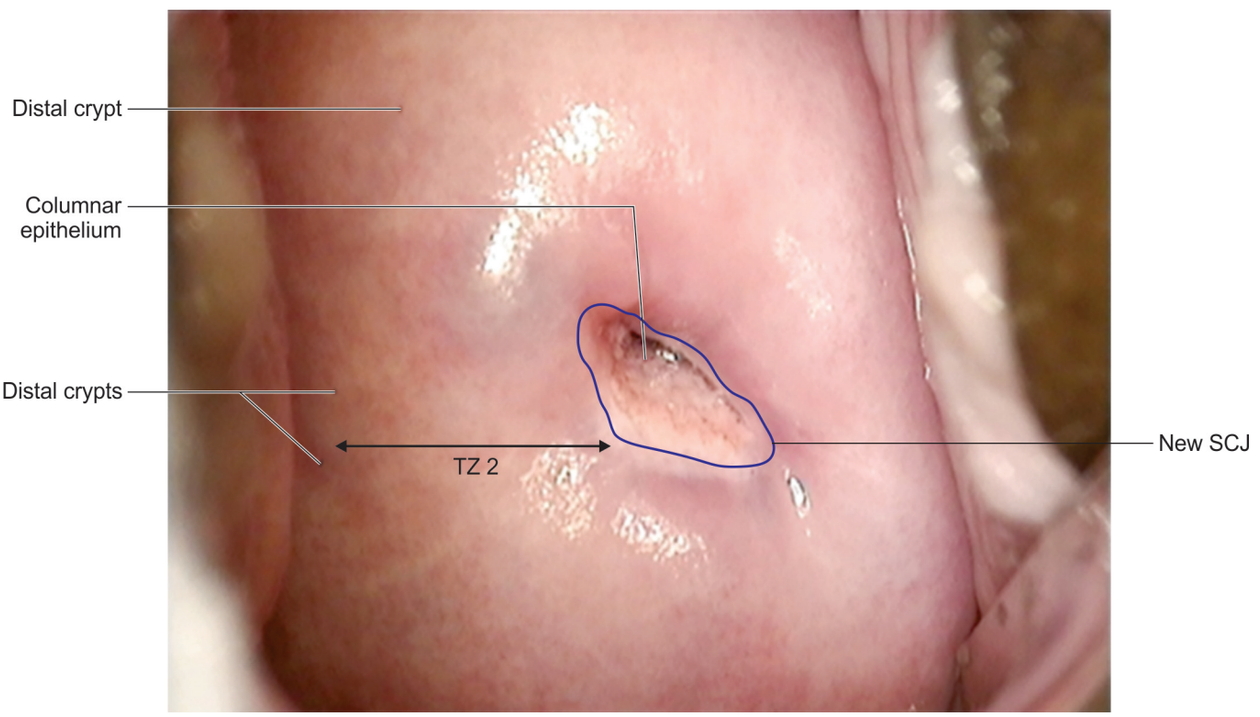


Fig. 3.11b

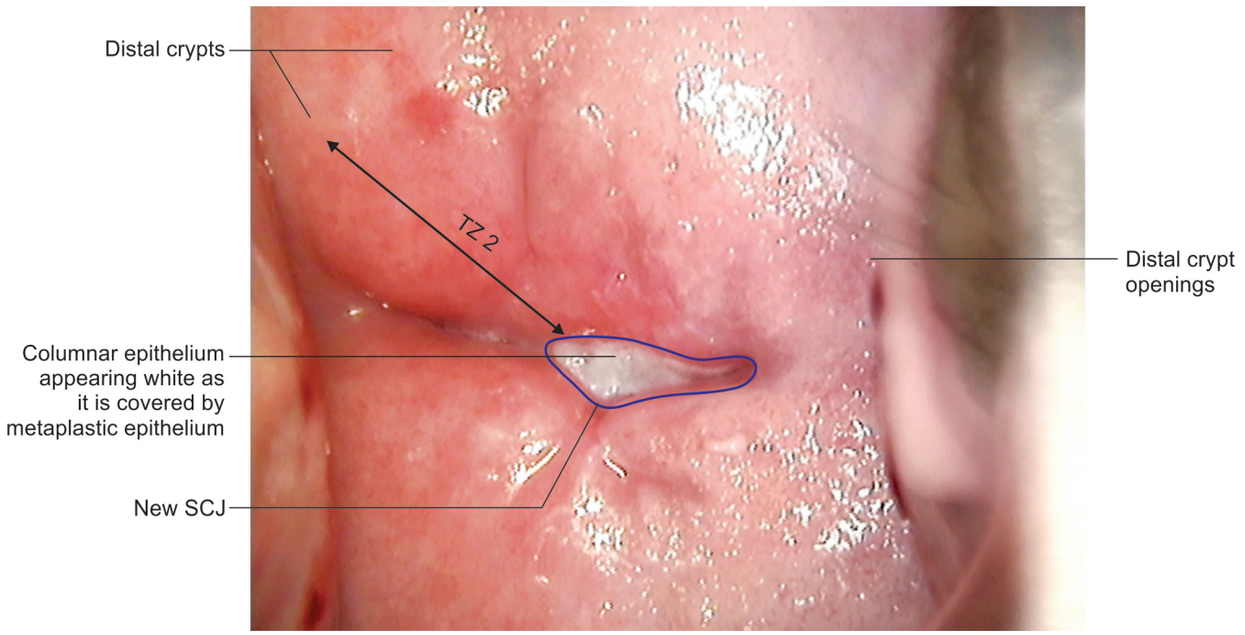


Fig. 3.11c

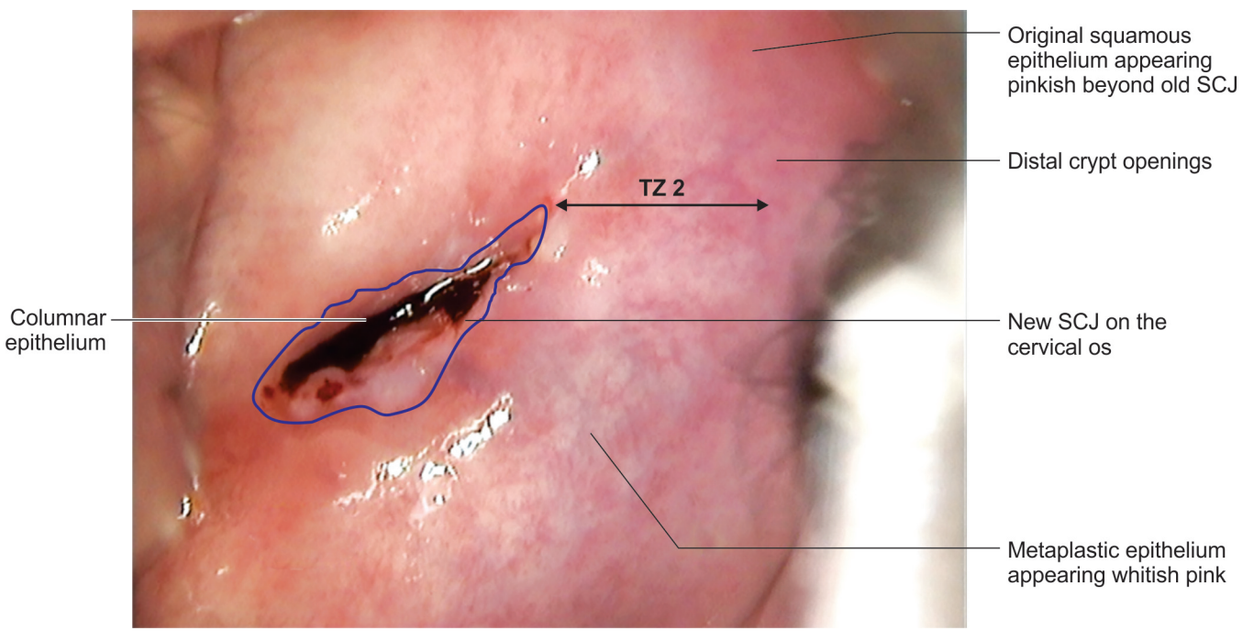


Fig. 3.11d

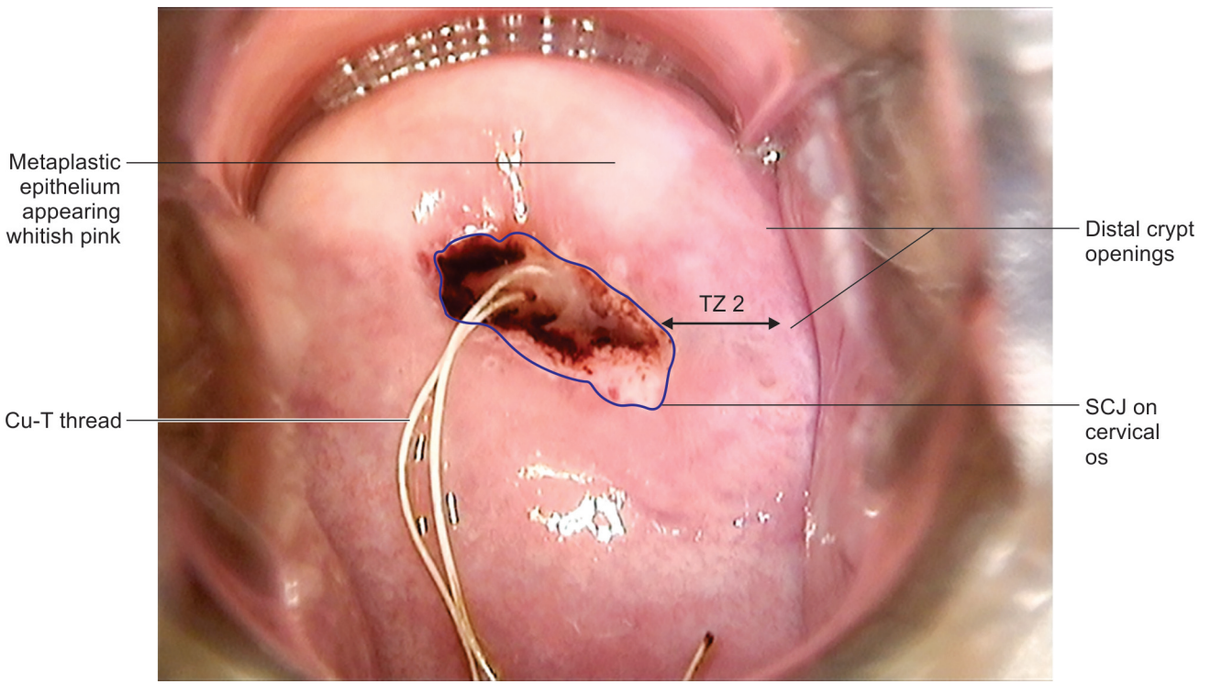


Fig. 3.11e

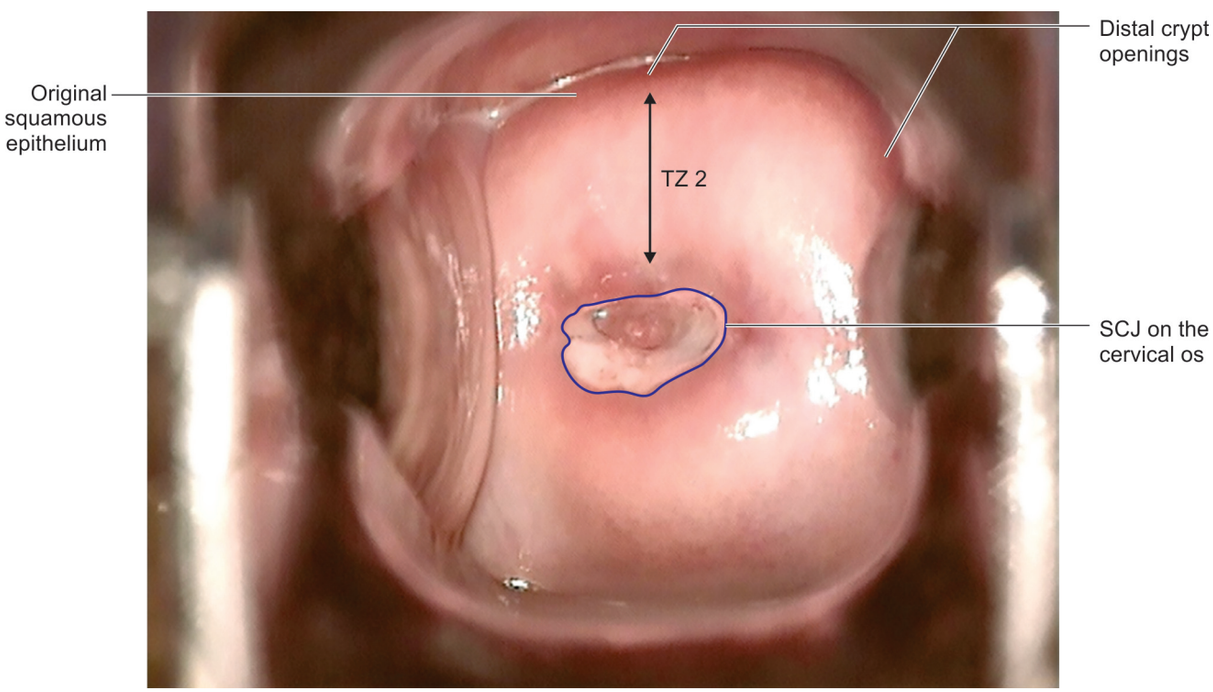


Fig. 3.11f

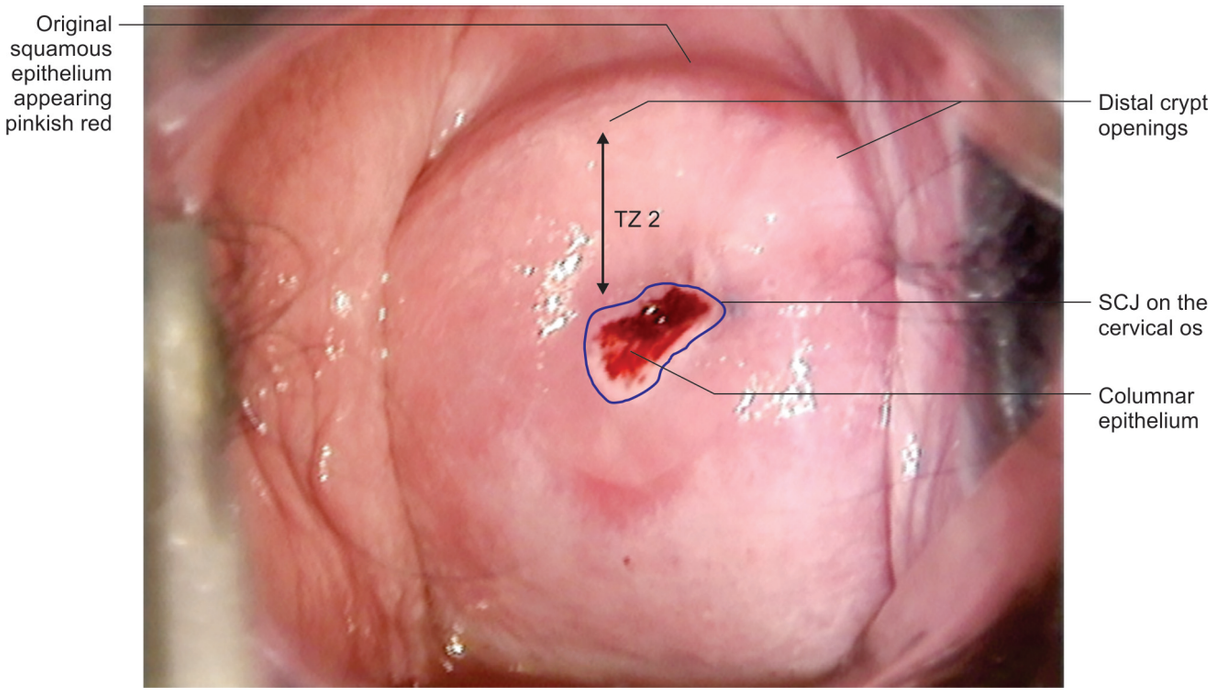


Fig. 3.11g

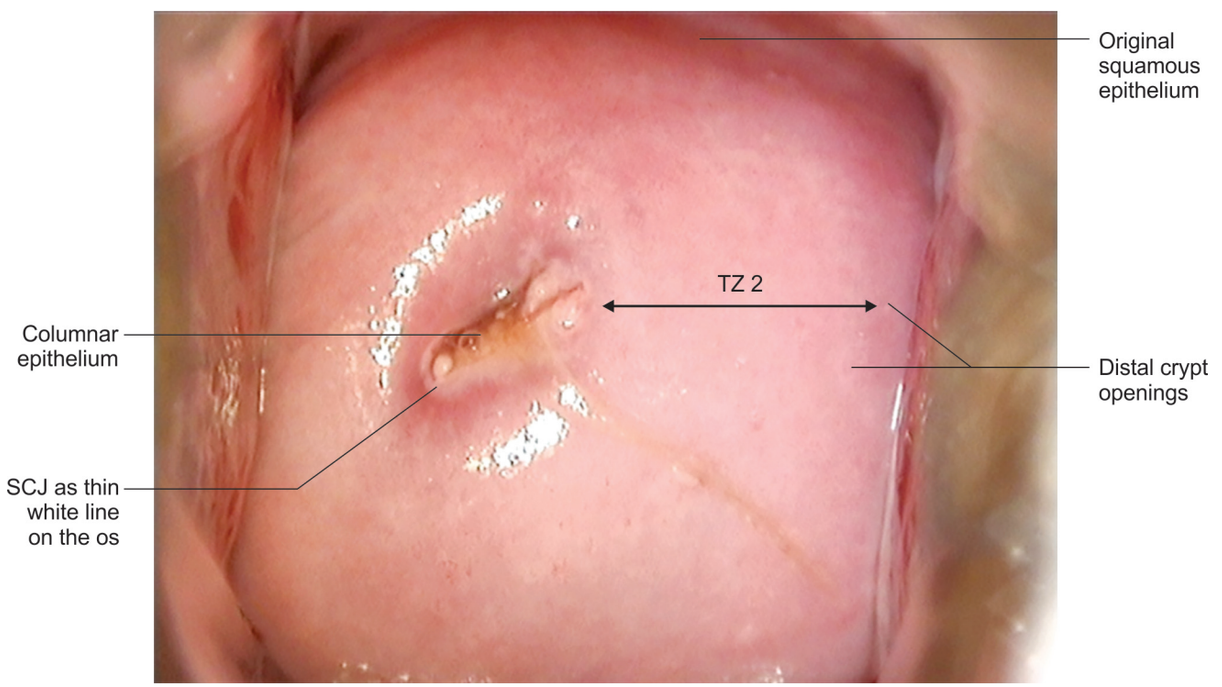


Fig. 3.11h

Transformation Zone Type 3 (Figs 3.12a to h)

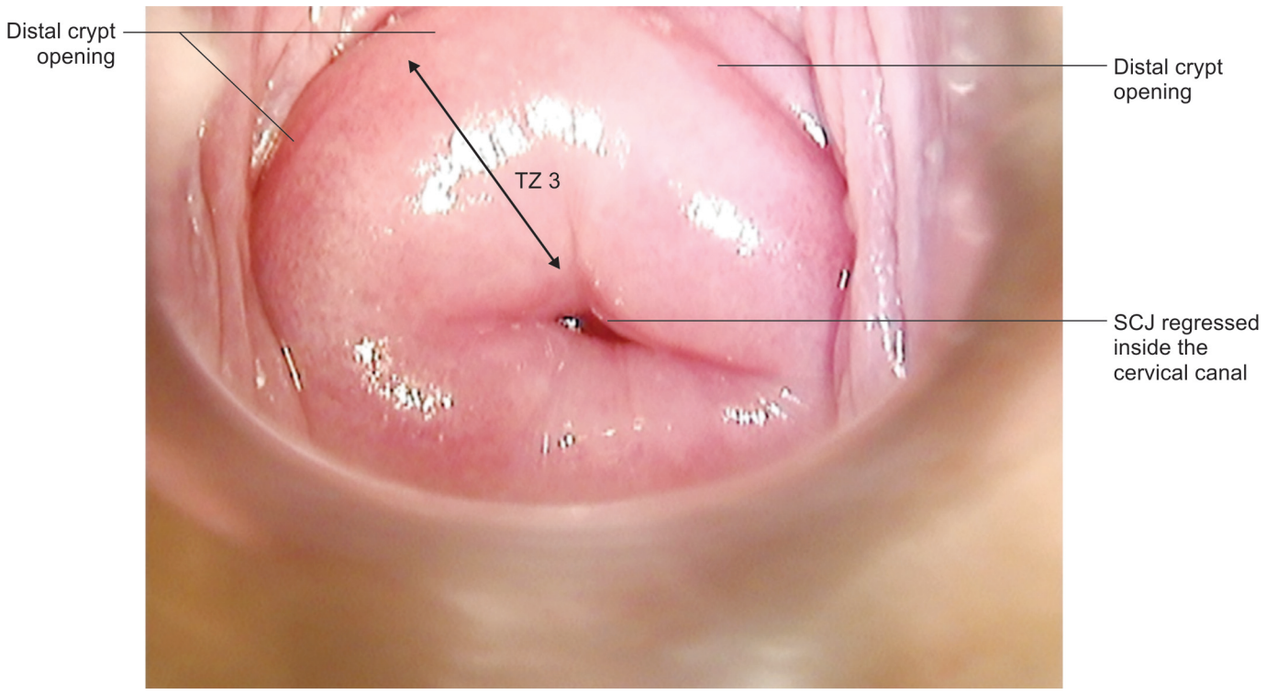


Fig. 3.12a

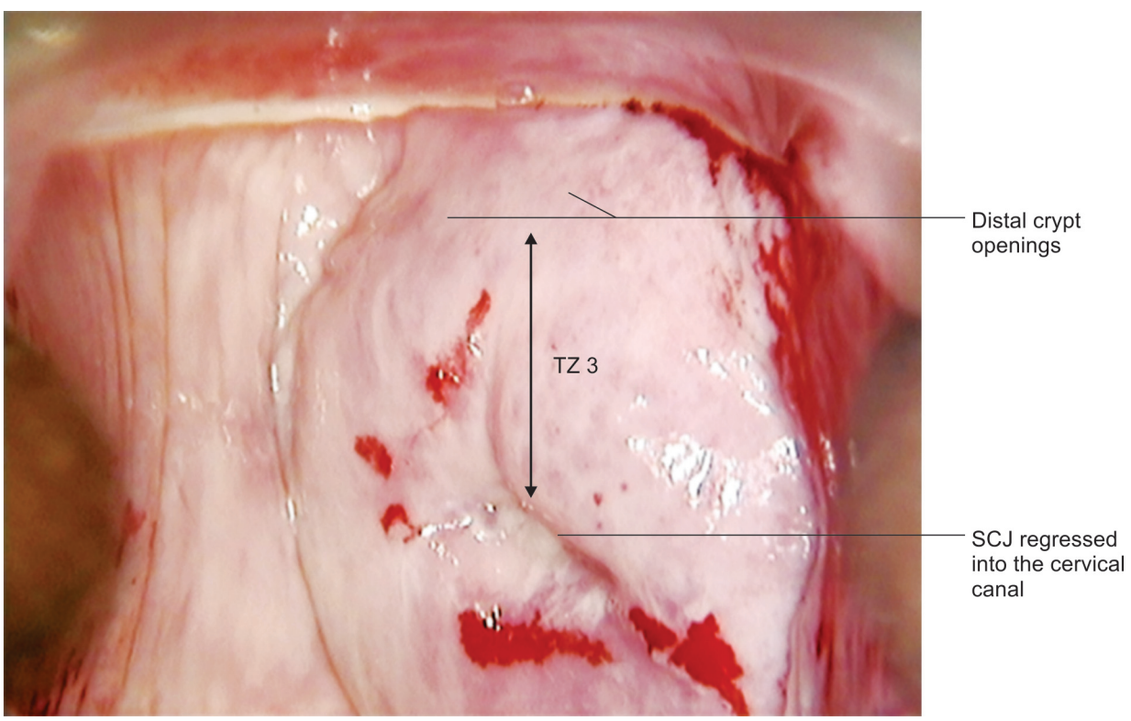


Fig. 3.12b

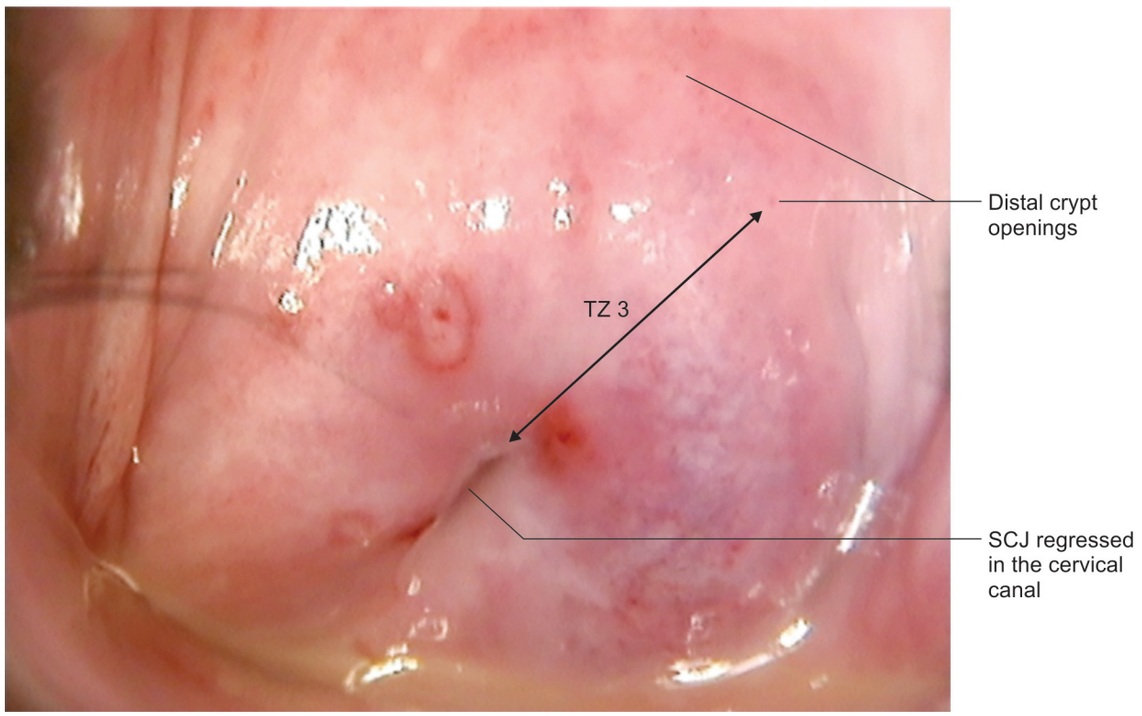


Fig. 3.12c

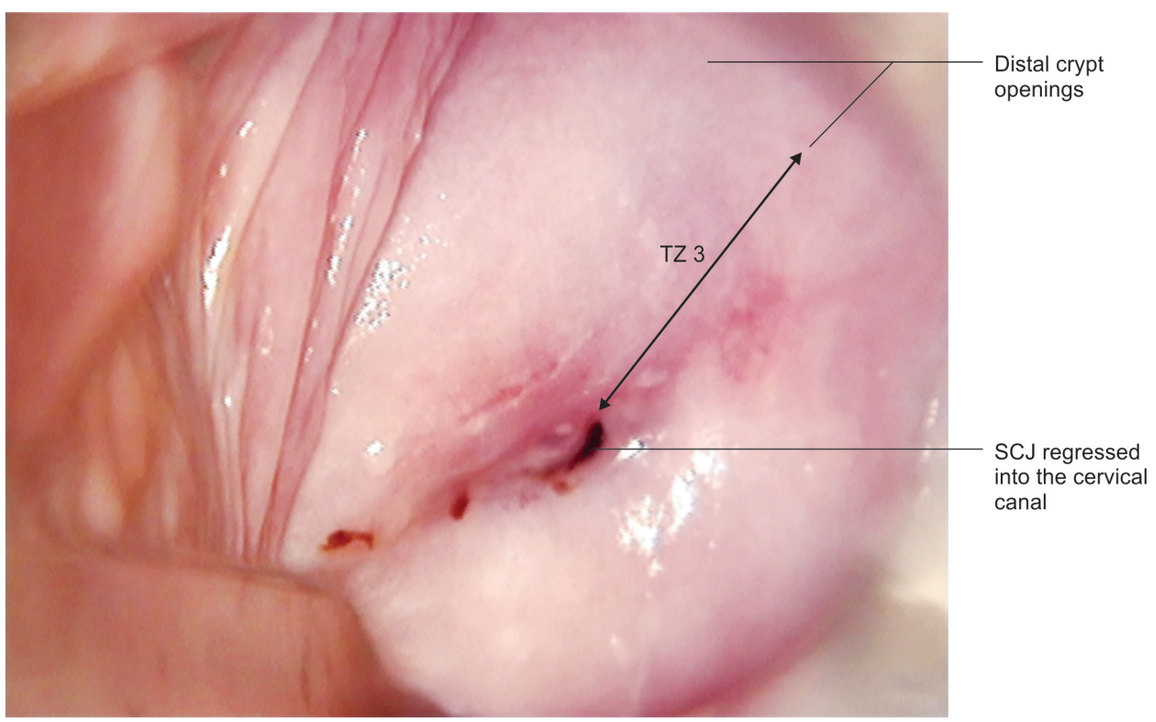


Fig. 3.12d

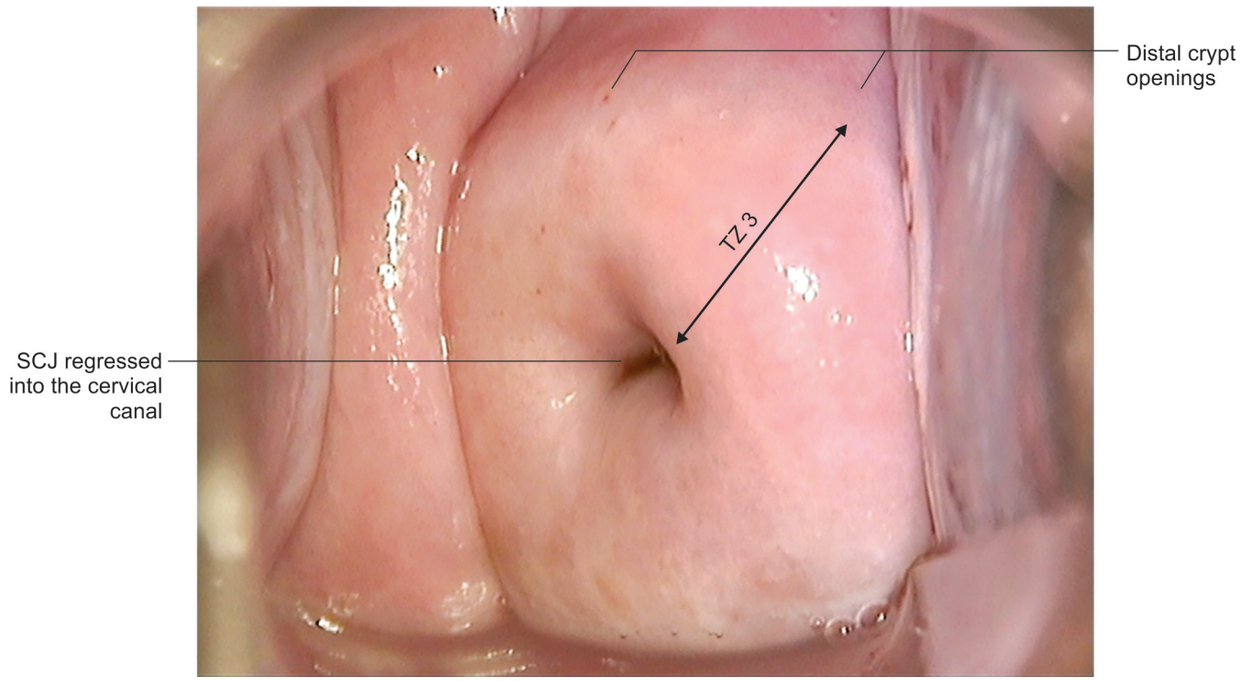


Fig. 3.12e

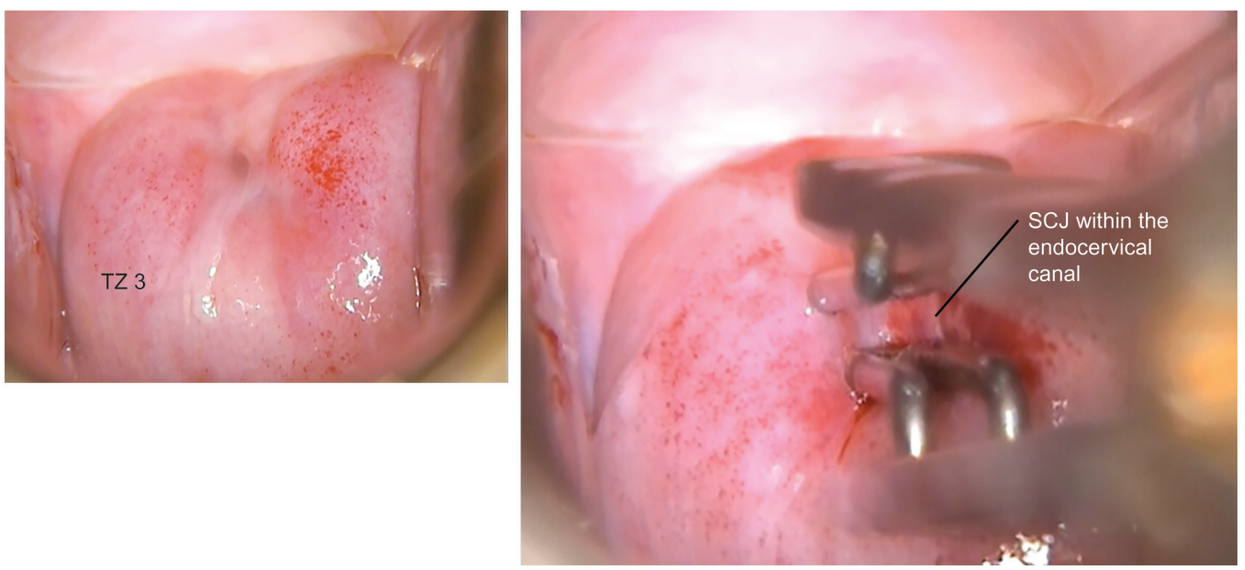


Fig. 3.12f: TZ 3 endocervical speculum examination

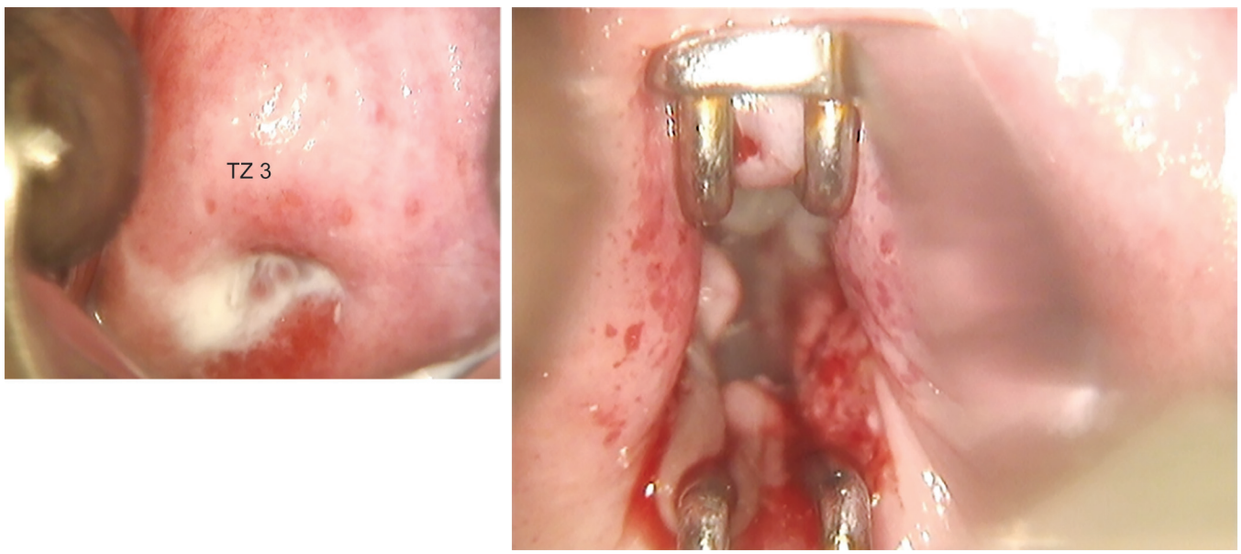


Fig. 3.12g

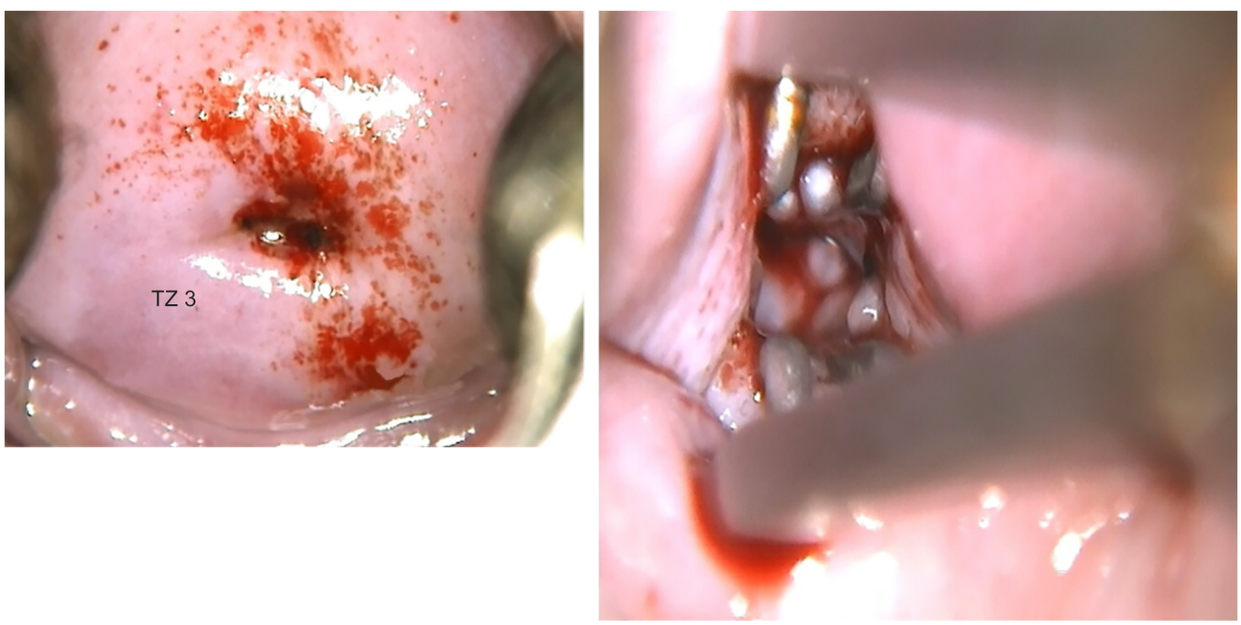


Fig. 3.12h: TZ 3 endocervical speculum examination

7. ECTOPY (Figs 3.13a to f)

In the early reproductive age group, due to influence of estrogen hormones, the columnar epithelium is everted on the squamous epithelium. Due to the influence of acidic vaginal pH, the reserve cells get activated and metaplasia, i.e. transformation of columnar epithelium to squamous epithelium, takes place.

Sometimes this process of metaplasia is not initiated and hence the cervix appears reddish due to columnar epithelium. This is, many a times, termed as ulcer or erosions by many.

When the columnar epithelium covers more than two-thirds of the cervix, it is termed as ectopy.

Usually, the ectopy causes excessive repeated white discharge. This can be treated with electrocauterization, cryo or thermal ablation also.

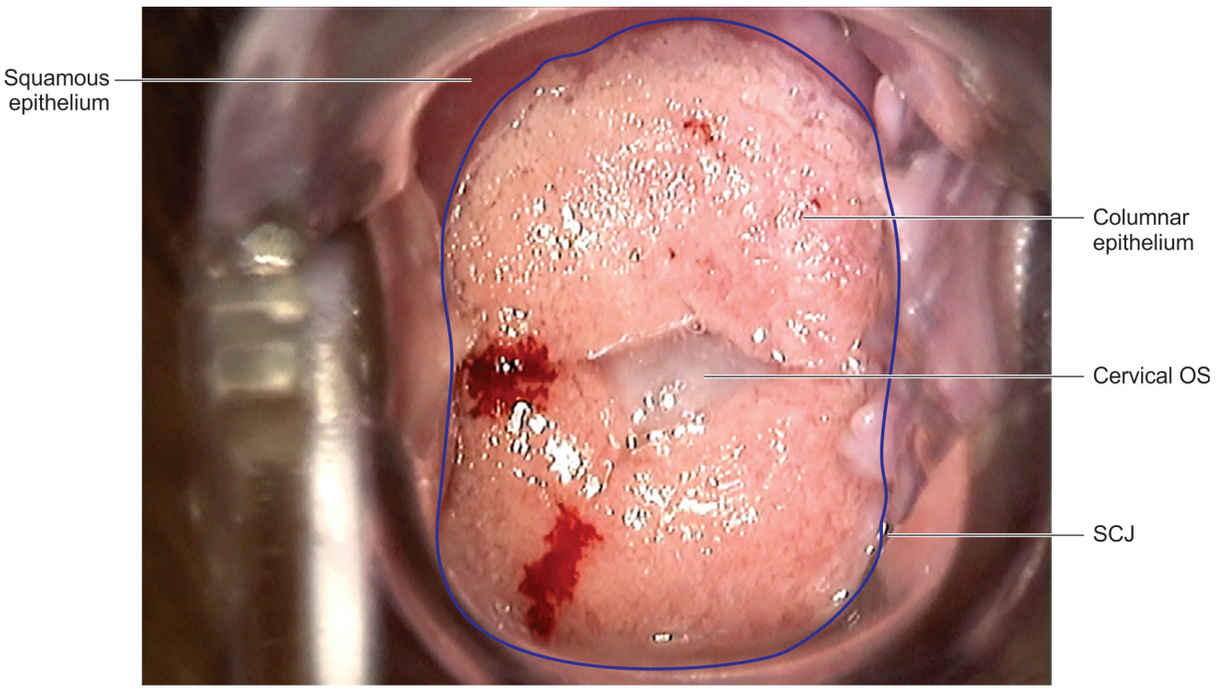


Fig. 3.13a

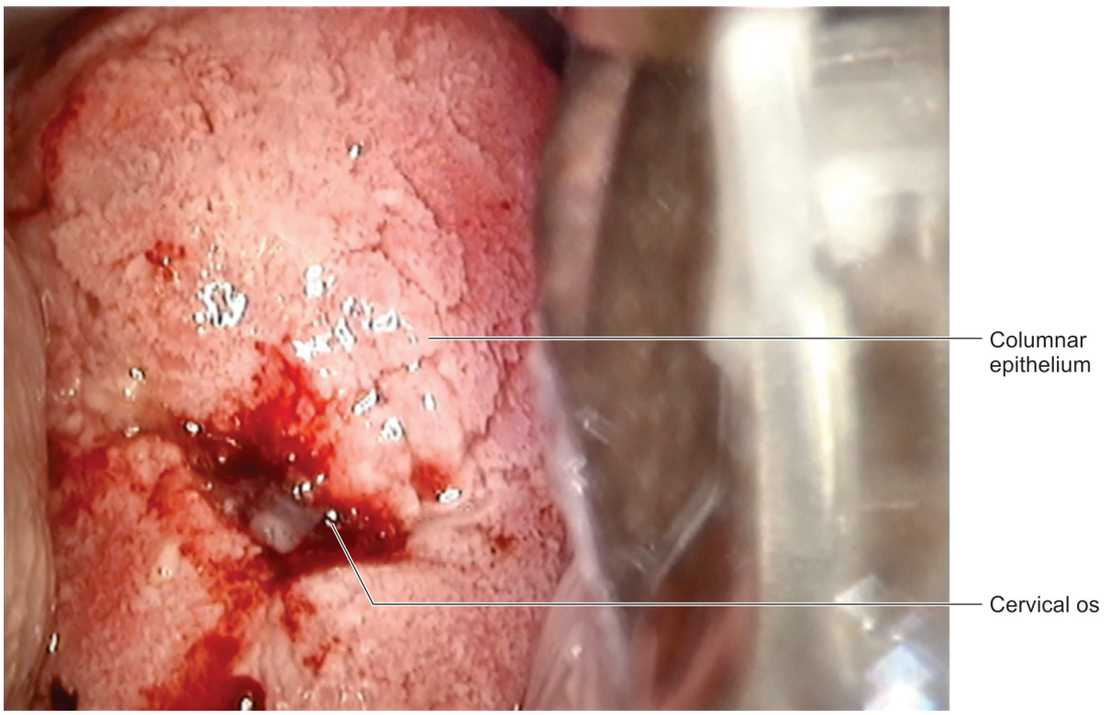


Fig. 3.13b

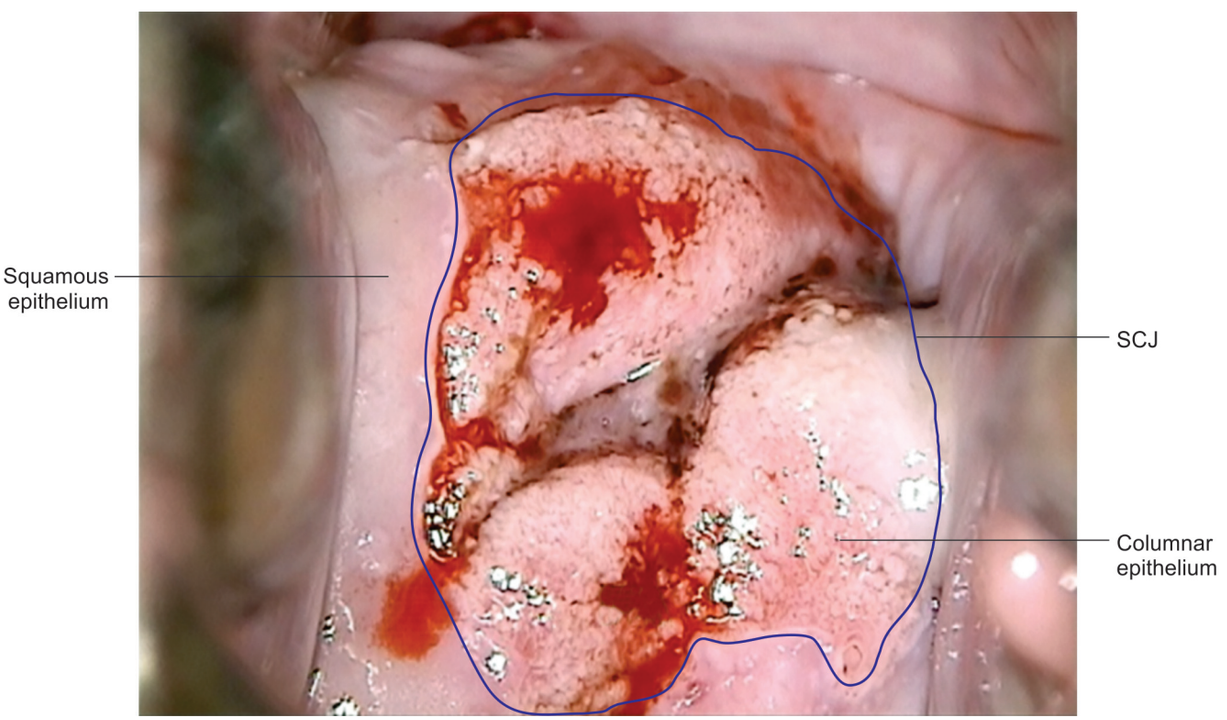


Fig. 3.13c

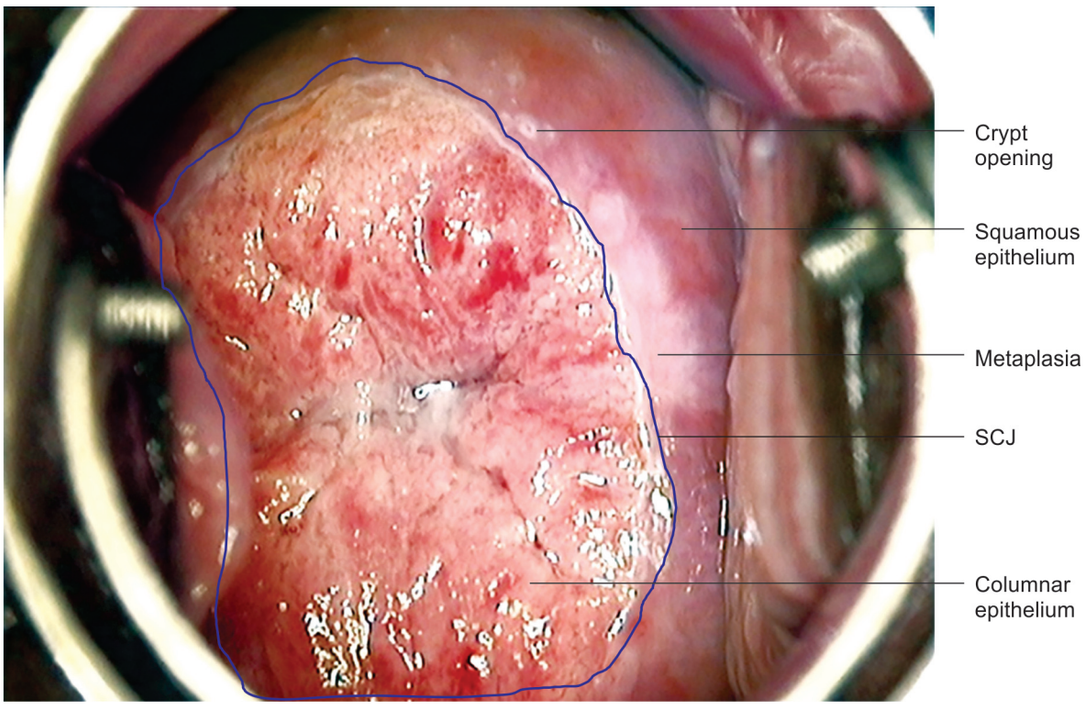


Fig. 3.13d

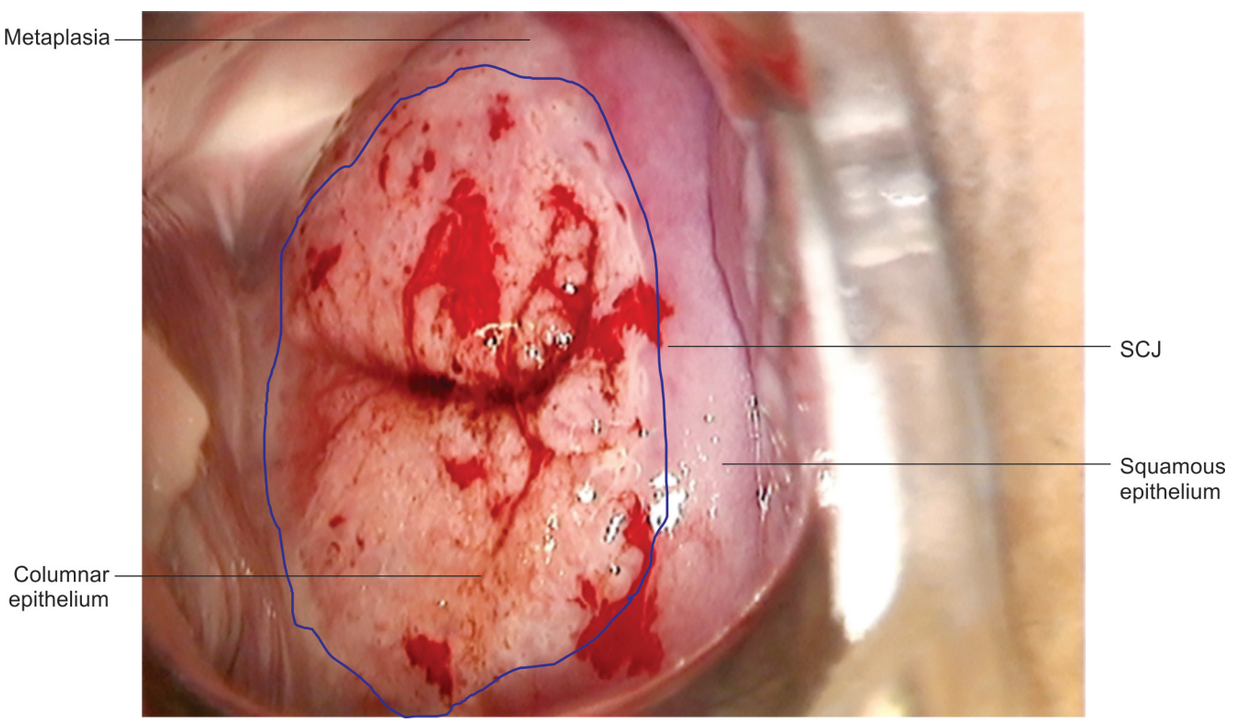


Fig. 3.13e

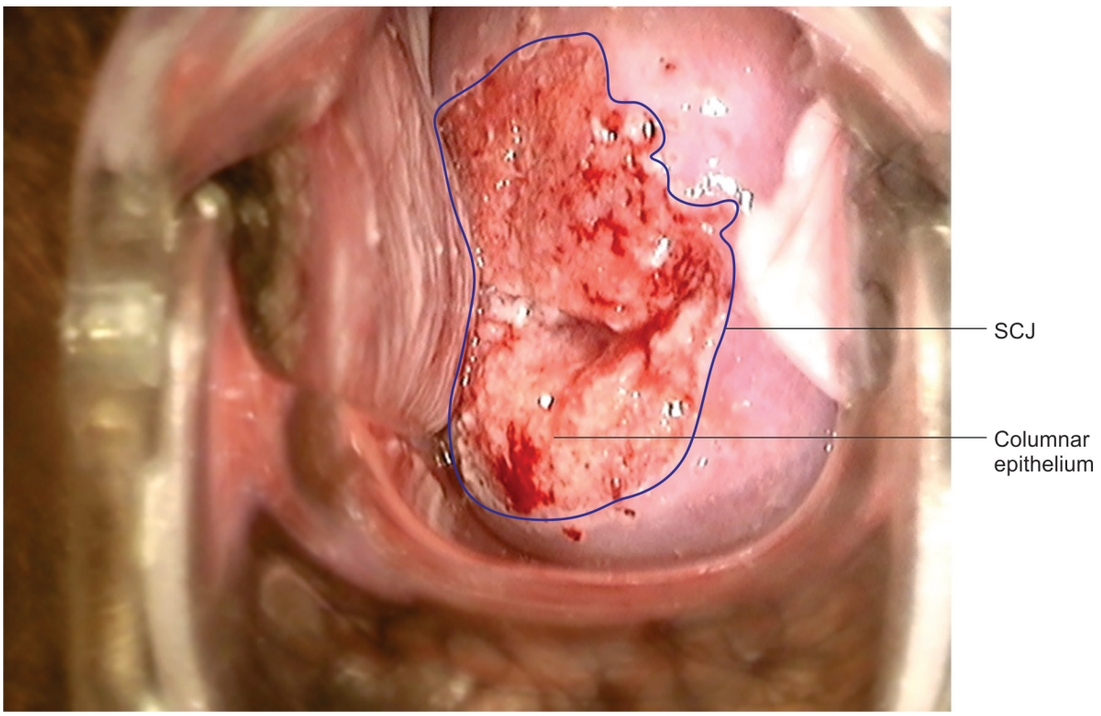
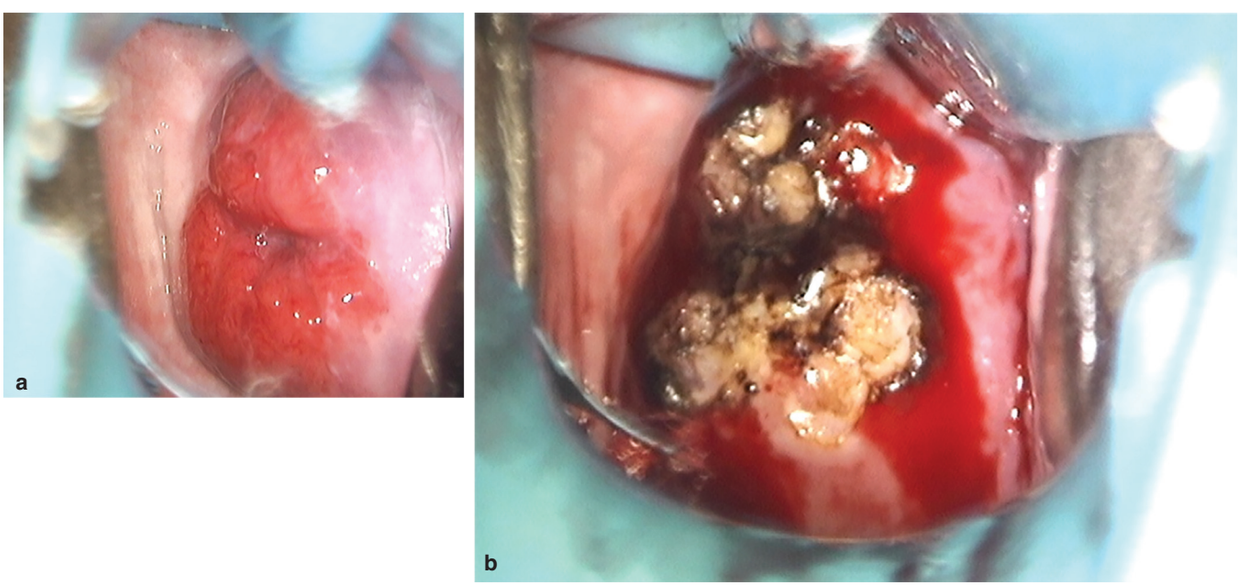


Fig. 3.13f

Ectopy can be corrected by electrocauterization with ball cautery (Figs 3.14a and b).



Figs 3.14a and b: Electrocauterization with ball cautery

8. CONGENITAL TZ (Figs 3.15a and b)

During embryonic life, the cuboidal epithelium of vaginal tube is replaced by the squamous epithelium, which begins at the caudal end of the dorsal urogenital sinus. This process is completed well before birth. So during birth, the vaginal epithelium and the ectocervix is covered by squamous epithelium. With this normal epithelialization, the original SCJ is located at the external os at the time of birth. If for some reason, this process is arrested, the original SCJ will be located distal to the external os or may be rarely found on vaginal wall and the cuboidal epithelium persists all throughout the lifetime giving rise to congenital transformation zone (TZ).

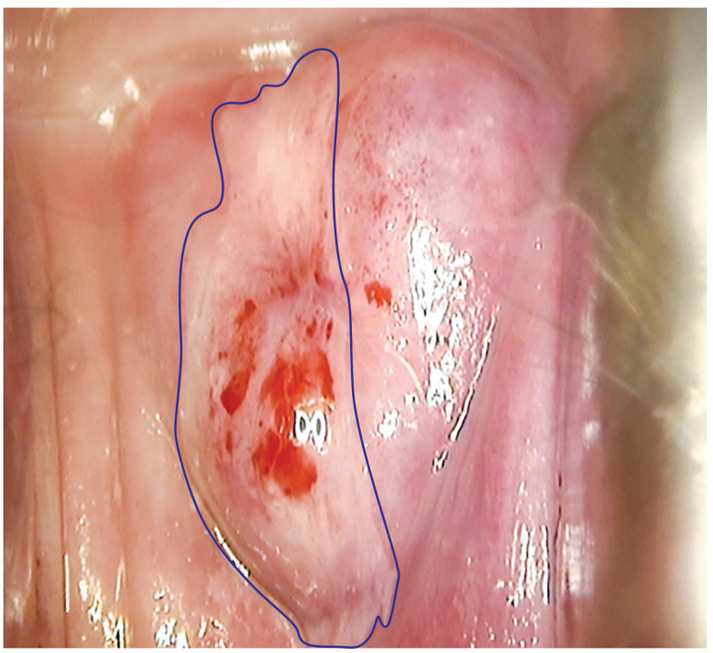


Fig. 3.15a: Acetowhite area covering the entire ectocervix more on the anterior and posterior regions extending till the vagina

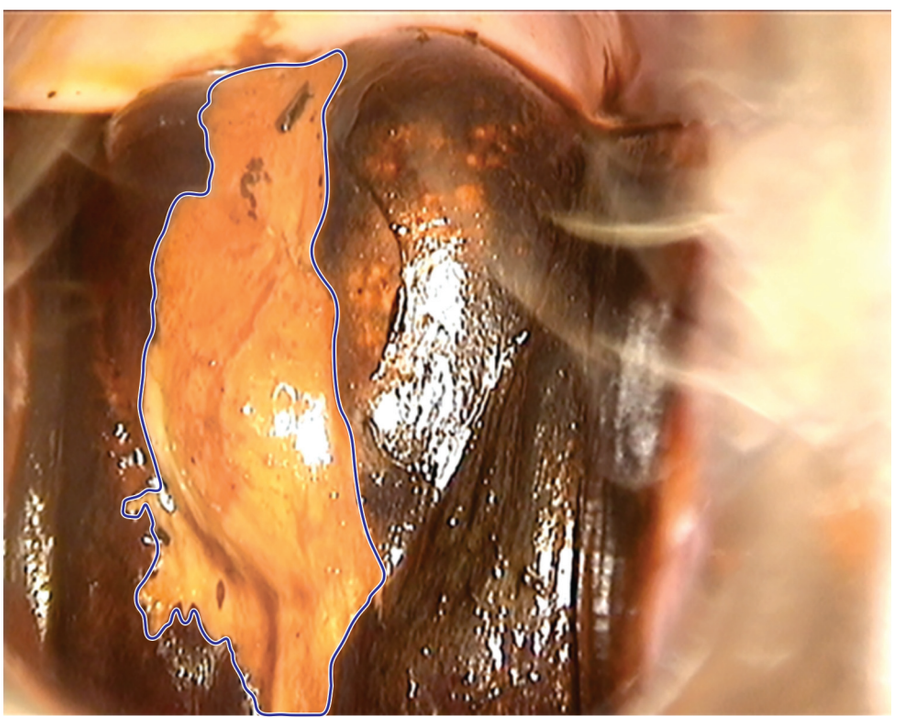
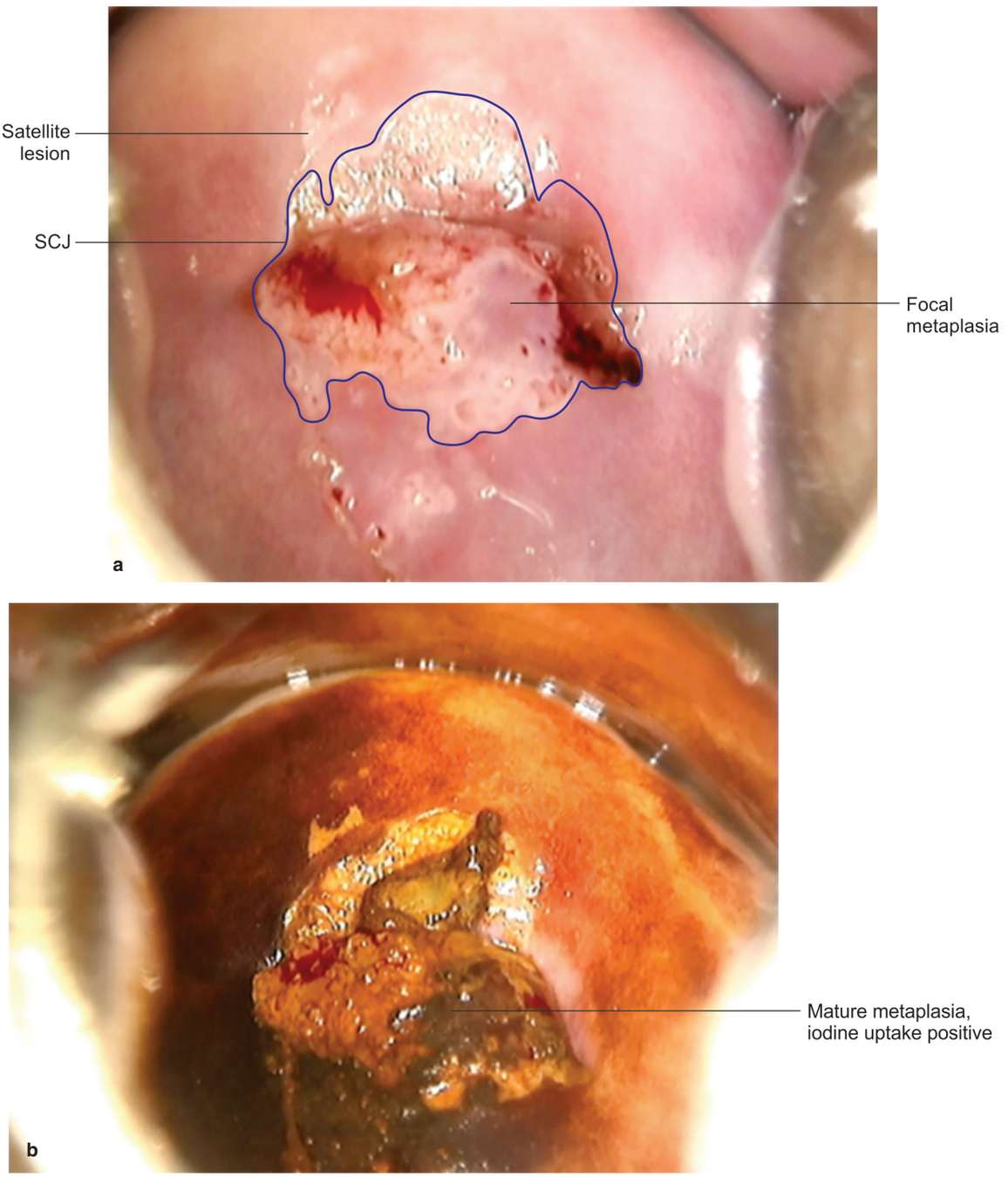


Fig. 3.15b: The entire area not taken up iodine, Lugol's negative, extending till the vagina

9. METAPLASIA (Figs 3.16a and b)

As discussed, metaplasia is transformation of one type of epithelium to another.

Squamous metaplasia is conversion of columnar epithelium to squamous epithelium.



Figs 3.16a and b: Squamous metaplasia can begin focally from any area on the columnar epithelium. They appear as thin translucent acetowhite area without any geographical margin, initially immature slowly turning to mature metaplasia. Iodine uptake is negative during immature metaplasia and takes mahogany brown after mature metaplasia

Immature squamous metaplasia (Fig. 13.17). This term is used when the upper layer of superficial squamous metaplastic epithelium has yet not stratified, i.e. does not have intracellular glycogen. This stains acetowhite on 5% acetic acid application as thin translucent shiny acetowhite with feathery margins. On Lugol's iodine application, the immature metaplasia does not stain brown.

Mature squamous metaplasia: The immature metaplastic epithelium eventually matures, i.e. the upper superficial layers stratify, i.e. there is intracellular accumulation of glycogen. This epithelium appears pinkish white as compared to the original squamous epithelium which appears more pinkish. Mature metaplasia turns mahogany brown on application of Lugol's iodine.

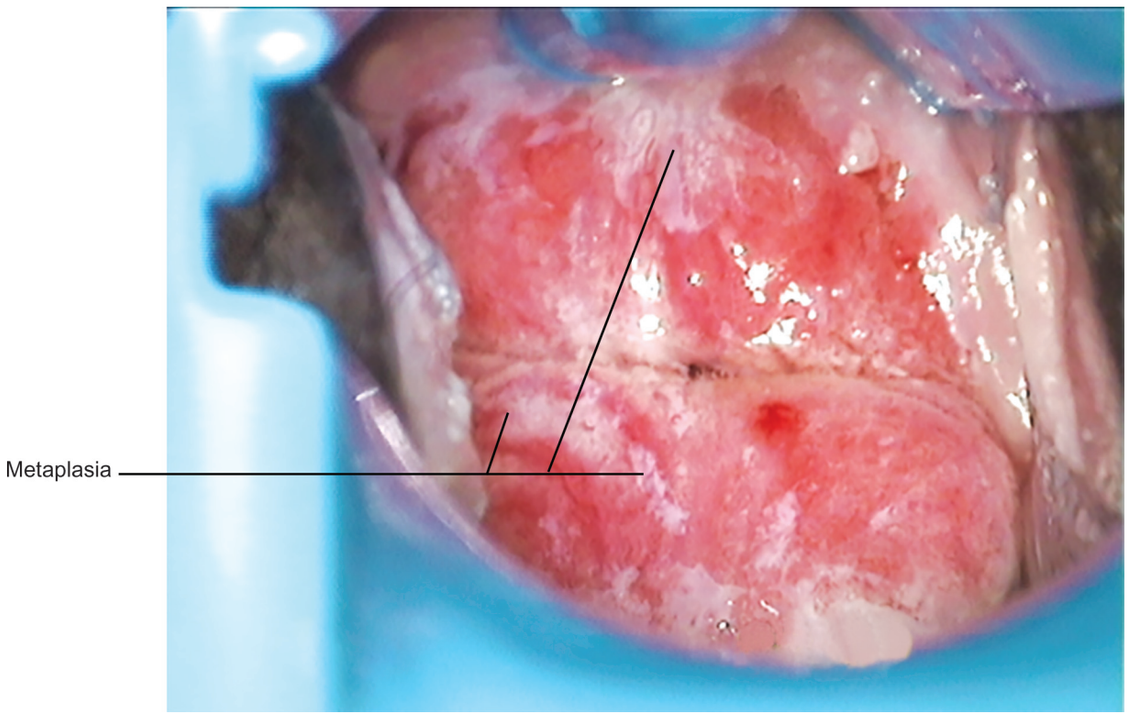


Fig. 3.17: Thin transparent acetowhite with finger-like/fond-like projection pointing centripetally on the columnar epithelium

10. DYSPLASIA

Dysplasia is the pathological deviation from the normal course of metaplasia, where the columnar cells while getting converted to squamous cells become abnormal, irregular in size and shape with disproportion in the nuclear cytoplasmic ratio due to infection of the cells.

11. MOSAICS AND PUNCTATIONS

This terminology is very important in describing the lesions.

The basement membrane of the squamous epithelium is not straight but thrown into folds called stromal papillae. The stroma along with the blood vessels is invaginated within the stromal papillae. These blood vessels supply nutrition to the dividing cells. The areas between two stromal papillae are called rete pegs (Fig. 3.18). The blood vessels appear as punctations on the cross-sectional head on view. In case of normal epithelium, the blood vessels are of normal caliber which appear as small dots or fine punctations. They can be easily located.

In case of pathological dividing cells as in case of CIN lesions, the stromal blood vessels develop into high caliber blood vessels to feed the rapidly dividing cells (Fig. 3.19). In case of higher lesions as in c/o CIN 2/3, the dividing cells with bizarre nucleocytoplasmic ratio, occupy many layers, thus the stromal papillae along with the stromal blood vessels are invaginated and stretched further towards the surface, which are easily visible as larger dots, i.e. coarse punctations on head on view of cervix.

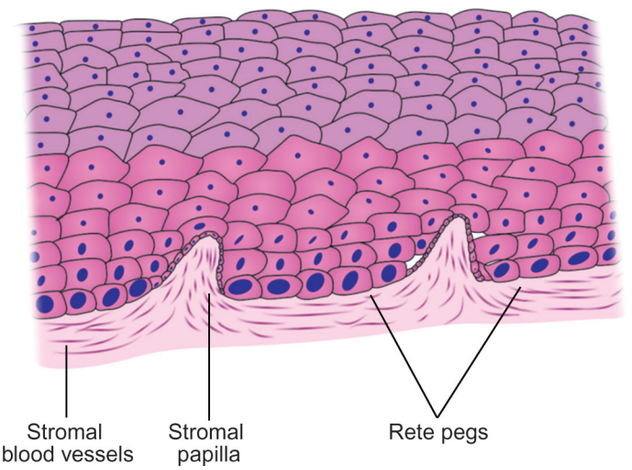


Fig. 3.18: Rete pegs

The dividing cells occupy the rete pegs. On head-on view, the interconnecting stromal vessels supplying these cells form a mosaic tile pattern, polygonal in shape. Usually these mosaic patterns are fine mosaics. In case of lesions, the rete pegs get widened due to accumulation of the dividing cells within the rete pegs. Hence, the mosaic pattern now appears as large tiled mosaic pattern. Thus, we see large mosaics (Fig. 3.20) within the lesions detected on colposcopy.

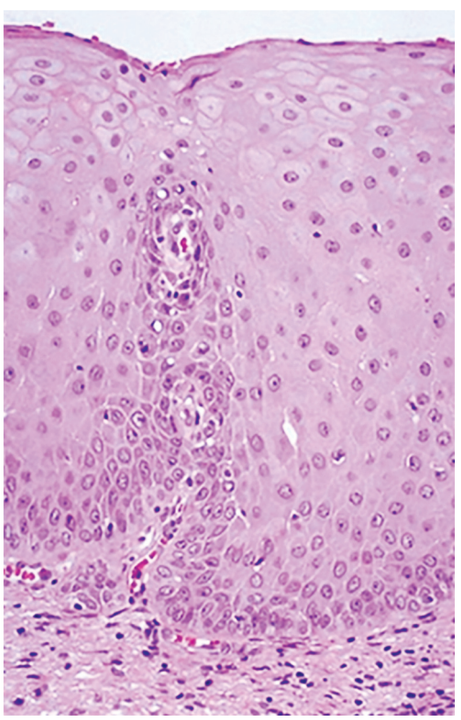


Fig. 3.19: Stretched vessels in stromal papilla

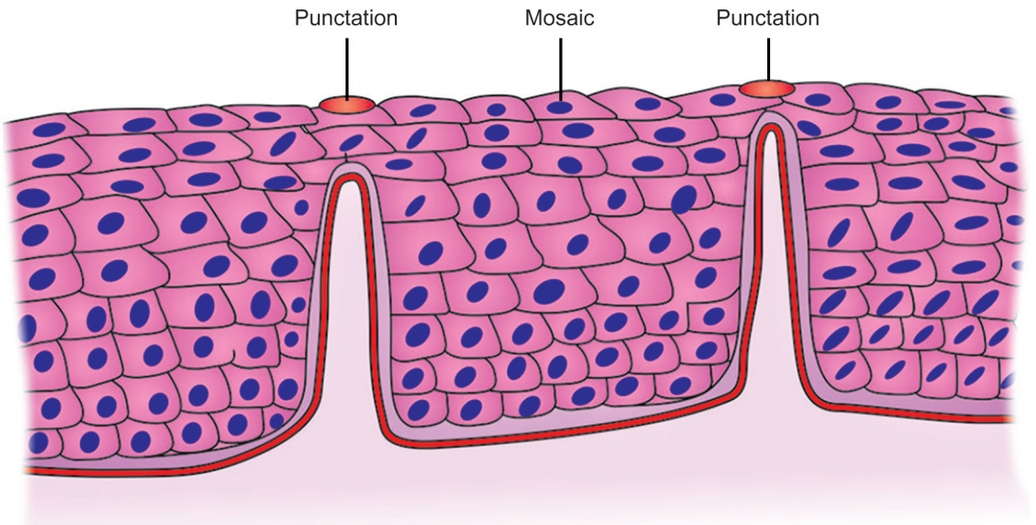


Fig. 3.20: Stretched blood vessels in the stromal papillae in CIN lesion giving rise to punctation and mosaic on colposcopic examination

Fine Mosaics and Punctations (Figs 3.21a to g)

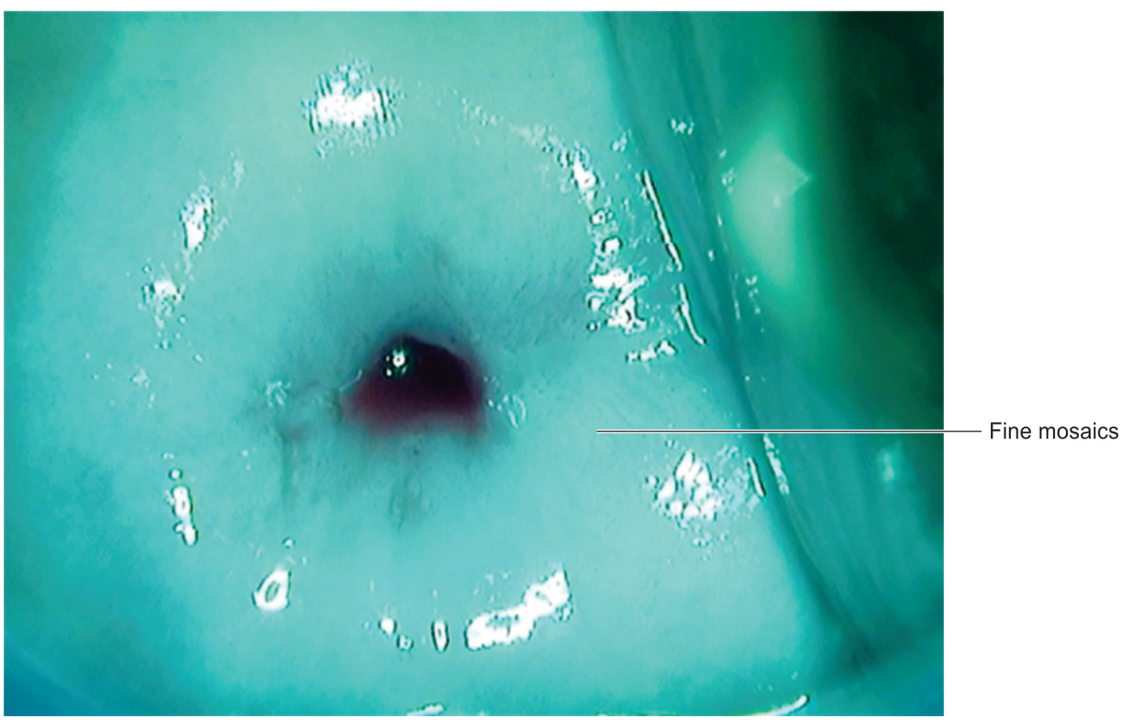


Fig. 3.21a

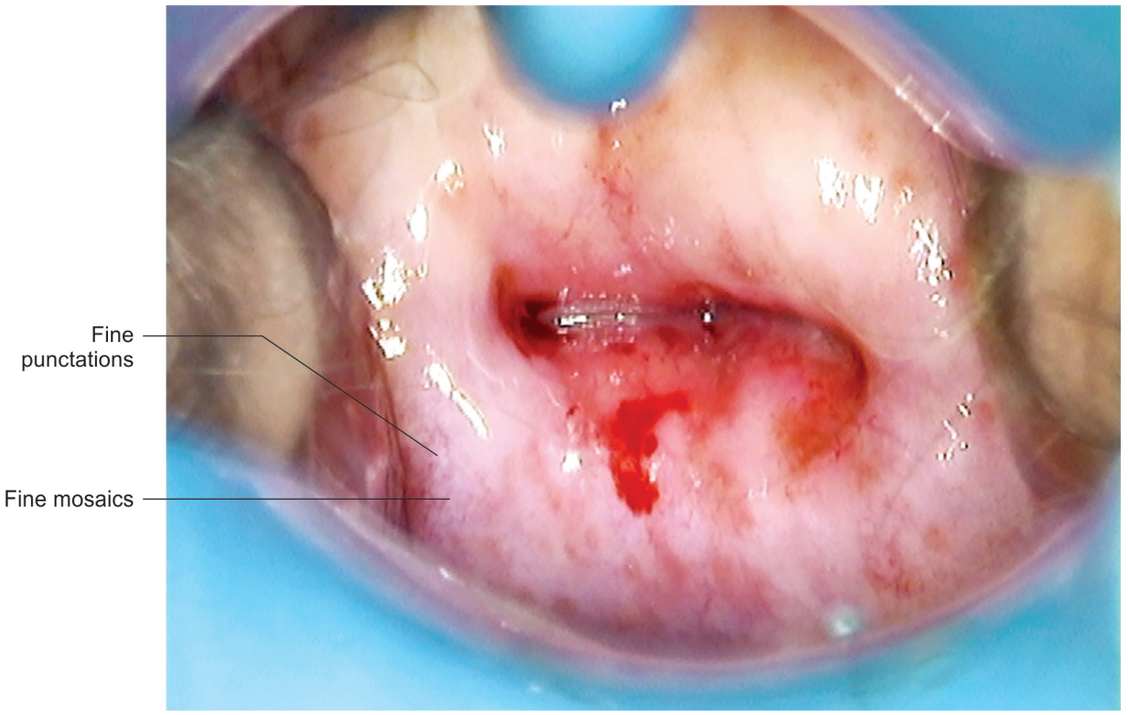


Fig. 3.21b

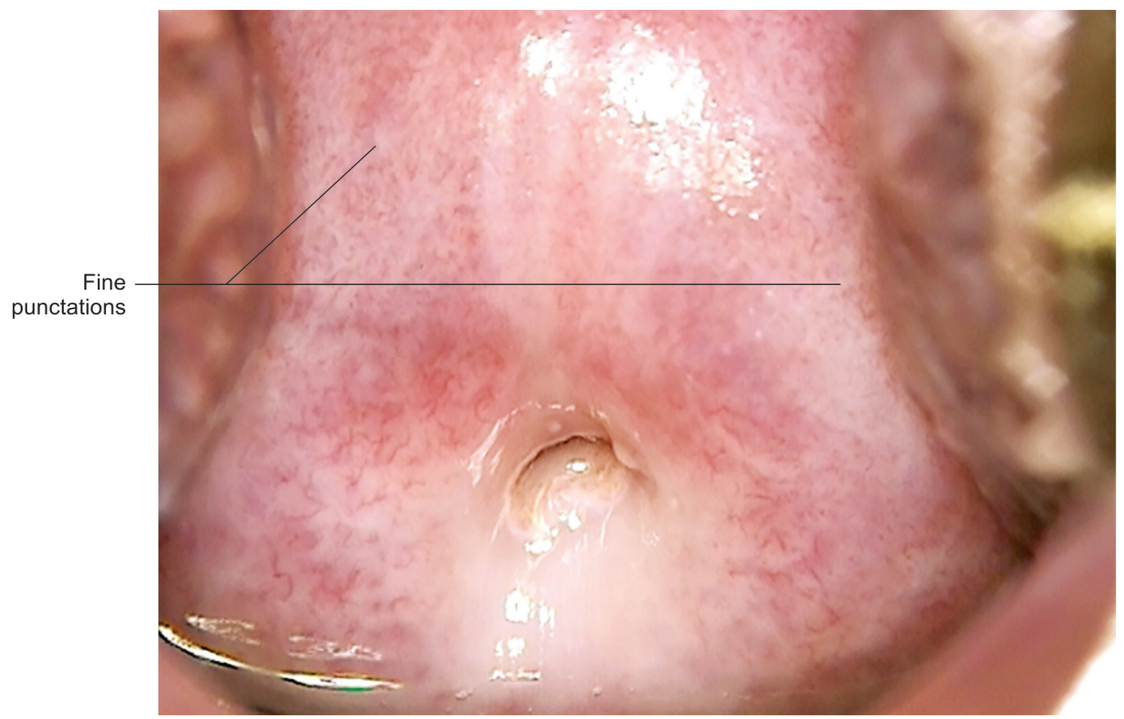


Fig. 3.21c

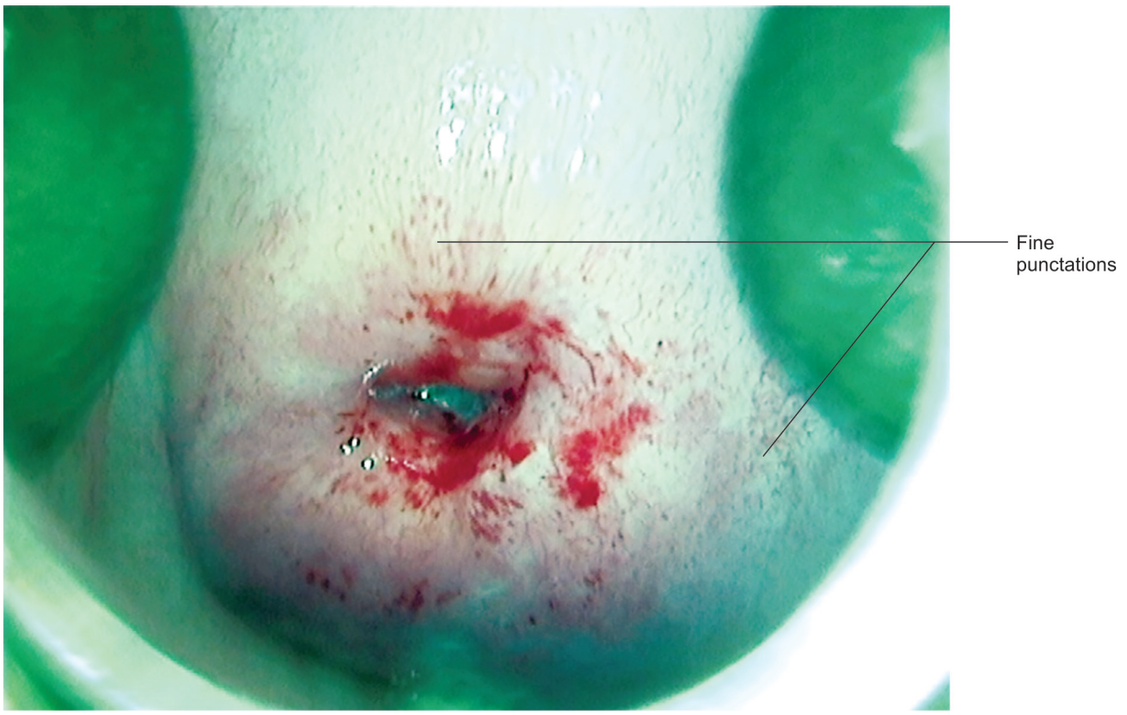


Fig. 3.21d

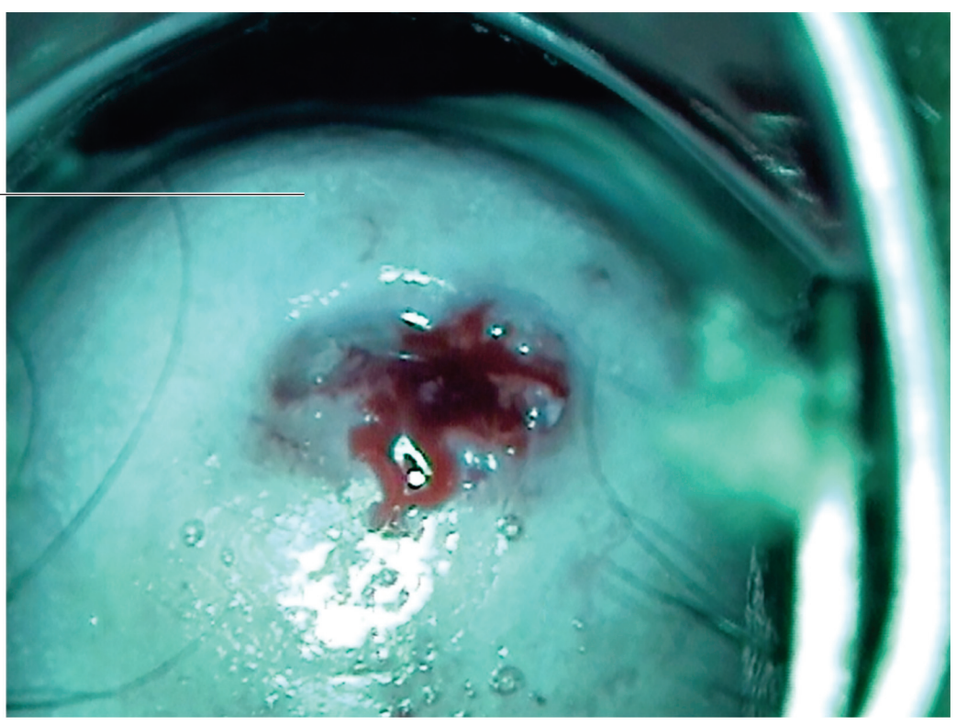


Fig. 3.21e

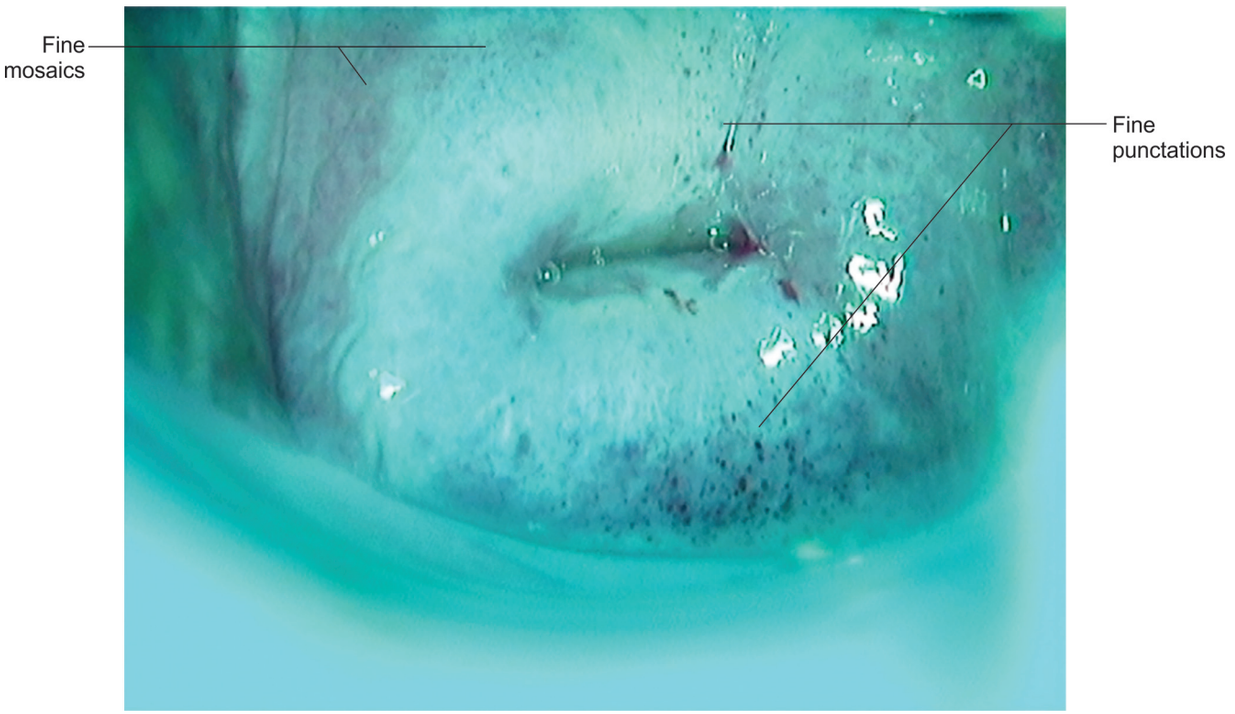


Fig. 3.21f

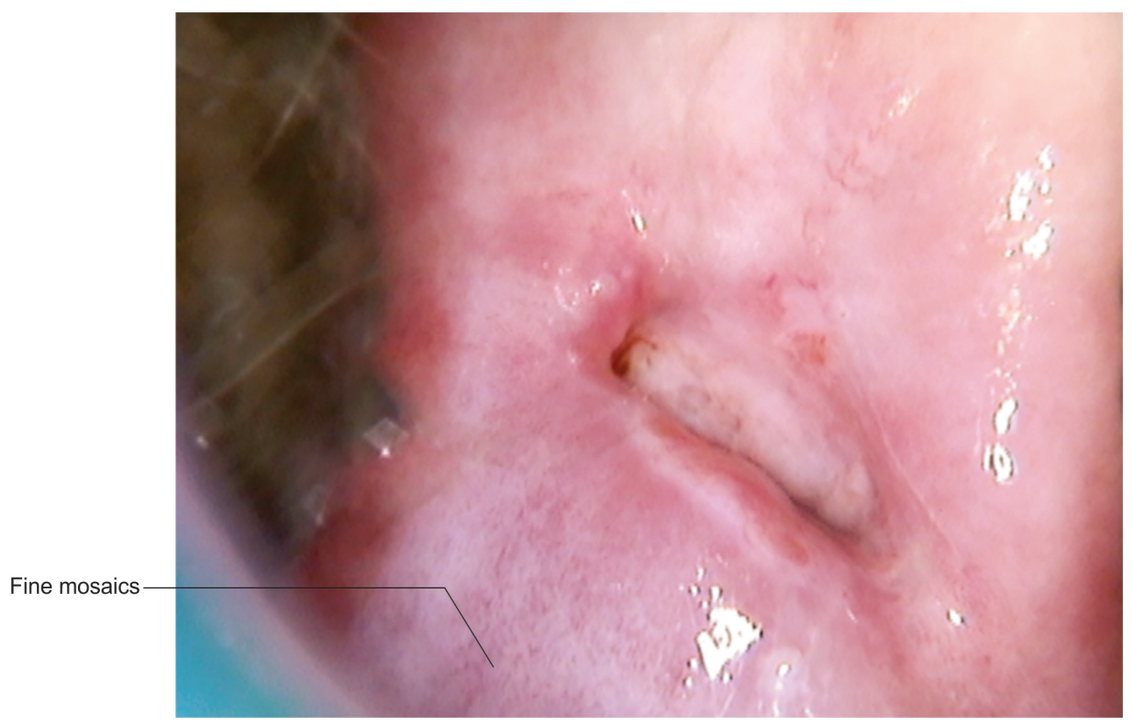


Fig. 3.21g

Coarse Mosaics and Punctations (Figs 3.22a to g)

Coarse punctations are seen on cross-sectional head-on view as large dots. They are observed due to high caliber blood vessels and neovascularization supplying the rapidly dividing neoplastic cells.

Coarse mosaics are noticed as large tiled pattern. They are due to stretching of rete pegs with the dividing cells surrounded by stromal papillae.

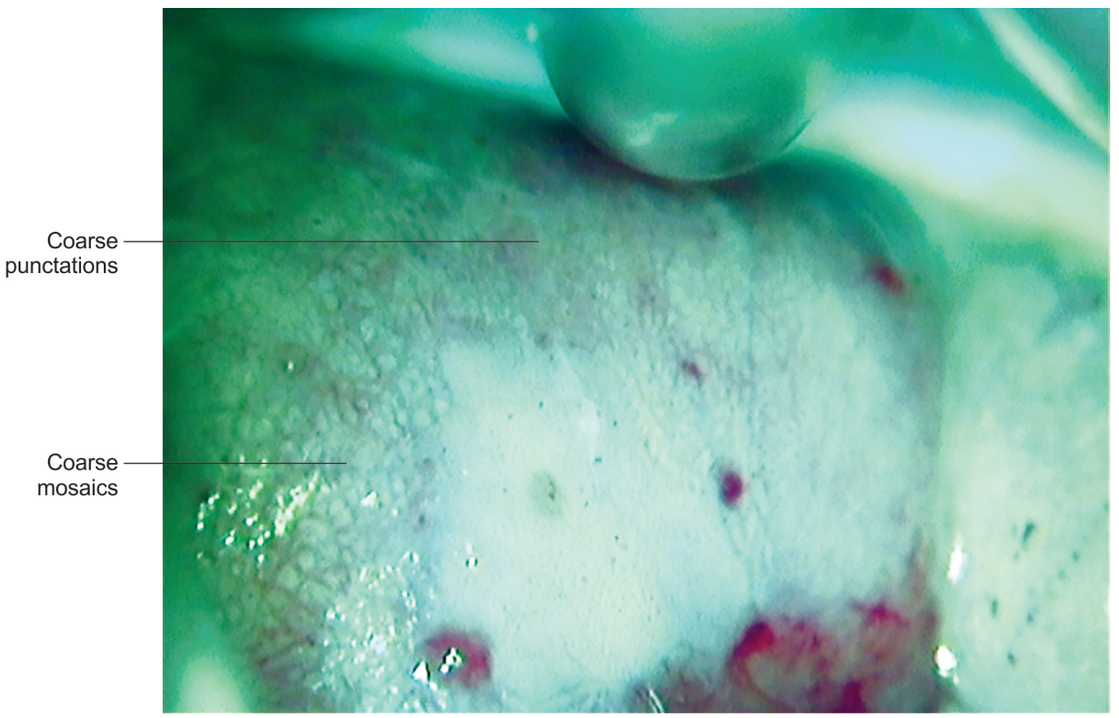


Fig. 3.22a

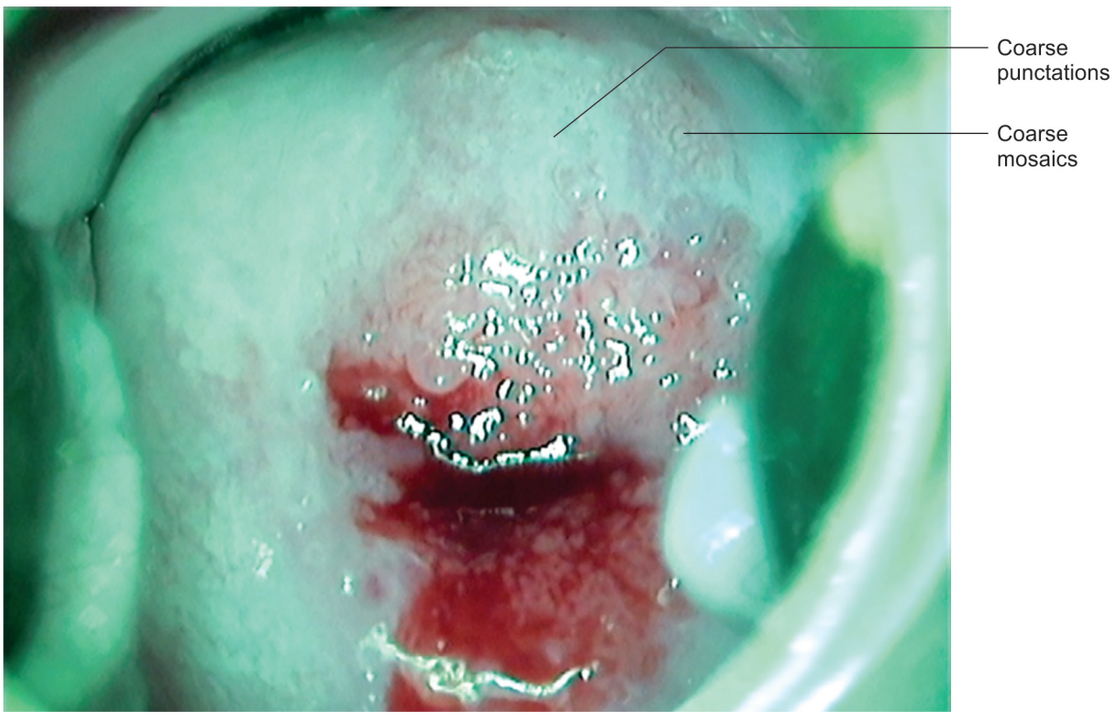


Fig. 3.22b

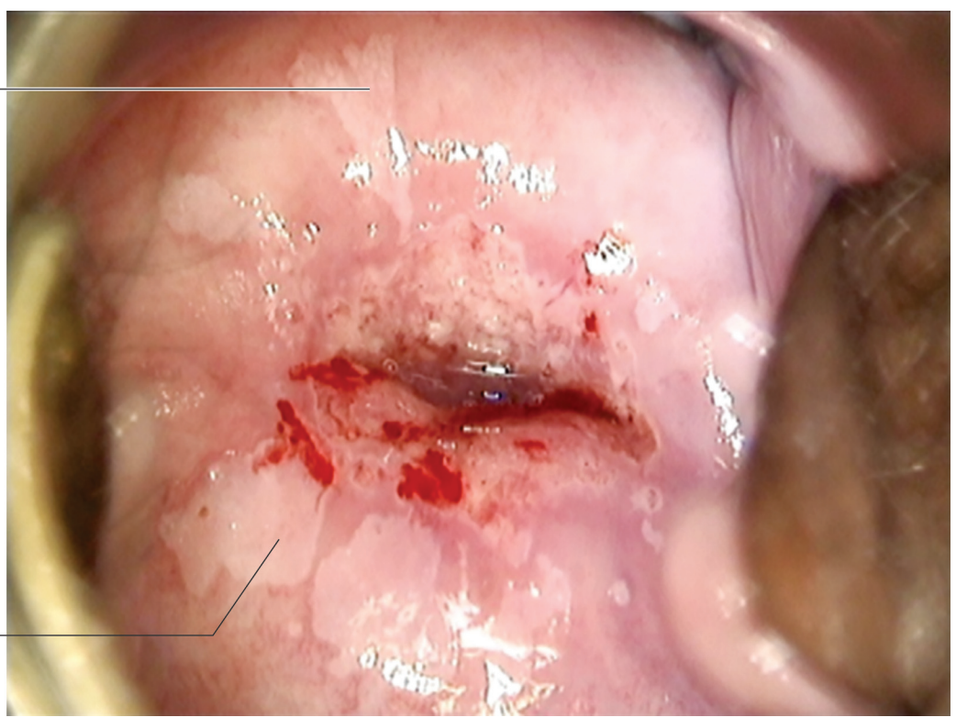


Fig. 3.22c

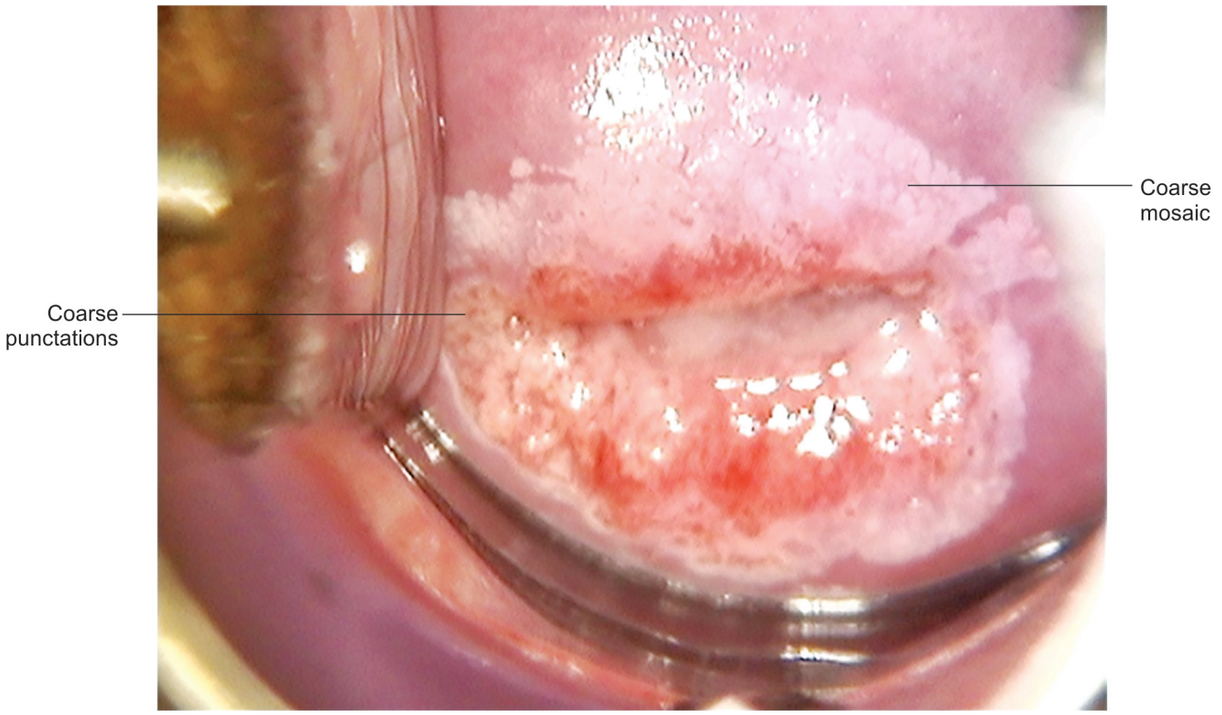


Fig. 3.22d

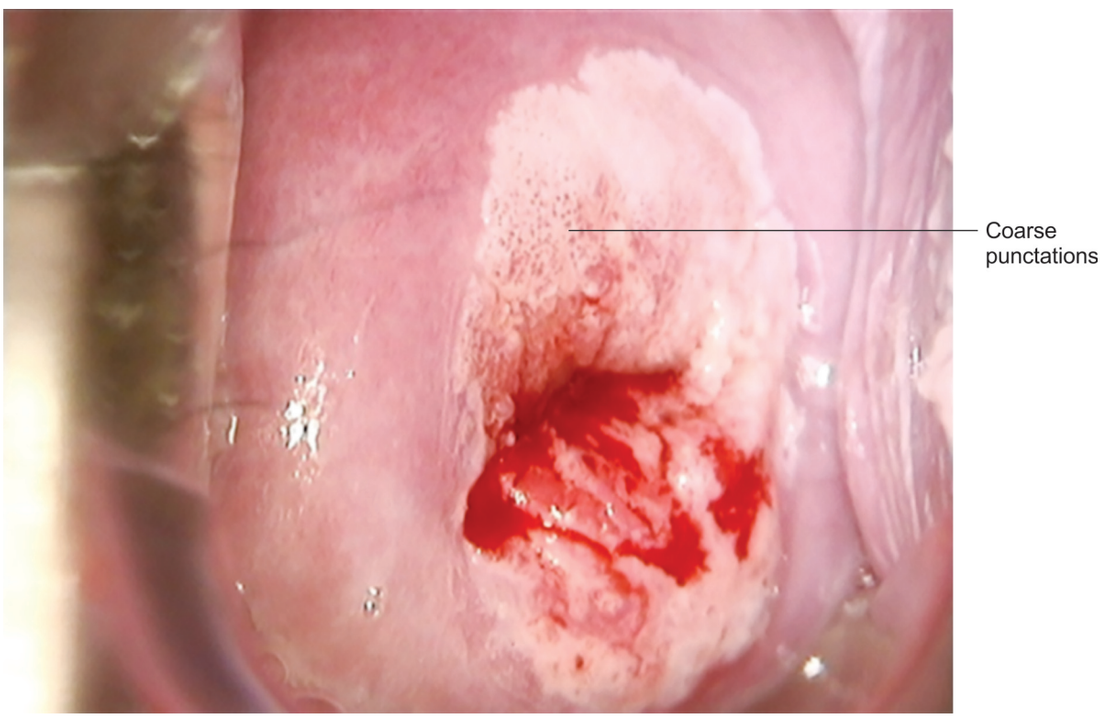


Fig. 3.22e

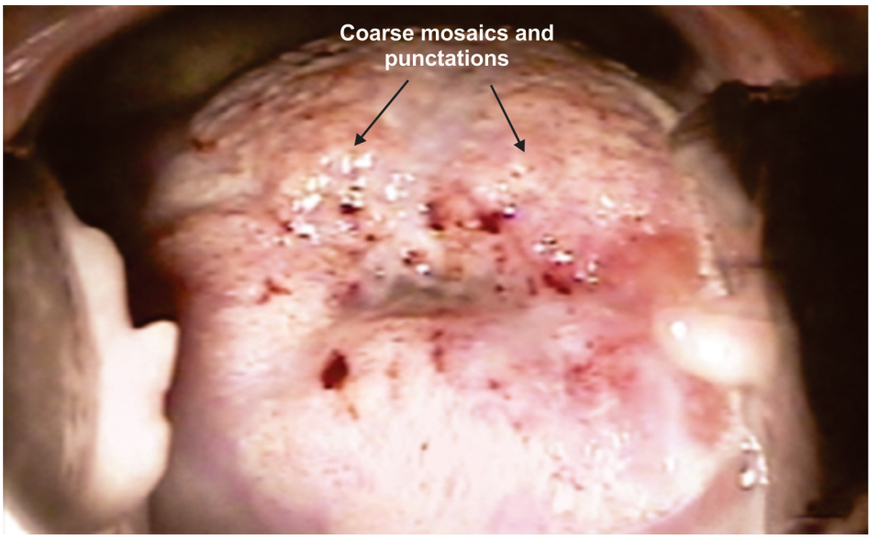


Fig. 3.22f

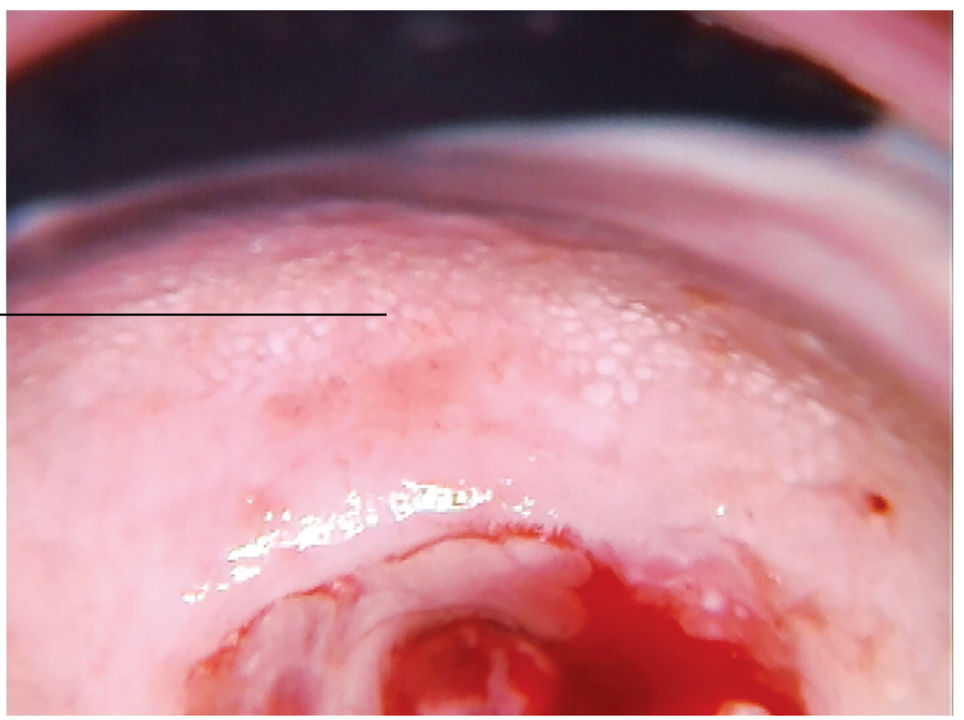


Fig. 3.22g

CHAPTER

4

Cervical Intraepithelial Neoplasia (CIN)

Invasive cervical cancers are usually preceded by a long phase of clinically identifiable precancerous phase called cervical intraepithelial neoplasia (CIN) phase. CIN, as the name suggests, is a neoplasia (neo—new; plasia—cellular division) within the epithelial cells of the cervix. This precancerous phase is characterized microscopically as a spectrum of cellular abnormalities progressing from cellular atypia to CIN further progressing to cervical cancer.

Depending on the concept, that there is a continuous spectrum of disease process, whereby the normal epithelium turns into precancerous lesions and then into invasive cancerous lesions, Richart, et al in 1968 coined the term cervical intraepithelial neoplasia (CIN), to describe the progressive staging of cellular atypia confined to the epithelium.

CIN is further graded as CIN 1, 2, 3. In 1980, condylomatous atypical koilocytic changes due to HPV infection were recognized and described. Thus a newer grading system was evolved as per modified Richart classification in 1980, i.e. low grade CIN comprising of abnormalities consistent with koilocytic changes and CIN 1; and high grade CIN comprising of CIN 2, and CIN 3. In 1989, the US National Cancer Institute (NCI) workshop's report on newer methodology for pathological reporting was published. The recommendations from this workshop and the subsequently one held in 1991 gave rise to The Bethesda System (TBS). This simplified the reporting system even further by creating a two-tier classification system, viz. squamous intraepithelial lesions (SIL) of low grade (LSIL) and high grade (HSIL). LSIL included condylomatous changes and CIN 1. HSIL included CIN 2 and CIN 3.

LOW GRADE LESIONS (LSIL)

Low grade lesions appear as thin opaque acetowhite areas with clear cut geographical pattern arising from SCJ, directing centrifugally within the transformation zone. The lesions appear as thin milky white neither transparent nor opaque with feathery finger-like projections arising from SCJ within the TZ . They appear late and fades away fast within minutes. They show fine punctations and fine mosaic. On application of Lugol's iodine, low grade lesions do not take up iodine or partially take up iodine giving it a variegated appearance.

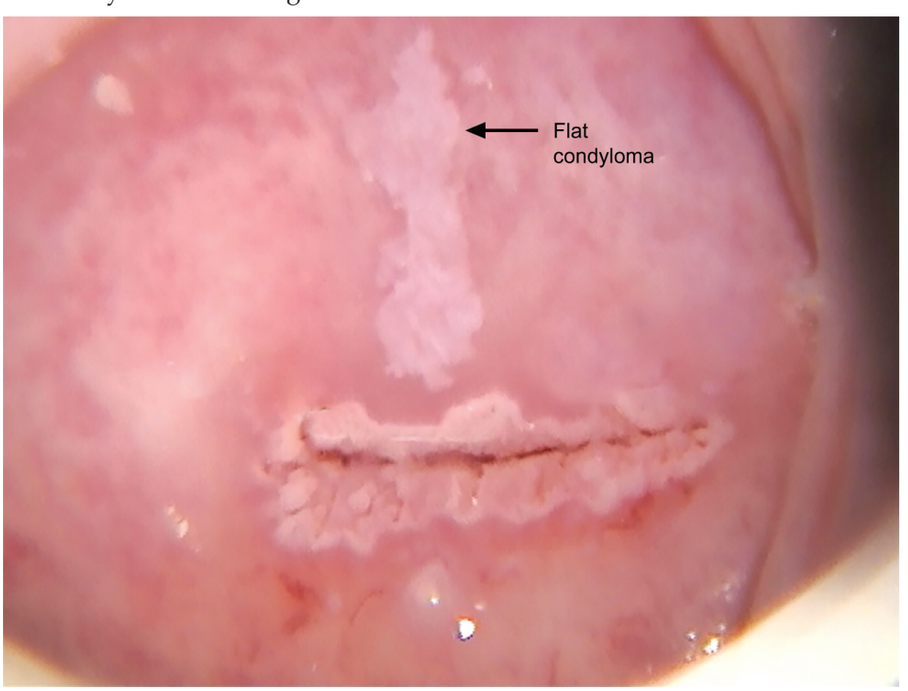


Fig. 4.1: Flat condyloma

Condylomas: Condylomas are due to low grade HPV infections. Flat condylomas (Fig. 4.1) arise anywhere within or outside transformation zone away from SCJ. They appear as satellite lesions.

Condylomatous condylomas or exophytic condylomata accuminata turn acetowhite immediately on application of 3–5% acetic acid and they may be found inside or beyond the TZ (Figs 4.2a and b).

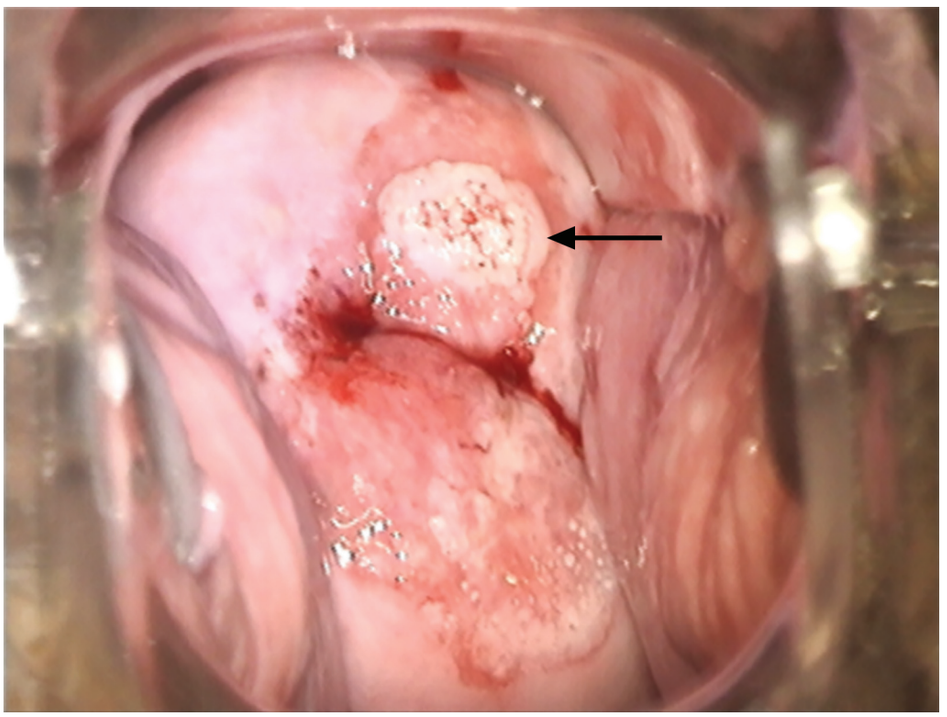


Fig. 4.2a: Exophytic condyloma

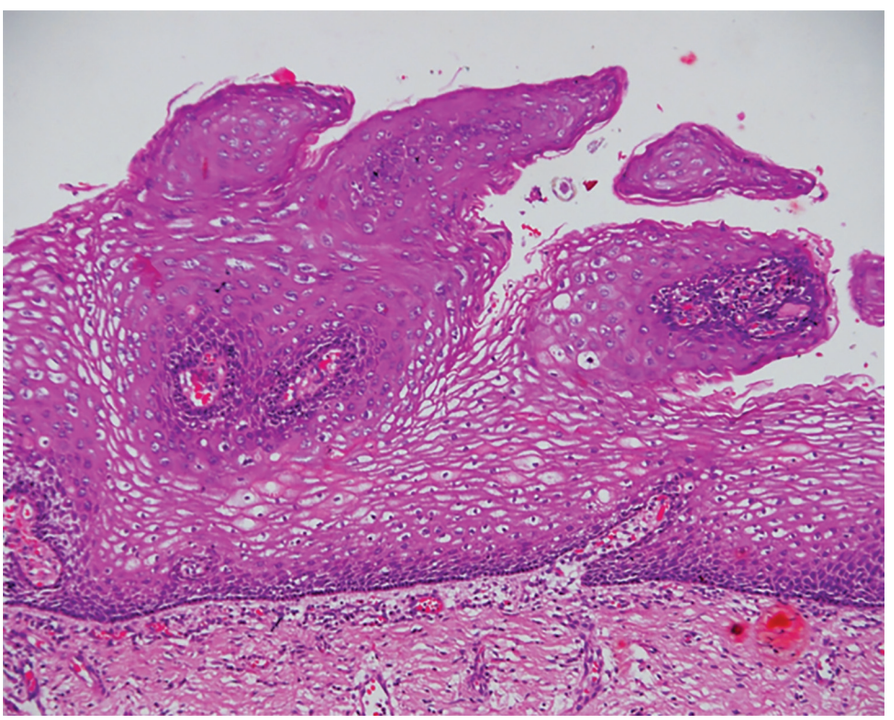


Fig. 4.2b: Histology of condyloma

Low-Grade Squamous Intraepithelial Lesion (LSIL)—CIN 1 (Figs 4.3a, b and 4.4a, b)

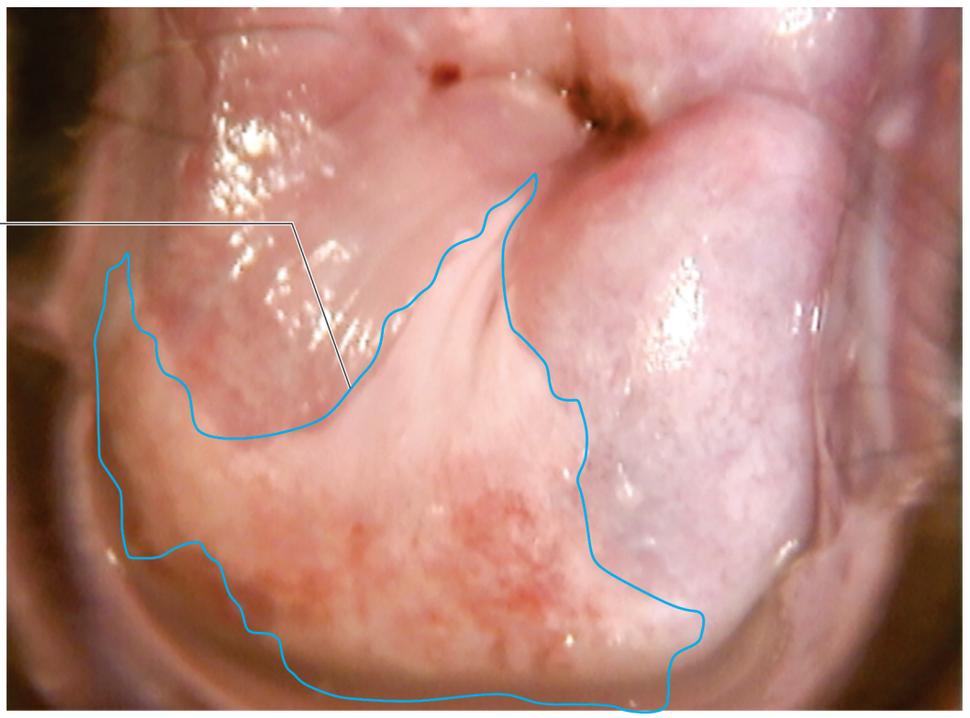


Fig. 4.3a

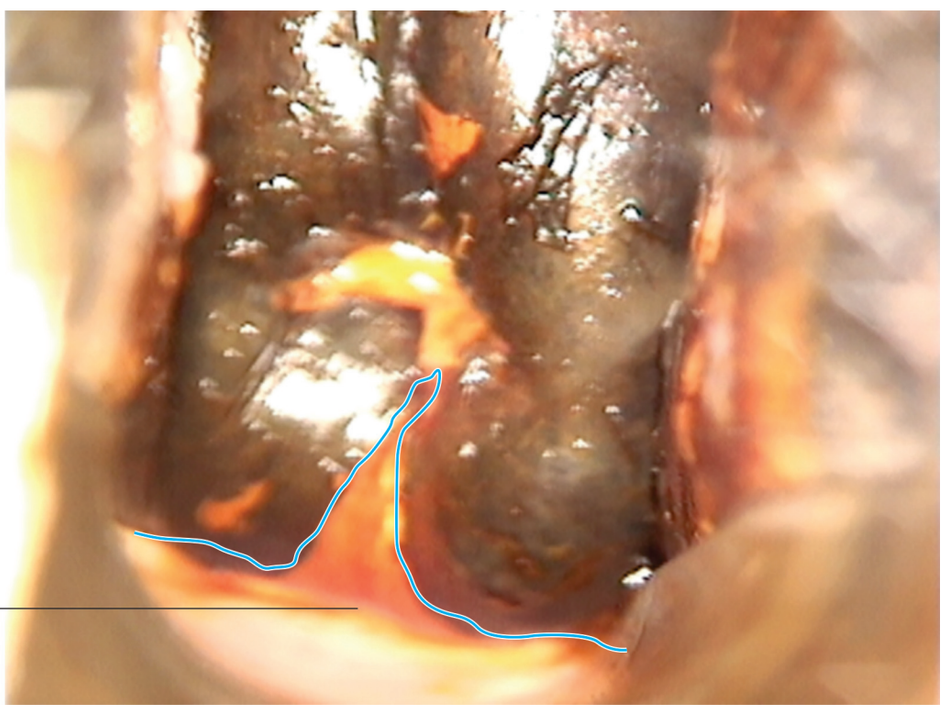


Fig. 4.3b

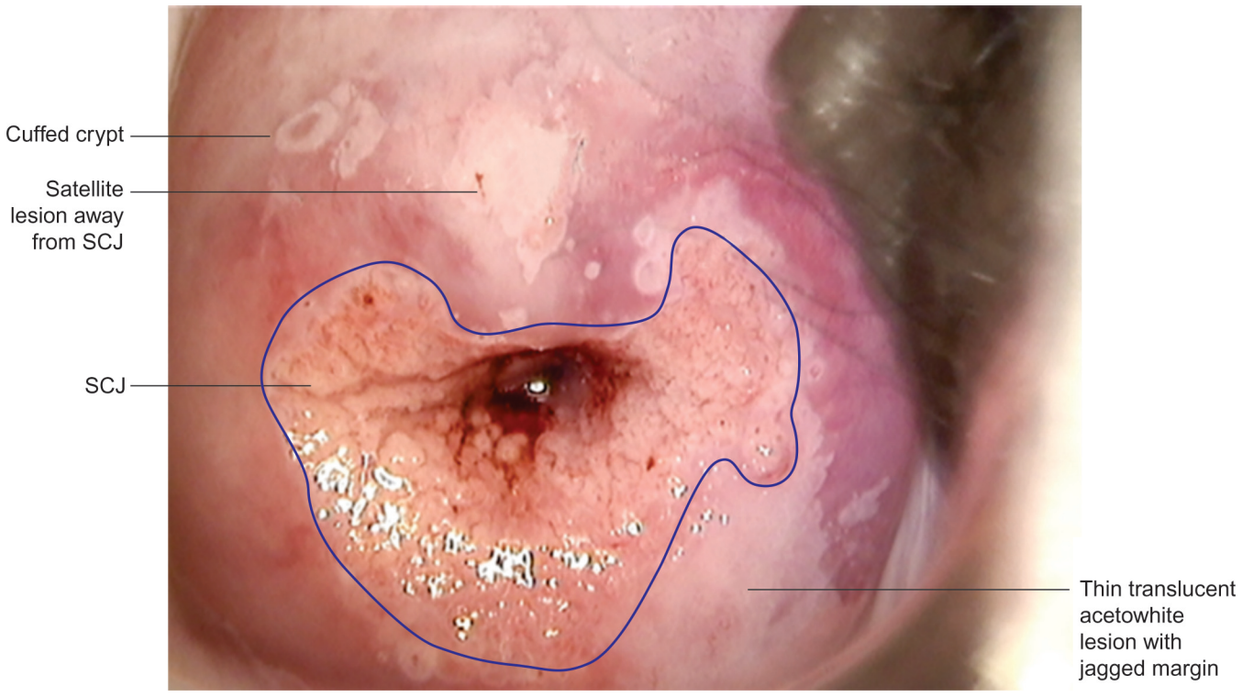


Fig. 4.4a

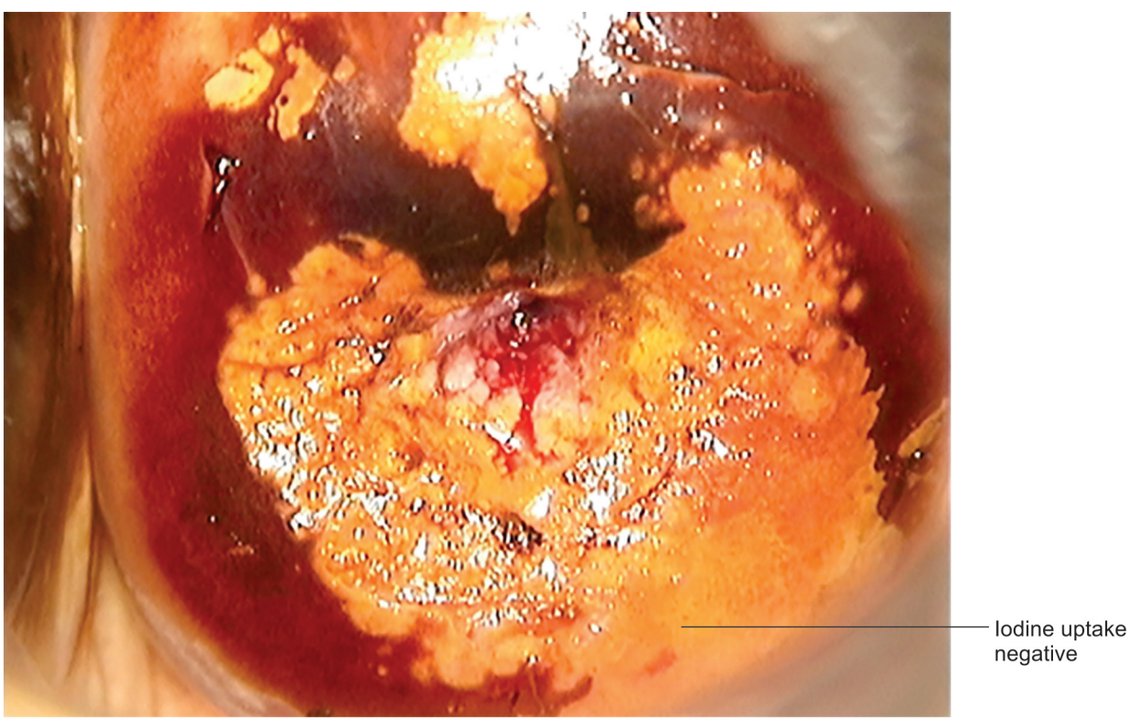


Fig. 4.4b

HIGH GRADE LESIONS (HSIL)

High grade lesions show thick, dense, opaque acetowhiteness arising from SCJ with well-demarcated, raised, rolled out margin, irregular undulating surface, and oyster egg white to chalky white, appearing rapidly after the application of acetic acid and persisting for long. The lesions show coarse punctations and coarse mosaic. In TZ 2/3, these lesions may extend into the endocervical canal (Fig. 4.5).

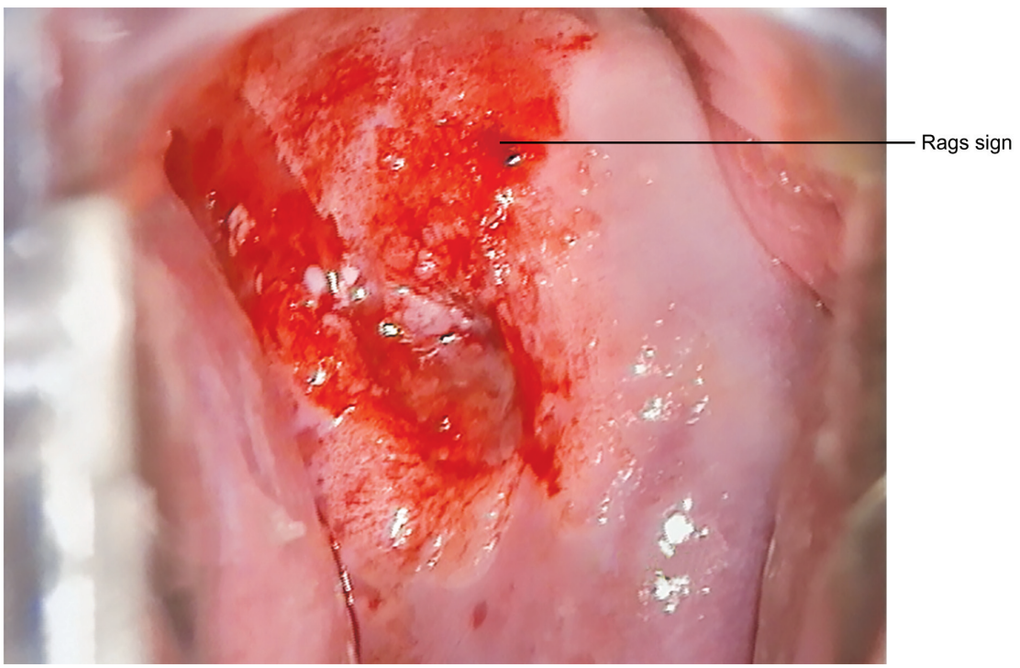


Fig. 4.5: High grade lesion

HSIL lesions may peel off giving "Rags" appearance. Sometimes there are lesions within the lesions. The sharp demarcation between the thin and dense acetowhite areas that exists within the same lesion is known as "inner border sign" (Fig. 4.6).

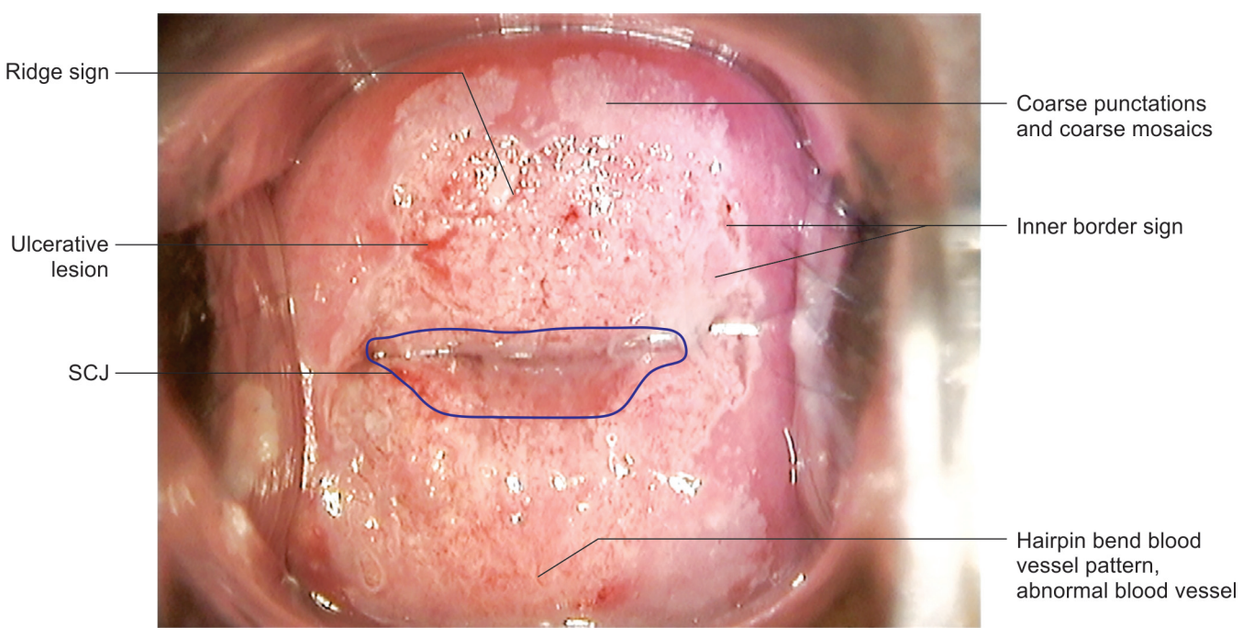


Fig. 4.6: High grade lesion—CIN 3 with focal area of microinvasive lesions on LLETZ excision biopsy

CERVICAL INTRAEPITHELIAL NEOPLASIA GRADE 3 LESION (Figs 4.7a to c)

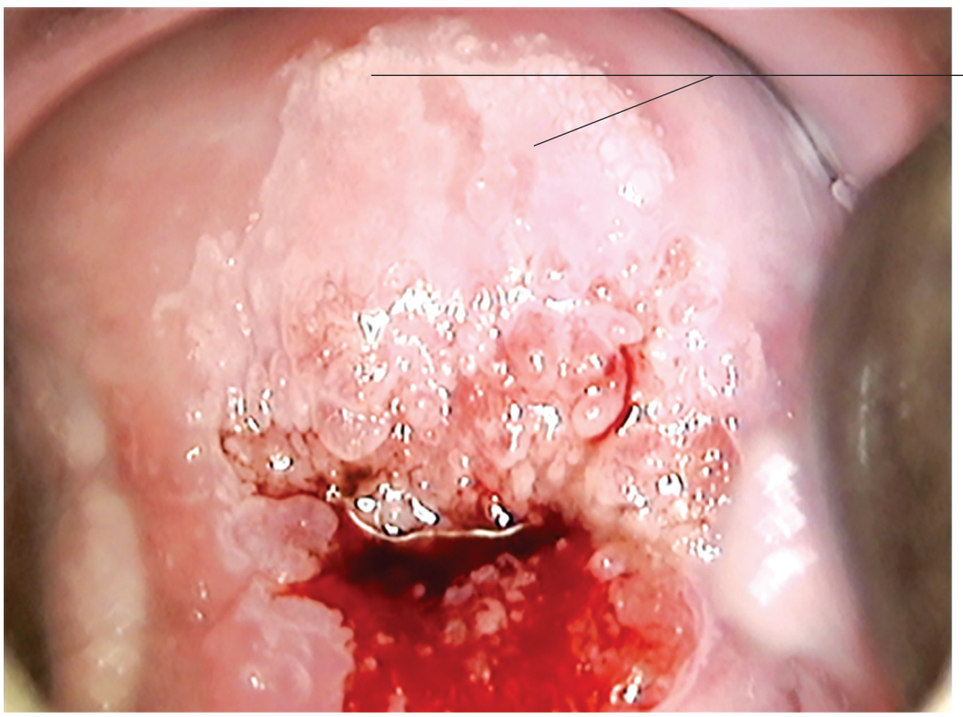


Fig. 4.7a

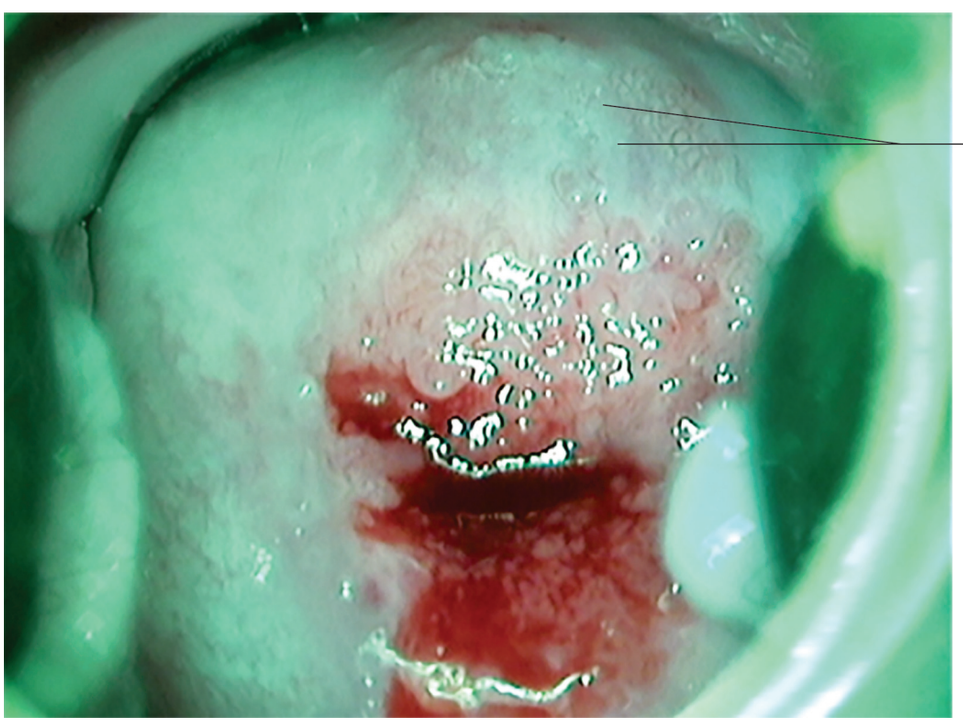


Fig. 4.7b

The rapidly dividing cells in high grade lesion do not accumulate glycogen in the cytoplasm thus turning yellow on iodine application.

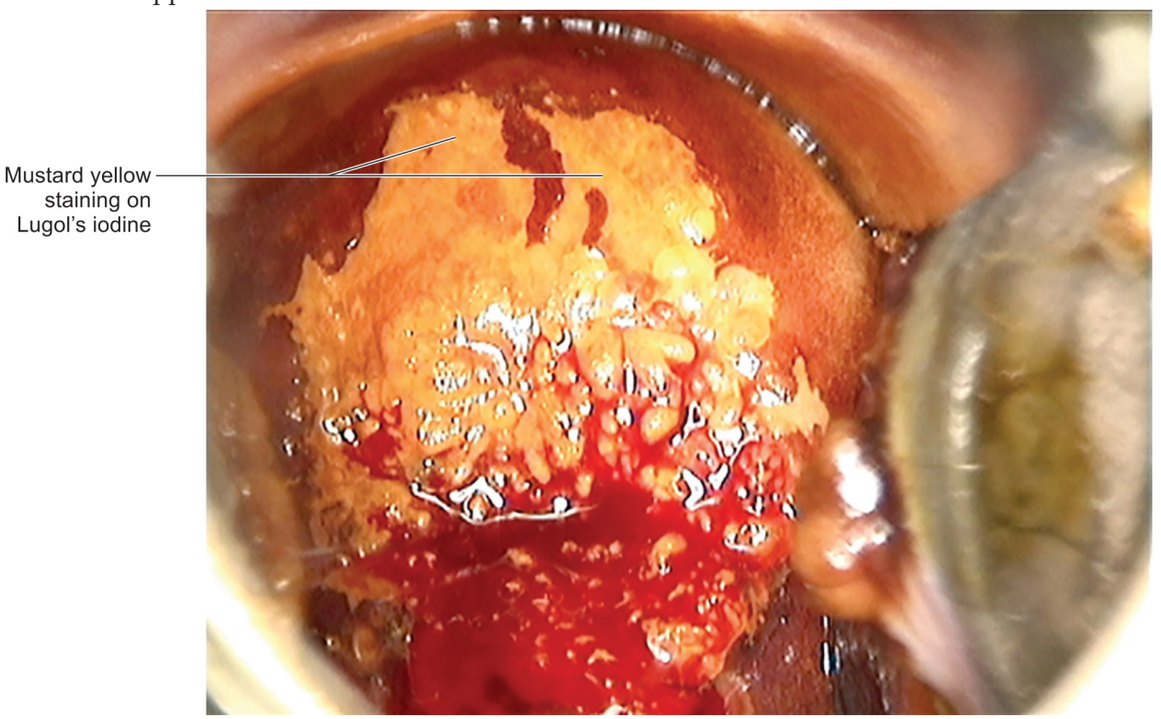


Fig. 4.7c

MIXED LESION

Many a times, mixed lesions are noted in the cervix (Figs 4.8 a,b and 4.9 a,b)

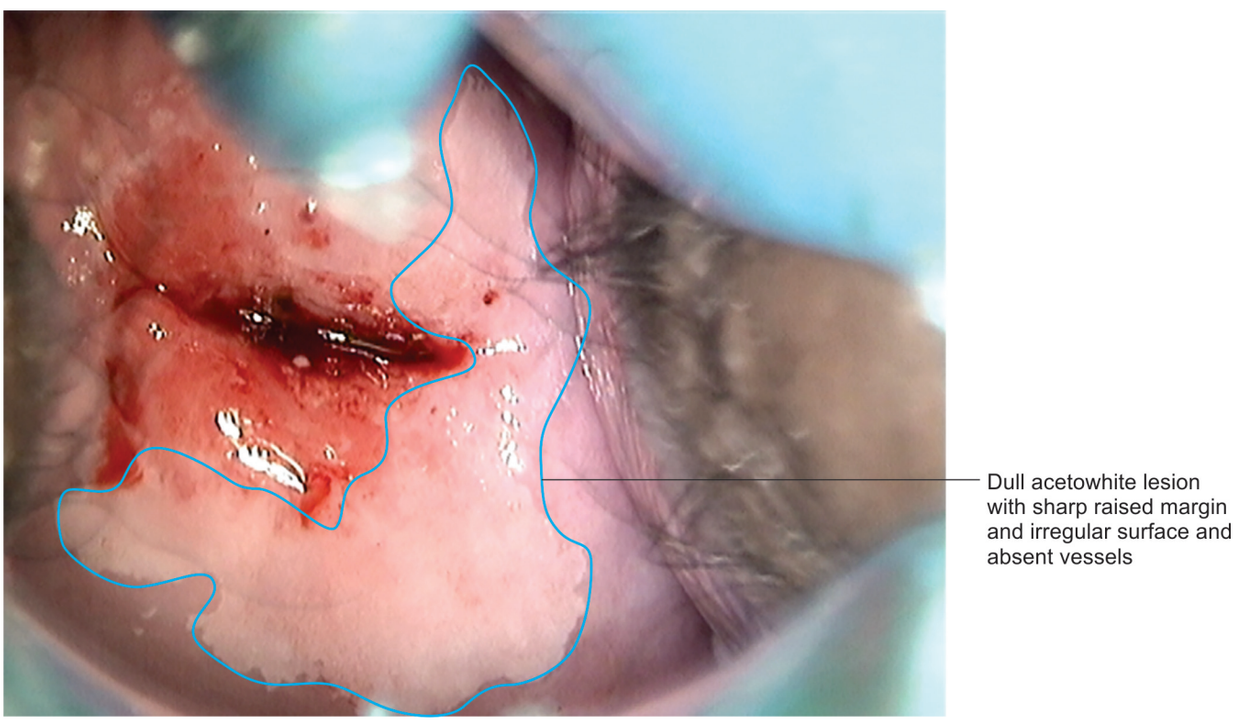


Fig. 4.8a: High grade CIN 2 lesions at the lower lip and CIN 3 at the upper lip

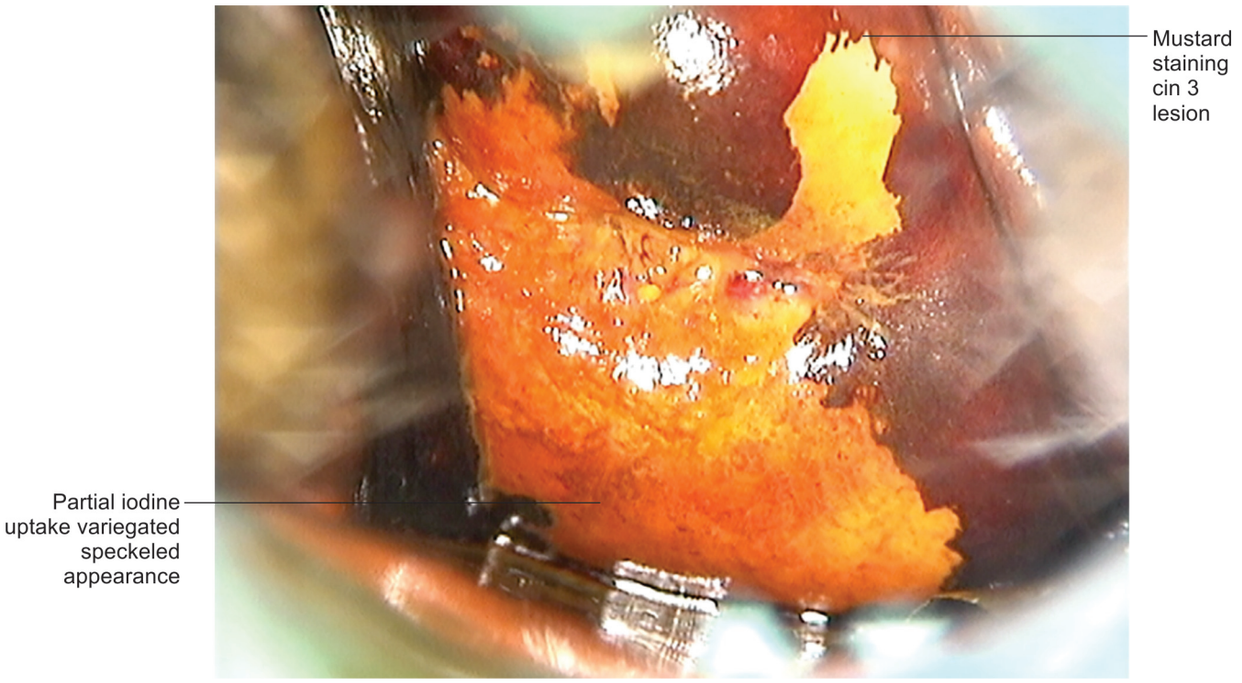


Fig. 4.8b: High grade lesions with CIN 3 at the upper lip and CIN 2 at the lower lip

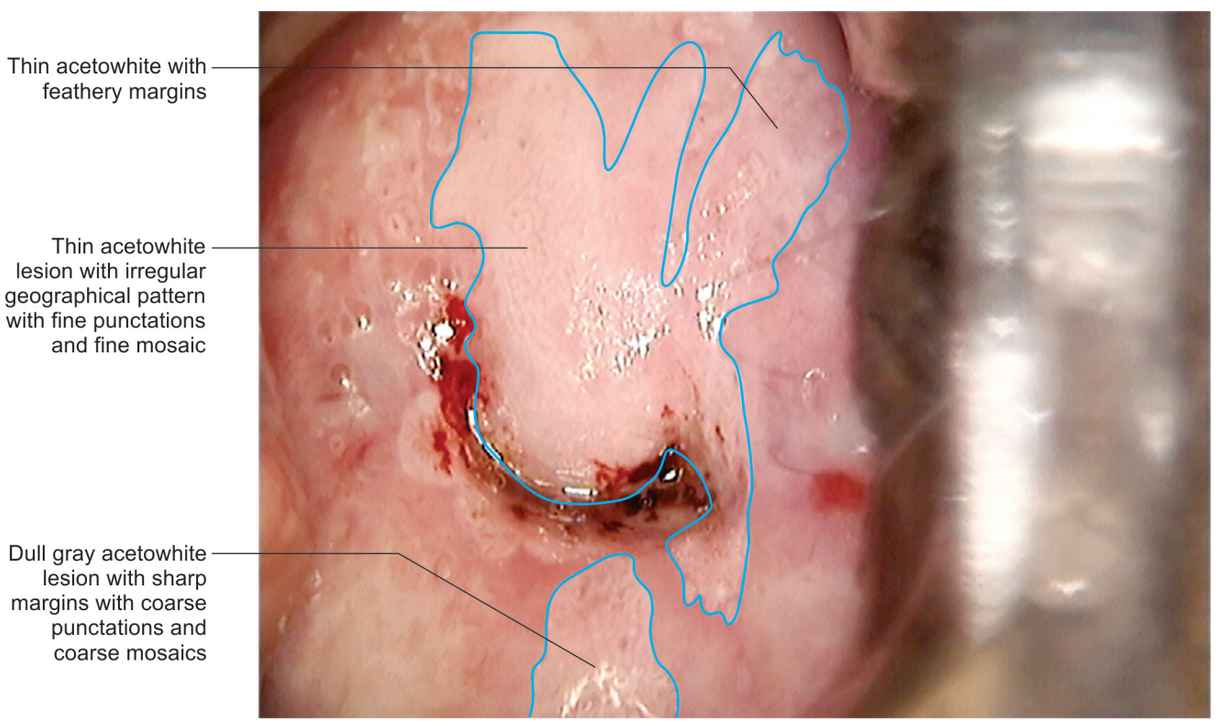


Fig. 4.9a: CIN 1 lesions on upper lip with CIN 2 lesions on lower lip

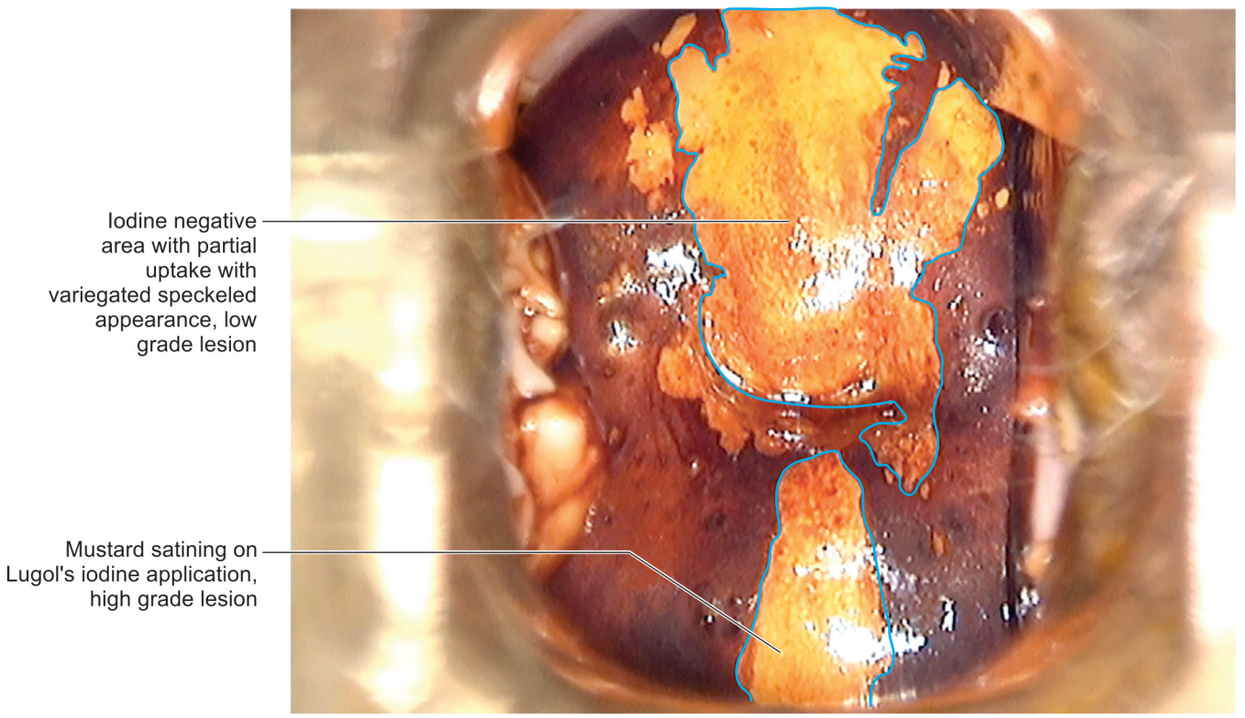


Fig. 4.9b

Ridge sign: High grade CIN 3 lesions can be characterized by dense opaque lesion having overhanging border resembling a ridge (Fig. 4.10).

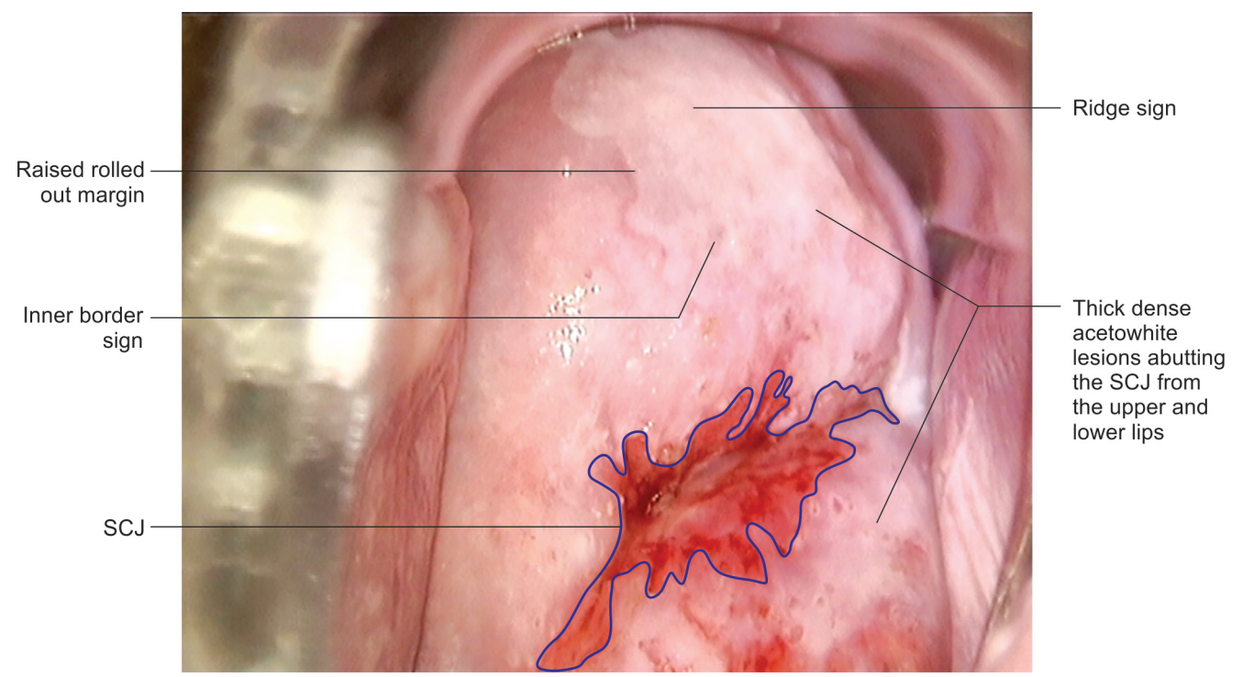


Fig. 4.10: High grade lesion on the upper and lower lips, dull gray acetowhite, rough surface with ridge sign, inner border sign

CIRCUMFERENTIAL LESION

Circumferential lesions usually cover all the 4 quadrants of the cervix (Figs 4.11, 4.12a–c and 4.13a, b).

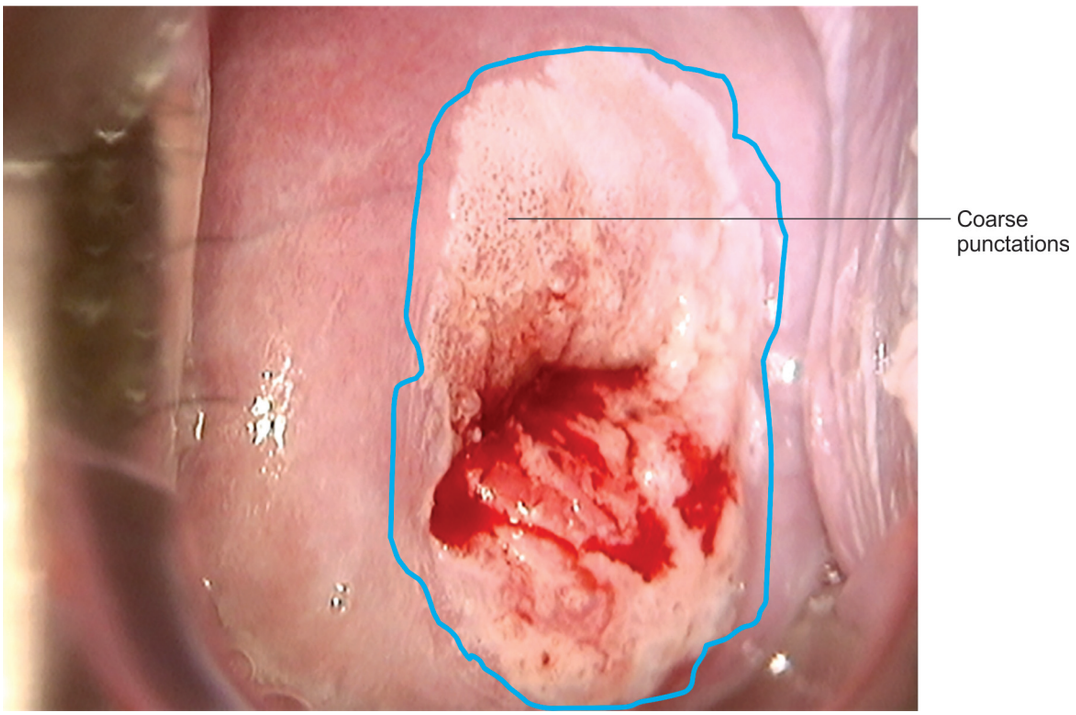


Fig. 4.11: High grade circumferential lesion with rough surface, raised margins and coarse punctations

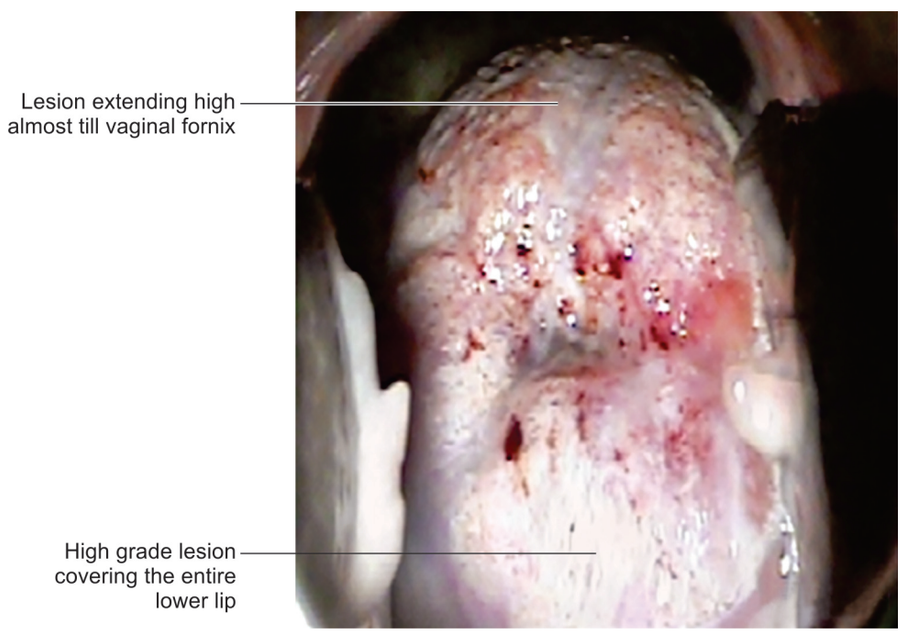
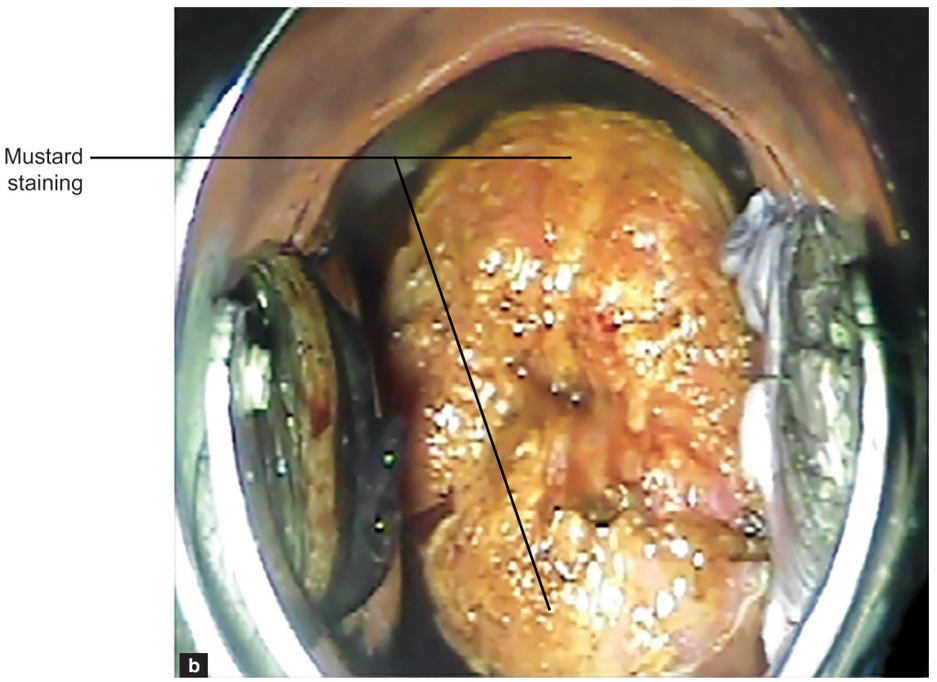
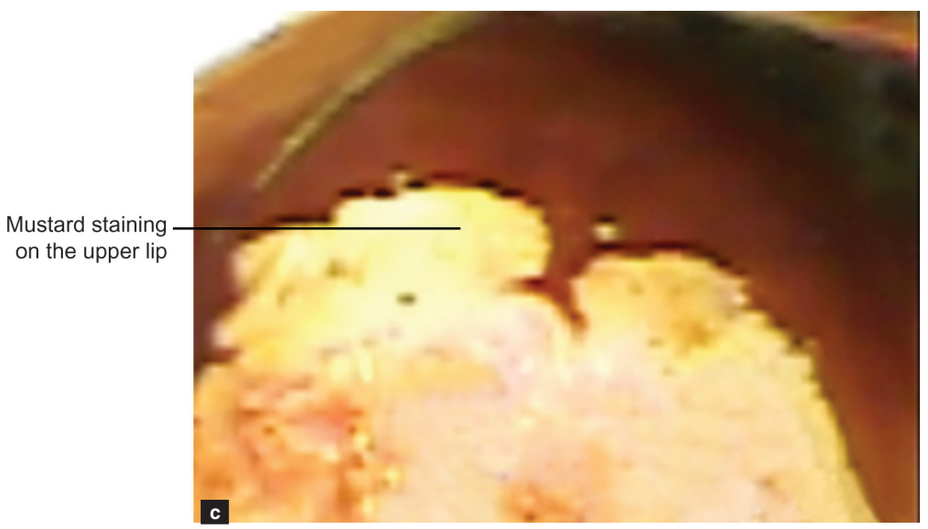
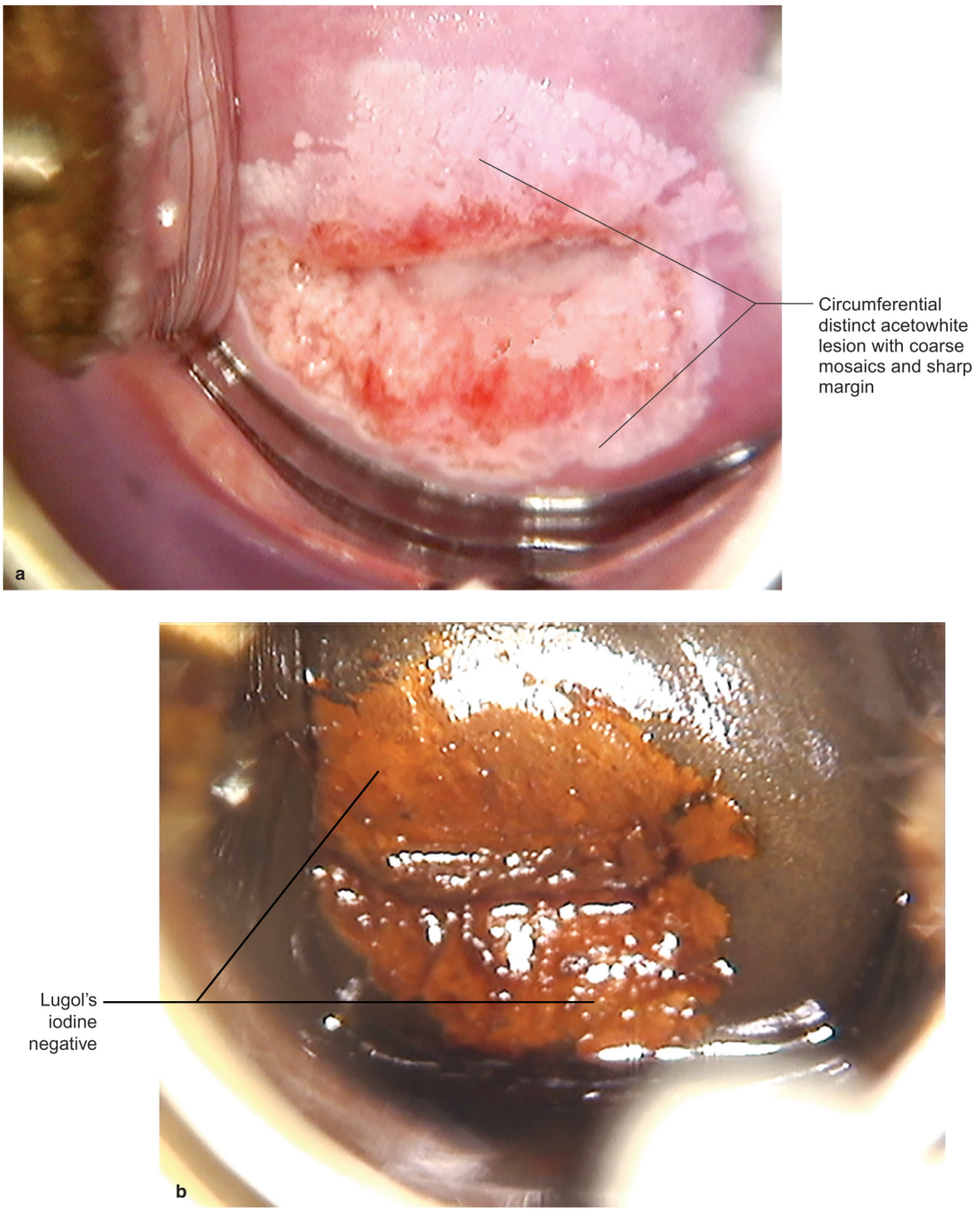


Fig. 4.12a: Circumferential HSIL





Figs 4.12b and c: On Lugol's iodine application



Figs 4.13a and b: Circumferential lesion

PRECLINICAL INVASIVE CARCINOMA (Figs 4.14 and 4.15)

The prime responsibility of a colposcopist is to identify the preclinical invasive carcinoma. It is seen as rough, opaque, oyster egg white, raised acetowhite area with raised uneven surface. Breaking mosaics, atypical blood vessels are feature of microinvasice carcinoma. Atypical blood vessels have bizzare shape like waste thread, tendril, comma, corkscrew, etc.

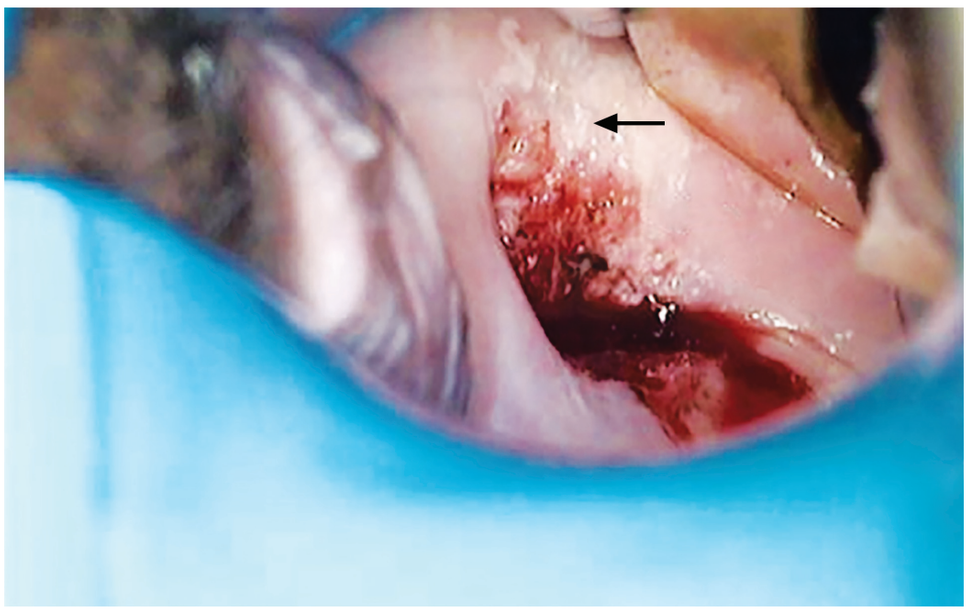


Fig. 4.14: Preclinical invasive carcinoma (arrow) on 5% acetic acid application—rough, oyster egg white, raised acetowhite area arising from SCJ with definite margins showing with margins. Coarse punctations and coarse mosaics, umbilications clearly noted on the lesions

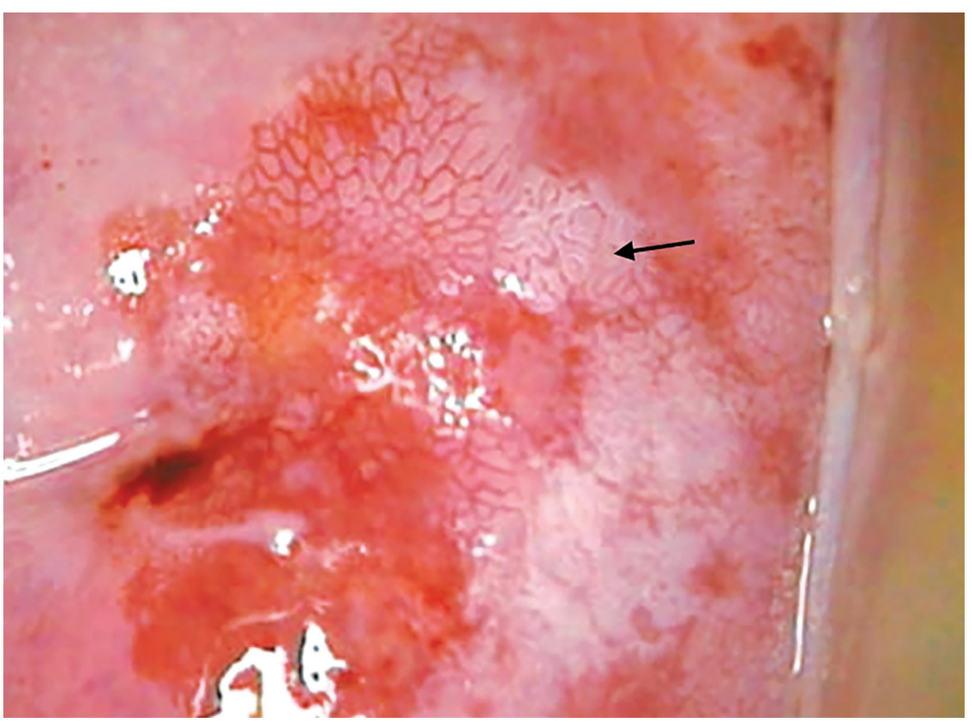


Fig. 4.15: Preclinical invasive carcinoma (arrow) on acetic acid: Dense, thick, rough, oyster egg acetowhite areas raised coarse mosaic

INVASIVE CARCINOMA (Figs 4.16a to c)

Invasive carcinomas on application of acetic acid appear thick, dense, opaque with rough, undulated surface, turning chalky white immediately and persisting for quite some time. They show lesion within lesion and have variegated appearance.

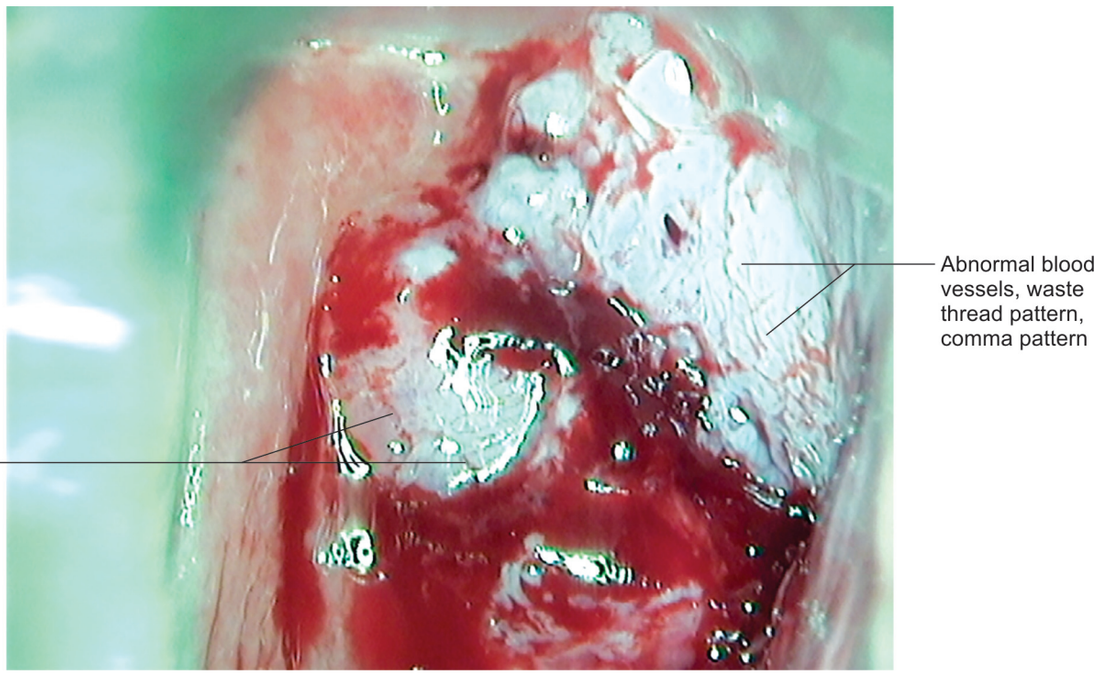


Fig. 4.16a

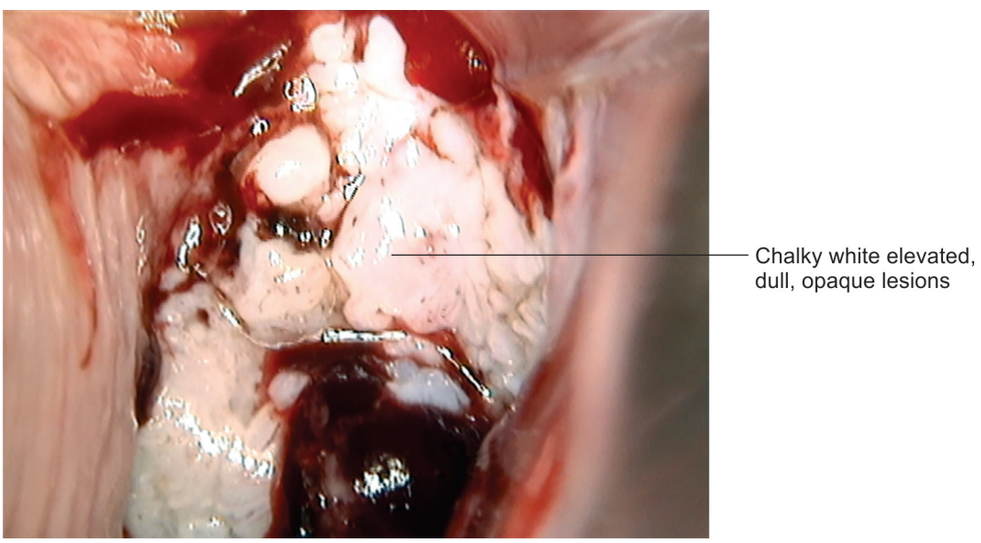


Fig. 4.16b

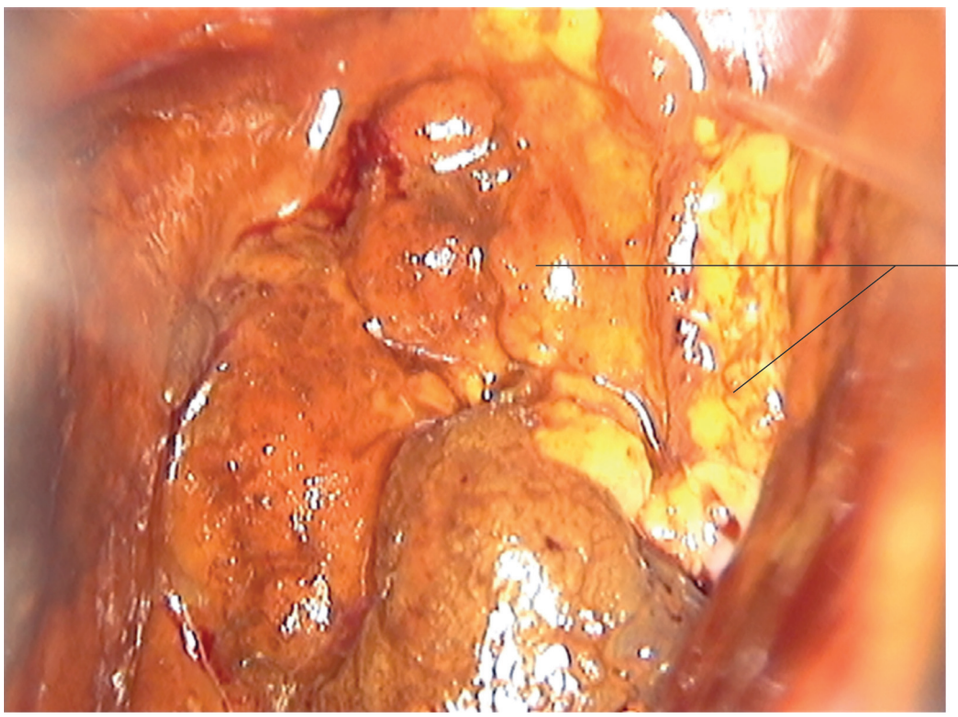


Fig. 4.16c

ADENOCARCINOMA *IN SITU* (Figs 4.17a–c and 4.18a, b)

They are the precancerous lesions arising from the columnar epithelium usually found in the TZ area. The normal columnar epithelium is replaced by abnormal epithelium showing loss of polarity, altered size and shape with

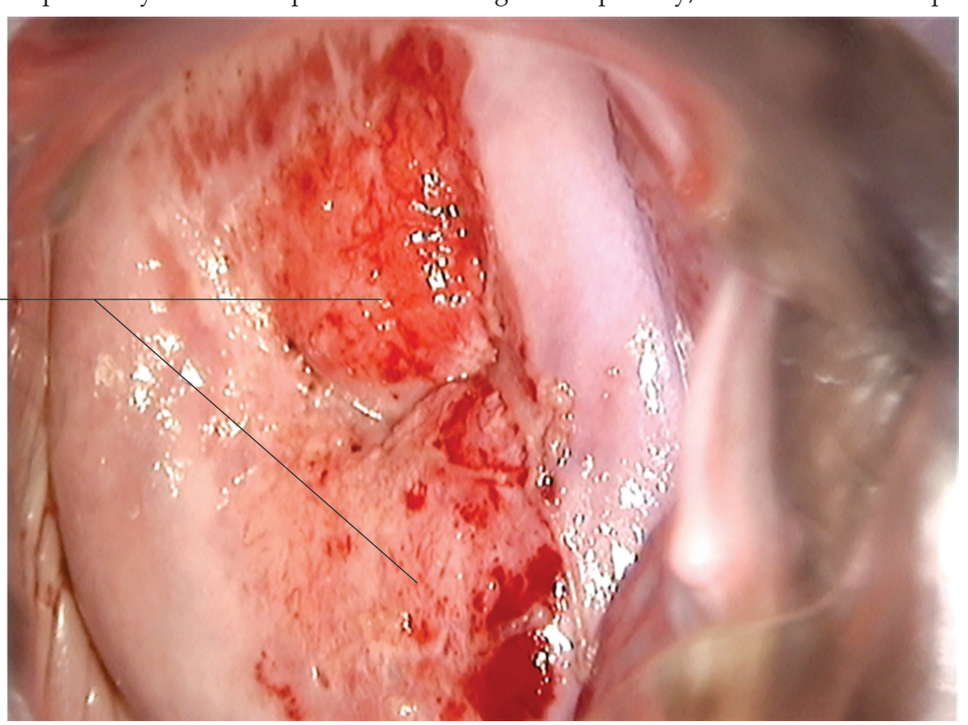


Fig. 4.17a

nuclear pleomorphism, hyperchromasia, raised mitotic activity. Abnormal glands with intraluminar cellular projections are noted. Depending on the cell type, AIS is classified as:

- Endocervical
- Endometrioid
- Intestinal
- Mixed cell types.

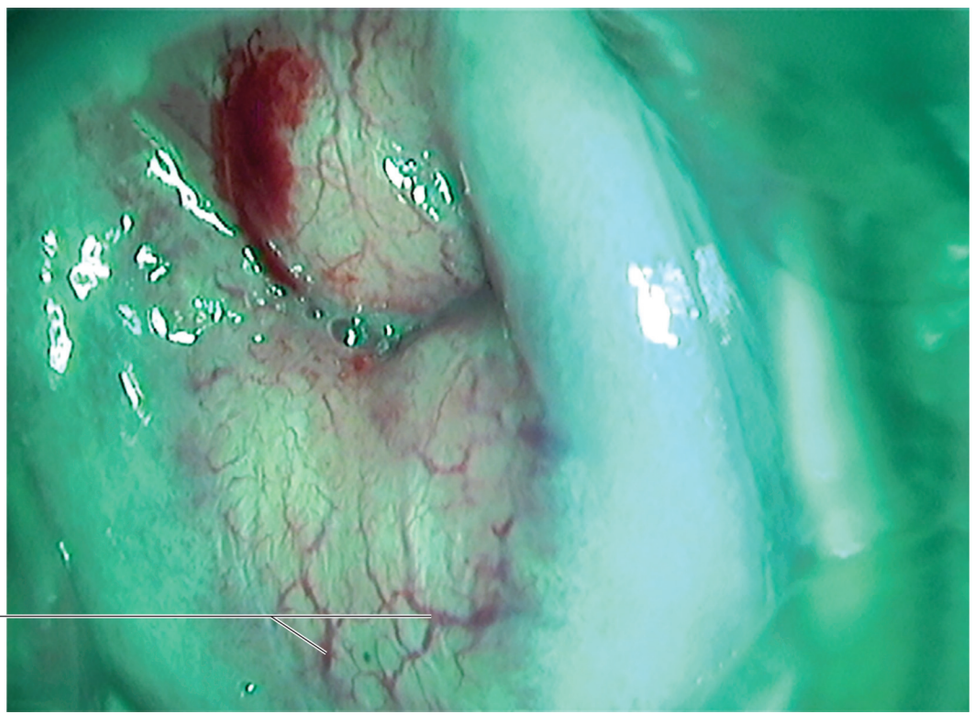


Fig. 4.17b

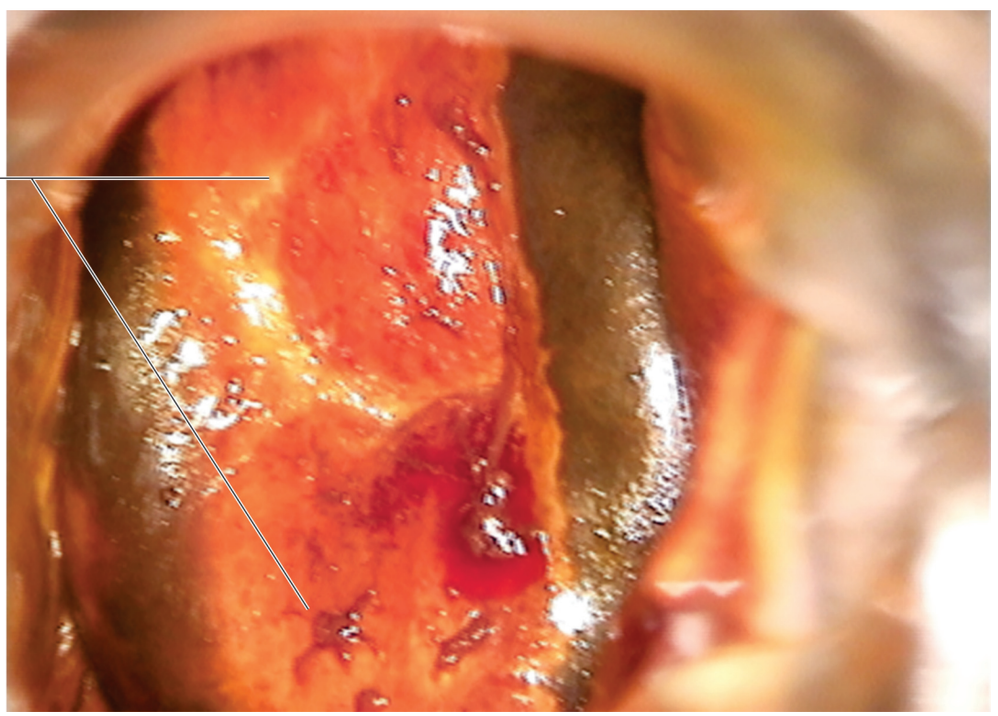


Fig. 4.17c

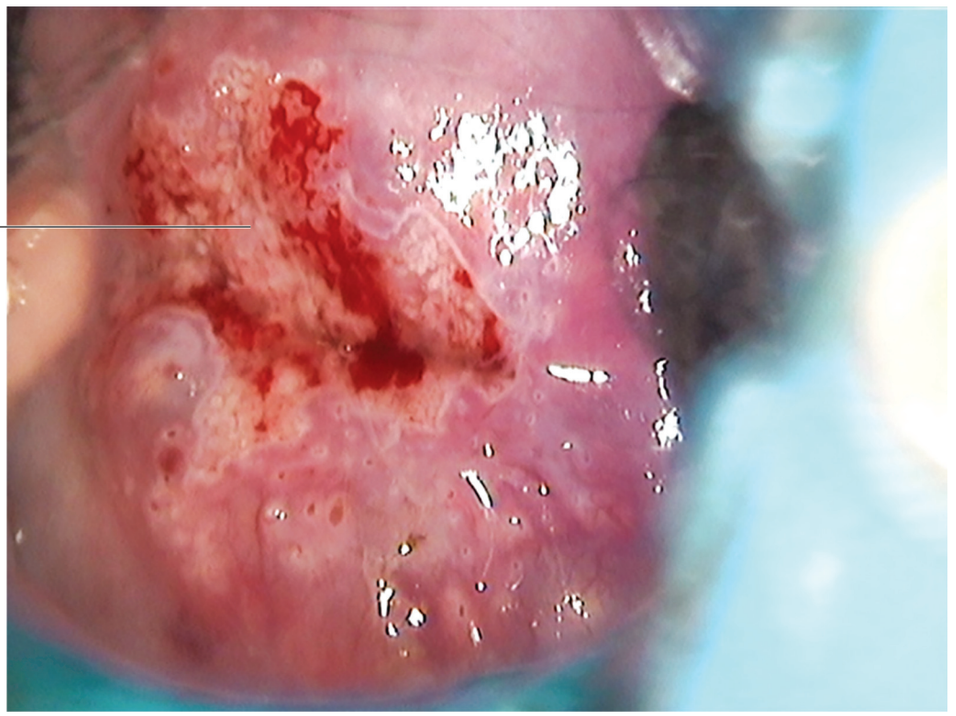


Fig. 4.18a

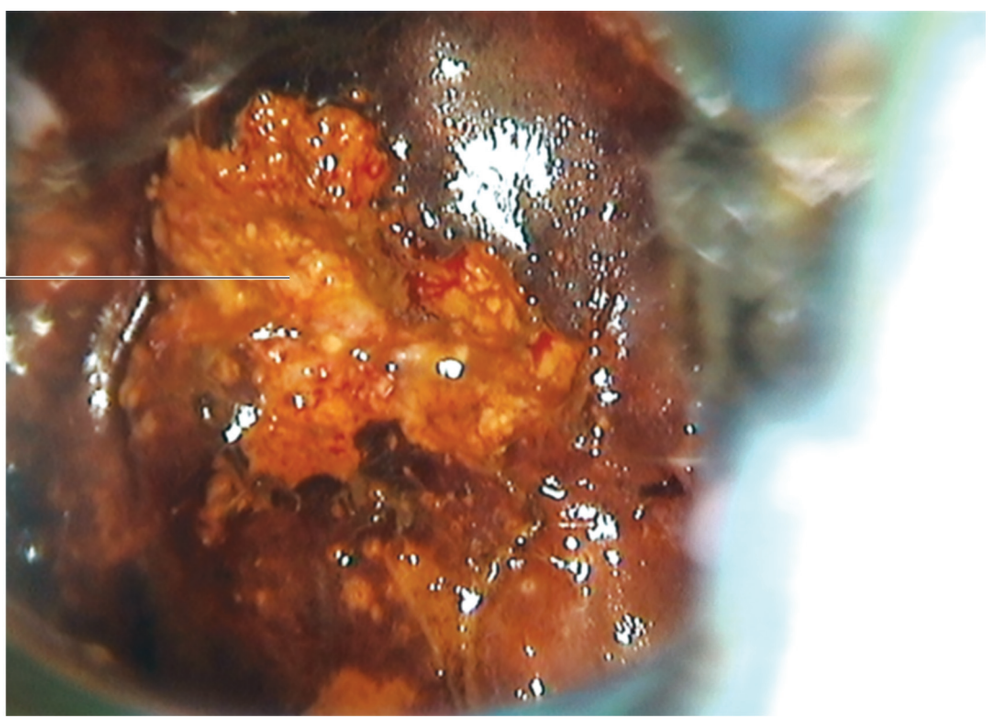


Fig. 4.18b

CHAPTER

5

Vaginal Intraepithelial Neoplasia (VAIN)

VAIN is a condition that denotes premalignant histological findings in the vagina, which is characterized by dysplastic changes. It is a rare condition but colposcopist has to keep this in mind so as not to miss the diagnosis. While performing colposcopy, the vagina has to be smeared with acetic acid to note any acetowhite areas. These areas do not turn brown on Lugol's iodine application; whereas the normal vaginal mucosa turns dark brown.

CASE OF NECROTIC CERVICAL GROWTH EVALUATED FOR THE VAGINAL INVOLVEMENT (Figs 5.1a to e)

It is preferable to know the extent of vaginal involvement in the case to excise beyond that margins in radical surgery.

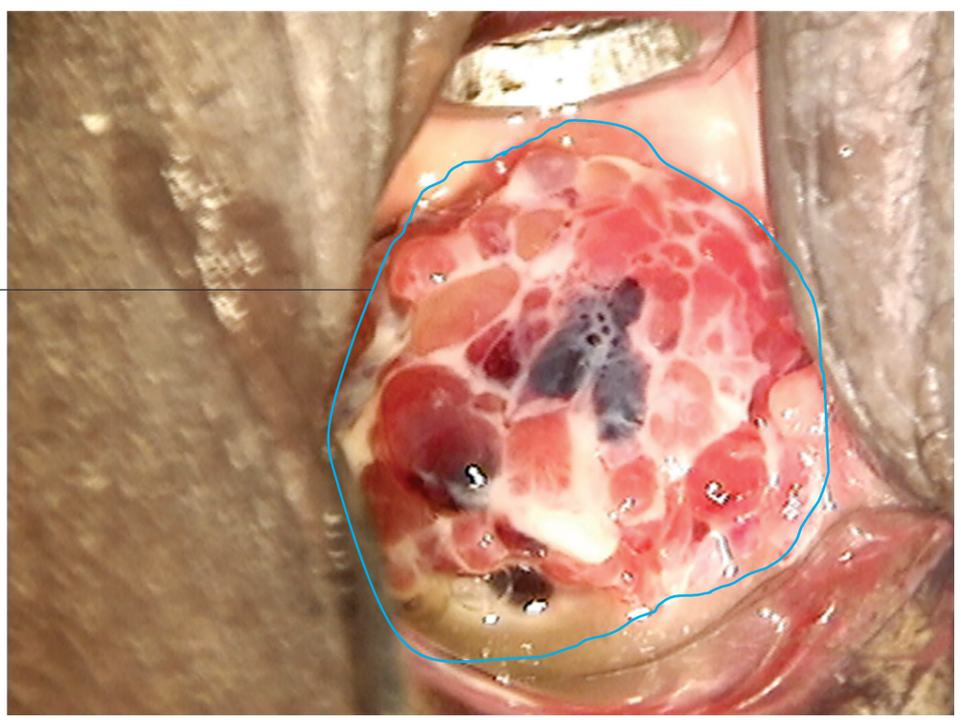


Fig. 5.1a: Necrotic cancer growth flushed with the cervix

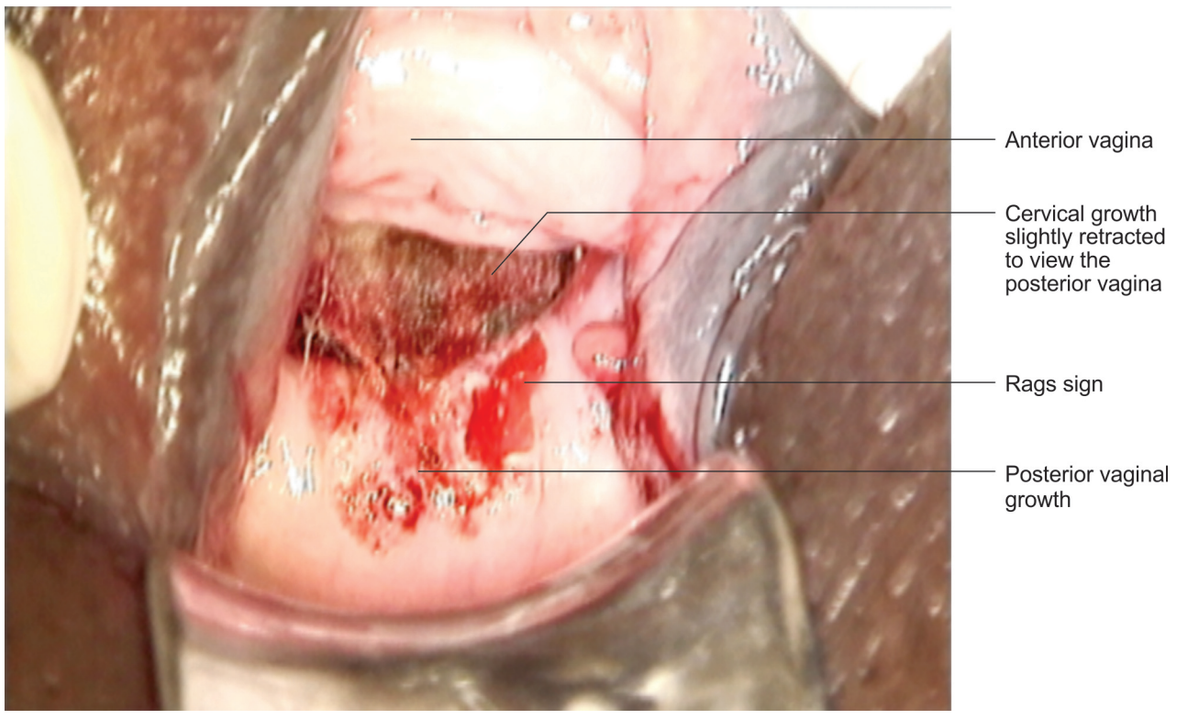


Fig. 5.1b: Vaginal extension of invasive squamous cell cancer

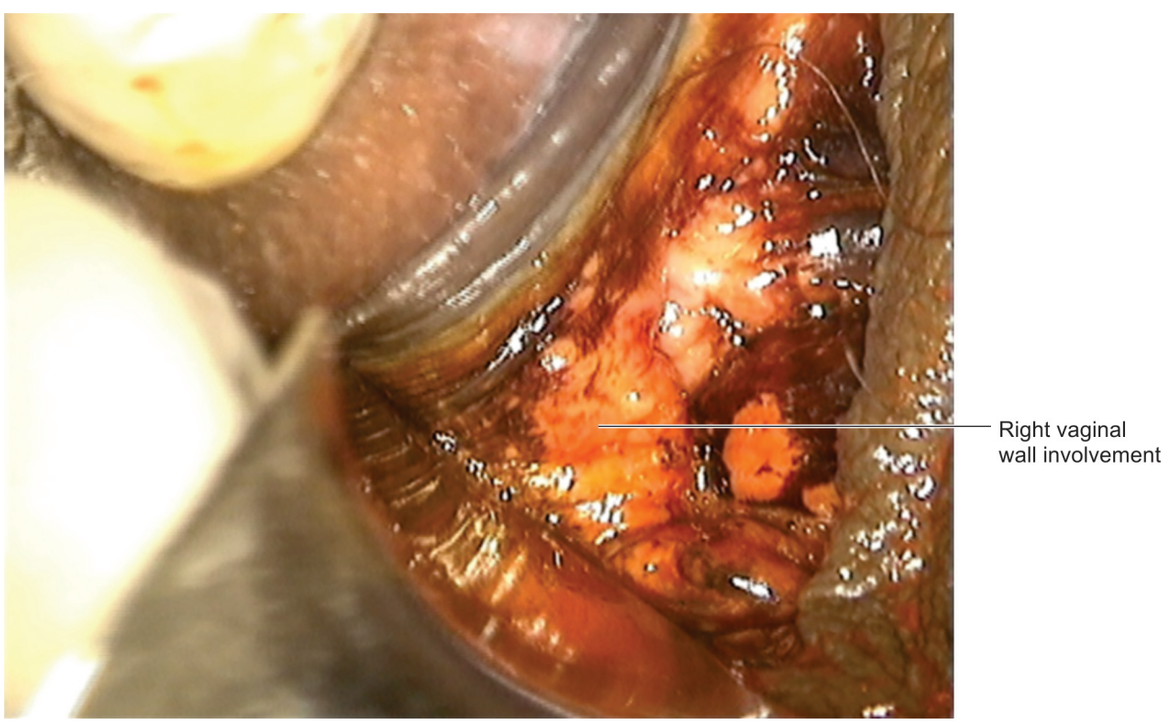
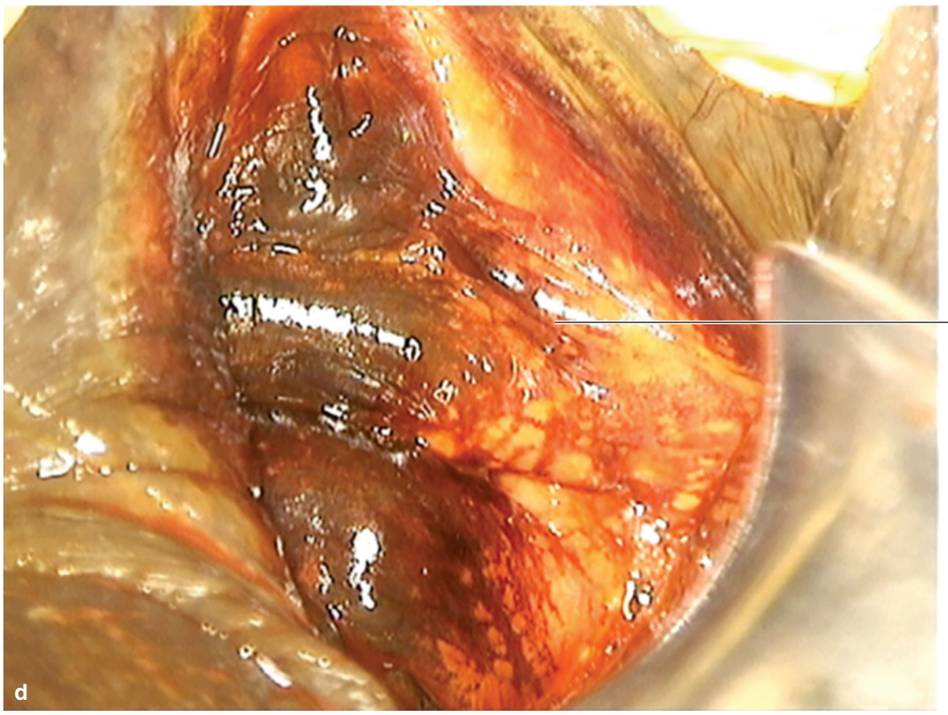
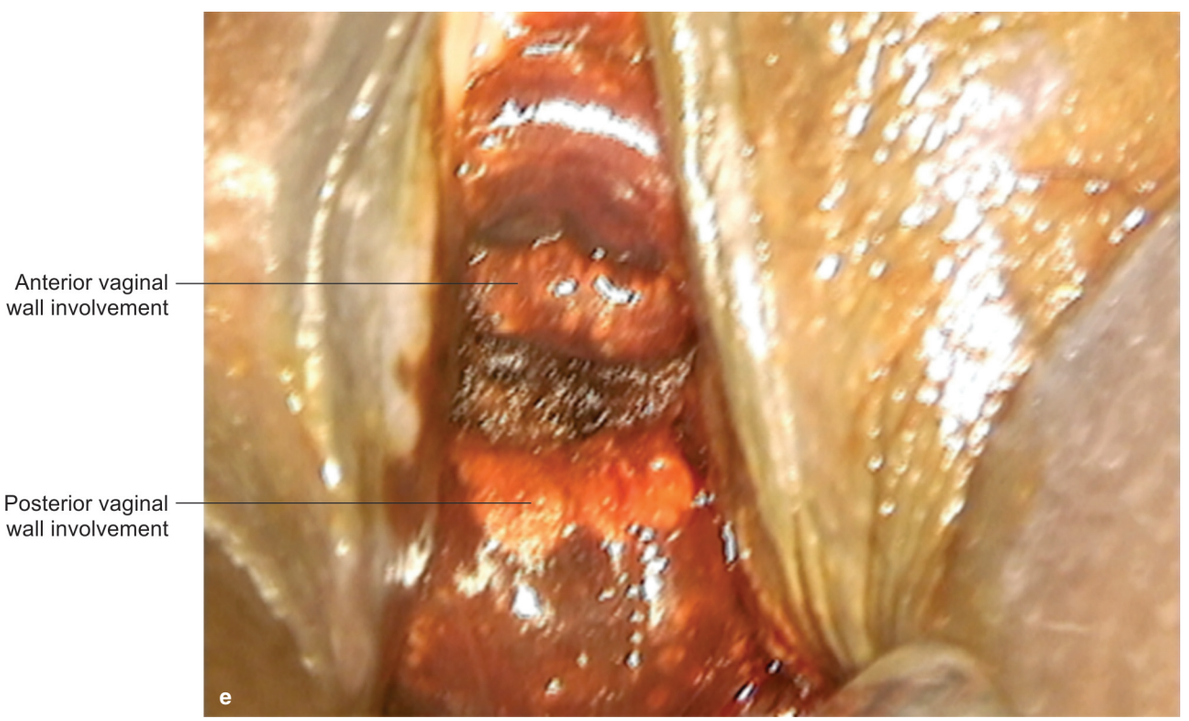


Fig. 5.1c: Demarcation of the extent of vaginal involvement in SCC





Figs 5.1d and e: Demarcation of the extent of vaginal involvement

VAULT COLPOSCOPY

Vault colposcopy is usually recommended for cases who have undergone hysterectomy for precancerous or cancerous lesions. Cytology is usually done along with colposcopy annually. If 3 consecutives annual check-up is negative, she can be put in 5 yearly surveillance protocol.

Healthy vault: On application of 5% acetic acid, there is no acetowhite area or discolouration of vault (Fig. 5.2).

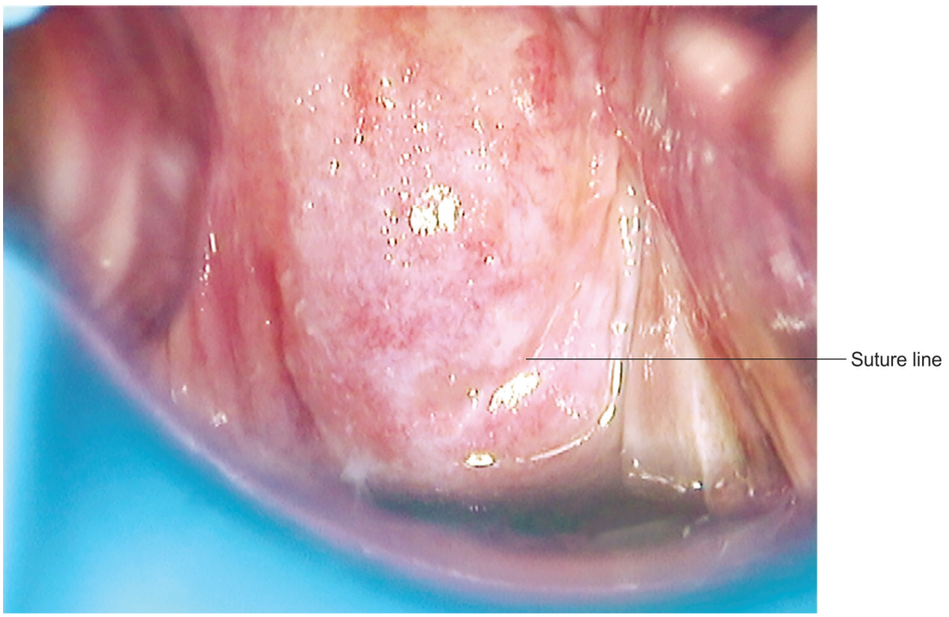


Fig. 5.2: Healthy vault

LEFT OUT CERVIX IN SUBTOTAL HYSTERECTOMY

Many a times, during obstetric hysterectomy, subtotal hysterectomy is performed leaving behind cervix. This is also encountered while performing hysterectomy in case of severe bladder adhesions, previous surgeries or endometriosis. In such cases, colposcopy examination reveals the left over cervical tissue (Fig. 5.3).

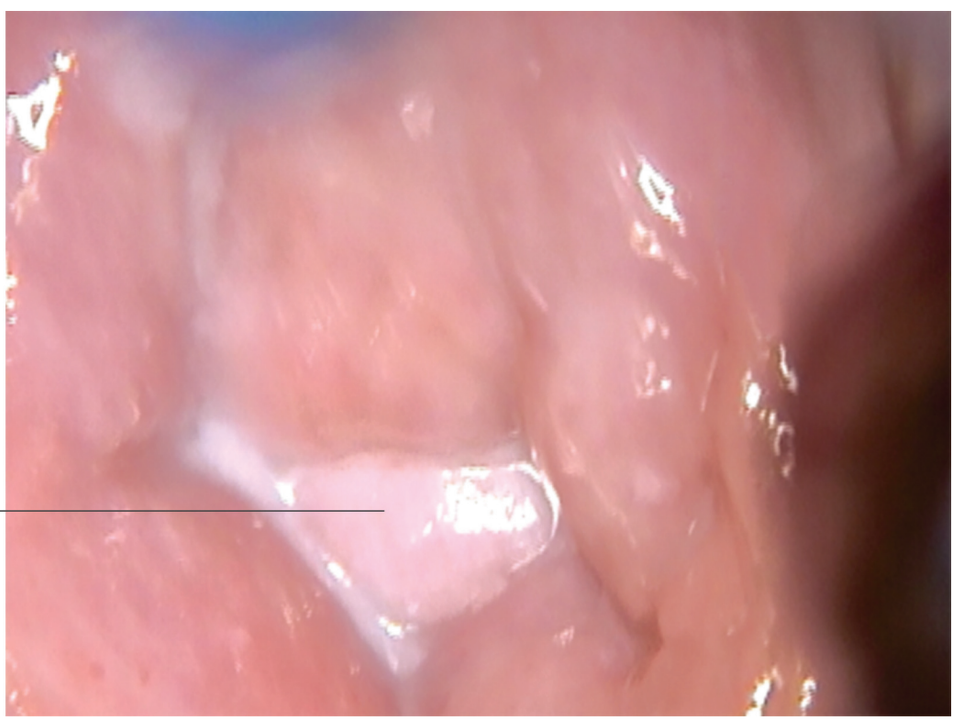


Fig. 5.3: Left out cervix in subtotal hysterectomy

Vault neoplasia (Fig. 5.4) is sometimes seen in case of SCC who have undergone radical hysterectomy.

The vault carcinomas are usually recurrent cervical cancers.

On application of 5% acetic acid on the vault, rough, dense acetohite lesions are noted, they can have rags sign (Fig. 5.5). On Lugol's application, the lesion appears mustard yellow (Fig. 5.6). In advance stage, vault carcinoma appears as growth on the vault, which bleeds on touch (Fig. 5.7).

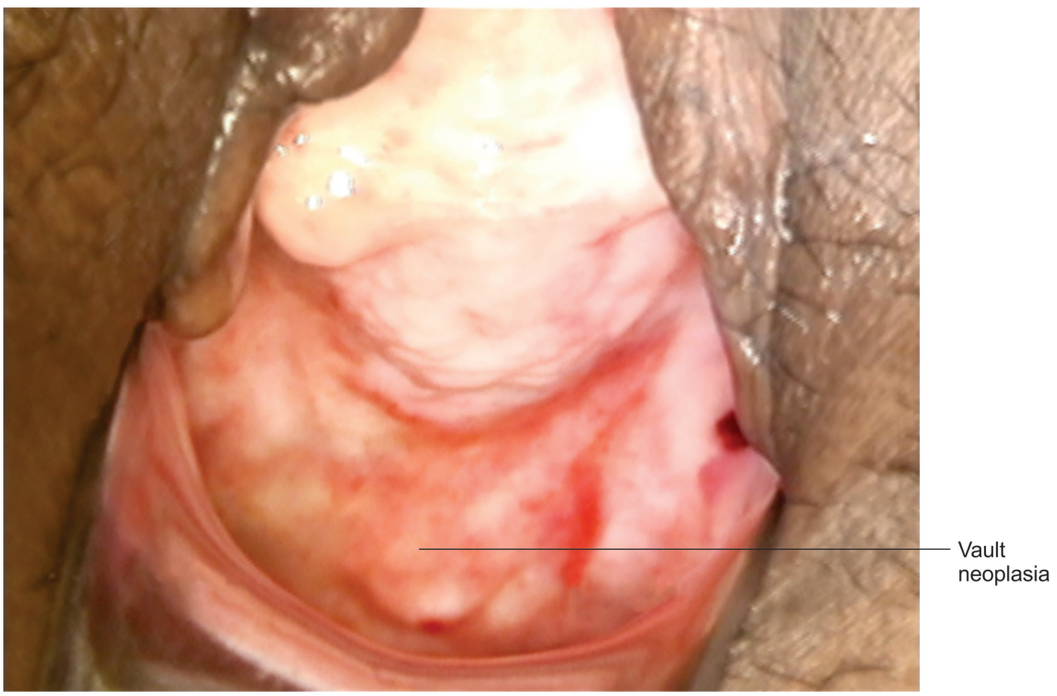


Fig. 5.4: Vault carcinoma—post-radical hysterectomy done for SCC

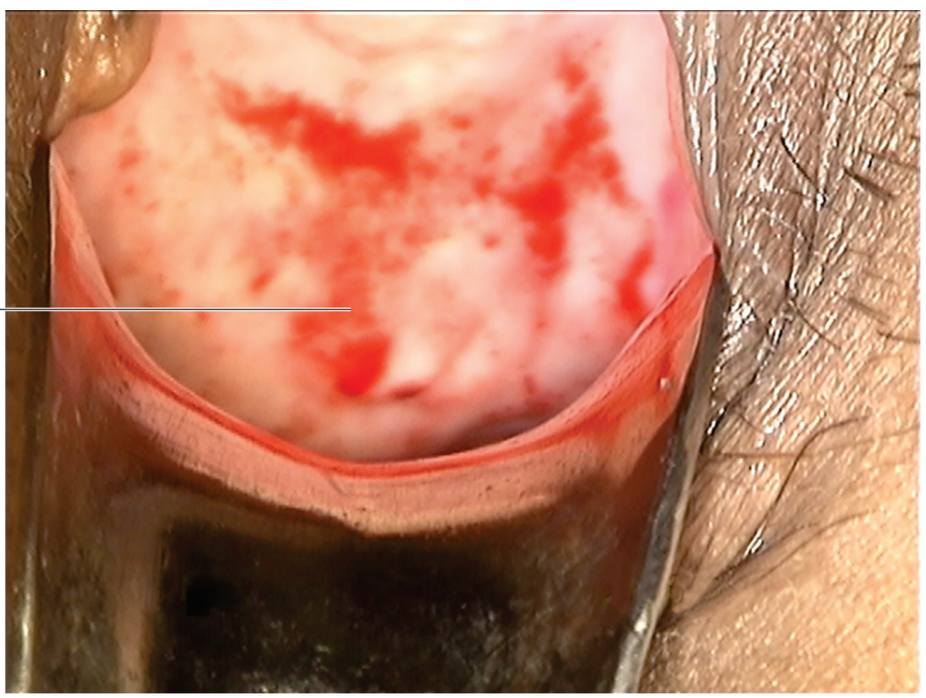


Fig. 5.5: Vault neoplasia on application of 5% acetic acid

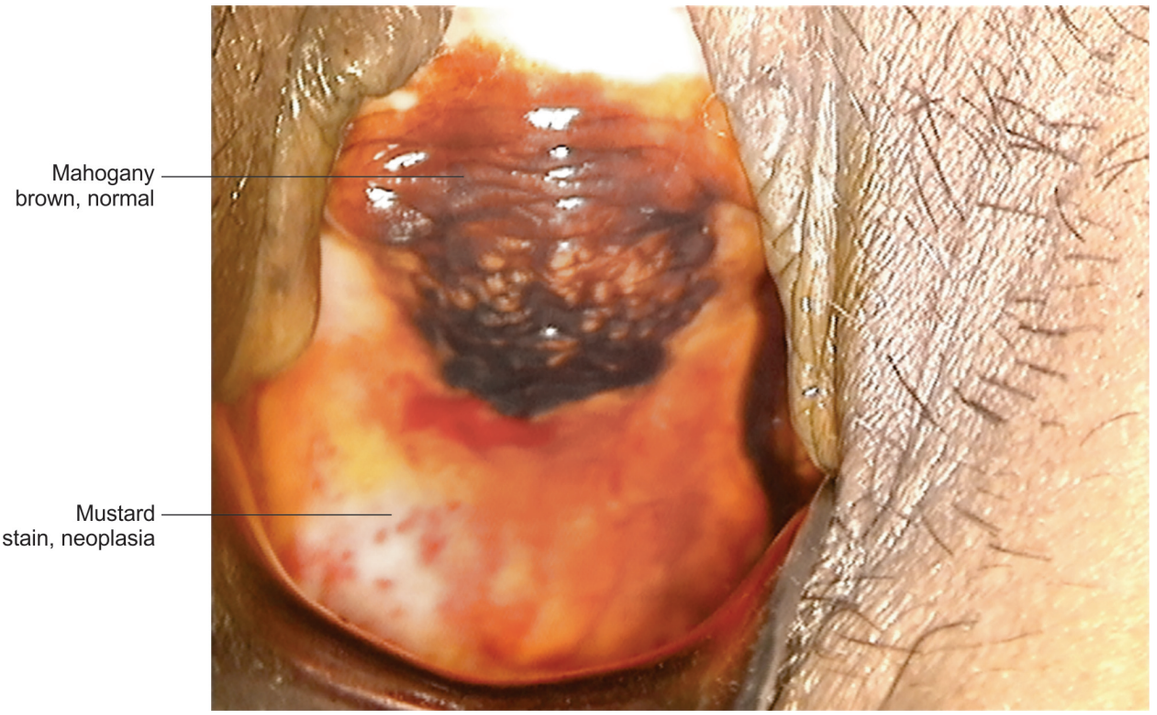


Fig. 5.6: Vault neoplasia—Lugol's iodine

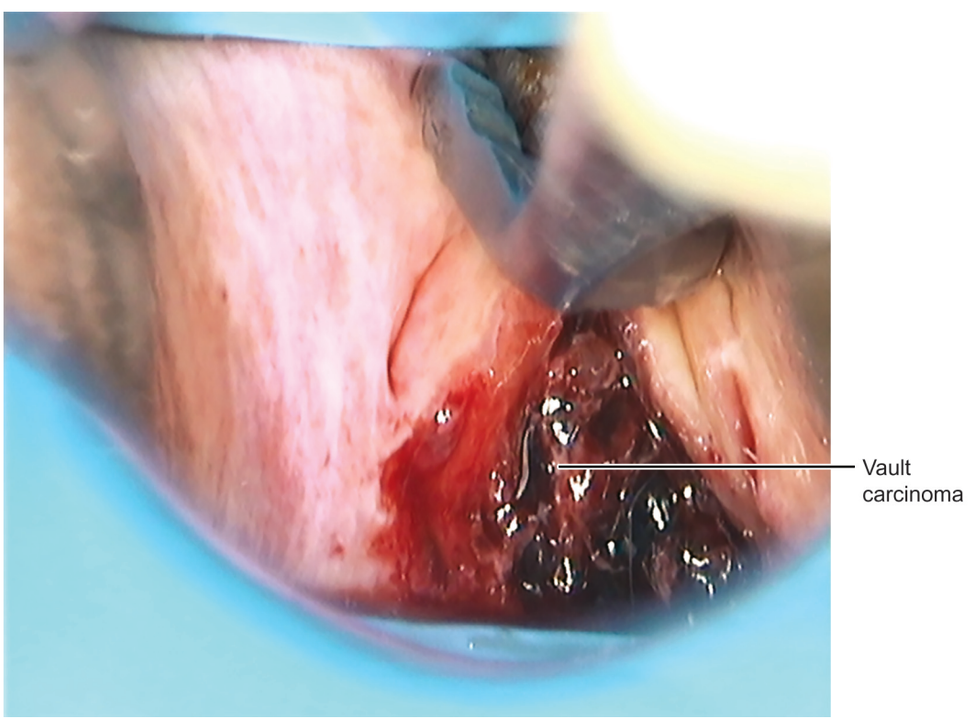


Fig. 5.7: Vault carcinoma

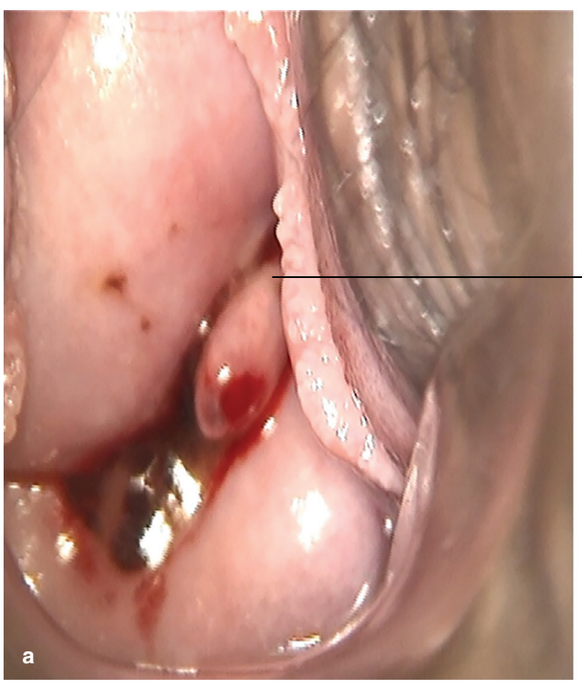
CHAPTER

6

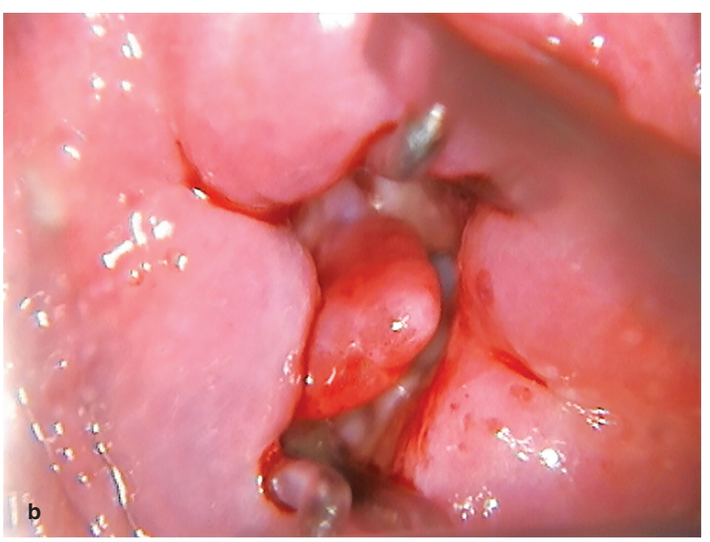
Different Conditions of Cervix

1. ENDOCERVICAL POLYP (Figs 6.1 and 6.2)

A cervical polyp is an overgrowth and enlargement of single columnar epithelial papillae which appears as reddish mash protruding from the cervical os.



Cervical polyp, the stalk is seen very prominently in endocervical speculum examinations



Figs 6.1a and b: Endocervical polyp

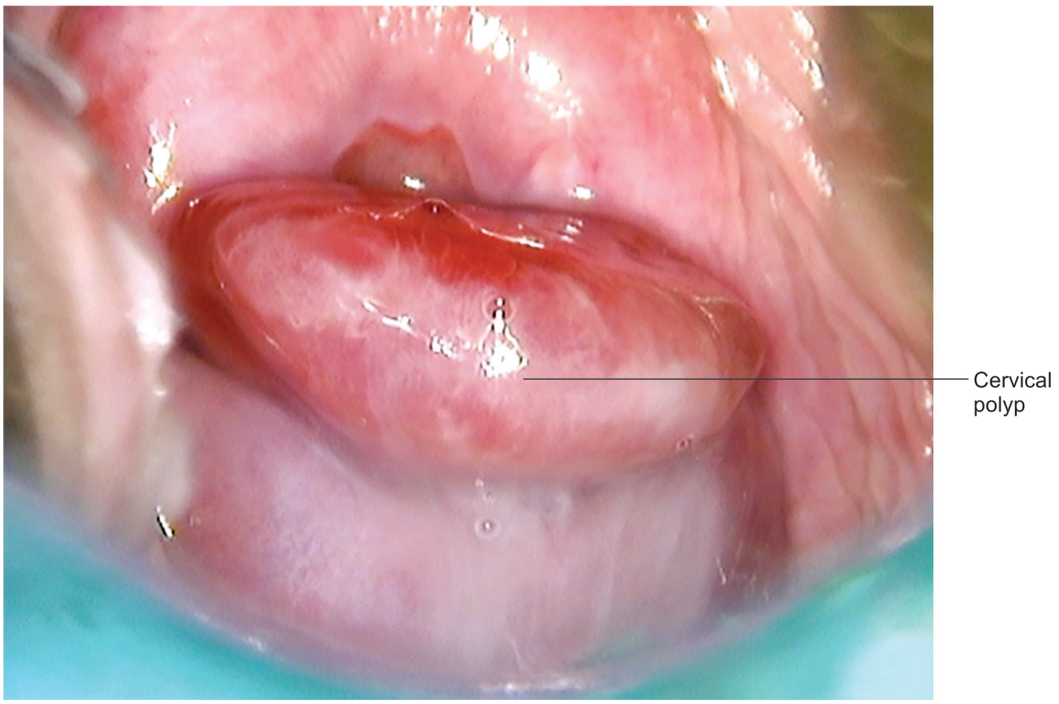


Fig. 6.2: Endocervical polyp

2. CERVICAL ENDOMETRIOSIS (Fig. 6.3a to c)

This is a rare entity found as cigar burn spots or blackish spots on the cervix, many a times ECC (endocervical curettage) specimen sent for HP reveals endometrial glands. Many a times, the endocervical cells are scanty. The features on HP suggest cervical endometriosis.

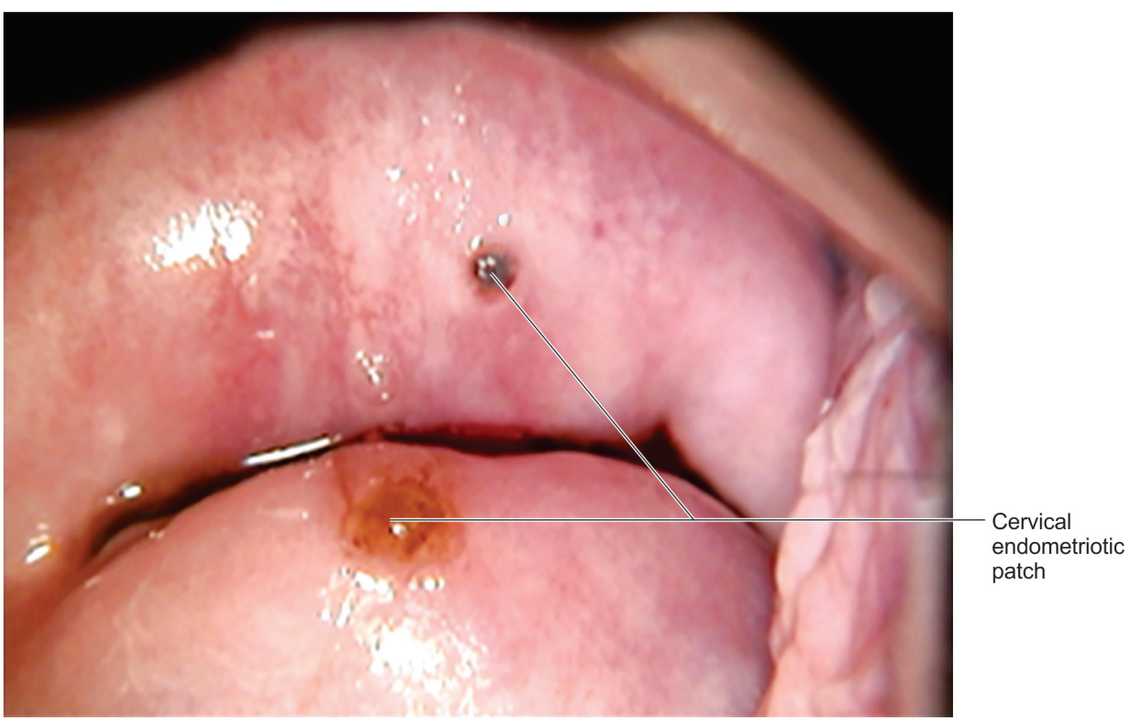


Fig. 6.3a: Cervical endometriosis had a case of post-coital bleeding

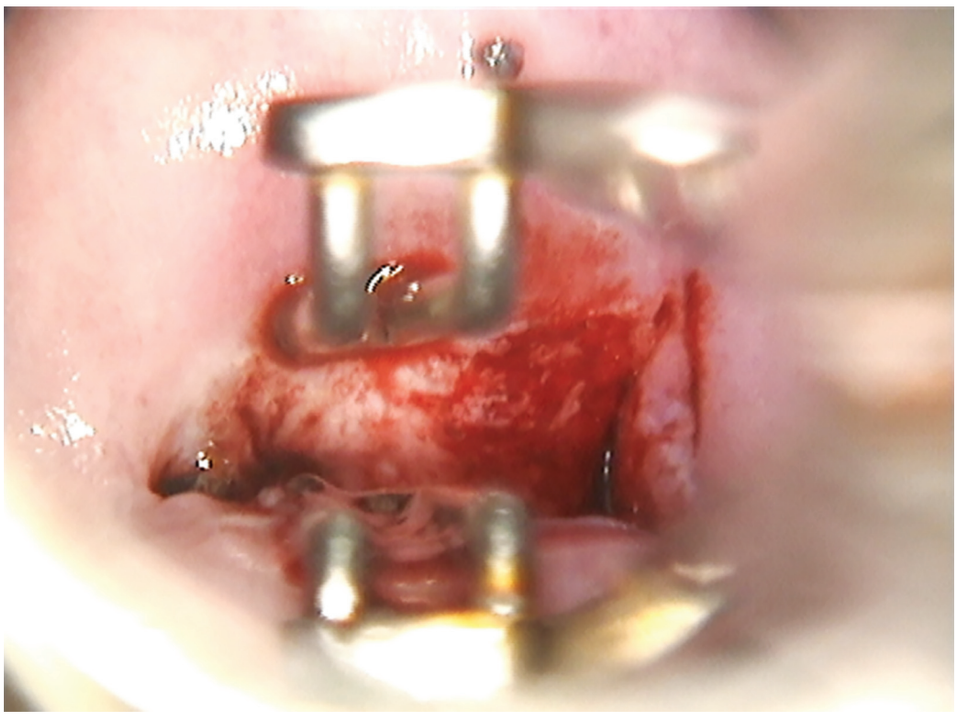


Fig. 6. 3b: Endocervical speculum examination of cervical endometriosis case, endocervical curettage HP-endometrial glands

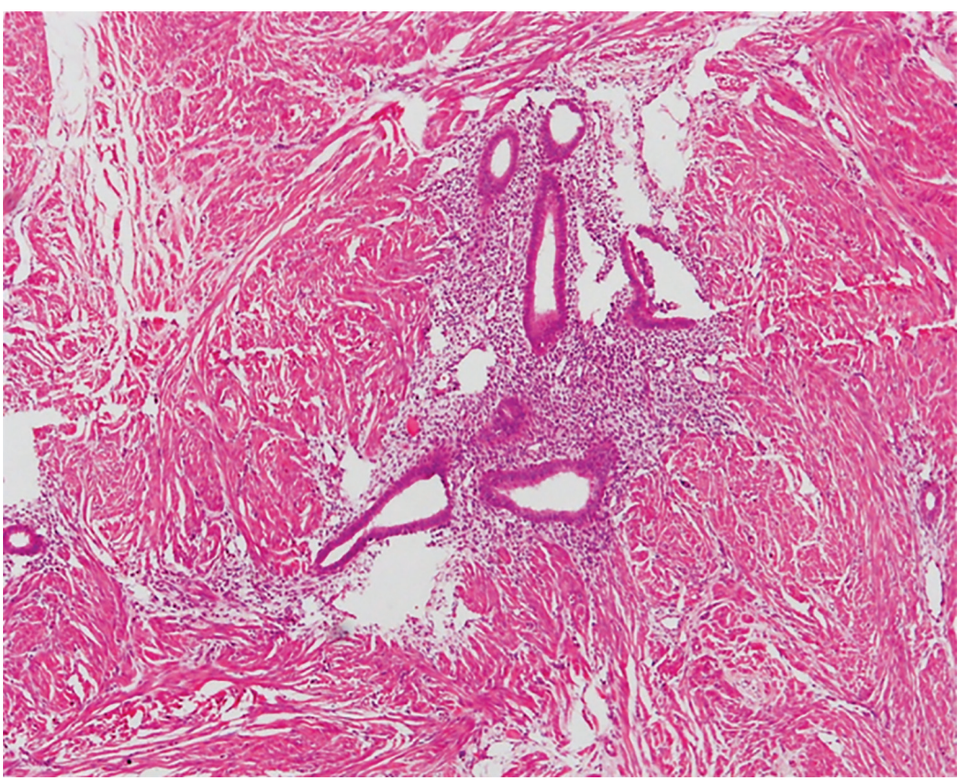


Fig. 6.3c: Histology of endometriosis

3. HYPERKERATOTIC PATCH (Fig. 6.4)

Hyperkeratotic patches are seen as white patch even without application of acetic acid due to high accumulation of keratin due to old trauma.

Fig. 6.4: Hyperkeratotic patch

4. CERVICAL FIBROID

Tough fibroid growth from endocervix protruding from the cervical os (Figs 6.5a to d).

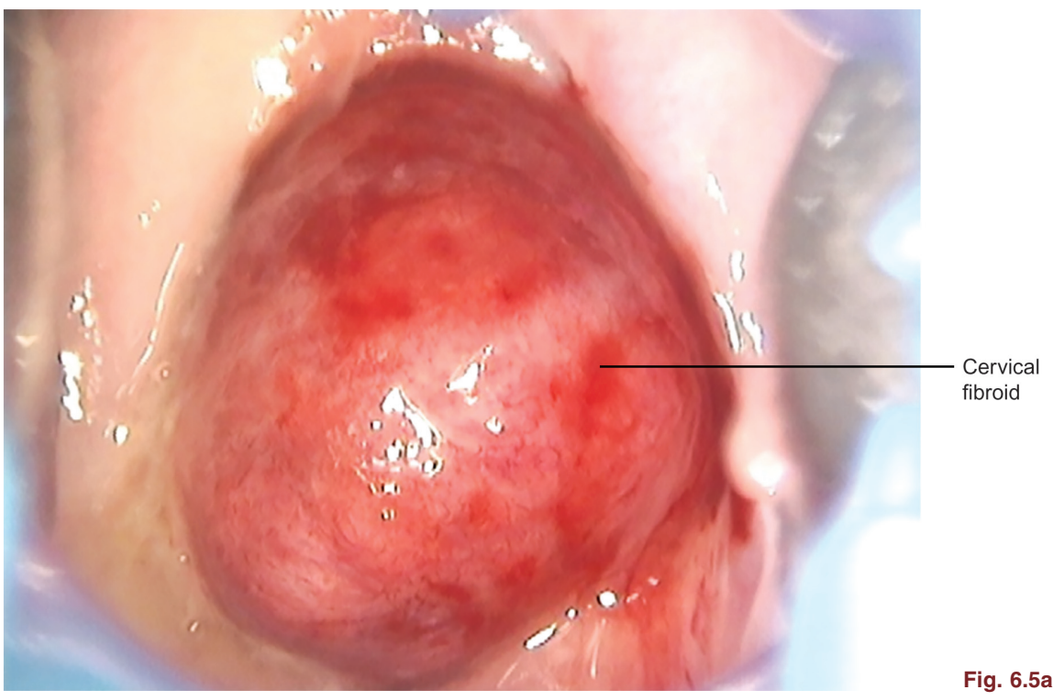


Fig. 6.5a

Cervical fibroid removal can be performed during colposcopy examination, there is no need for GA/LA. This can be easily removed during the same sitting with ovum forceps/sponge holder forceps and given for HP.

Fig. 6.5b

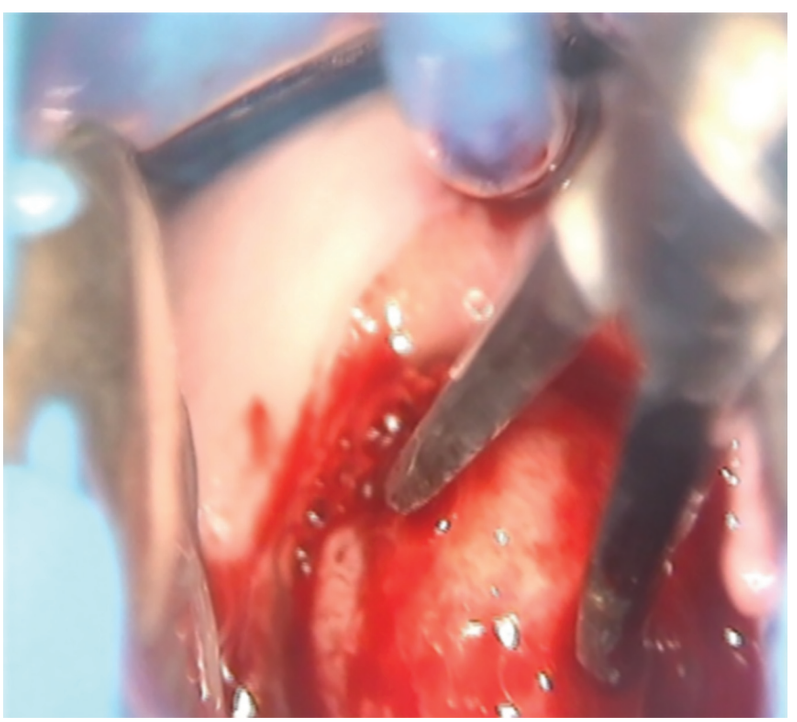


Fig. 6.5c

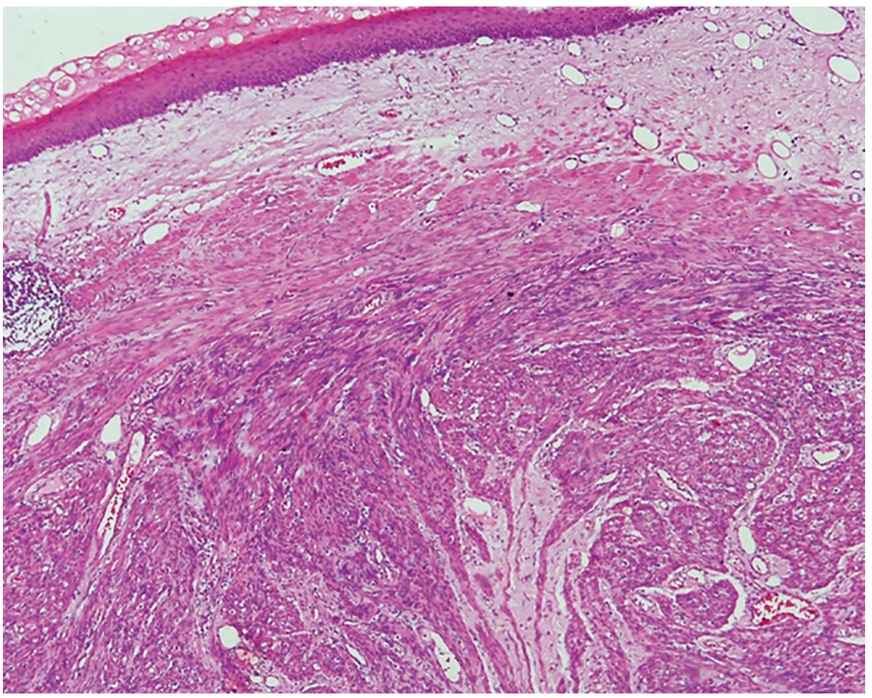


Fig. 6.5d

5. MENOPAUSAL AGE

The epithelium is thin, atrophic, lusterless. Application of acetic acid causes petechial hemorrhage (Fig. 6.6a). Due to lack of superficial stratified epithelium, Lugol's iodine uptake is negative (Fig. 6.6b).

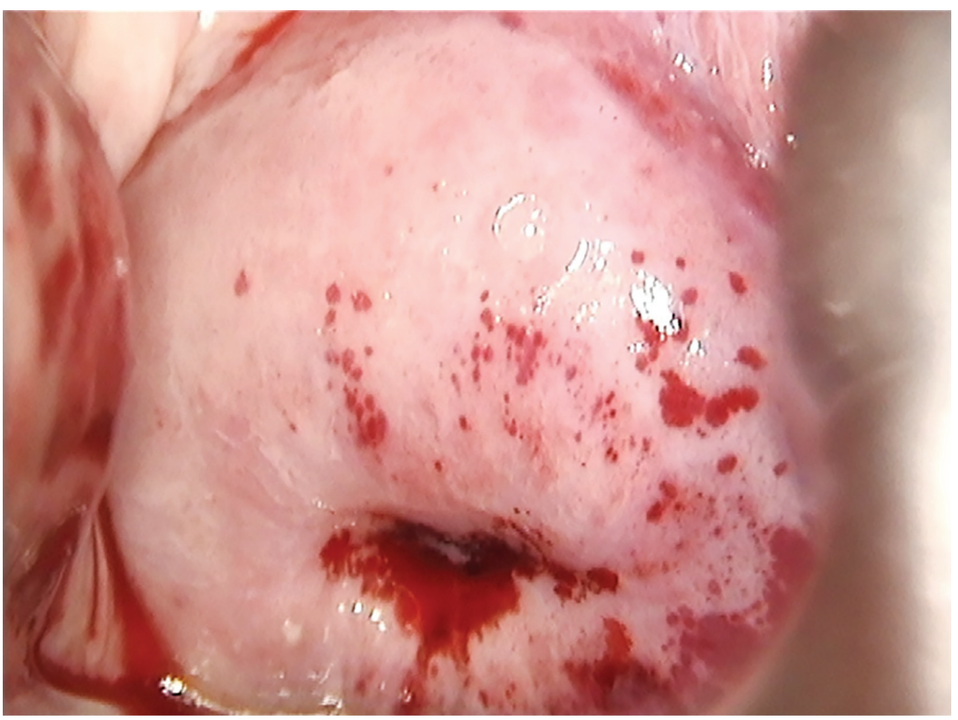


Fig. 6.6a

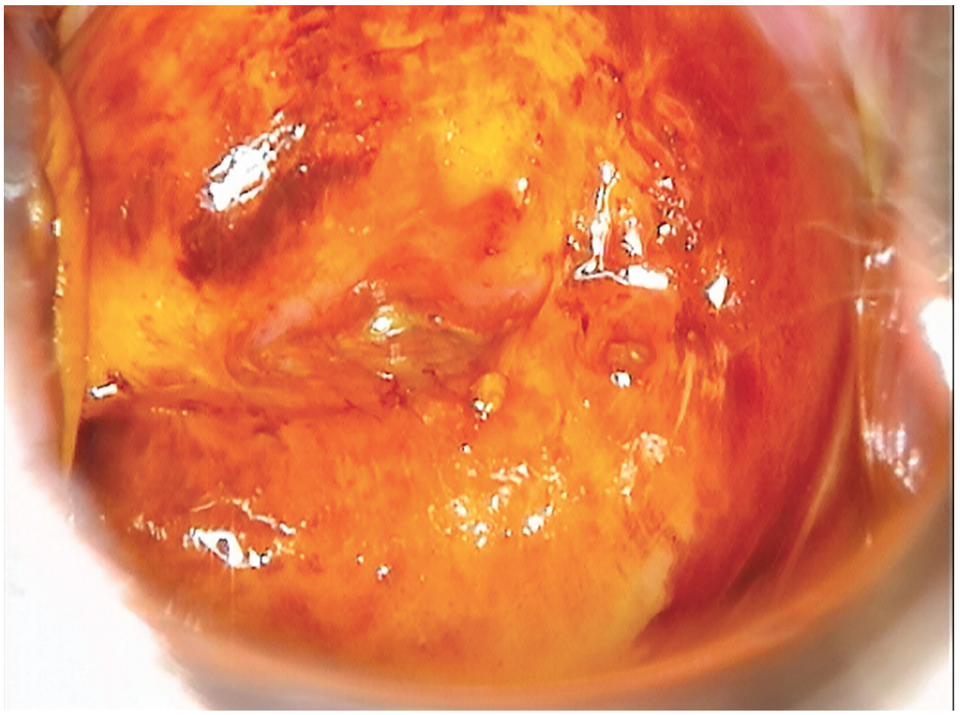


Fig. 6.6b

6. COLPOSCOPY IN CHALLENGING CASES LIKE MULLERIAN ANOMALIES (Figs 6.7a to d)

While routine examination, we may come across cases with mullerian anomalies like vaginal septum.

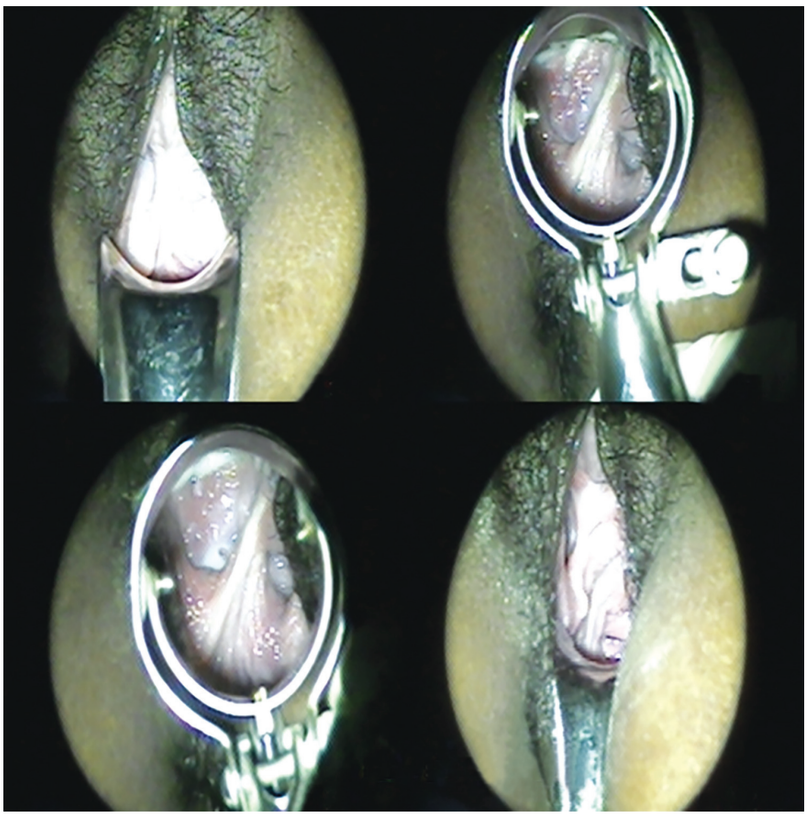


Fig. 6.7a: A complete vaginal septum

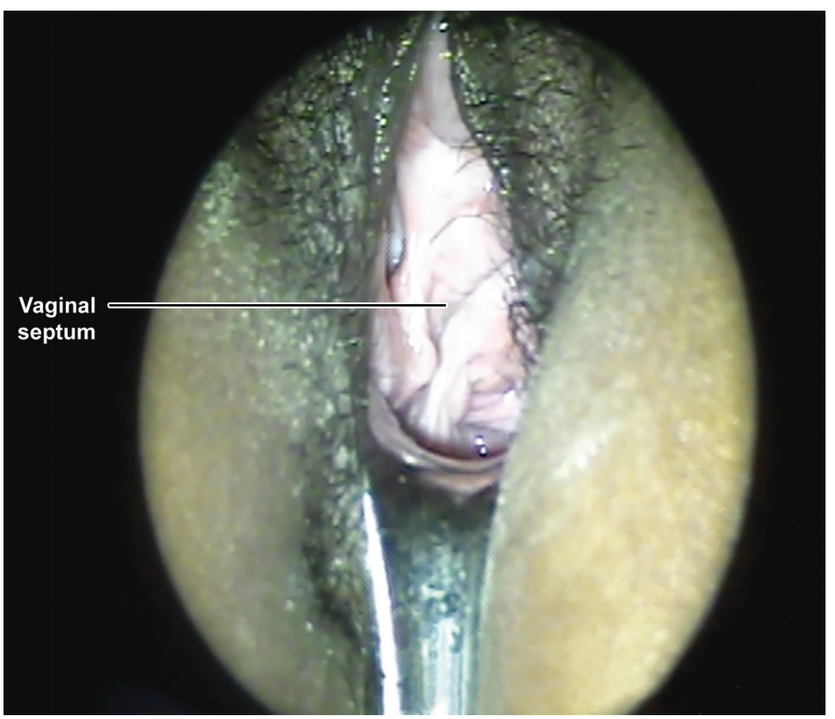


Fig. 6.7b: Complete vaginal septum noted during colposcopy examination

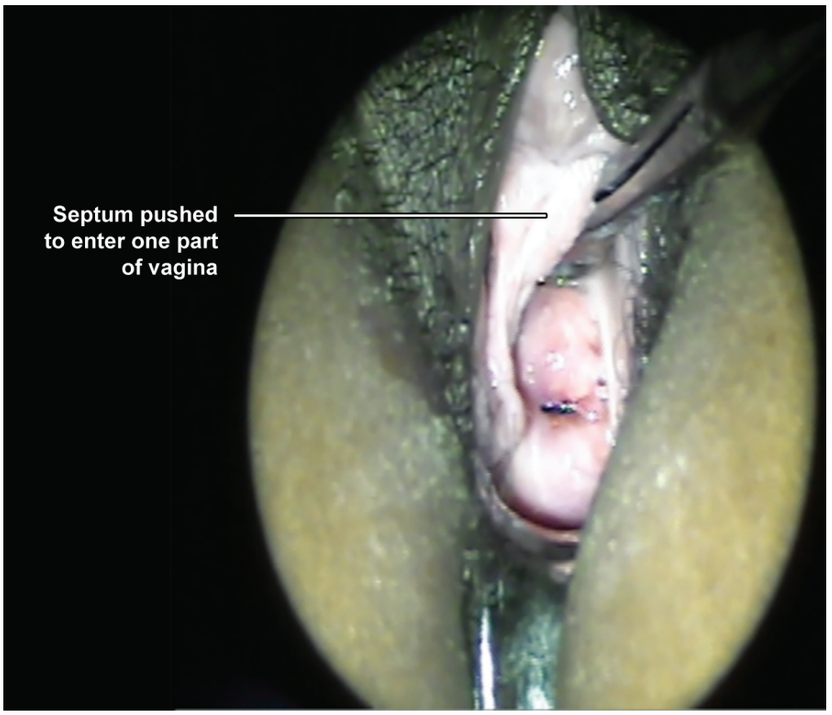


Fig. 6.7c: Cervix is located in one vaginal opening

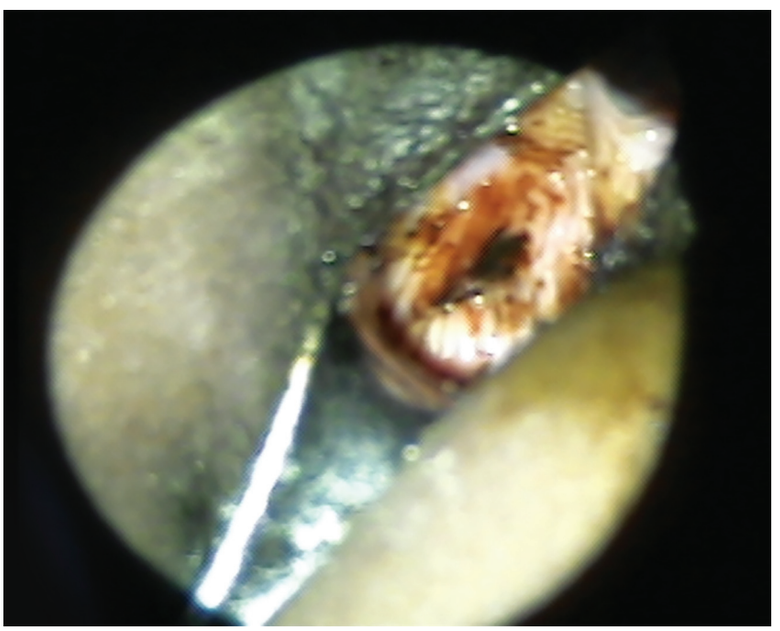


Fig. 6.7d: The second vaginal opening is blind pouch

While performing colposcopy in such cases, one has to judiciously understand the anomaly. A through examination should be done to identify the cervix. In such cases, using of Sims vaginal speculum and anterior vaginal wall retractor is beneficial rather than Cusco's speculum.

Double cervical opening detected during colposcopy (Figs 6.7e to g).

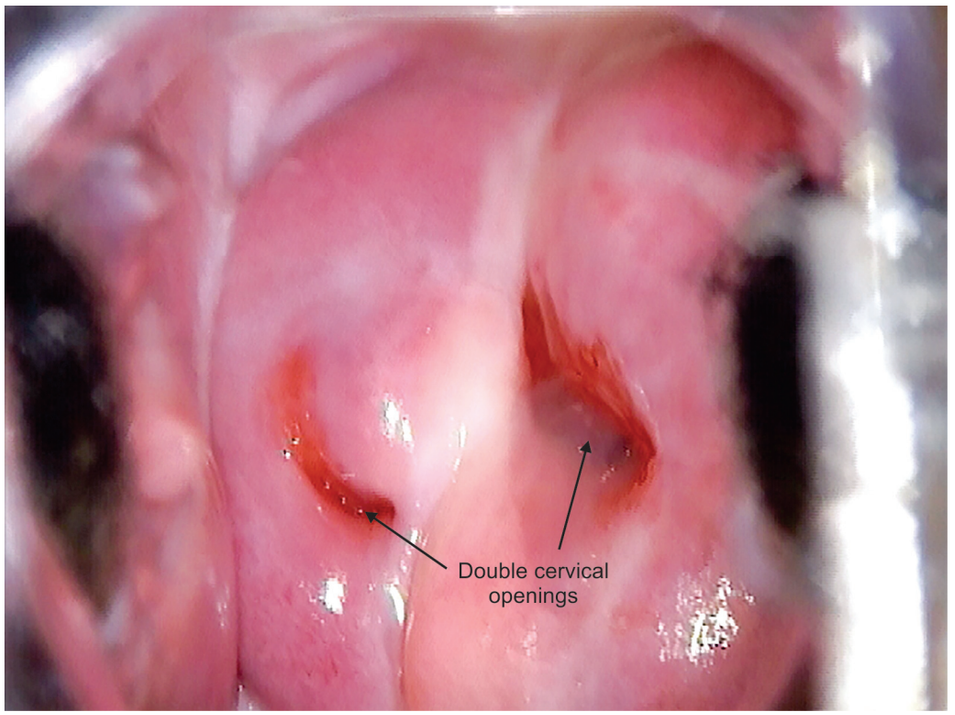


Fig. 6.7e

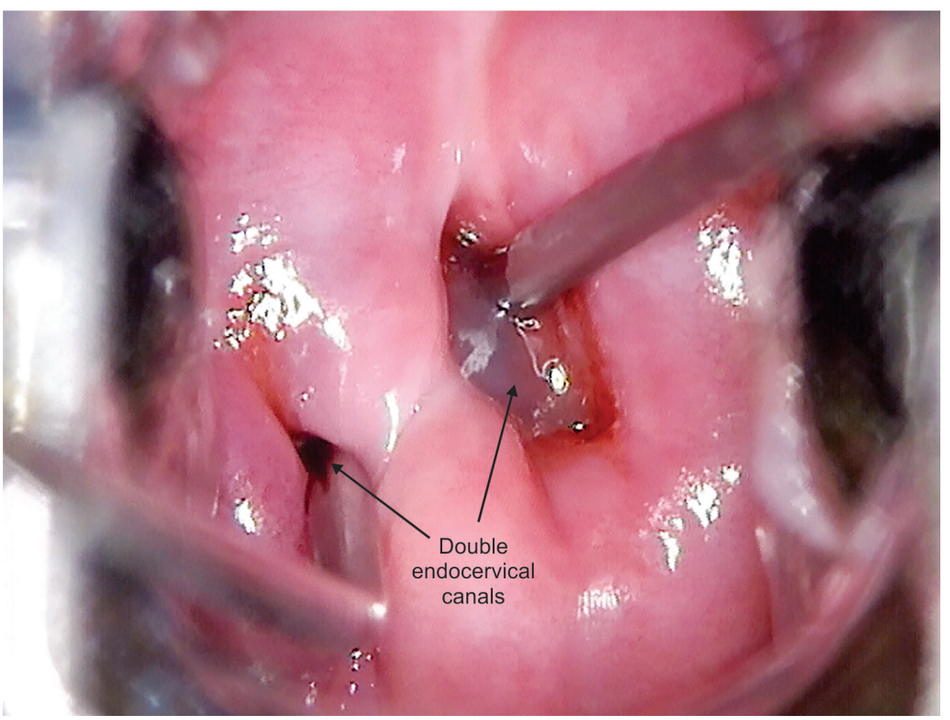


Fig. 6.7f

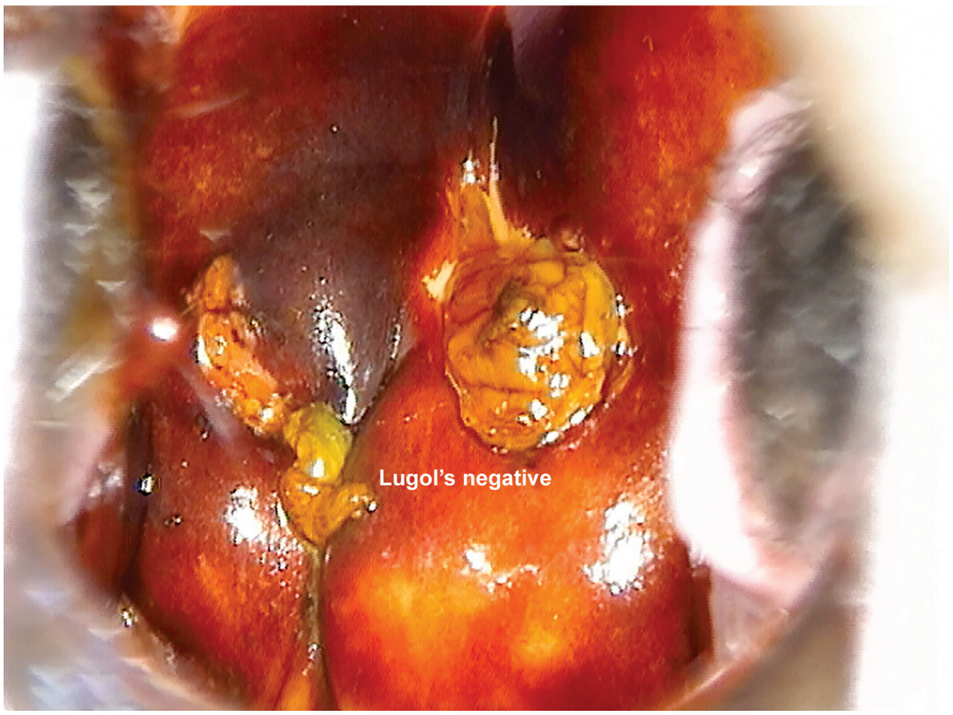


Fig. 6.7g

Real-time pelvis ultrasound report (TVS) of the case discussed above from Figs 6.7e to g

- Anatomically normal urinary bladder. Bicornuate uterus noted with two uterine cervix represents bicornuate bicollis uterus.
- Right uterine horn measuring 5.4 × 2.8 × 2.7 cm. No evidence of focal lesion. Myometrial echotexture is smooth and homogenous. The right horn endometrium is homogenous, measures 4 mm.
- Left uterine horn measuring 5.8 × 3.0 × 2.6 cm. No evidence of focal lesion. Myometrial echotexture is smooth and homogenous. The left horn endometrium is homogenous, measures 3.8 mm.
- Both the ovaries are well visualized and appear normal. No evdience of any ovarian or adnexal mass noted.
- The right ovary measures 2.8 × 2.2 cm. Dominant follicle of size 13 mm seen in right ovary.
- The left ovary measures 2.5 × 2.2 cm.
- Cervix appears unremarkable
- No e/o free fluid in pouch of Douglas.

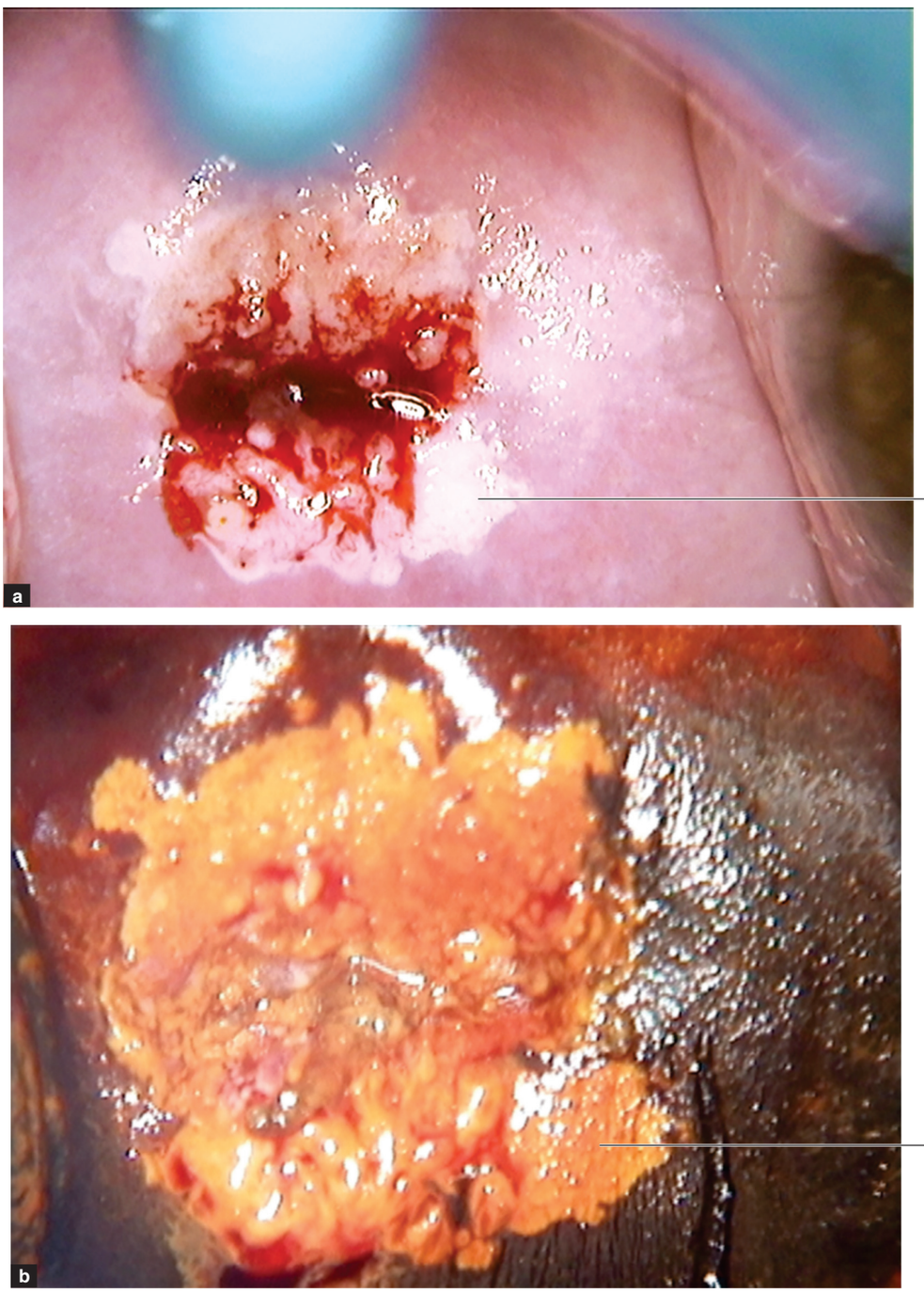
Conclusion

- Bicornuate bicollis uterus. Suggest—MRI pelvis correlation to rule out longitudinal vaginal septum
- Normal ovaries and adnexa
- No other significant abnomrality is seen.

7. COLPOSCOPY IN PREGNANCY

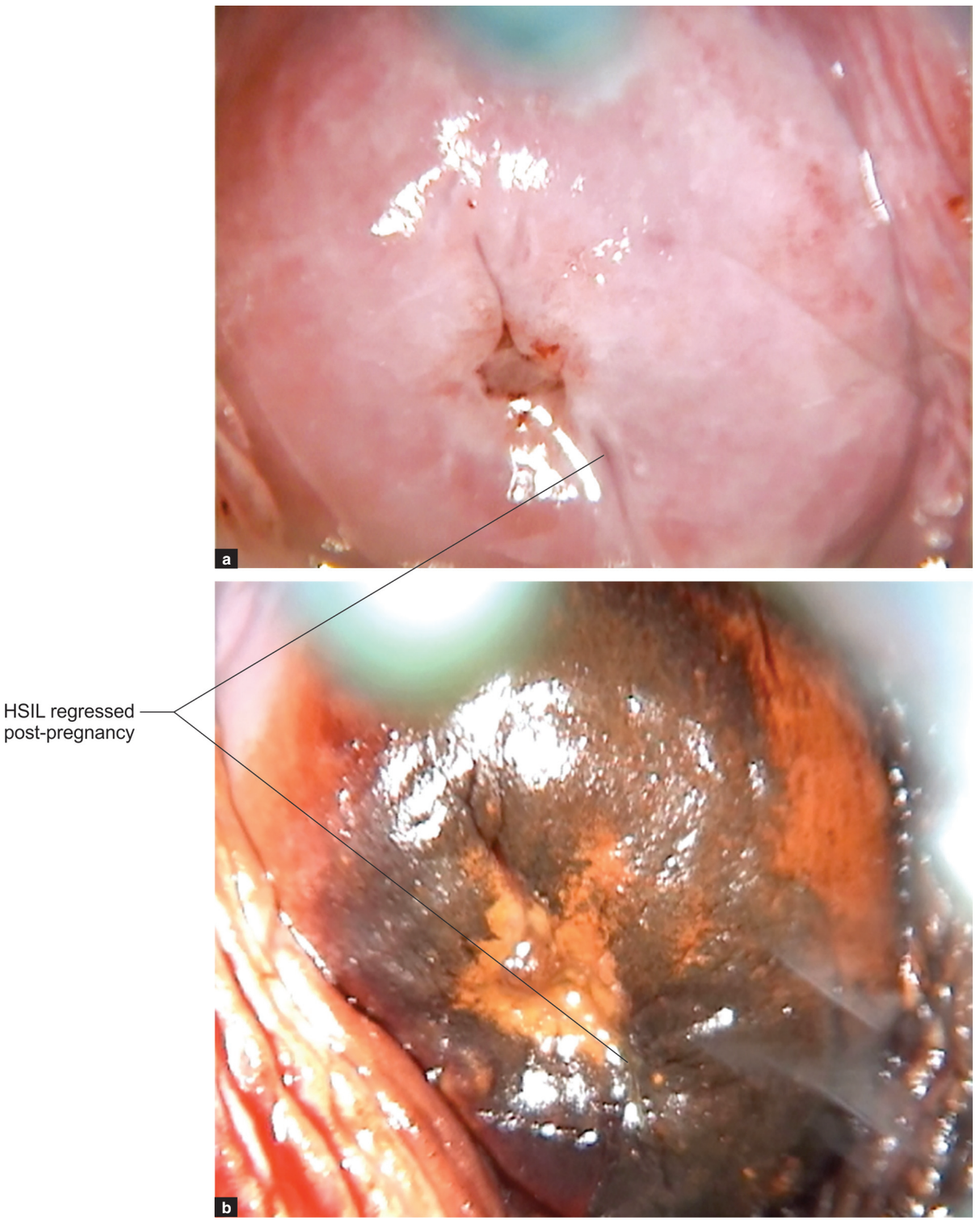
Colposcopy is usually avoided during pregnancy. Pregnancy exaggerates the lesion. Hence it is advisable to do a repeat colposcopy during PNC 4th–6th month. Usually the lesion regresses. Cytology can be done in case of suspected conditions.

In this case, a high grade lesion was detected during 1st month of missing her period. On HP examination, it revealed CIN 2/1 lesion. Cytology showed NILM (Figs 6.8a and b).



Figs 6.8a and b: HSIL detected in pregnancy

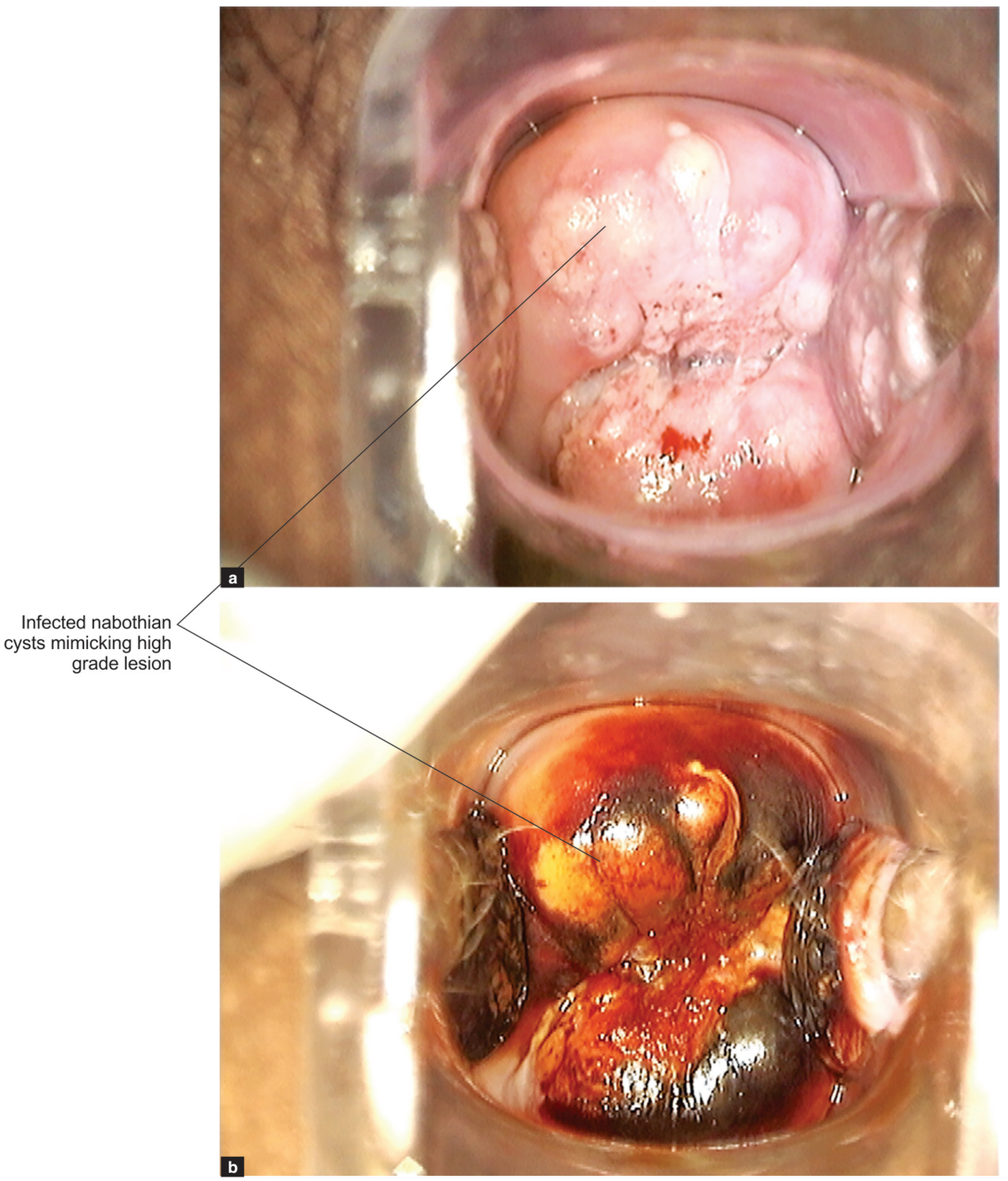
Colposcopy was repeated again in this case at 4th month PNC. The lesion showed regression to LSIL. Pregnancy exaggerates the lesion due to high vascular state (Figs 6.9a and b)



Figs 6.9a and b: Post-pregnancy—LSIL

8. INFECTED NABOTHIAN CYSTS MIMICKING CERVICAL GROWTH

Rarely multiple nabothian cysts, which are long-standing and infected, appear as cervical growth. The tree branching blood vessel pattern on the nabothian cyst is very useful for identification. Manipulation of such lesion helps to resolve the condition (Figs 6.10a and b).



Figs 6.10a and b: Nabothian cysts

9. HERPES SIMPLEX INFECTION (Figs 6.11a to d)

Herpes simplex type 1 is usually seen affecting oral mucosa,very commonly seen in oral sex practise. Herpes type 2 lesions are commoin in genital area.Very rare to find herpes simplex type 1 lesions in genital area. This is detected in scrape sent for multiplex PCR STI Panel detection (Figs 6.11a to d).

Fig. 6.11a

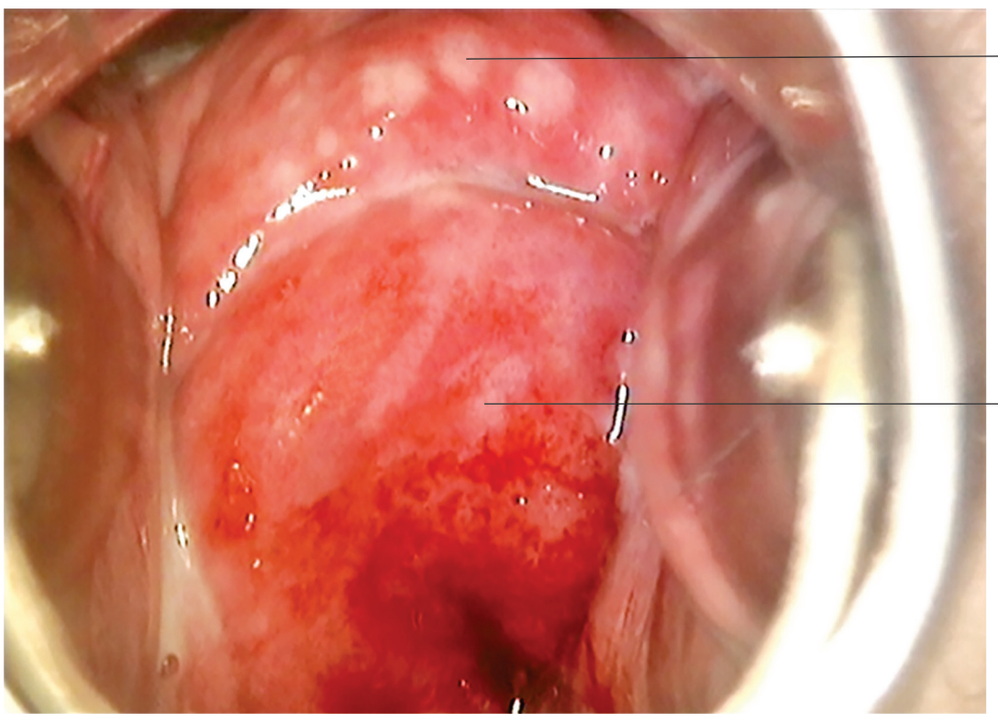


Fig. 6.11b

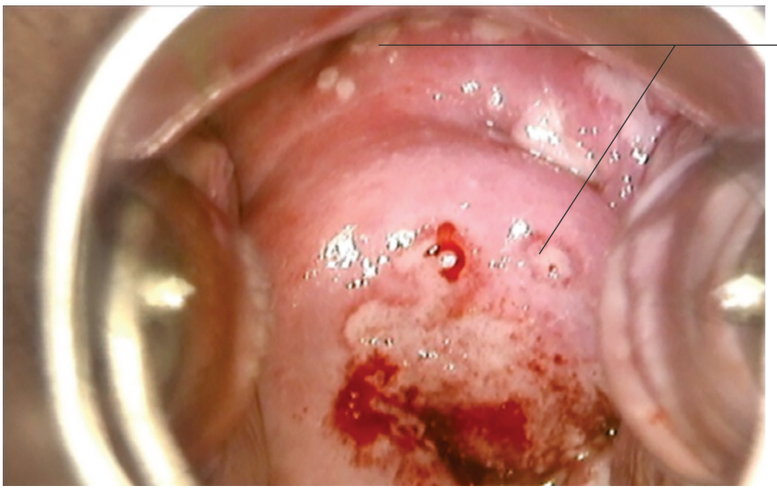


Fig. 6.11c

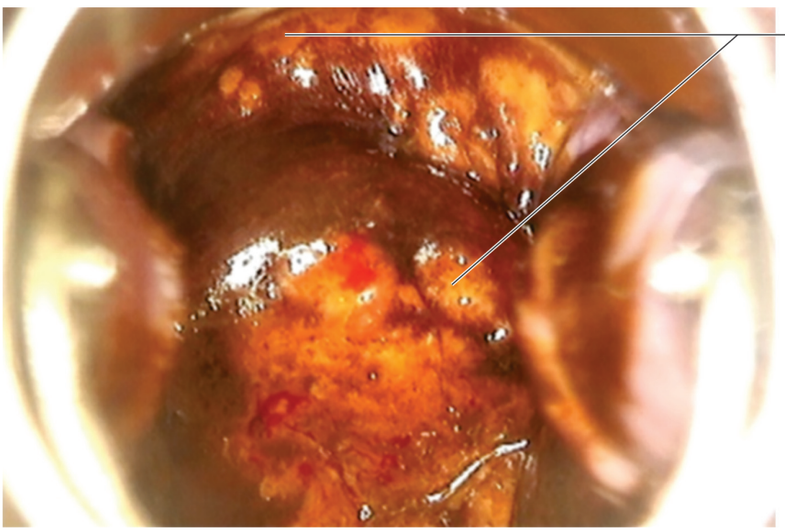


Fig. 6.11d

CHAPTER

7 Nomenclatures and Scoring System

INTRODUCTION

Scoring system is required for ease of reporting. There are various systems of reporting and nomenclatures, viz;

- IFCPC nomenclature
- Modified Reid scoring
- Swede scoring.

The elaborative explanation of various scoring systems is provided in author's *Textbook on Colposcopy in Practical Gynaecology*. This chapter explains Swede scoring system which is adopted by WHO/IARC and various organizations globally.

Strander *et al* from Sweden proposed a new scoring system in 2005.

The Swede scoring system includes lesion size as a variable in addition to the four original variables described in Reid's colposcopic index.

The Swede score			
Swede score	*0*	*1*	*2*
Acetowhite	Zero or transperent	Shady milky white neither transperent nor opaque	Distinct opaque white
Margins/surface	Diffuse	Sharp but irregular jagged, geographic satellites	Sharp, even difference in surface level, includes cuffing
Vessel	Fine regular	Absent	Coarse or atypical
Lession size	<5 mm	5–15 mm 2 quadrants	15 mm or 3 to 4 quadrants or undefined endocervically
Iodine staining	Brown	Fainty or patchy yellow	Distinct yellow
Total Score 10			

Total Swede Score 10

0, 1	Atypical HPV infection
2, 3, 4	CIN 1
5, 6, 7	CIN 2
8, 9, 10	CIN 3

UNDERSTANDING OF SWEDE SCORING WITH VARIOUS CASE DISCUSSIONS

1. 32-yr-old with C/O Irregular Menses

Colposcopy description: Adequate, SCJ visible, TZ 1, thin opaque milky white acetowhite lesions with sharp, jagged geographical pattern abutting from SCJ with fine punctations, with size less than 5 mm occupying one quadrant and patchy yellow on application of Lugol's iodine (Figs 7.1a to d).

Fig. 7.1a: Normal saline

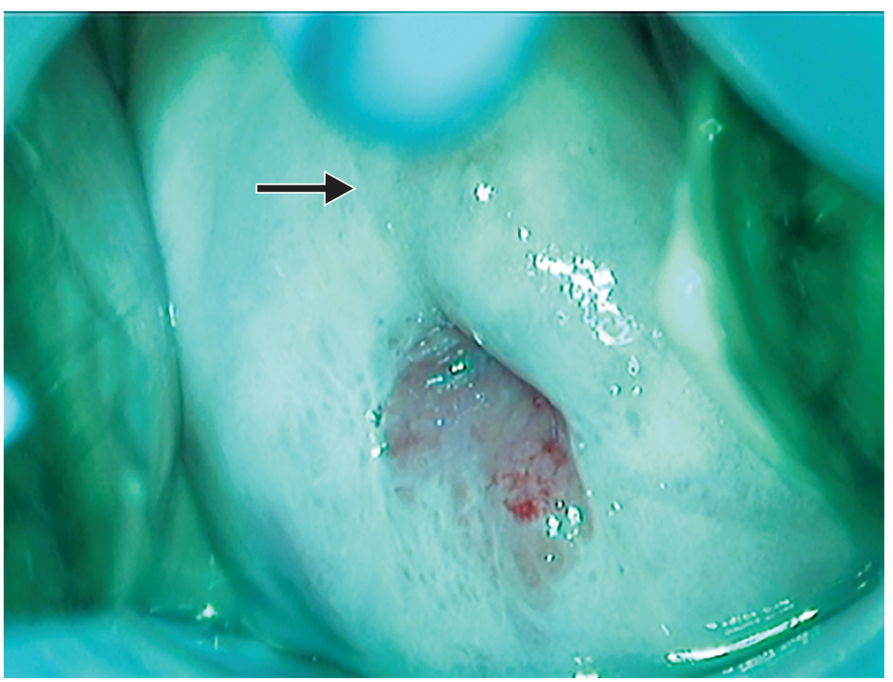


Fig. 7.1b: Green filter showing fine punctations

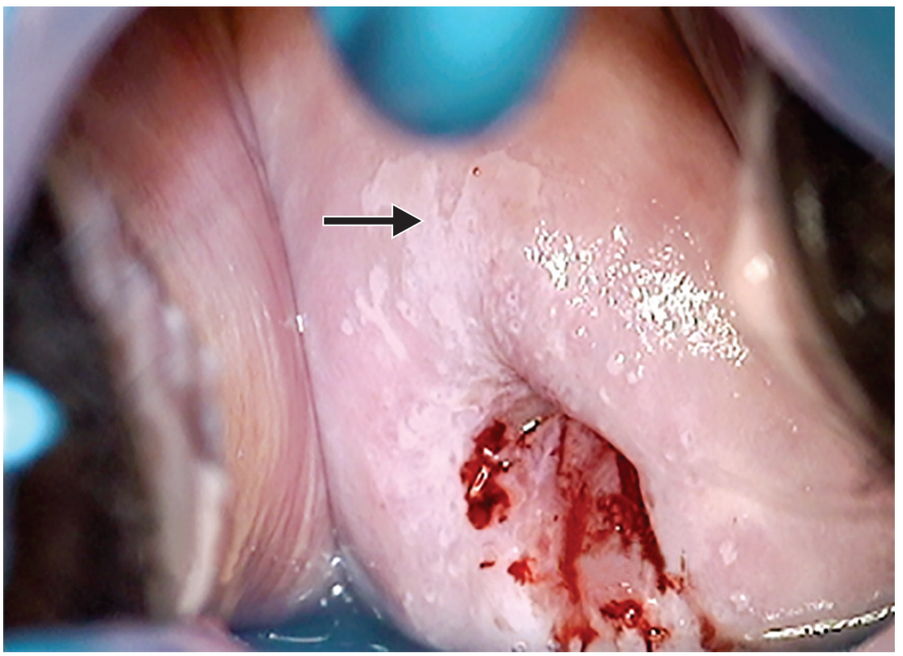


Fig. 7.1c: 5% acetic acid—thin opaque milky white lesion with sharp, jagged geographical pattern abutting from SCJ, having fine punctations and less than 5 mm, occupying one quadrant

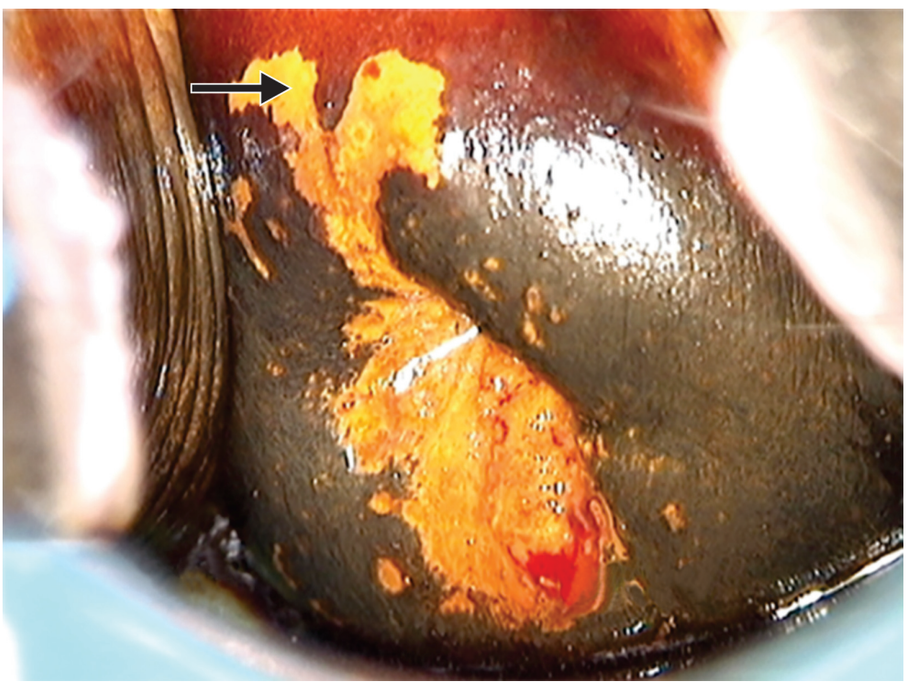


Fig. 7.1d: Lugol's iodine—variegated patchy yellow

Swede—1 + 1 + 0 + 0 + 1 = 3
CIN 1/LSIL
Cytology—Inflammatory smear
HP—Chronic cervicitis

2. 36-yr-old with White Discharge

Colposcopy description: Adequate, SCJ visible, TZ 1, thin milky white acetowhite lesions neither transparent nor opaque, abutting from SCJ within the TZ with jagged margins, having fine mosaics, occupying 2 quadrants and patchy yellow on Lugol's iodine application.

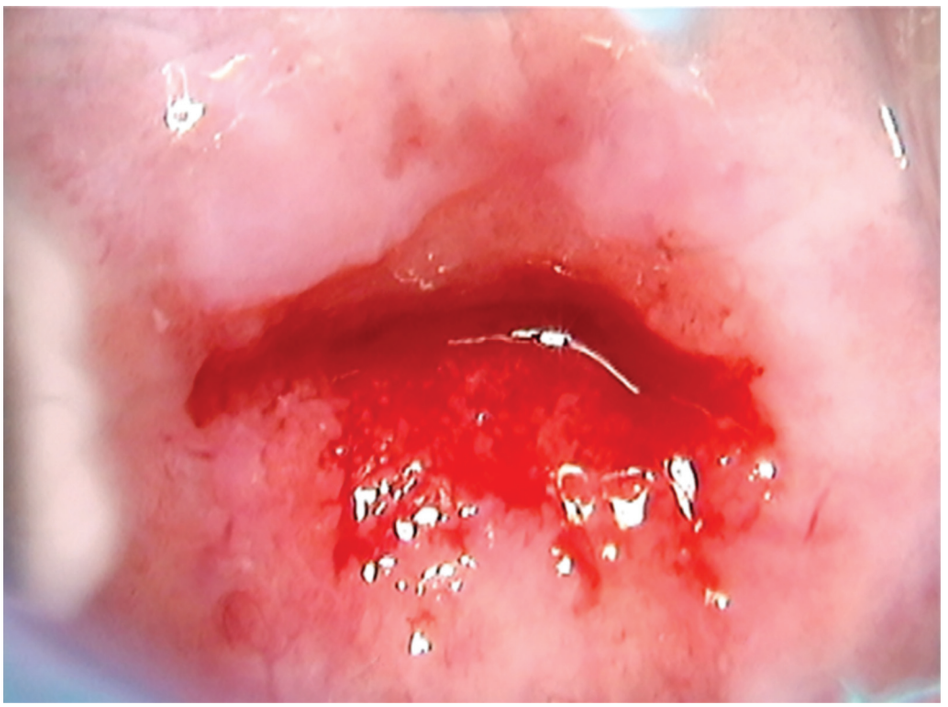


Fig. 7.2a: Normal saline

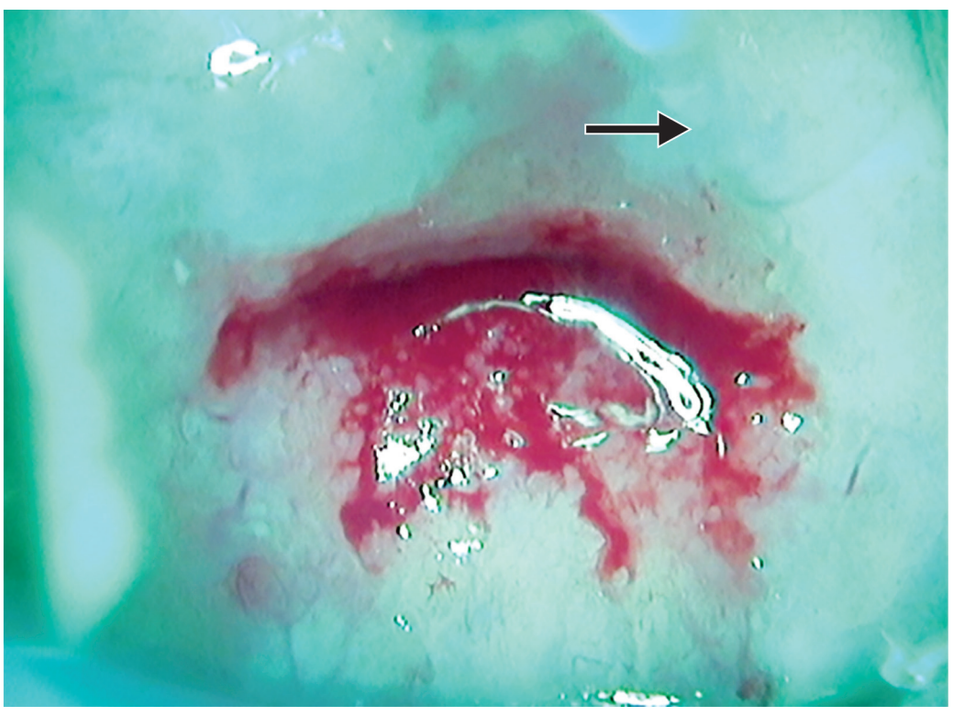


Fig. 7.2b: Green filter showing fine mosaics

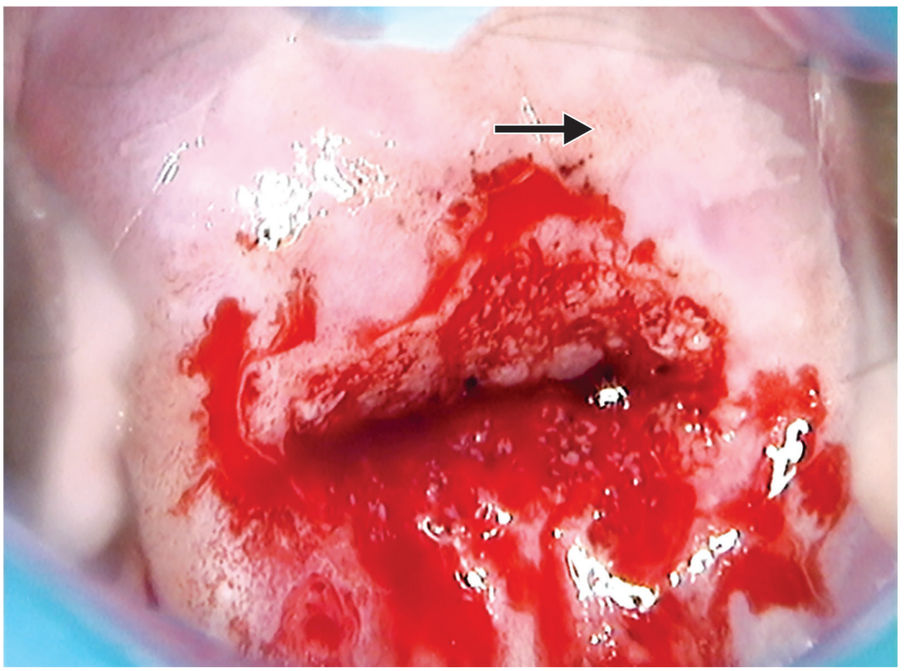


Fig. 7.2c: 5% acetic acid—thin milky white acetowhite lesions neither transparent nor opaque, abutting from SCJ within the TZ with jagged margins, having fine mosaics, occupying 2 quadrants

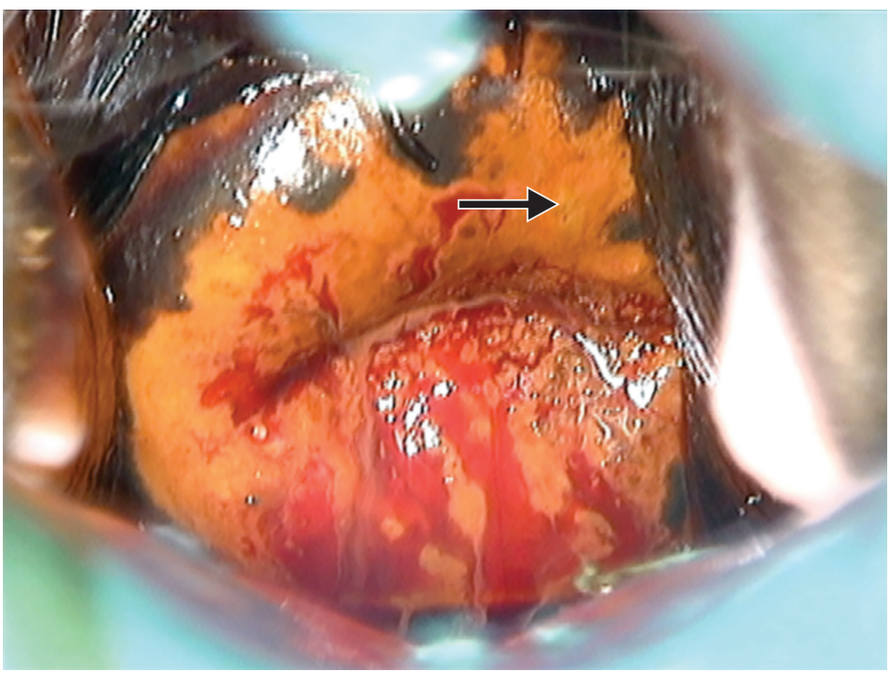


Fig. 7.2d: Lugol's iodine—variegated patchy yellow

Swede—1 + 1 + 0 + 1 + 1 = 4
CIN 1/LSIL
Cytology—CIN 1
HP—CIN 1

3. 32-yr-old with White Discharge

Colposcopy description: Adequate, SCJ visible, TZ 1, distinct opaque acetowhite lesion with sharp raised margin, coarse mosaics, abutting from SCJ, occupying 2 quadrants and patchy yellow on Lugol's iodine application.

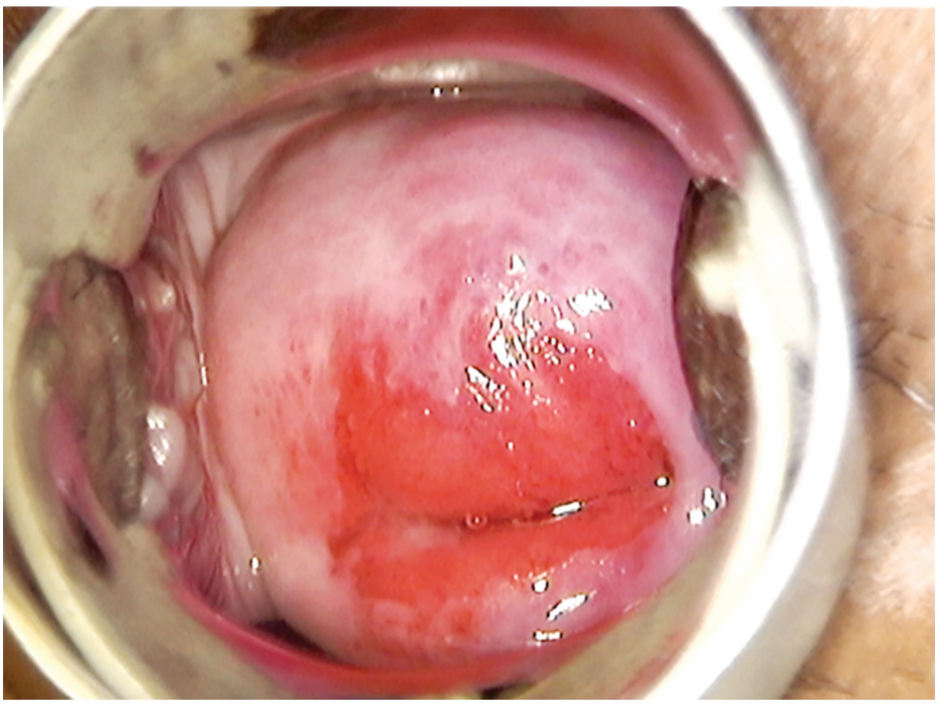


Fig. 7.3a: Normal saline

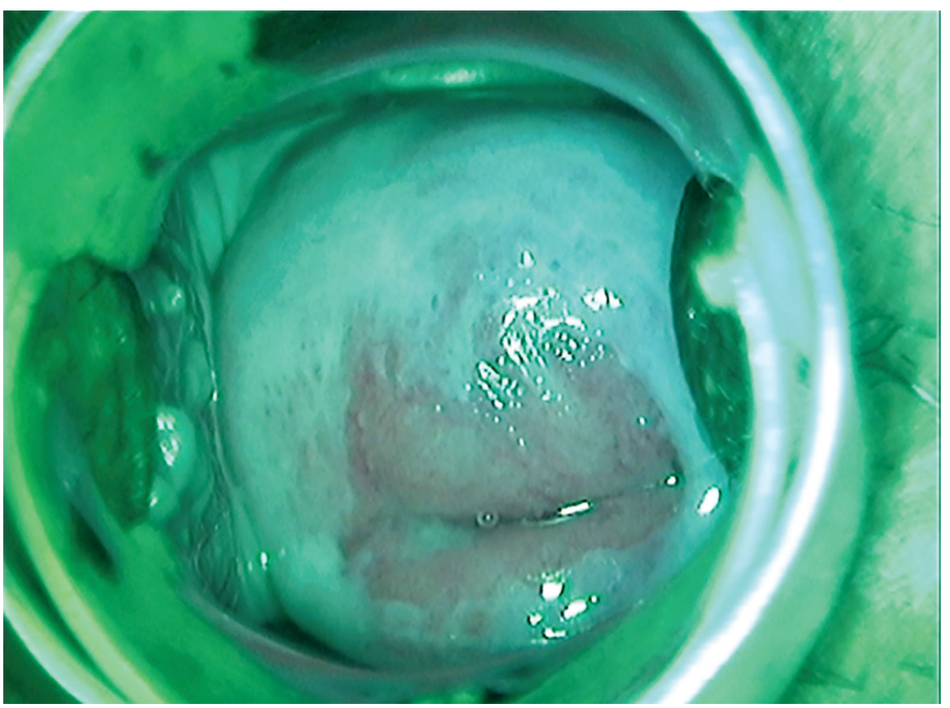


Fig. 7.3b: Green filter

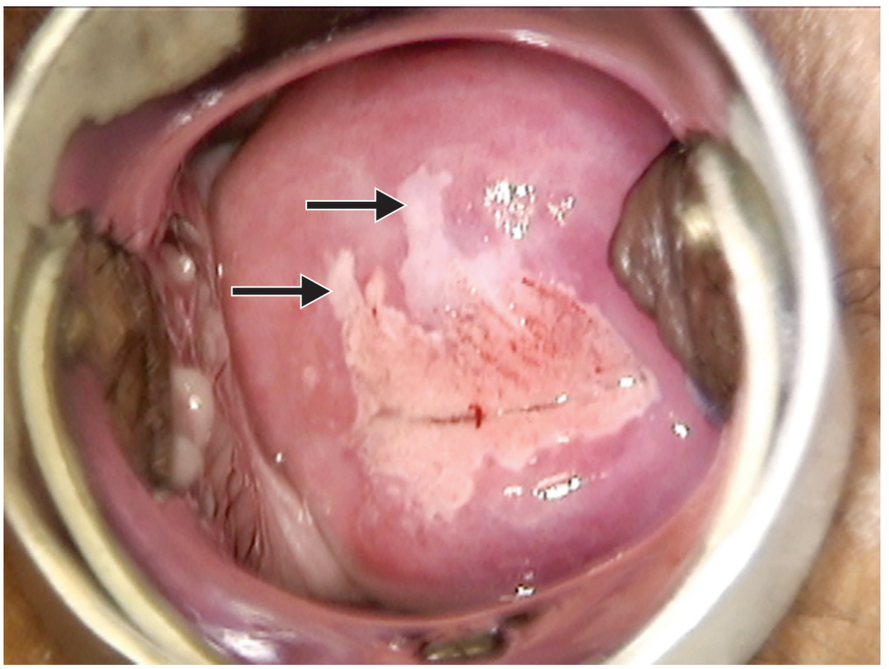


Fig. 7.3c: 5% acetic acid—distinct opaque acetowhite lesion with sharp raised margin, coarse mosaics, abutting from SCJ, occupying 2 quadrants

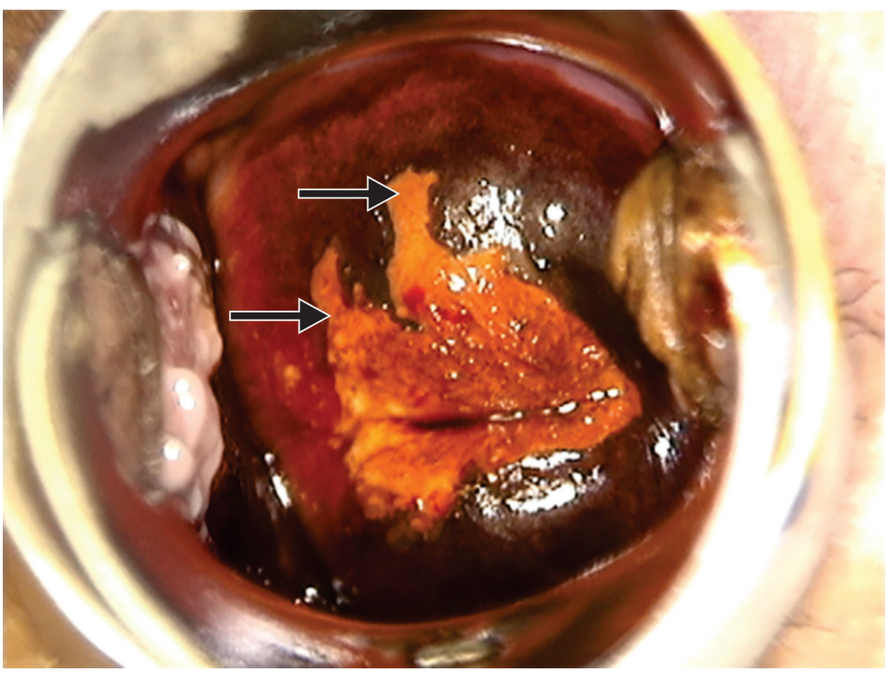


Fig. 7.3d: Lugol's iodine—variegated patchy yellow

Swede—2 + 2 + 2 + 1 + 1 = 8
CIN 3/HSIL
Cytology—CIN 2
HP—CIN 2

4. 42-yr-old with Repeated UTI and WD

Colposcopy description: Adequate, SCJ visible on the OS, TZ 2, distinct opaque acetowhite lesions with sharp margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants and variegated patchy yellow on Lugol's iodine application.

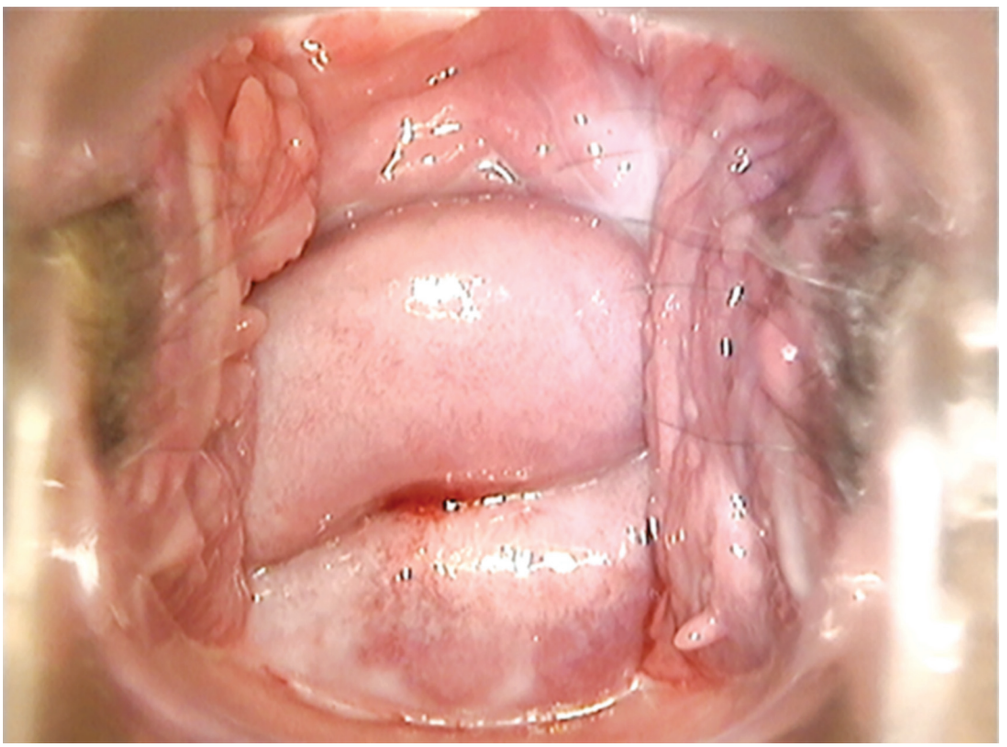


Fig. 7.4a: Normal saline

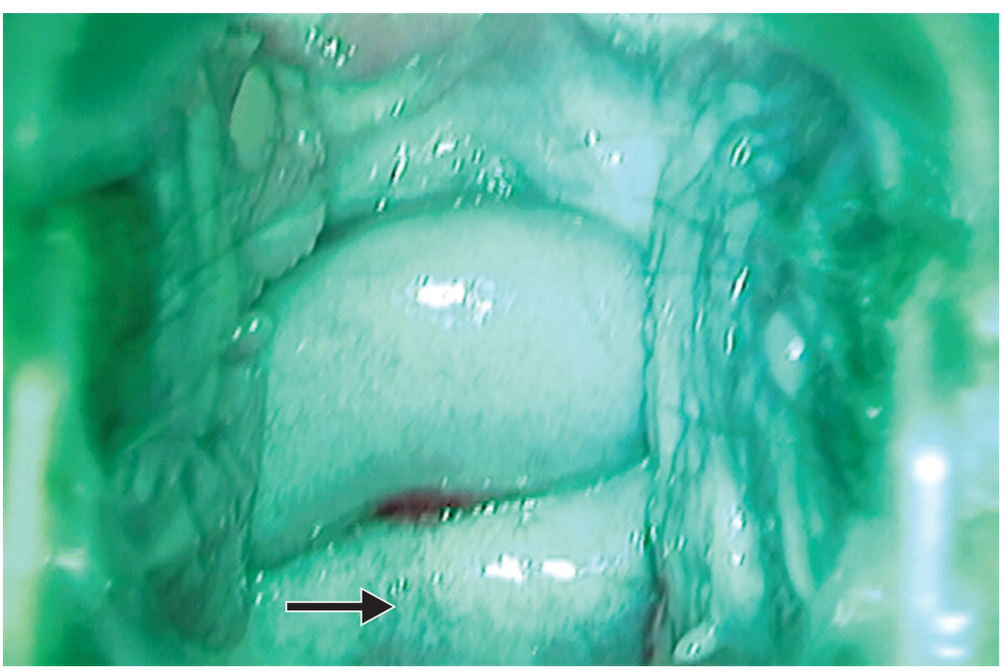


Fig. 7.4b: Green filter—coarse punctations

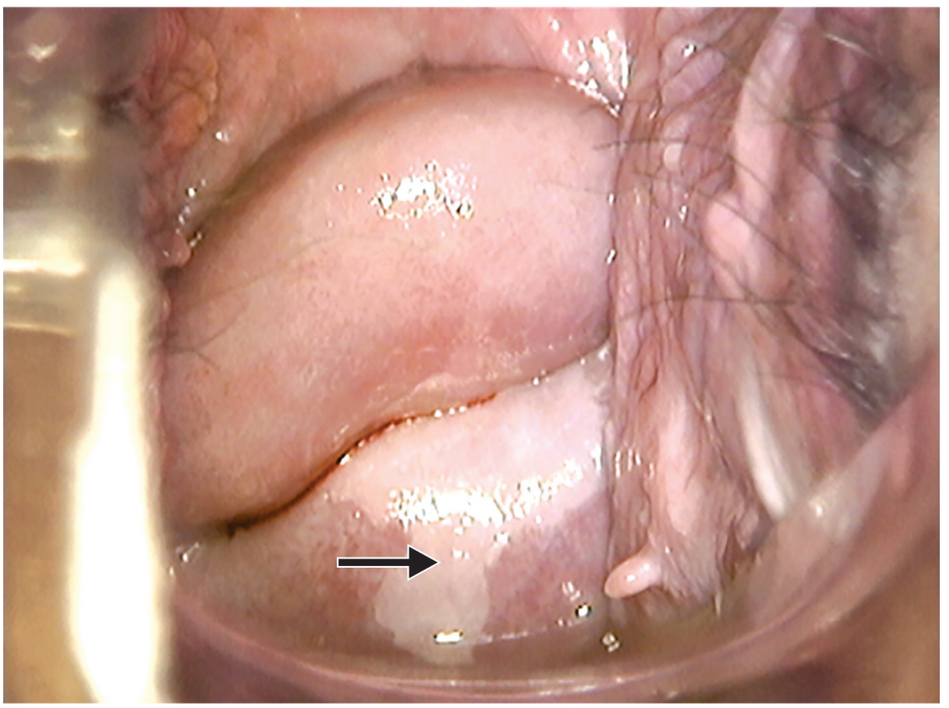


Fig. 7.4c: 5% acetic acid—distinct opaque acetowhite lesions with sharp margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants

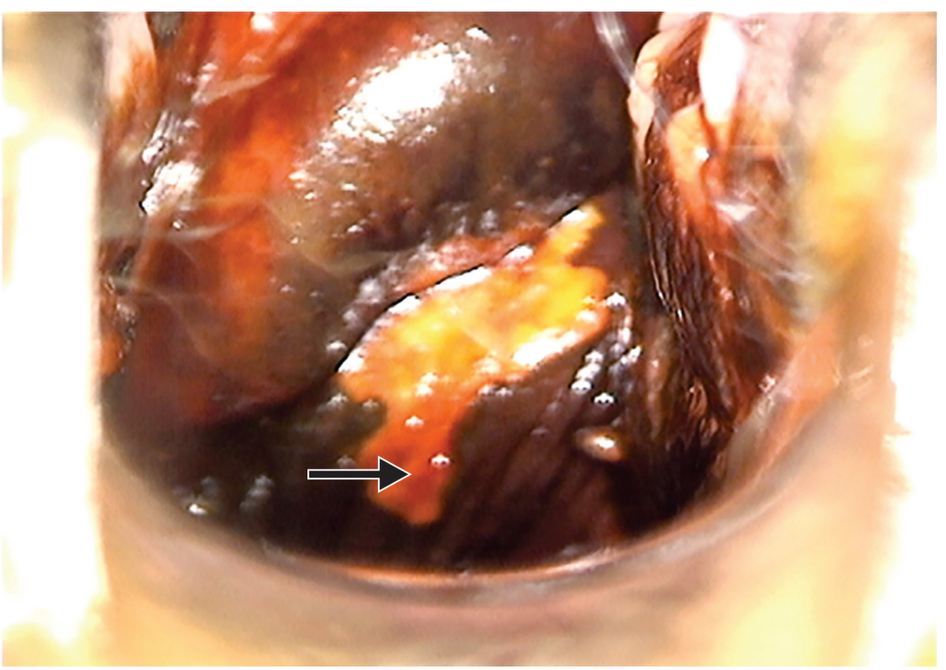


Fig. 7.4d: Lugol's iodine—variegated patchy yellow

Swede—2 + 2 + 2 + 1 + 1 = 8
CIN 3/HSIL
Cytology—ASC-H
HP—CIN 2

5. 36-yr-old with Repeated UTI

Colposcopy description: Adequate, SCJ visible on the OS, TZ 2, distinct opaque acetowhite lesions with rolled out raised margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants and distinct yellow on Lugol's iodine application.

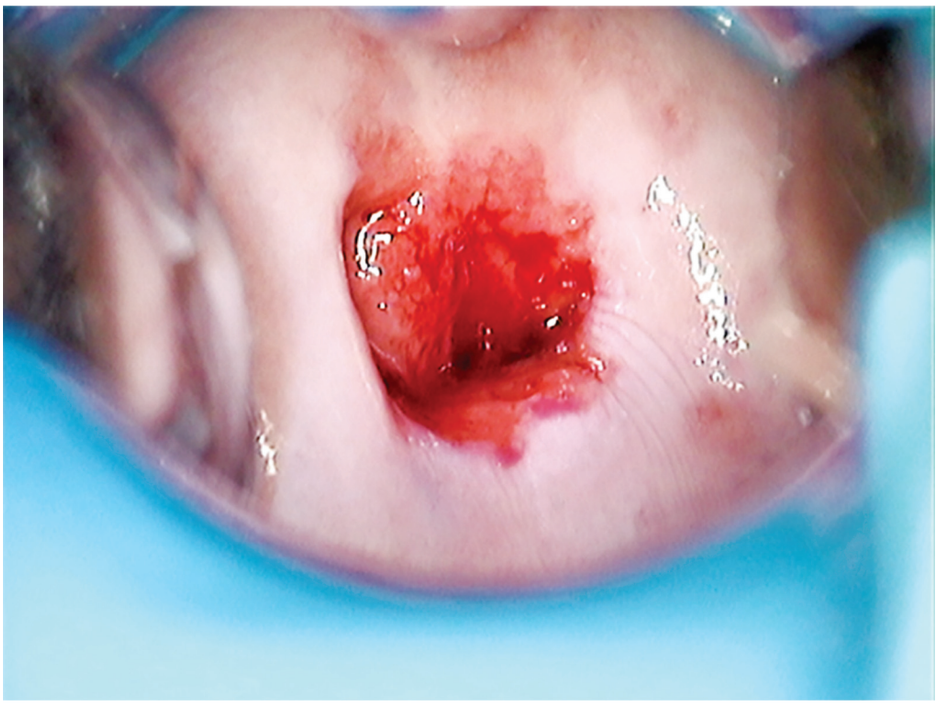


Fig. 7.5a: Normal saline

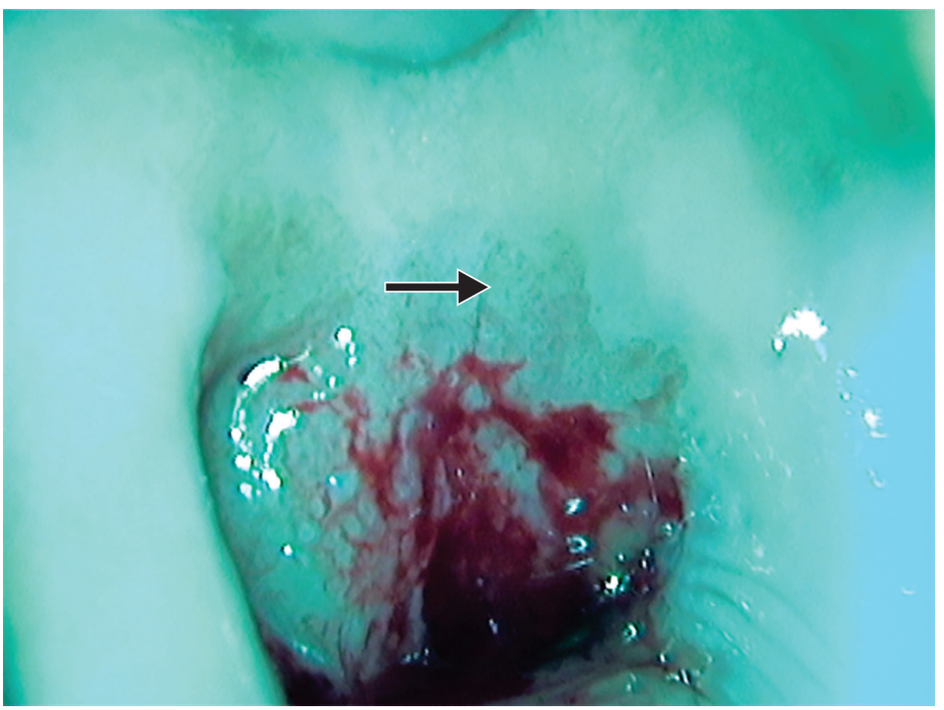


Fig. 7.5b: Green filter—coarse mosaics and punctations

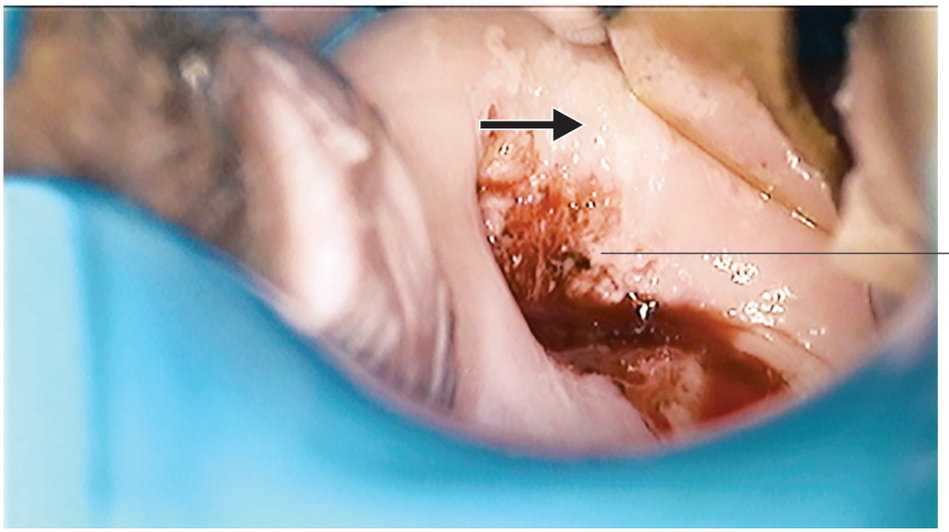


Fig. 7.5c: 5% acetic acid—distinct opaque acetowhite lesions with rolled out raised margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants

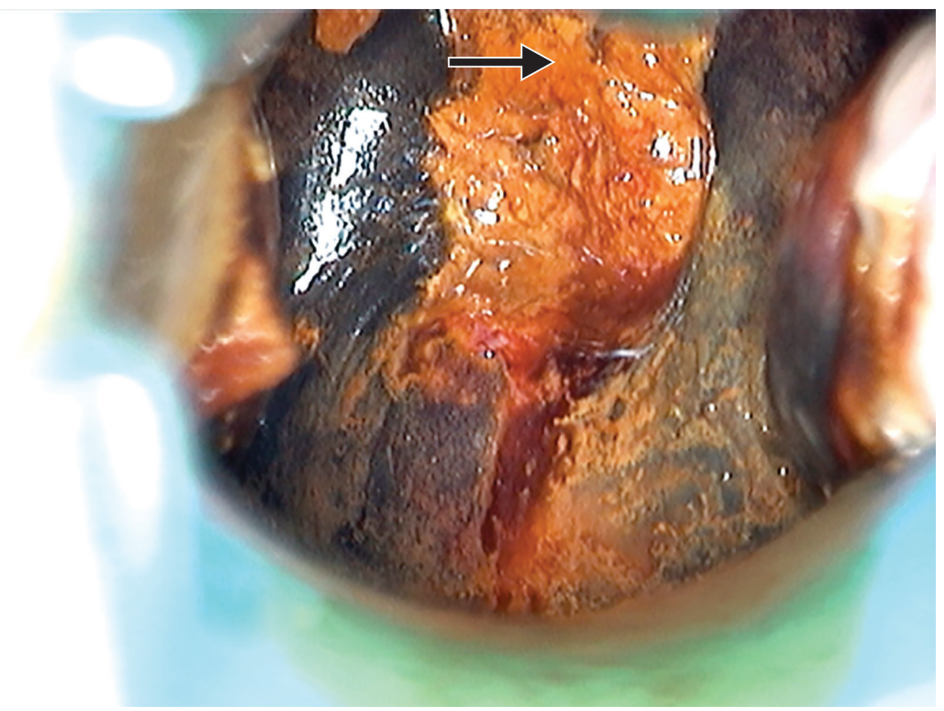


Fig. 7.5d: Lugol's iodine—distinct yellow

Swede—2 + 2 + 2 + 1 + 2 = 9
CIN 3/HSIL
Cytology—Atypical dysplasia
HP—Invasive SCC

6. 34-yr-old with Postcoital Bleeding

Colposcopy description: Adequate, SCJ visible, TZ 1, distinct opaque acetowhite lesions with raised margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants and variegated patchy yellow on Lugol's iodine application.

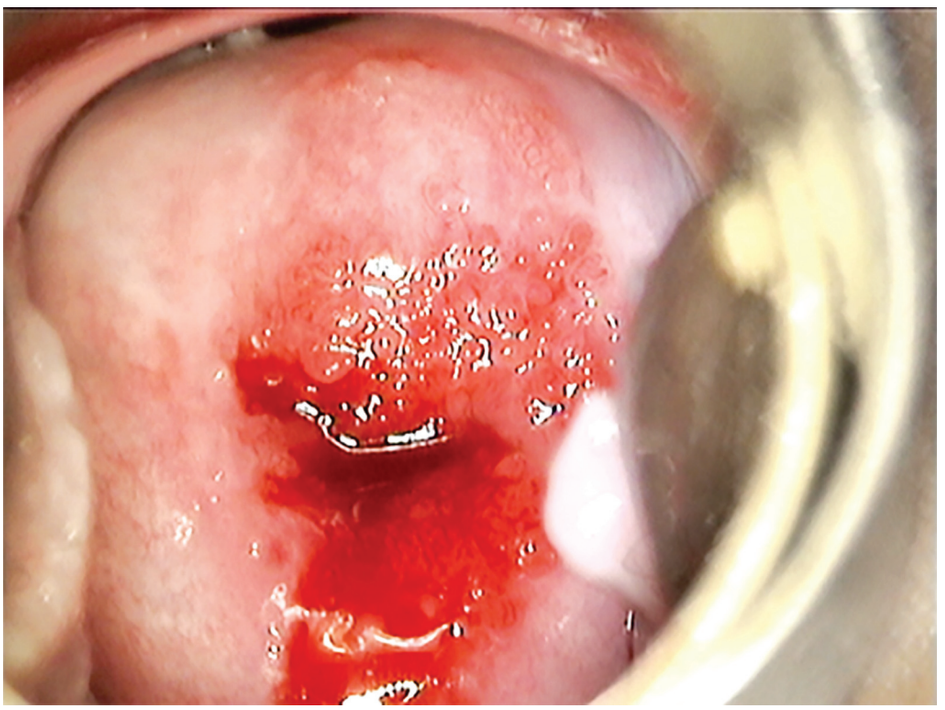


Fig. 7.6a: Normal saline

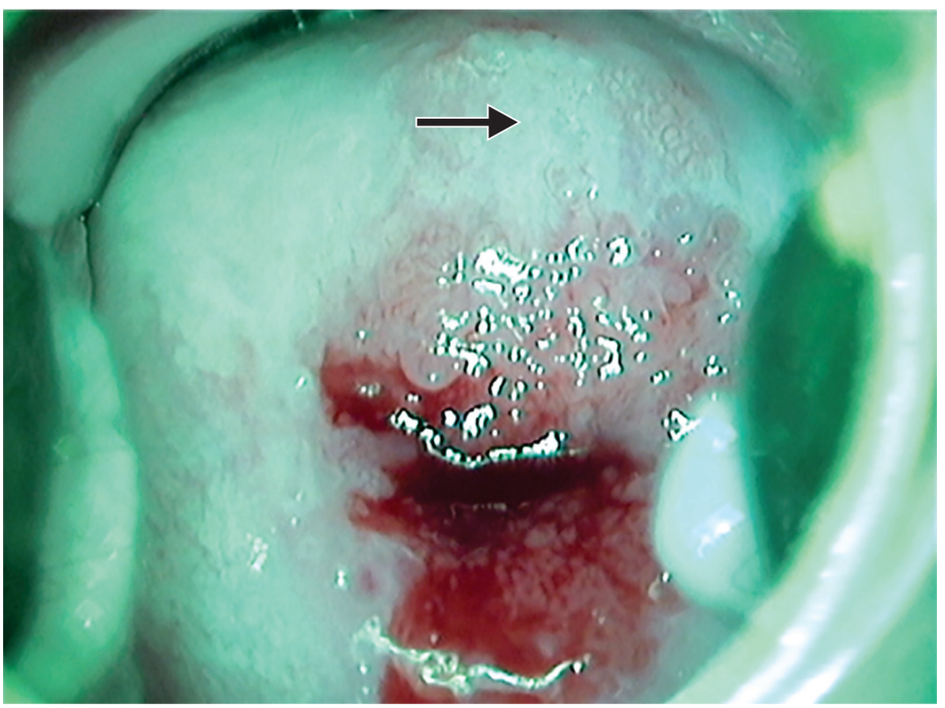


Fig. 7.6b: Green filter—coarse mosaics and punctations

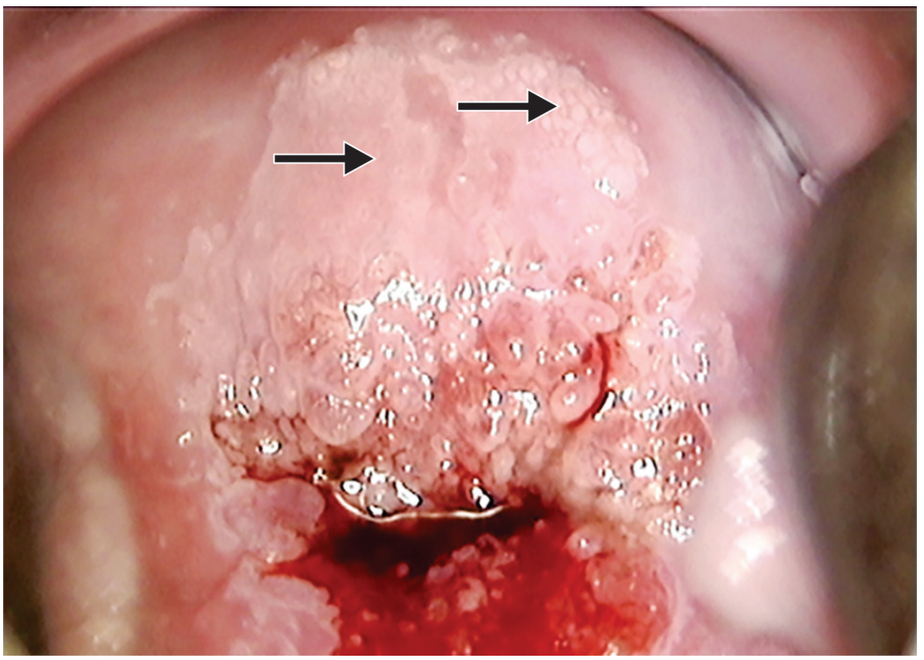


Fig. 7.6c: 5% acetic acid—distinct opaque acetowhite lesions with raised margins, abutting from SCJ, having coarse mosaics and punctations, occupying 2 quadrants

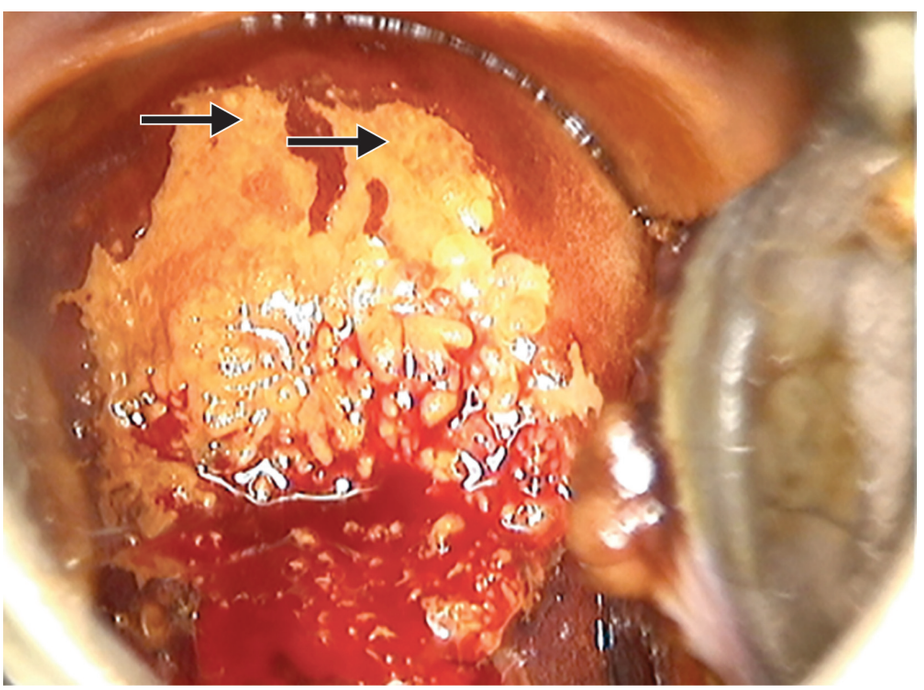


Fig. 7.6d: Lugol's iodine—variegated patchy yellow

Swede—2 + 2 + 2 + 1 + 1 = 8
CIN 3/HSIL
Cytology—CIN 3
HP—CIN 3

7. 26-yr-old with Recurrent UTI, WD

Colposcopy description: Adequate, SCJ visible, TZ 1, dense opaque circumferential lesion with jagged margin, abutting from SCJ within TZ, having coarse mosaics and coarse punctations, occupying all the 4 quadrants and variegated patchy yellow on Lugol's iodine application.

Fig. 7.7a: Normal saline

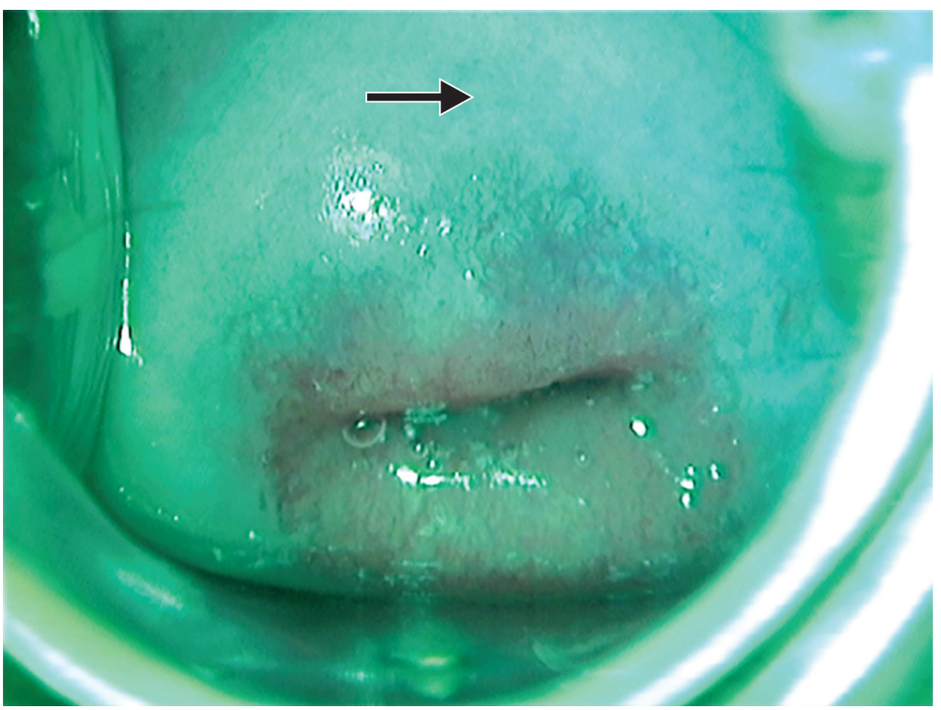


Fig. 7.7b: Green filter—abnormal blood vessels

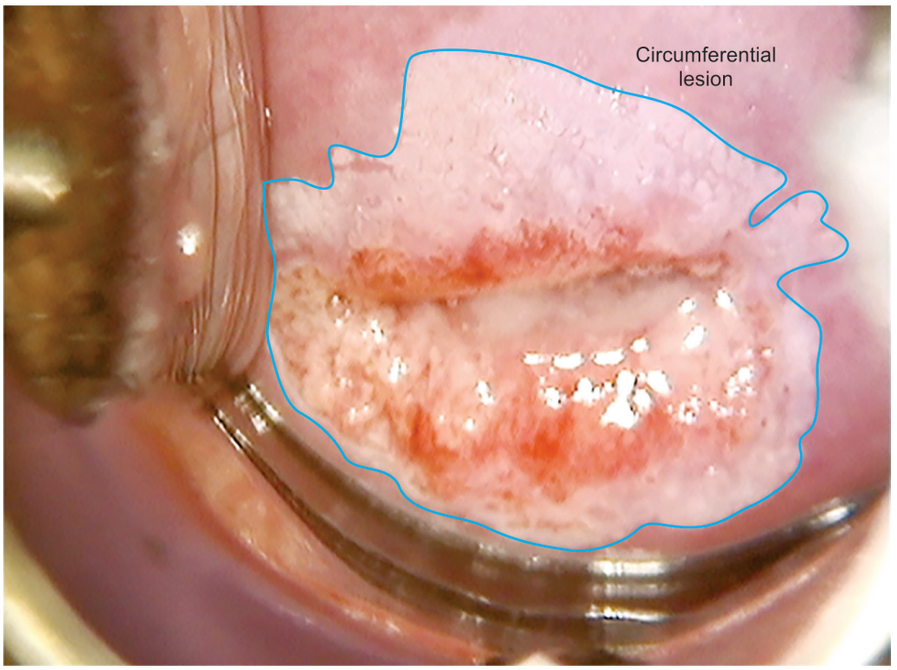


Fig. 7.7c: 5% acetic acid—dense opaque circumferential lesion with jagged margin, abutting from SCJ within TZ, having coarse mosaics and coarse punctations, occupying all the 4 quadrants

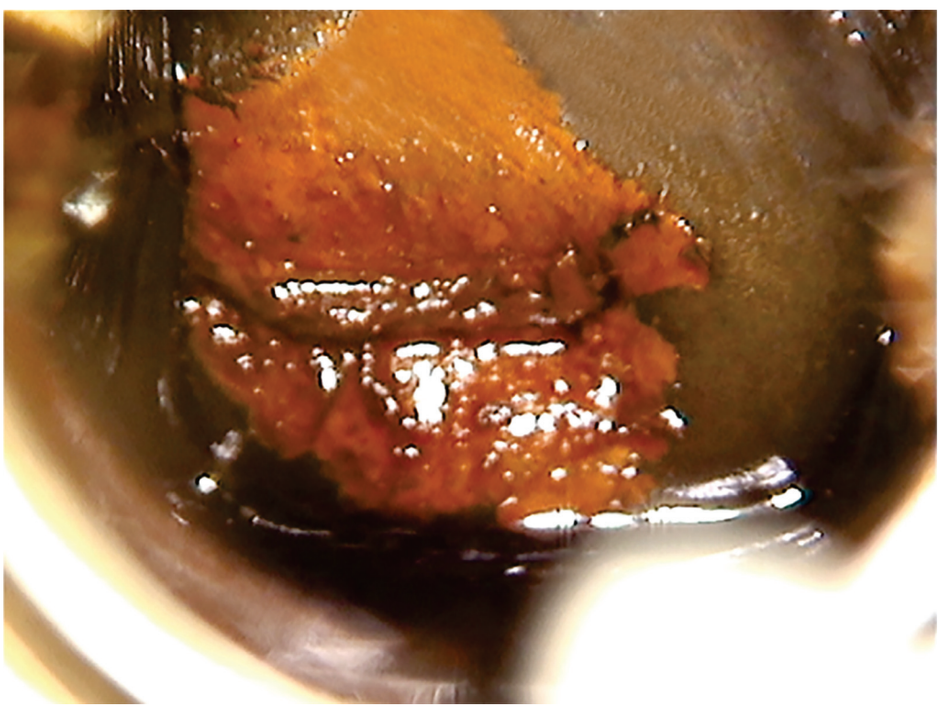


Fig. 7.7d: Lugol's iodine—variegated patchy yellow

Swede—2 + 1 + 2 + 2 + 1 = 8
CIN 3/HSIL
Cytology—ASC-H
HP—CIN 2

8. 41-yr-old with H/O Premenstrual Spotting and WD

Colposcopy description: Adequate, SCJ visible, TZ 1, distinct opaque acetowhite lesions with sharp raised margins, abutting from SCJ within the TZ with absent blood vessels, occupying 2 quadrants and variegated patchy yellow on Lugol's iodine application.

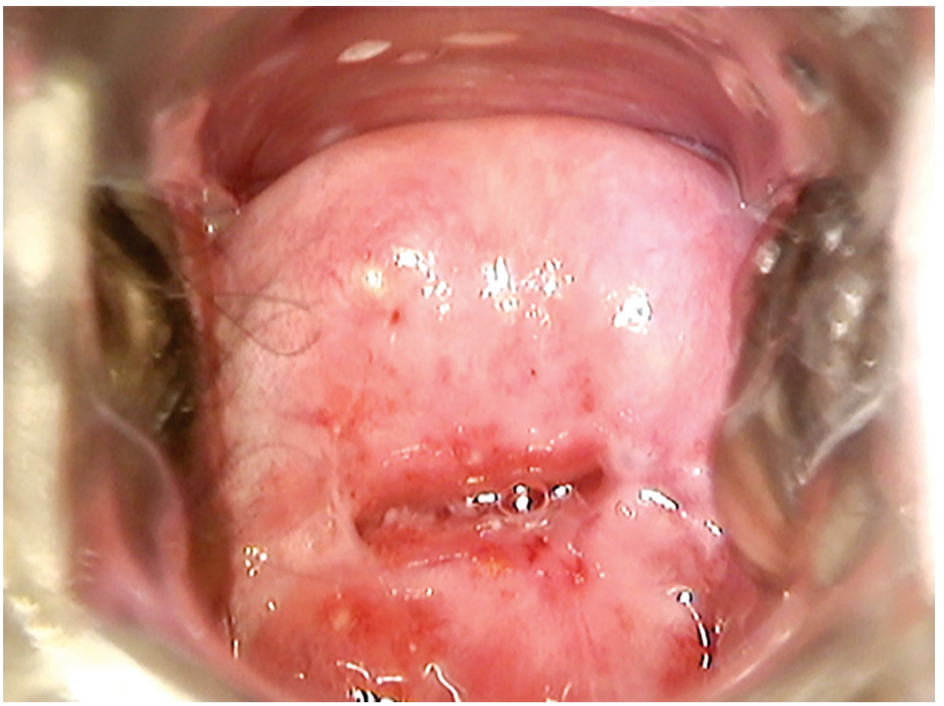


Fig. 7.8a: Normal saline

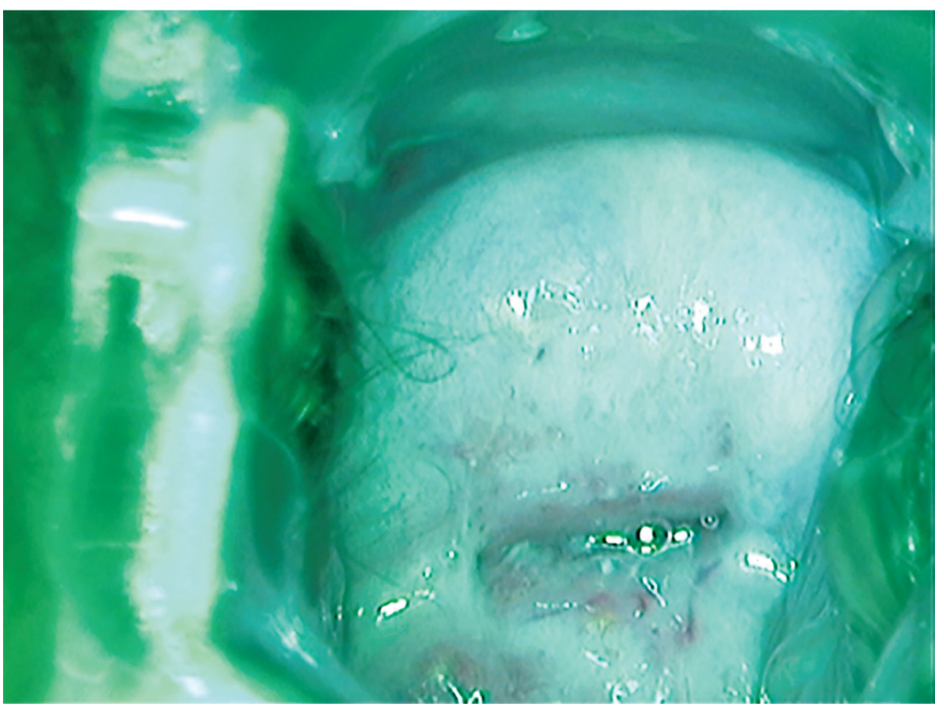


Fig. 7.8b: Green filter

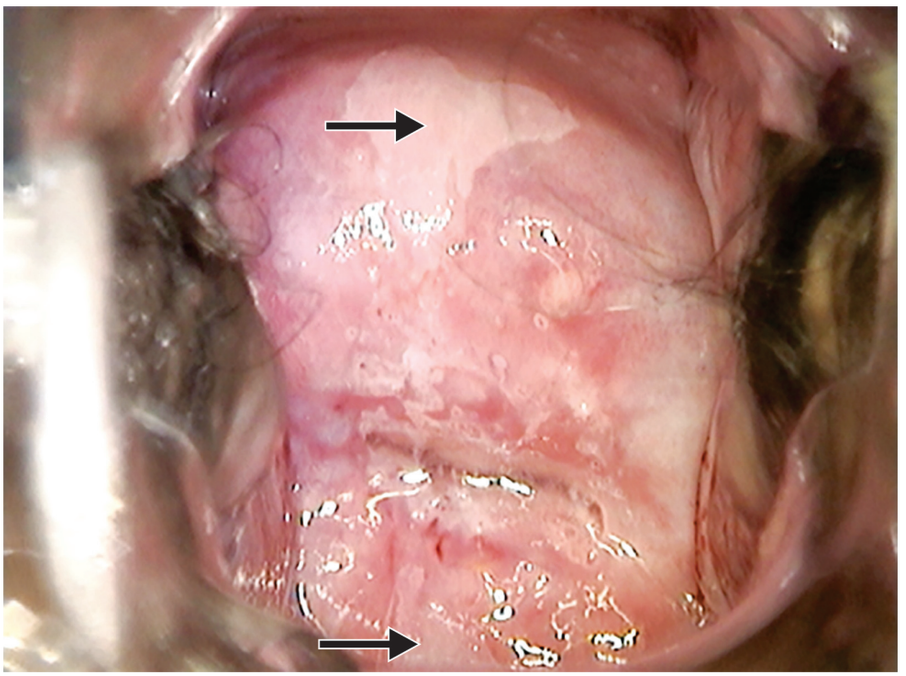


Fig. 7.8c: 5% acetic acid—distinct opaque acetowhite lesions with sharp raised margins, abutting from SCJ with absent blood vessels, occupying 2 quadrants

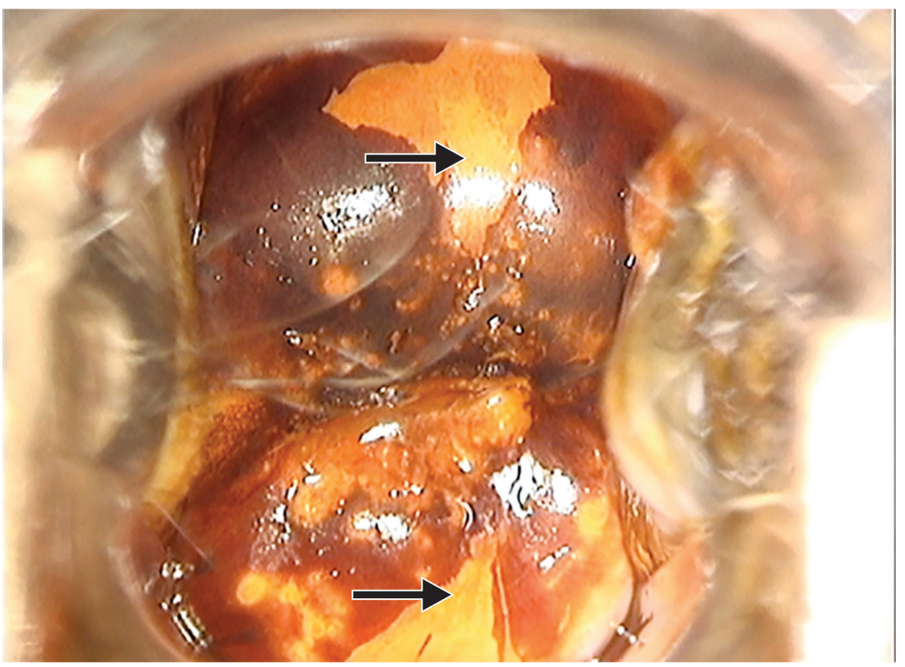


Fig. 7.8d: Lugol's iodine—variegated patchy yellow

Swede—2 + 2 + 1 + 1 + 1 = 7
CIN 2/HSIL
Cytology—CIN 1
HP—CIN 2

9. 35-yr-old with Postcoital Bleeding

Colposcopy description: Adequate, SCJ visible on the OS, TZ 2, thin milky acetowhite lesions with sharp margins, abutting from SCJ within the TZ, having coarse punctations and coarse mosaics, occupying 3–4 quadrants and variegated patchy yellow on Lugol's iodine application.

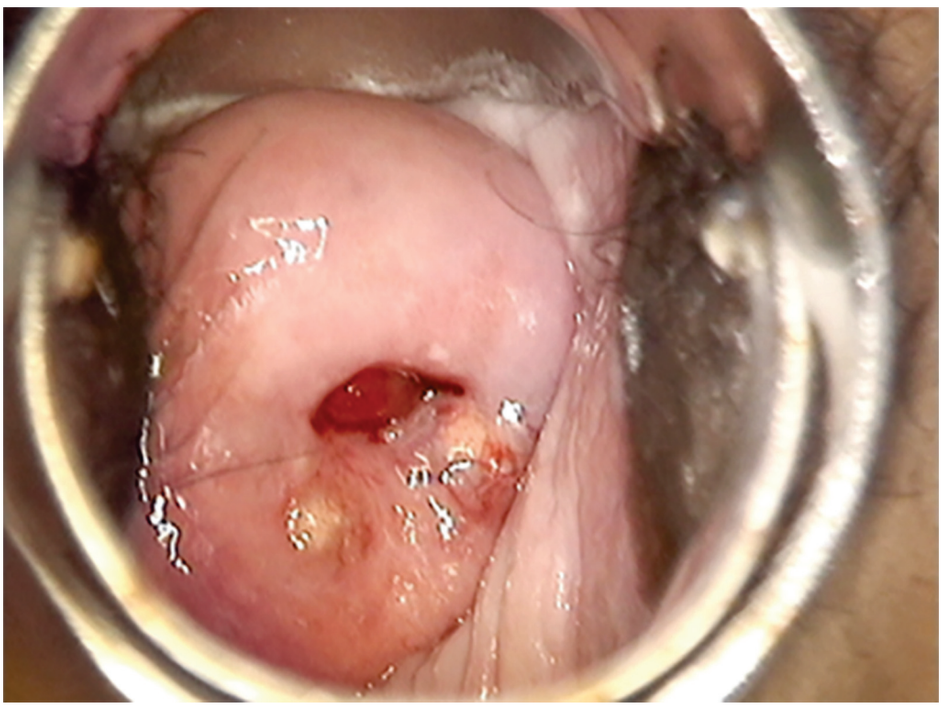


Fig. 7.9a: Normal saline

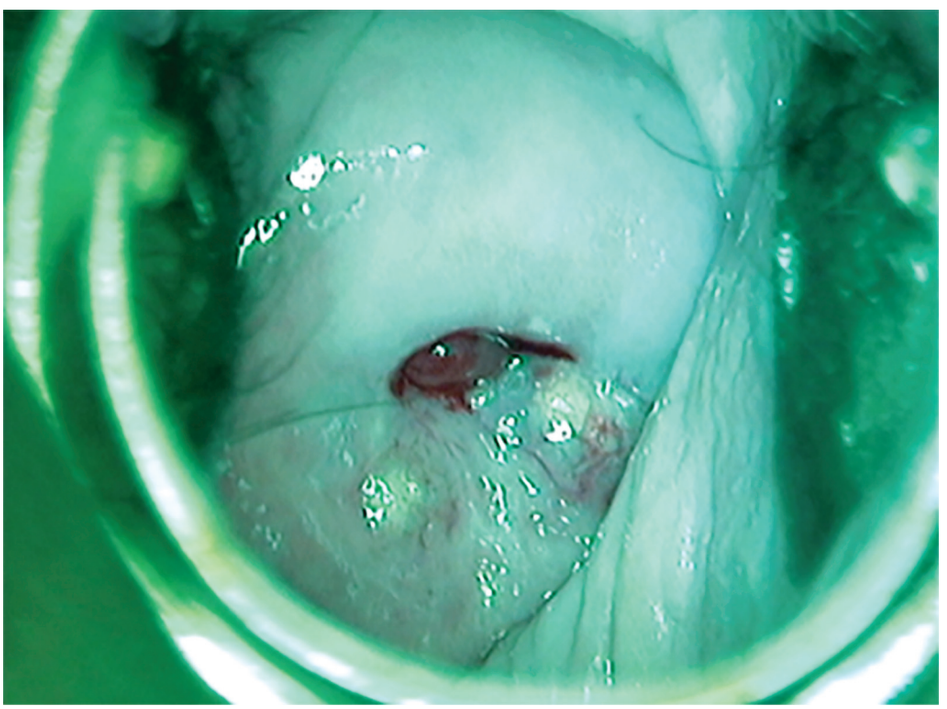


Fig. 7.9b: Green filter

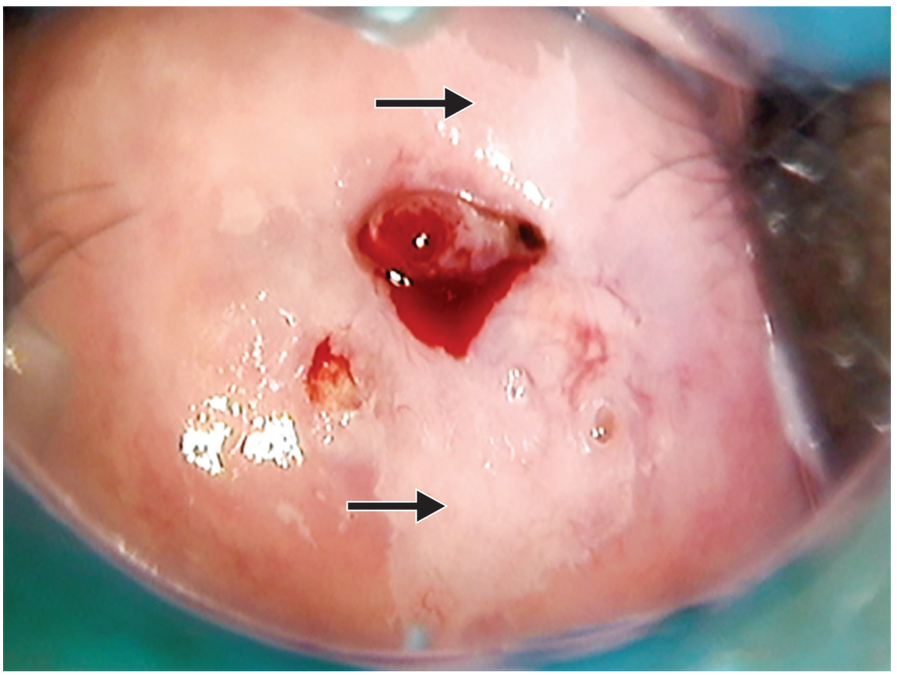


Fig. 7.9c: 5% acetic acid—thin milky acetowhite lesions with sharp margins, abutting from SCJ within the TZ, having coarse punctations and coarse mosaics, occupying 3–4 quadrants

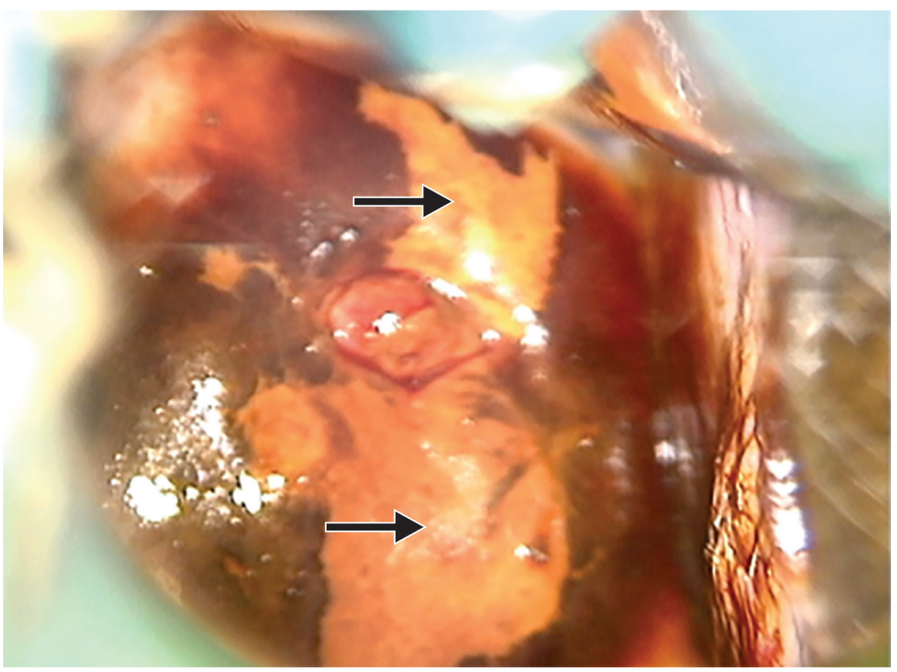


Fig. 7.9d: Lugol's iodine—variegated patchy yellow

Swede—1 + 2 + 2 + 2 + 1 = 8
CIN 3/HSIL
Cytology—Atypical dysplastic cells
HP—CIN 2

10. 43-yr-old with White Discharge

Colposcopy description: Adequate, SCJ visible, TZ 1, distinct opaque acetowhite lesions with raised rolled margins, abutting from SCJ within the TZ with coarse mosaics, occupying 2–3 quadrants and variegated patchy yellow on Lugol's iodine application.

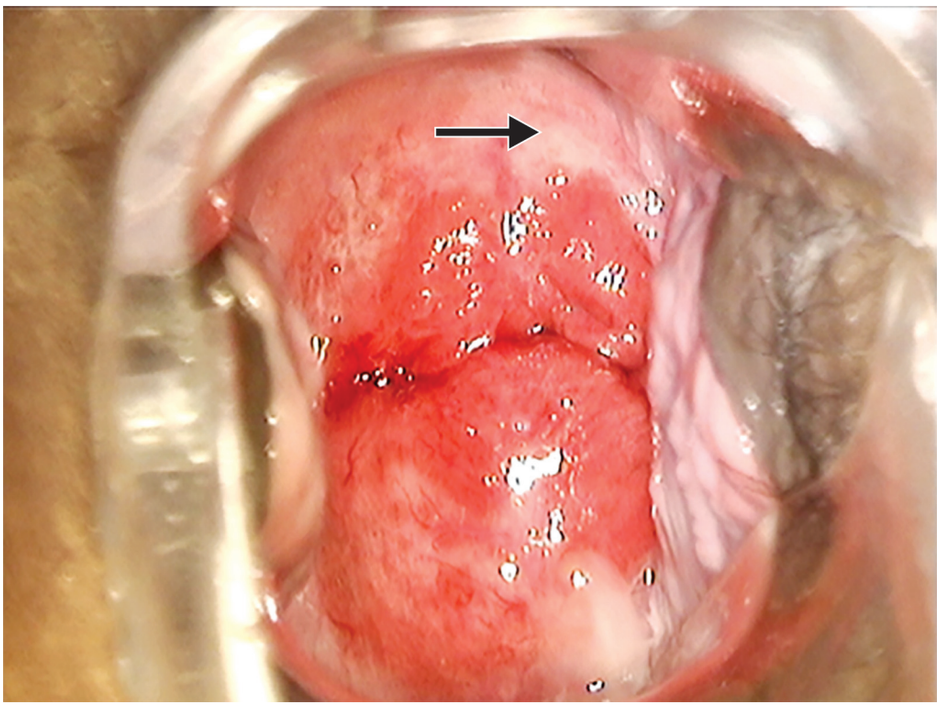


Fig. 7.10a: Normal saline

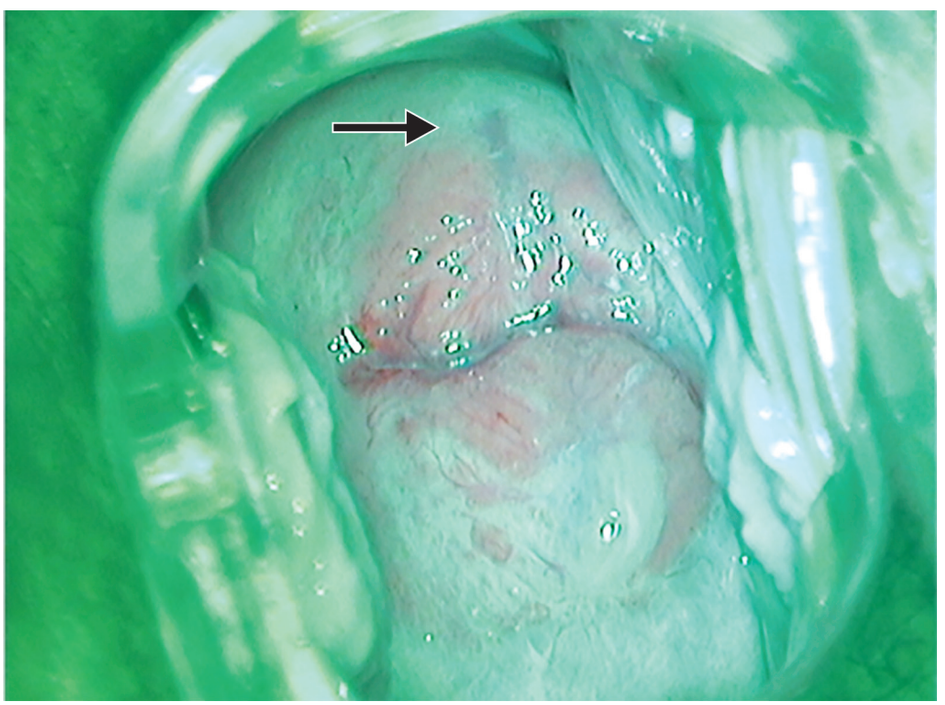


Fig. 7.10b: Green filter—coarse mosaics

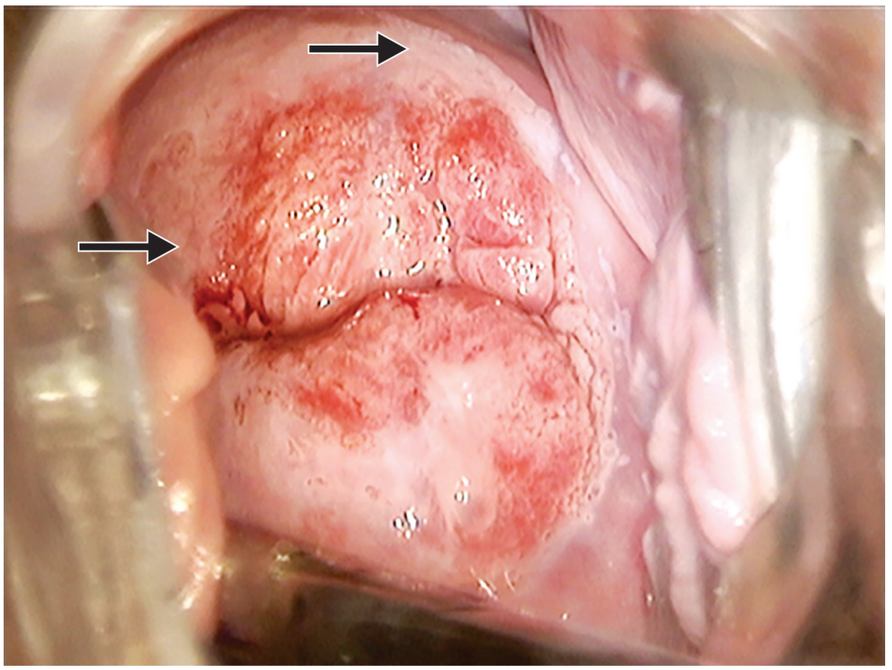


Fig. 7.10c: 5% acetic acid—distinct opaque acetowhite lesions with raised rolled margins, abutting from SCJ within the TZ with coarse mosaics, occupying 2–3 quadrants

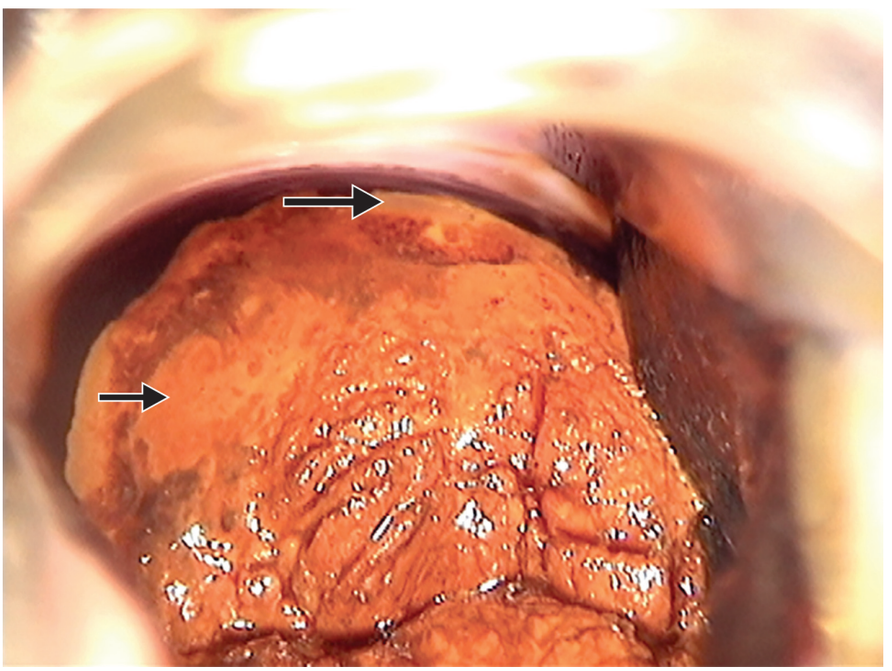


Fig. 7.10d: Lugol's iodine—variegated patchy yellow

Swede—2 + 2 + 2 + 2 + 1 = 9
CIN3/HSIL
Cytology—Inflammatory dysplasia
HP—CIN 2

11. 46-yr-old with Postcoital Bleeding

Colposcopy description: Inadequate due to bleeding, SCJ not visible, TZ 3, thick chalky white dense opaque acetowhite lesions with raised rolled margins, abutting from SCJ within the TZ with inner border sign, ridge sign, abnormal blood vessels, occupying 3–4 quadrants and mustard yellow on Lugol's iodine application.

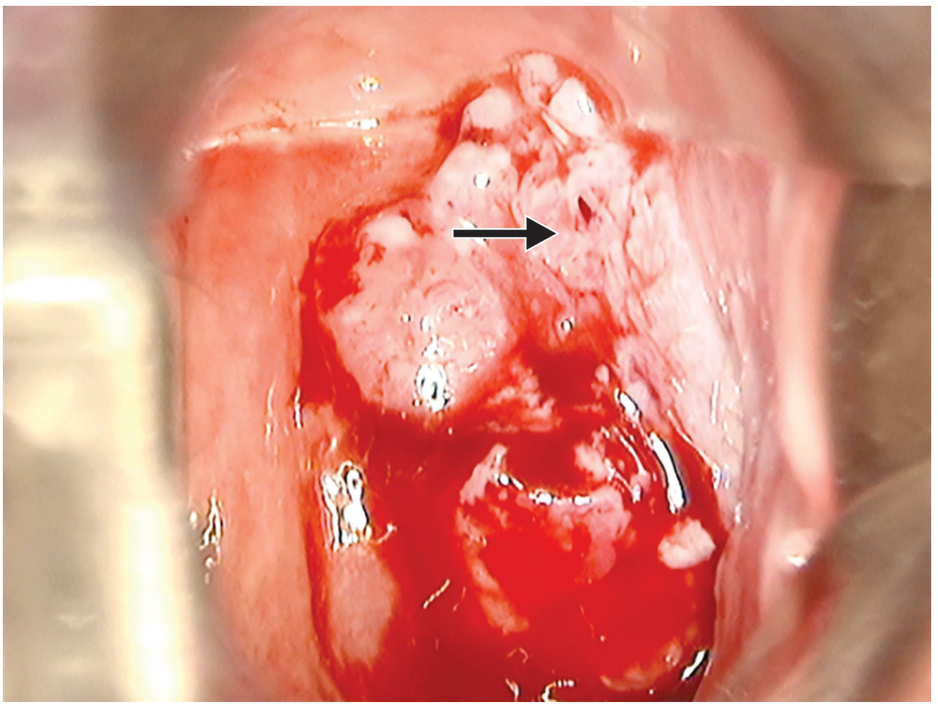


Fig. 7.11a: Normal saline—thick lesion visible

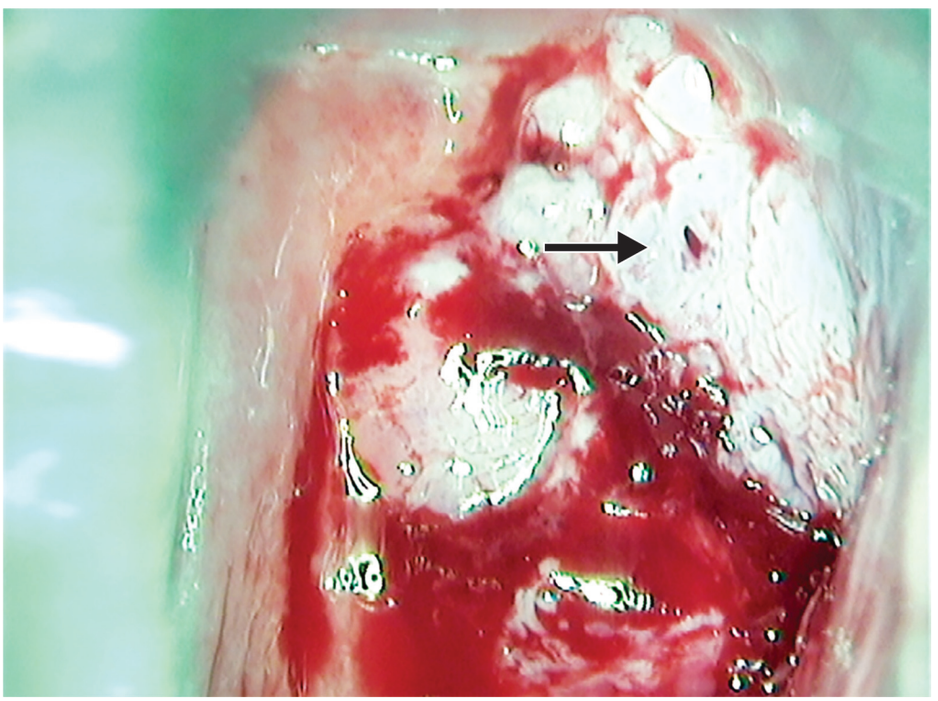


Fig. 7.11b: Green filter—abnormal blood vessels

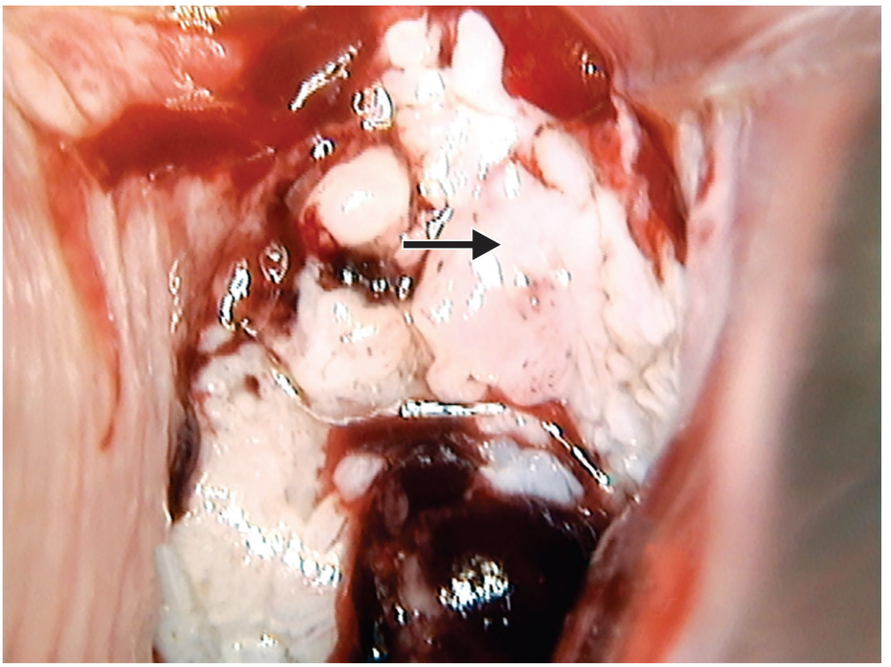


Fig. 7.11c: 5% acetic acid—thick chalky white dense opaque acetowhite lesions with raised rolled margins, abutting from SCJ within the TZ with inner border sign, ridge sign, abnormal blood vessels, occupying 3–4 quadrants

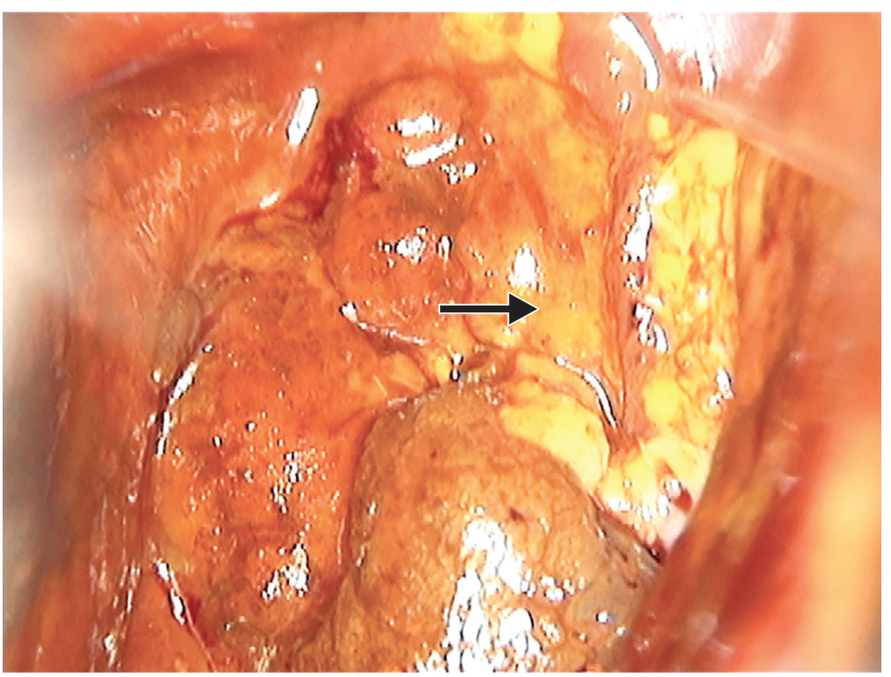


Fig. 7.11d: Lugol's iodine—mustard yellow

Swede—2 + 2 + 2 + 2 + 2 = 10
HSIL
Cytology—Squamous cell CA (SCC)
HP—SCC

CHAPTER

8

Procedures and Therapies

CERVICAL PUNCH BIOPSY

We should use dedicated biopsy forceps for this purpose (Fig. 8.1).

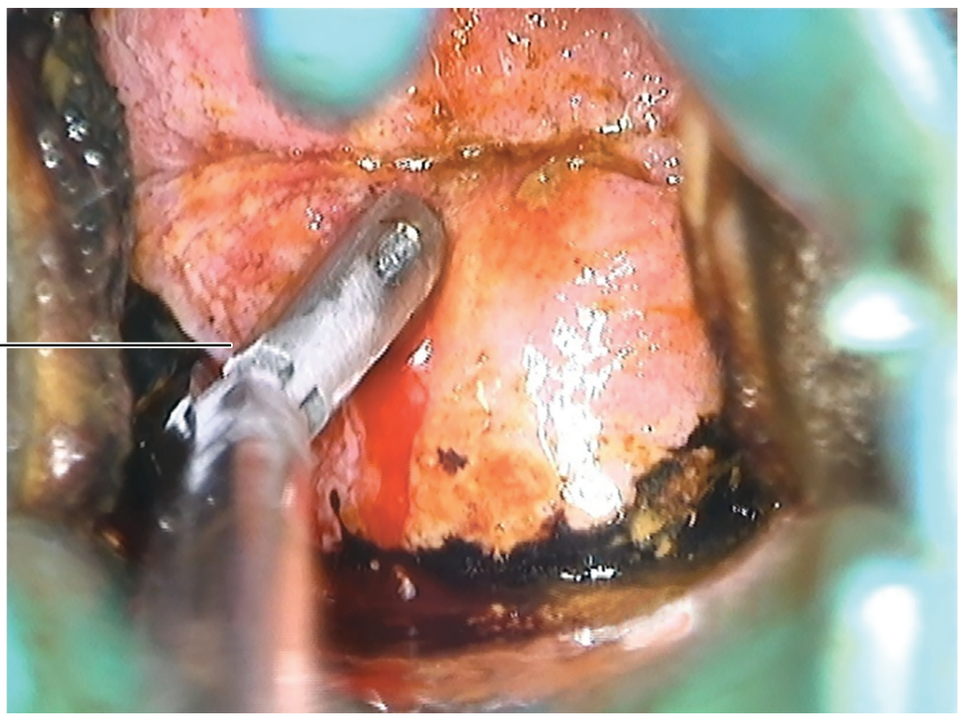


Fig. 8.1: Cervical punch biopsy with Tischler forceps

Case Management

Introduction

- The treatment of CIN should read as the management of women with CIN.
- Should never be dictated by an individual test results, even histology.
- Should incorporate all the case characteristics.
- Is a balance of benefit vs harm.

How to Safely Treat HSIL?

Safely means reducing the risk of cervical cancer to almost zero, reducing the side effects of treatment to as low as possible.

- Pretreatment counselling: Need, risk, follow-up, monitoring by cytology/HPV/colposcopy. Assessment of all case characteristics: Age, parity, future fertility.

Types of Treatment

The two main OPD-based treatments are:

- Ablative therapy which includes cryotherapy, electrocauterization, cold coagulation, and laser ablation.
- Excisional therapy includes cone biopsy, loop electrosurgical excision procedure (LEEP), large loop excision of transformation zone (LLETZ).

Advantages of these OPD Procedures

1. OPD procedure
2. Can be performed in low resource settings.
3. Easy to learn
4. 95–97% cure rate
5. Affordable to the patients
6. Well tolerated by patients
7. Avoids unnecessary hysterectomy (except when it is extremely necessary)
8. Preserves the fertility by avoiding hysterectomies
9. Halts the progression to cancer.

Effectiveness of the Therapy

- Depends upon the depth of the lesion. A right therapy has to be selected to prevent the recurrence.
- Electrocauterization reaches up to 4–5 mm in depth.
- Cryotherapy reaches a depth of 5–7 mm.
- LEEP reaches a depth of 7–8 mm.
- A treatment that is effective to a depth of 6–7 mm is necessary to destroy high grade lesions.

A. CRYOTHERAPY

It is a most popular ablative procedure practiced widely. It is economical, with less of side effects and cost-effective. It gives excellent results in CIN 1 and CIN 2 lesions. It is quite a safe procedure and does not require much expertise.

Principle of Cryotherapy

During the therapy, a cryoball made of ice is created around the cryogun. The tip of the gun is usually made of silver or copper. The core temperature of the crater formed is –68°C using carbon dioxide gas and –89°C using nitrous oxide gas. The temperature at the periphery is –20°C. Cryonecrosis of the cells occurs at this very low temperature and the intracellular water gets crystallized. There is vascular stasis, dehydration and protein denaturation. A rapid freezing for 3 minutes followed by slow thawing approximately for 5 minutes, allowing the color of the epithelium to return to original pink color followed by rapid freezing for 3 minutes is carried out. This practice of rapid freezing, slow thawing followed by rapid freezing and thawing is essential for the cryonecrosis.

Criteria for the Patient Selection

- It can be used in 'screen and treat' program.
- The lesion should not extend into the cervical canal.
- Chronic cervicitis and the active infection are to be cured first.
- There should be no evidence of PID. If so, the PID has to be cured prior to the therapy.
- The extent of the lesion should be within two-thirds of the diameter of the cryoball.

Prerequisites: The gas cylinder to be used should be completely full.

Instruments

A cryogun, large-sized self-retaining Cusco's speculum, nitrous oxide or carbon dioxide cylinder with a pressure gauge (Fig. 8.2). The pressure gauge shows three color zones—yellow, green, and red. After attaching the pressure gauge to the cylinder, note the position of the indicator showing in the gauge. Green indicates that the pressure in the cylinder is full; yellow indicates a very low pressure in the cylinder and so the cylinder has to be changed; red

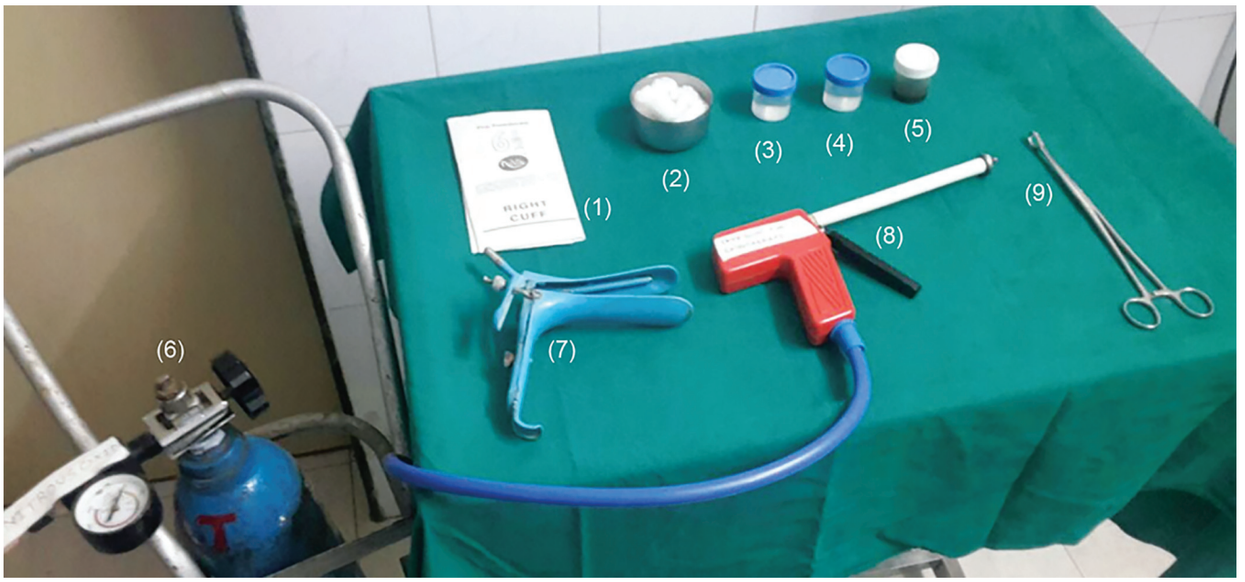


Fig. 8.2: Cryotherapy instruments: (1) Gloves, (2) cotton, (3) normal saline, (4) 5% acetic acid, (5) Lugol's iodine, (6) nitrous oxide, (7) Cusco's speculum, (8) cryogun for cryotherapy, and (9) sponge holder

indicates dangerously high pressure so some gas has to released before starting the procedure. Prior to starting of the procedure, the cryogun set has to be assembled, and the tubing of the cryogun along with the meter gauge has to be fixed to the gas cylinder.

Procedure

The filling of patient consent form is mandatory. After taking the consent and explaining the whole procedure to the patient in the language which she understands, the patient is given dorsal lithotomy position. An adequate size of self-retaining Cusco's speculum is inserted in the vagina. The cervical mucus is cleared with normal saline. With the application of 5% acetic acid, the lesion becomes more prominent. On application of Lugol's iodine, the margins of the lesion get delineated (Figs 8.3a to d). The cryoprobe with the cryogun is firmly held at the ectocervix with the center of the tip at the os. The vaginal wall should not come in contact with the cryoball. In case of lax vagina, use speculum covered with condoms. The timer is set and the handle of the cryogun is pressed to release the gas. The gas is released with a hissing sound. An ice ball is slowly formed on the tip of the cryogun, increasing in size and covering the lesion on the cervix. Release the handle after 3 minutes. By now the cryoprobe is stuck to the cervix along with the ice ball. Slow thawing is allowed till the cervix returned to original pink colour. During this time, the probe which was tightly adherent to the cervix gets released as the ice melts. Never pull the probe forcibly, if it is adhered to the cervix, to avoid injury to it.

After 5 minutes, the procedure is repeated again one more time. So we perform 3 minutes of rapid freeze and 5 minutes of slow thawing. A satisfactory freezing is achieved when the periphery of the cryoball covers the whole lesion adequately.

Cleaning of the cryogun: The cryogun probe is cleaned with running water and wiped with 60–90% ethyl alcohol or isopropyl alcohol and then kept dry.

Advice to the Patient after the Cryotherapy Procedure

The patient should be given verbal as well as written instructions that are to be followed after the procedure. They are as follows:

- There can be mild abdominal pain which subsides on its own or with mild analgesics.
- Mild raise of temperature is noticed. Patient can take one tablet of 500 mg of paracetamol, if temperature >100°C.
- There is usually no need of antibiotics.

- Watery discharge rarely blood stained can be there for about 21–30 days.
- Do not use any vaginal tampon or vaginal pessary.
- No sexual intercourse for 4 weeks.
- Report, if there is foul smelling discharge or excessive bleeding.
- To come for follow-up colposcopy examination after 3 months.

Healing of the Cervix

Healing usually takes place during the first 6 weeks of cryotherapy. Healing occurs by granulation tissue which appears during the first 2–3 weeks, followed by re-epithelialization of the surface. The wound heals completely within 6–8 weeks of the treatment. A repeat colposcopy is done by 6 months as a test of cure (Figs 8.4a and b).

Follow-up

The follow-up visits are at 3 months, 6 months and later 9–12 months. Then annually she is called once a year for 3 years. Once she is CIN negative during these three years, she is put in annual cytology screening program for 5 years. If three consecutive cytology reports are negative, then she need not come annually for screening. She is called once in 3–5 years till the age of 60 years.

Effectiveness of Cryotherapy

Cryotherapy is 95–97% effective with failure rate of only 3–5%. The treatment failure is manifested usually during the first year.

Reasons for Failure

- Faulty selection of patient for the cryotherapy. Remember the lesion size should be within two-thirds of the cryoball.
- The contact between the cryoprobe and the surface of the lesion on the cervix is inadequate.
- The channel of passage of gas in the cryoprobe could be blocked for some reason, thereby cryoball is inadequately formed.
- The cylinder is only partially full.
  The therapy is performed in haste without maintaining the principle of rapid freezing and slow thawing.
- Freezing done only once without repeating the process.
- Adenocarcinoma *in situ* (AIS) associated with CIN will not be benefited.

Management of Failure Cases

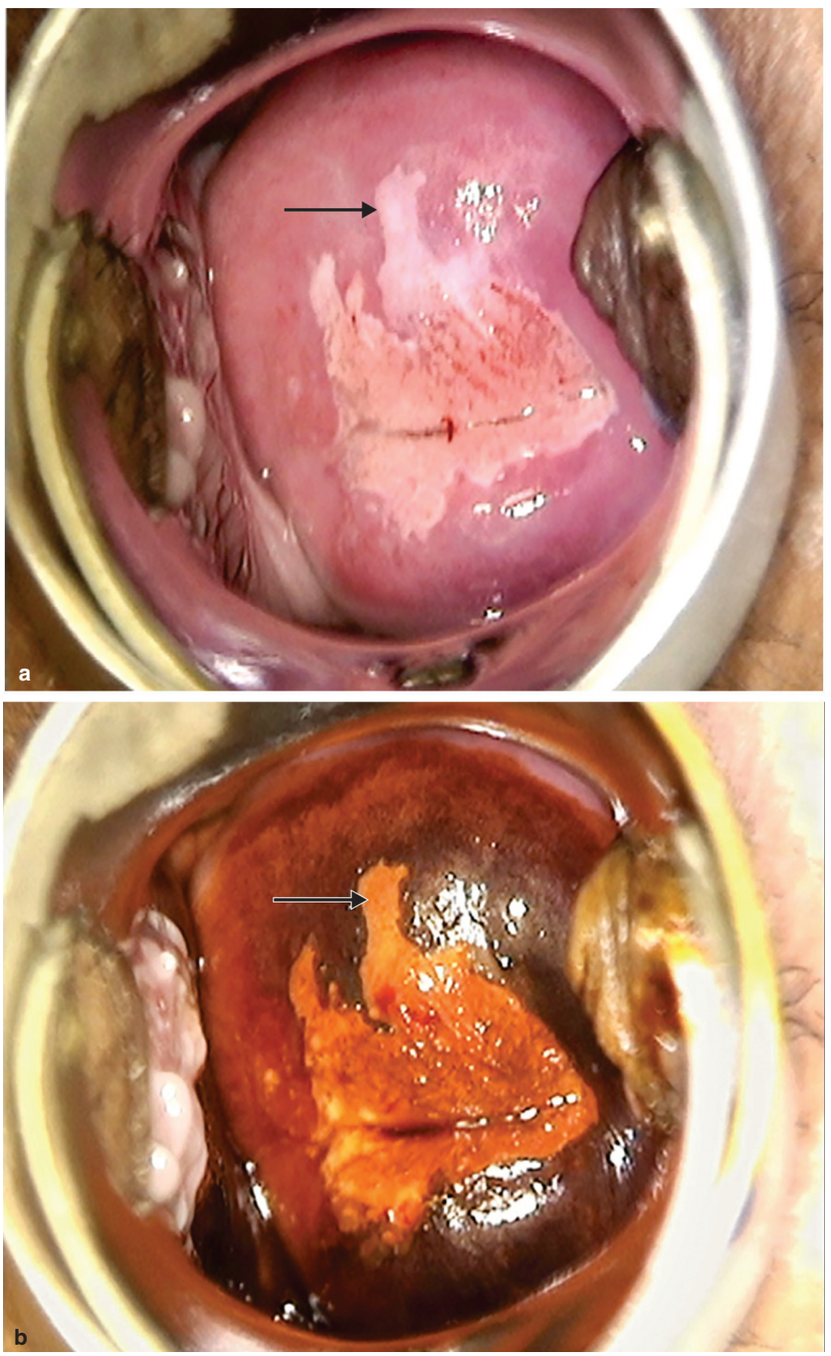
In case, if the patient come with the treatment failure, the colposcopy-guided biopsy should be repeated along with the endocervical curettage (ECC) histopathology to find out the cause of failure. Many a times, we find a few patches of CIN lesion which could not be covered in the cryoball and hence have been left out. In such cases, it is advisable to perform a repeat cryotherapy to tackle the lesion. As previously said, ensure that the cylinder is full and the procedure is performed correctly with 3 min freeze–5 min thaw–3 min freeze. Rarely we find a large lesion residues left over in spite of the previous treatment. In such cases, an alternative treatment modality is discussed and offered to the patient, which includes LEEP therapy, simple hysterectomy, if her family is complete and if she insists.

Complications and Long-Term Sequelae

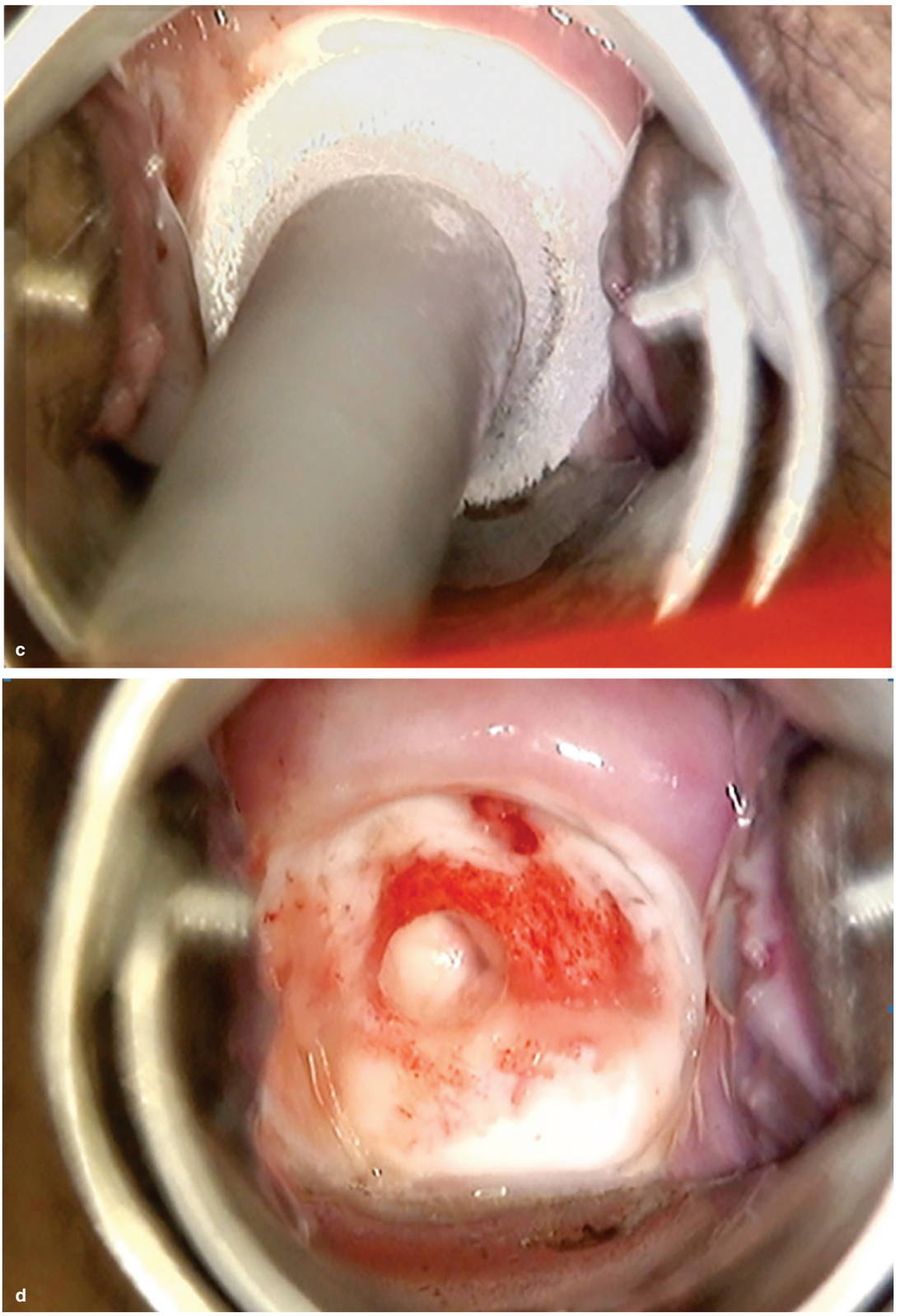
- Excessive malodorous discharge—usually CIN cases are concurrent with pelvic inflammatory infection, bacterial vaginosis, and trichomoniasis. In such cases, the pathology of PID, cervicitis should be adequately treated prior to the treatment of CIN; otherwise there could be a flare up of PID.
- Both the sexual partners should be treated in the cases of reproductive tract infections, if any, or cervicitis, as the case may be. Use of condoms is highly recommended.
- Cervical stenosis occurs in less than 1% of women.

CASE 1

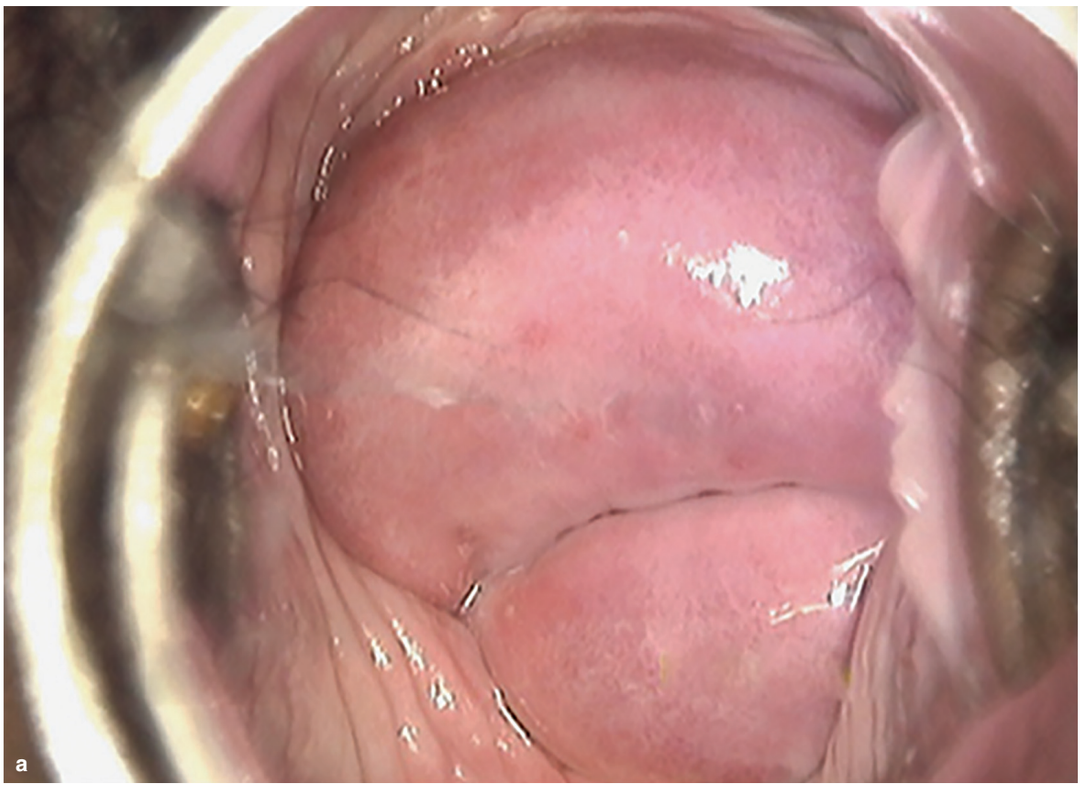
Case of HSIL treated with cryotherapy (Figs 8.3a to d)

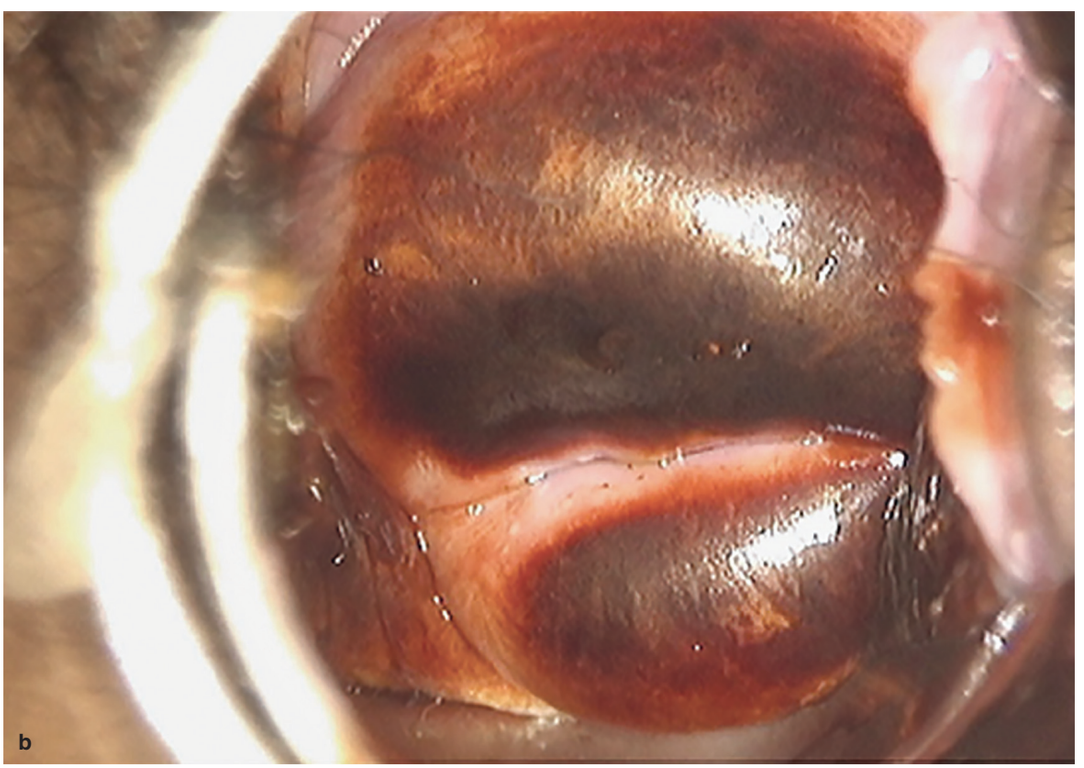


Figs 8.3a and b: A case of high grade lesion (CIN 2)



Figs 8.3c and d: Cryotherapy





Figs 8.4a and b: Postcryotherapy—complete healing of the lesion (6 months later)

CASE 2

Case of LSIL treated with cryotherapy (Figs 8.5a to e)

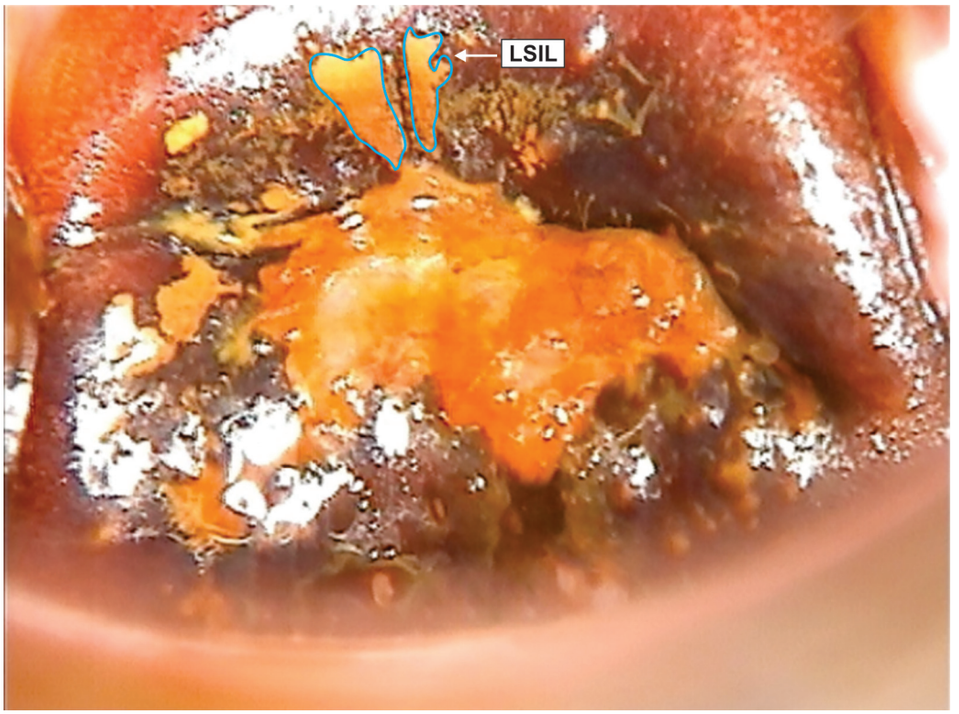


Fig. 8.5a: LSIL on colposcopy

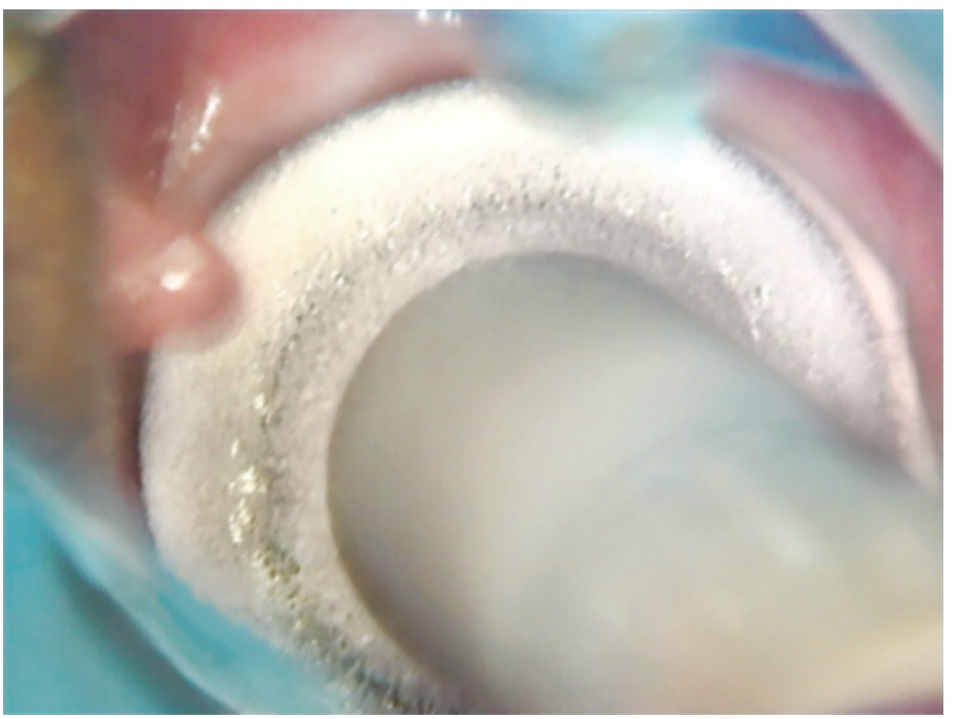


Fig. 8.5b: Cryotherapy with nitrous oxide

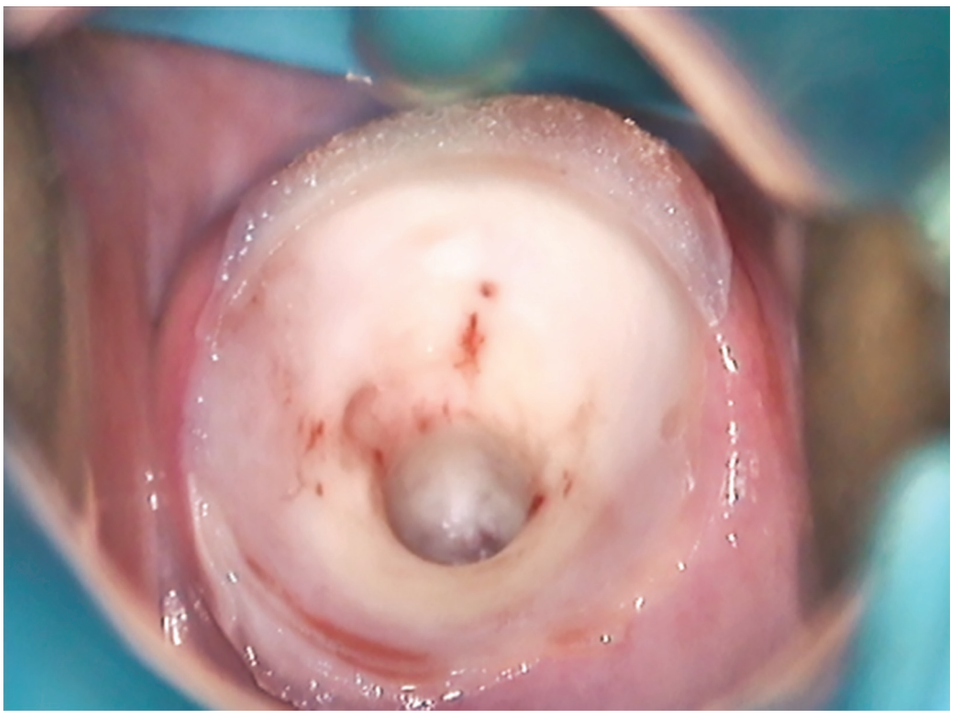


Fig. 8.5c: Post-cryotherapy

Fig. 8.5d: Post-cryotherapy follow-up after 6 months with 5% acetic acid

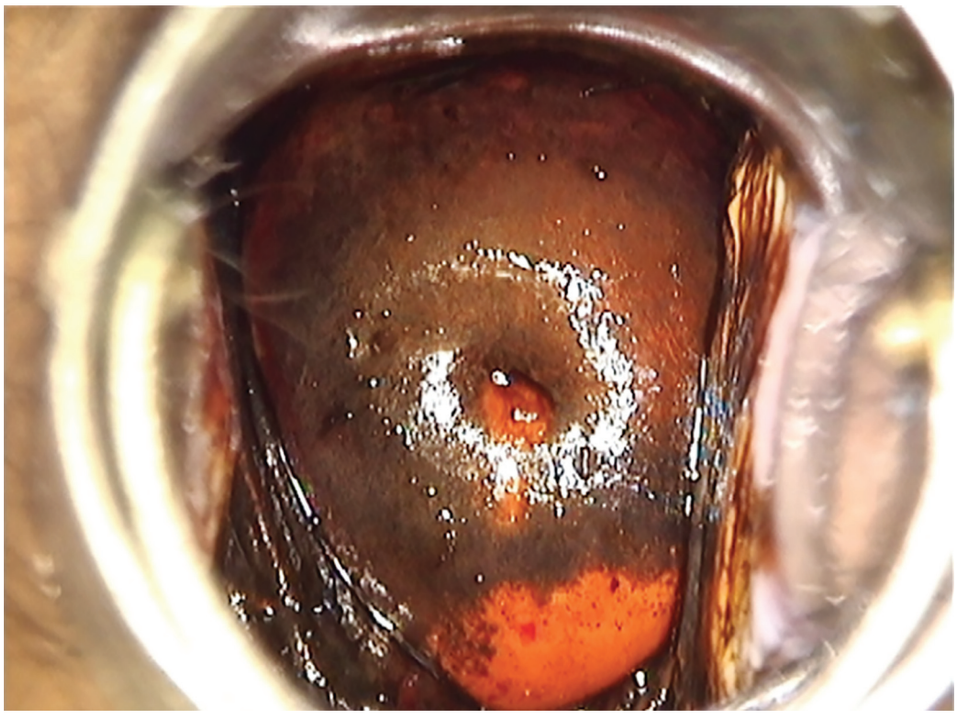


Fig. 8.5e: Post-cryotherapy follow-up after 6 months with Lugol's iodine

B. COLD COAGULATION OR THERMOCAUTERY

Introduction

It was introduced by Kurtz and Emm in 1966. It was originally used for cervical benign pathology and later from 1970 used in treatment of CIN.

Techniques

Cold coagulation is a misnomer as it is not cold. The probes are preheated to 120°C. The probe is applied in 40 sce pulses covering entire lesion in single or several applications. Local anesthesia is not required. It can be performed in see and treat approach.

Principle

It dessicates the intracellular water, denaturing the tissues, thus destroying the lesions.

Equipment (Figs 8.6a and b)

1. Portable operating unit with temperature control dial
2. Current models require main power supply
3. Detachable teflon-coated thermosound(s) probe

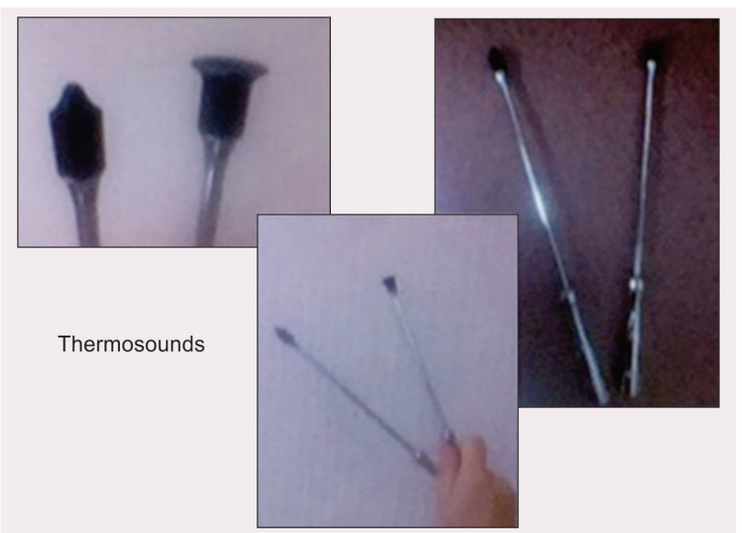


Fig. 8.6a: Probes and thermosounds

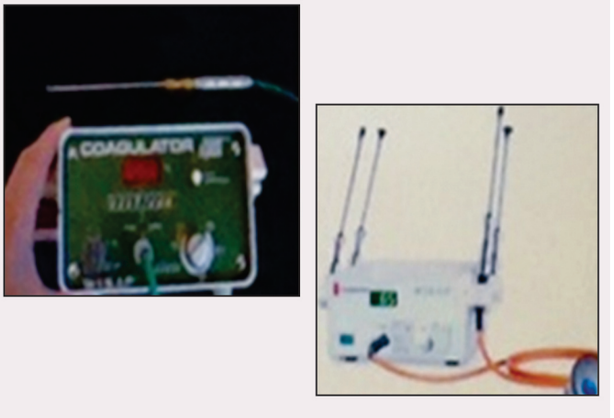


Fig. 8.6b: Portable operative unit

Advantages

- No refilling of gas.
- Operates on electricity, now battery operated is in experiment.
- Low learning curve.
- Can be used for see and treat.

Disadvantages

- Electricity recquired
- High cost (yet one time investment)
- No biopsy specimen

C. ELECTROCOAGULATION

Introduction

It is the usual treatment for ectropion and ectopy done with ball cautery. The whole exposed area of columnar epithelium is countered by ball cautery. The depth reached approximately 5 mm.

Principle

The subcolumnar reserve cells get stimulated to transform into metaplastic cells.

Advice

1. No sexual activity for 21 days.
2. Black discharge from vagina will be seen for a few weeks.

CASE 1

Electrocoagulation under Local Anesthesia (Figs 8.7a to d)

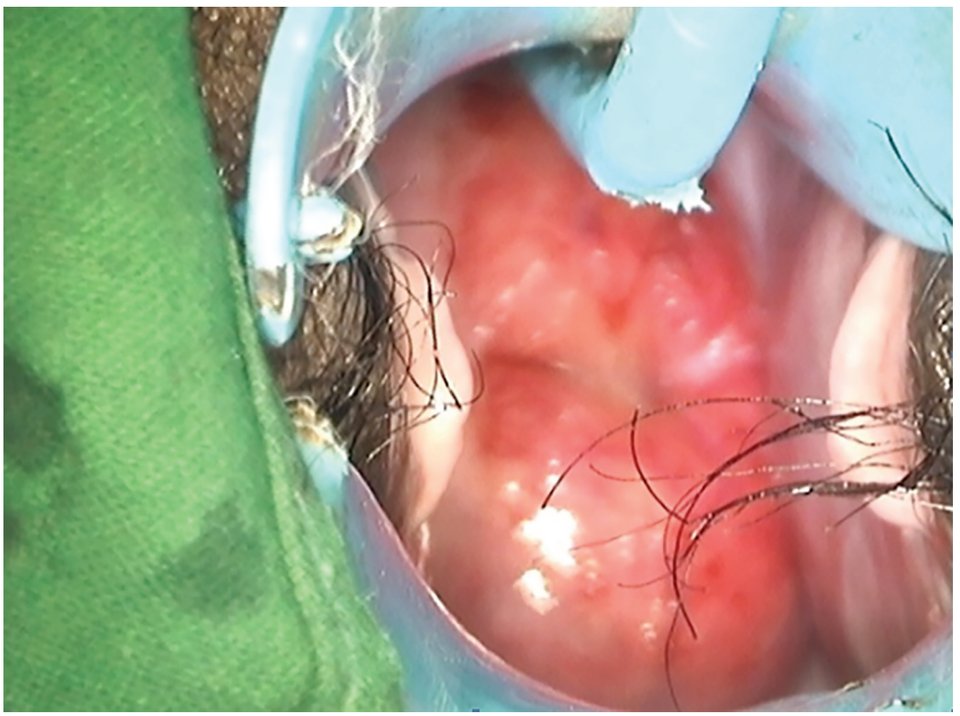


Fig. 8.7a: Case of ectropion

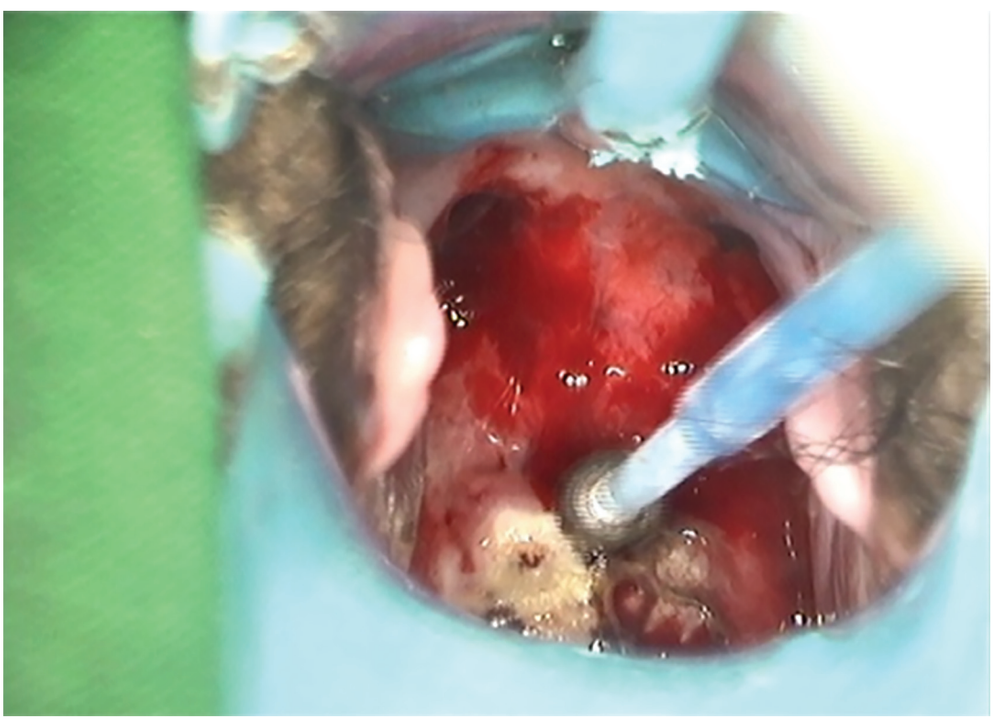


Fig. 8.7b: Cauterization with ball cautery

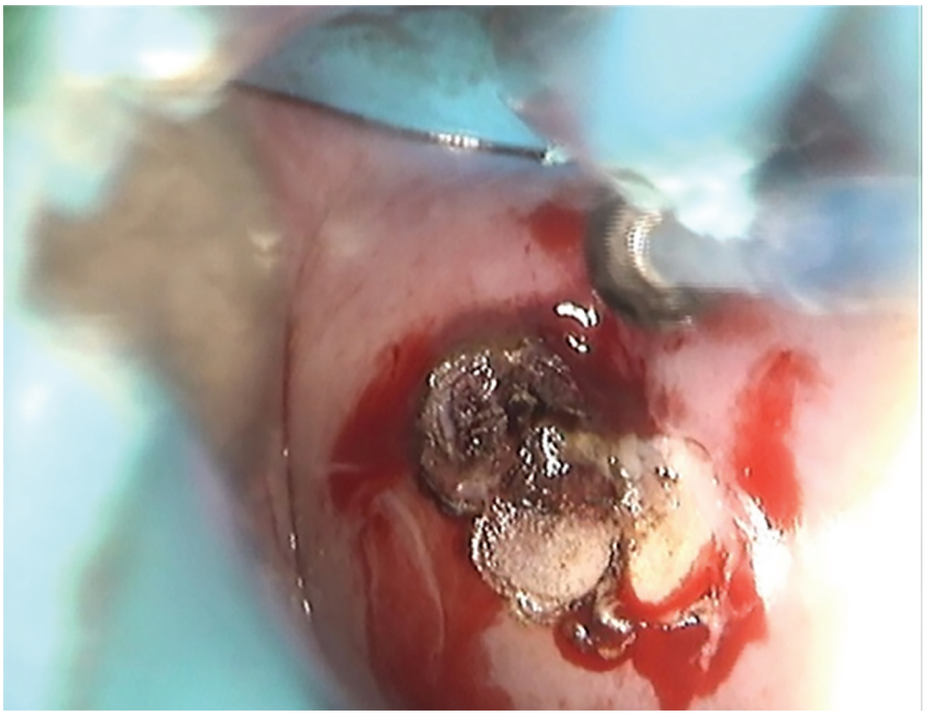


Fig. 8.7c: Ball cautery application covering whole of ectropion

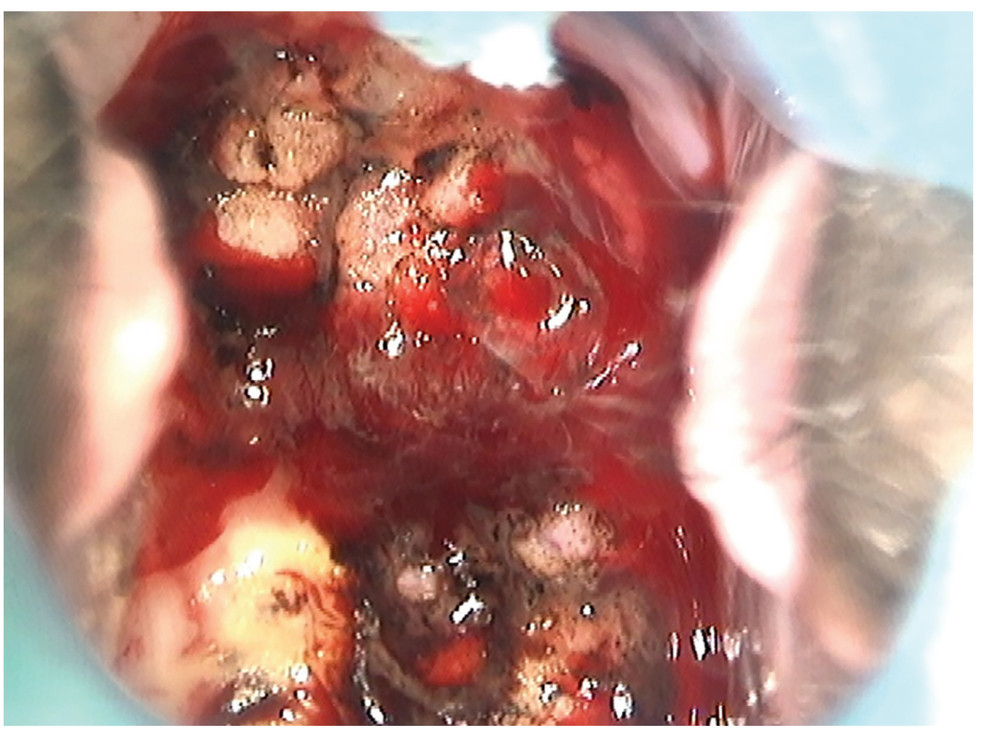


Fig. 8.7d: Complete ectropion cauterized with ball cautery

CASE 2

Case of Ectopy (treated with electrocautery—Figs 8.8a, b)

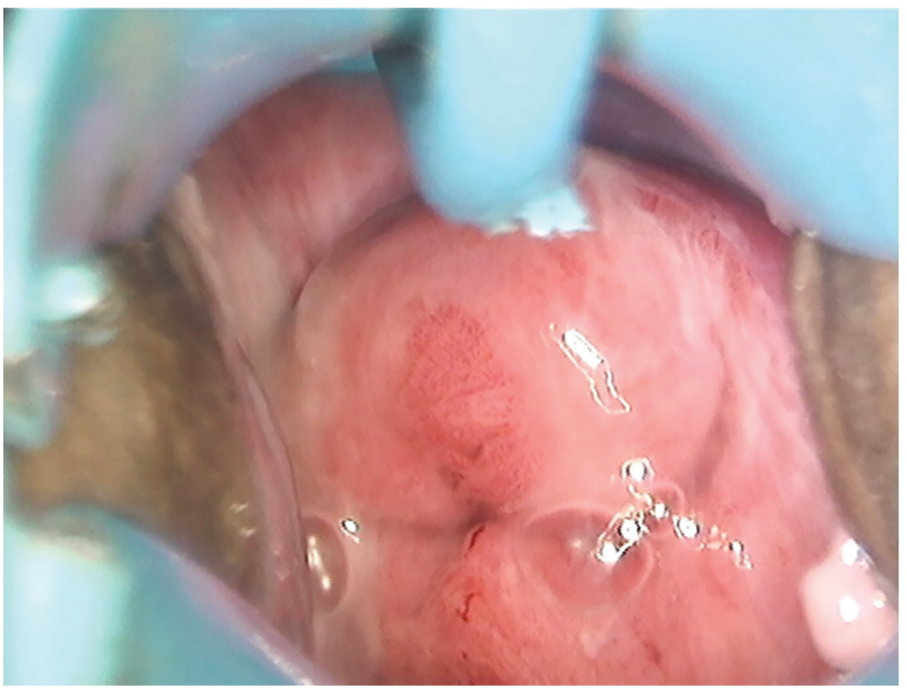


Fig. 8.8a: Case of ectopy

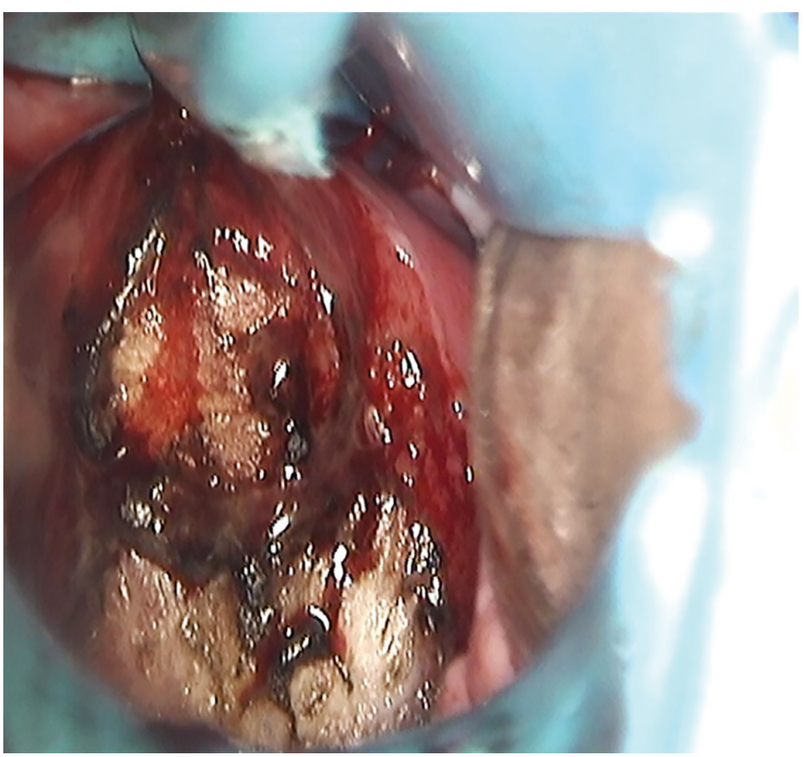


Fig. 8.8b: Treated by electrocautery using ball cautery

D. LOOP ELECTROSURGICAL EXCISION PROCEDURE (LEEP)

Large Loop Excision of Transformation Zone (LLETZ)

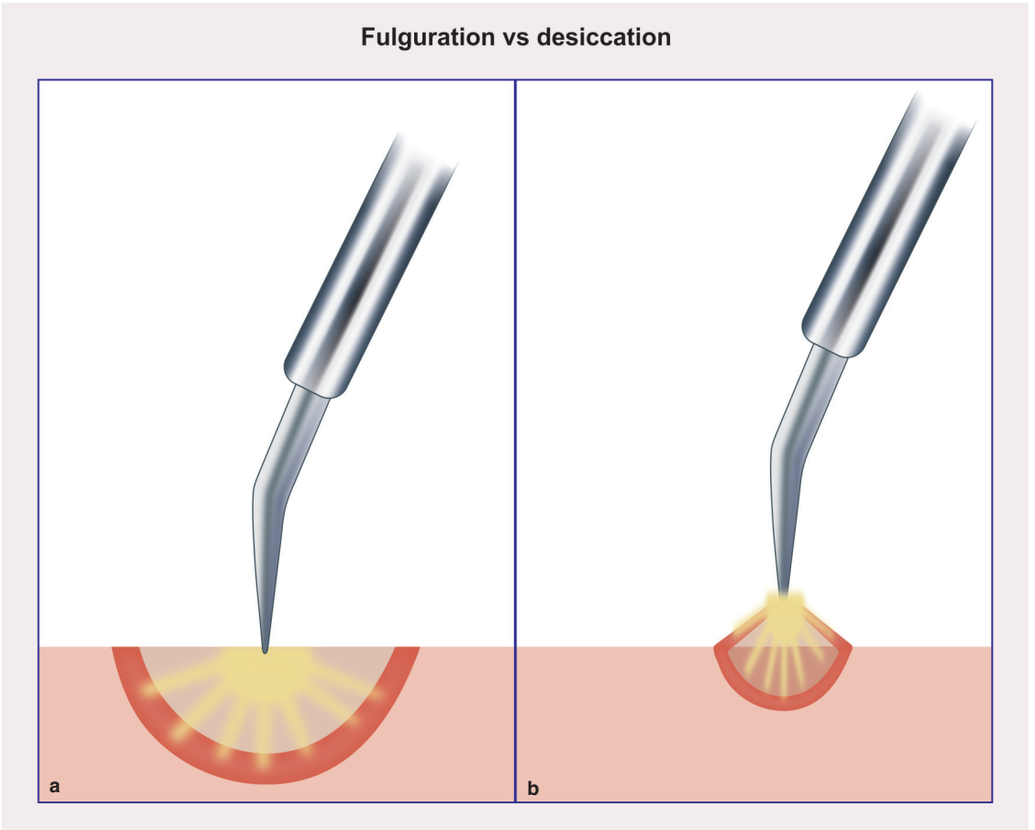
Introduction

The term LLETZ was coined by 'Rene Cartier' in early 1980s using a low voltage diathermy loop using thin wire under LA with blended diathermy. This term was coined to discriminate from small loop used by Ramey Kartey in Paris to take biopsy in early 1980s.

Fig. 8.9: High current

Principle

Based on discovery from Farday that the muscle does not contract by very high frequency alternating current (Fig. 8.9) greater than 100 kHz, it is possible to allow safe passage of electricity through controlled surface in the human body and to utilize the localised point of contact effect to achieve cutting, coagulation or combination blend of two. ESU operates to frequency above 300 KHz when contraction of muscle is overcome. The electrical energy used in electrosurgery is transformed into heat and light energy. The heat from a high voltage electrical arc between the operating electrode and the tissue has three effects on tissue depending on the power setting and the waveform of the current used—desiccation, cutting and fulguration. The tissue is cut by vaporizing tissue at 100°C or to coagulated by dehydrating tissue above 100°C. There are three types of coagulation–desiccation in which the active electrode touches the tissue; fulguration in which there is no contact between the active electrode withthe tissue, the electric current is sprayed with multiple sparks which flows between the electrode and the tissue; needle coagulation wherein a needle is inserted into the center of a lesion. The fulguration setting uses higher peak-to-peak voltage waveforms, coagulating the tissues with less current, and is, therefore, less harmful to the adjacent tissue. The waveform usually used is a blended waveform to control the bleeding during the procedure. Modern generators have the facility of blending both the coagulation current and the cutting current. Usually, the setting is made at 40 watts coagulation and 30 watts cutting to have a blended waveform. The settings can be adjusted accordingly. To complete the electrical circuit, a patient return electrode or dispersive plate should be placed in contact with patient's skin.



Figs 8.10a and b: a. Desiccation effect; **b.** Fulguration effect

Desiccation: There is full contact between the electrode and the tissue. ESU produces lower temperature but deeper diathermy effect, less coagulative and more damaging effect. This is usually useful in endometrial ablation (Fig. 8.10a).

Fulguration: The electricity passes through very small gap of tissue with relatively higher temperatures, used to achieve very less superficial tissue damage and sufficient cutting or coagulation effect (Fig. 8.10b).

How to achieve fulguration effect?

- Activate the electrode before contacting the tissue.
- Pass the loop slowly through the tissue whereby small stream window will occur between the loop and the tissue.
- Loop should not bend while passing the tissue or underneath the TZ.

Steps to be followed:

- Written informed consent should be taken.
- The procedure should be informed thoroughly to the patient. Also the alternative treatment modalities should be explained to the patient.
- In case of cervical atrophy in postmenopausal woman, topical application of estrogen is advisable before the procedure.
- *Instrument trolley* (Fig. 8.11): Insulated vaginal speculum or speculum covered by a condom, smoke evacuation tube, suction cannula, loop electrodes (Fig. 8.12), ball electrode, needle electrode, sponge holder, cotton balls, spinal needle no. 23 or 25, 5 cc syringe, 2% lignocaine, tooth forceps, cautery plate, Lugol's iodine, suture material, cautery handle, and monsel paste.
- Patient is made to lie on dorsal lithotomy position. Insulated vaginal speculum is inserted and the smoke evacuation tube is attached to the special operative speculum. The other end is attached to the suction machine.

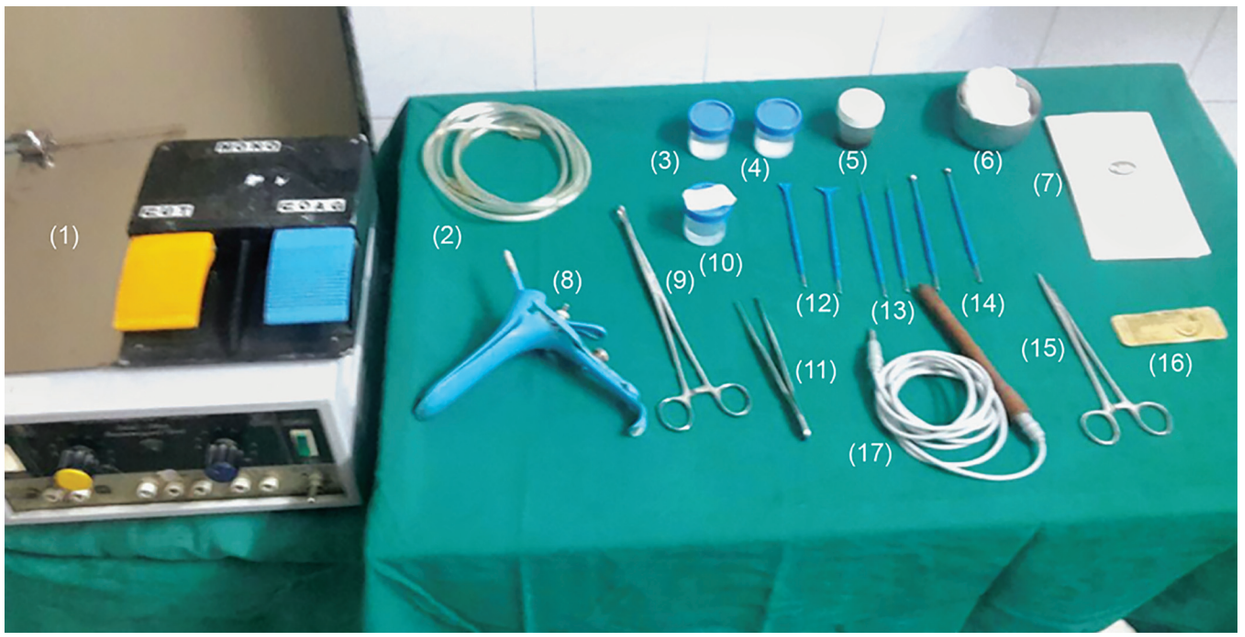


Fig. 8.11: Instrument trolley: (1) Cautery machine with foot pad, (2) smoke evacuation tube, (3) normal saline, (4) 5% acetic acid, (5) Lugol's iodine, (6) cotton balls, (7) gloves, (8) operative Cusco's speculum, (9) sponge holder, (10) specimen container, (11) tooth forceps, (12) LEEP's loops, (13) needle cautery, (14) ball cautery, (15) needle holder, (16) suture material, and (17) cautery handle

Fig. 8.12: Loop electrodes

The colposcopy procedure is repeated and the lesion is detected. Local anesthesia of 2% lignocaine is administered around the ectocervix using spinal needle. As the cervix is tough, there is some pressure to be applied for puncturing the tissue. Multiple sites are punctured to a depth of about 2 mm. Blanching of tissue is achieved while injecting the local anesthesia. To have a better field of vision, 1 drop of epinephrine can be added to the 10 ml of 2% lignocaine (to avoid epinephrine in case of high blood pressure). The smoke evacuation

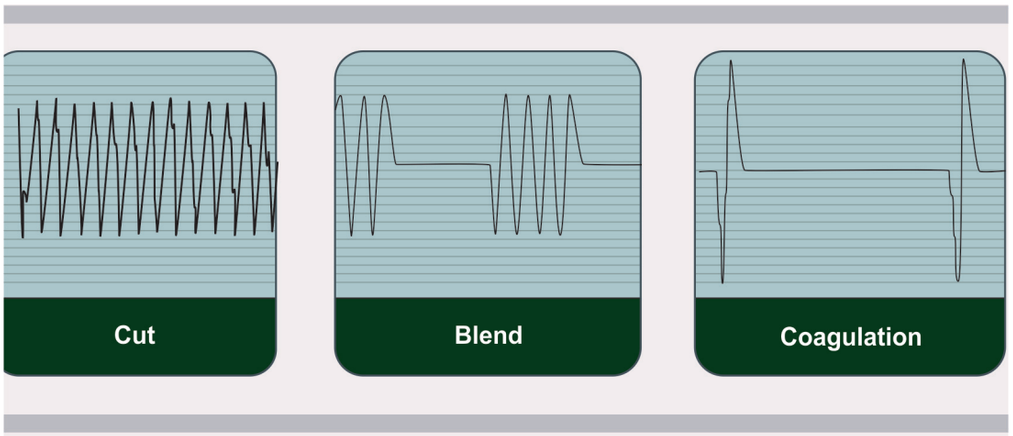


Fig. 8.13: Blended current

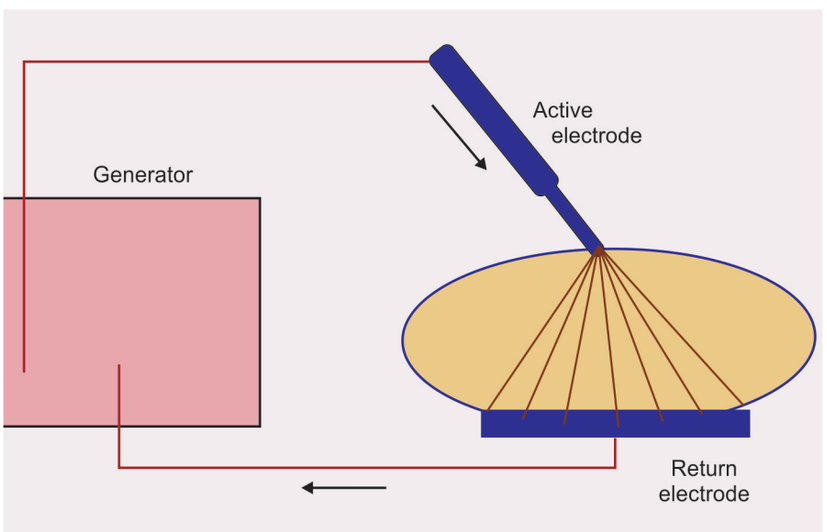


Fig. 8.14: Monopolar cautery

system is turned on. Just before the loop is placed on the cervix, the blended current is activated (Fig. 8.13), monopolar current is used (Fig. 8.14). The loop is placed on the tissue beyond the boundary of the lesion and simply cut through the cervical tissue without applying any pressure. The loop is guided parallel to the surface either horizontally or vertically with the handle perpendicular to the surface. Once the tissue is cut, the loop is withdrawn slowly and the dissected tissue is removed and sent for histopathology. The direction of movement can be from left-to-right; right-to-left; posterior-to-anterior (Fig. 8.15). But never from anterior-to-posterior as the excised tissue curls down and obscures the visual field. Once the tissue is removed, the surface is cauterized by ball cautery (Fig. 8.16). Minor bleeding is cauterized by needle cautery. Hemostasis is checked (Fig. 8.17). Intractable bleeding is tackled by taking a hemostatic stitch with late dissolving suture. Sometimes the lesion exceeds the width of the largest loop, in such cases multiple passes can be taken with different sizes of loop. The margins of the tissue removed should be lesion free on the HP report.

Instructions after the Procedure

- To avoid penetrative sexual contact for 4–6 weeks.
- Patient will have blackish brown discharge for 2–3 weeks.
- To report excessive bleeding or malodorous discharge.
- Follow-up at 3 months, 9–12 months, for test of cure (TOC Figs 8.18 a and b), and then yearly for 5 years.

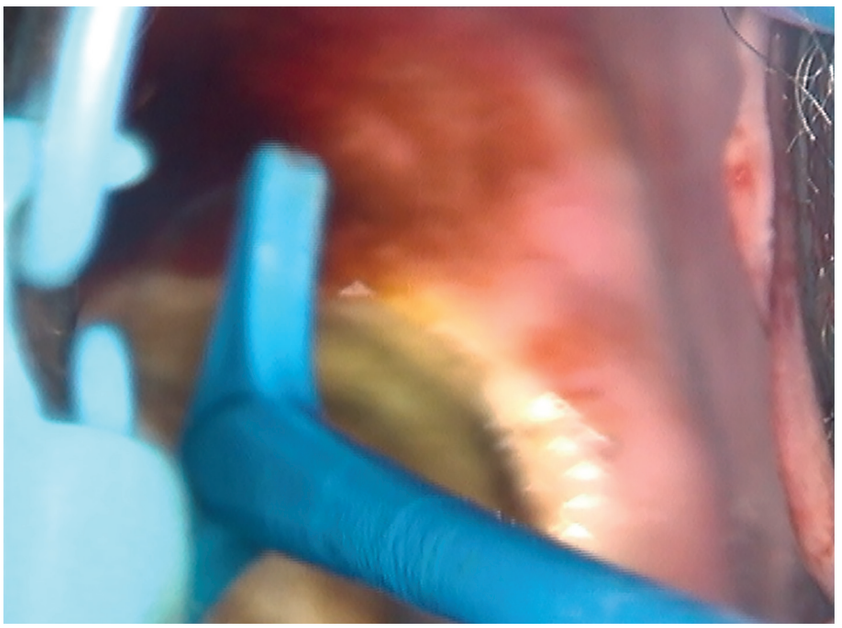


Fig. 8.15: Excision with loop electrode under LA

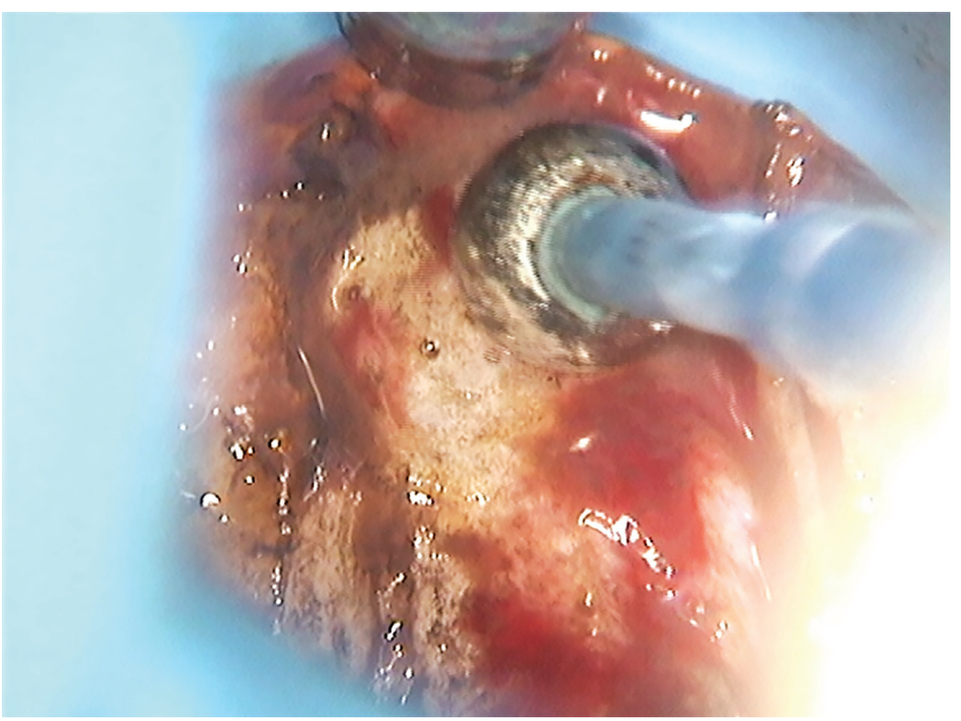


Fig. 8.16: Ball cautery used to achieve hemostasis

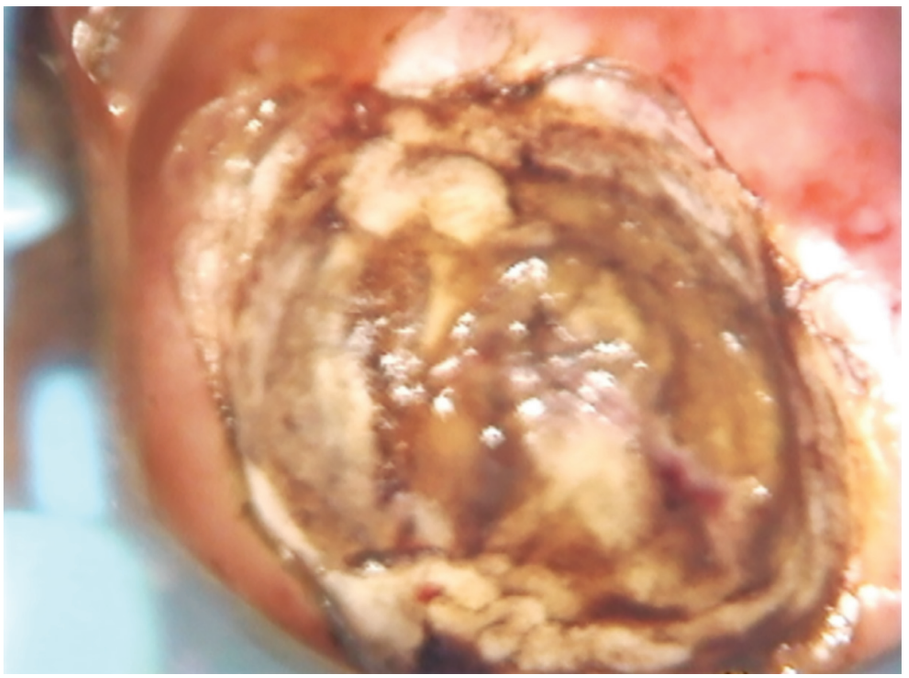


Fig. 8.17: Post-LEEP perfect hemostasis achieved

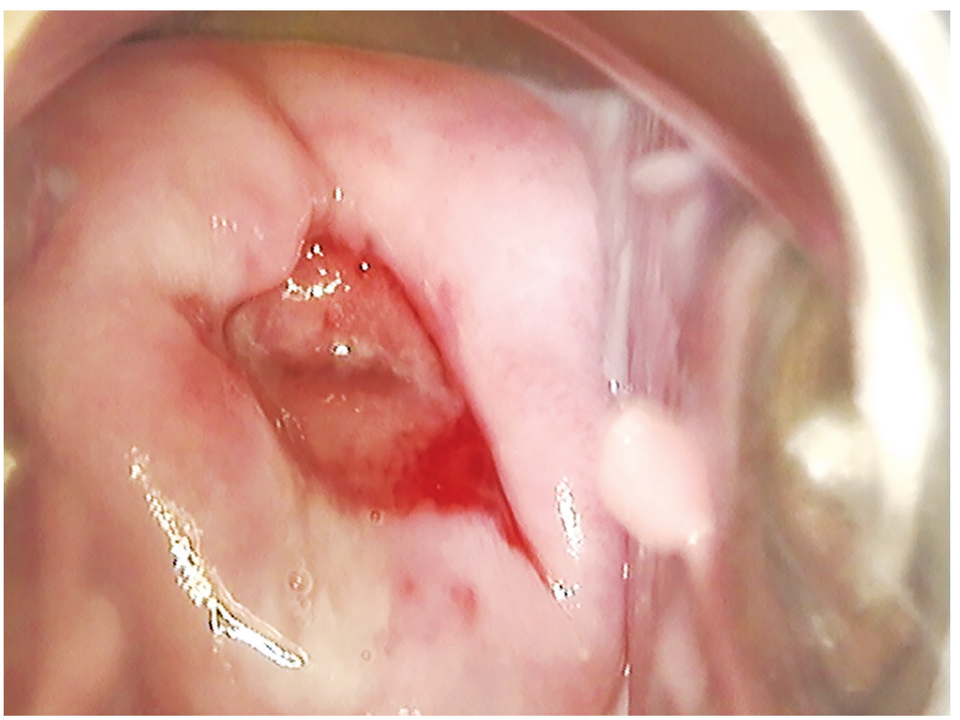


Fig. 8.18a: Post-LEEP follow-up after 6 months

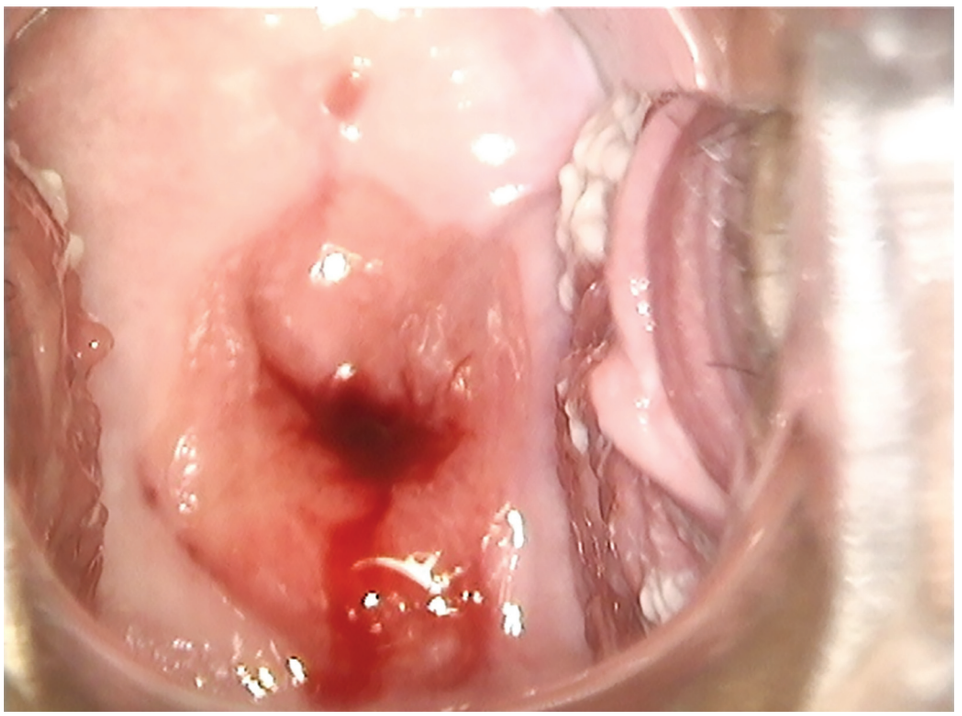


Fig. 8.18b: Follow-up post-LEEP after 1 year

Adverse Side Effects and Complications

- Excessive bleeding: Severe and moderate postoperative bleeding occurs in a few cases, which should be tackled immediately by fulguration or applying monsel paste or using a silver nitrate application stick. Rarely placement of suture is necessary.
- Postoperative infection.
- *Treatment failure:* This is seen in 10% of the cases. It is advisable and mandatory to biopsy all the persistent lesions to reporting of any preclinical invasive carcinoma. Persistent lesions can be treated with LEEP or cryotherapy.

Follow-up Post-Treatment

The valuation approach presented here is provided by the 2012 consensus guideliens of the American Society for Colposcopy and Cervical Pathology in collaboration with multiple professional societies and government organizations in the United States and Canada, including the American College of Obstetricians and Gynecologists, Society of Obstetricians and Gynaecologists of Canada, Society of Gynecologic Oncologists, American Cancer Society, Centers for Disease Control and Prevention, and the US Food and Drug Administration. The algorithms for the consensus guidelines can be found online.

After treatment with excision or ablation, women with cervical intraepithelial neoplasia (CIN) 2, 3 should be followed with:

- Human papillomavirus (HPV) cervical cytology cotesting at 12 and 24 months.
  - If both cotests are negative, cotesting should be repeated in three years. If cotesting is again negative, the patient may resume routine screening.
  - If there is abnormal cytology or a positive HPV test during follow-up, colposcopy with endocervical sampling should be performed.
- Routine screening is recommended for at least 20 years, even if screening continues beyond age 65 years.
- If CIN 2,3 is identified at the margins of an excisional procedure or postprocedure endocervical curettage (ECC), cytology and ECC at 4 to 6 months is preferred, but either repeat excision or hysterectomy may be performed.