An Overview of Colposcopy: Normal Findings

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Learning Objectives

• 1. Review the Squamo-Columnar Junction through the female lifespan
• 2. Define the Transformation Zone & Satisfactory Colposcopy
• 3. Understand the Effect of Acetic Acid and Lugols on the cervix
• 4. Recognize Nabothian Cysts
• 5. Recognize Squamous Metaplasia
The Squamo-Columnar Junction

Squamous

Columnar
Over time, the SCJ “moves” proximally by the process of squamous metaplasia

• Metaplasia is the replacement of one cell type with another.

• Squamous metaplasia is the process of replacement of columnar with squamous epithelium.

• Squamous metaplasia is the normal process of cervical maturation.
Squamous Metaplasia

- Columnar epithelium on the portio vaginalis of the cervix is replaced by squamous epithelium.
  - Estrogen lowers vaginal pH
    - “Acid burn” stimulates metaplasia of delicate one cell-layer thick endocervical epithelium
    - Estrogen levels increase in neonatal period and at puberty
  - Cervical eversion mediated by estrogen
    - Exposes endocervical columnar epithelium to more acidic vaginal environment
    - Effect significant in pregnancy
Mechanism of squamous metaplasia

- Columnar cells replaced by immature metaplastic cells
  - Become indistinguishable from squamous cells as they mature
- Transformation zone thought to arise simultaneously centrally and peripherally
  - from subcolumnar reserve cells
  - from proliferation of existing squamous cells at the SCJ
Squamous Metaplasia

Reserve cells develop below columnar epithelium

Metaplastic cells replace columnar epithelium

Columnar epithelium in gland

Former gland filled with metaplastic cells
Squamous Metaplasia Through the Colposcope

Immature Cervix  After Squamous Metaplasia
What happens to those mucus secreting glands when they become blocked by squamous cells?

- Nabothian Cyst
- Gland Openings
Gland Openings
Nabothian Cyst
Nabothian Cyst
Unroofed Nabothian Cyst
Normal superficial blood vessels branch or “arborize” over Nabothian cysts.
Branching vessels
Multiple Nabothian Cysts
Nabothia cyst with large gland opening
The Transformation Zone

- The zone of past and present squamous metaplasia: the area transformed from columnar to squamous epithelium
- The area between the new, colposcopic SCJ and the original SCJ (the squamo-squamous junction)
  - Colposcopically extends from the new SCJ to the last gland opening
What's the extent of the transformation zone?
What's the extent of the transformation zone?
Action of Acetic Acid

- Mucolytic
- Osmotic action
  - Squamous cells become dehydrated
  - Increased nuclear:cytoplasmic ratio results in more white light being reflected
Etiology of Acetowhite Effect

Variable amounts of light from the colposcope penetrate to the basal capillaries of the lamina propria. It will be reflected back with a pink color. Part does not completely penetrate but is reflected back from the epithelium with a white color. The reflected whiteness is dependent upon:

- The depth of the surface epithelial layer
- Nuclear to cytoplasmic ratio of the epithelial cells
Normal Cervix: Acetic Acid Exposure

Ectocervix

Endocervix

D M O’Connor
Effect of 3-5% Acetic acid
The Fully Visualized SCJ

- The entire transformation zone can be seen.
  - The entire new squamo-columnar junction can be visualized, ie 360° of columnar epithelium.
  - The upper (medial) limit of any lesion is visible.
- May require Q tip or endocervical speculum
- Other terminology:
  - Adequate
  - Satisfactory
SCJ Fully Visualized

SCJ Not Fully Visualized
How do we fully visualize the SCJ when it’s inside the endocervical canal?
SCJ not fully visualized

Fully visualized with endocervical speculum
SCJ fully visualized with moistened cotton tipped applicator stick
Lugols

• Cervical squamous epithelium and normal vaginal epithelium and mature metaplastic show glycogen-rich cells.

• Dysplastic epithelium - little or no glycogen.

• Normal epithelium - the intense iodine uptake - mahogany-brown color, almost black.

• Low-grade lesions - partial uptake - saffron yellow.

• High-grade lesions - minimal or absent uptake - intense mustard
Lugol’s stains glycogen rich cells
dysplastic cells lack glycogen
Effect of green filter

- Acetowhite effect more prominent
- Vessels contrast against background
Squamous Metaplasia
Squamous metaplasia
Normal Cervix: Acetic Acid Exposure

Metaplasia

Inflammation

D M O’Connor
Acute and Chronic Cervicitis with Reactive Atypia
Conclusions

- 1. The Squamo-Columnar Junction “moves” through the female lifespan
- 2. The entire Transformation Zone must be visualized for a Satisfactory Colposcopy
- 3. Acetic Acid and Lugols demonstrate dysplasia differently
- 4. Nabothian Cysts are normal & contain branching vessels
- 5. Squamous Metaplasia is a normal finding