Increased Detection of Adenocarcinoma in Situ (AIS) by Electrical Impedance Spectroscopy (EIS)

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Disclosures

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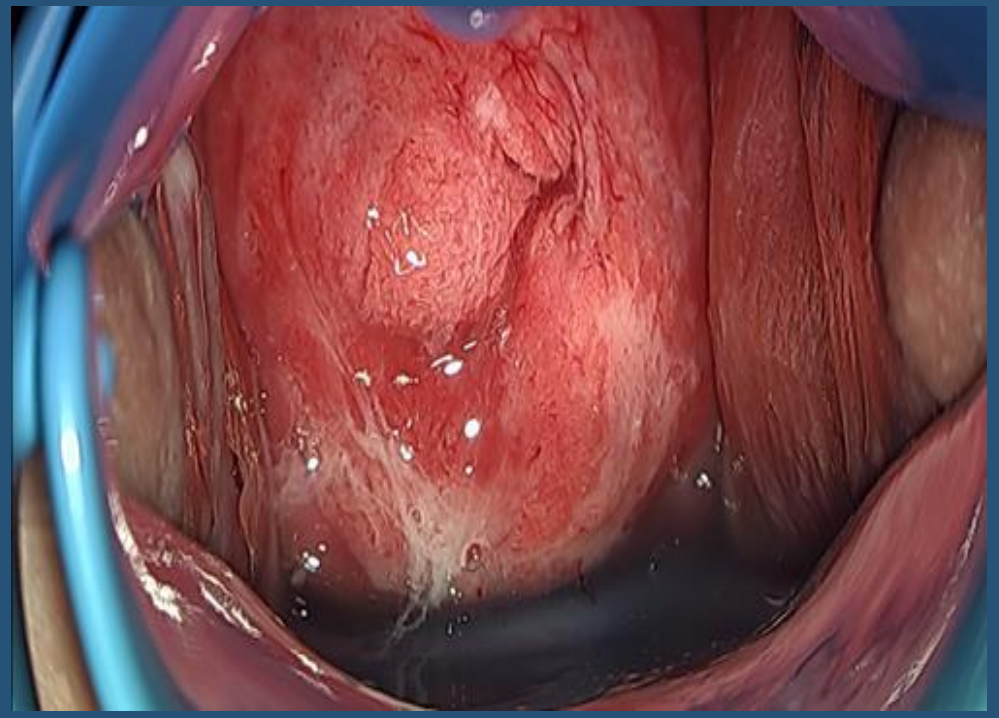
Adenocarcinoma in situ

- Rare condition
- Incidence of abnormal glandular cytology
  - UK screening programme - 0.04% of all cytology samples. 0.7% of all abnormal cytology samples.
- Management is usually to recommend excision
  - Knife cone, LEEP, Hysterectomy

Adenocarcinoma in situ

- Colposcopy
  - AIS is often associated with HG-CIN
  - Features of AIS poorly described
    - Aceto-white epithelium in the glandular tissue
    - Fusion of villi
  - Colposcopy has poor sensitivity 10%
  - Colposcopy has high PPV 94%
  - Even when reported as normal, 47-78% had a significant lesion on excised specimen



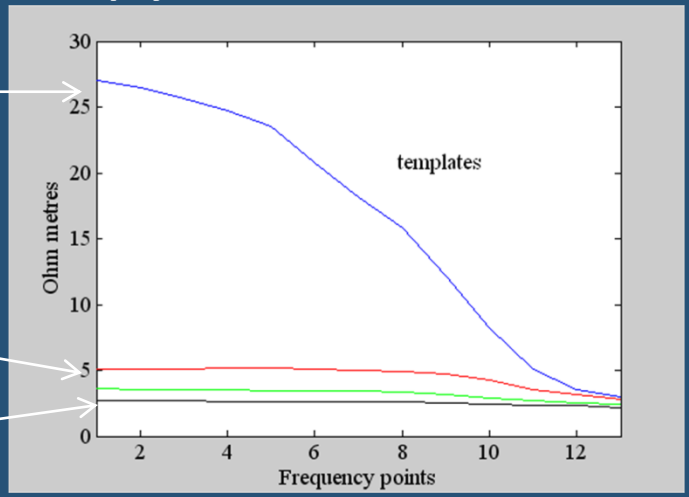
Electrical Impedance Spectroscopy

- Measures the impedance to the flow of an electrical current at a range of frequencies
- Low frequencies assess flow around cells, high frequencies assess intra-cellular structures
- The cervix has been modelled to predict spectroscopy in normal and abnormal epithelium

Normal squamous

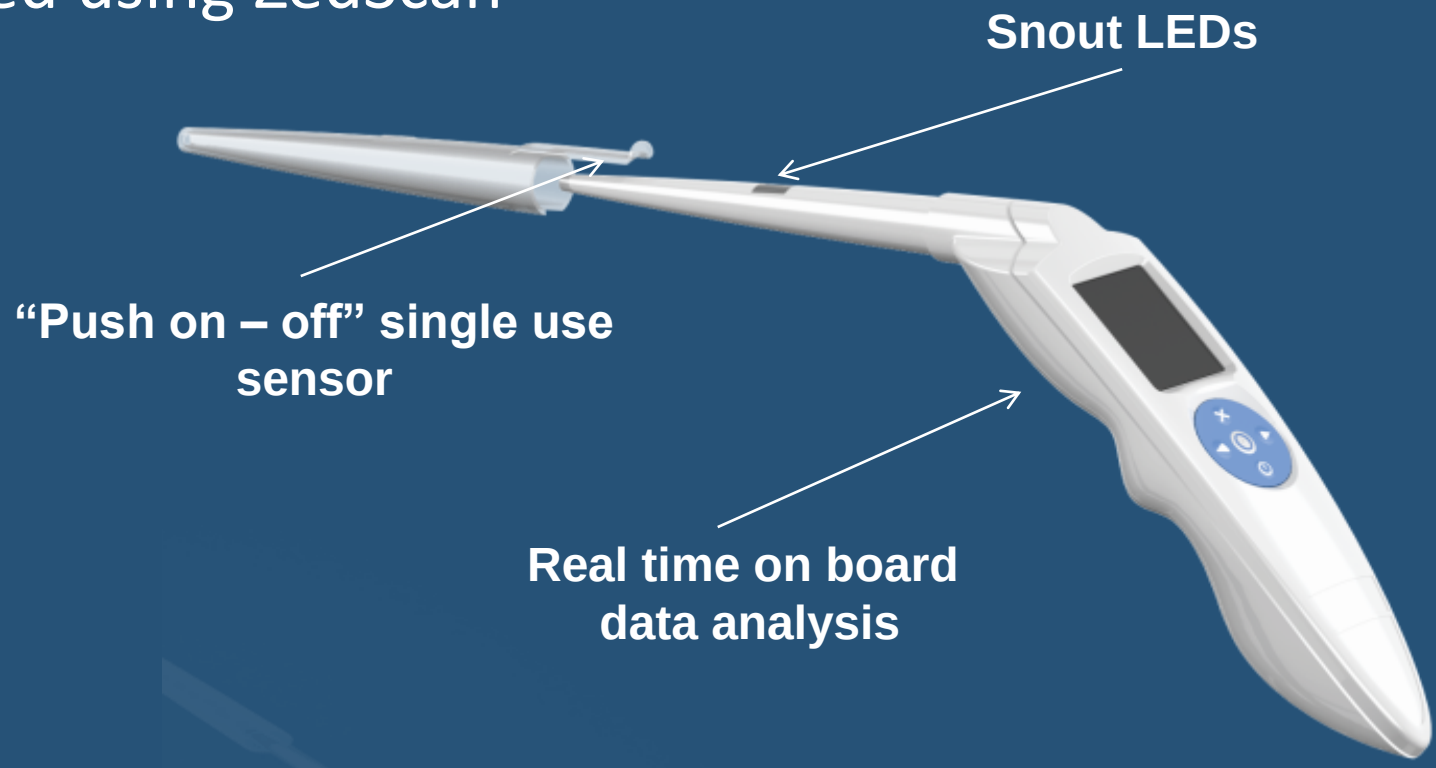
HSIL

Normal columnar

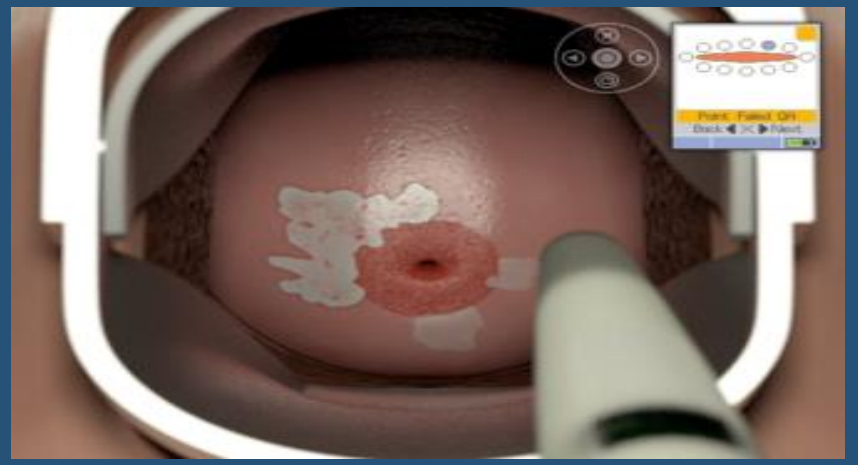


Electrical Impedance Spectroscopy

- EIS can be measured using ZedScan

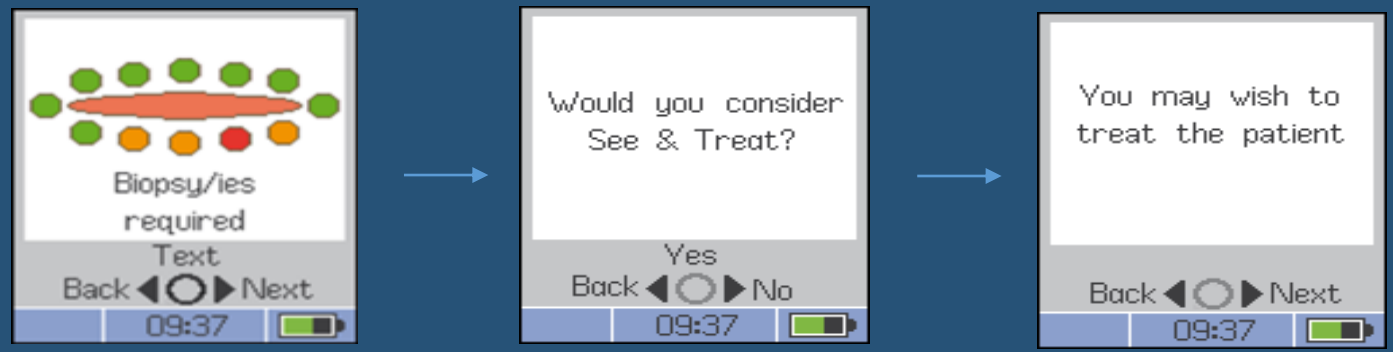


Electrical Impedance Spectroscopy

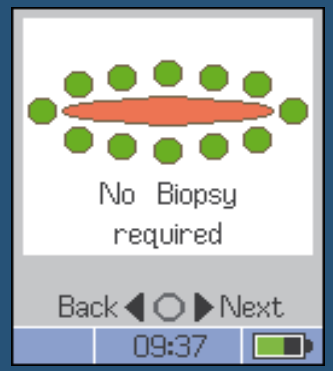


Biopsy required – Single point mode

Treat at first visit



No biopsy required



Study

- To establish the performance of colposcopy with EIS (ZedScan) in women referred with abnormal glandular cytology or diagnosed with AIS (high grade glandular intra-epithelial neoplasia (HG-CGIN)). To evaluate the electrical impedance spectra associated with AIS.
- A prospective cohort study of women undergoing both colposcopic and ZedScan examination as part of the investigation of an abnormal cervical cytology result.

Study

- 42 women were referred with either AGC (16), or AGUS(26)
- 25 were found to have SIL and/or CGIN, of whom 23 had HSIL and/or AIS
- A further 10 women were found to have CGIN (9 had AIS) on cone biopsy or LEEP following investigation of an abnormal squamous cytology sample or clinical indication
- There were 18 cases of pure AIS with no SIL

Study

- 89% of HSIL/AIS was detected by a colposcopic impression of high grade disease and / or a positive ZedScan result
- 90% of pure AIS was detected by a colposcopic impression of high grade disease and / or a positive ZedScan result
- Four cases of pure AIS were detected only by a positive ZedScan result
- EIS data for pure AIS is different from normal glandular tissue but similar to HSIL

Conclusions

- The performance of colposcopy in detection of AIS has previously been shown to be poor with sensitivity of 10% and 87% having a normal colposcopic impression
- EIS can separate AIS from normal glandular epithelium
- ZedScan identified 89% of AIS cases compared with 72% for colposcopy