



# Validity of Colposcopy in the Diagnosis of Early Cervical Neoplasia



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# Objective

QUANTIFICATION OF PERFORMANCE  
OF COLPOSCOPY IN DIAGNOSIS OF  
EARLY CERVICAL DISEASE TO  
ASSESS JUSTIFICATION FOR ITS  
ROLE .

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# Outline

- Background/Objective
- Study Design
- Data
- Results
- Summary/Conclusion
- Recommendations

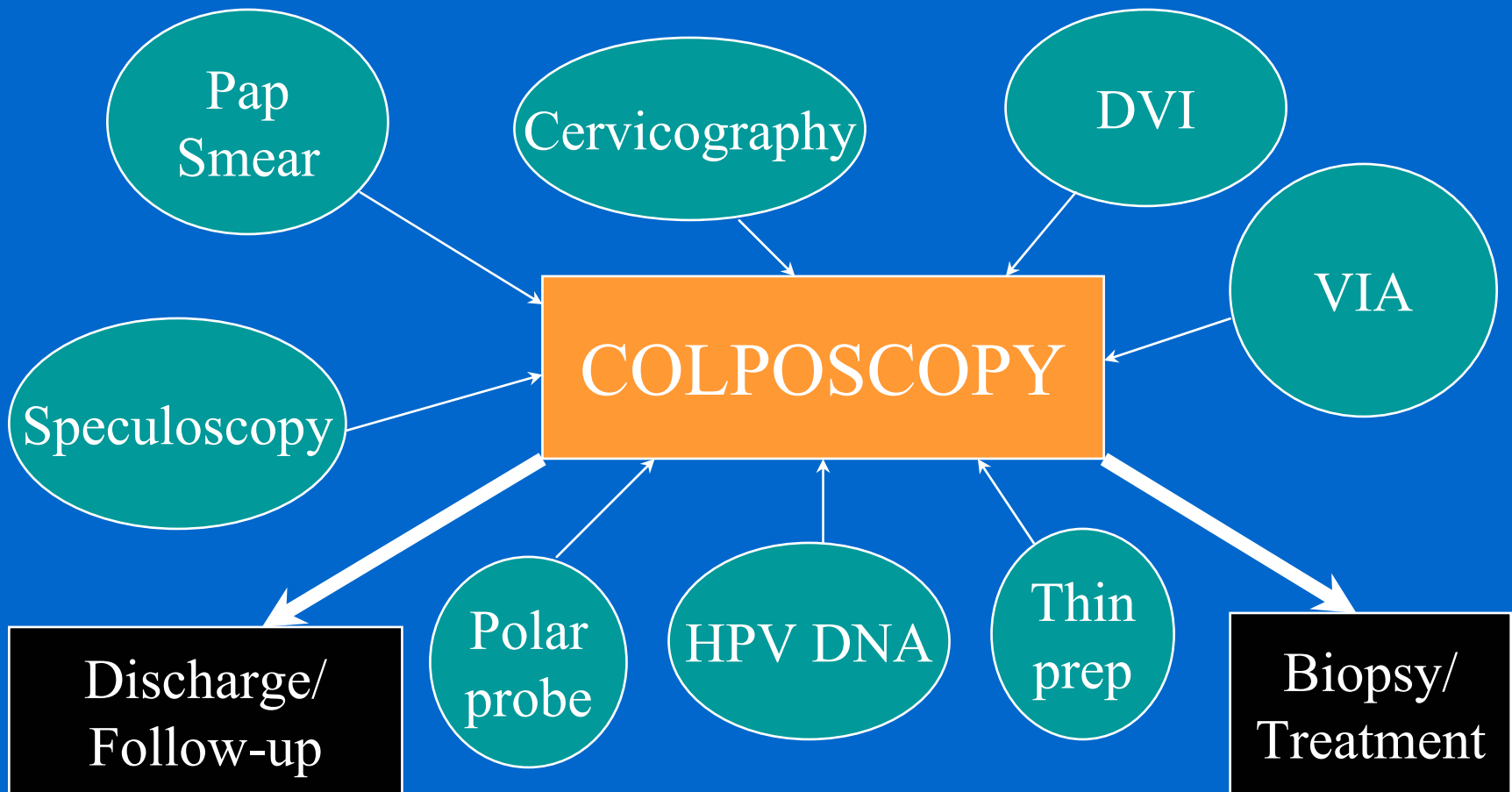
# Background

## THE COLPOSCOPE

- Introduced by HANS HINSELMANN 1925
- A binocular microscope for visualising the cervix at magnifications of X6-40.

# Background

## THE ROLE OF COLPOSCOPY



# Study Design: Meta-Analysis

## INCLUSION

- Original articles
- Diagnostic colposcopy
- Directed biopsy
- Raw data

## EXCLUSION

- Unsatis. Colposcopy
- Screening colposcopy
- Rx follow-up
- Limited participation

**TABLE 1. CHARACTERISTICS OF SELECTED STUDIES.**

| Author & year                           | Type of study       | Referral indications                                                                   | No. of participants | Intervention                      | Outcome measure                           |
|-----------------------------------------|---------------------|----------------------------------------------------------------------------------------|---------------------|-----------------------------------|-------------------------------------------|
| <b>Stafl &amp; Mattingly 1973 [13].</b> | Longitudinal study. | 1. Atypical cytology<br>2. Suspect cytology<br>3. Positive cytology<br>4. Positive DVI | 659                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| Benedet et al 1976 [25].                | Longitudinal study  | 1. Atypical cytology<br>2. Positive cytology<br>3. Suspect cytology                    | 549                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| <b>Javaheri &amp; Fejgin 1980 [26].</b> | Longitudinal study  | 1. Positive cytology<br>2. Positive DVI                                                | 903                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| Edebiri AA 1990 [27]                    | Longitudinal study  | 1. Positive cytology<br>2. Positive DVI<br>3. Clinical symptoms                        | 222                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| Seshadri et al 1990 [28]                | Longitudinal study  | 1. Positive cytology<br>2. Clinical symptoms                                           | 152                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| Benedet et al 1991[29].                 | Longitudinal study  | 1. Positive cytology                                                                   | 3252                | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| <b>Kierkegaard et al 1994 [31].</b>     | Longitudinal study  | 1. Positive cytology                                                                   | 783                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |
| <b>Cristoforoni et al 1995[32].</b>     | Longitudinal study  | 1. Positive cytology                                                                   | 188                 | Colposcopy/<br>directed<br>biopsy | Histologic/<br>colposcopic<br>correlation |

**DVI = Direct Visual Inspection**

# Results

**TABLE 2. MEASURES OF EFFECTIVENESS OF COLPOSCOPY :**

*(a) For Threshold Normal Versus All Grades Of Abnormal Tissue.*

| Study                   | No. of patients | TP   | FP  | FN  | TN  | Prev (%) | Sensitivity (%) | Specificity (%) | Positive predictive value (%) | Negative predictive value (%) |
|-------------------------|-----------------|------|-----|-----|-----|----------|-----------------|-----------------|-------------------------------|-------------------------------|
| Stafl & Mattingly [13]  | 659             | 493  | 118 | 6   | 42  | 74.8.    | 98.8            | 26.3            | 80.7                          | 87.5                          |
| Benedet et al [25]      | 549             | 434  | 53  | 2   | 60  | 79.1     | 99.5            | 53.1            | 89.1                          | 96.8                          |
| Javaheri & Fejgin [26]  | 903             | 680  | 28  | 1   | 194 | 75.3     | 99.8            | 87.4            | 96.1                          | 99.5                          |
| Edebiri [27]            | 222             | 113  | 30  | 17  | 62  | 50.9     | 86.9            | 67.4            | 79.0                          | 78.5                          |
| Seshadri et al [28]     | 152             | 61   | 54  | 9   | 28  | 40.1     | 87.1            | 34.2            | 53.0                          | 75.7                          |
| Benedet et al [29]      | 3252            | 2284 | 467 | 131 | 370 | 70.2     | 94.6            | 44.2            | 84.1                          | 73.9                          |
| Kierkegaard et al [31]  | 783             | 697  | 27  | 29  | 30  | 89.0     | 96.0            | 52.6            | 96.3                          | 50.9                          |
| Cristoforoni et al [32] | 188             | 127  | 38  | 20  | 3   | 67.6     | 97.7            | 34.5            | 77.0                          | 87.0                          |
| <b>Mean</b>             |                 |      |     |     |     |          | <b>95.1</b>     | <b>50.0</b>     |                               |                               |

**TP = True positive ; FP = False positive ; TN = True negative ; FN = False negative ;  
Prev = Prevalence.**

# Results

**TABLE 2. MEASURES OF EFFECTIVENESS OF COLPOSCOPY :**

**(b) *For Threshold Normal & LSIL Versus HSIL.***

| Study                    | No. of patients | TP   | FP  | FN  | TN  | Sensitivity (%) | Specificity (%) | Positive predictive value (%) | Negative predictive value (%) |
|--------------------------|-----------------|------|-----|-----|-----|-----------------|-----------------|-------------------------------|-------------------------------|
| Stafl and Mattingly [13] | 659             | 396  | 52  | 103 | 108 | 79.4            | 67.5            | 88.4                          | 51.2                          |
| Benedet et al [25]       | 549             | 393  | 25  | 43  | 88  | 90.1            | 77.9            | 94.0                          | 67.2                          |
| Javaheri & Fejgin [26]   | 903             | *    | *   | *   | *   | *               | *               | *                             | *                             |
| Edebiri [27]             | 222             | 101  | 27  | 29  | 65  | 77.7            | 70.7            | 78.9                          | 69.2                          |
| Seshadri et al [28]      | 152             | 48   | 18  | 22  | 64  | 68.6            | 78.1            | 72.7                          | 74.4                          |
| Benedet et al [29]       | 3252            | 1671 | 216 | 744 | 621 | 69.2            | 74.2            | 88.6                          | 45.5                          |
| Kierkegaard et al [31]   | 783             | 276  | 3   | 450 | 54  | 38.0            | 94.7            | 98.9                          | 10.7                          |
| Cristoforoni et al [32]  | 188             | 31   | 2   | 99  | 56  | 23.9            | 96.6            | 93.9                          | 36.1                          |
| <b>Mean</b>              |                 |      |     |     |     | <b>63.8</b>     | <b>87.9</b>     |                               |                               |

**LSIL = Low Grade Squamous Intreepithelial Neoplasia ; HSIL = High Grade Squamous Intraepithelial Neoplasia. \*Not ammenable to stratification.**

**TABLE 3.****1. Likelihood Ratios of Colposcopy For Identifying Normal Tissue From All Grades Of Abnormal Tissue.**

| STUDY                   | DIAGNOSIS    | No. In EACH STRATUM | PROPORTION OF BIOPSY POSITIVE | PROPORTION OF BIOPSY NEGATIVE | LIKELIHOOD RATIO |
|-------------------------|--------------|---------------------|-------------------------------|-------------------------------|------------------|
| Stafl & Mattingly [13]  | Negative     | 48                  | 6/499                         | 42/160                        | <b>0.05</b>      |
|                         | LSIL         | 163                 | 97/499                        | 66/160                        | <b>0.47</b>      |
|                         | HSIL         | 448                 | 396/499                       | 52/160                        | <b>2.44</b>      |
|                         | <i>Total</i> | <b>659</b>          |                               |                               |                  |
| Benedet et al [25]      | Negative     | 62                  | 2/436                         | 60/113                        | <b>0.01</b>      |
|                         | LSIL         | 69                  | 41/436                        | 28/113                        | <b>0.38</b>      |
|                         | HSIL         | 418                 | 393/436                       | 25/113                        | <b>4.07</b>      |
|                         | <i>Total</i> | <b>549</b>          |                               |                               |                  |
| Javaheri & Fejgin [26]  | Negative     | 195                 | 1/681                         | 194/222                       | <b>0.002</b>     |
|                         | CIN I-II     | 320                 | 299/681                       | 21/222                        | <b>4.64</b>      |
|                         | CIN III      | 388                 | 381/681                       | 7/222                         | <b>17.74</b>     |
|                         | <i>Total</i> | <b>903</b>          |                               |                               |                  |
| Edebiri [27]            | Negative     | 79                  | 17/130                        | 62/92                         | <b>0.19</b>      |
|                         | LSIL         | 33                  | 20/130                        | 13/92                         | <b>1.09</b>      |
|                         | HSIL         | 110                 | 93/130                        | 17/92                         | <b>3.87</b>      |
|                         | <i>Total</i> | <b>222</b>          |                               |                               |                  |
| Seshadri et al [28]     | Negative     | 37                  | 9/70                          | 28/82                         | <b>0.38</b>      |
|                         | LSIL         | 49                  | 13/70                         | 36/82                         | <b>0.42</b>      |
|                         | HSIL         | 66                  | 48/70                         | 18/82                         | <b>3.12</b>      |
|                         | <i>Total</i> | <b>152</b>          |                               |                               |                  |
| Benedet et al [29]      | Negative     | 501                 | 131/2415                      | 370/837                       | <b>0.12</b>      |
|                         | LSIL         | 864                 | 613/2415                      | 251/837                       | <b>0.85</b>      |
|                         | HSIL         | 1887                | 1671/2415                     | 216/837                       | <b>2.68</b>      |
|                         | <i>Total</i> | <b>3252</b>         |                               |                               |                  |
| Kierkegaard et al [31]  | Negative     | 59                  | 29/726                        | 30/57                         | <b>0.08</b>      |
|                         | LSIL         | 445                 | 421/726                       | 24/57                         | <b>1.38</b>      |
|                         | HSIL         | 279                 | 276/726                       | 3/57                          | <b>7.72</b>      |
|                         | <i>Total</i> | <b>783</b>          |                               |                               |                  |
| Cristoforoni et al [32] | Negative     | 23                  | 3/130                         | 20/58                         | <b>0.07</b>      |
|                         | LSIL         | 132                 | 96/130                        | 36/58                         | <b>1.19</b>      |
|                         | HSIL         | 33                  | 31/130                        | 2/58                          | <b>6.9</b>       |
|                         | <i>Total</i> | <b>188</b>          |                               |                               |                  |

# Results

**TABLE 4. Correlation Between Colposcopic and Histologic Diagnosis.**

| Study                   | Biopsy Worse |     |      | Biopsy better |      |     | Total |      |
|-------------------------|--------------|-----|------|---------------|------|-----|-------|------|
|                         | <<<          | <<  | <    | Accuracy      | >    | >>  |       | >>>  |
|                         |              |     |      | concord.      |      |     |       |      |
| Stafl & Mattingly [13]  | 23           | 54  | 161  | 313           | 86   | 19  | 3     | 659  |
| Benedet et al [25]      | 17           | 39  | 91   | 327           | 58   | 14  | 3     | 549  |
| Javaheri & Fejgin [26]  | 0            | 8   | 68   | 813           | 13   | 1   | 0     | 903  |
| Edebiri [27]            | 7            | 11  | 21   | 134           | 27   | 17  | 5     | 222  |
| Seshadri et al [28]     | 3            | 18  | 44   | 61            | 15   | 7   | 4     | 152  |
| Benedet et al [29]      | 24           | 130 | 511  | 1730          | 560  | 232 | 65    | 3252 |
| Kierkegaard et al [31]  | 0            | 3   | 78   | 568           | 130  | 4   | 0     | 783  |
| Cristoforoni et al [32] | 0            | 0   | 16   | 124           | 46   | 2   | 0     | 188  |
| Total                   | 74           | 263 | 990  | 4070          | 935  | 296 | 80    | 6708 |
| % of total              | 1.1          | 3.9 | 14.8 | 60.7          | 13.9 | 4.4 | 1.2   | 100  |
| ACCURACY =              | 89.40%       |     |      |               |      |     |       |      |

# Summary

- Colposcopic accuracy = 89%
- Concordance (Bx) = 61%
- Sensitivity = 87-99%
- Specificity = 26-87%
- Positive predictive value increases with disease severity.

# Conclusion/Recommendation

- Colposcopy is an accurate and valid tool for the diagnosis of early cervical disease.
- **Implication for Practice:-** Endocervical biopsy- ‘ *To be or not to be?* ’
- **Implication for Research:-** Colposcopy via Internet- ‘ Telecolposcopy ’, is a potential means of extending colposcopy training & services to areas of low technical expertise .

# Acknowledgement

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