Teaching Colposcopy and Androscopy in Family Practice Residencies

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Addressing the widespread human papillomavirus and genital epithelial dysplasia epidemic requires mastery of colposcopy, androscopy, and cryotherapy. Implementing a family medicine residency training program for these skills requires identifying a faculty facilitator to consider the issues of time, cost, caseload, reimbursement, specialist support, personal training, and office impact related to this training. Experience with teaching these skills in a community-based family practice residency indicates that startup costs range from $10,000 to $20,000. Residents will initially require from 30 to 60 minutes to provide a complete examination. All procedures require precepting by trained faculty and adherence to established protocol. The most frequent indications for these procedures include evaluating the abnormal Papanicolaou smear, visible cervical abnormalities, or evidence of clinical papillomavirus infection in either sex. Experience suggests that over 90% of cervical dysplasia can be managed entirely in the residency outpatient setting. These procedures have become the most common outpatient procedures performed, surpassing all others combined. Referrals to the residency for these procedures are readily available. Strategies for developing curriculum, literature review, learning materials, and training workshops are presented. Colposcopy, androscopy, and cryotherapy are appropriate additions to the training curriculum of family practice residencies. **J FAM PRACT 1990; 31:171-178.**

This paper explores the rationale, feasibility, and methods for teaching the skills of colposcopy and androscopy during family practice residency training. Colposcopy is a method of magnifying and examining the visible female reproductive system.[1] Androscopy describes the process of magnified examination with men.[2] Characteristics of the current human papillomavirus (HPV) epidemic compel primary care clinicians to become skilled in identifying and treating this sexually transmitted disease (STD). Originally the discovery of dysplasia on Papanicolaou smear required referral to the gynecologist for colposcopic evaluation and treatment.[3,4] The use of the colposcope applies now to both sexes for a wider range of indications.[5–7] Family physicians can meet this developing demand.[8–13]

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RATIONALE

The prevalence, infectivity, and biological expression of the HPV underscores the need for primary care providers to become adept at managing HPV genital infections in either sex. There has been nearly a 500% rise in reported cases from 1966 to 1981. This virus infects 10% of the general population and up to 30% of individuals presenting to STD clinics.[14–16] Infectivity is extremely high, with a majority of sexual consorts having simultaneous genital infection.[17,18] Currently compelling arguments link cervical neoplasia with this sexually transmissible virus.[19–25] Although details explaining the biological mechanism for this link are still to come, evidence of viral infection occurs with over 90% of cervical dysplasias. The detection of HPV in the female genital system dramatically increases the chance of genital epithelial neoplasia.[15,26–29] Sexually active teenagers show an especially high incidence of HPV infection. Their HPV infections also demonstrate aggressive premalignant potential for cervical dysplasia and carcinoma.[30,31] Ability to screen and treat HPV is imperative if family physicians are to make significant contributions to cancer prevention in women.

The inability to culture this intranuclear DNA-based virus has forced the clinician to develop other means to identify its presence. Indeed, abnormal findings on a Papanicolaou smear often are the first sign of infection in the woman. Cervical cancer prevention relies on Papanicolaou smear testing. Recent concern focuses, however, on the high false-negative detection rates for this time-honored screening test. These rates range from 20% to 50%, particularly in the higher risk teenage population.[32–36] Testing for viral DNA of the papillomavirus in the genital tract may help address the troublesome high false-negative rates of traditional Papanicolaou smear screening. Commercially available HPV/DNA probe tests will have an impact on how clinicians screen and interpret Papanicolaou smear findings.[37,38] Focused patient inquiry about personal STD risks may help to further identify women at special risk for infection with HPV and future genital malignancies.

Characteristics of the family physician's practice make a compelling argument to become trained and skilled with androscopy and colposcopy. Individuals at-risk for HPV infection include sexually active men and women of various ages. Detection and treatment strategies for HPV infections must include all members of a sexual relationship. That problems with reinfection or treatment failures for both sexes often require multiple provider visits over prolonged periods highlights the importance for continuity of care. High treatment success rates (90%) for cervical dysplasia by outpatient cryotherapy indicate that the overwhelming majority of abnormal Papanicolaou smears can be evaluated and successfully managed by techniques and equipment readily available to family physicians.[39] The more widespread availability of and patient preference for colposcopy services provided by their primary care physicians should have a favorable impact on earlier detection of precancerous genital disease. Detecting and treating early cervical dysplasia by office colposcopy and cryotherapy reduces the need for cervical conization procedures and can substantially lower costs and avert significant morbidity. Rural family physicians have discovered distinct advantages to providing colposcopy and cryotherapy services. Their patients often find it especially difficult to make repeated trips to urban centers for workup and treatment of HPV-related disease. Finally, the presence of HPV-infection in either partner betrays a history of potential high-risk sexual behavior. The ability to treat both men and women affords the family physician an ideal opportunity to question them about their sexual history and current practices. Providing patient education and continuity of care for multiple family members or sexual partners is a familiar undertaking for the family physician.

Regardless of whether family practice residency programs find it possible to develop a colposcopy curriculum, teaching androscopy skills should be within the means of all programs. The inspection of the male genitalia with the use of acetic acid soaking and magnification is a procedural skill new to most physicians. The androscopic examination also includes magnified distal urethral inspection, the more liberal use of biopsy, and for perianal condylomata, the need for anoscopy.

Family physicians are already accustomed to treating obvious male condylomata, which more often present as a cosmetic nuisance rather than as a sexually transmitted viral infection having long-term implications for both men and women. Men rarely enter the health care system because of their concerns for warts on the penis or scrotum. Many men fail to notice even obvious condylomatous infection of their genital organs. Indeed, an abnormal finding on a man's sexual partner's Papanicolaou smear may be the first sign of his infection.

Although preliminary evidence shows malignant potential for HPV infections in men, treatment strategies are thought to lessen the spread of disease and reduce the reservoir for the virus.[40] One half of men infected with the virus have lesions detectable only with the use of topical acetic acid and magnification. Up to two thirds of men who have HPV-infected sexual partners will display evidence of infection as well.[41] Conversely, penile HPV infection places the female partner(s) at significant risk for cervical dysplasia.[42] The significance of male HPV infections should no longer be underestimated. Becoming skilled at examining men is essential.

FEASIBILITY CONSIDERATIONS

Colposcopy, androscopy, and cryotherapy entail cognitive and technical skills that are appropriate additions to the training emphasis of family practice residencies. Successfully incorporating these procedures as core curriculum for all family practice residency settings, however, requires careful consideration. This paper discusses the method and experience acquired from establishing colposcopy, androscopy, and cryotherapy training programs within the context of a community-based family practice residency program.

Do We Have The Time?

Teaching and performing a skillful colposcopic or androscopic examination is initially time-intensive. The beginning colposcopist requires a full 40 minutes to provide appropriate patient education, informed consent, and colposcopic evaluation. As skill increases, the average time for an examination with biopsies will require 20 to 30

TABLE 1. EQUIPMENT REQUIRED FOR OFFICE COLPOSCOPY

Equipment	Approximate Cost ($)
Colposcope	2500–9000
Cryotherapy setup	1200
Tank lease, monthly	50
Biopsy forceps (eg, Tischler)	325
Endocervical curette (eg, Kevorkian-Young)	55
Endocervical speculum (eg, Kogan)	145
Miscellaneous Tenaculum, sounds, retractors, large speculum	75
Clear, lighted speculum setup (eg, Welch/Allyn) for selected cases	150
Disposable vaginal speculums	0.45
Anoscopy setup (clear, disposable are ideal) (colposcope can be used for light source and magnification)	0.50

NOTES

1. *The average office probably should have two colposcopy instrument packs available.*
2. *Be sure to choose the appropriate cryotherapy tips. Include at least the 2- to 3-cm flat or mildly convex tip.*
3. *Shop around, there are significant differences in price. A good potential source is the conference where you train.*
4. *Photography capabilities are nice but expensive.*

TABLE 2. INDICATIONS FOR COLPOSCOPY AND ANDROSCOPY

Indications for colposcopy
Papanicolaou smear consistent with dysplasia or cancer
Papanicolaou smears with unexplained atypia
Papanicolaou smear evidence of human papillomavirus infection, eg, koilocytosis
Suspicious visible lesions of the cervix
Patients with a history of intrauterine diethylstilbestrol exposure (best referred to gynecologist experienced with this problem)

Strong consideration for colposcopy
Patient with visible condylomata of the genital tract
Past history consistent with human papillomavirus infection at any site
Unexplained vaginal discharge, vulvodynia, cystitis
Sexual partner with evidence of human papillomavirus infection
Multiple sexual partners, early age of first intercourse
A history of or current other sexually transmitted disease, intravenous drug use
Positive findings of human papillomavirus DNA on cervical screening

Indications for androscopy
Unexplained lesions of the male genital tract, biopsy advised
Men whose sexual partners have evidence of human papillomavirus, cervical dysplasia

minutes. Patient orientation materials sent before the procedure, as well as the inclusion of the nursing staff in the education team, will reduce the time needed. Cryotherapy will require a 20-minute visit. Complications during either procedure will warrant more time, and the clinical staff should be prepared for this possibility.

Can We Afford the Equipment?

The required equipment is outlined in Table 1. Several of the basic hand tools may already be available in many family physicians' offices. The start-up costs for the remaining items represent a substantial investment. Some programs may initially find sharing the use of the colposcope and cryotherapy unit with other programs more desirable. Residency programs should stress purchasing adequate equipment from the outset. Colposcopes should have the option for video or teaching arm attachments, as these features are well worth the extra investment to enhance training. Several recent articles review the basic features of available colposcopes and equipment.[43,44] Discussing equipment preference with colposcopists in the local community or with the faculty where formal training occurs provides valuable information. Local support and service for equipment are essential and will often limit the number of colposcope options within a given area.

Can We Predict the Case Load?

Procedural training requires adequate clinical volume for faculty and residents to attain competence. Table 2 lists current indications for performing colposcopy and androscopy derived from practice standards, the literature, and experience with these procedures. Concern must also focus on economic impact. Predicting demand for these procedures requires a review of current practice experience. The need for colposcopic services appears to parallel the demand for obstetric and gynecologic services provided by the practice. The average patient age in the practice requires consideration, since most colposcopic examinations are generated by younger populations. A review of the log of abnormal Papanicolaou findings further clarifies potential needs for examination. Family practice residency programs can often avail themselves of local referral work; for example, Planned Parenthood or Indian Health Service clinics in the area can become excellent referral sources.

Adequate clinical volume to justify performing these procedures appears to be immediately available within the family practice residency setting. Patient acceptance for colposcopic or androscopic procedures performed by either male or female residents remains high. Problems with patients drifting to either female or male residents have not occurred as has happened with vasectomy. Colposcopy, androscopy, and cryotherapy may easily become the most frequently performed procedures in the ambula-

tory care center, surpassing sigmoidoscopies, endometrial biopsy, and vasectomy combined.

Local Reimbursement Expectations and Capabilities

Family practice programs are already aware of the dichotomy that exists for reimbursement between cognitive and procedural services. As colposcopy, androscopy, and cryotherapy services are procedural, they would have a favorable impact on office economics. Nevertheless, they are initially time-intensive procedures, and a prospective estimate regarding their overall impact on office economics is appropriate and well advised.

Gynecologist and Pathologist Support

Family physicians are familiar with their role as health care coordinators. The family physician colposcopist remains dependent upon pathologist, gynecologist, and urologist support. Family physicians should discuss their intentions with their local consultants to set up the necessary close feedback required to yield adequate patient care. Experience confirms that successful treatment for over 90% of abnormal Papanicolaou smears is attainable entirely within the ambulatory care setting. A small but critical proportion of patients, however, will require referral for treatment not frequently offered by the family physician, for example, laser therapy, conization, and hysterectomy.[45] Furthermore, consultation about case management should be routine for the family physician colposcopist. Accordingly, preliminary discussions with these consultants remain a critical aspect for the success of the primary care physician performing colposcopy, androscopy, and cryotherapy. An adversarial relationship between the family physician colposcopist and the various consultants upon which he or she depends will result in inadequate patient care. These specialist consultants will benefit from an increased number of referrals for appropriate procedural intervention.

Training Issues

Although understanding the scientific basis of colposcopy and androscopy results from a thoughtful review of the literature, attaining skill requires demonstration and practice. There is an impressive amount of variation among colposcopy workshops. The current time demand for conferences related to these procedural skills ranges from 2 hours to about 4 days. Experience with teaching these procedures to family physicians indicates that workshop training lasting 1 to 2 days is optimal. Competence regarding these procedures, however, relates more to the individual's practice, personal skill, and motivation than to the intensity of his or her initial training.

Physical and Personnel Issues

Programs must consider their particular facility and staff when undertaking training for colposcopy, androscopy, and cryotherapy. Enlisting support from all areas of a program is essential. Clinics must have adequate space to accommodate the equipment and the training audience. Programs that become busy with these procedures will need to create a colposcopy room. Even though the manufacturers will stress that colposcopes are portable, moving colposcopes around will pose problems during a busy clinic session. The setup time and patient preparation demands are considerable for these procedures. Including the nursing staff as part of the educating team improves patient preparation and time effectiveness. Nursing staff will need to participate in careful patient follow-up and case management to assure quality assurance. Identifying and contacting patients who miss appointments requires considerable time, for instance. Programs that do not have the personnel for such activities should reconsider starting a busy colposcopy service. Frequent cancellations and a high no-show rate because of unexpected menses or pregnancy are not uncommon occurrences.

HOW TO START: THE FACILITATOR

Because colposcopy, androscopy, and cryotherapy demand a blend of cognitive and procedural skills, instituting a training program for these procedures will take considerable initial effort and supervision. It is unrealistic to train all faculty at once. A first step would be for residency faculty to choose among themselves the facilitator for beginning a colposcopy project. This faculty facilitator should be someone who has both the time available to become well trained and an interest in following this rapidly changing field. Focusing the training efforts initially on one individual will also ensure the training intensity that helps achieve competence. The "see one, do one, teach one" philosophy does not apply to these procedures. Preliminary experience indicates that up to 20 colposcopies and cryotherapies are necessary to ensure comfort with the technical demands of the equipment. Competence requires ongoing practice.

The facilitator will be in the ideal position to consider the feasibility of colposcopy training. Programs should withhold technical training for their facilitator until addressing basic program issues. Having the facilitator well

trained but unable to reinforce his or her new skills in a program still struggling with basic startup issues hampers effective learning. Preliminary organizational meetings between the reception, nursing, and billing staffs are essential. These meetings also provide an excellent opportunity to review the program's current mechanism for managing abnormal Papanicolaou smears. Adding the volume of data produced by colposcopy and biopsy to an already overburdened system for follow-up of abnormal Papanicolaou findings will place the practice at risk of providing inadequate management for patients with a potentially life-threatening malignancy.

The facilitator should ensure that adequate teaching occurs for Papanicolaou smear technique and screening issues. The medical school graduate requires additional training to perform an adequate Papanicolaou smear and a thorough inspection of the lower female genital system. Furthermore, teaching the rationale and technique for examining male genitalia is seldom included in medical school at all. Basic examination skills are prerequisite to providing specific colposcopy training. Finally, the facilitator can ask for support from local gynecologists, urologists, and pathologists who may be willing to arrange precepted teaching experiences.

Attending a colposcopy workshop is not the best first move for the facilitator. Workshops are often intense, fast paced, and expensive. Reviewing printed and audiovisual materials before attending will optimize the workshop learning experience. Table 3 lists a variety of training programs as well as self-instruction materials. In addition to these resources, GRATEFUL MED[46] or other office-based literature search programs provide valuable information.

If the feasibility of a colposcopy program appears to be excellent, the colposcope should be purchased as soon as possible. Using the colposcope during routine Papanicolaou smear testing on a consenting patient is a valuable way to gain basic technical competency with the equipment. Avoid random and unskilled biopsy before training. Strict adherence to established protocol is essential. Technical familiarity with the equipment before patient contact is mandatory. Fumbling with equipment and poorly timed discussions in front of an already frightened patient is disappointing for all concerned. Use the new colposcope immediately for androscopy.

With training accomplished and equipment at hand, get as much experience as possible with these procedures. The variations of clinical HPV infections in the genital systems of both male and female patients mandate refined skills. Accompanying referred patients to the office of the gynecologist or urologist provides an excellent method to acquire and maintain skills. The time commitment can be considerable, however. Defining competence with colposcopy remains difficult. Studies addressing the effectiveness of teaching these skills are rare and not definitive.[47,48] Experience with training family practice residents indicates that the combination of personal study, careful precepting, and the liberal use of biopsies would be a successful teaching strategy. Immediate referral is essential for all atypical or difficult cases, especially those of inadequate colposcopy, the diethylstilbestrol-exposed offspring, and all cases of microinvasive or invasive cervical cancer. Likewise, pregnant patients requiring colposcopy with biopsy are best referred until advanced skill levels are achieved.

Creation of a reference library is essential. Reviewing

TABLE 3. SELECTED RESOURCES

Workshops, teaching materials

Academy of Family Physicians, state chapters

The American Academy of Family Physicians
Department of Continuing Education
8880 Ward Parkway
Kansas City, MO 64114-2797
800-274-2237

The American Academy of Obstetricians and Gynecologists
600 Maryland Avenue, SW, Suite 300 West
Washington, DC 20024-2588
(202) 638-5577 (The When and Where for ACOG Courses)

Colposcopy Teaching Aids
CAL, Inc
2420 Hidden Acres Road
Folsom, CA 95630
(An excellent source for teaching slides/videos regarding colposcopy)

Planned Parenthood, local chapters
(Many are pursuing educational training for colposcopy)

Books

Atkinson's Correlative Atlas of Colposcopy, Cytology, Histopathology
Robert L. Guintoli, et al
Philadelphia, JB Lippincott, 1987
$114 (basic how-to text, excellent for family physicians)

Practical Colposcopy
Renae Cartier
Stuttgart, New York, Fischer, 1984
$140 (beautiful picture atlas)

Colposcopy, Cervical Pathology: Textbook and Atlas
Erick Burghardt
Stuttgart, New York, George Thieme Verlag, 1984
$100 (good reference/atlas with excellent text)

Synopsis of Gynecologic Oncology, ed 3
CP Morrow and DE Townsend
New York, John Wiley & Sons, 1987
$45

Journal articles

In References at the end of this article, sources marked with an asterisk are recommended.

TABLE 4. COLPOSCOPY SUBJECT CATEGORIES

- Human papillomavirus (HPV) basic science
  - HPV biology
    - Detection, subtypes
  - Epidemiology
    - Malignant transformation potential
    - Incidence, infectability
- Detection, screening issues
  - Screening programs/protocols
  - The Papanicolaou smear
    - Technique
      - Brush vs swab
      - One- vs two-slide techniques
    - Problems, controversies
      - Endocervical cells present?
      - Interpretive/terminology issues
      - Special circumstances; pregnancy; adolescent; perimenopausal or postmenopausal
  - Cervigram literature
  - DNA probe/hybridization literature
    - When, who, why?
- Colposcopy
  - Indications
  - How to
  - Family practice experience
  - Special problems
    - Endocervical curettage always necessary?
    - Pitfalls
  - Special cases
    - Pregnancy
    - Perimenopausal
    - Rape
- Equipment/economic issues
- Treatment for HPV infection/dysplasias
  - General reviews
  - Specific methods and problems
    - Cryotherapy
    - Chemotherapy
    - Laser
    - Other (interferon, etc)
- HPV nongenital infections
- Teaching colposcopy
- Androscopy
  - Indications and protocols
  - How to
  - Treatment approaches

several hundred articles related to the subject clarifies basic categories regarding the science and method for these skills (Table 4). Selecting one or two articles from each category and setting up a training manual is an ideal way to build a comprehensive source ready for resident review. Articles found to be valuable for this purpose are marked with an asterisk in the references at the end of this paper. No single textbook has been able to keep up with the technology and skills encompassed by these procedures. A colposcopic atlas is very helpful, however. Having residents review slide sets or videotapes and using the colposcope on routine examinations are effective teaching strategies.

Creating a colposcopy workbook for resident review helps reinforce rationale and technique. Sections in this workbook should relate to (1) basic articles by grouping, (2) patient education materials, (3) the colposcopy, androscopy, and cryotherapy examination sheets, and (4) the basic protocol algorithms. Requiring residents to review this material before the actual examination enhances the benefit of demonstrating technique. Residency programs should take advantage of their didactic opportunities with morning, noon, or day-long conferences introducing these procedures.

Skilled faculty need to attend all colposcopy and cryotherapy procedures. The colposcopist-in-training should be discouraged from performing procedures without a skilled preceptor. Requiring a faculty preceptor at all such procedures places increased demands on the faculty, especially if colposcopy and cryotherapy become frequent procedures in the residency clinic. Eventually, having additional faculty members trained and experienced with these procedures would be an essential part of a successful program. Finally, the facilitator should set up quality-assurance meetings among providers and office personnel. A review of patient acceptance, provider competence, case management, and overall clinic protocol are important topics for these meetings. Ensuring mechanisms for excellent documentation and rigorous follow-up is likewise essential. Colposcopy teaching programs should be continually appraised for their efforts aimed at delivering high-quality care.

CONCLUSIONS

A worldwide epidemic of HPV infection plagues the sexually active population. Epidemiologic evidence implicates HPV infection as a highly significant risk factor for genital dysplasia and malignancy. Consistent with the concept that cervical cancer may well be a result of this sexually transmissible disease, abnormal Papanicolaou smears have also had a similar dramatic rise in frequency. Managing HPV infection and the abnormal Papanicolaou smear requires skill with colposcopy, androscopy, and cryotherapy. Outpatient treatment methods with excellent success rates and high levels of patient satisfaction render colposcopy, androscopy, and cryotherapy desirable additions to the practice of the contemporary family physician. Current experience demonstrates that it is pos-

sible to teach these basic skills in the context of a family practice residency. A successful training curriculum requires strict compliance with established protocol and coordinating the efforts of the family medicine training center with the pathologist, the urologist, and the gynecologist. Mechanisms for excellent documentation and rigorous follow-up are mandatory. Residency programs that assimilate colposcopy, androscopy, and cryotherapy skills into their teaching practice will benefit from responding to a major public health problem and enhancing access to care.

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