



## High-resolution anoscopy: Procedure and findings

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### ABSTRACT

High-resolution anoscopy (HRA) using a colonoscope or operating microscope with 5% acetic acid and Lugol's solutions was developed to identify abnormal epithelial changes such as high-grade squamous intraepithelial lesions (HSIL) and other lesions associated with human papillomavirus (HPV). It is hypothesized that targeted treatment of HSIL will prevent progression to cancer. HRA has become more accepted in clinical practice especially for populations considered at risk for anal cancer including those who are immunocompromised and men who have sex (MSM). While data from prospective clinical trials designed to determine the effectiveness of HRA in preventing cancer are still pending, the procedure is now available in 200 clinics worldwide. This article describes the procedure and identification of lesions for potential treatment.

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### Introduction

High-resolution anoscopy (HRA) is defined as an examination of the anus, anal canal, and perianus using a colonoscope or operating microscope with 5% acetic acid and Lugol's solutions in order to identify abnormal epithelial changes, particularly those associated with human papillomavirus (HPV). The colonoscope's lighting and magnification provides the high-powered view that help identify potential cancers or the cancer precursor high-grade squamous intraepithelial lesions (HSIL) as well as benign low-grade (L) SIL. The vital stains result in epithelial and vascular changes that differentiate normal tissue from lesions and help guide the clinical decision to biopsy for diagnosis by histology considered the gold standard.<sup>1,2</sup> The term HRA was first coined by Dr. Mark Welton to distinguish it from the gynecologic "colposcopy" indicating examination of the "colpo" or vagina. The term HRA first appeared in publication in 2001<sup>3</sup> although reports of colposcopic visualization for anal canal disease appeared as early as 1977.<sup>4</sup> With the advent of epidemiologic and natural history studies establishing the increased incidence of anal HSIL and cancer in certain high-risk populations,<sup>5,6</sup> the procedure has become more widespread with HRA practices established worldwide.<sup>7</sup> As HRA becomes the more accepted clinical care, it is important to establish standards for defining and practicing HRA as articulated in a recent publication by Hillman et al.<sup>8</sup> This article will describe the procedure as well as recognition and identification of different lesion types.

### Equipment and office setup

A standard gynecologic colonoscope can be used but the procedure requires specific modifications particular to HRA. In general, HRA requires higher magnification compared to cervical colposcopy. Direct stereoscopic visualization is preferred because the magnification and resolution is superior to videoscopic imaging, although technologic advances are improving these as well. Surgical Loupes do not provide adequate magnification for HRA. A side swing-arm or overhead stand allows for better ergonomics and greater flexibility in the examination position (Fig. 1). The preferred anoscopies are straight-edge (disposable or metal) with a 1.5 cm opening. This provides good visualization, easy maneuverability of instruments and patient comfort during the exam. Larger anoscopies (e.g., 22 mm) can be used for obese or muscular patients. Side-slotted or angled anoscope require more manipulation, repositioning, or reinsertion of the anoscope causing unnecessary discomfort as well as lengthening the exam time. The remaining equipment is standard in most gynecologic clinics and are listed in Table 1. A camera and image management system connected to the colonoscope assist in the documentation of examination results.

### Position

HRA can be performed in any of the following positions depending on the available examination table: left or right lateral, prone jackknife, and while lithotomy can be used, visualization is sometimes complicated by the pressure of the abdomen pushing downward especially in obese patients, or in males, the scrotum

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Fig. 1. HRA position of patient, provider, colposcope and equipment tray.

can hamper visualization. Whichever position is used, location of lesions should be described using anatomic descriptors including the octant and position within the anal canal (Fig. 2). Attention should be given to appropriate ergonomics for the clinician and comfort measures for the patient including pillows under or between knees and/or head as the exam can be as long as 20 min or more if treatment is also involved.

### Examination procedure

Obtain the cytology specimen first if needed using a moistened synthetic non-scored swab. This is followed by the digital anal rectal exam (DARE), which is done using lubrication mixed with topical anesthetic such as lidocaine gel or cream. Begin the exam in the distal rectum with careful palpation of the entire anal canal and perianus as well as the prostate. Correlate any abnormal findings with the HRA.

The HRA begins with placement of a small swab wrapped in cotton gauze soaked in 5% acetic acid. This is placed into the anus through the anoscope and left in place for 1 min after the anoscope is withdrawn. The gauze is then removed and the anoscope reinserted. The anoscope is slowly withdrawn until the junction between the anus and the rectum is visible. This is known as the squamocolumnar junction (SCJ) (Fig. 3). It will be visible as a separation in subtle color differences between the two tissue types with the colon redder and

darker compared to the lighter pink anus; these color differences are highlighted by the acetic acid; a thin white line may also be visible after application of acetic acid. The SCJ is the proximal edge of the anal transformation zone (AnTZ) where squamous cells change to columnar epithelium of the distal rectum undergoing metaplasia: a normal process of cellular change occurring at the junction between two tissue types (e.g., anal squamous and colonic columnar epithelium). The AnTZ may be as small as a few millimeters or greater than a centimeter and most HPV-associated lesions occur here. The SCJ and AnTZ are evaluated systematically to be certain they are seen in their entirety. This involves frequent application of additional acetic acid with small cotton swabs and manipulation of the anal mucosa by small adjustments of the anoscope. Small cotton swabs with adjustments in pressure from the anoscope help manipulate mucosal folds so that all aspects of the anal canal are visualized. After thorough application of the acetic acid and identification of potential lesions, Lugol's iodine solution should be applied as an adjunctive aid to highlight these lesions. The iodine preferentially stains glycogen-containing tissue mahogany or dark brown. Cells lacking glycogen including HSIL are less likely to take up the iodine and will remain unstained or pale yellow. A partial stain with a speckled appearance is often associated with LSIL. Following complete evaluation of the SCJ and identification of potential abnormalities, biopsies are done beginning with the dependent lesions to avoid blood obscuring the field. In a previously unexamined patient considered at high risk for anal HSIL, an average of 3–5 biopsies is common. Most biopsies occur above the dentate line, so other than the pressure of the anoscope, the exam with biopsies is generally well tolerated and does not require anesthesia. However, biopsies of the perianus require small amounts of local anesthetic injected just below the mucosal or skin surface. Distal canal lesions may also require local anesthesia. The occasional patient who finds the exam less tolerable can be pre-medicated with a low-dose benzodiazepine. An average exam will last approximately 10–15 min; shorter exams (e.g., < 5 min) may indicate inadequate visualization of the entire canal and when exams are longer than 20 min the mucosa swells and also interferes with complete examination.

### HRA findings: Normal

Clinicians must be able to identify normal HRA findings. These include recognition of the SCJ and AnTZ as described above. The

Table 1  
Equipment.

Cytology collection system	Liquid or conventional
Synthetic swab (e.g., Dacron)	Non-scored, not cotton (cytobrush not recommended)
Anoscope	1.5 cc plastic disposable or metal straight-edge
Nonsterile cotton swabs	
Nonsterile scopettes	
Nonsterile 4 × 4 gauze pads	
lubricating jelly	Surgical lubrication will prevent adherence of vital stains
2% and 5% Lidocaine gel or cream	Avoid ointments as these may prevent absorption of the vital stains
5% Acetic acid	
Lugol's strong solution	
Monsel's solution	
Silver nitrate sticks	
Biopsy forceps	Baby Tischler's; punch biopsy for perianal
1% Lidocaine with epinephrine	
0.5% Bupivacaine hydrochloride with epinephrine	
1–3-cc syringes	
Colposcope	Preferred specifications: 5-step magnification should range 10 × –25 × and must have the mid-range (15–17 × )
Photographic system	Colposcope will require beamsplitter and camera lens
Image management system	Store images, preferably with annotation capability
Documentation forms	Electronic or paper templates

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