

# Pathology Gross Photography

## The Beginning of Digital Pathology



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### KEYWORDS

- Gross photography • Digital pathology • Electronic medical record • Diagnostic report
- Anatomic pathology

### ABSTRACT

**T**he underutilized practice of photographing anatomic pathology specimens from surgical pathology and autopsies is an invaluable benefit to patients, clinicians, pathologists, and students. Photographic documentation of clinical specimens is essential for the effective practice of pathology. When considering what specimens to photograph, all grossly evident pathology, absent yet expected pathologic features, and gross-only specimens should be thoroughly documented. Specimen preparation prior to photography includes proper lighting and background, wiping surfaces of blood, removing material such as tubes or bandages, orienting the specimen in a logical fashion, framing the specimen to fill the screen, positioning of probes, and using the right-sized scale.

### OVERVIEW: SETTING THE STAGE

Today, digital pathology equates to whole-slide imaging (WSI). But before high-priced scanners and computer-assisted diagnoses, there were static images of microscopic slides and gross surgical pathology specimens. This is where digital pathology started. Photomicrography has given way to WSI but capturing and documenting gross surgical pathology specimens is just as important and, the authors argue, a key component of the pathology report and the electronic medical record.

AP is a visual discipline and photographic documentation of clinical specimens is an essential

element of the effective practice of pathology. Because photography is not a fundamental subject of medical training, pathology residents most often have little experience with photography as it applies to the AP setting. Moreover, whereas there seems to be broad consensus that basic digital gross pathology competency should be considered a requisite component of pathology education<sup>1</sup> and is accordingly included in the list of training objectives and residency handbooks of most major residency programs, available learning resources are scant. Of the publications with regard to gross pathology photography, most address the logistics of image acquisition, transfer, and storage or the relative benefits of select hardware/software advances.<sup>2–6</sup> As such, only a few articles serve as essential guides to understanding the importance of hands-on strategies and techniques for quality gross photography.<sup>7–10</sup> The aim of this article is to describe informally, through a variety of examples, many of the important concepts that underlie quality gross pathology photography.

### GROSS PHOTOS IN PRACTICE

Quality gross specimen photographs are a fundamental element of AP practice. Such images not only are part of patient medical records but also are often reviewed at conferences, used as educational material, and integrated into professional publications. The value of thoughtful, complete, and first-rate image support cannot be overstated. Photos obtained by a prosector assigned to a

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particular case are often the only permanent record of specimen features and associated anatomic landmarks, prior to histopathologic sampling. As pathology practices merge and cases are handed off to others at sign-out, the need for visual documentation of complicated surgical specimens becomes even more critical. A related benefit of gross photography may be realized at microscopic examination, whereupon photographic review may be used to map sites of histologic sections. In addition to multidisciplinary review of digital pathology WSI at tumor board conferences in select institutions, it is expected that relevant gross pathology photographs will be available for assessment as well. Pathology practice is also part of the broad realm of patient-centered care, health information sharing, and electronic medical records, and, with ever increasing frequency, pathology gross photography is considered for integration into AP laboratory information systems, electronic medical records, and pathology diagnostic reports.<sup>11</sup> This guide for gross pathology imaging would not be complete without mention of the critical importance of associated specimen/patient information. Just as many experienced pathologists have desk drawers full of 35-mm photographic slides identified only by a specimen accession number, quality digital gross images are only of value if they are stored and archived along with appropriate metadata. Given these considerations, along with thoughtful attention to optimized patient care, clinical concerns, and associated educational opportunities, any pathology laboratory may establish a standard of excellence for gross specimen photography.

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### THE DECISION TO SHOOT

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Not every gross specimen needs to be photographed. A good guideline to determine whether a specimen should be photographed is simple—all grossly evident pathology should be documented. Following this basic rule, if and when a clinical request for gross presentation of a particular specimen is received, the relevant pathology images may be reliably and readily provided. But that is not quite all. The photos should be taken to best show any and all associated disease processes, and the photos should be aimed to address all relevant clinical questions and concerns. Additionally, all grossly absent yet expected pathologic features should be documented in the photo records. Moreover, when the issue may be of particular clinical importance, photos should document the appearance of the specimen as it was received in pathology, before any further

manipulations have taken place. For clarity, it is generally a good idea to orient a series of photographs of the same specimen in the same way. Consider photographing specimens that have sutures or other surgical markings in a manner that corresponds to the description, such as “short suture superior” at the top of the photo. Each set of images should tell a story, so that the final composite leads to a conclusion.

Because gross-only specimens, by definition, have no tissue submitted for histology, and hence no associated histologic diagnosis, complete quality photo documentation is imperative. This means that gross-only specimens should be photographed from all perspectives and all clinically relevant details should be included. Explanted medical devices, such as breast implants, intrauterine devices, and catheters, are a special subset of gross-only specimens and should be treated as such. These devices should be examined thoroughly and additional photos should document all identifying features like brand name and serial number as well as any probable sites of defect. As with medical devices, any specimens that, based on clinical history, likely will have medicolegal action should be documented thoroughly. They should be photographed from all perspectives, with attention to any clinically relevant details. If the specimen is patient derived and associated with trauma, thoroughly document associated pathologic changes, which may include such features as hemorrhage, lacerations, and so forth as well as any foreign material present (bullets, grass, gravel, and the like). Last but certainly not least, thoroughly document all unusual or rare specimens with photos from all perspectives, and be certain to include characteristic features of the pathology involved, because these shots may serve as valuable material for students, pathologists in training, and clinicians.

Although a vermiform appendix is most often considered a simple and routine surgical specimen, photos should document the associated grossly evident pathology. As shown in **Fig. 1**, with markedly congested vessels along the serosa and a tan to olive-green suppurative exudate, this gross image readily supports the diagnosis of acute gangrenous appendicitis and periappendicitis. **Fig. 2** is a gross image of another vermiform appendix submitted to surgical pathology with the clinical diagnosis of acute appendicitis. This specimen should likewise be well documented with photographs. There is no evident pathology present. Yet, because the appendix was submitted with clinical diagnosis of acute appendicitis, this discrepancy must be clearly demonstrated in the associated gross photos. A segment of rib

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