Evaluation of Breast Specimens
Removed by Needle Localization Technique

**Specimen Handling:**

The breast specimen when received should be measured and grossly inspected for any orientation designated by the surgeon. The specimen, still intact, should be placed on an x-ray plate and a radiograph should be taken (Figure 1). The radiograph should be evaluated with comparison to the patients mammogram which showed the suspicious microcalcification and/or abnormal soft tissue densities (ASTD) (this is best evaluated by a radiologist.) If calcification/ASTD are identified which correspond to those observed mammographically, the surgeon should be informed immediately as the procedure is finished. If **no** calcifications or ASTDs corresponding to those seen on mammogram are identified, then a **second radiograph** (Figure 2) of serial sections should be reviewed before proceeding with any further surgery. For this purpose, the oriented breast specimen is inked (multiple colors may be used to identify various margins of resection.) Tissue is sequentially sectioned in 3-5mm thick sections and laid down, in order, on an x-ray plate (keeping coherent orientation.) A second radiograph is taken and evaluated for the presence of microcalcifications and/or ASTDs. If calcifications or ASTDs corresponding to the mammogram are not identified, additional tissue must be removed after relocation procedure. If corresponding calcifications or ASTDs are identified, no further procedure is required. A flow diagram for this procedure is outlined in Figure 3.

It is strongly suggested that no frozen section of these tissue specimens be performed (unless an identifiable lesion of adequate size--more than 1 cm--becomes apparent with serial sectioning). These specimens should be examined on permanent sections. For relatively small specimens (less than 5 cm in diameter), all of the tissue specimen can be easily submitted for evaluation. Comparison of serial tissue sections with the corresponding radiograph should allow identification of tissue segments which contain microcalcifications and/or ASTDs. The cassettes into which these areas are submitted should be identified in the gross dictation. For larger specimens, permanent sections should include 1) all areas containing microcalcifications and/or ASTDs. 2) all areas of fibrous parenchymal tissue 3) tissue margins of resection.

![Figure 1](image1.png)

**Figure 1:** A radiograph of a needle-localization biopsy showing the tip of the guide wire slightly to the left of clustered calcifications in the center of the specimen. Please see text above.
Figure 2: Specimen radiograph after margins were inked and serial sections were made. The lines inside the various sections correspond to the actual tissue blocks. Please refer to the text above and to the flow diagram (Figure 3).
Microscopic Examination

Microscopic examination should include the following:
1) **Nuclear Grade** - See the attached grading system. (Grading is based on the Consensus Conference on the classification of DCIS, Phil. PA, see below).

2) **Necrosis** - Necrosis is defined by the presence of ghost cells and necrotic debris and is categorized as central or punctate (see below for definition).

3) **Architectural pattern** - These include comedo, cribriform, papillary, micropapillary and solid. They should be listed in order of decreasing amounts, and the notation made that there are several patterns.

4) **Size (Extent of DCIS)** - Provide the number of sections containing DCIS as well as the largest dimension of DCIS lesion on a glass slide.

5) **Margins of resection** - Record closest margin as: > 3-9 mm, > 10 mm or a re-excision margin.

6) **Calcifications** - Correlate pathologic findings with specimen x-ray and mammographic findings. State the relationship of any calcifications or ASTDs to the DCIS.

**Consensus Conference on the Classification of Ductal Carcinoma In Situ**
*Phil. PA, Cancer:80, 1798, 1997*

A. **Low-grade nuclei (NG 1) (Figures 4,5)**

Appearance: Monotonous (monomorphic)

Size: 1.5 - 2.0 normal RBC or duct epithelial cell nucleus dimensions

Features: Usually exhibit diffuse, finely dispersed chromatin, only occasional nucleoli and mitotic figures. Usually associated with polarization of constituent cells.

Caveat: The presence of nuclei that are of similar size but are pleomorphic precludes a low-grade classification

B. **High-grade nuclei (NG 3) (Figures 6-8)**

Appearance: Markedly pleomorphic

Size: Nuclei usually >2.5 RBC or duct epithelial cell nuclear dimensions

Features: Usually vesicular and exhibit irregular chromatin distribution and prominent, often multiple nucleoli. Mitoses may be conspicuous.

C. **Intermediate grade nuclei (NG2) (Figures 9-12)**

Nuclei that are neither NG 1 nor NG3

The following are examples of DCIS graded by six experienced breast pathologists. The nuclear grade assigned to each case represents consensus agreement among all pathologists.
Figure 4: Two pathologists graded this lesion as nuclear grade 2 and four as nuclear grade 1; consensus agreement was 1.
Figure 5: One pathologist graded this lesion as nuclear grade 2 and five as nuclear grade 1; consensus agreement was 1.
Figure 6: All six pathologists graded this lesion as nuclear grade 3.
Figure 7: Three pathologists graded this lesions as nuclear grade 2, and three as 3; consensus agreement was 3.
Figure 8: Two pathologists graded this lesion as nuclear grade 3, and four as 2; consensus agreement was 3.
Figure 9: All six pathologists graded this lesions as nuclear grade 2.
Figure 10: All six pathologists graded this lesions as nuclear grade 2.
Figure 11: Two pathologists graded this lesions as nuclear grade 2, and four as 3; consensus agreement was 2.
Figure 12: Two pathologists graded this lesions as nuclear grade 1, and four as 2; consensus agreement was 2.

**Necrosis Quantification**

**Comedonecrosis:** Any central zone necrosis within a duct, usually exhibiting a linear pattern
within ducts if sectioned longitudinally.

Punctate: Non-zonal type necrosis (foci of individual cells necrosis visible under 10X) (40X is not needed)