

**Mammographic Findings Seen on  
Only One Standard View: Common  
Problem, Practical Solutions**

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**Edward A. Sickles, M.D.**

**Not infrequently, potentially abnormal findings are identified at screening mammography on only one of the two standard-projection images.**

- **Summation artifact**
- **Benign lesion**
- **Breast cancer**

Edward A. Sickles, MD

**Index terms:**

Breast, calcification, 00.81

Breast, diseases, 00.30

Breast neoplasms, 00.30

Breast neoplasms, diagnosis, 00.11,  
00.30

Breast radiography, 00.11

Breast radiography, technology, 00.11

**Radiology 1998; 208:471-475**

**Abbreviations:**

CC = craniocaudal

DCIS = ductal carcinoma in situ

IDC = invasive ductal carcinoma

ILC = invasive lobular carcinoma

MLO = mediolateral oblique

<sup>1</sup> From the Department of Radiology, University of California School of Medicine, Box 1667, San Francisco, CA 94143-1667. From the 1997 RSNA scientific assembly. Received November 11, 1997; revision requested January 29, 1998; revision received February 20; accepted April 10. **Address reprint requests** to the author.

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# Findings at Mammographic Screening on Only One Standard Projection: Outcomes Analysis<sup>1</sup>

**PURPOSE:** To determine the radiographic and clinical outcomes of findings seen at mammographic screening on only one standard projection.

**MATERIALS AND METHODS:** To identify prospectively marked benign-appearing and abnormal findings that were seen on only one standard projection, 63,836 consecutive two-view mammographic screening studies were reviewed. Subsequent outcomes analysis included determination of the frequency of occurrence, mammographic features, work-up performed, and final imaging assessment. For imaging findings that prompted tissue sampling, histopathologic diagnosis was recorded. To identify breast cancers among the remaining findings, screening cases were linked with a regional tumor registry.

**RESULTS:** Of the 61,273 screening studies available for review, 2,023 (3.3%) involved prospectively identified findings seen on only one standard projection. One thousand eighty-six (53.7%) studies with one-view-only findings were judged to represent superimposition of normal breast structures (summation artifact) simply from the standard projections obtained at screening; findings in an additional 587 (29.0%) studies were characterized as representing superimposition of normal structures after recall for further diagnostic imaging. None of these 1,673 cases was subsequently found to be cancer. Cancers were identified in 36 one-view-only studies; six involved ductal carcinoma in situ; 18, invasive ductal carcinoma; and 12, invasive lobular carcinoma (a large percentage [33%], since only 10% of all cancers are invasive lobular carcinoma).

**CONCLUSION:** Findings seen on only one standard projection are common among lesions identified at mammographic screening. More than 80% can be correctly assessed as representing superimposition of normal structures, either without or with the aid of additional imaging studies. Among those findings that truly are cancer, a disproportionately high percentage are invasive lobular carcinoma.

# Frequency of One-View-Only Findings

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**61,273 screening exams available for review**

**2,023 exams had one-view-only findings**

- **3.3% of all screening exams**
- **1 in every 30 screening exams**

# Frequency of One-View-Only Findings

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**A moderately busy mammography screening practice can expect to encounter one-view-only findings on a daily basis.**

# Features of One-View-Only Findings

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| <b>Mammo. Feature</b>           | <b>Cases</b> | <b>Pct.</b>  |
|---------------------------------|--------------|--------------|
| <b>Asymmetry</b>                | <b>1,716</b> | <b>84.8%</b> |
| <b>Architectural distortion</b> | <b>217</b>   | <b>10.7%</b> |
| <b>Calcifications</b>           | <b>83</b>    | <b>4.1%</b>  |
| <b>Combinations</b>             | <b>7</b>     | <b>0.3%</b>  |

# Assessment of One-View-Only Findings

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**2,023 one-view-only findings**

```
graph TD; A[2,023 one-view-only findings] --> B[1,086 summation artifact]; A --> C[937 recall];
```

**1,086 summation artifact**

**937 recall**

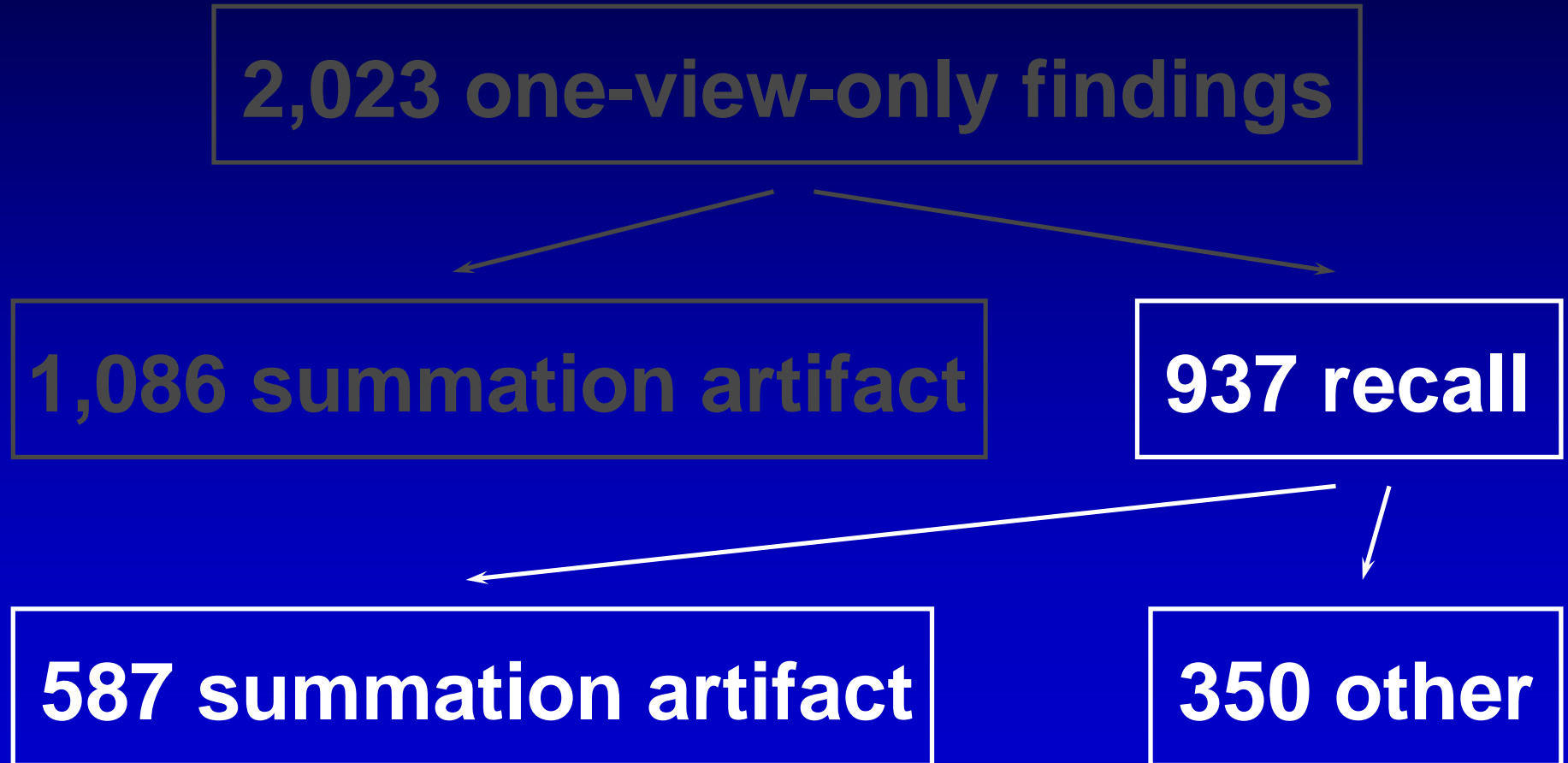
# Assessment of One-View-Only Findings

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**1,086 (53.7%) of one-view-only findings were judged to represent summation artifact simply on the basis of the standard two-view screening exam.**

# Assessment of One-View-Only Findings

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# Assessment of One-View-Only Findings

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**587 (62.6%) of one-view-only findings recalled for additional imaging also were judged to represent summation artifact.**

# **Vary the View Where Seen Well**

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**Repeat the same view where seen well**

# Vary the View Where Seen Well

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Repeat the same view where seen well

**Change beam obliquity slightly**

# Vary the View Where Seen Well

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Repeat the same view where seen well

Change beam obliquity slightly

**Change breast obliquity (roll view)**

# Vary the View Where Seen Well

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Repeat the same view where seen well

Change beam obliquity slightly

Change breast obliquity (roll view)

**The change in obliquity of exposure is controlled more precisely by changing beam obliquity than by roll views**

# Vary the View Where Seen Well

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Repeat the same view where seen well

Change beam obliquity slightly

Change breast obliquity (roll view)

**Use spot-compression technique**

# Vary the View Where Seen Well

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Repeat the same view where seen well

Change beam obliquity slightly

Change breast obliquity (roll view)

Use spot-compression technique

Use magnification technique

# Vary the View Where Seen Well

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Repeat the same view where seen well

Change beam obliquity slightly

Change breast obliquity (roll view)

Use spot-compression technique

Use magnification technique

**Do NOT use ultrasound**

## **Occult Breast Masses: Use of a Mammographic Localizing Grid for US Evaluation<sup>1</sup>**

To determine if there was a problem of misidentification of mammographically detected masses with freehand ultrasound (US), the authors examined 50 mammographically distinct masses in 47 patients who were scheduled to undergo needle localization. In only six cases were the masses to be localized in an area of the breast that contained other mammographic opacities that could have led to problems of identification. The patients were first studied with freehand US. Results were then compared with those subsequently obtained with a fenestrated mammographic compression grid to guide the US evaluation. Needle localization was then performed. In five of 50 cases, masses detected with freehand US and initially believed to correspond to the mammographically detected mass were subsequently found to represent different areas of the breast when US was used with the compression grid. These results suggest that the potential for misidentification of masses with freehand US is real and that a mammographic grid localization device can be used to overcome this problem.

**Index terms:** Breast neoplasms, 00.3 • Breast neoplasms, localization, 00.125 • Breast neoplasms, US studies, 00.1298

**Radiology** 1991; 181:143-146

**Radiology 1991; 181:143-146**

# Assessment of One-View-Only Findings

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**2,023 one-view-only findings**

```
graph TD; A[2,023 one-view-only findings] --> B[1,086 summation artifact]; A --> C[937 recall]; C --> D[587 summation artifact]; C --> E[350 other];
```

**1,086 summation artifact**

**937 recall**

**587 summation artifact**

**350 other**

# Assessment of One-View-Only Findings

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**1,673 (82.7%) of one-view-only findings were judged to represent summation artifact, either without or with the aid of additional imaging studies.**

# **Assessment of One-View-Only Findings**

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**None of the one-view-only findings  
judged to represent summation artifact  
were found to be breast cancer, by  
linkage with regional tumor registry.**

**Had all one-view-only findings been recalled for additional imaging, the recall rate would have increased by 33%, from 5.1% to 6.8%.**

**Had all one-view-only findings been  
biopsied, the yield of malignancy  
would have decreased by 64%,  
from 35.2% to 12.6%.**

# Assessment of One-View-Only Findings

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**2,023 one-view-only findings**

```
graph TD; A[2,023 one-view-only findings] --> B[1,086 summation artifact]; A --> C[937 recall]; C --> D[587 summation artifact]; C --> E[350 other];
```

**1,086 summation artifact**

**937 recall**

**587 summation artifact**

**350 other**

# Assessment of One-View-Only Findings

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350 recalled “real” findings

```
graph TD; A[350 recalled "real" findings] --> B[91 benign]; A --> C[157 prob. ben.]; A --> D[102 biopsy];
```

91 benign

157 prob. ben.

102 biopsy

# Assessment of One-View-Only Findings

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**91 recalled cases assessed as benign**

- **53 simple cysts at ultrasonography**
- **38 benign at mammography**

# Assessment of One-View-Only Findings

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350 recalled “real” findings

```
graph TD; A[350 recalled "real" findings] --> B[91 benign]; A --> C[157 prob. ben.]; A --> D[102 biopsy];
```

91 benign

157 prob. ben.

102 biopsy

# Assessment of One-View-Only Findings

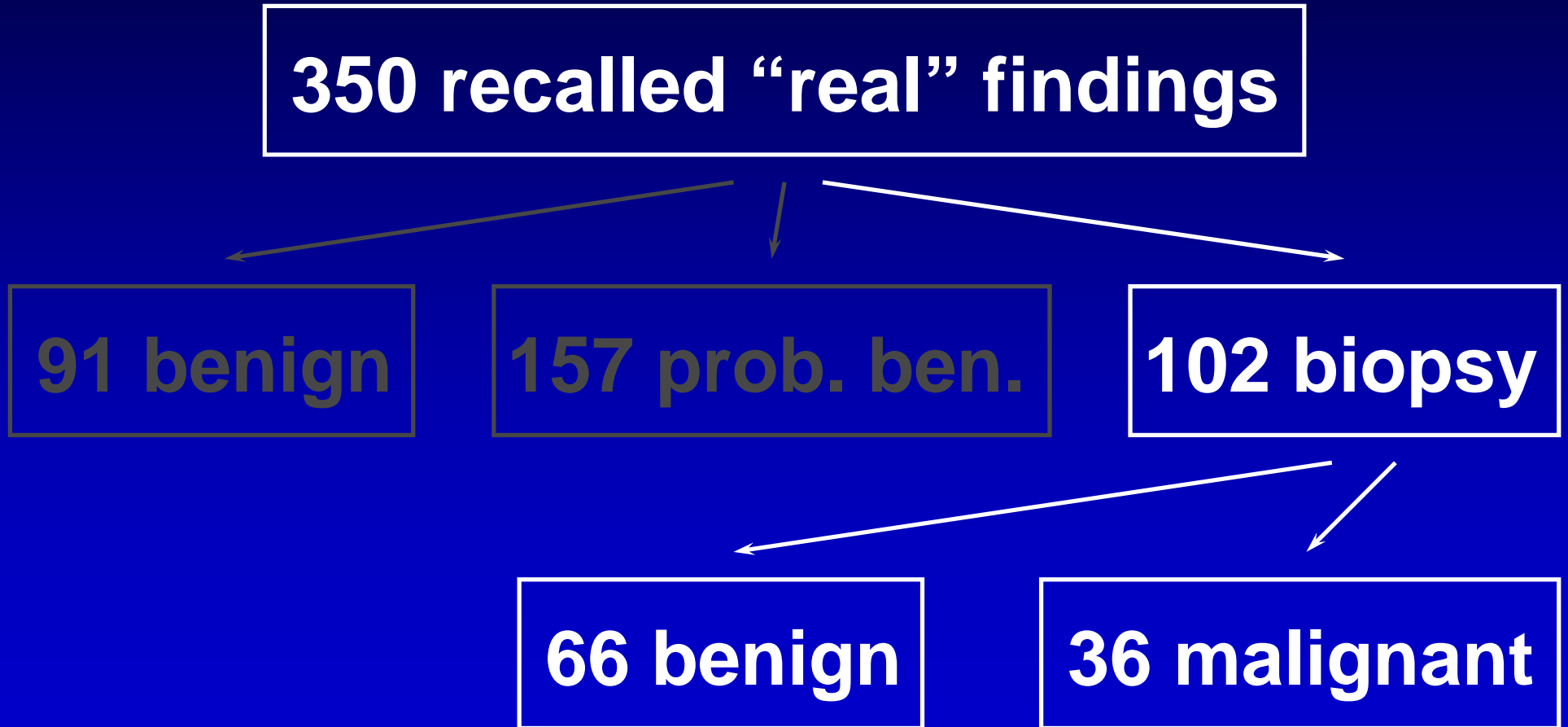
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**157 recalls assessed as probably benign**

- **136 focal asym. or circum. solid mass**
- **21 grouped punctate microcalcification**
- **4 lesions enlarged, benign at biopsy**

# Assessment of One-View-Only Findings

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# Assessment of One-View-Only Findings

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**102 recalls required tissue diagnosis**

- **6 ductal carcinoma in situ**
- **18 invasive ductal carcinoma**
- **12 invasive lobular carcinoma**

# Visibility of Screening-Detected Cancers

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| View       | DCIS     | IDC       | ILC      |
|------------|----------|-----------|----------|
| CC only    | 0 ( 0%)  | 5 ( 3%)   | 8 (24%)  |
| MLO only   | 6 ( 7%)  | 13 ( 6%)  | 4 (12%)  |
| Both views | 85 (93%) | 185 (91%) | 22 (65%) |

**A disproportionately high percentage of ILC cases were seen initially as one-view-only findings.**

- 35% (12 of 34) of ILC cases were one-view-only cases, but only 8% (24 of 294) of IDC and DCIS cases were one-view-only cases.**

**A disproportionately high percentage of one-view-only cancer cases were ILC.**

- 33% (12 of 36) of one-view-only cancer cases were ILC, but only 10% (34 of 328) of all cancer cases were ILC.**

**A disproportionately high percentage of ILC cases were seen initially only on the CC view.**

- 24% (8 of 34) of ILC cases were CC-view-only cases, but only 2% (5 of 294) of IDC and DCIS cases were CC-view-only cases.**

# Histologic Features of ILC

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- **Infiltrates diffusely without much desmoplasia**
- **Grows in multicentric foci separated by areas of normal tissue**

# Mammographic Features of ILC

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- **Reduced tumor opacity, limiting lesion visibility on any given view**
- **Increased likelihood that ILC will be seen on only one screening view**

# **Mammographic Features of ILC**

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**Visibility of ILC is especially dependent on vigorous breast compression, which usually is applied more effectively on the CC view than the MLO view.**

# Conclusions

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**Findings seen on only one view are common among lesions detected at mammography screening.**

# Conclusions

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**Most (> 80%) one-view-only findings can be correctly assessed as summation artifact, either without or with the aid of additional imaging studies.**

# Conclusions

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**Since the majority of one-view-only findings represent summation artifact, it is important for radiologists to correctly characterize these findings.**

# Conclusions

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**Among those one-view-only findings that truly are cancer, a disproportionately high percentage are ILC, often displaying subtle mammographic features more readily seen on CC view than MLO view.**