



ARMENIA

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Trends in surgery of nonpalpable tumors in modern breast surgery



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**[www.oncology.am](http://www.oncology.am)**

**[www.breast.am](http://www.breast.am)**



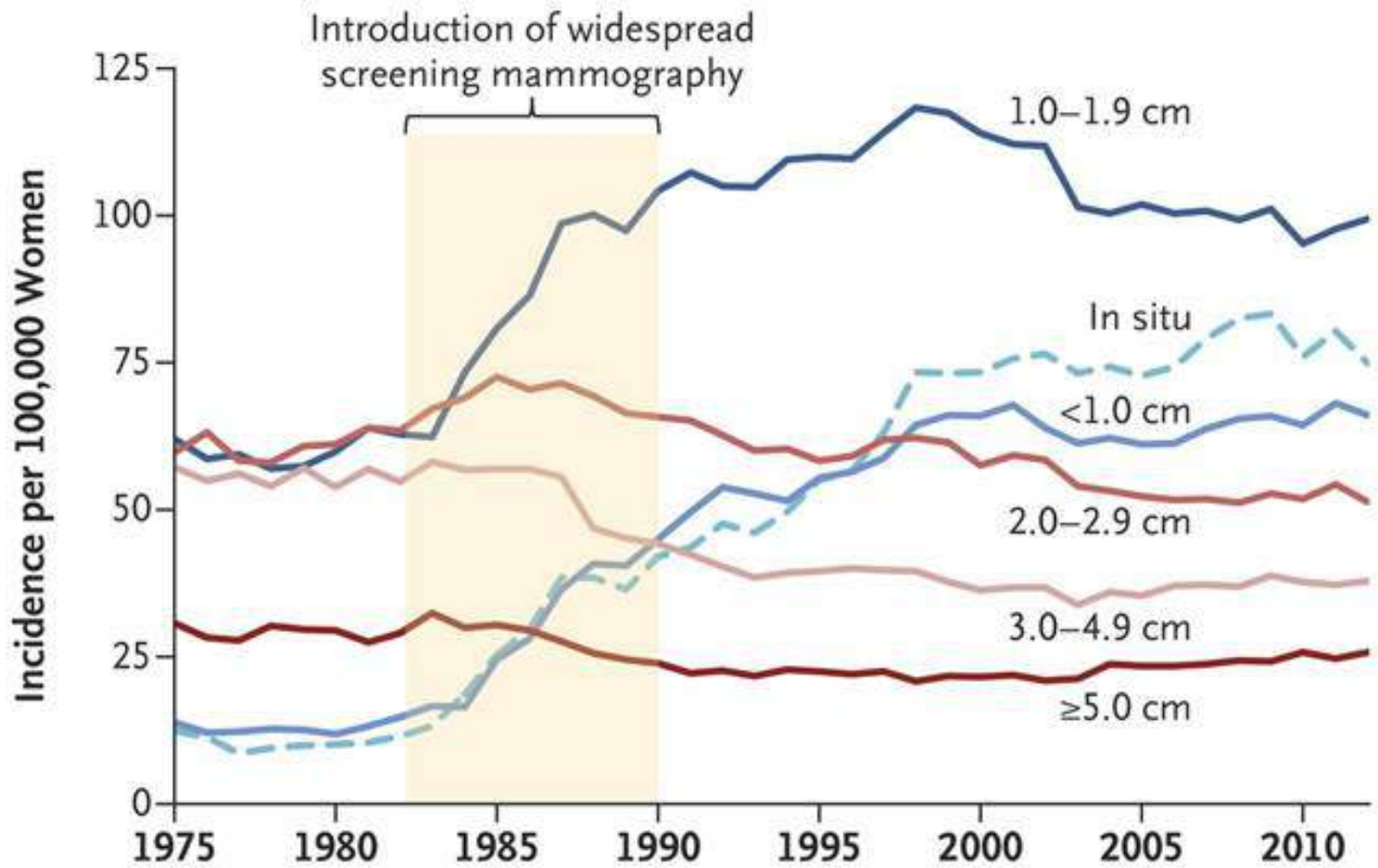




# **National Center of Oncology, Yerevan, Armenia**



## B Size-Specific Incidence

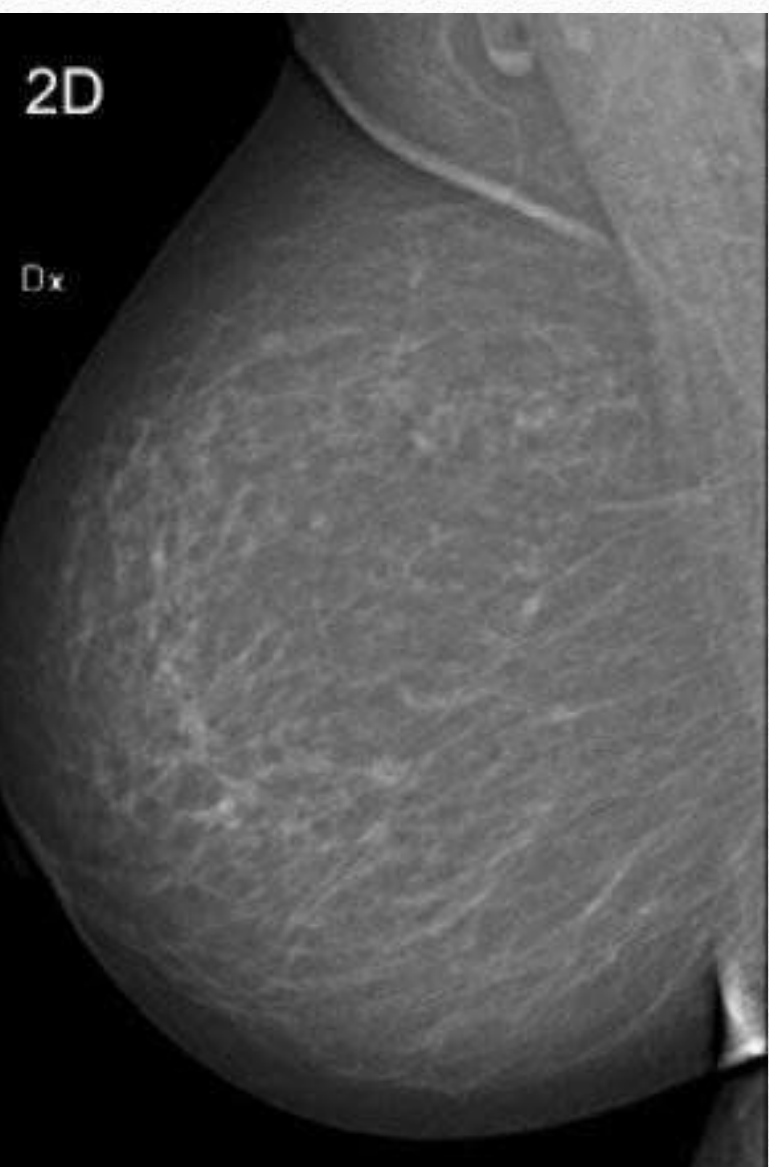




3D

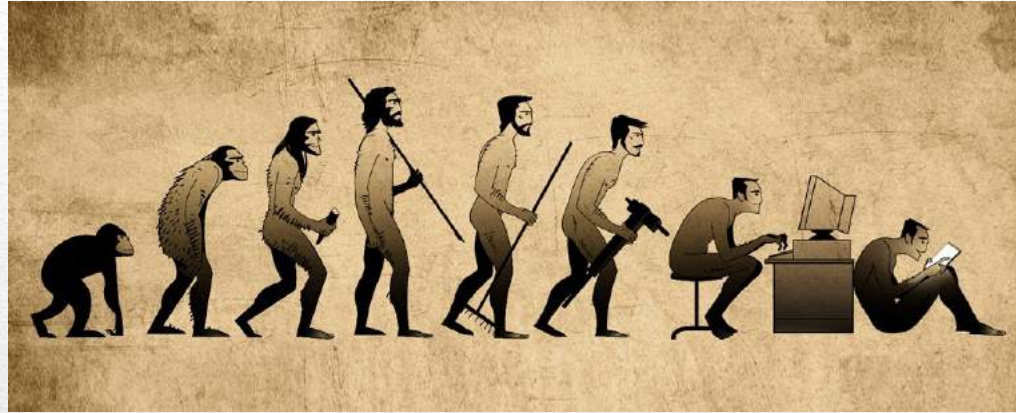


2D



Dx

# The pioneer of nonpalpable breast cancer localization method is wire-needle



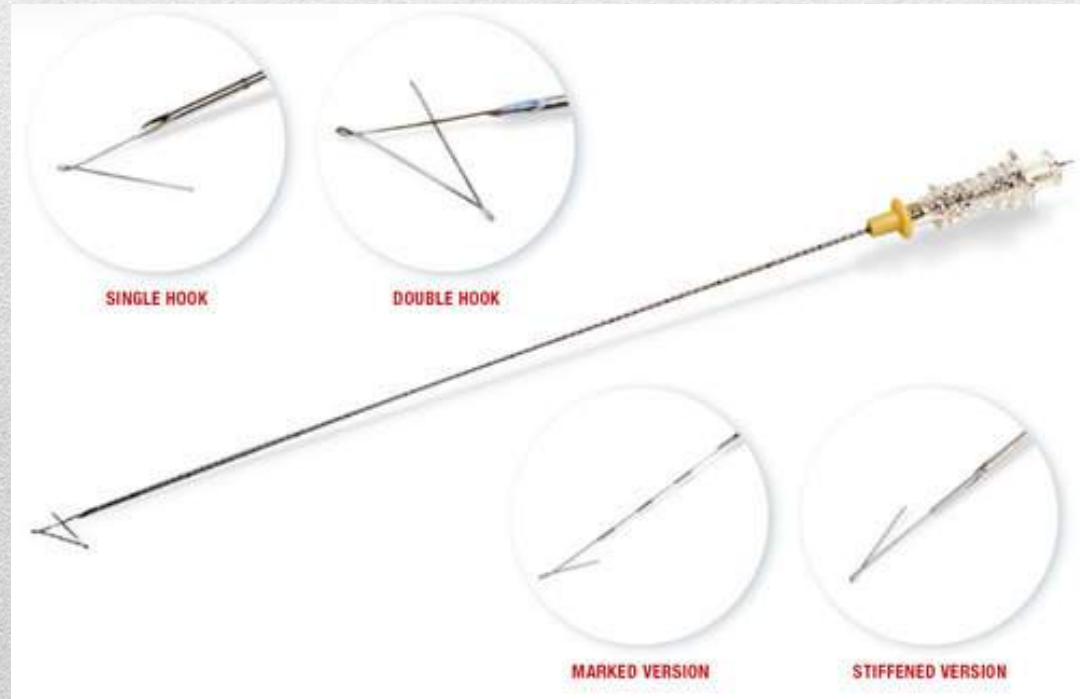
## Development of Wire Localization for Occult Breast Lesions: Boston Remembrances<sup>1</sup>

Ferris M. Hall, MD  
Daniel B. Kopans, MD  
Norman L. Sadowsky, MD  
Marc J. Homer, MD

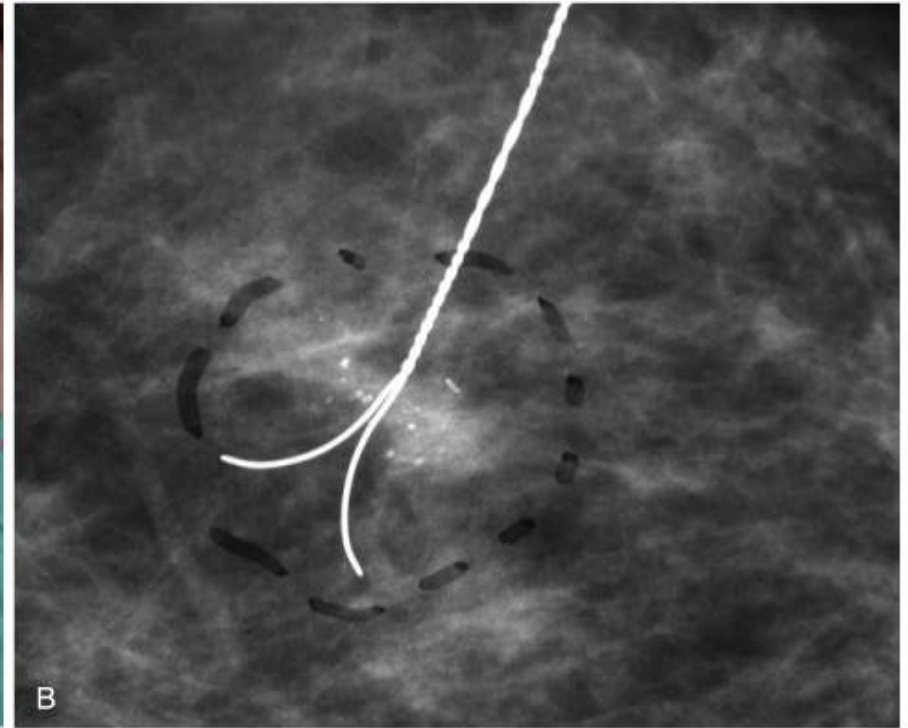
In the 1970s, the four authors of this article each set up mammographic screening programs and independently developed preoperative needle-wire localization techniques at different Boston-area hospitals. These innovations, which facilitated surgical biopsy of nonpalpable abnormalities, helped establish and popularize mammography and have only minimally changed over the ensuing decades. This historical perspective shares personal anecdotes of the early development of mammography and mammographic wire localizations.



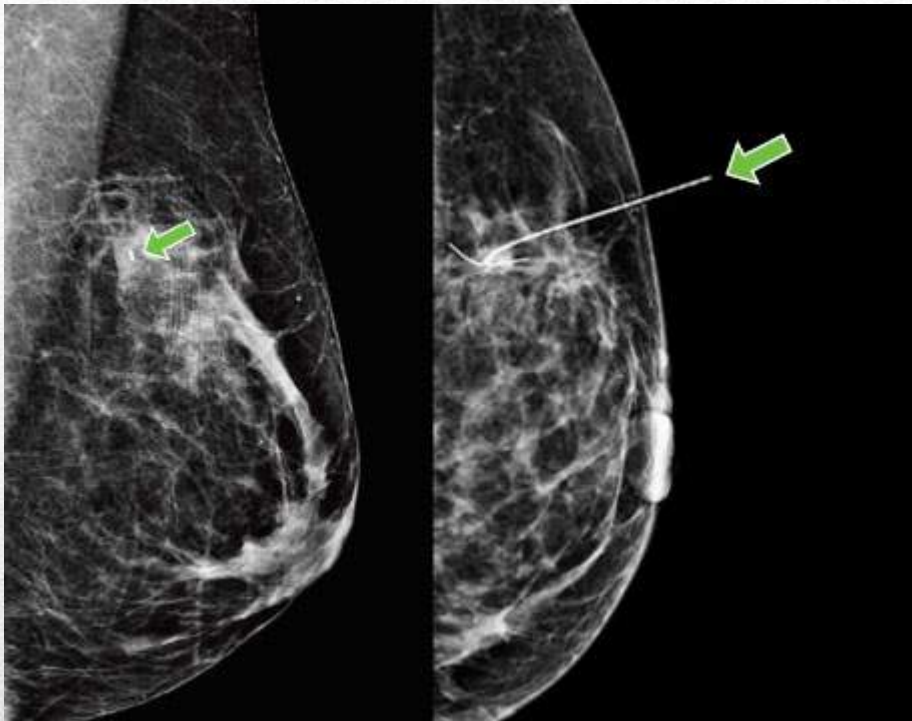
# WIRE NEEDLES



# WIRE NEEDLE LOCALIZATION







# **Wire needle localization**

## **Advantages/ Disadvantages**

**Main advantages of the wire needle method of localization:**

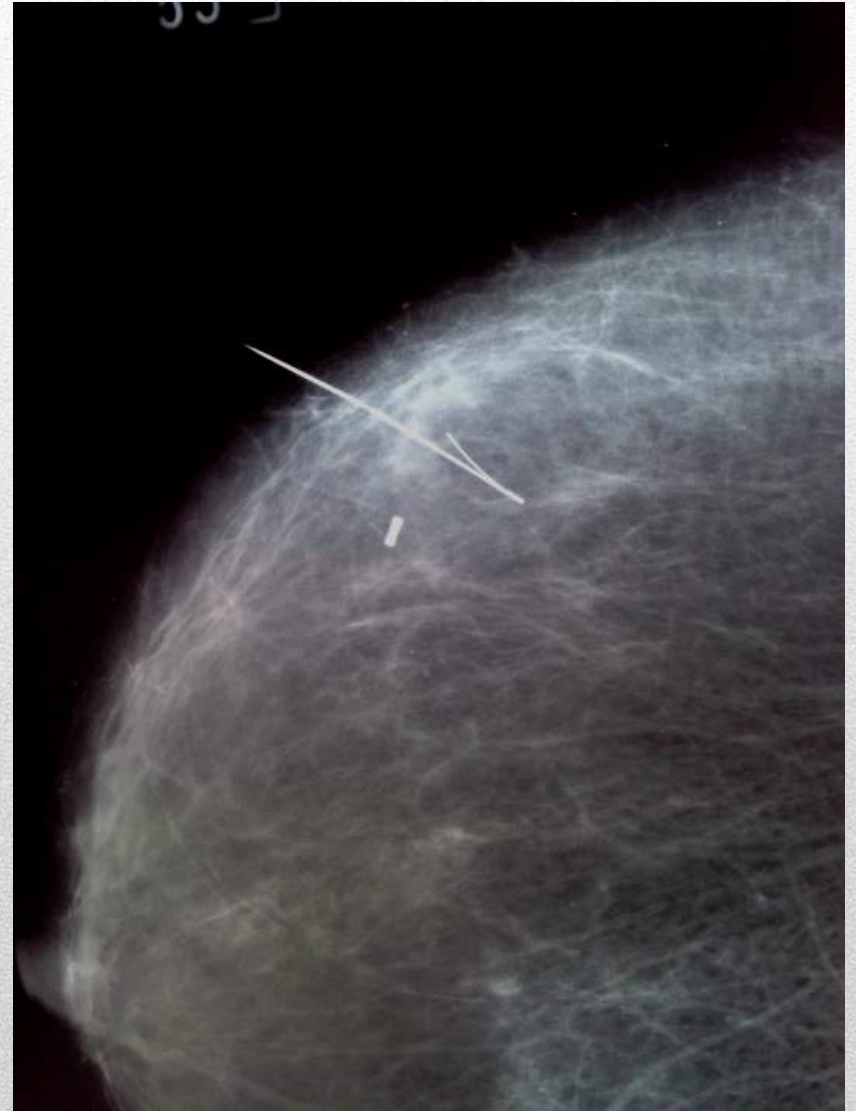
- 1. Simple performance**
- 2. Low cost of production**

**Disadvantages:**

- 1. Risk of the needle migration before or during the surgery.**
- 2. Limitations in setting up the date and time of the surgery (we all know that mostly surgeries are scheduled in the morning hours).**
- 3. Restrictions for the surgeon when selecting the excision site (the scope of many cancer surgeries is limited).**
- 4. Bothersome for patients.**



# LAMPECTOMY AFTER NEOADJUVANT CHEMOTHERAPY





# SPECIMEN WITH WIRE NEEDLE AND CLIP MARKER





# CLIP MARKERS



OPEN COIL



BUTTERFLY



BARREL



BOWTIE



TRIPLE TWIST



U-SHAPE



BARBELL

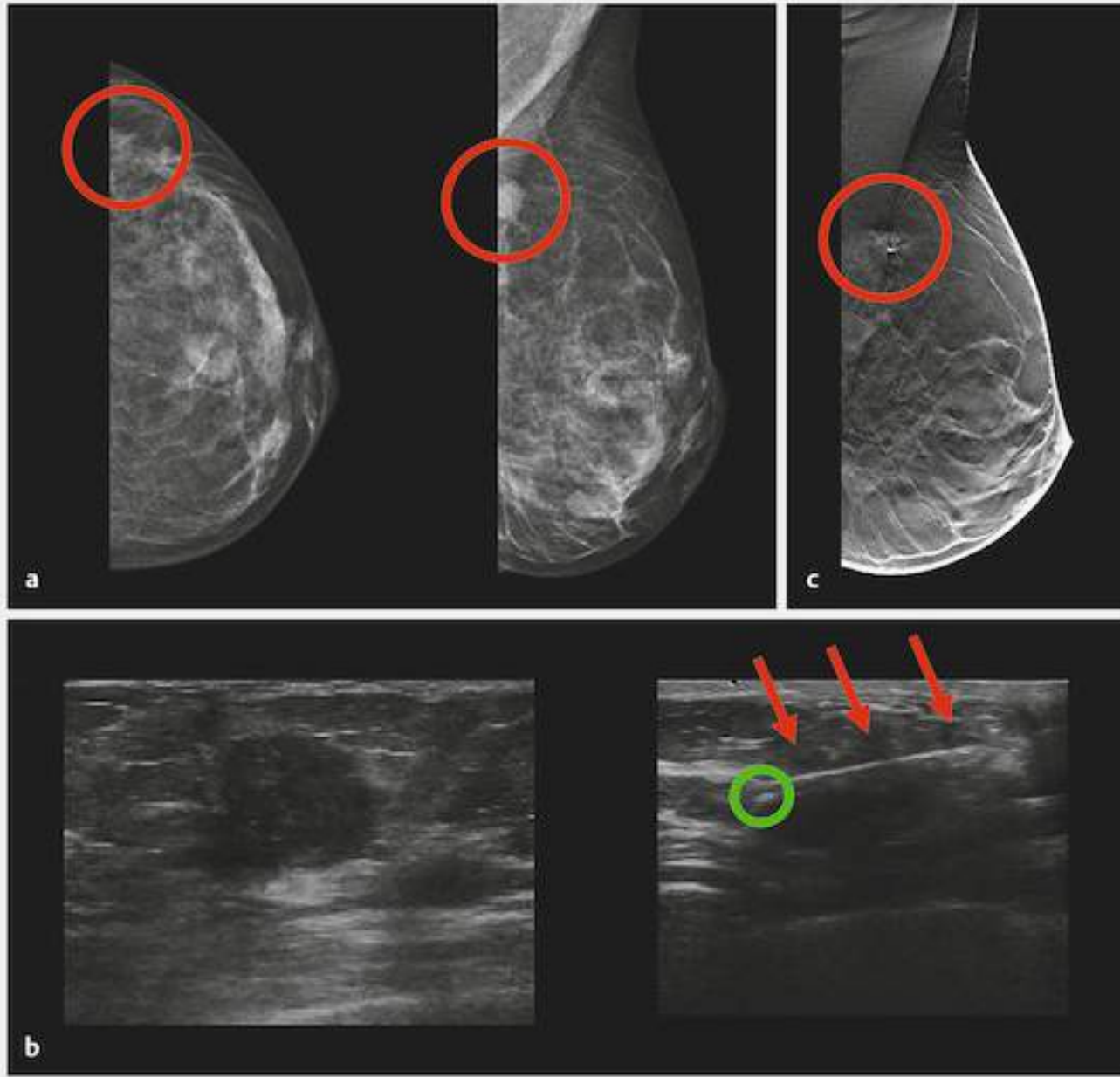


TRIBELL



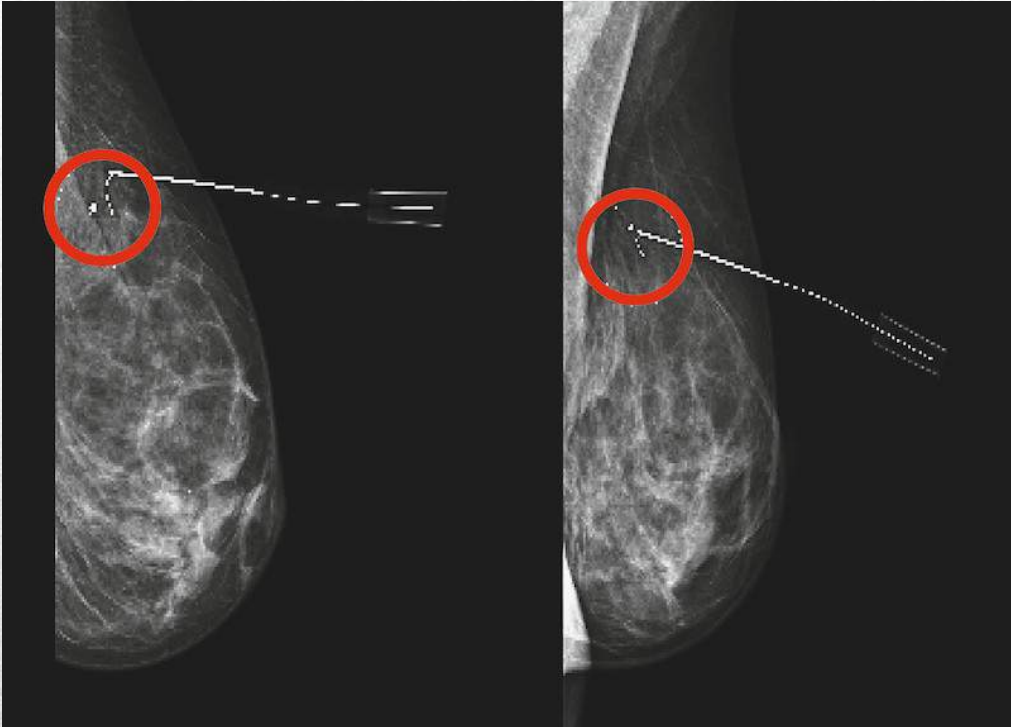
ANCHOR

# CLIP MARKER'S PLACEMENT

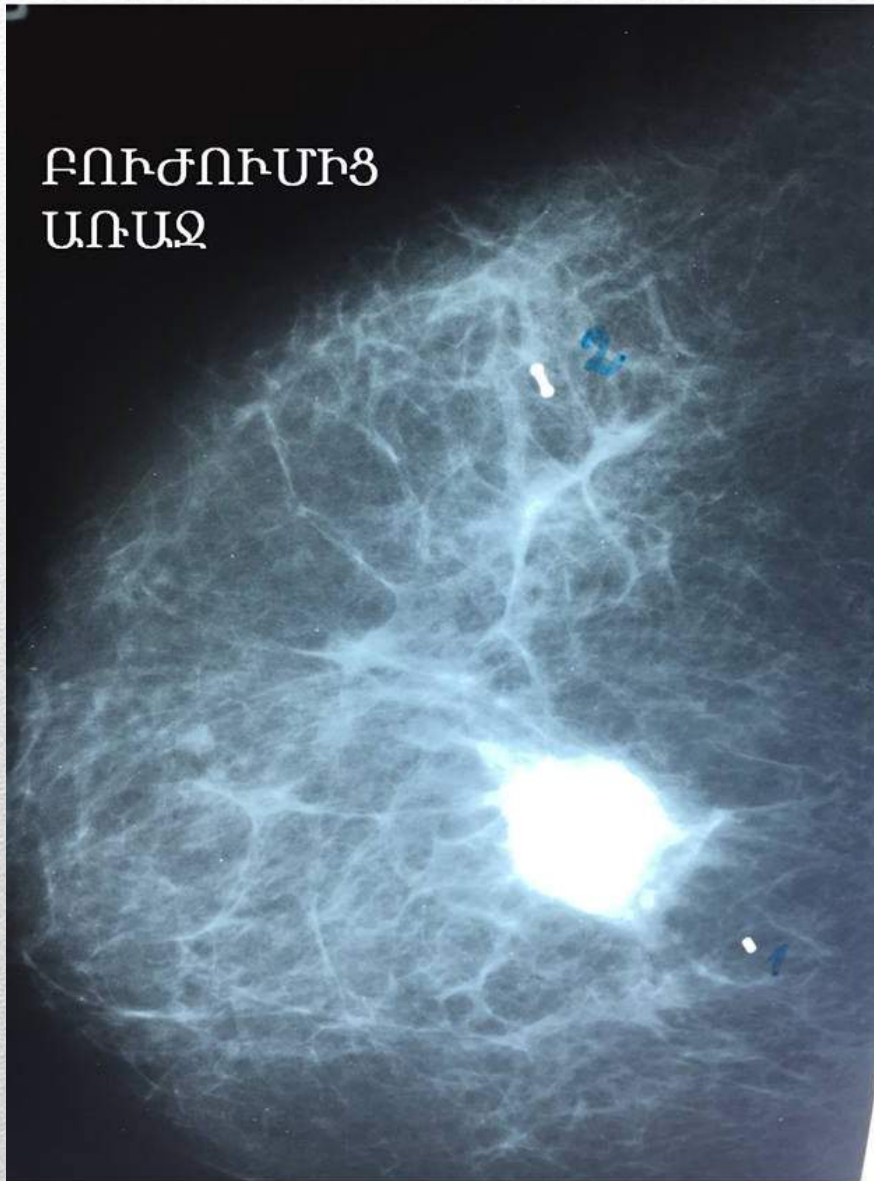




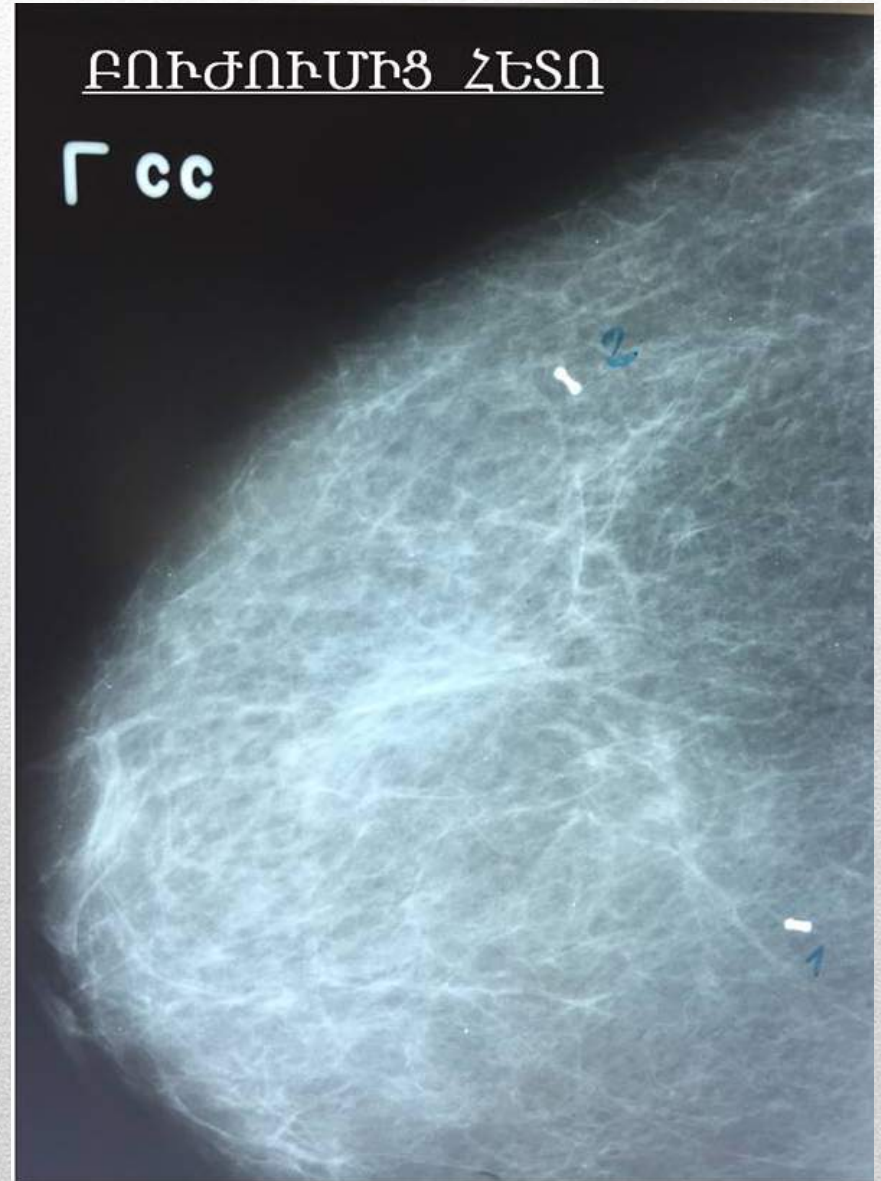
# LAMPECTOMY WITH SPECIMEN RADIOGRAPHY



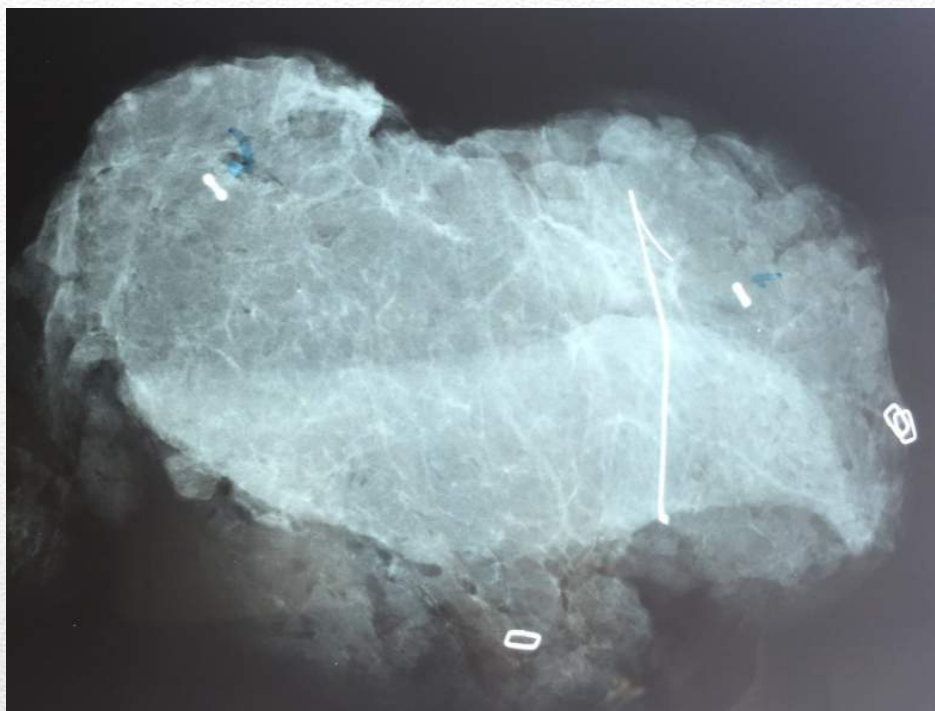
# Before chemotherapy



# After chemotherapy

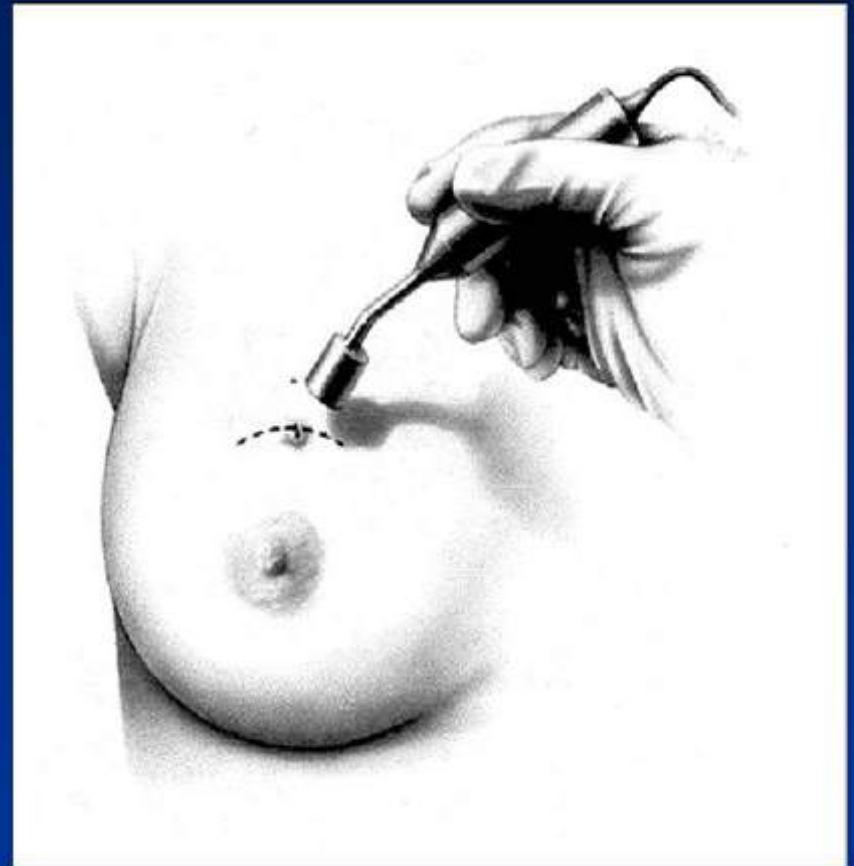






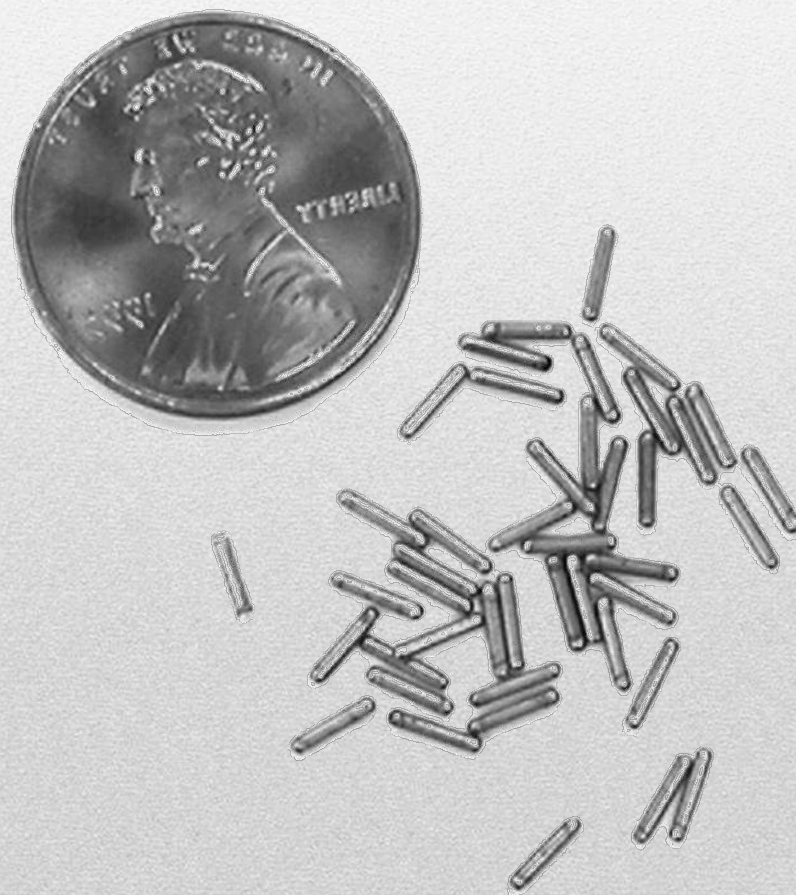
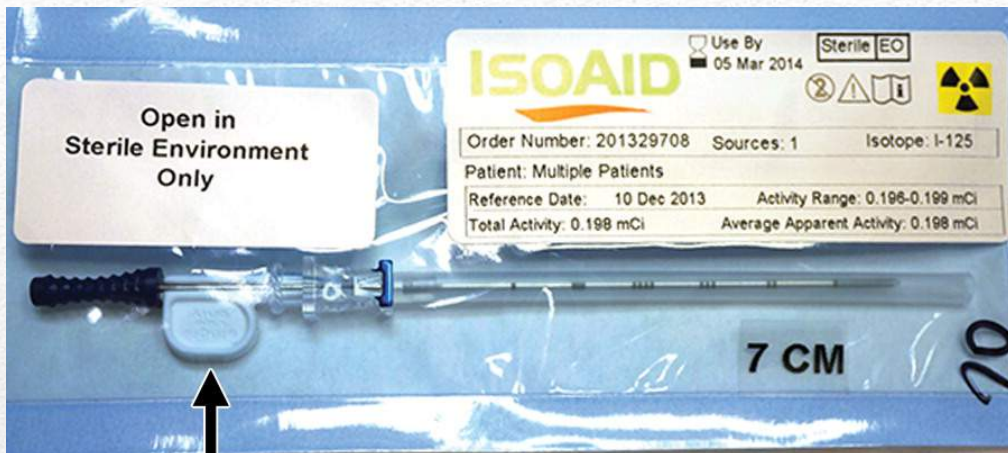
# Surgical Removal Of I-125 Seed

- Identification of surgical patient containing I-125 seed
- Handheld gamma probe is scanned across breast
  - Probe set at 27 keV to detect gamma radiation from I-125



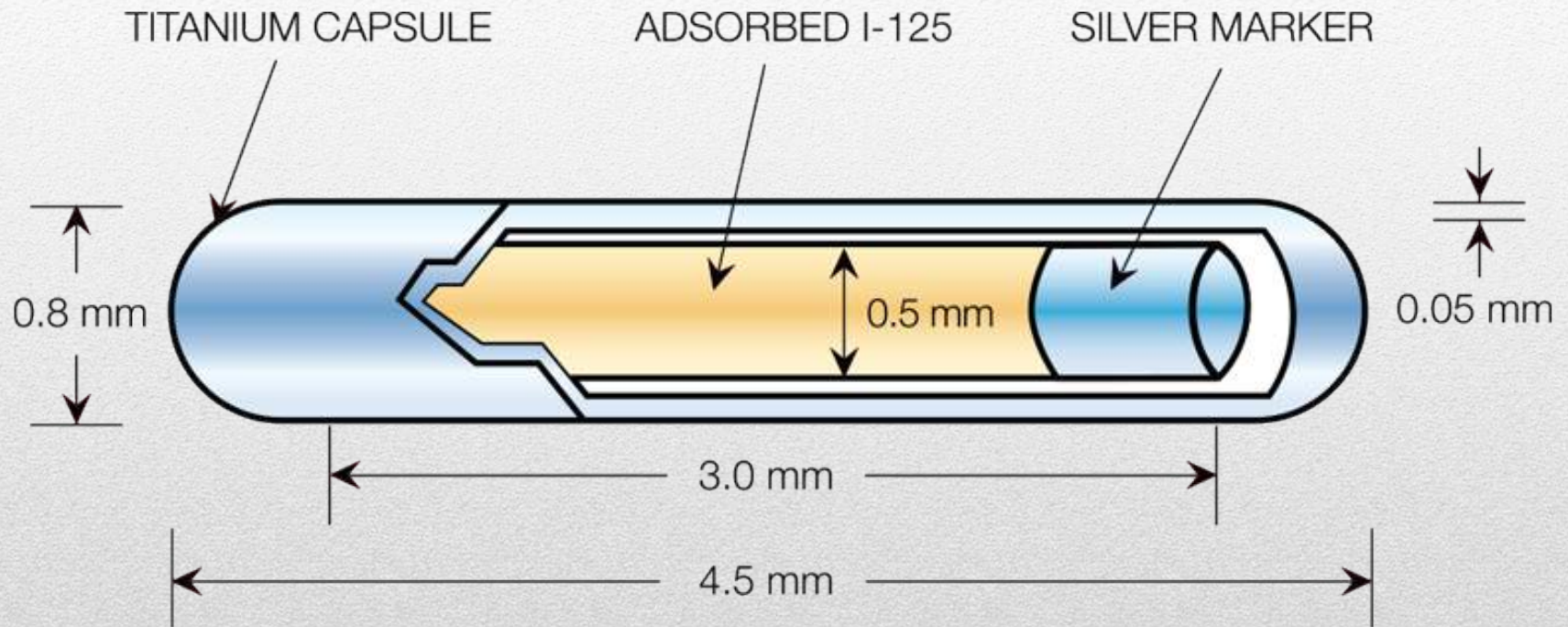


# Radioactive seed localization system for breast surgery





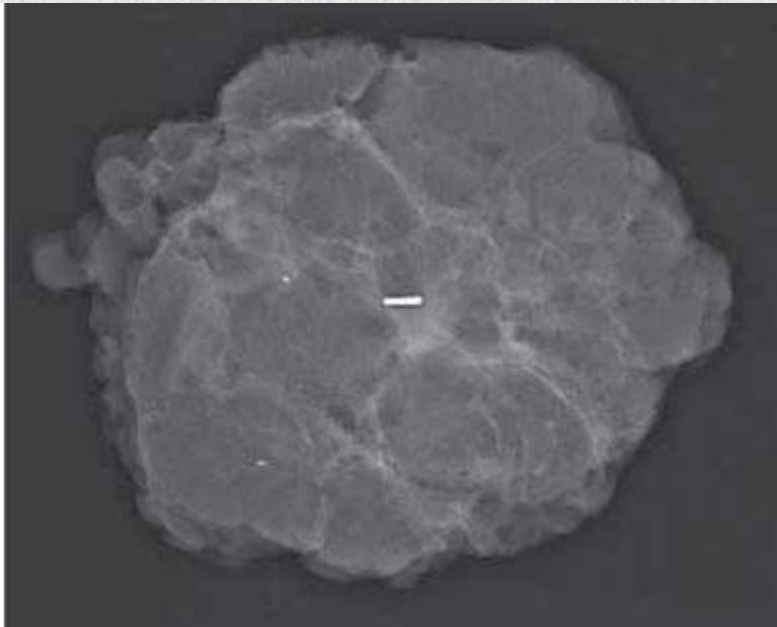
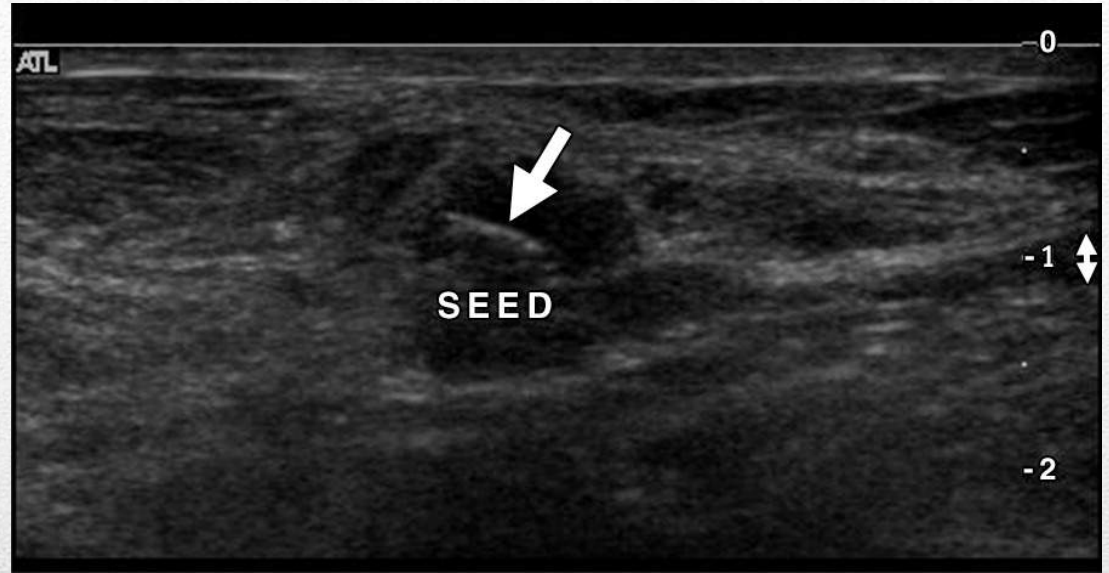
# THE CAPSULE STRUCTURE



IsoAid Advantage™ (model IAI - 125A) I-125 source



# THE RADIOACTIVE SEED



# Radioactive seed localization

## Advantages/ Disadvantages

The main advantages of the radioactive seed localization system:

1. Low risk of dislodging
2. The seed could be placed up to 5 days before surgery, allowing for independent scheduling of the localization and surgery
3. Independent incision side
4. The system using for sentinel lymph node biopsy
5. The oncologically safe efficacy is confirmed by many studies.

Disadvantages:

1. Strict nuclear regulatory requirements
  - ✓ Obtaining and maintaining proper licensing and meticulous tracking of the seed is mandatory
  - ✓ All personnel involved with the handling of the seed must have radiation safety training
  - ✓ You should avoid placing an infant, child, or young animal on your chest for more than 30 minutes per day while the seed is in place.
  - ✓ The radioactive seeds should be removed in pathology department and placed in special packs.
2. More expensive than WNL



# Indocyanine Green Fluorescence-Guided Occult Lesion Localization (IFOLL)

BreastCare

Case Report · Kasuistik

Breast Care 2012;7:48-51  
DOI: 10.1159/000336497

Published online: February 13, 2012

## Excision of Nonpalpable Breast Cancer with Indocyanine Green Fluorescence-Guided Occult Lesion Localization (IFOLL)

Fatih Aydoğan<sup>a</sup> Volkan Özben<sup>b</sup> Erman Aytac<sup>a</sup> Halit Yılmaz<sup>c</sup> Ali Cercel<sup>a</sup> Varol Celik<sup>a</sup>

<sup>a</sup>Department of General Surgery, Istanbul University Cerrahpasa Medical School, Istanbul

<sup>b</sup>General Surgery Clinic, Sürmene State Hospital, Sürmene, Trabzon,

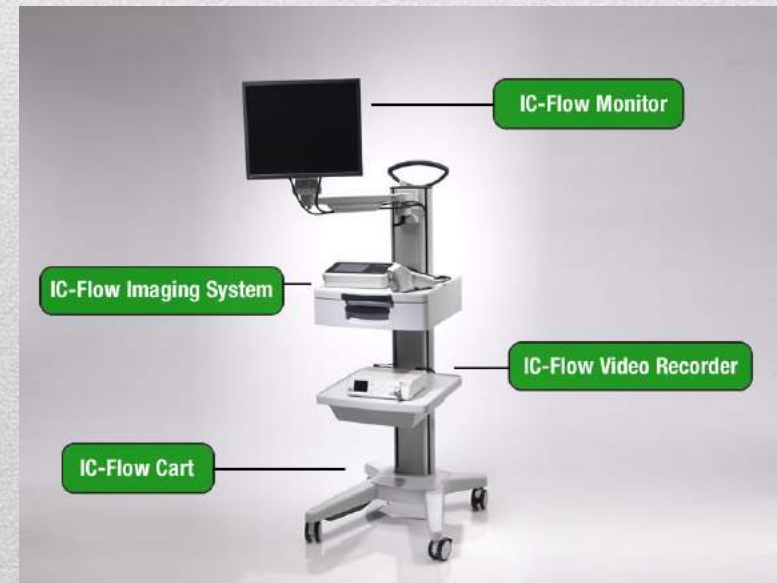
<sup>c</sup>Department of Radiology, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

### Keywords

Nonpalpable cancer · Breast · Indocyanine green fluorescence imaging · Lesion localization · Excision

### Schlüsselwörter

Nicht palpable Tumoren · Mamma · Indocyaningrün-Fluoreszenzbildgebung · Läsion Lokalisation · Resektion



REVIEW

Open Access



# Intraoperative ultrasound in breast cancer surgery—from localization of non-palpable tumors to objectively measurable excision

Natasa Colakovic<sup>1\*</sup> , Darko Zdravkovic<sup>2</sup>, Zlatko Skuric<sup>1</sup>, Davor Mrda<sup>3</sup>, Jasna Gacic<sup>2</sup> and Nebojsa Ivanovic<sup>2</sup>

## Abstract

**Background:** The utilization of intraoperative ultrasound (IOUS) in breast cancer surgery is a relatively new concept in surgical oncology. Over the last few decades, the field of breast cancer surgery has been striving for a more rational approach, directing its efforts towards removing the tumor entirely yet sparing tissue and structures not infiltrated by tumor cells. Further progress in objectivity and optimization of breast cancer excision is possible if we make the tumor and surrounding tissue visible and measurable in real time, during the course of the operation; IOUS seems to be the optimal solution to this complex requirement. IOUS was introduced into clinical practice as a device for visualization of non-palpable tumors, and compared to wire-guided localization (WGL), IOUS was always at least a viable, or much



# BREAST CANCER SURGERY WITH ULTRASOUND ELECTROMAGNETIC 3D NAVIGATION





# HHS Public Access

Author manuscript

*Ann Surg Oncol.* Author manuscript; available in PMC 2018 June 24.

Published in final edited form as:

*Ann Surg Oncol.* 2017 October ; 24(10): 2950–2956. doi:10.1245/s10434-017-5979-z.

## **A Patient-Specific 3D-Printed Form Accurately Transfers Supine MRI-Derived Tumor Localization Information to Guide Breast-Conserving Surgery**

**Richard J. Barth Jr., MD<sup>1</sup>, Venkataramanan Krishnaswamy, PhD<sup>4</sup>, Keith D. Paulsen, PhD<sup>4</sup>, Timothy B. Rooney, MD<sup>2</sup>, Wendy A. Wells, MD<sup>3</sup>, Elizabeth Rizzo, MD<sup>3</sup>, Christina V. Angeles, MD<sup>1</sup>, Jonathan D. Marotti, MD<sup>3</sup>, Rebecca A. Zuurbier, MD<sup>2</sup>, and Candice C. Black, DO<sup>3</sup>**

<sup>1</sup>Section of General Surgery, Department of Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, NH

<sup>2</sup>Department of Radiology, Dartmouth-Hitchcock Medical Center, Lebanon, NH

<sup>3</sup>Department of Pathology, Dartmouth-Hitchcock Medical Center, Lebanon, NH

<sup>4</sup>Thayer School of Engineering, Dartmouth College, Hanover, NH

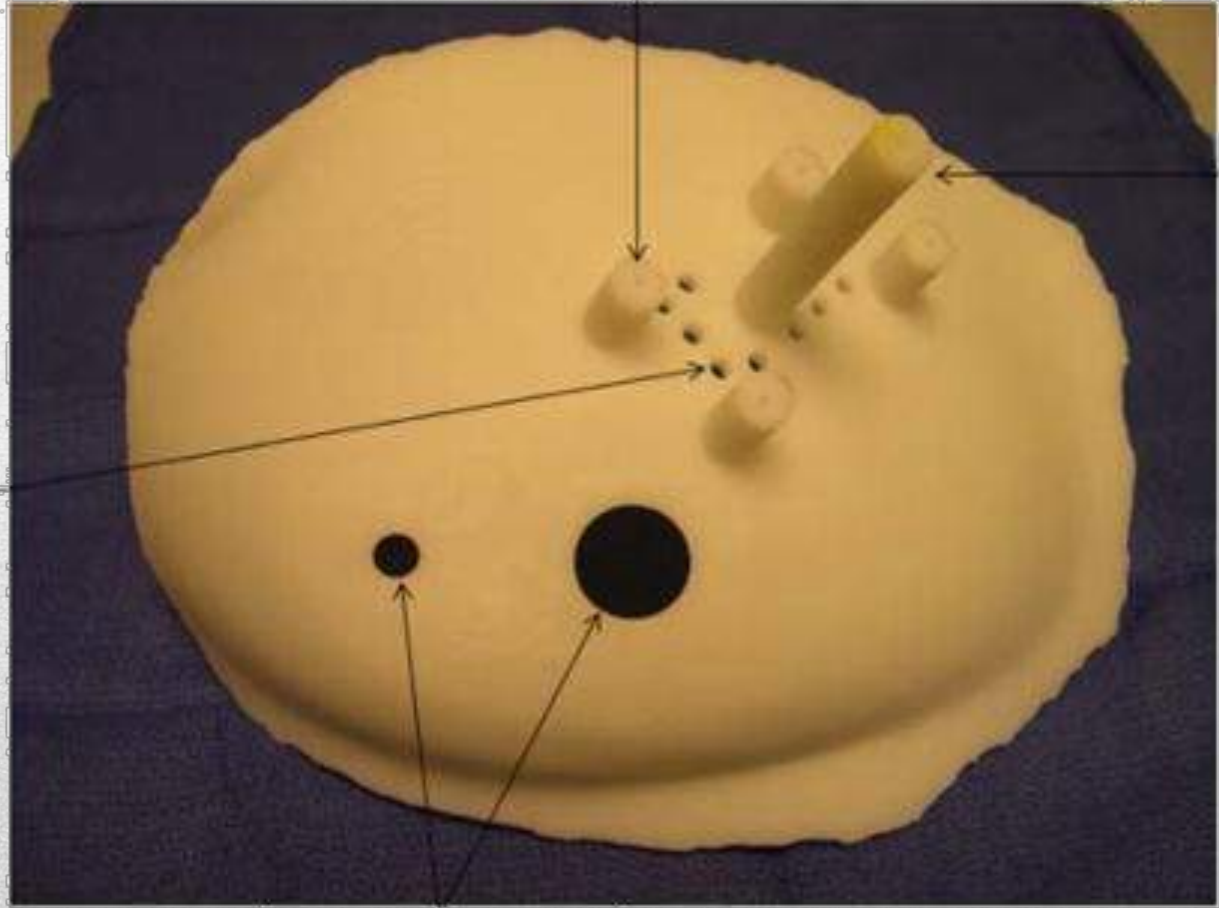


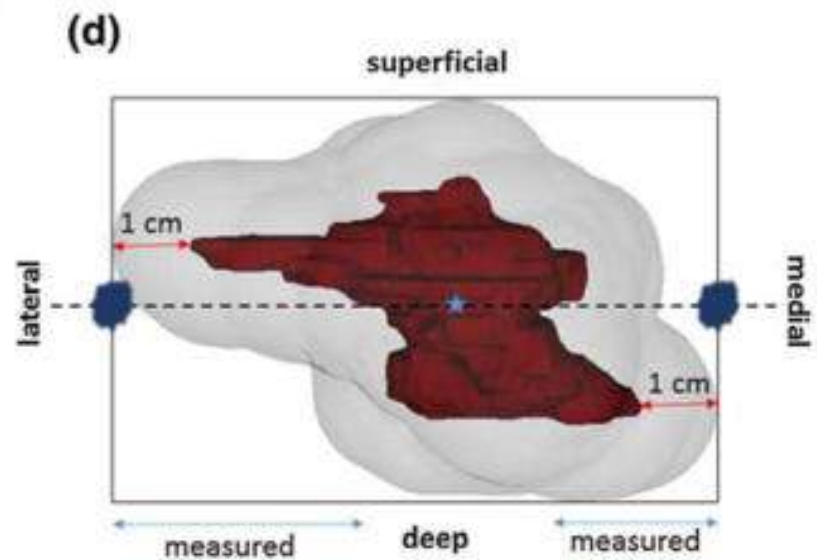
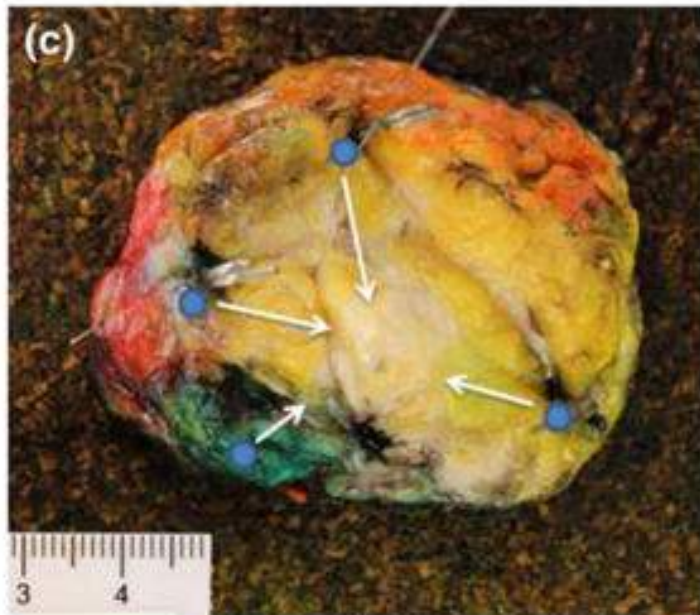
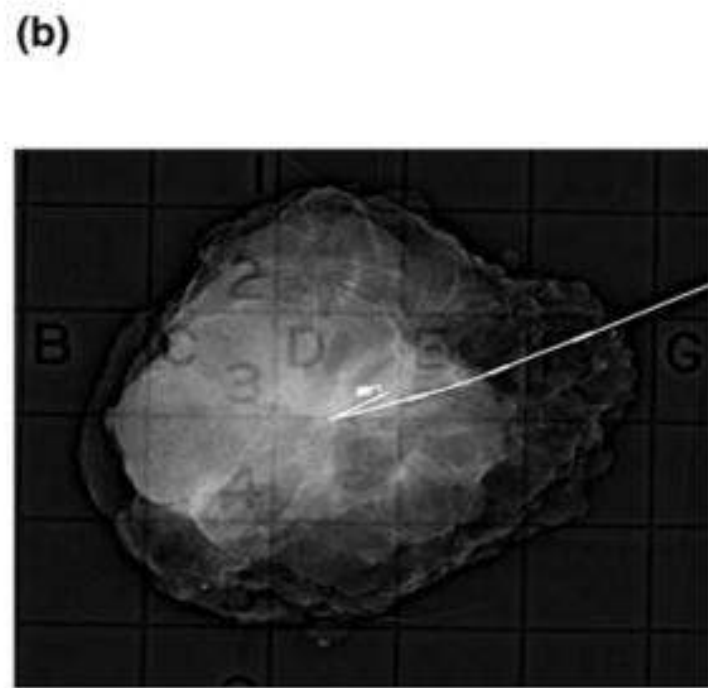
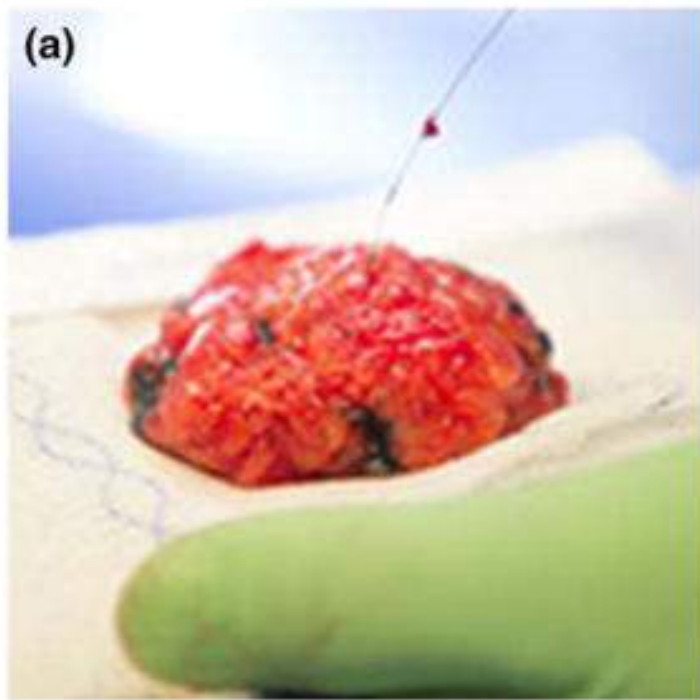
Blue dye injection port

Hook wire port

Tumor edge marking hole

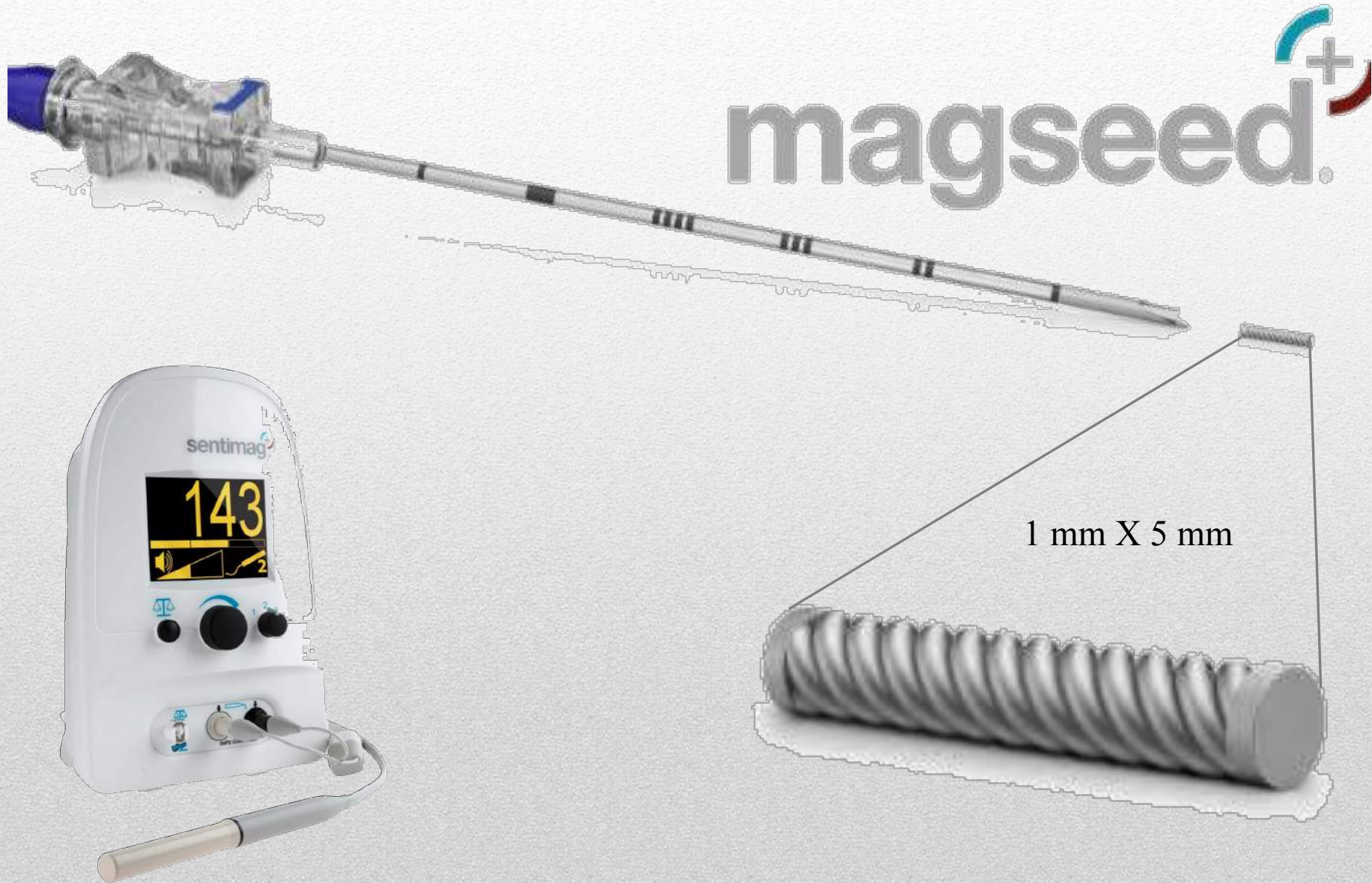
Alignment holes







# MAGSEED localization system



# **Magseed localization**

## **Advantages/ Disadvantages**

**The main advantages of Magseed method of localization:**

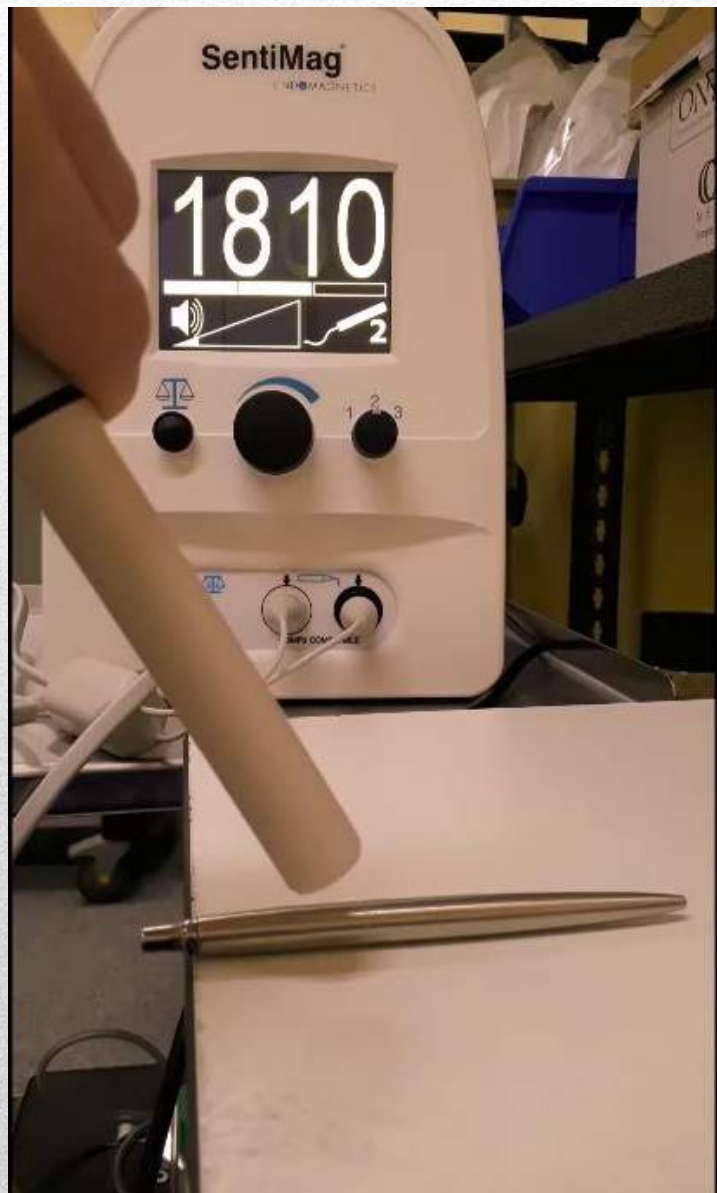
- 1. Low risk of dislodging**
- 2. Seeds can be placed up to 30 days before operation**
- 3. No radiation**
- 4. No nuclear regulatory requirements**
- 5. Independent incision side**
- 6 .The system using for sentinel lymph node biopsy also**

**Disadvantages:**

- 1. High cost**
- 2. Nonferromagnetic surgical instruments are necessary**



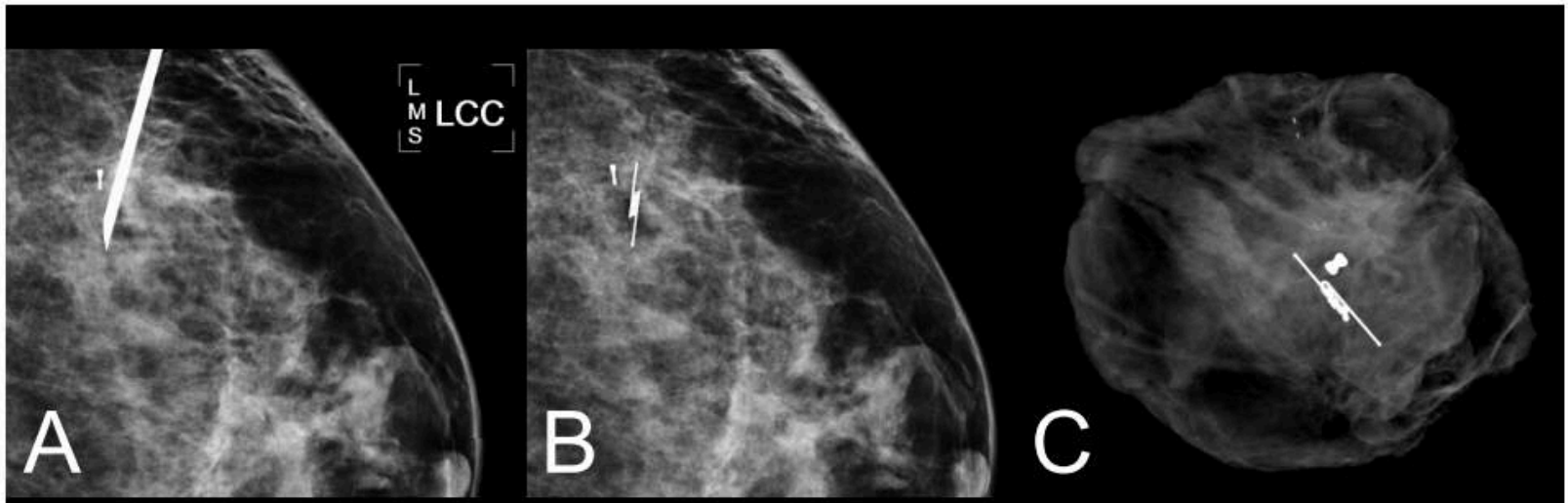
# special NONFERROMAGNETIC surgical instruments



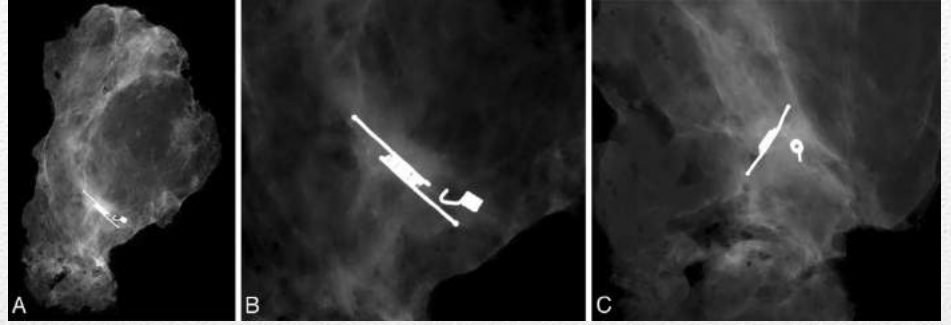
# SAVI SCOUT radar localization system



Figure 1. SAVI SCOUT System Components.









clideo.com



# **Savi Scout infrared localization**

## **Advantages/ Disadvantages**

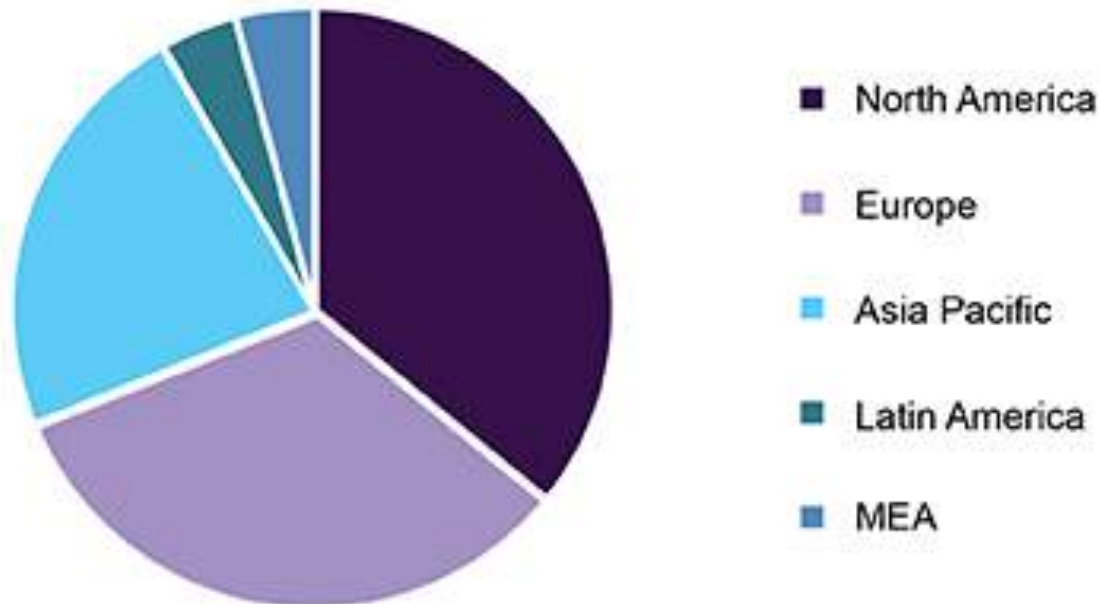
**The main advantages of Savi Scout method of localization is:**

- 1. Low risk of dislodging**
- 2. Placement up to 30 days before surgery (flexibility of scheduling for surgeon and radiologist)**
- 3. No radiation**
- 4. No nuclear regulatory requirements**
- 5. Independent incision side**
- 6. Low risk of dislodging**
- 7. Precise detection of the reflector's (tumor's) depth.**

**Disadvantages:**

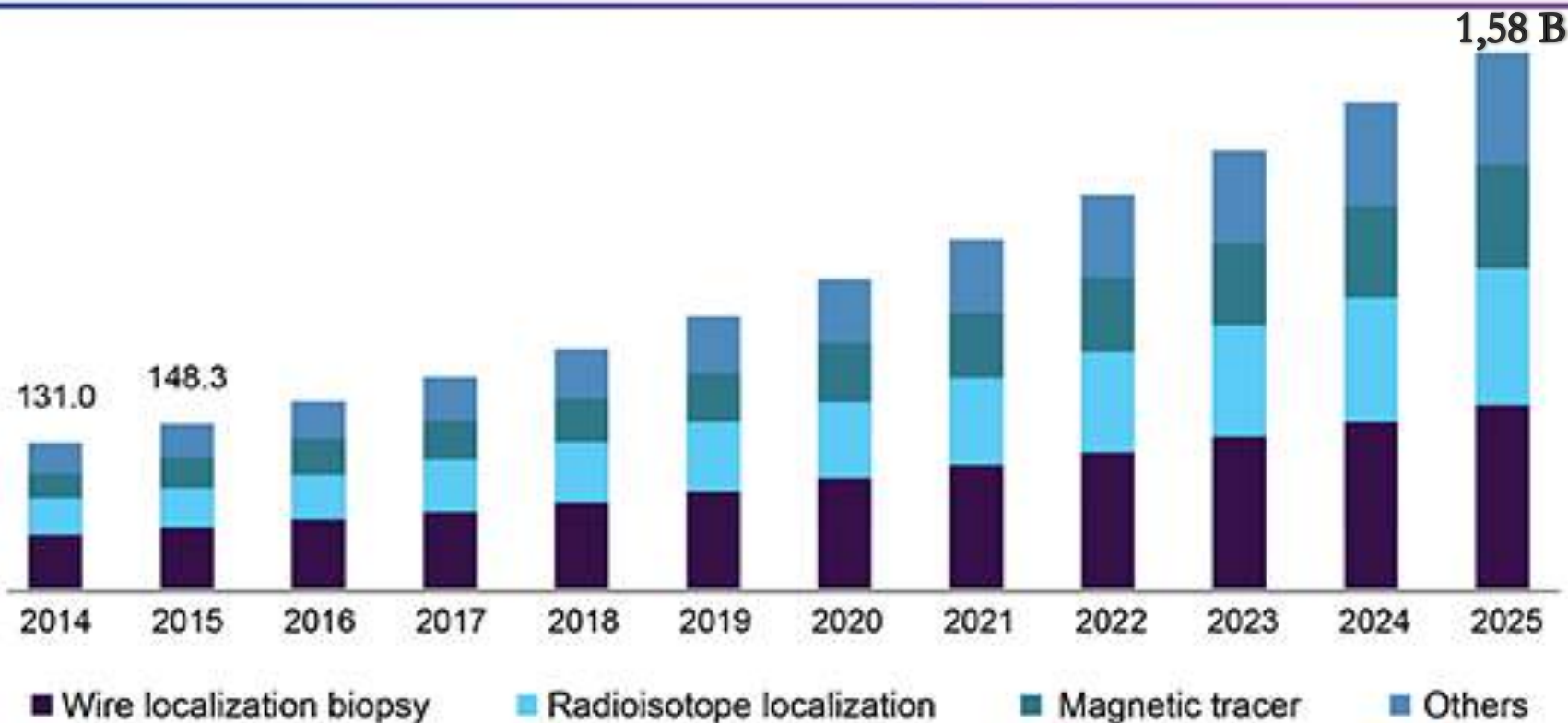
- 1. Reflector's damage in the event of direct contact with the electrocoagulator**
- 2. Price**

## Global breast lesion localization methods market share, by region, 2017 (%)





## U.S. breast lesion localization methods market size, by type, 2014 - 2025 (USD Million)



Source: [www.grandviewresearch.com](http://www.grandviewresearch.com)

**These techniques also eliminate bothersome protruding wires and the risk of dislodging, allow the incision site and don't affect the selection of the technique for onco-plastic breast-conserving surgeries to be independent from the localization site.**

**The progress of science and medical technologies gives surgeons more freedom in the treatment of nonpalpable breast cancer, thus increasing the efficacy of the surgical treatment.**



A close-up photograph of a person's hand holding a white marker. The person is wearing a light blue button-down shirt. The words "THANK YOU" are written in black, uppercase, sans-serif letters across the middle of the marker. The background is a plain, light-colored wall, slightly out of focus.

THANK YOU