NEW PERSPECTIVES OF INTRAOPERATIVE US GUIDANCE

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In the second century B.C. Leonidas of Alexandria established the identity breast cancer as typical neoplasia of female sex and described nipple retraction as sign of breast cancer

He also described treatment with breast excision and cauterization for better restrain the haemorrage. Moreover He recommended to cauterize tissues for eradication of disease

Background of our experience based on the lobar anatomy and radial echographic scanning

- **Early diagnosis and echographic staging as fundamental step for adequate conservative surgery in the treatment of breast carcinoma.**

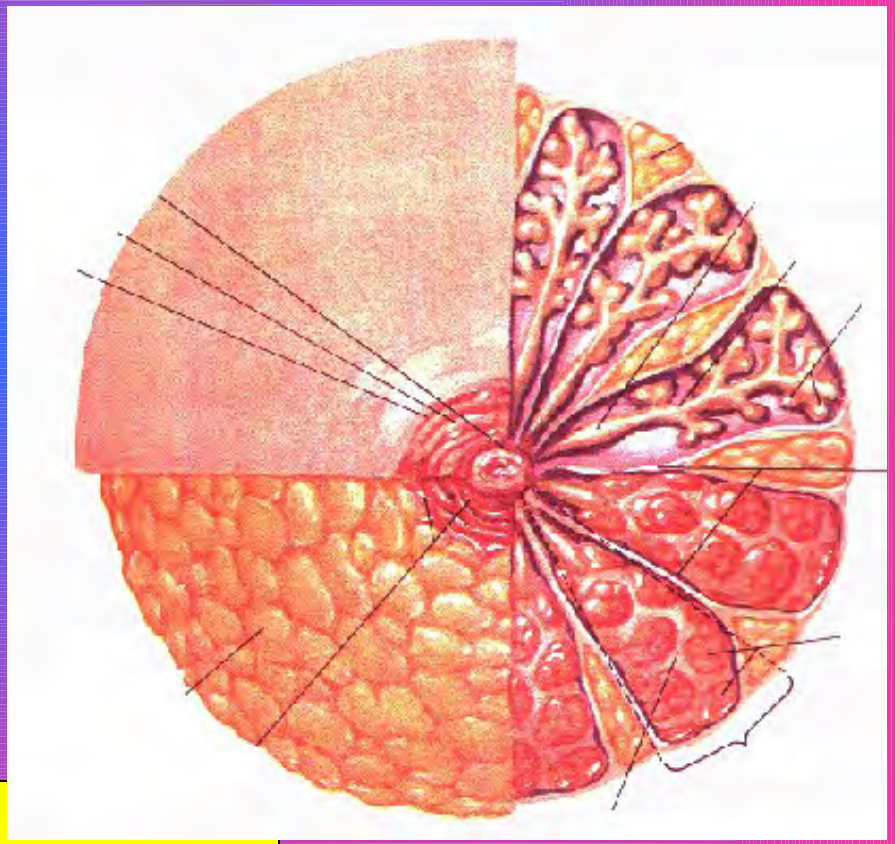
Argomenti di Chirurgia 1-2, 11:117-130, 1982.

- **Surgical echography as diagnostic and staging tool in breast pathology.**

Thoracic Surgery , Monduzzi Ed., 1988, pp.301-308.

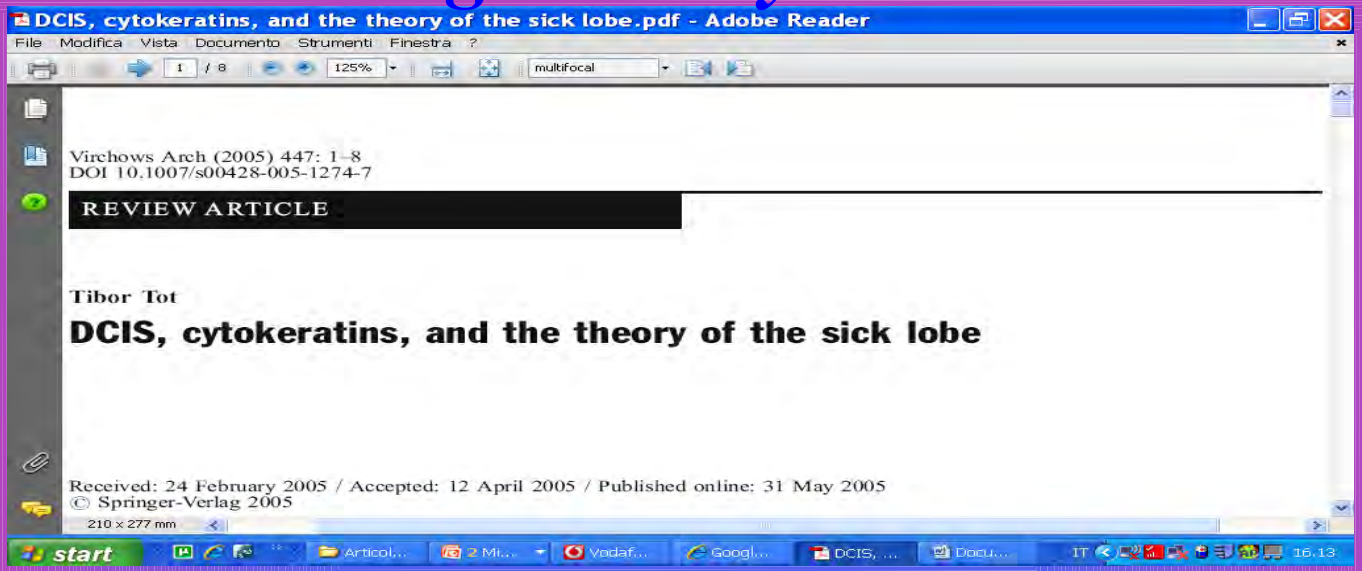
We must stress the concept for breast surgery:

- Breast composed of 15-20 lobes as many as the ducts
- each lobe is a sector or a segment
- major ducts come from periphery to the nipple



BREAST DISEASES ARE DISEASES OF DUCTAL SYSTEM

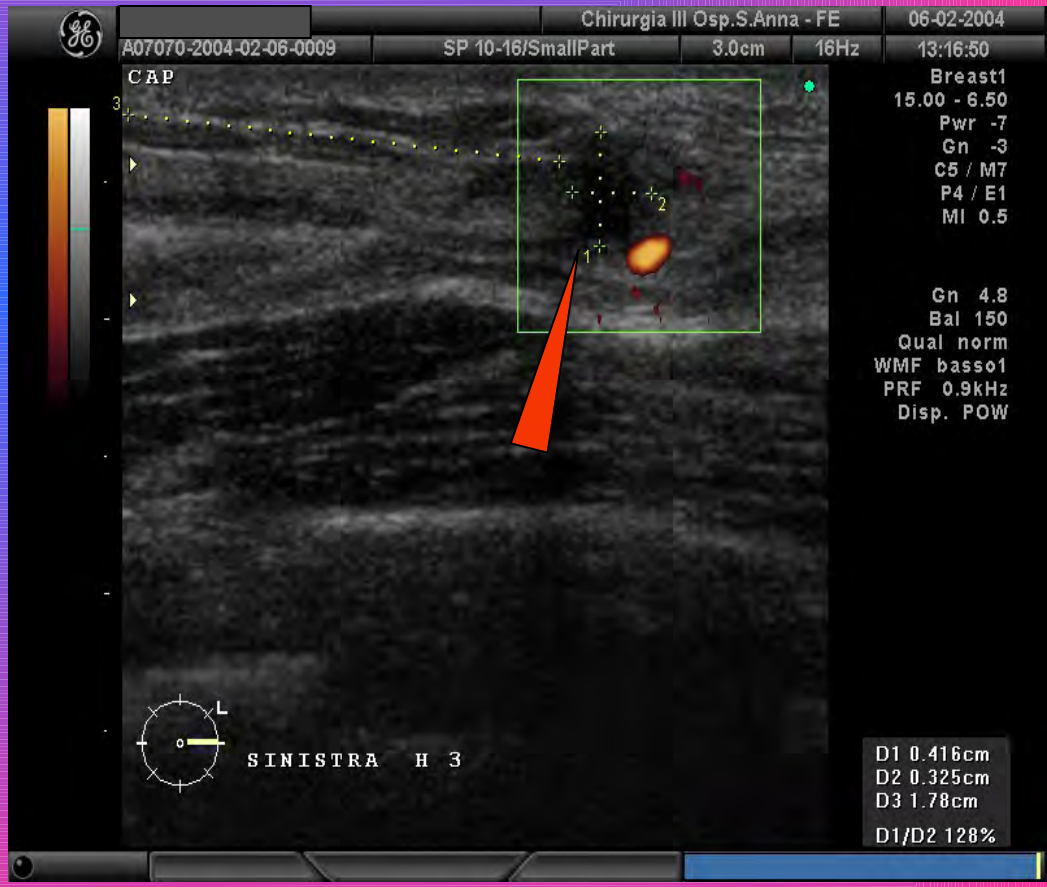
More recently the principle of lobar disease has been recognized by others authors



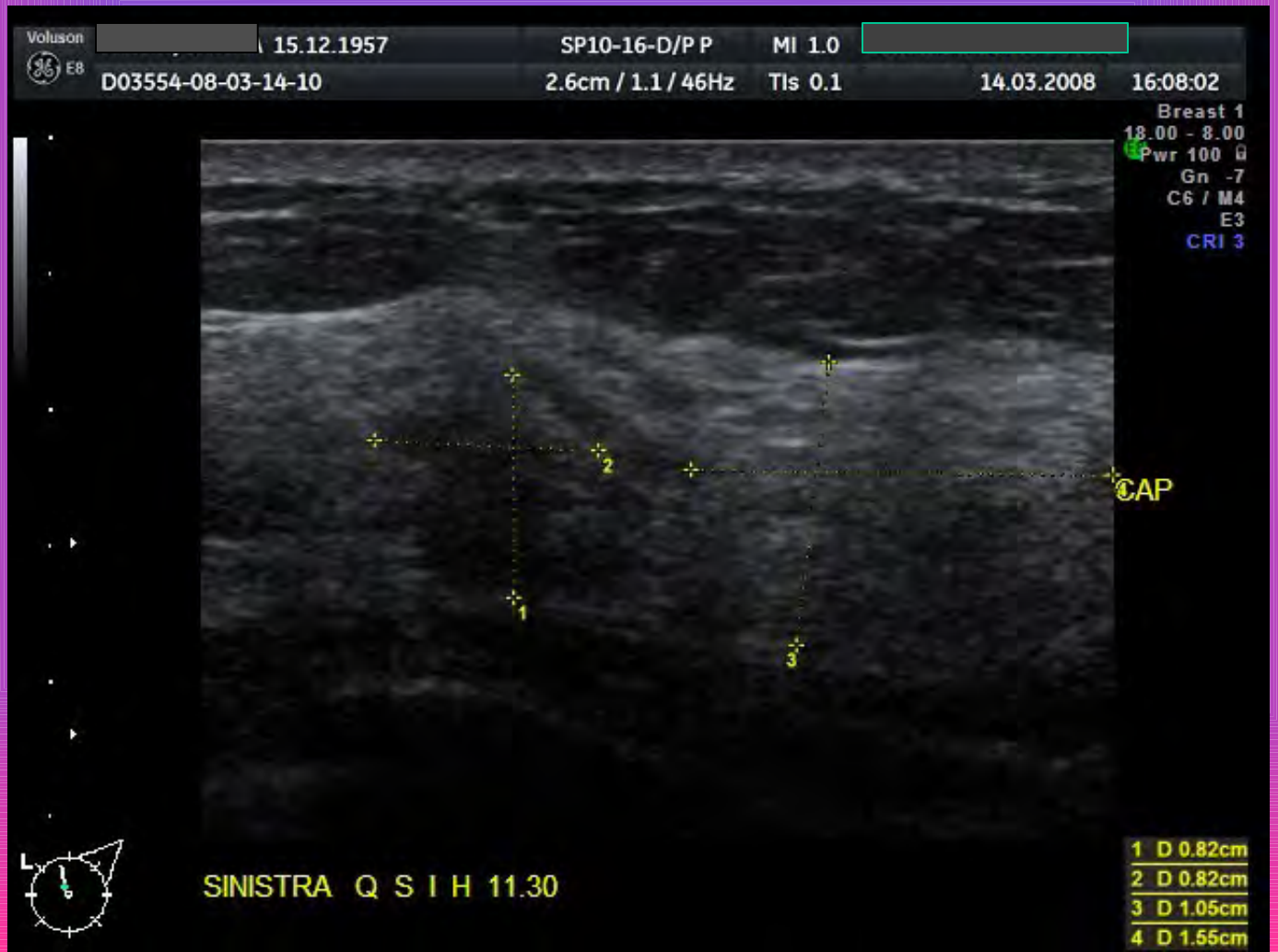
Primary objective of breast surgeons is to remove lesions with adequate margins but in radical way and preserving the patient's aesthetic good looking.

Another objective for the surgeons is to perform surgical intervention and axillary staging in one single definitive procedure.

More and more patients are diagnosed with breast cancer which is impalpable and gives pre-operative and intra-operative imaging indispensable for surgical management

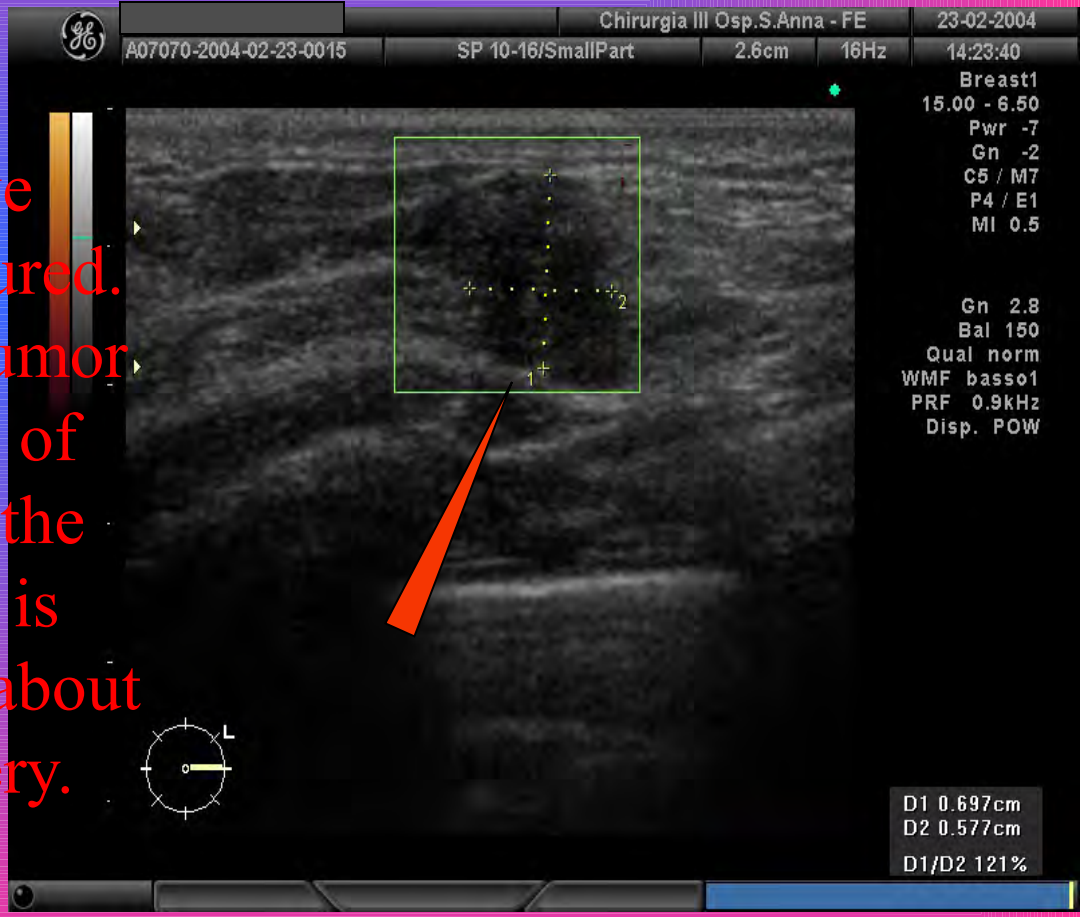


The size of tumor plays a critical role in determining both the stage and the treatment of breast cancer

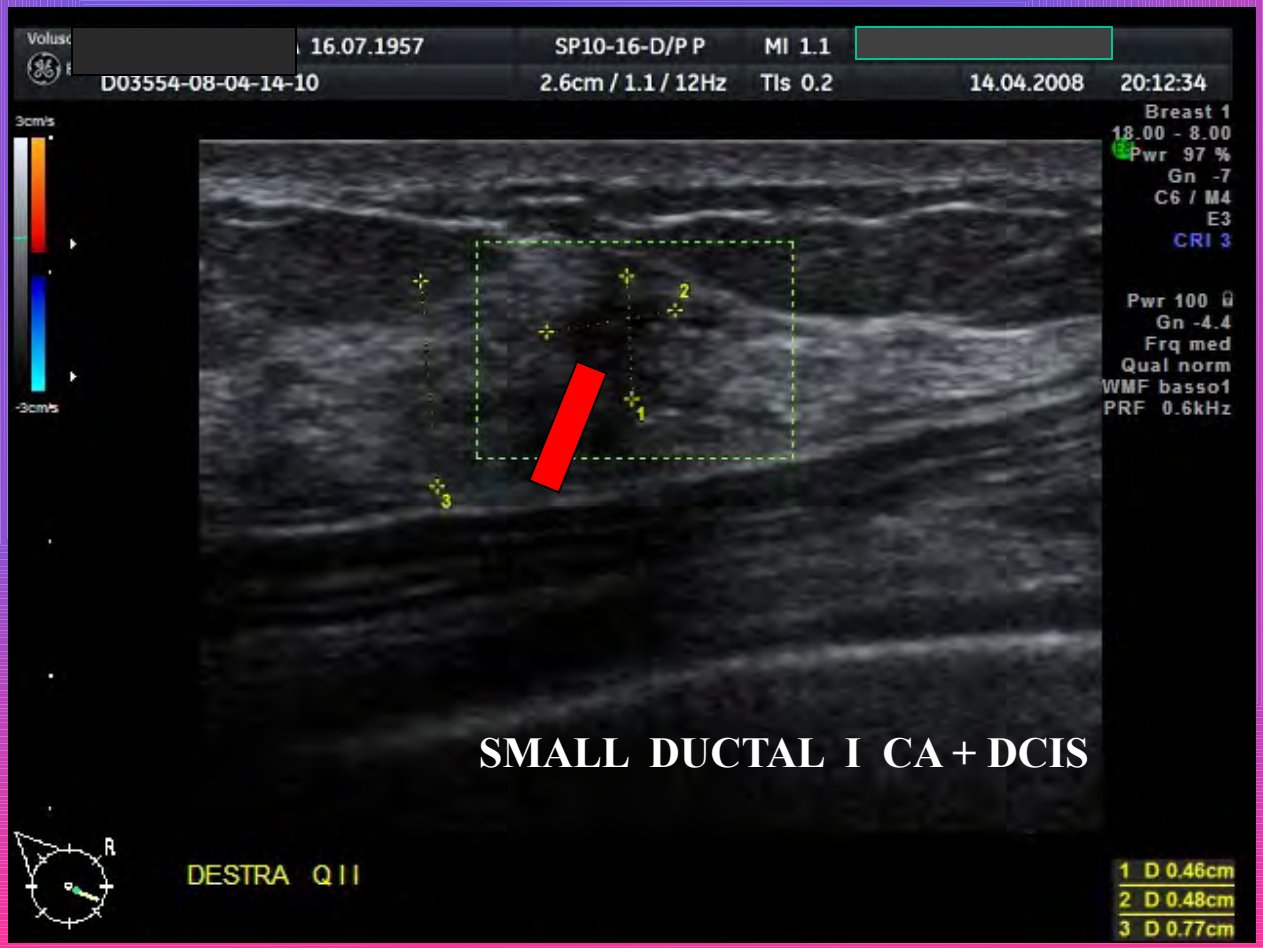


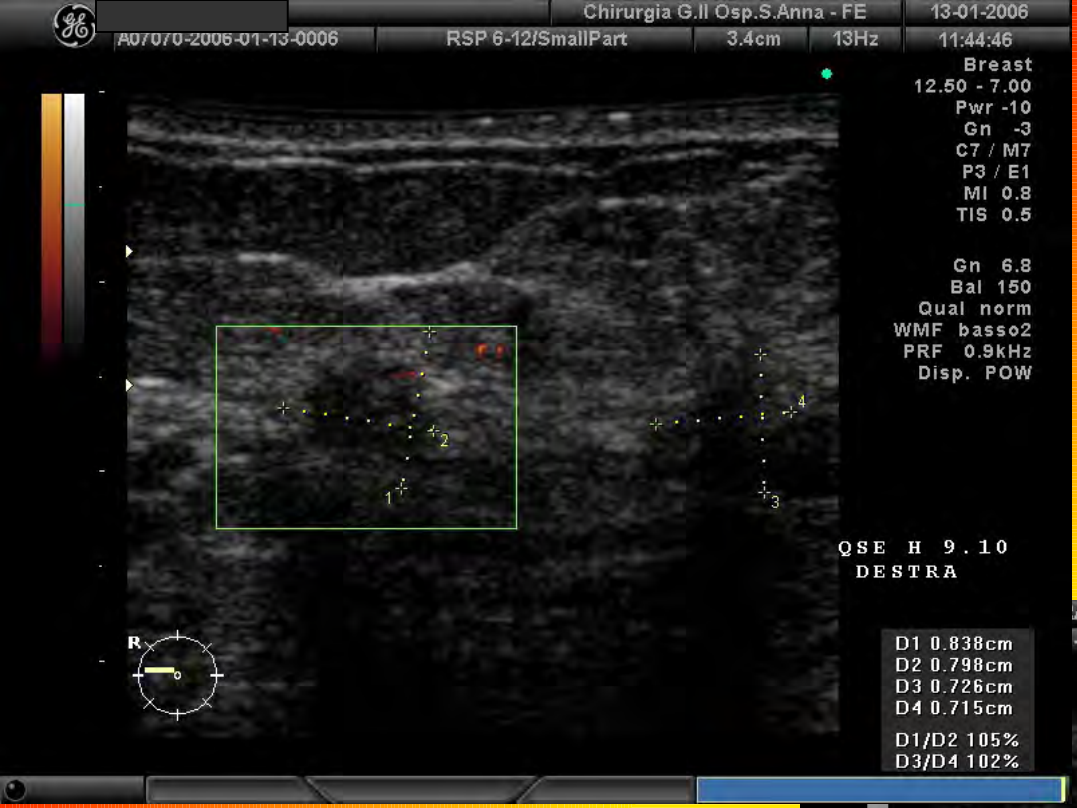
The best estimate of tumor size results from correlating imaging and histologic data which reduces over and underestimation.

Invasive and noninvasive components must be measured. The prognostic value of tumor size depends on the size of invasive components but the size of the entire lesion is useful in decision making about breast conservative surgery.



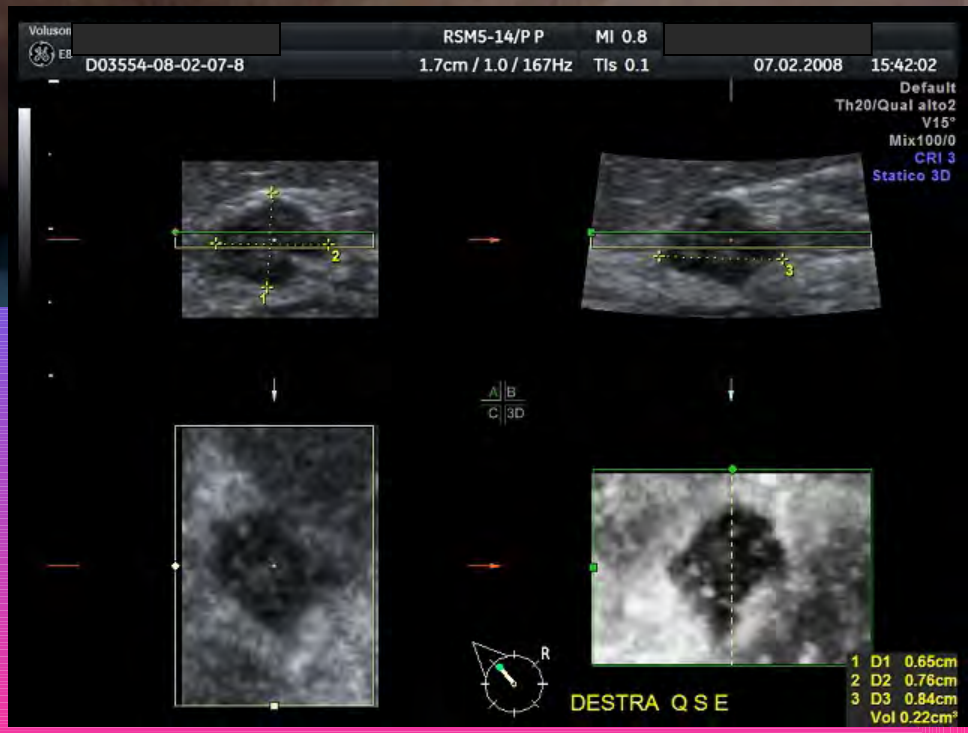
Breast US is a valuable tool for cancer staging but an adequate training is mandatory. Trained physician should be allowed and encouraged to use this technique without arbitrary limitations due to medical specialty

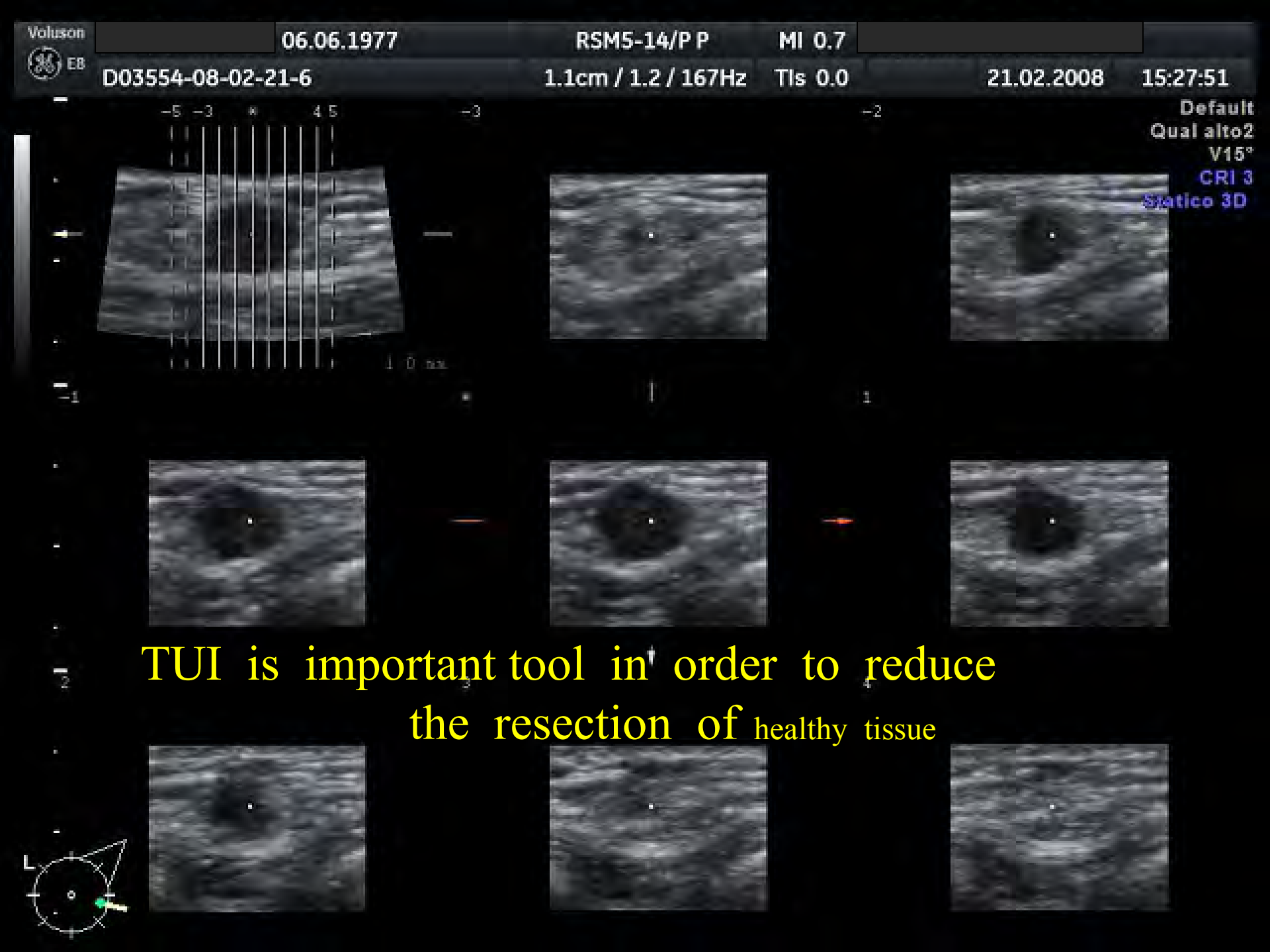



Chirurgia G.Il Osp.S.Anna - FE
13-01-2006
A07070-2006-01-13-0006
RSP 6-12/SmallPart
3.4cm
13Hz
11:44:46
Breast
12.50 - 7.00
Pwr -10
Gn -3
C7 / M7
P3 / E1
MI 0.8
TIS 0.5
Gn 6.8
Bal 150
Qual norm
WMF basso2
PRF 0.9kHz
Disp. POW
QSE H 9.10
DESTRA
R
D1 0.838cm
D2 0.798cm
D3 0.726cm
D4 0.715cm
D1/D2 105%
D3/D4 102%


Chirurgia G.Il Osp.S.Anna - FE
13-01-2006
RSP 6-12/SmallPart
3.4cm
31Hz
11:46:57
Breast
12.50 - 7.00
Pwr -8
Gn -3
C7 / M7
P3 / E1
MI 0.8
CAP
QSE H 9.10
DESTRA
R
D1 0.310cm
D2 1.21cm
D1/D2 26%

Lesion may be studied with 3D-4D transducer operating at 7 - 14.50 MHz. This tranducer allows to have a Tomographic Ultrasound Imaging that displays multiple parallel slices within a volume data set.




Voluson
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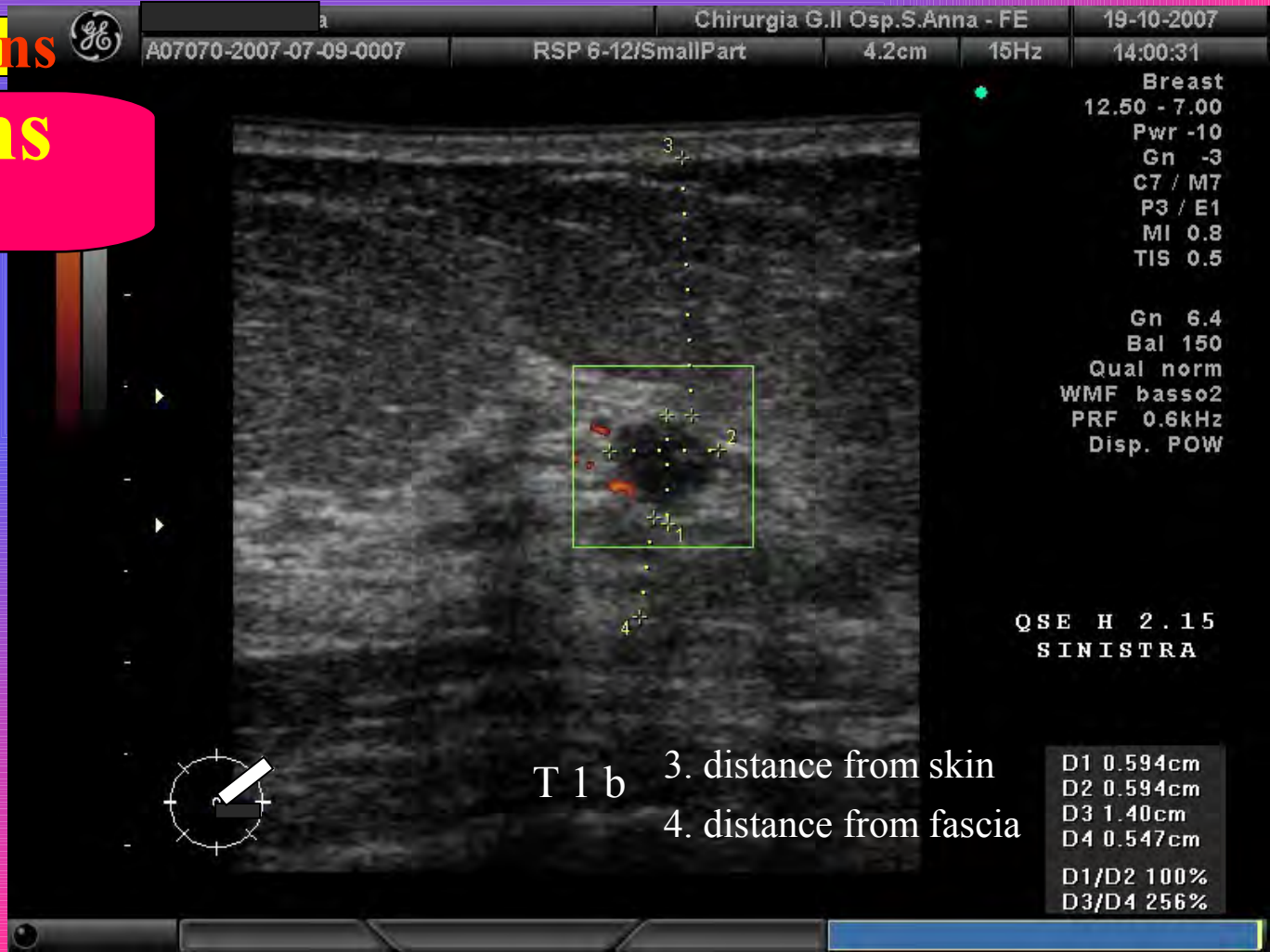
RSM5-14/P P
MI 0.7
D03554-08-02-21-6
1.1cm / 1.2 / 167Hz
TIs 0.0
21.02.2008
15:27:51
Default
Qual alto2
V15°
CRI 3
Slatico 3D
TUI is important tool in order to reduce
the resection of healthy tissue

For therapeutic, oncologically radical and anatomically correct surgery, preliminary parameters of lesions are necessary:

- Stage the lesions

Dimensions



T 1 b

3. distance from skin
4. distance from fascia

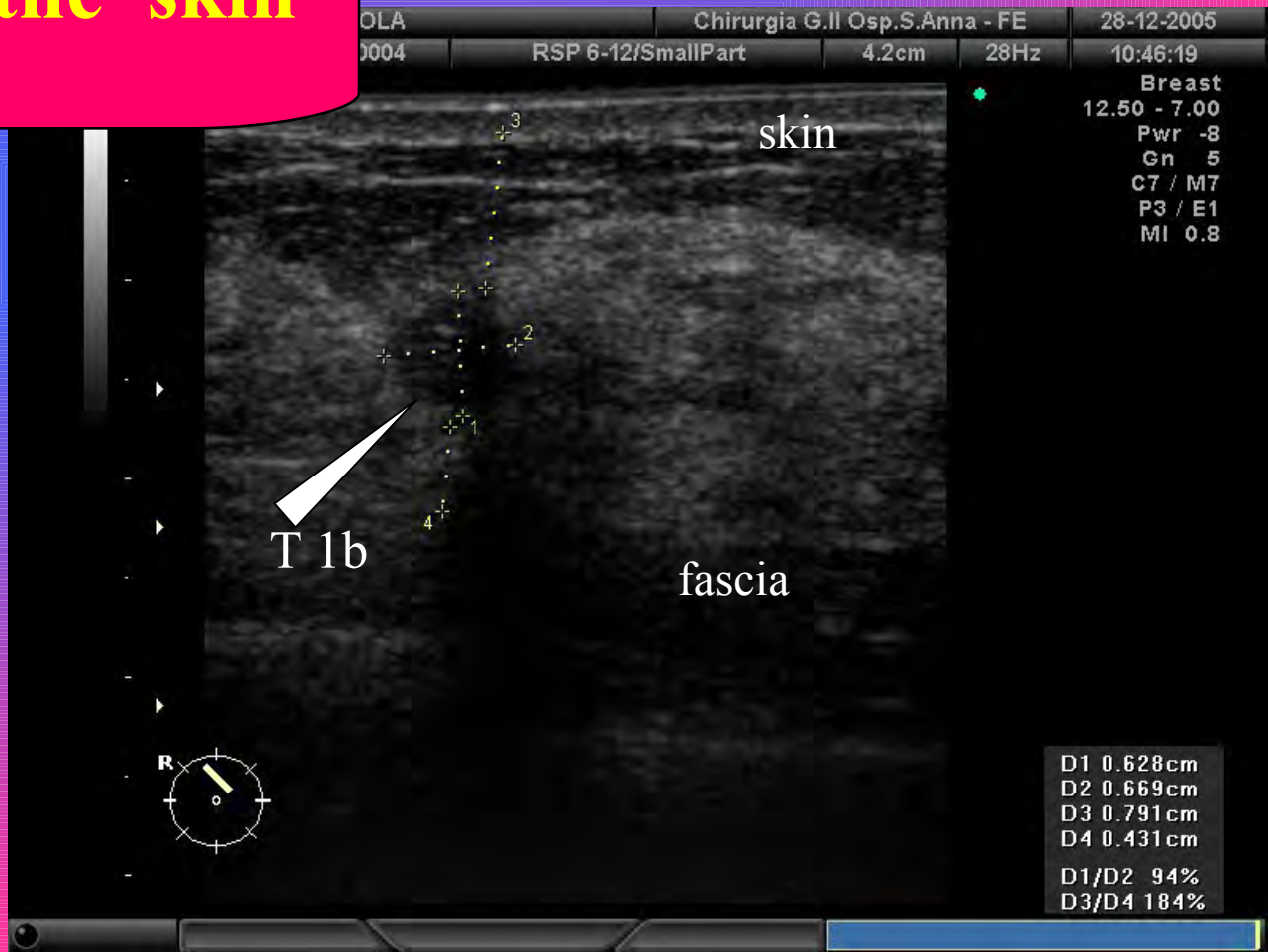
Secondary parameters for conservative, oncologically radical, cosmetic surgery :

Distance from the nipple

Secondary parameters for conservative, oncologically radical, cosmetic surgery:

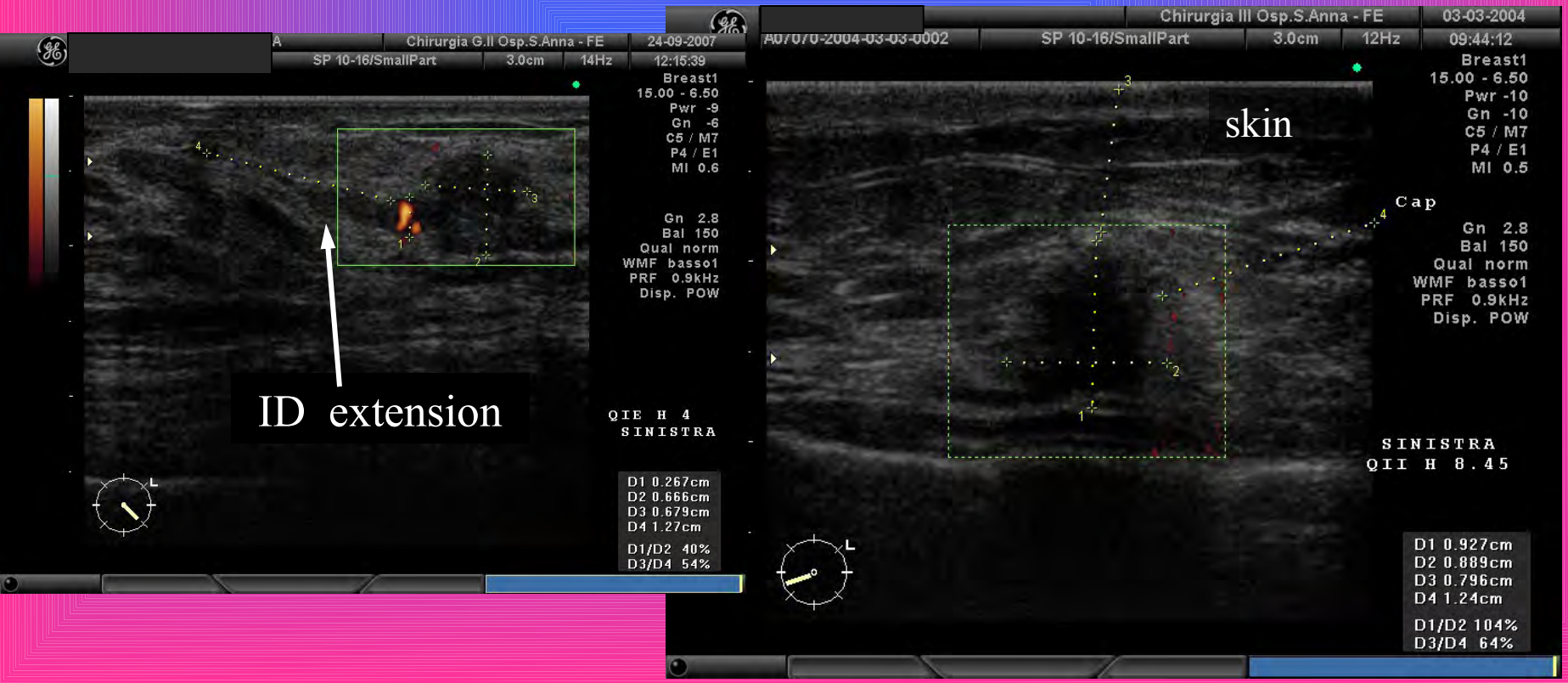
- Distance from the nipple

Distance from the skin



Secondary parameters for conservative, oncologically radical, cosmetic surgery :

- Distance from the nipple
- Distance from the skin



Secondary parameters for conservative, oncologically radical, cosmetic surgery :

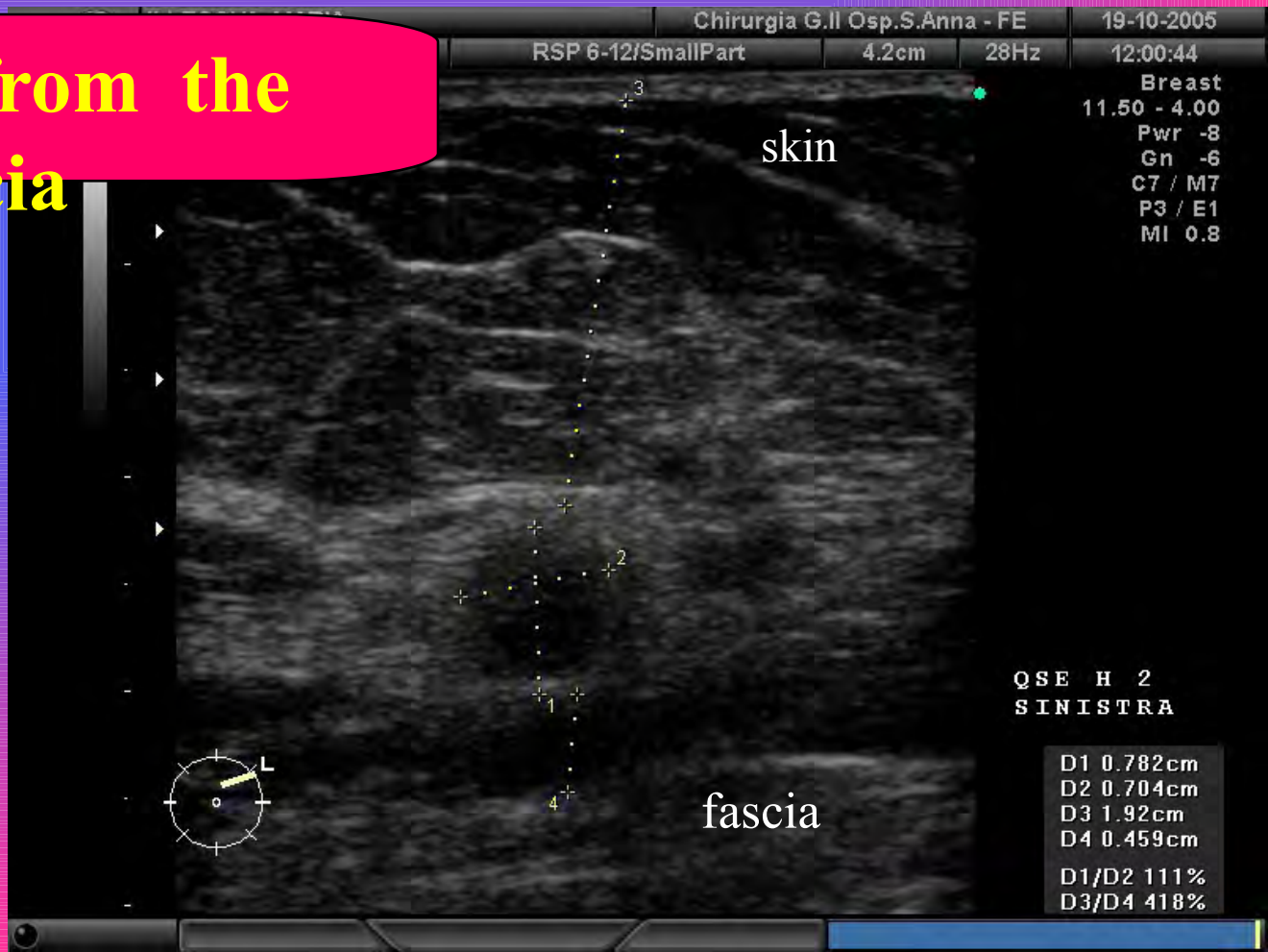
- Distance from the nipple
- Distance from the skin

When the skin is very near to the tumor we must remove the skin in front of the tumor using mostly a double curvilinear incision according the Langer lines.

Secondary parameters for conservative, oncologically radical, cosmetic surgery :

- Distance from the nipple
- Distance from the skin

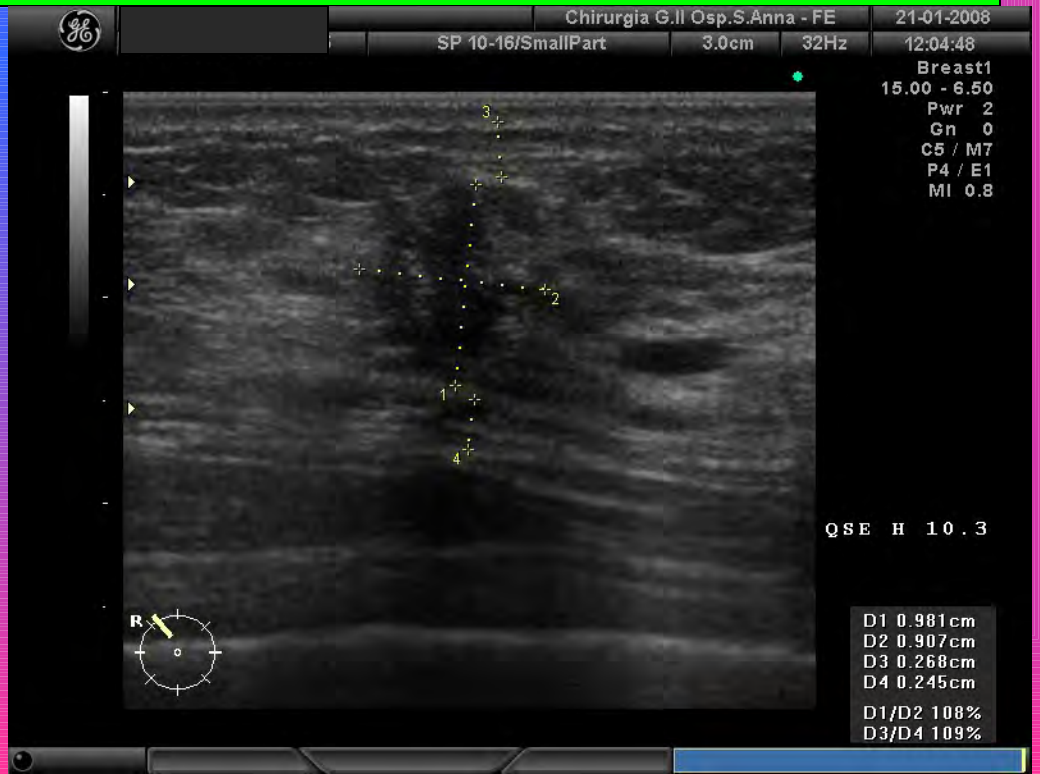
Distance from the fascia



Secondary parameters for conservative, oncologically radical, cosmetic surgery :

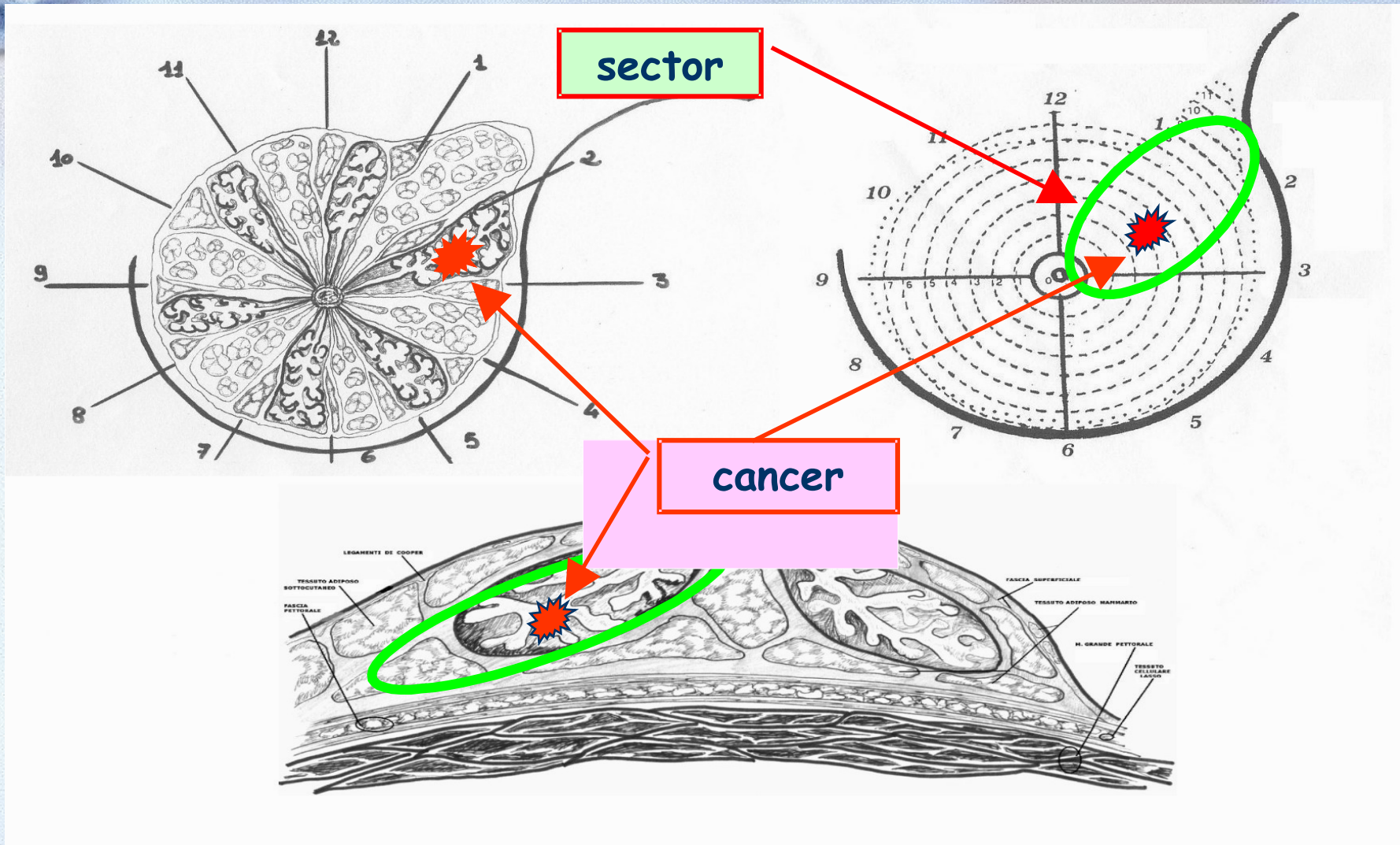
- Distance from the nipple
- Distance from the skin
- **Distance from the pectoralis fascia**

Pectoralis fascia is a different anatomic entity from the deeper layer of superficial fascia that envelop the breast tissue. Behind this there is a retromammary fat layer and than the pectoralis fascia

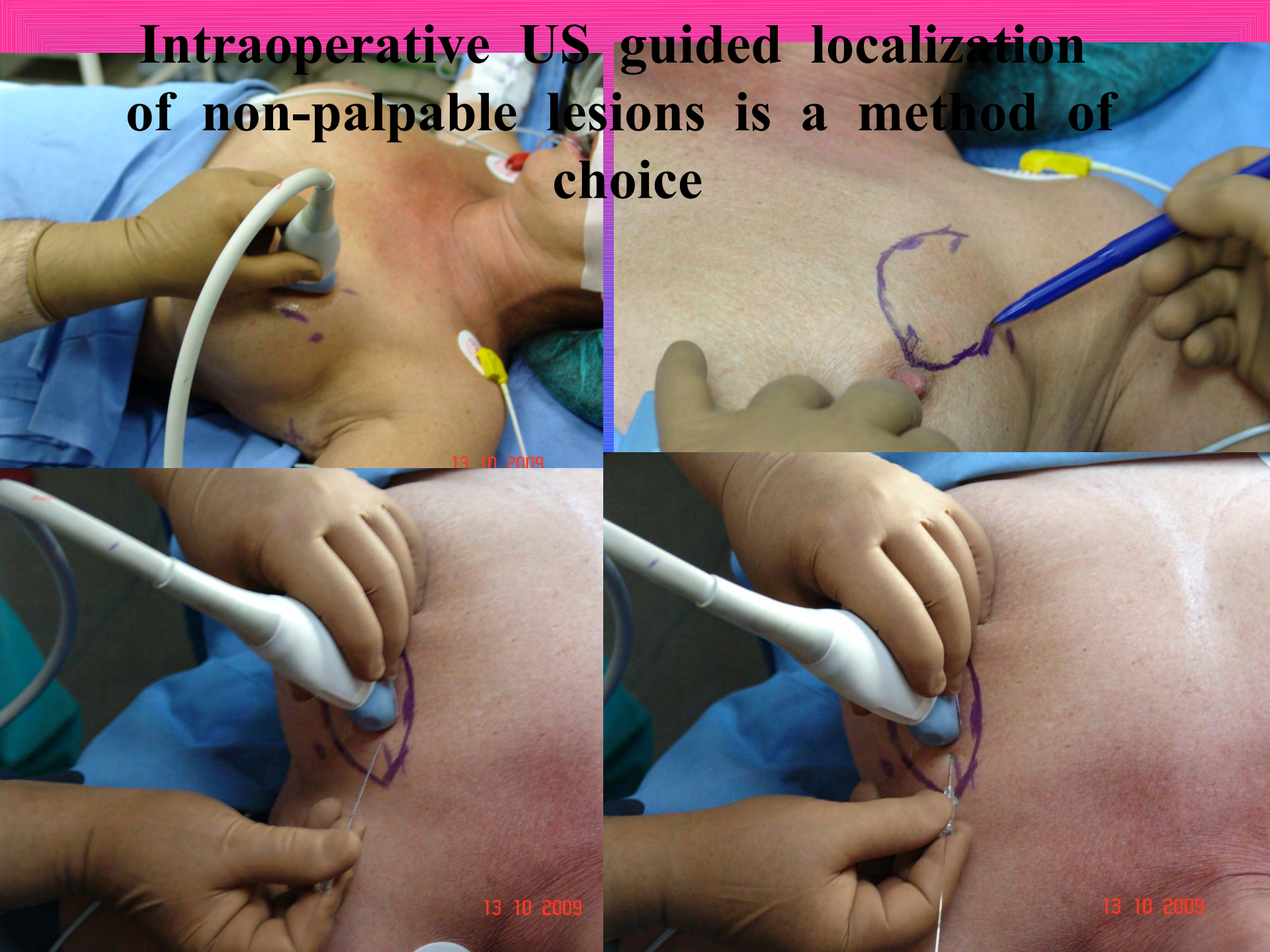


Sectoriectomy

According the lobar anatomy



Intraoperative US guided localization of non-palpable lesions is a method of choice

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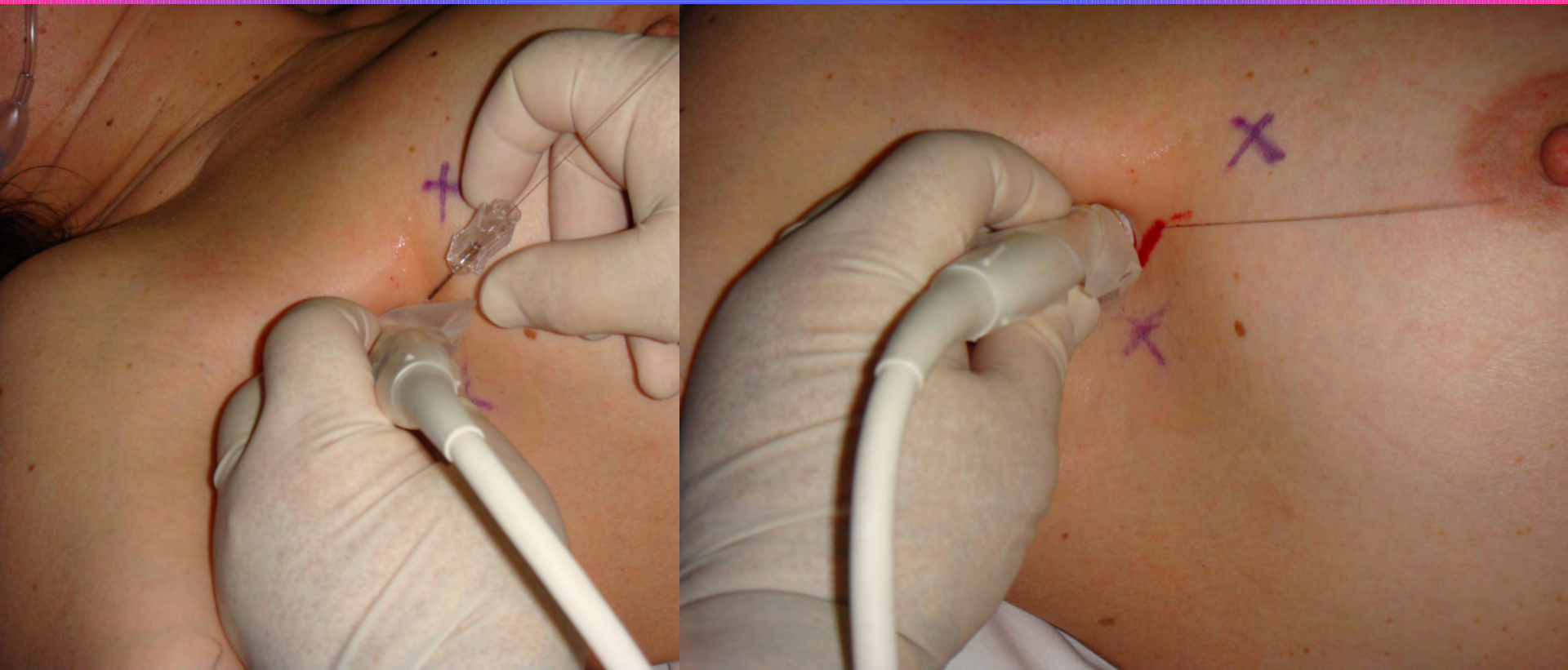
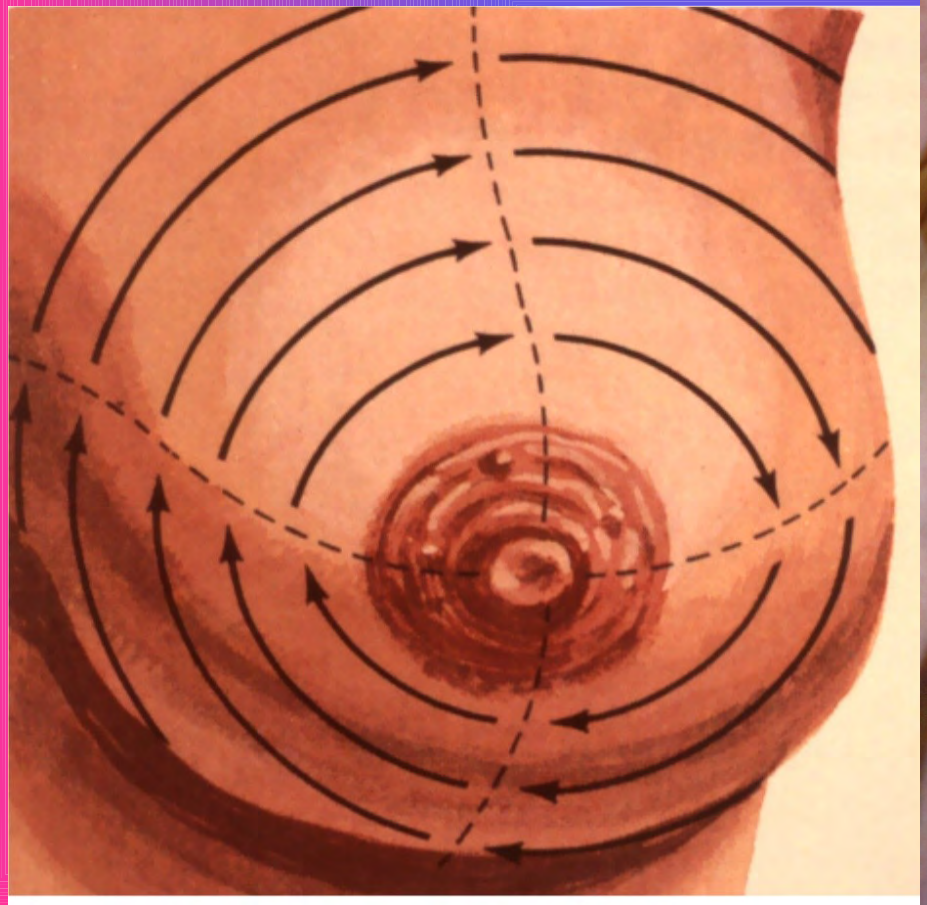
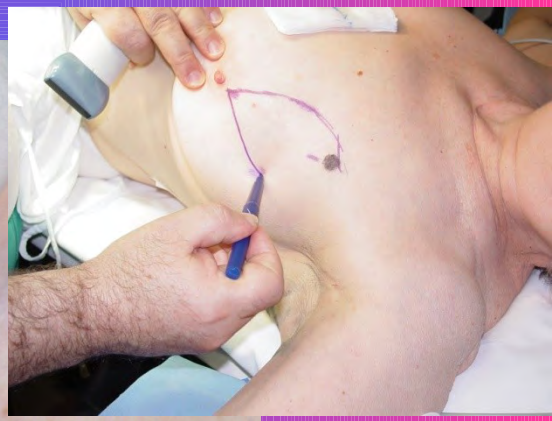
US sentinel node is localized at the beginning of surgical procedure by hook-wire



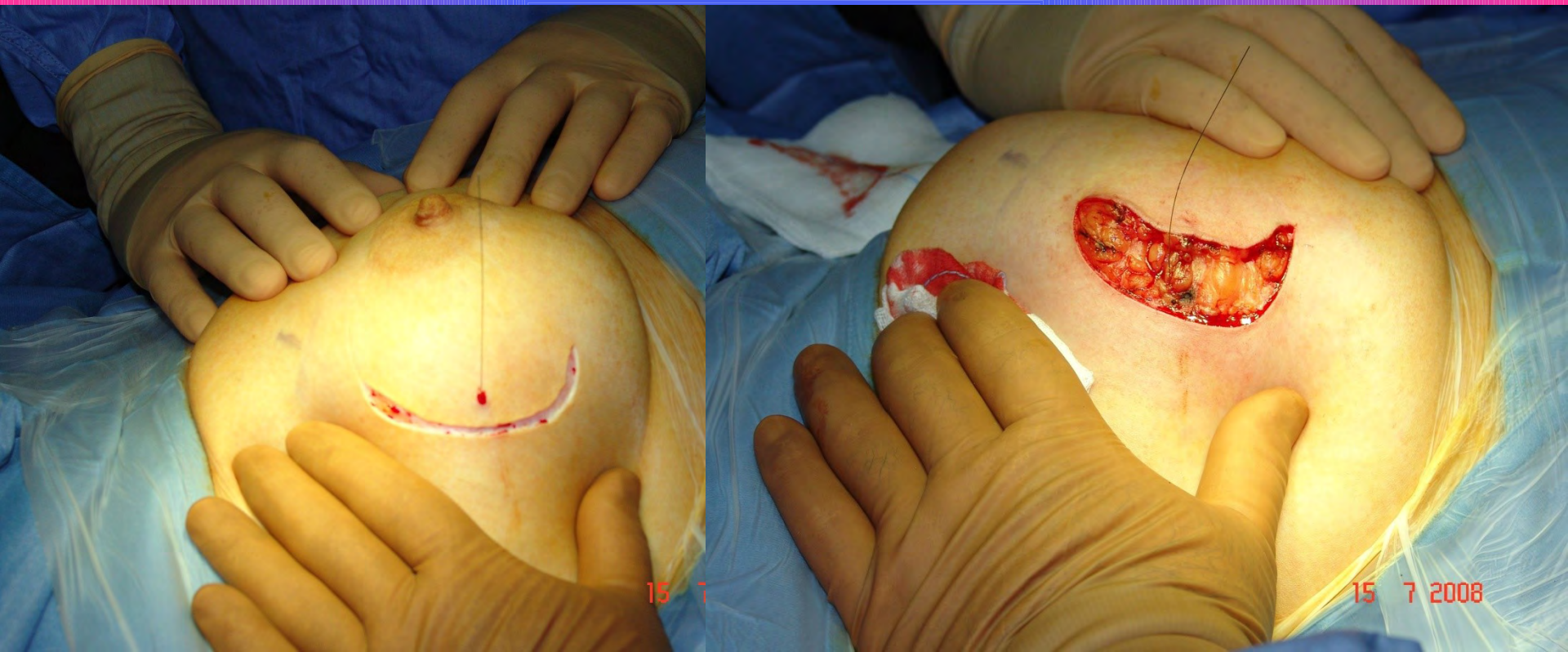
Surgical planning is based on the echographic assessment of lesion and adjacent tissue in radial scans with multifrequency transducer ope- rating at 8-18MHz and with 3D-4D scans with transducer operating at 7.10-14.50 MHz. we draw on the skin the extension of the lobe and plan the most advantageous incision always according the Langer lines and the resection of breast tissue according the lobar anatomy described by Craig and Towsend.



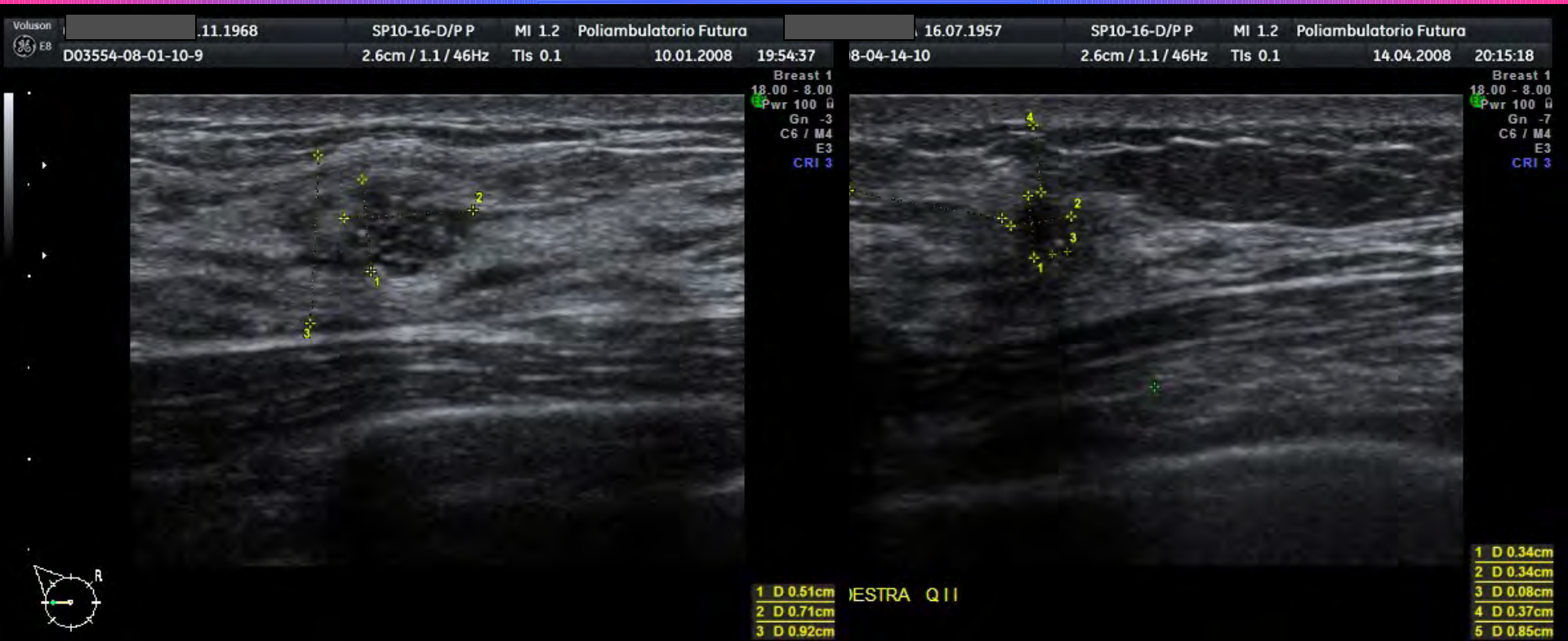


Limits of resecting lobes are depicted on the skin

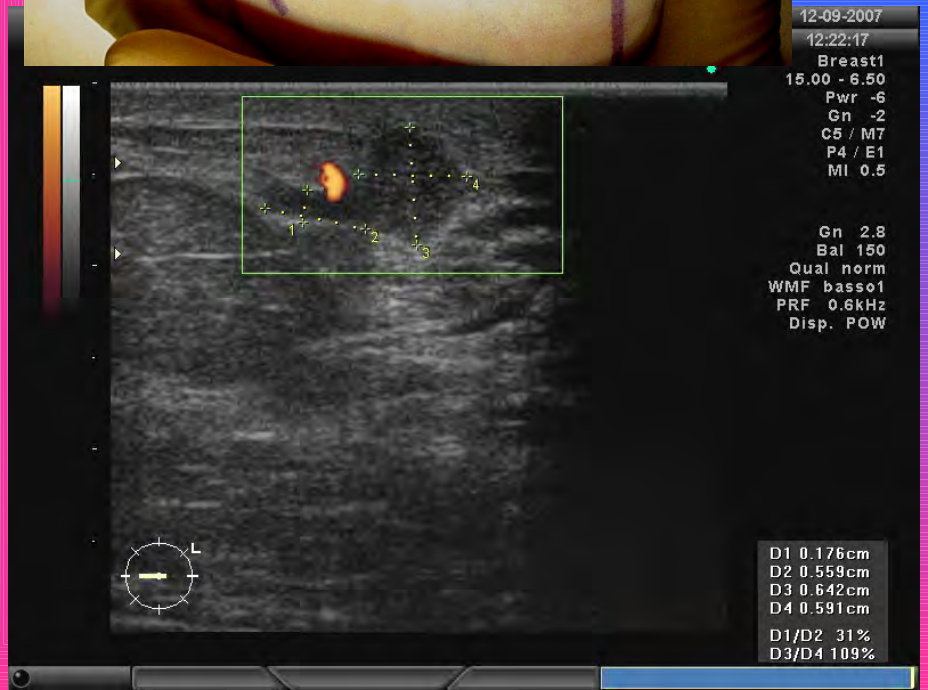
Skin incision is made by curvilinear incision according the Langer's lines parallel to the periareolar line

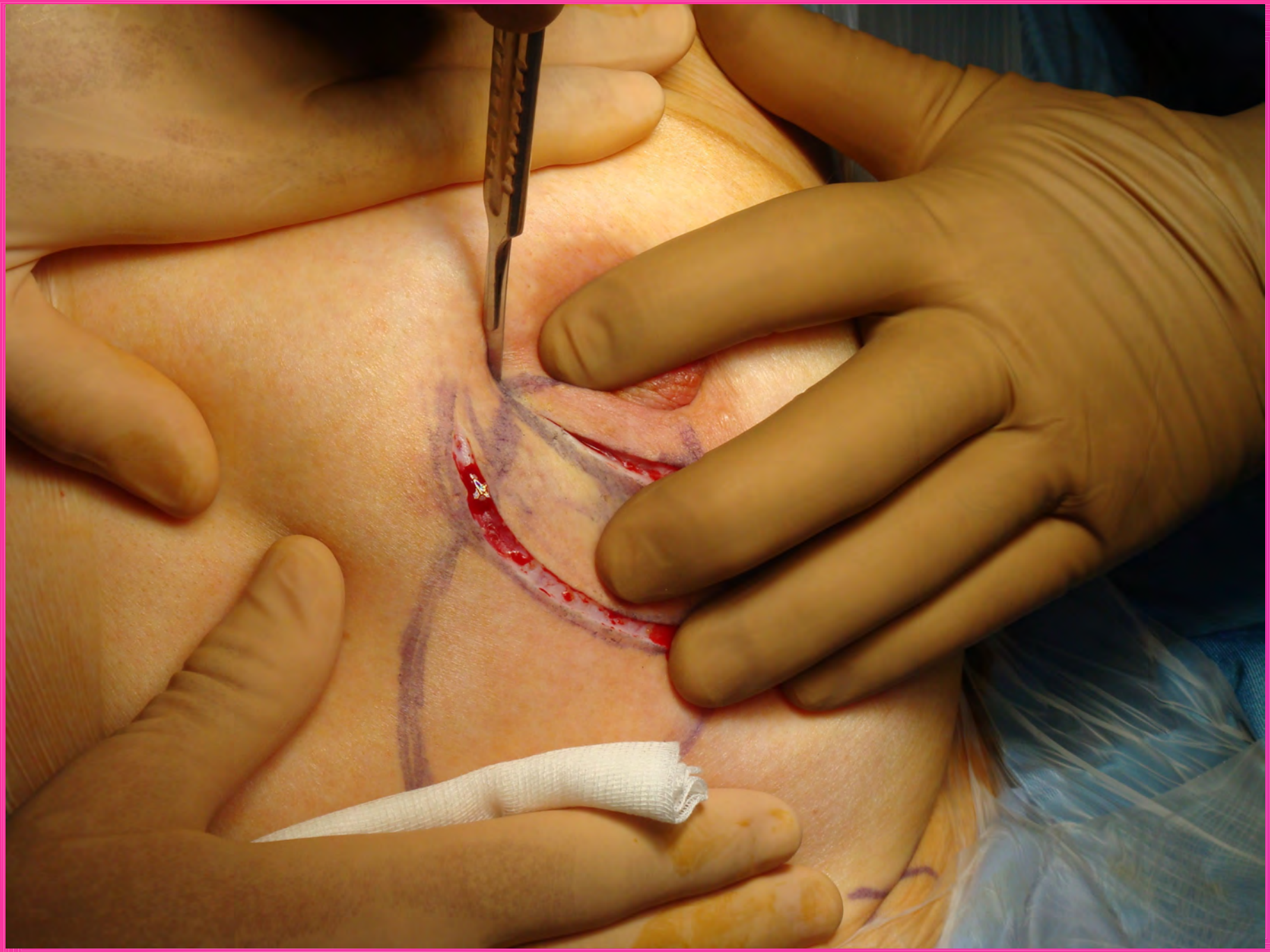


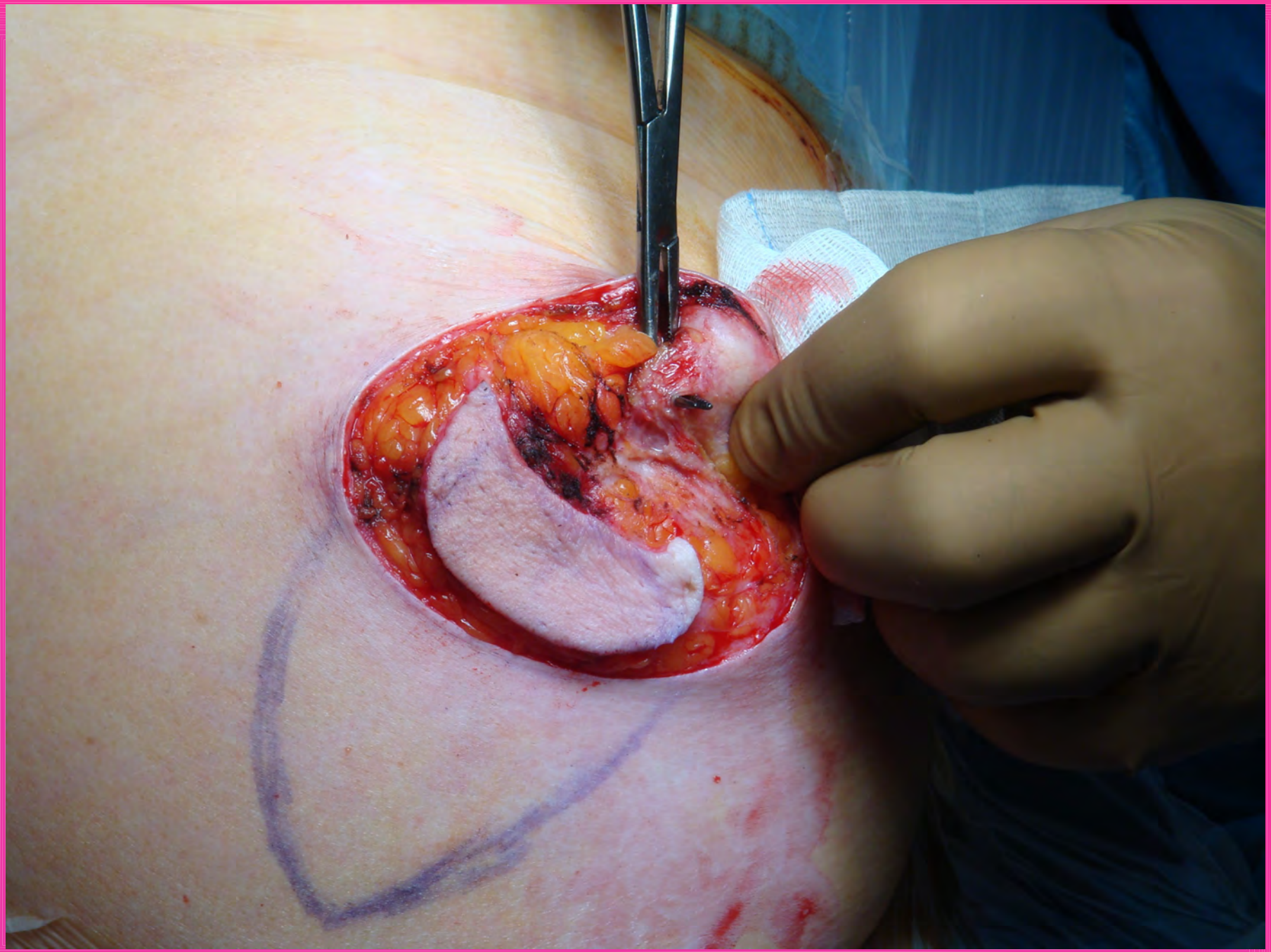
Single or double curvilinear incision depends on the distance of tumor from the skin. If the tumor is far from the skin more than 5mm and the superficial layer of the superficial fascia is free of distortion or disruption we don't remove the skin so that we perform a single curvilinear incision and always when it is possible we perform a peri-areolar incision even if this requires more time to dissect the tissue until the periphery.



If the tumor is near to the skin or the fascia superficial layer is altered we perform a double curvilinear incision and remove the skin in front of the tumor.

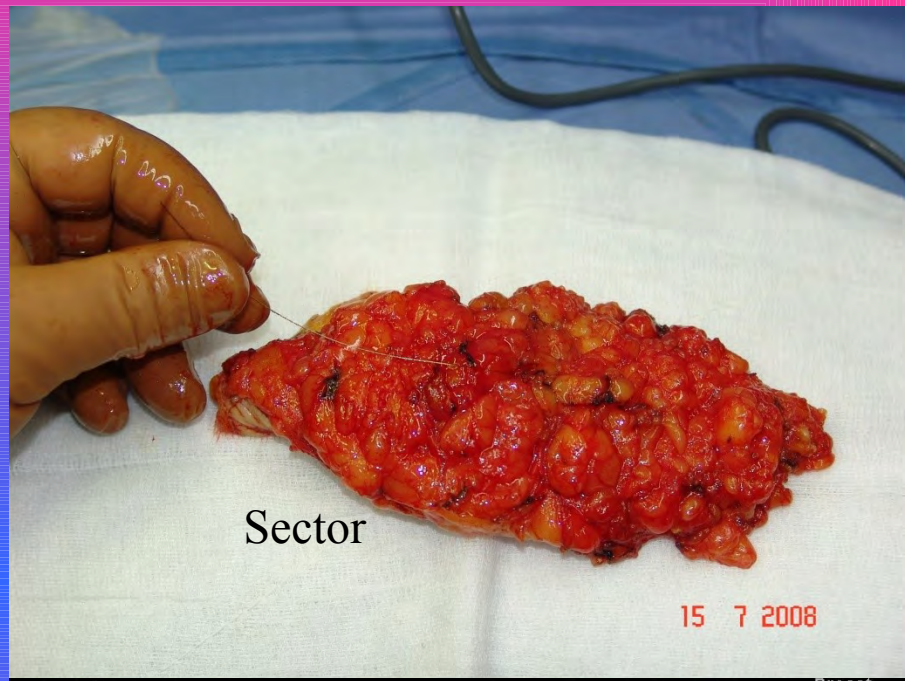


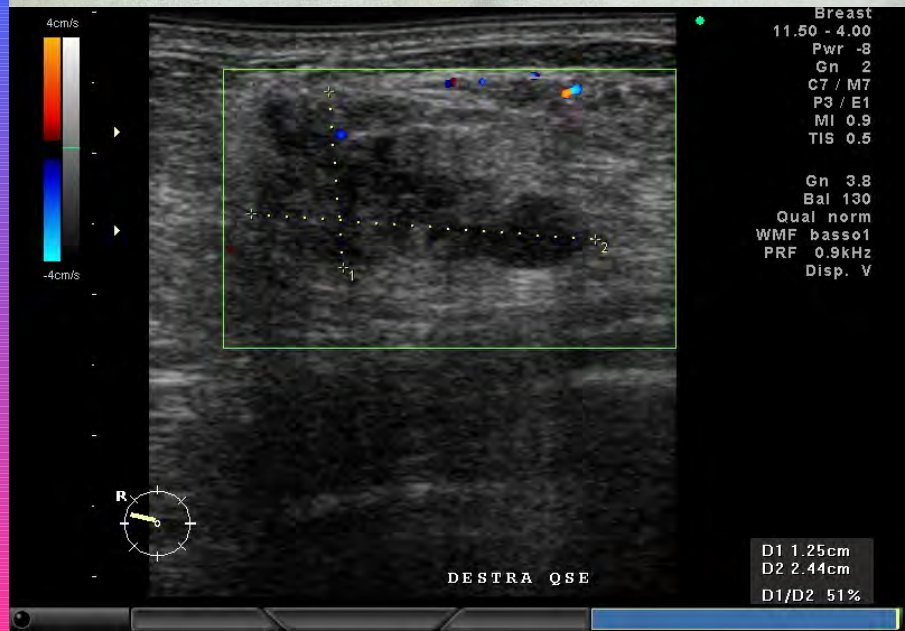


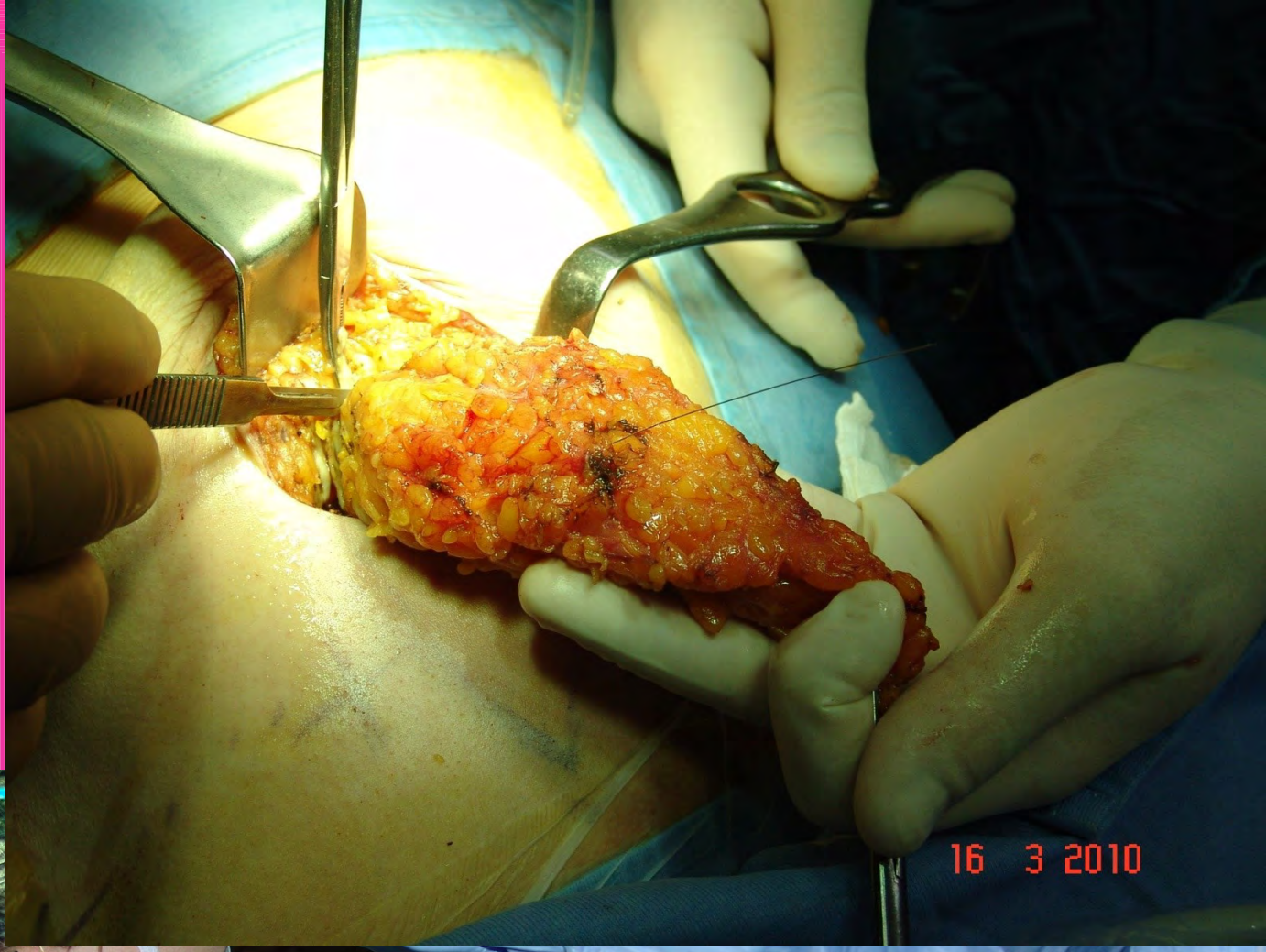


The role of modern breast surgeon must not be only that of resector but He should be able to

- **Guide biopsy**
- **Stage the lesions**
- **Inject R.labeled tracer**
- **Localize I.O. unpalpable**
- **Guide Surgery according Anatomy**
- **Assess Specimen Margins**
- **Guide Para-Surgical Procedures**



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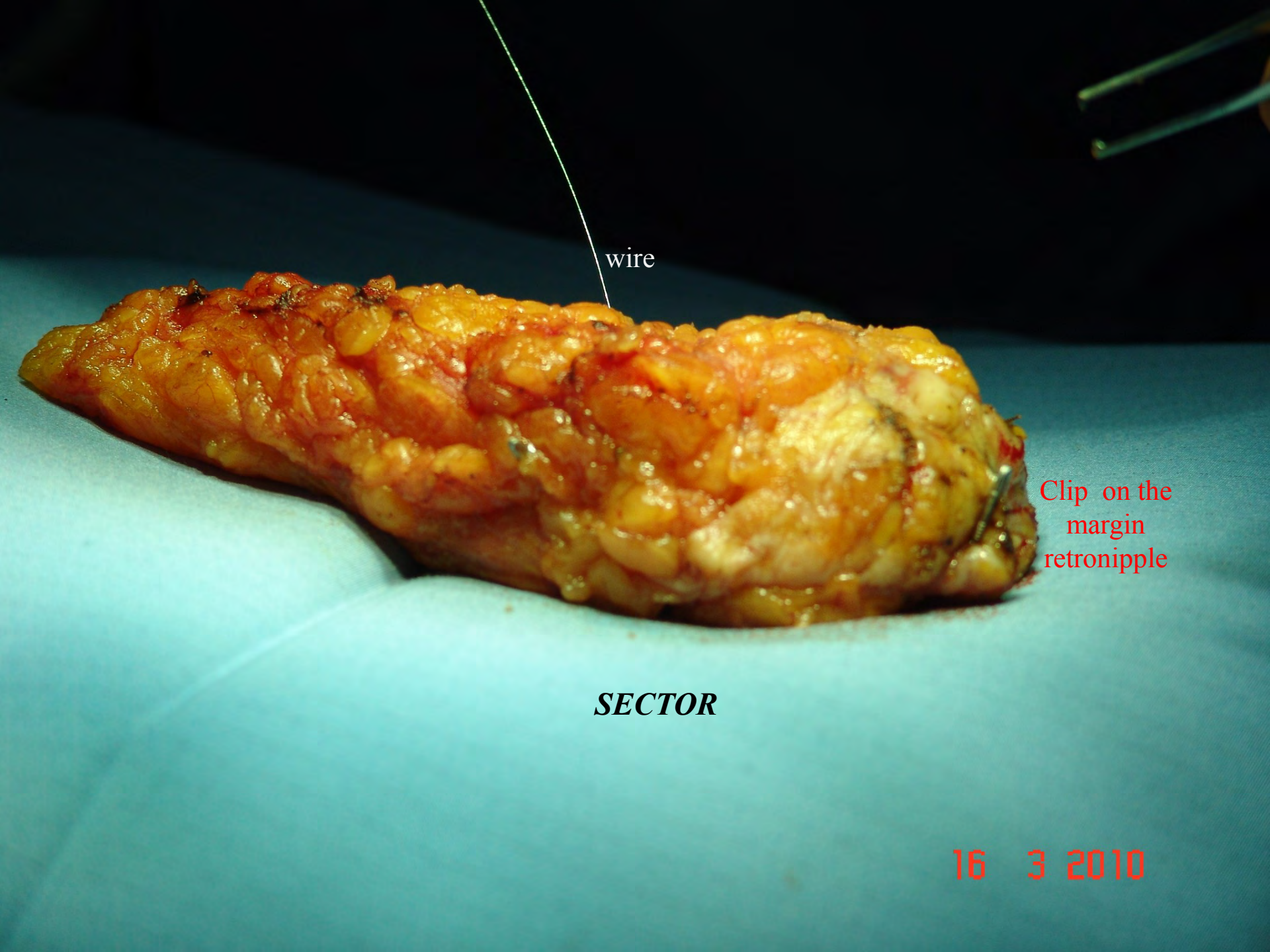
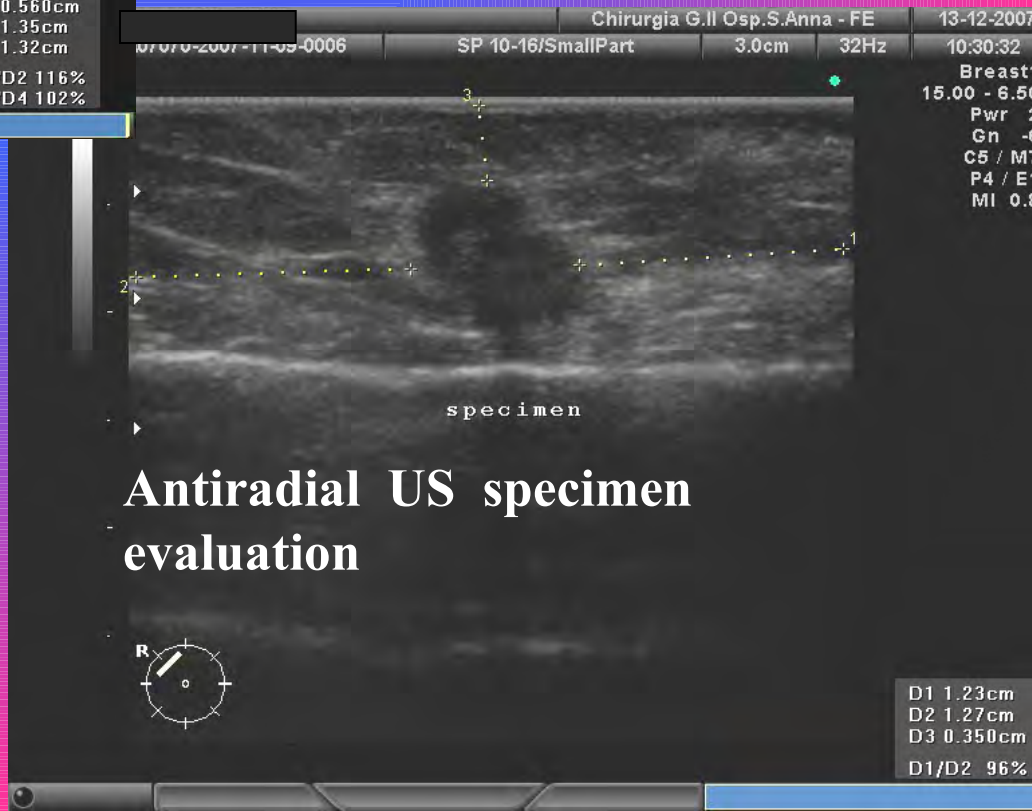


SECTOR

An US image of the resected specimen immediately allows the surgeon to visualize the presence of lesion, the adequate lateral margins that may benefit, eventually, from immediate reexcision. This does not exclude the option of specimen radiography that we perform with Faxitron equipment side to the operating room in case of microcalcifications.


21 4 2011

Antiradial US specimen evaluation



Antiradial US specimen evaluation

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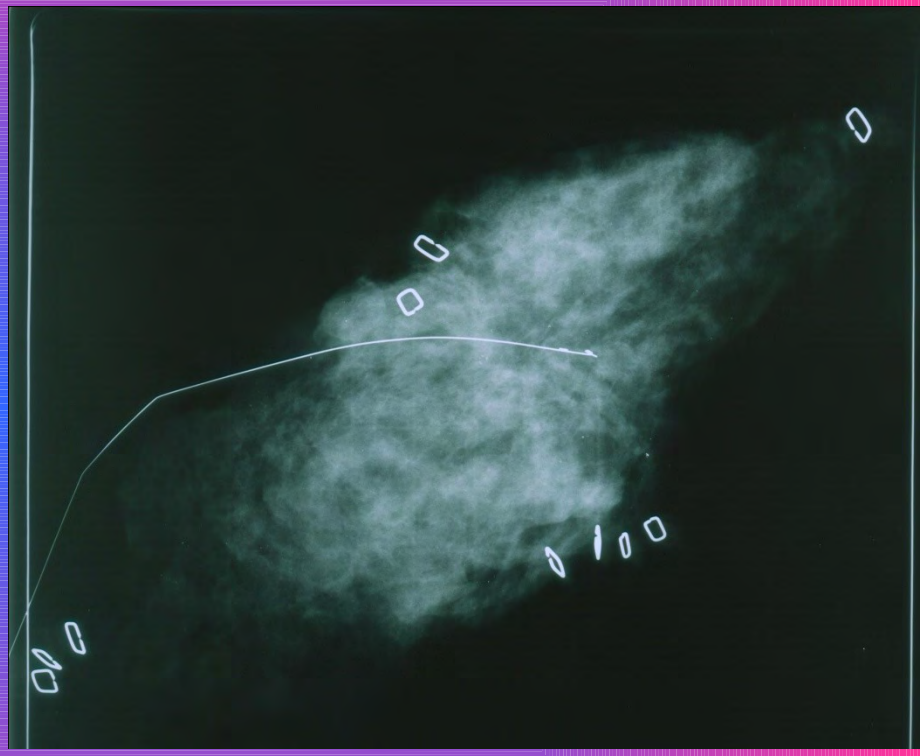
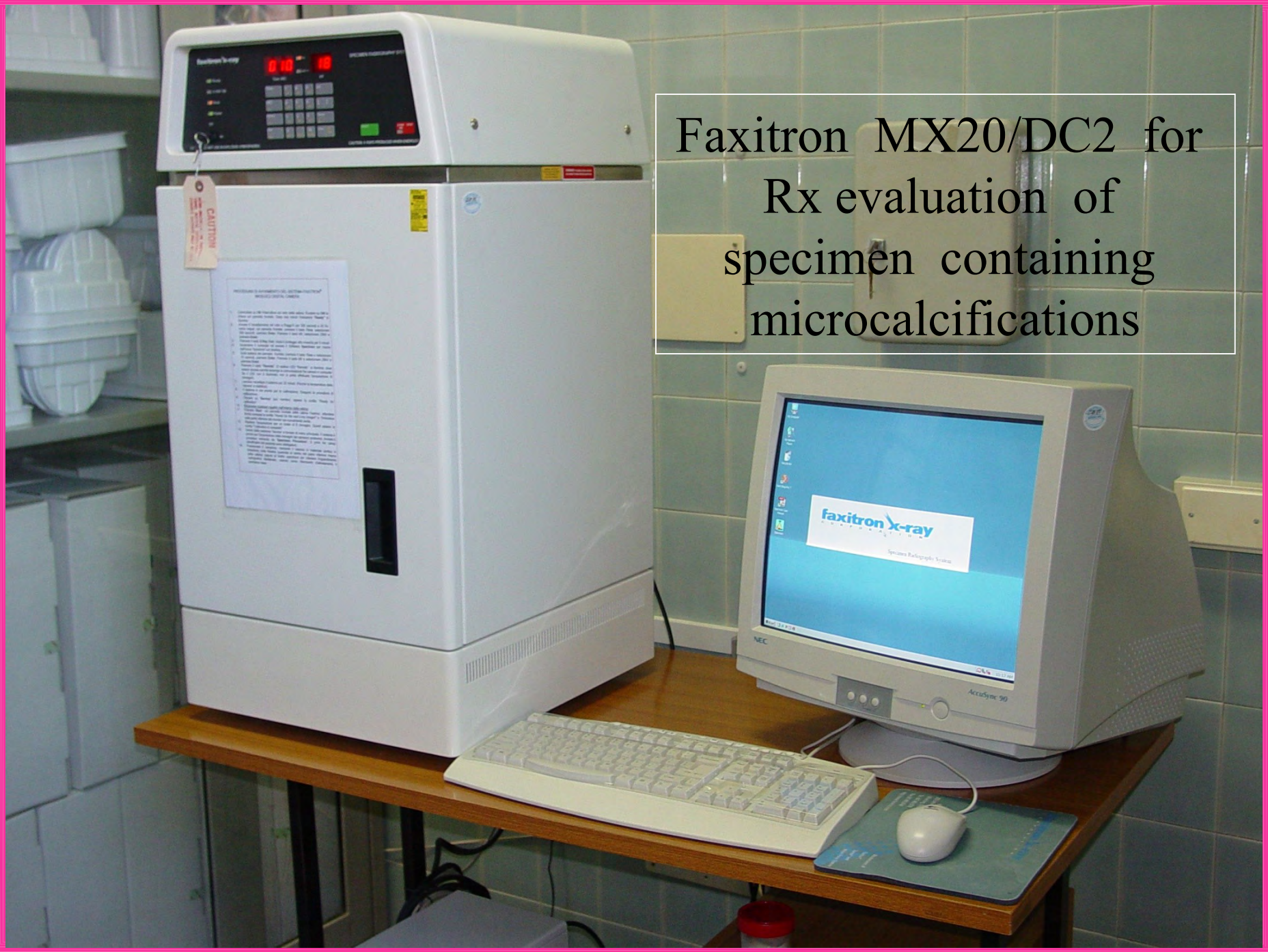
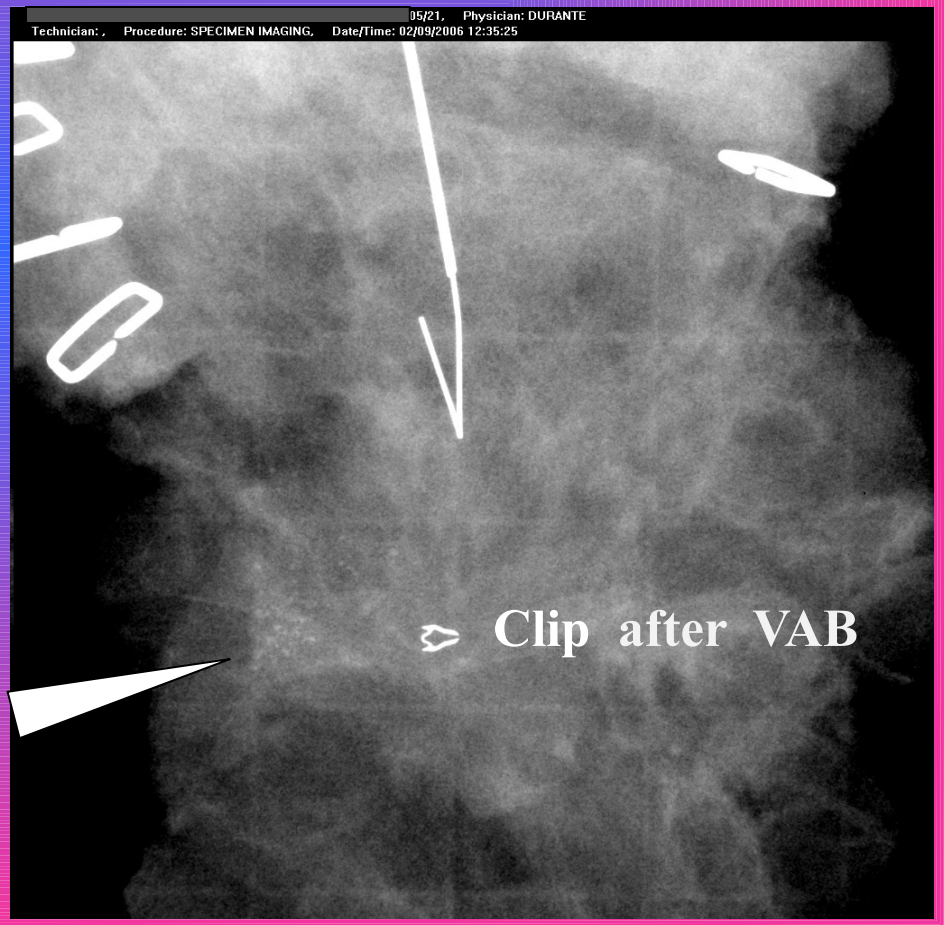


with Faxitron in case of microcalcifications or clip after VAB


Faxitron MX20/DC2 for Rx evaluation of specimen containing microcalcifications
faxitron X-ray
CAUTION

If indicated by specimen US or X-Ray the lateral margins are extended intraoperatively but in our experience this comes very few times only for diffuse microcalcifications

Residual microcalcifications near to the margin




Physician: DURANTE
11:30:29
Margin re-excision without microcalcifications

Surgical bed of resected sector is US evaluated by 8-18 MHz transducer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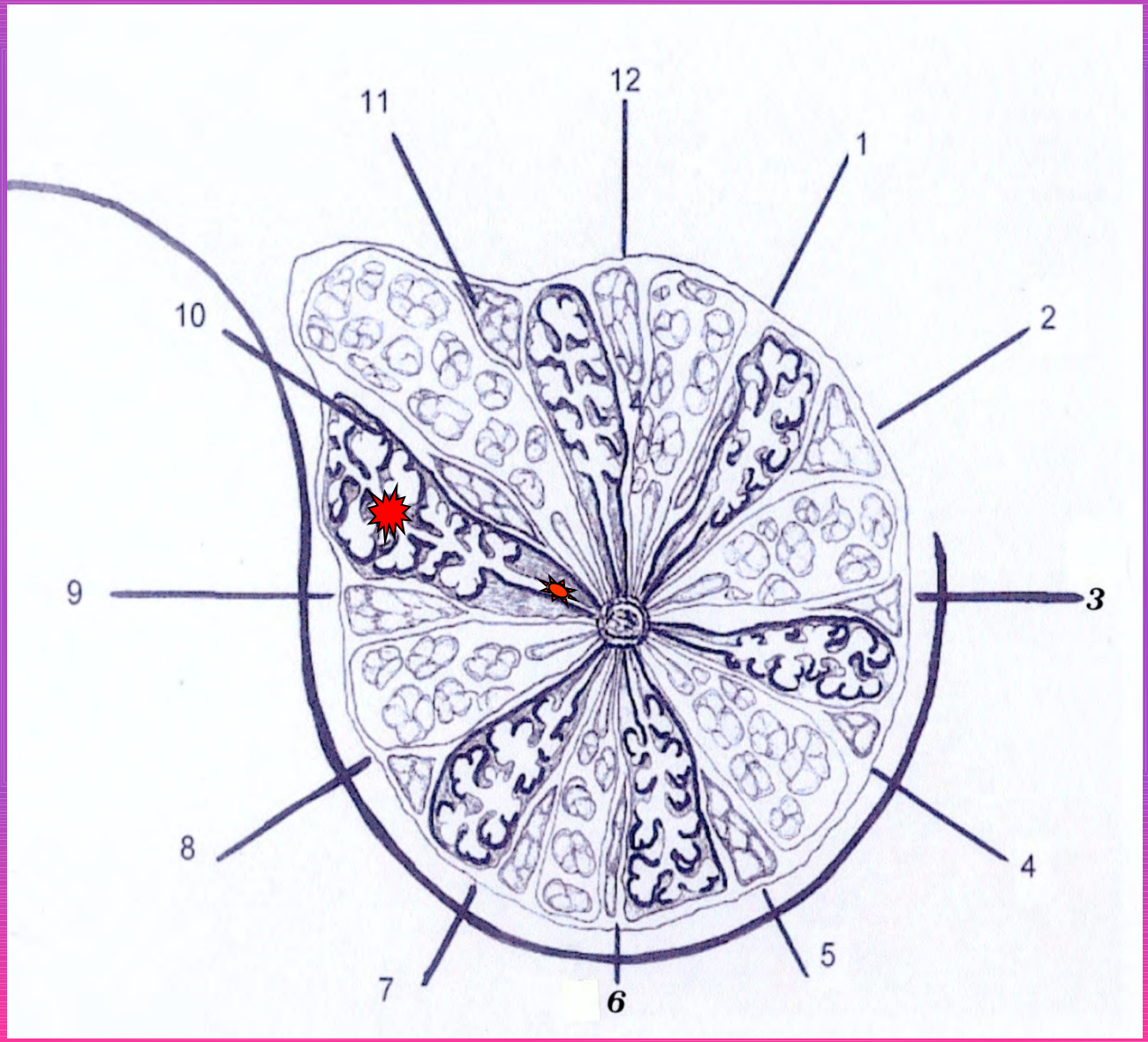
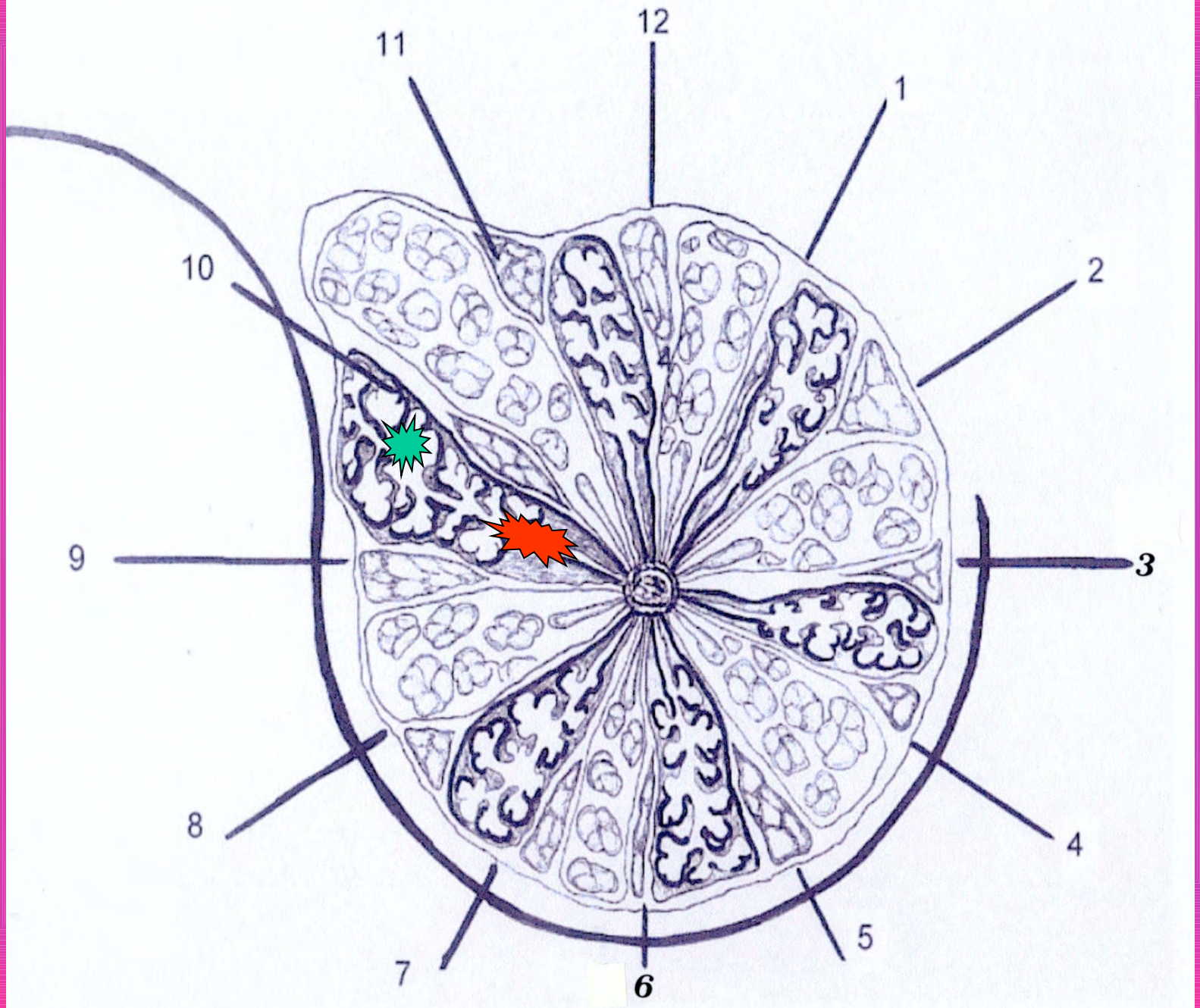
The use of intraoperative US and the principles of the lobar anatomy we avoid to leave in place small foci of cancer along the major axis of the sick lobe

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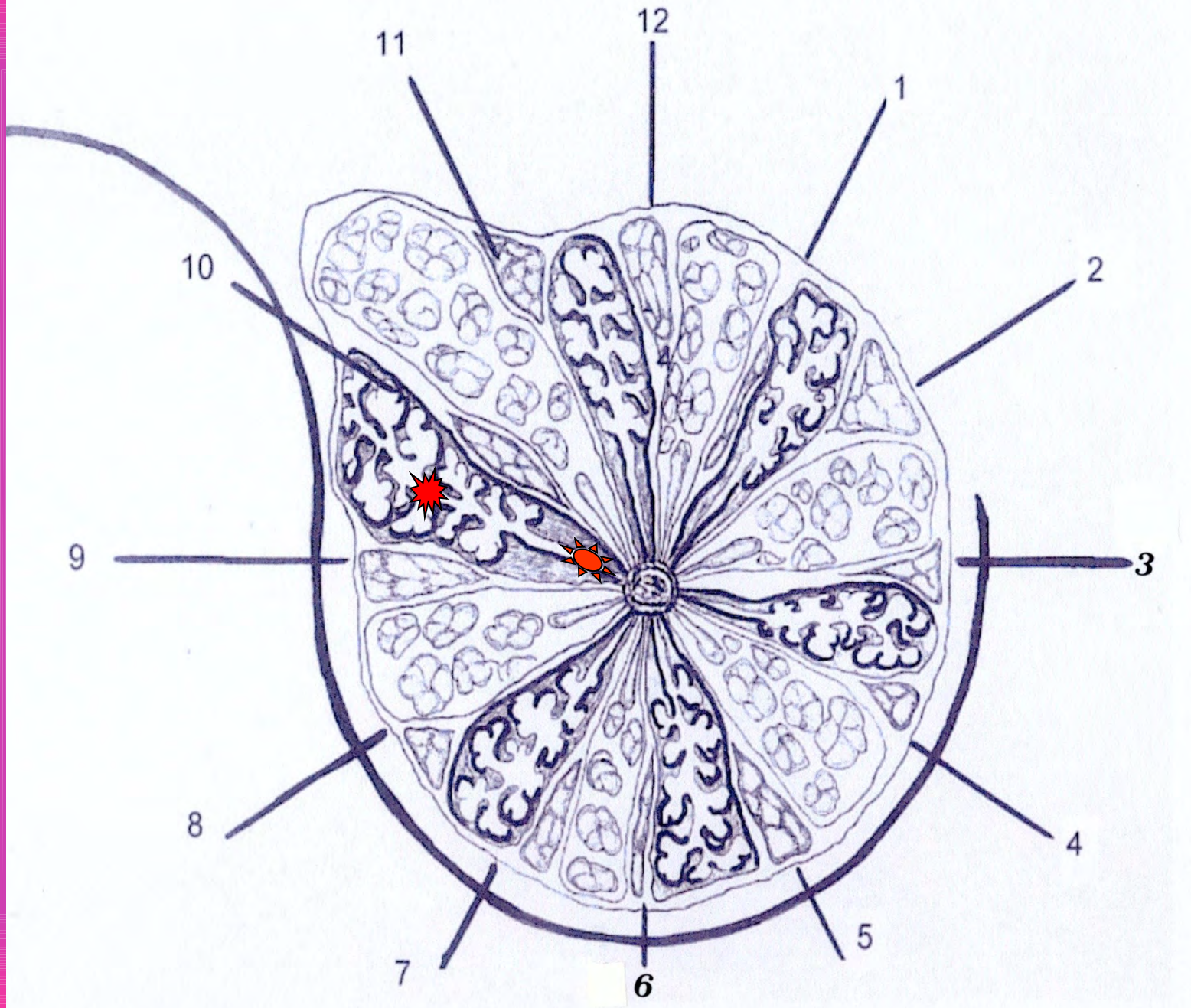
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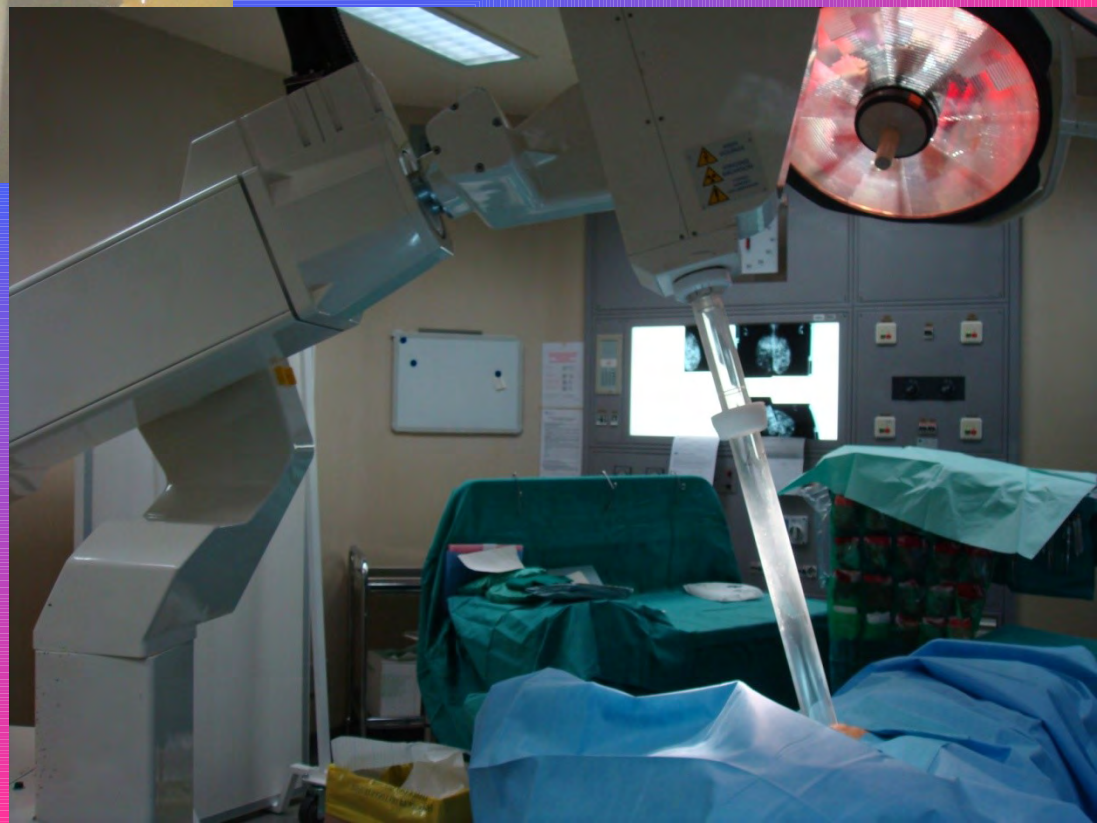
The use of IntraOperative US becomes more and more useful with the increasing use of IORT



Distant Cosmetic Results

Distant Cosmetic Results


8 4 2009

Distant Cosmetic Results

Contra-indications to breast conservative surgery

- Tumor size vs breast volume
- Multicentricity
- Contraindications to breast irradiation
- Hereditary breast cancer

GROUP OF PAZIENTS WITH MINIMUM F-U OF 4 ys

AGE	N° of PATIENT
< 50	105
50-65	188
>65	113
min	30
max	84

DIMENSIONS	N° of PATIENTS
0-10mm	241 (59,5%)
11-20mm	127 (31,1%)
>20mm	38 (9,4%)

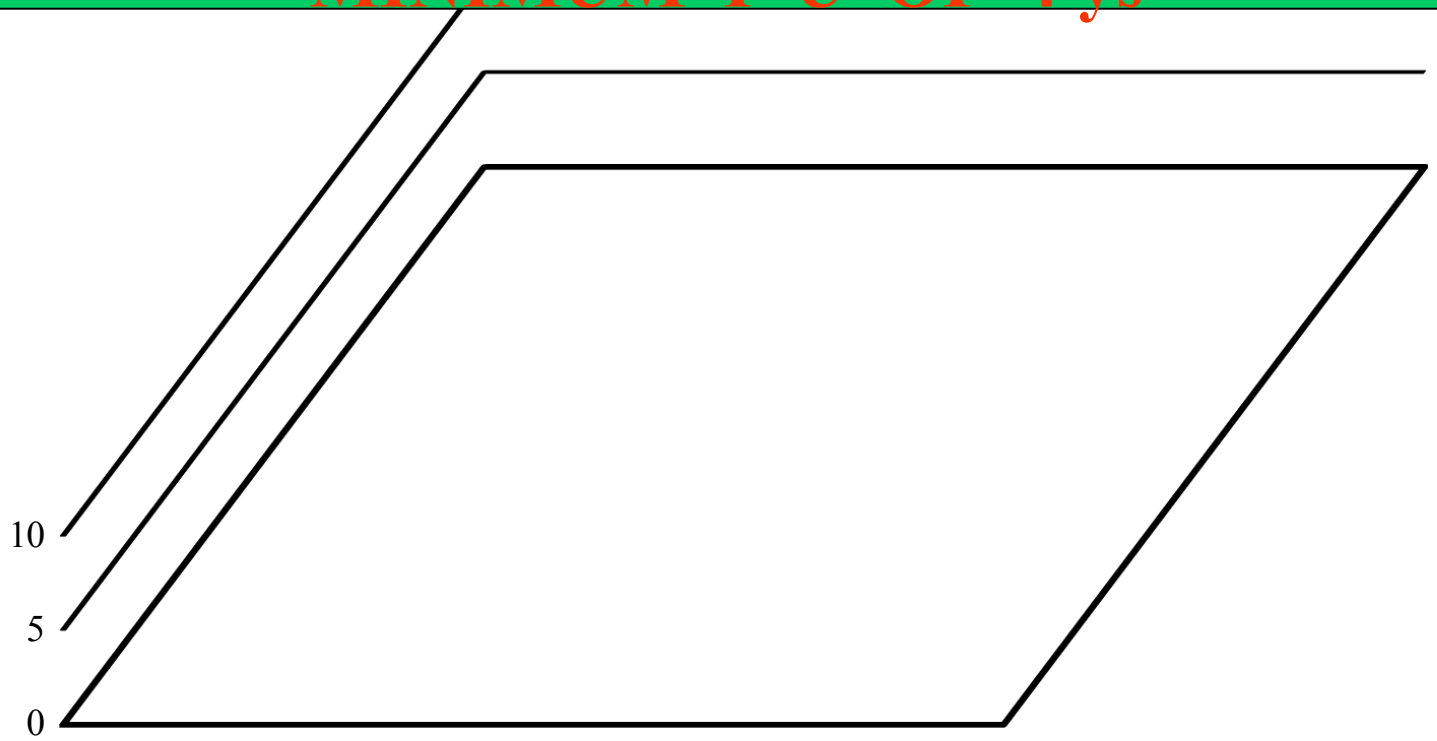
HISTOLOGY IN THE SAME GROUP

DCIS

~~INF. CA~~

RESULTS

RECURRENCES IN ONE GROUP WITH MINIMUM F-U OF 4 ys



ADVANTAGES OF US GUIDED SURGERY

- Indipendent planning of surgery according the lobar anatomy
- IO Localization
- Absence of needle dislocation
- Precise planning of incision
- Better anatomic orientation
- Less resection of breast tissue
- Less reintervention for axillary dissection (6%)
- Fewer recurrences (<1% absolute in 21 ys f-u)
- Less hospitalization (24 hours)
- Patient return sooner to a normal lifestyle
- Cosmesis is improved
- Better ratio cost/benefit

Surgical ultrasound in breast is still underused even if the high-end equipment used in the operating room is able to visualize the anatomy and architecture, to accurately localize lesions and guide the better planning

Ultrasound technology migrates very quickly and surgeons should be able to get the innovations for better treat an increasing number of patient

Surgeons should be well-educated and opened to a relatively innovative use of ultrasound in the operating room for breast surgery

INTERNATIONAL BREAST ULTRASOUND COURSE

FERRARA, ITALY

September 7 - 10, 2011

http://www.ibus.org