Stereotactic Breast Biopsy

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Principles of Stereotaxis

- Stereotaxis is defined as “Pertaining to or characterized by precise positioning in space.”
- A system of three dimensional coordinates for locating the target site.

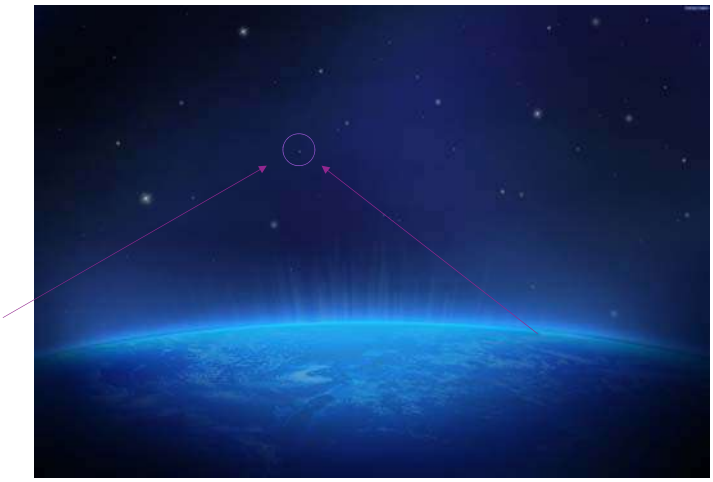
Disclosure

- No disclosures

Objectives

- Principles of Stereotaxis
- Keys to a successful biopsy
- Complications and troubleshooting
- Questions

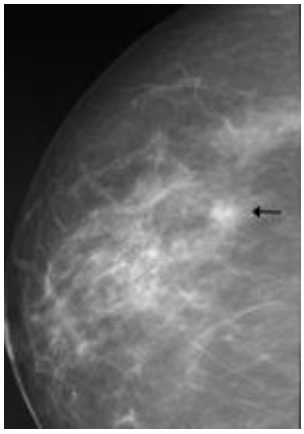
Precise Positioning in Space



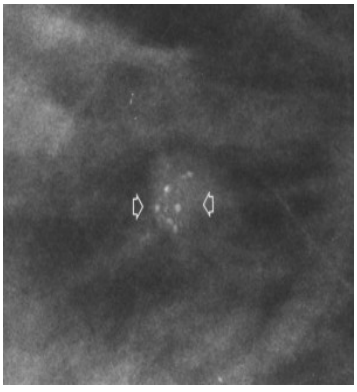
Breast Tissue Sampling

- Abnormality in the breast
- Non-palpable
- Lesion not seen with ultrasound
- Micro calcifications
- Tomo only finding

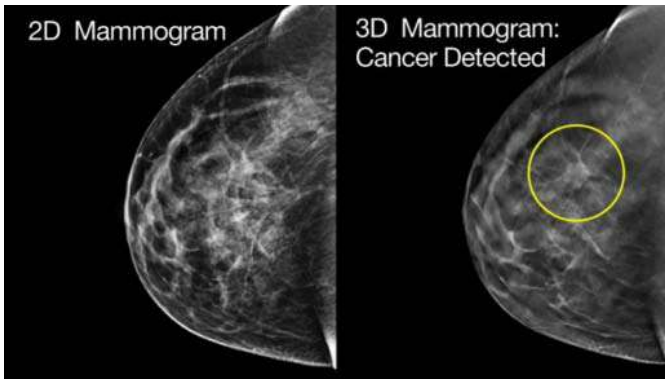
Abnormality not seen with ultrasound



Micro Calcifications



Tomo Only Finding



Advantages of Stereotactic Biopsy

- Less invasive
- Performed in outpatient setting/ Mammography Center
- Patient able to return to normal activity
- Procedure takes approximately 1 hour or under on average
- Reduced scarring to the breast
- Cost effective
- Minimal pain – performed with local anesthetic
- Precise, accurate analysis & diagnosis

Disadvantages of Stereotactic

- Posterior lesions near chest wall
  - Limitations of equipment
  - Limitations of patient
- Area of interest to vague to visualize
- Missed lesions/calcs after successful sampling
- Inconcordant pathology

Function of Stereotaxis Method in Breast Tissue Sampling

- Two dimensional images are obtained
- 15 degree angles + and – from center
- Images analyzed with software
- Result is a precise “3 Dimensional” Calculation of the area to be sampled.

Stereotactic Equipment

Upright Attachment

Upright Attachment

- Quickly convert your existing mammography unit
- Utilize existing space
- Can be performed with patient seated upright or recumbent on designated biopsy chair/table
- Cost Effective

Stereotactic Equipment

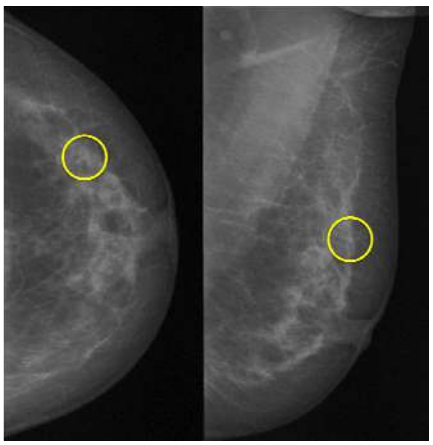
- Prone Table

Prone Table

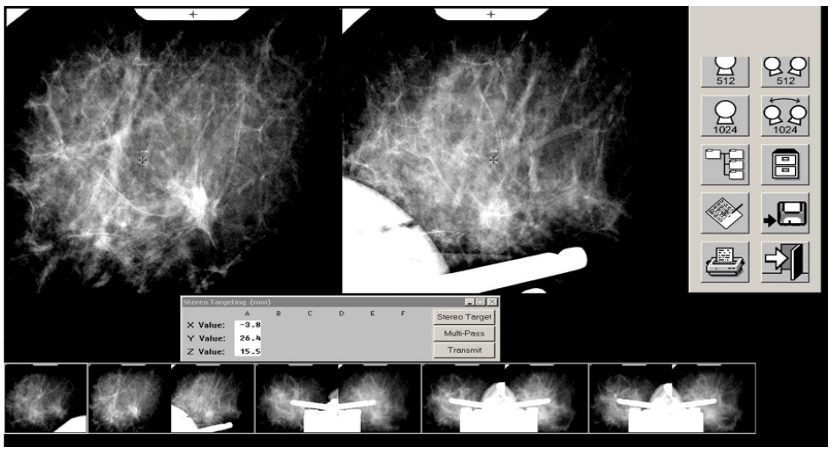
- Dedicated procedure room
- Patient positioned prone with breast through opening
- Reduce risk of vasovagal event
- C-Arm allows for 360 degree access of the breast
- Reaching posterior lesions/calcs – gravity

Procedure

- Same method for upright attachment and prone table

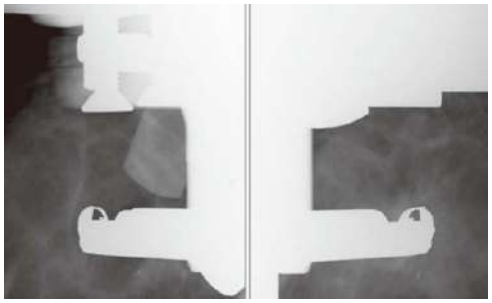


Scout Image



Procedure

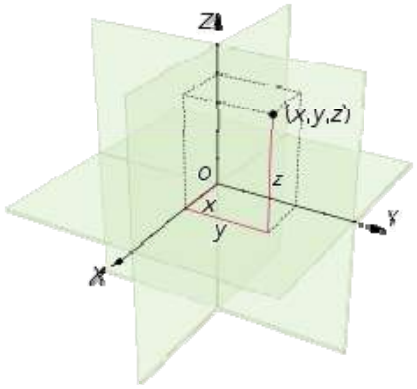
- Scout “Stereo Pair” is obtained
- Area of interest closest to center as possible
- Two images tube angled 15 degrees from each side of scout

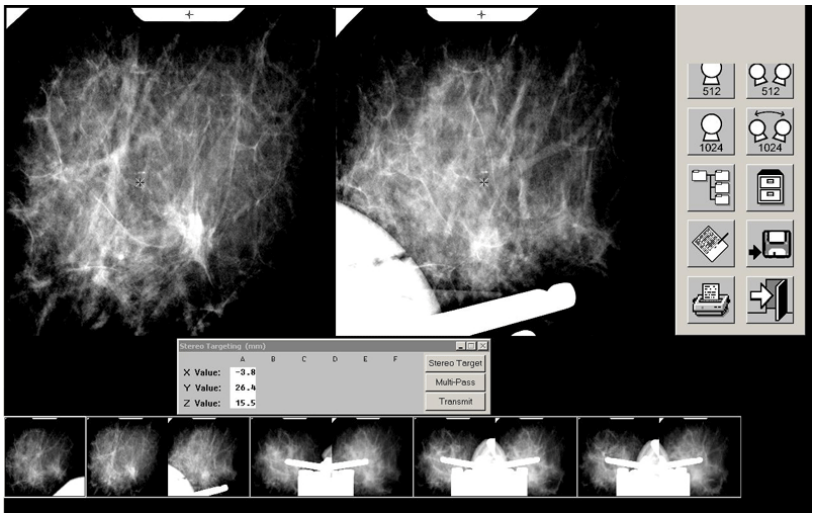


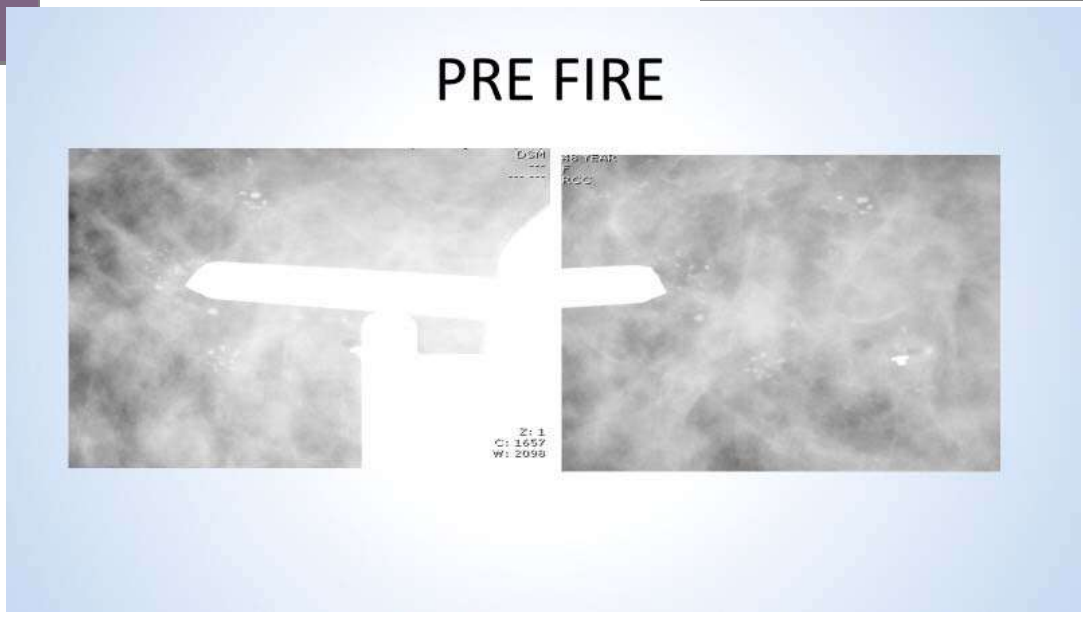
Cartesian Coordinates

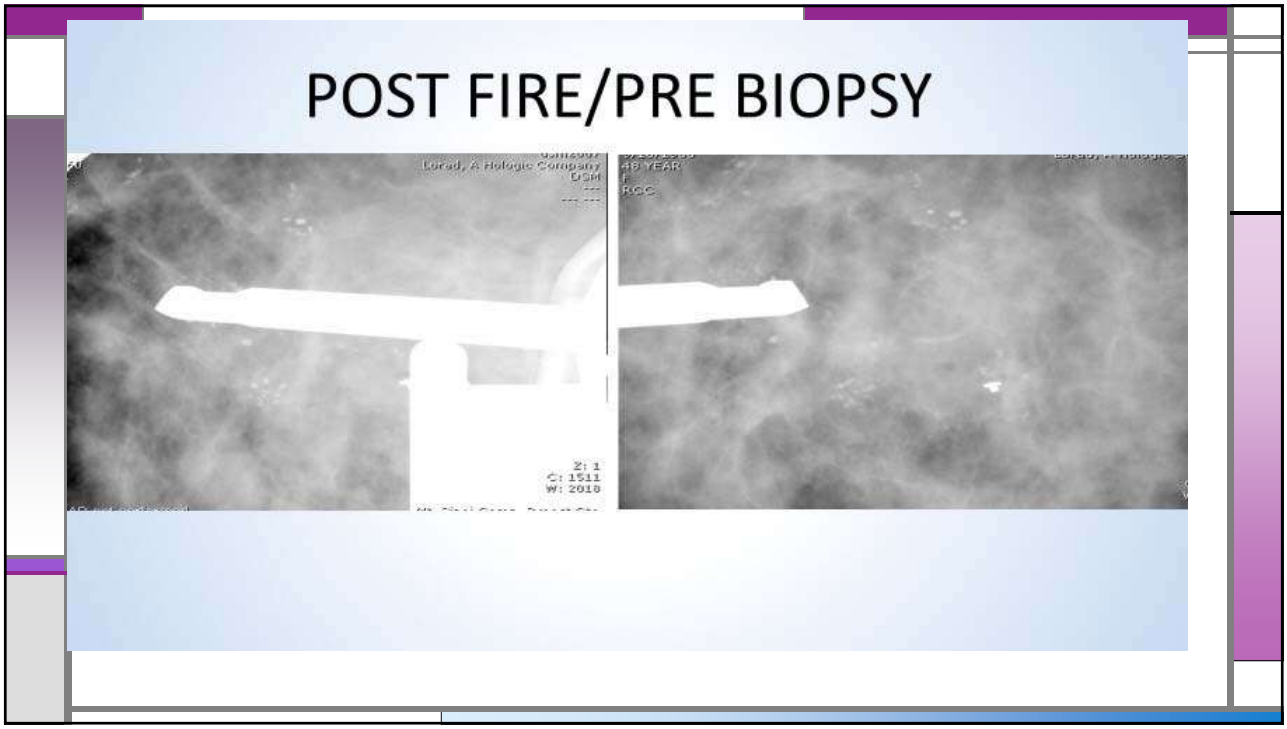
- X = horizontal axis
- Y = vertical axis
- Z = depth

- Stereo Pair is used to target the area of interest.
- X, Y,and Z coordinates will precisely calculate the location within the breast

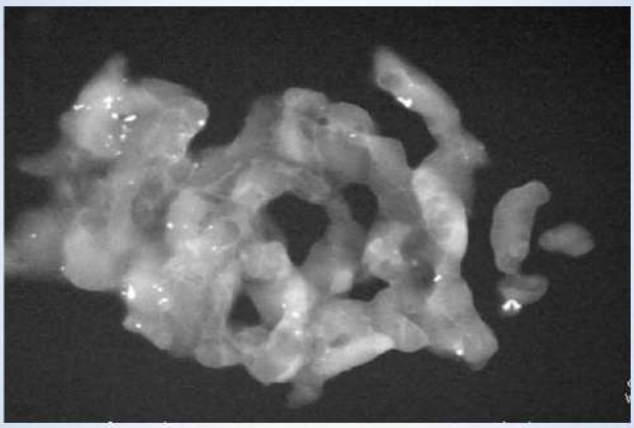








Tissue Sample Image



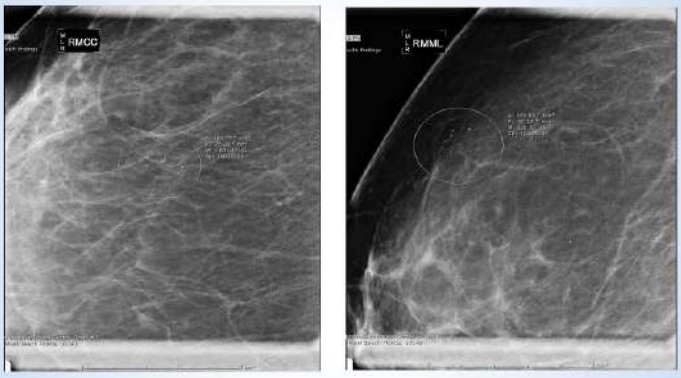
Key to a Successful Biopsy…

Preparation and Communication

Before Getting Started - Technologist

- Prepare
  - View case in advance – one day if possible
  - Review case with Radiologist
  - Direction of approach
  - More than one area
  - Know your target

Review Images



Before Getting Started - Technologist

- Prepare
  - Know orientation of breast vs. how it displays
    - Orientation of display has changed with different versions of software
  - Needle size Standard vs. Petite
    - Depends on thickness of breast and location of targeted area
  - Possible patient limitations
    - Frozen shoulder, range of motion with neck/shoulders, unable to be seated upright or be in prone position for period of time
  - Type of clip to use – have a selection of 2-4 to choose from
    - Sensitivity to certain materials ie: nickel

Before getting started - Patient

- Communication with the patient
  - Scripting in place
  - Varies with facility
    - Technologist
    - Radiologist
    - Nurse Navigator

Before getting started - Patient

- Explanation of the procedure
  - Prior to appointment date if possible.
    - After workup is complete if adding on same day.
  - Brochure/handouts available
  - Patient Video from vendor – to watch while in department prior to scheduling. Be available for any questions.
- Proper scripting – consistency from technologist to technologist

Sample Script

- The radiologist has recommended that you have a Stereotactic Breast Biopsy.
- Very common procedure
- You'll be seated upright/lying prone
- Positioned as you are for a mammogram. Smaller paddle. Slightly more compression.
- Technologist will take several images to determine precise area of interest.
- Images will be reviewed and confirmed with the radiologist.
- We'll wash your skin with a colored betadine.
- Radiologist will numb just over the area of interest with some lidocaine. Make a small incision and numb a little deeper and closer to the sight to be sampled.
- The biopsy device will be inserted in through the incision.
- We will then take more images and confirm that our targeting is accurate.

Sample Script - continued

- After we confirm our images, we will advance the needle of the biopsy device into sampling position. When this happens you'll hear a click or "cork pop" sound.
- Try not to move or jump - reassure that technologist will be with her
- We will then take more images to confirm that we can begin sampling.
- Sampling will begin. You'll hear a "whirring" sound and may feel some pressure. If you feel pain, we will pause, administer more lidocaine if needed.
- We will take 4-6 samples, image them to verify we have a good tissue sample.
- A very small clip will be placed within the breast and an image will be taken before we remove the needle.
- We will hold compression for about 10 min., place some steri-strips over the incision, some gauze and take some post biopsy images to verify clip placement.

Sample Script – Post biopsy

- We will show our images to the Radiologist.
- Once Radiologist verifies our images, you will be free to leave.
- We'll give you an ice pack and post care instructions.
- "Do you have any questions or concerns?"

Before getting started - Patient

- Screening the patient
  - Diabetic
  - Anti-coagulants
    - Radiologist preference on if/when to discontinue
  - Anxiety medication
    - Not to take until consent is signed
  - Allergies to medication
    - Lidocaine
    - Betadine/Chloraprep

Before getting started - Patient

- Explanation of procedure – Day of biopsy
  - What to say…
    - Be honest, sensitive to anxiety
    - Length of procedure, how long in compression
  - What NOT to say…..
    - Avoid using "Gun" "Large Needle" "Fire/Shoot the Needle"
    - Instead use "advance the biopsy device"
- Patient experience
  - Discomfort/Pain
    - Most experience little to no pain, varies patient to patient, Lidocaine will be used to numb the area, communicate with us your pain level.
  - Be honest. Explain sounds/feeling she may experience – vacuum device, whirring of the biopsy device, advancement of the device "cork pop"

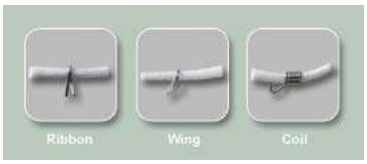
Before getting started - Patient

- Compression
  - Upright vs. prone
    - Importance of stability of the breast to decrease risk of movement, a little more than her normal mammogram
- How will she be positioned
  - Comfort is key for successful procedure
  - Use of blankets, towels, padding, arm rests
- Importance of stillness throughout exam
  - Hand on back of patient to stabilize

Before getting started - Patient

- Explanation of clip placement
  - Patient Anxiety – foreign object
  - Have sample to demonstrate
  - Any metal allergies/sensitivities

Types of Clips



Before getting started - Patient

- Consent
  - Form set up
    - Separate line for clip placement
  - Radiologist
  - Technologist/Nurse Navigator
- Marking side of interest – Radiologist
  - Facility specific
  - Clinic vs. Hospital
  - "Time Out" Protocol in place

Positioning the Patient

- Upright
  - Biopsy Chair
    - Trendelenburg
  - DBI Table
- Prone Table
- Patient as comfortable as possible
- Key in successful biopsy

Types of Biopsy Chairs

Decubitus Table

Positioning

- Movement of the tube
  - Watch surroundings and patients head with angulation of the tube
- Any question of table or chairs stopping the movement of the tube……..STOP…..do not proceed without verifying equipment is working properly.

Positioning – Preparing the Patient

- Protective cloth – Chucks to protect clothing…and equipment (fan)
- Warm blanket
- Wet wash cloths
- Emesis basin
- Room temperature
- Sheet for table or chair
- Pillows
- Padding
- Ammonia inhalants

Positioning – Preparing the Patient

- Relaxation Tools
  - Aromatherapy
    - Lavender
      - Aids in relaxation
    - Orange
      - Nausea
- Calming Décor/pictures
- Light music
- Guided imagery
- Serenity Suites – all bundled into one

Tray Set-Up

- Supplies Needed
  - Varies between facilities and physicians
  - Procedure in place to include tray supplies and set up
  - Pre-made biopsy trays
- When to set up
  - Prepping prior to
    - Day prior, morning of
    - Supplies out and ready for set up
- Needle-less systems
  - Vial Adapters – decreases risk of needle sticks

Tray Set Up

Tray Set Up

The Procedure

- Procedure/Policy in place
  - Specific instructions
  - Clarity
- Staffing – facility based
  - One tech or two?
    - Advantages of two techs – one to stay with patient and do control panel/imaging, one to work with Radiologist and tissue sampling.

The Procedure

- Technologist Duties
  - Communication with the patient
  - Positioning
  - Image acquisition
  - Pre-targeting and coordinate verification – needle size selection
  - 2 technologists (Patient Tech/Procedure Tech)
- Radiologist Duties
  - Marking of patients skin
  - Communication and consent
  - Targeting and coordinate verification – needle size verification
  - Administration of anesthesia
  - Procedure – tissue sampling

The Procedure

- What your patient can expect
- Communication
- Designated Roles
- Being one step ahead –forward thinking, troubleshooting, planning, coordination, preparation

Post Procedure

- Post Clip Images and Evaluation
  - Review with Radiologist prior to dismissing patient
- Patient Care
  - Holding pressure
    - How long
    - Physician or technologist
  - Cleaning and bandaging
    - Ice pack
  - Post Care Instructions
    - Facility specific

Complications

- Vasovagal reaction
- Missed Target
- XYZ Error
- Target Obscured
  - Dense Breast Tissue
  - Lack of compression over target area
  - Lidocaine
  - Snowplowing of calcs
- Movement of patient
- Breast compresses beyond capability of equipment

Vasovagal Reaction

- What is happening?
- Vasovagal syncope (vay-zoh-VAY-gul SING-kuh-pee) occurs when you faint because your body overreacts to certain triggers, such as the sight of blood or extreme emotional distress.
- The vasovagal syncope trigger causes your heart rate and blood pressure to drop suddenly. That leads to reduced blood flow to your brain, causing you to briefly lose consciousness.
- Vasovagal syncope is usually harmless and requires no treatment.

Vasovagal Reaction – Patient Experience

- Before you faint due to vasovagal syncope, you may experience some of the following:
- Pale skin
- Lightheadedness
- Tunnel vision — your field of vision narrows so that you see only what's in front of you
- Nausea
- Feeling warm
- A cold, clammy sweat
- Yawning
- Blurred vision

Vasovagal Reaction – Signs to watch for

- Jerky, abnormal movements
- A slow, weak pulse
- Dilated pupils
- Patient complains of being hot

Vasovagal Reaction

- Preventative Measures
  - Patient as comfortable as possible
  - Room temperature not too warm
  - Cold compress
  - Aromatherapy
  - Distracting conversation
  - Toe/Feet movement

Vasovagal Reaction

- If preventative measures don't work
- DON'T Freak Out
- Remain calm
- Move quickly and accurately
  - Slowly remove needle from breast
  - Hold compression
  - Cold washcloth to back of neck/forehead
  - Get patient into Trendelenburg position
  - Check and monitor BP

Vasovagal Reaction

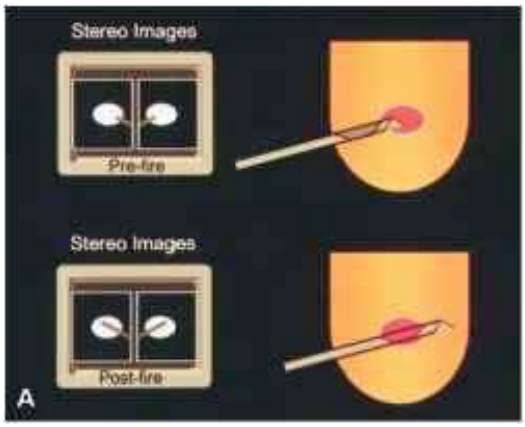
- Can we continue on?
- Patient tolerability level
- Change position and approach
- Stretcher or reclined Biopsy chair

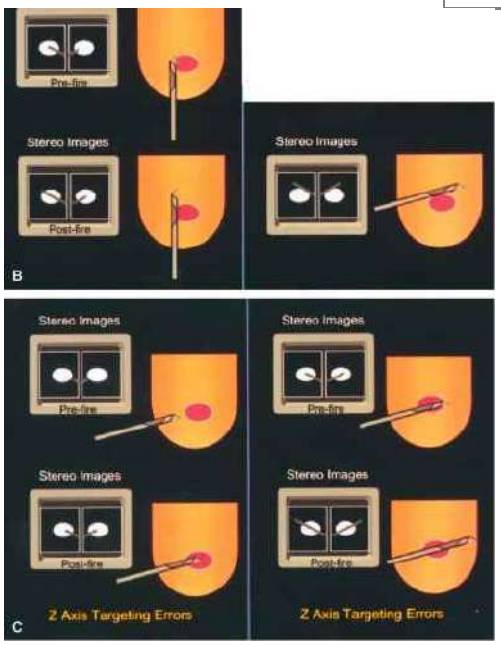
Missed target

- What could have happened?
- Accuracy of target coordinates
- Wrong area targeted
- Tissue consistency
- Equipment malfunction

XYZ Errors

- How to spot them





XYZ Errors – How to Correct

- Attempt Sample
  - Pull of vacuum assisted device
  - Image Sample
  - Re-image Stereo Pair
- Reposition and Retarget
- "Jog" the needle inside or outside the breast
  - Depends on distance
  - Radiologist comfort

Target Obscured

- Extremely dense breast tissue with fine microcalcifications
- Lidocaine
  - How much is too much?
  - Snowplowing of calcs
- Ways to correct
  - Patient comfort is key
  - Communication with Radiologist

Patient movement

- Ways to prevent
- How to recognize
  - Image blur
  - Markings you made on patient have moved
- How to correct

Breast Thickness

- Compresses too thin
  - Target area/check coordinates
  - Z + 6 is equal to or less than compression
    - Know the calculation for your equipment
    - Malfunctions DO happen
  - Different needle
    - Petite
    - Blunt tip non-firing
  - Firing Outside the Breast
  - Different approach
  - Build the breast up
    - Play doh
    - Tape
    - Tagaderm
  - Air Gap technique (not recommended)

Questions?

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