



Stereotactic Breast Biopsy

Advancements in Imaging Technology

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Origins

Breast Biopsy

While signs of cancer are detected using medical imaging, the only method of confirming the cancer's malignancy is through pathology; retrieving specimens for pathology requires some method of biopsy procedure. At the infancy of medical imaging, biopsies could only be performed as excisional procedures, requiring operating rooms and general anesthesia — which had significant patient drawbacks including longer recovery periods and unappealing scars near the region of interest. Since there was no alternative to performing biopsies, excisional procedures became the standard of care for retrieving tissue viable for pathology.

Stereotactic Breast Biopsy

Advancements in imaging technology provided an alternative to excisional biopsies in the form of minimally invasive biopsy procedures. The combination of imaging devices and surgical instruments allowed physicians to avoid open surgery for the extraction of tissue specimens.

Currently, the stereotactic method is the most popular for invasive breast biopsies. This method pinpoints the exact location of the abnormality by taking a pair of X-ray images at predetermined angles, which are pivoted around a given point (or fulcrum). After identifying suspicious tissue on the pair of images, the system is capable of calculating a specialized biopsy device's approach toward a given abnormality. The sophisticated software considers the biopsy device's dimensions to ensure the procedure's success. Once it has penetrated the breast, the biopsy device extracts tissue in a closed, incisional manner.

Compared to an excisional biopsy, the stereotactic biopsy reduces pain, scars, recovery time, and the risk of post-surgical complications. Thanks to medical advances, there are now two main approaches to stereotactic biopsy: **prone and upright**.





Stereotactic Breast Biopsy Today:

Prone

Stereotactic breast biopsies were originally performed with the patient in a prone position using a specialized table. Some breast surgeons prefer performing biopsies with patients in a prone position as it immobilizes the breast tissue without sacrificing patient comfort.

Since stereotactic biopsy's infancy, breast surgeons and radiologists have contested what are the required qualifications of performing such a procedure. The prone method does not discriminate against either physician's discipline: a prone biopsy table simulates an operating room for surgeons, and the X-ray imaging concept is equally as familiar with radiologists.

All physicians, independent of their discipline, see advantages to the ample room required for a prone system; the prone table allows for two people to work comfortably around the patient, making the procedure more efficient for the entire medical staff.

Some manufacturers have also developed mobile prone biopsy tables that enable a facility to wheel the platform either to different areas within a room or even between multiple rooms. This feature makes prone biopsy feasible even for those centers that are unable to dedicate an entire room to breast biopsy.

Kathy Foote RT (R) (M) is a technologist at Martin Memorial Hospital, a freestanding surgical center in Stuart, Florida, which uses prone breast biopsy exclusively.

“We find that the prone approach provides a much more comfortable set-up for the patient compared to an upright system. It also decreases the chances of patient movement. With a prone table, patients can place the entire arm and shoulder through the hole, which extends accessibility to the breast and provides additional comfort for the patient.”



Stereotactic Breast Biopsy Today:

Upright

Despite the advantages of a prone system, its requirements can be impractical in certain situations. These systems are relatively expensive, are one dimensional, and require significant space within the department. For this reason, radiology departments have difficulty justifying ownership of a dedicated prone system.

In response, the industry began investigating cost-effective methods of performing stereotactic breast biopsy. These investigations led to a very popular concept: an attachment that converts a mammography screening unit into a stereotactic biopsy device. Using this attachment provides a prone system's functionality while minimizing cost and space.

When the upright biopsy attachment device was introduced, a popular concern was the complexity and duration of converting from the mammography unit to biopsy from screening. As the biopsy "attachment" technology developed and users' familiarity improved, the system's conversion between the two modes became seamless and had a negligible impact on the imaging center's workflow. Independent of technological advancements, users began to discover the upright approach's dynamic nature.

At first, users were dependent on specialized chairs because they were lightweight, versatile, and similar to the prone biopsy method. It also kept patients immobilized in the decubitus position. As users became more familiar with the technology, intuition developed ways to perform the biopsy without specialized chairs, instead using a standard gurney, cart, or wheelchair to effectively perform the procedure.

Dr. Helen E. Mrose, MD, Ph.D., is an independent radiologist in Annapolis, Maryland. Her initial experience with stereotactic breast biopsy was predominantly with prone tables and, as a result, she was comfortable with the technology. After joining a group practice which did not have space for a prone table, she was introduced to the upright biopsy approach and was pleasantly surprised.

"We found the upright biopsy positioning to be more accommodating to the patient, as well as decreasing the length of time of the procedure. I find the upright system to be superior in terms of patient comfort — patients' arms do not fall asleep and their necks are much more comfortable. An unexpected benefit of an upright system is less bleeding. I believe that because the breast is less dependent during an upright study that it significantly decreases the amount of bleeding a patient may experience."

Dr. Mrose believes upright systems provide additional benefits to small-breasted patients. "Sometimes when a patient is small breasted, there is no way to biopsy them on a prone system. If you can see the area of concern on a mammogram, you can visualize it with an upright biopsy system."



The Choice is Yours

The availability of both the **upright** and **prone** biopsy options is evidence to one method's inability to replace the other; users must consider several factors to determine which solution is best. These factors include user preference, cost, and available space required for the device.

For example, breast surgeons will prefer a prone table because it simulates the environment of an operating room. Having a dedicated space and unit to perform the biopsy allows a surgeon to avoid distractions and work in tandem with a technologist or nurse. Radiologists may prefer an upright system because it positions the breast in the same manner as when the area of concern was detected. Ultimately, it is up to the users to decide which will be the most effective method of providing patient care.

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