



# How Scar Tissue Affects a Mammogram



C5



# Objectives

- Definition
- Formation
- Procedures that cause scarring
  - Angela Lee's story
  - Technology
- Reducing Scar Tissue



# Scar Tissue

## Definition:

The connective tissue forming a scar.  
It is composed mostly of fibroblasts in recent scars  
and dense collagenous fibers in old scars.

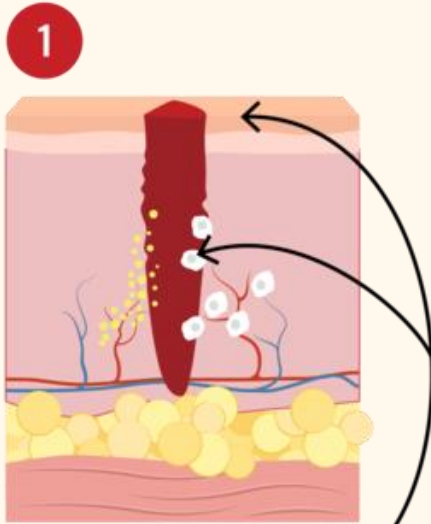


# How Does Scar Tissue Form ?

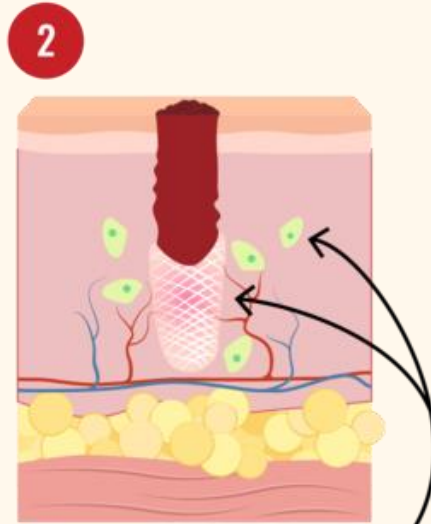
When a person has an injury, the body responds by repairing the damaged tissue. This creates scar tissue.



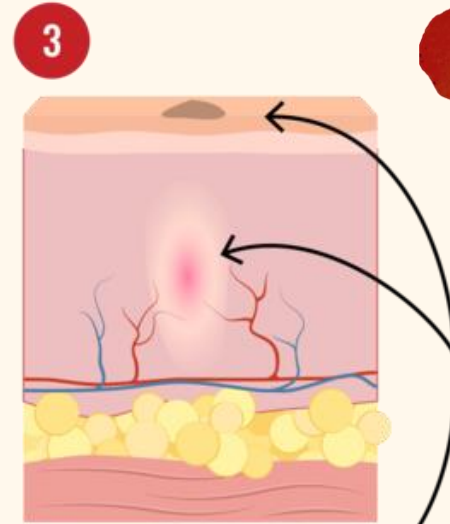
# Scar Formation Process



**1**  
Blood clotting & scab formation protect the wound from infection while inflammatory chemicals and white blood cells protect the area



**2**  
Epithelial cells multiply rapidly to create granulation tissue, repair damage, and restore blood supply to the area



**3**  
Scar tissue is formed- excess collagen causes a lack of flexibility, which can lead to pain and dysfunction

# What Breast Procedures Cause Scar Tissue





# Surgery

# Lumpectomy



“... a type of breast cancer surgery in which the tumor and a small amount of surrounding tissue called the margin is removed. The purpose of a lumpectomy is to remove the cancerous cells.” (MD Anderson Cancer Center & Blackburn, 2021)



<http://www.antoniopacella.it/category/articoli/alimentazione/>



<https://ecancer.org/en/news/16135-nationwide-study-finds-breast-cancer-patients-unaware-of-surgical-options>



# Mastectomy

Surgical operation to remove the breast.



<https://www.drlichtman.com/blog/2020/october/breast-reconstruction-after-cancer-what-are-my-o/>



<https://www.mastectomyguide.com/blog/how-long-does-it-take-a-mastectomy-incision-to-heal>

# Breast Reduction

Breast reduction surgery, also known as reduction mammoplasty, removes fat, breast tissue and skin from the breasts.



<https://www.realself.com/question/atlanta-la-breast-reduction-scar-surgery>



<https://www.miamilakescosmetics.com/breast-reduction-scars/>

# Breast Implants

Surgery to increase breast size.



<https://floridaindependent.com/can-you-remove-breast-implant-scars>



<https://www.brisbaneplasticsurgery.com/stage/scarring-after-breast-surgery-expectations-prevention-and-management/>



<https://floridaindependent.com/can-you-remove-breast-implant-scars>

# Radiation Therapy





<https://www.nejm.org/doi/full/10.1056/NEJMicm1516482>



<https://www.dovepress.com/prevention-and-treatment-of-acute-and-chronic-radiodermitis-peer-reviewed-fulltext-article-BCTT>

Scar tissue and fibroids can appear after many years of radiation therapy.

# Core Needle Breast Biopsies

**Stereotactic**

(mammogram or tomosynthesis guided)

**Ultrasound Guided**

**MRI Guided**



Ranging in  
size and color

<https://anndermatol.org/search.php?where=aview&id=10.5021/ad.2010.22.2.238&code=0140AD&vmode=PUBREADER>



<https://journals.viamedica.pl/rpor/article/download/73261/53351>



[https://www.researchgate.net/figure/Surgical-scar-arrow-6-weeks-after-vacuum-assisted-core-biopsy-in-patient-B-25-years\\_fig2\\_316770523](https://www.researchgate.net/figure/Surgical-scar-arrow-6-weeks-after-vacuum-assisted-core-biopsy-in-patient-B-25-years_fig2_316770523)



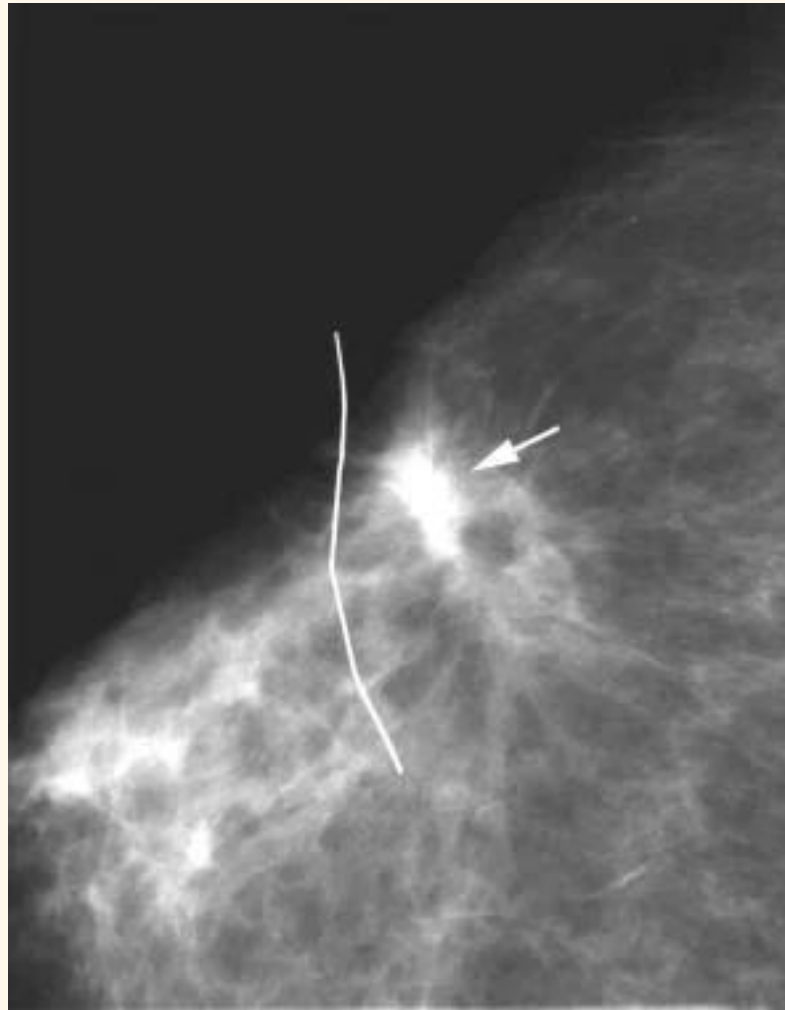
# Why is Scar Tissue not Good for Mammograms?

\*Especially 2D\*

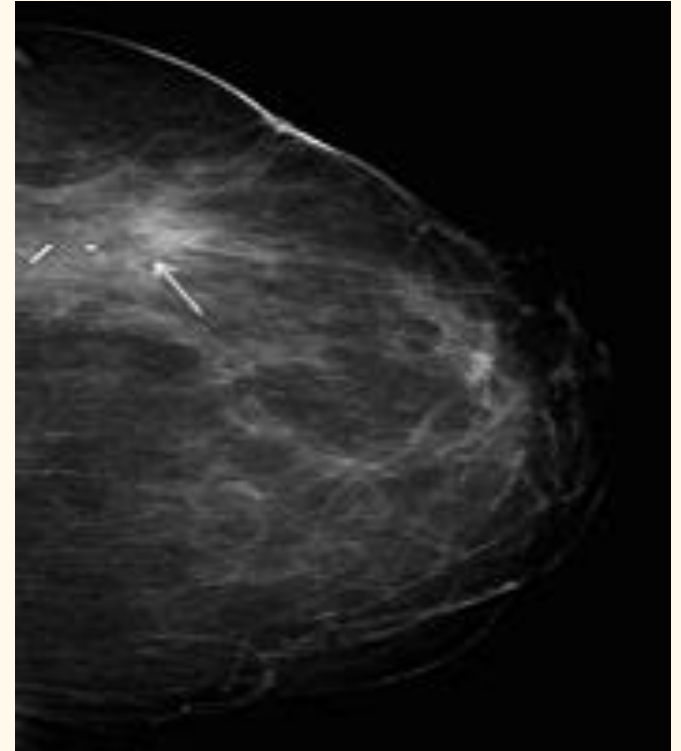
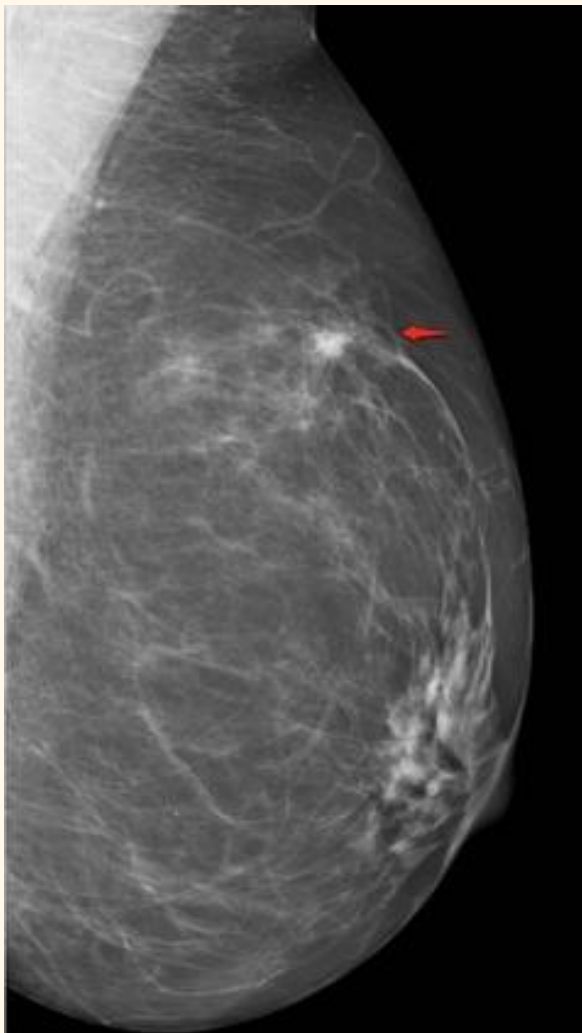




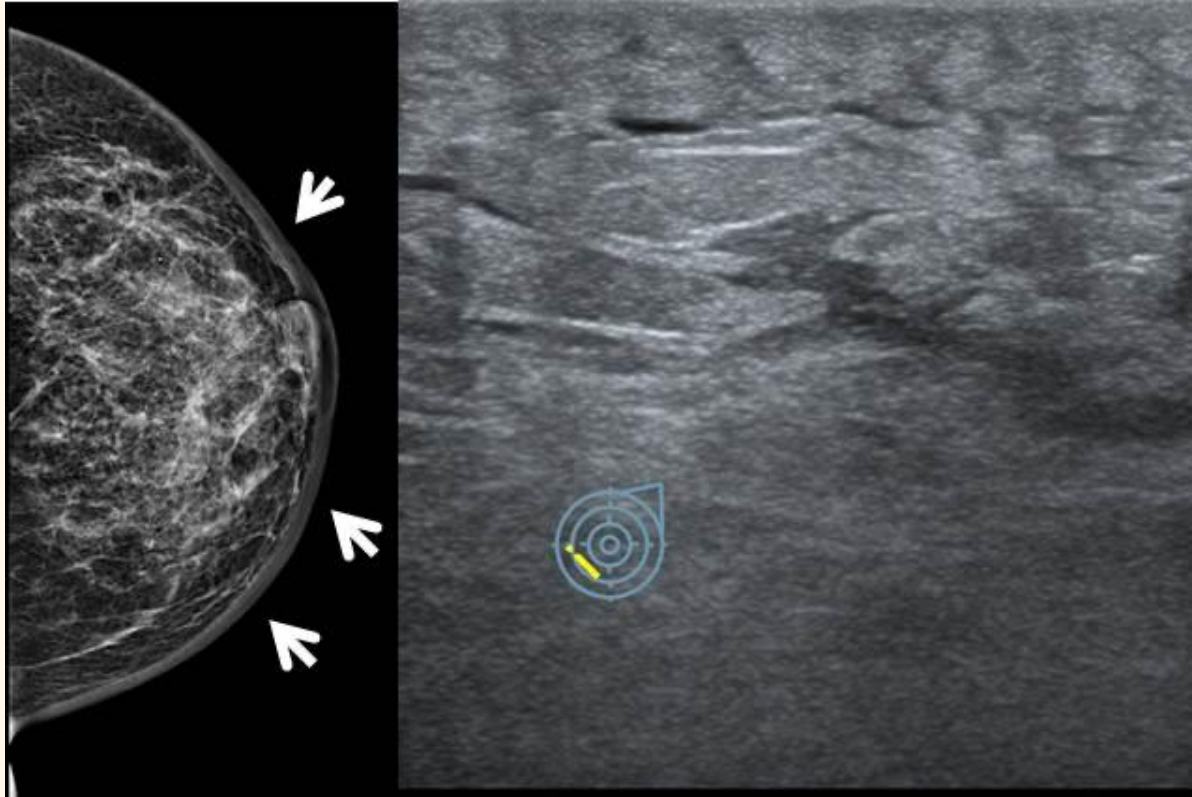
Postsurgical  
Scar on a Mammogram



Post Surgical

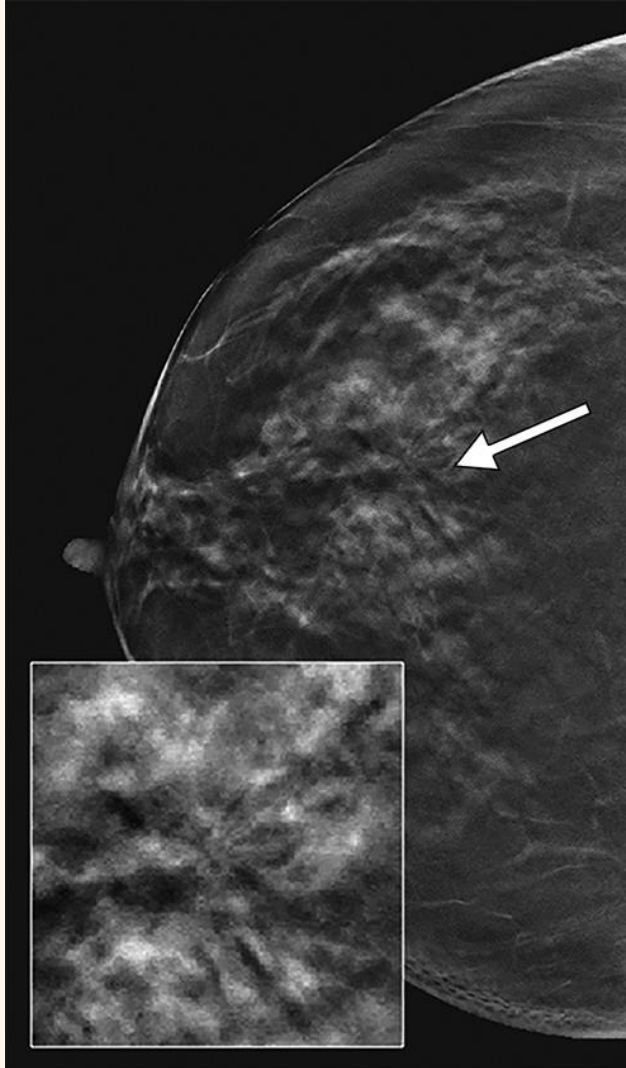


<https://brieflands.com/articles/ijradiology-90670>

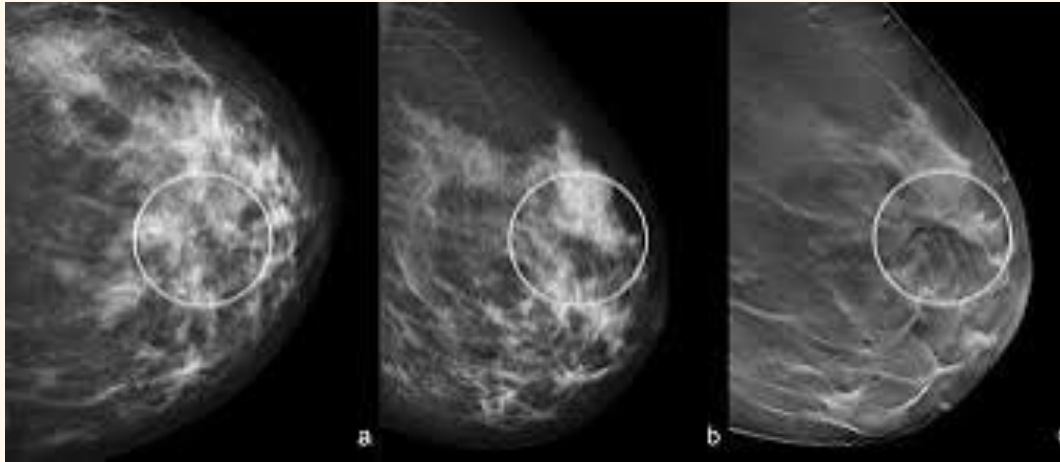


<http://radiologycases.my/2021/12/07/mammogram-skin-thickening-post-irradiation/>

Scar that caused skin thickening: from radiation therapy.



Radial scar from  
core needle biopsy



<https://pubs.rsna.org/doi/full/10.1148/radiol.2019190748>

Radial scars can look like malignancies/cancerous spots, and have to be examined under a microscope to determine if they are benign.

Consequences:

- Extra costs for patient
- Worry in the patient's mind



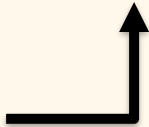
“Prior breast surgery, trauma, and breast conservation treatment (BCT), or lumpectomy, can result in scarring and distortion as seen on imaging studies. These findings can be **mistakenly** interpreted as **suspicious for malignancy.**”

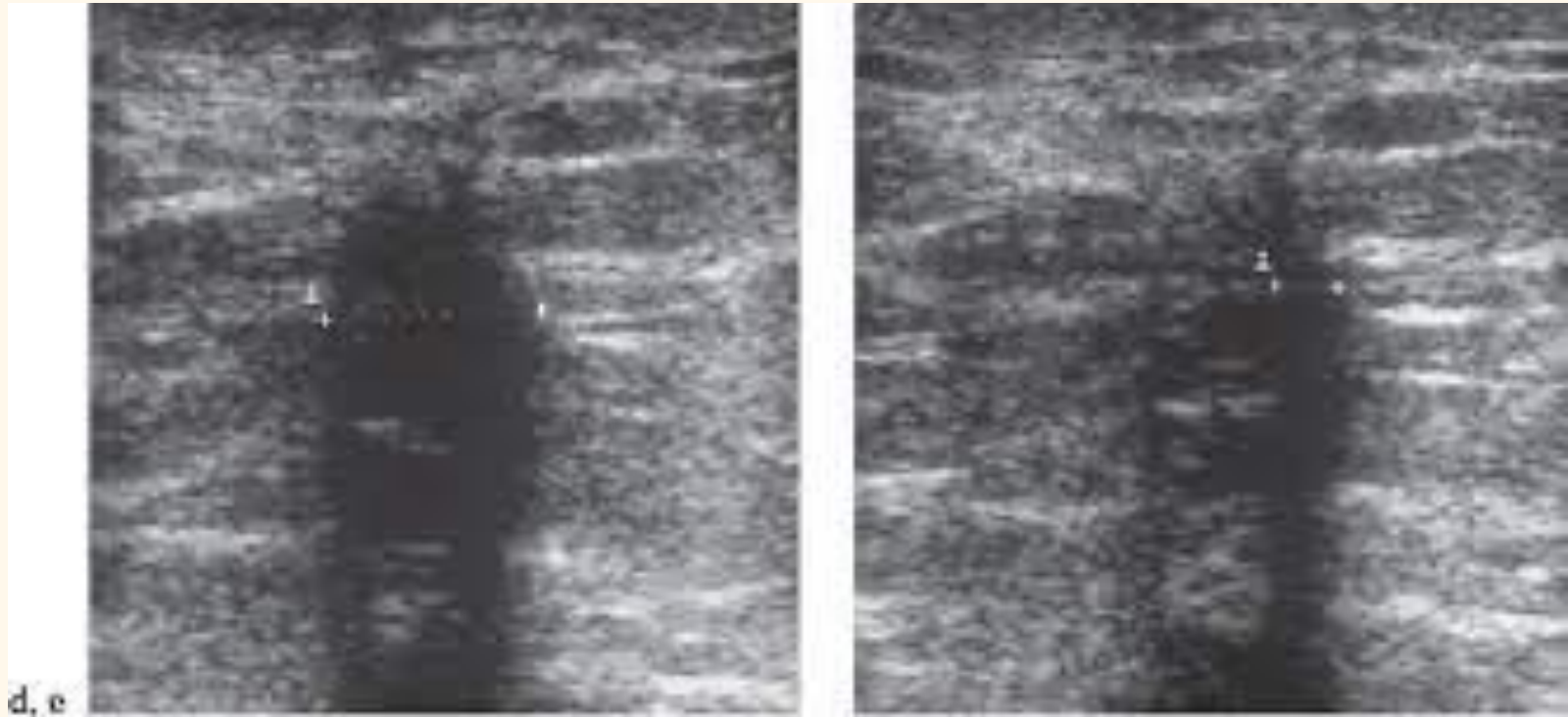
- Susan Ackerman, MD

Malignancies can also be mistaken for scars on people with a history of breast surgery...

<https://news4sanantonio.com/news/trouble-shooters/breast-cancer-patient-fighting-for-her-life-said-tumor-was-mistaken-for-scar>

Click link for video



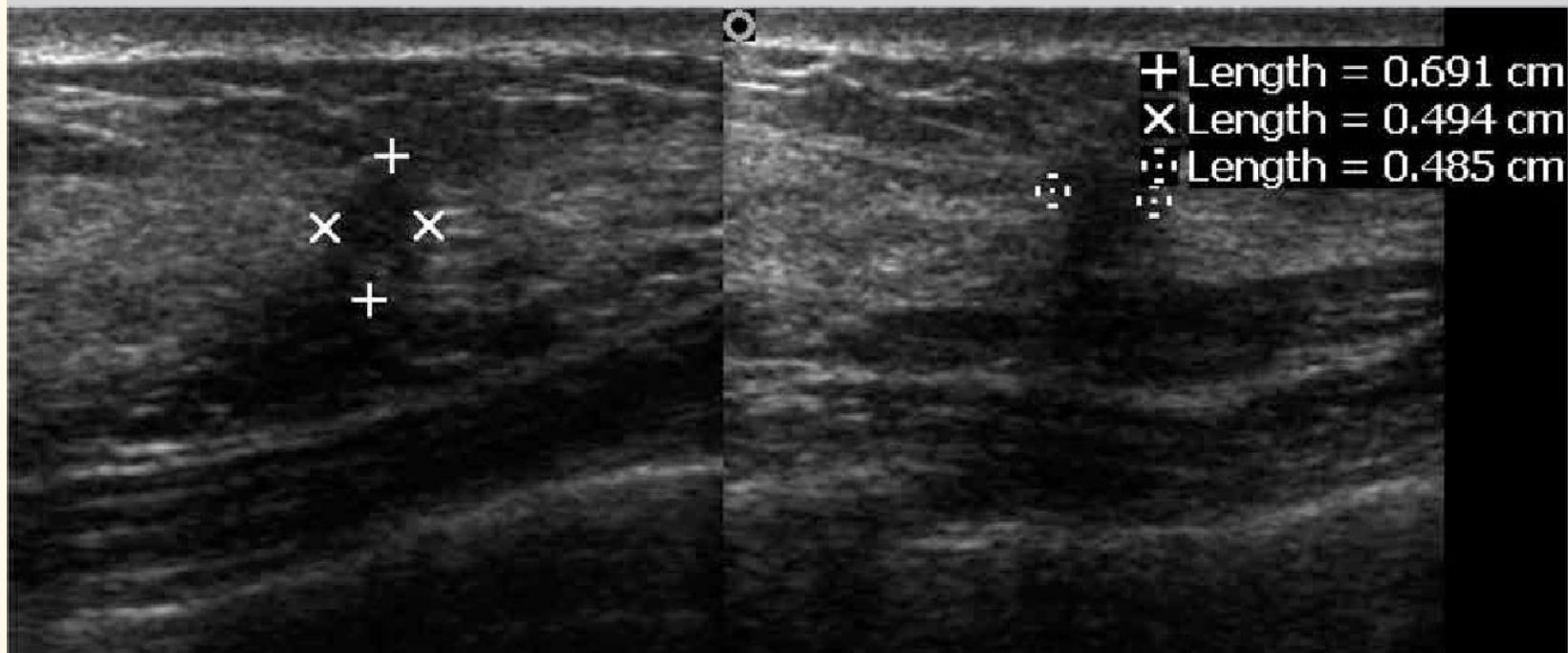


<https://radiologykey.com/scars-the-treated-breast/>

Scar on breast ultrasound

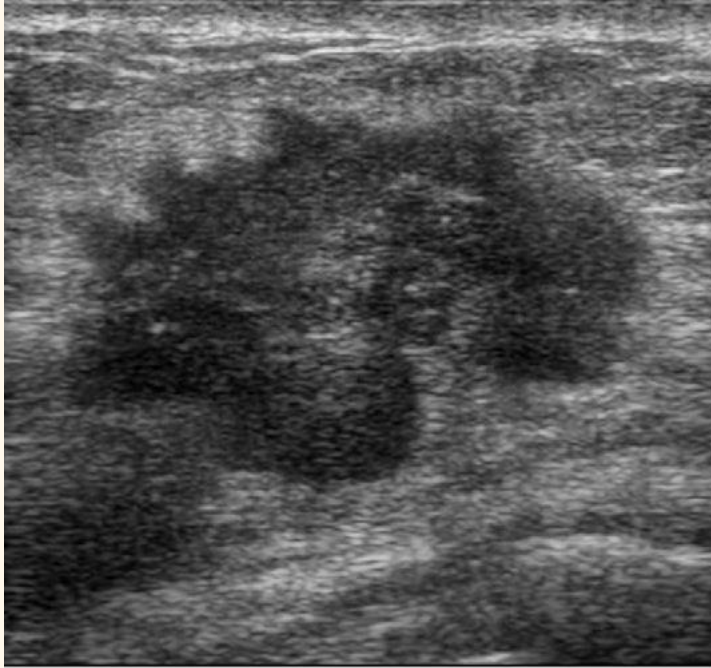


Figure 1

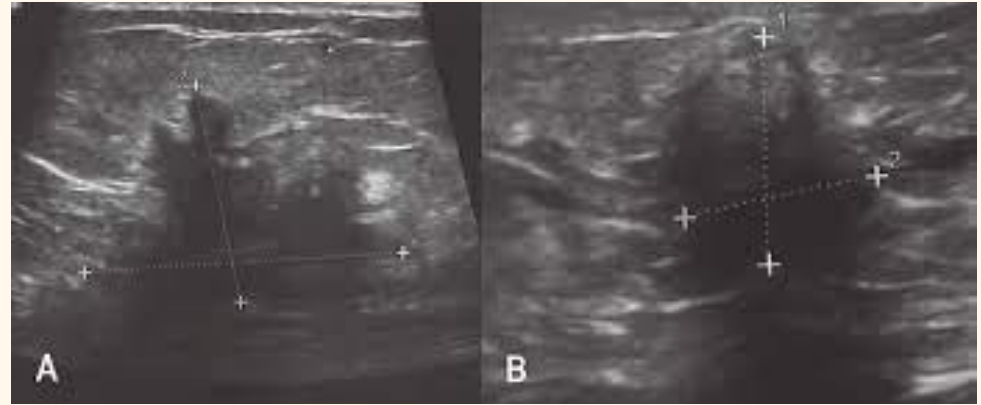


<https://www.semanticscholar.org/paper/Radial-Scar-of-the-Breast-Huang-Sheu/d2d85578b09314fbc9df94747e363076ee2422/figure/0>

Scar on breast ultrasound



<https://www.ultrasoundcases.info/benign-lesions-mimicking-malignancy-2525/>




<https://www.cureus.com/articles/142204-utility-of-ultrasound-imaging-features-in-diagnosis-of-breast-cancer#!/>

Malignancies/tumors on breast ultrasound  
(VERY SIMILAR)

As the video also stated...

There is a **40-50%** chance  
you can miss a cancerous  
spot with **2D** imaging if you  
have dense breasts or scar  
tissue. (Stavros, 2020, 3:25)





What can help differentiate between a scar and a  
tumor?

- **Breast MRI** (Most reliable)
  - 3D mammograms
  - Biopsy



# Technology



# Why is 3D Imaging Better for Scar Tissue

- The slices 3D imaging takes, helps the radiologist to see underneath the scar (making detection easier).
- "The more dense you are the more beneficial 3D is." (Osby, 2016)
  - Scar tissue can become thick/dense, making them more difficult to compress.
- Markers placed on the skin will not cover suspicious areas (due to the fact that we can "see" beneath them).



# Reducing Scar Tissue

- Procedures
- Other methods



# Procedures



- Dermabrasion.**

“Dermabrasion may be used to minimize small scars, minor skin surface irregularities, surgical scars, and acne scars. As the name implies, dermabrasion involves removing the top layers of skin with an electrical machine that abrades the skin. As the skin heals from the procedure, the surface appears smoother and fresher.”

- Chemical peels.**

“Chemical peels are often used to minimize sun-damaged skin, irregular color (pigment), and superficial scars. The top layer of skin is removed with a chemical application to the skin. By removing the top layer, the skin regenerates, often improving the skin's appearance.”

- Collagen injections.**

“One type of collagen (made from purified cow collagen) is injected beneath the skin. It replaces the body's natural collagen that has been lost. Injectable collagen is generally used to treat wrinkles, scars, and facial lines. There are several other types of injectable materials that can be used also.”





## Procedures Cont.



- Cortisone injections.**

”These types of injections can help soften and then shrink hard scars. Keloids and hypertrophic scars often soften after intralesional steroid injections.”

- Cryosurgery.**

“Cryosurgery can help reduce the size of scars by freezing the top skin layers. The freezing causes the skin to blister.”

- Laser resurfacing.**

“Laser resurfacing uses high-energy light to burn away damaged skin. Laser resurfacing may be used to minimize wrinkles and refine hypertrophic scars.”

# Procedures Cont.

- **Punch grafts.**

“Punch grafts are small skin grafts to replace scarred skin. A hole is punched in the skin to remove the scar. Then the scar is replaced with unscarred skin (often from the back of the earlobe). Punch grafts can help treat deep acne scars”

- **Surgical scar revision.**

“Surgical scar revision involves removing the entire scar surgically and rejoining the skin. A new scar will form. But the goal of this surgery is to create a less obvious scar. Surgical scar revision is usually done on wide or long scars, scars that healed in an unusual way, or scars in very visible places.”

- **Radiation therapy.** (last resort)

“This is not used often. It's used mainly for scars resistant to other treatments.”



# Other Treatments

- Silicone Gel and Sheets
- Aloe Vera
- Micro Needling
- OTC creams
- Vitamin E
- Coconut Oil



# Conclusion

- Scar Tissue forms when there is an injury to the skin, causing connective tissue to form.
- Surgeries, radiation therapy, and biopsies can all cause scar tissue to form on and around the breasts.
- Malignancies can be mistaken for scar tissue.
- 3D imaging is best for dense breasts or those with scars on the breasts.
- Numerous procedures can be done to reduce scar tissue along with other non-medical treatments.
- **ALWAYS** get your yearly mammogram!



# References

Aichinger U;Schulz-Wendtland R;Krämer S;Lell M;Bautz W; (n.d.). [*scar or recurrence--comparison of MRI and color-coded ultrasound with Echo signal amplifiers*]. RoFo : Fortschritte auf dem Gebiete der Rontgenstrahlen und der Nuklearmedizin.

<https://pubmed.ncbi.nlm.nih.gov/12424666/#:~:text=Purpose%3A%20MRI%20is%20the%20most,the%20breast%20after%20surgical%20treatment.>

Developer. (2023, October 31). *How breast surgery may affect cancer screening*. Envision Radiology.

<https://www.envrad.com/breast-surgery-affect-cancer-screening/>

Frothingham, S. (2023, February 6). *Medical remedies and natural options for getting rid of scars*. Healthline.

<https://www.healthline.com/health/how-to-get-rid-of-old-scars>

# References

KA;, S. E. (n.d.). *Intramammary scar tissue: A mimic of the mammographic appearance of carcinoma*. AJR. American journal of roentgenology.

<https://pubmed.ncbi.nlm.nih.gov/6773341/#:~:text=Scar%20tissue%20within%20the%20breast,defined%2C%20spiculated%20mass%20on%20mammography>.

Mayo Foundation for Medical Education and Research. (2022, September 28). *Breast reduction surgery*. Mayo Clinic. <https://mayoclinic.org/tests-procedures/breast-reduction-surgery/about/pac-20385246>

MD Anderson Cancer Center, & Blackburn, K. B. (2021, May 18). *Lumpectomy: 7 things to know*. MD Anderson Cancer Center. <https://mdanderson.org/cancerwise/lumpectomy-for-breast-cancer-treatment--what-it-is--what-to-expect-and-recovery.h00-159460845.html#:~:text=A%20lumpectomy%20is%20a%20type,to%20remove%20the%20cancerous%20cells>.

# References

Merriam-Webster. (n.d.). *Scar Tissue Definition & meaning*. Merriam-Webster. <https://www.merriam->

[webster.com/dictionary/scar%20tissue](https://www.merriam-webster.com/dictionary/scar%20tissue)

Molina, A. (n.d.). *Breast cancer patient fighting for her life said tumor was mistaken for Scar*. WOAI.

<https://news4sanantonio.com/news/trouble-shooters/breast-cancer-patient-fighting-for-her-life-said-tumor-was->

[mistaken-for-scar](https://news4sanantonio.com/news/trouble-shooters/breast-cancer-patient-fighting-for-her-life-said-tumor-was-mistaken-for-scar)

Osby, L. (2016, October 4). *New 3D mammography provides a clearer image*. The Greenville News.

<https://www.greenvilleonline.com/story/news/health/2016/10/04/new-3d-mammography-provides-clearer->

[image/91137192/](https://www.greenvilleonline.com/story/news/health/2016/10/04/new-3d-mammography-provides-clearer-image/91137192/)

Scar Tissue Formation. (2023, October 14). <https://www.breastcancer.org/treatment-side-effects/scar-tissue-formation>