

Breast Reconstruction in Plastic Surgery:

Microsurgical vs. Traditional Methods and Developing a New Surgical Program

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Avera Plastic & Reconstructive Surgery

10/5/2024

History of Plastic Surgery

- *Plastikos* – To mold or give form
- 4000 BC – Facial fractures treated medically
- 2000 BC – Surgery
- 800 BC – Skin grafts
- 100 BC – Detailed anatomical drawings
- 50 BC – "The Art of Medicine" Aulus Cornelius Celsus
- 1827 – America's first plastic surgeon performs Cleft palate repair (Dr. John Meitbauer)



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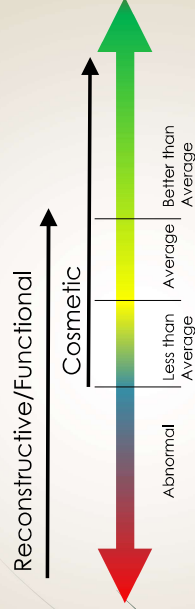


Plastic Surgery in a Nutshell

- Expert anatomists who move tissues around:
 - to solve a problem +/-
 - make things look better



Reconstructive vs. Cosmetic Surgery



Goal: Move Patient in the **Right** Direction

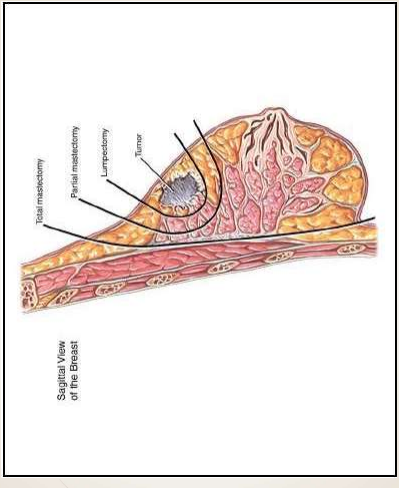
CAUTION!

Some images are graphic

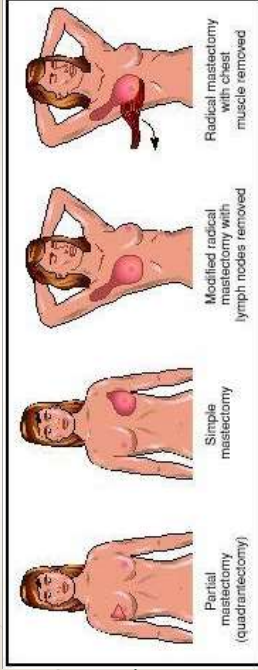
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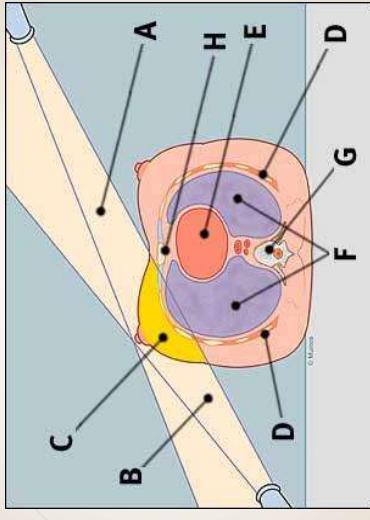
Breast Cancer



Variables: What Type Defect?



Radiation Fields



Definition: What is Breast Reconstruction?

- In the treatment of Breast Cancer, sometimes the entire breast is removed.
- Breast reconstruction** is the replacement, rebuilding or reshaping of an absent (or partially absent) breast.
- One or both** breasts can be absent due to:
 - cancer treatment
 - prevention of cancer
 - developmental or traumatic causes (less common)
- Breast reconstruction is optional.
 - can be **implant-based** or **tissue-based**.
- Extensive decision making is involved in determining the type and timing of breast reconstruction.

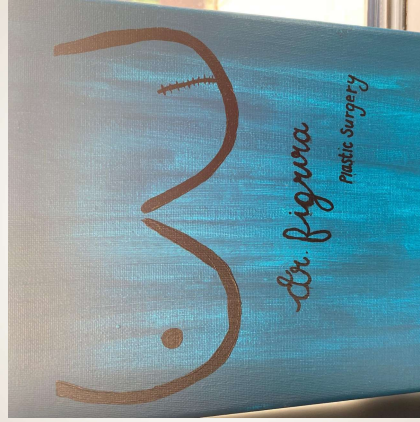
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Variables: What Incision? Keep Nipple?



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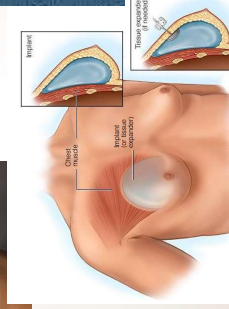
Options in Breast Reconstruction

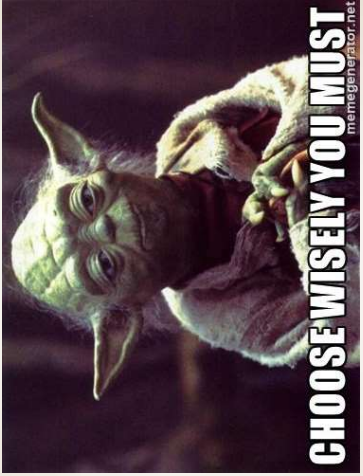
- No reconstruction
- Go Flat/Live Flat
- Camouflage Flat
- Implant based reconstruction
- Tissue based reconstruction



Options in Breast Reconstruction

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- Go Flat/Live Flat
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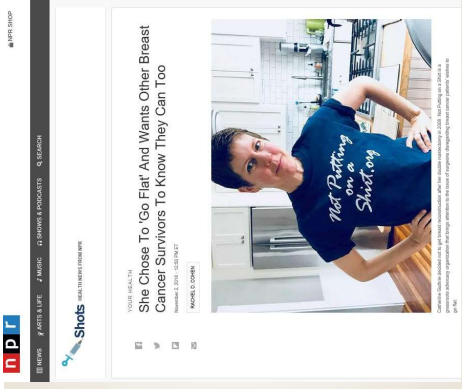
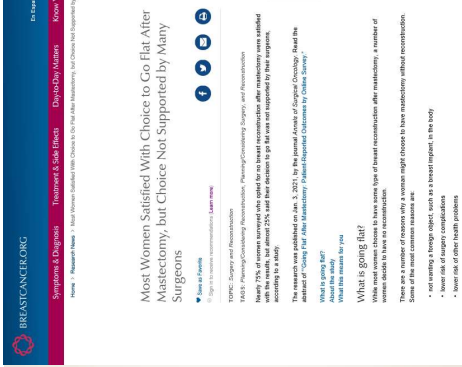


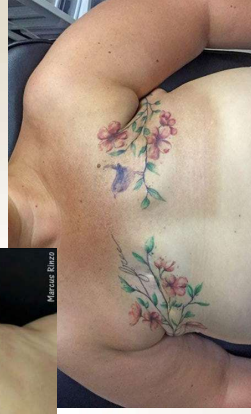
Agenda

- Introduction
- **No reconstruction**
- Implant based breast reconstruction
- Tissue based breast reconstruction
- Microvascular breast reconstruction
 - Patient Selection
 - Pre-Operative Preparations
 - Intraoperative Details
 - Inpatient Postoperative Course & Monitoring
 - Outpatient Postoperative Course & Monitoring
- Complications & Take Backs
- Review
- Test

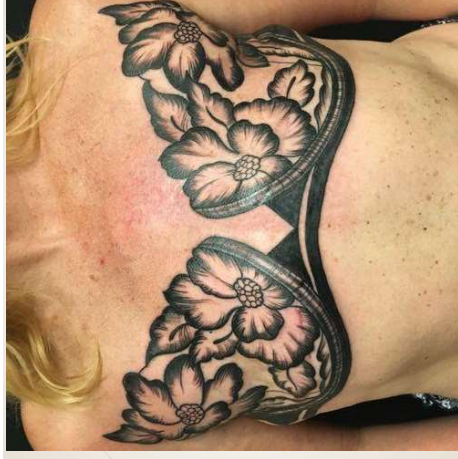
No Reconstruction

Going Flat/Living Flat vs Camouflage Flat





Marcus Pezz



Judith Morrow: Tattoo by Storm Wallin

'Reclaiming Their Beauty': Tattoo Artist Inks Exquisite Flowers Over Mastectomy Scars

APRIL 13, 2017 | By Michael Grecco

This artist is more than a generalist.
The first time a woman approached tattoo artist David Allen and asked him to ink her mastectomy scars, he says he "pretty declined."

He'd had surgery himself, and knew that scar tissue isn't the same — it's sort of like a wound that never fully heals. "I was like, 'I can't do this. I can't do this,'" he says. "I was like, 'I can't do this. I can't do this.'"

"It changed me. The gravity of the situation, watching her change," Allen says. "The way she carried herself, her posture, her smile, her joy were infectious. I was like, 'I can't do this. I can't do this.'"

"This artist is more than a generalist," Allen says. "The way she carried herself, her posture, her smile, her joy were infectious. I was like, 'I can't do this. I can't do this.'"



The artist is more than a generalist.



No Reconstruction



Why?

- Maintain sexual function on one side
- Simplest
- Lowest risk of complications
- No long term follow-up
- ? less expensive
- Often temporary plan
 - Wait til chemo over
 - Complete radiation therapy
 - Medical improvement
 - HgbA1c better
 - Liver enzymes better
 - WBC count has improved
 - Off anticoagulant
 - Stopped smoking
 - Better coping

No Reconstruction



No Reconstruction

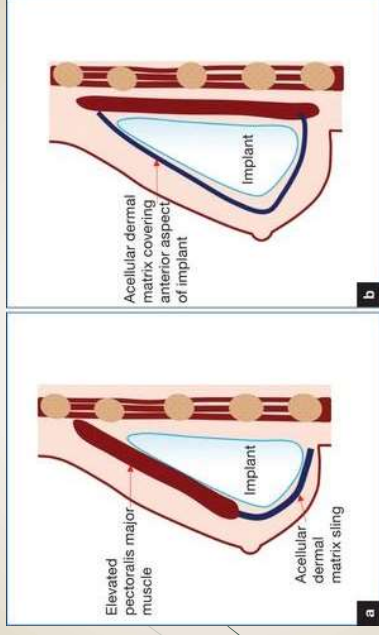
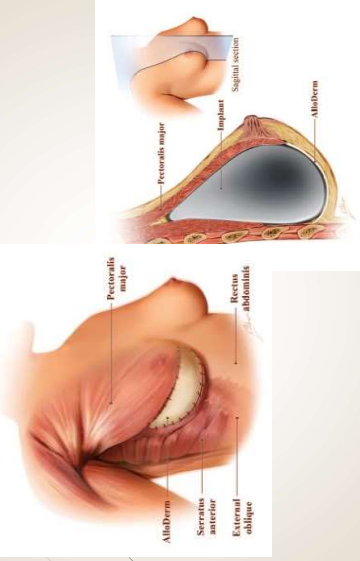


Options?

- Reduction/Lift on natural side
- Wear a prosthetic
- Forget about it
- ? Back/neck/shoulder pain
- Pursue autologous tissue
- Delayed reconstruction with 2 stage tissue expander to implant
- Prophylactic removal other side



Retro-pectoral Implant-Based Reconstruction (2006+)



British Journal of Hospital Medicine Vol. 81, No. 3 Symposium
Direct to implant breast reconstruction with biological acellular dermal matrices
Victoria Tooh: Gerald Gul Published Online 4 Mar 2020 <https://doi.org/10.12968/hmed.2018.0428a>

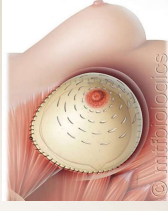
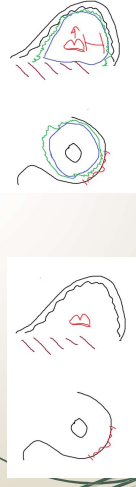
Retro-pectoral vs Pre-pectoral

	Retro	Pre
Vintage	Old	New
Rippling in cleavage	Better	Worse
Animation deformity		
When moving	Worse	Better
When still	Better	Worse
Muscular dysfunction	Worse	Better
Projection	Worse	Better
Lateral displacement	Worse	Better
Pain	Worse	Better
Radiation effect	Worse	Better
Flattened apex	Worse	Better
Cosmesis	Worse	Better
Support	Better	Worse
Changes with time	Worse	Better

One Step (Direct to Implant)

"Permanent" Breast implant placed same time as mastectomy

- Single operation
- May need a revision
- Surgeon chooses size
- Risk mastectomy flap necrosis
- Smaller breastst best



Two Step (Tissue Expander → Implant)



- Tissue Expander First Step
- Adjustable volume
- Can be light (if use air)
- Can sew to chest wall
- Patient gets to pick final size based on weight/projection
- Less mastectomy flap necrosis
- Better pocket control

Exchange to Implant Second Step

- Easy
- Often with fat grafting
- 2nd chance to make perfect
- 3-12 months later (diff deductible?)

Three Step (Reduction → TE → Implant)

- Lumpectomy + Reduction or Lift First Step
- Way to get to Nipple sparing mastectomy for some
- Looks better
- Easy early surgery
- But 3 steps
- ?Coverage/costpay considerations

- 1st - Breast Reduction +/- Lumpectomy
- 2nd - Mastectomy with Expander/ADM
- 3Rd - Exchange to implant +/- Fat Grafting



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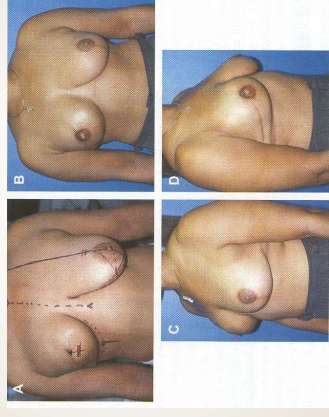
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 - Coverage/copy considerations



"I hope somebody here understands what she is saying"

Implant-Based Reconstruction with Balancing Procedure



Implant Reconstruction *

Pros

- Simple procedure
- Shorter operation & recovery time
- No additional major donor site morbidity
- Adjacent tissue skin matching
- Saves autologous tissue as salvage procedure

Cons (vs Autologous or Nothing)

- Foreign body sensation (1st 2 years)
- Multiple stages usually
- Implant risks
 - Rupture
 - Displacement
 - Infection
 - Contracture
 - Breast implant illness
 - Anaplastic Large Cell Lymphoma of the Breast
- Not lifelong devices

* Spear S. PRS Jan 2001, 107(1): 177-187

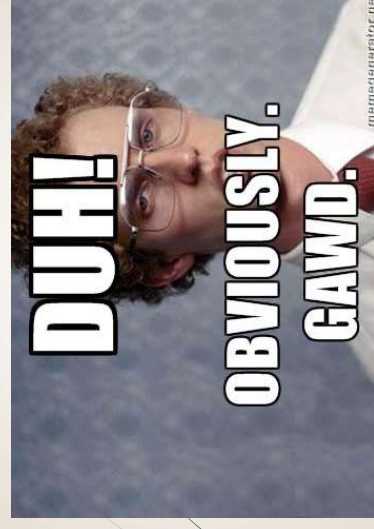
Implants



Implants



ROUND IS BETTER ANYWAY





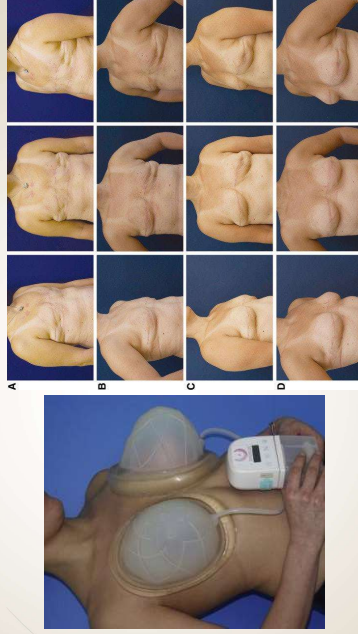
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- **Tissue based breast reconstruction**
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What is **tissue based** reconstruction?

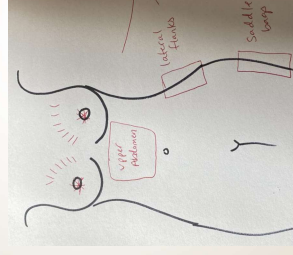
- Any reconstruction using the patient's own tissue to make or fill a breast mound without using an expander/implant.
- Total Autologous Fat Grafting
- Local Flap – as in Galdino's – Autoderm/excess mastectomy flaps buried and shaped
 - Pedicled Regional flaps
 - Latissimus Dorsi Myocutaneous flap or Muscle flap
 - Pedicled TRAM flap
 - Distant or Microvascular or FREE flap

Total Autologous Fat Grafting Breast Reconstruction with BRAVA



Autologous Fat Grafting

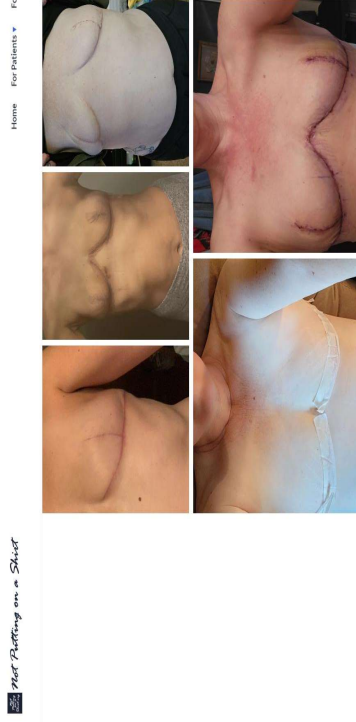
- Rarely used successfully as a total reconstruction
- Used as an adjunct to another base technique most frequently



Definition: What is a **Flap**?

- A **Flap** is a portion of tissue that is elevated and moved from one area to another - to solve a problem, defect or wound - while maintaining its own blood supply.
- A **Pedicle Flap** is when this tissue remains connected to its original blood supply by a named artery and vein that have been isolated.
- A **Free Flap** is when the target tissue is completely disconnected from its original blood supply and reattached to a recipient blood supply.
- This requires **microsurgical repair** of the artery and vein(s)
 - This means sewing the cut end of a donor vessel to a recipient vessel under the microscope.

True Goldilocks Reconstructions:



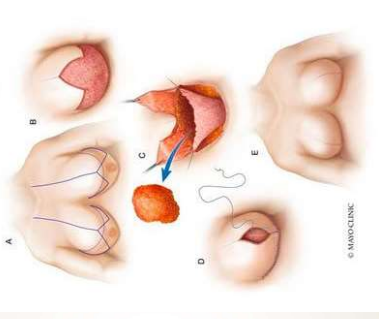
Goldilocks – Autoderm or buried excess mastectomy flaps

- **Goldilocks is technically reconstructing the entire breast:**

- Small breast:
 - To avoid concavity
 - To hold a bra down
- Large breast:
 - To make a mound

Often used as an adjunct tool in implant based reconstruction:

- To reinforce the lower pole
- Protect against implant exposure
- Increase reconstructive volume without the heaviness of silicone
- Improve shape



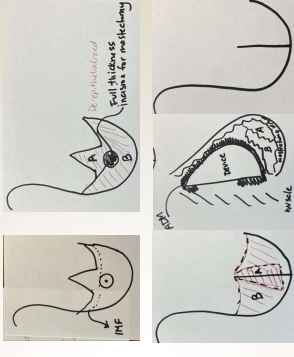
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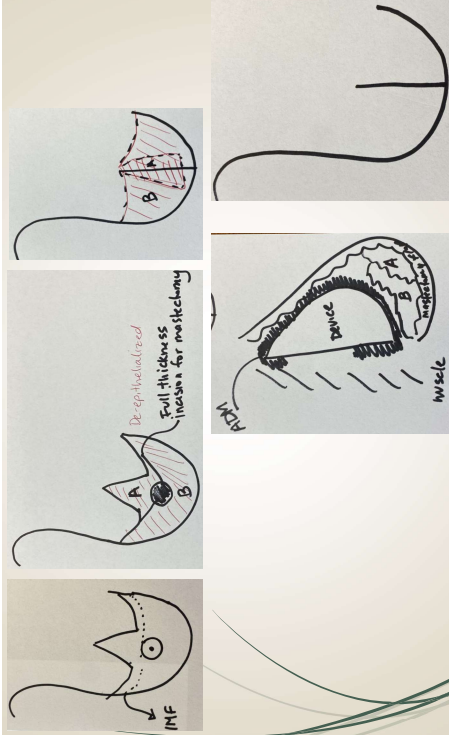
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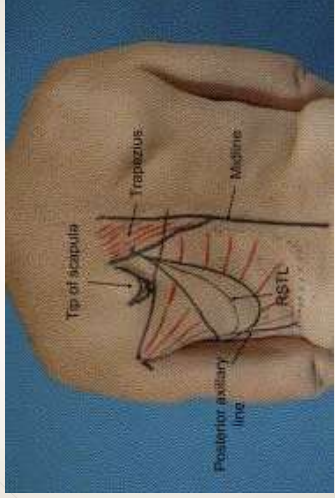


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Autologous Tissue Reconstruction – Pedicled Latissimus Dorsi (LD) Flap



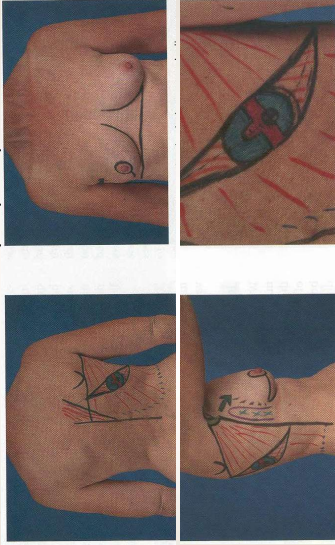
Credit: Dennis Hammond, MD

Autologous Tissue Reconstruction – Pedicled Latissimus Dorsi (LD) Flap



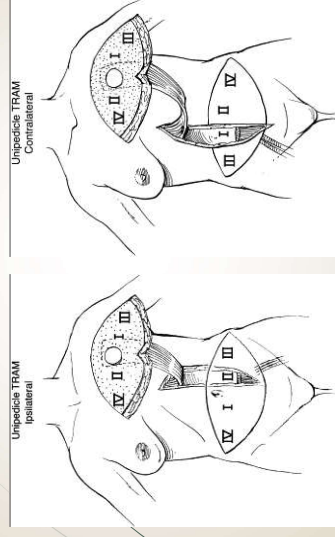
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Autologous Tissue Reconstruction – Pedicled Latissimus Dorsi (LD) Flap



Credit: Dennis Hammond, MD

Pedicled TRAM Flap



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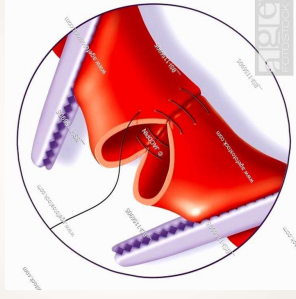
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The First Free Flap – Kidney Transplant



Definition: Microvascular Repair – Minute vessels sewn together under magnification



<https://previews.agedioblock.com/previewimage/medbigoff/b684c2596893bbda0202eb166f95c2bae-1156903.jpg>

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 - This means sewing the cut end of a donor vessel to a recipient vessel under the microscope.
- **Close monitoring during and after surgery is critical to monitor patency of the repaired vessels and success of the tissue transfer.**

Types of Microvascular Surgery:

- **Breast** Reconstruction **(new)**
- Oropharyngeal (ENT) Reconstruction
- Extremity Reconstruction
- Scalp Reconstruction
- Digit or other Replant
- Organ Transplant (Kidney/Liver)

New Program – **Microvascular Breast Reconstruction**

- This is a **NEW** program to bring microvascular TISSUE-BASED Breast reconstruction to our hospital
 - **Microvascular = Free Flap**
- Previously, patients were referred **out of state** to New Orleans, Mayo, Omaha (another newer program)
- Requires technical capabilities, **team approach**, significant preparation, commitment
- Started January 16, 2024
 - 13 Breast flaps. 1 loss at 12 days (7%)

Microsurgical **Breast** Reconstruction Team



■ Dr. Jason Fowler,
PhD



■ Jillian Nedved,
PA



■ Dr. Laura Figura



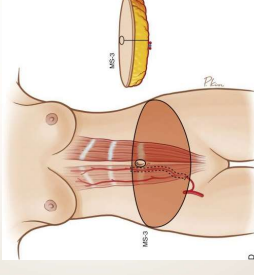
■ Brooke Munk,
NP

What are types of Microvascular Breast Reconstruction?

■ Abdominal Donor Site (**Most common and initial focus for new program**)

- Free Tram (more muscle used)
- Free Muscle Sparing Tram (minimal muscle used)
- Free DIEP (no muscle used)
- Groin Donor Site (Inner thigh)
- Free Gracilis
- Thigh Donor Site (Anterior thigh)
- Free ALT
- Buttock Donor Site
- Free SGAP or IGAP

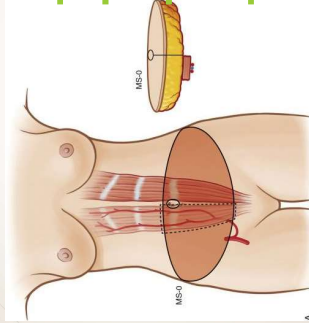
Abdominal Free Flap in Breast Reconstruction



- Tissue is completely disconnected based on isolated blood supply from one artery and 1-2 veins.
- The transferred tissue is re-attached under the microscope to donor vessels in the chest or axilla
- DIEP (pronounced "DEEP") = Deep Inferior Epigastric Artery Perforator Flap
- **A DIEP is depicted. No muscle is utilized or transferred to the breast.**

<https://dx.doi.org/10.1016/j.plast.2020.02.004>
9780323511148.pg9w#960

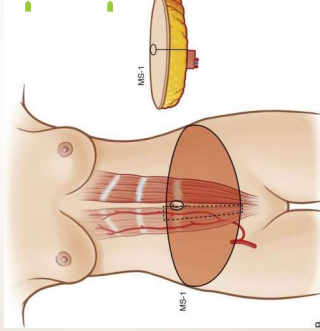
Abdominal Donor Site – Free TRAM



- Transverse Rectus Myocutaneous Flap (TRAM)
- **A Free TRAM is depicted. A portion of one rectus muscle is utilized/transferred to the breast.**
- More abdominal morbidity, but still tremendously less than a pedicled TRAM (which uses an entire rectus muscle)
- Occasionally necessary due to anatomic variations.

<https://dx.doi.org/10.1016/j.plast.2020.02.004>
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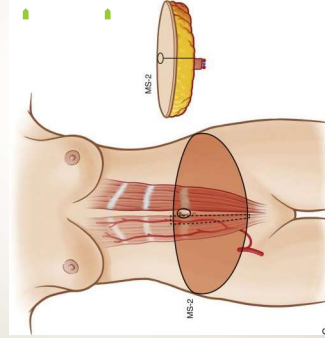
Abdominal Donor Site – Free Muscle Sparing TRAM (MS-1)



- **A muscle sparing TRAM is depicted. A strip of a portion of one rectus muscle is utilized/transferred to the breast.**
- Mild abdominal morbidity, often necessary due to the manner in which the target vessel traverses the muscle.

<https://dx.doi.org/10.1016/j.plast.2020.02.004>
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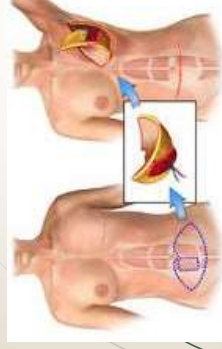
Abdominal Donor Site – Free Muscle Sparing TRAM (MS-2)



- **Another more muscle sparing TRAM is depicted. A narrow strip of a portion of one rectus muscle is utilized/transferred to the breast.**
- Minimal abdominal morbidity, often necessary due to the manner in which the target vessel traverses the muscle.

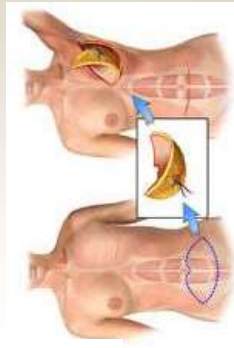
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Autologous Reconstruction – Microvascular TRAM vs DIEP

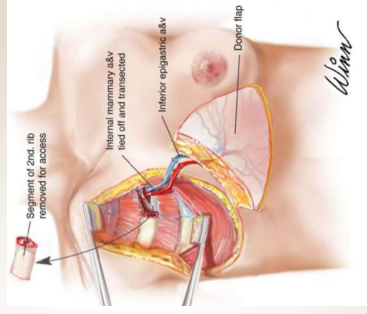
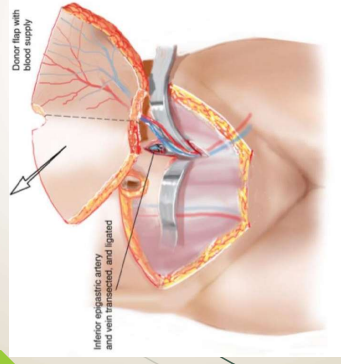


Above: Free TRAM to breast
May require a small amount of mesh in the abdominal donor site, but usually not.

Below: Free DIEP to breast
Fascial opening repaired primarily.

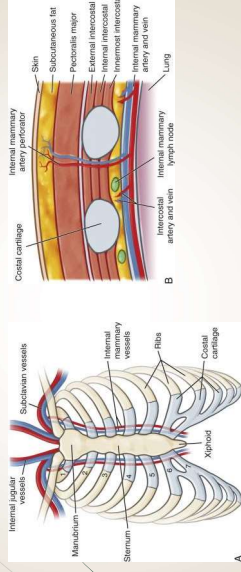


DIEP Flap Reconstruction



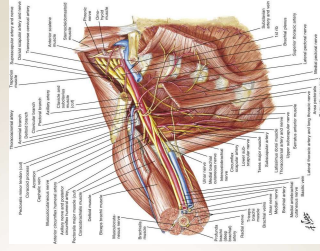
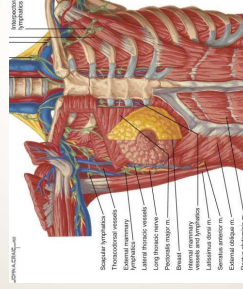
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Internal Mammary Perforators – Most Common Breast Recipient Vessels



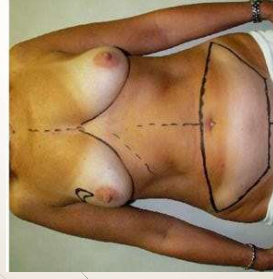
<https://i0.wp.com/plasticsurgerykey.com/wp-content/uploads/2020/02/H002-003b-9780323511148.jpg?w=960>

Thoracodorsal Artery & Veins – Secondary Recipient Vessels

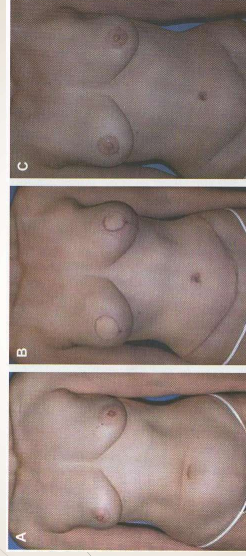


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Examples: Autologous Tissue Reconstruction – TRAM Flap



Examples: Autologous Tissue Reconstruction – TRAM Flap



Patient Guidance & Selection

Procedure Overview, Protocol & Pre-operative Education/Instructions

PLASTICS (BOWEN/PIRMOVAL) FREE FLAP PROTOCOL Rev. 1/16/2024

1. Preoperative testing (CBC, coagulation studies, etc.)
2. Preoperative counseling (discuss risks, benefits, and expectations)
3. Preoperative skin care (antibiotic ointment, etc.)
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Overview of Surgical Procedure:

- 6-8 Hours for one breast (one free flap)
- 12-18 Hours for two breasts (two free flaps)
- General anesthesia
- Two surgeons plus assistants
- Two surgical technicians
- 2-7 days inpatient (Avg 3-4 days)
- First 48 hours critical**
- Takebacks – 2-3 hours**
- Risks: Bleeding, infection, flap loss, partial flap loss, DV/PE, wound healing problems, need for further surgery (greatest in first 48 h), dissatisfaction, abdominal bulge, chronic pain, seroma, poor scars**
- All patients will need additional surgery** to refine the shape of the breast and for symmetry procedures

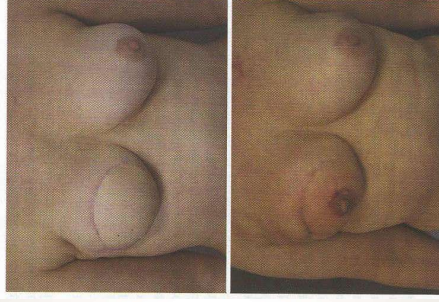
Patient Selection:

In general, patients undergoing microvascular tissue-based **Breast** reconstruction will be:

- Women
- Healthy
- An entire breast is absent (not partial breast defects)
- Finished with cancer treatments (if indicated)
 - Last radiation at least 6-12 months prior
 - Last chemo at least 3 months prior
- Delayed (not at same time as the mastectomy)
- Have other factors disfavoring implant based reconstruction
 - Prior failure or dissatisfaction
 - Aversion to implant based
 - Younger age

Autologous Tissue → Post operative Radiation Therapy Effect

This is why all patients will have completed their radiation treatments at least 6-12 months prior to microvascular reconstruction



Intra-Operative Portion

Set-up, Prep, Order of Operation, Dressings

Intra-Operative Details: Anesthesia & Room Set Up

- Warm room to 72 degrees
- If pt temp >37.5, can turn down ambient temp
- Aqua K warming pad on bed
- Position: Supine, Arms out
- secured with warm blanket and Kefix roll
- Rotate arms, legs, head Q 30 mins
- Position on bed allows "sit up" to 45 degrees
- SCD's on
- Lower body Bair Hugger
- Foley w/ Urometer/Temp Probe
- Microscope opposite operative side

- 5,000 units SQ heparin in thigh **in pre-op**
- Peripheral IV x 2 (either or both arms ok)
- Decadron 10mg IV at beginning
- Muscle relaxants ok
- Support pressure with fluid, albumin first
- Pressors ok, **please discuss with surgeon if considered**
- Redose Abx q 3-4 hours (Ancef or Clinda)
- Wake up patient in semi-fowler position like a tummy tuck
- Avoid coughing or HTN at wake up

Intra-Operative Details: Set-Up & Prep

One Main Set up:

- See Case Card "Figura Plastic Free Flap" & "Fowler Abdomen Harvest" (**Don't need any other PICKS**)

Trays to open:

- Plastics & ENT combined Micro Tray
- Plastics Tray

Two Mayo Stands:

- Two surgeon teams working simultaneously
- One at breast, one at abdomen
- White towels on the mayos

Two Bowie Machines:

- Label each Bowie & Unit – Tiger print for Fowler.
- Start 40/40 blend on both, bipolar 12

Prep/Drape:

- Use Trimmers to shave mons to anterior vulvar commissure
- Chloroprep (Chin to mid thigh to sides of bed, axillas last)
 - If the patients abdomen is loose, you may need to lift the parrnus while prepping
- Betadine to prepubic area
- Sticks
- Universal Drapes
- Will place white surgical towels around micro field before anastomosis

Intra-Operative Details: Meds

On the Surgical Field:

- Exparel** 20 mg, Bupivacaine 0.25% plain and 100cc of saline (mix/open after micro complete)
 - Inject with 10cc syringes x 2 and 22 gauge needles x 2
- Heparin saline** (5000 units in 500cc of injectable saline) **in fluid warmer**
- Saline (in fluid warmer)
- Bone wax in wrapper

In the Room/Available:

- Aspirin** 300mg rectal suppository (end of case)
- ICG** (Indocyanine Green 25mg/10ml) for SPY
 - Dosed 1 ml at a time on Surgeon directive
- CathFlo Activase (**Alteplase**) (for thrombolysis)
 - Now stocked in Main OR Pyxis
 - 2.2 mg vial, reconstitute with 2.2 ml sterile water → 1mg/ml solution
- Papaverine** 40mg/2ml (for vasospasm)

Alteplase (tPA)

Each vial of Cathflo Activase contains 2.2 mg of Alteplase (which includes a 10% overfill). 77 mg of L-arginine, 0.2 mg of polysorbate 80, and phosphoric acid for pH adjustment. Each reconstituted vial will deliver 2 mg of Cathflo Activase, at a pH of approximately 7.3.

Reconstitute Cathflo Activase to a final concentration of 1 mg/mL:

- Aspirically withdraw 2.2 mL of Sterile Water for Injection, USP (diluent is not provided). Do not use Bacteriostatic Water for Injection.
- Inject the 2.2 mL of Sterile Water for Injection, USP into the Cathflo Activase vial, directing the diluent stream into the powder. Slight foaming is not unusual; let the vial stand undisturbed to allow large bubbles to dissipate.
- Mix by gently swirling until the contents are completely dissolved. Complete dissolution should occur within 3 minutes. **DO NOT SHAKE.** The reconstituted preparation results in a colorless to pale yellow transparent solution containing 1 mg/mL Cathflo Activase at a pH of approximately 7.3.

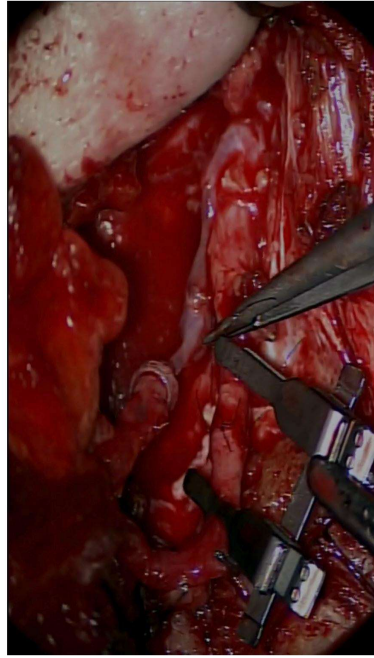
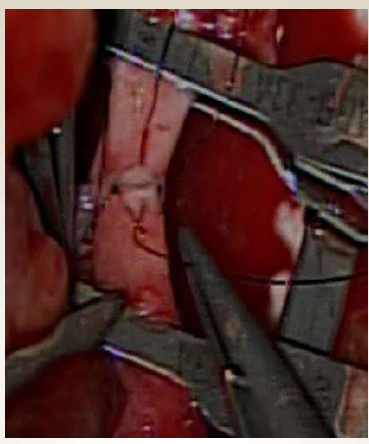
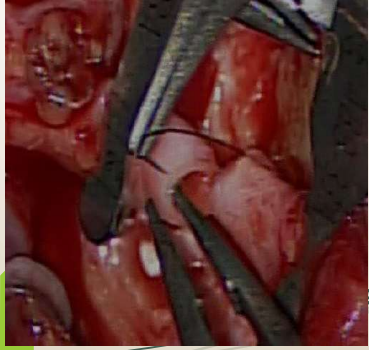
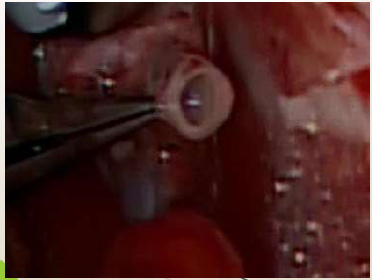
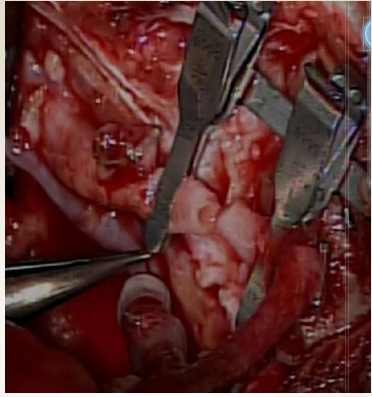
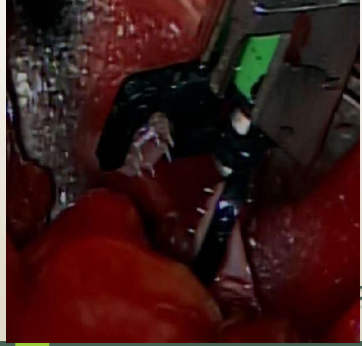
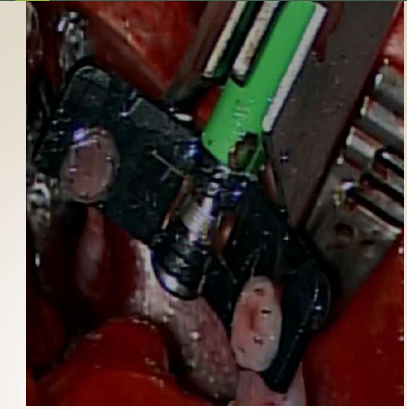
Final reconstitution is 2.2mg in 2.2cc of solution (1mg/ml)

Inject or flush artery with:

- 0.5cc (0.5mg) q 4 mins with vein open
 - or 2cc (2mg) slowly over 1 min q30 mins x 2 (up to 40mg, 40cc) with vein open
- or Stroke dosing is 0.9mg/kg of flap weight
 - (need to weigh or estimate)
 - injected into pedicle artery, infused into A/V clamped flap for 3 minutes, then systemic circulation
- Use within 4 hours after reconstitution

Case Order: General

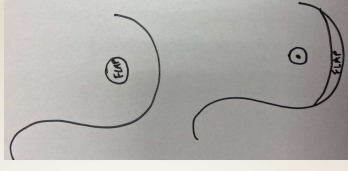
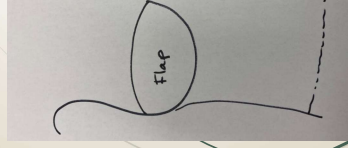
- Surgeon 1 – Develop donor site on the abdomen, select and isolate donor vessels on each side.
- Surgeon 2 – Prepare operative breast, remove medial third rib, expose and isolate recipient internal mammary vessels
- MICRO Time Out – Prepare to harvest donor flap
 - No one will count or enter/leave the field for next 45 minutes or so
- Dock the microscope, Inject 5000 units IV Heparin, Wait 3-5 minutes, Harvest flap
- Surgeon 1 & 2 – Microvascular anastomosis with white mayo stand/instruments
- Surgeon 2 – Inset flap
- Repeat all steps (flipping sides)**
- Surgeon 2 – Inset flap
- Surgeon 1 – Close abdomen
- Apply dressings
- Insert 300mg rectal aspirin
- Emerge from anesthesia



Post-Operative Monitoring INPATIENT SETTING

Where Does Patient Go After Surgery?

- **Personal handoff** from surgeon to next person
- Patient goes to Neuro Critical Care directly
 - (if bed is available)
 - Patient waits in PACU if no bed available
- Later, patient may go to 1 west if necessary



Possible exposed skin paddles:

Plastic Surgery Microsurgical Breast Reconstruction Infographic



Dr. Jason
Fowler, PhD
1-218-428-
9987 or
Voalle



Dr. Laura
Figueroa
1-814-464-
6255 or
Voalle

Goals:
Comfortable patient
Hydrated
Normotensive

Hospitalist: for med
mgmt

LOOK

- Assess Color of flap.
- Check drain color/volume

LISTEN

- Doppler signal within an inch of the blue stitch

FEEL

- Temperature
- Turgor – look for congestion, swelling, change in size of flap

DECIDE

- Is it the same as last check? → If not sure, CALL

PERSONAL HANDOFF

- Surgeon to nurse, then shift changes/lunch breaks, do assessment together at the bedside

Flap Monitoring

■ **PERSONAL HANDOFF WITH PRIOR NURSE/DR**

■ **Pencil Doppler Probe**

- Sanitized handheld pencil Doppler dedicated to the patient at the bedside.
- Every hour x first 24H
- At the blue suture or within 1.5cm
- Some DIEPs do not have a Doppler signal

■ **Color Assessment**

- Check the visible skin paddle and compare to the abdominal donor site skin.
- Same color as donor site (good)
- A little more red (hyperemic – good, but watch)
- White or pale (**bad if different**)
- Blue or purple tinged or darker (bad)

■ **Temperature Assessment**

- Same (good)
- Cold (bad)

Nursing Goals

Global Assessment → Objective Measurement → Flap Effects

- **Comfortable** → Pain 0-6 → Better perfusion
 - Pained → vasoconstricted → Worse perfusion/Flap problems
- **Hydrated** → NI urine output → Better perfusion
- **NI blood pressure** → Better perfusion
 - Low pressure (systolic <90, diastolic <40) → Poor perfusion/arterial thrombosis
 - High pressure (systolic >160, diastolic >100) → Bleeding events

Capillary Refill

- You may be asked to stroke the flap to check capillary refill if present
 - SOME DIEPs DO NOT HAVE CAP REFILL
 - Use a pen or narrow instrument
 - Stroke the skin paddle lightly and watch the pattern of blanching and refill
 - No blanching (bad)
 - Fills rapidly (bad)
 - Fills equal to surrounding skin (good)
 - Fills slowly (bad)



Visual Confirmation of Flap Status

- The **MOST** important aspect of flap monitoring is to pass off the flap to the next person **with a SHARED evaluation**
 - Visually inspect the flap together
 - Color, temp
 - Listen to the Doppler signal together
 - Where do you hear it best?
 - Does it have the same quality?
 - Triphasic sound? Monophasic?
 - Is it the same?
 - Changes are the most concerning
- **If the flap is the same as when it was passed off to you (and the same as when it was passed off from the surgeons) then it is OK**

Venous changes to a flap (red → purple)



[https://www.researchgate.net/publication/327152228/figure/fig/4/AS:11437811742638167055@150548444204/venous-congestion-in-a-free-flap.jpg](https://www.researchgate.net/publication/327152228/figure/fig/4/AS:11437811742638167055@1505484444204/venous-congestion-in-a-free-flap.jpg)

Window of Greatest Risk

- Most free flaps that fail do so in the first 24H
- **Timely detection and intervention** are key to salvage
 - **Must restore blood flow ideally within 4H**
- Flap loss decreases exponentially over following 7-10 days

Post-Op Recovery

1st 24H

- Flap checks q1H
- Strict Ins and Outs
 - Foley
- **Strip** & record drain output for each drain
 - Note color, turbidity, blood clots
 - Sudden increase in drain output that is dark/thick → suggests hematoma
- Aspirin
- Strict Bedrest
- Head of Bed elevated/Semi-Fowler Position
- Advance diet as tolerated
- Hospitalist for general care
 - (BP control, BS mgmt., etc.)

2nd 24H (if doing well)

- Foley out
- Up to chair, ambulating
- Flap Checks Q2H
- PT/OT/DC planning

3rd 24H (if doing well)

- Maybe home or Flap checks Q4-8H
- Ok to shower

Takebacks → Start Over

I think something's wrong – (Quickly)
Preparing for the Phone Call

- Check the **vitals**
 - Note the current HR (heart rate) and BP (blood pressure)
 - Is it different than when the flap was doing better?
- Check the **urine output**
 - When did patient urinate last and how much?
 - Does the patient feel the need to urinate now?
- Know your **assessment**
 - Flap: Pencil Doppler, Color, Temperature +/- Cap Refill
 - Patient: Comfortable/pained, Hydrated, Mentating.
- **ASAP** Call Dr. Laura Figura or Dr. Jason (Jay) Fowler – Cell or Voolte

This is a venous congested, likely non-salvageable flap



<https://www.researchgate.net/publication/327152228/figure/fig/4/AS:11437811742638167055@150548444204/venous-congestion-in-a-free-flap.jpg>

Outpatient Complaints:

- **Flap has changed color**
- Increase in drain output or color or surgical site swelling suggestive of acute bleeding/new onset hematoma
 - Gather information from patient by phone **immediately:**
 - How far out from surgery?
 - When was problem noted?
 - What exactly do they see? Don't waste a lot of time waiting for pictures
 - Where is the patient geographically?
 - When did they eat last?
 - **Contact surgeon (Dr. Fowler or Dr. Rigau) immediately by phone**
- Sudden shortness of breath, acute chest pain, leg or arm swelling → go to ED/Call 911 [R/o DVT/PE]
 - Keep in mind that the only area not treated with Exparel will be near the sternum on the operative side where a rib will be removed. This pain will not show up abruptly—it will be present since surgery and may gradually worsen as the Exparel wears off.
- Urinary symptoms (pain, burning, hesitancy, difficulty urinating) → consider UTI, contact PA/NP
- Other symptoms → contact PA/NP
- Patient isn't sure, something seems different → contact PA/NP, after expedited appt

Agenda

- Introduction
- No reconstruction
- Implant based breast reconstruction
- Tissue based breast reconstruction
- Microvascular breast reconstruction
 - Patient Selection
 - Pre-Operative Preparations
 - Intraoperative Details
 - Inpatient Postoperative Course & Monitoring
 - Outpatient Postoperative Course & Monitoring
 - Complications & Take Backs
- **Review**
- Test

Symmetry Procedures

Surprise topic!



"Make 'em Match"

(Twins vs. Sisters)

- Nipple reconstruction
- Fat grafting
- Lifts
 - Shape problem
 - Reductions
 - Too big or big
 - Augmentations
 - Too small
- Combo procedures
 - Augmentation mastopexy



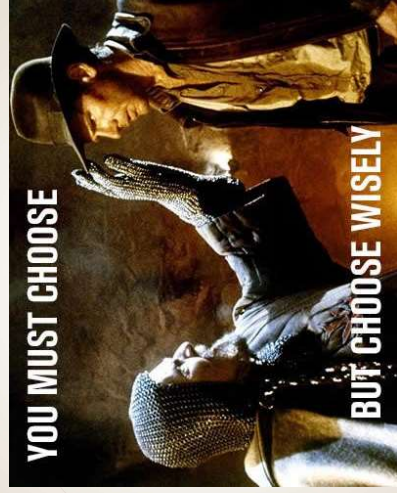
Flood Lights vs. Head Lights



...we didn't discuss today:

- Aging
- Weight change
- Radiation effects
- Breast Implant Illness
- Complications
- Dissatisfaction
- Need for further surgery

...and THAT's why
consultations take soooo
long!



Review

Key Concepts

Key Concepts in Free Flaps: LOOK FOR **CHANGES**

- Flaps will be monitored **hourly for 24 hours**.
 - Q2H after 24-48H, then likely Qshift
- **Color** of the flap should be similar to abdominal donor site
 - Blue or purple is consistent with venous problem
 - Very pale is consistent with arterial problem
 - Slightly red is normal, but could be early sign of venous problem
- **Temperature** of the flap should be similar to surround skin
 - Cold is consistent with arterial problem
- **Pencil Doppler signal** should be audible at the blue suture on the skin paddle.
 - Or within 1.5 cm of the stitch due to positioning
- **Shift Change: Flaps must be handed off at the bedside with shared exam**
- **Call Dr. Figura or Dr. Fowler ASAP** with concerns
- **4H ideal window to restore perfusion!**

Parting Thoughts

- A team approach to breast reconstruction is very important
 - Every person plays a role
- The Decision Making Tree in breast reconstruction is highly individualized
- Diligent **post operative monitoring** and excellent **team communication** are **critical** for free flap survival.
- **Education, advance planning** and **problem solving** does not completely ensure a smooth endeavor, but it does make it **more likely**.

Test

You must answer 4 of 6 questions correctly to avoid personal humiliation.

1-How do you usually monitor a **free flap** in the hospital?

- A - Color of the flap
- B - Temperature of the flap
- C - Doppler signal at the blue stitch
- D - Evaluation for changes
- E - All of the above

2 - Which is **best** if you have a concern over **free flap** viability?

- A - Call the hospitalist
- B - Call the On-Call plastic surgery provider
- C - Call Dr. Figura or Dr. Fowler ASAP
- D - Observe

3 - A **free flap** will **usually** be monitored visually and with Doppler every hour for 24 hours.

- A - True
- B - False

4 - All breast reconstruction patients will have a history of cancer

- A - True
- B - False

5 – Inpatient handoff to the next nurse must include visually checking the free flap and listening to the Doppler signal (if initially present) together at the bedside.

- A – True
- B – False

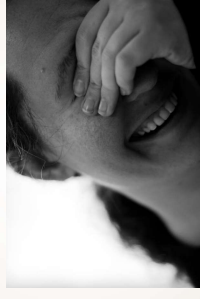
6 – My work monitoring free flaps in the post operative period is critical and deeply appreciated by the patients and the surgeons.

- A – True
- B – False

BONUS – My work **caring compassionately** for patients in the post operative period is important and deeply appreciated by the patients and the surgeons.

- A – True
- B – False

If you just experienced personal humiliation by not passing the test...



If you just experienced personal humiliation by not passing the test...



YOU NEED MORE CAFFEINE!!

“

Whatever you do, do it all
for the glory of God

1 Corinthians 10:31

”
*Thank you for your attention to the details of this learning exercise...
...and for your work ensuring the success of this program – for the patients, for
the surgeons and for Avera.*

Additional References:

- Khansa, et al. A systematic approach to emergent breast free flap takeback: clinical outcomes, algorithm and review of literature. *Microsurgery* 33:505-513, 2013
- Knoedler et al. Postoperative free flap monitoring in reconstructive surgery – man or machine?. *Front Surg*, 2023;10: 1130566
- Griffin, John R and Thornton, James F. *Microsurgery: Free tissue transfer and replantation. Selected Readings in Plastic Surgery*, 2005, Volume 10, Number 5, Part 2

Questions?

