

# **Current Options in Breast Reconstruction**

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# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- OVERVIEW
- IMPLANT RECONSTRUCTION
  - SINGLE-STAGE
  - TWO-STAGE
  - ALLODERM
  - RADIATION CONSIDERATIONS
- FLAP RECONSTRUCTION
  - THE EVOLUTION OF TRAM TO DIEP
  - OTHER FLAPS
    - GRACILIS (THIGH)
    - GLUTEAL
    - OTHER
  - RADIATION CONSIDERATIONS

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# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- 1<sup>st</sup> PRIORITY: BREAST CANCER TREATMENT
  - ❖ There are always reconstructive options regardless of adjuvant treatment

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- **GOALS OF BREAST RECONSTRUCTION**

- ❖ Symmetry

- ❖ As life-like as possible

- ❖ Breasts of the patient's desired size

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- FAQ #1

❖ “What is the BEST type of breast reconstruction?”

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- There is no single BEST type of breast reconstruction
- The decision is extremely personal and individual
  - ❖ What is “best” for you may not be “best” for someone else

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- The choice of reconstruction should be made once all the options are explained and understood

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- **RECONSTRUCTIVE OPTIONS**

- ❖ **IMPLANTS**

- *Single- vs. Two Stage*

- ❖ **AUTOGENOUS TISSUE  
("FLAPS")**

- *Autogenous = patient's own*

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

## ● **IMPLANT RECONSTRUCTION**

### ❖ **Advantages** (*compared to autogenous tissue*)

- Shorter operating time, shorter hospitalization
- No donor site
  - No donor site scar
  - Less pain

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

## ● **IMPLANT RECONSTRUCTION**

### ❖ **Disadvantages**

- Implant complications:
  - Capsular contracture
  - Implant rupture
    - ❖ Approximately 1% year
  - Implant rippling
  - Implant displacement
- Higher rate of late re-operation
- Lower long-term satisfaction

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Breast reconstruction with **FLAPS**
  - ❖ Advantages
    - More life-like than implants
      - Normal response to age & gravity
    - No Implant = no implant complications
    - Long-term benefits
      - Less likely to need later surgery
      - Higher long-term satisfaction rate

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Disadvantages of breast reconstruction with flaps
  - ❖ Magnitude of procedures
    - Longer hospitalization and recovery
  - ❖ Donor site morbidity
    - Scars
    - Pain
    - Weakness

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- IMPLANT RECONSTRUCTION

- ❖ History

- Subcutaneous vs. Submuscular
- When and why do you need tissue expansion?

- ❖ Alloderm

- ❖ Seri Scaffold

- ❖ Silicone vs. saline

# *HISTORY OF BREAST RECONSTRUCTION WITH IMPLANTS*

- 1962
  - ❖ First use of silicone implant for breast reconstruction
  - ❖ Implants placed in mastectomy defect
  - ❖ Early results encouraging
  - ❖ Longer-term problems

# *HISTORY OF BREAST RECONSTRUCTION WITH IMPLANTS*

- FAQ #2

❖ “Why does the implant go under the muscle?”

# *HISTORY OF BREAST RECONSTRUCTION WITH IMPLANTS*

- Early technique placed implant in subcutaneous position
  - High rate of complications and re-operation
    - Implants became “hard” (CAPSULAR CONTRACTURE)
    - Implants visible beneath the skin
    - Malposition
    - Infection

# *HISTORY OF BREAST RECONSTRUCTION WITH IMPLANTS*

- TISSUE EXPANSION
  - ❖ Not simply stretching
  - ❖ Creates new tissue
- Allows formation of a sub-muscular pocket for the implant

# *HISTORY OF BREAST RECONSTRUCTION WITH IMPLANTS*

- SUB-MUSCULAR RECONSTRUCTION

- ❖ More tissue covering the implant

- Less visibility of rippling
- Lower rate of complications
  - Capsular contracture
  - Malposition
  - Infection
  - Re-operation

- ❖ Most common technique for breast reconstruction in the US and the world

# ALLODERM

- Decreases or eliminates postoperative expansion
- Provides total coverage
- Defines the lower and lateral border of the breast
- Permanent protection and support

# ALLODERM

- A reconstructive tissue matrix
  - ❖ Derived from human dermis
  - ❖ Aseptic process preserves structure
- Intended for use in soft tissue repair procedures including breast reconstruction and hernia repair
- Alloderm becomes revascularized and replaced by patient's own tissue
  - ❖ Optimizes aesthetic results
  - ❖ Minimizes risk of some complications

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- SINGLE STAGE (ALLODERM + IMPLANT)
  - ❖ Total skin-sparing mastectomy
    - Nipple is preserved
  - ❖ Women who do not want to change breast size
  - ❖ More difficult for larger breasts
- TWO STAGE (ALLODERM + TISSUE EXPANDER)
  - ❖ When more skin is needed
    - Following mastectomy
      - Nipple is taken
    - Women who want to increase breast size

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Alloderm complications
  - ❖ Seroma formation
  - ❖ Infection
  - ❖ Implant loss
- Seri scaffold
  - ❖ Alternative material
  - ❖ FDA approved
  - ❖ Silk mesh
  - ❖ Multi-center trial

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Tissue expansion + implants
  - ❖ Disadvantages
    - Increased time to complete reconstruction
    - More doctor visits
    - Two operations (at least)
    - Symmetry is difficult to achieve in unilateral reconstruction
    - Implant complications: capsular contracture, displacement, rupture, etc

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Latissimus Dorsi Flap
  - ❖ Developed in 1970's
  - ❖ Requires the use of an implant
  - ❖ Can be done as single-stage reconstruction
  - ❖ Does not always require tissue expansion

# Latissimus Dorsi Flap for breast reconstruction

- Ideal for women who:
  - ❖ Have minimal tissue available for flap reconstruction
  - ❖ Are not ideal candidates for tissue expansion
    - History of radiation therapy
    - History of failed tissue expansion

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- FAQ #3

❖ “How will radiation therapy affect my result?”

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- RADIATION THERAPY CONSIDERATIONS

- ❖ Radiation damages small blood vessels in the skin
- ❖ Higher rate of capsular contracture and all other implant related complications
- ❖ Tissue expansion is not possible following radiation

# *RADIATION THERAPY CONSIDERATIONS IN IMPLANT RECONSTRUCTION*

- Complete tissue expansion before radiation therapy begins
  - ❖ Much easier to accomplish when expander is partially expanded at the time of mastectomy, i.e. with Alloderm

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- FAQ #4

❖ “Should I choose saline or silicone gel implants?”

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Silicone gel implants
  - ❖ More life-like
  - ❖ Less rippling
  - ❖ Less capsular contracture
  - ❖ Do not deflate when ruptured

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- Saline implants
  - ❖ Adjustable volume
  - ❖ More rippling
  - ❖ Will deflate if leak/rupture

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- BREAST RECONSTRUCTION WITH IMPLANTS

## ❖ CASE EXAMPLES

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  - **THE EVOLUTION OF TRAM TO DIEP**
  - **OTHER FLAPS**
    - **GRACILIS (THIGH)**
    - **GLUTEAL**
    - **OTHER**
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# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- FLAP CHOICES

- ❖ Depends on the patient

- ❖ Abdominal wall most common

- “Tummy-tuck” at donor site

- TRAM flap

- Developed early 1980’s

# TRAM flap

- Transverse
- Rectus
- Abdominis
- Myocutaneous

PEDICLED (NON-MICROVASCULAR) TRAM FLAP

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# TRAM flap

- Supplied by perforators through the rectus abdominis muscle
  - ❖ Dual blood supply

# TRAM flap

- Based on perforators through the rectus abdominis muscle
  - ❖ Dual blood supply

# TRAM flap

- Based on perforators through the rectus abdominis muscle
  - ❖ Dual blood supply



# Pedicled Flaps in Breast Reconstruction

- **Pedicle TRAM**
  - ❖ Supplied by superior epigastric artery
  - ❖ DIEA divided
  - ❖ Division of intercostal segmental vessels and nerves

# Pedicled Flaps in Breast Reconstruction

- **Pedicle TRAM**
  - ❖ Muscle and fascia harvested
  - ❖ Multiple intercostal nerves to muscle divided
  - ❖ Flap rotated to chest

# TRAM flap

- Advantages (*true of all abdominal flaps*):
  - Best tissue match for breast reconstruction
  - No implant
  - Donor site appearance (tummy-tuck)

# TRAM flap

- Disadvantages
  - ❖ Magnitude of procedure
    - Longer hospitalization and recovery
    - Postoperative pain
  - ❖ Fat Necrosis (*firm areas in flap*)
    - 10 – 40%
  - ❖ Donor site morbidity
    - Uni-pedicle: 25% pain/weakness at one year
      - Bi-pedicle: ?
    - Hernia rate 10 – 15%

# Microsurgical (“Free”) TRAM

- Uses deep inferior epigastric vessels
- Small portion of rectus abdominis muscle / fascia
- Fewer nerves divided

# TRAM flap

- Pedicled vs. Microsurgical (“Free”)
  - ❖ “Free” TRAM (*microvascular transplant*)
    - Better blood supply → less fat necrosis
    - Better blood supply → larger flap possible
    - Better blood supply → use in smokers, obese patients, other high risk situations
    - Less muscle harvested → Less donor site morbidity

# Microsurgical Flaps

- Disadvantages
  - Need for special training, instrumentation, operating room team, postoperative care
  - Microsurgical complications
    - Thrombosis (clot) → take-back to surgery to correct
      - ❖ Re-operation rate 5%
      - ❖ Flap loss in breast reconstruction 1%

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- **DIEP FLAP**

- ❖ Usually first choice for patients choosing autogenous reconstruction

- Best donor site

- Scar well-hidden
- Flap harvest may improve aesthetics (“tummy-tuck”)

# **DIEP flap**

- **D**eep
- **I**nferior
- **E**pigastric
- **P**erforator

# Muscle-Sparing Autogenous Breast Reconstruction

- Deep Inferior Epigastric Artery Perforator Flap (**DIAP** flap)
  - ❖ Dissect artery through rectus abdominis muscle
  - ❖ Preserves muscle and nerves
  - ❖ Less pain
  - ❖ Better abdominal wall function

# *MICROSURGICAL BREAST RECONSTRUCTION*

- **DIEP**

- ❖ Perforators  
identified on  
anterior  
surface of  
rectus fascia

# *MICROSURGICAL BREAST RECONSTRUCTION*

- **DIEP**

- ❖ Perforators  
dissected  
through rectus  
muscle
- ❖ Muscle, fascia,  
motor nerves  
preserved

# *DIEP FLAP BREAST RECONSTRUCTION*

- **Why bother?**

- ❖ **Pedicle TRAM:**

- Denervates rectus

- Postop pain and weakness

- 25% at one year

- ❖ Lejour et al, *PRS 87:1054, 1991*

- ❖ Mizgala et al, *PRS 93:988, 1994*

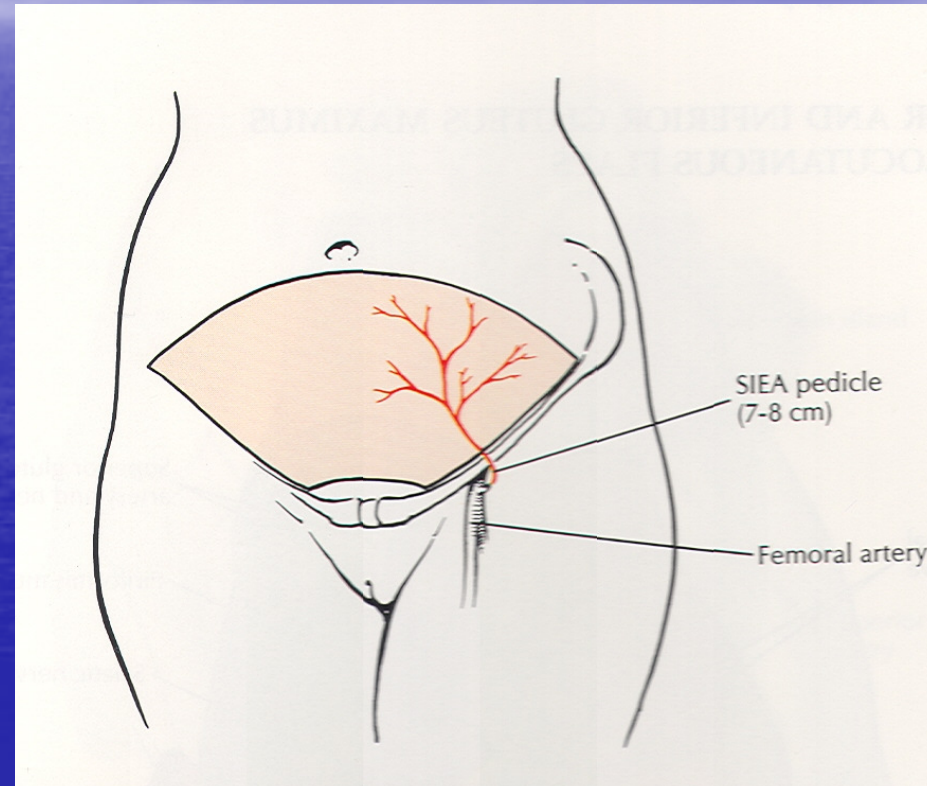
- ❖ Kind et al, *PRS 99:417, 1997*

# *DIEP FLAP BREAST RECONSTRUCTION*

- Why bother?
  - ❖ **Pedicle  
TRAM**
    - Fat necrosis
      - 15 – 40%
    - Ventral hernia
      - 10 - 15%

# Superficial Inferior Epigastric Artery ("SIEA") flap

- ❖ Branch of Femoral Artery
- ❖ Superficial to abdominal fascia



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# Superficial Inferior Epigastric Artery ("SIEA") flap

❖ Superficial artery large enough to use for breast reconstruction in 10 - 15%

## ❖ Advantages

- No fascial incision
- Shorter harvest time
- Even less pain & morbidity

# Superficial Inferior Epigastric Artery ("SIEA") flap

- Disadvantages
  - ❖ Artery size
  - ❖ Flap supplied by SIEA is lower and more lateral than DIEP
  - ❖ Blood supply not reliable across the midline
    - Limits flap size

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- What are the options if the abdominal wall is unavailable?
  - ❖ Other Microsurgical Flaps
    - Gluteal Flaps (buttock area)
    - Gracilis Flaps (inner thigh)
    - Other
  - ❖ Latissimus dorsi
    - Requires implant

# Other Microsurgical Flaps for Breast Reconstruction: **Gluteal Flaps**

- Main indication is lack of enough abdominal tissue
- Several Disadvantages
  - ❖ Donor site issues
  - ❖ Increased OR time due to need for re-positioning
  - ❖ Vessel dissection complicated by large venous plexus usually present

# Gluteal Flaps

- Donor site issues
  - ❖ Can cause deformity
  - ❖ Asymmetry in unilateral cases
  - ❖ IGAP Exposure of sciatic nerve

# Other Microsurgical Flaps for Breast Reconstruction

- **Gracilis flap**

- ❖ Myocutaneous (*muscle + skin*)
- ❖ Small muscle at medial thigh
- ❖ Minimal donor site morbidity

# Other Microsurgical Flaps for Breast Reconstruction

- Gracilis myocutaneous flap
  - ❖ Used in patients who:
    - Lack abdominal tissue (e.g. have already had a TRAM flap)
    - Have minimal abdominal tissue and adequate medial thigh tissue

# Gracilis Myocutaneous Flap for breast reconstruction

- Compared to abdominal flaps
  - ❖ Vascular pedicle is shorter and smaller than the DIEA
  - ❖ Blood supply to the subcutaneous fat is less reliable
    - Especially distal skin and fat
  - ❖ Donor site scar more visible

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- RADIATION THERAPY CONSIDERATIONS

- ❖ 35 – 45% OF RADIATED FLAPS REQUIRE A SECOND MAJOR PROCEDURE

- ❖ IF POSSIBLE, PERFORM FLAP AFTER RADIATION THERAPY

- 6-12 months

# *CURRENT OPTIONS IN BREAST RECONSTRUCTION*

- SUMMARY

- ❖ Although there are always options available for breast reconstruction, there is no single best technique for all patients
- ❖ All options should be discussed

**■ THANK YOU!**

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