SKIN MESHER EDUCATIONAL WEBINAR FOR TISSUE BANK RECOVERY AND PROCESSING

- AGENDA:
  - ANATOMY OF SKIN
  - INTRODUCTION OF BURN INJURIES
  - BRIEF OVERVIEW OF TREATMENT
  - BACKGROUND ON MESHING
  - MESHER EDUCATION AND USE
  - EXSURCO/4MED MESHER PRODUCT REVIEW

exsurco® medical

INTRODUCTION EXSURCO MEDICAL

- Our goal is to help generate additional value for the Tissue Bank professional and promote better overall patient outcomes by enabling the following from tissue donors:
  - Greater quantities of skin (yield)
  - fewer quantities of recovered skin to be discarded
  - better quality of skin grafts recovered and processed
  - easier skin recovery and processing procedures
- AATB Affiliate Member
- Corporate Sponsor of Donate Life America

Amber McAfee MBA, CTBS, CTP, CWCMS

- Amber is the subject matter expert for the webinar and the Director of Sales, Tissue Banks and Life Sciences at Exsurco Medical.
- She brings more than 17 years' experience in the tissue bank and organ recovery industry.
- Amber served as an officer for the International Society For Organ Preservation, and has been its Executive Director for the last 7 years.

Debra Kurtz BA, BS, MBA

- Moderator of the event and healthcare industry expert
- She is the president of Kurtz Consulting Inc. which provides healthcare organizations with sales and marketing solutions
- www.DebraKurtz.com

Kurtz Consulting Inc.
Strategic Sales & Marketing Solutions

This presentation contains photographs of actual clinical case studies. Some may find these pictures graphic.

SKIN FACTS

- Largest organ of the human body
- Covers 19 square feet - average adult
- 2 square centimeters of skin contains:
  - 10 meters of blood vessels
  - 25 nerve endings
  - 2 million living cells

Stole this picture from a Glenn Greenleaf, LifeCell presentation.

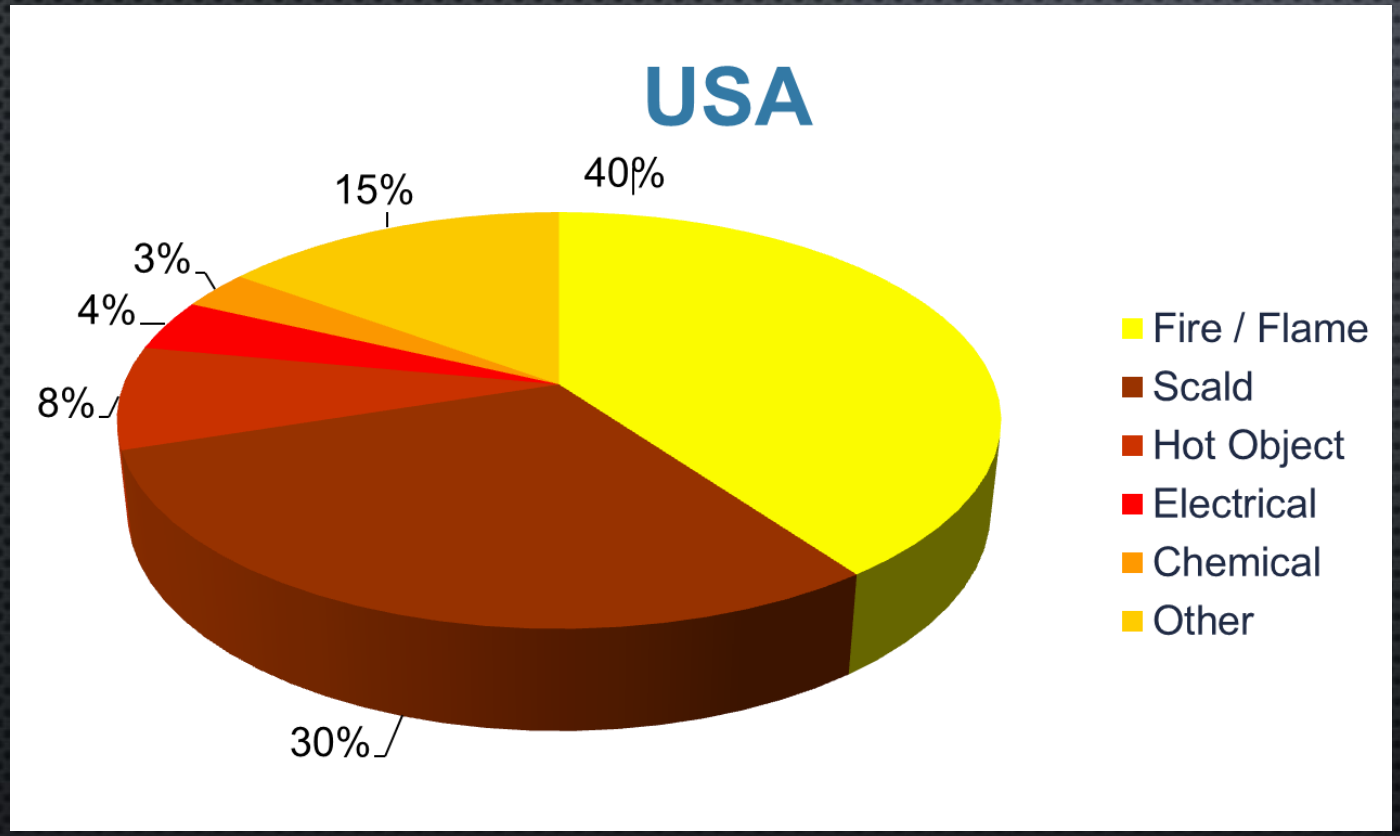
Skin function

- Protects the underlying tissues
- Maintains integrity of internal environment
- Temperature control
- Sensory organ
- Identifies individuals

What is a Burn?

- An injury to tissue caused by a thermal agent
- Causes of Burns
  - Sun
  - Fire
  - Heat
  - Hot liquid
  - Electricity
  - Lightening
  - Radiation
  - Chemical Agent
  - Frostbite

BURN CARE



- More than 700,000 burn injuries in the USA annually that require treatment by a healthcare professional
  - Approximately 35,000 individuals are admitted to hospitals
  - Each year 4,500 people die from burn injuries

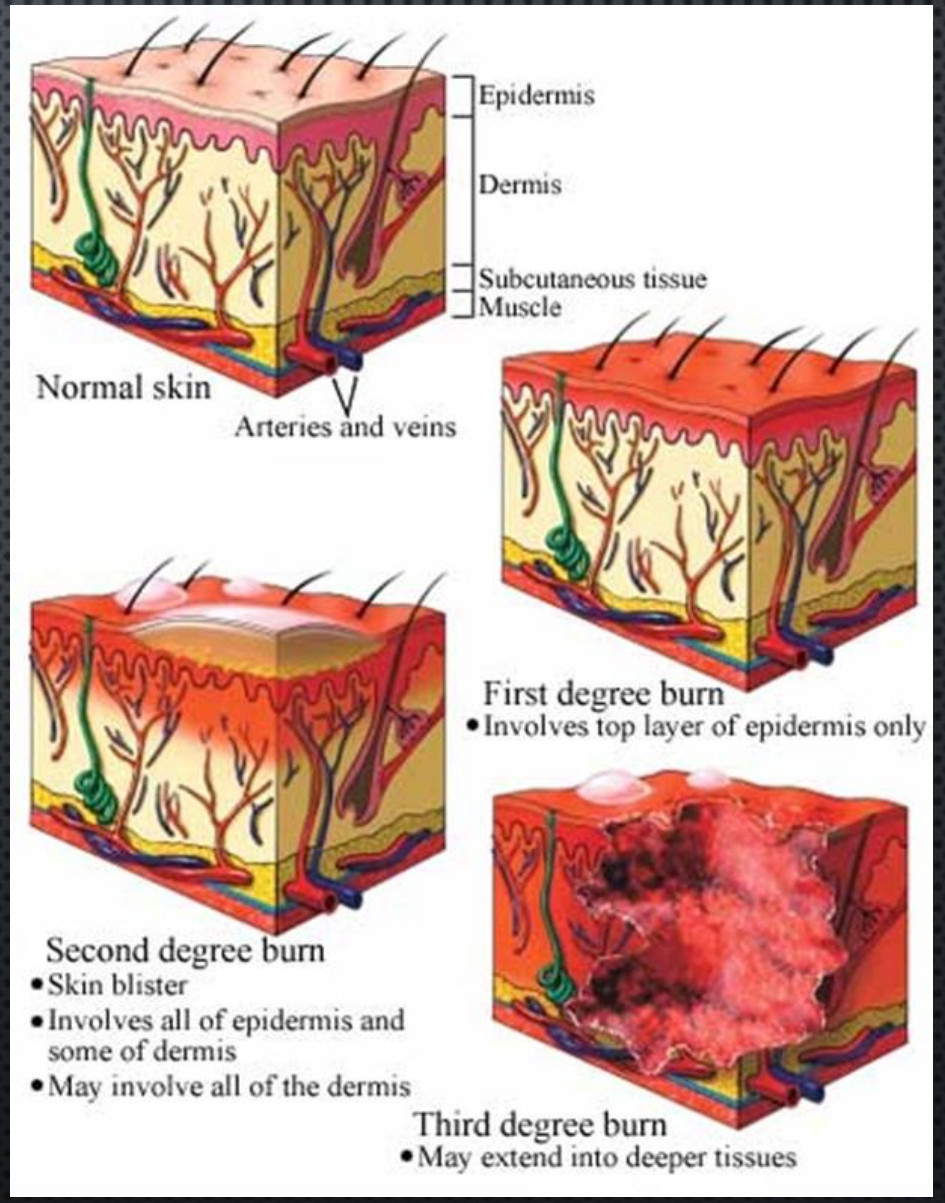
(Source: Herndon, David L.; *Total Burn Care*)

- The majority of burn care can be provided safely in an outpatient setting
  - Most small burns will heal completely on their own if kept free from infection

Courtesy of: AlloSource, Denver, CO

BURN CARE

- SPLIT THICKNESS ALLOGRAFT SKIN FOR BURNS
  - PRIMARILY FOR 3RD AND 4TH DEGREE BURNS
  - USED TO PREPARE WOUND BED
  - USED AS A TEMPORARY COVERING / BRIDGE
  - PRESERVES AUTOGRAFT SKIN USE
  - CAN BE USED TO SECURE AUTOGRAFT
- APPLIED TO DEBRIDED TISSUE
  - SURGICAL EXCISION OF INJURED TISSUE
  - MESHED TO ALLOW EXPANSION AND EXUDATE DRAINAGE
- GRAFT EVENTUALLY IS SLOUGHED OFF AND IS REPLACED
  - WITH AUTOLOGOUS SKIN GRAFT
  - WITH A SKIN SUBSTITUTE



Courtesy of: AlloSource, Denver, CO

BURN INJURIES

3rd Degree Burn

A full-thickness burn, extends through all layers of the skin and damages tissue and nerve endings just beneath the skin

Texture: Stiff and white or brown, no blanching under pressure, leathery and dry

Sensation: Painless (nerve endings are damaged or destroyed)

Approximate Time to Heal: Several months, requires specialized burn treatment, full function may not be restored in some cases

2nd Degree Burn

Also known as partial-thickness burn, damaging some on the underlying skin/flesh layers

Texture: Redness with clear blisters, skin blanches (turns white) under pressure, damaged area feels moist

Sensation: Extremely painful, injury site remains very sensitive to touch, slight hot and cold

Approximate Time to Heal: 2-3 weeks

1st Degree Burn

A burn affecting only the superficial (outermost) layers of skin.

Texture: Redness, some irritation, no blistering

Sensation: Moderate "stinging" pain

Approximate Time to Heal: 5 to 10 days

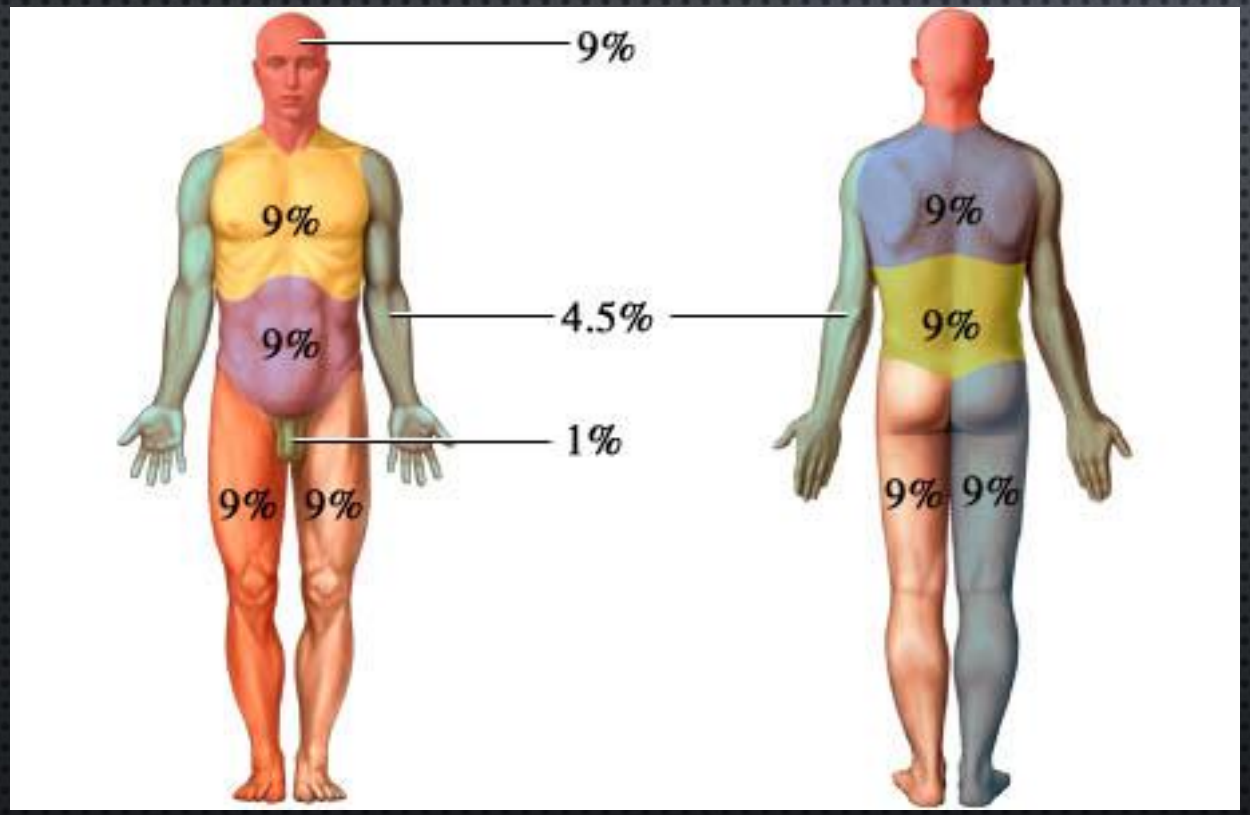
4th Degree Burn

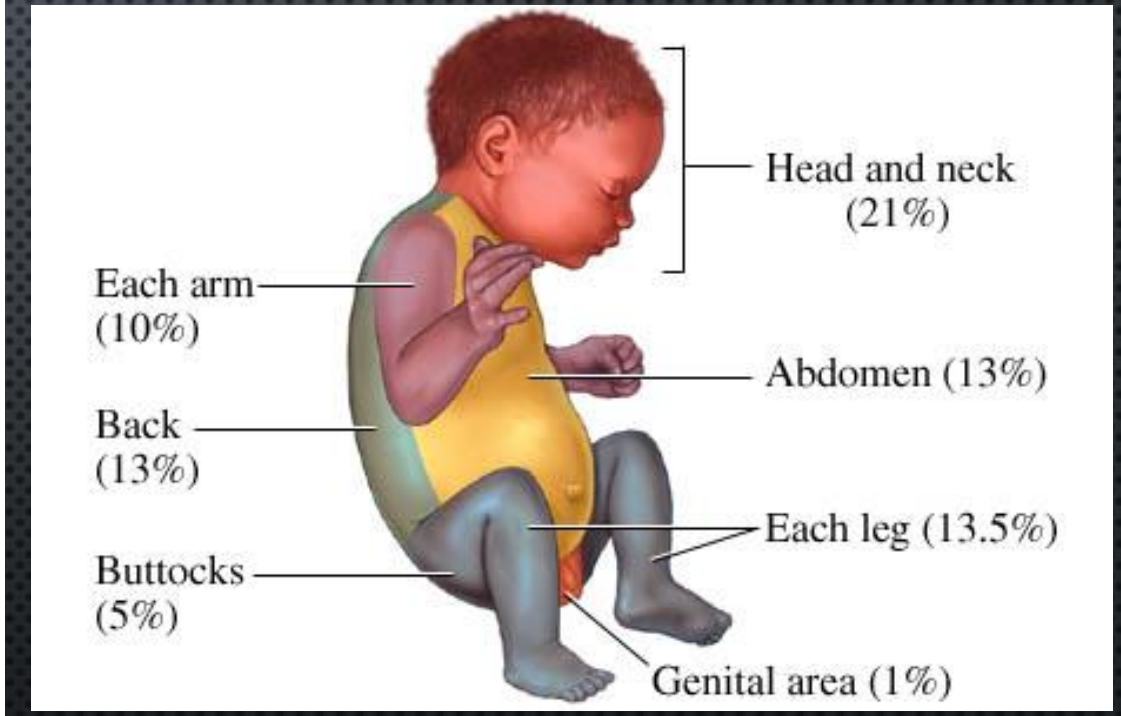
A severe burn extending beyond the skin and into underlying fat, muscle, or bone

Another Dimension of Severity: Size of the Burns

- Burns are evaluated based on the percentage of total body surface area (TBSA) of the wound.
- Burns of greater than 10% TBSA in children and 15% TBSA in adults are potentially life threatening.
- Palm Measurement

BURN DIAGRAM - RULE OF 9"S





What determines patient prognosis

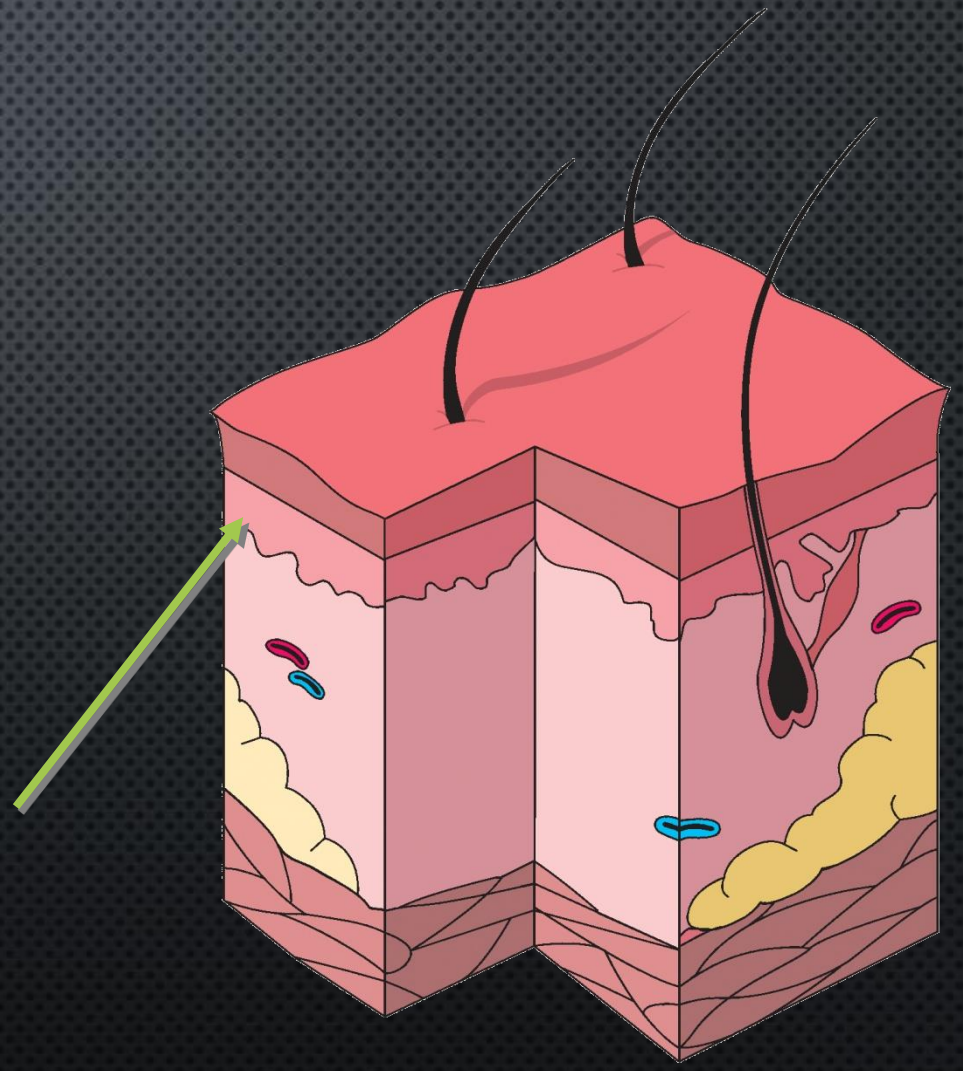
- Extent of the burn
- Age of the patient
- Severity of medical complications
- Quality of care available
  - Adult patients with greater than 40% TBSA burns that are not treated in a specialty burn care facility are most likely not going to survive

Goals of Wound Healing for the Burned Patient

- Survival
- Pain Control
- Restore function through replacement of burned dysfunctional skin with *autologous* functional tissue
- Prevent Scarring
- Removal or minimizing of scarring and its effects

First degree or superficial burn

- Involves only epidermis
- Skin is red
- Painful
- 7-10 days to heal
- Minimal or no residual scarring



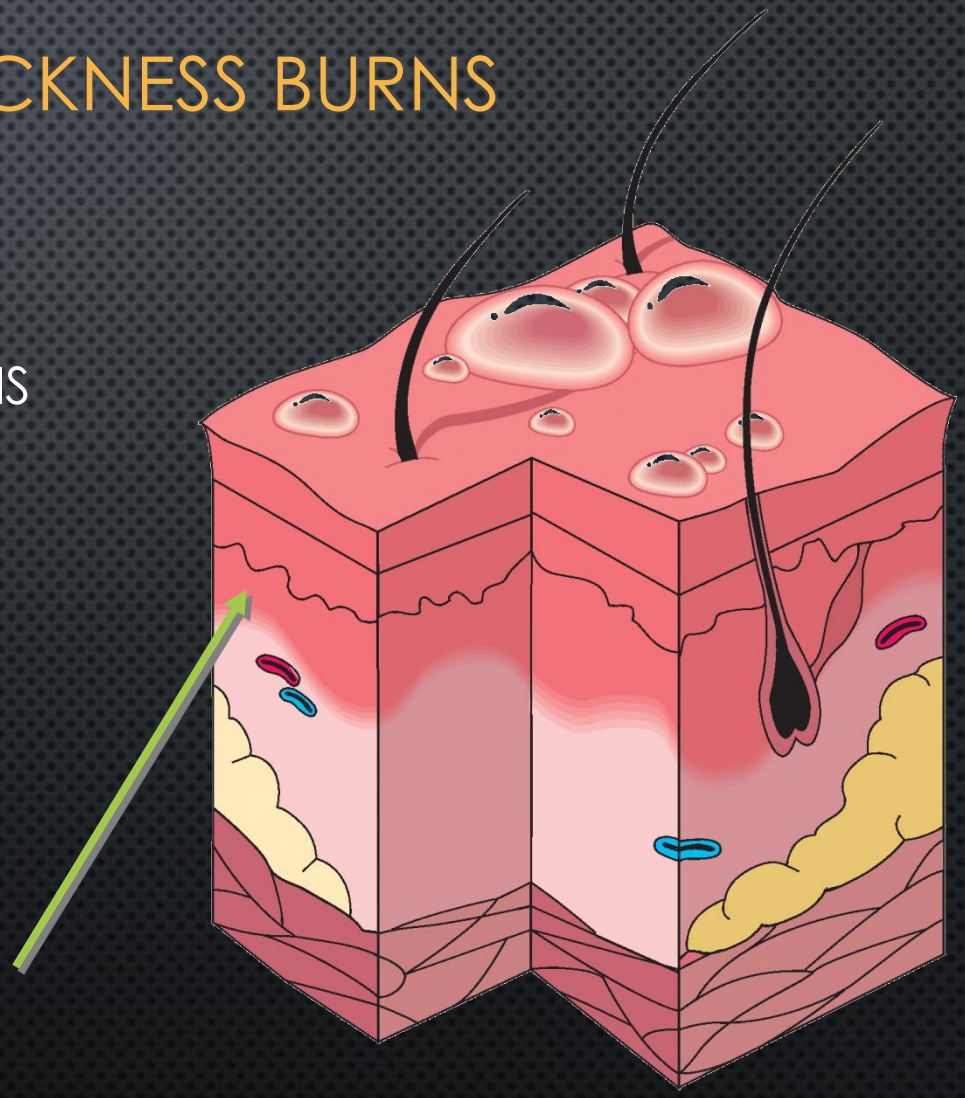
First degree burns (superficial burn)

Causes include:

- UV radiation
- Scald
- Brief flash

SECOND DEGREE OR PARTIAL THICKNESS BURNS

- INVOLVES EPIDERMIS AND PART OF THE DERMIS
- SKIN IS RED, BLISTERED, SWOLLEN
- PAINFUL
- MAY/MAY NOT HEAL IN 2-3 WEEKS
- MAY/MAY NOT HEAL WITH SCARRING



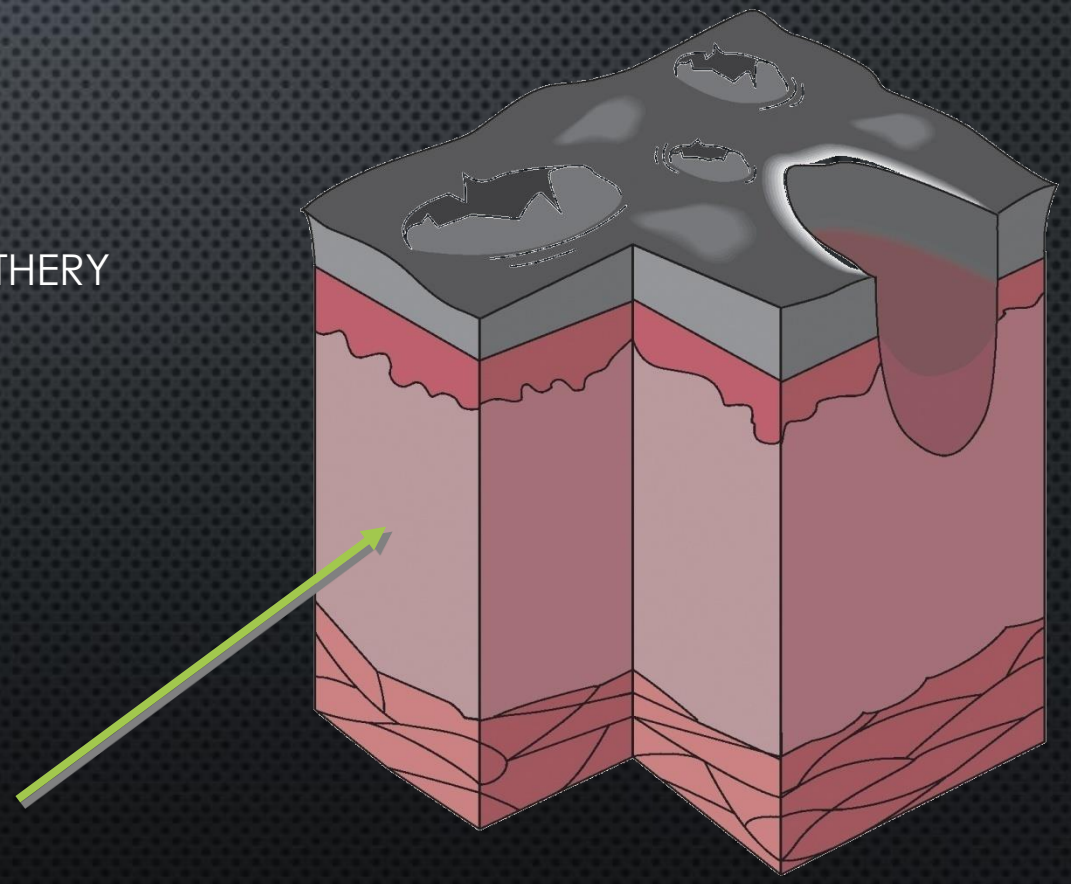
SECOND DEGREE OR PARTIAL THICKNESS BURNS

CAUSES INCLUDE:

- FLAME
- SCALD
- CHEMICAL
- CONTACT

Third Degree or Full Thickness Burns

- Involves all of epidermis and dermis
- Whitish or charred appearance, tough and leathery
- Sensation is lost
- Takes several weeks to heal
- Will result in scarring



Third degree or full thickness burns

Causes include:

- Flame
- Scald
- Chemicals
- Tar
- Contact
- Electricity

FOURTH DEGREE BURNS OR DAMAGE TO ORGANS, BONES, TENDONS, ETC UNDER THE SKIN

FACIAL BURNS

TYPES OF GRAFTS

- STSG-A split-thickness skin graft (STSG) is composed of the top layers of skin (the epidermis and part of the dermis). The graft is placed over an open wound to provide coverage and promote healing.

- Meshed STSG-If a skin graft is passed through a meshing device made from two metal rollers, it will insert multiple fenestrations (holes) into the skin graft, allowing the surface area to be dramatically increased. A graft which originally measured 5x5cm, may be doubled or tripled in size. This avoids the need to recover large areas of skin and spares the patient a large donor site wound.

- FTSG-A full thickness skin graft (FTSG) includes the epidermis and entire dermis but no subcutaneous fat. Because the entire thickness of skin is taken, the graft donor site must be closed primarily.

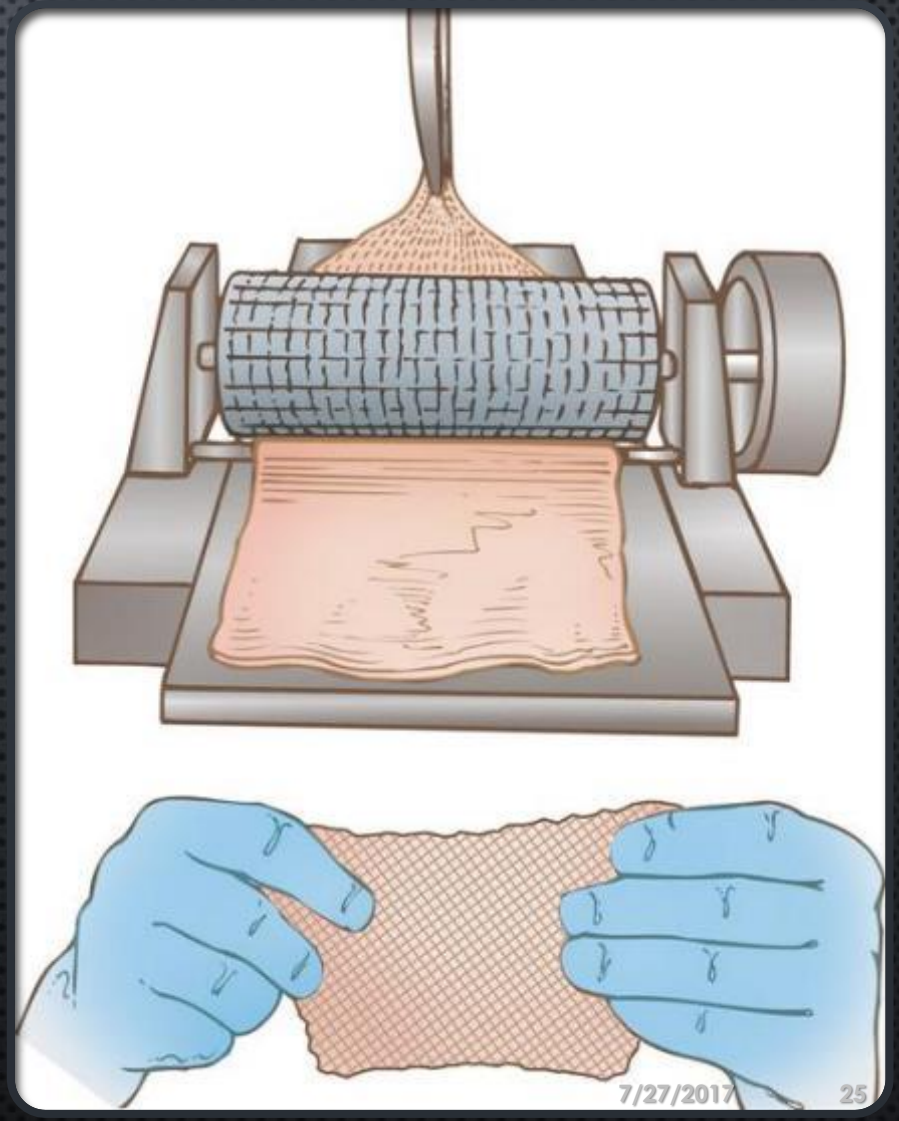
500 BC

- Reconstructed noses that had been mutilated as punishment for theft and adultery

- Skin grafts obtained from buttocks slapped with a wooden panel until red and congested, then cut with a leaf

SKIN GRAFT MESHING

- THE FIRST DOCUMENTATION OF A MODERN SKIN GRAFT IN HUMANS WAS BY CARL BUNGER IN 1823
- THE SUCCESS OF SKIN GRAFTS WAS LOW DUE TO INEFFICIENT RECOVERY AND USE OF LARGE AND THICK GRAFTS
- THE METHOD OF MESHING GRAFTS CAN BE TRACED BACK TO LANZ IN 1907, WHO DESIGNED A CUTTING TOOL CONSISTING OF A SERIES OF SMALL KNIVES MOUNTED IN PARALLEL TO MAKE MULTIPLE HOLES IN A GRAFT, FORMING A MESH

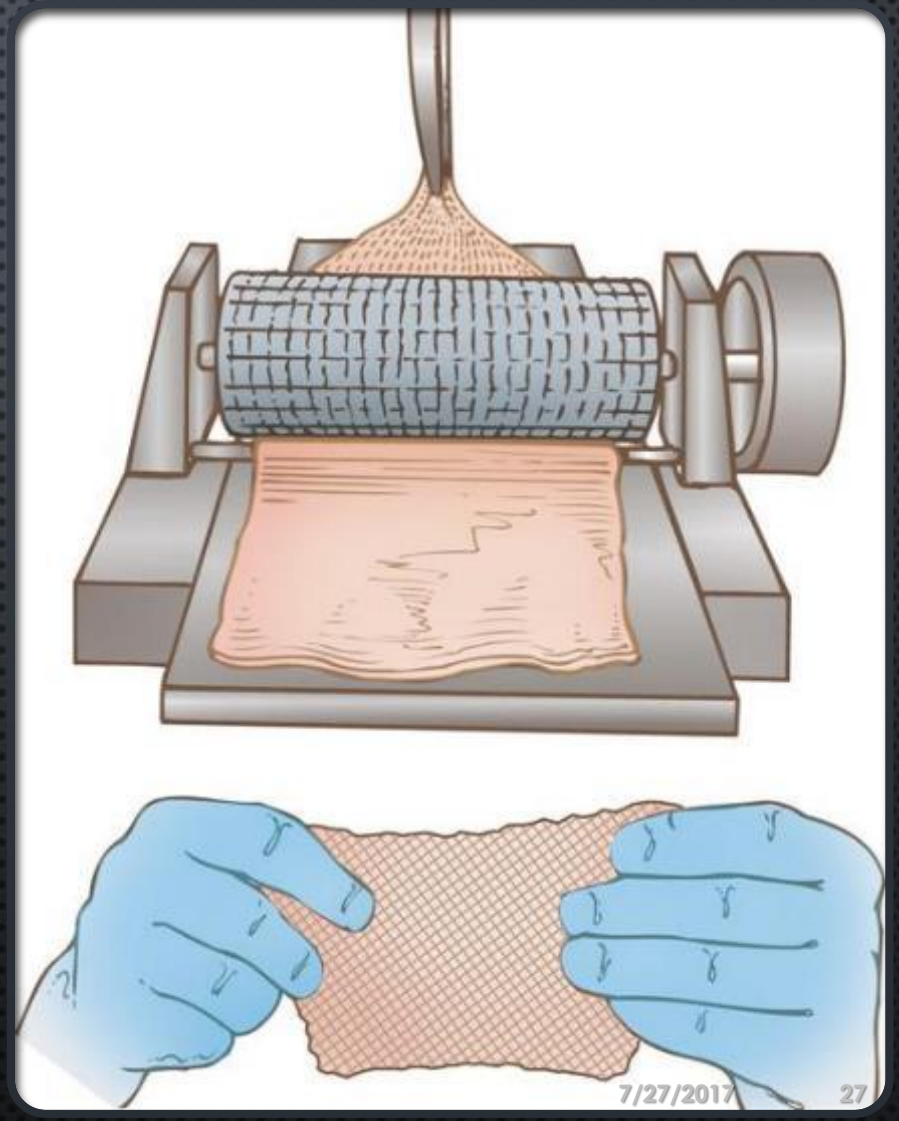


1871 G.D. POLLOCK

- Introduced idea of using skin grafts to treat burn wounds
- Donated small pieces of his own skin which he used in conjunction with the burn patient's skin to treat a wounded area

SKIN GRAFT MESHING

- A METHOD OF EXPANDING THE GRAFT SIZE WAS DESCRIBED BY MEEK IN 1958 WHICH UTILIZES A SPECIAL DERMATOME (MEEK WALL DERMATOME) AND PRE-FOLDED GAUZES WHICH ALLOWED A NINE FOLD EXPANSION OF THE SKIN GRAFT
- DESPITE THE INTRODUCTION OF MESHING AND MICROGRAFTING TECHNIQUES, THESE WERE STILL INSUFFICIENT TO MEET THE INCREASED DEMAND FOR SKIN
- LONG TERM STORAGE OF HUMAN SKIN FOR BOTH AUTOLOGOUS AND ALLOGENIC SKIN TRANSPLANTATION WERE DEVELOPED IN THE 1940–50'S, OF WHICH A MAJOR MILESTONE WAS THE INTRODUCTION OF THE USE OF GLYCEROL TO CRYOPRESERVE SKIN



1940 – 1950 SKIN

- Refrigerated skin as a temporary dressing
- Development of the electric dermatome
- First US Skin Bank
- Discovery of cryopreservation agents

Importance of Skin Meshing

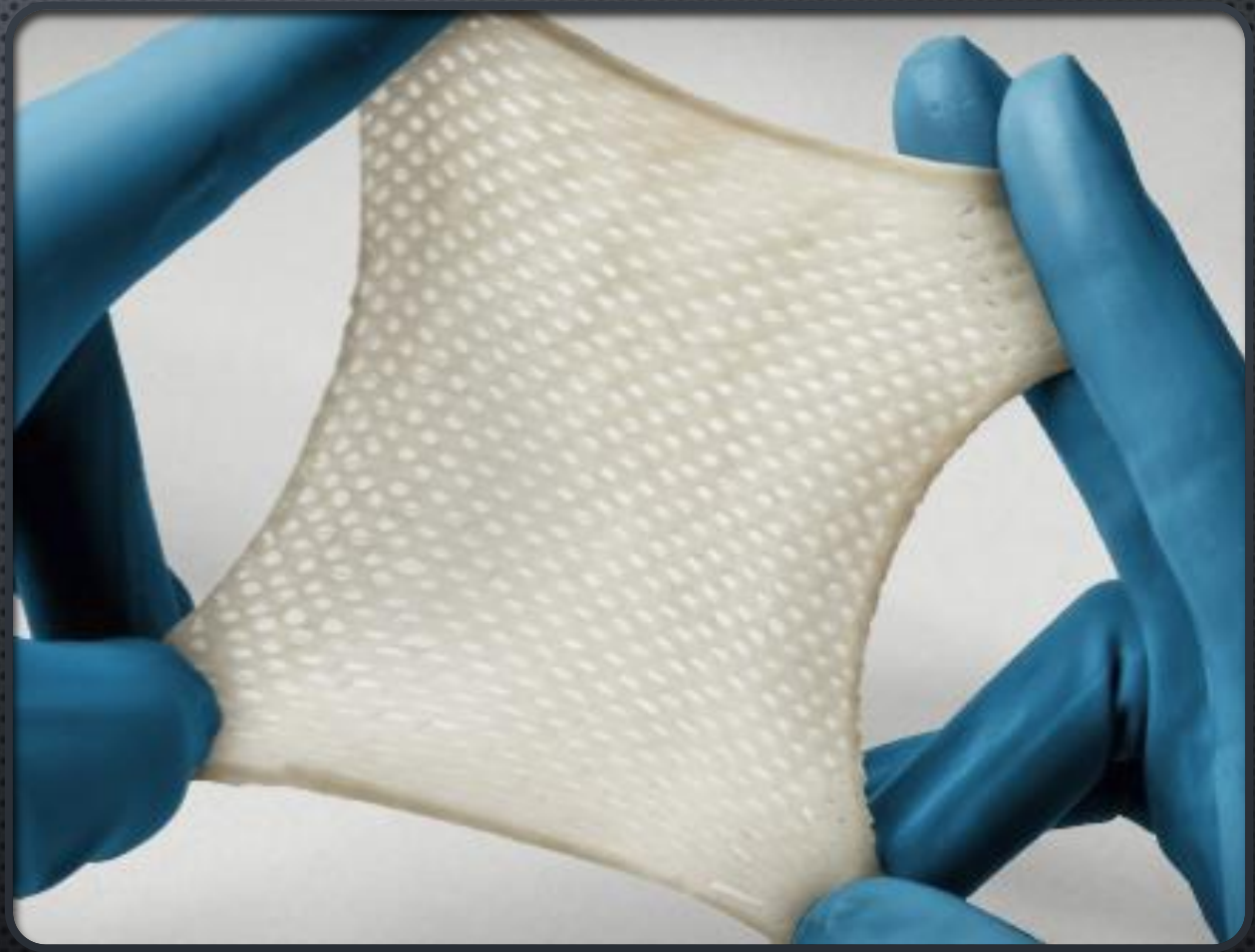
- Throughout the next few slides you will be informed of the history and importance of Skin meshing
- Understand how skin meshing is performed
- Be introduced to the 4MED Skin Mesher by Exsurco Medical

MESHING SKIN GRAFTS

- A MESH GRAFT IS A FULL- OR PARTIAL-THICKNESS SHEET OF SKIN THAT HAS BEEN FENESTRATED TO ALLOW DRAINAGE AND EXPANSION.
- MESH GRAFTS ARE USEFUL BECAUSE THEY CONFORM TO UNEVEN SURFACES. THEY CAN BE PLACED IN LOCATIONS THAT HAVE EXCESSIVE MOTION BECAUSE THEY CAN BE SUTURED TO THE UNDERLYING WOUND BED.

HISTORY OF SKIN MESHING

- SKIN GRAFTING IS THE TRANSPLANTING OF SKIN
- THE TECHNIQUE OF SKIN GRAFTING AND TRANSPLANTATION WAS INITIALLY DESCRIBED APPROXIMATELY 2500-3000 YEARS AGO
- MORE MODERN USES WERE DEVELOPED MAINLY DUE TO WARS: THE MID-TO-LATE 19TH CENTURY, REVERDIN'S USE OF THE PINCH GRAFT IN 1869; OLLIER'S AND THIERSCH'S USES OF THE SPLIT-THICKNESS GRAFT IN 1872 AND 1886, AND WOLFE'S AND KRAUSE'S USE OF THE FULL-THICKNESS GRAFT IN 1875 AND 1893.
- THE EARLIEST RECORD OF SKIN GRAFTING GOES BACK TO THE 5TH CENTURY AD



MESHING SKIN GRAFTS

- THEIR FENESTRATIONS PROVIDE OUTLETS FOR FLUID THAT MAY ACCUMULATE BENEATH THE GRAFT, WHICH HELPS REDUCE TENSION AND THE RISK OF INFECTION AND IMPROVE VASCULARIZATION OF THE GRAFT

- AFTER THE GRAFT HAS BEEN INCISED, IT IS PREPARED FOR MESHING. THE SIZE AND NUMBER OF SLITS DEPEND ON HOW MUCH DRAINAGE AND EXPANSION ARE DESIRED. THE SLITS ARE ARRANGED ALONG THE LENGTH OF THE GRAFT. LARGER SLITS PROVIDE GREATER EXPANSION BUT WILL RESULT IN A LESS COSMETIC APPEARANCE THAN WILL SMALLER OPENINGS.

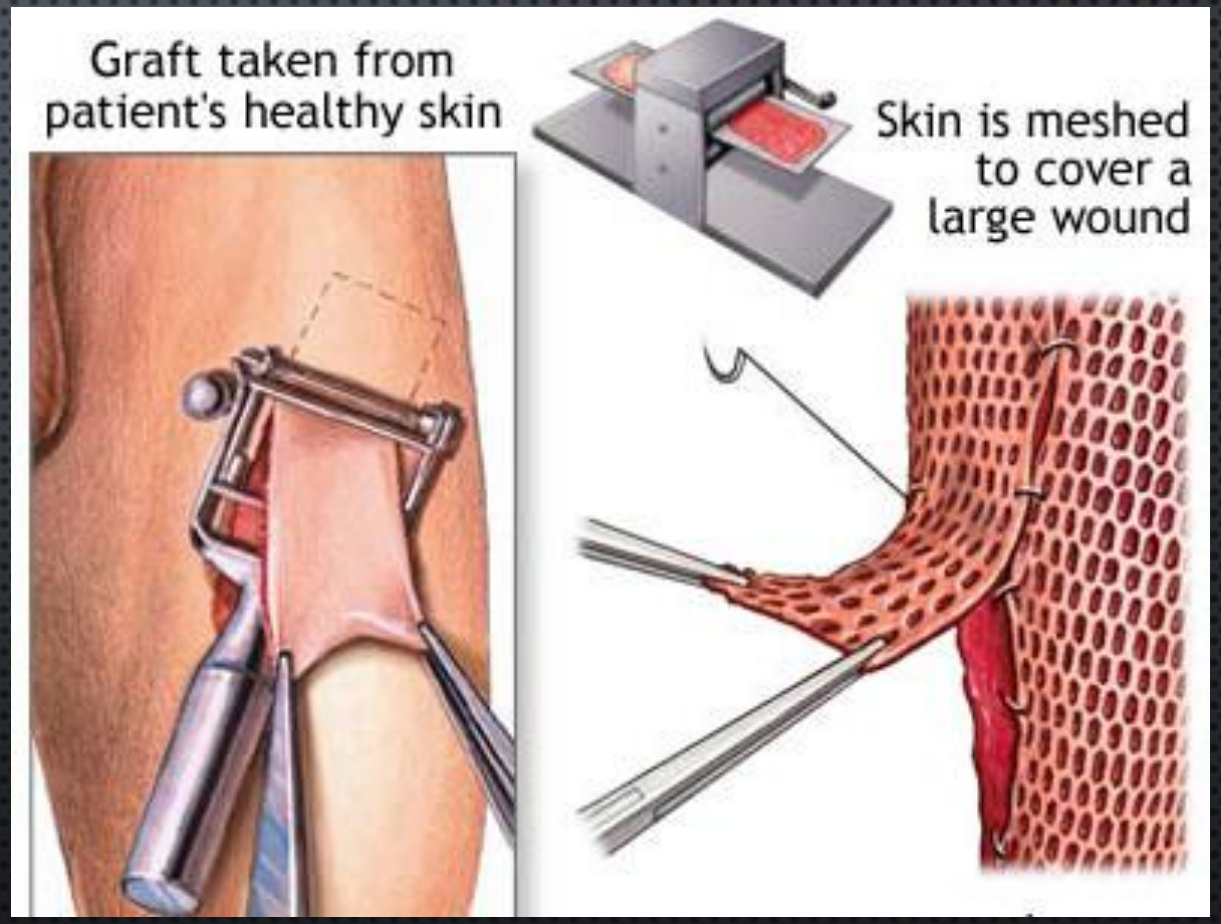
MESHING SKIN GRAFTS

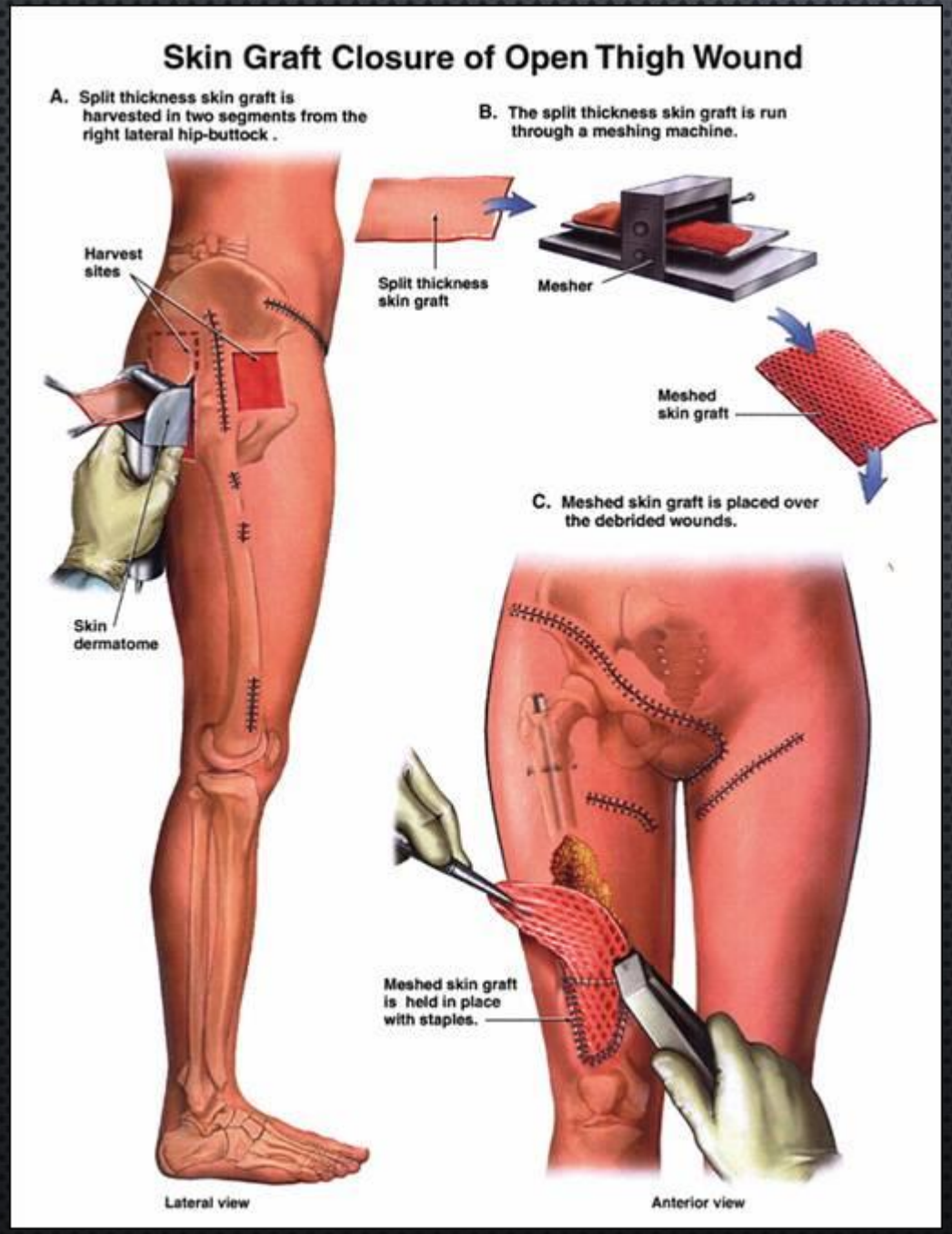
- THE GRAFT IS USUALLY ATTACHED TO THE WOUNDED SITE WITH SUTURES OR STAPLES
- AFTER GRAFT IS ATTACHED, BANDAGES ARE ESSENTIAL TO ABSORB DRAINAGE, IMMOBILIZE THE GRAFT, AND PROTECT IT FROM TRAUMA.
- A MESHED GRAFT HELPS ALLOWS SERUM, BLOOD, AND EXUDATES TO DRAIN FOR GOOD GRAFT-BED CONTACT. IT ALSO ALLOWS PLACEMENT OF TACKING SUTURES TO IMMOBILIZE THE GRAFT WITHOUT CAUSING HEMATOMA FORMATION, SINCE BLOOD CAN DRAIN THROUGH THE MESH HOLES.
- IT ALLOWS THE DONOR SKIN TO COVER A GREATER BURNED AREA BECAUSE IT IS EXPANDED.

MESHER EDUCATION

- DOCTORS PASS THE SKIN GRAFT THROUGH A ROLLING DEVICE (RESEMBLING AN MIMEOGRAPH MACHINE) THAT PERFORATES THE SKIN WITH HUNDREDS OF TINY HOLES. THE RESULT LOOKS LIKE A MESH T-SHIRT.

- THE SURGEON CAN NOW STRETCH THE MESHED SKIN TO COVER A LARGER WOUND AREA. MESH SKIN ALSO ALLOWS THE UNDERLYING WOUND TO EASILY EXCRETE FLUIDS, LESSENING THE RISK OF INFECTION.





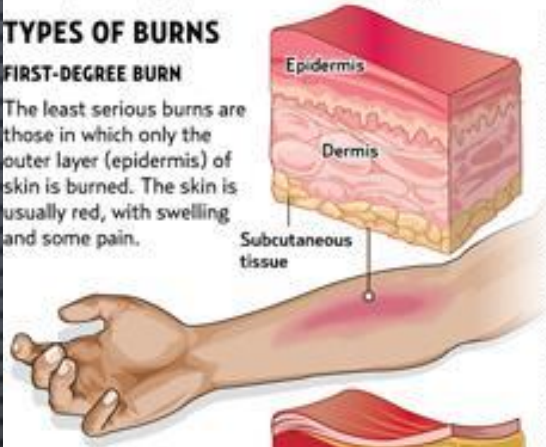
CRITICAL BURNS AND TREATMENT

Serious burns that cover large portions of the body can often cause death. Many of those who sustained burns from the Imperial Sugar refinery explosion are suffering from such burns. Treatment for burns can vary. They often depend on the severity of the injury. Below is a look at the degrees of burns and how some large burns are treated.

TYPES OF BURNS

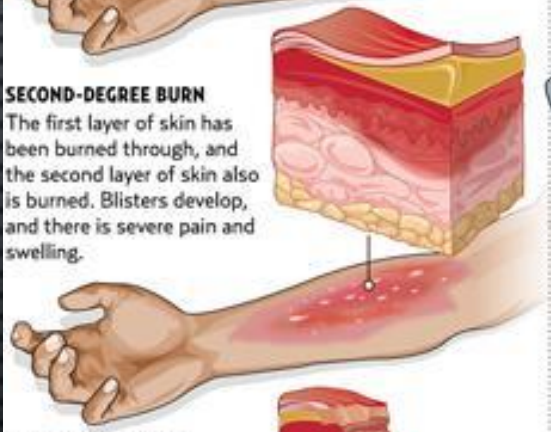
FIRST-DEGREE BURN

The least serious burns are those in which only the outer layer (epidermis) of skin is burned. The skin is usually red, with swelling and some pain.



SECOND-DEGREE BURN

The first layer of skin has been burned through, and the second layer of skin also is burned. Blisters develop, and there is severe pain and swelling.



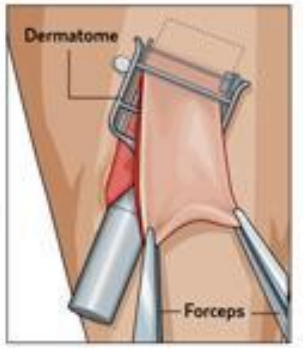
THIRD-DEGREE BURN

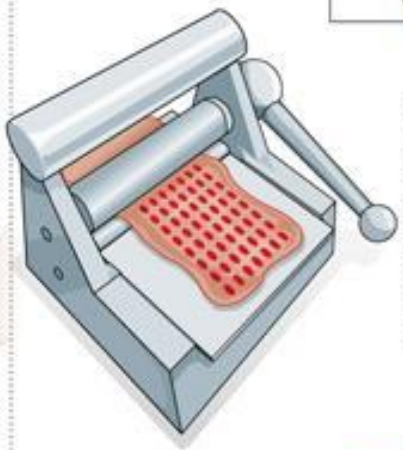
This involves all layers of the skin and causes permanent tissue damage and scarring. Fat, muscle and even bone may be affected. Areas may be charred black or appear dry and white.

SKIN GRAFTS

A skin graft is a surgical procedure in which a piece of skin is transplanted from one area to another.

An electronic device called a dermatome is used to slice a layer of skin from an unaffected area that is normally unseen, such as the inner thigh, back or buttocks.





STRETCHING THE SKIN

If the injured area is large, the harvested skin may be put through a skin-graft mesher that stretches the skin for greater coverage. As healing takes place, the mesh effect fades.

The graft is then sutured over the affected area.

If the injury involves a deep loss of tissue, a full-thickness graft (a flap of skin with underlying muscle and blood vessels) may be required. Taking the graft from the injured person makes rejection of the tissue unlikely.

Sources: Healthwise Inc., Mayoclinic.com, MedlinePlus

Terrence Horan/Savannah Morning News

THE "ROSENBERG" SKIN MESHER BY 4MED

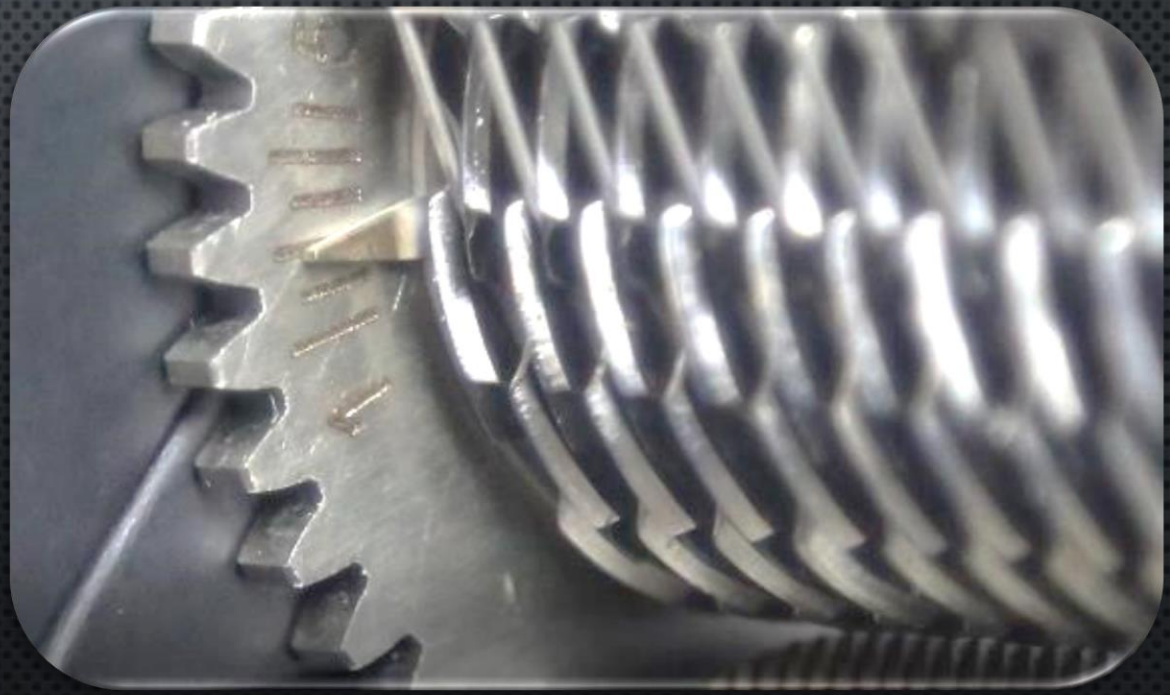
Distributed in the US Exclusively by Exsurco Medical for 4MED

ROSENBERG SKIN MESHER

- EASY TO USE AND CLEAN
- GRAFTS OF DIFFERENT LENGTHS AND WIDTHS TO BE MESHED
- CARRIER DESIGN ELIMINATES SHEARING OF THE GRAFTS
- GUARDS PREVENT ROLLING OF SKIN BACK ONTO THE BLADES
- ADJUSTABLE MESHING RATIOS WITH NO ADDED COSTS
- AVAILABLE IN ADJUSTABLE, FIXED RATIOS, OR WIDE FIXED RATIO

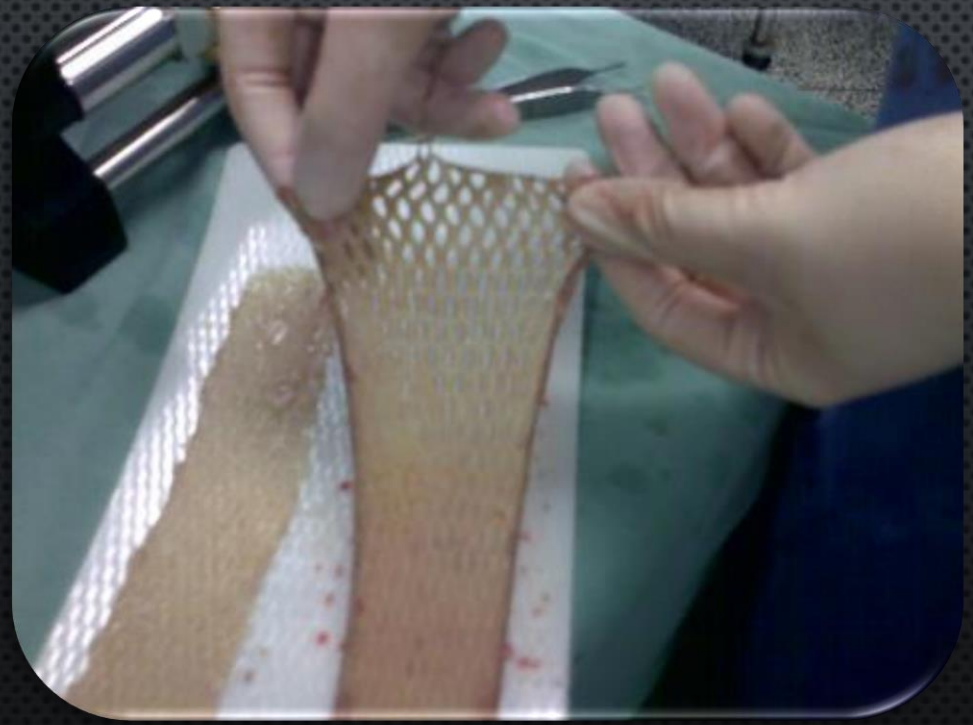
ADJUSTABLE MESHER

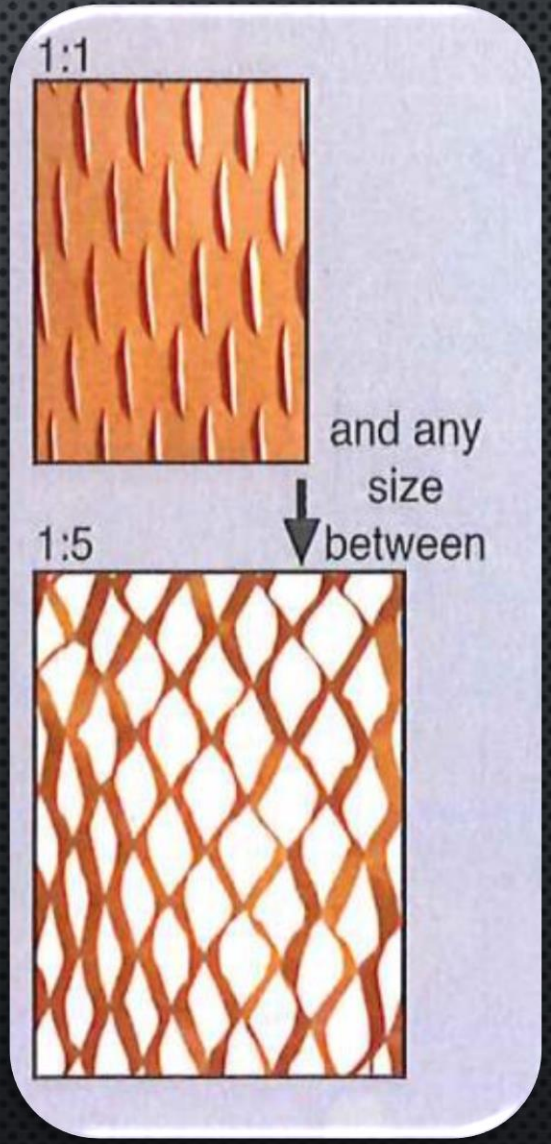
- THE ROSENBERG MESHER WIDTH IS NEARLY DOUBLE THE WIDTH OF TRADITIONAL MESHERS.
- THICKNESS RANGE FROM 0.2MM (0.007") TO 4MM (0.150"), WIDTH UP TO 150MM (5.9")
- ELIMINATES THE NEED FOR STOCKING ADDITIONAL COMPONENTS
- MULTIPLE MESHING RATIOS: (1:1, 1:1.5, 1:2, 1:3, 1:4, 1:5)



ADJUSTABLE MESHER

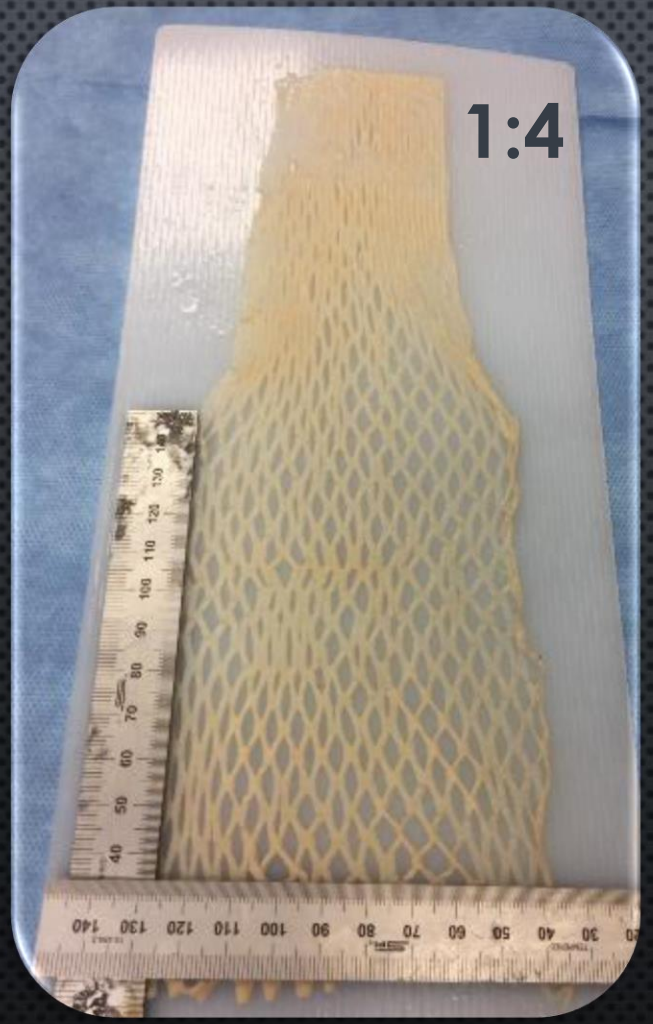
- SKIN GRAFT MAY BE MESHED INTO DIFFERENT MESHING RATIOS ACCORDING TO THE GRAFT SIZE NEEDED, AVAILABLE SKIN, AND FUNCTIONAL AND AESTHETIC CONSIDERATIONS.



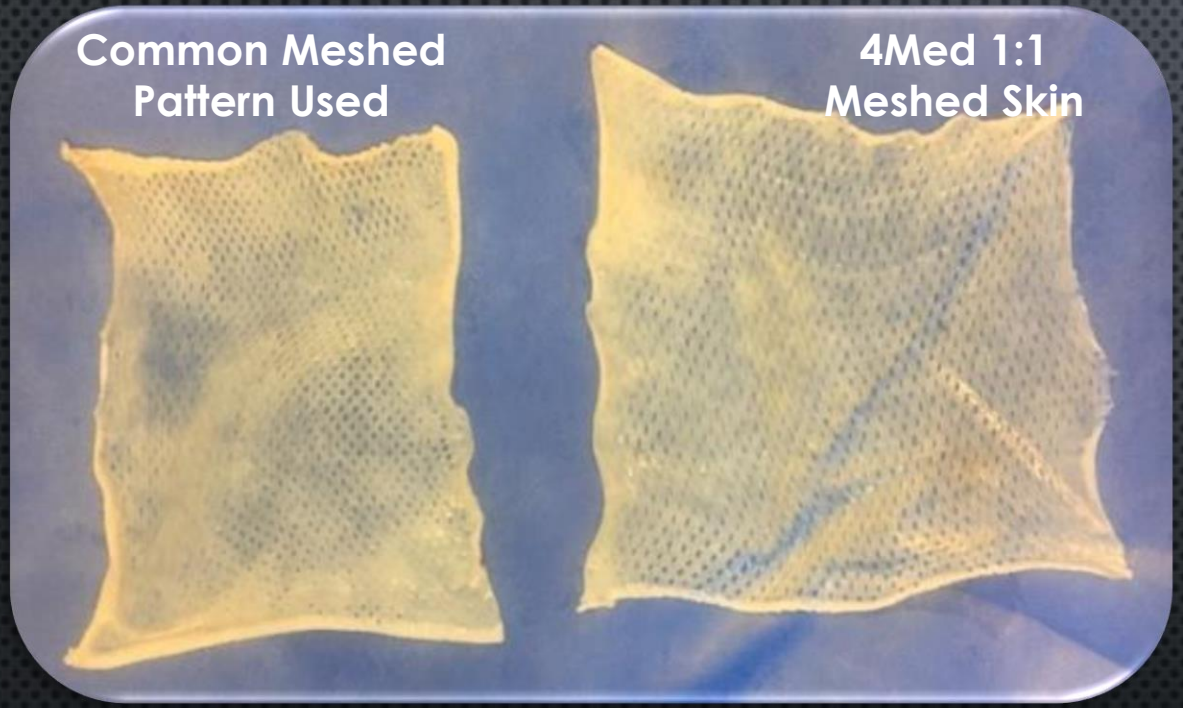


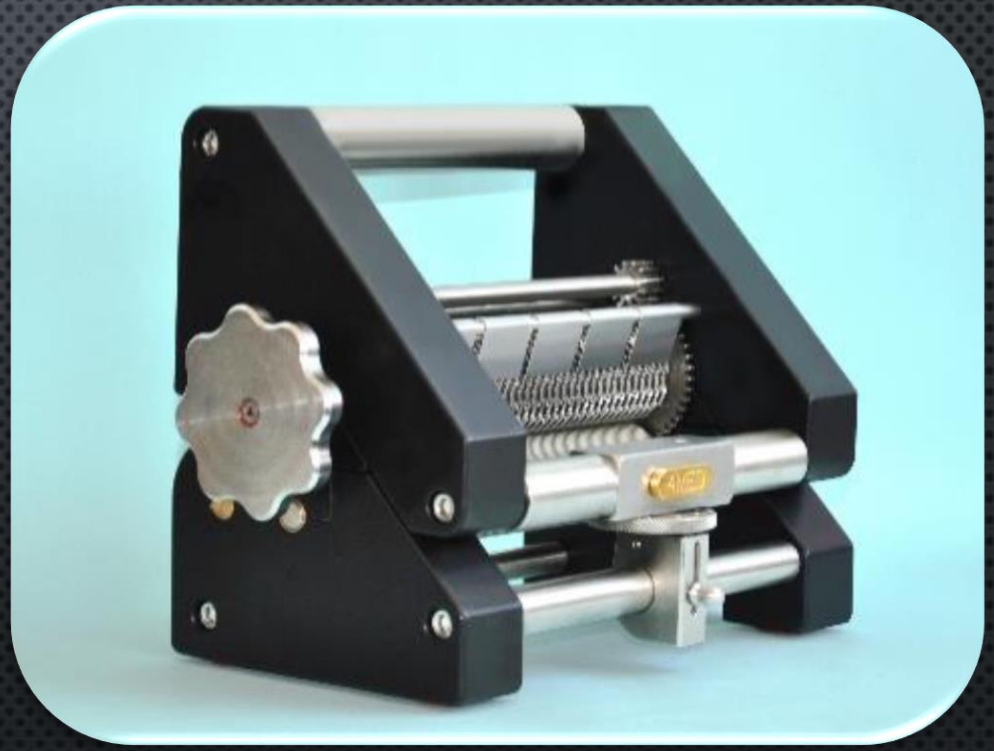
ADJUSTABLE MESHER RATIOS

ADJUSTABLE MESHER RATIOS

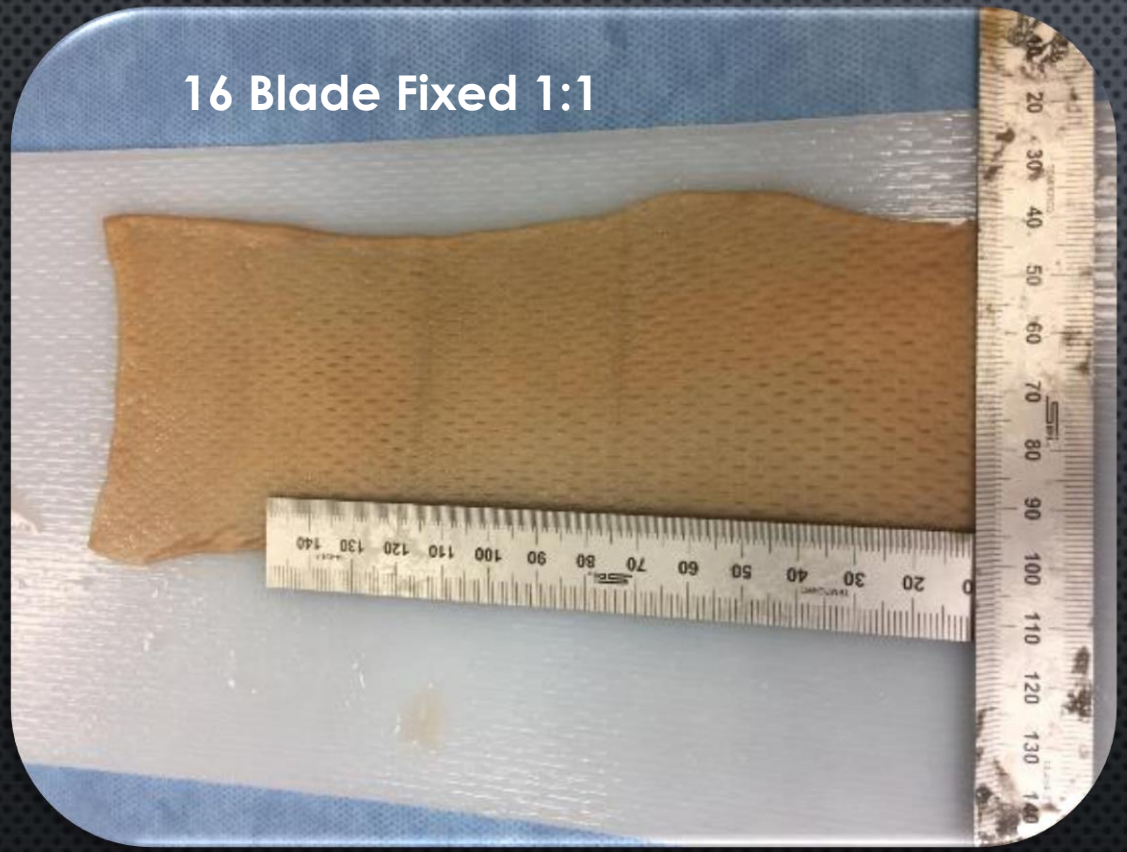


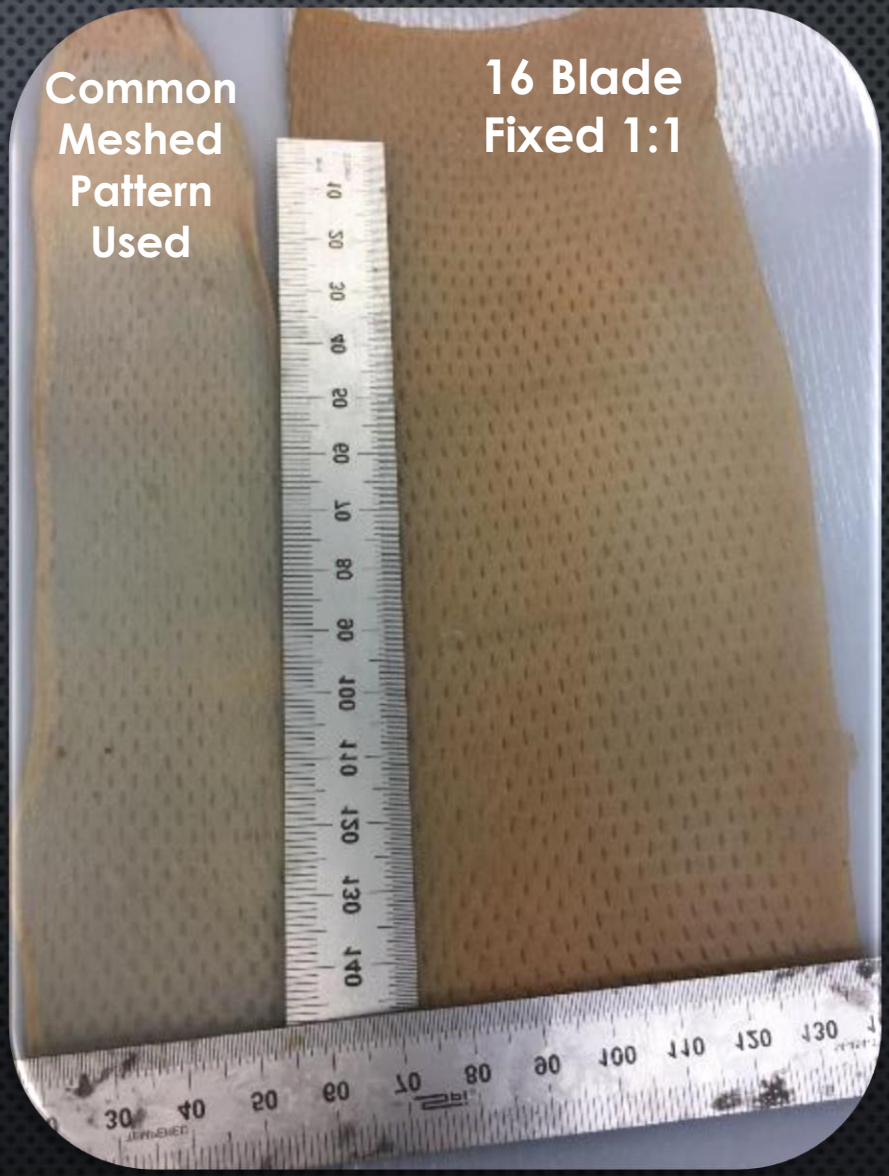
FIXED MESHING RATIOS





FIXED MESHING RATIOS

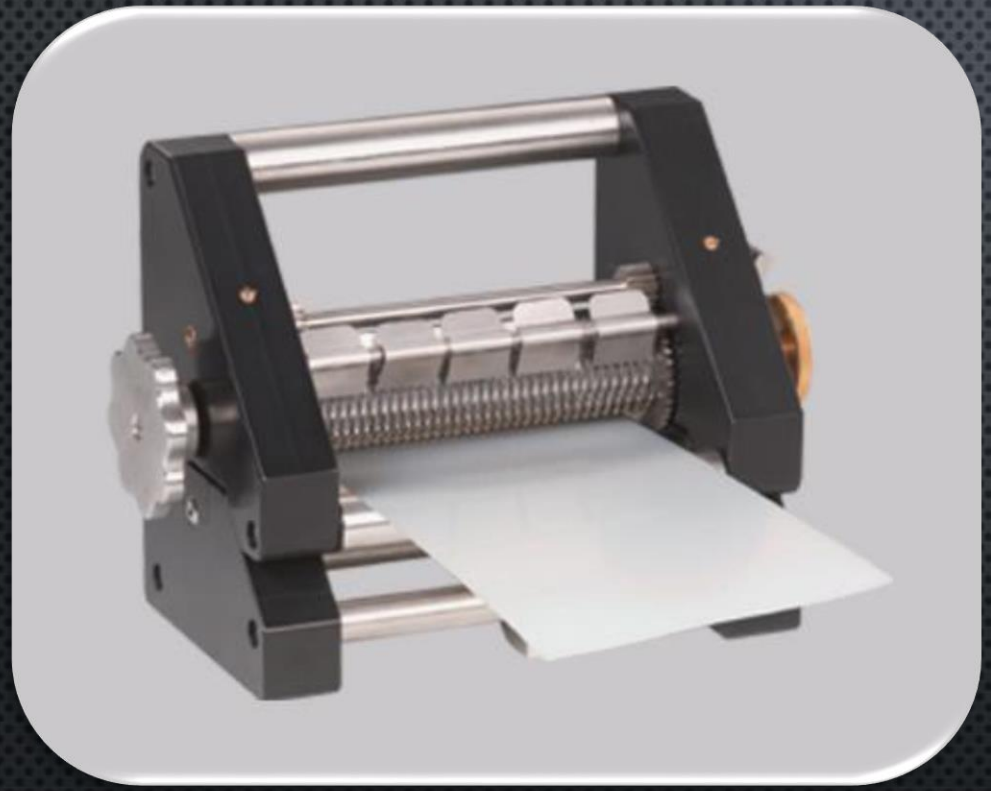




SKIN PROCESSING

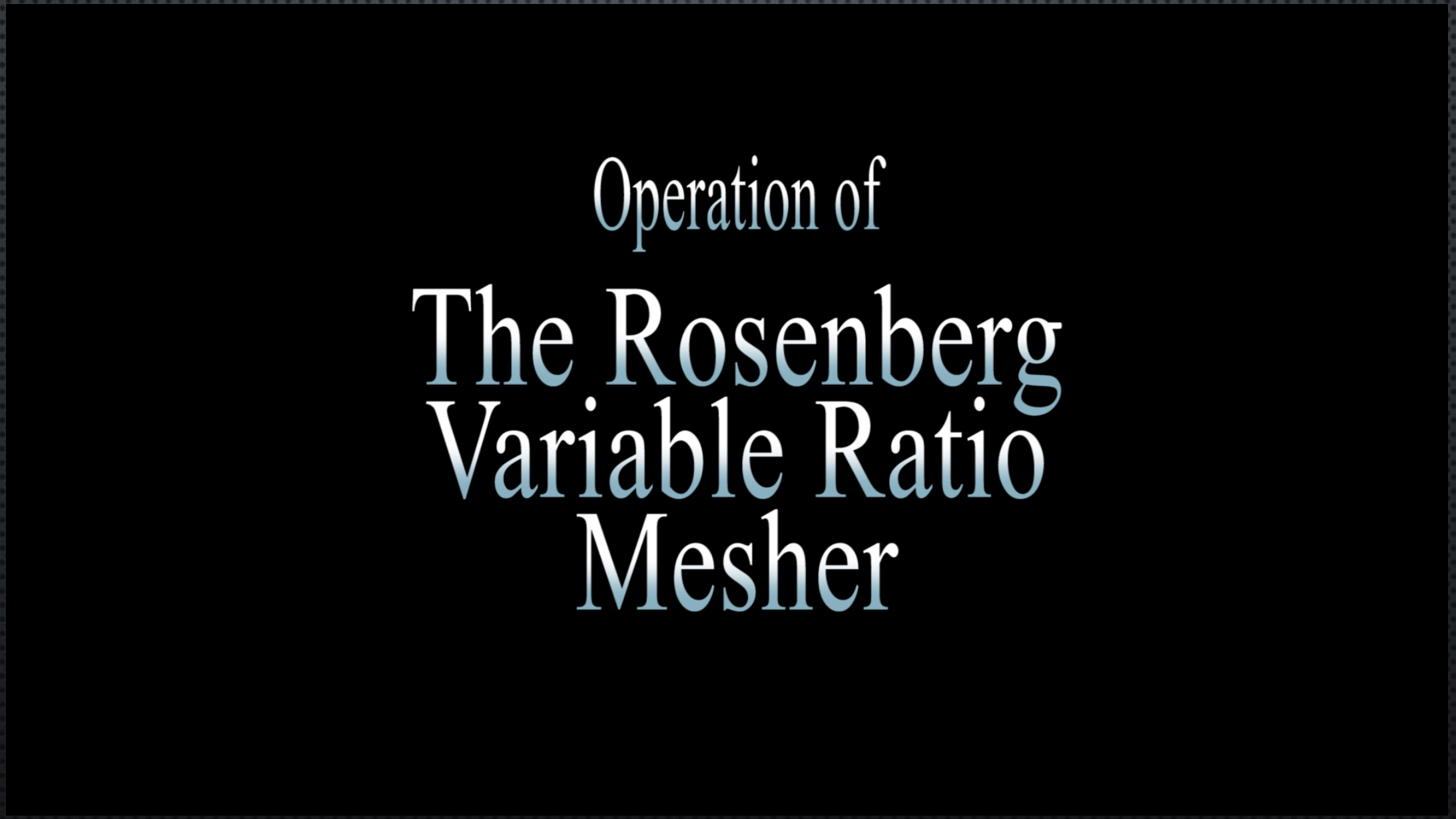
- MESHER CAN BE FIXED TO DESIRED RATIO TO ENSURE CONSISTENCY BETWEEN EACH SKIN GRAFT AND TECHNICIAN
- EASY TO USE RATCHET
- ABILITY TO USE IN CLEAN ROOM OR PROCESSING HOOD
- LONG CARRIERS AVAILABLE FOR LONG STRIPS OF SKIN OR MESHING MULTIPLE GRAFTS AT SAME TIME
- CARRIERS LASTS FOR ENTIRE PROCESSING EVENT
- STEAM AUTOCLAVABLE

CARRIERS



- Boxes of 20
- Individually sterile packed
- Used multiples times for same donor
- High Density Polyethylene (HDPE)
- Available in different sizes (w x l):
  - Standard = 14cm x 30cm (5.5" x 12.0")
  - Long = 14cm x 60cm (5.5" x 24.0")
  - Wide = 16.5cm x 35.5cm (6.6" x 14.2")

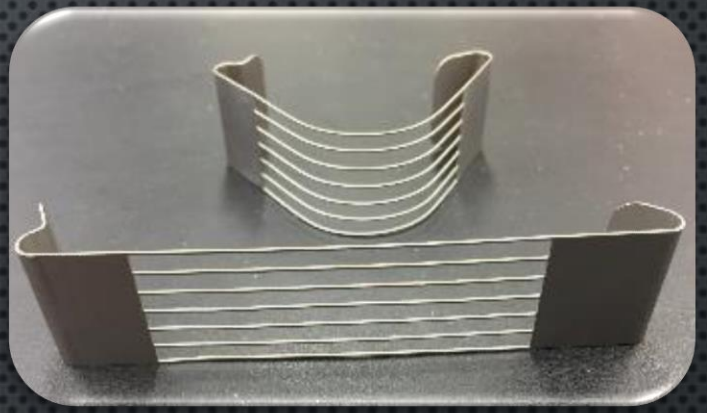
4MED MESHER IN ACTION



ACCESSORIES

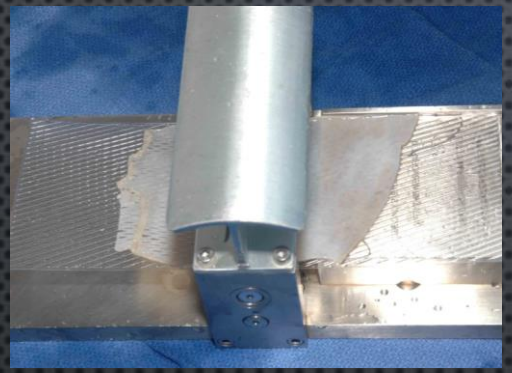
- Ratchet

- Guards



- Sterilizing Container with Top Filter
  - Filter for Sterilization Container

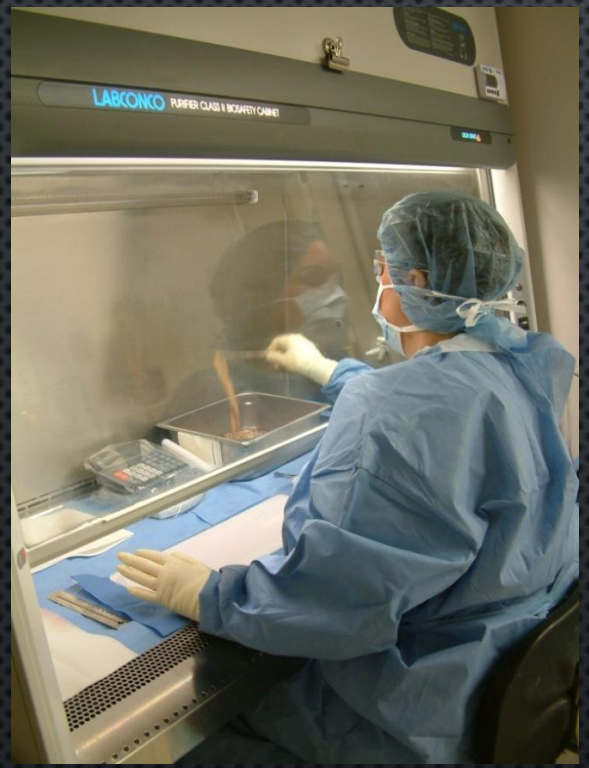
SPLIT THICKNESS ALLOGRAFT SKIN

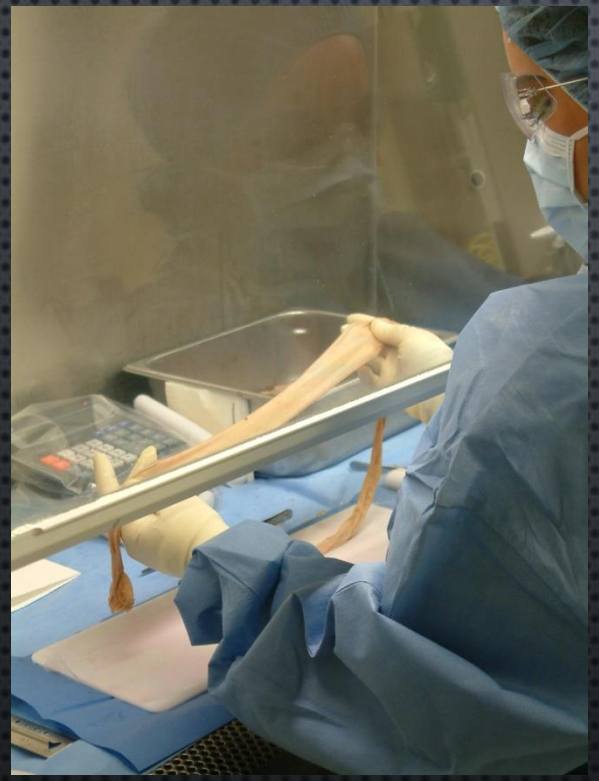


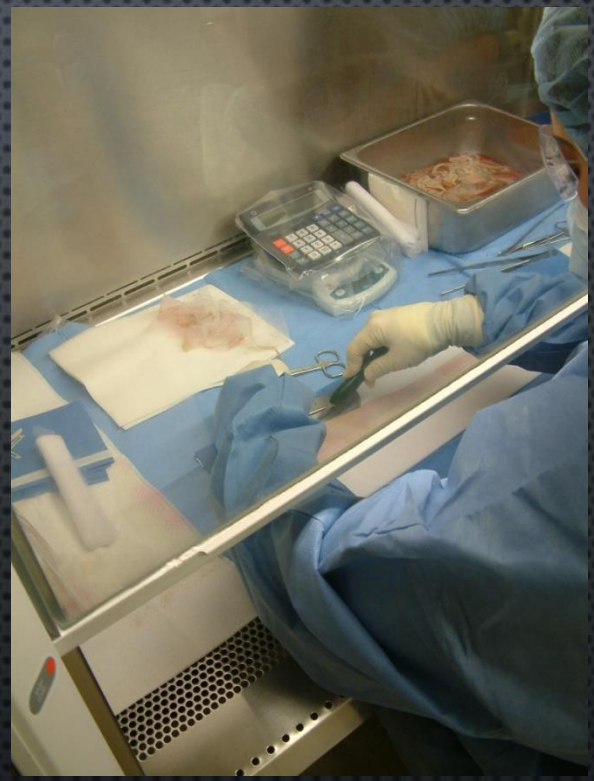
BENEFITS

- LIMITATION OF INFECTION
- DECREASE FLUID LOSS
- REDUCTION IN PAIN
- CONSERVATION OF AUTOGRAFT
- PHYSIOLOGIC CLOSURE OF EARLY WOUND
- TESTING OF WOUND FOR AUTOGRAFT TAKE
- TEMPORARY CLOSURE OF LIFE-THREATENING, MASSIVE WOUNDS

SPLIT THICKNESS SKIN PROCESSING

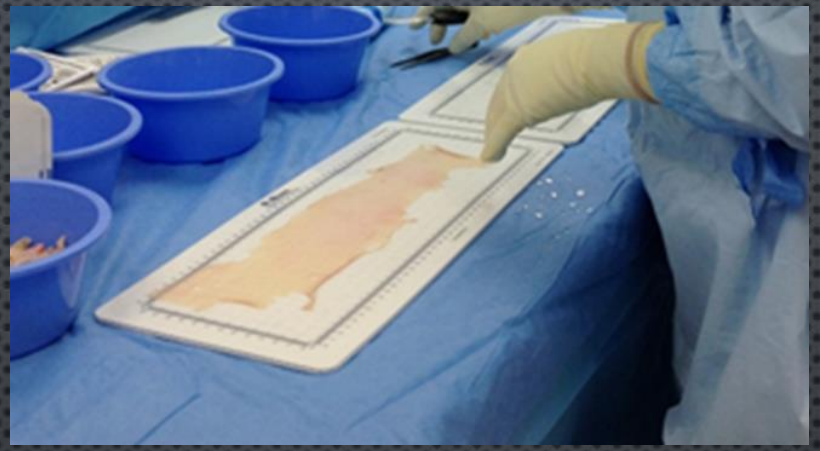


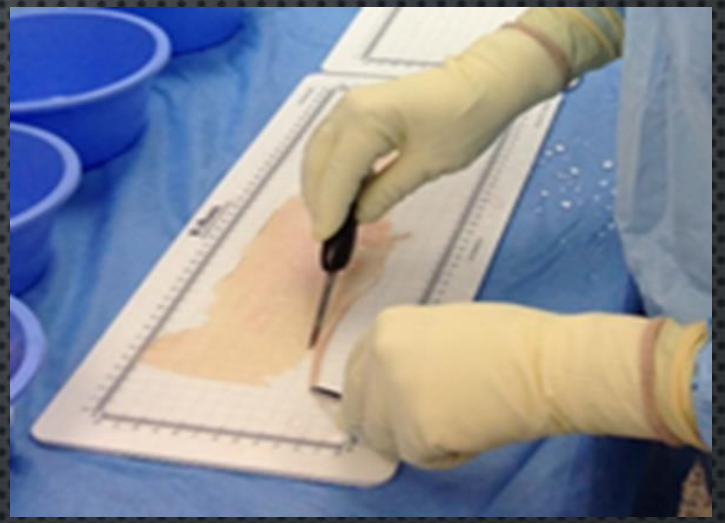


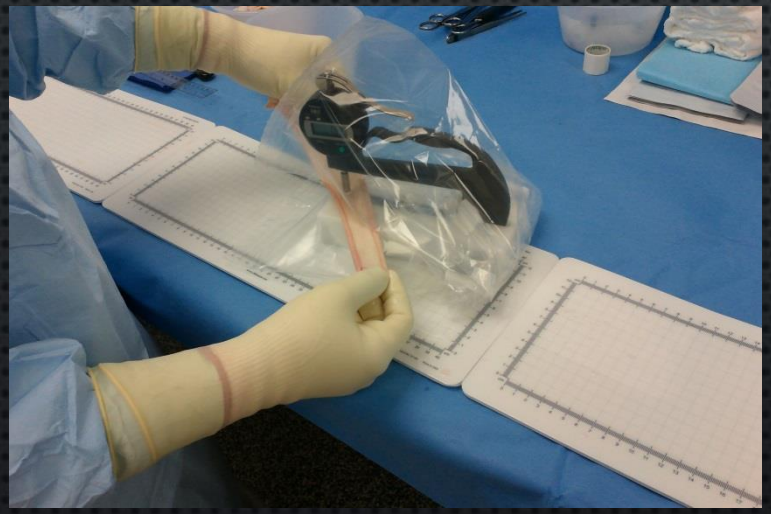


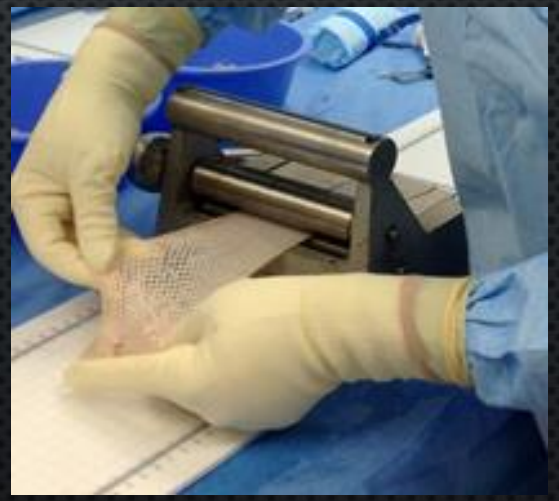
Courtesy of: Community Tissue Services, Kettering, OH

SPLIT THICKNESS SKIN PROCESSING









Courtesy of: AlloSource, Denver, CO

Early excision and grafting

- Reduces length of hospitalization
- Reduces costs of hospitalization
- Lessens amount of pain
- Decreases hypermetabolic state
- Decreases the amount of complication
- Decreases risk of infection

Early excision and grafting

- Speeds recovery
- Decreases scar formation
- Return patients to a functional capacity in a shorter period of time
- Better cosmetic outcome

Graft Adherence

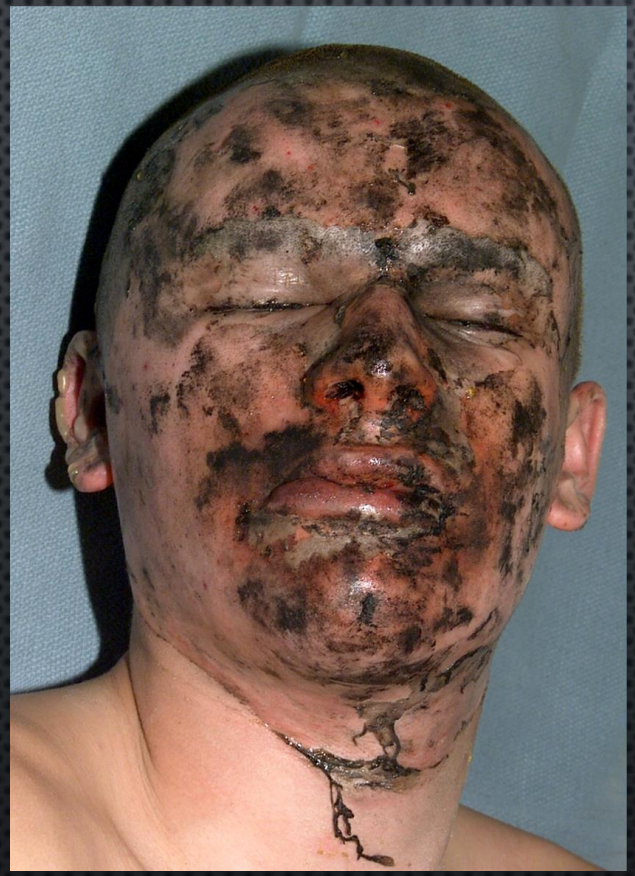
- Two Conditions Need to Be Met:
  - First, the wound bed should be clean and free from necrotic or sloughy tissue which would be heavily colonized with bacteria.
  - Ideally, no bone or tendon should be exposed, since skin grafts will not adhere to these structures.

SECURING AND DRESSING THE GRAFT

- A LAYER OF NONSTICK MATERIAL, SUCH AS ANTIBIOTIC-IMPREGNATED GAUZE, SHOULD BE PLACED DIRECTLY OVER THE GRAFT.
- MOISTEN A STERILE GAUZE WITH MINERAL OIL (IF AVAILABLE) OR SALINE.
- FLUFF THE GAUZE AND PLACE IT OVER THE NONSTICK LAYER; THEN COVER THE AREA WITH DRY GAUZE.
- TRY TO KEEP THE DRESSING AS SECURE AS POSSIBLE EITHER BY WRAPPING WITH GAUZE OR BY TYING THE DRESSING IN PLACE.

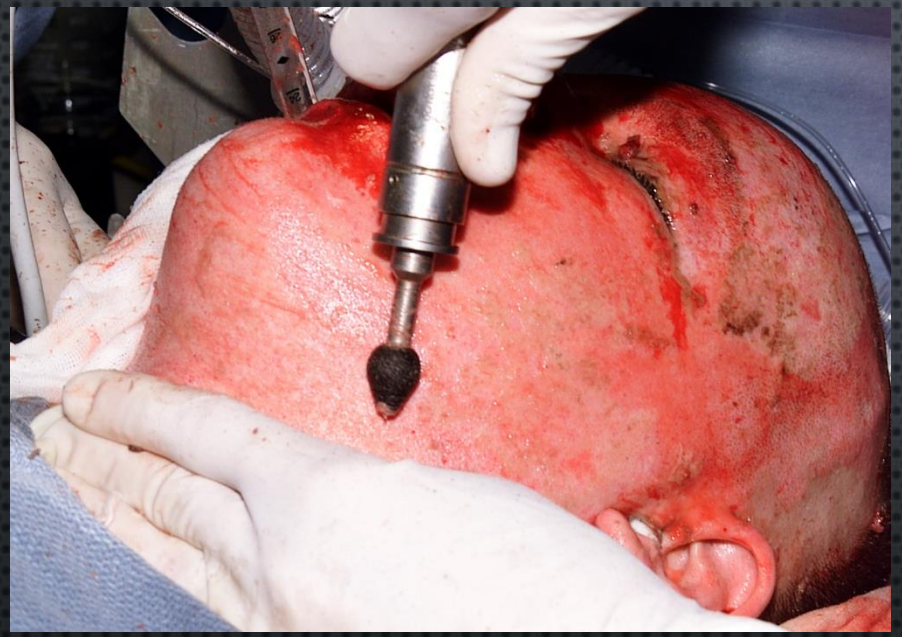
CASES WITH MESHED SKIN USED IN TREATMENT

MID-PARTIAL THICKNESS BURNS



Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

MID-PARTIAL THICKNESS BURNS



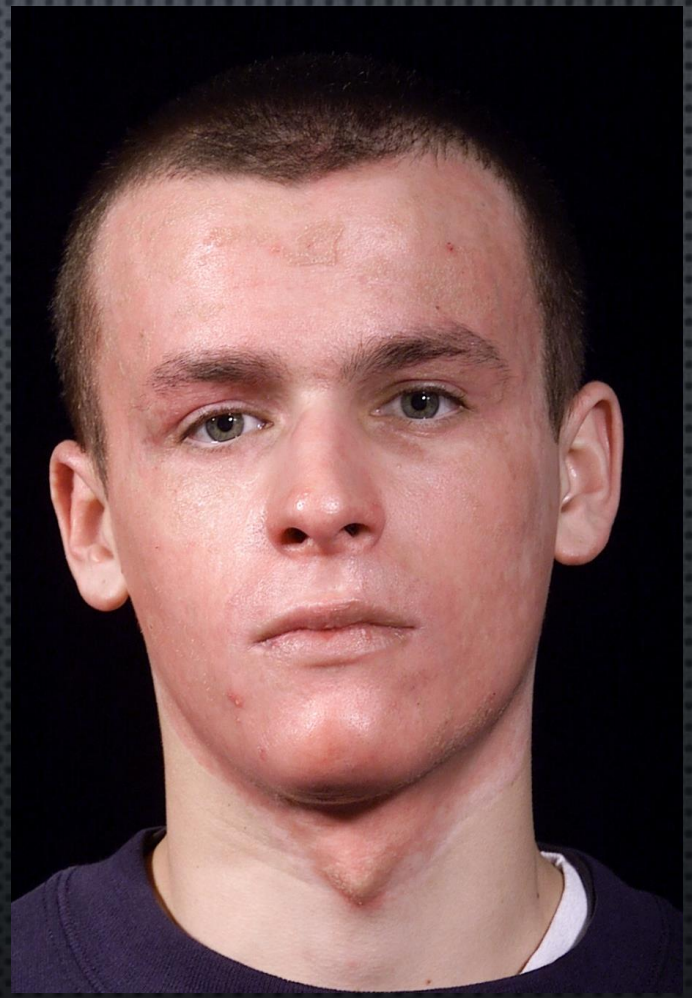
Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

MID-PARTIAL THICKNESS BURNS

Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

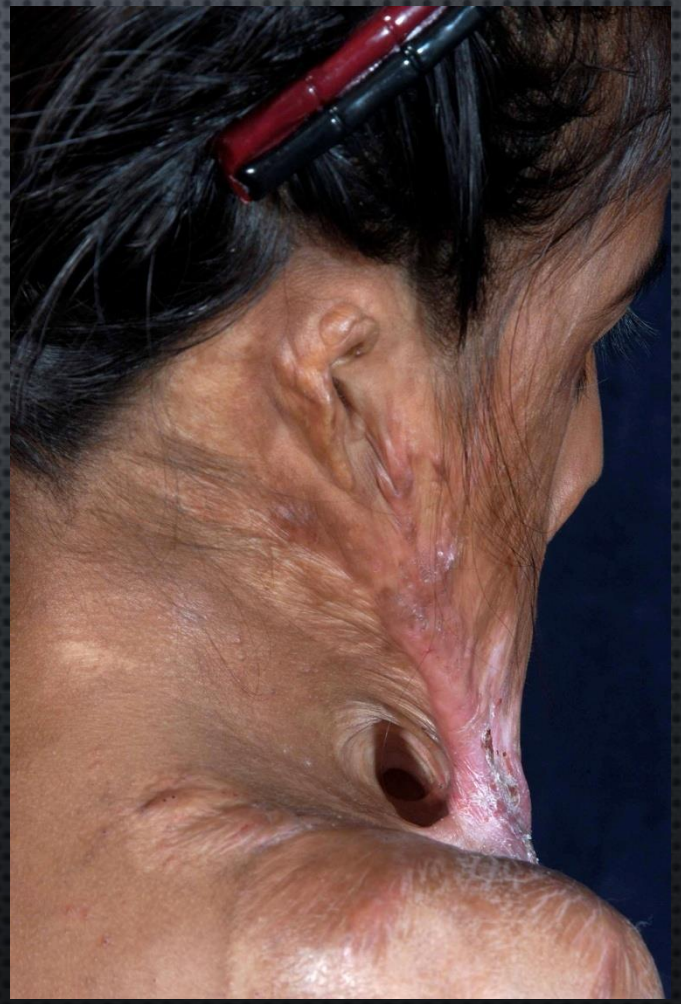
2 WEEKS POST INJURY

5 WEEKS POST INJURY



Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

BURN RECONSTRUCTION



Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

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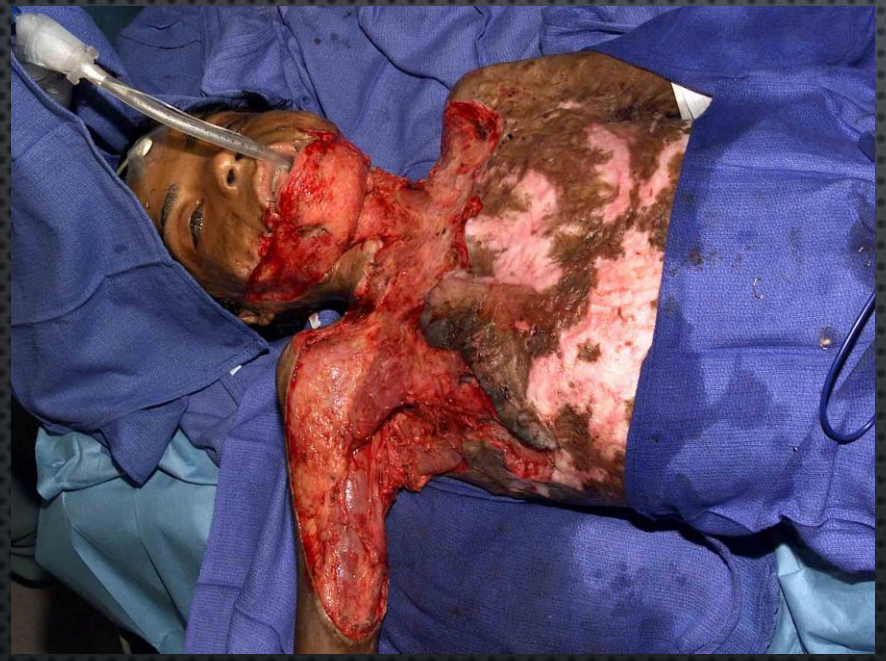

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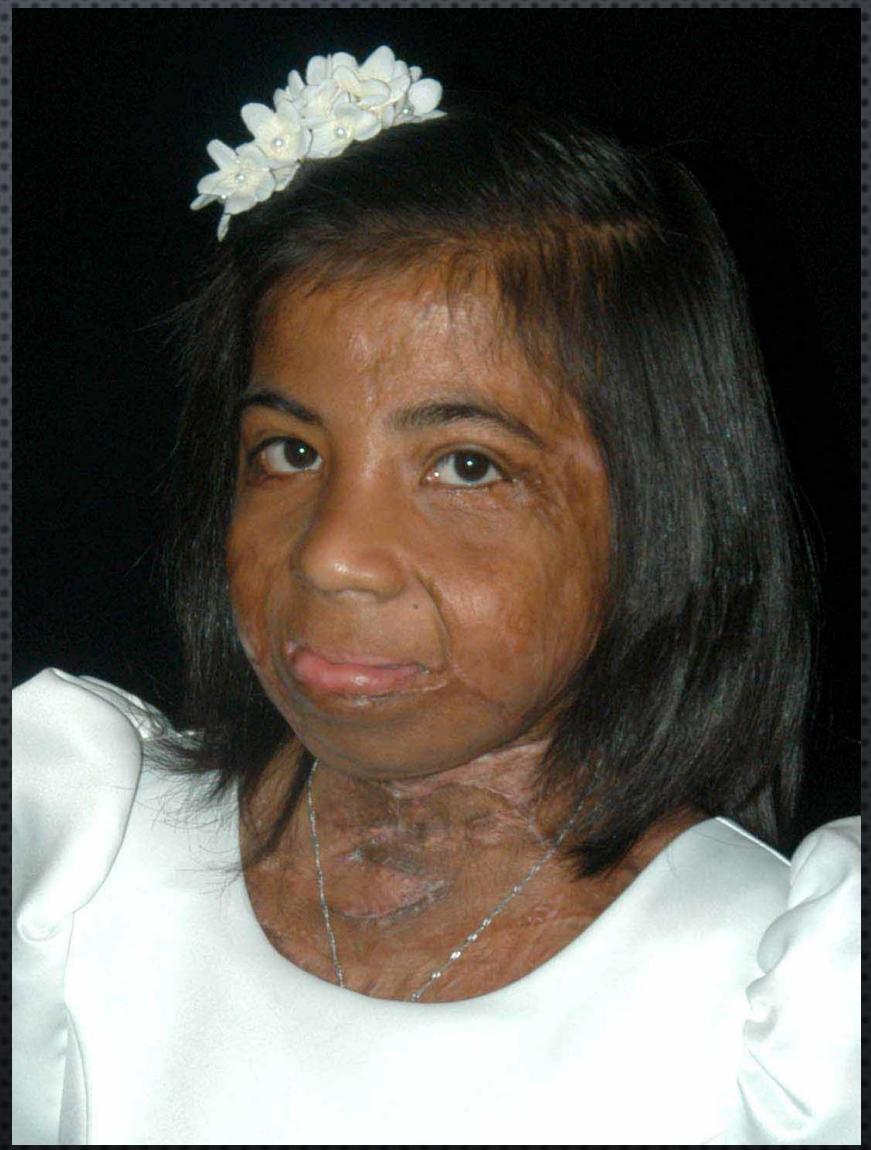

Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

STEVENS - JOHNSON / TENS

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STEVENS - JOHNSON / TENS

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CATASTROPHIC BURN

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90 DAYS AFTER INJURY

Courtesy of: Peter Grossman, MD FACS, Grossman Burn Center, West Hills, CA

MESHED SPLIT THICKNESS GRAFTS

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

THIS PATIENT'S ARM WAS BURNED WHEN A SCIENCE PROJECT WENT BAD.

ONE YEAR LATER, THE BURN IS COMPLETELY HEALED WITHOUT SCARRING.

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

- Wound Care - *After multiple applications of skin, the wound healed. This patient had to have their toes amputated. The wound was not healing well so a skin allograft was applied.*

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

Admission

Application

Two weeks post application

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

Courtesy of: AlloSource, Denver, CO

MESHED SPLIT THICKNESS GRAFTS

Courtesy of: AlloSource, Denver, CO

"Allograft skin is an integral part of the best treatment practices for treating burn and wound patients in a specialized facility"

Zaheed Hassan, MD

Vice President
Burn, Plastic and Reconstruction Surgeon
Joseph M. Still Burn Centers, Inc., Augusta, GA

QUESTIONS?


Survivors

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