A 9 Year Clinical Experience with Kelo-cote ®

The Role of topical silicone in wound healing

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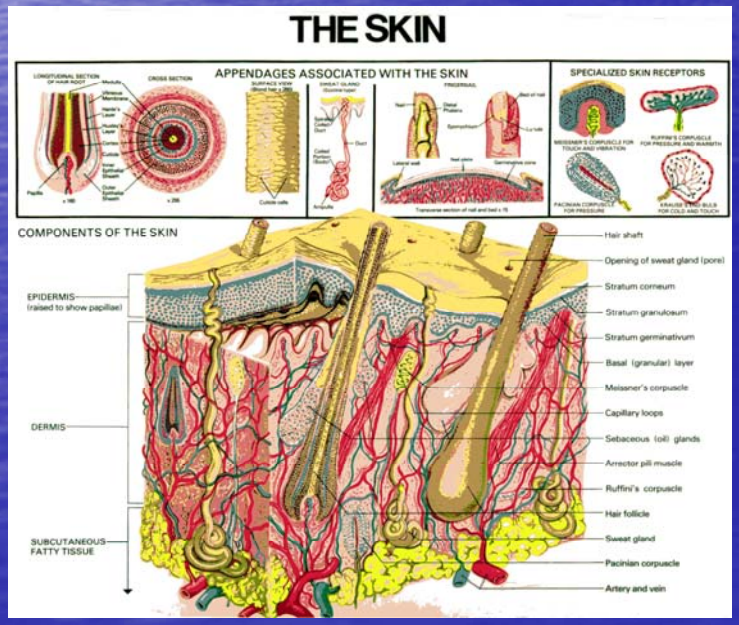
Not all wounds are created equally

- Fresh surgical: sharp edges, tensionless epidermis, layered dermal repair
- Traumatized tissue: crushed irregular edges, tension
- Thermal and chemical burns: basal layer and dermis may be absent
- Post-scar (hypertrophic/keloid) excision: tendency to recur
- Scar prone locations: chin to xiphoid, intra-mucosal
- Scar prone races: related to Fitzpatrick skin types: tan easily=scar easily



Epidermis: 40 - 150 microns

Dermis: 140 - 400 microns

E & D: 180 >/= 550 microns

Choices In Topical Therapy Dry Wounds

- Tapes: control tension, shear through surface protection, hydration
- Oil based antibiotic ointments: Polymyxin, Bacitracin, Bactroban, Neosporin
- Skin substitutes: Biobrane, Alloderm
- **Silicone gel: Kelo-cote, Scarfade, Mederma**
- **Silicone gel sheeting: Cica-care, Epiform, Mepilex, Mepitel, Silgel**
- Collagens: Clayton Chagall
- Tissue adhesives: cyanoacrylate-Dermabond, Epiglu, Indemil, Liquiband
- Barrier films: fast drying carrier solvent: Cavillon, Comfeel, Superskin

Choices In Topical Therapy Wet Wounds

- Silver dressings: Acticoat, Actisorb, Avance, Flamazine
- Foams: absorptive for exudates-Allevyn, Flexipore
- Alginates: seaweed based very absorptive- Meligisorb, Algisite, Sorbsan
- Hydrogels: >70% water,minimally absorptive- Aquaform, Intrasite, Nu-Gel
- Hydrocolloids: semi-permaeable-Aquacel, Cutinova
- Vapour permaeable films: semi-permeable, fluid acculates-Tegaderm
- Low-Adherance Dressings: Telfa, Medipore, Cutilin, Xeroform
- Multi-layer bandages: useful for venous ulceration- Profore

Components of Normal Wound Healing

- Coagulation process
- Inflammatory process

A) Immediate to 2-5 days
B) Hemostasis : Vasoconstriction , Platelet aggregation , Thromboplastin clot
C) Inflammation: Vasodilation , Phagocytosis

- Migratory/ Proliferative process

A) 2 days to 3 weeks
B) Granulation: Fibroblasts lay collagen, Fills & new capillaries
C) Contraction: Wound edges pull together to reduce defect
D) Epithelialization: Crosses moist surface up to 3 cm

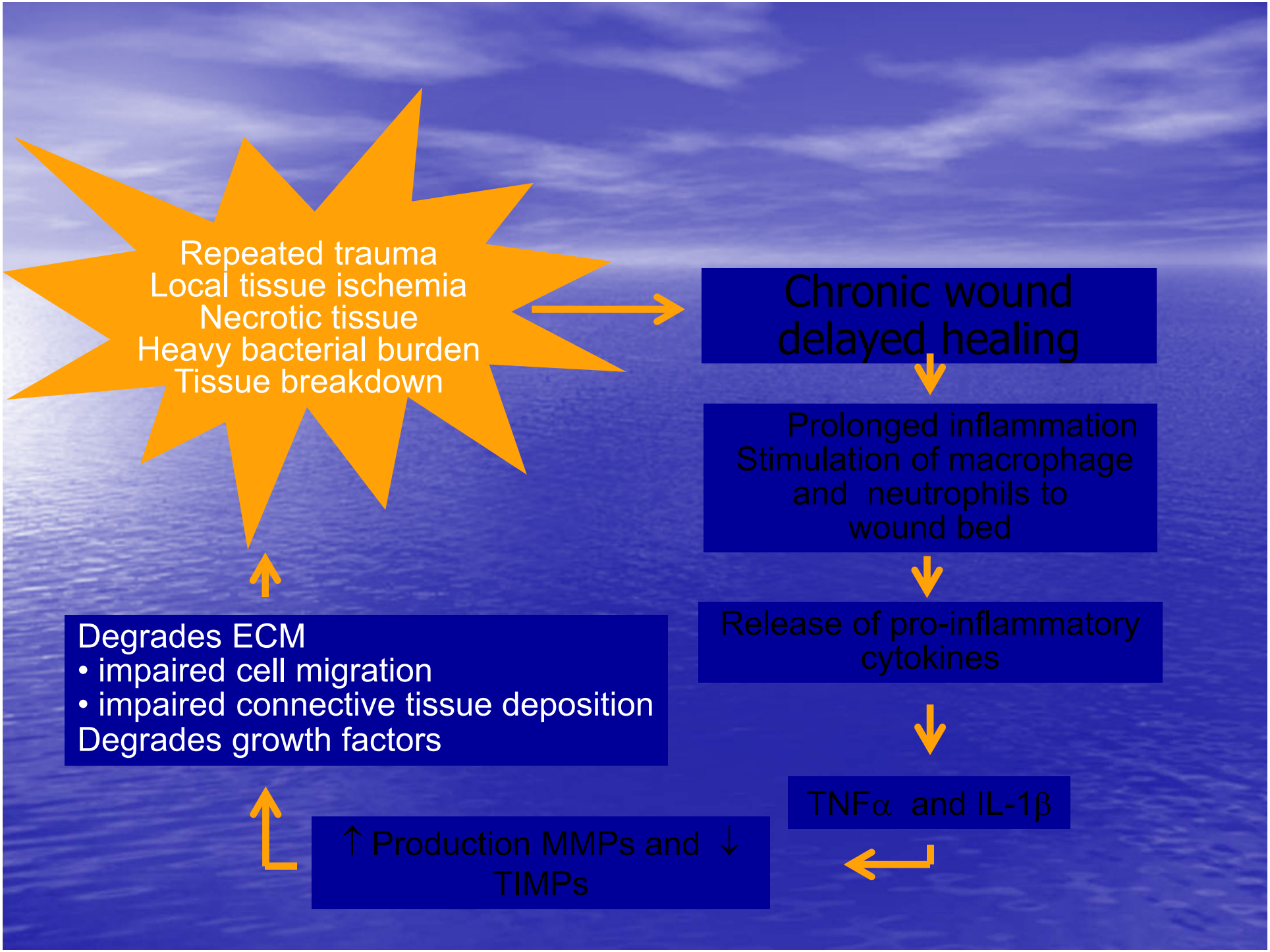
- Remodeling process

A) 3 weeks to 2 years
B) New collagen forms which increases tensile strength
C) Scar tissue is only 80 percent as strong as original tissue

Injury: hours / days weeks

Biochemical Differences

Healing wounds		Chronic wounds
↑	cell mitosis	↓
↓	pro-inflammatory cytokines	↑
↓	matrix metalloproteinases	↑
↑	growth factors	↓
↑	cells capable of responding to healing signals	↓


Repeated trauma
Local tissue ischemia
Necrotic tissue
Heavy bacterial burden
Tissue breakdown
Chronic wound
delayed healing
Prolonged inflammation
Stimulation of macrophage
and neutrophils to
wound bed
Release of pro-inflammatory
cytokines
TNFα and IL-1β
↑ Production MMPs and ↓
TIMPs
Degrades ECM
• impaired cell migration
• impaired connective tissue deposition
Degrades growth factors

TIME Principles of Wound Bed Preparation

Wound bed preparation accelerates healing

Tissue non viable or deficient	**I**nfection or inflammation	**M**oisture imbalance	**E**dge of wound non advancing or undermined
Defective matrix and cell debris	High bacterial counts or prolonged inflammation	Desiccation or excess fluid	Non-migrating keratinocytes Non-responsive wound cells
↓	↓	↓	↓
Debridement	Antimicrobials	Dressings compression	Biological agents Adjunct Therapies Debridement
↓	↓	↓	↓
Restore wound base and ECM proteins	Low bacterial counts and controlled inflammation	Restore cell migration, maceration avoided	Stimulate keratinocyte migration

Debridement Methods

- Surgical: excise
- Mechanical: adherence, sheer, irrigate
- **Autolytic: topical**
- Enzymatic: topical
- Biological: topical

Autolytic Debridement

- The process by which the wound bed utilizes phagocytic cells and proteolytic enzymes to remove debris

- This process can be promoted and enhanced by maintaining a moist wound environment

Autolytic Debridement Considerations

- Less aggressive
- Slower
- Easy to perform
- Little or no discomfort
- Performed in any setting
- Contraindication: infection

Enzymatic Debridement

- The use of topically applied chemical agents to stimulate the breakdown of necrotic tissue

- Common Topical Agents
  - **Papain-Urea**
  - **Papain-Urea-Chlorophyllin**
  - **Collagenase**

Enzymatic Debridement

Collagenase

- Derived from Clostridium Hystoliticum
- Highly specific for peptide sequence found in collagen
- Less aggressive debridement
- Site of action – collagen fibers anchoring necrotic tissue to the wound bed

[10]Harper (1972) [11]Boxer (1969) [12]Varma (1973)

Enzymatic Debridement

Papain-Urea

- Proteolytic enzyme derived papaya[6]
- Urea is added as a denaturant[6]
- Site of action – cysteine residues on protein[8]

[6]Falabella (1998) [8] Sherry and Fletcher (1962)

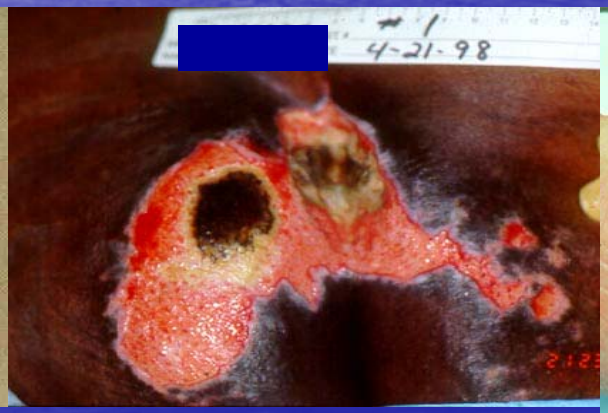
Enzymatic Debridement Considerations

- Should be painless
- Less traumatic than surgical or mechanical debridement
- Easy dressing change
- Observe caution with infected wounds

- Consider for individuals who:
  - Cannot tolerate surgery
  - long-term-care facility
  - home care*

*Agency for Healthcare Research and Quality (1994)

Autolytic Collagenase Papain-Urea-Chlorophyllin



The right method is a clinical decision that requires judgment

Bacterial Balance

- Intact skin is a physical barrier
- Skin secretes fatty acids and antibacterial polypeptides
- Normal flora prevent pathogenic flora from establishing

Bacterial Burden

- Tissue bacterial levels > $10^{5/gram}$ have consistently resulted in impaired healing causing:

- Metabolic load
- Produces endotoxins and proteases

[13]Robson (1997) [14]Dow (2001)

Efficacy of traditional topical antibiotics

- Leyden & Kligman, 1979: Neomycin contact sensitivity < 1% skin testing
- Booth, etal,1994: Minimum Inhibitory Concentration mg/L

Bacteria	A:Neomycin	B:Bacitracin	C:Polymyxin B	(TAO): A+B+C
Staph Aureus	1	54	61	synergy
Pseudomonas aerug.	32	>6917	8	synergy
Enteric bacillus	8	>6917	1	synergy

- Dire, et al, 1995: Uncomplicated sutured soft tissue trauma wounds

Topical Agent	Infection Rate
Bacitracin Zinc	5.5%
TAO	4.5%
Petroleum	17.6%

3 "Rules" for Topical Antimicrobial Agents ?

- Do not use antibiotics that are used systemically – ability to breed resistant organisms (topical gentamicin, tobramycin)
- Do not use agents that are common allergens (neomycin, gentamicin, amikacin, tobramycin, bacitracin, lanolin)
- Do not use agents that have high cellular toxicity in healable wounds (povidone iodine, chlorhexidine, hydrogen peroxide)

[22]Sibbald 2003

Topical Antimicrobials: Silver

- Centuries of use
- Cytotoxicity associated with carriers not silver - ex. Silver nitrate, Silver sulfadiazine
- Traditional delivery required repeated applications due to binding with chlorine and proteins
- New silver dressings allow for continued silver release in to the dressing - up to 7 days

[17]Demling and DeSanti (2001)

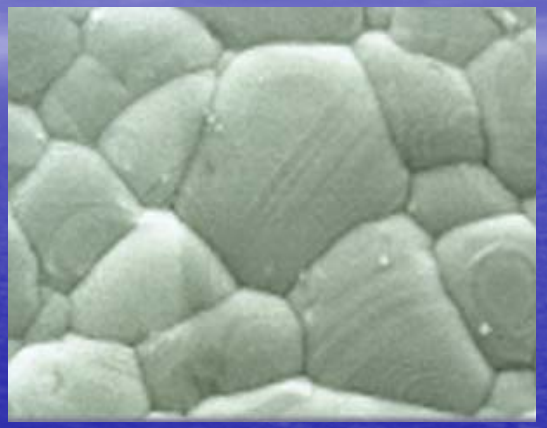
Why Silver for Wound Bed Preparation?

- Broad spectrum antimicrobial: yeasts, molds & bacteria, including MRSA
- Kills microbes on contact: inhibition cellular respiration
  denatures nucleic acids
  alters cell membrane permeability
- Does not induce resistance: if used at adequate levels
- Low mammalian cell toxicity

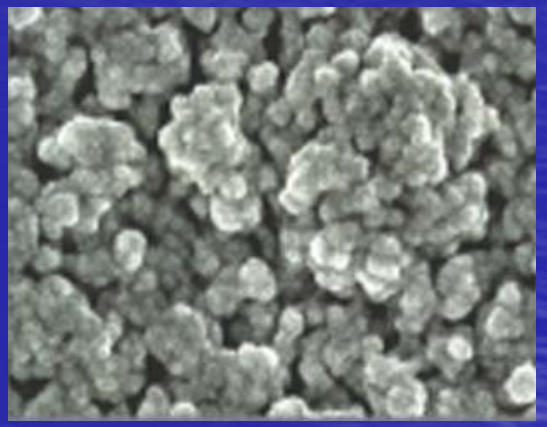
Nanocrystalline Silver

- Decreased size of silver particles leads to increased proportion of surface atoms

- The nanocrystalline structure is responsible for the rapid and long lasting action[15]



Magnification of normal Silver



[17]Demling and DeSanti (2001)

Magnification of Nanocrystalline Silver (< 1 micron)

Evaluating Silver Products

- Minimum bactericidal concentration (MBC)
  - amount of antimicrobial agent required to kill a given microbe

    MBC is represented by a log reduction of 3

    Stratton et al (1991)

  - The silver required varies from 5ppm - 50+ ppm for clinically relevant microbes

    Yin et al (1999) & Hall (1987)

  - MBC of silver for MRSA = 60.5 ppm

    Calculated from Maple et al (1992)

Moist Wound Environment

Additional benefits

- Faster healing
- Capacity for autolysis
- Decreased rates of infection
- Reduced wound trauma
- Decreased pain
- Fewer dressing changes
- Cost effective

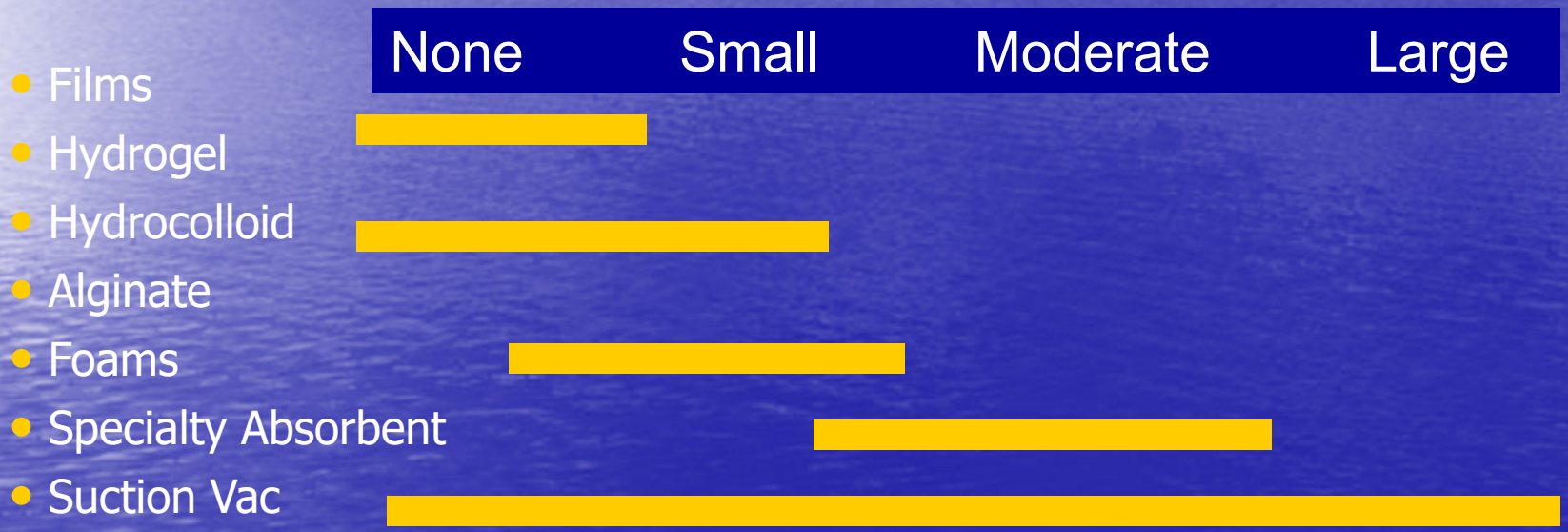
Exudate from a Chronic Wound

- Different from acute wound
- Imbalance of growth factors and pro-inflammatory cytokines
- Excessively high levels of proteases
- Degrades ECM and selectively inhibits proliferating cells

[21]Enoch and Harding, 2003

Managing Moisture Imbalance

- Exudate amount

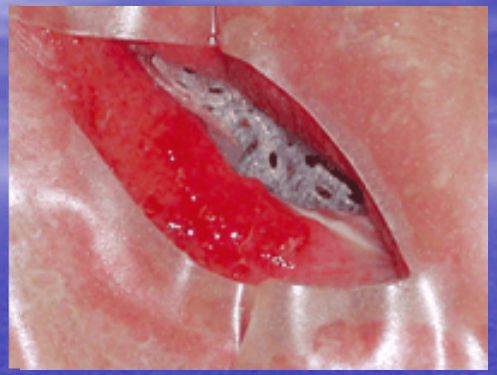


Suction Vac Therapy

Management of open wounds

- increases granulation rate> 5x's
- success depends on pore size, -125mmHg
- reduces wound volume
- requires changing every 2 days
- vascular ingrowth and healing appear to be due cell deformation
- early epithelial cells lack rete pegs and are easily strained to 5-20%, postulated mechanism

Saxena, etal, 2004: PRS 114(5)



Modern Scar Concepts (1)

- New keratinocytes lack rete pegs, are fragile, deformable and produce many fibrotic growth factors
- Fibroblasts within the injury zone are more sensitive to these and other growth factors
- Sulphated side chains develop from chondroitin produced from these fibroblasts
- The side chains cause water binding and subsequent scar rigidity

Modern Scar Concepts (2)
Collagenesis - Deposition - Resorption

Collagenesis

- Scar volume is dependent on the volume of collagen
- Collagen formation: mRNA mediated
- Fibroblast interferon ß(IFN- ß): inhibitor of collagenesis
- Transforming Growth Factor TGF ß 1 (adult): stimulates collagenesis
- TGF ß 3 (infant): inhibits collagenesis
- Renovo/ Retinae: inhibitors of TGF- ß1 activation: reduced collagenesis improving scars
- Gamma interferons and other cytokines down regulate collagen and matrix synthesis and increase monocyte retention within the wound

Modern Scar Concepts (3)

Collagenesis - **Deposition - Resorption**

Collagen Deposition & Resorption

- Fibroblast and monocyte collagenase: reduce collagen deposition
- Metalloproteinases inhibit collagenases: promoting collagen deposition
- Expression of fetal metalloproteinase: loss of scarless healing
- Intralesional steroids inhibit fibroblast growth
  inhibit collagen deposition:
  - increase monocyte collagenase secretion
  - no influence on metalloproteinase
  - no influence on collagen production

Modern Scar Concepts (4)

+ The Role of Tissue Hypoxemia -

- - impedes epithelialisation
- - increases infection: neutrophil dependent
- + reduces collagenesis in an epithelialised wound
- + compression and radiation lead to local fibroblastic hypoxemia
- : Compression and radiation should be used <u>after</u> epithelialisation is complete

Summary of Treatments for Hypertrophic Scar and Keloids

- Surgery
- Laser Excision
- Pulse Dye Laser Reduction
- Cryotherapy
- Pressure Therapy
- Radiotherapy
- Steroid, Interferon, 5-FU Injections, Colchicine
- Topical Aldara 5%
- Prolonged taping*
- Silicone gel/sheeting*

* patient controlled
inexpensive
non-prescription
few if any complications
well tolerated

Prolonged Paper Tape To Scar

Atkinson,et al, PRS Nov 2005; 116 (6), 1648-

- 70 pts acute scars: s/p caesarian section, Brisbane, Australia
- Micropore tape to randomized 1/2 pts after staple removal 4-7 days post-op
- Tape applied continuously for 12 weeks
- The control group received no treatment
- Scar volume was assessed by ultrasound
- Scar volume was reduced in the treatment group ($p<0.05$)
- High correlation between subjective scar rating & intradermal scarring ($p<0.001$)
- Authors postulate that tension is the cause of significant scarring

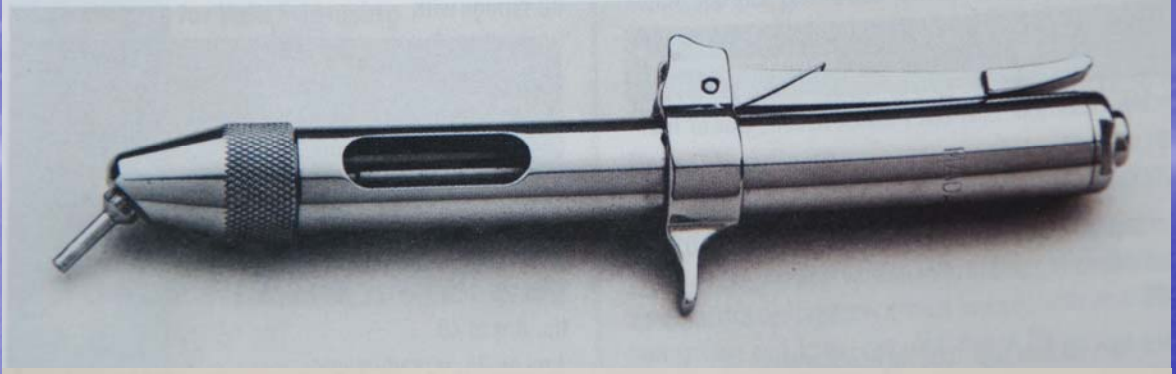
Management of Common Keloids

- Earlobe - If primary excision:
  3 x daily peroxide and triple antibiotic
  remove nylon 5.0 sutures at 10-14 days, then:
  Dermajet inject Kenalog (trimacinolone 40mg/ml)
  start Kelo-cote after sutures out for at least 3 months
  start compressive clamp "ear-ring" : no Nickel
  return every 6 weeks for further injections

- **Berman B, Bieley HC. Dermatol Surg 1996 Feb;22(2):126-30**
  - **excision alone: 45-100 % recurrence**
  - **excision and Kenalog injection: < 50 % recurrence**
  - **excision and irradiation: < 10% recurrence**
  - **excision and button compression: no recurrences**

www.delasco.com tel: 1 800 320-9612

MadaJet Needle-Free Injector



Pressure Earrings

For Post Op Ear Lobe Keloid Treatment

PE-3

PE-5

PE-9

PE-11, PE-12

PE-10

PE-1

Our fashionable Pressure Earrings feature a self adjusting clip designed to apply a correct amount of even pressure on both sides of the lobe. This applied pressure, used with Silastic Gel Sheeting, is optimum for reducing earlobe Keloid

PE-2

Glori-Sil® Pressure Earrings

Oval, Sleeper, Square

Glori-Sil Compression earrings are attractively designed plus hypo-allergenic and nickel-free. Fitted with DuraSiL™-K silicone sheeting. Clear finish is heat-cured for durability.

Average Lobe

PS-14	Oval	pr / 35.00

Management of Common Keloids

- Earlobe - if secondary excision:
  - excise and within 14 days: post-op irradiation
  - either one dose of 10 Gy or up to 15 Gy in 2-4 fractions
  - sutures out 14 days post-op
  - Kenalog injection, compressive ear-ring and 6 week follow-up

Klumpar DJ, Murray JC, Anscher M. J Am Acad Dermatol 1994 Aug;31(2 Pt 1):225-31

- Dose irradiation most important factor: give >900c Gy
- Irradiation completed within 1-3 weeks equally effective
- ear lobe 98% successful at > 1 yr follow-up
- small subsequent recurrences can be re-irradiated: 15 Gy

Improvement of Erythematous and Hypertrophic Scars by he 585-nm Flashlamp-pumped Pulsed Dye Laser, Tina Alster. Ann Plast Surg 1994;32:186-190

- 14 healthy subjects with hypertrophic and or erythematous scars as a results of trauma
- Scars were at least 2 years old
- Candela flashlamp-pumped dye laser: 6.5-6.75 J/cm2 1-2 treatments
- 57% improved: lightening and flatter after one treatment
- 83% improved after 2 treatments
- Continued improvement over 6 months
- Improvement was not location specific, depth of scar not assessed

Irradiation mostly contraindicated

Re-resection definitely harmful

Laser excision usually harmful

Pulse Dye lasers not helpful

Aldara 5% not helpful

Silicone sheeting not helpful

Steroid injections very helpful

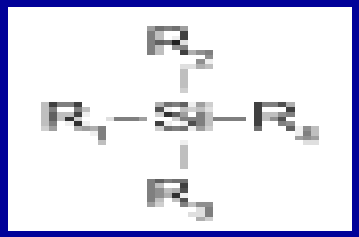
Kelo-cote helpful if < 5mm raised

Kelo-cote® unique formulation

- Kelo-cote® composition:
  - Long chain polymers of silicone (Polysiloxanes)
  - Minimal Silicone dixoide cross links polymers
  - A volatile solvent allows silicone to dry on the stratum corneum in an ultra-thin sheet

Silicone Composition

Silanes: monomers



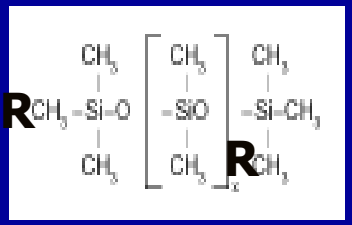
R

Methyl
Higher Alkyl
Phenyl
CF3CH2CH2

Characteristics

Hydrophobicity & Low surface tension
Organic-compatibility and Paintability
Thermo-stabile,Organo-compatible, Hydrophobic
Solvent resistant

Siloxanes: polymers



more crosslinked: more solid
recurring silicone / oxygen backbone
end / side chains determine functionality
R: ie.: amine,carboxy, hydroxyl,epoxyl

Favorable properties related to scar reduction

- Intermediate forms: elastomers: gel, rubber
- Solid-liquid binding requires catalyst 'curing': ie. platinum, stannous octoate
- Delivery in an evaporative solvent may provide the ability to change the properties of the silicone upon delivery

- Properties influencing scar reduction include:
  - Thickness: < 0.254mm
  - Moisture vapor transmission rate: <15mg/cm2/day
  - Oxygen permeability: > 600cc/100 in.sup.2/day
  - High stretch: ,1.5lbs/in stretches > 110% length
  - Tensile strength: >100g
  - Penetrability: 4-7mm
  - Peel strength: 2-6 g

Silicone Mode of Action

- Potential Theories
  - Hydration: increases
  - Oxygenation: decreases
  - Protection: increases
  - Cellular Strain: increases ?
  - Modulation of growth factors

Silicone Mode of Action

Hydration

- Kelo-cote is semi-occlusive aerating and hydrating
- Silicone absorption is limited to the epidermis
- Stratum corneum regulates fibroblast /collagenesis
- Hydration normalises the collagen synthesis

Silicone Mode of Action

Hydration

- **<u>But not all breathable dressings will reduce scars</u>**
- In a study comparing silicone and hydrogel dressings,
  silicone normalised collagen synthesis,
  other breathable non-silicone dressings did not
- Silicone has a scar reducing characteristic not seen with polyurethanes
- Further research ongoing

Silicone Mode of Action

Protection

- Microbial, chemical or physical irritation promote excessive collagen production in early scars:
- Keratinocyte dependent: exposed cell release growth factors
- Fibroblast dependent: Staph epidermidis Immortalization Theory
- Intact dermis is necessary for normal wound healing

Silicone Mode of Action

Modulation Theory

- Silicones oils and sheeting appear to have an influence on Fibroblast growth factors and transforming growth factors
- Silicone reduces FGF growth factors in vivo, yet
  (opposite in vitro)
  - Fibroblast are reduced
  - Collagenase is increased
- "Collagen production is normalised"

History of Silicone in Scar Reduction

Good review: Mustoe, et al, PRS 2002:110(2) 560-

- Perkins et al, 1983: reported silicone a new treatment for hypertrophic scars
- Ahn, et al, 1989: silicone gel improved texture, color, thickness and itching from small hypertrophic scars
- Sawada & Sone, 1990: 20% silicone gel 82% improved hypertrophic scars and keloids a.c.t. glycerin 22% improved
- Sawada &Sone, 1992: silicone gel an elastomer sheeting vs. petroleum, 6 months f/u silicone group much softer, less red
- Pamieri, et al, 1995: Found Vit E enhanced hypertrophic scar and keloids
- Phillips, et al. 1996: hydrocolloid dressings no evidence to support reduce scarring after hypertrophic scar or keloid established

Literature lacks double blind placebo controlled studies

Placebo Controlled Pilot Study Evaluating Kelo-cote in the Reduction of Scarring Following Cleft Lip Repair

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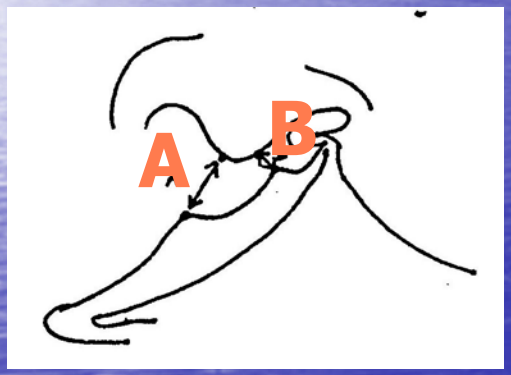
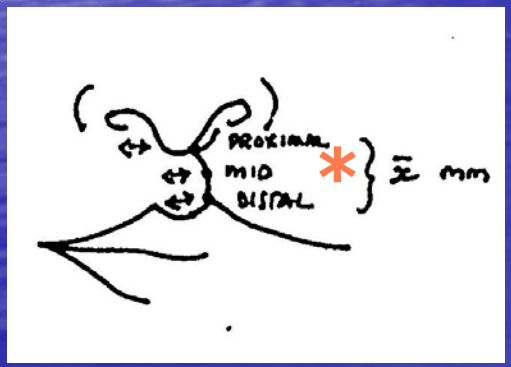
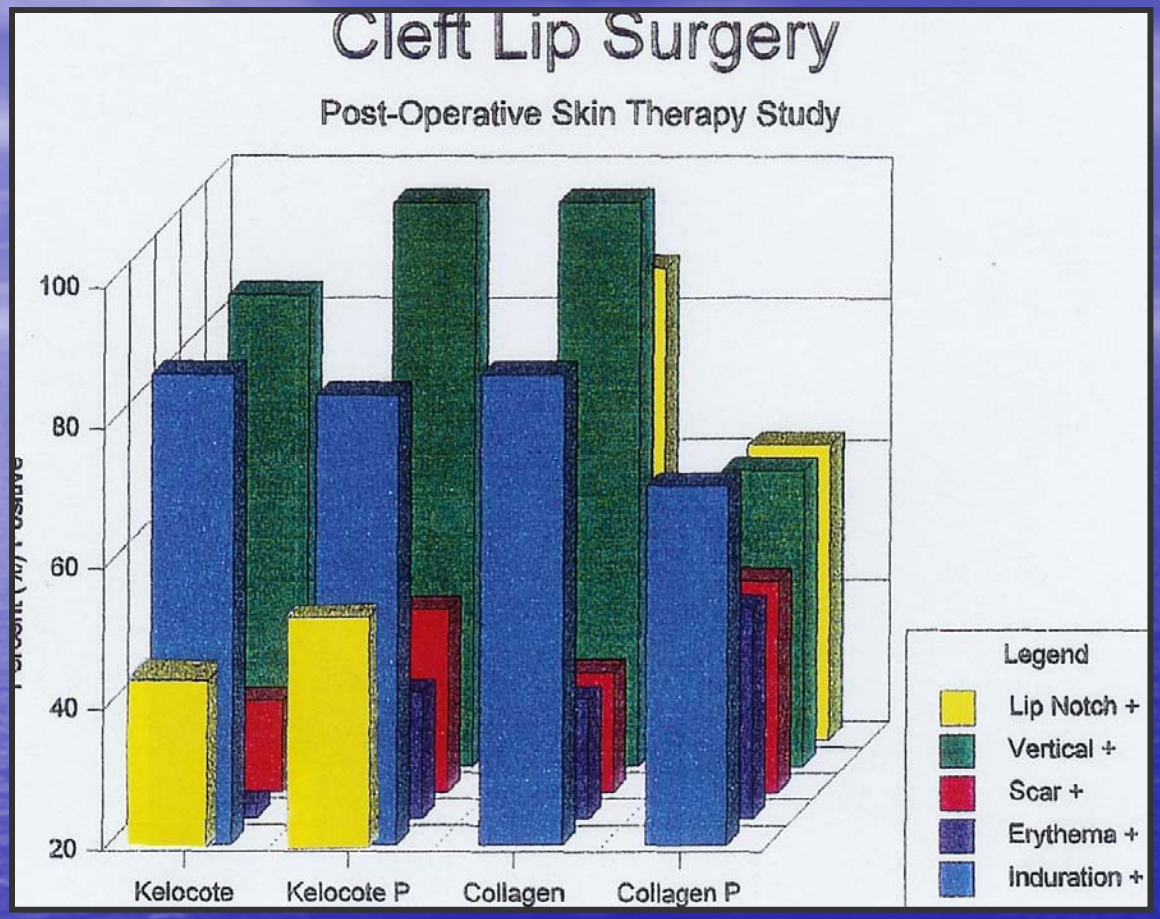
10 days post-op **8 weeks post-op** **8 months post-op**





- 33 patients, Santiago, Chile, 1996
- Methods: mm vertical scar shortening (A-B)
  mm depth lip notch
  *average width scar mm
  scar softness 0-3 grade
  scar erythema 0-3 grade
- 6 week follow-up results



Markedly reduced erythema (p< 0.005)

Reduced horizontal scar width (p<0.05)

Chan, et al, 2005: PRS Sept 15

- Placebo controlled study prospective clinical trial of silicone gel (Scarfade ®) in the prevention of hypertrophic median sternotomy scars
  - 100 wounds/50 pts Malaysia
  - Reduction of:
    - pigmentation (p=0.02)
    - vascularity (p=0.001)
    - pliability (p=0.001)
    - height (p=0.001)
    - pain (p=0.001)
    - itchiness (p=0.001)

Sebastian et al, 2005

- Non-placebo controlled study Kelo-cote on scars: all-comers, up to 48 month follow-up
  - Data 111 patients Germany, Switzerland & Austria
  - Study: legal requirement for 'new' products
  - Independent study
  - Data is on all types of scars
  - Different ages of scars
  - Measurement tool is Vancouver scar scale, which is standard measurement for scars

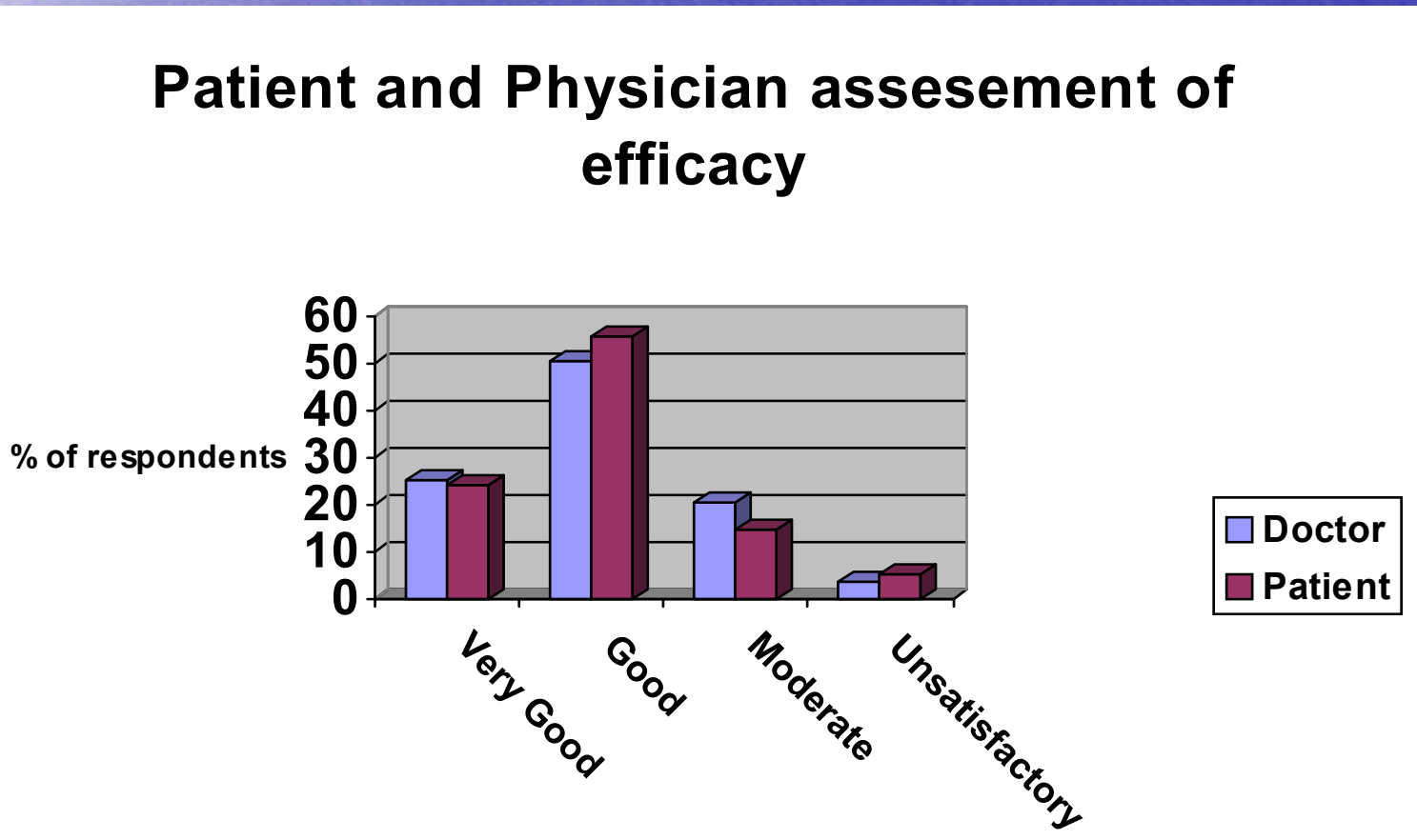
Sebastian et al, 2005

- Patients & physicians assessment of tolerability and efficacy using 4 point scale
- Vancouver scar scale

	Score					
	0	1	2	3	4	5
Pigmentation	Normal	Hypopigmentation	Hyperpigmentation			
Vascularity	Normal	Pink	Red	Purple		
Pliability	Normal	Supple	Yielding	Firm	Banding (rope-like)	Contracture
Height	Flat	1 to 2 mm	2 to 5 mm	>5 mm		
Pain	None	Occasional	Requires medication			
Itchiness	None	Occasional	Requires medication			

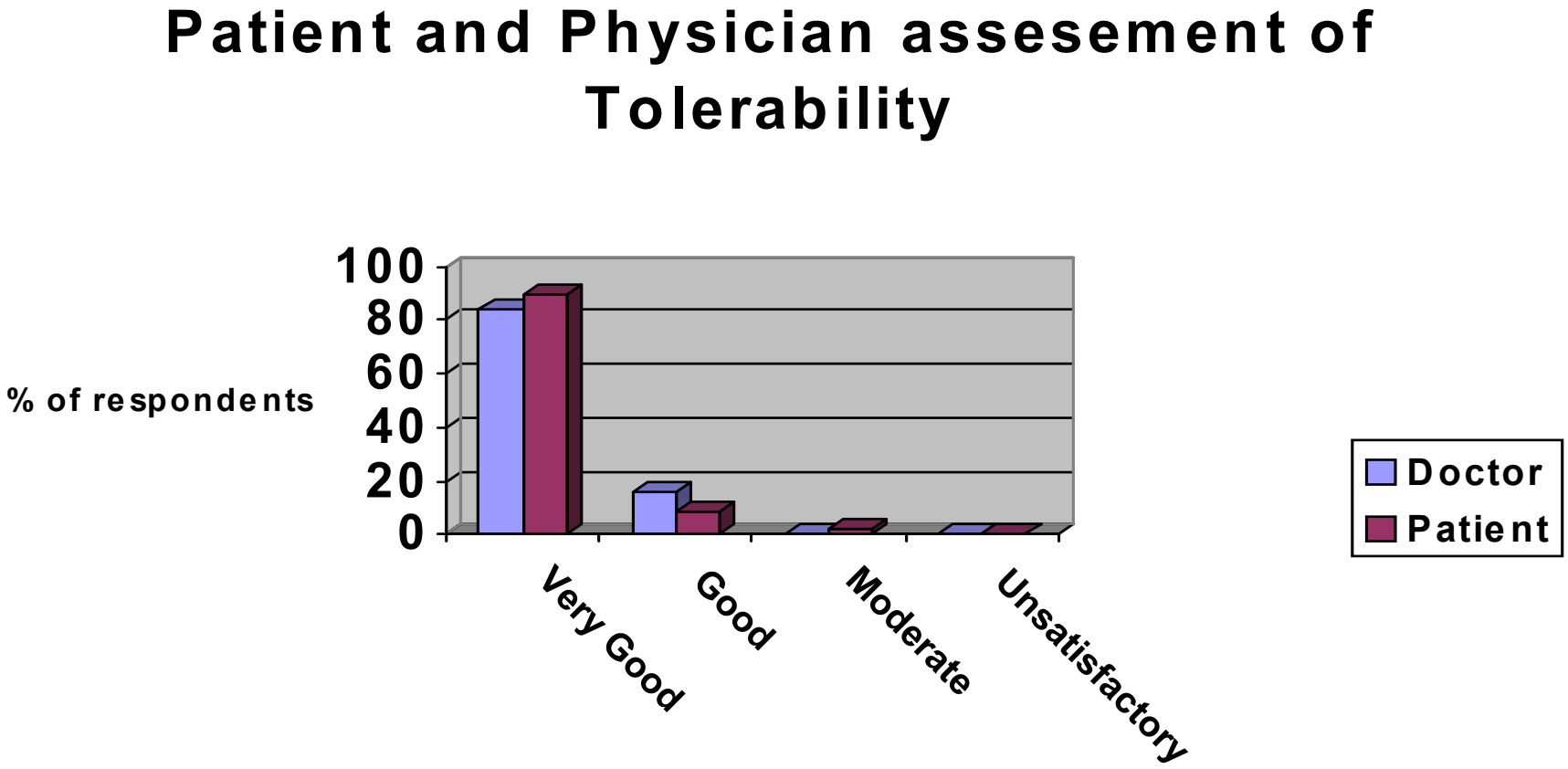
Sebastian et al, 2005

Results of patient and physician assessment - Efficacy



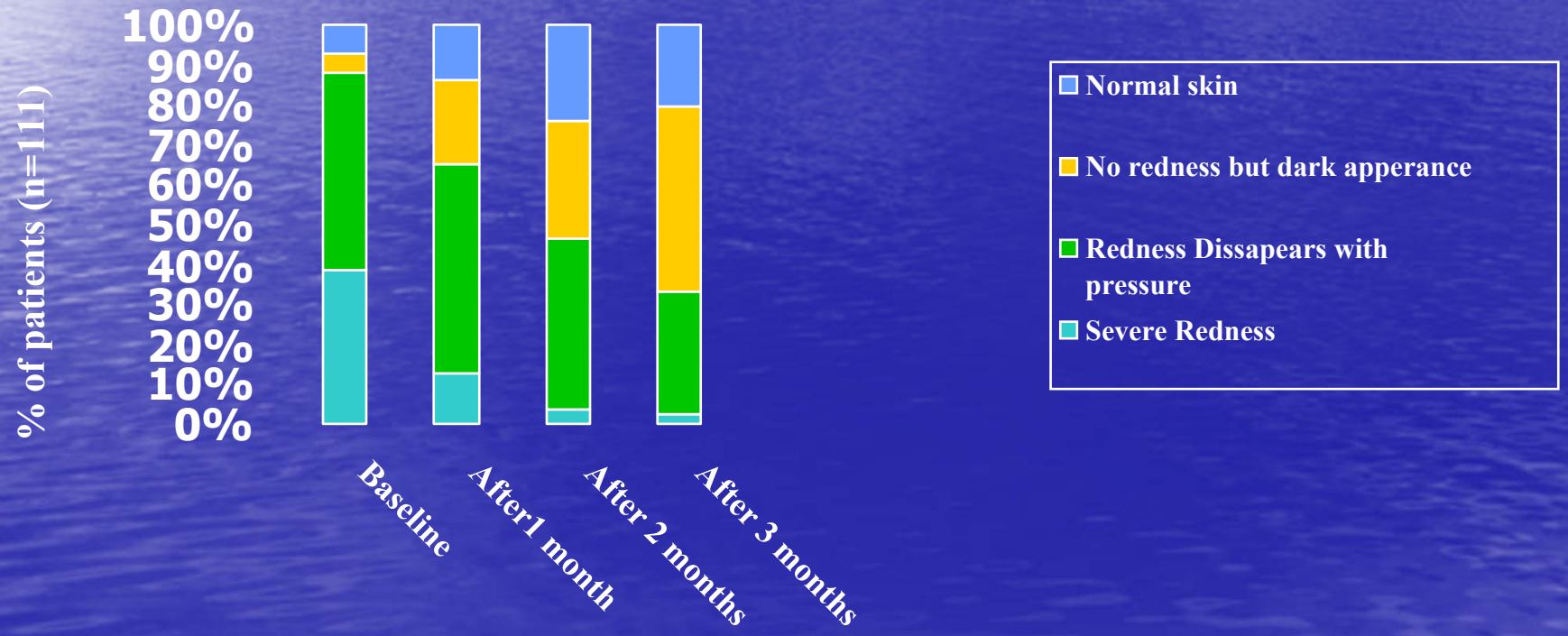
Sebastian et al, 2005

Results of patient and physician assessment - Tolerability



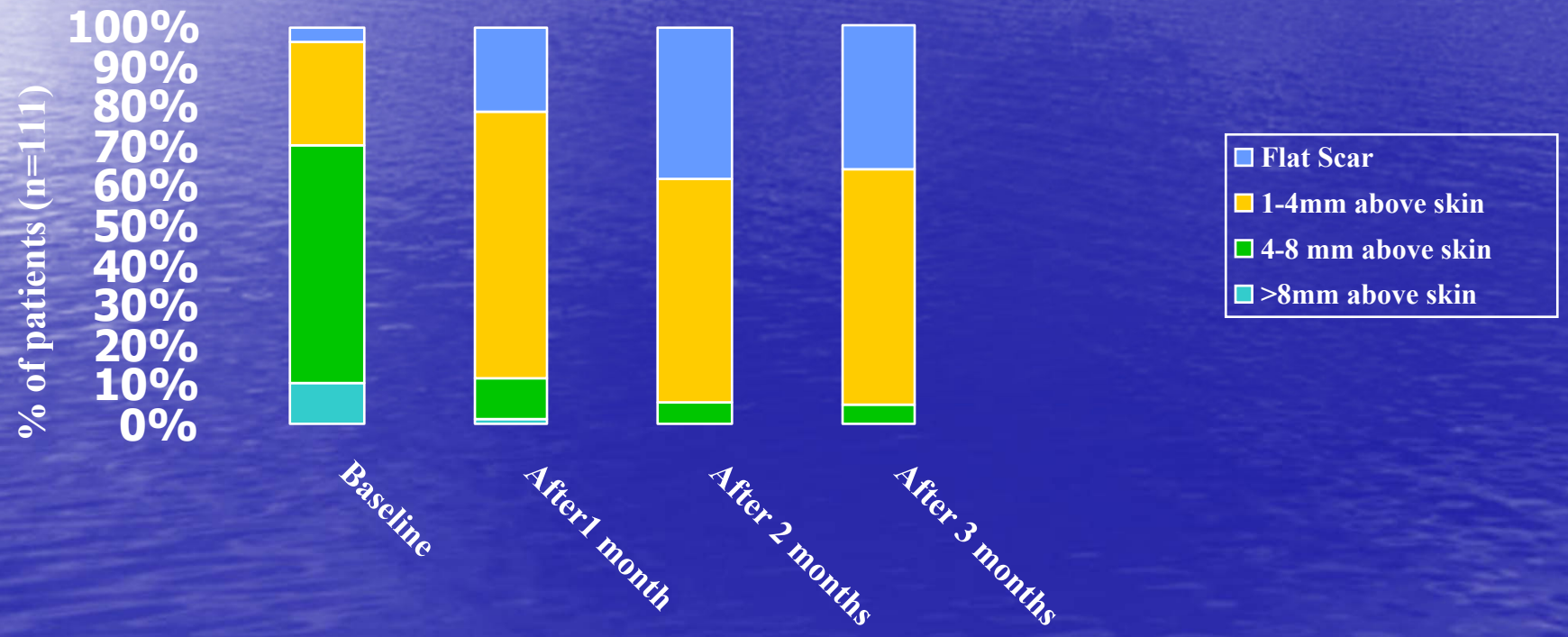
Sebastian et al, 2005

Decrease in Vancouver Scar Scale - Redness



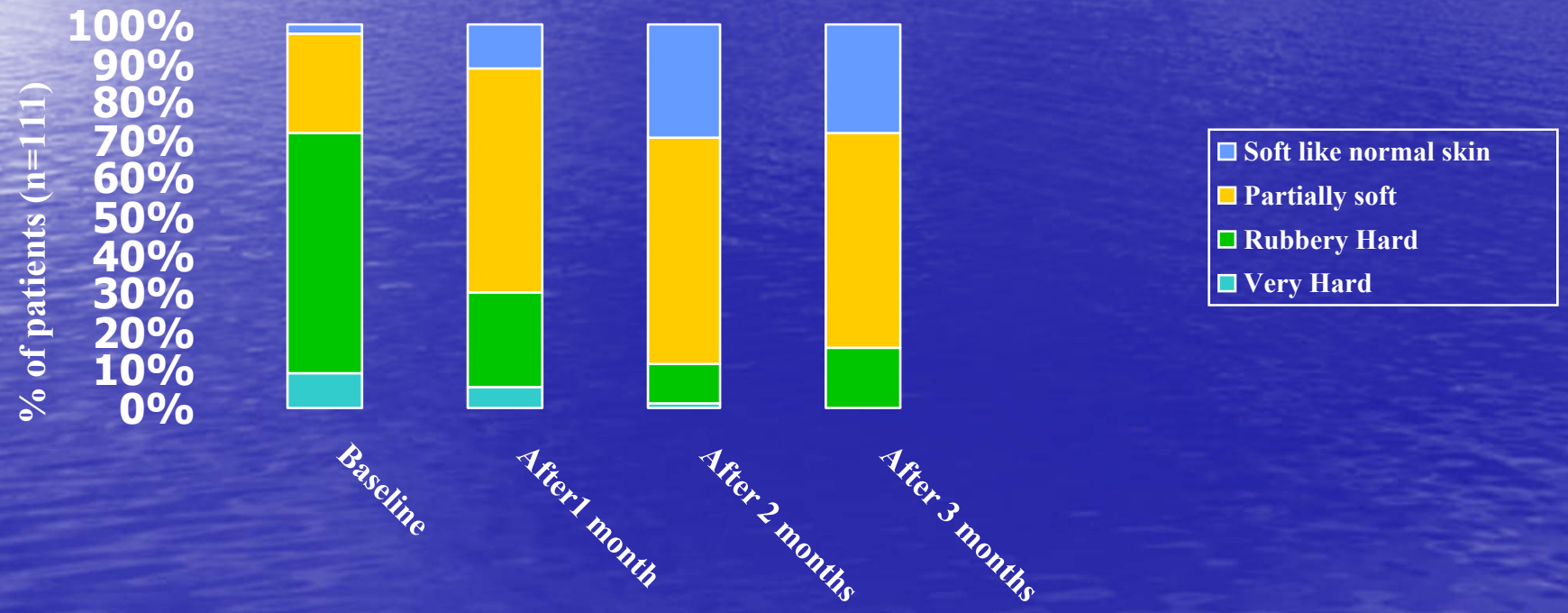
Sebastian et al, 2005

Decrease in Vancouver Scar Scale - Elevation



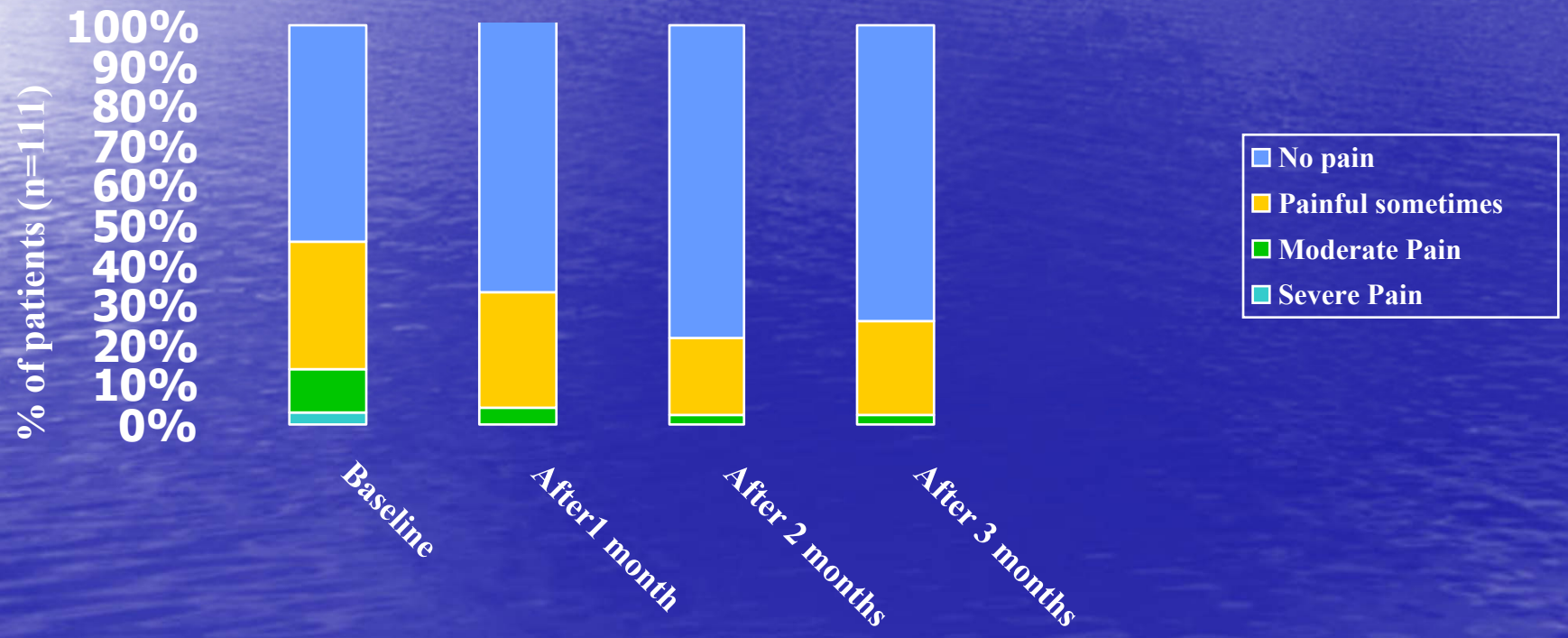
Sebastian et al, 2005

Decrease in Vancouver Scar Scale - Hardness



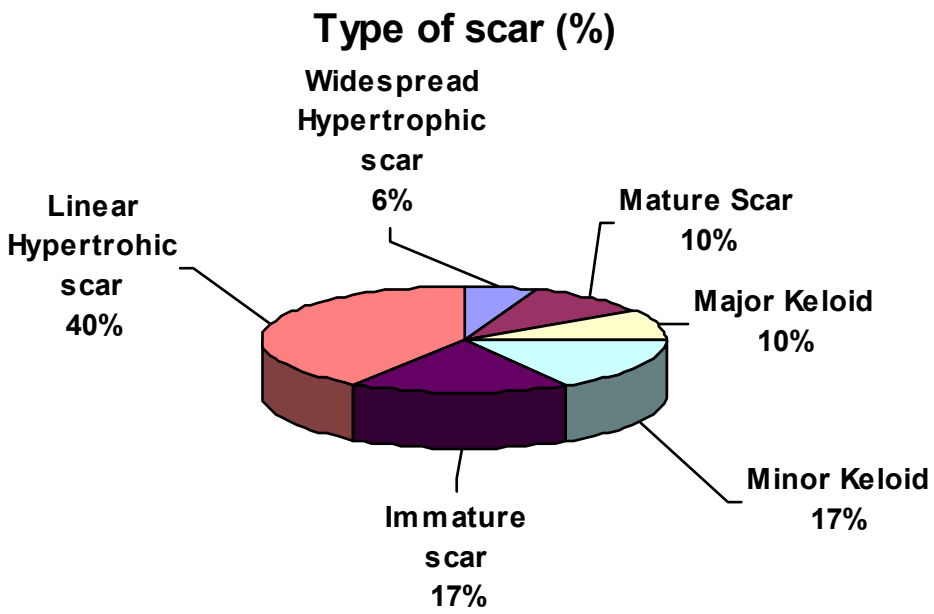
Sebastian et al, 2005

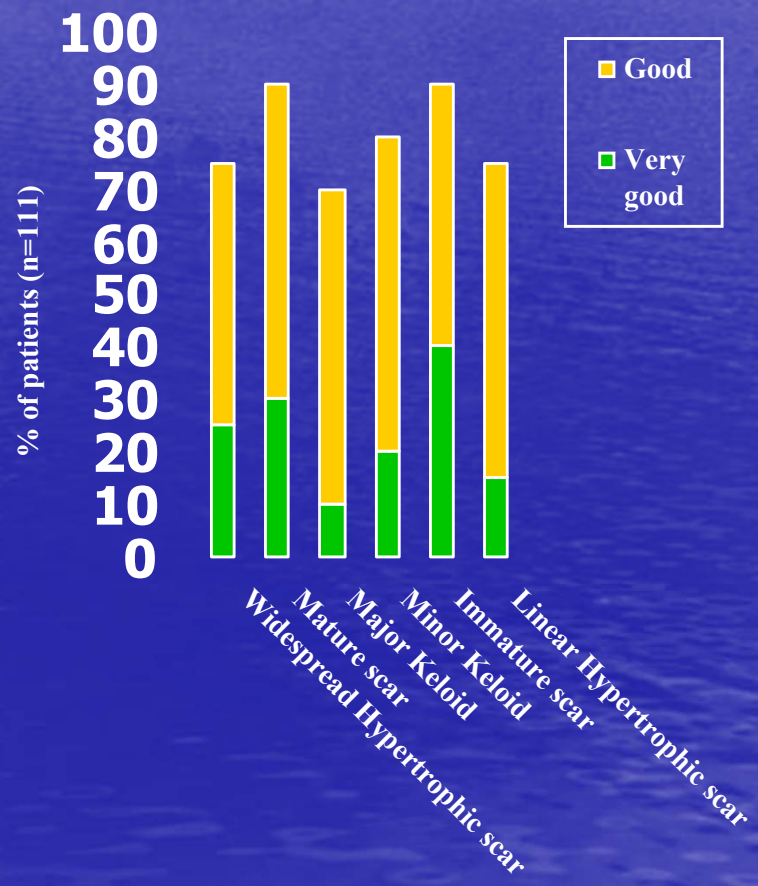
Decrease in Vancouver Scar Scale - Pain



Sebastian et al, 2005

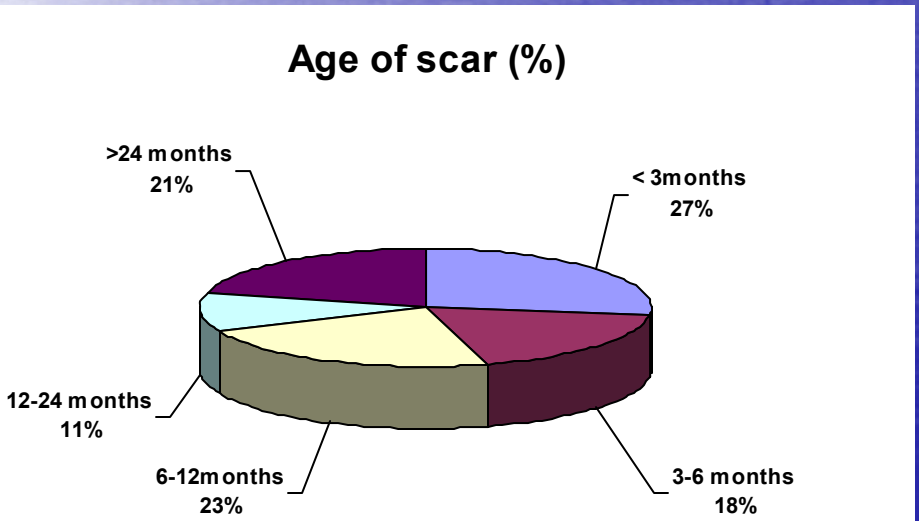
Results by type of scar

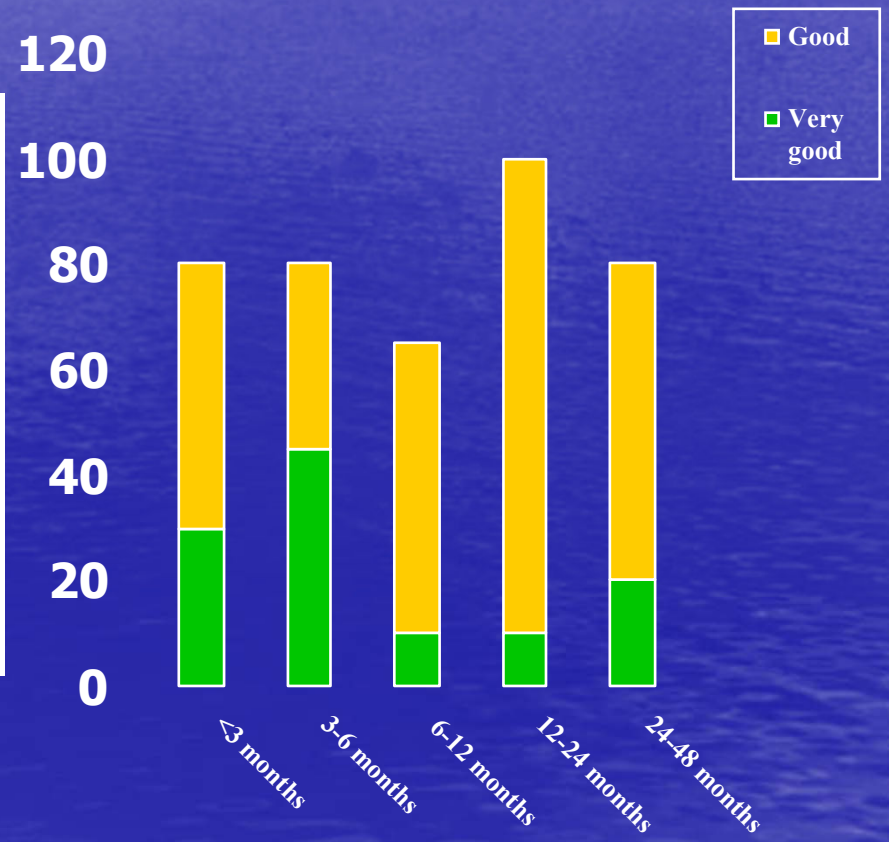




Sebastian et al, 2005

Results by age of scar





Summary of study

- Kelo-cote® rated:good/very good > 80% patients & physicians
- Physicians rated tolerability: good/very good 100% of patients
- Kelo-cote® decreased: redness, elevation, hardness,itchiness and pain of scars over a two month period
- Kelo-cote® can be used on old and new scars
- Kelo-cote® can be used to treat all types of scars

Indications for use

- **Kelo-cote® is indicated for the management of:**
  - **Acute healing scars**
  - **Hypertrophic scars**
  - **Keloids**
- **Kelo-cote®™ has also been used for scars resulting from:**
  - **Trauma**
  - **Burns**
  - **Surgery**
  - **Acne**
  - **Post laser erythema**

Length of treatment

- Minimum treatment should be 2 months
- Treat larger and older scars >3 months
- Active persons apply usually in am
- May treat with other topicals in pm

Instructions for use 0.5 oz Kelo-cote

- Ensure the area is clean and dry.
- Apply a very thin layer and allow to dry
- Apply once daily, or twice daily
- Maximum effect, 24 hours of continuous contact
- Once dry, OK to cover with pressure garments, sun block or cosmetics
- If not dried within 4–5 minutes: too much
- Gently remove the excess and allow the drying
- Larger and older scars > 90 days
- 0.5 oz contains enough Kelo-cote®, for: 7.5–10cm 2x/day for 90 days
- Reduce drying time hotter climates, keep in the refrigerator
- In colder weather, use low setting on hair dryer to reduce drying time

Warnings and Precautions

- **Avoid direct contact with eyes, mucous membranes, & open wounds**
- **Kelo-cote® may stain clothing if not completely dry**
- **Store below 77°F (25°C)**
- **Do not use after the expiration date**

Mederma: $25, 50g, EtOH, water,PEG-4,xanthum gum, sorbic acid

Scarguard: $72, 100g, with hydrocortisone, Vit E

Cimeosil: $56, 14 gram, polysiloxanes

Skin Esthetique: $24, 170g,dimethicone, arnika, copper, seaweed

Scarfade: $25, 50g, silicone dioxide, micro quartz crystals +/- vit E,K, co-enzyme Q-10

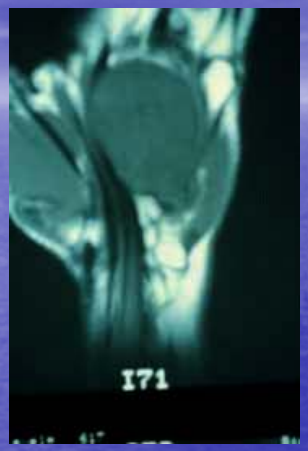
Pro-Sil: $17.50, glide-on, silicone "creams and oils"

- Kelo-cote® is a uniqe patent protected silicone gel
- 80% patients rate Kelo-cote® as good or very good in scar reduction
- 100% physicians rate Kelo-cote® good or very good in pt tolerability
- Kelo-cote® softens, flattens &reduces the redness of old & new scars
- Kelo-cote® is a comaparatively cost effective treatment

Clinicial Care:'**Olsen's Rule'**

- "Most wounds heal proportionate to the time and attention they are given"
- Steristrip minimum of 4 - 7 days & then another 5 days after changing strips
- Early application of Kelo-cote, avoid any contact with clothing for 6 weeks minimum: diapers OK
- All open wounds treated with 1/2 peroxide, bacitracin, minimum of twice daily

Hand

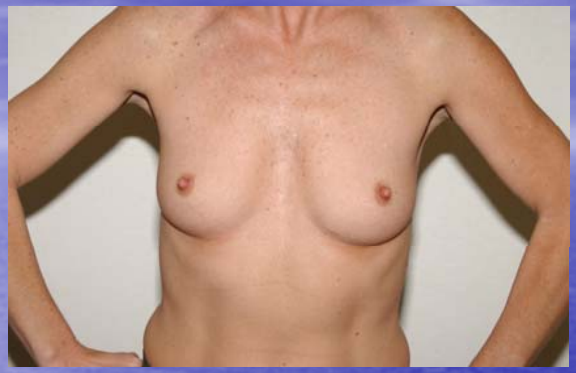


Breast Reduction



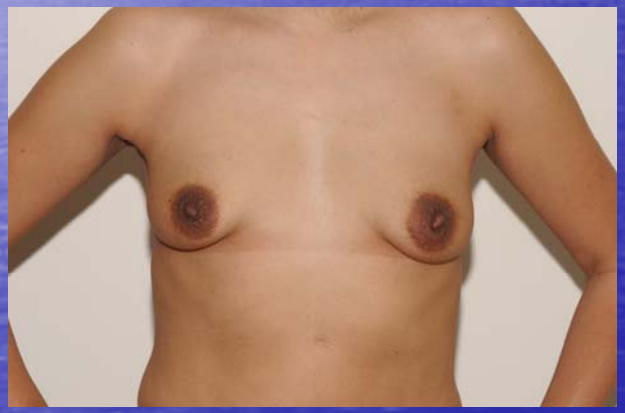



Breast Augmentation






Mastopexy Augmentation



Verbal testimonial: Mastopexy Augmentation

Breast Cancer Reconstruction

- Bilateral Transverse Rectus Abdominus Myocutaneous Flap

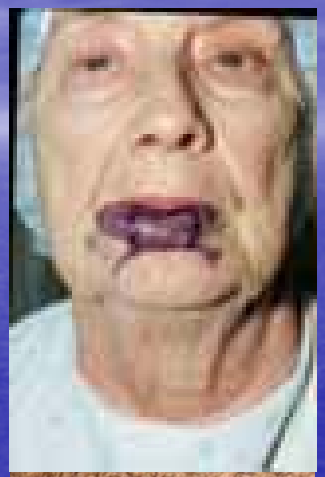
Abdominoplasty

<Olsen's Rule

Facial Trauma

Facelift

Head and Neck Excisional Surgery



Cleft Lip Surgery

Looking into the Future

Bioglass and nano crystal Silver Spray