# Sclerotherapy Complications and Contra-Indications

Dr Paul Thibault

Phlebologist

Newcastle NSW

# Sclerotherapy Complications and Contraindications

*"Not everything that needs to be known can be taught"*

# Sclerotherapy
# Complications and Contraindications

- *"World-wide clinical experience has proved beyond all possible doubt that embolism is a complication not to be feared and its interest is almost purely theoretical.*

*Properly conducted, the injection treatment of varicose veins can be carried out without the slightest risk, and if reasonable care be exercised, ulceration at the site of injection becomes a complication of extreme rarity"*

*Dr Victor Coppleson 1929*

# Patient Selection (Contraindications)

- Absolute
  - Acute deep venous thrombosis
  - Allergy to sclerosant

# Patient Selection (Contraindications)

- Relative
  - Predisposition to thrombosis
    - Past history of thrombosis/PE
    - FH venous thrombo-embolism
    - Hypercoagulable state eg polycythaemia rubra vera
    - Long-distance travel
    - Known Thrombophilia
    - Bedrest and inability to ambulate
    - Pregnancy
    - 1st and 3rd generation Ocs

# Sclerotherapy and Thrombosis

- *"World-wide clinical experience has proved beyond all possible doubt that embolism is a complication not to be feared and its interest is almost purely theoretical.*
  - *Dr Victor Coppleson 1929*
- *"The reported incidence has been less than seen in the general population"*
  - *Dr Craig Feied* Semin Dermatol 1993
- *Anecdotal reports that asymptomatic DVTs are more common than recognised*
  - *Parsi and Myers*

# Sclerotherapy and Thrombosis

- Large veins are probably at no greater risk than small veins
  - STS and POL are anticoagulants at concentrations>0.3%
- There is no evidence that patients with known thrombophilia are more predisposed to post-sclerotherapy VTE than others
- Medico-Legal Indication for Prophylactic Clexane
  - Significant thrombophilia
  - Past History  DVT or PE if no significant contributary cause

# Sclerotherapy and Thrombosis

- Diagnosis
  - Asymptomatic
  - Painful swollen leg
  - Pulmonary embolus (chest pain, dyspnoea)

# Sclerotherapy and Thrombosis

| **Complications** | **STS** *N=2,686* | **POL** *N=16,804* |
|---|---|---|
| Death | **0** | 0 |
| Anaphylactoid | **4** (0.15%) | 0 |
| Urticaria | **2** (0.07%) | 12 (0.07%) |
| Rash | **1** | 2 |
| Migraine | **3** | 3 |
| Deep vein thrombosis | **0** | 3 (0.02%) |

# Sclerosant Effects on Clotting Tests (*Parsi)*

- STS prolongs all clotting tests at concentrations higher than 0.3% demonstrating potent anticoagulant activity.
- STS shortens XACT and NAPTT at concentrations less than 0.3% demonstrating pro-coagulant activity.
- STS behaves as a procoagulant phospholipid at concentrations lower  than 0.3%.

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# Sclerosant Effects on Clotting Tests *(K Parsi)*

- POL has less dramatic effect on clotting time
- POL has more procoagulant activity at low concentrations when compared with STS with increased exposure time.
- STS is a more potent anticoagulant at high concentrations when compared with POL.

# Sclerotherapy and Thrombosis Prevention

- Selection of patients
- Post-treatment graduated compression stocking
  - 3-4 days day and night
  - 10 – 20 days during day
- Walk immediately after treatment 15-20 minutes
- Daily walking 45 minutes
- Prophylactic Clexane for high-risk patients

# Patient Selection (Contraindications)

- Relative
  - Predisposition to thrombosis
  - Defer or avoid Rx or consider prophylactic LMWH
    - Past history of thrombosis/PE
    - FH venous thrombo-embolism
    - Hypercoagulable state eg polycythaemia rubra vera
    - Long-distance travel
    - Known Thrombophilia
    - Bedrest and inability to ambulate
    - Pregnancy
    - 1st and 3rd generation Ocs

# Allergy and Anaphylactic Reactions

| **Complications** | **STS**<br>*N=2,686* | **POL**<br>*N=16,804* |
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# Allergy and Anaphylactic Reactions

- More likely with STS
- More likely with stronger solutions (>1%)
- Most commonly pseudoanaphylactic (anaphylactoid)
- Anaphylactic reactions can occur also

# *Anaphylactic Reactions*

- Type 1 hypersensitivity reaction
- Requires previous exposure
- always caused directly by degranulation of mast cells or basophils  mediated by IgE
- Time of onset varies from minutes to hours after exposure
- Biphasic anaphylaxis (relapse within 72 hrs) occurs in 1 – 20% of cases

# *Anaphylaxis - Symptoms*

- **Skin** involvement including generalized hives, itchiness, flushing, and swelling of the lips, tongue or throat. (90%)
- **Respiratory** symptoms may include shortness of breath, wheezes or stridor, and low oxygen. (70%)
- **Gastrointestinal** symptoms may include crampy abdominal pain, diarrhea, and vomiting (45%)
- **Cardiovascular** Hypotension can cause fainting & LOC. Due to histamine release, coronary artery spasm may occur with subsequent myocardial infarction or dysrhythmia (45%)
- **CNS** - loss of bladder control and muscle tone
  - feeling of anxiety and "impending doom"

# *Pseudoanaphylaxis (Anaphylactoid)*

- does not involve an allergic reaction but is due to direct mast cell degranulation
- most common trigger for this mechanism is an intravenous infusion of an iodine-containing radiological contrast medium
- exact mechanism with sclerosants is unknown but may be related to degranulation (release of mediators) from endothelial cells
- occurs on 1st exposure to sclerosant and within minutes of injection

# Allergy and Anaphylactic Reactions

- Management
  - Awareness and early detection
  - Adrenaline (sc or im)
  - I-V line and airway (O2)
  - corticosteroids
  - ?admission to hospital
- Avoidance
  - Use foam rather than 1-3% STS solution as direct degranulation is dose/time -related

# Patient Selection (Contraindications)

- Relative
  - Current other systemic disease
  - Lymphoedema
  - Deep venous obstruction (only about 10% of cases)
  - Patent foramen ovale - avoid foam

# Local Complications

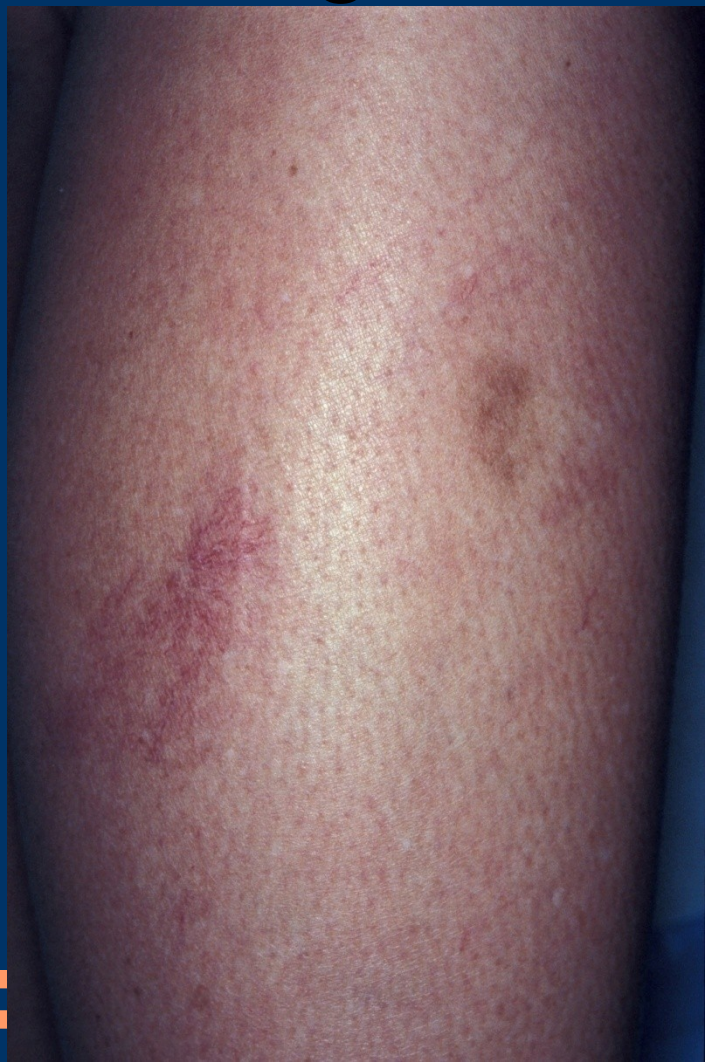
- Postsclerotherapy pigmentation
- Telangiectatic Matting
- Cutaneous Ulceration
- Superficial Thrombophlebitis and Acute Chemical Phlebitis
- Infection
- Hypertrichosis
- Skin reactions to tape, compression pads and stockings

# *Skin Reactions*

- Allergy to tape
- Friction (cleavage) reaction to compression pads
- Allergy to stocking fibres

# Postsclerotherapy Pigmentation and Telangiectatic Matting

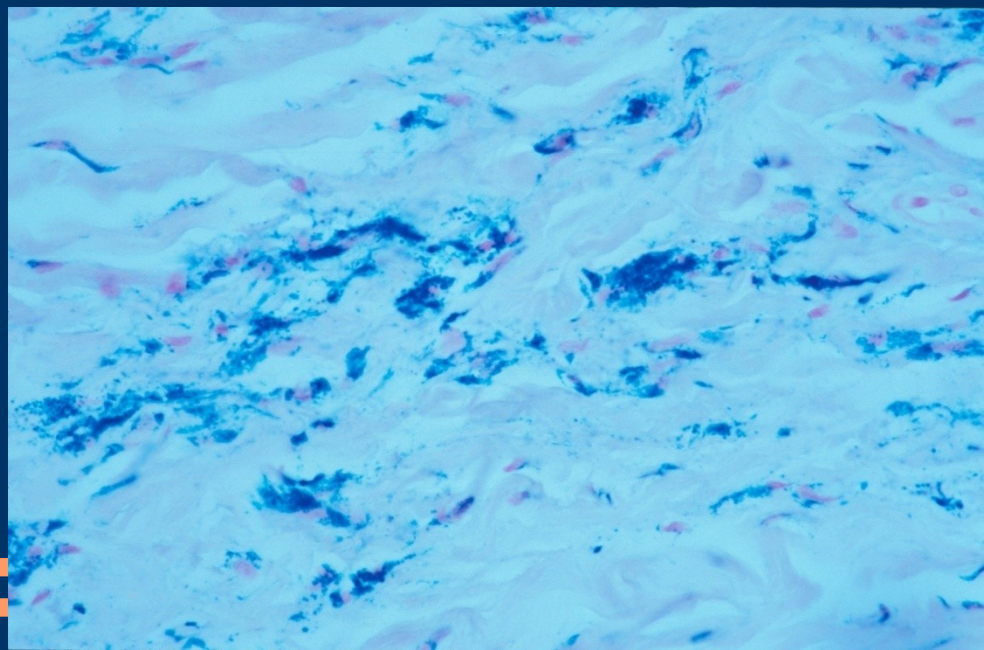
- Most common adverse sequelae
- Commonly occur together
- Probably have common aetiology
  - disruption of endothelium
  - thrombus formation
  - inflammation



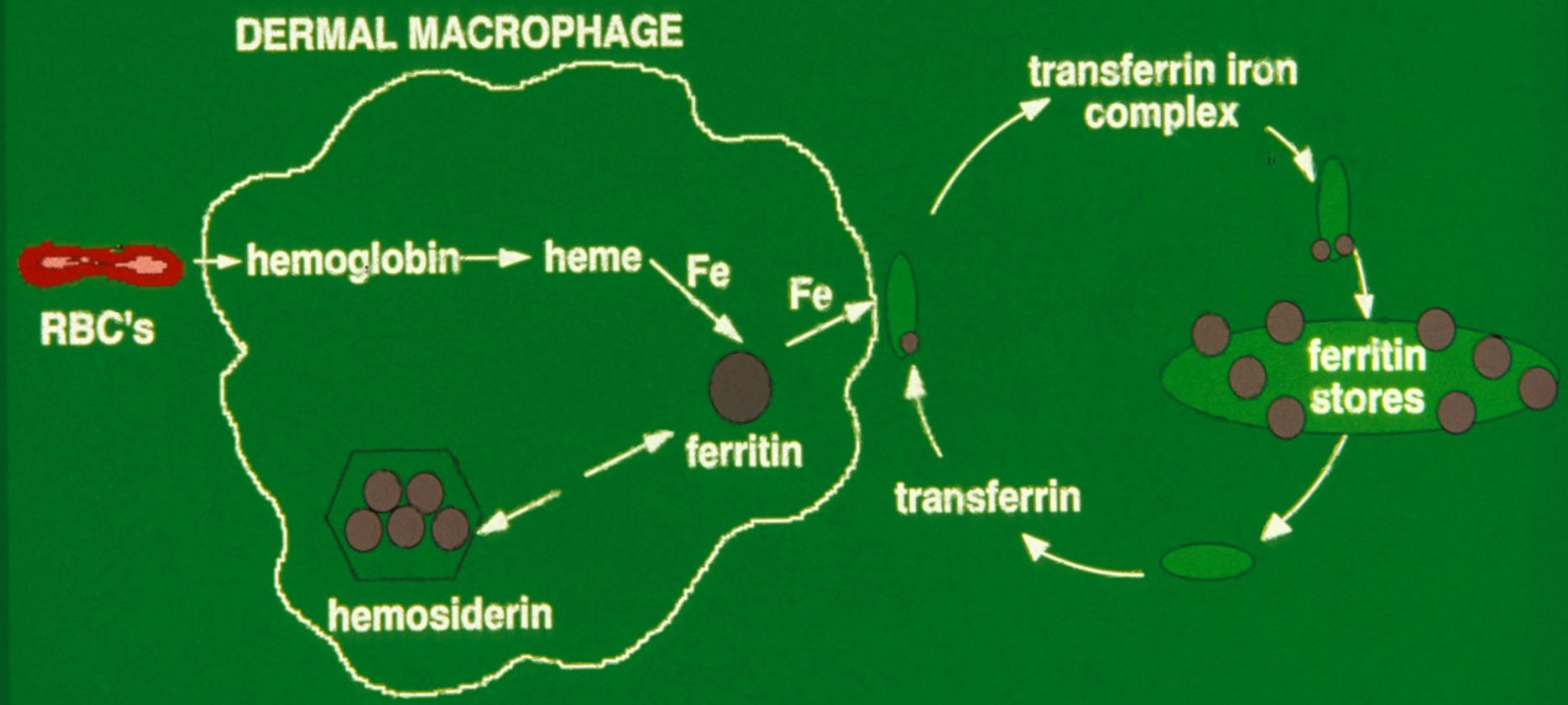
# Post-sclerotherapy Pigmentation: What is it?

Perl's stain

Haemosiderin found around dermal vessels



# CELLULAR MECHANISM OF PSHP



# Postsclerotherapy Pigmentation: Aetiologic Factors

- Proportional to quantity of haem (Fe) in tissues
- Inversely proportional to rate of removal of Fe from tissues

# Postsclerotherapy Pigmentation: Aetiologic Factors

- Sclerosing solution type and concentration
- Sclerotherapy technique
- Persistent proximal venous incompetence
- Vessel fragility (age)
- Vessel diameter
- Total body iron stores/transport mechanism
- Post-sclerotherapy management (compression)

# Post-sclerotherapy Pigmentation: Causes

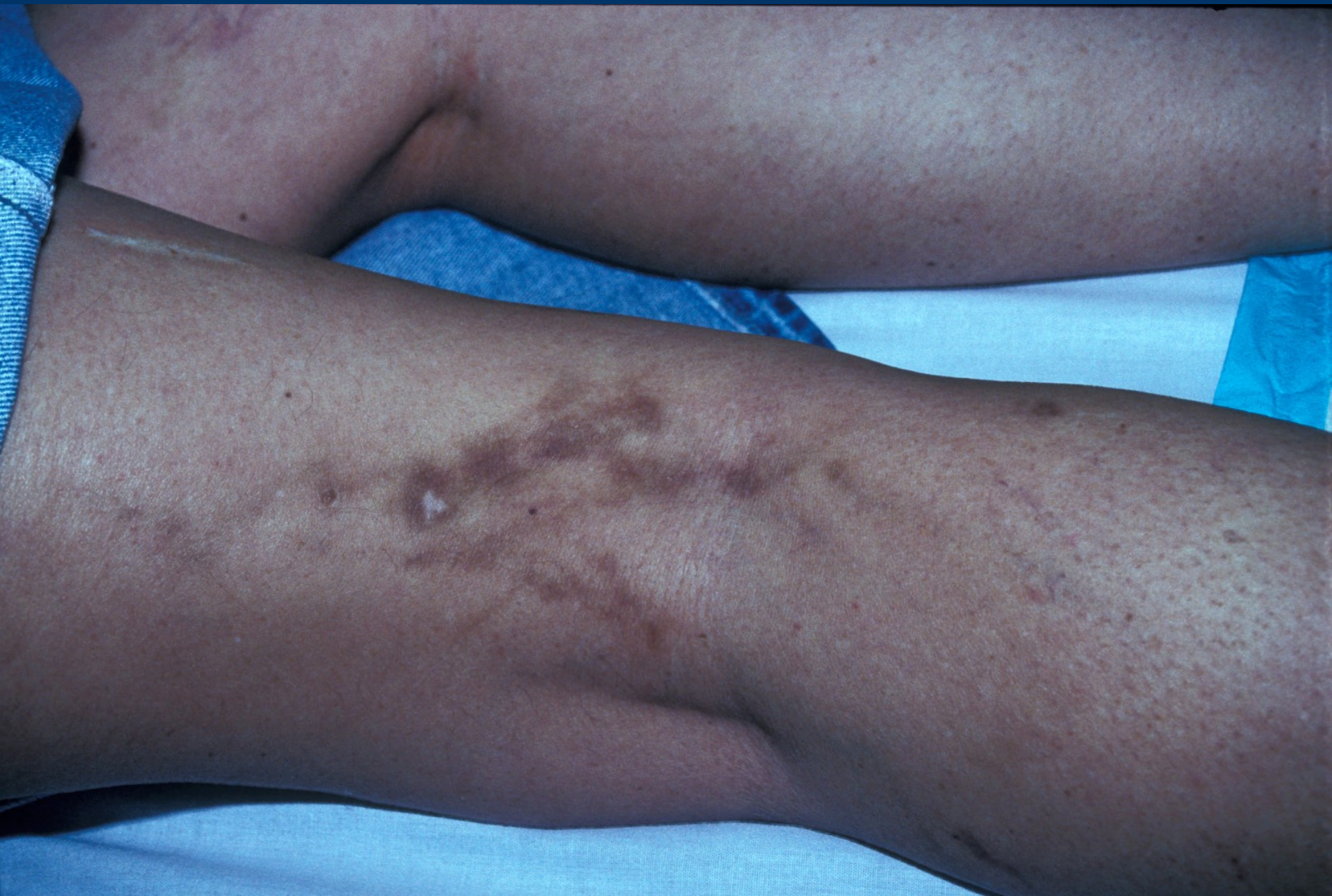
## Solution Type and Concentration

- **Excessive endothelial destruction predisposes to pigmentation**
- Potent sclerosants (eg STS,POL,Iodide)
- Less with weak sclerosants (HS and chromated glycerin)
- Concentration dependent (STS and POL)

# Local Complications

| **Complication** | **STS** *N=2,686* | **POL** *N=16,804* |
|---|---|---|
| Ulceration | **4** (0.15%) | 32 (0.2%) |
| Significant or severe pigmentation | **5** (0.2%) | 30 (0.2%) |
| Telangiectatic matting | **4** (0.15%) | 7 (0.04%) |
| Superficial thrombophlebitis | **3** (0.1%) | 14 (0.08%) |

# Excessive Sclerosant Concentration



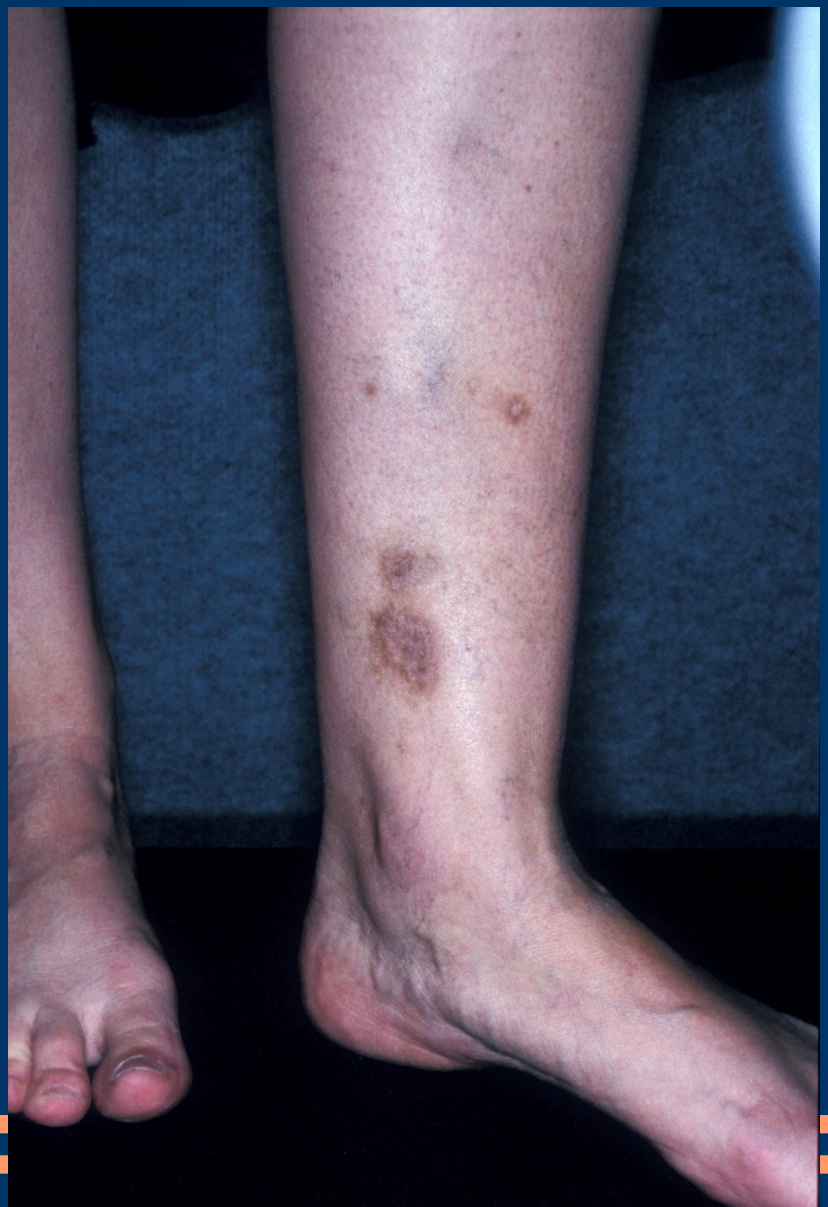
# Postsclerotherapy Pigmentation: Aetiologic Factors

- Sclerosing solution type and concentration
- Technique

# Postsclerotherapy Pigmentation: Technique

- Failure to treat proximal point of reflux first
  - incompetent junctions
  - incompetent trunks
  - larger varices
  - reticular veins
- Excessive injection pressure
  - 2-3ml syringes therefore better than 1ml

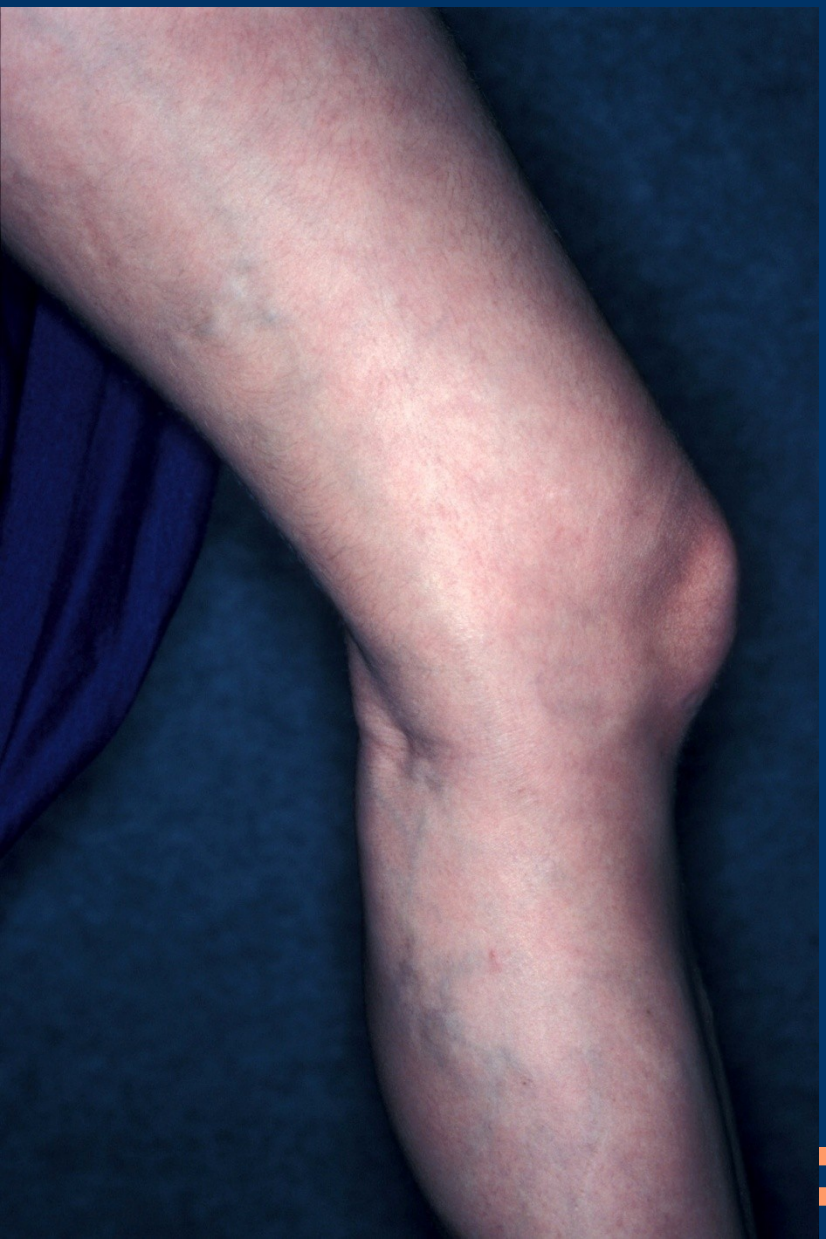
# Failure to treat proximal reflux

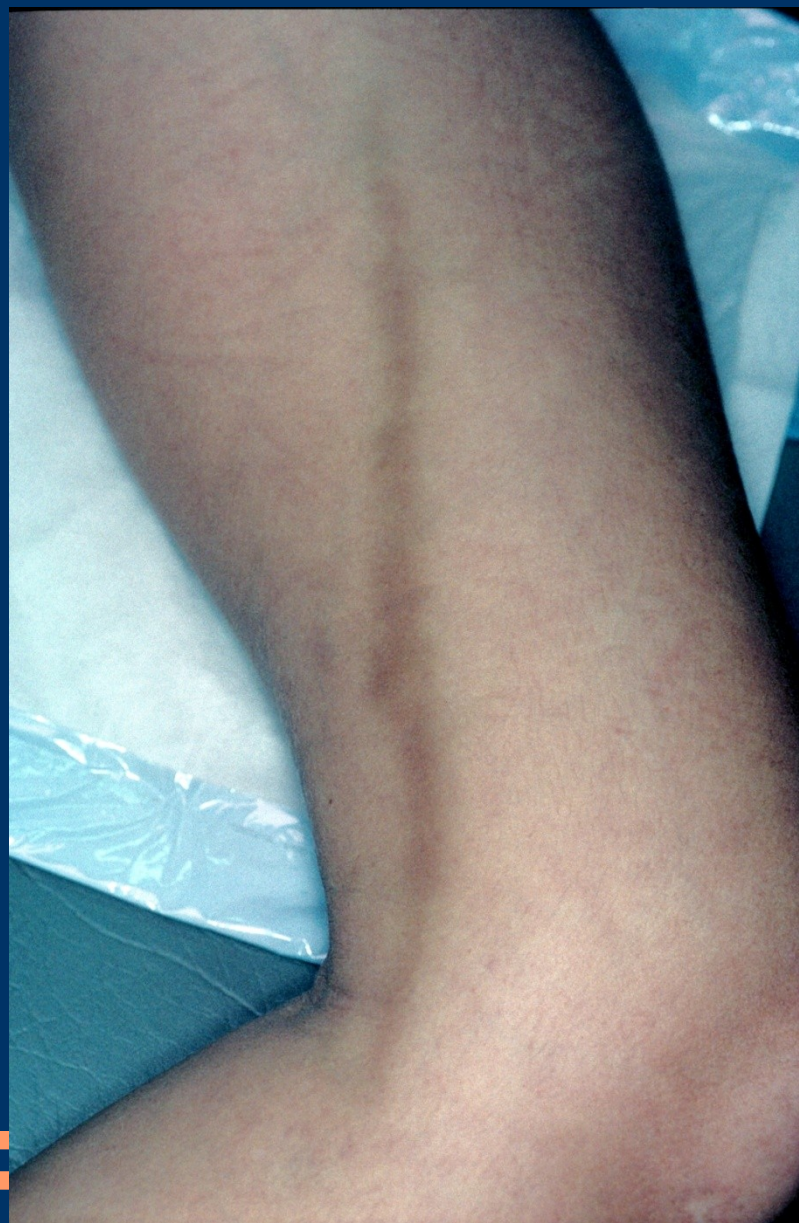


# Postsclerotherapy Pigmentation: Aetiologic Factors

- Sclerosing solution type and concentration
- Technique
- Predisposition to pigmentation

# Size of Vein and Sclerosant Concentration

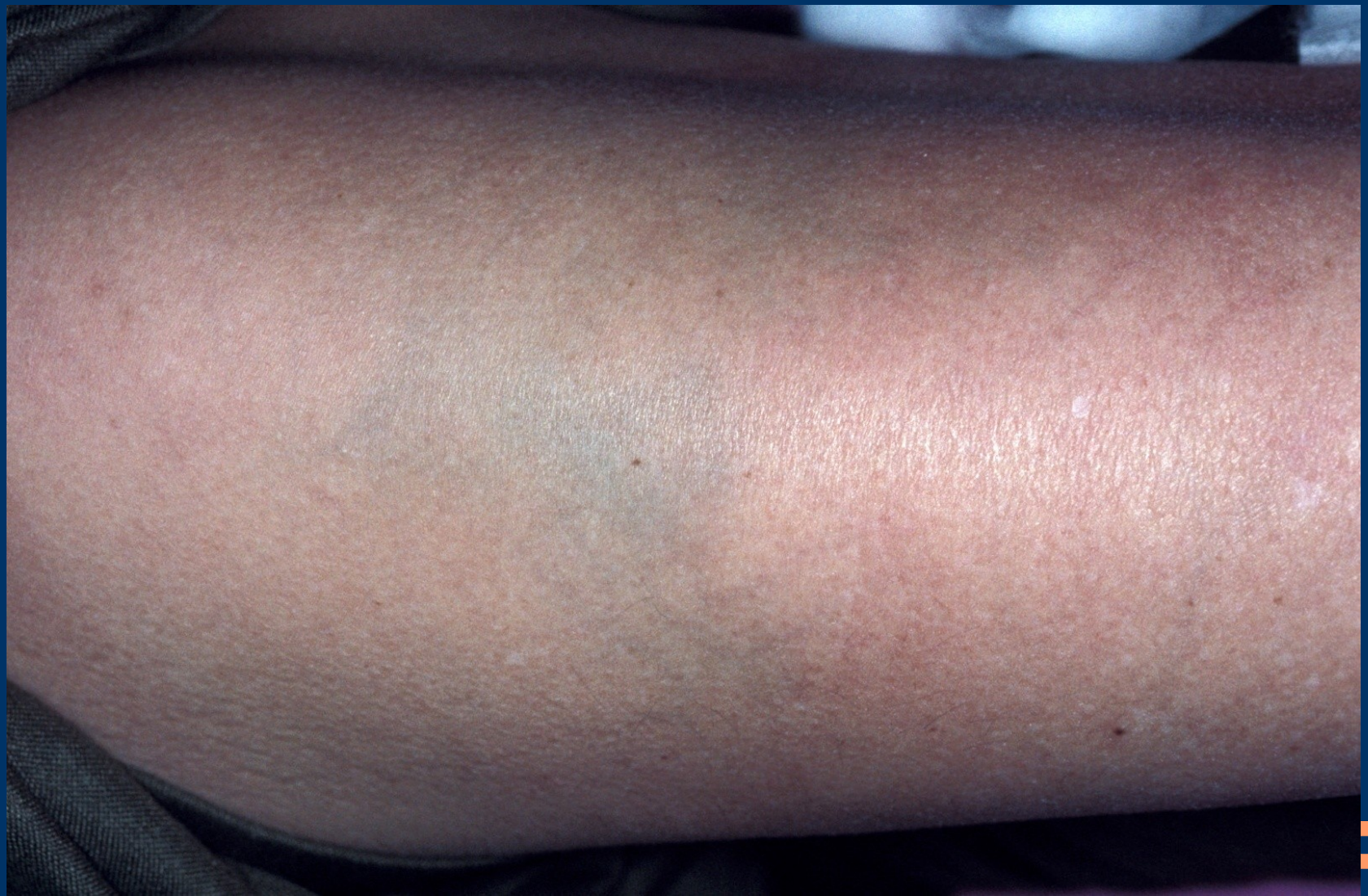




# Postsclerotherapy Pigmentation: Predisposition to pigmentation

- Unrelated to skin or hair colour
- Increased vessel fragility
  - post-menopausal
  - menstruation
- Minomycin - blue-grey
- Total body iron stores

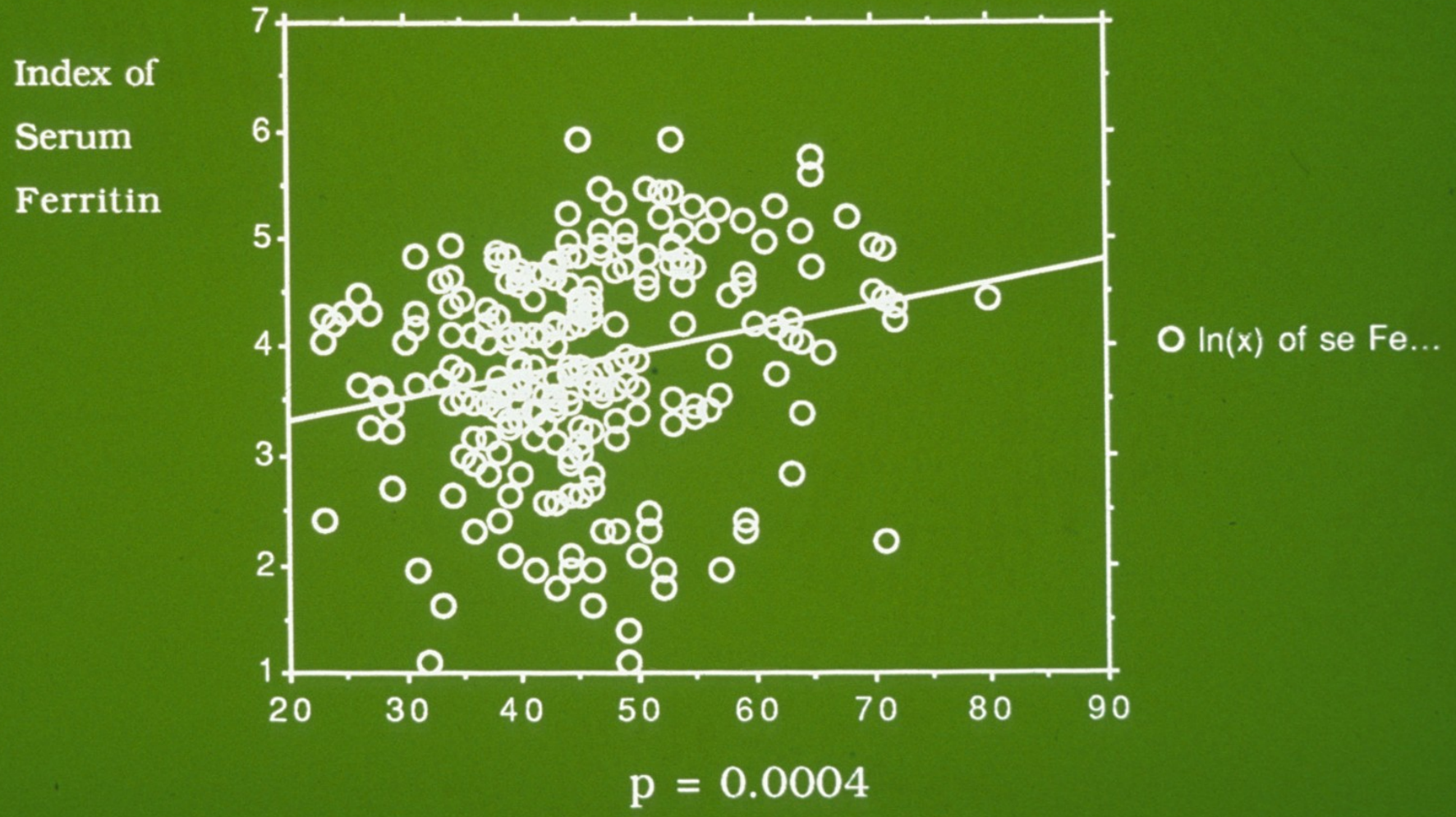
# Minomycin staining



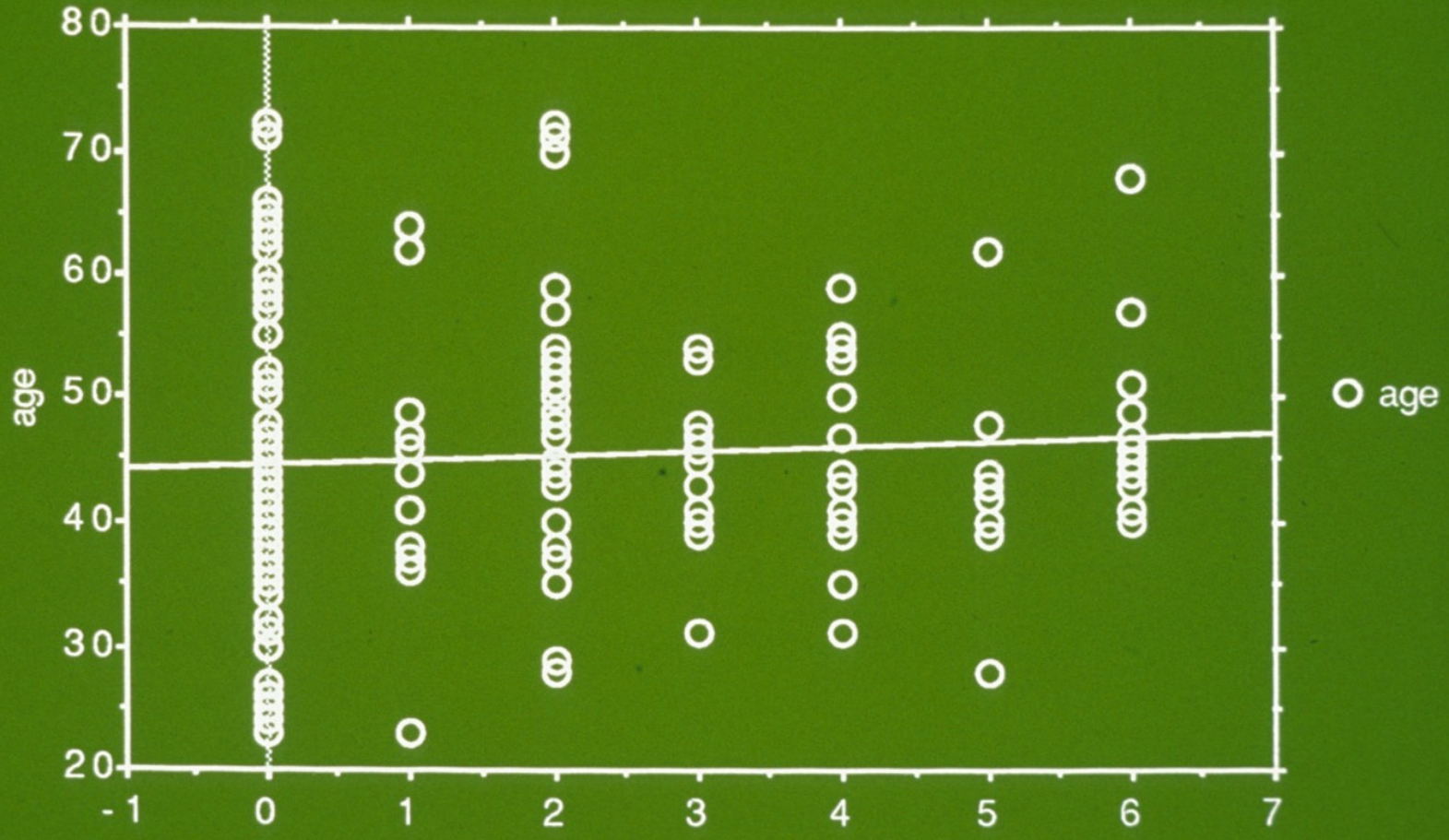
# Post Sclerotherapy Pigmentation The role of Fe

- Prospective study JDSO Oct 1994 (Thibault & Wlodarczyk)
- 233 patients
- Serum Ferritin taken prior to treatment
- Followed at 3, 6, 12 months for PSP

# Serum Ferritin vs Age

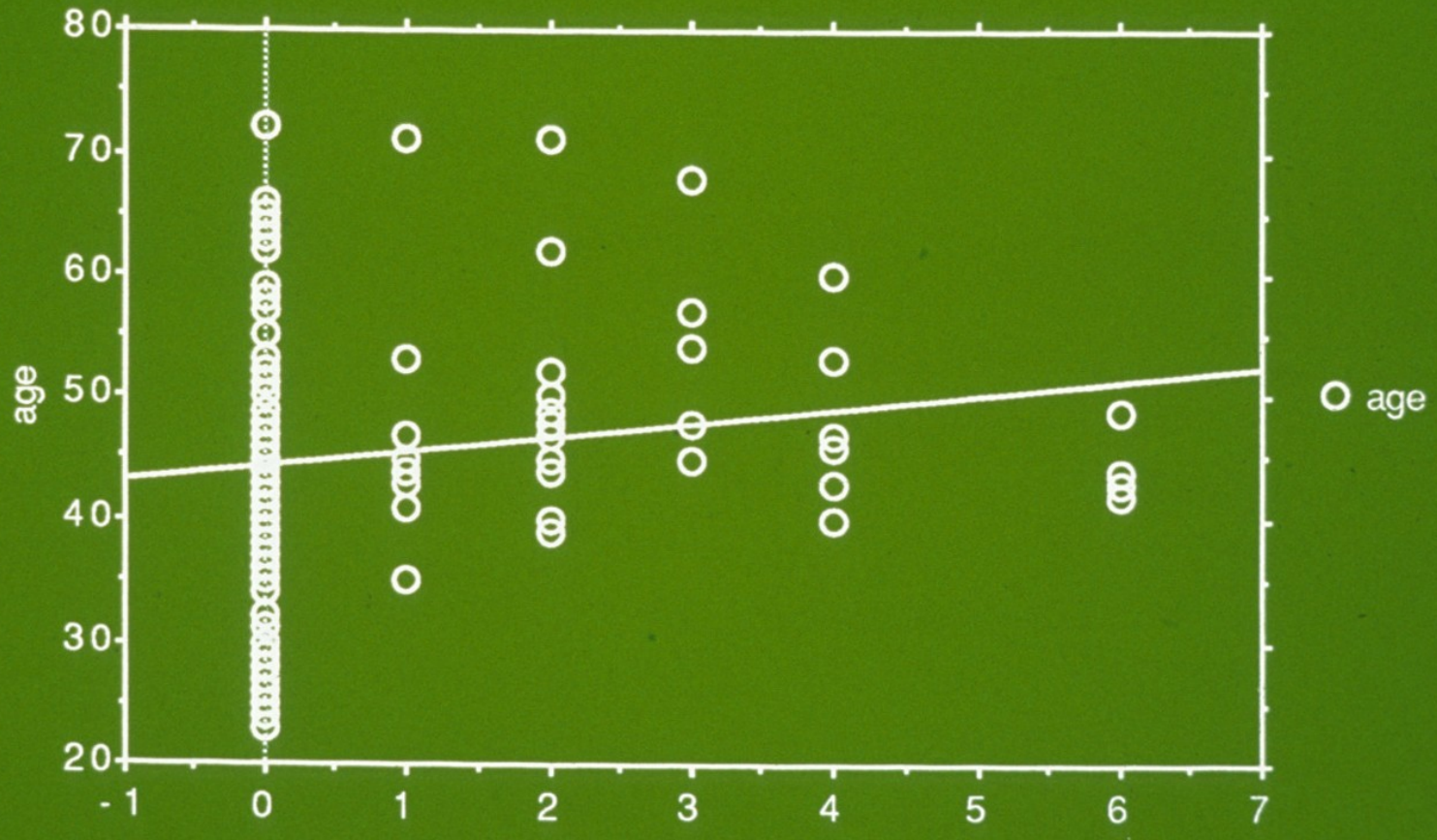


# Age vs Pigmentation at 3 months




p = 0.44

# Age vs Pigmentation at 12 months

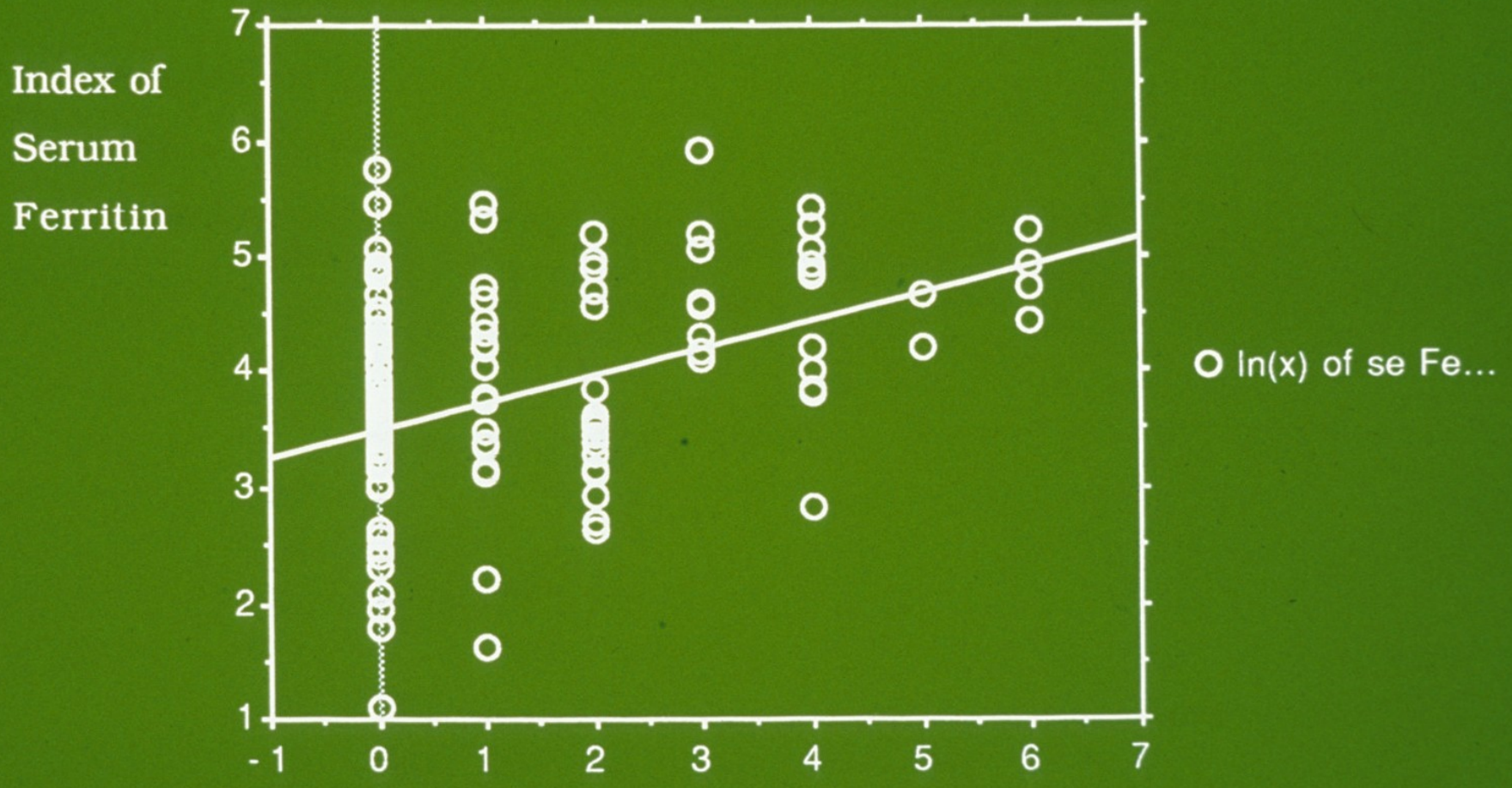



p = 0.07

# Serum Ferritin vs Pigmentation at 3 months

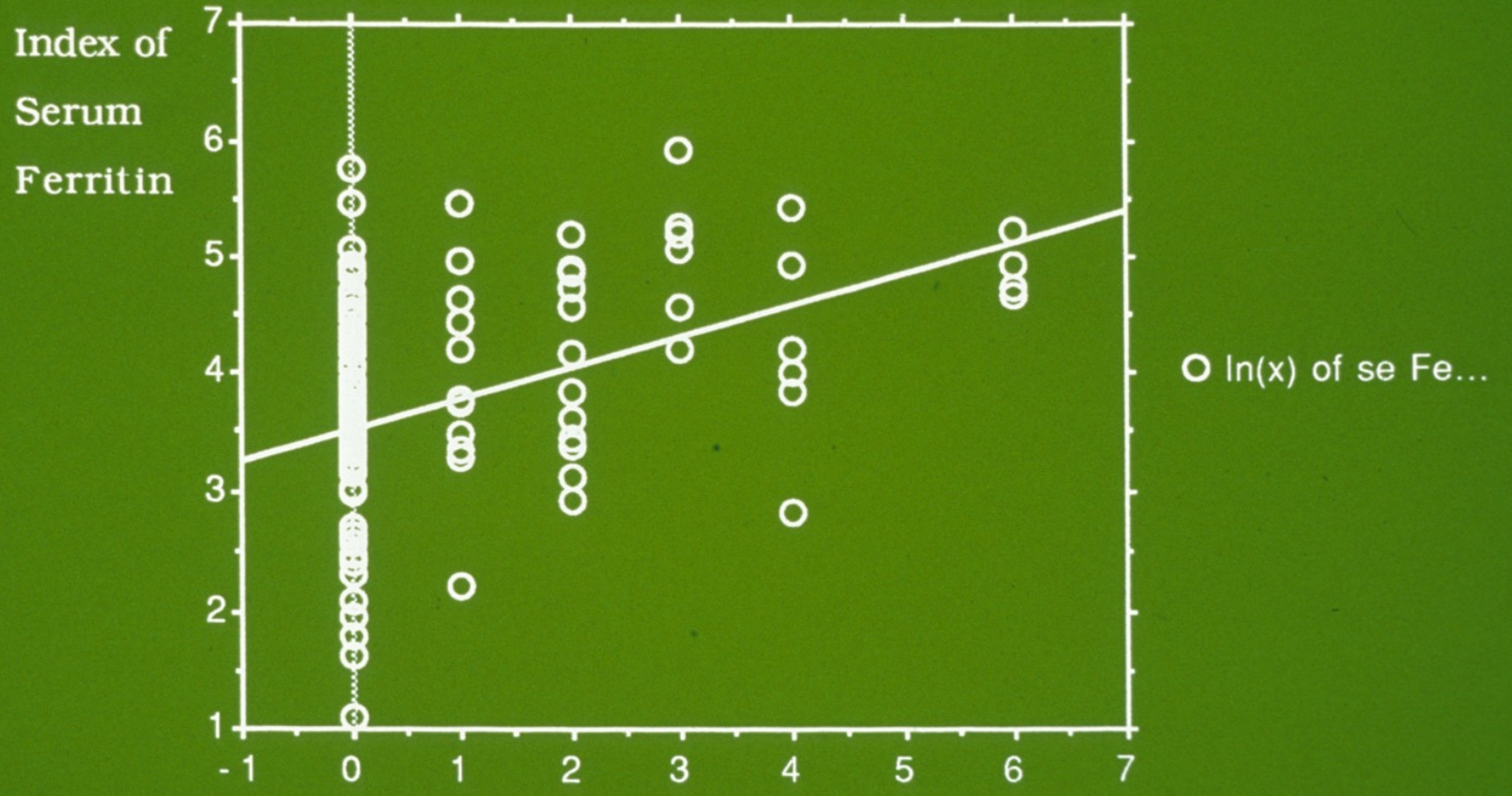

p = 0.0007

# Serum Ferritin vs Pigmentation at 6 months




p = 0.0001

# Serum Ferritin vs Pigmentation at 12 months

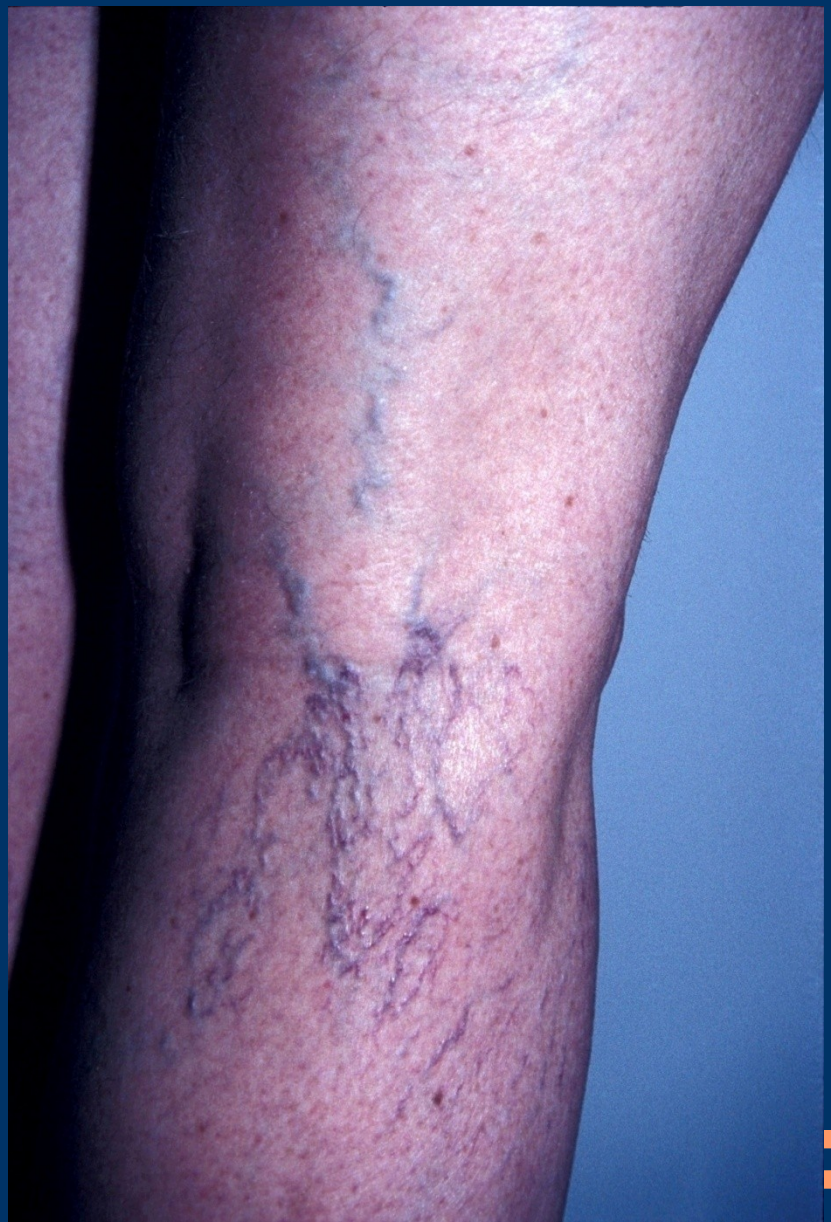


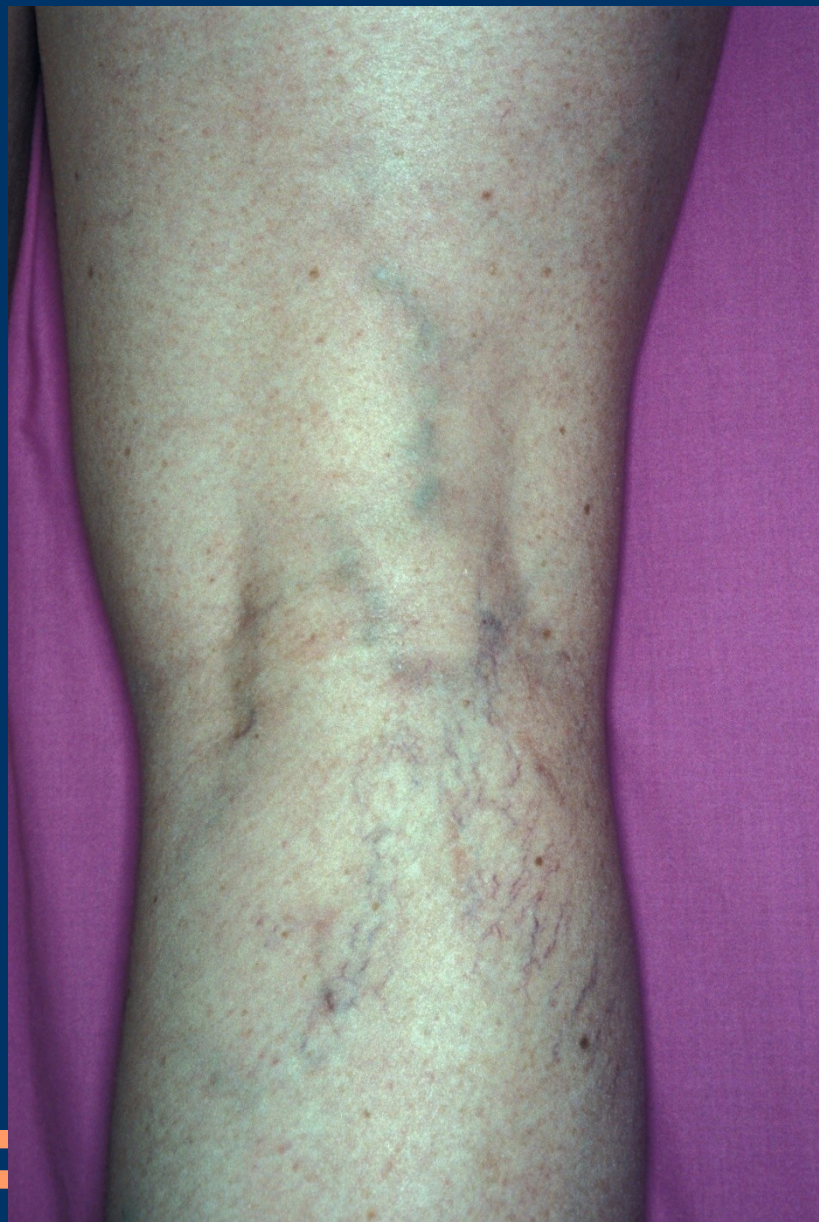

p = 0.0001

# Post Sclerotherapy Pigmentation The role of Fe

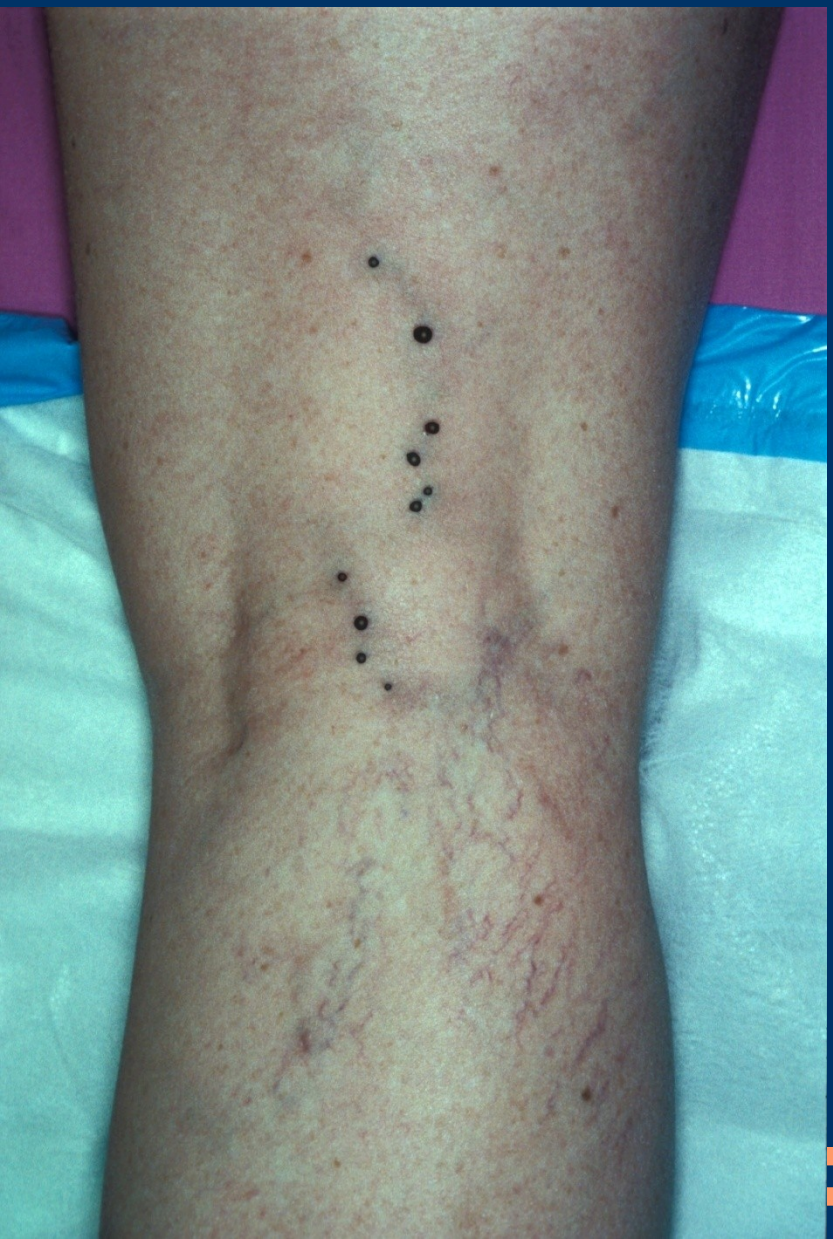
- CONCLUSION: The higher the serum ferritin level, the greater the risk of persistent post-sclerotherapy pigmentation

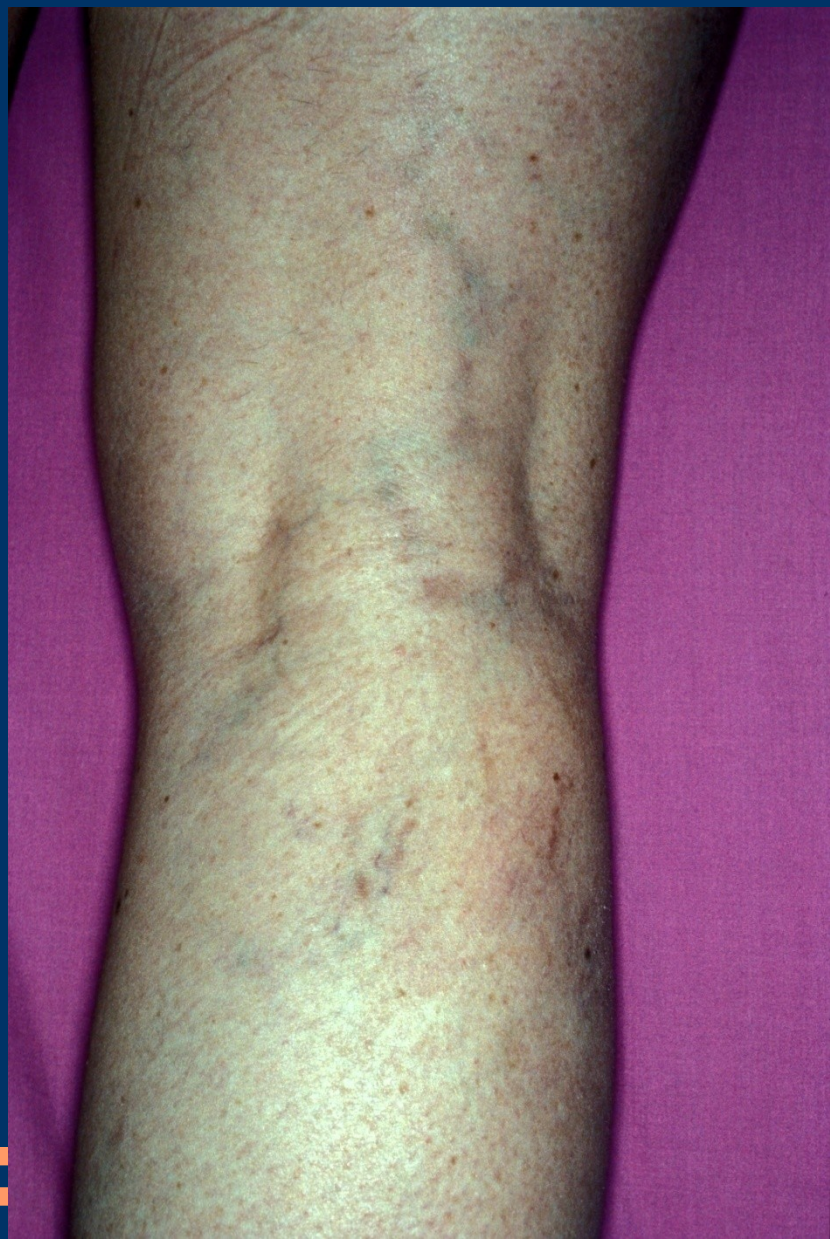
# How to remove Fe from the Skin?





# How to remove Fe from the Skin?





# Postsclerotherapy Pigmentation: Prevention

- ✓ Avoid iron supplements before, during and for 3 months after treatment
- ✓ Meticulous technique
  - ✓ Avoid excessive injection pressures
  - ✓ Select appropriate solution and strength
  - ✓ Treat proximal to distal
  - ✓ Evacuation of retained blood and microthrombi
  - ✓ Adequate postsclerotherapy compression

# Compression Bandaging Vs Graduated Compression Stockings

| | no. treated | no. success |
|---|---|---|
| Graduated compression stockings ٣٥ - ٤٠mmHg | ١٥٦ | ١٤٤ |
| Elastocrepe bandages | ١٤٧ | ١١٧ |
| | | p < ٠.٠٠١ |

(Scurr JH, Coleridge-Smith P, 1985)

- Superficial thrombophlebitis less in GCS
- Pigmentation less in GCS

# Compression in Treatment of Leg Telangiectasia

| | Pigmentation |
|---|---|
| | |
| Compression | ٢٨.٥٠% |
| Non - Compression | ٤٠.٥٠% |

***Study by Goldman, Marley, Butie et al. Patients with symetrical disease. One leg compressed for 72hrs with Class 2 stocking***

- Ankle and calf oedema also reduced
- No increase in effectiveness for vessels<0.5mm diam
- No increase in effectiveness in thigh

# Post-sclerotherapy Compression Study of Duration

- Weiss, Sadick, Goldman - Dermatologic Surgery 1999
  - **Class 1 GCS during daytime only**
  - **Reticular and spider veins**
  - **Effectiveness at 6, 12, and 24 weeks**
  - **Side effects**
    - **Post-sclerotherapy pigmentation**
    - **Telangiectatic matting**
    - **Oedema**
    - **Ulceration**

# Post-sclerotherapy Compression Study of Duration - Conclusions

- Effectiveness
  - **AT 6 WEEKS**
    - 3 weeks > 1 week > 3 days > None ($p<0.004$)
  - **AT 24 WEEKS**
    - 3 weeks > 1 week > (3 days, None) ($p<0.006$)
- Side Effects
  - **POST-SCLEROTHERAPY PIGMENTATION**
    - (None, 3 days) > 1 week > 3 weeks
  - **TELANGIECTATIC MATTING, ULCERATION, OEDEMA**
    - Not significant

# Postsclerotherapy Pigmentation: Treatment

- Chemical exfoliants - non specific
  - trichloroacetic acid, glycolic acid
- Physical exfoliants
  - $CO^2$, liquid nitrogen
- Chelating agents - topical EDTA
- Laser treatment

# Laser Therapy

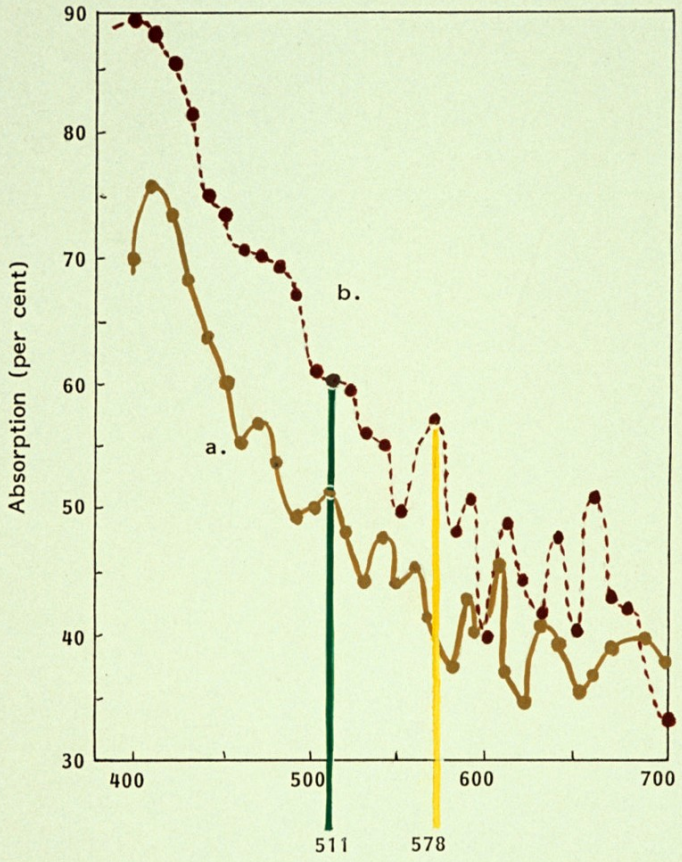
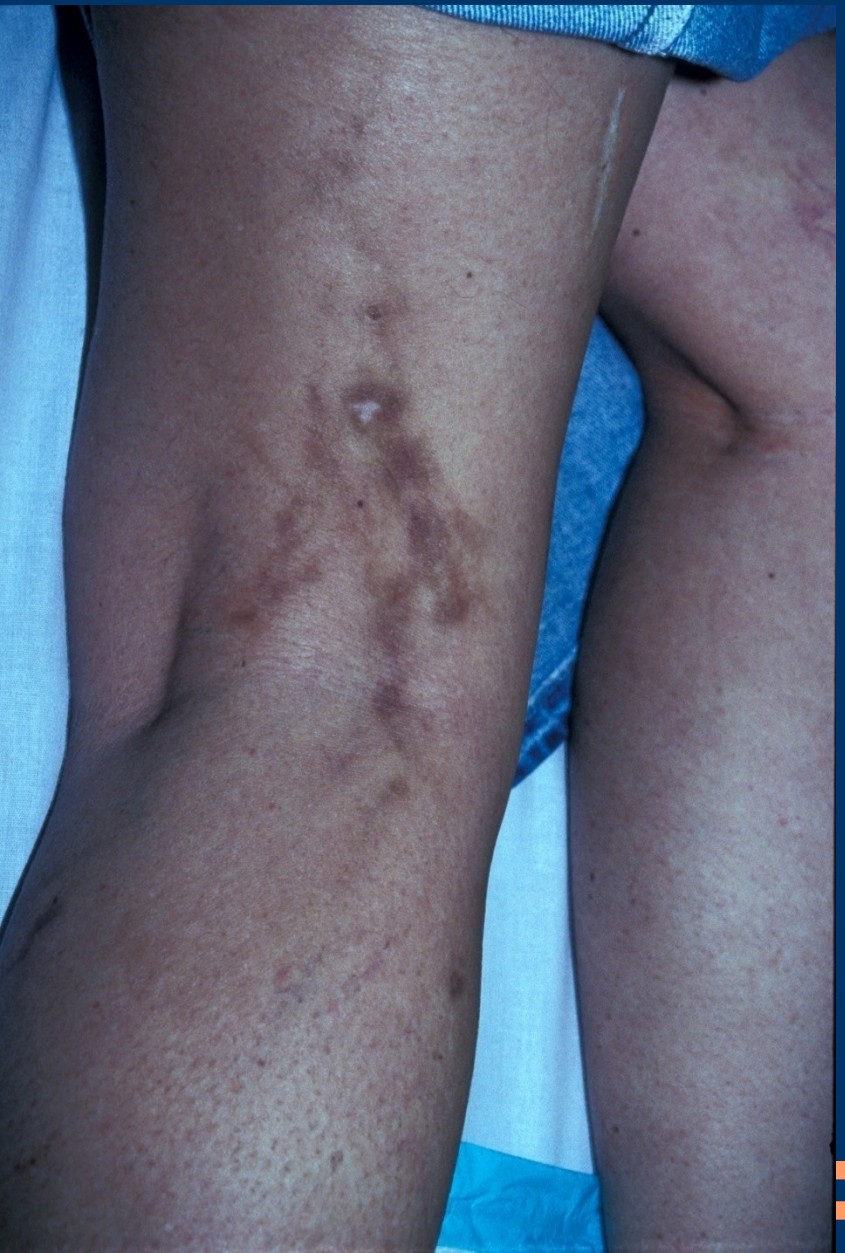
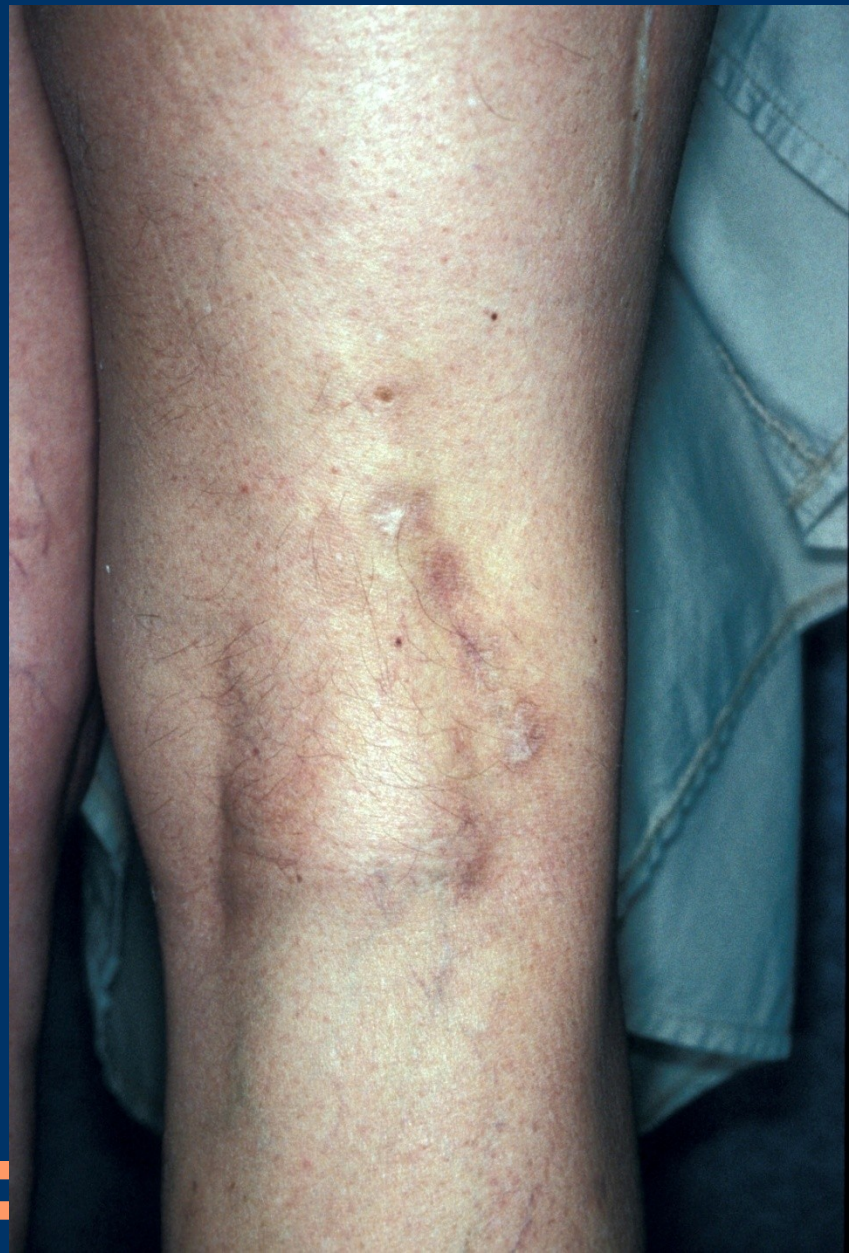



Fig. 3. Absorption spectra of haemosiderin granules.
(a) ●---● , Formalin-fixed, lipid-extracted, paraffin-embedded tissue; average of six determinations.
(b) ●---● , Freshly frozen tissue; average of two determinations.

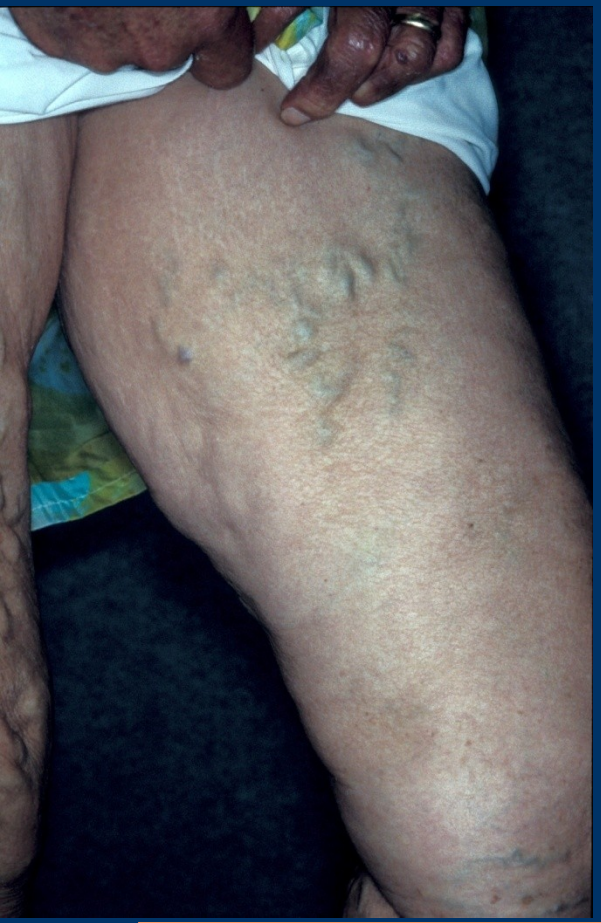
From NATURE 1962.

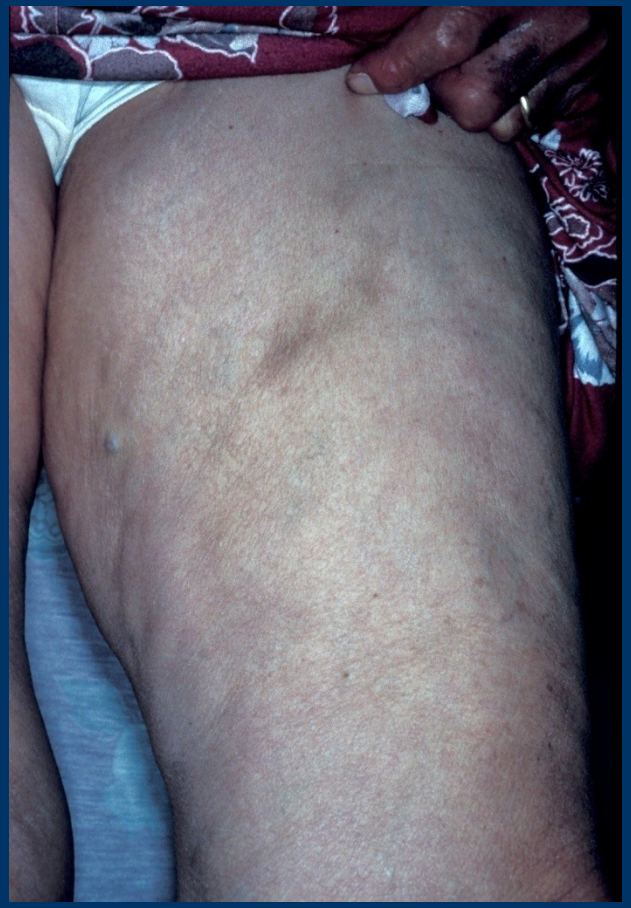
# Laser Therapy

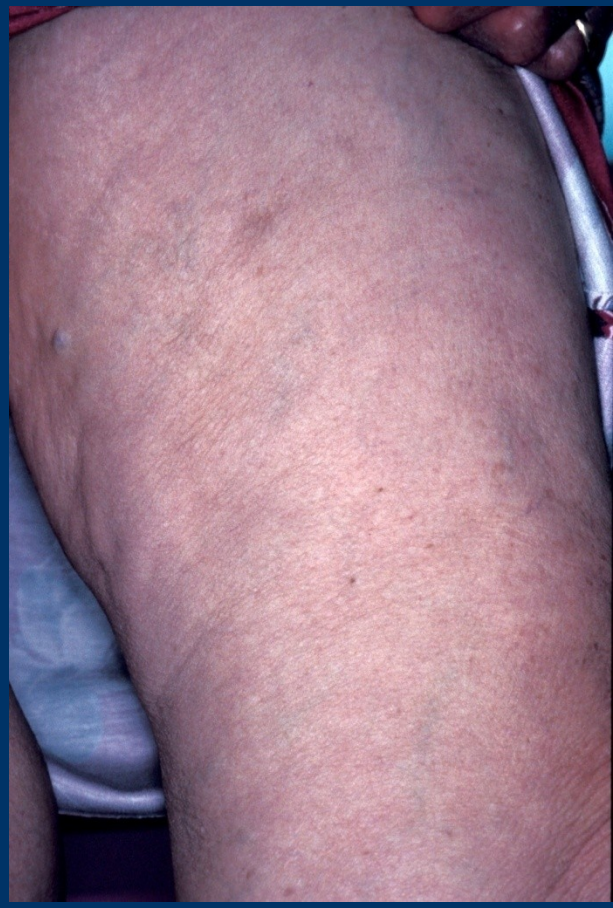




# Chronotherapy or “Flashbulb” Therapy







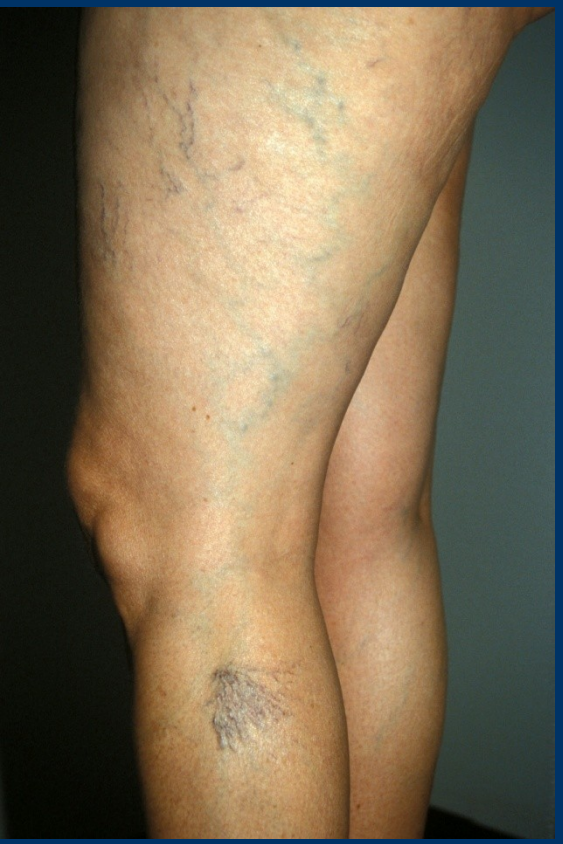
# Telangiectatic Matting

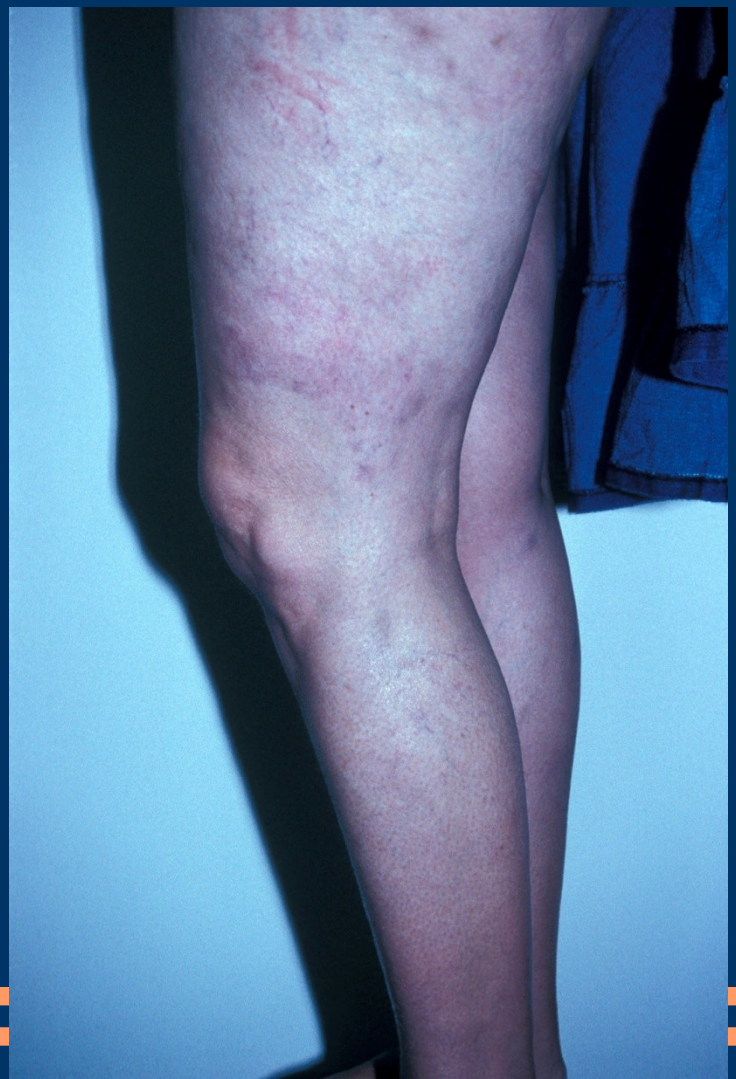
- New vessels < 0.2 mm in diameter
- Post-sclerotherapy
- Post-surgical
- Thigh affected > calf
- ?Age related
- ?F > M

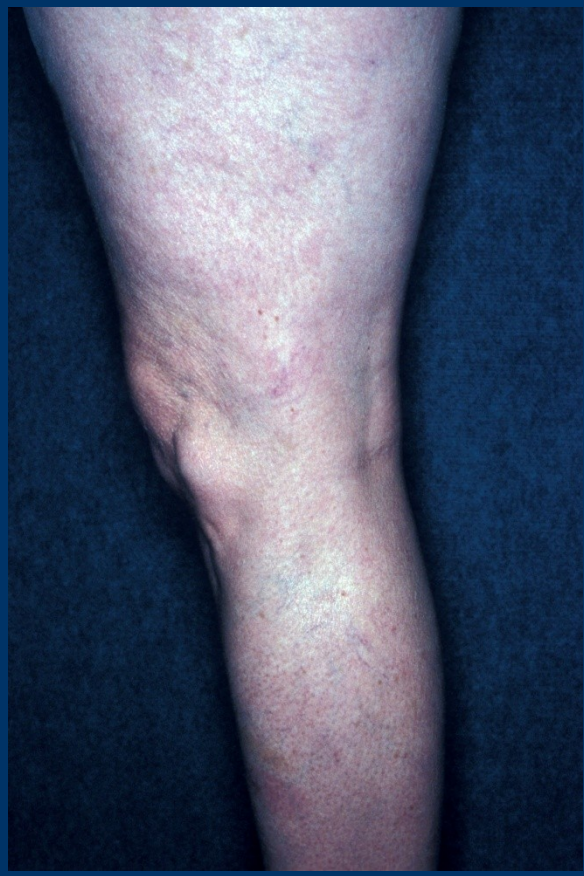
# Telangiectatic Matting

- Incidence – 5% - 75% (Goldman)
- Say 18%
  - 6% will get better spontaneously (inflammatory)
  - 6% will get better with further treatment (related to venous hypertension)
  - 6% is permanent (Duffy)

# Telangiectatic Matting







# Telangiectatic Matting Aetiology

- Patient predisposition
  - Extensive telangiectasias
  - Obesity
  - Oestrogen hormones
- Technique

# Telangiectatic Matting: Aetiologic factors

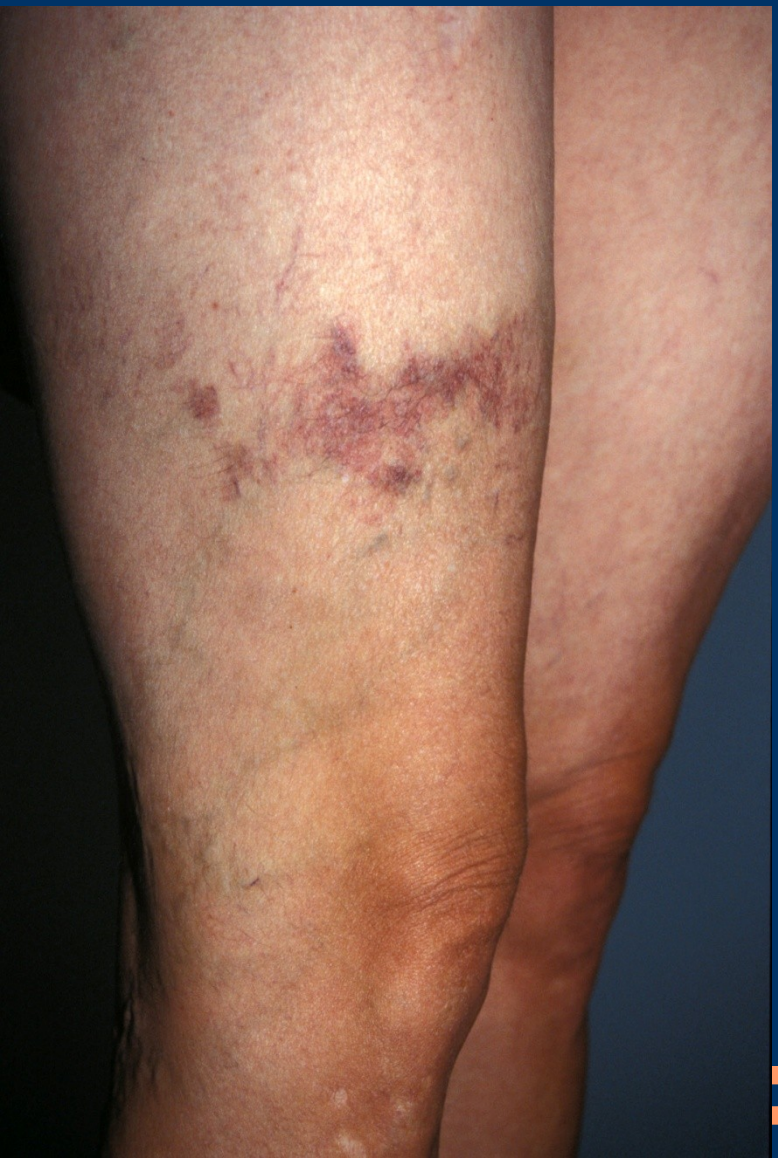
- Angiogenesis - release of angiogenic factors from:
  - damaged endothelial cells (disruption of endothelium)
  - peri-vascular mast cells (peri-vascular inflammation)
- Arterio-venous anastomoses
- Persistence of proximal sources of reflux

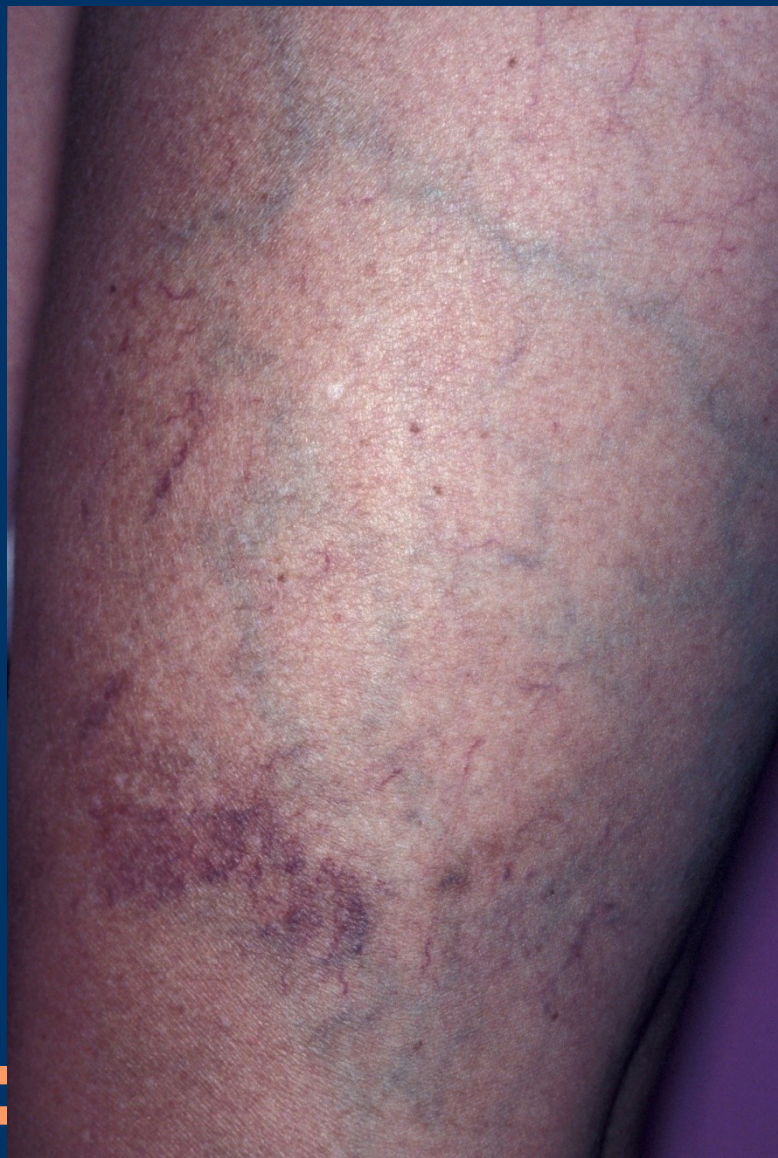
# Telangiectatic Matting Technique

- Failure to control proximal sources of reflux
- Excessive thrombosis in superficial veins (Interleukin- 8)

# Telangiectatic Matting

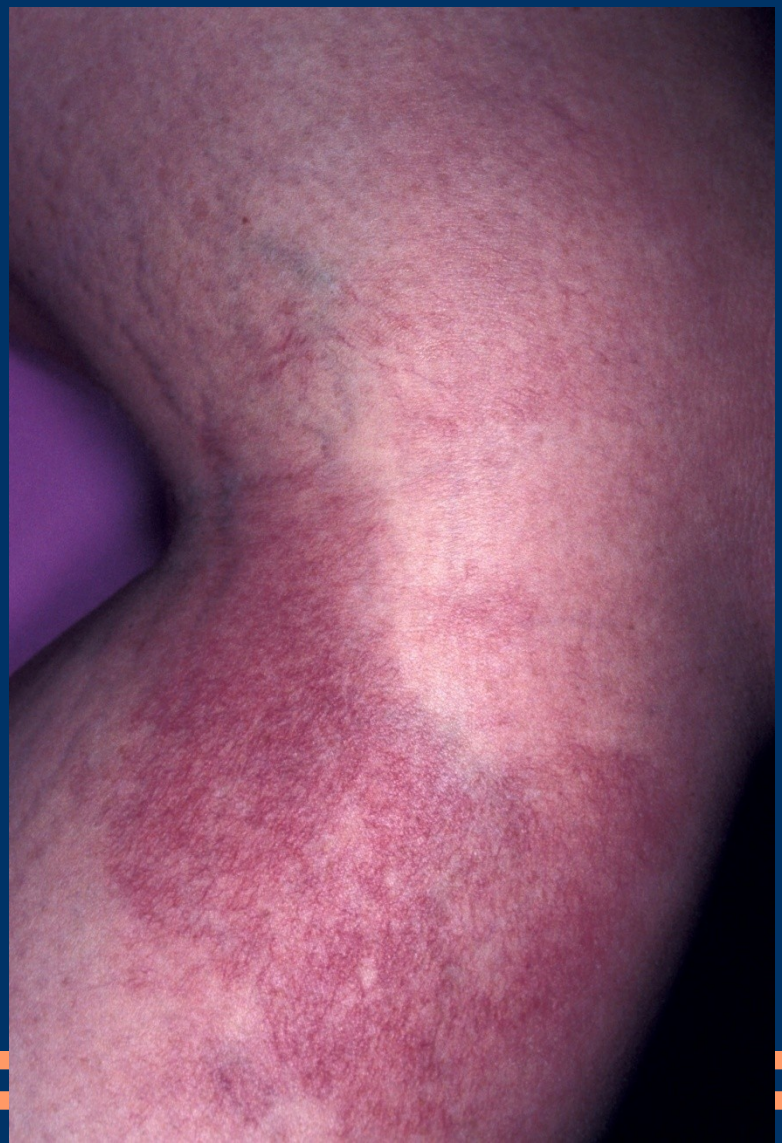
## Failure to control proximal sources of reflux





# Telangiectatic Matting

## Failure to control proximal sources of reflux



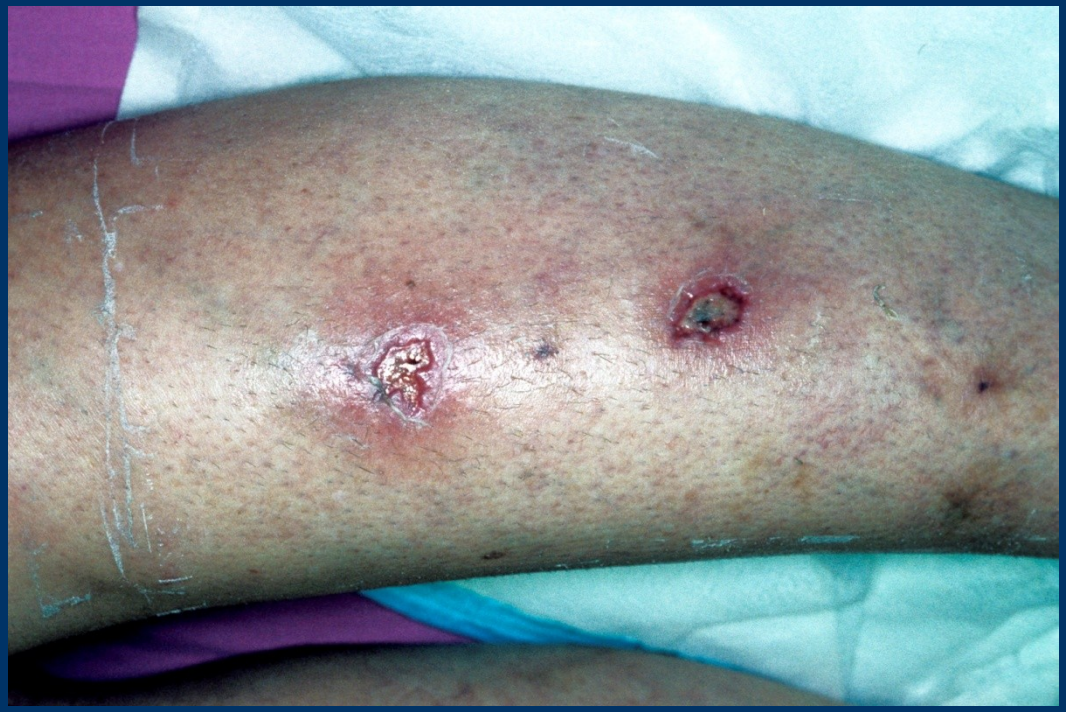
# Telangiectatic Matting Management

- As for post-sclerotherapy pigmentation
- Look for untreated proximal sources of reflux
- Chronotherapy
- Review and retreat cautiously every 3 months and progress will be made

# Telangiectatic Matting: Prevention and Treatment

- ✓ Treat all proximal sources of reflux including reticular veins
- ✓ Use compression
- ✓ Withdraw oestrogen therapy if not essential
- ✓ “chronotherapy” - review every 3 months
- ✓ Daily walking or other exercise to improve muscle tone

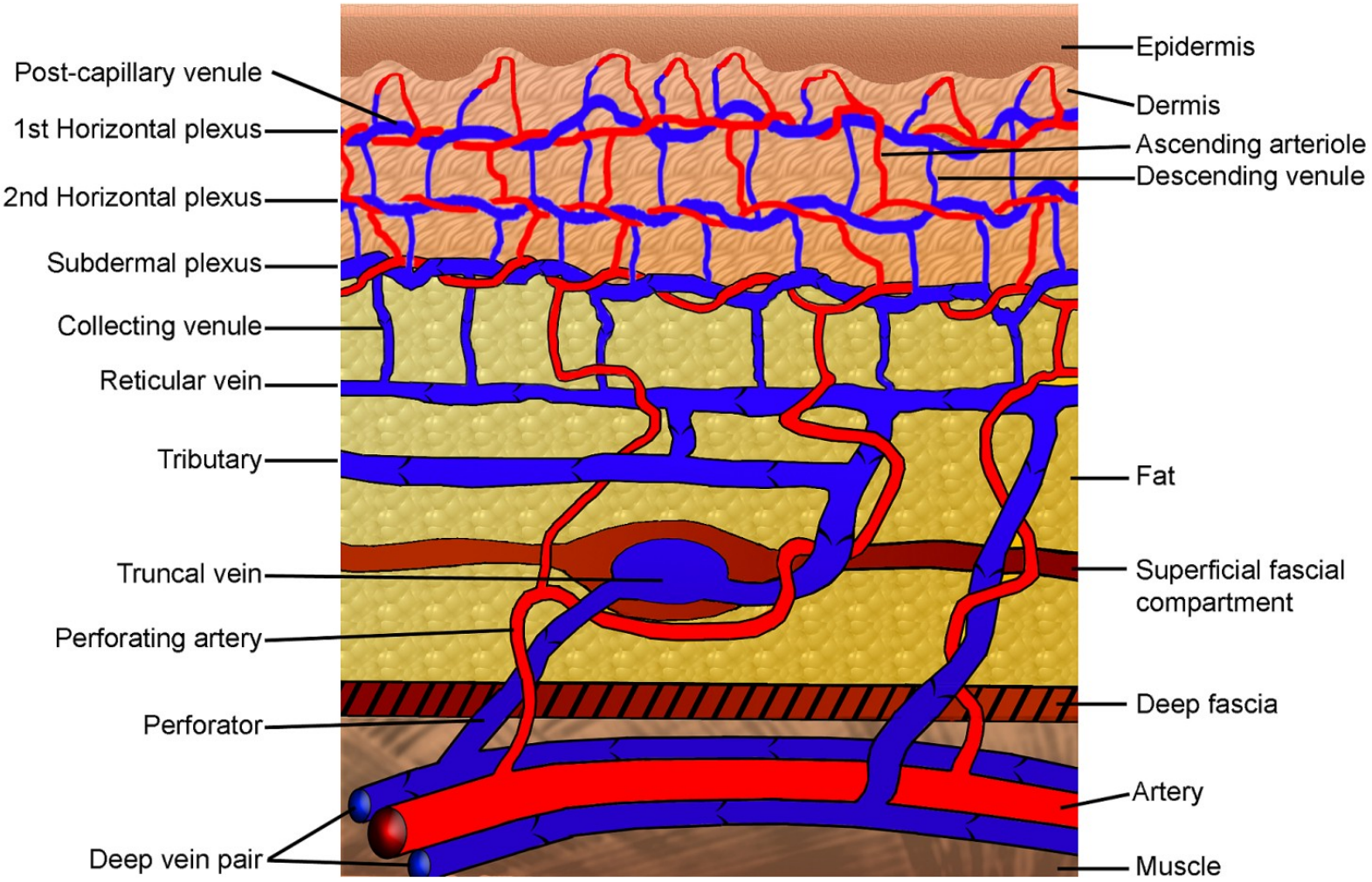
# Post Sclerotherapy Cutaneous Necrosis



# Cutaneous Necrosis

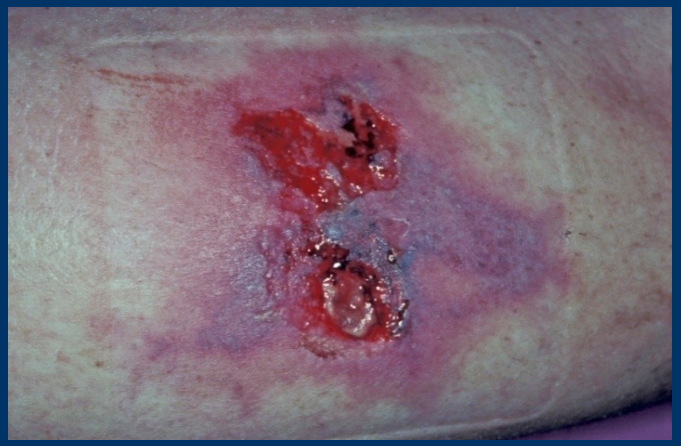
- Most common with hypertonic saline (extravascular injection)
- Less common with detergents – a variety of mechanisms – all ischaemic

# Microvasculature



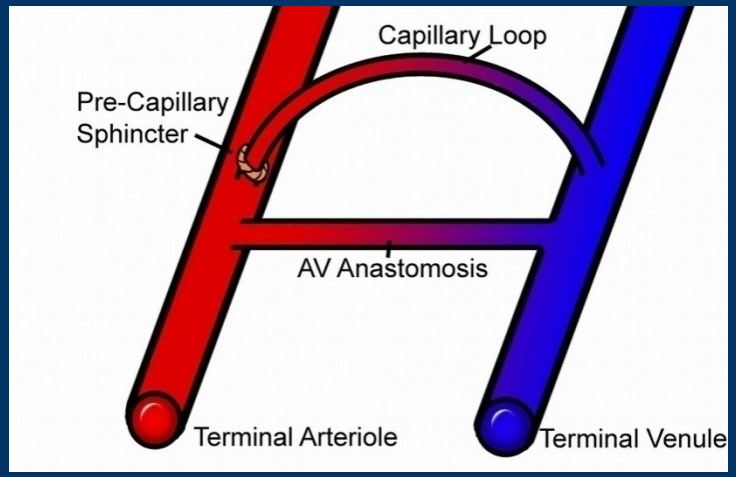
# Cutaneous Necrosis

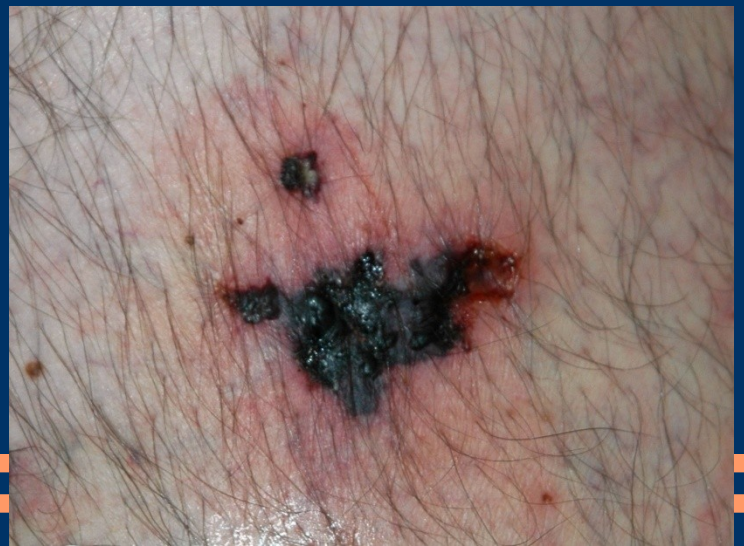
- Direct intra-arterial injection
- Stellate necrosis causing necrosis of large area of skin
- High risk sites
  - Popliteal fossa
  - Medial distal calf (PTPVs)
  - Groin



# Veno-arterio Reflex

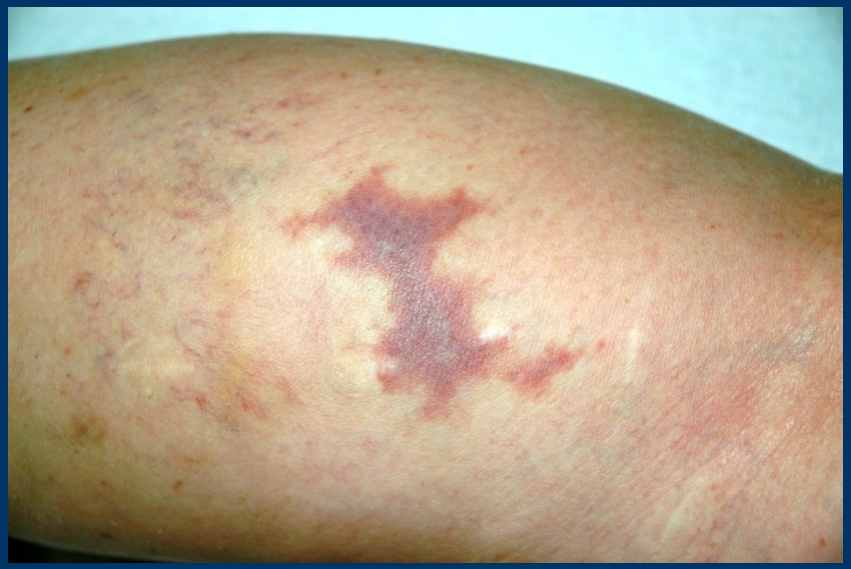
- Most common cause with detergents
- High venous pressure or sclerosant concentration causes reflex arteriolar spasm
- Cigarette smokers may be at greater risk



# Veno-arteriolar Reflex

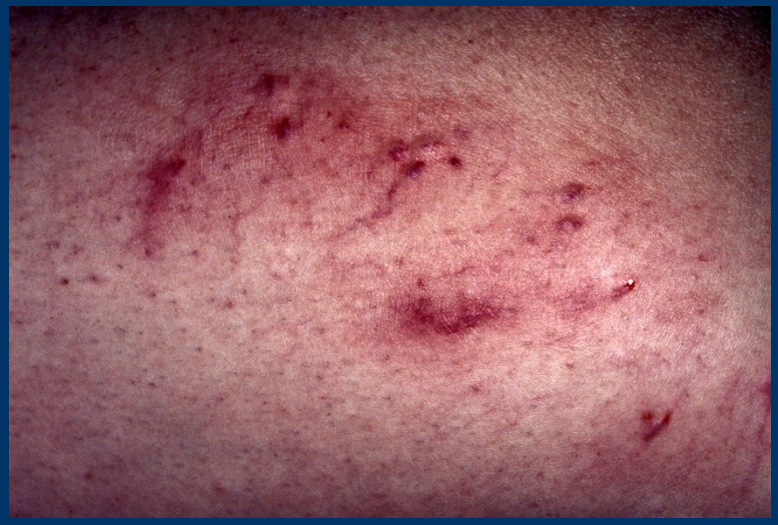
- Stellate purpura post-sclerotherapy of intersaphenous vein complicated by VAR vasospasm of small saphenous artery

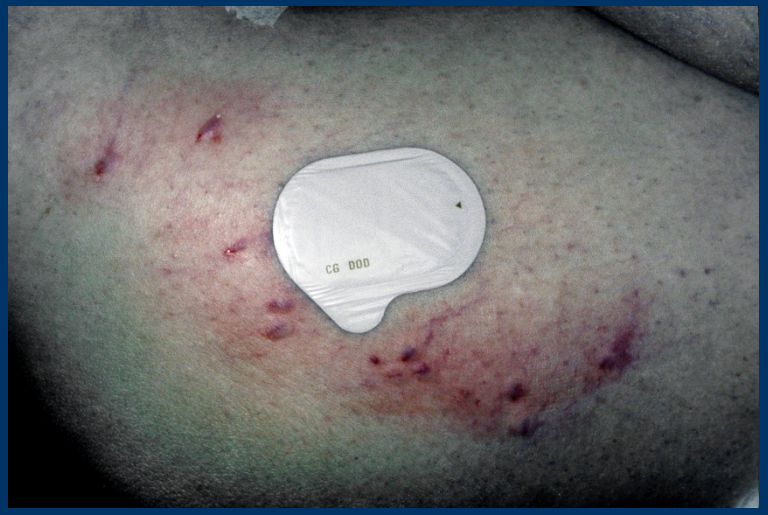


# Treatment of Cutaneous Necrosis

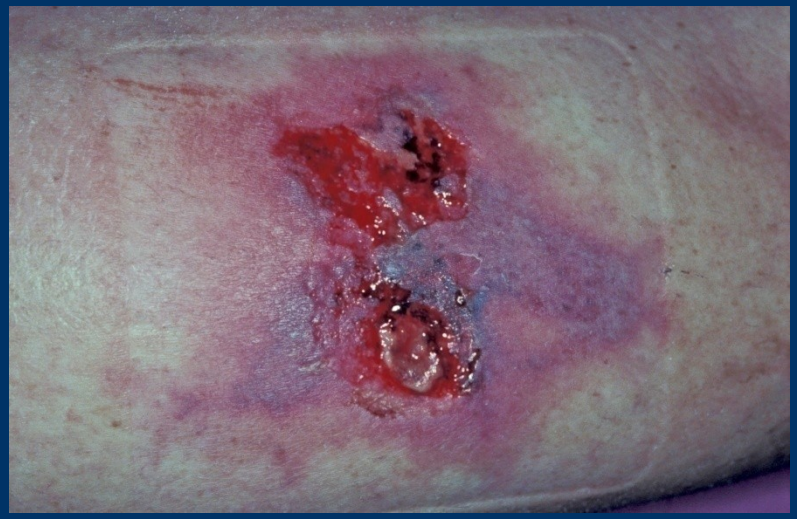
- Awareness and early detection
- Local vasodilator (2% nitroglycerin ointment)
- Compression
- Clexane or aspirin

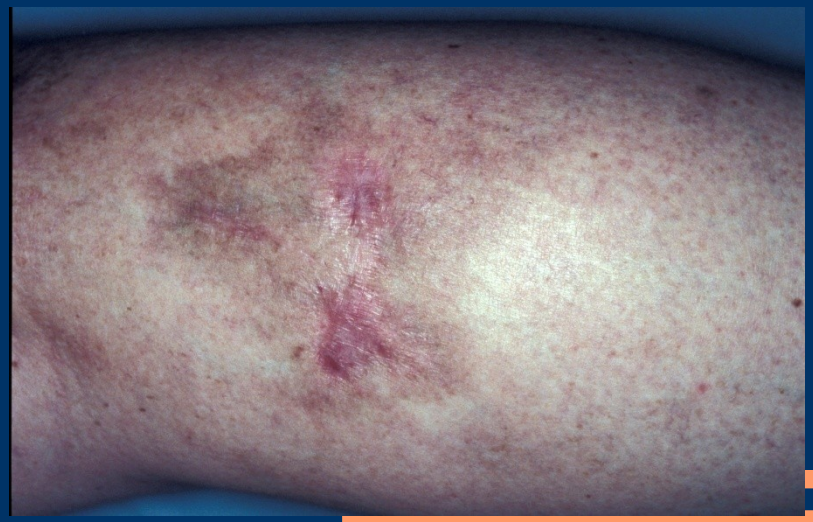
# Treatment of Cutaneous Necrosis

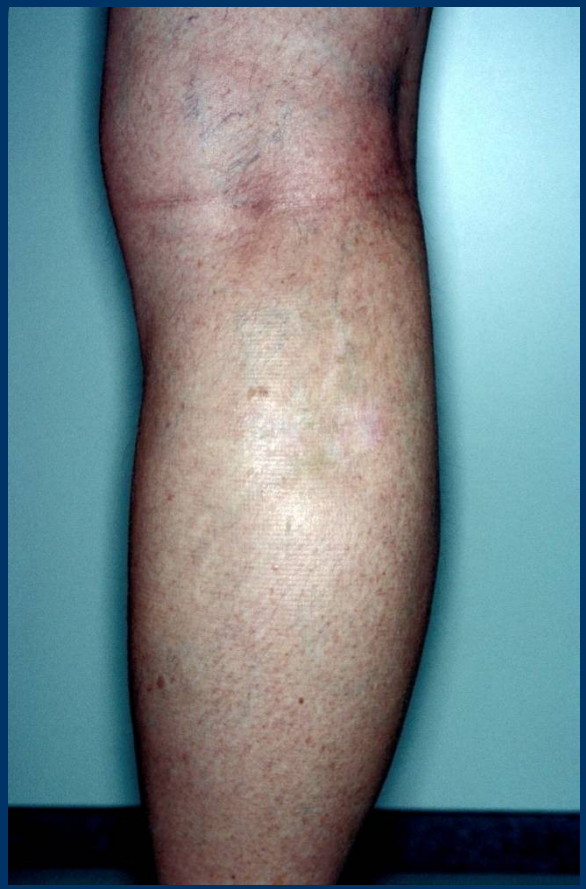




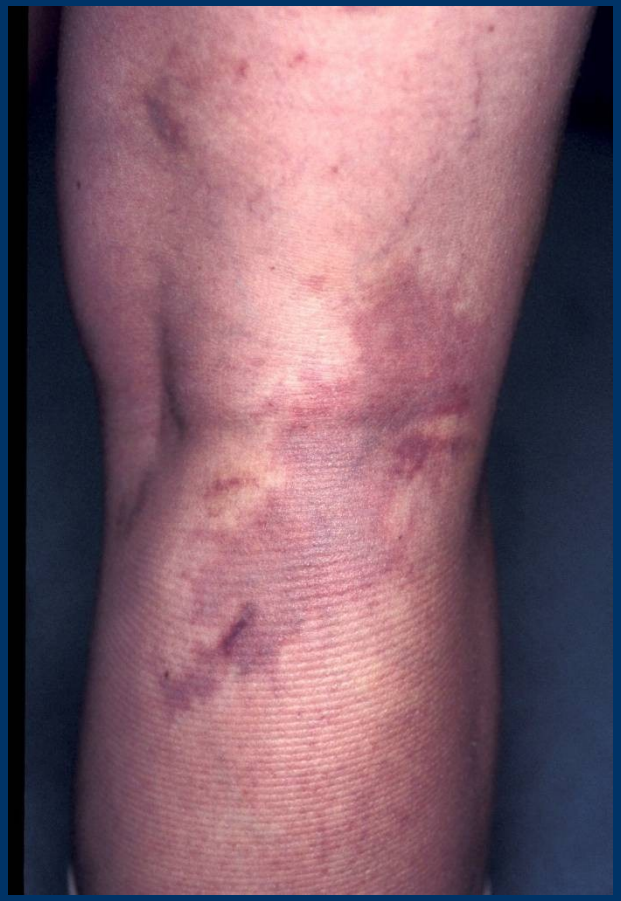
# Treatment of Cutaneous Necrosis

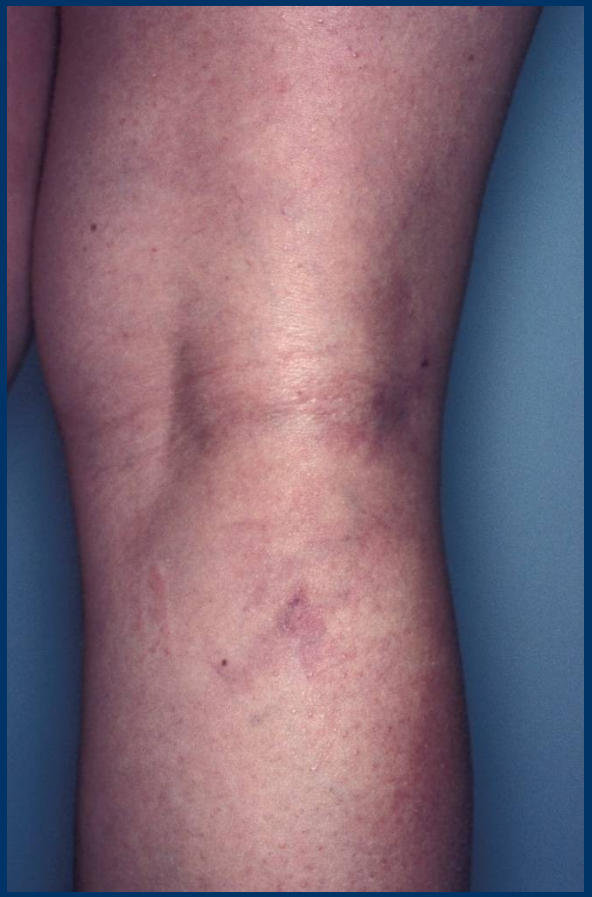






# Treatment of Cutaneous Necrosis





# Treatment of Cutaneous Necrosis

# Superficial Thrombophlebitis and Chemical Phlebitis

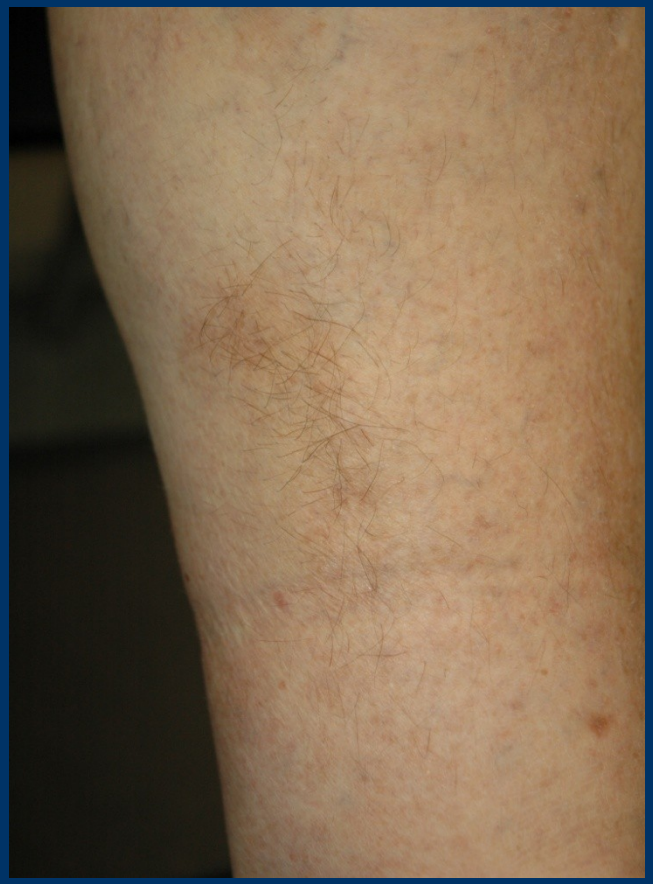
- Common
- Factors
  - Excessive sclerosant concentration
  - Not controlling proximal reflux

# Superficial Thrombophlebitis and Chemical Phlebitis Treatment

- Compression
- Walking
- NSAIDs
- Look for proximal reflux and treat

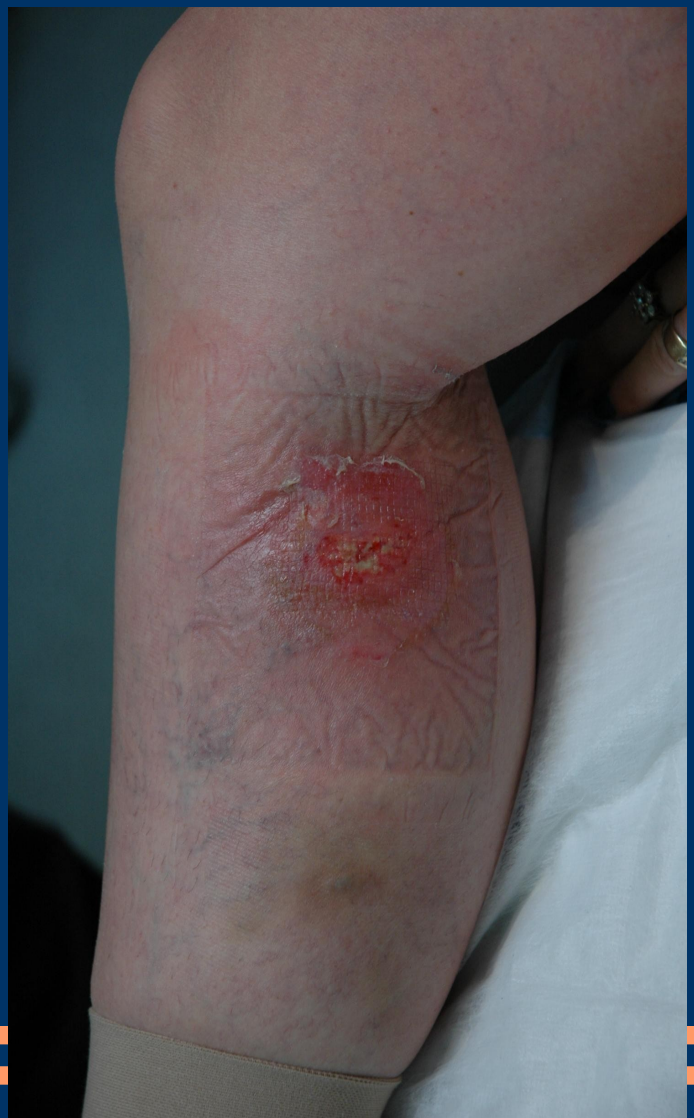
# Hypertrichosis

- ?Rare
- Transient
- STS and iodine
- Release of angiogenic cytokines



# Infection

- Rare
- May be unusual bacteria such as Pseudomonas



# *Infection*

- Differential Diagnosis
  - Thrombophlebitis
  - Intra-arterial injection
- Treatment
  - Appropriate oral or systemic antibiotic