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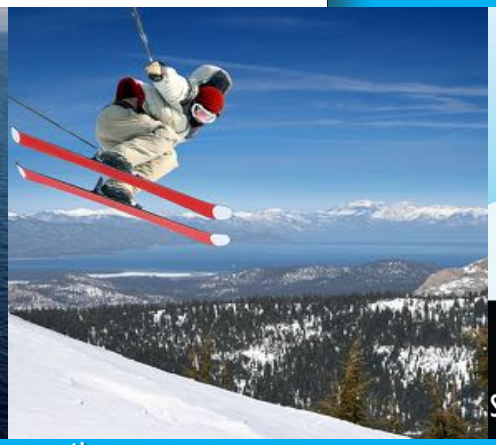

30th Feb Lk Tahoe Ski


Seattle March 10-11

Ankle Arthroscopy

39th Seattle Seminar

August Tuscany Trip


23rd Las Vegas Seminar

36th Hawaii Seminar

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# International Foot & Ankle Foundation for Education and Research

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# SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

## "Dock" DOCKERY, DPM, FACFAS

- Fellow, American College of Foot & Ankle Surgery
- Fellow, American Society of Foot & Ankle Dermatology
- Board Certified, American Board Foot & Ankle Surgery
- Founder & Director of Scientific Affairs,
  International Foot & Ankle Foundation
  for Education and Research
- Everett, Washington, USA

# SOFT TISSUE MASSES: BIOPSY INDICATIONS & PEARLS

## Definition:

The Soft Tissues consist of the following:

- Adipose tissue
- Fibrous tissue
- Musculature
- Vascular structures
- Peripheral nerve

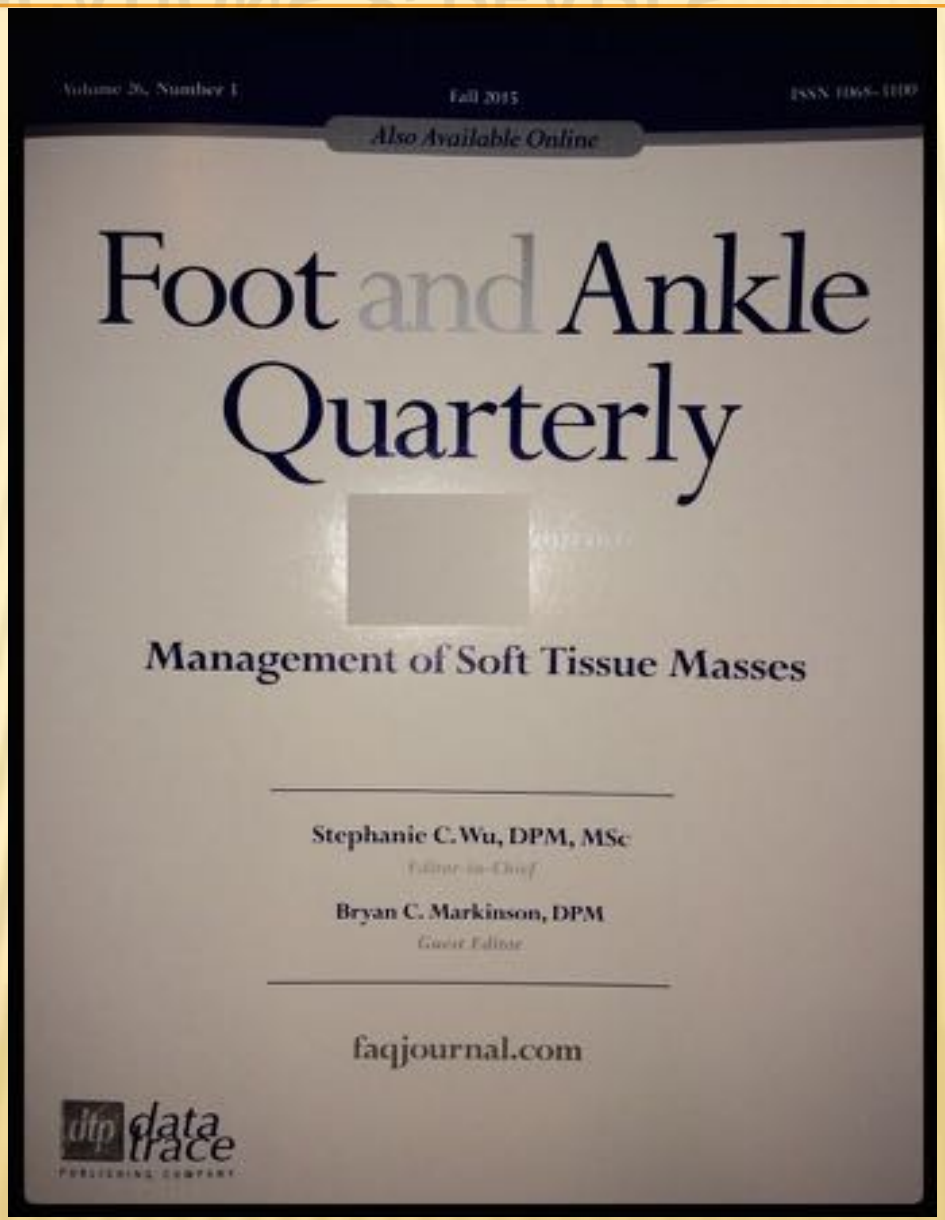
# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

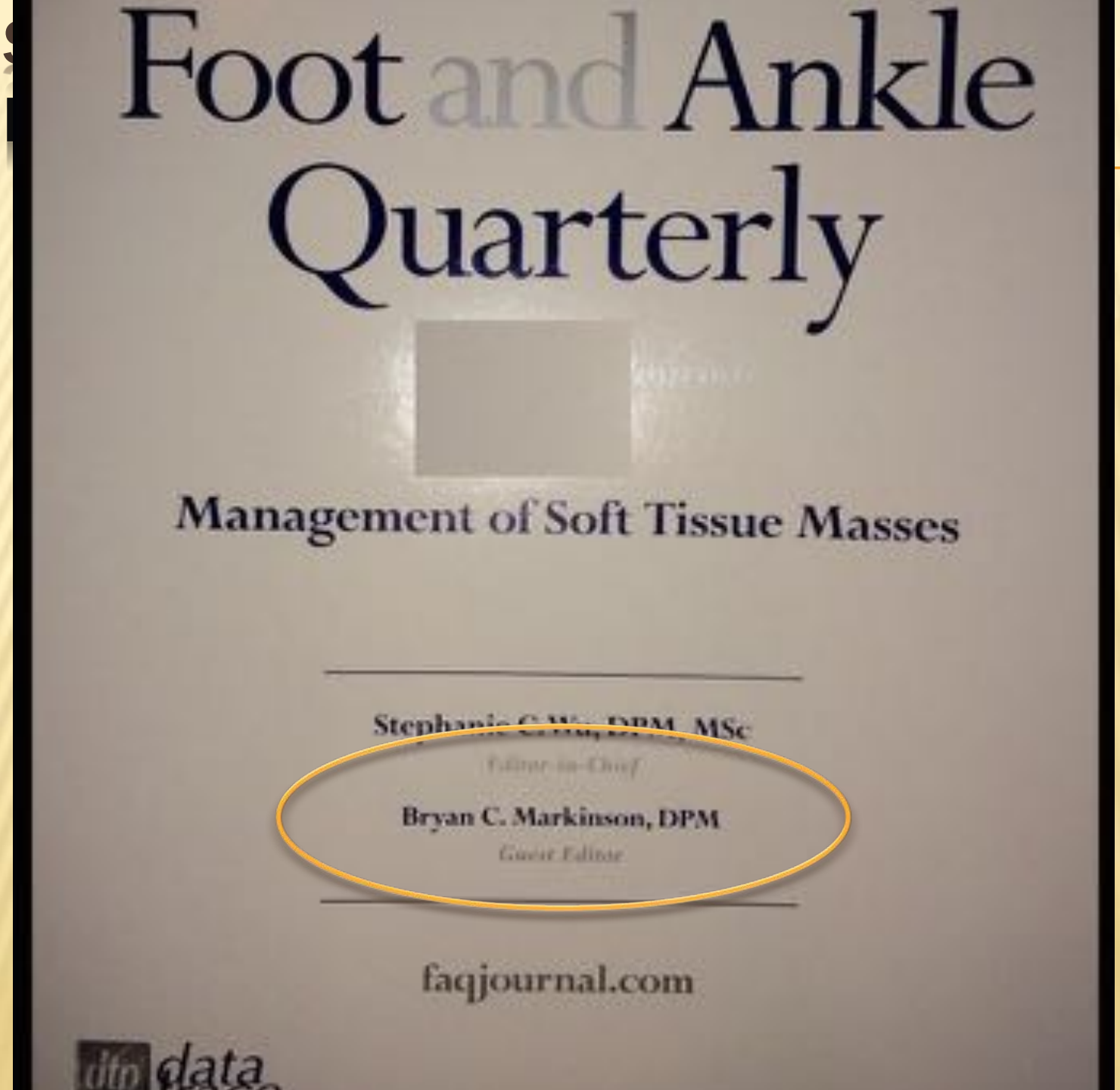
The 4 most common **soft tissue tumors** to arise in the foot and ankle are:

- ganglion cysts,
- fibromatosis,
- giant cell tumor of tendon sheath
- lipoma.




# SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS




Foot and Ankle
Quarterly
Management of Soft Tissue Masses
Bryan C. Markinson, DPM
Guest Editor
faqjournal.com

# BENIGN TUMORS, CYSTS, AND LESIONS

Never remove a soft tissue mass without knowing what it is.

**History of the Mass**

**Physical Exam of Patient AND of the Mass**

**Imaging of the Mass**

# BENIGN TUMORS, CYSTS, AND LESIONS

Never remove a soft tissue mass without knowing what it is.

## **Imaging of the Mass**

- **X-ray-Plain radiographs**
- **Ultrasound**
- **Magnetic Resonance Image (MRI)**
  - **With or Without Contrast**


Bancroft LW et al. Imaging of soft tissue lesions of the foot and ankle. Radiol Clin N Am. 46:1093-1103, 2008.

Fitzpatrick D. Imaging of soft tissue masses of the foot and ankle. Foot and Ankle Quarterly. 26(3):184-195, 2015.

# BENIGN TUMORS, CYSTS, AND LESIONS

- GANGLIONS

- Treatment: Injection or Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Ganglionic Cyst: posterior heel

# BENIGN TUMORS, CYSTS, AND LESIONS

- Ganglionic Cyst: spontaneous discharge

# BENIGN TUMORS, CYSTS, AND LESIONS

- DIGITAL MUCOID CYSTS

- Treatment: Injections, Excision, Rotational Skin Flap

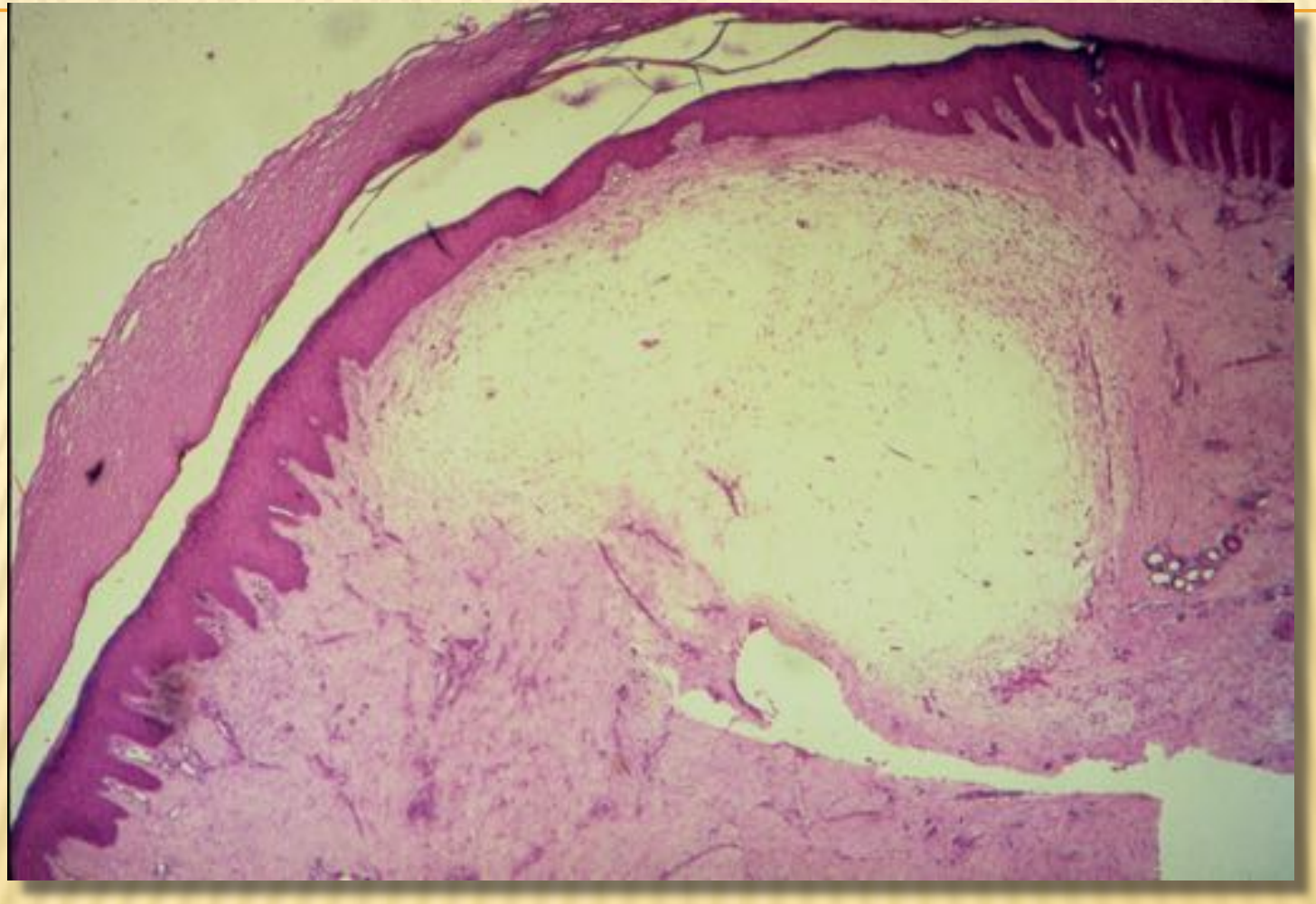
# BENIGN TUMORS, CYSTS, AND LESIONS

- Mucoid Cyst: Distal

# BENIGN TUMORS, CYSTS, AND LESIONS

- Mucoid Cyst: Viscous jelly-like fluid

# BENIGN TUMORS, CYSTS, AND LESIONS



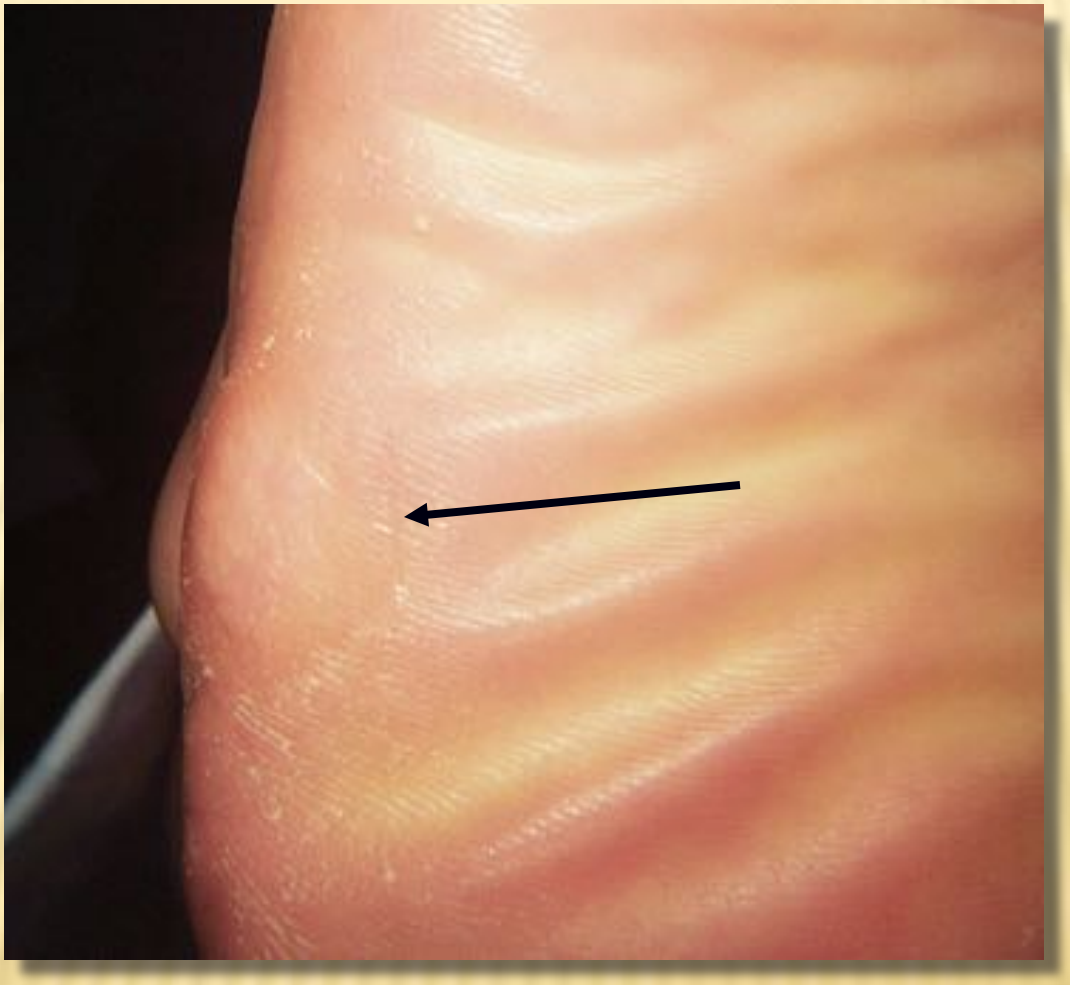
- Mucoid Cyst: stellate-shaped fibroblasts in a myxomatous stroma

# BENIGN TUMORS, CYSTS, AND LESIONS

- FIBROMAS

- Treatment: Manual, Injections, Excision

# BENIGN TUMORS, CYSTS, AND LESIONS



- Fibroma: Lateral Foot

# BENIGN TUMORS, CYSTS, AND LESIONS

- Fibroma: Plantar Medial Arch

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

Skin and Subcutaneous Biopsies

The indications for skin and subcutaneous biopsies are well-established and clearly defined.

# SKIN & SOFT TISSUE MASSES BIOPSY INDICATIONS

- **Skin lesions**
  - Asymmetrical shape/irregular borders
  - Asymmetrical color/irregular pigment
  - Diameter greater than 6mm
  - Blurred or indistinct borders
  - Lesions that spontaneously bleed or ulcerate
  - **If malignancy in differential diagnosis**

# WHERE TO BIOPSY

## SKIN & SUBCUTANEOUS LESIONS

- **Most representative site**
- **Darkest area**
- **Highest most elevated area**
- **Blister or vesicle (include border)**
- **Active edge (without adjacent normal skin)**

- **AVOID:**
- **Central area of lesion (unless it is one of the above criteria)**
- **Normal skin (dermatopathologist do not need normal tissue)**
- **Healed looking areas**

# SKIN & SUBCUTANEOUS LESIONS
# BIOPSY INDICATIONS

## WHEN IS IT *REALLY* NECESSARY?

- When you don't know what the condition is
- When you want verification of diagnosis
- When condition isn't responding to therapy
- If malignancy is in the differential diagnosis
- Any pigmented lesion > 6 mm diameter
- When patient is concerned about condition

Dockery GL, Bakotic BW: Biopsy Techniques, ch. 13, In, *Lower Extremity Soft Tissue & Cutaneous Plastic Surgery*, 2nd Edition, Elsevier (Saunders), 2012.

# SKIN & SOFT TISSUE MASSES: BIOPSY INDICATIONS & PEARLS

The indications for skin biopsy are well-established and clearly defined.

The indications for biopsy of soft tissue masses are not well-established and are poorly defined.

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

The indications for skin biopsy are well-established and clearly defined.

The indications for biopsy of soft tissue masses are not well-established and is poorly defined.

# Soft Tissue Mass BIOPSY INDICATIONS

MAIN INDICATIONS

- STM arising in patient without a history of trauma
- STM that persists for more than 4 weeks after trauma
- STM > 5 cm* (*However, one should not wait this long)
- STM that enlarges over time
- STM that becomes symptomatic
- STM that spontaneously ulcerates or bleeds
- Recurrent STM after a previous excision
- STM if malignancy is in the differential diagnosis

Bakotic BW: Soft Tissue Masses: When to Treat, When to Refer. Pod Today, 19(6):2006.

# SOFT TISSUE MASS
# BIOPSY INDICATIONS

## WHEN IS IT *REALLY* NECESSARY?

- When you don't know what the condition is
- When you want verification of diagnosis
- When condition isn't responding to therapy
- If malignancy is in the differential diagnosis
- Any expanding mass > than 1 cm diameter
- When patient is concerned about condition

Dockery GL, Bakotic BW: Biopsy Techniques, ch. 13, In, *Lower Extremity Soft Tissue & Cutaneous Plastic Surgery*, 2nd Edition, Elsevier (Saunders), 2012.

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

• **Soft tissue tumors of the lower extremities are mostly benign and may often be overlooked or mistaken as "simple lesions."** For example, ganglion cysts occur so frequently in the foot and ankle that it has often led to the careless assumption that every asymptomatic, soft, movable mass represents a benign lesion.

• Unfortunately, this lackadaisical confidence can lead to misdiagnosis and disaster in certain situations of sarcomas.

• Although rare, some "simple lesions" may actually represent a malignant process that goes undiagnosed until skeletal metastasis occurs or amputation is required. This tragedy could potentially lead to malpractice litigation for negligent care.

**"The safest approach to soft tissue tumors is consider them all to be sarcomas until proven otherwise."**


• Mykre-Jenson O: A consecutive 7-year series of 1,331 benign soft-tissue tumors: Clinicopathologic data and comparison with sarcomas. *Acta Orthop Scand 52:287, 1981*

• Walter JH, Goss LR. How to detect soft tissue tumors. Podiatry Today, 16(6), 2003.

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

**The principal biopsy techniques for soft tissue tumors are:**

- Fine needle aspiration (FNA) biopsy*♦,
- Core needle (Tru-Cut) biopsy*,
- Incisional biopsy and
- Excisional biopsy.

*with or without image-enhanced guidance

♦ (not recommended for possible sarcomas)

Pike J, et al. Soft tissue sarcomas of the extremities: How to stay out of trouble. BCMJ. 50(6):310-317, 2008.

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

## Soft Tissue Masses Can Mimic Sarcomas :

- Lesions < 5 cm that are superficial to the fascia are most likely benign.
- Benign masses are overall much more common than their malignant counterparts.
- However, most soft tissue masses should be presumed to be sarcomatous until proven otherwise.

Colman MW, Non-neoplastic soft tissue masses that mimic sarcoma. Orthop Clin N Am, 14(45):245-255, 2014.

Cipriano CA, et al. Surgical Management of Soft Tissue Sarcomas of the Extremities. Oper Tech Orthop. 24:79-84, 2014.

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

COMPARISON OF 3 BIOPSY TYPES: Open incisional, Core biopsy & Fine Needle
Open surgical biopsy more accurately identified malignancy, established diagnosis and guided appropriate treatment compared with fine-needle aspiration and core biopsy, according to the results of this Level I study.

This study included 57 patients with palpable extremity soft tissue masses. The researchers performed a fine-needle aspiration, then a core biopsy and finally, a surgical biopsy of the same mass.

- Open incisional biopsy was 100% accurate in all three areas: recognizing malignancy, determining accurate diagnosis and directing treatment.

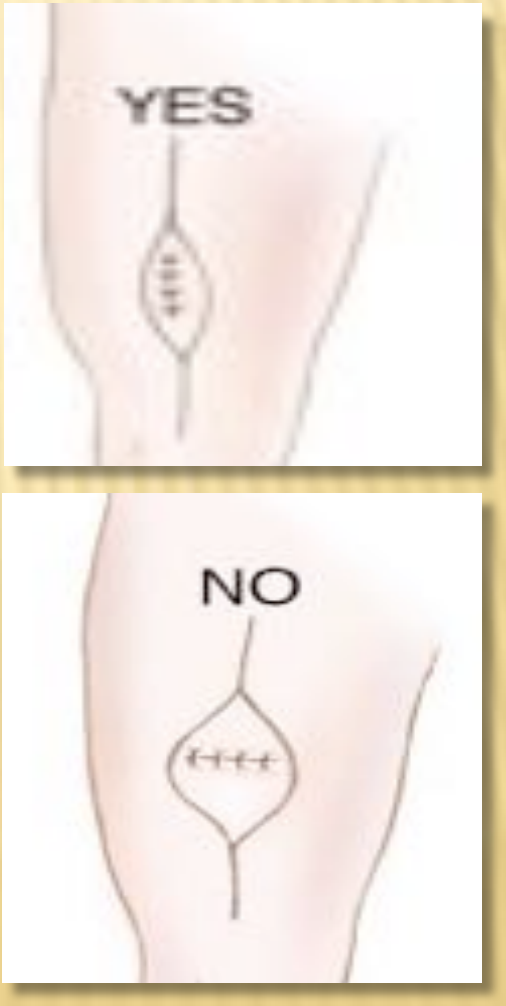
- Core biopsy (Tru Cut) had an overall accuracy of 80.7%.

- Fine-needle aspiration had overall accuracy of 75.4%

**Kasraeian S. Open surgical biopsy most accurate method for soft tissue mass diagnosis. *Clin Orthop Rel Res*. Published online: May 29, 2010.** http://www.orthosupersite.com/view.aspx?rid=65783

# INCISION PLACEMENT

- Avoid transverse incisions
- Soft tissue defects in the foot and ankle often require a free flap
- Inappropriately placed incision may lead to amputation



# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS


## INCISIONAL BIOPSIES

- Biopsies should be performed with a longitudinal incision parallel to the long axis of the extremity.
- The incision should be centered over the mass at its most superficial location. Care should be taken not to raise tissue flaps.
- This approach facilitates subsequent wide local excision of the tumor, and the incisional scar results in minimal difficulties in wound closure.

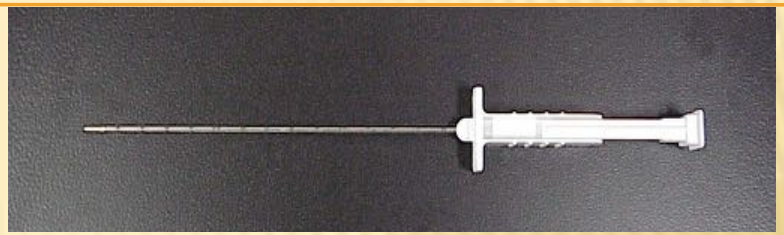
# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

INCISIONAL BIOPSIES

- Hospital or Surgery Center: Frozen section pathology (Cryosection). Pathologist reports either malignant or benign (usually within 20 minutes)
  - If malignant: close incision and refer to oncologist
  - If benign: complete total resection of STM
- Office or Clinic: Collect central sample and send to pathology. Close biopsy incision site. More detailed report (usually 3 to 7 days).



# BIOPSY TYPES



- Core needle biopsy
  - Minimally invasive
  - 14-18 gauge needle
  - Done in office under local for palpable lesions
  - CT or US guidance if lesion not palpable
  - Minimal tract to resect
  - Diagnostic in 90% of cases

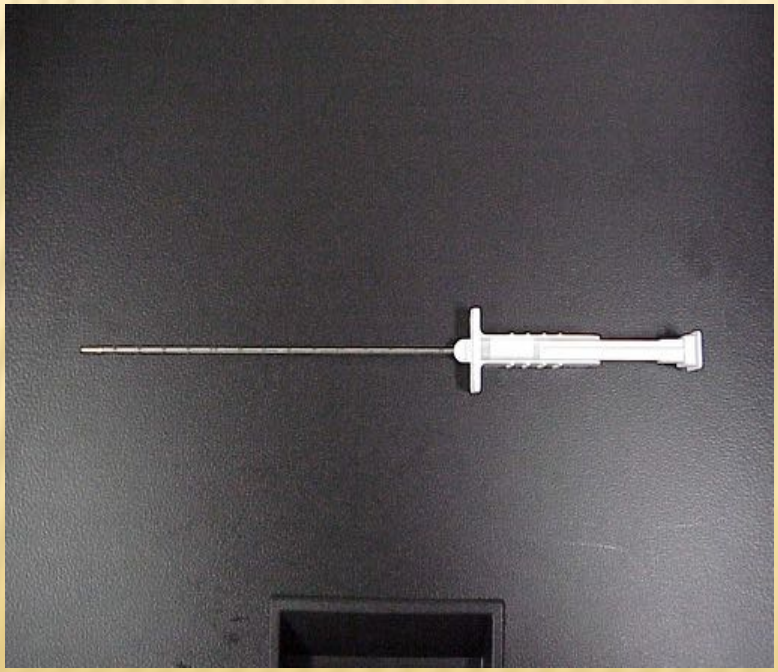
# BIOPSY

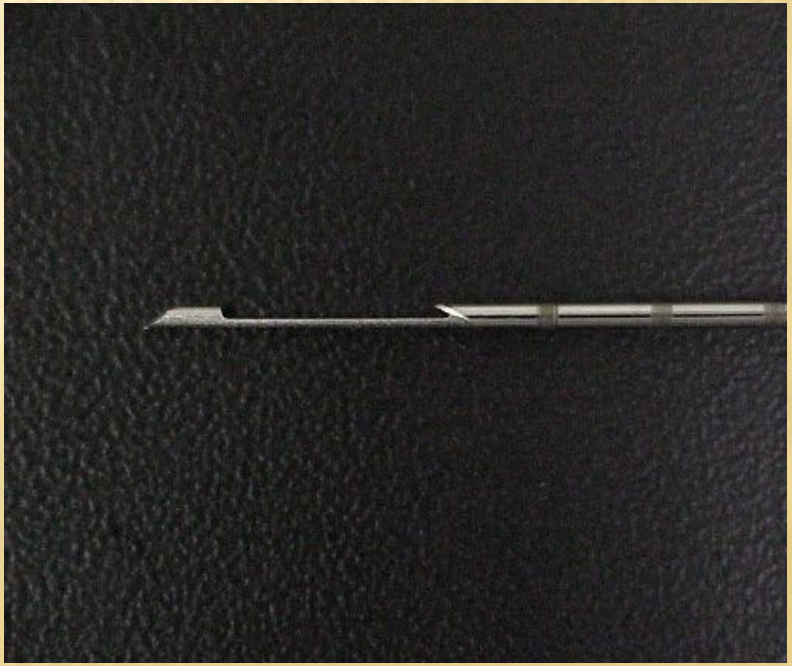
- ***In the plane of resection!***
- Biopsy tract considered contaminated and is excised
- Inappropriately placed biopsy may lead to amputation
- If you don't know the plane of resection—don't do the biopsy

# CORE NEEDLE BIOPSY

# BIOPSY

- Cutting needles, i.e., Tru-Cut needle obtains small amount of tissue usually adequate for pathologic analysis - causes minimal trauma





# CLINICAL EVALUATION

Things to Evaluate and Note in Chart:

- The anatomic location of the mass
- The physical character of the mass
- The size and shape of the mass
- Single vs. multiple lesions
- The surface of the mass
- The color of the mass
- The sharpness of the boundaries of the mass
- The consistency of the mass to palpation
- Presence of pulsation
- Lymph node examination

# WHERE TO BIOPSY

## SOFT TISSUE MASSES

- **Most representative site**
- **Darkest area**
- **Highest most elevated area**
- **Central area**

- **AVOID:**
- **Edge of mass (unless it is one of the above criteria)**
- **Normal skin (dermatopathologist do not need normal tissue)**

# SKIN & SOFT TISSUE MASSES: **BIOPSY** INDICATIONS & PEARLS

- Small subcutaneous lesions that persist unchanged for years may be observed rather than biopsied

- Choice of biopsy is based upon the size and location of the soft tissue mass

# VERY IMPORTANT PEARL
## SOFT TISSUE MASSES

Possessing the surgical ability to deftly remove a tumor should not be confused with providing the most up to date and comprehensive care!!

# SKIN & SOFT TISSUE MASSES: BIOPSY INDICATIONS & PEARLS

## CONCLUSIONS

- Many soft tissue masses look alike: biopsy all unknown lesions.

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- Bakotic BW, Borkowski P. Primary soft tissue neoplasms of the foot: The clinicopathologic features of 401 cases. JFAS, 2001;40(1):28-35.
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- Kasraeian S. Open surgical biopsy most accurate method for soft tissue mass diagnosis. Clin Orthop Rel Res. Published online: 5-29-2010. www.orthsupersite.com/view.aspx?rid=65783
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- Rottier F. How to differentiate soft tissue neoplasms. Pod Today. 21(1), 2008.
- Shidham VB, et al. Benign and malignant soft tissue tumors. http://emedicine.medscape.com/article/1253816-overview
- Temple At, Worman DS, Mnaynoneh WA. Unplanned surgical excision of tumors of he foot and ankle. Cancer Control 2001, 8:262-268.

# BENIGN TUMORS, CYSTS, AND LESIONS

# THANK YOU

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gdockdockery@aol.com

# OTHER BENIGN TUMORS, CYSTS & LESIONS

# BENIGN TUMORS, CYSTS, AND LESIONS

## EPIDERMAL & DERMAL LESIONS:

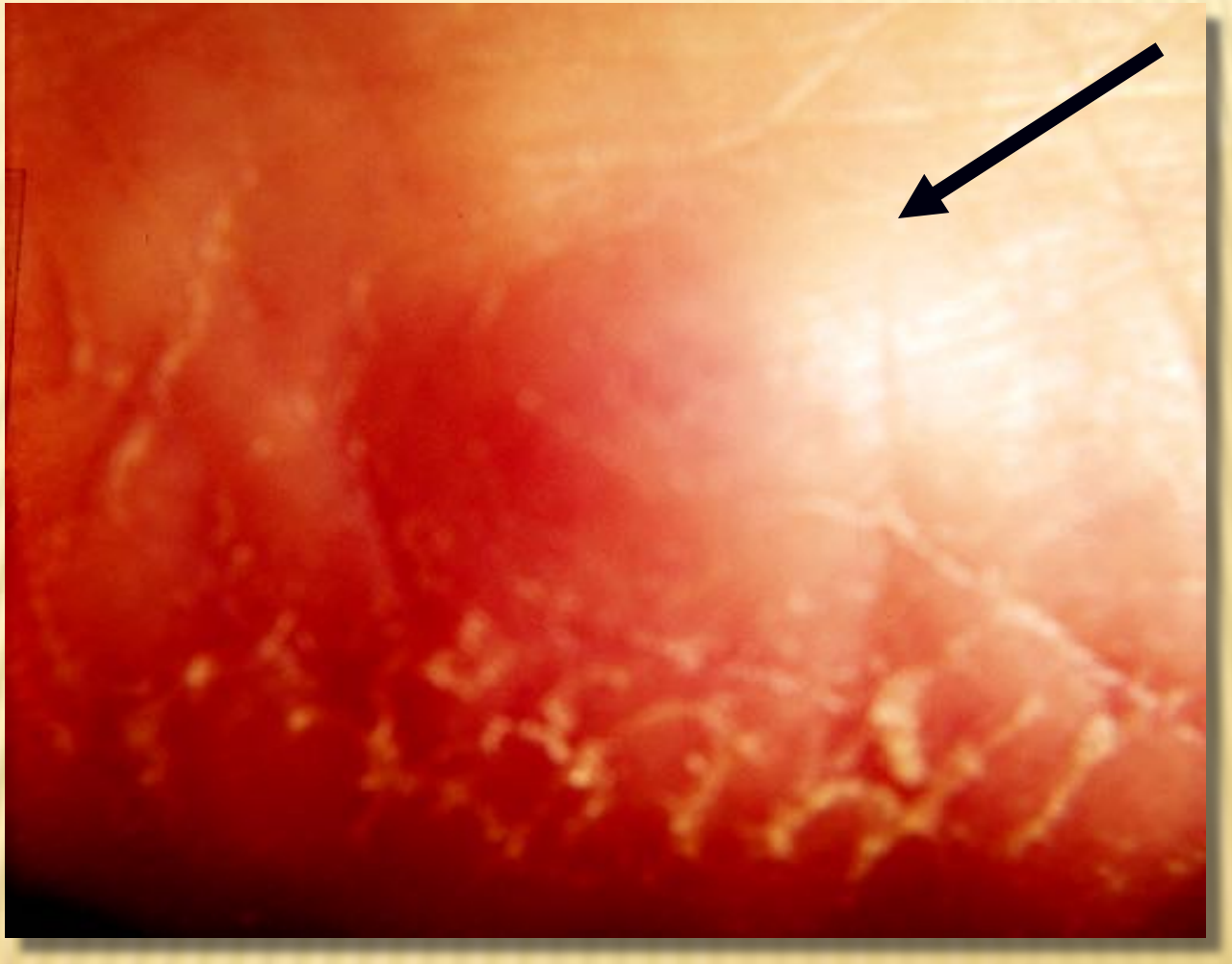
- Epidermoid Cysts (Inclusion)
- Dermoid Cysts
- Seborrheic Keratoses
- Solar (Actinic) Keratoses
- Stucco Keratoses

# BENIGN TUMORS, CYSTS, AND LESIONS

## EPIDERMOID CYSTS

- (Epidermal Inclusion Cysts)
- Treatment: Simple but full excision of lesion

# BENIGN TUMORS, CYSTS, AND LESIONS



- Epidermoid Cyst on Heel

# BENIGN TUMORS, CYSTS, AND LESIONS

- Epidermoid Cysts on Hallux

# BENIGN TUMORS, CYSTS, AND LESIONS

- DERMOID CYSTS

- Treatment: Full surgical excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Large Dermal Cyst on Heel

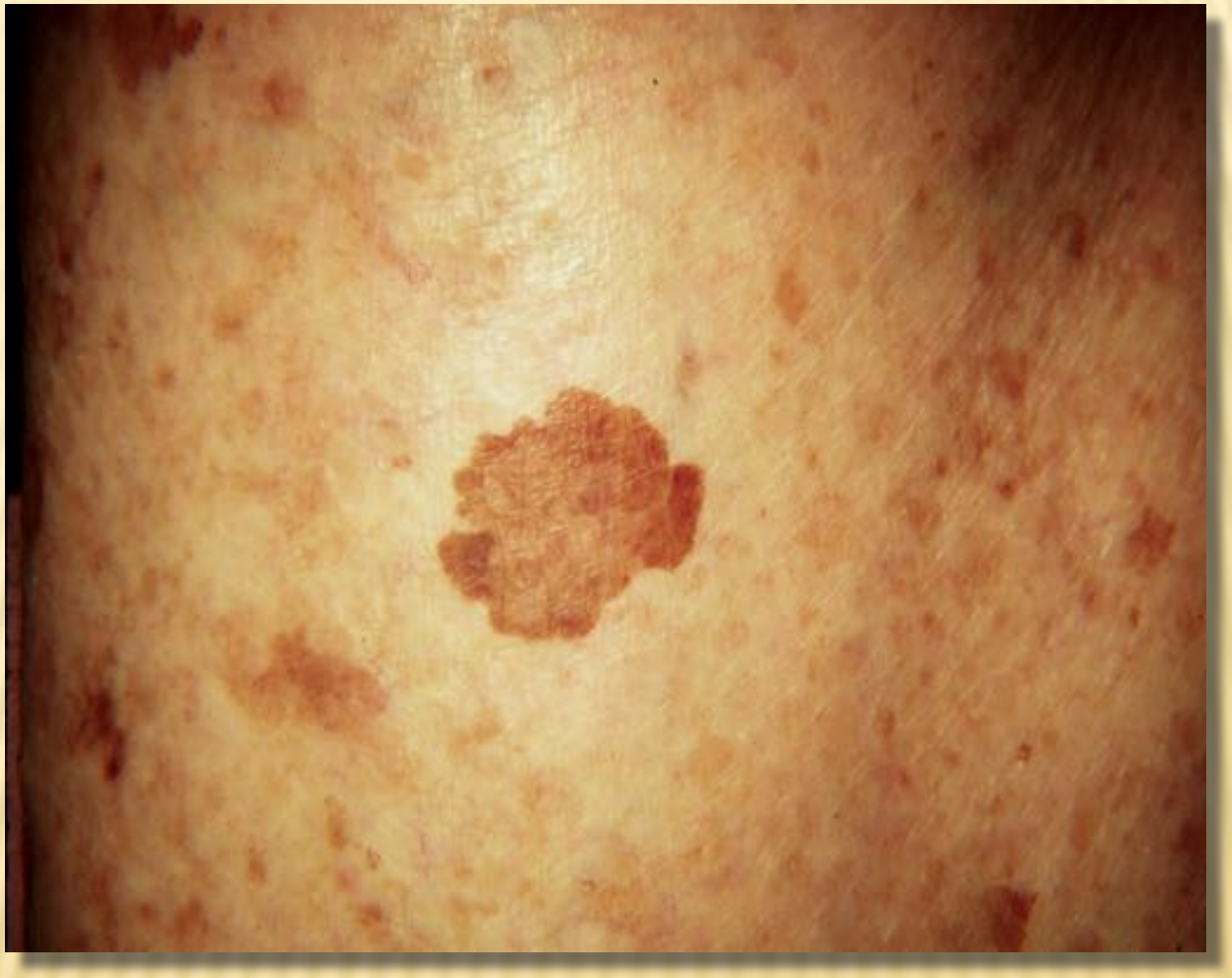
# BENIGN TUMORS, CYSTS, AND LESIONS

- White Keratin Material with Foul Odor

# BENIGN TUMORS, CYSTS, AND LESIONS

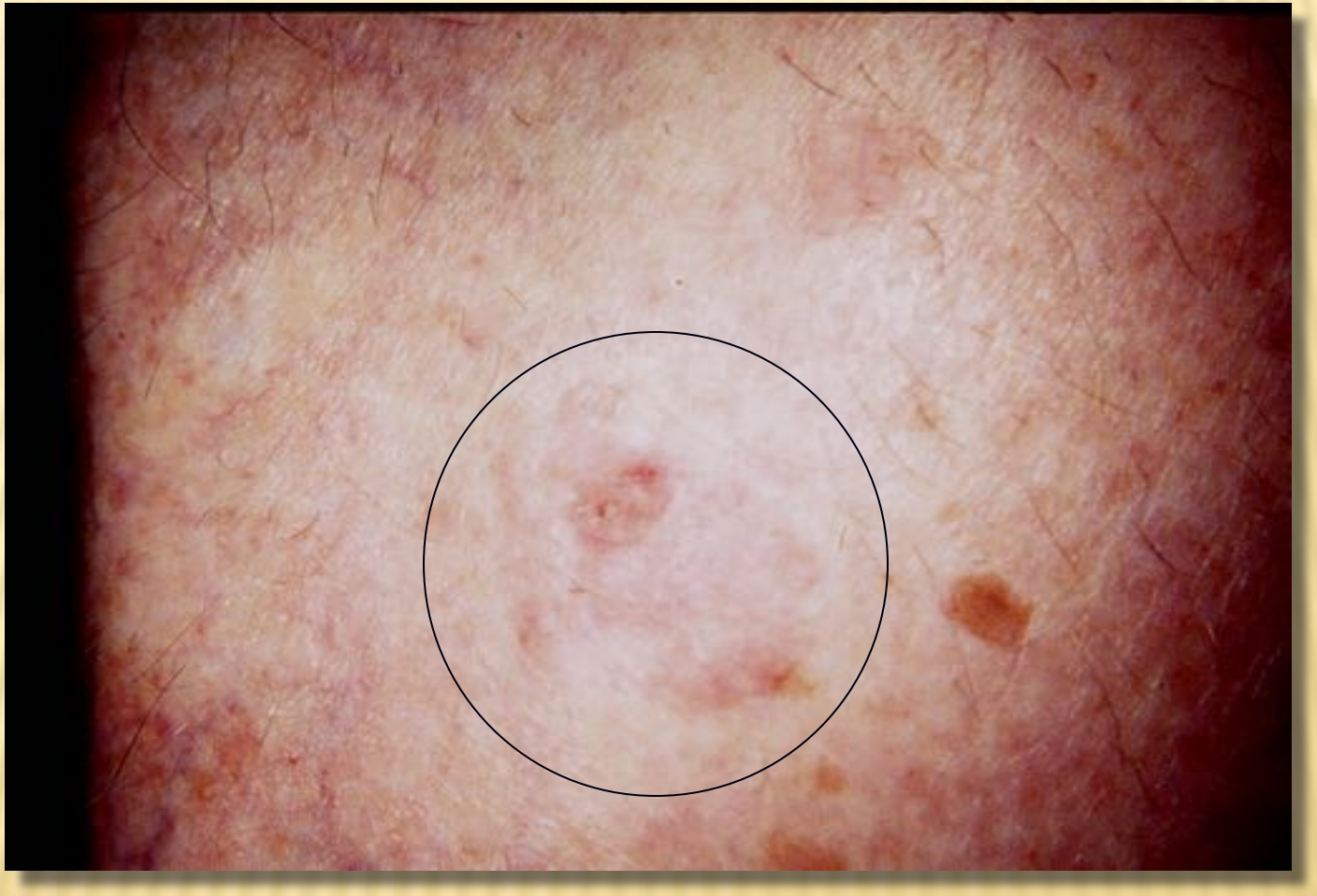
- SEBORRHEIC KERATOSES
  - Treatment: Frozen, shaved, curetted, excised or ignored

# BENIGN TUMORS, CYSTS, AND LESIONS



- Seborrheic Keratosis: Late Stage

# BENIGN TUMORS, CYSTS, AND LESIONS



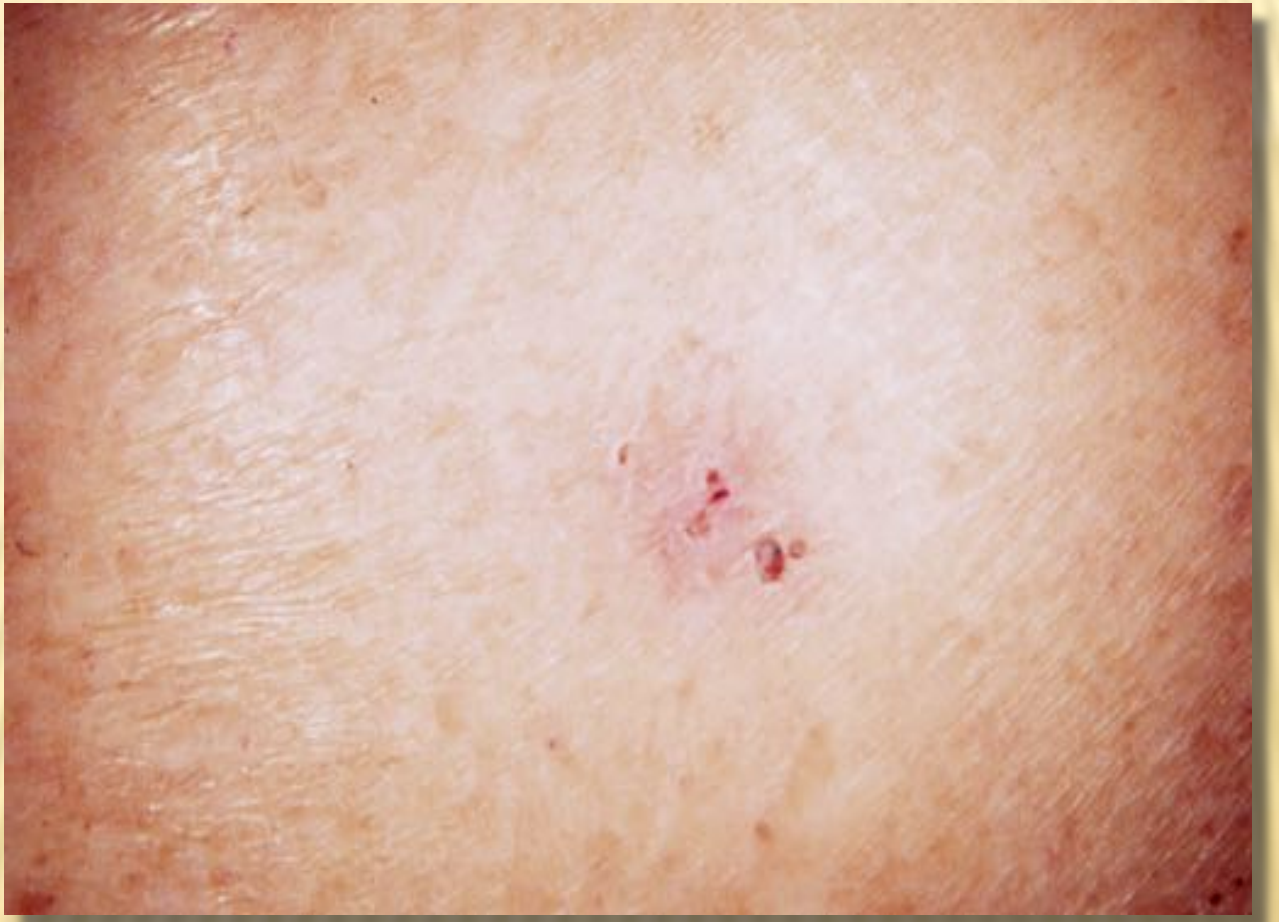
- Seborrheic Keratosis: Irritated & Pruritus

# BENIGN TUMORS, CYSTS, AND LESIONS

## ACTINIC KERATOSIS

- Treatment: Same as Seborrheic K.
- Successful Tx of Actinic Keratosis with imiquimod 5%, Stockfleth E. et.al., Br J Dermatol,2001;144(5), 1050-53.

# BENIGN TUMORS, CYSTS, AND LESIONS



- Actinic Keratosis: Irregular borders

# BENIGN TUMORS, CYSTS, AND LESIONS

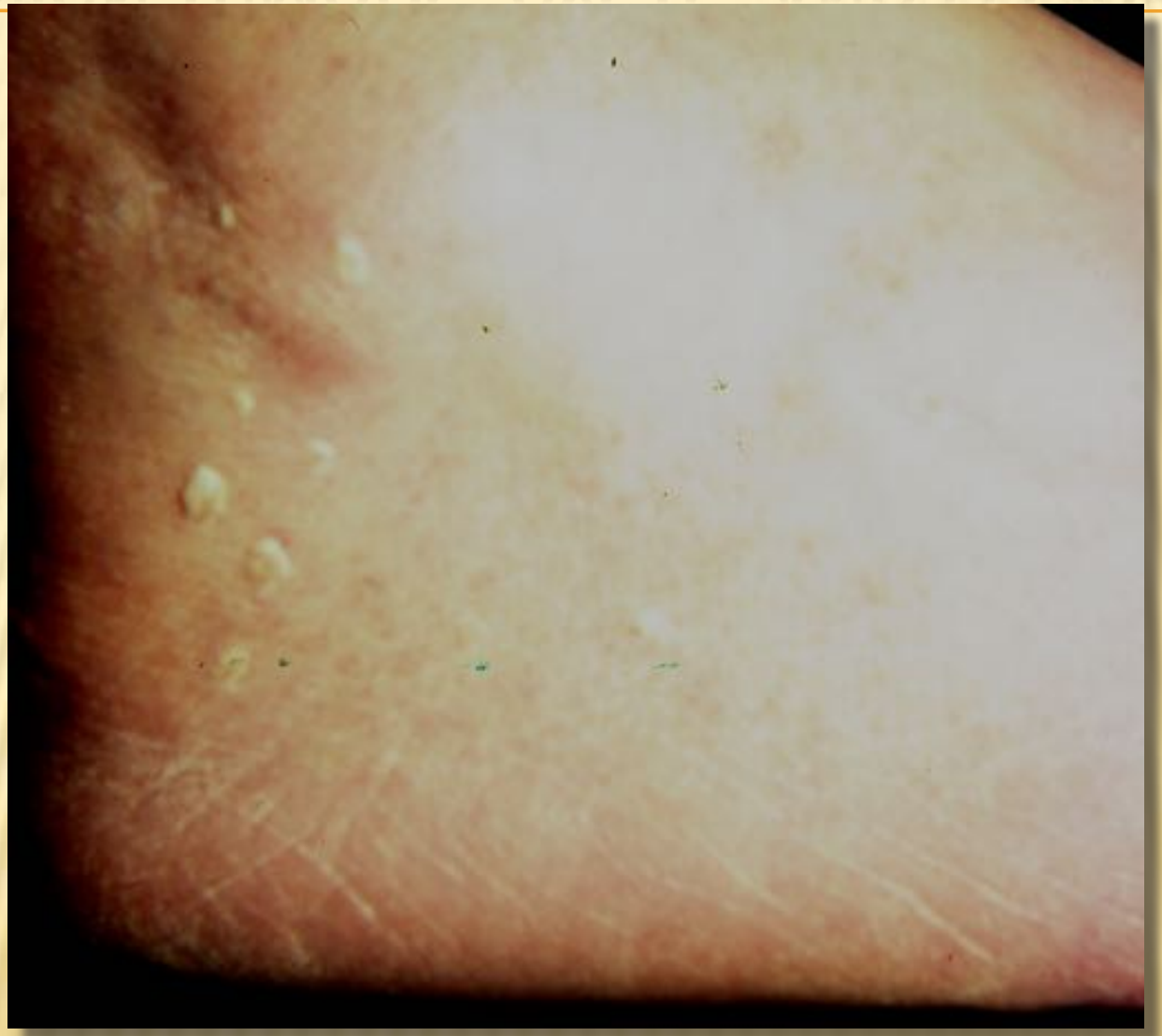
- Actinic Keratosis: Excoriations

# BENIGN TUMORS, CYSTS, AND LESIONS

## STUCCO KERATOSIS

- Treatment: Topical emollients, curettage, or cryotherapy

# BENIGN TUMORS, CYSTS, AND LESIONS



- Stucco Keratosis on Foot

# BENIGN TUMORS, CYSTS, AND LESIONS

- Stucco Keratosis on Lower Leg

# BENIGN TUMORS, CYSTS, AND LESIONS

## CONNECTIVE TISSUE TUMORS

- Skin Tags (*Acrochordons*)
- Polyps (*Acquired Fibroepithelial*)
- Skates (*Acquired Digital Fibrokeratomas*)
- Cutaneous Horns (*Acquired  Keratofibromas)*
- Scars (*Hypertrophic & Keloid*)

# BENIGN TUMORS, CYSTS, AND LESIONS

- ACROCHORDONS

  (Skin Tags)

  Multiple early lesions may predict nevoid basal cell CA syndrome. Chiritescu E, Maloney M: JAAD, 2001;44(5):789-94.

- Treatment: Shave, Scissor, Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Skin Tag: Pigmented Achrochordon

# BENIGN TUMORS, CYSTS, AND LESIONS

- Skin Tag: Plantar Achrochordon

# BENIGN TUMORS, CYSTS, AND LESIONS

## ACQUIRED FIBROEPITHELIAL POLYPS

- Treatment: Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Polyp: Typical Pedunculated Type

# BENIGN TUMORS, CYSTS, AND LESIONS

- Polyp: Convoluted Dome (Breakfast Roll)

# BENIGN TUMORS, CYSTS, AND LESIONS

- Polyp: Cerebriform Type

# BENIGN TUMORS, CYSTS, AND LESIONS

## ACQUIRED DIGITAL FIBROKERATOMA

- Treatment: Shave-cautery or Excision

# BENIGN TUMORS, CYSTS, AND LESIONS


- Acquired Digital Fibrokeratoma

# BENIGN TUMORS, CYSTS, AND LESIONS


- Acquired Digital Fibrokeratoma

# BENIGN TUMORS, CYSTS, AND LESIONS

- CUTANEOUS HORNS
  - Treatment: Curettage-cryotherapy or excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Cutaneous Horn

# BENIGN TUMORS, CYSTS, AND LESIONS

- Cutaneous Horn

# BENIGN TUMORS, CYSTS, AND LESIONS

- SCARS

- Treatment: Manual, Topical, Silicone, Injectables, Excision.

# BENIGN TUMORS, CYSTS, AND LESIONS

- Hypertrophic Scar

# BENIGN TUMORS, CYSTS, AND LESIONS

## OTHER CONNECTIVE TISSUE TUMORS

- Dermatofibromas
- Keratoacanthomas

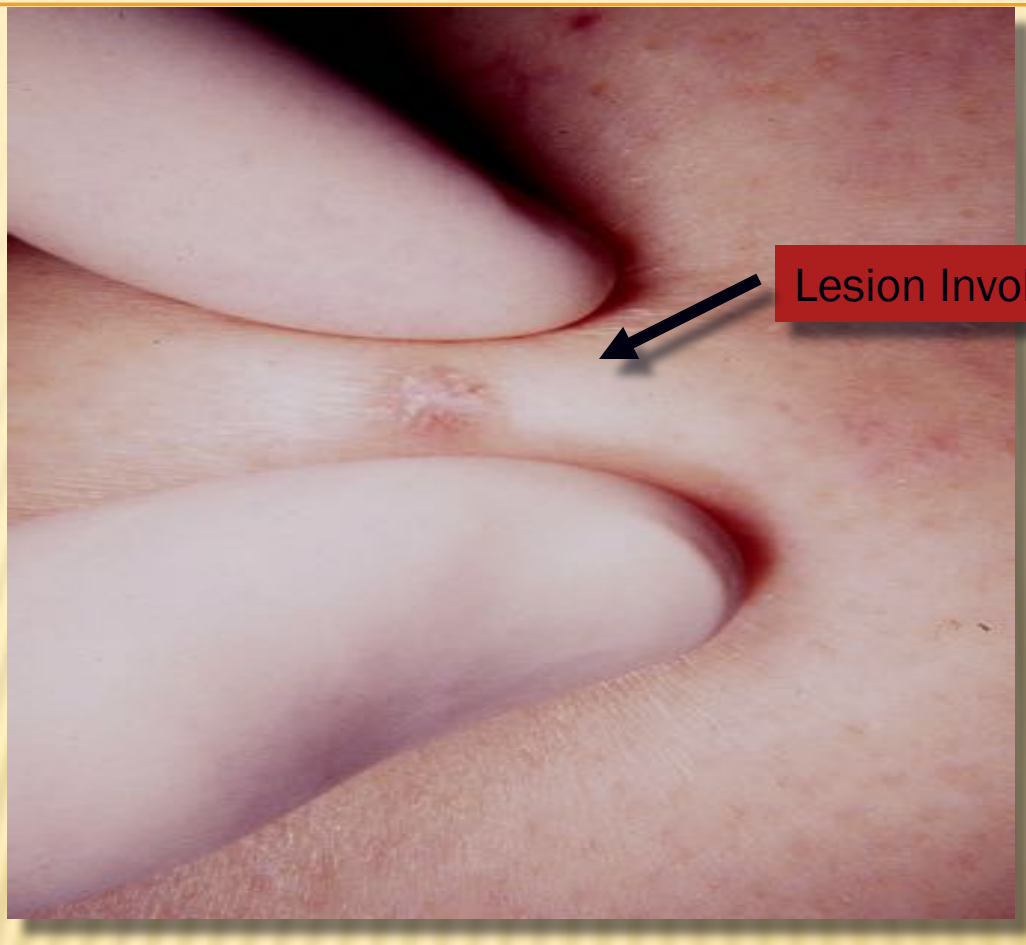
# BENIGN TUMORS, CYSTS, AND LESIONS

- **DERMATOFIBROMAS**
  - (*Solitary Fibrous Histiocytomas*)
- Treatment: None, Injections, Shave-cryotherapy, Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Dermatofibroma

# BENIGN TUMORS, CYSTS, AND LESIONS




- Dermatofibroma:
- Fitzpatrick's Pinch Test

# BENIGN TUMORS, CYSTS, AND LESIONS

- KERATOACANTHOMA

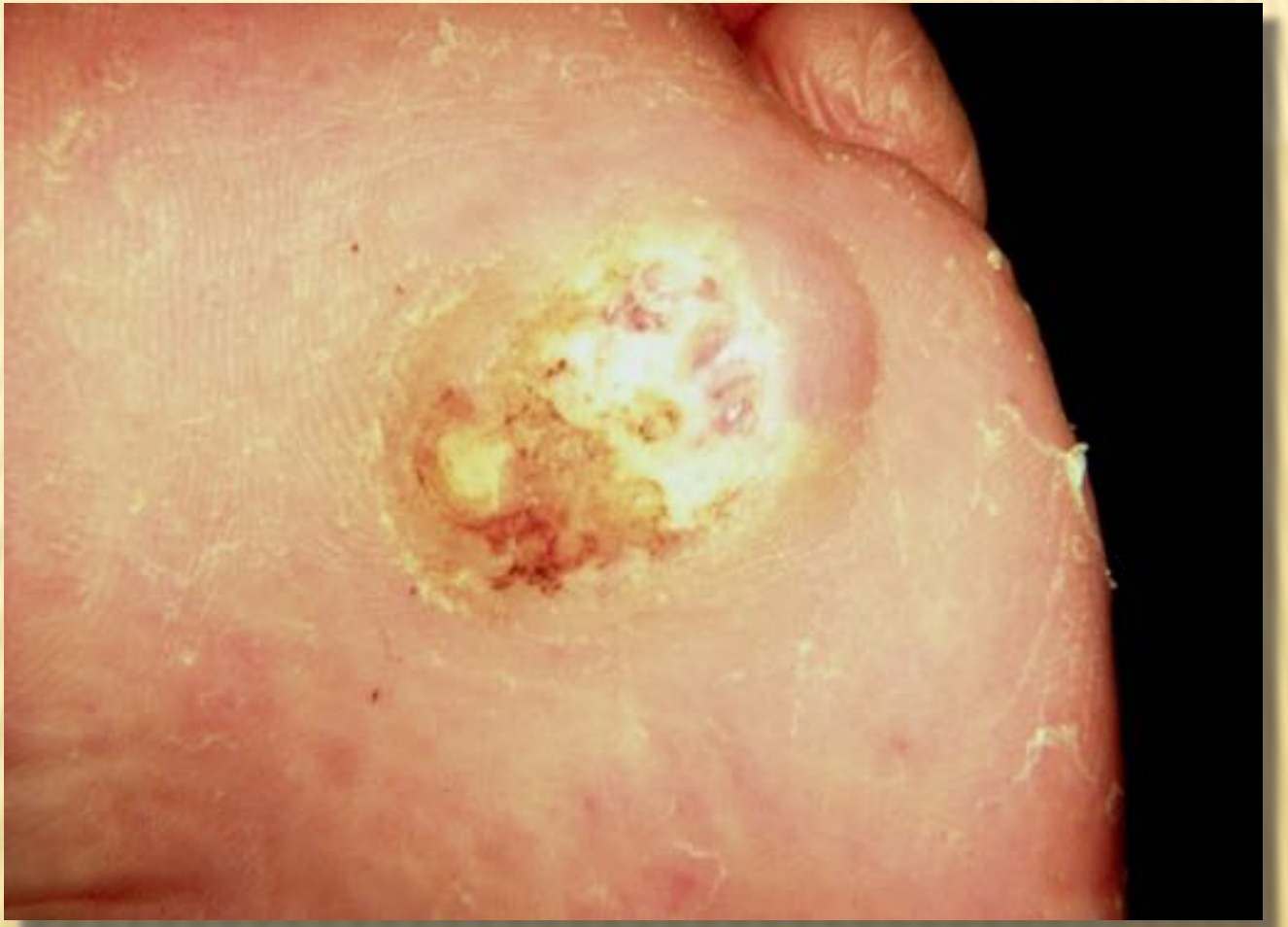
- Treatment: Surgical Excision

- Hale D, Dockery GL: Giant Keratoacanthoma. JFAS, 1993;32:75-84.

# BENIGN TUMORS, CYSTS, AND LESIONS

- Solitary Keratoacanthoma (KA)

# BENIGN TUMORS, CYSTS, AND LESIONS



- Giant Keratoacanthoma (> 2 cm)

# BENIGN TUMORS, CYSTS, AND LESIONS

## VASCULAR TUMORS

- Pyogenic Granulomas
- Hemangiomas
- Glomus Tumors

# BENIGN TUMORS, CYSTS, AND LESIONS

- PYOGENIC GRANULOMA

- Treatment: Curettage-cryotherapy, Surgical Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Pyogenic Granuloma: Typical Location

# BENIGN TUMORS, CYSTS, AND LESIONS

- Pyogenic Granuloma: Atypical Location

# BENIGN TUMORS, CYSTS, AND LESIONS

- HEMANGIOMAS

- Treatment: Electrodessication, cautery, laser therapy, excision.

# BENIGN TUMORS, CYSTS, AND LESIONS

- Cherry Hemangioma: Campbell de Morgan spot

# BENIGN TUMORS, CYSTS, AND LESIONS

- Senile Hemangioma (also Cherry Type)

# BENIGN TUMORS, CYSTS, AND LESIONS

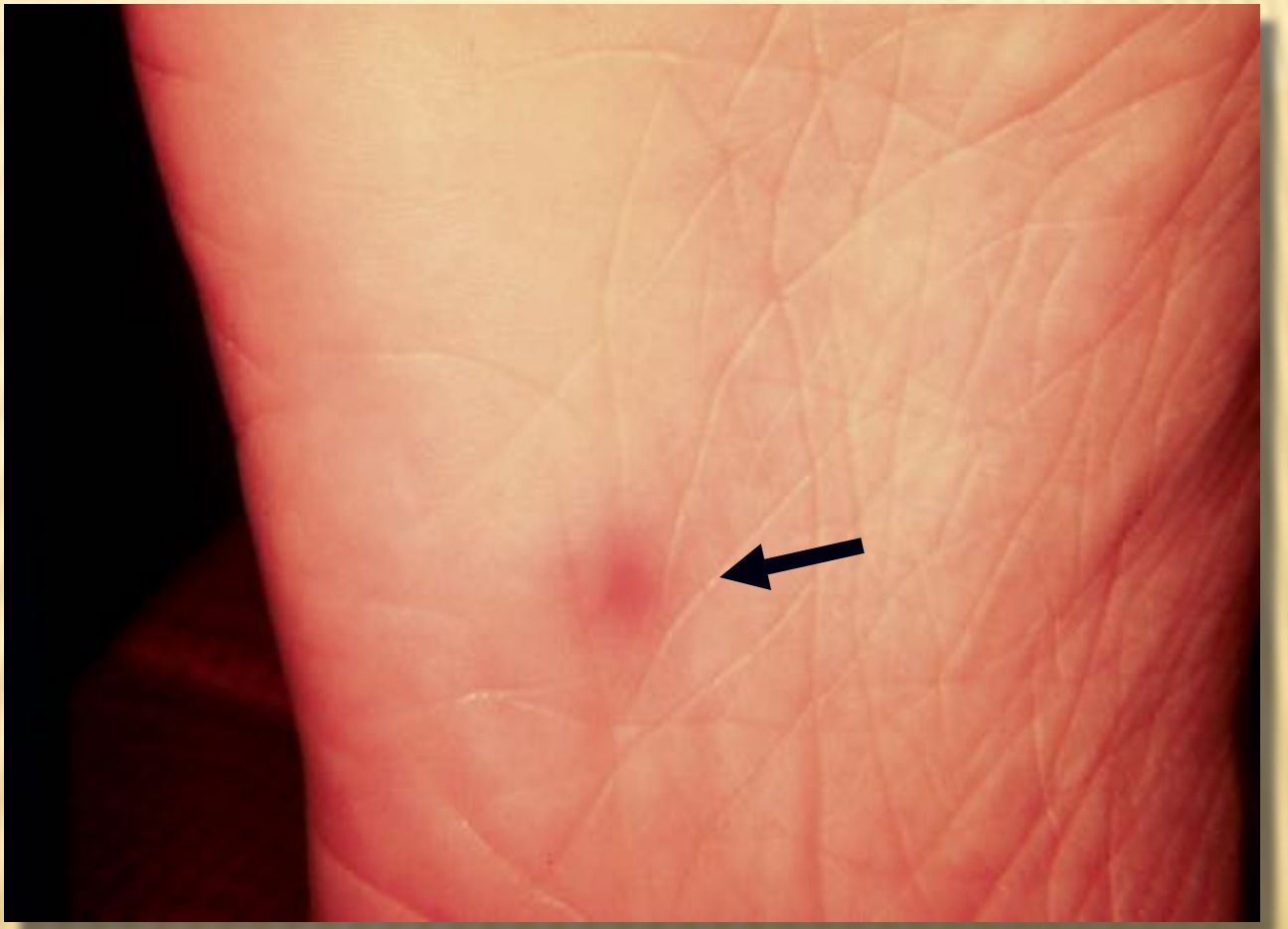
- **GLOMUS TUMOR**
- (SubQ Neuromyoarterial Glomus)

- Treatment: Surgical Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Glomus Tumor: Typical Location

# BENIGN TUMORS, CYSTS, AND LESIONS



- Glomus Tumor: Atypical Location

# BENIGN TUMORS, CYSTS, AND LESIONS

- SMOOTH MUSCLE TUMORS
  - Leiomyoma
  - Ganglion

# BENIGN TUMORS, CYSTS, AND LESIONS

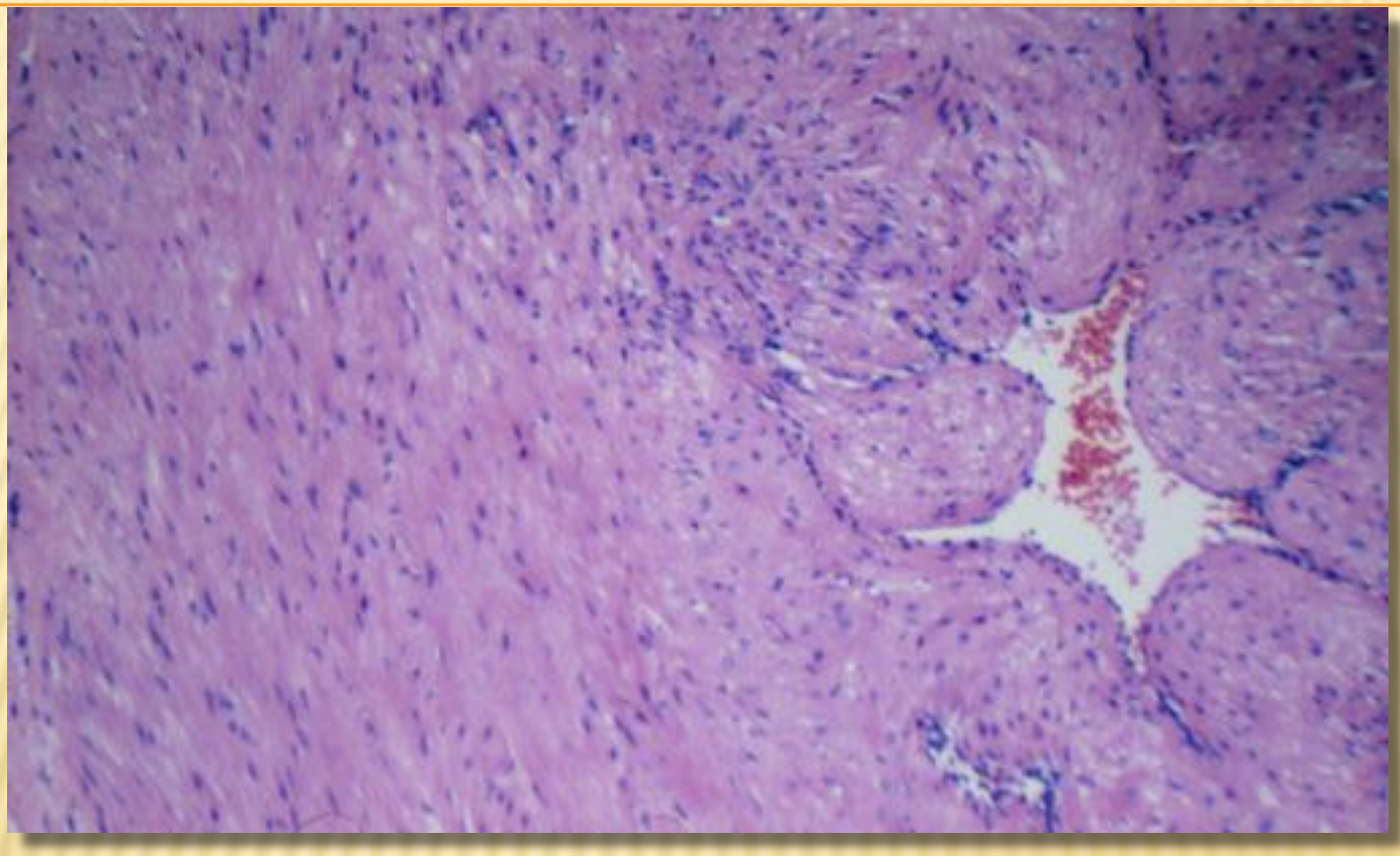
- **LEIOMYOMA**

- Treatment: Surgical Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Leiomyoma: Typical Digital Location

# BENIGN TUMORS, CYSTS, AND LESIONS



- Leiomyoma: eosinophilic spindle cells

# BENIGN TUMORS, CYSTS, AND LESIONS

## NERVE TISSUE TUMORS

- Dermal Neuroma
- Neurofibromatosis

# BENIGN TUMORS, CYSTS, AND LESIONS

## DERMAL NEUROMA

- Treatment: Injections or Excision

# BENIGN TUMORS, CYSTS, AND LESIONS

- Dermal Neuroma

# BENIGN TUMORS, CYSTS, AND LESIONS

- Dermal Neuroma

# BENIGN TUMORS, CYSTS, AND LESIONS

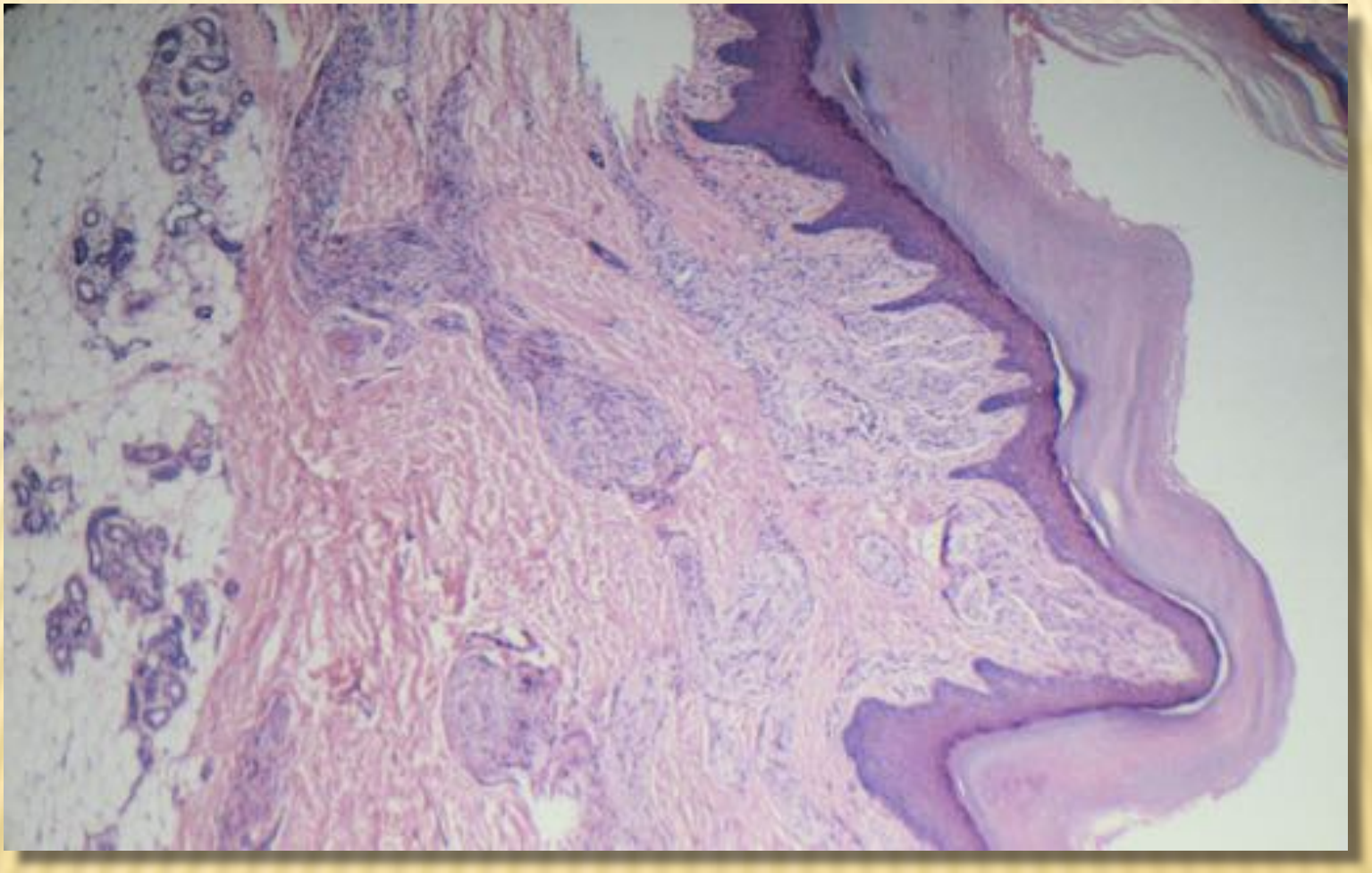
- NEUROFIBROMATOSIS

  - Solitary Form
  - Multiple Form

# BENIGN TUMORS, CYSTS, AND LESIONS

- Solitary: molluscum fibrosa

# BENIGN TUMORS, CYSTS, AND LESIONS



- **NF:** loosely arranged stroma partially surrounded by diffuse hyperplastic epidermal layer with plexiform features

# BENIGN TUMORS, CYSTS, AND LESIONS

- NF: Multiple tumors (Von Recklinghausen's Disease)

# BENIGN TUMORS, CYSTS, AND LESIONS

- NF: Multiple tumors
- (Von Recklinghausen's Disease)

# BENIGN TUMORS, CYSTS, AND LESIONS

## CONCLUSIONS

- Many lesions look alike: biopsy all unknown or unresponsive lesions. Follow established guidelines.

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# BENIGN TUMORS, CYSTS, AND LESIONS

# THANK YOU

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