

Integumentary Evaluation: Systems Review Peripheral Edema Wound Evaluation

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PT 521 Fall 2015

Objectives

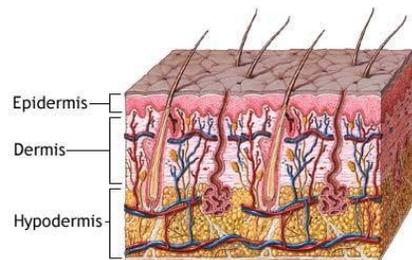
- To perform an examination of the Integumentary system
 - History/Subjective interview
 - Screening examination
 - Specific tests & Measures
- To perform the appropriate examination procedures for an individual who presents with peripheral edema
- To determine if physical therapy is appropriate or referral is indicated

Systemic disease

INTEGUMENTARY SCREENING EXAMINATION

Integumentary System

- Components
 - Skin
 - Hair
 - Nails
- Function
 - Protective Barrier
 - Sensation
 - Regulation
 - Overall body homeostasis



ADAM.

- skin is 1st immune response. A LOT of sensory receptors that affect the way we move

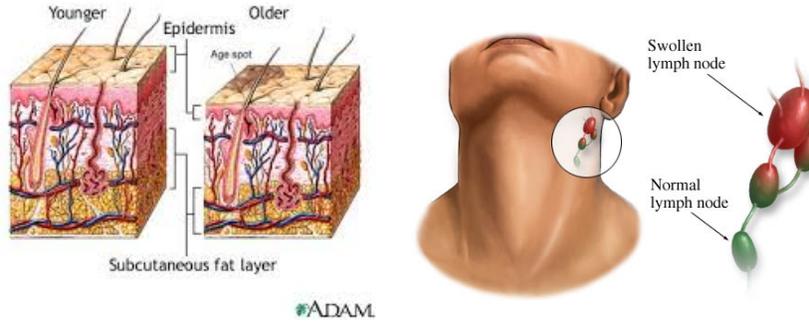
Why to PT's perform an Integumentary screening examination?

- Systemic pathology
 - Inflammatory diseases
 - Infectious diseases
 - Immunological diseases
 - Cancer
- Examples:
 - Liver, Gallbladder, Kidney, Endocrine, Cardiovascular pathologies
 - Lung or ovarian cancer

Integumentary Systems Review

- Observation
 - Erythema (redness); red streaks
 - Scar formation, lesions, wounds, callus, maceration
 - Dry skin, cuts, bruises, rashes, scars, hair follicles, nails
 - Non-healing trauma
 - Drainage
 - Edema/Swelling
- Palpation use dorsum of hand. compare sides.
 - Skin temperature (Fever: > 100°F)
 - Skin turgor
 - Pulses
 - Pitting/non-pitting edema
 - Tissue texture
 - Skin mobility & elasticity

Observation: Skin Changes



Skin lesions

Scleroderma



Autoimmune: inflammation & over production of collagen

Poison Ivy



Contact dermatitis

different forms for arthritis can form rashes.

Changes in the skin and nail beds

- May be first sign of
 - Inflammation
 - Infection
 - Immunologic disorders
 - Organ dysfunction

Information Available From Examination of the Fingernails

- | | |
|--|---------------------------|
| • Overall vitality | • Nutritional status |
| • Inner emotional state | • Cardiovascular function |
| • Cerebral dominance | • Possible malignancy |
| (your dominant thumb nail is usually slightly larger than your nondominant thumb nail) | • Kidney disease |
| • Occupations and hobbies | • Liver disease |
| • Medical history | • Rheumatic conditions |
| | • Dermatologic problems |

Clinical Observation: Nail Beds

Clubbing of nails



Lung, Inflammatory bowel , CV, Liver, disease and AIDS

Yellow Nail Syndrome



Respiratory disease
Primary Lymphedema

Bacterial Infection

should clear up with antibiotics in a few days, if not it could be something else



Lupus Butterfly Rask



- people will be experiencing other symptoms in addition to the integumentary system changes.
- have you had it before? how long have you had it? has the dr checked it out?

Screening Observations

- Changes in skin
 - Cyanosis
 - Jaundice
 - Pallor
 - Skin cancer
- Changes in nails
- Changes in hair
- Change in sweating or dryness of the skin
- Pruritis (itching)

Cyanosis

Peripheral



Central



Leukemia



Source: Kemp WL, Burns DK, Brown TG: Pathology: The Big Picture: www.accessmedicine.com

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Jaundice



Sample Questions

- Skin Lesion
 - Have you noticed this before? When? How long?
 - Has it recently changed in size, shape or color?
 - Have you discussed with your MD?
 - Do you know the cause?
 - Has the rash changed, spread or occurred in other body areas?
 - Alleviate or aggravate the rash?
 - Does the rash itch ? Burn? Feel numb?
 - Have you traveled recently? Where?
 - Any fever, joint pain, fatigue or other new symptoms associated with the rash?
 - Associated with any fever, chills, redness? Cold or recent illness?
 - Recent change in medication?
 - Did you inform your doctor?

Sample Questions

- Swelling
 - When did it start? Where did it start?
 - Has it changed? If yes, explain
 - Better or Worse?
 - 24 hour behavior
 - Is it painful? swelling with venous disease is painful. lymphedema can go either way.
 - Pitting or non-pitting?
 - Any associated skin changes?
 - Any new medications or change in dosage?
 - Associated with fatigue, shortness of breath, abdominal distention?

ABCD of Skin Cancer

- A Asymmetry
 - ½ is different than other half
- B Border Irregularity
 - Edges notched, uneven or blurred
- C Color
 - Uneven; shades of brown, tan, black
- D Diameter
 - > 6 mm

Evolution

Observations

Neoplastic Skin Lesions



FIGURE 5.7 Photographs of skin cancers. (a) Basal cell carcinoma. (b) Squamous cell carcinoma. (c) Melanoma.

Neoplastic Mole



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Observation

Cellulitis

skin infection caused by staff infection becomes life threatening rapidly

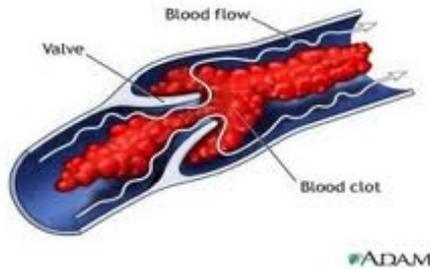
Cellulitis



Blood Clot: DVT

deep venous thrombosis

Anatomy



Platelets form a plug
Chemical reactions grow the clot
Anti-clotting agents
Break down of the clot

Clinic Presentation



Asymptomatic or symptomatic

Venous Insufficiency

Grade I: Spider Veins



CVI Grade II

chronic venous insufficiency



Continuum of Venous Disease

Tortuous Veins



CVI with lymphatic edema and wound



Observations

worst case scenario



Peripheral Edema

- Subjective interview guides the pathologic thought process
- Observations may assist in narrowing down hypothesis list
- Test and measures rule up or down **venous, arterial, lymphatic or systemic** causes or a combination
- Determine if physical therapy is appropriate

Edema

- Defined as :
 - Imbalance in **Starling Law of Equilibrium**
 - Imbalance in filtration and reabsorption rate
 - Results in excess fluid in the interstitial spaces/tissues
- Can be multi-factorial in cause
- Impedes healing regardless of etiology
- Location
 - Localized, unilateral , bilateral, systemic

protein molecules cannot be reabsorbed by venules. need to be absorbed by lymphatic vessels. this process at capillary beds helps prevent peripheral edema. any obstruction/insufficiency in lymph node or vessel will cause pitted edema.

Potential Causes of Peripheral Edema

- Trauma
- Infection
- Venous or Lymphatic pathology
- Wound
- Obstruction of lymph nodes
- Medications
- Organ pathology
 - Liver, Kidney, Cardiac, Pancreas, hormonal imbalances

Subjective Interview: Peripheral Edema

- Onset/ History of trauma
- Any pain? Pain scale? Constant?
- Aggs & Eases? Worse/Better with sitting, walking, elevation
- Socks cause an indentation on your legs?
- Difficulty wearing rings or watches?
- Any weight loss or gain?
- Shortness of breath?
- Difficulty breathing with sleep?
- Any change in medications? New or ↑/↓dosage?
- Any change in diet? Increase salt intake?

Red Flags: Cause for Concern

- Bilateral edema of the hands or feet
- Sudden onset of edema without traumatic event
- Edema that occurs simultaneously with fever, sweats and chills
- Progressive edema
- Distal edema with complaints of shortness of breath either with exertion or at rest
- Calf pain and edema after trauma
- Edematous body part with red streaks
- Edema that is warm or hot and painful to palpation
- Edema involving the face or arm that is present with discoloration of the chest, arm or face, loss of carotid pulses, dysphasia, wheezing, chest pain, headaches, dizziness
- Total body edema or total quadrant edema

Physical Exam

- **After systems review, what test and measures may be performed next?**

Physical Exam

- **Pain scale**
- **ROM**
- **Neurologic testing**
 - DTR, Sensation & Strength
- **Functional tests**
- **Palpation:**
 - Pitting or non-pitting
 - Texture
 - Skin mobility
- **Circumferential measurements**
 - Every 10 cm for LE
 - Every 4 cm for UE
 - Figure 8 for ankle
- **Volumetric measurements of extremity or hand**

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Palpation: Pitting & Fibrosis

time it takes for indentation to return to normal
 fibrotic = more severe. harder.



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Pitting Scale



- Record the time it takes for the pitting to resolve
- Note the quality of the edema
 - Record presence of fibrosis
 - > fibrosis = faster resolution

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Edema - *pitting*

- Caused by
 - CHF
 - Venous insufficiency
 - Lymphedema (as fibrosis develops, pitting is difficult)
 - Dependency
 - Grading scale
 - 0 = absent
 - 1+ = minimal; lasts 10 secs
 - 2+ = moderate; lasts 20 secs
 - 3+ = severe; lasts 30 secs
 - Descriptors
 - Describe: easily pits, some pitting or non-pitting
 - Brawny edema
 - Skin mobility
 - Viscosity
- soft, viscous, hard?



Circumferential Measurements

Circumferential Measurements



Circumferential Measurements



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Measurement Guidelines

- Ensure tape measure is placed perpendicular to the limb/skin
- Consistent "Tautness"
- Tape measure starts with zero or one
- Same patient position & set up



Measurement:

Standardize technique:

Anatomical reference
& distance ^{Taylor 2006}

Thin vs wide tape measure

Perpendicular to the limb

Consistent tension

Intra-rater & inter-rater

reliability > .92-.99 ^{Taylor 2006}

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Calculated volume from circumferential measurements

Summed Truncated Cone

$$V = (h)(C^2 + Cc + c^2)/12\pi$$

The arm is divided into
“segments” with the “h” being
constant either 4 cm or 5 cm or
10 cm...

Each of the segments are
considered a “mini” cone and are
summed to determine the volume

Figure 8 Measurement

- [Youtube hyperlink](#)



Volumetric Water Displacement



USC Faculty Practice

Evidence

- Both circumferential measurement & water displacement are reliable tools
- Both demonstrate good-excellent intra-rater & inter-rater reliability
- Cannot interchange calculated volume and water displacement values
- Water displacement tends to underestimate while CM ^{over}underestimates
 - Deltombe 2007; Sander 2002; Taylor 2006

Pathologies of Major Concern

- Organ dysfunction
 - CHF, liver, kidney
- Pulmonary edema with peripheral edema
- Blood clot

Summary

- Changes in the Integumentary system provide “clues” to other systems that may be pathological or imbalanced.
- Observations and further investigation are key in determining the appropriate course of action
- Peripheral edema affects an individual’s function and quality of life.
- Can be a sign of serious organ pathology.
- Can lead to infection
- Presence of peripheral edema must be investigated.

Questions?

