

Working With Modalities and Basic Rehab CA Mod 6

ELECTRICAL MUSCLE STIMULATION

- The application of electrical current to the surface of the skin
- Types
 - Galvanic stimulation
 - TENS
 - Interferential
 - Combo (US & e-stim)

INTERFERENTIAL STIMULATION

- ◉ Uses interfering electrical currents to regulate blood flow, reduce pain, decrease edema, relieve muscle spasm, strengthen muscle tissue
- ◉ Used to treat: contusions, sprains, strains, etc.
- ◉ Should feel slight vibration

INTERFERENTIAL

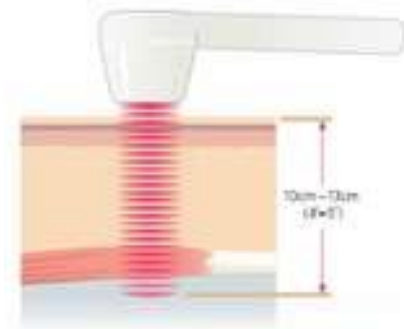
- ◉ Uses 4 electrodes set at a diagonal pattern
- ◉ Covers “larger” area
- ◉ Electrical currents “interfere” with each other to create a bigger surface areas
- ◉ Can be used with heat or cold
- ◉ Treatment time is 10-20 minutes



ULTRASOUND

- ⦿ Thermal or non-thermal modality that stimulates blood flow
 - Continuous or pulsed
- ⦿ Sound waves pass through pizoelectric crystal in sound head to create mechanical energy
- ⦿ Mechanical energy cause vibration of tissue cells which create heat
- ⦿ Heat can reach depth of 3-5 centimeters

ULTRASOUND



ULTRASOUND

○ Application

- Must use a coupling agent
 - Conductive gel, lotion, water
- Keep sound head moving with even pressure over the area being treated
- Area shouldn't be larger than 3-4 inches
- Treatment time 3-8 minutes

ULTRASOUND

◉ Indications for use

- Chronic injuries
- Acute injuries (non-thermal setting)
- Strains
- Sprains
- Tendonitis
- Contusions
- Tight tissue

ULTRASOUND

○ Contraindications for use

- Heart, eyes, ears, brain, spinal cord, genitals
- Epiphyseal plates
- Acute injuries
- Areas with poor circulation
- Stress fractures
- Open wounds
- Infected areas
- Tumors

21st Century Laser Therapy



THERE ARE TWO KINDS OF LASERS

1. **DESTRUCTIVE**

(Hot lasers)

(a) Surgery

(b) Photodynamic
Therapy

2. **CONSTRUCTIVE**

(Cold lasers)

(a) Improvement of
Tissue Repair

(b) Pain Relief

PRECAUTIONS

PRIMARY

CANCER - Avoid tumors

DIRECT IRRADIATION OF THE EYES

THYROID - Strong photoabsorber

SECONDARY

PREGNANCY - Liability is the issue

IMMUNE SUPPRESSANT DRUGS - Liability is the issue

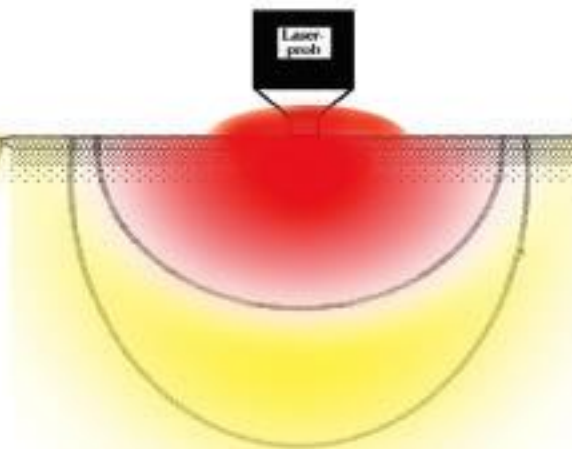
OCCIPITAL NERVE AND TATOO SENSITIVITY - Can feel hot

Treatment Technique

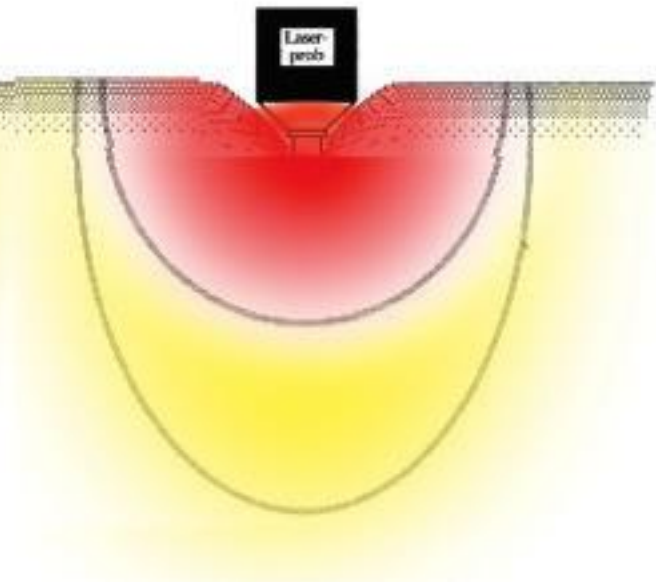
**NON-CONTACT:
DEEP**



**CONTACT:
DEEPER**



**CONTACT WITH
PRESSURE:
DEEPEST**



TYPES OF PATIENTS VS. DOSE

- ◉ Dark skinned: increase time by 50%
- ◉ Lighter skinner: decrease by 50%
- ◉ “Sensitive” types: decrease by 50%
- ◉ Thick mesomorphs: increase time by 50%

TWO DIFFERENT WAYS OF APPLYING LIGHT THERAPY

1. Painting technique
2. Single point technique

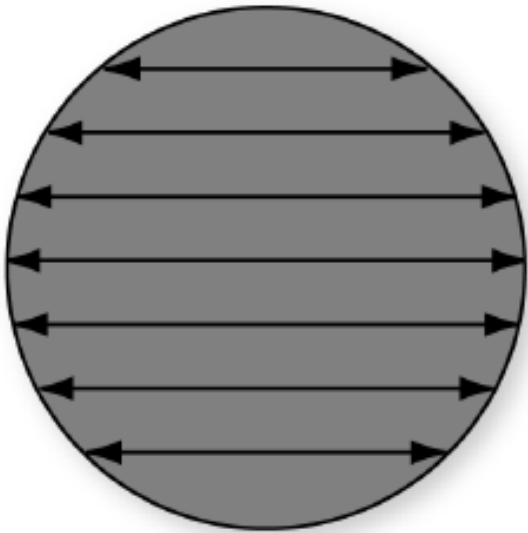
WHY PAINT?

Because:

.....You must stimulate the surrounding tissues that support a damaged region.

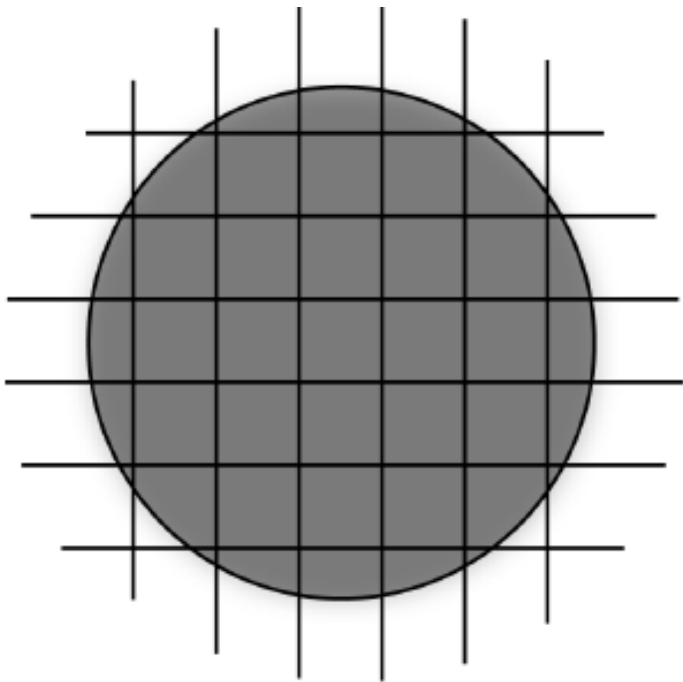


PAINTING TECHNIQUE



- ◉ Half the speed of ultrasound
- ◉ About 1" every 2 seconds
- ◉ Provides more even and superficial absorption
- ◉ Great for general stimulation

POINT TECHNIQUE



- ◉ Use a point probe or cluster
- ◉ The longer you leave the laser on a point, the more photons you send deep into the tissue

NERVE TRACING

- ◉ Trace the nerve from proximal to distal
- ◉ Look for swollen points along nerve
- ◉ Treat all points
- ◉ “Touch up” any point still symptomatic

HERNIATED DISC

- ◉ Treat the disc first
- ◉ Follow the nerve roots laterally
- ◉ Trace trigger points down the limb



LASERS HEAL DISCS



Rats received 830 nm LLLT for 4 weeks.

Discs treated w/ laser →
“remarkable ↑ in disc
regeneration.”

Biomed Sci Instrument 2008;44:34-40

TENS

(TRANSCUTANEOUS ELECTRICAL MUSCLE STIMULATION)

- ◉ Used primarily for pain control
- ◉ Electrodes are placed on skin over painful area to “block” the sensation of chronic or acute pain
- ◉ Cause a muscle contraction
- ◉ Used for 30 minutes to 1 hour treatment time
- ◉ Can be used so patient can exercise without pain

TENS



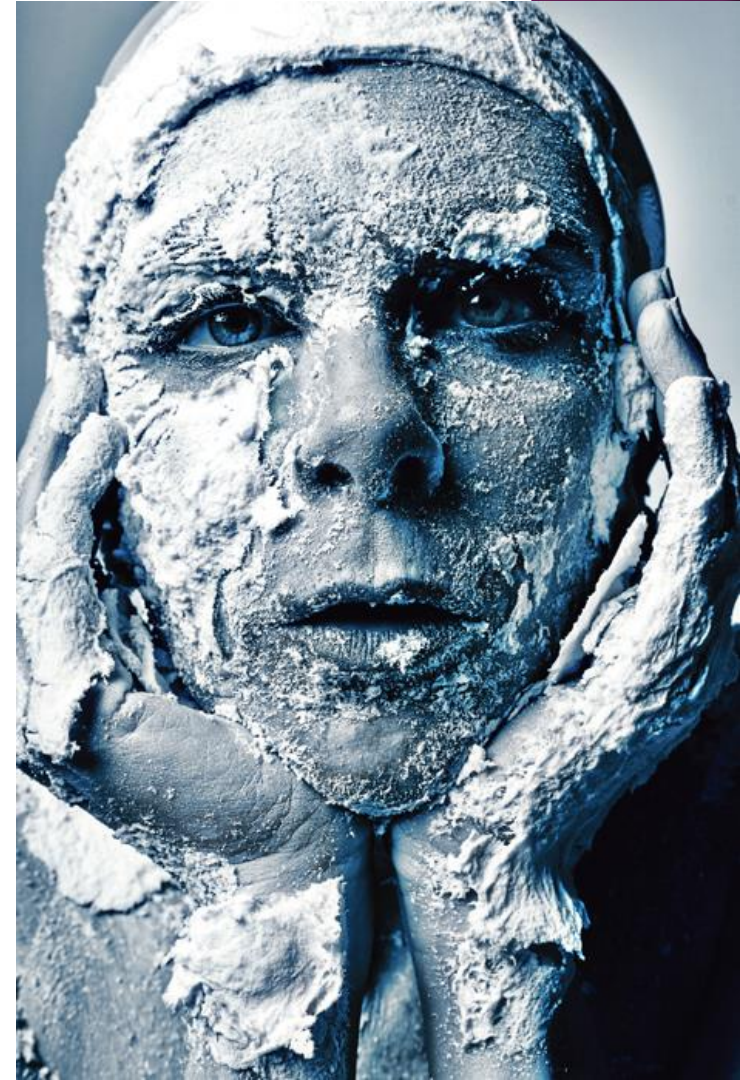
CRYOTHERAPY

○ Indications for use

- Acute injuries
- Pain
- Swelling
- Inflammation
- Preparing for exercise

○ Contraindications for use

- Open wounds
- Cold related allergy
- Areas with sensory or circulatory deficits



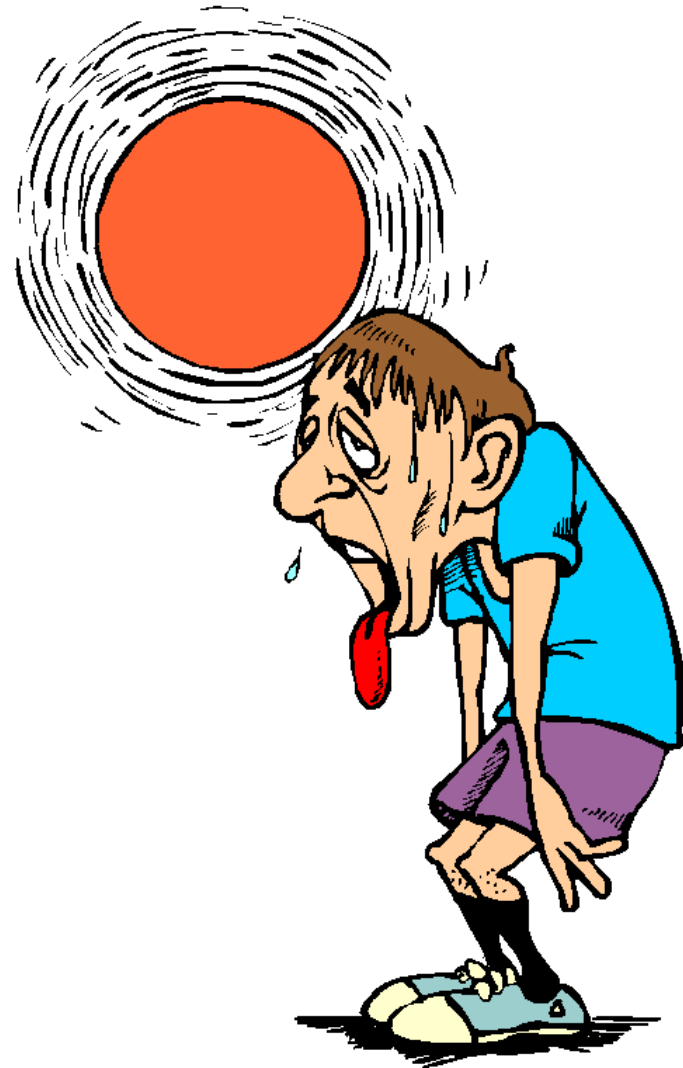
THERMAL MODALITIES

○ Physiological effects

- Increase tissue temperature
- Increase blood flow
- Increase tissue extensibility
- Increase ROM
- Decrease swelling
- Decrease muscle tone

○ Types of heat modalities

- Hydrocollator pack (moist heat) (10-15 minutes)
- Electrical heat pack (15-20 minutes)



HEAT

⦿ Indications for use

- Chronic inflammatory conditions
- Tight tissue—connective, muscle, tendon , ligament
- Chronic pain
- Chronic muscle spasm

⦿ Contraindications for use

- Acute injuries
- Areas with sensory deficits

REHABILITATION



WHEN IS IT TOO MUCH

- Indications that the intensity of the exercise is too great for the healing process includes:
 - Increase in swelling
 - Increase in pain
 - Decrease in ROM or strength
 - Increase in joint laxity of ligament



REASONS FOR IMPLEMENTING REHAB

- ◉ Drs Have to stay ahead of the game
- ◉ Customer demands
- ◉ Better outcomes
- ◉ Offering a “total package”
- ◉ Insurance reimbursements

ROLE OF REHABILITATION:

Helps with the healing process

Normalize ROM “re-establish”

Re -establish ADLs

Strengthen Core

Increases circulation and increases O₂ to tissues

DEVELOPING A REHAB PROGRAM

- ◉ Establish goals
 - Short term
 - Long term—return patient to full activity
- ◉ Execute program (action plan)
- ◉ Reassess as patient progresses through program

PASSIVE RANGE OF MOTION (PROM)

- ◉ Clinical Definition: Therapist moves selected joint(s) through full range of motion with no assistance from the patient



IMPORTANT POINTS ON PASSIVE RANGE OF MOTION

- ◉ Adequately stabilize patients joints as you move them. (some patients may have no active movement)
- ◉ Don't cause pain other than stretching
- ◉ Perform 5-10 motions per joint movement
- ◉ Familiarize yourself with normal directions and degrees of movement for each joint
- ◉ Listen to patient

ACTIVE RANGE OF MOTION (AROM)

- Clinical Definition: Patient moves selected joint(s) through full range of motion with no assistance from the therapist



ACTIVE ASSIST RANGE OF MOTION (AAROM)

- ◉ Clinical Definition: Patient and Therapist moves selected joint(s) through full range of motion with assistance from the patient



ACTIVE RESISTIVE RANGE OF MOTION (ARROM)

- ◉ Clinical Definition: Patient resists Therapist as they move selected joint(s) through full range of motion with resistance from the patient



IN OUR CLINIC

- ◉ Rehab is divided into 2 groups
 - General Exercise (Decompression pts)
 - (stretching, strengthening, gaining of ROM of the functional movers.)
 - Stabilization Exercise (Scoliosis pts)
 - (specific to deep trunk, and postural muscles)

TYPES OF MUSCLE CONTRACTIONS

Isometric: muscle stays at same length during contraction ex: pushing against an immovable object like a wall

Isotonic: muscle length changes during contraction. Biceps curl

Concentric: Muscle shortens during contraction ex: biceps during arm curls

Eccentric: Muscle lengthens during contraction. Ex: quadriceps when going down steps



ISOTONIC VS ISOMETRIC MUSCLES

- ⦿ Isotonic usually done 3x/week
- ⦿ Isometric done daily
- ⦿ Postural muscles are isometric!
- ⦿ After 48 hours the postural muscles loses 50% of its improvement.
- ⦿ After 72 hours it loses 90%
- ⦿ Postural Muscles respond best to Isometric

BEGINNING POST INJURY REHAB

◉ Isometrics

- Performed early in rehab when joint is immobilized
- Used when performing exercises through full ROM may be detrimental
- Increase static strength
- Assist in decreasing amount of atrophy
- Lessen swelling by causing muscle pumping action

RESISTANCE EXERCISE-ISOMETRIC

Contractions developed while the joints remain stationary.

Iso (same) metric (distance)

Generally considered the most intense type of muscle contraction.

Generally used in beginning stages of rehab when Joint ROM is severely diminished.

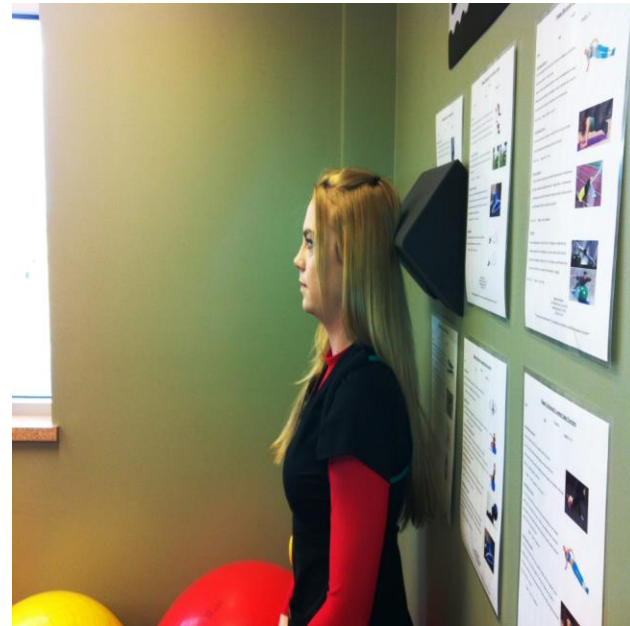
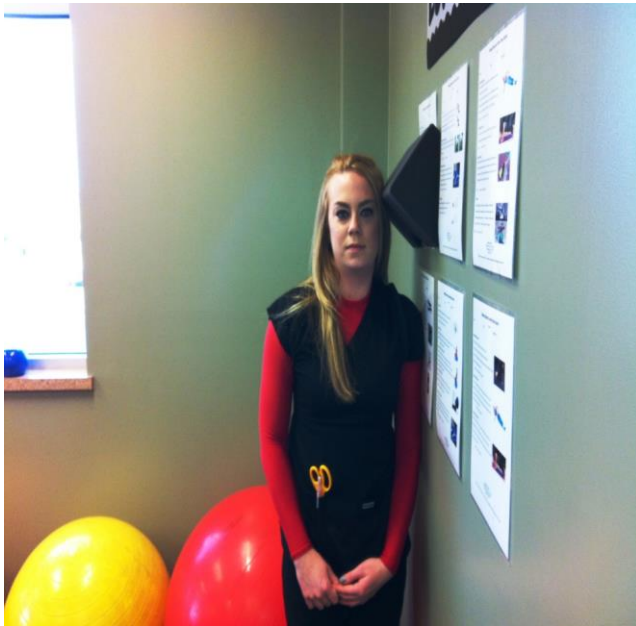
Followed by passive and assistive stretching techniques



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ISOMETRIC



ISOTONIC

- Isotonics (progressive resistance exercises or PRE's)
 - Most commonly used strengthening technique
 - Use free weights, exercise machines, tubing, bands, etc., with fixed weight through ROM
 - Use isotonic muscle contractions
 - Force is generated while the muscle is changing length
 - Use eccentric (lengthening) and concentric (shortening) muscle contractions

RESISTANCE EXERCISE-ISOTONIC

Tension remains unchanged while the muscles length changes.

Consists of two types of contractions, together

Concentric—the “up” contraction when a muscle shortens.

Eccentric-the “down” contraction when a muscle lengthens.

All exercises that require movement will be a form of Isotonic

Incorporated in later stages of rehabilitation



Clinical pearl

Eccentric contractions if overexerted will cause next day soreness in patients.

The soreness is caused by eccentric exercise, that is, exercise consisting of eccentric (lengthening) contractions. Isometric (static) exercise causes much less soreness, and concentric (shortening) exercise causes none.



BALANCE AND PROPRIOCEPTION

Balance/Proprioception: Whole-body stability as regulated by the inner ear and by visual cues.

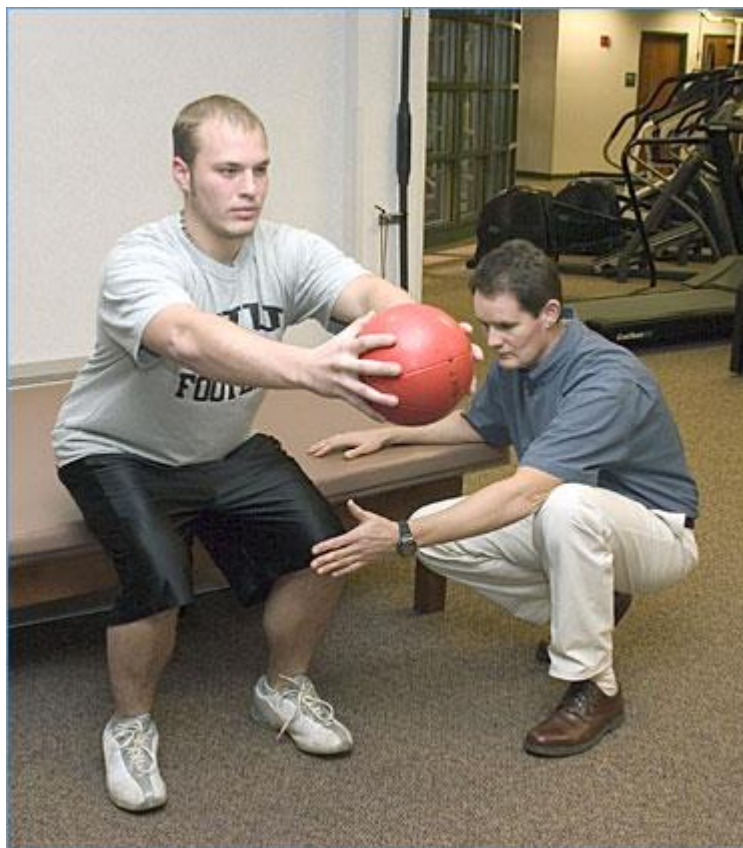
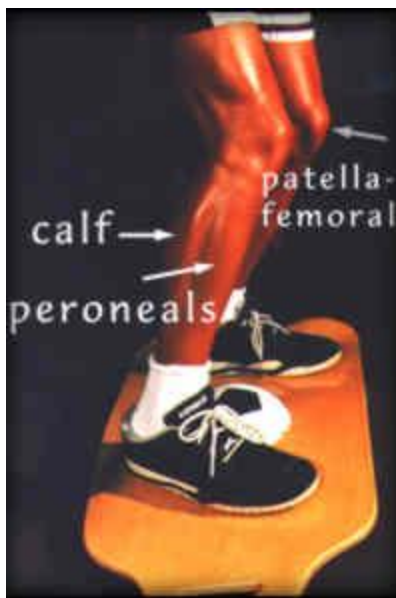
Proprioception: The body's ability to sense the position of its segments and maintain that positioning by making conscious or unconscious neuromuscular adjustments.

Kinesthetic sense development

Balance and proprioceptive sensitivity is reduced immediately following an injury.

These senses often return slowly, and sometimes never fully recover, unless they are specifically trained as part of the post-injury rehabilitation process.

PROPRIOCEPTION AND BALANCE



End Mod 6