

Lecture 4

Therapist Self-Care and Biomechanics

Definition –

Biomechanics-

The study of the mechanical laws relating to the movement or structure of living organisms. The study of the action of external and internal forces on the living body, especially on the skeletal system. The study of the mechanical nature of biological processes, as heart action and muscle movement

Self-care-

The practice of taking action to preserve or improve one's own health

Biomechanics:

- Efficient postural techniques
- Decreases trauma to therapist
- Decreases fatigue
- Decreases injury to joints/repetitive strain
- Career longevity

Biomechanics Guidelines:

- Relaxed Lunge style
- Feet flat
- Knees comfortably bent
- Pressure/stability front leg
- Keep shoulders relaxed
- Be mindful of applicator
- Use your body weight
- Support your applicator
- Wrists neutral
- Avoid hyperextending digits/wrists/knees
- Umbilicus points to work
- Umbilicus behind hands (most techniques)

Avoid straining/torqueing

- Table height
- Use body weight for leverage
- Supportive shoes
- Breathable comfortable clothing
- Warm up
- Mix techniques
- Get behind your work
- Pelvic tilt
- Align spine
- Smooth movements
- Lift correctly
- Breathe

- Hydrate
- well Rested

Therapist Self-Care

Classes:

- Yoga
- Tai Chi
- Stretching
- Strength
- Cardio
- Get Active! For body, and Mind!

Therapy:

- Massage Therapy
- Hydrotherapy

Stretches:

- Pectorals Minor /Major
- Scalenes
- Wrist extensors/flexors
- Exercises:
- Scapular retraction
- Diaphragmatic breathing
- Enough rest
- Eat well
- Healthy lifestyle

Injury Prevention:

Internal-

- Tight/weak musculature
- Fatigue
 - Sprint vs marathon
- Pain
- Duration of activity
- Poor biomechanics

External-

- Terrain
- Shoes
- Table height
 - Diff for diff C's
- What To Look For:
- Fatigue
- Pain
- Mood/behavior changes

Endangerment Sites

- Areas where nerves and blood vessels are located superficially, therefore not being well protected

- *Deep and sustained* pressure in these areas can potentially damage these vessels and nerves
- Kidney area is included because the kidneys are loosely suspended in fat and connective tissue therefore heavy pounding is contraindicated

11 Endangerment Sites

1. Anterior triangle of the neck

- Carotid artery, jugular vein, vagus nerve
- Mandible, SCM, trachea

2. Posterior triangle of the neck

- Brachial plexus, brachiocephalic artery and vein, subclavian artery and vein
- SCM, trap, clavicle

3. Axilla

- Brachial artery, axillary artery and vein, cephalic vein, nn of brachial plexus.

4. Medial Epicondyle of the Humerus

- Ulnar nerve

5. Lateral Epicondyle of the Humerus

- Radial nerve

6. Sternal Notch/Anterior neck

- Vagus nerve, nn's and vessels to the thyroid gland

7. Lateral to umbilicus

- Aorta

8. 12th Rib

- Dorsal aspect, location of kidneys

9. Sciatic Notch

- Sciatic nerve

10. Inguinal triangle/Femoral triangle

- femoral artery and vein, femoral nerve

11. Popliteal Fossa

- popliteal artery and vein, tibial nerve

Palpation

- Def'n
- The placement of the RMT's hands on the C's tissues for assessment purposes
- Process of assessing the body my means of touch
- *Why is it important?*
- Constant evaluation process during treatment
- Used to measure and evaluate effects and results
- **3 common errors made while palpating...**
- Lack of concentration of *what* is being palpated
- Too much movement of palpating fingers
- Using too much pressure

4 T's of Palpation

- Temperature – hot, cold, even
- Texture – smooth, ridges, even vs uneven
- Tenderness – twitching, move/pull away, jumping
- Tone – hypertonic vs hypotonic

How to palpate effectively...

1. Obtain Consent
2. What area is going to be palpated
3. Explanation
4. Tell C to tell you if they experience any P during palpation and where
5. Palpate Bilaterally
6. Start on Unaffected side 1st
7. Compare unaffected side and affected side
8. Use palmar surface of your hands
9. Use broad, light pressure

Look for...

- If the C is showing signs of discomfort
 - Flinching
 - Rapid breathing
 - Sweating
 - Flushing
 - Facial expressions
- If C reacts to pressure of palpation
 - Some will have no problem reporting P
 - Others will have to be asked

Massage Techniques

Stroking: pg 20

- Lightest technique
- Introductory/closing technique
- Temperature differences
- Palmar surface of hand used
- Pressure evenly applied
- Tissue not compressed
- Long or short movements
- Lotion/gel/oil unnecessary
- Performed on skin or through sheets
- **Stroking**: running the entire hand or fingertips over parts of the body to relax the muscles reflexively and help eliminate muscle spasm, improve circulation, or produce a parasympathetic response.

Uses of Stroking:

- Introductory or closing technique
 - Particular body part or whole body
 - Run from head to feet
 - Creates awareness/sense of connection to body
 - Temperature differences
- Palpation of tone unlikely

How to Perform Stroking:

- Palmar surface of hand or fingers
- Pressure equal through surface of hand or fingers

- Applied superficially
- Tissue not compressed, minimum pressure
- Direction centripetal or centrifugal
- Long or short movements
- Lubricant unnecessary
- Applied on broad areas

Can be performed through sheets

Effects of Stroking:

- Soothing technique
- Decreases sympathetic nervous system firing
- Reduces pain perception
- Reflexive effect on circulatory system

Contraindications:

- Uncovered or open contagious skin lesions

Effleurage: pg 21

Derived from the french word "effleurer" meaning,
To glide, stroke, or touch lightly

- Used to spread lotion/oil/gel
- Introduces therapist's touch
- Palpation of tone, texture, and temperature
- Prepares tissue for deeper techniques
- Transitional stroke
- Introductory/closing technique

How to Perform Effleurage :

- Hand with fingers together
- Fingertips, ulnar border
- Conforms to contours of body
- Pressure applied broadly
- Applied smoothly
- Light to moderate depth
- Long stroke, covering length of thorax or limb
- Direction is centripetal
- Return stroke maintains contact without pressure
- Single hand
- Double hand
- Single forearm
- Double forearm
- Supported hand
- Loose fist

Mechanical and Reflexive Effects of Effleurage:

Depends on depth, rate and rhythm of technique

- Less pressure = more reflexive effect
- Deeper pressure = more mechanical effect
- Increases local venous return
- Increases local lymphatic return

- Reduces local edema
- Increases tissue pliability
- Warms tissue/blood to area
- Stimulates peristalsis (abdominal massage)
- Sedative effect (slow, rhythmic)
- Stimulating effect (quick, erratic)similar to Petrissage

Effleurage Contraindications: pg 23

- Contagious lesions
- Open lesions
- Varicose veins
- Distal to areas of infection
- Not repetitively on limbs for those with hypertension, heart disease, varicosities, or edema caused by thrombus
- Sepsis
- Phlebitis
- Very diseased/degenerative kidneys

Careful modifications for:

- Contusions, inflamed tissue
 - Reflex sympathetic dystrophy
 - Hypertension
 - Congestive heart failure
- Coronary by-pass(48 hours)

Petrissage:

Techniques that rhythmically compress and release tissues

- Squeezing
- Stripping
- Wringing
- Picking up
- Skin rolling
- Kneading
- “To knead”
- Used after tissue is warmed up
- Increased focus and pressure
- Key to treatments
- Applied to muscle groups
- Applied to individual muscles
- Applied to part of muscle
- Shorter motions
- Direction is variable
- Pressure can be modified

How to Perform Petrissage:

•Applicators:

- Palm
- Finger pads
- Thenar Eminence

- Ulnar border of forearm
- Knuckles
- Application:**
- Methodical
- Firm
- Slow strokes
- Lift muscles, stretch gently while alternating squeezing and relaxation
- Variable pressure while squeezing
- Contact maintained with tissue
- Performed centripetally
- Wrists at 120 to 130 degree angle
- Extended arm to body at 45°
- Front leg is weight bearing until shifting

Squeezing:

- muscle compressed between palm and fingers or between both palms
 - Gently squeeze muscle
 - pressure applied towards venous flow
 - directed slightly vertically
 - May help relieve muscle spasm
- Perform after Picking up technique

Stripping:

- Thumb, elbow or ulnar border of the hand or fingertips
- Moderate to deep pressure
- Follow contours of muscle
- Distal to proximal
- Pressure applied *with* fiber direction

Wringing:

- Applied smoothly and quickly
- Both hands conform to tissue
- Muscle is firmly picked up with thumb and palm
- Wrung out like wringing a soaked wet sponge
- Alternating hand action contacting tissue
- Thumbs at 90 degree angle to 2nd and 5th digit
- Thumb and thenar eminence pushes tissue towards opposite thumb and thenar eminence
- Tissue bulges as hands pass each other
- Movement is performed transverse across the muscle at 90 degree angle
- Tension is created
- Pressure changes during technique
- Increased pressure when tissue lifted and torqued
- Less pressure at beginning and end of movement
- Use on large muscle groups (i.e. Hamstrings)

Picking up:

- Final stroke after client has been re-draped
- Fingers and thenar eminence
- Palms of the hands
- Grasp muscle in both hands on either side
- Release slowly
- Vertical pressure

Skin rolling:

- Skin lifted between thumb and fingers
- One hand moves laterally to end stroke
- Other hand moves medially to begin stroke
- Overlap slightly
- Gently roll over treated area
- Slow movements for deeper stroke
- Superficially to palpate restrictions
- Performed on deeper structures
- Repeat 3 times
- Monitor client's response to treatment

Kneading:

- Thumb, fingertips, palmar surface or ulnar border of hand/forearm
- Both hands work together
- Move tissue upwards and towards therapist's thigh
- Tissue is compressed down against bone
- Thenar eminence and pisiform of both hands
- Slowly easing off the mass of muscle
- Deliberate slow movement
- Like kneading bread dough
- Thumb, fingertips, palmar surface or ulnar border of hand/forearm
- Short, rhythmical unidirectional or circular movements
- Pressure peaks in the middle of technique
- Deeper pressure needed
- one handed or thumb
- other hand for reinforcement /support

Uses of Petrissage:

- Improvement of circulation
- Reduce inflammation (proximal/distal to injury)

Contraindications:

- Abdominal inflammation (gastro-enteritis or appendicitis)
- Acute inflammation (recent scars, muscle strains,)
- Bone pathologies
- Frail skin

Petrissage Mechanical Effects :

- Muscle fiber separation
- Creates hyperemia flushing fluids at deeper layers than effleurage

- Increases tissue pliability
- May break down inter-fiber and cross fiber adhesions
- Like breaking stones into pebbles

Petrissage Effects :

- Muscle stripping**--treats trigger points in muscle belly
- Skin rolling**--assesses superficial fascial restrictions or trigger points
 - treats trigger points in muscle belly
- Picking up**--may aid in venous and lymphatic flow as it creates a pressure change in deeper tissue
 - may stretch muscle and connective tissue differently than usual stretching

Petrissage:

Mechanical Effects on Circulatory System:

- Drain and refill lymph and venous tissues
- Facilitating fluid flow to heart

Reflex Effects on Circulatory System:

- Increased blood supply (pumping--vasoconstriction-vasodilation)

Toxin removal (Increase **Mechanical Effects on Nervous System:**

- Stimulates receptors
- Elicits an inhibitory reflex

Reflex Effects on Nervous System:

- Interrupts pain cycle
- Triggers changes in venous/arteriole tone vis sympathetic efferent of cellular nutrients

Tapotement:

- French “tapoter” meaning ‘to rap, drum or pat’
- “Percussion”
- Stimulating technique

Application of Tapotement Techniques:

- Percussive
- Rhythmic and rapid
- Pressure applied with both hands alternately
- Fingertips
- Ulnar border of hands
- Full palmar surface of hands
- Fists
- Relaxed wrists***
- Movement originates from wrists
- Elbows tuck close to body
- Hands close to client’s body
- Parallel to muscle fiber
- “C” shaped and relaxed hands
- No lubricant needed
- Appropriate anytime during treatment
- Follow principle of massage Superficial-Deep-Superficial

Tapotement Uses:

- Loosen mucus ---respiratory conditions
- Increases local circulation
- Increases sympathetic nervous system firing
- temporarily increasing muscle tone
- Generalized fatigue
- Cystic Fibrosis

Tapotement Effects:

- Reciprocal inhibition of the antagonist (i.e. Tapotement to quadricep muscle group relaxes the hamstrings)
- Stimulates weak/hypotrophied muscles
- May elicit stretch reflex

Light Techniques:

Pincement—*tissue gently plucked between thumb and fingertips*

Tapping– *tissue is tapped with fingertips*

- Hands springy
- Wrists relaxed
- Applied superficially
- Without force

Light Techniques:**Apply Tapping:**

- Around joints
- Tendons
- Face and hands
- Along spine

Heavy Techniques:**Beating/Pounding/Knuckle Percussion:**

- hand held in loose fist
- tissue struck with ulnar border of fist
- extensor surface of phalanges (rapping knuckles)
- Buttocks/large leg muscles

Hacking –ulnar border of hand

less force -- relaxed hand

more force -- stiff hand

-- upper back/shoulders

Cupping – hand in cupped position

fingers and thumb together

wrists pronated

tissue struck with alternating hands

making audible “clopping” sound

--Thorax

Mechanical Effects:

- Increases venous blood supply
- Increases waste removal via Lymphatic system
- Loosens and softens fibrocystic tissue adhesions

- Loosens mucus (cupping)
- Stimulation (light and short)
- Increases venous/lymph blood flow to superficial vessels of skin

Reflex Effects:

- Hyperemia (vasoconstriction then vasodilation)
- Histamine release
- Reaction response that relaxes muscles
- Localized contraction of muscle fibers (stimulation of motor nerves)
- Temporary analgesic effect (heavy/prolonged tapotement)
- Increases glandular activity
- Enhances effects of cold hydrotherapy

Indications for Tapotement:

- Stimulation of circulation
- Anemia
- Debility where stimulation necessary
- Scar tissue
- Stiff joints
- Stimulation of atrophied muscles
- Stretched muscles/tendons
- Decrease nerve conduction
- Alleviate pain (chronic neuralgia)

Contraindications of Tapotement:

- Bony prominences
- Kidneys
- Abdomen
- Fragile tissue
- Spastic paralysis
- Heavily atrophied(only light tapotement)
- Flaccid muscle tissue (only light tapotement)
- Spasm
- Acute inflammation
- Insomnia