J. Orthopedic Massage

The information in this section comes with permission from *Orthopedic Massage: Theory and Technique*, Second edition, Whitney W. Lowe. It is not necessary to purchase the book.

Blank Page

72a Orthopedic Massage: Introduction

Massage therapy Manual and scientific manipulation of the soft tissues of the body for the purpose of establishing and maintaining good health and promoting wellness.

Modality definitions

Swedish massage Massage that includes effleurage, petrissage, friction, compression, tapotement, and vibration. Father of Swedish is Pehr H. Ling. Johann Mezger made Swedish a fundamental component of physical rehabilitation and introduced French terminology into the massage profession.

Deep tissue massage Soft tissue work usually employing more pressure and slower work into problem areas. May include trigger points, cross-fiber friction, myofascial release, facilitated stretches, active release techniques, and Deep Massage the Lauterstein Method (without the energetic intent).

Sports massage Massage on athletes that focuses on increasing athletic performance by restoring range of motion, speeding recovery from exertion, and facilitating repair of damaged tissues.

Orthopedic massage Organized and effective approach for treating pain and injuries affecting tissues of the musculoskeletal (locomotor) system.

Deep Massage The Lauterstein Method A unique soft tissue therapy which works consciously and simultaneously to enhance energy flow as well as structural integrity. Deep Massage combines myofascial and neurological release.

72a Orthopedic Massage: Introduction

Lowe: Foreword by Leon Chaitow

Levels of healthcare in massage therapy

1. **Wellness massage** Massage that focuses on relaxation, stress reduction and prevention. Includes Swedish among others.

2. **Clinical massage** Massage that addresses dysfunctions and improves performance. Includes the use of Swedish, Deep Tissue, Sports, Orthopedic, and Deep Massage the Lauterstein Method among others.

3. **Integrative massage**
    - Helps the client feel integrated in terms of structure and energy
    - Therapist integrates multiple modalities based on the client interview
    - Includes Swedish, Deep tissue, Sports, Orthopedic, and Deep Massage the Lauterstein Method among others.

Characteristics of wellness (non-specific) massage

- Aims to achieve relaxation and promote wellness
- Is non-invasive and almost totally safe
- Has very few contraindications
- Produces consistently beneficial outcomes

72a Orthopedic Massage: Introduction

Lowe: Foreword by Leon Chaitow

Overview of orthopedic intervention strategies

- **Cryotherapy** External therapeutic application of cold that decreases sensory input, reduces inflammation, and slows local tissue metabolism.

- **Thermotherapy** External therapeutic application of heat that is generally soothing and can enhance relaxation and decrease sensory activity of the nervous system.

- **Myofascial release** Tangential force applied to the fascia without moving the treatment hands. Hold this until the client reports or the therapist feels a subtle sensation of tissue release.

- **Muscle energy technique (AKA: MET)** A class of soft-tissue manipulation methods that incorporate precisely directed and controlled, client initiated, isometric and/or isotonic contractions, designed to improve musculoskeletal function and reduce pain.

- **Trigger point deactivation** Sustained compression applied to a hyper-irritable spot in skeletal muscle for 8-10 seconds using melting.

- **Reduction of fibrosis** Reducing the bulk and realigning the fiber direction of scar tissue formed in response to tissue damage.

- **Enhancement of lymphatic and venous drainage**

- **Stretches and joint mobilizations**

72a Orthopedic Massage: Introduction

Lowe: Foreword by Leon Chaitow

Dysfunctions treated by orthopedic massage

- Trauma
- Over-use
- Chronic or acute pain
- Post-surgical care

Requirements of an orthopedic massage treatment

- Cautions and Contraindications
  - Pathology
  - Inflammation
  - Severe pain

- Comprehensive, validated, and systematic approach

- Assessment and treatment of musculoskeletal (locomotor) pain or injury

- Safety ("First, do no harm", this is more important than effectiveness)

- Enhancement of self-regulatory mechanisms of the body

- Reduction of the adaptive load
  - Biomechanical
  - Biochemical
  - Psychosocial

72a Orthopedic Massage: Introduction

Lowe: Foreword by Leon Chaitow

Load

Biomechanical load Contribution of mechanical forces in the body such as pressure, friction, and shear. This can happen as a result of exercise, weight change, traumatic injuries, and manual therapies.

Adaptive load Altered load due to a variety of stressors such as overuse or traumatic injury.

Attributes or components of manually applied loading

- Degree of force employed (light, medium, firm, etc.)
- Direction of force applied (longitudinally, cross-fiber, etc.)
- Constant or intermittent application of force (sustained or alternating)
- Duration of the application of force (brief, lengthy, pulsating)
- Rate at which the force is applied (rapidly, slowly, variably, harmonically)
- Active or passive role of the receiver (joint movement by therapist or client)
- Tissues involved (muscle, fascia, scar tissue, joint, etc.)
- Properties of tissues involved (muscles broaden when they contract, etc.)
- Stage of dysfunction of tissues involved (acute, chronic, sub-acute, etc.)
- Massage therapist's intent (reduce tension in superficial fascia, stimulate fibroblasts, etc.)

72a Orthopedic Massage: Introduction

Lowe: Chapter 1 - Introduction to Orthopedic Principles

Reasons to learn to address orthopedic (musculoskeletal) conditions

- They are the 2nd most common reason for doctor visits
- Repetitive stress injuries account for 56% of occupational injuries
- Recreation and daily activities result in many soft-tissue injuries
- 60% of visits to massage therapists are for musculoskeletal conditions
- Soft-tissue therapies are effective and affordable options

The 4 components of orthopedic massage

1. Orthopedic assessment
2. Matching injury physiology with physiological effects of treatment
3. Treatment adaptability
4. Rehabilitation protocol

72a Orthopedic Massage: Introduction

Lowe: Chapter 1 - Introduction to Orthopedic Principles

1. Orthopedic assessment

What is the difference between assessment and diagnosis?

- **Assessment** The systematic and ongoing process of gathering information to make informed decisions about treatment, and to track progress.

- **Diagnosis** The identification and labeling of a disease, illness, or condition made by a licensed medical professional.

Note: You may discuss the tissues that you believe are involved and how, but never tell a client that they have a specific condition.

Information gained using orthopedic assessment

- Tissues involved (muscle, fascia, ligament, etc.)
- Type of tissue dysfunction (tear, hypertonicity, trigger point, etc.)
- Biomechanical forces involved (compression, tension, shear)
- Pain levels and symptoms (on a scale of 1-10, 10 being the most painful)
- Appropriateness of massage for the client (contraindications, cautions, goals)

Five basic tools of assessment

- History
- Observation
- Palpation
- Range of motion and resistance testing
- Special tests

72a Orthopedic Massage: Introduction

Lowe: Chapter 1 - Introduction to Orthopedic Principles

2. Matching injury physiology with physiological effects of treatment

What is required to match techniques to an injury?

- Understanding how a technique interacts with tissues

  Example: Deep transverse friction stimulates fibroblasts produce collagen or cartilage used to repair tissue

- Treatment choices should address the nature of the pain or injury

  Example: Deactivating trigger points in the low back to reduce pain

- Using assessment and clinical reasoning to choose and adapt treatment methods or techniques on a case-by-case basis.

  Example: Releasing the superficial fascia first to allow access to deeper tissues.

What's an example of matching the treatment to the injury?

- Transverse friction of the transverse carpal ligament can be effective for relieving the entrapment of the median nerve found in carpal tunnel syndrome, but it would significantly exacerbate the symptoms.

- A treatment for carpal tunnel syndrome that matches the physiology of the injury would be deep longitudinal stripping to the wrist flexor muscle group. This decreases the accumulated tension in the muscle tendon units, which results in reduction of tenosynovitis that is aggravating the median nerve.

72a Orthopedic Massage: Introduction

Lowe: Chapter 1 - Introduction to Orthopedic Principles

3. Treatment adaptability

What does treatment adaptability in orthopedic massage mean?

- Skill and experience with commonly used techniques
  Example: Confidence and effectiveness with Swedish massage

- Not choosing a technique just because it is highly specialized or fancy
  Example: "I'm going to use this fancy new technique on all of my clients."

- Clinical reasoning to adapt treatment when it's not working

What is an example of treatment adaptability?

- What seems like an obvious case of carpal tunnel syndrome may not respond to a standard treatment protocol.

- Instead of the median nerve being compressed in the carpal tunnel, the brachial plexus may be compressed between the anterior and middle scalene muscles.

72a Orthopedic Massage: Introduction

Lowe: Chapter 1 - Introduction to Orthopedic Principles

4. Rehabilitation protocol

Rehabilitation protocol Course of injury management to support recovery.

4 steps of the rehabilitation protocol

1. **Normalize soft-tissue dysfunction**
    - Apply knowledge of soft-tissue anatomy and physiology
    - Use massage, cryotherapy, and thermotherapy
    - Sometimes employ stretches and joint mobilizations

2. **Improve flexibility**
    - Joint mobilizations
    - Stretching

3. **Restore proper movement patterns**
    - Injury can result in dysfunctional compensating neuromuscular patterns.
    - This results in protective muscle spasms or biomechanical imbalance.
    - Restoring proper movement patterns usually follows normalization of soft-tissue and improvement of flexibility.
    - Postural corrections need to be repeated regularly and frequently.

4. **Strengthening and conditioning**
    - Exercise should not be introduced until the first 3 steps are accomplished.
    - It may be necessary to work alongside a health care professional licensed to provide supervised exercise programs.

72a Orthopedic Massage: Introduction

Lowe: Chapter 2 - Understanding Soft-Tissue Injuries

Tissues addressed using Orthopedic Massage

- Muscle, tendon, joint capsule, ligament, fascia, and cartilage

Muscle dysfunction

Hypertonicity Greater than normal tone in resting muscle. Causes:

- Increased rate of contraction stimulus
- Mechanical stress from postural distortion
- Chemical stress, such as excessive caffeine
- Psychological stress

Trigger points Localized areas of hyperirritability. Painful when compressed and can give rise to characteristic referred pain, referred tenderness, and motor dysfunction. Causes:

- Repetition of any activity
- Direct trauma
- Disease and disorders
- Stress and fatigue

Atrophy Wasting away of or reduction in the mass of tissue. Causes:

- Disuse
- **Denervation** Deprived of nerve supply.

Strain Tearing of a muscle and/or tendon. Muscles that cross more than one joint are most susceptible to strain. Cause:

- Excessive tensile stress usually during eccentric contraction

Contusion Mechanical injury to muscle fibers and their neurovascular supply resulting in hemorrhage beneath unbroken skin (bruise). Cause:

- Trauma

72a Orthopedic Massage: Introduction

Lowe: Chapter 2 - Understanding Soft-Tissue Injuries

Tendon dysfunction

Tendinosis Degeneration and break down of collagen in the tendon fibers. Results in chronic pain and significant loss of tensile strength in tendon. Inflammation is usually not present. Cause:

- Repetitive mechanical load

Tenosynovitis Inflammation between a tendon and its tendon sheath. Results in rough spots on the tendon surface leading to the development of fibrous adhesion and possibly crepitus. Causes:

- Chronic overloading
- Excess friction

Adhesion The joining or uniting of two surfaces. Layers of connective tissue may adhere, which limits movement and increases the risk of injury. Causes:

- Trauma
- Disuse

Crepitus Crackling sound resembling the noise heard when rubbing hair between the fingers. In joints this can indicate worn cartilage or tendon. Causes:

Joint capsule dysfunction

Tears to the outer supporting ligamentous structure. Causes:

- Joint dislocation
- Significant joint stress

Fibrous adhesion of the capsule to itself similar to adhesive capsulitis.

72a Orthopedic Massage: Introduction

Lowe: Chapter 2 - Understanding Soft-Tissue Injuries

Ligament dysfunction

Sprain Ligament fiber damage that results in a tear or permanent elongation.

Types:

- **Plastic deformation** Permanent change in ligament length due to stretching it past its initial level of pliability. Results in joint instability and hypermobility.

- **Torn ligament** Complete or partial tear in a ligament due to a sudden tensile load that exceeds plastic deformation.

Fascia dysfunction

Fascial tearing or perforation (series of holes). Cause:

- Extreme tensile stress

Fascial shortening. Cause:

- Prolonged periods of shortened fascia

Nerve tissue dysfunction

Radiculopathy Nerve pathology that occurs at the nerve root. Example:

- **Herniated disc** Intervertebral disc pressing on the nerve root.

Peripheral neuropathy Damage to peripheral nerves. Examples:

- Thoracic outlet syndrome
- Carpal tunnel syndrome

Cartilage dysfunction

Compressive stress Results in a breakdown of the tissues. Cause:

- Heavy loads over long periods of time.

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Why use thermal modalities as treatment aids?

- Increase circulation
- Increase soft-tissue extensibility
- Increase or decrease local tissue metabolic rate
- Decrease inflammation
- Manage pain

Understanding Pain

Primary source of pain is soft-tissues due to their extensive innervations.

Pain Unpleasant sensory and emotional experience due to actual or possible damage to tissues. Pain slows down the healing process.

Acute pain Pain that occurs as an immediate result of a causative event such as an injury, and resolves within a relatively short period of time (generally less than 3-6 months).

Chronic pain Pain that continues past what would be considered the normal time period for healing of a particular condition (generally longer than 3-6 months). It causes increased muscle hypertonicity which causes further pain and biomechanical dysfunction.

Referred pain Pain that is experienced in a location different from the site of dysfunction.

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Understanding Pain, continued

Primary causes of soft-tissue pain

- Musculoskeletal (locomotor) dysfunction
- Inflammation or neurological excitation caused by:
  - Injury
  - Trauma
  - Degenerative diseases

Nociceptors (AKA: free nerve endings) Sensory receptors that detect stress (mechanical, chemical, and thermal) that could cause body damage and report it to the central nervous system where it is interpreted as pain.

Pain levels

- More nociceptors in a soft-tissue means more potential for pain
- Fewer nociceptors in a soft-tissue means less potential for pain
- Muscles and joint capsules have a relatively high number of nociceptors
- Vertebral discs have very few nociceptors

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Understanding Pain, continued

Pain signal transmission

- Pain signals are transmitted along small diameter afferent fibers
- Smaller diameter means slower transmission speed than non-pain receptors such as mechanoreceptors or proprioceptors
- Two types of fibers:
  - A-delta fibers (myelinated, faster transmission, sharp pain)
  - C fibers (unmyelinated, slower transmission, dull and longer-lasting pain)

Gate control theory Only a limited amount of sensory information can make it through to the central nervous system. This limitation keeps the body from being overwhelmed with the massive amount of sensory information that it processes.

- Thermal modalities produce strong sensory impulses that are faster than the pain signals
- They are sent using A-delta and C fibers
- They arrive at the central nervous system before the pain signals
- This reduces the amount of pain experienced

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Heat Transfer

Thermodynamics

- Production of heat or cold is the result of movement of heat from a warmer object to a colder object. Heat is transferred in an attempt to reach equilibrium.

Four methods of heat transfer

1. **Conduction** Transfer of heat between two objects that are touching.
   Examples: hot and cold packs in contact with the skin.

2. **Convection** Transfer of heat through a medium moving between two objects. The constant movement of the heated medium (water or air) allows quicker and more efficient heat transfer.
   Examples: Jacuzzi tubs or foot baths of moving water.

3. **Radiation** Transfer of heat through the movement of electromagnetic energy through space using thermal radiation.
   Examples: infrared heat lamps and saunas.

4. **Conversion** Transfer of heat by transforming non-thermal energy into heat. Not within the scope of practice for massage therapists.
   Examples: ultrasound diathermy and pulsed short–wave diathermy

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Heat Applications

Thermotherapy External therapeutic application of heat that is generally soothing and can enhance relaxation and decrease sensory activity of the nervous system.

Localized thermotherapy applications

- Heat transfer by conduction reaches a depth of 1 cm below the skin
- Closely and frequently monitor the client's response to prevent burns
- Applications of heat should be no longer than 15-20 minutes
- Effects come from neurological reactions (see gate control theory), not an increase in the temperature in the deep tissues

Dry heating pad

- Heating pad, usually electric, with different heat settings
- Common and convenient
- Less effective due to the lack of moisture

Moist heat pack

- Cloth packs of silica gel
- Various shapes and sizes
- Heated by submerging them in hot water
- One of the most effective superficial heat applications
- The moisture improves conduction
- Layers of towel between the hot pack and the skin regulate the temperature
- Additional layers of towel on top conserve the heat of the pack

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Localized thermotherapy applications, continued

Microwavable heat bags and pillows

- Heating pad that usually contains buckwheat or rice
- Handy for specific local applications and keeping clients warm
- Can be used with a moist washcloth for moist heat effect

Heating chemical gel packs

- Packs that contain a chemical compound that gets hot
- Some can be heated in the microwave
- Designed to fit in a certain region of the body
- May have Velcro or straps to hold them in place
- Commercially popular and convenient

Hot stones

- Stones heated in water-filled tubs then placed directly on tissues
- Primarily in spa environments, but can be a soft-tissue manipulation tool
- The density of the stone retains heat longer than other heat modalities
- Frequently check in with the client for comfort levels and to avoid burns

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Localized thermotherapy applications, continued

Paraffin

- A local heat treatment. Dipping a hand or foot into the melted paraffin
- The paraffin insulates the applied heat
- Wrapping the area in a towel or plastic wrap helps to prolong the heat application
- Helpful to apply heat to areas that are harder to reach due to their shape
- Test the paraffin temperature on yourself before applying it to the client

Whirlpool

- Tub of heated swirling water
- Efficient heat transfer due to continual movement of the water (convection)
- Effective localized moist heat application for distal limb injuries

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Heat Applications, continued

Whole-body thermotherapy applications

- The method of heat transfer is conduction or convection
- Effectively enhance circulation throughout the whole body
- Effects come from neurological reactions (see gate control theory), not an increase in the temperature in the deep tissues

Whirlpool

- Tub of heated swirling water stimulates circulation and reduces pain
- Efficient heat transfer due to continual movement of the water (convection)
- Hot tubs and whirlpool baths accomplish the same effects

Steam room

- Steam delivers moist heat across the body (convection)
- High humidity prevents cooling by evaporation making it easy to overheat

Sauna

- Static source of dry heat radiating from a wood fire or electrical element
- This method is preferable when the goal is to flush the body of toxins through sweating

Heat Applications, continued

Diathermy in the rehabilitation clinic

Diathermy Electrically induced heat using high-frequency electromagnetic currents. Three applications used in physical and occupational therapies are ultrasound, short-wave, and microwave.

Ultrasound (AKA: continuous wave ultrasound)

- A clinic with other health care practitioners may give access to this heat modality that is outside the scope of practice for massage therapists
- Most effective way to heat the deep tissues
- Transmission of high frequency sound waves into the body through a device
- Various tissues in the body absorb the ultrasonic energy at different rates
- The denser the tissue, the faster it absorbs ultrasound energy
- Very effective for heating dense and deep tissues connected to bone such as ligaments and joint capsules

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Heat Benefits

Increased local circulation

- Improves ischemia in hypertonic muscles
- Due to a reflex vasodilation and reduced blood viscosity
- Improves injury healing by better circulation of repair materials, nutrients, and waste products

Increased lymphatic fluid movement

- Improves removal of damaged cellular tissue debris due to injury

Increased connective tissue pliability, extensibility, and elasticity

- Due to increased temperature in superficial muscles and connective tissues

Decreased muscle tightness

- Due to reduced firing rate of muscle spindle cells
- May also be due to increased firing rate in Golgi tendon organs

Increased velocity of nerve conduction

- Improves coordination in muscular activities
- Improves biomechanical function

Increased pain threshold

- Due to the gate control theory, faster sensory nerve impulses arrive at the CNS before pain impulses, thus" beating them through the gate"
- Improves hypertonicity and spasm

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Precautions and Contraindications for Heat

Acute injury or inflammation

- Due to faster metabolic processes and inflammatory response
- 72 hours after an injury, heat modalities are safer to use
- Contraindicated for rheumatoid arthritis as it causes damage

Hemorrhage (recent or potential)

- Due to increased circulation and reduced viscosity of the blood

Edema Due to an increase in movement of fluid to an already swollen area

Impaired sensation or mental ability Due to inability to perceive excessive heat

Damaging temperatures

- Especially with moist heat applications, test it on yourself first

Thrombophlebitis Clots in the superficial leg veins.

- Increased circulation and blood viscosity can dislodge a clot
- Ask your client if they have any known clots

Malignant tumors Regional contraindication: may encourage tumor growth

Pregnancy

- Due to an increase in the temperature of the fetus
- Contraindication: therapeutic ultrasound directed at the fetus
- Contraindication: hot water immersion longer than 15 minutes

Broken or irritated skin

- Local contraindication: increases the chance of infection transmission

Topical analgesics

- Heat applied over menthol or capsaicin may cause a burn

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Cold Applications

Cryotherapy External therapeutic application of cold that decreases sensory input, reduces inflammation and slows local tissue metabolism.

Cold Modalities

- Cryotherapy is impractical for deep anatomical structures because there are no deep, penetrating cold modalities like there are in thermotherapy
- All cryotherapy modalities are superficial, affecting about 1 cm below the skin
- Monitoring cryotherapy for tissue damage is just as important as with thermotherapy

Cold pack

- A plastic or rubber bag that holds ice cubes, crushed ice, or ice immersed in water
- The pliability of the bag allows the application to mold to the shape of the body
- The thickness of the bag is an insulator that prevents tissue damage
- Repeated 10 minute applications generate the best tissue change and avoid adverse effects

Cold Modalities, continued

Cooling chemical gel pack

- Contains a chemical compound that gets very cold when frozen
- Use a freezer to prepare the gel pack
- Designed to fit in a certain region of the body
- May have Velcro or straps to hold them in place
- Application time is about 20 minutes
- Monitor the client closely because gel packs can be below freezing
- Commercially popular and convenient, but less effective than a cold pack

Ice massage

- Ice formed in a shape that is easy to handle
- Common preparation uses a water frozen in a paper cup
- Peeling away the top of the cup allows the exposed ice to be applied
- The cup provides an insulated handle for the therapist
- Combines cryotherapy and soft-tissue manipulation (deep transverse friction)
- Effects are faster and more effective than either cold packs or chemical gel packs
- Rub the ice over the target area until the 4 stages of cryotherapy have been achieved
- Applications are no longer than 5 minutes

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Cold Modalities, continued

Cold immersion

- Effective for regions such as distal extremities
- Submerge the extremity in ice water
- Applications are no longer than 5 minutes
- Closely monitor the client to avoid tissue damage
- Caution: ice immersion on distal extremities with poor circulation can cause tissue damage
- If performed with circulating water such as a whirlpool, adjust the water temperature so that it is not too cold for the length of the treatment
- One of the most effective methods of cryotherapy application

Vapo-coolant spray

- Flouri-methane and other substances are kept in pressurized bottles
- When sprayed in the skin, the liquids evaporate rapidly, causing the underlying tissues to be chilled
- Less popular due to their link to environmental damage such as ozone depletion

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Four Stages of Cryotherapy Treatment

1. Strong sensation of cold
2. Burning sensations in the skin
3. Deep aching sensations
4. Numbness
    - End the cryotherapy application when this stage is achieved
    - This is the goal of most cryotherapy applications
    - Continued use beyond this stage can lead to frostbite or nerve damage

Cold Benefits

Decreased local tissue metabolism

- A primary benefit of cryotherapy, especially for acute injuries
- Decreased metabolic activity at an injury site shortens recovery time
- Cryotherapy on an injury site is more effective when combined with compression

Limited spread of cold beyond the treated area

- Vasoconstriction of blood vessels prevents the spread of cold to other areas

Decreased edema

- Edema around an acute injury is the primary cause of pain
- Cold triggers vasoconstriction and reduces blood viscosity and capillary permeability resulting in less fluid movement to the injured area
- Cold also reduces the heat of inflammation
- Chronic edema due to poor circulation or immobility benefits more from thermotherapy

Cold Benefits, continued

Decreased nerve conduction velocity and pain

- Cryotherapy slows the transmission rate of peripheral nerve impulses
- Slower motor signal transmission results in lack of muscular coordination
- Slower sensory signal transmission reduces pain from injury and can break the pain-spasm-pain cycle
- Application times of 20 minutes or longer result in up to 30 minutes of pain reduction

Decreased stretch reflex

- Muscle spindle cell activity is reduced by cryotherapy
- Most useful for reducing tension due to acute muscle spasm
- Beware, cryotherapy will also reduce connective tissue pliability which will hinder muscle stretching

Reduction in muscle soreness

- Very helpful to reduce soreness due to certain methods of soft-tissue manipulation and DOMS
- **Delayed onset muscle soreness (AKA: DOMS)** Muscle soreness associated with unaccustomed exercise.

Decreased muscle tightness

- Pain-spasm-pain cycle can be broken by cryotherapy reducing nerve conduction velocity resulting in spasm reduction

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Precautions and contraindications for cold

Broken or irritated skin Local contraindication due to a risk of infection

Cold intolerance or cold allergy

- Caution: monitor all clients closely so that hives or rash resulting from cryotherapy allergy or intolerance may be detected and the treatment can be terminated

Raynaud's disease Arterial spasm (abnormal vasoconstriction)

Conditions of circulatory compromise

- May aggravate conditions that involve an undesirable reduction in circulation

Decreased connective tissue pliability

- When stretching is desirable, other benefits of cryotherapy may not outweigh a decrease in pliability

Over regions where nerves are superficial

- If the nerve is too close to the surface, it may be damaged
- Commonly the ulnar nerve on the posterior elbow
- Also commonly the peroneal nerve near the head of the fibula

Impaired sensation

- An inability of the receiver to perceive excessive cold

Impaired mental ability

- A receiver without full and normally functioning cognitive powers might not be able to determine if there is an excess of temperature applied to the body
- Impaired mental ability can result from genetic disorders, trauma, disease, medications, or other substances they may have taken.

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Contrast treatments

- Alternating thermotherapy and cryotherapy
- While contrast treatments do not produce significant tissue temperature fluctuations, they are still valuable for their neurological effects
- For every 3 minutes of heat, there should be 1 minute of cold

Topical analgesics as thermal agents

- **Analgesic** Substance or agent that relieves pain without a loss of consciousness.
- **Oral analgesic examples** Aspirin, ibuprofen, sodium naproxen.
- **Topical analgesic** Substance placed or rubbed directly on the skin in order to relieve pain.
- Topical analgesics are not true thermotherapy, but there are therapeutic benefits in certain conditions
- **Rubefacient** Agent that reddens the skin by producing active or passive hyperemia.

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Topical analgesics as thermal agents, continued

Categories of rubefacients used as topical analgesics

Counterirritants Agents that produce a superficial irritation in one part of the body that is intended to relieve irritation in another part.

- Most topical analgesics are counterirritants
- Cause a chemical stimulation of thermal receptors
- ArthriCare, Eucalyptamint, Atomic Balm, Icy Hot, Prossage Heat, Tiger Balm, Nature's Chemist, Biofreeze, and Therapeutic Mineral Ice

Salicylates Group of compounds derived from salicylic acids. Contain similar pharmacological agents to aspirin.

- Inhibit prostaglandin (local hormones) synthesis
- Reduce inflammatory activity
- Aid in fever reduction and pain management
- Less beneficial in severe or chronic situations
- Aspercreme, Ben Gay, Flexall, Mobisyl, Sportscreme

Capsaicin

- Active ingredient in cayenne pepper
- When applied to the skin or mucous membranes, there is an alkaloid irritation that produces pain-relieving sensations
- Initial binding to the nociceptors produces a burning sensation
- After the initial burning sensation, up to 2 weeks, there is some desensitization that leads to analgesic effects
- Zostrix, Zoxtrix HP, Capzaisin-P
- Wear gloves and don't apply thermotherapy over areas treated with capsaicin

72a Orthopedic Massage: Introduction

Lowe: Chapter 3 - Thermal Modalities as Treatment Aids

Topical analgesics as thermal agents, continued

Therapeutic effects of topical analgesics

Neurological

- The most significant benefit derived from topical analgesics
- Reduction of pain and muscular tension
- DOES NOT change tissue pliability or nerve conduction velocity

Circulatory

- Superficial and local vasodilation leading to hyperemia
- DOES NOT increase circulation beyond the area of application

Thermal

- DOES NOT raise the temperature of the tissues enough to be therapeutically relevant
- A tissue temperature of 104°F to 113°F is required to derive the thermal benefits of thermotherapy

Precautions using topical analgesics

- Topical analgesics WILL NOT make deeper tissues more pliable
- Topical analgesics CANNOT substitute for proper tissue warming
- Application of topical analgesics with a cold sensation WILL NOT reduce inflammation to an acute injury. It will instead increase circulation to the injury site.
- Burns can result from applying thermotherapy to an area where a topical analgesic has been applied.

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 4 - Introduction to Specific Massage Techniques

Massage Techniques

Effleurage Gliding parallel to the primary fiber direction using a hand molded to the area.

- Spread lubricant
- Warm tissues
- Enhance tissue fluid movement
- Reduce muscular tension

Wringing Superficial cross fiber gliding.

- Encourages tissue fluid flow
- Warms soft-tissues
- Enhances pliability
- Reduces muscular tension

Fulling/Compression broadening Compression combined with cross-fiber gliding.

- Reduces adhesions between muscle fibers
- Enhances myofascial elasticity and pliability

Deep transverse friction (AKA: deep cross-fiber friction) Moving one tissue over another.

- Breaks the cross linking bonds of fibrous scar tissue that have bound adjacent muscle, tendon, or ligament fibers together
- Stimulates fibroblast activity in degenerated tissues
- Treat the target area multiple times during a session
- Each time use moderate to firm pressure for 30 seconds

Swedish Massage Techniques, continued

Deep longitudinal stripping Slow gliding along the full length of the primary muscle fibers using moderate to deep pressure.

- Deactivates trigger points
- Reduces hypertonicity
- Offers assessment of tissue quality

Melting Static compression performed using the steps of a fulcrum.

- Deactivates trigger points
- Reduces hypertonicity
- Offers assessment of tissue quality

Myofascial release Application of a sustained light tensile force to connective tissue. Sensory receptors in the fascia, especially Ruffini endings, respond by reducing muscle tension and increasing pliability.

Stretching Techniques employed to enhance pliability and flexibility in soft-tissues such as muscle, fascia, and tendon.

- Thorough soft-tissue manipulation sets the stage for stretching to reset the muscle's resting length:
  - Reduce tension and increase mobility and pliability in superficial fascia.
  - Warm and soften the target and surrounding muscles.
  - Reduce myofascial trigger points and adhesions.

- Applying a prolonged tensile load to the fascia is an effective way to elicit relaxation effects from the sensory receptors in fascia.

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 4 - Introduction to Specific Massage Techniques

Active and passive engagement

Massage with passive engagement Simultaneous combination of a massage stroke and therapist-controlled (passive) joint movements that either shorten or lengthen the target muscle.

- Magnifies some of the physiological effects of the massage stroke
- Client is instructed to relax as best they can to allow the therapist to perform the movements
- Strokes: melting, deep longitudinal stripping, or fulling/broadening

Massage with active engagement Simultaneous combination of a massage stroke and client-controlled (active) joint movements that either shorten or lengthen the target muscle.

- Only use if the target muscle can contract without pain
- Magnifies physiological effects of a massage stroke on hard to reach muscles
- Reduces muscular tension and excessive muscle spindle activity
- Mobilizes connective tissues
- Strokes: melting, deep longitudinal stripping, or fulling/broadening

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 4 - Introduction to Specific Massage Techniques

Massage with passive engagement

Types:

1. **Passive engagement with muscle shortening/broadening**
   Simultaneous combination of a massage stroke and therapist-controlled (passive) joint movement that shortens and broadens the target muscle.
   - Hold for 20 to 90 seconds. This should result in pain reduction.
   - Particularly useful for treating severe muscle spasm following acute injury
   - Very similar to strain/counterstrain and positional release techniques
   - Example: "After melting into a painful trigger point or tight muscle, the therapist passively shortens the target muscle and holds it for 20 to 90 seconds"

2. **Passive engagement with muscle lengthening** Simultaneous combination of a massage stroke and therapist-controlled (passive) joint movement that lengthens the target muscle.
   - Mobilizes connective tissue
   - Reduces muscular tension
   - Encourages elongation of the myofascial tissues in tight muscles

   Two Methods:

   - **Pin and Stretch** Start with the target muscle in a shortened position. Melt into the target muscle. Passively lengthen the target muscle.

   - Start with the target muscle in a shortened position. Perform deep longitudinal stripping to the target muscle. Passively lengthen the target muscle.

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 4 - Introduction to Specific Massage Techniques

Massage with active engagement - Types:

1. **Active engagement with muscle shortening/broadening**
   Simultaneous combination of a massage stroke and client-controlled (active) joint movement that shortens and broadens the target muscle.
   - Enhances broadening of a muscle during concentric contraction
   - Removes inter-fiber adhesions using deep cross-fiber friction

   Method:
   - Melt into a hypertonic area of the target muscle and instruct the client to concentrically contract the target muscle.

   - Target muscle starts in a lengthened position. Perform fulling or compression broadening as the client simultaneously contracts the target muscle concentrically.

2. **Active engagement with muscle lengthening** Simultaneous combination of a massage stroke and client-controlled (active) joint movement that lengthens the target muscle.
   - Decreases muscle tightness and reduces trigger points
   - Elongates tissues (abnormally contracted sarcomeres)

   Method:
   - Bring the target muscle very close to its most shortened position. Have the client contract isometrically against your resistance. Now perform your massage technique to the focus area: either static compression or deep longitudinal stripping. This stroke should be maintained during the next step. Shift from isometric to eccentric contraction by having the client continue to contract but less forcefully so that the target muscle elongates.

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 4 - Introduction to Specific Massage Techniques

What's happening neurologically during muscle contraction and stretching?

Pain receptors/free nerve endings Excessive muscular contractions are detected by these sensory receptors, triggering a reflexive cessation of muscle contraction.

Golgi tendon organs Muscular contraction levels are measured by these sensory receptors found in the musculotendinous junction. The CNS uses this information to manage appropriate levels of muscular contraction force.

Muscle spindle cells Muscular stretch length and stretch speed are measured by these cells found throughout muscle tissue. Consist of both sensory and motor neurons.

Myotatic reflex (AKA: stretch reflex) Reflexive contraction of a muscle in response to the muscle spindle cells detecting a muscular stretch that is either too great in length or too fast. This prevents muscle tearing that would result from overstretching.

Static versus ballistic stretching

Static stretching Most common form of stretching. Bringing a tissue into a lengthened position and holding it there for about 15-20 seconds.

- **Phasic muscle** Muscle responsible for large power movements of the body. Require shorter static stretch durations

- **Postural muscle** Muscle responsible for maintaining erect posture during locomotion. A larger amount of perimysium in this type of muscle requires longer static stretch durations

Ballistic stretching Common among athletes. Bobbing or bouncing creates momentum to extend past the initial range of motion limitation.

Controversy: Some say ballistic stretching can activate the myotatic (stretch) reflex which is counterproductive to stretching. Others say that this sudden lengthening movement is very similar to movements performed during athletic activities, and is good preparation for athletes.

Best of both worlds: It has been shown that combined static and ballistic stretching is more effective than either one of them performed alone.

Active-assisted stretching

Active-assisted stretching Active engagement of specific muscular contraction by the receiver prior to or during a stretch. Uses the neurological principles of PIR and RI.

- **Comparing static and ballistic stretching:** Gains in range of motion are greater with active-assisted methods compared to static or ballistic methods.

Post-isometric relaxation (AKA: PIR) Neurological principle stating that immediately following an isometric contraction, there is an increased degree of relaxation in the muscle.

Reciprocal inhibition (AKA: RI) Neurological principle stating that when an agonist contracts, the antagonist is neurologically inhibited from contracting.

Active-assisted stretching, continued

Contract-relax stretch (AKA: CR stretch) Active-assisted stretch that uses PIR.

Method:

1. Instruct the client:
   - "Inhale and hold your breath."
   - "Contract the target muscle against my resistance (isometrically)."
   - "Hold this contraction for 3-7 seconds."
   - "Slowly release your breath and the contraction."

2. Immediately follow with a static stretch

3. Best results are achieved if repeated several times

Contract-relax-antagonist contract stretch (AKA: CRAC stretch) Active-assisted stretch that uses both PIR and RI.

Method:

1. Instruct the client:
   - "Inhale and hold your breath."
   - "Contract the target muscle against my resistance (isometrically)."
   - "Hold this contraction for 3-7 seconds."
   - "Slowly release your breath and the contraction."
   - "Now contract the antagonist to bring the target muscle into a stretch."

2. Hold this position and immediately perform a static stretch

3. Best results are achieved if repeated several times

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 5 - Physiological Effects

Physiological Effects of Massage

Fluid mechanic effects of massage

- Encourages the flow of blood through smaller capillaries where muscle tightness was restricting flow. Results in superficial hyperemia and increased skin warmth

- Fluid flow is enhanced if pressure is in the same direction as flow, reducing edema

- If pressure in the extremities is against the fluid flow, the build-up of pressure can dislodge a thrombus and lead to an embolism

- Superficial blood vessels are dilated by the pressure of massage which leads to removal of debris and arrival of nutrients

- Use effleurage, wringing, fulling, deep longitudinal stripping with a broad base

Physiological Effects of Massage, continued

Neuromuscular effects of massage

- Reduction of muscle tightness due to excessive neuromuscular stimulation

- **Breaking the Pain-Spasm-Pain Cycle** Excessive muscle tension produces PAIN (due to ischemia, resistance to stretch, and irritation of nociceptors). This triggers SPASM (further tightening of the muscle) which leads to more PAIN

- Retrains the patterns of motor signals in the body that involve less chronic tension, enhanced posture and movement, and benefits body systems

- Massage or thermal therapy can reduce pain because pressure and thermal receptors transmit signals faster than pain receptors (Gate Theory)

- Mechanical pressure that is held for a few seconds puts the muscle under a greater tensile load. This stretches the muscle and resets the resting tension reported by the muscle spindle cells

- For general muscle tension, use of effleurage, wringing, fulling, and broad compression is effective. For trigger points, melting is effective

- Active-assisted techniques are also very effective

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 5 - Physiological Effects

Physiological Effects of Massage, continued

Connective tissue effects of massage

- Tensile loads on muscle are reduced when fascial tension is reduced
- Slow, gradual fascia elongation is best achieved using lower pressure sustained for a longer period of time
- Collagen degeneration in tendons (tendinosis) and ligaments can be treated using deep transverse friction to stimulate the fibroblasts to multiple and re-grow
- Tenosynovitis, and adhesion between the tendon and the tendon sheath, can be addressed using deep transverse friction
- Limitations in joint and nerve movement caused by adhesion of scar tissues to adjacent fibers can also be addressed using deep transverse friction

72b Orthopedic Massage: Techniques & Effects

Lowe: Chapter 5 - Physiological Effects

Physiological Effects of Massage, continued

Psychological effects of massage

- The overall sense of relaxation or well-being
- Stress reduction, including improvement in depression and anxiety symptoms
- Therapeutic relationship has been shown to contribute significantly to positive therapeutic outcomes

Reflexive effects of massage

- Improved immune system function
- Reduction of stress hormone levels
- Lowering of blood pressure
- These effects are accomplished by treating the superficial fascia and specific points, such as in acupressure, shiatsu, and tui na

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Piriformis syndrome Entrapment of one or both divisions of the sciatic nerve by the piriformis muscle in the gluteal region.

Divisions of the Sciatic Nerve

- Tibial nerve
- Peroneal nerve

Structures that Surround the Sciatic Nerve

- Greater sciatic notch of the ilium (superior and lateral)
- Piriformis (superior)
- The other 5 deep lateral rotators (inferior)
    - Superior gemellus
    - Obturator internus
    - Obturator externus
    - Inferior gemellus
    - Quadratus femoris
- Sacrospinous ligament (inferior)

Activities That Exacerbate Piriformis Syndrome

- Sitting for long periods of time (sciatic nerve compression and local tissue ischemia)
- Sitting with a wallet in the back pocket (nerve compression)

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Symptoms of Piriformis Syndrome

Pain or paresthesia (sensation of pins and needles) in the gluteal region that radiates down the posterior lower extremity

Low back pain is also a common symptom. Treating it also is wise.

Superior gluteal nerve entrapment

- Also passes through the greater sciatic notch
- Travels superior to the piriformis
- Innervates the gluteals
- Nerve entrapment leads to aching buttock pain and weak hip abductors

Myofascial trigger points in the piriformis

Sacroiliac joint dysfunction

- Similar, but no radiating pain down the lower extremity

Sciatic Nerve Anatomical Variations

10% of the population One division of the sciatic nerve goes through the piriformis muscle. The other division passes inferior to the muscle.

2-3% of the population One division passes superior while the other division passes inferior to the piriformis.

1% of the population Both divisions pass through the piriformis.

Note: It is not necessarily true that an individual with the sciatic nerve passing through the piriformis would be in serious discomfort all the time.

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Sacroiliac joint dysfunction (S.I.) Diffused pain felt in the lumbar or sacral region**.**

- Caused by a number of problems at the sacroiliac joint with similar symptoms
- Pain may be referred to the groin or posterior leg
- Can be mistaken for lumbar disc pathology

Onset

- Acute injury such as an automobile accident
- Chronic dysfunctional biomechanics such as gait alteration or leg length discrepancy

Etiology

- **Sprain** Ligament fiber damage that results in a tear or permanent elongation.
- Friction between the articular surfaces
- Joint misalignment or joint "locking"

Sacroiliac Joints

- Are the joints between the sacrum and ilia of the pelvic bones
- Have no muscles that directly span the joints
- Use lumbosacral muscles, ligaments, and fascia to control motion
- Have rough surfaces to help produce stability

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Sacrum

- Acts as a wedge between the two pelvic bones
- Holds the weight of the upper body
- Is held firmly in place by a tight webbing of ligaments
- Has very slight movement called nutation and counternutation

Nutation and Counternutation of the Sacrum

- **Nutation** Forward tipping of the superior surface of the sacrum.
- **Counternutation** Backward tipping of the superior surface of the sacrum.
- Has a total range of 7-8° in the sagittal plane
- Is essential for proper mechanics (walking, bending over, etc.)

S.I. Joint Ligaments

- Anterior sacroiliac
- Posterior sacroiliac (fascially connect to Piriformis)
- Iliolumbar
- Sacrotuberous (fascially connected to G. Max and Biceps Femoris)
- Sacrospinous

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Traditional Treatments for Piriformis Syndrome

Reduction or cessation of exacerbating activities

- Effective

Stretching and joint mobilization

- Variable effectiveness: don't take the stretch too far for too long.

Anti-inflammatory medication

- Variable effectiveness: inflammation may not be present

Surgery

- Variable effectiveness

Cryotherapy

- Variable effectiveness: only effective to a depth of 1 cm.

Traditional Treatments for S.I. Joint Dysfunction

Joint mobilization and manipulation

- Variable effectiveness: it's not clear why it reduces pain

Strength training and exercise programs

- Effective: stabilizes the joint

Proliferant injections

- Variable effectiveness: encourages growth of stabilizing fibrous tissue

73a Orthopedic Massage: Introduction - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Considerations and Cautions for Piriformis Syndrome

- Reduce exacerbating activities such as prolonged sitting or sitting with a wallet in the back pocket.

- If the client reports an exacerbation of symptoms during the treatment, modify the treatment. Treatment modification options:
    - Work near the origin and insertion to avoid compressing the site of nerve entrapment which can be in the muscle belly

    - Use Contract-Relax stretching techniques

- Completely and fully reduce hypertonicity in the gluteals prior to treating the piriformis so that treatment does not feel invasive.

- After increasing tissue pliability, stretching is key to improving flexibility and resetting the resting length for the muscles.

Considerations and Cautions for S.I. Joint Dysfunction

- Clients with S.I. joint dysfunction may need accommodations to lie comfortably on the massage table. Have several options available.

- Modify treatment if it exacerbates symptoms

- Post-treatment sensations:
    - Proprioception and joint position can change substantially when in a non-weight-bearing position after treatment.

    - Encourage clients to move slowly when getting up from the massage table.

    - Bearing weight through the S.I. joint again after treatment could be painful.

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS

1. Sacroiliac ligament: deep transverse friction

- Address one side and then the other
- Use thumbs or finger tips with hands stacked for stability
- Work in a superior-inferior direction
- Use moderate pressure for about 1 minute
- Address all ligaments between posterior ilium and sacrum

2. Low back: superficial fascia assessment

- Work without lubricant
- Address one side and then the other
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

3. Low back: myofascial release (bilateral)

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Arms crossed: place hands 5 to 10 inches apart on either side of the spine
- Apply a light degree of pulling force between the hands
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat (between the sacrum and T10)

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS, continued

4. Draping

- Fold sheet and blanket diagonally to access upper and lateral gluteals

5. Gluteals: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

6. Gluteals: myofascial release

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Use a light and slow force to lengthen the superficial fascia
- Using two loose fists, stroke medial to lateral
- Do not neglect the uppermost gluteal fibers

Repeat on the other side starting with "5. Gluteals: superficial fascia assessment".

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS, continued

7. Low back: warming and softening

- Address thoracolumbar fascia, lats, erectors, and QL
- BMTs: spinal rotation and release with erector compressions
- Swedish: effleurage, wringing, pulling, and skin rolling
- Deep tissue: QL deep effleurage
- Tissues must be thoroughly warmed and softened before proceeding

8. Low back: deep longitudinal stripping

- Check in with the client because this may be intense
- Address thoracolumbar fascia, lats, and erectors
- Use thumbs or fingertips with hands stacked for stability
- Work superiorly in 2-4 inch sections
- Pause and repeat in areas of tension
- Progressively work more deeply as tissues soften

Repeat on the other side starting with "7. Low back: warming and softening".

9. Sacroiliac ligament: deep transverse friction

- Address one side and then the other
- Use thumbs or finger tips with hands stacked for stability
- Work in a superior-inferior direction
- Use moderate pressure for about 1 minute
- Address all ligaments between posterior ilium and sacrum

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS, continued

10. Hamstrings: warming and softening

- Address biceps femoris especially
- Swedish: effleurage, loose-fist compressions, kneading, and skin rolling
- BMT: hamstring compressions with knee and hip mobilization
- Deep tissue: deep effleurage and deep transverse friction and melting
- Tissues must be thoroughly warmed and softened before proceeding

11. Hamstrings: deep longitudinal stripping

- Check in with the client because this may be intense
- Address biceps femoris especially
- Start with a very broad forearm stroke
- Progress to thumb or fingertip stripping working proximally
- Work superiorly in 2-4 inch sections
- Pause and repeat in areas of tension
- Progressively work more deeply as tissues soften

12. Gluteals: warming and softening

- Address gluteus maximus especially
- Swedish: effleurage, loose-fist compressions, kneading, and skin rolling
- BMT: gluteal compressions with knee and hip mobilization
- Deep tissue: deep effleurage
- Tissues must be thoroughly warmed and softened before proceeding

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS, continued

13. Piriformis: deep longitudinal stripping

- Check in with the client because this may be intense
- Piriformis runs diagonally from the center of the sacrum toward the greater trochanter
- Use two loose fists focusing on 1 or 2 knuckles
- Strip from origin to insertion
- Progressively work more deeply as tissues soften

14. Piriformis: pin and stretch

- Holding the client's ankle, flex the knee to 90°
- Passively shorten the piriformis: take the hip into full lateral rotation
- Pin the piriformis: use a thumb or thumb wrapped in the index finger
- Passively lengthen the piriformis: compassionately continue to pin the piriformis while taking the hip into full medial rotation
- Release and repeat several times for maximum benefit

15. Piriformis: deep longitudinal stripping after PIR

- Check in with the client. This may feel intense.
- Holding the client's ankle, flex the knee to 90°
- Instruct the client:
    - "Use 25% of your strength to hold your leg in this position for 5 seconds as I try to rotate it toward me." (isometric contraction)
    - "Slowly release that contraction." (post-isometric relaxation)
- Pull the ankle toward yourself to medially rotate the hip
- Simultaneously use the knuckles of a loose fist to strip the piriformis
- Release and repeat several times for maximum benefit

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: PRONE DETAILS, continued

16. Piriformis: active-assisted stretch after PIR

- Use this for clients whose symptoms are exacerbated by pressure on the piriformis
- Check in with the client: lateral rotation may aggravate the knee joint
- Holding the client's ankle, flex the knee to 90°
- Hip joint mobilizations
- Bring the client's knee back to 90° of flexion
- Instruct the client:
    - "Use 25% of your strength to hold your leg in this position for 5 seconds as I try to rotate it toward me." (isometric contraction)
    - "Slowly release the contraction" (post-isometric relaxation, PIR)
    - "Now I'm going to stretch your piriformis."
    - "Let me know when this is a good stretch for you."
- Medially rotate the hip by pulling the ankle toward yourself
- When the client says its good, hold for three of your breath cycles
- Slowly release the stretch. Repeat hip joint mobilizations

17. Sacroiliac ligament: deep transverse friction

- Address one side and then the other
- Use thumbs or finger tips with hands stacked for stability
- Work in a superior-inferior direction
- Use moderate pressure for about 1 minute
- Address all ligaments between posterior ilium and sacrum

Repeat on the other side starting with "10. Hamstrings: warming and softening".

73b Orthopedic Massage: Technique Demo and Practice - Piriformis & Sacroiliac

Lowe: Chapter 8 - Hip and Pelvis

Soft-Tissue Manipulation: SUPINE DETAILS

18. Gluteal: passive stretch

19. Low back: passive stretch

20. Hamstring: active-assisted stretch after PIR

- Hip joint mobilizations
- Instruct the client:
  - "I'm going to stretch your hamstrings."
  - "Let me know when you begin to feel this stretch."
  - (Supporting the knee to avoid hyperextension, flex the leg until the client says that they can feel the stretch)
  - "Inhale and hold your breath. Using only 25% of your strength, press your thigh down toward the table against my resistance and I will count down from 5." (isometric contraction)
  - "Slowly release the contraction and the breath." (PIR)
  - "Now pull your thigh toward your chest until you feel a stretch. I'll follow you with my hands and support your leg."
  - "Relax your leg and I will hold it here for a stretch."
- Hold the stretch for three of your breath cycles
- Slowly release the stretch and repeat hip joint mobilizations

Repeat on the other side starting with "18. Gluteal: passive stretch".

Blank Page

75b Orthopedic Massage: Spot Check - Piriformis and Sacroiliac

Student Name _____ Group _____Date _____

As you observe the student, mark the appropriate space as satisfactory (S) or unsatisfactory (U)

Prone

_____ **1. Sacroiliac ligament: deep transverse friction**
(both sides, superior-inferior, moderate pressure, 1 minute, L5-S3)

_____ **2. Low back: superficial fascia assessment**
(without lubricant, both sides, tangential pressure, no sliding, all directions)

_____ **3. Low back: myofascial release**
(without lubricant, bilateral, tangential pressure, no sliding, T10-S1)

_____ **4. Gluteals: draping**
(fold sheet diagonally to access upper and lateral gluteals)

_____ **5. Gluteals: superficial fascia assessment**
(without lubricant, both sides, tangential pressure, no sliding, all directions)

_____ **6. Gluteals: myofascial release**
(without lubricant, both sides, tangential pressure, no sliding, 2 loose fists)

_____ **7. Low back: warming and softening**
(lower lats, lumbar erectors, QL, spinal rotation and release with erector compressions, eff, pet, wring, pull, skin rolling, QL deep eff)

_____ **8. Low back: deep longitudinal stripping**
("may be intense", lower lats, lumbar erectors, 2-4" sections, thumbs, fingertips)

_____ **9. Sacroiliac ligament: deep transverse friction**
(both sides, superior-inferior, moderate pressure, 1 minute, length of sacrum)

_____ **10. Hamstrings: warming and softening**
(esp. biceps femoris, hamstring compressions with knee and hip mobilizations, eff, loose fist compressions, knead, skin rolling, deep eff & transverse friction)

_____ **11. Hamstrings: deep longitudinal stripping**
("may be intense", esp. biceps femoris, 2-4" sections, thumbs, fingertips)

_____ **12. Gluteals: warming and softening**
(esp. gluteus maximus, gluteal compressions with knee and hip mobilizations, eff, loose fist compressions, knead, skin rolling, deep eff)

_____ **13. Piriformis: deep longitudinal stripping**

("may be intense", correct path, 2 loose fists focusing on 1 or 2 knuckles)

_____ **14. Piriformis: pin and stretch**

(knee flexed 90°, hip laterally rotated fully, pinned, hip medially rotated fully)

_____ **15. Piriformis: deep longitudinal stripping after PIR**

("may be intense", knee flexed 90°, "use 25% strength to hold this position", rotate toward you medially for 5 seconds, "slowly release the contraction", loose fist knuckle stripping while simultaneously rotating the hip medially)

_____ **16. Piriformis: passive stretching after PIR**

("may aggravate your knee", joint mobilizations, knee flexed 90°, "use 25% strength to hold this position", rotate toward you medially for 5 seconds, "slowly release the contraction", traction hip, "let me know when this stretch is good for you", hip medial rotation, hold for 3 of your breath cycles, joint mobilizations)

_____ **17. Sacroiliac ligament: deep transverse friction**

(both sides, superior-inferior, moderate pressure, 1 minute, length of sacrum)

Supine

_____ **18. Gluteals: passive stretch**

(joint mobilization, slight hip traction, "indicate when this stretch is good for you", knee toward coracoid , hold for 3 of your breaths, joint mobilizations)

_____ **19. Low back: passive stretch**

(joint mobilizations, position foot on lateral side of contralateral knee, slight hip traction, "indicate when stretch is good", hold for 3 breaths, joint mobilizations)

_____ **20. Hamstrings: active-assisted stretch with PIR**

(joint mobilizations, "let me know when this stretch is good for you", support knee avoid hyperextension, slight traction through hip and knee, "use 25% strength to press thigh down toward table against my resistance", resist hip extension for 5 seconds, "slowly release the contraction", "pull your thigh toward your chest", hold for 3 of your breath cycles, joint mobilizations)

_____ **Final Grade** (S = 100%, U = retake the exam)

Instructor Name _____ Student Name _____

76a Orthopedic Massage: Introduction - Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Causes of Low Back Pain (that we will address)

1. **Zygapophysial joint dysfunction (Z-joint dysfunction)** Lumbar hyperlordosis overloads the Z-joints causing joint capsule and synovial inflammation, and chondromalacia.

    - **Zygapophysial joint (AKA: facet joint, or Z-joint)** Synovial joint between the superior articular process of one vertebra and the inferior articular process of the vertebra directly above it.

    - **Chondromalacia** Degeneration (softening) of articular cartilage. Most common occurrence is on the underside of the patella, called chondromalacia patellae.

2. **Neuromuscular dysfunction** Impaired or abnormal functioning of nerves that control skeletal muscles.

Other Causes of Low Back Pain

- Sacroiliac joint dysfunction (previously addressed)
- Herniated disc
- Systemic disorders
- Tumors or infections

Signs and Symptoms of Low Back Pain Due to Z-joint Dysfunction

- Non-specific, deep, and achy
- Localized in a paravertebral area, unilaterally or bilaterally
- Worse in the morning
- Relieved by repeated motion
- Not worsened with coughing or laughing

76a Orthopedic Massage: Introduction - Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Activities that Exacerbate Low Back Pain Due to Z-Joint Dysfunction

- Rest
- Hyperextension
- Twisting
- Stretching
- Lateral bending

Why is Z-Joint Dysfunction More Common in Lumbar Vertebrae?

- Z-joints are partial load-bearing joints, and
- Vertebral extension increases the load carried by Z-joints, and
- Lumbar vertebrae are already in extension due to their lordotic curve

Traditional Treatments for Z-Joint Dysfunction

NSAIDs and cryotherapy

- Variable effectiveness: inflammation is not always present
- Long term use may lead to GI tract and cardiovascular risks

Instruction in body mechanics, stretching, and strength training

- Effective: if done regularly to reduce lumbar lordosis

Corticosteroid injections

- Not effective

76a Orthopedic Massage: Introduction - Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Neuromuscular dysfunction Impaired or abnormal functioning of nerves that control skeletal muscles.

Etiology of Low Back Neuromuscular Dysfunction

- Trauma
- Fatigued muscles that are suddenly and awkwardly overloaded during a combined lateral flexion and rotation motion
- Dysfunctional coordination between muscle recruitment and fascial tension

Complications of Low Back Pain Due to Neuromuscular Dysfunction

- Postural stress in standing and sitting positions
- Altered movement patterns:
    - Restricted motion between two vertebral segments can increase or decrease motion at other segments
    - This lack of proper vertebral coordination leads to a mechanical overload and neuromuscular dysfunction of numerous muscles

76a Orthopedic Massage: Introduction - Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Traditional Treatments for Low Back Pain Due to Neuromuscular Dysfunction

Bed rest

- Not effective: more detrimental than helpful
- Provides pain relief
- Causes muscle splinting and range of motion limitations
- May lead to deep vein thrombosis in the lower extremity

NSAIDs

- Variable effectiveness: inflammation is not always present
- Long term use may lead to GI tract and cardiovascular risks

Corticosteroid injections

- Variable effectiveness: inflammatory and pain management

Instruction in body mechanics, stretching, and strength training

- Effective: if done properly and regularly

Considerations and Cautions for Low Back Pain

- Restore proper joint biomechanics without increasing further trauma
- Stretching can be very helpful, especially if performed after massage
- If symptoms get worse as a result of treatment, cease that approach and reinvestigate the problem. You may need to refer the client to a more qualified practitioner for further evaluation
- Pay close attention to the pain reported by the client
- When in doubt about the cause of Low Back Pain, refer that client to a more qualified practitioner for further evaluation
- This treatment can dramatically alter muscular proprioception resulting in spasms in an easily overloaded muscle. Have the client move slowly and carefully when first getting up from the massage table and for a short time afterward

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Soft-Tissue Manipulation: PRONE DETAILS

1. Low back: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

2. Low back: myofascial release (bilateral)

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Arms crossed: place hands 5 to 10 inches apart on either side of the spine
- Apply a light degree of pulling force between the hands
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat (between the sacrum and T10)

3. Low back: warming and softening

- Address thoracolumbar fascia, lats, erectors, and QL
- BMTs: spinal rotation and release with erector compressions
- Swedish: effleurage, wringing, pulling, and skin rolling
- Deep tissue: QL deep effleurage
- Tissues must be thoroughly warmed and softened before proceeding

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Soft-Tissue Manipulation: PRONE DETAILS, continued

4. Erector spinae: deep longitudinal stripping

- Address lumbar sections of spinalis, longissimus, and iliocostalis
- Use thumbs or fingertips with hands stacked for stability
- Strip longitudinally and superiorly, working in 2-4 inch sections
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

5. Quadratus lumborum: deep longitudinal stripping

- Address the 3 angles of QL muscle fibers
    1. Iliac crest diagonally to lumbar transverse processes 1-4
    2. Iliac crest superiorly to the 12th rib
       (move to the opposite side of the table)
    3. Lumbar transverse processes 1-4 diagonally to the 12th rib
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

6. Lamina groove: deep longitudinal stripping

- Address the lumbar sections of multifidi and rotatores
- Use thumbs or fingertips with hands stacked for stability
- Strip longitudinally and superiorly, working in 2-4 inch sections
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

Repeat on the other side starting with "3. Low back: warming and softening".

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Soft-Tissue Manipulation: SIDE-LYING DETAILS

7. Side-lying: draping and positioning

- Keep the client fully covered with sheet and blanket

8. Quadratus lumborum: pin and stretch with active engagement

- Only use in non-acute stages and check in with the client because this may be intense or may exacerbate symptoms
- Instruct the client:
  - "I'm going to hold the sheet and blanket while you reposition."
  - "Lie on your side diagonally with your head at the top front corner and your hips at the back edge of the middle of the table."
  - "Slightly flex your bottom hip and knee so they stay on the table."
  - "Hang your top leg off the table behind you."
  - "Grasp the top edge of the table with your top hand to stabilize the torso and further stretch the lateral trunk muscles"
- Keeping the client completely covered with the sheet, move the blanket out of the way to help gain access to the QL
- Using a thumb wrapped in your index finger OR two thumbs side-by-side, press medially to clearly but compassionately pin the QL
- Instruct the client:
  - "Take the weight of your leg and hike your hip toward your ribs."
  - "Slowly release the hip hike and then lower the leg toward the floor behind you to stretch this muscle that I am pinning."
  - "Bring your leg back up and hike your hip again."
  - Repeat to facilitate more tension reduction up 3 repetitions total
  - "We're done. Bring your top leg forward to rest on the table."
- VARIATION: instead of pinning, strip the QL fibers inferiorly or superiorly as the client releases the hip hike and adducts the leg

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Soft-Tissue Manipulation: SIDE-LYING DETAILS, continued

9. Quadratus lumborum: active-assisted stretch after PIR

- Only use in non-acute stages and check in with the client because this may be intense or may exacerbate symptoms
- Instruct the client:
    - "I'm going to hold the sheet and blanket while you reposition."
    - "Lie on your side diagonally with your head at the top front corner and your hips at the back edge of the middle of the table."
    - "Slightly flex your bottom hip and knee so they stay on the table."
    - "Hang your top leg off the table behind you."
    - "Grasp the top edge of the table with your top hand to stabilize the torso and further stretch the lateral trunk muscles"
- Keeping the client completely covered with the sheet, move the blanket out of the way to help gain access to the QL
- Instruct the client:
    - "Inhale and hold your breath as you hike your hip toward your ribs. Hold this for 5 seconds." (isometric contraction)
    - "Slowly release your breath and the hip hike." (PIR)
    - "Lower your leg toward the floor behind you."
    - "I'm going to press down on your hip with crossed hands to stretch your QL."
    - "Let me know when this is a good stretch for you."
    - Hold stretch for 3 of your breath cycles
    - "Bring your leg back up."
    - Repeat to facilitate more length up to 3 repetitions total
    - "We're done. Bring your top leg forward to rest on the table."

Repeat on the other side starting with "8. Quadratus lumborum: pin and stretch".

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Soft-Tissue Manipulation: SUPINE DETAILS

Draping

- Keep the client fully covered with sheet and blanket

10. Iliopsoas: active-assisted stretch after PIR

- Instruct the client:
  - "I'm going to hold the sheet and blanket while you reposition."
  - "Lie diagonally with your head and hips at opposite sides of the table and your outside leg hanging off the table."
  - "Pull your inside knee up into your chest and hold it there" (reducing lumbar extension reduces Z-joint compression)
  - "Inhale and hold your breath. Using only 25% of your strength, lift your hanging leg with knee bent against my resistance and hold for 5 seconds." (isometric hip flexion)
  - "Slowly release your breath and your contraction, allowing your leg to lower." (post-isometric relaxation, PIR)
  - "Let me know when this stretch feels good."
  - Hold stretch for 3 of your breath cycles
  - Repeat to facilitate more length up 3 repetitions total
  - "We're done with this side. I'll hold the sheet and blanket while you reposition yourself on the table."

11. Quadriceps femoris: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

12. Quadriceps femoris: myofascial release

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Arms crossed: place hands 2 to 10 inches apart
- Apply a light degree of pulling force between the hands
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat to address the entire quadriceps femoris

13. Quadriceps femoris: warming and softening

- Address all 4 quad muscles, but focus on rectus femoris
- BMTs: supine hip rotation with leg compressions
- Swedish: effleurage, fulling, kneading, and skin rolling
- Deep tissue: deep effleurage, petrissage, and wringing/fiber spreading
- Tissues must be thoroughly warmed and softened before proceeding

14. Quadriceps femoris: deep longitudinal stripping

- Address entire length of rectus femoris
- Use thumbs or fingertips with hands stacked for stability
- Work superiorly in 2-4 inch sections
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

Repeat on the other leg, "10. Iliopsoas: active-assisted stretch after PIR".

76b Orthopedic Massage: Technique Demo and Practice – Low Back Pain

Lowe: Chapter 9 - Lumbar and Thoracic Spine

Soft-Tissue Manipulation: PRONE (again) DETAILS

15. Rectus femoris: passive stretch

- Mobilization of the hip joint with the knee flexed to 90 degrees
- Traction to slightly open the hip joint
- "I'm going to stretch your quads. Let me know when the stretch is good for you"
- Slowly bring the calcaneus toward the ischial tuberosity
- When the client indicates a good stretch, hold the stretch for 3 of your breath cycles
- Slowly release and mobilize the hip joint again

- VARIATION: to enhance the stretch with emphasis on the rectus femoris
- "I'm am going to enhance this stretch by lifting your leg and placing it on top of my leg"
- Fully flex the knee of your foot-leg and place it on the table just inferior to the client's flexed knee.
- Gently lift the client's leg and slide your leg in between it and the table
- Place your head-hand on the sacrum with slight anterior and inferior pressure to counteract any over emphasis of the lumbar lordosis
- "Is this position comfortable for you?"
- "Let me know when this stretch is good for you"
- Slowly bring the calcaneus toward the ischial tuberosity
- When the client indicates a good stretch, hold the stretch for 3 of your breath cycles
- Slowly release and repeat if needed

Repeat on the other side starting with "15. Rectus femoris: passive stretch".

Blank Page

78b Orthopedic Massage: Spot Check – Low Back Pain

Student Name _____ Group _____Date _____

As you observe the student, mark the appropriate space as satisfactory (S) or unsatisfactory (U)

Prone

_____ **1. Low back: superficial fascia assessment**
(without lubricant, both sides, tangential pressure, no sliding, all directions)

_____ **2. Low back: myofascial release**
(without lubricant, bilateral, tangential pressure, no sliding, T10-S1)

_____ **3. Low back: warming and softening**
(lower lats, lumbar erectors, QL, spinal rotation and release with erector compressions, eff, pet, wring, pull, skin rolling, QL deep eff)

_____ **4. Erector spinae: deep longitudinal stripping**
(lumbar erectors, superiorly, 2-4" sections, melt in if needed, thumbs, fingertips)

_____ **5. Quadratus lumborum: deep longitudinal stripping**
(iliac crest to TP, iliac crest to 12th rib, TP to 12th rib, thumbs, fingertips)

_____ **6. Lamina groove: deep longitudinal stripping**
(multifidi and rotatores, superiorly, 2-4" sections, melting, thumbs, fingertips)

Side-lying

_____ **7. Side-lying: draping and positioning**
(keep the client fully covered with sheet and blanket, side-lying diagonally with head at top front corner and hips at back edge of the side of the table, client instructed to grasp the top/side edge of the table, bottom leg flexed at the hip and knee, top leg ready to swing back and hang off the back edge of the table)

_____ **8. Quadratus lumborum: pin and stretch with active engagement**
(positioned as in #7, "reach leg back and hang it off the back edge of the table", "hike your hip", thumbs press on QL medially to pin it, "slowly un-hike your hip", repeat three times, "bring your leg back onto the table and rest it", as a variation may also strip the QL during the un-hiking of the hip.)

_____ **9. Quadratus lumborum: active-assisted stretch after PIR**
(positioned as in #7, "reach leg back and hang it off the back edge of the table", "hike your hip and hold for count of 5", "slowly un-hike your hip and let me know when this is a good stretch for you", repeat three times, "bring your leg back onto the table and rest it")

Supine

_____ **10. Iliopsoas: active-assisted stretch after PIR**
(keep client fully covered with sheet and blanket while repositioning, "lie diagonally with head and hips at opposite sides of the table and your outside leg hanging off the table", "pull your inside knee up into your chest and hold it there", "inhale and hold your breath as you use 25% strength to lift your hanging leg against my resistance", traction femur distally and press toward the floor to meet client's hip flexion isometrically, "release the breath and the contraction" "let me know when this stretch is good for you", hold stretch for 3 of your breath cycles, repeat 3 times.)

_____ **11. Quadriceps femoris: superficial fascia assessment**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **12. Quadriceps femoris: myofascial release**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **13. Quadriceps femoris: warming and softening**
(especially rectus femoris, supine hip rotation with leg compressions, eff, pet, wring, knead, skin rolling, deep eff, wringing/fiber spreading)

_____ **14. Quadriceps femoris: deep longitudinal stripping**
(entire length of rectus femoris in 2-4" sections, superiorly, thumbs, fingertips)

Prone

_____ **15. Rectus femoris: passive stretch**
(joint mobilization, announce stretch, traction, "let me know when this is a good stretch for you", flex knee moving calcaneus toward ischial tuberosity, hold for 3 of your breath cycles, slow release the stretch, joint mobilization)

_____ **Final Grade** (S = 100%, U = retake the exam)

Instructor Name _____ Student Name _____

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Rotator cuff strain (AKA: RC strain) Strain of one or more of the following muscles: supraspinatus, infraspinatus, teres minor, and subscapularis.

- **Strain** Tearing of a muscle and/or tendon. Muscles that cross more than one joint are most susceptible to strain. Caused by excessive tensile stress usually during eccentric contraction.

Onset

- Chronic onset: progressive degeneration. Partial-thickness tears are more likely.
- Acute onset: high force loads. Full-thickness tears are more likely.

How many muscles can be involved in a rotator cuff strain?

- Usually just one or two
- Rarely are all four are involved
- Subscapularis is rarely involved because there are several larger muscles that perform the same actions and provide support

Assessment

- Supraspinatus: pain during resisted glenohumeral abduction
- Infraspinatus/teres minor: pain during resisted glenohumeral lateral rotation
- Subscapularis: pain during resisted glenohumeral medial rotation

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Traditional Treatments

Physical therapy (stretching, strengthening, and ultrasound)

- Variable effectiveness

Corticosteroid injection

- Variable effectiveness

Surgery

- Most common is subacromial decompression for supraspinatus

Cessation or rest from offending activities

- Effective, especially combined with orthopedic massage

Etiology: Supraspinatus Strain

Subacromial compression Compression of the supraspinatus between the underside of the acromion process and the superior surface of the head of the humerus.

Consequences:

- Slower healing time
- **Tendinosis** Degeneration and break down of collagen in the tendon fibers. Results in chronic pain and significant loss of tensile strength in tendon.
- **Strain** Tearing of a muscle and/or tendon.
- **Calcific tendinitis** Calcium deposits in the tendon. Tendinosis may allow this to occur. Most common in supraspinatus.

Etiology: Infraspinatus and Teres Minor Strain

- Overuse and overloading
- **Strain** Tearing of a muscle and/or tendon.
- During throwing motions involving medial rotation of the glenohumeral joint, the infraspinatus and teres minor eccentrically contract to decelerate the arm after release of the ball.

Etiology: Subscapularis Strain

- Often accompanied by glenohumeral dislocation

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Considerations and Cautions for Rotator Cuff Strain

- First assess which muscle or muscles are torn. Accurate assessment is essential to determine the severity. Avoid vigorous deep friction on a recent or severe injury.

- Advise the client to cease or rest from any offending activities.

- Treat all muscles of the shoulder area to regain biomechanical balance.

- Supraspinatus is more difficult to access, but can be addressed.

- Subscapularis is rarely strained and mostly inaccessible. The distal tendon is an accessible and common site of strain.

- Stretching, joint mobilization, and activity modifications can reduce stress on damaged tissues allowing the soft tissue techniques to succeed.

- Topical thermotherapy is not effective for the deeper supraspinatus and sub-scapularis, but can be effective for infraspinatus and teres minor.

- If the client is receiving other treatment methods such as physical therapy, injections, or surgery, communicate with the other practitioners to ensure that the treatment plans are all compatible.

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Structures that Form the Carpal Tunnel

Proximal row of carpals from lateral to medial:

- Scaphoid, lunate, triquetrum, pisiform ("**S**teve **L**eft **T**he **P**arty")

Distal row of carpals from lateral to medial:

- Trapezium, trapezoid, capitate, hamate ("**T**o **T**ake **C**athy **H**ome")

Transverse carpal ligament (AKA: TCL, wrist flexor retinaculum)

Ten Structures that Pass Through the Carpal Tunnel

- Flexor pollicis longus (1 tendon)
- Flexor digitorum superficialis (4 tendons)
- Flexor digitorum profundis (4 tendons)
- Median nerve

Etiology

- Overuse of extrinsic finger and wrist flexors leading to tenosynovitis
- Adhesion or inflammation between a tendon and its synovial membrane increases the size of the tendon sheath causing compression of the median nerve

Occupations at Risk for Carpal Tunnel Syndrome

- Data entry
- Factory worker
- Packaging worker
- Janitorial and cleaning jobs

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Symptoms

- Numbness and pain in the skin of the first three and a half fingers
- **Paresthesia** Sensation of pins and needles.
- Clumsiness (when severe)
- Loss of dexterity (when severe)
- Weakening of grip strength (when severe)

Why are symptoms often exacerbated at night?

- Wrist flexion while sleeping increases carpal tunnel compression

Traditional Treatments

Ergonomic intervention

- Effective: wrist braces and supports, altered work schedules, variety of work activities, and tool design

Reduction of offending activities

- Effective

Pharmaceuticals (corticosteroid injection, oral steroids, NSAIDs, diuretics)

- Variable effectiveness

Wrist splints at night

- Effective

Surgery

- Variable effectiveness: incision on the flexor retinaculum to relieve compression on the median nerve

79a Orthopedic Massage: Introduction – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Considerations and Cautions for Carpal Tunnel Syndrome

- Treat the hypertonicity in wrist and hand flexors, and avoid any aggravating pressure to the median nerve.

- Stretch forearm flexor muscles to reduce hypertonicity and overuse irritation.

- Treat the entire upper extremity to reduce tension that may contribute to biomechanical dysfunction.

- Nerve damage is slow to heal. Immediate or rapid relief can occur, but complete resolution of the condition can be slow and gradual.

- If the condition is severe or symptoms are magnified, adjust the pressure, duration, and intensity of the treatment to avoid exacerbating the condition.

- Use caution with any technique that aggravates symptoms.

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SEATED DETAILS

1. TCL: myofascial release

- Perform while client is seated during interview
- Only for conditions with mild to moderate symptoms
- Begin to full the transverse carpal ligament
- Stop just beyond the scaphoid/trapezium and pisiform/hamate and hold it for 20 seconds
- Monitor for a subtle sensation of release that you feel or that is reported by the client

Soft-Tissue Manipulation: PRONE DETAILS

2. Upper back and shoulder: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

3. Upper back and shoulder: myofascial release (bilateral)

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Arms crossed: place hands 5 to 10 inches apart on either side of the spine
- Apply a light degree of pulling force between the hands
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat (between the T1 and T10)

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: PRONE DETAILS, continued

4. Upper back and shoulder: warming and softening

- Address trapezius, supraspinatus, and deltoid
- BMTs: shoulder mobilization with trapezius compressions
- Swedish: effleurage, kneading, and skin rolling
- Deep tissue: upper trapezius deep effleurage

5. Upper back and shoulder: deep longitudinal stripping

- Address trapezius, supraspinatus, and deltoid
- Use thumbs or fingertips with hands stacked for stability
- Work in 2-4 inch sections from origin to insertion
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

6. Supraspinatus insertion tendon: deep transverse friction

- Use fingertips or thumb
- Work just inferior to the lateral edge of the acromion process
- Use moderate pressure for 1 minute

7. GH lateral rotators: warming and softening

- Address infraspinatus, teres minor, and posterior deltoid
- BMTs: scapular mobilization with deltoid compressions
- Swedish: effleurage, kneading, and skin rolling
- Deep tissue: deep effleurage

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: PRONE DETAILS, continued

8. GH lateral rotators: deep longitudinal stripping

- Address infraspinatus, teres minor, and posterior deltoid
- Use thumbs or fingertips with hands stacked for stability
- Work in 2-4 inch sections from origin to insertion
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

9. GH lateral rotators: deep stripping with active engagement lengthening

- Address infraspinatus, teres minor, and posterior deltoid
- Bring the client into "cactus position" on one side:
  - Shoulder abducted 90° and elbow flexed 90°
  - Shoulder laterally rotated as far as comfortable
- Instruct the client:
  - "Hold this position for 5 seconds"
  - "Very slowly drop your arm and hand toward the floor" (lengthening of the lateral rotators via eccentric medial rotation)
- As the client does this, strip longitudinally from origin to insertion
- Repeat Hold-Rotate-Stripping to address all relevant fibers

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: PRONE DETAILS, continued

10. GH lateral rotators: passive stretch

- Address infraspinatus, teres minor, and posterior deltoid
- Joint mobilization: medial and lateral rotation
- Instruct the client:
    - "Place the back of your hand on your low back"
    - "Bring your arm in so that it is touching your torso"
    - "Let me know when you feel a good stretch"
- Head hand gently, flatly, and firmly presses the scapula so that it lies flat on the ribcage
- Foot hand tractions slightly and slowly presses the elbow toward the floor
- When the client says that it is a good stretch, hold it for three of your breath cycles
- Release and repeat up to 3 times to facilitate more length

11. Triceps and anterior forearm: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: PRONE DETAILS, continued

12. Triceps and anterior forearm: myofascial release

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Fulling position: place hands 2 to 5 inches apart
- Apply a light degree of pulling force between the hands
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat to address all relevant muscle fibers

13. Triceps and anterior forearm: warming and softening

- Swedish: effleurage, fulling, kneading, and skin rolling
- Deep tissue: triceps brachii deep effleurage
- Tissues must be thoroughly warmed and softened before proceeding

14. Anterior forearm: deep effleurage distally

- Place the arm palm up with slight flexion in the elbow
- Support the elbow by holding it in one hand and rest it on the table
- Use a loose fist to effleurage distally
- Lighten up on distal 1/3 of forearm
- Melt in or repeat in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SUPINE DETAILS

15. Chest and anterior deltoid: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

16. Chest and anterior deltoid: myofascial release

- Work without lubricant
- Assess the fascia before and after to track effectiveness
- Use a light and slow force to lengthen the fascia
- Hold. Wait for a subtle sensation of tissue release or a working sign
- Slowly release and repeat to address all relevant muscle fibers

17. Chest and anterior deltoid: warming and softening

- BMTs: shoulder mobilization with pectoral compressions
- Swedish: effleurage, kneading, and skin rolling
- Deep tissue: compressive effleurage, superficial and deep friction

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SUPINE DETAILS, continued

18. Chest and anterior deltoid: deep longitudinal stripping

- Address all fibers that are available according to appropriate draping
- Use thumbs or fingertips with hands stacked for stability
- Work in 2-4 inch sections from origin to insertion
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

19. Subscapularis: deep transverse friction and melting

- Check in with the client because this can feel intense
- Bring the client into this position:
  - Abduct the shoulder 90°
  - Flex the elbow 90° with hand pointing toward the ceiling
- Gently hold the client's arm in this position with your head hand
- Foot hand addresses accessible distal fibers of subscapularis:
  - Fingertips contact the lateral surface of the ribs near the axilla
  - Using finger pads, slide posteriorly and medially
  - Press flatly and posteriorly into the fibers to compress the muscle against the subscapular fossa
  - Melt in or deep friction into areas of palpated or reported tension
  - Progressively work more deeply as tissues soften
- **Variation: T.P. deactivation with active engagement lengthening**
  - "As I maintain this pressure, slowly let your arm and hand drop down toward the head of the table"
  - "Now bring your arm and hand back up to the starting position"

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SUPINE DETAILS, continued

20. Subscapularis: passive stretch

- Mobilize the glenohumeral joint
- Bring client into this position:
  - Abduct the shoulder 90°
  - Flex the elbow 90°
- Instruct the client: "Let me know when you feel a good stretch"
- Lightly traction the humerus distally with the foot hand
- Laterally rotate shoulder with the head hand
- When the client indicates a good stretch has been reached, hold this position for 3 of your breath cycles and slowly release

21. Anterior upper extremity: warming and softening

- Address biceps brachii, brachialis, coracobrachialis, brachioradialis, and anterior and posterior forearms
- BMTs: wrist, elbow, and shoulder mobilization
- Swedish: effleurage, fulling, kneading, and skin rolling
- BMT: deltoid/biceps/brachialis/brachioradialis fiber spreading
- Deep tissue: finger and wrist flexor stripping with traction
- Tissues must be thoroughly warmed and softened before proceeding

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SUPINE DETAILS, continued

22. Finger and wrist flexors: deep stripping with active lengthening

- Address the entire width of the forearm using multiple stripping paths
- On the first pass, use a broad tool such as a loose fist
- On subsequent passes, use thumbs or fingertips stacked for stability
- Lie client's forearm on the table palm up with hand hanging off the side
- Instruct the client:
  - "Make a fist and curl your wrist" (flexion)
  - "Now slowly uncurl your wrist and open your fingers" (extension)
- During extension, strip longitudinally and proximally 2 to 4 inches
- During flexion, pause holding your place
- Melt in or repeat in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

23. Flexor pollicis brevis: passive stretch

- Stand by the shoulder facing toward the foot of the table
- Bring the client into this position:
  - Abduct the shoulder 90°
  - Flex the elbow 90°
- Instruct the client:
  - "I'm going to stretch your short thumb flexors"
  - "Let me know when this is a good stretch for you"
- Outside hand gently pulls the client's wrist into hyperextension
- Inside hand grasps the thenar eminence and pulls the thumb into full extension
- Hold for three of your breath cycles
- Slowly release and repeat up to 3 times total

79b Orthopedic Massage: Technique Demo and Practice – Rotator Cuff & Carpal Tunnel

Lowe: Chapter 11 - Shoulder AND Chapter 12 - Elbow, Forearm, Wrist, and Hand

Soft-Tissue Manipulation: SUPINE DETAILS, continued

24. Median nerve: mobilization

- Establishes free movement of the median nerve through the carpal tunnel
- Only do this in the later stages of rehabilitation
- Bring client into this position:
    - Abduct the shoulder 90°
    - Fully extend the elbow
    - Hyperextend the wrist
- Slacken the nerve slightly and return it to a fully stretched position
- Do not hold this stretched position, but repeat the activity multiple times
- Symptoms may recur at the fully stretched position

81b Orthopedic Massage: Spot Check - Rotator Cuff and Carpal Tunnel

Student Name _____ Group _____Date _____

As you observe the student, mark the appropriate space as satisfactory (S) or unsatisfactory (U)

Seated

_____ **1. TCL: myofascial release** (during interview, wrist crease, tangential pressure)

Prone

_____ **2. Upper back and shoulder: superficial fascia assessment**
(without lubricant, both sides, tangential pressure, no sliding, all directions)

_____ **3. Upper back and shoulder: myofascial release (bilateral)**
(without lubricant, bilateral, tangential pressure, no sliding, T1-T10)

_____ **4. Upper back and shoulder: warming and softening**
(traps, supraspinatus, shoulder mob. BMT, eff, knead, skin rolling)

_____ **5. Upper back and shoulder: deep longitudinal stripping**
(traps, supraspinatus, 2-4" sections, melt in if needed, thumbs, fingertips)

_____ **6. Supraspinatus insertion tendon: deep transverse friction**
(inferior to lateral edge of acromion, cross-fiber, moderate pressure, 1 minute)

_____ **7. GH lateral rotators: warming and softening**
(infraspinatus, teres minor, posterior deltoid, scapular mobilization with deltoid compressions, effleurage, kneading, skin rolling, deep effleurage)

_____ **8. GH lateral rotators: deep longitudinal stripping**
(infraspinatus, teres minor, posterior deltoid, 2-4" sections, thumbs, fingertips)

_____ **9. GH lateral rotators: deep stripping with active engagement lengthening**
(infraspinatus, teres minor, cactus position, isometric contraction, lengthening)

_____ **10. GH lateral rotators: passive stretch**
(joint mobilization, back of hand on low back, bicep touching torso, 3 times)

_____ **11. Triceps and anterior forearm: superficial fascia assessment**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **12. Triceps and anterior forearm: myofascial release**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **13. Triceps and anterior forearm: warming and softening**
(triceps, anterior forearm, eff, full, knead, stripping, skin rolling, deep effleurage)

_____ **14. Anterior forearm: deep effleurage distally**
(one hand supports the elbow, loose fist distal effleurage, light on distal 1/3)

Supine

_____ **15. Chest and anterior deltoid: superficial fascia assessment**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **16. Chest and anterior deltoid: myofascial release**
(without lubricant, tangential pressure, no sliding, full length and breadth)

_____ **17. Chest and anterior deltoid: warming and softening**
(shoulder mob. with pectoral comp., eff, knead, skin rolling, deep effleurage)

_____ **18. Chest and anterior deltoid: deep longitudinal stripping**
(pectoralis major, anterior deltoid, 2-4" sections, thumbs, fingertips)

_____ **19. Subscapularis: deep friction and melting**
(shoulder abducted 90 degrees, elbow flexed 90 degrees, hand pointing toward the ceiling, press flatly and posteriorly, optional active engagement lengthening)

_____ **20. Subscapularis: passive stretch**
(joint mobilization, shoulder abducted 90 degrees, elbow flexed 90 degrees, announce it, foot-hand tractions elbow, head-hand laterally rotates shoulder)

_____ **21. Anterior upper extremity: warming and softening**
(biceps, brachialis, coracobrachialis, brachioradialis, wrist and finger flexors, eff, full, knead, skin rolling, fiber spreading BMT, thenar/hypothenar cross-fiber)

_____ **22. Finger and wrist flexors: deep stripping with active lengthening**
(make a fist/curl your wrist, proximal stripping during extension, 2-4" sections)

_____ **23. Flexor pollicis brevis: passive stretch**
(shoulder abducted 90 degrees, elbow flexed 90 degrees, joint mobilization, announce it, foot-hand hyperextends wrist and fingers, head-hand grasps the thenar eminence and pulls the thumb into extension)

_____ **24. Median nerve: mobilization**
(shoulder abducted 90 degrees, elbow extended, wrist hyperextended, release)

_____ **Final Grade** (S = 100%, U = retake the exam)

Instructor Name _____ Student Name _____

82a Orthopedic Massage: Introduction - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Thoracic outlet syndrome (AKA: TOS) Several pathologies involving compression of arteries, veins, or nerves near the thoracic outlet. A complex condition that is often overlooked or misdiagnosed.

Thoracic outlet Upper border of the thoracic rib cage where structures either exit or enter.

Structures that may be involved in TOS:

- Brachial plexus
- Subclavian artery
- Subclavian vein

Four different TOS pathologies

1. True neurogenic TOS
    - Rare. Brachial plexus compression between C7 "rib" and clavicle.
    - **Neurogenic** Originating in nervous tissue.
    - No soft tissue treatment can remove the cervical rib obstruction.
    - The techniques for the other syndromes can help this syndrome.

2. Anterior scalene syndrome
    - Neurovascular compression between anterior and middle scalenes.

3. Costoclavicular syndrome
    - Neurovascular compression between the clavicle and first rib.

4. Pectoralis minor syndrome
    - Neurovascular compression between pectoralis minor and ribs.

82a Orthopedic Massage: Introduction - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Brachial plexus cords

- Medial cord: ulnar 1/3 of the fingers and hand.
- Lateral cord: radial 2/3 of the fingers and hand (dorsum of hand excepted).
- Posterior cord: radial 2/3 of dorsum of the hand.

82a Orthopedic Massage: Introduction - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Onset and Etiology

Acute: often caused by a direct blow to the clavicle

Chronic: postural distortions with resultant muscular dysfunction

- Prolonged shoulder abduction (hairstyling, playing the violin)
- Wearing a heavy backpack or carrying heavy objects

Signs and Symptoms

Upper extremity

- Pain
- **Paresthesia** Sensation of pins and needles.
- Feeling of heaviness
- Coldness
- Discoloration

Thenar muscle atrophy

- **Thenar muscles** First and fifth finger abductors and flexors.
- **Atrophy** Wasting away of or reduction in the mass of tissue.
- Anterior and middle scalene tension compresses the brachial plexus.
- Coracobrachialis and biceps brachii tension pull the coracoid process inferiorly. This causes the pectoralis minor to shorten and become hypertonic resulting in compression of the brachial plexus against the ribcage.

Traditional Treatments

Postural re-education, stretching, and strengthening

- Effective.

Surgery

Variable effectiveness: most effective for true neurologic TOS.

82a Orthopedic Massage: Introduction - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Considerations and Cautions for Thoracic Outlet Syndrome

- Treat the soft tissues in ALL possible areas of compression.

- Address postural dysfunctions by using frequent postural corrections.

- Stretch cervical and shoulder girdle muscles to the point of mild pain or discomfort. This elongates the connective tissue component of the muscle, and changes the rate of stimulation in the neuromuscular component of the muscle, thus reducing tension.

- Exacerbation of neurological symptoms during muscular stretching may be due to stretching of neural tissues. Neural stretching may help to improve neural mobility. It is repetition, not tensile load that encourages greater mobility of the nerve between it and adjacent structures. Only perform the neural mobility technique after the entire upper extremity has been treated because it is more effective when the soft tissue along the path of the nerve is relaxed.

- In more severe cases where the suggested techniques aggravate the symptoms, simply reduce the pressure applied and focus on using the MET technique described below.

- **Vertebrobasilar insufficiency (AKA: VBI)** Decreased blood flow to the brain. Caused by compression of the vertebral artery by the combined actions of neck rotation and hyperextension. Symptoms are dizziness, vertigo, blurred vision, or fainting.

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SEATED DURING INTERVIEW DETAILS

1. Vertebrobasilar insufficiency test (VBI test)

- Perform while client is seated during interview
- Test both sides; first one side and then the other
- Instruct the client:
  - "Look up and over your shoulder to one side"
  - "Hold this position for 30 seconds"
- The test is positive if the client experiences any of the following:
  - **Vertigo** Perception of a spinning motion (due to dysfunction of the vestibular system)
  - **Dizziness** Sensation of feeling off balance
  - **Nausea** Sensation of unease and discomfort in the upper stomach with an involuntary urge to vomit
  - Double vision or blurred vision

- **NOTE:** Vertebrobasilar insufficiency is a contraindication for active cervical flexion with longitudinal stripping

Soft-Tissue Manipulation: SUPINE DETAILS

2. Upper chest: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

3. Upper chest: myofascial release

- Work without lubricant
- Sit at the head of the table facing down toward the feet
- Place each hand flatly on the skin surface working bilaterally
- Use your fingers to apply light tangential pulling pressure
- Press in just enough to traction the superficial fascia without sliding
- Hold. Wait for a subtle tissue release or indication from the client
- Repeat in different directions and areas to address restrictions

4. Upper chest: warming and softening

- Address pectoralis major and pectoralis minor
- BMT: unilateral ribcage compression and mobilization
- BMT: bilateral upper ribcage compressions
- BMT: shoulder mobilizations with pectoral compressions
- Swedish: effleurage, kneading, fiber spreading, stripping, and skin rolling
- Deep tissue: compressive effleurage
- Deep tissue: superficial friction
- Deep tissue: deep friction and melting
- Continue until the muscles are thoroughly warmed and softened

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

5. Pectoralis minor: deep longitudinal stripping

- Address all three bellies from coracoid process to ribs 3, 4, and 5
- This area can be tender, so adjust pressure accordingly
- Use thumbs or fingertips with hands stacked for stability
- Work inferiorly in 2 to 4 inch sections
- Melt in or repeat stripping in areas of palpated or reported tension
- Progressively work more deeply as tissues soften
- Immediately stop if neurovascular symptoms are reproduced

6. Pectoralis minor: pin and stretch

- Immediately stop if neurovascular symptoms are reproduced
- This area can be tender, so adjust pressure accordingly
- Stand at the head of the table facing toward the feet
- Use thumbs or fingertips with hands stacked for stability
- Make positive contact with pectoralis minor, checking to see if neurovascular symptoms are exacerbated by this contact
- Instruct the client:
    - "Keeping your arms alongside your torso, reach as far down toward your toes as possible" (scapulothoracic depression which concentrically contracts the pectoralis minor)
- Pin the pectoralis minor: apply pressure to pectoralis minor that is moderate to significant but within the client's comfort tolerance
- Instruct the client:
    - "Bring your shoulders up toward your ears" (scapulothoracic elevation which lengthens the pectoralis minor)
- As the client does this, maintain your position and pressure
- **Variation: strip inferiorly as the client elevates the scapula**
- Repeat to address tension in all three bellies of pectoralis minor

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

7. Anterolateral neck: superficial fascia assessment

- Work without lubricant
- Use your palm and fingers to apply light tangential pulling pressure
- Place your fingertips flatly on the skin surface
- Press in just enough to traction the superficial fascia without sliding
- Slowly traction in all directions taking note of restrictions
- Use before and after treating superficial fascia to gauge progress

8. Anterolateral neck: myofascial release

- Work without lubricant
- Sit at the head of the table facing down toward the feet
- Place each hand flatly on the skin surface working bilaterally
- Use your fingers to apply light tangential pulling pressure
- Press in just enough to traction the superficial fascia without sliding
- Hold. Wait for a subtle tissue release or indication from the client
- Repeat in different directions and areas to address restrictions in the anterior, lateral, and posterior cervical areas.

9. Anterolateral neck: warming and softening

- Address the anterolateral neck one side at a time
- Specifically, SCM, scalenes, levator scapula, and upper anterior trapezius
- BMT: head & neck rotation with posterior cervical compressions & release
- BMT: alternating scapular depression with trapezius compressions
- Swedish: effleurage, and broad cross-fiber with one thumb
- Continue until the muscles are thoroughly warmed and softened

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

10. Scalenes: deep longitudinal stripping

- While working in this area, be cautious of:
    - Carotid artery and jugular vein (vascular structures)
    - Trachea (respiratory structure)
    - Cranial nerves (neural structures)
- Address the accessible portions of anterior and middle scalenes
- Roll head slightly away from the area to be addressed
- Use fingertip of first 2 fingers to work in 2 to 4 inch sections
- Work inferiorly to best avoid loosening any blood clots
- Melt in or repeat in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

11. Scalenes: deep longitudinal stripping with active lengthening after PIR

- Warning: Vertebrobasilar insufficiency contraindicates this technique
- If the client is not comfortable with their head hanging off the end of the table, use a bolster or pillow under the upper back so there is room to move the head into hyperextension
- Instruct the client:
    - "Move past the head of the table to hang your head off the edge"
    - "Rotate it slightly to the left (right) as I support it with one hand"
    - (This results in the practitioner holding the client's head in one hand with it rotated to one side)
    - "Now take the weight of your head"
    - "Lift your head slightly and hold for 5-8 seconds"(isometric)
    - "Slowly relax your head" (post-isometric relaxation)
    - "Slowly lower your head toward the floor" (active lengthening)
- As the client does this, longitudinally strip the accessible scalene fibers inferiorly with your 2nd and 3rd fingers.

82b Orthopedic Massage: Technique Demo and Practice - Thoracic Outlet

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

12. Brachial plexus: mobilization

- Stand by the hips facing toward the head of the table
- Instruct the client:
    - "Keeping your nose pointing toward the ceiling, slide your head toward your left (right) shoulder" (lateral neck flex)
- Bring the client into this position:
    - Abduct the arm 90°
    - Flex the elbow 90° and hold it with your outside hand
    - Hyperextend wrist and fingers with your inside hand so that the fingertips are pointing inferiorly.
    - Holding this configuration, bring the arm and hand toward the client's ear.
- Do not hold the client in this final stretch position
- Bring the arm back to neutral and repeat several times

13. Neck passive stretches: lateral flexion

14. Neck passive stretches: rotation

84b Orthopedic Massage: Spot Check – Thoracic Outlet

Student Name _____ Group _____Date _____

As you observe the student, mark the appropriate space as satisfactory (S) or unsatisfactory (U)

Seated

_____ **1. Vertebrobasilar insufficiency test (VBI test)**

(client seated, "Look up and over your shoulder to one side", "Hold this position for 30 seconds", both sides tested, if the VBI test is positive, it contraindicates active cervical flexion with longitudinal stripping, VBI test is positive if:

- Vertigo = perception of spinning motion
- Dizziness = sensation of feeling off balance
- Nausea = sensation of upper stomach discomfort with an urge to vomit
- Double or blurred vision

Supine

_____ **2. Upper chest: superficial fascia assessment**

(without lubricant, light tangential pulling pressure, no sliding, in all directions)

_____ **3. Upper chest: myofascial release**

(without lubricant, light tangential pulling pressure, no sliding, hold and wait)

_____ **4. Upper chest: warming and softening**

(pectoralis major, pectoralis minor, unilateral ribcage comp. and mob., bilateral upper ribcage comp., shoulder mob. with pectoral comp., eff, knead, fiber spreading, skin rolling, deep effleurage, deep friction and melting)

_____ **5. Pectoralis minor: deep longitudinal stripping**

(three bellies, from coracoid process to ribs, 2-4" sections, thumbs, fingertips)

_____ **6. Pectoralis minor: pin and stretch**

(stand at the head of the table facing toward the feet, thumbs, fingertips, make positive contact with pectoralis minor, "Keeping your arms alongside your torso, reach as far down toward your toes as possible", pin pectoralis minor, "Bring your shoulders up toward your ears", all three bellies, variation: strip inferiorly as the client elevates the scapula)

Supine, continued

_____ **7. Anterolateral neck: superficial fascia assessment**
(without lubricant, light tangential pulling pressure, no sliding, in all directions)

_____ **8. Anterolateral neck: myofascial release**
(sit at the head of the table facing down toward the feet, without lubricant, light tangential pulling pressure, no sliding, hold and wait, anterior, lateral, posterior)

_____ **9. Anterolateral neck: warming and softening**
(one side at a time, SCM, scalenes, levator scapula, upper trapezius, head and neck rotation with posterior cervical comp. and release, alternating scapular depression with trapezius comp., effleurage, broad cross-fiber with one thumb)

_____ **10. Scalenes: deep longitudinal stripping**
(one side at a time, anterior and middle scalenes, head rolled slightly, 2-4 inch sections, strip inferiorly, melt in if needed)

_____ **11. Scalenes: deep longitudinal stripping with active lengthening after PIR**
(skipped if VBI test was positive, "Move past the head of the table and hang your head off the edge", "Rotate it slightly to the left as I support it with one hand", "Now take the weight of your head", "Lift your head slightly and hold for 5-8 seconds", " Slowly relax your head", "Slowly lower your head toward the floor", strip longitudinally and inferiorly)

_____ **12. Brachial plexus: mobilization**
(stand by the hips, facing the head of the table, "Slide your head toward your shoulder", abduct arm 90 degrees, elbow flexed 90 degrees, outside hand holds the elbow, inside hand hyperextends wrist and fingers so that fingers are pointing inferiorly, holding this configuration bring the arm and hand toward the client's ear, do not hold it here, release and repeat)

_____ **13. Passive stretches: neck lateral flexion**

_____ **14. Passive stretches: neck rotation**

_____ **Final Grade** (S = 100%, U = retake the exam)

Instructor Name _____ Student Name _____

85a Orthopedic Massage: Introduction - Neck Pain

Lowe: Chapter 10 - Cervical Spine

Neuromuscular neck pain Hypertonicity either throughout an entire neck muscle or in localized areas of a neck muscle.

Etiology

- Keeping the head in an upright position places postural strain on cervical muscles and other soft-tissues.

- Once the head moves forward of the center of gravity, there is a significant increase in muscle activity to hold the head upright.

- This can lead to muscular dysfunction in the form of trigger points or hypertonicity in an entire muscle.

- A pain-spasm-pain cycle can result from even slight muscular dysfunction.

- Sudden loading of hypertonic cervical muscles can produce symptoms in other areas such as the temporomandibular joint.

- Because many cervical muscles maintain constant isometric contractions during the day just to keep the head erect, patterns of dysfunction are facilitated by the very act of attempting to hold the head upright.

- These patterns of dysfunction can have a tendency to recur any time the individual is exposed to physical, psychological, or chemical stressors.

85a Orthopedic Massage: Introduction - Neck Pain

Lowe: Chapter 10 - Cervical Spine

Traditional Treatments

Immobilization using a cervical collar

- Variable effectiveness: only used if the pain is severe and joint hypermobility is a serious concern.

Rest

- Variable effectiveness: continue normal daily functions, but avoid any painful activities.

Instruction in body mechanics, stretching, and strength training

- Effective: if done properly and regularly

Anti-inflammatory medications

- Variable effectiveness: reduces pain if there is inflammation

85a Orthopedic Massage: Introduction - Neck Pain

Lowe: Chapter 10 - Cervical Spine

Considerations and Cautions for Neuromuscular Neck Pain

- Neuromuscular pain is established by constant reinforcement. Early in your treatment, encourage the client to change these movement patterns to complement the myofascial manipulation.

- Stretching and flexibility enhancement are essential to treating neuromuscular pain. Stretching is most effective after soft-tissue manipulation has enhanced tissue pliability.

- This treatment can dramatically alter muscular proprioception resulting in spasms in an easily overloaded muscle. Have the client move slowly and carefully when first getting up from the massage table and for a short time afterward.

- Clients with sensitivity during head and neck movement may brace with protective muscle guarding. Be aware of these guarding possibilities, and make sure that your treatment encourages relaxation.

Blank Page

85b Orthopedic Massage: Technique Demo and Practice – Neck Pain

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS

1. Posterolateral neck: superficial fascia assessment (bilateral)

- Work without lubricant and remove any from you and your client
- Sit at the head of the table facing down toward the feet
- Client's head and neck are in a neutral position
- Place your finger pads flatly on the skin surface working bilaterally
- Apply light tangential pulling pressure without sliding
- Take note of restrictions before switching to a different area or direction
- Use before and after treating superficial fascia to gauge progress

2. Posterolateral neck: myofascial release (bilateral)

- Work without lubricant and remove any from you and your client
- Sit at the head of the table facing down toward the feet
- Client's head and neck are in a neutral position
- Place your finger pads flatly on the skin surface working bilaterally
- Apply light tangential pulling pressure without sliding
- Hold. Wait for a subtle tissue release or indication from the client
- Repeat in different areas or in different directions
- Address all restrictions discovered in the posterolateral neck

85b Orthopedic Massage: Technique Demo and Practice – Neck Pain

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

3. Posterolateral neck: warming and softening

- Address upper trapezius, levator scapula, subocciptals, splenius, semispinalis, erectors, multifidi, and rotatores
- BMT: head & neck rotation with posterior cervical compressions & release
- BMT: alternating scapular depressions with trapezius compressions
- Swedish:
    - Sit at the head of the table facing down toward the feet
    - Work unilaterally with head rolled slightly to the opposite side
    - Effleurage longitudinally
    - Fingertip circles
    - Broad cross-fiber with one thumb, progressing inferiorly
- Continue until the muscles are thoroughly warmed and softened

4. Posterolateral neck: deep longitudinal stripping

- Address upper trapezius, levator scapula, subocciptals, splenius, semispinalis, erectors, SCM, scalenes, multifidi, and rotatores
- Sit at the head of the table facing down toward the feet
- Work unilaterally with head rolled slightly to the opposite side
- Use finger pads to work in 2 to 4 inch sections
- Work inferiorly
- Melt in or repeat in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

85b Orthopedic Massage: Technique Demo and Practice – Neck Pain

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

5. Lamina groove: deep longitudinal stripping

- Address multifidi and rotatores
- Lamina groove is between transverse and spinous processes
- Sit at the head of the table facing down toward the feet
- Work unilaterally with head rolled slightly to the opposite side
- Use finger pads to work in 2 to 4 inch sections
- Work inferiorly
- Melt in or repeat in areas of palpated or reported tension
- Progressively work more deeply as tissues soften

6. Cervical extensors: deep stripping with active lengthening after PIR

- Address upper trapezius, levator scapula, subocciptals, splenius, semispinalis, erectors, multifidi, and rotatores
- Sit at the head of the table facing down toward the feet
- Work unilaterally with the client's head in a neutral position
- Instruct the client:
    - "Using light pressure (25%), press your head back into the table" (isometric neck extension)
    - "Hold this pressure for 5 seconds and then slowly relax your head" (post-isometric relaxation)
    - "Now slowly lift your head bringing your chin to your chest"
- As the client does this, strip the cervical extensors inferiorly
- Repeat a few times.
- Progressively work more deeply as tissues soften

85b Orthopedic Massage: Technique Demo and Practice – Neck Pain

Lowe: Chapter 10 - Cervical Spine

Soft-Tissue Manipulation: SUPINE DETAILS, continued

7. Cervical lateral flexors: deep stripping with active lengthening after PIR

- Address upper trapezius, levator scapula, SCM, scalenes, splenius, and erectors
- Work unilaterally with the client's head in a neutral position
- Stand or sit by the belly facing toward the head of the table
- Place your outside hand along the side of the head to resist lateral flexion
- Instruct client:
    - "Keeping your nose pointing toward the ceiling, slide your left (right) ear toward your left (right) shoulder"
    - "Using light pressure (25%), press the side of your head into my hand" (isometric neck lateral flexion)
    - "Hold this pressure for 5 seconds and then slowly relax your head" (post-isometric relaxation)
    - "Now slowly slide your head toward the opposite shoulder."
- As the client does this, strip the cervical lateral flexors inferiorly
- Repeat a few times.
- Progressively work more deeply as tissues soften

8. Passive stretches: neck lateral flexion

9. Passive stretches: neck rotation

Orthopedic Massage: Spot Check – Neck Pain

Student Name _____ Group _____Date _____

As you observe the student, mark the appropriate space as satisfactory (S) or unsatisfactory (U)

Supine

_____ **1. Posterolateral neck: superficial fascia assessment**
(without lubricant, light tangential pulling pressure, no sliding, in all directions)

_____ **2. Posterolateral neck: myofascial release**
(sit at the head of the table facing down toward the feet, without lubricant, light tangential pulling pressure, no sliding, hold and wait, anterior, lateral, posterior)

_____ **3. Posterolateral neck: warming and softening**
(upper trapezius, levator scapula, splenius, semispinalis, head and neck rotation with post. cervical comp. BMT, alternating scapular depressions with trapezius comp. BMT, effleurage, fingertips circles, broad cross-fiber with one thumb)

_____ **4. Posterolateral neck: deep longitudinal stripping**
(upper trapezius, levator scapula, splenius, semispinalis, erectors, head rolled slightly to one side, 2-4" sections, finger pads strip inferiorly, melt in if needed)

_____ **5. Lamina groove: deep longitudinal stripping**
(multifidi, rotatores, head rolled slightly to one side, 2-4" sections, finger pads strip inferiorly, just lateral to the spinous processes, melt in if needed)

Supine, continued

_____ **6. Cervical extensors: deep stripping with active lengthening after PIR** (upper trapezius, levator scapula, splenius, semispinalis, erectors, head positioned in neutral, "Using 25% of your strength press the back of your head into the table", "Hold this pressure for 5 seconds", "Relax your head and now slowly lift it bringing your chin to your chest", work unilaterally, 2-4" sections, finger pads strip inferiorly, melt in if needed)

_____ **7. Cervical lateral flexors: deep stripping with active lengthening after PIR** (upper trapezius, levator scapula, splenius, erectors, "Slide your left ear toward your left shoulder", "Using 25% of your strength press the side of your head into my hand", "Hold this pressure for 5 seconds", "Relax your head and now slowly slide your head toward the opposite shoulder", work unilaterally, 2-4" sections, finger pads strip inferiorly, melt in if needed)

_____ **8. Passive stretches: neck lateral flexion**

_____ **9. Passive stretches: neck rotation**

_____ **Final Grade** (S = 100%, U = retake the exam)

Instructor Name _____ Student Name _____