Lesson 5.1 Objectives

- Discuss anatomic structures and physiologic processes related to the musculoskeletal system.
- Define skeletal disorders and list appropriate massage considerations.
- List risk factors for osteoporosis.
- Identify spinal deviations featured in this chapter and list massage considerations.

Musculoskeletal System Overview

- Three types of muscle tissue
  - Cardiac
    - Found in the heart; involuntary
  - Smooth
    - Found in walls of hollow structures (i.e., blood vessels, air passageways), and most abdominopelvic organs; involuntary
  - Skeletal
    - Move bone, skin, or other skeletal muscles; voluntary

Muscular Contraction

- Sliding filament theory
  - Myosin pulls on actin
  - Actin shortens myofibrils
  - Myofibrils shorten muscle fibers
  - Muscle fibers shorten muscle

Muscle Structure

- Skeletal muscle (cont'd.)
  - Consists of individual muscle cells called muscle fibers, which contain myofibrils
**Muscle Function**
- Produces body movements
- Stabilizes body positions
- Stores and moves substances within the body
- Generates heat; helps maintain normal body temperature

**Muscle Function Groups**
- Muscles work in pairs or groups to coordinate movement.
- Groups classified by function
  - Agonists
  - Synergists
  - Antagonists
  - Fixators

**Skeletal System**
- Components:
  - Bones
  - Cartilage
  - Ligaments
  - Joints

**Structure of Bone Tissue**
- Diaphysis
- Epiphyses
- Periosteum
- Medullary cavity
Bone Shape Classification

- Long – longer than they are wide
- Short – cube shaped
- Flat – thin and flattened
- Irregular – do not fit in other categories
- Sesamoid – small, round, embedded in certain tendons

Joint Classification

- Synarthrotic joint
- Amphiarthrotic joint
- Diarthrotic joint
  - Synovial joints

Synovial Joint Structure

Types of Synovial Joints

- Hinge joint
- Pivot joint
- Ellipsoidal joint
- Saddle joint
- Gliding joint
- Ball & socket joint

Skeletal Disorders

- Osteoporosis
- Osteomalacia and Rickets
- Paget disease
- Spondylosis
- Osteomyelitis
- Marfan syndrome

Osteoporosis

- Loss of normal bone density resulting in increased susceptibility to fractures
- Use lighter pressure and avoid joint mobilizations and compressions or administer carefully
Osteoporosis

- Bone deformity is most common manifestation (spinal curvature, loss of height)

Osteomalacia and Rickets

- Osteomalacia: inadequate mineralization of mature bones
- Rickets: osteomalacia in children
- Use lighter pressure and avoid joint mobilizations and compressions or administer carefully

Paget Disease

- Progressive bone disease with abnormal and excessive bone remodeling resulting in weak and deformed bones of increased mass
- Use lighter pressure and avoid joint mobilizations and compressions or administer carefully

Spondylolysis

- Structural defect in a vertebra (usually L5) leading to its weakness and impaired weight-bearing capacity
- Use lighter pressure over lower back and sacrum; avoid joint mobilizations or compressions of these areas or administer carefully

Osteomyelitis

- Bone infection most often caused by bacteria
- Massage is contraindicated

Marfan Syndrome

- Genetic disorder; abnormality in body’s connective tissue; affects many body systems, most often the skeletal and cardiovascular systems and eyes
- Modifications are based on disease severity
Spinal Deviations

- Kyphosis
- Lordosis
- Scoliosis

Kyphosis

- Exaggeration of the normal posterior thoracic curve
- Avoid overstretching spine; if due to osteoporosis, use lighter pressure

Lordosis

- Exaggeration of the normal anterior lumbar spinal curve
- Position the client for comfort; use deep stroking and kneading on affected muscles

Scoliosis

- Lateral curvature in the normally straight vertical spinal line, usually in the thorax
- Use deep stroking and kneading on affected muscles; avoid overstretching the spine

Lesson 4.2 Objectives

- Define foot deformities and list massage considerations.
- Define miscellaneous joint disorders and list massage considerations.
- List types of arthritis and discuss massage considerations.
- Contrast and compare ankylosing spondylitis with rheumatoid arthritis.

Lesson 4.2 Objectives (cont'd.)

- Name muscular and myofascial conditions and state massage considerations.
- Delineate types of headaches.
- List several clinical manifestations of fibromyalgia.
- Contrast and compare fibromyalgia and myofascial pain syndrome.
- Name several types of muscular dystrophy.
Foot Deformities

- Bunions
- Hammertoes and Mallet toes
- Pes planus and Pes cavus

Bunion

- Medial displacement of the first metatarsophalangeal joint (great toe)
- Avoid area or use lighter pressure if tender; avoid joint mobilizations

Hammertoes and Mallet Toes

- Hammer toe: metatarsophalangeal joint extended and proximal interphalangeal joint flexed
- Mallet toe: distal interphalangeal joint flexed
- Avoid area or use lighter pressure if tender; avoid joint mobilizations

Hammer Toes and Mallet Toes

Pes Planus and Pes Cavus

- Pes planus (flatfoot) – Medial longitudinal arch is reduced or collapsed
- Pes Cavus (high instep) – both medial and lateral longitudinal arches are excessively raised
- Deep gliding, kneading, and friction strokes to loosen tight calf muscles; avoid any related corns or calluses or use lighter pressure if tender

Pes Planus and Pes Cavus, (cont’d.)
Joint Disorders

- Spondylolisthesis
- Patellofemoral syndrome
- Ganglion cyst
- Baker cyst
- Bursitis
- Temporomandibular joint dysfunction

Spondylolisthesis

- Anteriorly displaced vertebra; usually affects lower spine
- Use lighter pressure over affected area; avoid joint mobilizations and compressions or administer carefully

Patellofemoral Syndrome

- Softening and degeneration of articular cartilage located on posterior patella
- Avoid area if swollen, inflamed, or tender; deep gliding, kneading, friction, myofascial release techniques on quads and hamstrings but avoid stretching of quads

Ganglion Cyst

- Benign mass usually located on wrist tendon
- Local contraindication

Baker Cyst

- Cyst behind knee caused by accumulation of synovial fluid
- Local contraindication; use soft bolster behind knees while client is supine

Bursitis

- Chronic or acute inflammation of the bursae
- Local contraindication in acute stage; deep friction and jt. mobs helpful in chronic stage (use ice afterwards); avoid jt. mobs if they cause pain
Temporomandibular Joint Dysfunction (TMJD)
- Disorders of the jaw joint, its musculature, or both causing pain in the jaw, teeth, head, and ears
- Massage is indicated using advanced techniques to intraorally treat jaw musculature (where legal)

Arthritis
- Osteoarthritis
- Spondylosis
- Rheumatoid arthritis
- Juvenile rheumatoid arthritis
- Ankylosing spondylitis
- Gouty arthritis
- Lyme disease
- Septic arthritis

Osteoarthritis
- Progressive damage and eventual loss of articular cartilage; also called degenerative joint disease
- Avoid joints that are red, hot, or tender; use mild-to-moderate-pressure; neck movements are best omitted or carried out with extreme caution

Spondylosis
- Degeneration of the spine
- Avoid undue pressure over the spine; joint mobilizations of the spine (including cervical area) are best omitted or carried out with extreme caution

Rheumatoid Arthritis
- Systemic arthritis affecting synovial membranes, then articular cartilages and other joint structures
- Massage contraindicated during exacerbations; otherwise, adjust pressure to client tolerance
**Juvenile Rheumatoid Arthritis**
- Any joint inflammation of at least 6 weeks in a child
- Massage contraindicated during exacerbations; otherwise, adjust pressure to client tolerance

**Gouty Arthritis (Gout)**
- Inflammatory arthritis resulting from uric acid crystals in joints
- During attacks, massage is adjusted according to symptoms; in chronic cases, use lighter pressure over nodules and avoid mobs of deformed joints.

**Septic Arthritis (Infectious Arthritis)**
- Infection in a joint; usually caused by bacteria
- Massage is contraindicated

**Ankylosing Spondylitis**
- Systemic arthritis leading to calcification and fusion (ankylosis) of joints, usually spine and sacroiliac joints
- Reduce pressure over tender areas; avoid joint mobilizations; avoid rib cage compressions

**Lyme Disease**
- Recurrent arthritis affecting not only joints, but skin, heart, and nervous system
- Massage contraindicated if fever is present; otherwise, tailor massage to symptoms and avoid lesions and red, swollen joints

**Muscular and Myofascial Disorders**
- Muscular atrophy
- Contractures
- Dupuytren contracture
- Headaches
- Fibromyalgia syndrome
- Myofascial pain syndrome
- Muscular dystrophy
- Myositis ossificans
Muscular Atrophy
- Decrease in muscle cell diameter; muscle appears smaller, looser, flattened
- Begin slowly and superficially; gradually increase pressure to tolerance

Contracture
- Transient or permanent shortening of muscle causing flexed and fixated position of joint
- Reduce pressure in areas with little or no sensation; contractures are difficult or impossible to reduce with massage; this should be conveyed to the client

Dupuytren’s Contracture
- Fibrosis of the palmar fascia; rare condition
- Reduce pressure in areas with little or no sensation; contractures are difficult or impossible to reduce with massage; this should be conveyed to the client

Headaches
- Pain in the head from any cause; types are tension (muscular contraction), cluster, and migraine
- Massage is indicated

Fibromyalgia Syndrome
- Chronic, generalized syndrome of diffuse soft-tissue pain and multiple tender points
- Massage tailored to how client is feeling at time of treatment; begin with slow increments in pressure from session to session

Fibromyalgia Syndrome (cont’d.)
Myofascial Pain Syndrome

- Disorder associated with presence of localized trigger points
- Massage and stretching is indicated over trigger points and adjacent areas; avoid oscillating movements (percussion and vibration) to avoid producing localized contractions

Fibromyalgia vs. Myofascial Pain Syndrome

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fibromyalgia</th>
<th>MPS</th>
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<tbody>
<tr>
<td>Location</td>
<td>Generalized</td>
<td>Regional</td>
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<tr>
<td>Primary symptom</td>
<td>Tender points with pressure application</td>
<td>Trigger points and referred pain patterns with pressure application</td>
</tr>
<tr>
<td>Gender</td>
<td>Female/Male (10:1)</td>
<td>Equal</td>
</tr>
<tr>
<td>Systemic signs</td>
<td>Few</td>
<td>Few</td>
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Muscular Dystrophy

- Collection of rare genetic muscle diseases characterized by progressive muscle atrophy
- Massage modifications based on disease severity

Muscular Dystrophy (cont'd.)

- Deposition of calcium in traumatized area of musculature caused by injury
- Local contraindication

Myositis Ossificans

- Deposition of calcium in traumatized area of musculature caused by injury
- Local contraindication
Lesson 5.3 Objectives

- Discuss musculoskeletal injuries and include massage considerations.
- List several types of fractures.
- Explain the three degrees of sprains and strains.

Musculoskeletal Injuries

- Dislocations and subluxations
- Fractures
- Sprains
- Strains
- Volkmann contracture
- Tendinitis, Epicondylitis, and Tenosynovitis
- De Quervain tenosynovitis

Musculoskeletal Injuries (cont’d)

- Osgood-Schlatter disease
- Torticollis
- Whiplash
- Repetitive strain injuries
- Adhesive capsulitis
- Compartment syndrome
- Shin splints
- Plantar fasciitis

Dislocation and Subluxation

- Dislocation – temporary displacement of bones at the joint
- Subluxation – contact is only partially lost
- Local contraindication for recent injuries and inflamed areas

Fractures

- Disruption or break in bone continuity
- Local contraindication if bone is immobilized, but massage to proximal and distal areas is useful

Sprain

- Overstretching or tearing of ligaments without bone displacement; three degrees (first, second, and third)
- Avoid affected area for 72 hrs after injury
**Strain (Pull)**
- Overstretching or tearing of muscle or its tendons; three degrees (first, second, and third)
- Avoid affected area for 72 hrs after injury

**Volkmann Contracture**
- Contracture of hand, fingers, and sometimes wrist; from reduced blood flow
- Reduce pressure in areas with little or no sensation; contractures are difficult or impossible to reduce with massage; this should be conveyed to the client

**Tendinitis (Tendonitis)**
- Inflammation of a tendon
- Avoid affected area if less than 72 hrs after injury; initial sessions are short and become longer as the area becomes use to pressure; follow with ice

**Tendinitis (cont'd)**
- Conditions associated with tendinitis are:
  - Tenosynovitis: tendinitis that also involves the sheath
  - Tendinosis: degeneration of the tendon
  - Epicondylitis: inflammation of the tendon where it attaches to a bone
  - Bursitis: inflammation of the bursae

**de Quervain’s Tenosynovitis**
- Inflammation of tendinous sheath on radial side of wrist
- Local contraindication if area is inflamed

**Osgood-Schlatter Disease**
- Patellar tendinitis in immature bone at the tibial tuberosity (where quads attach)
- Avoid area if swollen, inflamed, or tender; avoid overstretching quads on affected side
Torticollis
- Congenital or acquired spasms of sternocleidomastoid
- Avoid affected area if injury is less than 72 hours old; otherwise, avoid overstretching affected muscles

Whiplash
- A sprain/strain of the cervical spine and spinal cord (most commonly at the junction of C4 and C5); most common cause is injury from being pushed or struck from behind
- Avoid affected area for 72 hrs after injury

Repetitive Strain Injury (RSI)
- Injuries that develop over time; caused by prolonged repetitive or constant motion, usually combined with compressive forces
- Avoid area if inflamed; otherwise, deep pressure within client tolerance

Adhesive Capsulitis
- Disorder of shoulder joint and capsule; initially inflamed and eventually stiff or frozen
- Avoid area if inflamed; afterward, address surrounding muscles with heat and massage

Compartment Syndrome
- Occurs when pressure within a nonyielding fascial compartment increases; types are acute and chronic
- Avoid area if client reports intense, stabbing pain or is hypersensitive to pressure

Shin Splints
- Pain along the tibia; usually bilateral
- Avoid area if pain is severe
Plantar Fasciitis

- Chronic inflammation of the plantar fascia ("pain in the heel")
- Avoid area if pain is severe; be sure affected foot is not excessively dorsiflexed