

***Somatic Patterning***  
**Supplemental Instructor Materials**  
**Chapter 10: Fundamental Movement Patterns**

*Note: Numbered points in the chapter's reading list, objectives, and summary are correlated and focus on topics that I think will be most relevant for massage students.*

*In brackets after suggested readings and objectives you will find an occasional reference from a subsequent chapter that expands on material introduced in this chapter. Please contact your education director for answers to the chapter questions.*

**Chapter 10 Suggested Readings**

1. Standard Terms to Describe Movement, pp. 249-250, [see also "flexion" and "extension" in *Normal Spinal Alignment*, p. 41]
2. The Spine, The Back of the Spine, The Front of the Spine, pp. 250-254
3. Integrating Spinal Movement through Arcing, pp. 254-255
4. Comparing Upper and Lower Limb Movement, pp. 255-257
5. Dexterity of the Upper Limbs, Hand-Eye Coordination, Hand Movement, pp. 257-258
6. The Shoulder Girdle, Rotation and Circumduction, pp. 258-261
7. The Scapulohumeral Rhythm, pp. 261-262
8. The Pelvis, Movement of the Sacrum and Pelvis, The Coccyx and Pelvic Floor, pp. 262-266
9. The Hips and Legs, Flexion and Extension of the Lower Limb, Rotation of the Lower Limb, pp. 266-269
10. The Knees and Sagittal Tracking, pp. 269-270
11. The Feet, pp. 270-272
12. The Lumbar-Pelvic Rhythm, pp. 272-273
13. Weight Shifts and Locomotion, Walking, pp. 273-276
14. Stepping through the Whole Foot, pp. 276-278

**Chapter 10 Objectives**

1. Identify standard terms to describe movement in each part of the body.
2. Identify two types of spinal curves. Contrast spinal movement in the front and back.
3. Describe the spinal arcing exercise and explain how it integrates spinal movement.
4. Compare the range and function of upper limb movement to lower limb movement.
5. Describe how hands movements are organized and their range of motion.
6. Name the bones of the shoulder girdle, describe its structure, and identify its function.
7. Define the scapulohumeral rhythm.
8. Name the bones of the pelvis, describe its structure, and identify its function.
9. Identify the two functions of the lower limbs and discuss their range of motion.
10. Describe the unique features of the knees.
11. Identify the three arches of the feet and discuss their functions.
12. Define the lumbar-pelvic rhythm.
13. Describe forward, backward, and lateral shifts in the pelvis during locomotion.
14. Describe ideal weight transference through the feet and fall and recovery in gait.

**Chapter 10 Summary**

1. Flexion and extension close or open the angle of a joint. Abduction and adduction describe movements away from and toward midline. Outward and inward rotation describe movements that turn the limbs or spine toward or away from midline. Elevation and depression describe movements of the shoulders or jaw up or down. Retraction and protraction describe movements of the shoulders or jaw backwards or forward. Supination and pronation describe that turn the palms or soles of the hands or feet up or down.
2. There are two types of spinal curves: lordotic curves are convex toward the front, kyphotic curves are concave toward the front. The front of the spine has close-packed vertebral bodies and disks that bear weight and absorb shock; the back of the spine has numerous bony processes and facets joints that provide attachment sites for muscles and allow a small range of gliding motion at each vertebral segment.
3. Arcing is a spinal patterning exercise in which a person initiates spinal flexion or extension at either the head or the tail, then allows the movement to progressively mobilize each vertebral segment. Arcing integrates spinal movement by ensuring that each vertebral segment moves within its full range of motion in an organized sequence.
4. The upper limbs and lower limbs are attached to trunk through ball-and-socket joints at the shoulder and hips called the proximal joints. The shoulder girdle is a hanging structure that allows the upper limbs to move the hands with maximal mobility in all three planes. In contrast, the more stable structure of pelvic girdle allows the lower limbs the mobility required in locomotion with the stability required to support body weight.
5. Hand-eye and hand-mouth coordinations organize complex neuromuscular pathways that are evident in the refined and intricate dexterity of the fingers and hands. This incredible range of prehensile skills is made possible by the sum of the range of circumduction—a circular motion that inscribes a cone shape—in the shoulder, elbow, wrist, and fingers.
6. The shoulder girdle is made up of the clavicles, scapula, and humeri. It is a highly mobile structure that attaches to the axial skeleton at the sternoclavicular joints; is supported by the tensional pulls of muscles suspended from the spine, scapula, and sternum; and functions like a yoke to suspend the arms away from the body where they can freely rotate and circumduct at the glenohumeral joints.
7. The scapulohumeral rhythm is the ratio of movement between the scapula and the shoulder. In a coordinated rhythm, the scapula remains stable until the shoulder moves past 90 degrees of flexion or 60 degrees of abduction, at which time the scapula moves with the shoulder in a 1:2 ratio.
8. The pelvis is made up of the pelvic bones, the sacrum, and the coccyx. It is a bony basin that transfers forces between the spine and the lower limbs, supports and protects the pelvic organs, serves as a base of support in a seated posture, and contains two acetabula, which are the proximal articulating sockets of the hip joints.

9. The two functions of the lower limbs are for weight support and locomotion. The lower limbs swing in a sagittal plane motion of flexion and extension as we walk, rotate as we change directions, and move laterally as we shift weight in a sideways direction.
10. The knee, the most complex joint in the body, allows the lower limb to bend and has two large menisci that pad the joint and absorb shock during weight-bearing activities. The knee rotates during flexion to compensate for differences in the size of the femoral condyles; the knee is often injured during movements involving excessive joint rotation.
11. Each foot is a tripod made up of three arches: a transverse, lateral, and medial arch. The functions of the arches are weight-bearing, shock absorption, and propulsion. On each step, the arches change shape to adapt the foot to uneven surfaces and they flatten and rebound, which provides a spring-like energy to the feet as we walk.
12. The lumbar-pelvic rhythm is the ratio of movement between the lumbar spine and hips. In an optimal rhythm, during forward bending the lumbar spine flexes first, then the hips begin to flex. Any rigidity or instability in the lumbar spine or hips will throw the rhythm off. For example, rigidity in the hips can cause compensatory hyperflexion in the lumbar spine.
13. Powerful muscles in the hips and legs propel the pelvis into a forward shift as we walk or run and into a lateral shift as weight transfers between the right and left legs. The shifts forward over the hips through a subtle, oscillation between an anterior and posterior pelvic tilt and sideways through a subtle, oscillating right-left lateral tilt.
14. In an ideal gait pattern, weight transfers through each foot, rolling from the heel through the toes in an alternating reach with the heel and push off with the toes. Walking is a process of fall and recovery in which one leg reflexively drops forward to catch the body on each step.

**Chapter 10 Questions**

*Note: Make sure to pay attention to the italics in some of the questions because they ask you to identify the statement that **does not** refer or is **not true** about the topic of the question.*

1. The front of the spine has close-packed vertebral bodies and disks
  - a. that bears weight and absorbs shock.
  - b. that provide attachment sites for muscles.
  - c. that allow gliding motion at each vertebral segment.
  - d. that are freely moveable in all three planes.
  
2. Which of the following statements *does not* describe the patterning exercise called arcing?
  - a. It is spinal flexion and extension motion that initiates at either the head or the tail.
  - b. It requires spinal movement to progressively mobilize each vertebral segment.
  - c. It organizes motion through each vertebral segment in a linear sequence.
  - d. It is the most efficient when it initiates somewhere in the middle of spinal curves.
  
3. Which of the following statements is *not true* about the shoulder and hips.
  - a. They are ball-and-socket joints that freely move in all three planes
  - b. They both attach to the axial skeleton via highly mobile girdles.
  - c. They are called proximal joints because they are closest to the trunk.
  - d. One is more mobile and the other is more stable for weight support.
  
4. The statements that *does not* describe a function of the pelvic girdle is
  - a. to transfer forces between the spine and lower limbs.
  - b. to allow enough mobility in legs for locomotion.
  - c. to be stable enough to support the body's weight.
  - d. to be flexible enough to allow prehensile articulations in the toes.
  
5. The incredible dexterity and mobility of the upper limbs comes from
  - a. the two-directional range of motion in the ellipsoid joints of the wrists.
  - b. the ability of the forearms to twist in supination and pronation.
  - c. the combined circumduction of the shoulders, elbows, wrists, and fingers.
  - d. the range of flexion and extension in all the joints of the arm.
  
6. The shoulder girdle attaches to the axial skeleton at
  - a. the sternoclavicular joints.
  - b. the acromioclavicular joints.
  - c. the scapulothoracic joints.
  - d. the glenohumeral joints.
  
7. Which of the following statements *does not* describe a function of the pelvis?
  - a. It supports and protects the pelvic organs.
  - b. It serves as a base of support in a seated posture.
  - c. It contains the articulating sockets of the hip joints.

- d. It allows greater flexibility than the shoulder girdle.
8. Restrictions in hip mobility will throw off a normal lumbar-pelvic rhythm by
    - a. causing compensatory flexibility in the lumbar spine.
    - b. causing compensatory rigidity in the lumbar spine.
    - c. causing compensatory instability in the lumbar spine.
    - d. causing adaptive shortening in the lumbar spine.
  9. In an arm movement with a normal scapulohumeral rhythm
    - a. The scapula always moves slightly before the shoulder moves.
    - b. The scapula remains stable through a full range of shoulder motion.
    - c. The scapula remains stable until after 90 degrees of arm flexion.
    - d. The degrees of motion in scapula and arm occur in an equal ratio.
  10. One way to ensure a full range of motion in the hips while walking is to
    - a. roll from the heel to the toes on each step.
    - b. avoid bending the toes as you step forward.
    - c. make sure the heel lands on the ground after the toes.
    - d. make sure the whole foot lands on the ground at the same time.