

Somatic Patterning
Supplemental Instructor Materials
Chapter 8: Neuromuscular Patterning

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.

Please contact your education director for answers to the chapter questions.

Chapter 8 Suggested Readings

1. Visualization and Ideokinesis, pp. 202-204
2. Bones, Skeletal Architecture and Physical Forces, pp. 204-205
3. Dimensional Balance in Movement, pp. 205-207
4. Laws of Motion, p. 207
5. Mechanical Stresses, pp. 207-208
6. Gravity and Levity, pp. 208-209
7. Balance between Tensile and Compressive Stresses, pp. 209-210
8. Synovial Joints, pp. 210-212
9. Muscles, Muscle Fibers and Function, pp. 212-213
10. Muscle Contraction, pp. 213-214?
11. Types of Contraction, pp. 214-218
12. Stretching Muscle or Fascia, pp. 218-219
13. Reciprocal Inhibition and Innervation in Coupled Pairs, pp. 219-220
14. Stretching Techniques, pp. 220-221
15. Peripheral Nerves and Stretching, pp. 221-223

Chapter 8 Objectives

1. Describe the Ideokinesis approach to neuromuscular patterning.
2. Identify and describe the architectural features of each body mass in the human skeleton.
3. Define dimensional balance and describe how it affects posture and movement.
4. Identify and define the three laws of gravity.
5. List and describe the effects of five mechanical stresses on the joints.
6. Describes the forces that produce the effects of levity and gravity on the body.
7. Discuss the balance between tensile and compressive forces on the body.
8. Describe synovial joints and list six types. Identify three types of intra-articular motion.
9. List three types of skeletal muscle fibers, two ways they metabolize oxygen, and their three general work capacities.
10. Explain the sliding filament theory of muscle contraction.
11. Define two types of contractions and two subtypes of contractions that change length.
12. Compare stretching techniques for fascia and muscles and explain why they differ.
13. Define the reciprocal innervation and reciprocal inhibition of coupled muscle pairs.
14. Identify and describe four stretching techniques.
15. Discuss the effects of stretching on peripheral nerves.

Chapter 8 Summary

1. Ideokinesis is the process of using an anatomically-correct visualization to guide the pathway of movement during a neuromuscular patterning exercise. During this process, it is important to inhibit voluntary effort toward the movement until after the image initiates the action, and to begin each exercise from a position of complete rest to avoid carrying muscular tensions into the new pattern.
2. The major masses of the human skeleton have several architectural features that illustrate how physical forces pass through the bones. The head is a top load borne through axial compression of the spine; the shoulder girdle resembles a tensional yoke that transfers the weight of the arms into a hanging side load; the pelvis functions like a braced arch that transfers forces between the spine and the lower limbs.
3. Ideally, the body has a dimensional balance between its width, height, and depth in each of the three planes, and this balance is maintained through a sequence of movement.
4. The three laws of motion are the law of reaction, which states that for every action there is an equal and opposite reaction; the law of inertia, which states that a body remains at rest or in uniform motion until acted upon by an unbalanced force; and the law of acceleration, which states that the acceleration of an object is directly proportional to the force causing it.
5. The joints are always working under five mechanical stresses of tension, which stretch joint structure; compression, which compresses joint structures; shearing, which causes joint structures to slide off each other; torsion, which twists joints structures, and bending, which is a harmful combination of stresses that tip a joint off its base of support. I only count four stresses of tension
6. Levity describes the lift in the body that comes from a combination of forces such as the tensional pull of muscles, the turgidity of fluids, and the inflation of the lungs during inhalation. Gravity describes the downward pull of gravity on the body masses.
7. When there is a balance between tensile and compressive stresses, the tensional pulls of the myofascial tissues give the body a three-dimensional volume that counters compression from the downward pull of gravity on the bones.
8. The freely-moveable synovial joints have space inside the joint cavity filled with a lubricating synovial fluid. The six types of synovial joints are hinge, pivot, saddle, condyloid, plane, and ball-and-socket. Each type allows gliding, spinning, and rolling to occur between the articulating surfaces inside the joint.
9. Skeletal muscle fibers are predominantly slow oxidative fibers, fast oxidative 2a fibers, and fast glycolytic 2b fibers, which contract at varying speeds and metabolize oxygen through either aerobic or anaerobic processes. Different fibers are active during a

contraction, depending on whether a muscle is working to stabilize joints, to control joint motion, or to generate joint motion.

10. The mechanism in a muscle contraction is explained by the sliding filament theory, which describes how a motor nerve impulse to a muscle triggers a chemical binding of sliding filaments which pull toward each other to generate force. When the sliding filaments release, the muscle relaxes.
11. There are two basic types of muscle contractions: isotonic, which change the length of a muscle, and isometric, in which a muscle remains the same length. There are two types of isotonic contraction: a concentric contraction during which a muscle shortens, and an eccentric contraction, during which a muscle is lengthened by an outside force.
12. Fascial adhesions and muscular contractures that restrict tissue elasticity may need to be stretched with different types of stretching techniques. Fascia is a non-contractile tissue that responds to passive stretching techniques such as deep tissue massage. Muscular contractures need to be stretched with active techniques that induce a relaxation response to release the contraction prior to being stretched.
13. The reciprocal innervation of agonist/antagonist muscles allows them to work in coupled pairs in a process called reciprocal inhibition, which means that the contraction of an agonist can inhibit its antagonist by initiating relaxation.
14. Four approaches to stretching are ballistic stretching, in which a person uses short, quick bouncing movements; sustained stretching, in which a person holds a stretch long enough to override the stretch reflex and place mechanical tension on tight fascia; facilitory stretching, in which a person contracts a muscle before stretching it to trigger a post-relaxation response; and inhibitory stretching, in which a person contracts the antagonist of the target muscle to trigger a reciprocal inhibition response. The facilitory and inhibitory approaches are muscle energy techniques because they access muscle reflexes that enhance the stretch.
15. The connective tissue sheaths encasing peripheral nerves are crimped and somewhat elastic to allow the nerves to stretch and bend during joint motion. Stretching places peripheral nerves under tension, elongating them and stretching fascial restrictions around them, which allows nerves to slide more freely through surrounding tissues.

Chapter 8 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 to the topic of the question.*

1. Which of the following statements *does not* describe Ideokinesis?
 - a. It involves using anatomically-correct visualizations to guide a movement pathway during a neuromuscular patterning exercise.
 - b. Ideokinesis exercises should only be practiced in a standing position, and one movement should blend into the next movement.
 - c. It is important to inhibit voluntary effort toward the movement until after the image initiates the action.
 - d. It is important to begin each exercise from a position of complete rest to avoid carrying muscular tensions into the new pattern.

2. The architectural feature that the shoulder girdle most resembles is
 - a. a braced arch that transfers forces between the spine and the lower limbs.
 - b. a top load that is carried above the structures involved in locomotion.
 - c. a hanging yoke that transfers a top load into a side load.
 - d. a cantilevered ledge of a bony ring held up by muscular sheaths.

3. The ground reaction force, which is the counterforce of the ground against the feet as we are walking or running, demonstrates which law of gravity?
 - a. the law of inertia
 - b. the law of acceleration
 - c. the law of gravity
 - d. the law of reaction

4. The most harmful of the five mechanical stresses is
 - a. compression, which compress joint structures.
 - b. bending; which tip a joint off its base of support.
 - c. shearing, which cause joint structures to slide off each other.
 - d. torsion, which twists joints structures.

5. Which tissues of the body are the most resilient and structurally suited to withstand the compressive effect of gravity?
 - a. the bones.
 - b. the muscles.
 - c. the ligaments.
 - d. the fascia.

6. Three types of motion that occur between the articulating surfaces of synovial joints are
 - a. sliding, gliding, spinning.
 - b. rolling, bending, spinning.
 - c. gliding, twisting, spinning.
 - d. rolling, gliding, spinning.

7. Three types of skeletal muscle fibers are
 - a. slow glycolytic fibers, fast oxidative 2a fibers, and fast glycolytic 2b fibers.
 - b. slow oxidative fibers, slow glycolytic 2a fibers, and fast glycolytic 2b fibers.
 - c. slow oxidative fibers, fast oxidative 2a fibers, and fast glycolytic 2b fibers.
 - d. fast oxidative fibers, slow oxidative 2a fibers, and slow glycolytic 2b fibers.

8. Muscles with a predominance of slow fibers are most well-suited for
 - a. sustained contractions required in postural support.
 - b. quick contractions required in sports movements.
 - c. strong contractions required in weight lifting.
 - d. repetitive contractions that fatigue muscles.

9. The difference between an isotonic and an isometric contraction is
 - a. the former shortens while the latter is elongated by an opposing force.
 - b. the former remains the same length while the latter changes length.
 - c. the former changes length while the latter remains the same length.
 - d. the former is elongated by an opposing force while the latter shortens.

10. Which of the following statements *does not* refer to a facilitory or inhibitory stretching technique?
 - a. They are done using sustained stretching in which a person holds a stretch long enough to override the stretch reflex and place mechanical tension on tight fascia.
 - b. They are muscle energy techniques because they access muscle reflexes that enhance the stretch.
 - c. The facilitory technique involves contracting a muscle before stretching it to trigger a post-relaxation response.
 - d. The inhibitory stretch involves contracting the antagonist of the target muscle to trigger a reciprocal inhibition response.

Chapter 8 Suggested Learning Activities

Note: Any exercise titled “Patterning Exercise” can be found in the current edition. Page numbers for these exercises (inserted in parentheses) are included to help instructors utilize activities during lessons that may be based on other segments of the book

Patterning Exercise #76: Proprioceptive Skills: Contract, Relax, and Stretch (p. 213)

Objectives:

- To develop control over skeletal muscles
- To identify and contrast the sensations of muscle contraction, relaxation, and stretch.
- To practice skills that can be used in client education.

Exercise: (10 minutes for each part by yourself, 20 minutes for each partner exchange)

1. *Contrasting contraction and relaxation:* Pick any muscle and contract it as hard as you can. (Imagine your muscle like a sponge and squeeze it as hard as you can.)
2. Now relax the muscle slowly. (Imagine your muscle as the sponge slowly returning to its original shape.) Keep focusing on relaxing until you feel the muscle completely relax. If this is difficult, contract it again under a load, perhaps lifting a limb or an external weight to make the muscle work harder. Then relax it again.
3. Continue to contract and relax it until you feel a clear contrast in sensations between the two states.
4. *Feeling stretch:* Put the same muscle on a slow stretch. Sense the difference in sensation between relaxing and stretching the muscle.
5. Progressively contract, relax, and stretch other muscles in your body, refining your proprioception of each muscle by actively contracting, relaxing, then stretching it.

Patterning Exercise #77: Developing Isometric Control (p. 214)

Objectives:

- To learn and practice training slow fibers for postural muscle control
- To practice skills that can be used in client education.

1. While sitting or standing, put your hands on your lower abdominal wall. Using all your strength, pull your lower abdominal muscles back toward your sacrum as fast and hard as you can in a phasic contraction. Then completely relax them and let your belly hang out.
2. Now contrast this phasic contraction with a tonic isometric contraction. Start by placing your hands on your lower abdominal muscles to monitor them. Then *slowly, very slowly and lightly*, pull your abdominal wall back toward your sacrum and hold it there. *Use only one third of the effort you used for the concentric contraction.*
3. Continue to hold this light isometric contraction while you breathe deeply. How many seconds can you hold it?
4. Relax completely.
5. Repeat step 2 several times to get the feel for slow, tonic isometric contraction.