Anatomy:
The spine is made up of 33 boney vertebrae- 7 cervical (neck), 12 thoracic (mid-back), 5 lumbar (low back), 5 fused to form the sacrum, and 4 fused to form the coccyx that are separated by intervertebral discs. The discs are made up of 70-80% fluid. They act as shock absorbers during movement and increase the flexibility of the spine. The discs are composed of a nucleus (the center part of the disc) and an annulus (the outside part of the disc). The nucleus has a consistency of jelly while the fibers of the annulus are similar to crabmeat. The boney vertebrae enclose the spinal cord and provide exit openings, called intervertebral foramina, for the spinal nerves to exit through the back of the cord. A herniation occurs when the fluid of the nucleus bulges out through the annulus and imposes increased pressure on the corresponding spinal nerve.

Causes/Mechanism of Injury:
Herniations can be caused by degeneration due to aging or injury to the spine. Herniations typically occur between L4 and L5 which are the lowest lumbar vertebrae; this is due to the fact that the lower back is constantly bearing the weight of the forces imposed on the upper and lower body. It is extremely mobile and is involved in many movements throughout daily activities. Most herniations occur in the posterior (back) left or back right of the spine. But can occur in the anterior (front) of the vertebrae due to a weakness of the ligament of trauma to the back of the vertebrae forcing the disc forward. If we think of our spine a clock with 12 being the front of the vertebrae (closest to the stomach), 3 and 9 being each pelvic bone, and 6 being the “pointy” area of the spine in the back- herniations occur between 5 and 7 o’clock, but can occur between 11 and 1 o’clock

Symptoms:
- Severe low back pain
- Radiating pain into the buttocks, legs, and/or feet
- Muscle weakness, numbness, and tingling in the lower extremity
- Decreased and painful range of motion
- Pain with coughing, sneezing, bearing down when moving your bowels
- Diminished deep tendon reflexes
- Posture deviations
- Leg pain when sitting, tucking chin to chest, slouching the trunk, and straightening the leg

These symptoms may be experienced on one side of the body or both.

Treatment/Management:
Majority of patients experiencing a herniated disc will recover with conservative treatment of physical therapy and a home exercise program. Only about 5% will require a surgical intervention.
Physical therapy treatment consists of:
- Modalities such as electrical stimulation, hot/cold pack, whirlpool, vibratory massage to decrease pain and inflammation.
- Manual therapy such as joint mobilizations - mobilize the discs (disc imbibing), stretching, soft tissue massage can be used to relax tissues and improve joint mobility.
- Manual and mechanical traction can be used to decrease nerve compression by disc.
- Therapeutic exercise/ aquatic therapy can be performed to maintain flexibility and stability of the spine.

Pharmacological treatment:
- Medrol dose packs
- Pain medication
- Epidural injections

Surgical treatment:
- Discectomy - Removal of the herniated disc
- Laminectomy - Removal of the lamina (bone) that is causing nerve irritation

Exercises:
Exercises for a herniated disc focus on extension (backward bending) movements if the disc is herniated posteriorly to the right or left. Conversely, exercises will focus on flexion (forward bending) movements if the disc herniation is anteriorly to the right or left. Pictures and parameters of correct exercises are pictured on the next page.