

# Apophyseal Joint Kinematics

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- Facet Opening
- The term facet opening refers to the anterior and superior glide of the inferior articular process of the superior vertebra on the superior articular process of the vertebra below.
- Forexample, the facets are said to open bilaterally in spinal flexion;
- open on the left during flexion, side bending, and rotation to the right
- or open on the right during flexion, side bending, and rotation to the left.

# Facet Closing

- The term facet closing refers to the posterior and inferior glide of the inferior articular process of the superior vertebra on the superior articular process of the vertebra below.
- For example, the facets are said to close bilaterally in spinal extension;
- close on the left during extension, side bending, and rotation to the left
- or close on the right during extension, side bending, and rotation to the right.

# Facet Gapping

- The term facet gapping refers to the separation or distraction (traction) of the joint surfaces in a perpendicular direction.
- If a thoracic or lumbar facet gaps on the left, this implies that the inferior articular process of the superior vertebra separates away from the superior articular process of the inferior vertebra.
- ❑ Gapping of the facets generally occurs in the thoracic and lumbar spine in response to rotation on the ipsilateral side.
- On the contralateral side of the rotation, the facets approximate each other as they are compressed together.

# Roll-Gliding

- According to Kaltenborn, the vertebral motion segment, not unlike the extremity joints, moves in a roll-gliding fashion.
- Except for the occipitals condyles, which are convex surfaces moving on the concave surfaces of the atlas, the remainder of the motion segments of the spine behave or function as a concave surface (superior vertebra) moving on a convex one (inferior vertebra).

This suggests that the roll of the superior component (concave rule) will glide in the same direction on the inferior component below, whereas the inferior component (convex rule) will glide in the opposite direction of its roll.

# Motion Barriers

- There are 4 barriers (3 normal and 1 abnormal) to joint motion.
- Physiologic Barrier
- The end of an active, voluntary effort in a normal joint is the physiologic barrier for that motion.  
Every movement in the body has an associated physiologic barrier.

# Elastic Barrier

- The elastic barrier is the point at which the soft tissue slack is taken up during a passive movement in a normal joint (ie, "the beginning of the end").

# Anatomic Barrier

- The anatomic barrier is the absolute end-point in the passive range of motion in a normal joint beyond which tissue injury occurs (ie, "the end").



# Restrictive Barrier

- The premature motion loss in an impaired joint is known as the restrictive barrier.
- It may represent a restriction at any point in the overall range of motion of the joint.
- It is associated with an abnormal end feel (ie, hard or nonyielding).
- Restrictive barriers have multiple causes (ie, muscle spasm, capsular fibrosis, internal derangement, myofascial tightness) and are responsible for causing either a **major** motion loss or a **minor** motion loss

- Major: when 50% or more of the range is restricted,
- Minor : motion loss involving less than 50% of the range of motion in a specific direction.
- The restrictive barrier is an impairment that results from tissue pathology and can lead to
  - **functional limitation and disability**  
if not given the appropriate intervention.
- The goal of manual therapy is to diagnose and correct these impairments so that the associated functional limitation and disability are minimized or ideally eliminated.

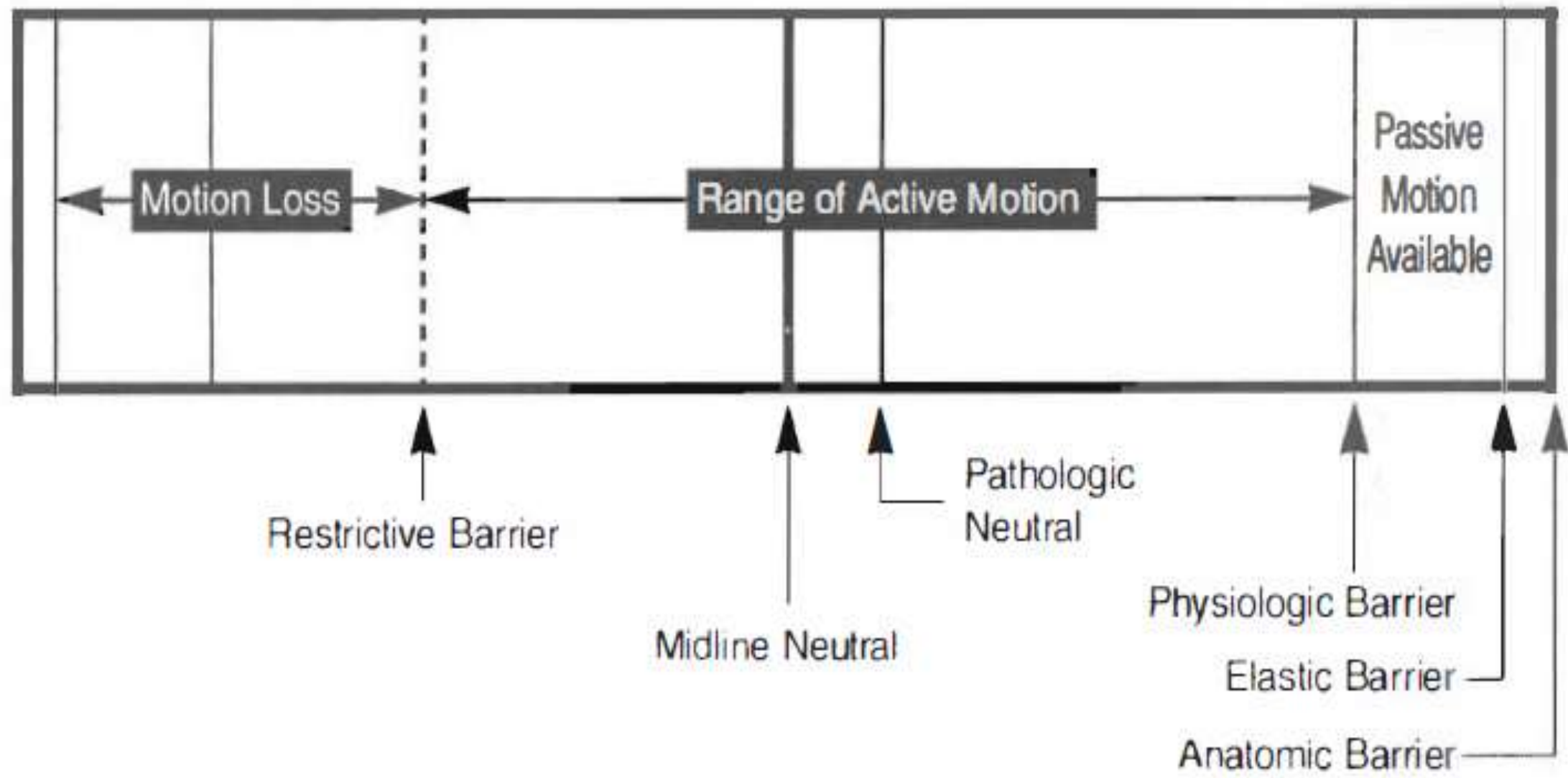


Figure 1-8. Normal and abnormal motion barriers. (Reprinted with permission from Flynn TW. *The Thoracic Spine and Rib Cage: Musculoskeletal Evaluation and Treatment*. Boston, MA: Butterworth-Heinemann; 1996.)