



RANGE OF MOTION:

DEFINITION AND ASSESSMENT

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Joint range of motion is a critical component of a wheelchair seating and mobility evaluation. It is essential to understand just what range of motion is and how it is accurately measured and documented.

DEFINITION:

Range of motion (ROM) is defined as the full potential movement of a joint¹. Available ROM is determined by joint type, articular surfaces and soft tissue acting on the joint - including muscles, ligaments and tendons. Active ROM is joint movement performed by the client within their ability. Passive ROM is joint movement performed by someone else, such as a clinician, and may result in further range of movement beyond the active range.

Types of joint movement include (see Figure 1):

- Flexion and Extension (i.e., elbow)
- Pronation and Supination (i.e., forearm)
- Abduction and Adduction (i.e., shoulders and hips)
- Horizontal Abduction and Adduction (i.e., shoulders)
- Internal and External Rotation (i.e., shoulders and hips)
- Dorsiflexion and Plantarflexion (i.e., ankle)
- Inversion and Eversion (i.e., ankle)
- Opposition (i.e., thumb)

MEASUREMENT:

ROM is measured in degrees of a circle. The most common measurement tool is a goniometer. The center of the goniometer is placed over the axis of the joint. A stationary arm remains in alignment with a bone on one side of the joint, and a movement arm remains in alignment with a bone on the other side of the joint as this is moved. It is important to measure accurately. For example, if a client has limited hip flexion, continuing to move the femur into flexion without sufficient ROM will result in the pelvis rocking rearward into a posterior pelvic tilt.

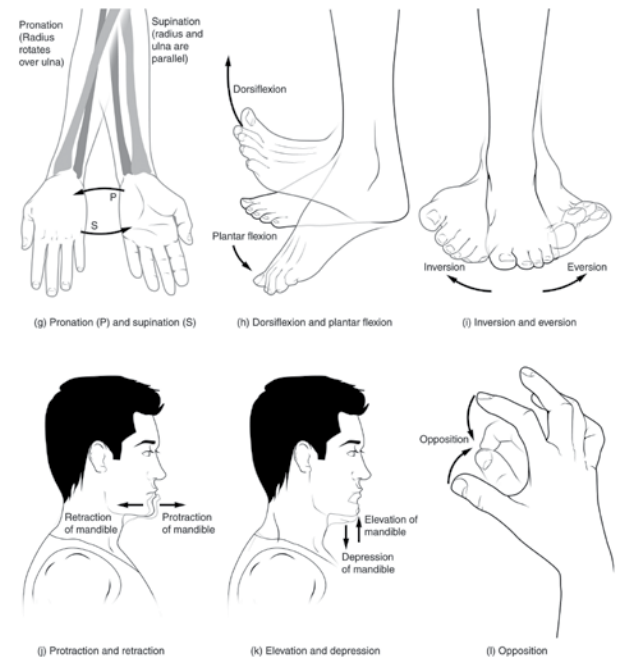
LIMITATIONS:

Limited Active ROM may be due to pain, weakness, paralysis or lack of motor control. Increased muscle tone can impact motor control of a joint. Limited Passive ROM may be due to swelling, muscle shortening, muscle tightness or spasm, or changes to the bony surfaces or capsule of the joint.

WHEELCHAIR SEATING IMPLICATIONS:

ROM limitations may not impact the seated position. For example, lack of full elbow extension will not impact sitting. Other ROM limitations have a direct impact on seating, including hip, knee, ankle movement and available ROM of the spine. If ROM is limited in these areas, the seating system must respect the available movement. For example,

FIGURE 1



if a client lacks full hip flexion, the seat to back angle must be increased to match available ROM.

Range of motion is easy to take for granted. However, accurate measurement can lead to improved wheelchair seating outcomes for the clients we serve.

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Michelle Lange is an occupational therapist with over 30 years of experience and has been in private practice, *Access to Independence*, for over 10 years. She is a well-respected lecturer, both nationally and internationally, and has authored numerous texts, chapters and articles. She is the co-editor of *Seating and Wheeled Mobility: A clinical resource guide*, editor of *Fundamentals in Assistive Technology, Fourth Edition*, NRRTS Continuing Education Curriculum coordinator and clinical editor of NRRTS *DIRECTIONS* magazine. Lange is a RESNA Fellow and member of the Clinician Task Force. She is a certified ATP, certified SMS and is a senior disability analyst of the ABDA.

