

CROM 3 Procedure Manual

Procedure for Measuring Neck Motion with the CROM 3

**CROM 3 (Cervical Range of Motion Instrument)
is a product of:**

***Performance Attainment Associates
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Introduction

Pain and loss of motion in the cervical region are common problems that increase with age. Over 40 million adult Americans suffer from some form of osteoarthritis or degenerative joint disease, and 50 to 85 percent of these people will experience debilitating back or neck pain of a temporary or chronic nature.

Accurate measurement of cervical motion during the course of a therapeutic regime can provide objective data on the benefits of the selected treatment. However, currently available measurement devices are time consuming, cumbersome, poorly standardized and poorly accepted by practitioners. In response to this lack of an acceptable means of measurement, existing devices were evaluated and the following design criteria established:

- easily applied
- measures all planes of motion
- comfortable
- time efficient
- easily adjusted
- quickly read
- standardized landmarks and positioning
- standardized protocol
- reproducibility
- simple design
- reasonable cost

Based on these criteria, the CROM 3 instrument, accessories and protocol were developed. The CROM 3 accurately and quickly measures the range of sagittal, coronal and horizontal movements that can be performed by the head and neck.

To perform and document accurate cervical measurements you will need the following items:

- CROM 3 Instrument, including the rotation arm and the forward head arm
- magnetic yoke
- vertebra locator
- tape measure
- recording sheets
- procedure manual

The CROM 3 Instrument is aligned on the nose bridge and ears and is fastened to the head by a velcro strap (see figure 1).

Three dial angle meters are used to take most of the measurements. The **sagittal plane meter** and the **lateral flexion meter** are gravity meters. The **rotation meter** is magnetic and responds quickly to the shoulder-mounted **magnetic yoke**, accurately measuring cervical rotation. Because the rotation meter is controlled by the magnetic yoke, shoulder substitution is eliminated.

Two frequently observed problems seen in patients with cervical dysfunction are forward head (cranio-thoracic postures) and rounded shoulders (scapular protraction). Forward head is the anterior glide of the cervical spine and the head with cervical hyper extension. The CROM 3 Instrument, with the **forward head arm** and the **vertebra locator**, accurately measures forward head (see figure 2).

Rounded shoulder is the anterior movement of the scapula (shoulder and upper extremity) on the thorax. Rounded shoulder measurements are taken with the **tape measure**.



Figure 1: CROM 3 with rotation arm and magnetic yoke



Figure 2: CROM 3 with forward head arm and vertebra locator

Suboccipital Flexion and Extension

Instruct the subject to position the **CROM 3 Instrument** as if putting on a pair of glasses. Fasten the velcro strap in line with the bows. You will not need the magnetic yoke, rotation arm, forward head arm or vertebra locator for these measurements. Instruct the subject to stand facing away from an outside corner of a wall or edge of a open door frame. The subject's sacrum, thoracic spine and occiput must be in contact with the corner of the wall or door edge (see figure 3). Instruct the subject to maintain constant pressure to prevent substitution movements. Since the sagittal plane meter normally reads zero when the ear bows are parallel to the horizontal plane, this reading (zero or otherwise) indicates the subject's resting suboccipital posture; record it on the recording sheet*.



Figure 3: Resting posture

Instruct the subject to flex the suboccipital area as much as possible while maintaining equal pressure at the skull, thorax and sacrum (see figure 4). Record this measurement.



Figure 4: Flexion

Instruct the subject to extend the suboccipital area as much as possible without allowing the skull, thorax and sacrum to leave the contact surface (see figure 5). Record this measurement.



Figure 5: Extension

* A sample recording sheet is provided in the back of this manual. Tablets of the recording sheet may be ordered from your dealer as PAA Form 101.

Cervical Flexion and Extension

Instruct the subject to sit erect in a straight-back chair with the sacrum against the back of the chair, the thoracic spine away from the back of the chair, arms hanging at sides and feet flat on the floor. Next, instruct the subject to position the CROM 3 instrument as if putting on a pair of glasses. Fasten the velcro straps snugly in line with the bows. You will not need the magnetic yoke, rotation armforward head arm or vertebra locator for these measurements.

To assure full flexion in this multi-joint area, first instruct the subject to “nod your head to make a double chin” (suboccipital flexion). Then encourage the subject to flex further until full cervical flexion is obtained (see figure 6). To take the reading on the sagittal plane meter, read through the meter’s beveled edge; from this angle the pointer will be magnified to the dial edge. Record this measurement in the appropriate space on the recording sheet.

To measure cervical extension, first instruct the subject to “nod your head back” (suboccipital extension). Then have the subject extend further until full extension is achieved (see figure 7). Record this measurement also.



Figure 6: Cervical flexion



Figure 7: Cervical extension

Lateral Flexion

Instruct the subject to sit erect in a straight-back chair with the sacrum against the back of the chair, the thoracic spine away from the back of the chair, arms hanging at sides and feet flat on the floor. Note: to eliminate rotation during lateral flexion the subject should focus on a point on a wall straight ahead. The sagittal plane meter will read zero if the subject is looking straight ahead. The lateral flexion meter will also read zero if the head is not laterally flexed. If the lateral flexion meter does not read zero, record the reading as lateral flexion at rest. You will not need the magnetic yoke, rotation arm, forward head arm nor vertebra locator for these measurements.

Instruct the subject to flex the head laterally to the left, keeping the shoulders level and without rotating the head (see figure 8). Monitor for shoulder elevation by lightly placing your hand on the right shoulder, and correct manually any head motion outside the coronal plane. Note and record the measurement from the lateral flexion meter.

Now instruct the subject to flex the head laterally to the right, again keeping the shoulders level without rotating the head (see figure 9). As before, monitor for left shoulder elevation and correct head motion.



Figure 8: Left lateral flexion



Figure 9: Right lateral flexion

WARNING: The magnetic yoke should not be used if the patient has an implanted pacer or defibrillator.

Rotation

You will need to use the CROM 3 instrument plus the magnetic yoke and rotation arm for these measurements. To obtain an accurate rotation measurement, first determine which direction is north.*

Next, place the magnetic yoke on the subject's shoulders with the arrow pointing north (see figure 10). Instruct the subject to sit erect in a straight-back chair with the sacrum against the back of the chair, the thoracic spine away from the back of the chair, arms hanging at sides and feet flat on the floor. The lateral flexion and sagittal plane meters must read zero for the rotation meter to be level; if necessary, assist the subject into the correct position. As the subject faces straight ahead, grasp the rotation meter between your thumb and index finger and turn the meter until one of the pointers is at zero.



Figure 10: Magnetic yoke pointing north

Instruct the subject to focus on a horizontal line on the wall so the head is not tipped during rotation. Have the subject turn the head as far to the left as possible (see figure 11), and to ensure that no shoulder rotation occurs, lightly stabilize the right shoulder with your hand. (Note: if the head and shoulders are rotated together the pointer will not move because the magnetic yoke positioned on the shoulders eliminates shoulder substitution). Record this measurement in the appropriate place on the recording sheet.



Figure 11: Left rotation

While you lightly stabilize the left shoulder, instruct the subject to turn the head as far as possible to the right (see figure 12). Record this measurement also.



Figure 12: Right rotation

*You can find magnetic (map) north by noting the direction of the red needle on the rotation meter when it is at least four feet from the magnetic yoke.

Forward Head

Instruct the subject to sit erect in a straight-back chair with the sacrum against the back of the chair, the thoracic spine away from the back of the chair, arms hanging at sides and feet flat on the floor. You will need to use the CROM 3 instrument plus the forward head arm and the vertebra locator for this measurement, but not the magnetic yoke, nor the rotation arm.

Attach the forward head arm on the CROM 3 in place of the rotation arm (see figure 13). Stand to the subject's left side so you can read the sagittal plane meter. To assure that the forward head arm is horizontal, assist the subject to position the head with the sagittal plane meter reading zero. While the subject maintains this position, locate the seventh cervical vertebra and place the foot (bottom tip) of the vertebra locator on the spinous process. Position the locator so the bubble is centered within the vertical lines on the vial. The forward head arm is calibrated in centimeters for the horizontal distance from the nose bridge to the locator contact point with the seventh vertebra.

Now, instruct the subject to slide the head as far back as possible, while keeping the chin level. Note the measurement at the junction of the forward head arm and the vertebra locator and record it as retraction.

Next, instruct the subject to relax and record this measurement as the resting posture.

Then, instruct the subject to protract or protrude the head forward as much as possible, while keeping the chin level. Record this measurement as protraction.



Figure 13: CROM 3 with forward head arm and vertebra locator

Rounded Shoulder (scapular protraction)

Instruct the subject to sit erect in a straight-back chair with the sacrum against the back of the chair, the thoracic spine away from the back of the chair, arms hanging at sides and feet flat on the floor. You will need only the tape measure to take this measurement.

To measure scapular protraction, first locate the following landmarks:

- the postero-lateral borders of the acromion
- the vertebral spinous process at the intersection of a line connecting the inferior angle of the scapulae.

If the scapulae are at noticeably different heights locate spinous processes for each side at the vertebral intersection of a horizontal line from the inferior angle of the scapula to the spine.

After you have located the landmarks, use the tape measure to measure the distance from the spinous process to the right acromion (see figure 14). Record this measurement and then repeat the measurement on the left side.

Next, while the subject assumes a corrected posture, take each measurement again, indicating the maximal potential for improvement.



Figure 14: Right rounded shoulder

CROM 3 Recording Sheet

Name: _____ Date of Initial Evaluation: _____

Facility: _____ Examiner: _____

DATES

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MEASUREMENTS

Suboccipital:	Resting Posture						
	Flexion						
	Extension						

Cervical:	Flexion						
	Extension						

Lateral Flexion:	Resting Posture						
	Left						
	Right						

Rotation:	Left						
	Right						

Forward Head:	Retraction						
	Resting Posture						
	Protraction						

Round Shoulder:	Left						
	Right						

Limited Warranty

The CROM 3 (Cervical Range of Motion Instrument) is warranted for one year from the date of purchase to be free from defects in materials and workmanship when used in normal operating conditions.

Performance Attainment Associates will repair or replace, at its option, any part which has been found to be defective and within the warranty period, provided the product is shipped freight prepaid to Performance Attainment Associates, call 1-800-835-2766. The repaired or replaced product will be returned prepaid under this warranty.

Performance Attainment Associates will not be liable for any special or consequential damages or loss, damage or expense, directly or indirectly arising from the use of the CROM 3 or any inability to use it.