Clinical Practice Procedures:
Assessment/Myotatic stretch reflexes

Policy code	CPP_AS_MYR_1017
Date	October, 2017
Purpose	To ensure a consistent procedural approach to assessing a patient's Myotatic stretch reflexes.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
Source of funding	Internal – 100%
Author	Clinical Quality & Patient Safety Unit, QAS
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Myotatic stretch reflexes

The myotatic stretch reflexes (also known as deep tendon reflexes) are spinal reflexes important for proprioception and injury prevention. The sudden stretch of a muscle activates stretch receptors within the muscle causing signals to be transmitted to the spinal cord by afferent sensory nerves. This results in the contraction of the stretched muscle and relaxation of the opposing muscles.

Clinical assessment of the deep tendon reflexes provides useful information regarding both regional and global neurological function. Reduced (hyporeflexia) or absent (areflexia) stretch reflexes may result from pathology within any component of the reflex arc, including:

- pathology within the muscle
- the sensory or motor nerves innervating the muscle
- spinal cord pathology at or above the level being assessed
- global conditions that impair muscle or nerve function (eg. electrolyte disturbances such as hypokalaemia or ingestion of neuro-depressant drugs).

Enhanced stretch reflexes (hyperreflexia), on the other hand, tend to result from loss of higher centre inhibition, through either:

- a lesion affecting the normal central nervous system inhibitory inputs influencing the spinal reflex (e.g. stroke)
- global states which enhance neuronal excitability (e.g. electrolyte disturbance such as hypocalcaemia, or ingestion of stimulants or selective serotonin reuptake inhibitors).

Indications

- To aid in the neurological assessment of a patient

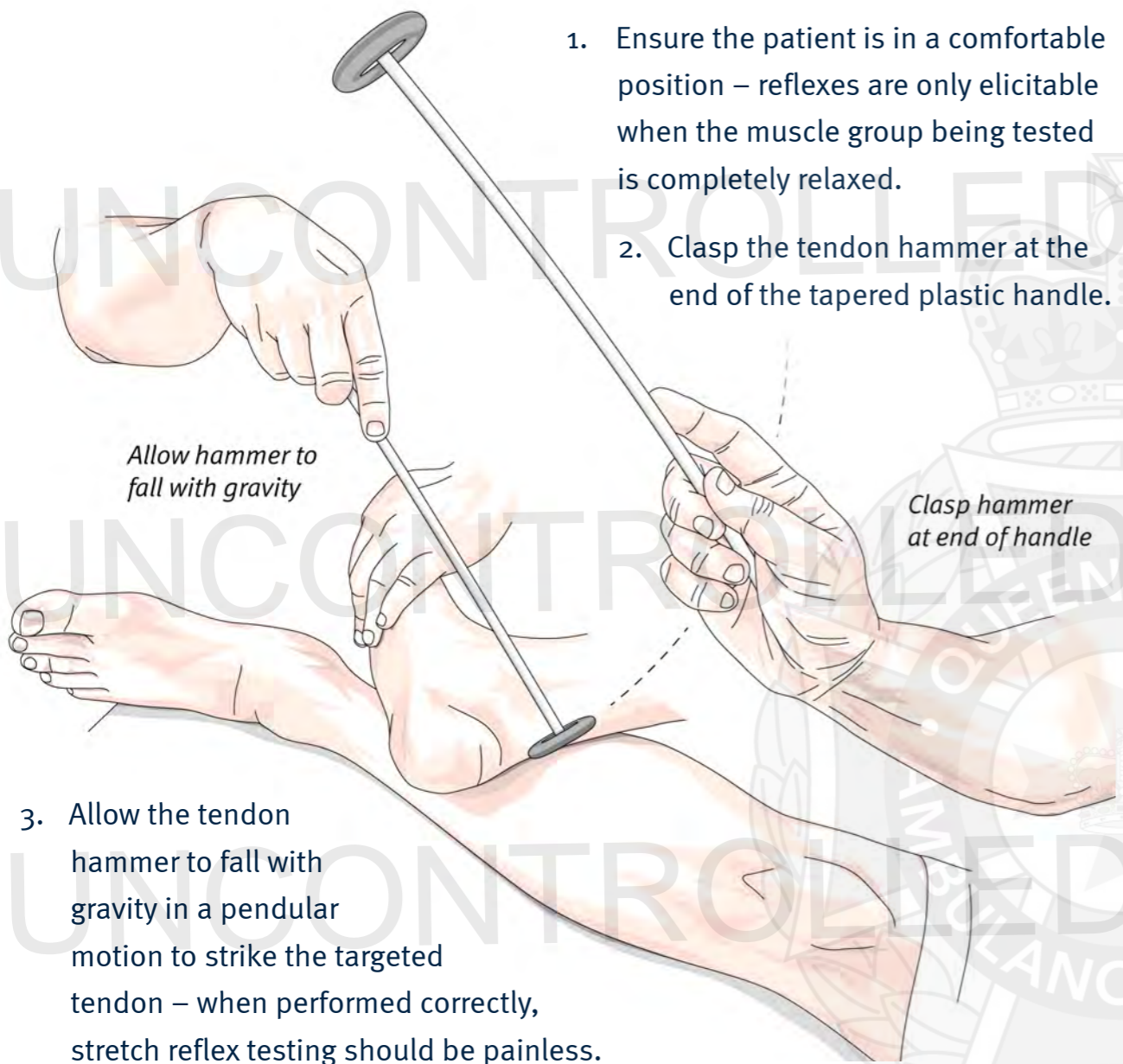## Contraindications

- Nil in this setting

Complications

- Nil in this setting

Procedure [1,2] – Myotatic stretch reflexes

1. Ensure the patient is in a comfortable position – reflexes are only elicitable when the muscle group being tested is completely relaxed.

2. Clasp the tendon hammer at the end of the tapered plastic handle.

Allow hammer to fall with gravity

Clasp hammer at end of handle

3. Allow the tendon hammer to fall with gravity in a pendular motion to strike the targeted tendon – when performed correctly, stretch reflex testing should be painless.

4. Examine and grade the resultant muscle response (observed as muscle twitch and movement across the joint) as per the 0–4 scale below:

- 0 = Absent (even after reinforcement)
- 1+ = Present, but reduced
- 2+ = Normal
- 3+ = Increased
- 4+ = Greatly increased, with repetitive contractions (clonus)

5. If there is no reflex elicited, repeat the above utilising a reinforcement maneuver just prior to striking the tendon:

- *Upper limb reflexes* – ask the patient to clench their jaw.

- *Lower limb reflexes* – ask the patient to interlock their fingers while simultaneously trying to separate their hands.
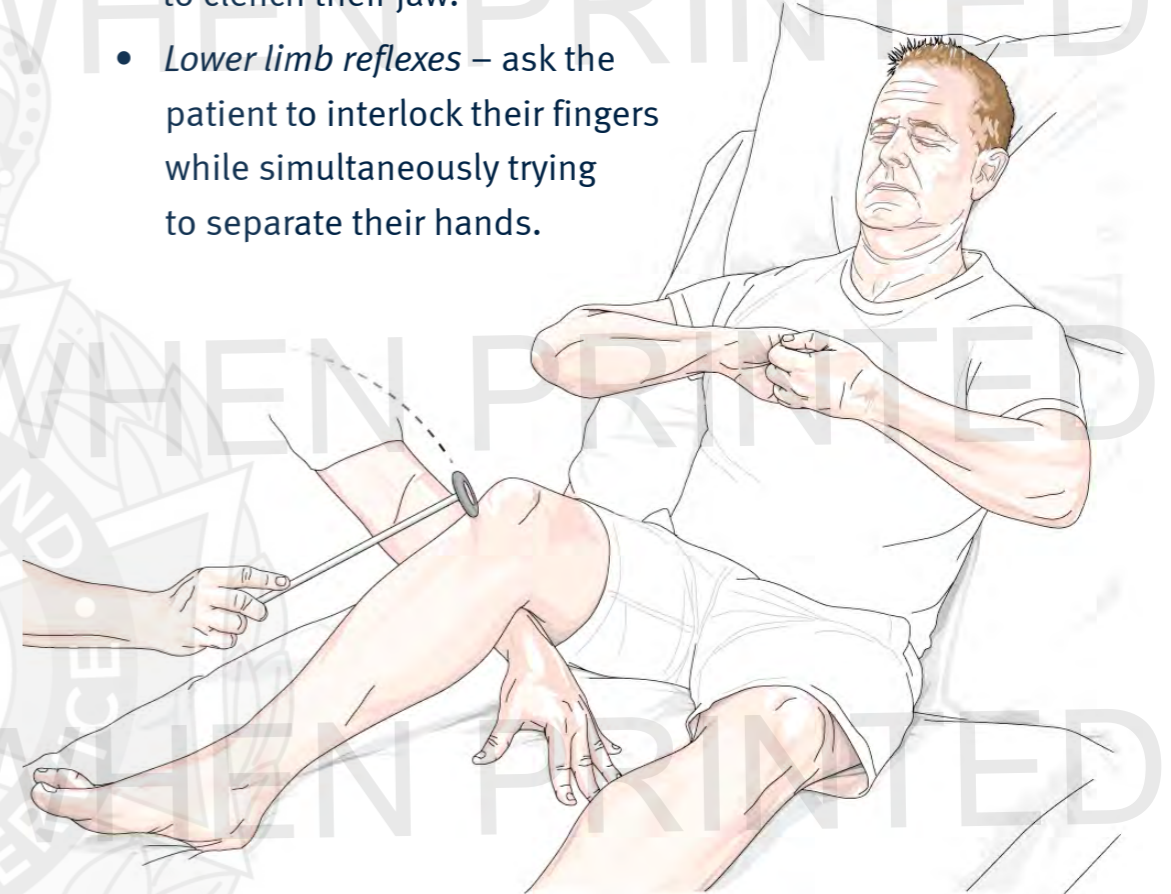
Lower limb reflexes

Only four muscle groups are routinely assessed in clinical practice and this usually provides sufficient clinical information to guide further investigation and/or treatment. These muscle groups are:

- elbow flexors (bicep jerk C5–C6)
- elbow extensors (tricep jerk C7–C8)
- knee extensors (knee jerk L3–L4)
- ankle plantarflexors (ankle jerk S1–S2)

Upper limb reflexes

1. Position the patient so their elbows are passively flexed to approximately 90 degrees, hands in their lap with their palms facing inwards.

Elbow flexors (biceps jerk C5–C6)

1. With your non dominant hand, palpate the biceps tendon within the elbow crease.

2. Place your non dominant index finger over the biceps tendon.

3. Strike your non dominant index finger with the tendon hammer.

4. Assess for biceps contraction and/or elbow flexion.
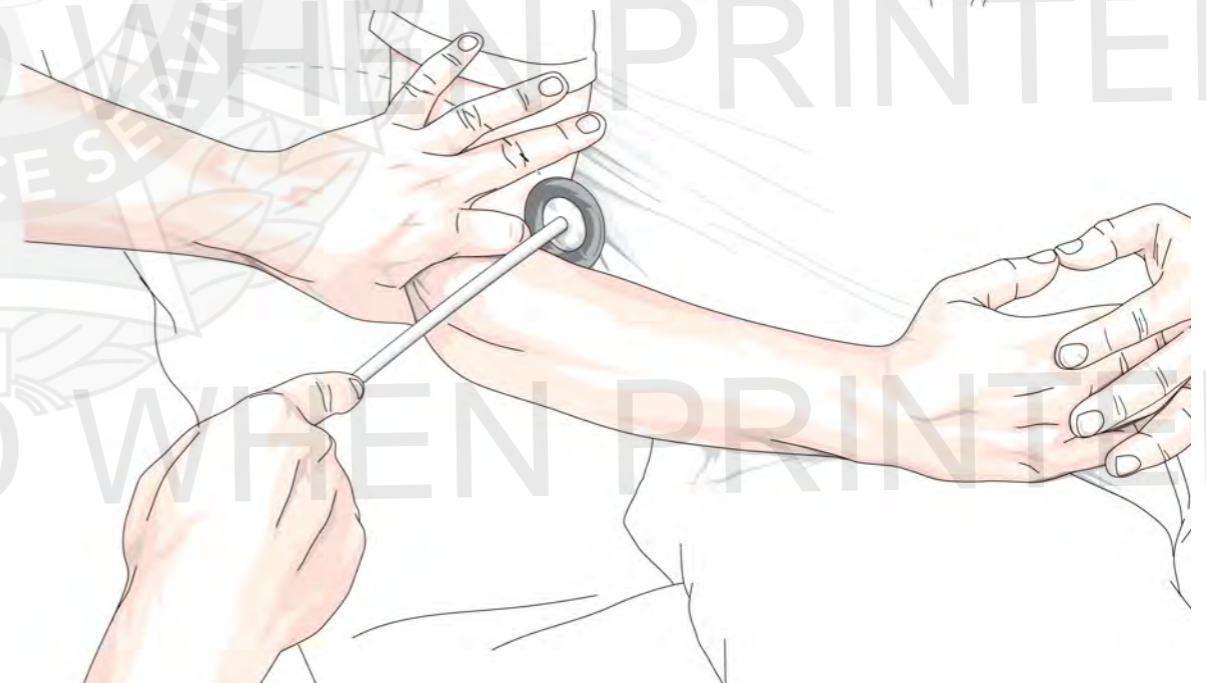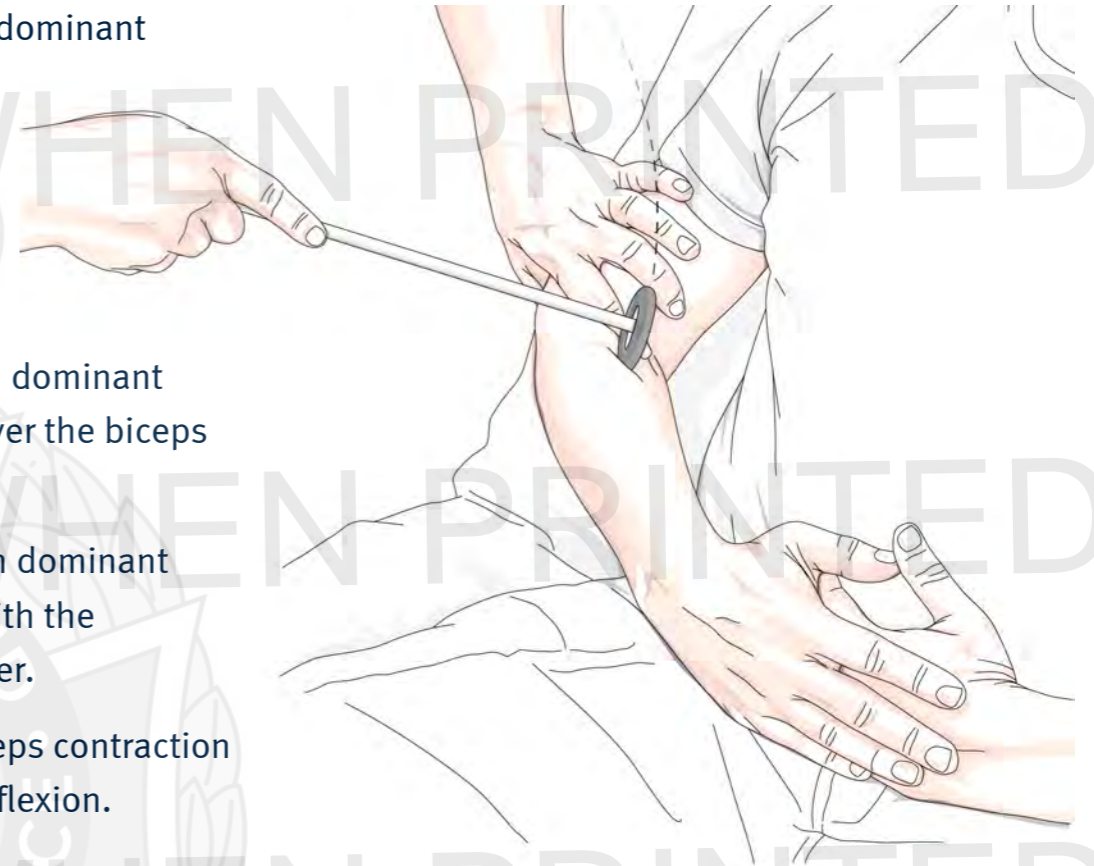
Elbow flexors (triceps jerk C7–C8)

1. Support the patient's arm under the elbow.

2. Identify the triceps tendon just above (proximal) to the olecranon.

3. Strike the triceps tendon with the tendon hammer.

4. Assess for triceps contraction and/or elbow extension.
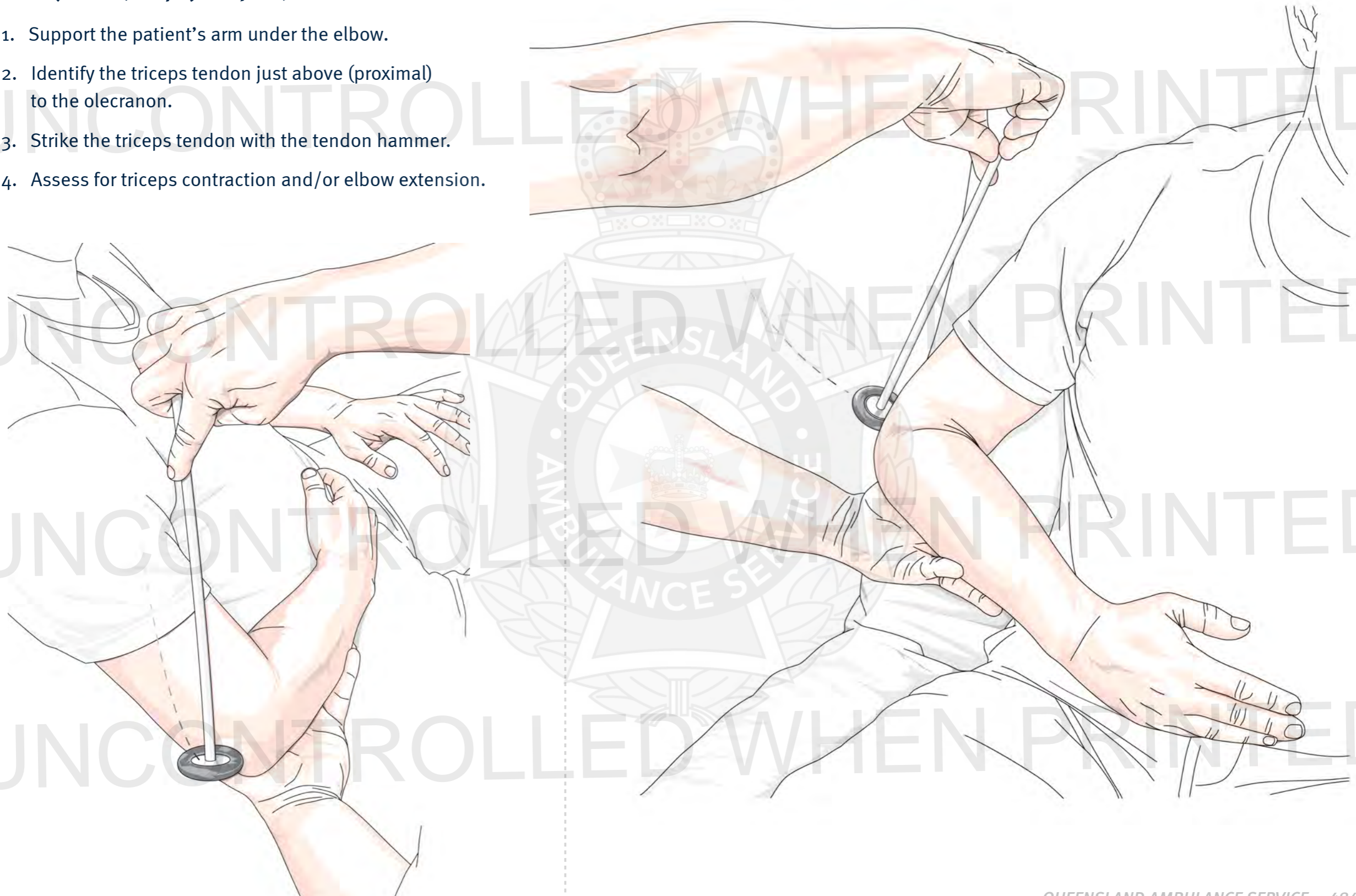
Lower limb reflexes

1. Position the patient in a sitting semi-recumbent with their legs outstretched. Alternatively the patient can sit with their legs hanging unsupported. Assessment of the ankle jerk in the sitting position is not recommended as the patient's the chair often obstructs the path of the tendon hammer's arc.

Knee extensors (knee jerk L3–L4)

Semi-recumbent position. Bend the patient's knee to approximately 30 degrees.

1. Identify the quadriceps ligament between the patella and the tibia.

2. Support the entire weight of the patient's leg with the non dominant arm.

3. Strike the quadriceps ligament with the tendon hammer.

4. Assess for quadriceps contraction and/or knee extension.
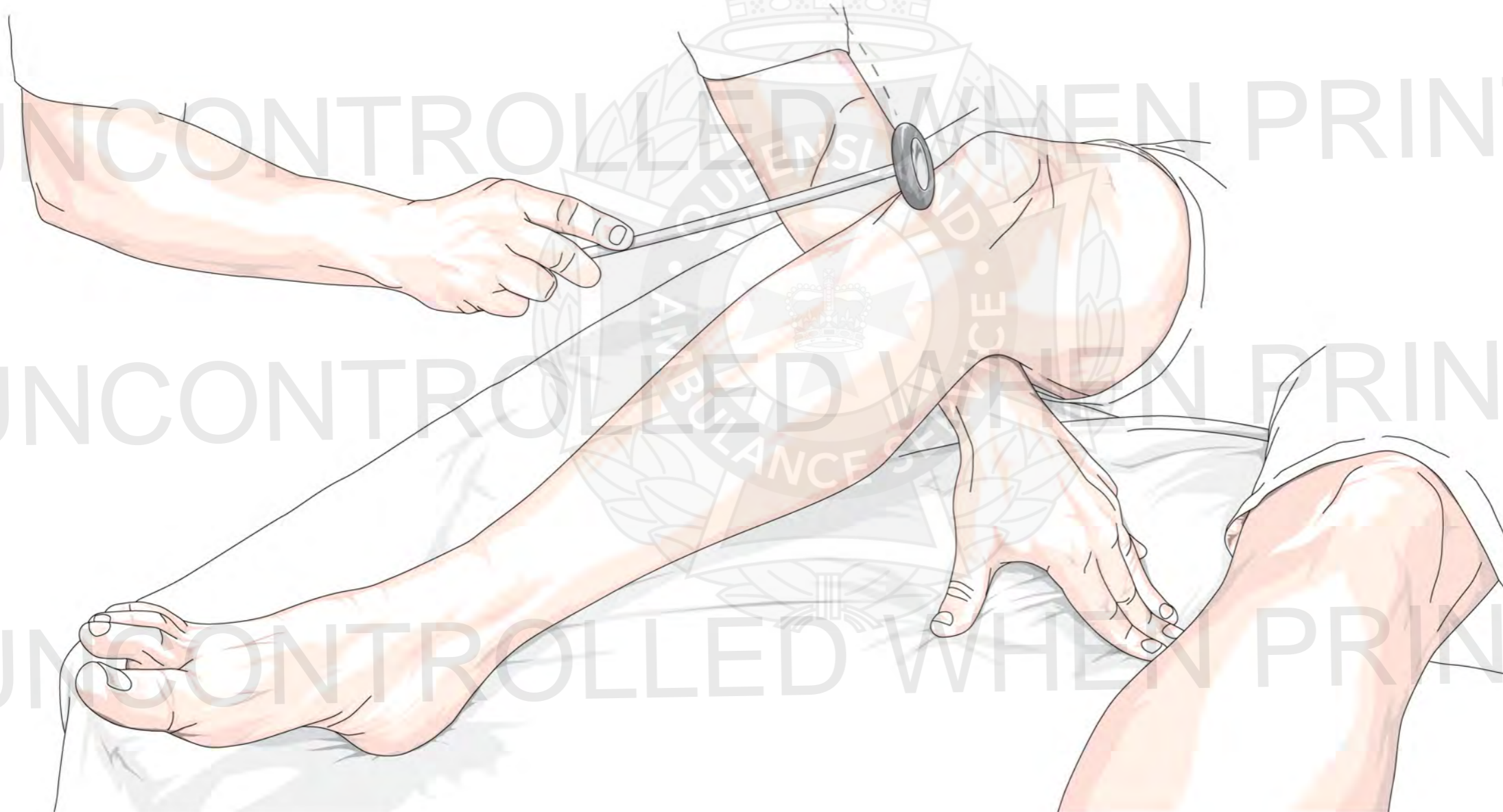
Sitting position

1. Ensure the knee is flexed to approximately 90 degrees.

2. Ensure the foot is not in contact with the floor and the knee is flexed to approximately 90 degrees.

3. Identify the quadriceps ligament between the patella and the tibia.

4. Strike the quadriceps ligament with the tendon hammer.

5. Assess for quadriceps contraction and/or knee extension.

Ankle plantarflexors (ankle jerk S1–S2)

1. Position the patient with their hips at 45 degrees and externally rotated and knees slightly flexed at 90 degrees.

2. Stretch the Achilles tendon by placing pressure on the ball of the foot and flexing the ankle approximately 90 degrees.

3. Identify the Achilles tendon approximately 3–5 cm above the heel.

4. Strike the Achilles tendon with the tendon hammer.

5. Assess for calf muscle contraction and/or foot plantar flexion (pointing of the foot).
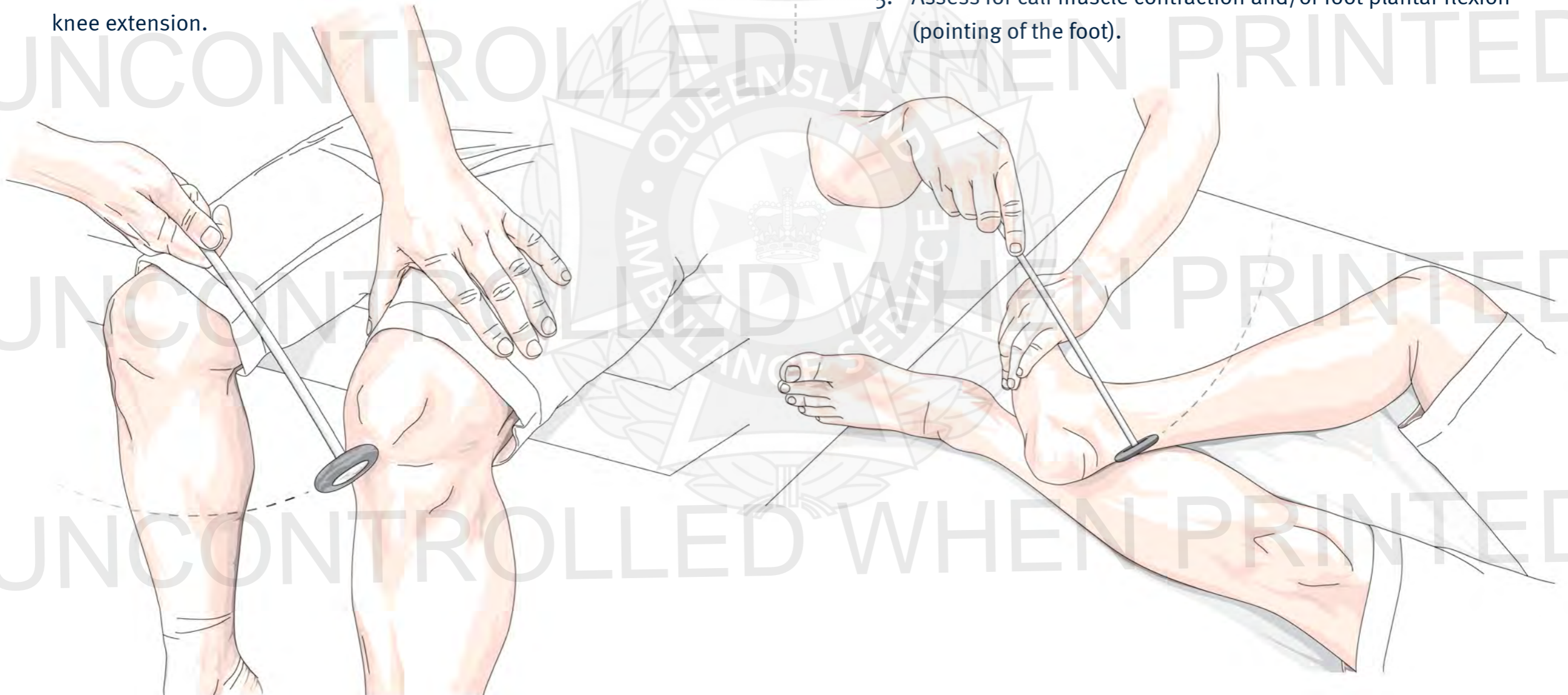
➕ Additional information

- The presence of normal deep tendon reflexes does not exclude serious pathology.

- The degree of reflex response varies among individuals – any response from grade 0 to 3+ may be normal.

- 4+ reflexes with repetitive contraction (clonus) is always abnormal.

- Asymmetrical reflexes (either between left and right limbs, or upper and lower limbs) suggests pathology.

- A useful mnemonic for the spinal levels involved in each of these major reflexes is as follows:

  - *"One, two… buckle my shoe"*
    (S1,2 – Ankle jerk / ankle plantar flexion)

  - *"Three, four… kick the door"*
    (L3,4 – Knee jerk / knee extension)

  - *"Five, six… pick up sticks"*
    (C5,6 – Biceps jerk / elbow flexion)

  - *"Seven, eight… shut the gate"*
    (C7,8 – Triceps jerk / elbow extension)
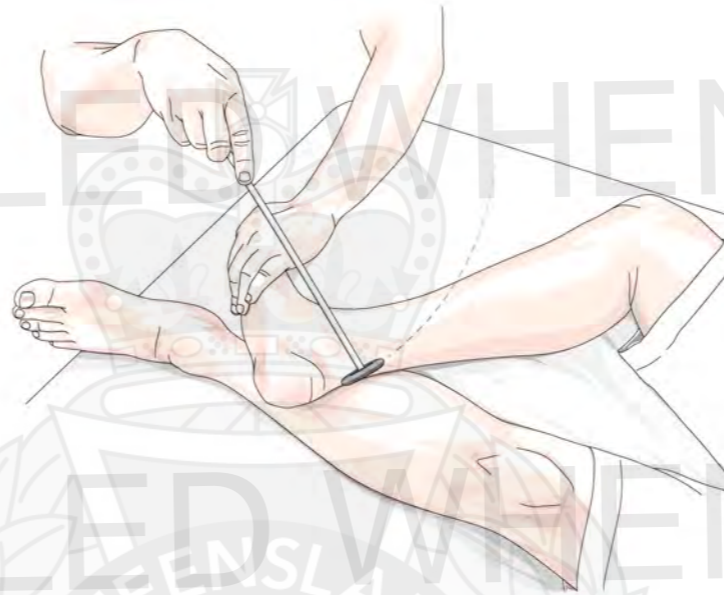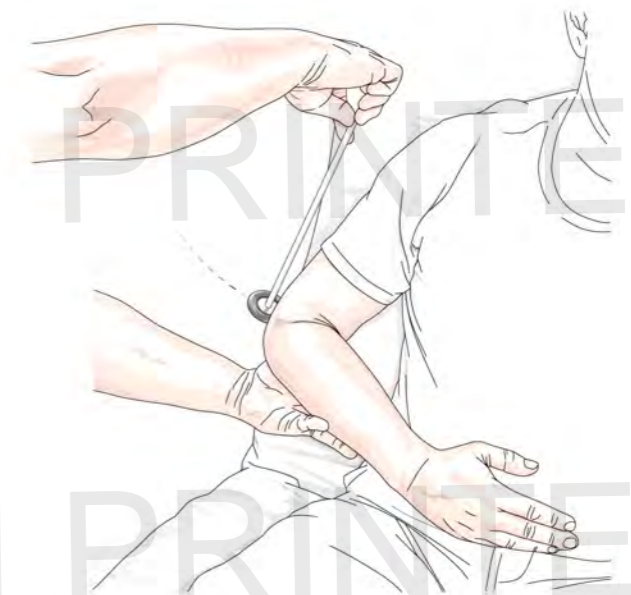

S1,2 – Ankle jerk / ankle plantar flexion
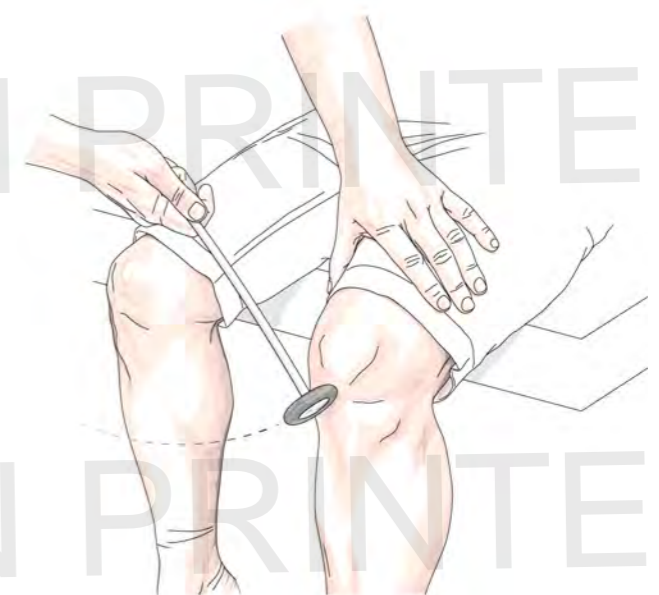
L3,4 – Knee jerk / knee extension

C5,6 – Bicep jerk / elbow flexion

C7,8 – Tricep jerk / elbow extension