

# NEUROLOGICAL ASSESSMENT FOR MASSAGE THERAPY CLINICAL IMPRESSION

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- During the Assessment, If the client has any of the following complaints:
  - Headaches
  - Blurry vision
  - Change in behavior
  - Fatigue
  - Change in balance or coordination
  - Numbness or tingling in the arms or legs
  - Decrease in movement of the arms or legs
  - Injury to the head, neck, or back
  - Fever
  - Seizures
  - Slurred speech
  - Weakness
  - Tremor

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# Neurological Assessment

- CNS: Central Nervous System Assessment
- PNS: Peripheral Nervous System Assessment
- SCREENING FOR RED AND YELLOW FLAGS

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# CNS: Central Nervous System Assessment

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## Mental status

Mental status (the patient's level of awareness and interaction with the environment) may be assessed by conversing with the patient and establishing his or her awareness of person, place, and time. The person will also be observed for clear speech and making sense while talking. This is usually done by the patient's healthcare provider just by observing the patient during normal interactions

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## Motor function and balance

This may be tested by having the patient push and pull against the healthcare provider's hands with his or her arms and legs. Balance may be checked by assessing how the person stands and walks or having the patient stand with his or her eyes closed while being gently pushed to one side or the other. The patient's joints may also be checked simply by passive (performed by the RMT) and active (performed by the patient) movement.

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## Sensory exam

The RMT provider may also do a sensory test that checks his or her ability to feel. This may be done by using different instruments: dull needles, tuning forks, alcohol swabs, or other objects. The healthcare provider may touch the patient's legs, arms, or other parts of the body and have him or her identify the sensation (for example, hot or cold, sharp or dull).

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## Evaluation of the nerves of the brain

There are 12 main nerves of the brain, called the cranial nerves. During a complete neurological exam, most of these nerves are evaluated to help determine the functioning of the brain.

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## Cranial nerve I (olfactory nerve)

- This is the nerve of smell. The patient may be asked to identify different smells with his or her eyes closed.

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## Cranial nerve II (optic nerve)

- This nerve carries vision to the brain. A visual test may be given and the patient's eye may be examined with a special light.

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## Cranial nerve III (oculomotor)

- This nerve is responsible for pupil size and certain movements of the eye. The patient's healthcare provider may examine the pupil (the black part of the eye) with a light and have the patient follow the light in various directions.

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## Cranial nerve IV (trochlear nerve)

- This nerve also helps with the movement of the eyes.

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## Cranial nerve V (trigeminal nerve)

- This nerve allows for many functions, including the ability to feel the face, inside the mouth, and move the muscles involved with chewing. The patient's healthcare provider may touch the face at different areas and watch the patient as he or she bites down.

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## Cranial nerve VI (abducens nerve)

- This nerve helps with the movement of the eyes. The patient may be asked to follow a light or finger to move the eyes.

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## Cranial nerve VII (facial nerve)

- This nerve is responsible for various functions, including the movement of the face muscle and taste. The patient may be asked to identify different tastes (sweet, sour, bitter), asked to smile, move the cheeks, or show the teeth.

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## Cranial nerve VIII (acoustic nerve)

- This nerve is the nerve of hearing. A hearing test may be performed on the patient.

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## Cranial nerve IX (glossopharyngeal nerve)

- This nerve is involved with taste and swallowing. Once again, the patient may be asked to identify different tastes on the back of the tongue. The gag reflex may be tested.

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## Cranial nerve X (vagus nerve)

- This nerve is mainly responsible for the ability to swallow, the gag reflex, some taste, and part of speech. The patient may be asked to swallow and a tongue blade may be used to elicit the gag response.

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## Cranial nerve XI (accessory nerve)

- This nerve is involved in the movement of the shoulders and neck. The patient may be asked to turn his or her head from side to side against mild resistance, or to shrug the shoulders.

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## Cranial nerve XII (hypoglossal nerve)

- The final cranial nerve is mainly responsible for movement of the tongue. The patient may be instructed to stick out his or her tongue and speak.

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## Coordination exam

- The patient may be asked to walk normally or on a line on the floor.
- The patient may be instructed to tap his or her fingers or foot quickly or touch something, such as his or her nose with eyes closed.

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## PNS: Peripheral Nervous System Assessment

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## The Nervous System Becomes Sensitive When it is Exposed to a Pathological Environment

As peripheral nerves pass through the body they may be exposed to mechanical or chemical irritation at different anatomical points. Prolonged compression or fixation of a nerve may result in a reduction of intraneural blood flow. This then triggers the release of pro-inflammatory substances from the nerve. This by product is referred to as neurogenic inflammation and it can disrupt the normal function of nerves even without overt nerve damage, it can also contribute to the initiation and propagation of chronic pain (Barbe et al., 2019; Bove et al., 2019; Matsuda et al., 2019).

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## Clinical Sensory Testing Can Be Used to Assess for Increased Sensitivity of the Nervous System

- A thorough health history intake can be done to gather information about patients' limitations, course of pain, and prognostic factors (e.g. coping style) and answers to health-related questions. Screen patients to identify those with a higher likelihood of serious pathology/red flag conditions. Then undertake a physical examination: neurological screening test, assess mobility and/or muscle strength.

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- If there is an irritated peripheral nerve, clinical sensory testing can be used to assess for areas of hypersensitivity. In addition to orthopedic testing this could involve palpation (neural and non-neural structures). If a hypersensitive peripheral nerve has been identified, a treatment plan is then implemented based on patient-specific assessment findings and patient tolerance.

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Upper Limb Neurodynamic Tests						
	1	2	3	4	5	6
ULNT – Median (1)	Shoulder girdle stabilization	Shoulder abduction	Wrist/finger extension	Forearm supination	Shoulder external rotation	Elbow extension
ULNT – Median (2)	Shoulder girdle depression	Elbow extension	Shoulder external rotation	Forearm supination	Wrist/finger extension	Shoulder abduction
ULNT – Radial (3)	Shoulder girdle depression	Elbow extension	Shoulder internal rotation	Forearm pronation	Wrist/finger flexion	Shoulder abduction
ULNT – Ulnar (4)	Wrist/finger extension	Forearm pronation	Elbow flexion	Shoulder external rotation	Shoulder girdle depression	Shoulder abduction

### Lower Limb Neurodynamic Tests

	1	2	3	4	5	
<b>Slump</b>	Hands behind back	Thoracic flexion	Extend one knee	Dorsiflex foot	Cervical flexion	
<b>Straight Leg Raise</b>	Supine position	Raise the leg with the knee extended	If pain radiates when the angle of the leg is between 30 and 70 degrees (positive)	Increased pain on dorsiflexion of the patient's foot increases sensitivity of the test		
<b>Femoral Nerve Test</b>	Prone or side lying	Knee flexion	Extension at the hip			
<b>Dorsiflexion-Eversion</b>	Supine	Place foot into full dorsiflexion & eversion	Hold for 5-10 sec.			

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### Head, Neck & Upper Limb

Occipital nerve	Pain, numbness or tingling at the base of the occiput	Base of the occiput
Suprascapular n.	Shoulder pain, weakness in shoulder abduction and external rotation	Suprascapular notch
Dorsal scapular nerve	Upper and mid-thoracic pain, stiffness	Medial border of rhomboids
Long thoracic nerve	Pain, numbness or tingling over lateral flank. Winging of the scapula is possible	In-between scapula and chest wall
Median nerve	Pain, numbness or tingling in the thumb, index, middle, and ring fingers.	Upper arm, pronator teres and carpal tunnel
Ulnar nerve	Pain, numbness or tingling in ring and little finger	Upper arm, cubital tunnel
Radial nerve	Pain, numbness or tingling over common extensor tendon	Triangle interval, spiral groove, epimysial groove – extensor, snuff box

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Back & Hip		
Spinal nerve (dorsal cutaneous ramus)	Dysesthesia on the upper back between the vertebra and scapula (T2-T6)	Deep to back muscles
Intercostal nerve	sharp or shooting thoracic pain	Anterior cutaneous branches of the thoracoabdominal (T7 -11) and subcostal (T12) nerves – lateral border of the rectus muscle
Cluneal nerve	Pain, numbness or tingling along iliac crest or into gluteus muscles	Superior rim of the iliac crest
Sciatic nerve	Pain, numbness or tingling felt in the buttock, back of the thigh down to the calf, into the toes	Popliteal fossa
Lateral femoral cutaneous nerve	Paresthesia of the lateral upper thigh	Distal to inguinal ligament

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## Lower Limb

Saphenous nerve	Knee pain or paresthesia medial thigh	Adductor canal
Tibial nerve	Pain, numbness or tingling over medial ankle and arch of the foot	Tarsal tunnel, posterior to the medial malleolus
Medial & lateral plantar n.	Sharp or stabbing heel pain	Deep to plantar muscle – running under the calcaneus
Peroneal nerve	Pain, numbness or tingling over lateral ankle and dorsum of foot	Over peroneal muscle belly & dorsum of foot
Sural nerve	Pain, numbness or tingling over entrapment site and lateral calf	Mid-belly of the gastrocnemius, lateral ankle

## Key Takeaways

- As peripheral nerves pass through the body they may be exposed to mechanical or chemical irritation at different anatomical points. Prolonged compression or fixation of neurovascular structures may result in reduced intraneural blood flow and ischemia, this then triggers the release of pro-inflammatory substances from the nerve. This by product is referred to as neurogenic inflammation and it can contribute to the propagation of acute and chronic pain.

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## SCREENING FOR RED AND YELLOW FLAGS

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## Red flags

- Red flags are signs and symptoms that raise suspicion of serious underlying pathology, if a serious pathology is suspected a clinical decision should be made to refer the patient to an appropriate healthcare practitioner.
- Red Flags for Back Pain – For patients with low back pain there are a number of serious spinal pathologies to be aware of, these are cauda equina syndrome, spinal fracture, malignancy, and spinal infection (Finucane et al., 2020).

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## Red flags

- Red flags for musculoskeletal disorders, which are indicators of possible serious pathology such as inflammatory or neurological conditions, structural musculoskeletal damage or disorders, circulatory problems, suspected infections, tumours or systemic disease. If suspected, these require urgent further investigation and often medical referral.

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## Yellow flags

- Yellow flags are psychosocial and occupational factors that may affect patient presentation and treatment approaches and outcomes.
- Unhelpful beliefs about pain: indication of injury as uncontrollable or likely to worsen.
- Expectations of poor treatment outcome, delayed return to work.
- Emotional Responses: Distress not meeting criteria for diagnosis of mental disorder. Worry, fears, anxiety.
- Pain behaviour (including pain and coping strategies): Avoidance of activities due to expectations of pain and possible reinjury.
- Over-reliance on passive treatments.

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## Yellow flags include many aspects of thoughts, feelings and behaviours

- Catastrophising – thinking the worst
- Finding painful experiences unbearable, reporting extreme pain disproportionate to the condition
- Having unhelpful beliefs about pain and work – for instance, ‘if I go back to work my pain will get worse’
- Becoming preoccupied with health, over-anxious, distressed and low in mood
- Fear of movement and of re-injury
- Uncertainty about what the future holds
- Changes in behaviour or recurring behaviours
- Expecting other people or interventions to solve the problems (being passive in the process) and serial visits to various practitioners for help with no improvement.

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# Questions and Answers

1. How to screening Reg Flags?
2. What is the relationship between peripheral nerves and chronic pain?
3. How to assess the mental status?