When	Why	How
• During the physical exam	• To rule out neurological deficits in patients with suspected neurological pathologies	• Reflexes are best assessed with the muscle in a relaxed position. • A reflex hammer elicits a quick shortening response in the muscle when striking over the tendon. • It is important to use an even amount of pressure when striking each tendon to have an equal response side to side. • Comparison is an important component of assessing whether or not a response is normal for the patient. • It is commonly suggested to strike the same muscular tendon from side to side one after the other to make a comparison. This allows for the detection of minor differences in response in matching muscles.

Interpretation and Documentation

The following table shows to nerve roots that correlate to the specific muscles used for assessing reflexes. Many of the listed muscles are innervated by multiple nerve roots but may have one nerve supply that is **dominant**. In attempting to interpret whether or not a certain nerve root is involved, sensory and motor testing information can help assist in trying to localize a nerve root lesion.

Muscle/Tendon	Innervation
Biceps	Nerve root: **C5**, C6, Peripheral innervation: Musculocutaneous
Brachioradialis	Nerve root: C5, **C6**, Peripheral innervation: Radial
Triceps	Nerve root: C6, **C7**, C8, T1 Peripheral innervation: Radial
Patellar	Nerve root: L2, L3, **L4**, Peripheral innervation: Femoral
Medial Hamstring	Nerve root: **L5**, **S1**, Peripheral innervation: Sciatic
Achilles	Nerve root: L5, **S1**, S2 Peripheral innervation: Tibial

Grading

Reflexes are graded based on the amount of muscular response to the tendon strike. The grading system below is designed by the (National Institute of Neurological Disorders and Stroke) NINDS. This is a commonly used scale and has evidence supporting its use. When learning to assess reflexes, it is important to practice technique frequently and assess as many different individuals as possible in order to begin to develop an understanding of what a 'normal' reflex looks like.

Grade	Interpretation
0	Absent; no response
1	Reflex small, less than normal, trace response (may require reinforcing technique to elicit)
2	Reflex in the lower half of normal response
3	Reflex in the upper half of normal response
4	Reflex more than normal, may include clonus (if clonus is present, intern should include documentation that clonus is present)

Plus (+) or minus (-) may be used in some documentation forms to document responses in between the numbers listed above. In some grading systems, 5 may be used to document sustained clonus as response.

Hyporeflexia is most commonly associated with lower motor neuron lesions (LMNL), occurring at/or distal to the level of the of the nerve root. Examples of common causes of LMNLs in chiropractic practice are conditions such as disc herniation or intervertebral foramen (IVF) stenosis. Systemic conditions such as thyroid disease and diabetes may also cause hyporeflexia. Hyperreflexia is most commonly indicative of upper motor neuron lesions (UMNL). Examples of these could be conditions such as a stroke or infarct in the spinal cord or brain, as well as space occupying lesions such as tumors or compression of the spinal cord in conditions such as central canal stenosis.

Reinforcement

In circumstances where a clinician finds a lack of response to a tendon strike in one or more areas, they may use a reinforcement to try to elicit a response. The value in these maneuvers is often to relax the muscle being approached and distracting the patient with another motor task. Common distraction maneuvers include asking the patient to clench their jaw just before striking, or having the patient perform a Jendrassik Maneuver, where the patient grasps both hands together and pulls them forcefully apart while the clinician strikes the tendon of an uninvolved limb. It is important to document if reinforcement is used to elicit a reflex.

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References

1. Zimmerman B, Hubbard JB. Deep Tendon Reflexes. [Updated 2023 Jul 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK531502/
2. Hoppenfeld, J. D., & Hoppenfeld, Stanley. (2018). Orthopaedic neurology : A diagnostic guide to neurologic levels (Second ed.).
3. Litvan, I. , Mangone, C. A. , Werden, W. , Bueri, J. A. , Estol, C. J. , Garcea, D. O. , Rey, R. C. , Sica, R. E. , Hallett, M. & Bartko, J. J. (1996). Reliability of the NINDS Myotatic Reflex Scale. Neurology, 47 (4), 969-972. doi: 10.1212/WNL.47.4.969.