

Table 8.4 Deep Tendon, Superficial, and Pathological Reflexes

Reflex	Neural segment	Stimulus and response
DEEP TENDON		
Achilles	S1	Plantar flexion upon striking the tendon (normal)
Biceps	C5 , C6	Elbow flexion upon striking the tendon (normal)
Brachioradialis	C5, C6	Radial deviation upon striking the tendon (normal)
Jaw	Cranial V	Mouth closes upon striking anterior chin (normal) Exaggerated (UMNL)
Medial hamstring	L5 , S1	Knee flexion upon striking the semimembranosus tendon (normal)
Lateral hamstring	S1 , S2	Knee flexion upon striking the biceps femoris tendon (normal)
Patellar	L2, L3, L4	Knee extension upon striking the infrapatellar tendon (normal)
Tibialis posterior	L4, L5	Plantar flexion and inversion upon striking the tibialis posterior just behind the medial malleolus (normal)
Triceps	C7	Elbow extension upon striking the triceps tendon (normal)
SUPERFICIAL		
Abdominal Upper Lower	T7-T10 T10-L1	Movement of the umbilicus toward the area being stroked (normal); if unilateral, pinpointing the involved quadrant indicates the approximate level of lesion
Anal	S2-S4	Anal sphincter contracts with touching or stroking the perianal skin (normal)
Cremasteric	T12, L1, L2	Scrotum contracts and testicle retracts with stroking the skin on the anterior, inner thigh (normal); unilateral absence indicates LMNL injury at L1, L2; bilateral absence indicates UMNL
Gluteal	L4, L5 S1-S3	Gluteal muscles contract with stroking the overlying skin (normal).
Lumbar	T12-L5	Back extensor muscles contract with stroking the skin overlying the erector spinae muscles (normal)
Plantar	S1, S2	Toes flex with lightly stroking the plantar surface of the foot (normal)
PATHOLOGICAL		
Clonus	UMNL	Antagonist and agonist muscle groups rapidly alternate involuntary contraction and relaxation with a sudden, forced stretch of a muscle (pathological); usually performed at the wrist (extension), ankle (dorsiflexion), or knee (downward force on the patella to stretch the quadriceps)
Babinski	UMNL (pyramidal tract)	Great toes extend and other toes splay (extend and abduct) with stroking the lateral plantar surface and across the sole of the foot (pathological)
Chaddock		Great toes extend and other toes splay with stroking the side of the foot distal to the lateral malleolus (pathological)
Gordon		Great toes extend and other toes splay with compressing or squeezing the calf muscle (pathological)
Oppenheim		Great toes extend and other toes splay with stroking downward on the anterio-medial tibial surface (pathological)

LMNL = lower motor neuron lesion, UMNL = upper motor neuron lesion.

Neural segments set in bold denote the primary nerve root contributing to and being tested by the reflex.

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