Online Appendix

Table 1. Modified Upper Extremity Motor Testing Scale for Telemedicine

Muscle Group	Nerve Root	Strength	Description
Deltoid	C5	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to abduct shoulder without gravity (supine)
		3	Able to abduct shoulder against gravity
		4	Able to abduct shoulder with 5-10lb of resistance (dumbbell, etc.)
		5	*Difficult to assess; can consider full strength if able to abduct shoulder with weight >10 lbs*
Bicep	C5, C6	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to flex elbow without gravity (supine)
		3	Able to flex elbow against gravity
		4	Able to flex elbow with 5-10lb of resistance (dumbbell, etc.)
		5	*Difficult to assess; can consider full strength if able to flex elbow with weight >10 lbs*
Triceps	C6, C7	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to extend elbow without gravity (supine)
		3	Able to extend elbow against gravity
		4	Able to extend elbow with 5-10lb of resistance (dumbbell, etc.)
		5	*Difficult to assess; can consider full strength if able to extend elbow with weight >10 lbs*
Wrist Extensors	C6	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to extend wrist without gravity (supine)
		3	Able to extend wrist against gravity
		4	Able to extend wrist with 2-5lb of resistance (dumbbell, etc.)
		5	*Difficult to assess; can consider full strength if able to extend wrist with weight >5lbs*
Finger flexors	C8	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to make a full fist in supination
		3	Able to make a full fist in pronation
		4	Able to make a full fist in pronation with some resistance from contralateral hand
		5	*Difficult to assess; can consider full strength if make a full fist with near full resistance from contralateral hand*
Finger abduction	C8, T1	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to abduct fingers with palm resting on a flat surface
		3	Able to abduct fingers with palm perpendicular to flat surface
		4	Able to abduct fingers fully with some resistance from contralateral hand
		5	*Difficult to assess; can consider full strength if able to abduct fingers fully with near full resistance from contralateral hand*

Source: Iyer S, Shafi K, Lovecchio F, Turner R, Albert TJ, Kim HJ, Press J, Katsuura Y, Sandhu H, Schwab F, Qureshi S. The Spine Physical Examination Using Telemedicine: Strategies and Best Practices. *Global Spine J.* 2020 Aug 5:2192568220944129. doi: 10.1177/2192568220944129. Epub ahead of print. PMID: 32755256.

Table 2. Modified Lower Extremity Motor Testing Scale for Telemedicine

Muscle Group	**Nerve Root**	**Strength**	**Description**
Iliopsoas*	L1, L2, L3	0	Absence of any muscle activation
*May be performed in seated position if patient unable to balance		1	Muscle flicker
		2	Able to flex hip without gravity (lateral decubitus position)
		3	Able to flex hip against gravity (allow knee to passively flex, chair for balance)
		4	Able to flex hip against gravity, and maintain (allow knee to passively flex, chair for balance)
		5	*Difficult to assess; can consider full strength if flex hip against gravity and maintain without difficulty*
Quadriceps*	L2, L3, L4	0	Absence of any muscle activation
*If unable to perform single leg raise, may perform knee extension and attempt to maintain against gravity		1	Muscle flicker
		2	Able to extend knee without gravity (lateral decubitus position)
		3	Able to perform a single leg raise from chair with support
		4	Able to perform a single leg raise from chair without support, moderate difficulty
		5	*Difficult to assess; can consider full strength if able to perform a single leg raise from a chair without support or perceived difficulty*
Tibialis Anterior	L4	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to dorsiflex ankle without gravity (lateral decubitus position)
		3	Able to raise onto heels, unable to maintain
		4	Able to raise onto heels and maintain this position for 10 seconds
		5	*Difficult to assess; can consider full strength if able to raise onto heels and perform lateral walks for 10 paces*
Gastrocnemius-soleus complex	S1	0	Absence of any muscle activation
		1	Muscle flicker
		2	Able to plantarflex ankle without gravity (lateral decubitus position)
		3	Able to raise onto toes, unable to maintain
		4	Able to raise onto toes (raise heels) and perform 10 heel raises, with some difficulty

		5	*Difficult to assess; can consider full strength if able to perform 10 repetitions of heel raises without perceived difficulty*

Source: Iyer S, Shafi K, Lovecchio F, Turner R, Albert TJ, Kim HJ, Press J, Katsuura Y, Sandhu H, Schwab F, Qureshi S. The Spine Physical Examination Using Telemedicine: Strategies and Best Practices. *Global Spine J.* 2020 Aug 5:2192568220944129. doi: 10.1177/2192568220944129. Epub ahead of print. PMID: 32755256.

Table 3. Special Tests for Spine pathology compatible with telehealth.

Test	Description	Positive Result
Finger escape Sign	Fingers held in adducted and extended position for 30 seconds	Ulnar drift and flexion of ring and small fingers
Grasp and Release Test	Beginning with an open palm, the patient is instructed to grip and release their fingers as many times as possible within a period of 10 seconds.	Inability to complete 20 repetitions within 10 seconds suggestive of underlying myelopathy
10s-Step Test	In standing position, patient "marches" in place, taking alternating high steps raising hips to 90 degrees of flexion. Number of alternating steps in 10 seconds recorded	Inability to take 20 total steps within 10 seconds suggestive on underlying myelopathy
Single Leg Stance (SLS) Test	Beginning in the standing position, the patient is first asked to flex one leg to 90 degrees, allowing knee to passively flex and maintain this position	Inability to maintain stance for 30 seconds indicative of L5 pathology (may overlap with hip pathology)
5-Repitition Sit-to-Stand (5R STS) Test	From seated position, the patient is asked to stand fully upon hearing the starting queue (“Go”) and subsequently sit again, touching the seat firmly. This maneuver is repeated for 5 cycles.	Total time >15 seconds associated with worse overall lower extremity function and disability
Straight Leg Raise (SLR)	From the supine position, patient acted to actively flex their hip, keeping knee extended	Pain with hip flexion beyond 30 degrees suggestive of herniated nucleus pulposis (HNP). Inability to perform straight leg raise suggestive of iliopsoas weakness.

Source: Iyer S, Shafi K, Lovecchio F, Turner R, Albert TJ, Kim HJ, Press J, Katsuura Y, Sandhu H, Schwab F, Qureshi S. The Spine Physical Examination Using Telemedicine: Strategies and Best Practices. *Global Spine J.* 2020 Aug 5:2192568220944129. doi: 10.1177/2192568220944129. Epub ahead of print. PMID: 32755256.