

**Table 15.1** Tape Measure Examination of Thoracolumbar (TL) and Lumbar (L) ROM

Motion	Location of tape measure	Movement	Measurement	Normal range
TL flexion	Spanning C7 to S2 spinous processes	Begin in neutral, bilateral stance (feet shoulder-width apart); trunk moves into forward flexion to limit of motion.	Increase in measured distance (cm) between C7 and S2 from neutral stance to full flexion	10 cm
TL extension	Suprasternal notch to surface of table	Begin prone, with pelvis stabilized; trunk raises into a push-up (hands at shoulder level) to limit of motion, without lifting pelvis from table.	Measured distance (cm) between table and suprasternal notch	Will vary with stature
L flexion	Spanning distance from S2 to a mark 10 cm superiorly	Begin in neutral, bilateral stance (feet shoulder-width apart); trunk moves into forward flexion to limit of motion.	Increase in measured distance (cm) between mark and S2 from neutral stance to full flexion	5 cm
L extension	Spanning distance from S2 to a mark 10 cm superiorly	Begin in neutral, bilateral stance (feet shoulder-width apart) and hands on the iliac crests; trunk moves into hyperextension to limit of motion.	Decrease in measured distance (cm) between mark and S2 from neutral stance to full hyperextension	2 cm
Lateral flexion	Spanning fingertip to floor surface	Begin in neutral, bilateral stance (feet shoulder-width apart); side bend to limit of motion (watch for trunk rotation, hip hike, and lateral deviation of pelvis).	Distance (cm) between 3rd fingertip and floor	Will vary with stature—should be equal bilaterally
Trunk rotation	None; observation only			
Muscle length (toe touch)	Spanning fingertip to floor surface	Begin in neutral, bilateral stance (feet shoulder-width apart); trunk moves into forward flexion to limit of motion while attempting to reach toes.	Distance (cm) between 3rd fingertip and floor	Able to touch floor. For hypermobility, have athlete stand on box and record distance beyond box surface
Costovertebral motion	Circumferentially around the athlete's chest just below the axilla (T4)	Maximal expiration followed by maximal inspiration	Difference (cm) between end inspiration and expiration	3 to 7.5 cm

From S. Shultz, P. Hougum, and D. Perrin, 2016. *Examination of musculoskeletal injuries*, 4th ed. (Champaign, IL: Human Kinetics).