

Supplemental Table 1 - Virtual Shoulder Exam

For Patients: Instructions intended to be provided PRIOR to the scheduled telehealth visit.

Clothing: Exposure of both shoulders is required. For male, shirtless or tank top (patient preference). For females, tank top or sports bra (patient preference).

Exam Space: 10-15 feet of open space should be available to allow the patient to move away from the camera and provide perspective during range of motion testing.

Position: Initially, the patient should stand 4-5 feet from the camera but will be asked to move closer to or further away from the camera during portions of the examination.

Camera Position: At shoulder level.

Additional Items: Common household items - plastic grocery bags (double bag) or similar, eight 16-ounce soup cans or other canned goods.

For Physicians:

In addition to verbal instructions, supplementary video examples of several of the physical exam components are provided.

The left column contains the physical exam component. The middle column contains recommended medical record documentation fields. The right column contains standardized verbal instructions in layman’s terms that the clinician may provide to the patient for each physical exam component.

The “Core Shoulder Exam” components are highlighted in blue and are included in a single video supplement. Additional specialty exams also available via video supplement are highlighted in gray. Other exam components do not have an associated video supplement but can be implemented if desired by the clinician by using the associated verbal instructions for the patient.

*The virtual examination has been modified to allow patients to perform each component independently. Some additional components marked with asterisk may be included if a remote examiner is present with the patient.

Physical Exam Component	Documentation	Verbal Instructions for Patient
Cervical Spine		“We are going to start by examining your neck.”
Pain Location	<input type="checkbox"/> Midline <input type="checkbox"/> Paracervical	“Do you have any pain in your neck? If so, please point to the location.”

	<input type="checkbox"/> Trapezius <input type="checkbox"/> Periscapular <input type="checkbox"/> Other:									
Range of Motion										
Flexion	<input type="checkbox"/> WNL <input type="checkbox"/> Limited <input type="checkbox"/> Severely limited <input type="checkbox"/> Painful	<p>“If you have pain during any of the following, tell me what hurts and where the pain is.”</p> <p>“Bend your neck forward as far as you can and try to touch your chin to your chest.”</p>								
Extension	<input type="checkbox"/> WNL <input type="checkbox"/> Limited <input type="checkbox"/> Severely limited <input type="checkbox"/> Painful	<p>“Now, tip your head backward as far as you can and try to look up at the ceiling.”</p>								
Spurling ^{28, 67, 68} <table border="1"> <tr> <td>Sensitivity</td> <td>30%-52%</td> </tr> <tr> <td>Specificity</td> <td>74%-96%</td> </tr> <tr> <td>LR+</td> <td>1.9</td> </tr> <tr> <td>LR -</td> <td>0.67</td> </tr> </table>	Sensitivity	30%-52%	Specificity	74%-96%	LR+	1.9	LR -	0.67	<input type="checkbox"/> Negative <input type="checkbox"/> Shoulder pain <input type="checkbox"/> Radicular pain	<p>“With your head still in this position, tilt your head back and to the right side as far as it will go. Does this cause pain? If so, where does the pain go?”</p> <p>Now tip your head back and to the left side as far as it can go. Does this cause pain, if so where does the pain go?”</p>
Sensitivity	30%-52%									
Specificity	74%-96%									
LR+	1.9									
LR -	0.67									
Rotation Right	<input type="checkbox"/> WNL <input type="checkbox"/> Limited <input type="checkbox"/> Severely limited <input type="checkbox"/> Painful	<p>“Look back at the camera. Without moving your shoulders, rotate your head to the right.”</p>								
Rotation Left	<input type="checkbox"/> WNL <input type="checkbox"/> Limited <input type="checkbox"/> Severely limited <input type="checkbox"/> Painful	<p>“Now rotate your head as far as you can to the left.”</p>								
Toe Walk	<input type="checkbox"/> Normal <input type="checkbox"/> Weakness <input type="checkbox"/> Unable	<p>“Stand up making sure that the camera shows me your feet. Walk several steps up on your toes.</p>								
Heel Walk	<input type="checkbox"/> Normal <input type="checkbox"/> Weakness <input type="checkbox"/> Unable	<p>“Now turn and walk back up on your heels.”</p>								
Shoulder		<p>“We are going to now start examining your shoulder.”</p>								
Inspection	<input type="checkbox"/> Normal <input type="checkbox"/> Abrasion <input type="checkbox"/> Swelling <input type="checkbox"/> Rash	<p>“Please stand facing the camera so that I can see the front of your shoulders.”</p>								

	<input type="checkbox"/> Ecchymosis <input type="checkbox"/> Erythema <input type="checkbox"/> Scar(s) <input type="checkbox"/> Healed incision(s) <input type="checkbox"/> Healing incision(s) <input type="checkbox"/> Other:	<p>“Now, turn sideways so that I can see the side of your injured shoulder.”</p> <p>“Now, turn so I can see the back of your shoulders.”</p>
Deformity	<input type="checkbox"/> None <input type="checkbox"/> SC <input type="checkbox"/> Clavicle <input type="checkbox"/> AC <input type="checkbox"/> Pec major <input type="checkbox"/> Popeye <input type="checkbox"/> Other:	<p>“Turn back and face the camera. Have you noticed any deformities? If so, point to the location.”</p>
Pain Location	<input type="checkbox"/> None <input type="checkbox"/> SC <input type="checkbox"/> Clavicle <input type="checkbox"/> AC <input type="checkbox"/> Acromion <input type="checkbox"/> Scapular spine <input type="checkbox"/> Posterior shoulder <input type="checkbox"/> Periscapular <input type="checkbox"/> Deltoid <input type="checkbox"/> Bicipital tunnel <input type="checkbox"/> Other:	<p>“Does your shoulder hurt anywhere specifically? If so, please point to the location using one finger.”</p>
Range of Motion		
FF	<input type="checkbox"/> WNL <input type="checkbox"/> 170-180 <input type="checkbox"/> 150-160 <input type="checkbox"/> 130-140 <input type="checkbox"/> 110-120 <input type="checkbox"/> 90-100 <input type="checkbox"/> <90 <input type="checkbox"/> Pseudoparalysis <input type="checkbox"/> Anterosuperior escape	<p>“Move away from the camera approximately 10 feet.</p> <p>Turn to the side so that you are standing perpendicular the camera, with your affected shoulder facing the camera. Bring both arms up as high as you can.</p> <p>If the injured shoulder does not go as high as the other side, use your other hand to help raise the injured arm as high as it will go.”</p>
Abd	<input type="checkbox"/> WNL <input type="checkbox"/> 170-180 <input type="checkbox"/> 150-160 <input type="checkbox"/> 130-140 <input type="checkbox"/> 110-120 <input type="checkbox"/> 90-100 <input type="checkbox"/> 70-80 <input type="checkbox"/> <70	<p>“Face the camera. Bring both of your arms out to the side as high as they can go.”</p>

ER	<input type="checkbox"/> WNL <input type="checkbox"/> 80-90 <input type="checkbox"/> 60-70 <input type="checkbox"/> 40-50 <input type="checkbox"/> 20-30 <input type="checkbox"/> 0-10 <input type="checkbox"/> Partial Lag <input type="checkbox"/> Complete Lag	<p>“With your arms at your sides, and your elbows bent to 90 degrees, rotate your forearms outward.”</p>								
IR	<input type="checkbox"/> WNL <input type="checkbox"/> T2-T7 <input type="checkbox"/> T8-T12 <input type="checkbox"/> L1-L5 <input type="checkbox"/> Sacrum <input type="checkbox"/> Back pocket <input type="checkbox"/> Trochanter	<p>“Turn your back to the camera. With both hands, reach behind you and touch your back as high as you can.”</p>								
Scapula (Kibler) ^{29, 34, 44, 62} <table border="1"> <tr> <td>Sensitivity</td> <td>74%-78%</td> </tr> <tr> <td>Specificity</td> <td>31%-38%</td> </tr> <tr> <td>LR+</td> <td>n/a</td> </tr> <tr> <td>LR -</td> <td>n/a</td> </tr> </table>	Sensitivity	74%-78%	Specificity	31%-38%	LR+	n/a	LR -	n/a	<input type="checkbox"/> Normal Rhythm <input type="checkbox"/> Shrug <input type="checkbox"/> Dyskinesia <input type="checkbox"/> Medial winging <input type="checkbox"/> Lateral winging	<p>“Keeping your back to the camera, raise your arms in front of you as high as you can. Slowly bring them back down in front of you. Repeat these two more times.”</p>
Sensitivity	74%-78%									
Specificity	31%-38%									
LR+	n/a									
LR -	n/a									
Neurovascular										
Sensation (Gen)	<input type="checkbox"/> Axillary <input type="checkbox"/> LABCN <input type="checkbox"/> Radial <input type="checkbox"/> Median <input type="checkbox"/> Ulnar	<p>“Please turn back to face the camera. Do you have any areas of numbness, burning, or tingling? If so, please point to these areas.”</p>								
Sensation (Spec)		<p>“We are going to test sensation in some specific locations. Please use your other hand to touch...”</p>								
Axillary	<input type="checkbox"/> Normal <input type="checkbox"/> Numbness <input type="checkbox"/> Painful touch	<p>“...the outside part of your shoulder.”</p>								
LABCN	<input type="checkbox"/> Normal <input type="checkbox"/> Numbness <input type="checkbox"/> Painful touch	<p>“...the outside part of your forearm.”</p>								
Radial	<input type="checkbox"/> Normal <input type="checkbox"/> Numbness <input type="checkbox"/> Painful touch	<p>“...the back of your thumb below your nail.”</p>								
Median	<input type="checkbox"/> Normal <input type="checkbox"/> Numbness	<p>“...the palm side of your index finger.”</p>								

	<input type="checkbox"/> Painful touch	
Ulnar	<input type="checkbox"/> Normal <input type="checkbox"/> Numbness <input type="checkbox"/> Painful touch	"...the palm side of your small finger."
Motor (Gen)	<input type="checkbox"/> Deltoid <input type="checkbox"/> Biceps <input type="checkbox"/> Triceps <input type="checkbox"/> Intact distally	<p>"Do you feel weak with any particular movements? If so, what feels weak."</p> <p>"With your elbows bent and your knuckles touching one another, raise your arms to shoulder height. Bring your arms down to your sides with your elbows straight. Turn your palms facing up and bend your elbows. Now, bend your wrist down. Bend your wrist up. Hold your thumbs up. Spread your fingers. Make an A-OK sign."</p>
Motor (Spec)		<p>"The following strength tests can be performed using a doubled plastic grocery bag and eight 16-ounce soup cans or other canned goods.</p> <p>For each of the following exercises, I ask that you place the maximum number of soup cans that you can lift in the bag.</p> <p>You will perform the movements that follow while lifting the bag of soup cans. If you are unable to perform the movement with the number of cans in the bag, remove some and repeat. If you are able to perform the movement, then increase the number of cans in the bag to a maximum of 8."</p>
Deltoid	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	"Raise your arm out to the side to shoulder height."
Elbow flexion	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	"With your arms by your side, bend your elbow."
Elbow extension	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	"Bring your injured arm overhead with the elbow bent such that the bag is touching your back. Now straighten your elbow to lift the bag overhead."
Wrist extension	<input type="checkbox"/> Unable	"With your forearm turned down bend your wrist back."

	<input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	
Wrist flexion	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	“Turn your forearm facing up. Bend your wrist up.”
EPL	<input type="checkbox"/> Unable <input type="checkbox"/> Able	“Give a thumbs up.”
FPL	<input type="checkbox"/> Unable <input type="checkbox"/> Able	“Make an OK sign.”
IO	<input type="checkbox"/> Unable <input type="checkbox"/> Able	“Open your fingers out wide like a fan and keep them there.”
Circulation		“We are going to test the circulation of your extremities.”
Well perfused	<input type="checkbox"/> Symmetric <input type="checkbox"/> Cooler <input type="checkbox"/> Hotter	“Does your hand feel the same temperature on both sides.”
Capillary refill	<input type="checkbox"/> <2 seconds <input type="checkbox"/> >2 seconds	“Using your other hand, press the fingernail of your thumb until it turns white. Then, release your thumb and allow it to pink back up. How long did it take to pink back up?”

Impingement / Rotator Cuff

Neer ^{27, 28, 31, 38, 45, 65} <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Sensitivity</td> <td>59%-83%</td> </tr> <tr> <td>Specificity</td> <td>47%-51%</td> </tr> <tr> <td>LR+</td> <td>1.12-1.44</td> </tr> <tr> <td>LR -</td> <td>0.52-0.86</td> </tr> </table>	Sensitivity	59%-83%	Specificity	47%-51%	LR+	1.12-1.44	LR -	0.52-0.86	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Stand 5 feet from the camera. Use your other hand to raise the affected arm overhead as high as it will go. Tell me if this causes pain at the top.”
Sensitivity	59%-83%									
Specificity	47%-51%									
LR+	1.12-1.44									
LR -	0.52-0.86									
Hawkins ^{27, 28, 31, 38, 45, 65} <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Sensitivity</td> <td>69%-88%</td> </tr> <tr> <td>Specificity</td> <td>43%-48%</td> </tr> </table>	Sensitivity	69%-88%	Specificity	43%-48%	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Now, raise your arm in front of you to shoulder height and bend your elbow to 90 degrees. Use your other hand to grasp your wrist. While keeping your elbow in the same bent position, push your wrist down toward the ground, rotating your shoulder. Repeat this several times. Does this cause pain?”				
Sensitivity	69%-88%									
Specificity	43%-48%									

LR+	1.33-1.36		
LR -	0.55-0.65		
Supraspinatus ^{27, 28, 31, 38, 45, 65}		<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	<p>“The following strength tests can be done using a doubled plastic grocery bag and eight 16-ounce soup cans or other canned goods.</p> <p>For each of the following exercises, I ask that you place the maximum number of cans in the bag that you think you are able to lift.</p> <p>You will perform the movements that follow while lifting the bag of cans. If you are unable to perform the movement with the number of cans in the bag, then remove some and repeat. If you are able to perform the movement, then increase the number of cans in the bag to a maximum of 8 cans.”</p> <p>“Keeping your elbows straight, and thumbs pointing downward. Raise your arms up to the side and slightly forward to shoulder height.”</p>
Sensitivity	88%	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	<p>“Now lay on your side facing the camera so that your injured shoulder is up. With your elbow bent to 90 degrees and tucked next to your side, rotate your forearm to lift the bag off of the ground.”</p>
Specificity	70%		
LR+	2.93		
LR -	0.17		
Infraspinatus ^{27, 28, 31}		<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans <input type="checkbox"/> 8 soup cans	
Sensitivity	76%-84%	<input type="checkbox"/> Positive Hornblower <input type="checkbox"/> Negative Hornblower	<p>“Sit or stand facing the camera and raise your arms to shoulder height with your elbows bent to 90 degrees and your palms facing forward.”</p>
Specificity	53%-57%		
LR+	1.76		
LR -	0.3		
Teres Minor ^{14, 27, 43}			
Sensitivity	79%-100%	<input type="checkbox"/> Unable <input type="checkbox"/> Gravity only <input type="checkbox"/> 1 soup can <input type="checkbox"/> 4 soup cans	<p>“Change position to lay on your injured shoulder. With your elbow bent to 90 degrees and tucked next to your side, rotate your forearm up off of the floor toward your belly to lift the bag off of the ground.”</p>
Specificity	67%-93%		
LR+	12		
LR -	0.05		
Subscapularis			

		<input type="checkbox"/> 8 soup cans									
Belly press ^{4, 27, 31, 59, 47}	<table border="1"> <tr> <td>Sensitivity</td> <td>28%-50%</td> </tr> <tr> <td>Specificity</td> <td>96%-99%</td> </tr> <tr> <td>LR+</td> <td>12.2-20</td> </tr> <tr> <td>LR -</td> <td>0.61</td> </tr> </table>	Sensitivity	28%-50%	Specificity	96%-99%	LR+	12.2-20	LR -	0.61	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Equivocal	<p>“Please stand up and face the camera. While keeping your wrists straight, place the palms of your hands on your belly. Push in on your belly while bringing your elbows forward. Now, turn 90 degrees so that the affected shoulder is facing the camera and repeat this movement.”</p>
Sensitivity	28%-50%										
Specificity	96%-99%										
LR+	12.2-20										
LR -	0.61										
Lift off ^{4, 27, 31, 59, 47}	<table border="1"> <tr> <td>Sensitivity</td> <td>12%-25%</td> </tr> <tr> <td>Specificity</td> <td>95%-100%</td> </tr> <tr> <td>LR+</td> <td>4.96</td> </tr> <tr> <td>LR -</td> <td>N/A</td> </tr> </table>	Sensitivity	12%-25%	Specificity	95%-100%	LR+	4.96	LR -	N/A	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Equivocal	<p>“Turn so that your injured side is facing the camera. Place your hand on the small of your back. Lift your hand backward off of your back without straightening your elbow and keep it in this position.”</p>
Sensitivity	12%-25%										
Specificity	95%-100%										
LR+	4.96										
LR -	N/A										
Acromioclavicular Joint and Biceps-Labral Complex											
Cross Body ^{13, 27, 44}	<table border="1"> <tr> <td>Sensitivity</td> <td>77%</td> </tr> <tr> <td>Specificity</td> <td>79%</td> </tr> <tr> <td>LR+</td> <td>3.67</td> </tr> <tr> <td>LR -</td> <td>0.29</td> </tr> </table>	Sensitivity	77%	Specificity	79%	LR+	3.67	LR -	0.29	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	<p>“Face the camera. Raise your arm up in front of you to shoulder height. Use your other hand to grasp your forearm and then pull the injured arm across your body. Does this cause pain? If so, where?”</p>
Sensitivity	77%										
Specificity	79%										
LR+	3.67										
LR -	0.29										
Speed ^{6, 22, 28, 30, 34, 65}	<table border="1"> <tr> <td>Sensitivity</td> <td>32%-90%</td> </tr> <tr> <td>Specificity</td> <td>14%-81%</td> </tr> <tr> <td>LR+</td> <td>1.28-2.77</td> </tr> <tr> <td>LR -</td> <td>0.58-0.91</td> </tr> </table>	Sensitivity	32%-90%	Specificity	14%-81%	LR+	1.28-2.77	LR -	0.58-0.91	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Equivocal	<p>“Holding the grocery bag with cans inside, turn your palms up and fully straighten your elbows. Bring your arms up to 45 degrees. Does this cause your pain? If so, where?”</p>
Sensitivity	32%-90%										
Specificity	14%-81%										
LR+	1.28-2.77										
LR -	0.58-0.91										
Yergason ^{6, 22, 28, 30, 34, 65}	<table border="1"> <tr> <td>Sensitivity</td> <td>41%-43%</td> </tr> <tr> <td>Specificity</td> <td>79%</td> </tr> </table>	Sensitivity	41%-43%	Specificity	79%	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	<p>“With your arms at your side and your elbows bent to 90 degrees, grab a fixed object such as a countertop and try to rotate your (right/left) forearm</p>				
Sensitivity	41%-43%										
Specificity	79%										

LR+	1.94-2.05		(clockwise/counterclockwise). Does this cause you pain?"
LR -	0.72-0.74		
O'Brien ⁶³		<input type="checkbox"/> Positive glenohumeral <input type="checkbox"/> Positive at AC joint <input type="checkbox"/> Negative	<p>"Hold the grocery bag with cans inside using both hands and raise it until the bag is directly in front of your face. Your elbows should be straight, and your thumb should be facing downward like you are pouring something out. Remove the uninjured arm. Does this cause your pain? If so, where?</p> <p>Now, repeat this with your thumb facing upward. Is this less painful or the same?"</p>
Sensitivity	54%-100%		
Specificity	11%-99%		
LR+	0.67-49.5		
LR -	0.01-2.5		
Instability			
Apprehension ^{19, 28, 65}		<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Painful	"Standing up and facing the camera, lift your arm away from your side to shoulder height and bend your elbow to 90 degrees. Rotate your arm backward like you are throwing a ball. Is this painful? Does this make you nervous? Does the shoulder feel unstable?"
Sensitivity	72%-98%		
Specificity	72%-96%		
LR+	3.46-20.22		
LR -	0.02-0.29		
Posterior stress		<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Painful	"Face the wall. Bring your arm up to shoulder height directly in front of your face with your thumb pointing downward. Push against the wall with your palm. Does this cause you pain?"
Sulcus		<input type="checkbox"/> Positive <input type="checkbox"/> Negative	"Turn perpendicular to the camera. Rest your arm at your side while holding a bag with 8 cans inside. Let your shoulder muscles relax completely."
Beighton Criteria			"Each of the following tests should be done on the right and left side.
Thumb-to-Forearm		RIGHT <input type="checkbox"/> Positive <input type="checkbox"/> Negative LEFT <input type="checkbox"/> Positive <input type="checkbox"/> Negative	Bend your wrist. Now, bend your thumb down and try to make it touch it to your forearm."
5 th MCP >90		RIGHT <input type="checkbox"/> Positive <input type="checkbox"/> Negative LEFT <input type="checkbox"/> Positive <input type="checkbox"/> Negative	"Bend your pinky back as far as it will go"

Elbow >10	RIGHT <input type="checkbox"/> Positive <input type="checkbox"/> Negative LEFT <input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Stand perpendicular to the camera, straighten your elbows as far as they go.”
Knee >10	RIGHT <input type="checkbox"/> Positive <input type="checkbox"/> Negative LEFT <input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Step back from the camera and stand perpendicular to it, straighten your knees as far as they go.”
Palms to Floor	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Bend at the waist while keeping your knees straight, and attempt to place both palms on the floor.”
Thoracic Outlet		
Roos	<input type="checkbox"/> Positive <input type="checkbox"/> Negative	“Place both arms in the throwing position with the elbow 90 flexed, the shoulder raised to the side 90 deg and the shoulder rotated outward 90 deg. Open and close the hands slowly over a 3-minute period.”