The University of Western Ontario

Assessment Manual

Prognosis following acute WAD:

Development and Initial Validation of a New Clinical Tool

Version 3.0

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Assessment Manual

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INTRODUCTION

What we are doing

This project is part of the research thesis component of David Walton, PhD candidate in Health and Rehabilitation Sciences at The University of Western Ontario. The purpose of the project is to develop a tool that can be easily administered in a clinical setting, and can provide rehabilitation professionals with an estimate of the risk that a patient will go on to develop chronic WAD-related problems. For those patients deemed to be at risk of a poor outcome, the tool will also provide the *nature* of the risk. It is this second purpose that will help guide clinicians in deciding the most appropriate mode of intervention to minimize the risk of chronic problems.

Why is a new tool needed?

Currently, the most widely used classification system for patients with whiplash-related symptoms is the system developed by the Quebec Task Force in 1995[1]. This system is clinician-friendly in that it classifies patients into one of 4 categories based on a simple assessment of presenting signs and symptoms. However, scientific support for the prognostic ability of the system is lacking[2]. Further, the system does not suggest the optimal direction for intervention for the patient.

Subsequent tools have been developed in an effort to improve the accuracy of prognosis[3,4,5]. To date, none of these tools have garnered widespread acceptance, nor have they demonstrated consistent predictive ability.

Beyond prognosis, much of the literature pertaining to WAD has been directed at finding the optimal intervention that will prevent the transition to a state of chronic pain or disability. To date, many of these attempts have met with sub-optimal results, leading to suggestions that the best approach to whiplash is to educate the patient to stay active, and otherwise take a wait-and-see approach.

The researchers on this study, along with others in the field, have opined that several of the novel interventions that have recently been evaluated might find better results when applied to a more targeted sub-set of the acute whiplash population. Unfortunately, no system of classifying patients with whiplash based on the nature of risk has yet been developed. We hope that this project is the first step in developing a comprehensive risk assessment tool for this purpose.

HOW TO USE THIS MANUAL

This manual provides instructions for the standardized assessment of a patient with acute whiplash-associated disorder (WAD). It is to be used during the initial assessment of any WAD patient who has been included in the study. The inclusion and exclusion criteria may be found at the bottom of this page.

It is **imperative** that assessors adhere to the assessment protocol described within this manual, and in the accompanying video. The assessment procedures have been designed to maximize reliability between different assessors. The response options are mostly categorical, and require the assessor to check an appropriate box based on their observations. Further, the assessment procedures described herein have been designed with the acute pain patient in mind. Each assessment procedure has been designed in such a way as to minimize the likelihood of flaring an irritable condition. Each procedure allows an option of 'unable to perform' or 'unwilling to move', for those subjects in whom the assessor believes the procedure would cause undue discomfort to the patient.

Performing this assessment should in no way preclude the assessor from performing other, more directed assessment procedures as deemed appropriate. Assessors are free to continue with their full assessment approach upon completing the procedures described in this manual. The only request is that the assessment protocol described here be completed in its entirety prior to carrying out further assessment. For the purposes of this study, the researchers are not interested in the findings of any assessment procedures beyond those described here.

Pilot testing suggests that with minimal practice this entire assessment protocol can be completed within 10 minutes, and is acceptable to the majority of patients with acute whiplash.

Inclusion criteria for the study:

- Any patient presenting for rehabilitation of neck or other upper quadrant symptoms as a result of a motor vehicle accident. This includes, but is not limited to, neck pain or stiffness, headache, pain in the shoulder girdle or arms, changes in sensation or strength in the arms or face.
- The patient is able to understand written and spoken English to at least a grade 6 level.
- The patient presents for their first assessment <u>within 4 weeks</u> of the trauma.
- The patient is at least 18 years old.

STEPS IN ASSESSMENT PROTOCOL

			Corresponds to scoring tool number:
1.	ACTIVE CERVICAL RANGE OF MOTION Flexion, Extension, Rotation, Side Flexion		1—8
2.	ACTIVE MOVEMENTS OF THE JAW Opening, closing, lateral trusion		9
4.	SENSATION TO LIGHT TOUCH *Equipment:* Semmes-Weinstein monofilament		10
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Physical assessment module: The following is a checklist for you to record your findings from the physical exam of the patient with acute whiplash associated disorder. Please refer to the standardized assessment manual for instructions on how to perform each of the tests below. It is important that you perform the assessment in the way outlined in the manual, even if it is not the technique that you would normally use. A standardized assessment technique is a requisite part of a test with good inter-tester reliability, and is necessary for our findings to be valid.

Physical assessment				
1. During the subjective exam, does the patient report symptoms on one side more than the other?	☐Worse on right	☐Worse on left	☐Equal both sides or centrally	
2. Check any of the following <u>active</u> movements that <u>reproduce *any* of the patient's symptoms,</u> regardless of the severity of the invoked symptoms: ☐ Patient unwilling to move in any direction	☐ Flexion	☐ Extension	Rotation ☐Right ☐Left	Side flexion ☐Right ☐Left
3. Is the patient <u>restricted</u> in <u>active</u> cervical flexion?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move
4. Is the patient <u>restricted</u> in <u>active</u> cervical extension?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move
5. Is the patient <u>restricted</u> in <u>active</u> cervical *right* rotation?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move
6. Is the patient <u>restricted</u> in <u>active</u> cervical *left* rotation?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move

7. Is the patient <u>restricted</u> in <u>active</u> cervical *right* side flexion?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move
8. Is the patient <u>restricted</u> in <u>active</u> cervical *left* side flexion?	☐No	☐Restricted a little (able to move >50% of normal)	☐Restricted a lot (able to move <50% of normal)	☐Unwilling to move

9. Assessment of the TMJ			
(a) Do you appreciate any abnormal **auditory or palpatory** events, such as popping, clicking, locking, or crepitus?	☐No	☐Yes	☐Unable to test
(b) Is there obvious (>50%) **restriction on opening or lateral trusion**?	☐No	☐Yes	☐Unable to test
(c) Is there **significant, abnormal deviation from the midline** during full opening?	☐No	☐Yes	☐Unable to test
If the patient reports pain during any of these tests, check here:	☐pain		

	Right	Left	
10. Sensation to light touch:			
(a) Check the box if the patient is <u>not able</u> to feel the 3.61 monofilament at the lateral elbow crease on the:	☐can't feel	☐can't feel	☐Unable to test
(b) Check the box if the patient is <u>not able</u> to feel the 2.83 monofilament at the:			
(i) Pad of the thumb?	☐can't feel	☐can't feel	☐Unable to test
(ii) Pad of the little finger?	☐can't feel	☐can't feel	☐Unable to test
(iii) Dorsum of the wrist?	☐can't feel	☐can't feel	☐Unable to test

11. Compared to the opposite side, do you appreciate weakness of <u>forearm pronation</u> on the most affected/dominant side?	☐No	☐Yes
Check here if the patient reports pain during this test: ☐Unable to test	☐ in the neck or shoulder girdle ☐locally	

12. Compared to the opposite side, do you appreciate weakness of the wrist extensors on the most affected/dominant side? **Check here if the patient reports pain during this test:** ☐Unable to test	☐No ☐in the neck or shoulder girdle ☐locally	☐Yes
13. Compared to the opposite side, do you appreciate weakness of the elbow flexors on the most affected/dominant side? **Check here if the patient reports pain during this test:** ☐Unable to test	☐No ☐ in the neck or shoulder girdle ☐locally	☐Yes
14. Compared to the opposite side, do you appreciate weakness of the elbow extensors on the most affected/dominant side? **Check here if the patient reports pain during this test:** ☐Unable to test	☐No ☐ in the neck or shoulder girdle ☐locally	☐Yes

15. Does general cervical traction change any of the patient's symptoms? Ask specifically about worsening *and* improvement.	☐No	☐Yes – worsens ☐Yes – improves		☐Unable to perform
16. Does general cervical compression with slight side-flexion reproduce any of the patient's symptoms?	☐No	Yes		☐Unable to perform
		☐With left SF	☐With right SF	
17. Is the patient able to lift his/her head off the bed while lying supine?	☐No	☐Yes – easily		☐Yes – with difficulty

18. Record the patient's pressure pain threshold at the muscle belly of the *tibialis anterior*. Instructions to the patient: ***"Please tell me the moment the sensation changes from comfortable pressure to slightly unpleasant pain."***	Right: (3 tests) 1. _____ lbs 2. _____ lbs 3. _____ lbs	Left: (3 tests) 1. _____ lbs 2. _____ lbs 3. _____ lbs	☐Unable to test
19. Record the patient's pressure pain threshold at the angle of the *upper trapezius* muscle. Instructions to the patient: ***"Please tell me the moment the sensation changes from comfortable pressure to slightly unpleasant pain."***	Right: (3 tests) 1. _____ lbs 2. _____ lbs 3. _____ lbs	Left: (3 tests) 1. _____ lbs 2. _____ lbs 3. _____ lbs	☐Unable to test

Active Cervical Range of Motion

Position of patient:

Seated in an upright posture, feet flat on the floor.

Position of therapist:

Looking at the patient from the side for flexion and extension, and from the front for rotation and side-flexion. The therapist's eyes should be level with the patient's head to prevent parallax viewing distortion.

Instructions to the patient:

Ask the patient to perform each of the following movements, in order. At end-range in each position, ask the patient about their pain: "Does this movement bother you?".

Please use the wording provided.

1. "Keeping your teeth together, please bend your head forward as far as you can tolerate."
   Ask about symptoms

2. "Please look upwards as far as you can tolerate"
   Ask about symptoms

3. "Please turn your head to the right as far as you can tolerate." *NB: Watch for 'trick' movements during rotation, such as rotating the trunk to increase perceived rotation.*
   Ask about symptoms

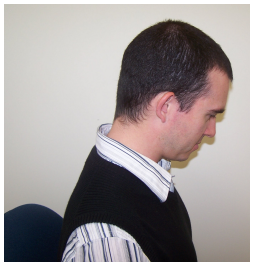
4. "Please turn your head to the left as far as you can tolerate."
   Ask about symptoms

5. "Keeping your nose forward, please bring your left ear to your left shoulder as far as you can tolerate." *NB: Watch for 'trick' movements during side-flexion, such as side-bending the trunk or raising the shoulder, to increase perceived side-flexion*
   Ask about symptoms

6. "Keeping your nose forward please bring your right ear to your right shoulder as far as you can tolerate." **Ask about symptoms**

Scoring on next page.

Scoring Cervical Range of Motion

	Start position	Less than 50% ROM	Greater than 50%, less than full ROM	Full ROM
Flexion:				
Extension:				
Rotation:				
Side Flexion:				

Active Movements of the Jaw (TMJ)

Position of patient:

Seated in an upright posture, feet flat on the floor.

Position of the therapist:

Observe at least one full open/close cycle while in front of the patient, with fingers placed on the TMJ (Figure 1) , as shown.

Observe at least one full right/left lateral trusion movement while in front of the patient, with fingers placed on TMJ.

Repeat movements as necessary to ensure a proper appreciation for the presence of any of: Clicking, locking, crepitus, **severe, abnormal** lateral deviation from the midline on opening, severe (>50%) restriction in opening, closing or lateral trusion. At end range of each movement, ask:
"Does this movement bother you?".

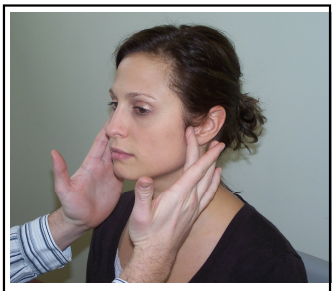


FIGURE 1: Palpation of the TMJ

Instructions to the patient

1. "Please open your mouth as far as you can tolerate."
   Ask about symptoms
2. "Please slide your jaw to the right (left) as far as you can tolerate." (Demonstrate)
   Ask about symptoms

A note on abnormal deviation from the midline on opening: the intention of this test is to identify problems such as severe laxity or tearing of the ligamentous complex that restrains the mandibular condyle in the temporal fossa, or significant muscle spasm that causes deviation of the jaw on opening. Mild deviation from the midline is normal. We are looking for deviation that would indicate the presence of pathology that should be followed-up or treated.

Opening (front) Opening (side) Lateral Trusion (front)

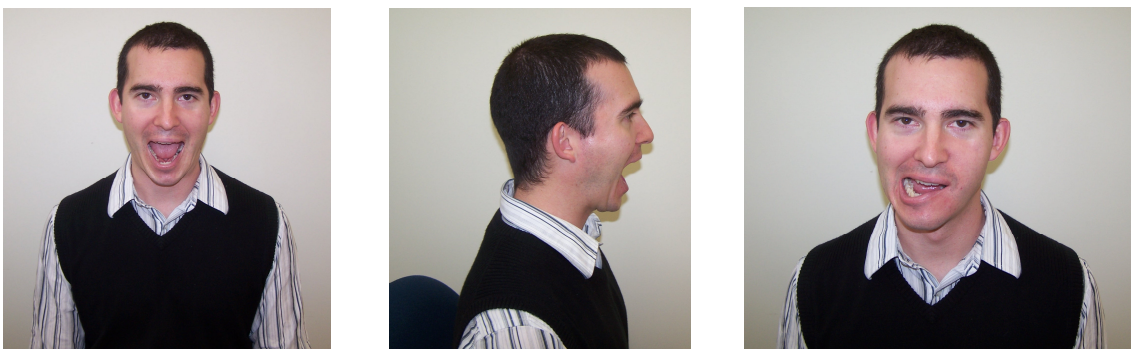


FIGURE 2: Active movements of the jaw.

Sensory Testing

Position of patient:

Seated in a comfortable upright posture, feet flat on the floor, forearms resting on the lap. Eyes closed for testing.

Position of the therapist:

Seated or standing in front of the patient. The Semmes-Weinstein monofilaments are used to apply the pressure. **Begin the testing at each point on the right side.**

FIGURE 3: The 2.83 monofilament. While difficult to see here, the circle indicates the location of the weight stamp (2.83).

1. Show the patient each of the locations that will be tested (Fig. 4), but **do not touch the patient** throughout the duration of this test.
2. Locate the monofilament labeled **3.61** (Fig. 3). Show it to the patient, and demonstrate with your finger how it bends easily with little pressure. State to the patient: "In a moment I'm going to ask you to close your eyes, and I'm going to touch the skin at the front of your elbow. I would like you to tell me when you feel the filament touch your skin."
3. Have the patient close his/her eyes. Touch the filament to the skin on the anterior aspect of the patient's elbow (over the cubital fossa), in the lateral half (Fig. 4a), just until it starts be bend slightly. Try your best to avoid moving hair. Wait to see if the patient indicates that he/she felt the filament. Repeat the test on the opposite side. If the patient is unable to feel the filament on one or both sides, record that on the scoring sheet.
4. Now find the **2.83** monofilament (Fig. 3). Repeat the same procedure using the **2.83** monofilament at the other 3 points as shown in Figure 4: pad of thumb (fig. 4b), pad of little finger (fig. 4c), and dorsum of wrist at the base of the 3rd metacarpal (fig. 4d). Record your findings on the scoring sheet.

Important: Do not touch the patient with anything other than the monofilament throughout this part of the test. This includes landmarking with your fingers.

FIGURE 4: Locations for testing sensation of light touch. A: Lateral half of the skin over the cubital fossa at the anterior elbow, B: Pad of the thumb, C: Pad of the little finger, D: Dorsum of wrist at the base of the 3rd metacarpal.

Key muscle testing - forearm pronation (C6)

Position of patient:

Seated in an upright posture, feet flat on the floor, elbow flexed 90°. Forearm is in neutral pronation/supination, with the thumb pointed upwards.

Position of the therapist:

Standing at the side of the patient, facing the patient. To test pronation on the left (reverse hands for right):

1. Grasp the radius and ulna firmly with the left hand just proximal to the wrist. The thenar eminence should be along the shaft of the radius. The fingers should be wrapped fully around the ulna. The right hand cups the elbow to provide support and to keep the arm from moving.
2. Apply a force in the direction of supination. The therapist's wrist extensors should be providing the majority of the force.
3. Apply a slowly increasing force, proportional to the morphology of the patient, pushing the radius laterally with the thenar eminence while pulling the ulna medially with the fingers (Figure 5). This should produce a supination moment about the forearm. Ramp up to full force over the course of 2-3 seconds, hold 5 seconds, and slowly release. The therapist is trying to find the 'break' point of the patient's strength over the course of the 5 second maximal hold.
4. If you are unsure if weakness is present, repeat the test one time. If upon repeated testing you are still unsure if weakness is present, you may assume that weakness is not present and score it as such.

FIGURE 5: Testing isometric pronation of the forearm. Arrow indicates direction of force application. **Note: You may choose an alternate technique if there is one you are more comfortable with. One hand on the volar radius with the other on the dorsal ulna is another acceptable technique for example.**

Instructions to the patient

"I am going to test the strength in your forearm by trying to turn your palm upwards. Please hold your position and don't let me move you."

Scoring

The tool only requires that you indicate the presence or absence of muscle weakness or pain, and the side(s) that is/are weak. Expected strength is influenced by the size, age and gender of the patient, so comparison against clinical experience *and the opposite side* is necessary.

Key Muscle Testing - wrist extension (C6,7)

Position of patient:

Seated in an upright posture, feet flat on the floor, forearm resting on a firm surface such as a cushioned armrest or examination bed.

Position of the therapist:

Standing to the side and slightly behind the patient on the side to be tested, facing the same direction as the patient. To test extension on the left (reverse for right):

1. Grasp the volar forearm firmly with the left hand. If the armrest of the chair is hard, place either a cushion or folded towel under the forearm, or wrap your own fingers under the forearm (as in Figure 6).
2. Ask the patient to extend his/her wrist roughly half way.
3. Therapist places the palm of the right hand against the back of the patient's hand. The thenar eminence and base of the palm placed against the dorsal aspect of the MCP* joints allows for a long lever for the therapist while avoiding undue pressure on the back of the patient's hand.
4. Apply a slowly increasing force, proportional to the morphology of the patient, to the back of the hand in the direction of wrist flexion. Ramp up to full force over the course of 2-3 seconds, hold 5 seconds, and slowly release. The therapist is trying to find the 'break' point of the patient's strength over the course of the 5 second maximal hold.
5. If you are unsure if weakness is present, repeat the test one time. If upon repeated testing you are still unsure if weakness is present, you may assume that weakness is not present and score it as such.

FIGURE 6: Testing isometric extension strength at the wrist. Arrow indicates direction of force application. Circle represents ideal axis of rotation for the movement being tested. **Note: other techniques are acceptable if you are more comfortable with them.**

Instructions to the patient

"I am going to test the strength in your wrist by pushing on the back of your hand. Please hold your position and don't let me move you."

Scoring

The tool only requires that you indicate the presence or absence of muscle weakness or pain, and the side(s) that is/are weak. Expected strength is influenced by the size, age and gender of the patient, so comparison against clinical experience *and the opposite side* is necessary.

*: metacarpophalangeal joints

Key muscle testing - elbow flexion (C6)

Position of patient:

Lying supine, elbow flexed 90° and held against the body, forearm supinated with the thumb pointing laterally.

Position of the therapist:

Standing at the side of the bed at the level of the patient's shoulder, facing the feet of the patient. To test flexion on the left (reverse hands for right):

2. Place the left hand under the distal portion of the humerus, just proximal to the elbow. The left thumb can wrap around the upper arm and palpate the biceps tendon as it become taut with this movement.
3. The right palm is placed against the distal portion of the patient's forearm, with as much of the palm in contact with the forearm as possible to prevent too much pressure on sensitive structures.
4. Apply a slowly increasing force, proportional to the morphology of the patient, pushing the forearm caudally in an extension direction. With the patient holding his/her elbow at 90°, ramp up to full force over the course of 2-3 seconds, hold 5 seconds, and slowly release. The therapist is trying to find the 'break' point of the patient's strength over the course of the 5 second maximal hold.
5. If you are unsure if weakness is present, repeat the test one time. If upon repeated testing you are still unsure if weakness is present, you may assume that weakness is not present and score it as such.

Instructions to the patient

"I am going to test the strength in your elbow by trying to straighten your elbow. Please hold your position and don't let me move you."

Scoring

The tool only requires that you indicate the presence or absence of muscle weakness or pain, and the side(s) that is/are weak. Expected strength is influenced by the size, age and gender of the patient, so comparison against clinical experience *and the opposite side* is necessary.

FIGURE 7: Testing isometric flexion strength at the elbow. Arrow indicates direction of force application. Circle represents ideal axis of rotation for the movement being tested.

Key muscle testing - elbow extension (C7)

Position of patient:

Lying supine, elbow flexed 90° and held against the body, forearm in neutral supination/ pronation with the thumb pointing cranially.

Position of the therapist:

Standing at the side of the bed at the level of the patient's hips, facing the head of the patient. To test extension on the left (reverse hands for right):

2. Place the right hand under the distal portion of the humerus, just proximal to the elbow. This will help to control rotation of the arm during the movement.
3. The left palm is placed against the distal portion of the patient's forearm, with as much of the palm in contact with the forearm as possible to prevent too much pressure on sensitive structures.
4. Apply a slowly increasing force, proportional to the morphology of the patient, pushing the forearm cranially in a flexion direction. With the patient holding his/her elbow at 90°, ramp up to full force over the course of 2-3 seconds, hold 5 seconds, and slowly release. The therapist is trying to find the 'break' point of the patient's strength over the course of the 5 second maximal hold.
5. If you are unsure if weakness is present, repeat the test one time. If upon repeated testing you are still unsure if weakness is present, you may assume that weakness is not present and score it as such.

FIGURE 8: Testing isometric extension strength at the elbow. Arrow indicates direction of force application. Circle represents ideal axis of rotation for the movement being tested.

Instructions to the patient

"I am going to test the strength in your elbow by trying to bend your elbow. Please hold your position and don't let me move you."

Scoring

The tool only requires that you indicate the presence or absence of muscle weakness, and the side that is/are weak. Expected strength is influenced by the size, age and gender of the patient, so comparison against clinical experience *and the opposite side* is necessary.

Notes on Key Muscle Testing

1. For ease, always start on the right side, unless there is good reason for not doing so. There is no theoretical reason for doing this other than ease and consistency.

2. In order to fully appreciate the amount of strength available to a patient, these tests should be 'break' tests rather than 'make' tests. What this means is that after ramping up to what you expect to be near maximal strength over the first 2-3 seconds, continue to slowly increase the force until you start to feel the patient's joint subtly giving way. Once you have found the break point, very small fluctuations in force (decreasing slightly, then increasing again) over the course of the 5 second holds will improve your muscle memory for the amount of strength required to break the patient's strength. This can then be compared to the opposite side.

3. A second test on the same muscle of the same side is only necessary if you are unsure if weakness is or is not present after the first test. If weakness is clearly evident, or clearly not evident, after the first testing, a second test is unnecessary.

Notes on Sensory Testing

1. Try your best to avoid moving hair on the forearm or hand when testing sensation to light touch. This will be more of an issue with some patients than with others.

2. Apply only enough pressure to make the monofilament start to bend a few degrees. You do not need to make the filament bend into a full arc, they are designed to apply the same amount of pressure to the skin regardless of how much the filament bends.

3. As long as you have performed a good test, you only need to touch the skin once, then back off and test the opposite side. Do not 'tap' the skin multiple times. The only time you would touch the skin a second time is if you think that the test wasn't performed properly the first time (ie. you missed the skin).

General Cervical Traction and Compression

Traction

Position of patient:

Laying supine. A pillow may be used under the patient's head if necessary for comfort.

Position of the therapist:

Seated or standing at the patient's head. One hand is cupped under the patient's occiput, the other hand is placed across the dorsum of the cervical spine, abutting or overlapping the first hand (Figure 9).

The instructions to the patient are: "I am going to lightly pull on your head for 5 seconds. Please let me know if this causes you any problems."

FIGURE 9: Position for traction.

1. Apply a traction force to the entire cervical spine, doing your best to spread the force through both hands. Avoid putting too much pressure on potentially sensitive tissue.
2. Hold the traction for 5 seconds.
3. Ask the patient "Does this make your pain worse, better or stay the same?". Record the patient's response.

Compression

Position of patient and therapist as per traction. This time, the hand that was cupping the occiput is moved to the crown of the head (Figure 10).
The instructions to the patient are: "I am going to lightly push on the top of your head for 5 seconds. Please let me know if this causes you and problems."

FIGURE 10: Position for compression.

1. Apply a small side-flexion movement (approx. 10°) to one side, and then apply a compression force of approximately 5 lbs of pressure through the crown of the head. Hold the force for up to 5 seconds. Ask about the impact on the patient's pain as per traction. Repeat the movement but cock the head into slight side-flexion in the other direction.

Deep Neck Flexor Test

Position of patient:

Lying supine. Make sure that the patient's neck is in a neutral flexion/extension posture. This might require a small towel or pillow under the head, or adjustment of the head of the examination bed.

Position of the therapist:

Seated or standing at the side of the patient, with the eyes at the level of the patient's neck.

The instructions to the patient are: "I would like you to imagine that your head and neck are like a newspaper. Try rolling the newspaper by slightly tucking your chin and lifting your head off the bed."

1. Have the patient attempt to perform the maneuver as indicated by the instructions. If the patient is unclear about what you want, you may demonstrate the movement or cue the patient with light contact.
2. While maintaining the slight chin tuck, the patient attempts to lift his/her head off the bed approximately 1 inch, then return the head to the bed in a controlled manner.
3. Record whether or not the patient is able to perform this maneuver easily (Fig. 8a), or with difficulty (Fig. 11b). Difficulty in this case would include: grunting, facial grimacing, severe shaking during the movement, loss of control on the descent, or reports or behaviours suggesting increased pain.

A  B 

FIGURE 11: **A**: An example of a patient who is able to perform the supine neck flexion movement easily. The chin remains tucked. The therapist is observing the distance that patient is able to lift the head, here it is roughly 1 inch. **B**: An example of a patient who is able to lift the head but with difficulty. The patient is unable to maintain the chin tuck.

Pressure Pain Threshold

i. Muscle belly of tibialis anterior

Position of patient:

Laying supine. The leg to be tested is flexed roughly 90˚ at the knee, with the foot flat on the bed.

Position of the therapist: ***(Start on the right side)***

Standing at the foot of the bed on the side to be tested, facing the patient's head.

Landmarking:

The therapist first palpates the tibial tubercle anteriorly, then moves 1/4 of the way down the shaft of the tibia and 1 to 1 1/2 inches laterally (Fig. 12). The therapist should be on the muscle belly of tibialis anterior, and can verify the position by having the patient perform a resisted dorsiflexion of the ankle.

Instructions:

"I am going to start slowly applying pressure to your muscle. Please tell me the moment the sensation changes from comfortable pressure, to slightly unpleasant pain."

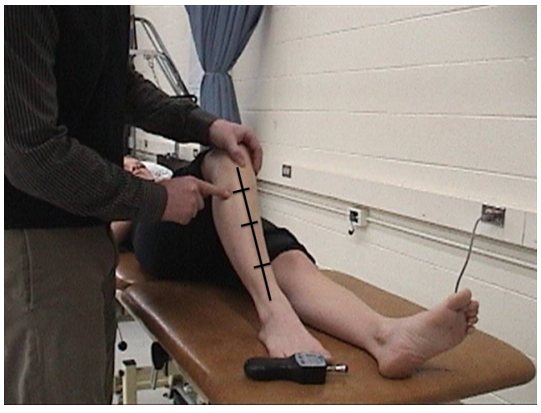
Application:

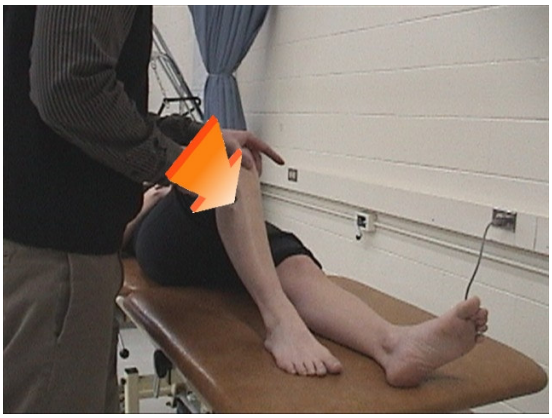
The therapist applies force directed postero-medially, on an imaginary line directed towards the posterior aspect of the tibia. The force builds gradually at a rate of 5 Newtons per second, see page 22 for a suggestion on how to practice this, and general use principles for the algometer. At the moment the patient indicates that pain threshold has been reached, the therapist immediately stops applying pressure, and removes the device from the skin. The peak force will remain on the screen. The evaluator records the peak force in pounds of force (lbf) on the scoring sheet, and repeats the test on the opposite side.

Repeat the test 3 times on each leg, moving from one side to the other, and record the results for <u>each test</u> on the scoring sheet.

Figure 12 A: landmarking the location of the muscle belly of tibialis anterior.

B: Direction of force application of the algometer, postero-medially towards the posterior aspect of the tibia.





Pressure Pain Threshold

ii. Angle of upper trapezius

Position of patient:

Seated comfortably in an upright position, feet flat on the floor. Arms resting on the lap. The shoulder girdle should be in a neutral position, neither elevated nor depressed. The patient should be dressed in such a way that the test does not need to be done through clothing, ie. no turtleneck sweaters.

Position of the therapist: ***(Start on the right side)***

Standing behind the patient, holding the algometer in the dominant hand.

Landmarking:

The therapist palpates the superomedial angle of the scapula on the side to be tested. The therapist then moves 1 inch superiorly towards the angle of the trapezius (Fig. 13). If the therapist palpates a hypertonic levator scapula muscle, the algometer should be placed just lateral to that muscle to avoid an artificially low reading from pushing on that tender muscle.

Instructions:

"I am going to start slowly applying pressure to your muscle. Please tell me the moment the sensation changes from comfortable pressure, to slightly unpleasant pain."

Application:

The therapist applies a force directed infero-anteriorly on the upper trapezius muscle. The force should be slightly more inferior than anterior so that the patient does not feel like he/she is being pushed forward. The force increases by 5 Newtons per second until the patient indicates that pain threshold has been reached. The peak reading in pounds of force (lbf) is recorded on the scoring sheet. The test is repeated on the opposite side.

Repeat the test 3 times on each side, moving from one side to the other, and record the results for <u>each</u> <u>test</u> on the scoring sheet.

Figure 13. A: Landmarking for testing algometry of the upper trapezius.

B: Application of the algometer, directed infero-medially.

Tips for Using the Algometer

To turn the algometer on:

First attach the 1cm^2 circular rubber tip to the algometer by screwing it on with your fingers. It should only be finger tight—do not over tighten as you may damage the force transducer. Hold the algometer upright and push the red on/off button. Continue to hold the algometer upright until it has zeroed itself, this should take about 5 seconds. Once you see 0.00 you may set the algometer down. Be sure to hold the algometer upright any subsequent time that you turn the device on or zero it with the 'zero' button.

To change units:

The algometer can measure in pounds of force (lbf), kilograms of force (kgf), Newtons (N), or ounces of force (ozf). To scroll through these units, push the 'units' button across the bottom of the screen.

To set the unit to remember peak force:

Across the top of the screen you will see 'lo bat' on the left, that will flash when the battery is low and needs to be recharged. On the right are 'T' 'C' and 'PEAK'. 'T' stands for 'traction', and will register the force when the unit is being pulled on. 'C' stands for compression, and should be used for most applications. An arrow under 'PEAK' indicates that the peak force will be stored on the screen. For this test, the arrows should be under 'C' and 'PEAK'. You might want to use the 'T' setting to get a sense of what 5 lbs of traction force feels like for the traction/compression testing.

To practice the rate of application:

You should familiarize yourself with the feeling of applying 5 Newtons of force per second, in the following way. Attach the rubber tip to the device and turn it on. Use the 'PEAK' button to make sure there are arrows under 'C' and 'PEAK' in the upper right corner of the display. Use the 'UNITS' button to scroll through the units until the arrow is beside 'N'. Have a friend or colleague watch a clock for you. At the word 'go', have your friend count off 5 seconds while you apply to a solid surface. After 5 seconds have elapsed, look at the screen, you should have approximately 25 newtons of force. Practice until you are able to accomplish this reliably.

Maximum force of the unit:

Do not exceed the maximum force of the unit, or you risk damaging the sensitive force transducer. The scale is reliable up to 25 lbs of force, but will continue to read slightly beyond that, up to about 29 lbf. After that the display will read 'help', indicating that you have exceeded the scale for the device. Do not go beyond this. If a patient goes beyond 29 lbf before reaching pain threshold, record '29' on the scoring sheet.

Study website:

http://publish.uwo.ca/~dwalton5/Website.htm

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