



Tool 15.2: Considerations for a virtual physical examination for medical assessment and follow-up of concussion patients

All patients presenting with a suspected acute concussion should undergo a complete physical examination that includes a neurological examination and cervical spine examination, as well as examination for any other traumatic injury. Depending on the patient's presenting or prolonged symptoms, supplementary physical examination tests can be considered. This also depends on the healthcare professional's experience in performing and interpreting these objective tests.

See **Tool 2.1: Physical Examination** for a comprehensive list of tests for the neurological and cervical spine examination.

Due to conditions such as the visual quality of in-person videoconferencing and environmental factors (e.g., lighting, examination room size and configuration) some of the components of the virtual physical examination recommended here may not be able to be performed during all patient assessments. **Providers should use their clinical discretion when performing and interpreting components of the virtual physical examination.**

Mental status and speech:

Mental status: Document if patient is alert and oriented to date and place.

- Alternatively document Glasgow Coma Scale score.

Speech: Speech may be assessed during clinical interview or on examination.

- Abnormal: document any evidence of dysarthria, word finding difficulty, apraxia, aphasia etc.

Modified cranial nerve exam:

Extraocular movements: Ask the patient to position themselves close to the camera. Ask the patient to look directly at the camera. Observe ocular alignment in the primary position and assess for any evidence of ptosis or nystagmus. Ask the patient to keep their head still and hold their finger up at eye level approximately half an arm's length away from their face. While following their finger with their eyes, ask the patient to slowly move their finger to the right and left and then trace an "H" allowing the examiner to evaluate the six cardinal positions of gaze. Ask the patient if they experience any diplopia during gaze in any direction. Then ask the patient to visually track their finger by moving it slowly back and forth in the horizontal direction with the head stationary, making

sure not to go more than about 30 degrees from neutral to avoid eliciting end-gaze nystagmus. This can also be repeated in the vertical plane.

- *Abnormal:* Note any abnormal alignment of the eyes in the primary position or any restriction in eye movement during testing. Note any patient-reported diplopia during testing.

Smooth Pursuits: Ask the patient to position themselves close to the camera. Ask the patient to look directly at the camera. Ask the patient to visually track his/her finger by moving it slowly back and forth in the horizontal direction with the head stationary, making sure not to go more than about 30 degrees from neutral to avoid eliciting end-gaze nystagmus. The patient may be cued to move closer to or farther from the camera or vary the plane of their finger to enable optimal viewing of the patient's eyes. This may also be repeated in vertical visual plane.

- *Abnormal:* Abnormal findings include sustained beats of nystagmus, staccatic (i.e., jerking) eye motion, loss of conjugate vision, corrective (catch-up or back-up) saccades, loss of visual fixation OR symptom provocation (dizziness, nausea or headache).

Facial symmetry: Ask the patient to look directly at the camera. Ask the patient to smile. Ask the patient to elevate their eyebrows and then close their eyes tightly.

- *Abnormal:* Note any facial asymmetry at rest or during testing.

Facial sensation: Ask the patient to take the index finger of each of their hands and lightly touch their face along the ipsilateral V1, V2, and V3 distributions of the trigeminal nerve. Ask the patient to indicate whether sense of touch is perceived in all distributions and is equal when comparing both sides.

- *Abnormal:* Note any evidence of decreased sensation.

Movement of palate and tongue: Ask the patient to position themselves close to the camera. Ask the patient to open their mouth and say "ah". Ask the patient to stick out their tongue, move it to the right and left, and retract it.

- *Abnormal:* Note any asymmetry or abnormal findings. Note any restricted movement of the jaw/mouth opening.

Motor/coordination:

Pronator drift: In a standing position, ask the patient to raise their arms forward to shoulder level (90 degrees of shoulder flexion) and position their hands with palms facing upwards. Ask the patient to close their eyes and maintain this position.

- *Abnormal:* Note any pronation of the hand or downward drift of the arm.

Rapid alternating hand movements: In a standing position, ask the patient to place one hand palm upwards in front of them and place the opposite hand palm down on top of the other hand. Ask the patient to rapidly flip the top hand quickly back and forth from a palm up and down position. Ask the patient to switch hands and repeat the same movements.

- *Abnormal:* Note any differences in speed or coordination between sides.

Cervical spine

In a standing or seated position ask the patient to slowly flex their neck forward, extend their neck backward, and bend their neck to the left and right as far as comfortably possible. Ask the patient to slowly rotate their neck to the left and right as far as comfortably possible. Ask the patient whether they experience any pain during any movements.

- *Abnormal:* Note any restricted range of motion or any reported pain.

Balance

Balance tests may be performed near a supporting caregiver or object (e.g., chair/wall).

Feet together stance: With the patient positioned so their entire body is visible to the examiner, ask the patient to stand with their feet together and their hands on their hips. Ask the patient to close their eyes and hold the position for 20 seconds.

- *Abnormal:* Note any instability, stumbling out of position or eye opening.

Tandem stance: With the patient positioned so their entire body is visible to the examiner and near a supporting caregiver or object (e.g., chair/wall), ask the patient to stand with their dominant foot slightly in front of their non-dominant foot with their hands on their hips. Ask the patient to close their eyes and hold the position for 20 seconds.

- *Abnormal:* Note any instability, stumbling out of position or eye opening.

Tandem gait (eyes open): With the patient positioned so their entire body is visible and positioned perpendicular to the examiner, ask the patient to walk in the forward direction heel-to-toe with their eyes open for 5 paces.

- *Abnormal:* Note any instability or stumbling out of position

Tandem gait (eyes closed): With the patient positioned so their entire body is visible to the examiner, ask the patient to walk in the forward direction heel-to-toe with their eyes closed for 5 paces.

- *Abnormal:* Note any instability, stumbling out of position or eye opening.

- Note: Consider if tandem gait is normal.

Memory:

Explain to the patient that you are going to test their memory. Provide the patient with a list of five items. Ask the patient to immediately repeat the items back in any order. Record the number of correctly repeated items out of five (immediate recall). After a set time period (e.g., five minutes) has elapsed, ask the patient if they can remember the five items provided. Record the number of correctly repeated items out of five (delayed recall).

Vestibulo-ocular:

Horizontal saccades: Ask the patient to position themselves close to the camera. Ask the patient to hold up their index fingers and place them at half arms length away from the face and 30 cm apart from each other. While keeping their head still, ask the patient to look quickly and accurately back and forth between each index finger for a total of 10-15 repetitions. Ask the patient whether performing these eye movements worsen or elicit any concussion symptoms (e.g., dizziness, headache)

- *Abnormal:* Note evidence of over- or undershooting of the target or saccadic corrections. Note slowed or delayed initiation of saccades.
- *Symptomatic:* Note whether the movements elicit or worsen any concussion-like symptoms (e.g., dizziness, headache)

Gaze stabilization: Ask the patient to hold their thumb up at the level of the eyes and at arms length distance from the face. Ask the patient to fix their eyes on their thumb and quickly but comfortably shake their head back and forth within 15-20 degrees of rotation for 10 repetitions.

- *Symptomatic:* Note whether the movements elicit or worsen any concussion-like symptoms (e.g., dizziness, nausea)
- *Note:* Do not perform test unless patient has full and painless range of motion of the cervical spine.

Reference

Modified from: Ellis M, Mendez, Russell K. (2020). Preliminary clinical algorithm to optimize delivery of remote pediatric concussion care in Canada's North. *International Journal of Circumpolar Health* (published online October 22, 2020) <https://doi.org/10.1080/22423982.2020.1832390>