Video Consultations: Clinical Modules

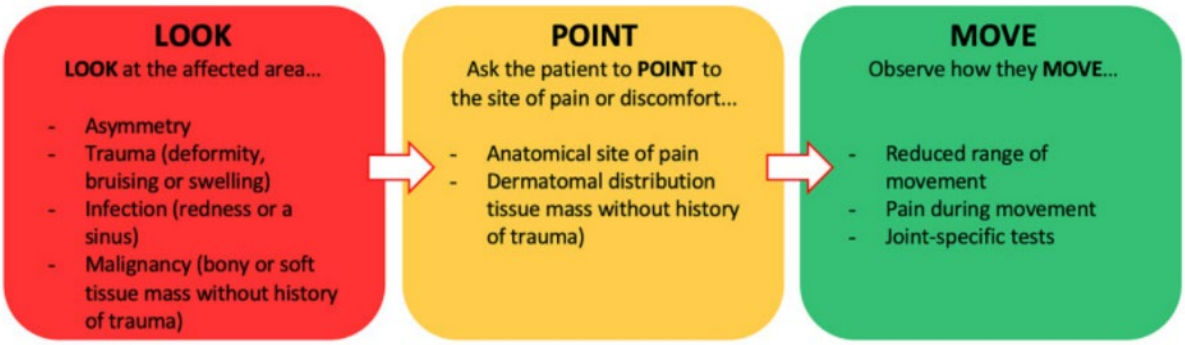
Musculoskeletal assessment

Contents

Summary – Key messages

- Virtual health is a viable alternative to assess and manage some musculoskeletal conditions.

- Modified traditional tests are suggested to allow a complete framework for remote MSK
  examination - using a **'look, point, move'** approach followed by modified special tests.



- **Use copying movements** when demonstrating a movement or exercise (make sure your hands/arms/the relevant body part can be seen in the camera).

Validity / reliability:

- Good concurrent validity and excellent reliability for virtual musculoskeletal assessments across most areas (Mani et al. 2016)

- High level of agreement between videoconference assessment and in-person assessment of patients with chronic lumbar spine, knee or shoulder conditions referred to a tertiary advanced-practice physiotherapy screening clinic (Cottrell et al. 2018)

Red flags

Red flags are similar to those indicated in an in-person consultation. Higher risk groups and clinical symptoms are outlined below:

- Age > 40 years for fractures
- Age > 50 years for malignant processes
- Previous history or current history of a cancer diagnosis
- Osteoporosis risk factors — known diagnosis with low bone mineral density, previous insufficiency or stress fractures, previous history of eating disorder or disordered eating, family history of osteoporosis, long term use of medications known to interfere with bone metabolism (steroids/prednisone, thyroid medications, Depot Provera injection, anti-seizure medications)
- High energy trauma
- Night pain — wakes the patient from sleep in the middle of night, not often movement related
- Systemic symptoms of night sweats, fevers, unexplained non-intentional weight loss
- Initial management has not helped despite compliance with treatment — should reconsider diagnosis

Template/prompts/checklist/how-to (making it easier!)

History

The visit will begin with a face-to-face discussion of symptoms/history.

- Triage can, in most cases, be based on a thorough history alone.
- A basic assessment of the area can increase the diagnostic value and quality of a virtual visit.
- If there is uncertainty, and where appropriate, initial investigations may be arranged.
- Many conditions e.g. tendinopathies, are suitable to virtual consultations, where imaging adds very little initial value to the clinical history and targeted functional examination assisted by the patient.
- Similar to an in-person consultation
  - Brief history of current illness/injury concentrating on mechanism of injury or onset of symptoms
  - Additional history on medication, allergies, previous medical and surgery history, sport performance, previous injuries in the region and training history (recent and past)
  - Patient's performance goals
- Consider options — initial advice, care and/or rehab plan, actions

Remote Physical Examination

Assess the patient's physical and mental function as best as you can. You may need to get creative to work out how a desired examination can be achieved in the virtual environment.

- When explaining a procedure — use video to show as well as tell them what to do. Demonstrate on your own body. Try to use the same words your patient uses.
- Camera position: the camera should be still and ideally not hand-held during the examination. Sometimes using another person may be key to getting the examination done e.g. moving the camera to visualise a particular area. Could be propped on a chair for examining knee/hip and on a table/counter for examining shoulder.
- Lighting - Ensure the room is well-lit and the patient is not in shadow (no back-light). Ask the patient to use indirect light if you need to examine something on their body.
- Screen-sharing — allows for shared visualization and explanation of imaging studies or use of pictures/diagrams as visual aids.
- Ensure the patient is wearing clothing that allows for proper examination of the affected joint (e.g. shorts for knee).

    1. **Ask the patient to point to area of maximum pain/tenderness.**
    2. **Observe for skin changes, colour, redness, swelling, bruising, deformity, atrophy**

- Test the involved and contralateral joint range of movement (active and if possible, passive).
- Ask the patient to carefully palpate the injured area while you observe.
- Consider special tests based on the condition and what is possible. The patient may be able to perform their own special test(s) (e.g., Thessaly's test as detailed below or a flexion adduction internal rotation test for hip pain), or measurements at home (e.g. step count for the day/past week).
- Provide feedback on what and how much you can see, and how clearly. You can help by explaining how to best use the technology e.g. tablet/phone – back camera is superior.

Figure 1: This video covers spine, knee, ankle/foot and hip examinations, gait analysis, Ottowa knee test and Ottowa foot test — all by video consultation.

VIDEO: Lower MSK exam by video (July 2020, Dr Gandalf, eGPlearning)

Knee

Assess:

- History – particularly for an acute knee:
    - What was the mechanism that caused this injury? What was the force that hit this knee? Fall, twist…
    - Could they continue what they were doing / 'play on' or need to stop immediately?
    - Immediate swelling?
    - Did they hear a crack or pop?
- Able to weight-bear?
- Range of motion (sitting or standing) – straighten knee out as far as they can, bend 90°
- Observation for swelling – bruising – vastus medialis obliquus (VMO) atrophy – effusion
- Clinician directed, patient to self-palpate the patella for pain and potential apprehension.
- Observation of patient's gait
- Test extensor mechanism to ensure intact in sitting (straight leg raise - simply get them to extend the leg whilst sitting, or stand from the chair without using their hands).
- Hyperextension (standing with patient pushing knee posteriorly, camera on the side)
- Flexion (patient pulls heel toward body while sitting)
- Single-leg stance and squat – frontal view looking for medial knee drift – measure of proximal pelvis stability
- Perform Thessaly's test for meniscal tear in standing - Thessaly test can be performed by the patient independently while directly facing the camera
- "Now stand up and face the camera. You may use a table, chair or wall for balance. Stand on your injured leg only. Bend your knee slightly, to about 20 degrees. Twist your body around your knee back and forward several times. Does this cause pain?"

Limitations in examination can be supplemented by imaging if indicated by history in particular a history suggestive of a haemarthrosis or true mechanical symptoms or true instability, presence of effusion, loss of motion or other findings.

Webinar: Telehealth Consults – Assessing the Knee (March 2020, Axis Sports Medicine Specialists with orthopaedic surgeon Mr Simon Young)

Hip

- Hips are more difficult to examine as look component has minimal components apart from gait assessment, single leg knee bending or hop testing (single leg hopping, to assess for possible hip stress injury).
- Ideally a full-body view of walking both toward and away from the camera to assess gait (a second person is recommended to control camera).
- Assess hip range of motion in sitting on a chair (preferable adjustable height and not too low) and location of pain.
- In sitting test hip flexion, internal rotation and external rotation as hip is at 90 degrees.
- Hip flexion – patient to lie with one side to the camera and pull knee to chest.
- Hip extension / abductor strength – patient arise from a chair without assistance.
- Impingement tests of the hip = flexion adduction internal rotation FADIR and cross-legged sitting FABER testing.
- Having the patient lie supine and perform a straight-leg raise can be used to assess for neural tension.
- Lumbar spine examination with flexion / side bending / extension in standing.

VIDEO: Telehealth Hip and Groin Examination Example (April 2020, Axis Sports Medicine Specialists, Dr Chris Hanna)

Webinar: Telehealth Consults – Assessing the Hip and Groin (April 2020, Axis Sports Medicine Specialists, Dr Chris Hanna)

Ankle and Foot

- Look for asymmetry, swelling (including Achilles), loss of medial arch, bony or other deformities
- Assess gait: heel and toe walking
- Ask patient to point to site of any pain or discomfort
- Assess active ankle range of motion and reproduction of pain during any of these movements

Figure 2: This video covers neck, shoulder, elbow and wrist examinations, specific shoulder tests, tennis and golfer elbow tests – all by video consultation.

VIDEO: Upper MSK exam by video (July 2020, Dr Gandalf, eGPlearning)

Shoulder

- Assessment of range of motion (ROM) & symmetry especially abduction, internal rotation and external rotation. Note that loss of active and self-performed passive ROM is the first signs seen in shoulder capsulitis and is highly predictive with a corresponding history
- Scapular mechanics can be assessed by observing flexion and abduction from behind with the skin exposed
- Clinician directed, patient to self-palpate over the acromioclavicular joint and sternoclavicular Joint (ACJ / SCJ).

Webinar: Telehealth Consults – Management of Shoulder Problems (April 2020, Axis Sports Medicine Specialists with Dr Mark Fulcher and Mr Rob Elliott)

Elbow

- Flexion and extension / supination and pronation of the elbow are observed with the patient facing the camera and abducting the arm to 90°. Wrist extension and flexion can also be viewed.
- Strength testing can be performed against gravity and while holding objects of known weight during wrist and elbow flexion and extension.
- Concern re lateral epicondyle pain is best assessed with a straight arm and holding a weight with pronation = palm facing down
- Chair lift testing

Falls Risk Assessment

- A basic falls risk assessment is recommended to be completed annually for all patients aged 75+ (Māori and Pacific patients aged 65+).
- This quick assessment is easily done remotely.
- If any risks are identified, you can optionally complete the full risk assessment or refer to strength and balance/falls prevention providers.

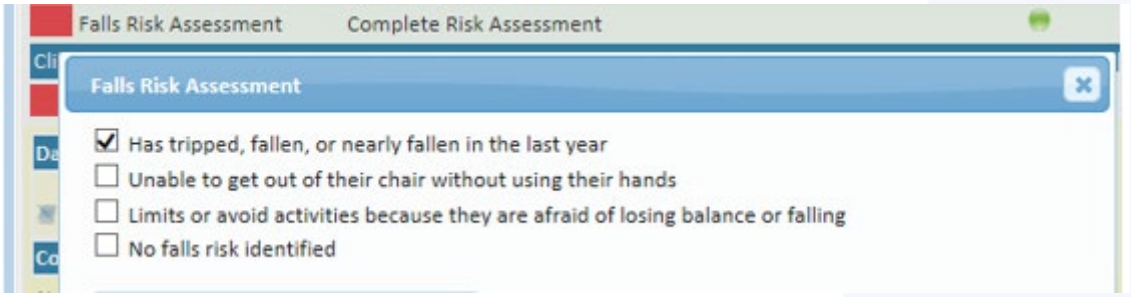


Figure 3: Falls Risk Assessment in PMS

Figure 4: Telehealth falls screening script guideline

Figure 5: Falls risk assessment practice guide

Take-home – resources to give patient

Health Navigator: Back Pain

Health Navigator: Shoulder pain

Health Navigator: Shoulder exercises

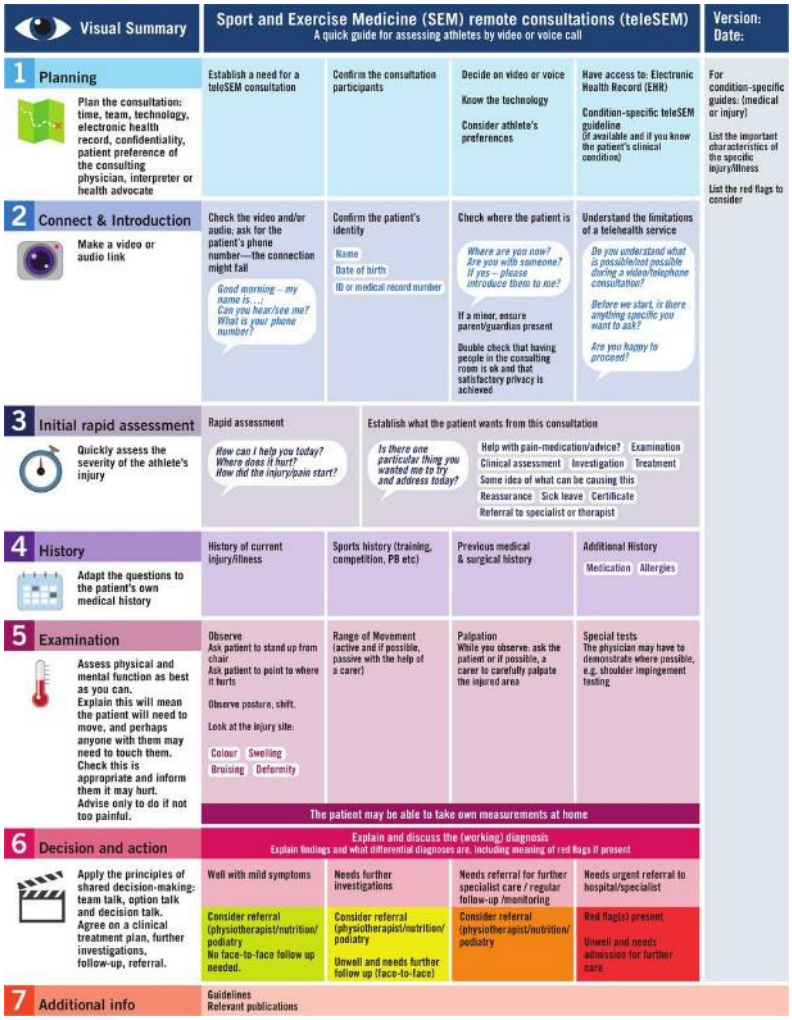
Health Navigator: Knee and hips exercises

Health Navigator: Strains and sprains

Health Navigator: Tennis Elbow

Video guides and Learn more

Infographic: A quick generic sport and exercise medicine (SEM) guide to assessing an athlete with a sports injury remotely (June 2020, British Journal of Sports Medicine)



VIDEO: How to do a musculoskeletal exam through video (April 2020, Dr Tania Elliott)

VIDEO: Telehealth physical exam: Musculoskeletal (May 2020, Bear in Mind Strategies): Covers wrist, neck, shoulder, lower back, hip, knee, foot and ankle

References and Reviews

Remote Musculoskeletal Assessment Framework: A Guide for Primary Care. (January 2021, Cureus Journal of Medical Science).

A new musculoskeletal assessment framework published in Cureus provides pre-consultation guidance and step-by-step remote examination instructions to musculoskeletal clinicians working in primary care to adapt their assessments based on published evidence, and community-sourced best practice; it also includes patient and clinician resources (patient information leaflet and photographs of examinations).

University of Plymouth: Remote measures and assessment tools, Telerehab toolkit for practitioners. (First published August 2021, but continually evolving).

The Telemedicine Musculoskeletal Examination (Laskowski et al, August 2020, Mayo Clinic)

This article provides the medical practitioner performing a virtual musculoskeletal examination with a specific set of guidelines (including photos and videos) to enhance the information obtained when evaluating the shoulder, hip, knee, ankle, and cervical and lumbar spine.

Telemedicine in the Era of COVID-19, the virtual orthopaedic examination. (June 2020, The Journal of Bone and Joint Surgery)

Remote assessment in sport and exercise medicine (SEM): a narrative review and teleSEM solutions for and beyond the COVID-19 pandemic (June 2020, British Journal of Sports Medicine)

The Knee Examination for Video Telemedicine Encounters (October 2020, HSS Journal), and appendix of supplementary material

The Virtual Foot and Ankle Physical Examination (Eble et al, July 2020, Foot and Ankle International)

The Virtual Spine Examination: Telemedicine in the Era of COVID-19 and Beyond (Satin et al, July 2020, Global Spine Journal)

Technologies to Support Assessment of Movement During Video Consultations: Exploratory Study (Jones et al, September 2021, JMIRx Med)