<table>
<thead>
<tr>
<th>Session Overview</th>
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<td><strong>Upper Limb</strong></td>
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<td><strong>Q/A</strong></td>
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Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
Overview

Examination Component

- Clinical Significance
- Demonstration
- Exam Tips
Session Overview

Upper Limb 18:30-19:15
Break 19:15-19:20
Lower Limb 19:20-19:50
Q/A 19:50-20:00
Neurological Examination of the Limb: Components

ATP-RCS

Appearance  Reflexes
Tone           Co-ordination
Power         Sensation
Appearance: What are we looking for and why?

General Inspection
- General appearance
- “Any pain?”
- Bedside medications, orthotics or monitors
- Any other clues?

Closer Inspection
- Skin – wounds, scarring, rashes or lumps
- Muscle – wasting, fasciculations, tremor or dyskinesia

Look for symmetry, movements and positioning. Formulate an impression.
Exam Technique

- Full exposure – shoulders to fingers
- Inspect EVERYTHING; front and back, make it obvious

Communication

- “Do you have any…?”
- Scars
- Lumps
- Rashes
- Numbness/tingling/pins and needles
- Weakness

DO NOT TRUST WHAT THEY SAY, CHECK ANYWAY
Exposure and Positioning
Neurological Examination of the Limb: Components

ATP-RCS

Appearance  Reflexes
Tone  Co-ordination
Power  Sensation
Tone:
What are we looking for and why?

- Pronate, supinate and circumduce
- Flex and extend
- Circumduce
Tone: What are we looking for and why?

Hypotonia

Hypertonia

LMN lesion

UMN lesion

Hypertonia

Parkinsonism:
- Lead-pipe rigidity
- Cogwheeling

Other UMN lesion:
- Clasp-knife rigidity
Top Tips

Exam Technique

Distal → proximal

Hand placement:
1 hand holding theirs
1 taking the weight of their UL by the elbow

Communication

“Let me take your hand as if I am shaking it”
“Fully relax your arm and let me do all the heavy lifting”

Safety: Double check for any pain or injuries!
Demonstration: Assessing Tone
Neurological Examination of the Limb: Components

ATP-RCS

Appearance  Reflexes
Tone  Co-ordination
Power  Sensation
Power: What are we looking for and why?

MRC Scale

0 - No contraction
1 - Trace of a contraction (fasciculation)
2 - Active movement with gravity eliminated
3 - Active movement against gravity
4 - Active movement against gravity and resistance
5 - Normal Power
Assessing motor innervation at each joint

**Power:**
What are we looking for and why?

- **Shoulder:** Abduction & Adduction
- **Elbow:** Flexion & Extension
- **Wrist:** Flexion & Extension
- **Hand:** Abduction (incl. thumb), Adduction, Power & Pincer Grips
Top Tips

Exam Technique

Proximal → Distal
Isolate each joint and always compare contralaterally
Demonstrate whilst describing the positioning

Communication

Shoulders: “Arms up like a chicken”
Elbows: “Arms up like a boxer”
Wrists: “Hands out like you’re riding a bike”
Hands: “Splay your fingers as wide as you can”

Standardise by testing with the same muscle group
Demonstration: Assessing Power
Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
Reflexes:
What are we looking for and why?

<table>
<thead>
<tr>
<th>Deep Tendon Reflexes</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Normal</td>
<td>Brisk or Reduced</td>
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</tbody>
</table>
## Reflexes: What are we looking for and why?

### Deep Tendon Reflexes - Technique

<table>
<thead>
<tr>
<th>Muscles</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triceps</td>
<td>Lift their limb by the cub. fossa and use your free hand to palpate the tendon</td>
</tr>
<tr>
<td>Biceps brachii</td>
<td>Place their hands on their thighs and palpate the tendon with your thumb</td>
</tr>
<tr>
<td>Brachioradialis</td>
<td>Place two fingers on the tendon, 5 cm from radial styloid</td>
</tr>
</tbody>
</table>
Exam Technique

Avoid scaring them
Gently move their limb around to help them relax
Jendrassik Maneuver: Jaw Clench

Communication

Tendon hammer – “Have you seen one of these before?”
“Relax your arm and let me take all the weight”

In exams, only attempt each reflex twice
Demonstration: Eliciting Reflexes & The Jendrassik Maneuver
<table>
<thead>
<tr>
<th>UMN +</th>
<th>LMN -</th>
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<td>A- Fasciculations, fibrillations or wasting</td>
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<td>R- Hyperreflexia, upgoing plantars</td>
<td>R- Absent reflexes (tendons and plantar)</td>
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Demonstration: Pronator Drift
Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
## Coordination: What are we looking for and why?

<table>
<thead>
<tr>
<th>Clapping Test</th>
<th>Past Pointing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysdiadochokinesia</td>
<td>Dysmetria</td>
</tr>
</tbody>
</table>

### Cerebellar Signs
- Dysdiadochokinesia
- Ataxia
- Nystagmus
- Intention tremor
- Staccato or slurred speech
- Hypotonia
<table>
<thead>
<tr>
<th>Exam Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate the clapping technique whilst explaining it!</td>
</tr>
<tr>
<td>Ensure they are stretching to their maximum capacity when trying to touch your finger</td>
</tr>
</tbody>
</table>

Once they are performing the exercise correctly, ask them to stop after about 5 seconds.
“Place your R hand palm up on your thigh and clap it with your L hand, now raise your L hand to head height, turn it over and clap with the back of your hand. Now I want you to continue clapping, alternating to the front and back of your L hand and try to do it fast.”

“Ok now stop with your palms together and flip your hands over to the other thigh”

“Touch your nose with your R finger, now touch my finger. Now touch your nose, touch my finger....” etc.
Demonstration: Assessing for Dysdiadochokinesia and Dysmetria
Neurological Examination of the Limb: Components

ATP-RCS

Appearance  Reflexes
Tone  Co-ordination
Power  Sensation
### Sensation:
What are we looking for and why?

#### Where is The Lesion?

<table>
<thead>
<tr>
<th>Location</th>
<th>Sensory Loss Description</th>
</tr>
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<tbody>
<tr>
<td>Peripheral Nerve</td>
<td>Loss along PN distribution</td>
</tr>
<tr>
<td>Nerve Root</td>
<td>Dermatomal sensory loss</td>
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<tr>
<td>Spinal Pathway</td>
<td>Loss of sensory modalities</td>
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![Diagram](image)
Top Tips

Communication

Light touch: “Say ‘Yes’ every time you feel something touch you” & “Is it the same on both sides?”

Pain: “Say whether it feels sharp or blunt”

Proprioception: “Say whether it’s pointing ‘up’ or ‘down’”

Vibration: “Say ‘Yes’ if you feel a vibration and say ‘Yes’ again when you feel it stop.”
Top Tips

Exam Technique

Test each piece of equipment on their sternum so they know what it feels like

Ensure their eyes are closed throughout

Light Touch: Test bilaterally before moving on

Proprioception: Isolate the joint properly

If + peripheral sensory loss, assess the extent it has spread (distal → proximal)

Always verbally offer to test all 5 sensory modalities
Demonstration: Testing Light Touch (C5-T1)
Session Overview

Upper Limb 18:30-19:15
Break 19:15-19:20
Lower Limb 19:20-19:50
Q/A 19:50-20:00
### Session Overview

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Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
Appearance: What are we looking for and why?

**General Inspection**
- General appearance
  - “Any pain?”
- Bedside medications, orthotics or monitors
- Any other clues?

**Closer Inspection**
- Skin – wounds, scarring, rashes, lumps or ULCERS
- Muscle – wasting, fasciculations, tremor or dyskinesia

Look for symmetry, movements and positioning. Formulate an impression.
Exam Technique

- Full exposure – Thighs to toes
- Inspect EVERYTHING; front and back, make it obvious

Communication

- “Do you have any…?”
  - Scars
  - Lumps
  - Rashes
  - Numbness/tingling/pins and needles
  - Weakness

DO NOT TRUST WHAT THEY SAY, CHECK ANYWAY
Demonstration: Exposure and Positioning
Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power

Reflexes
Co-ordination
Sensation
Tone:
What are we looking for and why?

Hip

Knee

Foot

“Leg roll” - Rotation

“Knee lift” – Flexion/Extension

Circumduce and Jerk
Tone:
What are we looking for and why?

Hypotonia

HYPER-
Tonia

LMN lesion

UMN lesion

Hypertonia

Ankle joint rigidity during leg roll
Foot coming off bed during knee lift
5 or more beats of clonus during ankle jerk

Parkinsonism:
Lead-pipe rigidity
Cogwheeling

Other UMN lesion:
Clasp-knife rigidity

Parasomnia:
**Exam Technique**

Proximal → Distal

Ensure your patient is in a comfortable position lying on the couch

**Communication**

“Are you comfortable?”

“I’m going to move your legs but I want you to stay floppy and let me do all the moving”

Keep them relaxed - Talk through the movements so the patient knows what to expect
Demonstration: Assessing Tone
Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
Assessing motor innervation at each joint

**Power:**
What are we looking for and why?

Assessing motor innervation at each joint

- **Hip**
  - Flexion and Extension

- **Knee**
  - Flexion and Extension

- **Foot**
  - Dorsiflexion and Plantarflexion
Top Tips

**Exam Technique**

- Proximal → Distal
- Isolate each joint and always compare contralaterally
- Give simple, clear instructions: “Don’t let me push/pull you”

**Communication**

- **Positioning**
  - **Hips**: “Lift your L/R leg off the bed whilst keep it straight”
  - **Knees**: “Bend your knees up but keep your feet on the bed”
  - **Ankles**: “Rest your legs flat on the bed again”

Remember to stay on the patient’s right-hand side
Demonstration: Assessing Power
Neurological Examination of the Limb: Components

ATP-RCS

Appearance
Tone
Power
Reflexes
Co-ordination
Sensation
# Reflexes: What are we looking for and why?

## Deep Tendon Reflexes - Technique

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<th>Technique</th>
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<tbody>
<tr>
<td>Patellar Tendon</td>
<td>“Let me do all the work”</td>
</tr>
<tr>
<td>Calcaneal Tendon</td>
<td>“Cross your feet for me”</td>
</tr>
<tr>
<td>Plantar Reflex</td>
<td>Use an orange stick or pointy bit of the tendon hammer</td>
</tr>
</tbody>
</table>

Check if the patient is ticklish before assessing plantar reflex - for your sake and theirs.
### Exam Technique
- Avoid scaring them
- Gently move their limb around to help them relax
- Classic Jendrassik Maneuver

### Communication
- Tendon hammer – “Have you seen one of these before?”
- “Relax your leg and let me take all the weight”

In exams, only attempt each reflex twice
Demonstration: Eliciting Reflexes
## Where is the lesion?

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Neurological Examination of the Limb: Components

ATP-RCS

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Tone
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Co-ordination
Sensation
# Coordination:
What are we looking for and why?

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<th>Foot Tapping</th>
<th>‘The Slide and Kick’</th>
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## Cerebellar Signs
- Dysdiadochokinesia
- Ataxia
- Nystagmus
- Intention tremor
- Staccato or slurred speech
- Hypotonia
### Exam Technique

You may use your hands to demonstrate how you want to patient to perform the foot tapping exercise.

Practice efficiently explaining the movements of the ‘slide and kick’ exercise.

Once they are performing the exercise correctly, ask them to stop after about 5 seconds.
"Tap my hand with your right foot like you’re pressing a car pedal. Now the other foot. Now alternate one foot at a time and keep going quickly until I tell you to stop”

"Bring your right heel to your left knee. Slide it down your shin towards your left foot and then kick my hand” – do this a few times

“Now do the same again with the other side. Bring your left heel to your right knee, slide it down and kick”
Demonstration: Assessing for Dysdiadochokinesia and Dysmetria
Neurological Examination of the Limb: Components

ATP-RCS

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“L3 to the knee, L4 to the floor”
Top Tips

Communication

Light touch: “Say ‘Yes’ every time you feel something touch you” & “Is it the same on both sides?”

Pain: “Say whether it feels sharp or blunt”

Proprioception: “Say whether it’s pointing ‘up’ or ‘down’”

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Test each piece of equipment on their sternum so they know what it feels like

Ensure their eyes are closed throughout

Light Touch: Test bilaterally before moving on

Proprioception: Isolate the joint properly

If + peripheral sensory loss, assess the extent it has spread (distal → proximal)

Always verbally offer to test all 5 sensory modalities
Demonstration: Testing Light Touch (L2-S1) and Proprioception
Romberg’s Test and Gait Assessment: What are we looking for and why?

- **Romberg’s Test**
  - Vision + Vestibular function + Proprioception

- **Gait Assessment**
  - Ask them to normally walk 5m
  - Then, if normal, walk 5m ‘heel-to-toe’

Check this slide’s notes for details of different pathology associated gaits.
### Exam Technique
- First, test for Romberg’s
- Then, assess gait
- Put them at ease

### Communication
- “Are you able to stand on your own?”
- “Are you able to walk unaided?”
- “I will be right by your side the whole time”

**Safety:** Be ready to catch the patient at all times
Demonstration: Romberg's Test and Gait Assessment
Demonstration: Trendelenburg’s Sign
Structure, Structure and More Structure

First, collect your thoughts and breathe
Simply say what you did, to whom and how
Any positives but only relevant negatives
Summarise
Give your impression (ddx, further invx)

“Additionally, to complete my examination, I would like to perform X, Y, Z examinations…”
## Take Home Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always employ a structured, consistent approach (e.g. proximal → distal)</td>
<td></td>
</tr>
<tr>
<td>Effective communication; Give simple, clear instructions – avoid jargon</td>
<td></td>
</tr>
<tr>
<td>If you have a mind blank, fall back on ATP-RCS</td>
<td></td>
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Session Overview

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Thank you!

Questions?

Feedback: https://forms.gle/mpjLYrVmoMDkCuuy5

ds4415@ic.ac.uk
1. Revision tips and resources
2. UMN vs LMN signs
3. Dermatomes
4. Myotomes
5. Sensory Pathways
Revision Resources and Advise

Useful Online Resources:
1- https://simpleosce.com/
2- https://geekymedics.com/

Revision Tips:
Form study groups and meet up regularly to practice
- It may be more manageable to have frequent yet shorter sessions (e.g. meeting up to practice 2 examinations with feedback)
- Use the timed mark schemes on Simpleosce.com to test each other
- Have 3 people involved: Student, examiner and patient

Practice as much as possible on real patients
# Where is the lesion?

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Dermatomes
Myotomes

Upper Limb
C5 – Elbow Flexion
C6 – Wrist Extension
C7 – Elbow Extension
C8 – Finger Flexion
T1 – Finger Abduction

Lower Limb
L2 – Hip Flexion
L3 – Knee Extension
L4 – Ankle Dorsiflexion
L5 – Long Toe Extension
S1 – Ankle Plantar Flexion
Ascending (Afferent) Spinal Tracts

Descending Tracts (Motor)
- Lateral Corticospinal Tract
  - main voluntary motor
  - upper extremity motor
  - pathways are more medial (central)

Ascending Tracts (Sensory)
- Dorsal Columns (posterior funiculi)
  - deep touch, proprioception, vibratory
- Lateral spinothalamic tract
  - pain and temperature
- Ventral spinothalamic tract
  - light touch

Ventral Corticospinal Tract
- voluntary motor