

# South Tees Community Musculoskeletal Outpatient Physiotherapy Student Placement Pack



## **CONTENTS PAGE**

<b>Introduction</b>	<b>3</b>
<b>Knowledge/skills required &amp; Learning outcomes</b>	<b>5</b>
<b>Propose learning/Development Plan</b>	<b>8</b>
<b>STARTING YOUR ASSESSMENT</b>	<b>9</b>
<b>CERVICAL SPINE</b>	<b>9</b>
<b>SHOULDER</b>	<b>16</b>
<b>ELBOW</b>	<b>23</b>
<b>HAND AND WRIST</b>	<b>28</b>
<b>THORACIC SPINE AND RIB CAGE</b>	<b>34</b>
<b>LUMBAR SPINE</b>	<b>39</b>
<b>HIP</b>	<b>45</b>
<b>KNEE</b>	<b>52</b>
<b>FOOT AND ANKLE</b>	<b>57</b>
<b>Suggested pre-placement reading for MSK</b>	<b>64</b>
<b>Internet Resources</b>	<b>64</b>
<b>Databases</b>	<b>65</b>

## **INTRODUCTION**

Welcome to your placement with the South Tees Community Physiotherapy Service. This pack has been put together to provide you with information for your placement with us.

### **South Tees Community Musculoskeletal Out Patient Departments**

#### **Sites:**

#### **East Cleveland Primary Care Hospital, Alford road, Brotton**

Tel: 01287 676205

Clinical Supervisors: Ben Senior, Nadine Williams

#### **Guisborough Primary Care Hospital, Northgate, Guisborough**

Tel: 01287 284030

Clinical Supervisors: Anne Hardy, Pauline Newton

#### **One Life Centre, Linthorpe Road, Middlesbrough**

Tel: 01642 737800

Clinical Supervisors: Louise Arkwright, Jane Bennison, Claire MPoy, Chris Richardson, Chris Wright.

#### **Redcar Primary Care Hospital, West Dyke Road, Redcar**

Tel: 01642 511185

Clinical Supervisors: Paul Brooks, Crystal Rosser, Debbie Blake

## **WHAT YOU CAN EXPECT FROM US**

- You will receive an induction into your work area to ensure you are familiar with the environment, know the local policies and are able to practice safely.
- You will discuss your learning needs and outcomes at the beginning of the placement
- We will provide an environment conducive to meeting identified individual student learning needs which is also safe and healthy.
- During your placement you will be allocated a mentor/s to work alongside. The mentor will be a qualified physiotherapist who will assist and support you during your clinical work.
- Your mentor will assess your performance against your course learning outcomes, and provide feedback to help you develop your skills.
- You will receive supervision during your clinical practice.
- You will be a valued member of the multidisciplinary team during your placement, and can expect support from all your colleagues
- We will listen to your feedback about your placement and will respond to any issues raised sensitively
- You will be treated with respect & dignity

## **WHAT WE EXPECT FROM YOU**

- We expect you to arrive on time
- We expect you to ensure your mentor is aware of your learning outcomes for the placement and specific learning needs

- We expect you to act in a professional manner.
- We expect you to dress in accordance with your University uniform policy, and also in accordance with the South Tees uniform policy.
- You should inform your mentor if you are unwell and not able to attend your placement. The process for how to do this will be covered on your local induction.
- We expect you to maintain and respect confidentiality at all times in accordance with our local policy.
- We would like you to raise any issues regarding your placement with your mentor. If this is not possible you should contact your link tutor / placement co-ordinator.

### **KNOWLEDGE/ SKILLS REQUIRED**

Students will be expected to:

- Have a knowledge of the anatomy of the locomotor system and relevant pathophysiology (e.g. Soft tissue/ fracture healing ), and be able to link this to patient symptoms and presentations
- Execute a subjective and objective examination, demonstrating application of appropriate communication skills, to investigate the causes for functional impairment, using appropriate active/ passive/ manual assessment techniques. This process should include the interpretation of all available resources e.g. imaging, where appropriate.
- Record information in keeping with local policy on System 1 and have notes countersigned each time by their mentor.

- Demonstrate, following assessment, appropriate clinical reasoning to identify diagnosis/ problems, treatment goals and outcome measures to support the implementation of suitable treatment plans and progressions.
- Have knowledge of pain mechanisms.
- Demonstrate the safe and effective application of appropriate treatment techniques, which may include:
  - exercise therapy – for individuals and groups
  - manual therapy skills
  - gait re-education
  - patient education
  - pain management
  - hydrotherapy
  - electrotherapy
- Timely discharge patients, following liaison with other MDT members, as necessary.

## **LEARNING OUTCOMES**

On completing this placement, the student should be capable of:

- Justifying and carrying out an accurate and detailed subjective and objective examination for a range of simple and more complex MSK conditions, affecting peripheral and spinal areas. Thus demonstrating the application of assessment skills to investigate the causes for functional impairment using appropriate active/ passive/ manual assessment techniques. This process should include the interpretation of all available resources e.g. imaging, where appropriate.

- Demonstrating the ability to plan, carry out, modify/ progress and evaluate the therapeutic management of patients with an MSK dysfunction.
- Write concise and accurate records using System 1.
- Managing their time and caseload effectively, showing appropriate prioritisation skills.
- Communicating effectively and appropriately, verbally and in – writing, with patients, carers and other professionals
- Critically evaluating the role, benefits and limitations of physiotherapy with reference to current evidence.

### **OTHER OPPORTUNITIES**

Experience may occasionally also be gained in other aspects of the service:

- Hydrotherapy
- Provision of required walking aids/ splints
- Falls risk assessment
- Classes - Spinal Rehabilitation
  - Pilates
  - Hand therapy
  - Knee rehabilitation
  - Shoulder rehabilitation
  - Pulmonary rehabilitation

### **TRAINING**

All students will receive formal supervision to gain competency and accuracy in patient assessment and treatment. They will be encouraged to develop treatment plans considering current evidence and demonstrate sound clinical reasoning.

**PROPOSED LEARNING/DEVELOPMENT PLAN:**

---

**Week 1:**

- First morning Induction period.
- Objectives
- Teaching sessions on related topics.
- Observe qualified members of staff assessing and treating patients.
- Discuss each patient with clinical educator after each subjective and objective assessment.
- Begin to undertake subjective & objective assessments which may be observed by clinical educator.
- Daily discussion sessions with clinical educator to discuss treatment issues.
- MSK student teaching
- Weekly feedback session on progress so far.
- Observation of classes

**Week 2:**

- Continue to undertake subjective & objective assessments
- Suggested use of half-day study to prepare for patient discussion with visiting university tutor.
- Informal teaching as required.
- Daily discussion sessions continued.
- Observation of classes

**Week 3:**

- Shorter daily discussion sessions continue as required.
- Mid way appraisal and presentation of patient profile.
- Informal teaching sessions as requested.
- Weekly feedback session on progress.
- Observation of classes

**Week 4:**

- Discussion sessions with clinical educator as requested.
- Lead a class (depending on availability).

**Week 5:**

- Consolidation of skills and experience
- Optional presentation to the team
- Demonstration of critical skills
- Final appraisal

The student may be asked deliver a presentation/ case study to their supervisor & university tutor during the mid-placement visit.

During this placement, the majority of outpatient clinics/ classes will be within the physiotherapy department. Occasionally, you may accompany your supervisor to a GP Practice clinic. It will be possible to gain experience in the assessment and treatment of patients, of all ages, referred by GP's, Orthopaedic Consultants and other members of the multi – disciplinary team, with a wide range of acute and chronic musculoskeletal conditions.

## **STARTING YOUR ASSESSMENT**

INTRODUCE YOURSELF, HAVE YOUR NAME BADGE ON

ASK IF THEY ARE HAPPY TO BE SEEN BY A STUDENT

GAIN & DOCUMENT CONSENT

CHECK PATIENT DEMOGRAPHICS & ASK THEIR PREFERRED NAME

THE SYSTEM ONE TEMPLATE WILL GUIDE YOU THROUGH YOUR ASSESSMENT

REMEMBER TO GET NOTES COUNTERSIGNED BY YOUR MENTOR FOLLOWING YOUR ASSESSMENT.

## **CERVICAL SPINE ASSESSMENT**

### **SUBJECTIVE HISTORY**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op)?

Consider age-How might this relate to potential for pathology (soft tissue and bone/joint)?

#### *History*

Consider mechanism of injury, trauma, high velocity, sports, occupational?

Insidious or repetitive. Think of structures relating to the cervical spine.

Work related –repetitive work, level of activity with work, overhead work sedentary role?

Any change in occupation, level of activity or general health?

Any paraesthesia/ anaesthesia, motor loss, is this pre-existing or recent.

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past of previous injury to the area?

Have they had any previous treatment for the problem & if so did it help?

Sleep- do they sleep well. If not is it because of this problem or other factors impairing sleep quality.

How are they feeling about the problem & what are their expectations?

Aggravating factors –e.g. prolonged position, turning head

Easing factors –e.g. rest, analgesia, heat etc.

Is the problem getting better/ staying the same or worsening with time?

24 Hour/ diurnal pattern. Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS (at worst, at best, currently)

Irritability – how easily/quickly does the pain come on & if aggravated how long will it take to settle?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

Functional limitations- what can't they do because of this problem?

Investigations- what & when have they had? What are the results? (Can access radiological through IMPAX)

### Past Medical History

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Family History

Is there a family history of problems e.g. RA, AS

Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role? Hand dominance.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

Lifestyle- do they smoke?

Special Questions / Red Flags

General health- weight loss, poor appetite, fatigue

Trauma- in road traffic collisions (RTC) - notes speed, nature of impact, whether driving/ passenger/liability. Did they seek immediate medical attention, have they been X-rayed?

Night sweats

Inflammatory arthropathy e.g. RA which can be linked with cervical instability

History of cancer- consider Pancoast tumour which can present as shoulder pain/ neck tension & Horner's syndrome

Cervical myelopathy– gait disturbance, signs in the legs & feet, signs in the arms & hands

3Ns- dizziness, dysarthria, dysphagia, drop attacks, diplopia, nausea, nystagmus, facial numbness- may be linked to cervical artery dysfunction but also consider cranial nerves, upper cervical spine issues/ other causes.

Headaches- how long, site, pattern, worsening, investigations. Cervicogenic or other cause.

Following the subjective assessment you should have a working hypothesis of which structures may be at fault.

You will have an idea about the severity, irritability & nature of the problem. (SIN factors). This will help you plan which tests & how many you may be able to do at this stage.

**Severity** – pain score typically VAS

**Irritability** – how easily/quickly does the pain come on?

**Nature** – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic? Think type of pain arthrogenic, myogenic, neurogenic

You can then formulate a MUST, SHOULD & COULD list for the objective assessment.

## **OBJECTIVE ASSESSMENT**

Establish the state at rest/ present symptoms.

### Observation-

- Forward head position- check from the side, the ear should be aligned over the shoulder & the chin should not poke forwards excessively
- Check for lumps/ swelling
- From behind the upper contours of trapezius should be symmetrical
- Dowager's hump
- Wry neck
- Nystagmus/ Horner's syndrome

### Palpation

Palpate for pain/ lumps/ muscle spasm- work from upper cervical to lower cervical, centrally, unilaterally. Palpate across to shoulders/ scapulae. Palpate down to T4 & lower if indicated.

To achieve full ROM, the thoracic spine as far down as T4 should move freely.

*Passive accessory intervertebral movements (PAIVMs)* – application of posterior to anterior pressure over the spinous process or articular pillar, assessing movement, pain and muscle spasm if present.

*Passive physiological intervertebral movements (PPIVM's)* – passive movement of the cervical spine whilst palpating the movement between the spinous processes or facet joints. Palpating for restriction of movement as well as muscle spasm

### Movements

AROM- willingness to move, quality of movement, jerky/ shaky, pain, range.

- Flexion 50°
- Extension 50°
- Rotation 80° (40° occurs at the C1-2 motion segment)
- Lateral flexion 40°
- Protrusion
- Retraction

Note range, quality & response to movement. If AROM is full & pain free can add overpressure.

Screen shoulders & thoracic spine. May need to assess TMJ

Screen patient carefully for risk factors before considering use of manual therapy techniques during assessment e.g. osteoporosis, instability.

Instability testing- check with mentor beforehand

### Neurological Assessment

To establish:

- Whether nerve conduction is impaired
- Identify whether a nerve root, peripheral nerve or spinal cord entrapment is causing the condition
- Whether any changes in neurological status during Rx

You need to know the upper extremity dermatomes, myotomes & sclerotomes.

You need to know peripheral nerve innervation and consider the brachial plexus.

Test:

Skin sensation – light touch-use a cotton wool ball/ tissue to check & compare with other side/ areas of normal sensation. Can also check hot/cold/ pin-prick.

Motor power- isometric testing in mid-range position. Use Oxford scale 0-5. Compare with other side.

Reflexes- biceps, triceps, brachioradialis. May also add in Hoffman's & palmar reflex tests. Compare to other side & at times may need to check lower limb reflexes. Report as absent, reduced, normal, increased or brisk.

Dermatomes	Myotomes/ reflexes
C2-hair	C1 upper cervical flexion
C3- sternocleidomastoid	C2 upper cervical extension
C4- clavicle	C3 upper cervical lateral flexion
C5- deltoid insertion/ radial border wrist	C4- shoulder girdle elevation
C6- thumb/ index fingers	C5 deltoid
C7 middle/ ring fingers	C6 biceps, brachioradialis
C8- little finger	C7- triceps
T1- ulnar border of wrist	C8- EPL
	T1- interossei

Neurodynamic testing- ULTT, PNF, slump.

Spurling's test- caution where cervical artery dysfunction suspected

Cord signs- may be necessary to check lower limbs for clonus, or loss of reflex inhibition (Babinski reflex test) where neurological conditions or cervical myelopathy are suspected.

Proprioception/ balance & co-ordination testing could also be required.

Cranial nerves mnemonic. 'On Old Olympus Table Top A Fin & German Valsed A Hop'

On occasion it may be necessary to test the cranial nerves. Look up how to do this.

### *Other Tests*

- Combined movements and quadrant tests are useful to assess coupling of movement.
- Muscle length tests- scalenes, upper trapezius
- Cervical Artery Testing- Impairment of blood flow through the vertebral & carotid arteries may be due to arteriosclerosis or mechanical compromise. Consider risk factors in your history taking. If present cervical mobilisation or manipulation becomes more of a risk than a benefit. Check with mentor prior to using mobilisation techniques.

If absence of risk factors positional tests are then performed prior to mobilisation techniques.

- Sustained rotation for vertebral artery.
- Sustained extension for internal carotid artery.

Risk factors associated with cervical arterial dysfunction: (Banks Hengeveld 2010)

- 5Ds, 3Ns
- Hypertension
- Cardiac & vascular disease, previous CVA/ TIA
- Hearing disturbances e.g. tinnitus, deafness
- Memory loss
- Retinal dysfunction
- Gait disturbance
- Trauma/ instability/ repeated trauma
- Headache/ facial pain

- Anticoagulant therapy
- Oral contraceptives
- Hypercholesterolemia
- Hyperlipidaemia
- Diabetes
- Hypermobility
- Blood clotting disorders
- RA
- Chiari malformation
- Down's syndrome
- HRT
- Vit B 12/ folic acid deficiency
- Long term steroids
- Erectile dysfunction
- Immediately post-partum
- Smoking or history of
- BMI  $\geq$  30
- Poor diet

*Some of the conditions seen:*

- Cervicogenic headache
- Cervical spondylosis
- Whiplash Associated Disorder (WAD)
- Cervical radiculopathy
- Cervical myelopathy- need referring on if suspected. May see post op.
- Postural syndromes
- Wry neck
- Post op- e.g. Cloward's procedure, disc replacement
- Trigger points
- Facet joint lesions
- AS/ RA
- Disc lesions

*References /Bibliography:*

Atkins E. Kerr.J. A Practical Approach to Orthopaedic Medicine: Assessment, Diagnosis, Treatment, 3e Paperback – 1 Mar 2010

Banks, K. Hengeveld,E. Maitland's Clinical Companion: An Essential Guide For Students. 2009. Churchill Livingstone.

## **SHOULDER ASSESSMENT**

### **SUBJECTIVE HISTORY**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op).

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

#### History

Consider mechanism of injury, trauma, high velocity, sports, occupational?

If due to a fall is this fragility fracture (not from a height) & if so have they been referred to the osteoporosis service? Are they a frequent faller & do they need a falls assessment?

Insidious or repetitive. Loading of tendon tissue suddenly with an increased level of activity? Think of structures relating to the hand & wrist and overuse or injury.

Work related –repetitive work, level of activity with work, sedentary role?

Any change in occupation, level of activity or general health?

Any paraesthesia/ anaesthesia, motor loss.

Does the shoulder feel unstable, history of dislocation, hypermobility?

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past or previous injury to the area?

Have they had any previous treatment for the problem & if so did it help?

Sleep- do they sleep well. If not is it because of this problems or other factors impairing sleep quality.

How are they feeling about the problem & what are their expectations?

Aggravating factors – lying on affected side, lifting etc.

Easing factors –rest, analgesia, heat etc.

24 Hour/diurnal pattern, on waking non mechanical? Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS (at worst, at best, currently)

Irritability – how easily/quickly does the pain come on & if aggravated how long will it take to settle?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

Functional limitations- what can't they do because of this problem?

Investigations- what & when have they had? What are the results?

### Past Medical History

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Family History

Is there a family history of problems e.g. RA

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role. Hand dominance.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

Lifestyle- do they smoke?

RED FLAGS (Some to consider)

Weight loss

Trauma

Night sweats

History of cancer

Systemically unwell/ fever

Signs of cord compression

Following the subjective assessment you should have a working hypothesis of which structures may be at fault.

You will have an idea about the severity, irritability & nature of the problem. (SIN factors). This will help you plan which tests & how many you may be able to do at this stage.

**Severity** – pain score typically VAS

**Irritability** – how easily/quickly does the pain come on?

**Nature** – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic? Think type of pain arthrogenic, myogenic, neurogenic

You can then formulate a MUST, SHOULD & COULD list for the objective assessment.

**OBJECTIVE EXAMINATION**

Establish state at rest/ present symptoms

You should assess the joint above (cervical spine) & below (elbow). Include ACJ, SCJ & scapulo-thoracic articulation. Where appropriate the thoracic spine, costal joints may be assessed. Consider visceral referral also.

*Observation*

- bony deformity
- colour changes
- wasting
- swelling
- scars
- skin & nail health e.g. thinning, pitting, clubbing
- bruising

*Palpation*

- temperature
- pain – is it localised to a particular joint or structure or diffuse
- swelling
- lumps- hard, soft, bony, painful
- thickening

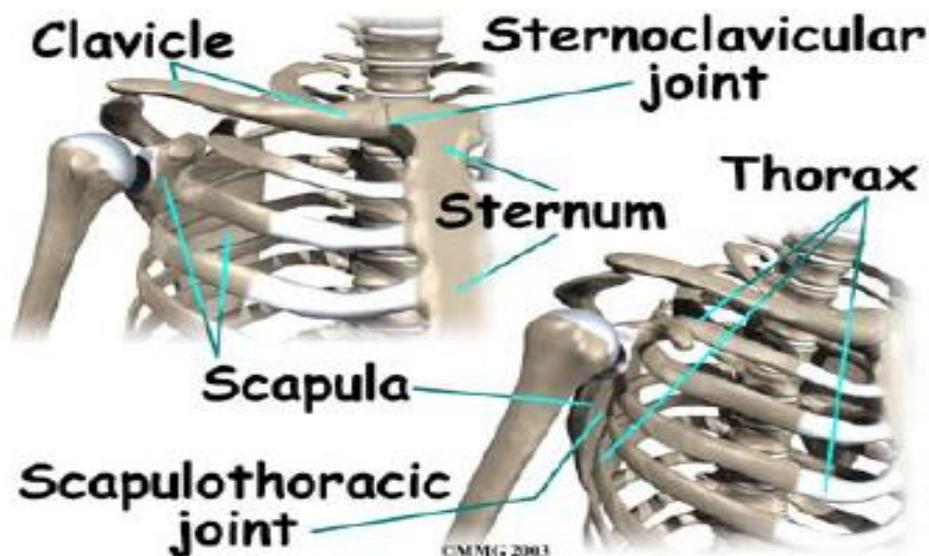
*Active Movements*- willingness to move, quality of movement, jerky/ shaky, pain, range. Use goniometer to get & compare to other side.

*Passive Movements*- range, pain, end feel. What structures are being stressed/ compressed? Compare to other side.

*Resisted Tests*- for the above movements checking if painful & grading using the Oxford Scale. (0-5). Isometric -test in comfortable, mid-range position.

*Accessory Movements*- may be added to the assessment where appropriate.

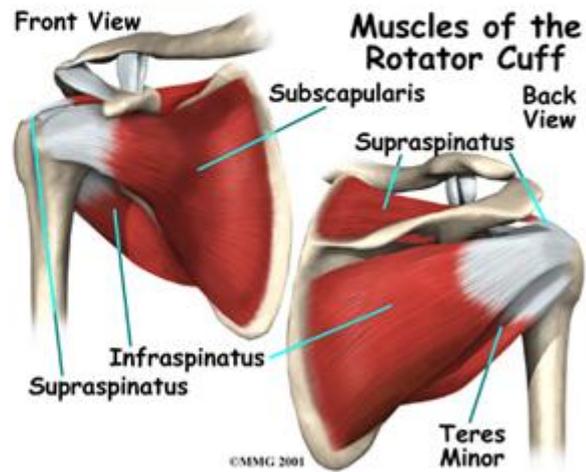
Muscle testing- recruitment patterns & length tests



## Rotator Cuff

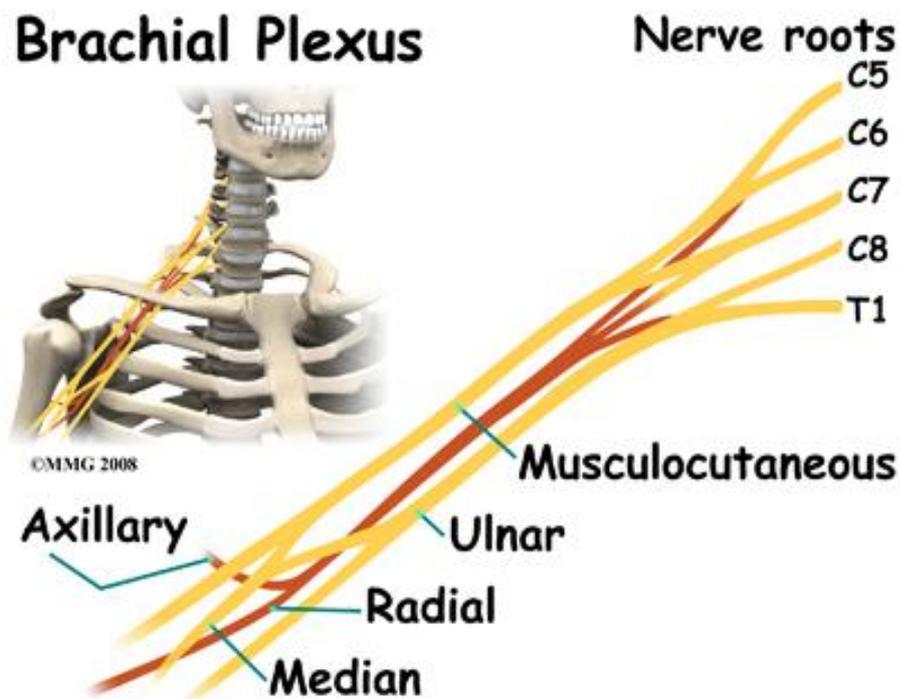
- Four Muscles

- Subscapularis
- Supraspinatus
- Infraspinatus
- Teres Minor



### Neurological Assessment

## Brachial Plexus



A hard neurological screen is required if subjective history of paraesthesia/ numbness/ motor deficit. Do the signs & symptoms fit a dermatomal, peripheral nerve or other distribution? Are symptoms intermittent or constant? Are they worsening, spreading or improving?

Don't just consider musculoskeletal causes, consider other neurological conditions also. They may also have a pre-existing neurological condition to take into account.

Assess myotomes, dermatomes & reflexes. Compare to other side.

Neurodynamic testing- ULTT, PNF, slump

May need to add in other neurological tests if appropriate. E.g. Romberg's test

### *Special tests*

#### Impingement tests

- Neer's sign
- Hawkin's Kennedy

#### Tendon pathology tests

- Rotator Cuff
- Empty/full can
- Drop Arm
- Gerber Lift Off
- Belly Press
- Yergasson's
- Speed's
- Lateral rotation lag sign
- Hornblower's

#### Laxity tests

- Sulcus sign
- Load & shift test

#### Instability tests

- Anterior apprehension
- Relocation test
- Posterior drawer test

#### Labral tear tests

- O'Brien's test
- Biceps load
- Crank test

### Scapular test

- Scapular assistance
- Wall push up test

### ACJ

- Shear
- Scarf test

### **Conditions you may see:**

Impingement

Rotator cuff

Subacromial bursitis

Instability- TUBS/ AMBRI

Dislocation

Frozen shoulder/ capsulitis/ hypomobile shoulder

ACJ pain/ dislocation/ surgery

Fractures- proximal humerus, clavicle, scapular, humeral shaft

OA

Inflammatory arthropathy

Polymyalgia rheumatic

Thoracic outlet syndrome

Peripheral neuropathies e.g. axillary, suprascapular, long thoracic

CRPS

Post-surgical e.g. cuff repair, SAD, arthroplasty, stabilisation

### *Bibliography*

Atkins E. Kerr.J. A Practical Approach to Orthopaedic Medicine: Assessment, Diagnosis, Treatment, 3e Paperback – 1 Mar 2010

Banks, K. Hengeveld, E. Maitland's Clinical Companion: An Essential Guide For Students. 2009. Churchill Livingstone.

Donatelli, R.A. Physical Therapy of the Shoulder. Elsevier Health Sciences, 2011.

Ellenbecker, Todd S. Clinical Examination of the Shoulder. Elsevier Saunders, 2004

Ellenbecker, Todd S. Shoulder rehabilitation: non-operative treatment. Thieme, 2006

## **ELBOW ASSESSMENT**

### **SUBJECTIVE HISTORY**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op)?

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

#### **History**

Consider mechanism of injury, trauma, high velocity, sports, occupational?

If due to a fall is this fragility fracture (not from a height) & if so have they been referred to the osteoporosis service? Are they a frequent faller & do they need a falls assessment?

Insidious or repetitive. Loading of tendon tissue suddenly with an increased level of activity? Think of structures relating to the elbow & wrist and overuse or injury.

Work related –repetitive work, level of activity with work, sedentary role?

Any change in occupation, level of activity or general health?

Any paraesthesia/ anaesthesia, motor loss.

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past of previous injury to the area?

Have they had any previous treatment for the problem & if so did it help?

Sleep- do they sleep well. If not is it because of these problems or other factors impairing sleep quality.

How are they feeling about the problem & what are their expectations?

Aggravating factors – gripping, lifting etc.

Easing factors –rest, analgesia, heat etc.

24 Hour/diurnal pattern, on waking non -mechanical? Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS (at worst, at best, currently)

Irritability – how easily/quickly does the pain come on & if aggravated how long will it take to settle?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

Functional limitations- what can't they do because of this problem?

Investigations- what & when have they had? What are the results?

### Past Medical History

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Family History

Is there a family history of problems e.g. RA

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role? Hand dominance.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

Lifestyle- do they smoke?

**RED FLAGS (Some to consider)**

Weight loss

Trauma

Night sweats

History of cancer

Systemically unwell/ fever

Signs of cord compression

Following the subjective assessment you should have a working hypothesis of which structures may be at fault.

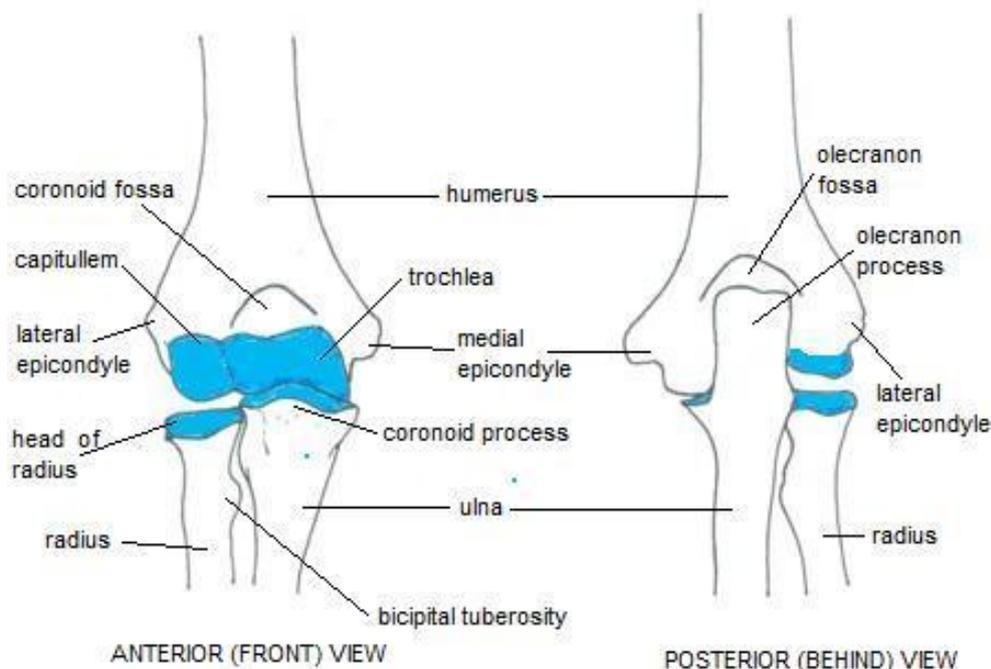
You will have an idea about the severity, irritability & nature of the problem. (SIN factors). This will help you plan which tests & how many you may be able to do at this stage.

You can then formulate a MUST, SHOULD & COULD list for the objective assessment.

**OBJECTIVE EXAMINATION**

You should assess the joint above & below also. It may also be appropriate to assess the relevant spinal segment.

Establish the state at rest/ present symptoms



### *Observation*

- Deformity
- Resting posture
- Swelling
- Skin changes
- Bruising
- Wasting

### *Palpation*

- temperature
- pain – is it localised to a particular joint or structure or diffuse
- swelling
- lumps- hard, soft, bony, painful
- thickening

### *Movement*

Active Movement (AROM) - willingness to move, quality of movement, jerky/ shaky, pain, range.

Where possible use goniometer to get an objective measure & compare to other side.

- Elbow Flexion (140-150°)
- Elbow Extension (0-10°)
- Supination (85-90°)
- Pronation (85-90°)

*Passive Movements*- range, pain, end feel. What structures are being stressed/ compressed? Compare to other side.

*Resisted Tests*- for the above movements checking if painful & grading using the Oxford Scale. (0-5). Isometric so testing in comfortable, mid-range position.

*Accessory Movements*- may be added to the assessment where appropriate

### *Neurological Assessment*

A hard neurological screen is required if subjective history of paraesthesia/ numbness/ motor deficit. Do the signs & symptoms fit a dermatomal, peripheral nerve or other distribution? Are symptoms intermittent or constant? Are they worsening, spreading or improving?

Don't just consider musculoskeletal causes, consider other neurological conditions also. They may also have a pre-existing neurological condition to take into account.

Assess myotomes, dermatomes & reflexes. Compare to other side.

May need to add in other neurological tests if appropriate. E.g. Romberg's test

### *Special Tests*

Tinel's test- over cubital tunnel for cubital tunnel syndrome

Lateral epicondylitis (tennis elbow) - pain on resisted wrist extension/ middle finger extension felt around the lateral epicondyle

Medial epicondylitis (golfer's elbow) - pain on resisted wrist flexion- felt over the medial epicondyle

Ligamentous Instability Tests

### *Some of the Conditions You May See:*

Tennis Elbow

Tennis / Golfer's elbow post-surgical release

Golfer's elbow

Fractures- e.g. supracondylar, radial head

Cubital Tunnel Syndrome

OA

Inflammatory arthropathy

Dislocation

Ligament injuries/ repairs

Distal biceps tendinopathy

## **HAND & WRIST ASSESSMENT**

### **SUBJECTIVE HISTORY**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op)?

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

#### *History*

Consider mechanism of injury, trauma, high velocity, sports, occupational?

If due to a fall is this fragility fracture (not from a height) & if so have they been referred to the osteoporosis service? Are they a frequent faller & do they need a falls assessment?

Insidious or repetitive. Loading of tendon tissue suddenly with an increased level of activity? Think of structures relating to the hand & wrist and overuse or injury.

Work related –repetitive work, level of activity with work, sedentary role?

Any change in occupation, level of activity or general health?

Any paraesthesia/ anaesthesia, motor loss.

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past or previous injury to the area?

Have they had any previous treatment for the problem & if so did it help?

Sleep- do they sleep well. If not is it because of this problem or other factors impairing sleep quality.

How are they feeling about the problem & what are their expectations?

Aggravating factors – gripping, lifting etc.

Easing factors –rest, analgesia, heat etc.

24 Hour/diurnal pattern, on waking non mechanical? Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS (at worst, at best, currently)

Irritability – how easily/quickly does the pain come on & if aggravated how long will it take to settle?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

Functional limitations- what can't they do because of this problem?

Investigations- what & when have they had? What are the results?

### Past Medical History

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Family History

Is there a family history of problems e.g. RA?

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role? Hand dominance.

Hobbies -gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

Lifestyle- do they smoke?

### RED FLAGS (Some to consider)

- Weight loss
- Trauma
- Night sweats
- History of cancer
- Systemically unwell/ fever
- Signs of cord compression

Following the subjective assessment you should have a working hypothesis of which structures may be at fault.

You will have an idea about the severity, irritability & nature of the problem. (SIN factors). This will help you plan which tests & how many you may be able to do at this stage.

You can then formulate a MUST, SHOULD & COULD list for the objective assessment.°

## **OBJECTIVE EXAMINATION**

You should assess the joint above & below also. It may also be appropriate to assess the relevant spinal segment.

Establish state at rest, present symptoms.

### *Observation*

- bony deformity
- colour changes
- wasting
- swelling
- scars
- skin & nail health e.g. thinning, pitting, clubbing
- bruising

### *Palpation*

- temperature
- pain – is it localised to a particular joint or structure or diffuse
- swelling
- lumps- hard, soft, bony, painful
- thickening
- Mnemonic to remember carpal bones- 'Simply Learn The Parts That The Carpus Has'.
- Scaphoid, Lunate, Triquetral, Pisiform, Trapezium, Trapezoid, Capitate Hamate

### *Movement*

Active Movement (AROM) - willingness to move, quality of movement, jerky/ shaky, pain, range.

Where possible use goniometer to get an objective measure & compare to other side.

### Wrist Joint AROM

- Flexion (80-90°)

- Extension (70-90°)
- Radial Deviation (15°)
- Ulnar Deviation (30-45°)

#### Radio-ulnar joint AROM

- Pronation (85-90°)

#### Supination (85-90°)

#### Finger flexion

- MCPJ (85-90°)
- PIPJ (100-115°)
- DIPJ 80-90°

#### Finger Extension

- MCPJ (30-45°)
- PIPJ ( 0°)
- DIPJ (20°)

#### Finger Abduction (20-30°)

#### Finger Adduction (0°)

#### Thumb AROM

- Flexion CMCJ (45-50°), MCPJ (50-55°), IPJ (85-90°)
- Extension MCPJ (0°), IPJ (0-5°)
- Adduction (30°)
- Abduction (60-70°)
- Opposition- should get tip of thumb to tip of 5<sup>th</sup> finger

Passive Movements- range, pain, end feel. What structures are being stressed/ compressed? Compare to other side.

*Accessory Movements*- may be added to the assessment where appropriate

*Resisted Tests*- for the above movements checking if painful & grading using the Oxford Scale. (0-5). Isometric so testing in comfortable mid-range position.

#### *Neurological Assessment*

A hard neurological screen is required if subjective history of paraesthesia/ numbness/ motor deficit. Do the signs & symptoms fit a dermatomal, peripheral nerve or other distribution? Are symptoms intermittent or constant? Are they worsening, spreading or improving?

Don't just consider musculoskeletal causes, consider other neurological conditions also. They may also have a pre-existing neurological condition to take into account.

Assess myotomes, dermatomes & reflexes. Compare to other side.

May need to add in other neurological tests if appropriate. E.g. Romberg's test

### *Vascular assessment*

This may be required at times. Know how to palpate pulses e.g. radial/ ulnar.

### *Some of the Conditions & Pathologies Encountered*

Compression Neuropathies- Carpal Tunnel Syndrome- the commonest of the upper limb compression neuropathies. Mild to moderate cases may benefit from night-time splints +/- steroid injection. Long-standing/ marked cases need surgery. Can see for physio post op. Some rarer ones are Guyon's tunnel, cubital tunnel & Wartenberg's syndrome

Fractures- typically distal radius, scaphoid, phalanges, metacarpals

OA- Heberden's nodes affect DIPJ, Bouchard's nodes affect PIPJs

Inflammatory Arthropathy

De Quervain's tenosynovitis/ intersection syndrome

Dupuytren's contracture- can be referred to physio post- op

Ligament sprains

Burns

Complex Regional Pain Syndrome

Crush Injuries

Tendon repairs

Trapeziectomy

Arthroplasty

Special Tests

Carpal Tunnel Syndrome

- Phalen's test
- Durkan's test
- Tinel's test

DeQuervain's tenosynovitis

- Finkelstein's test

*Bibliography:*

Atkins E. Kerr.J. A Practical Approach to Orthopaedic Medicine: Assessment, Diagnosis, Treatment, 3e Paperback – 1 Mar 2010

Banks, K. Hengeveld,E. Maitland's Clinical Companion: An Essential Guide For Students. 2009. Churchill Livingstone.

## **THORACIC SPINE& RIB CAGE ASSESSMENT**

### **SUBJECTIVE HISTORY**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op)?

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

#### *History*

Consider mechanism of injury, trauma, high velocity, sports, occupational?

If due to a fall is this fragility fracture (not from a height) & if so have they been referred to the osteoporosis service? Are they a frequent faller & do they need a falls assessment?

Insidious or repetitive. Loading of tendon tissue suddenly with an increased level of activity? Think of structures relating to the elbow & wrist and overuse or injury.

Work related –repetitive work, level of activity with work, sedentary role?

Any change in occupation or level of activity?

Any paraesthesia/ anaesthesia, motor loss.

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past or previous injury to the area?

Have they had any previous treatment for the problem & if so did it help?

Sleep- do they sleep well. If not is it because of this problem or other factors impairing sleep quality.

How are they feeling about the problem & what are their expectations?

Aggravating factors- e.g. trunk twisting, deep inspiration

Easing factors –rest, analgesia, heat etc.

24 Hour/diurnal pattern, on waking non mechanical? Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS (at worst, at best, currently)

Irritability – how easily/quickly does the pain come on & if aggravated how long will it take to settle?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

Functional limitations- what can't they do because of this problem?

Investigations- what & when have they had? What are the results?

### Past Medical History

General health- any changes

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Family History

Is there a family history of problems e.g. AS, osteoporosis

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role? Hand dominance.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

Lifestyle- do they smoke?

### Red Flags / Special questions (Some to consider)

The thoracic spine is an area that can mimic many of the pains due to visceral disorder so extreme care is required in determining the site & behaviour of symptoms.

Weight loss

Trauma

Excessive sweating attacks/ night sweats

History of cancer

Systemically unwell/ fever

Signs of cord compression

Poor general health

Abdominal pain

Nausea

Lack of appetite

Bladder/ bowel problems

Gait disturbance

History of cancer

Chest problems- any recent changes?

Cardiac problems- any recent changes?

Osteoporosis- could this be a compression fracture?

Do symptoms occur during following meals or bladder/ bowel functions?

Following the subjective assessment you should have a working hypothesis of which structures may be at fault.

You will have an idea about the severity, irritability & nature of the problem. (SIN factors). This will help you plan which tests & how many you may be able to do at this stage.

You can then formulate a MUST, SHOULD & COULD list for the objective assessment.

## **OBJECTIVE ASSESSMENT**

Establish the state at rest/ present symptoms.

### **Observation-**

- Forward head position- check from the side, the ear should be aligned over the shoulder & the chin should not poke forwards excessively
- Protracted shoulder girdle
- Scapular position
- Check for lumps/ swelling

- From behind the upper contours of trapezius should be symmetrical
- Increased thoracic kyphosis
- Flat thoracic spine
- Scoliosis
- Ribcage deformity
- Wasting

### Palpation

Work from lower cervical to upper lumbar spine (& lower if indicated) centrally, unilaterally. Palpate across to shoulders/ scapulae/ ribcage/ abdomen.

Palpate for

- pain
- lumps
- muscle spasm.
- sweating
- position of vertebrae/ ribs (esp. 1<sup>st</sup> rib)

### Movements

AROM- checks willingness to move, quality of movement, jerky/ shaky, pain, range.

- Combined range of flexion/ extension ranges from 50-70 °
- Rotation 35°
- Lateral flexion 20–25°

Note range, quality & response to movement. If AROM is full & pain free can add overpressure.

Screen shoulders/ girdle, cervical & lumbar spine.

Accessory movements- Screen patient carefully for risk factors before considering use of manual therapy techniques during assessment e.g. osteoporosis. Can look at vertebral & rib movements. Assess for pain/ stiffness/ hypermobility.

Combined movements

Muscle testing- recruitment patterns & length tests

Chest- inspiration/ expiration/ cough

### Neurological Assessment

Neurodynamic testing- ULTT, PNF, slump, SLR

Dermatomes, myotomes, reflexes- may need to do upper limb +/- lower limb

Cord signs- may be necessary to check lower limbs for clonus, or loss of reflex inhibition (Babinski reflex test) where neurological conditions or cervical myelopathy are suspected.

Proprioception/ balance & co-ordination testing could also be required.

### Special tests

Tap test

Thoracic outlet tests

### Some of the conditions seen:

Spondylosis

Postural syndromes

Osteoporosis

AS

Sheuermann's disease

Marfan's syndrome

Scoliosis

Thoracic outlet syndromes

T4 syndrome

### Bibliography

Atkins E. Kerr.J. A Practical Approach to Orthopaedic Medicine: Assessment, Diagnosis, Treatment, 3e Paperback – 1 Mar 2010

## LUMBAR ASSESSMENT

### SUBJECTIVE HISTORY

**History** – Insidious or traumatic. Work related, effect of sitting, standing? Is there any previous episode of low back pain or sciatica?

**Age.** Degeneration, Disc prevalence 30-50, Red flags (first onset over 55 years old or below 18).

**Occupation,** manual workers, physical exertion load and repetition of job, has this increased or changed? Office based workers who sit a lot are prone to deconditioning of spine. Fork lift drivers and long distance lorry drivers shown that they have increased incidence of disc related problems, relating to vibration.

**Hobbies and lifestyle** Level of fitness and activity may indicate if this relates to any possible pathology. Gives an indication of their rehabilitation aims as well.

**Site and spread** Low back pain +/- radicular leg pain (dermatomal?), any associated paraesthesia of either leg?

**Special questions** symptoms relating or aggravated by cough or sneeze, any bladder or bowel disturbance (incontinence or retention), any perianal anaesthesia. Do they have bilateral leg symptoms? Any history of cancer, any change in weight (sudden weight loss)? Have they been unwell with fever or systemically unwell? Any balance or coordination problems, foot drop/dragging? Do they have constant unremitting pain, that is non mechanical?

**Onset and duration Gradual or sudden.** Was there a traumatic injury involved, if the answer is yes, this should have been assessed medically and investigated if indicated. Have they had back pain before and is this episode different? If leg symptoms are present, have they had the leg symptoms before are they similar or more severe?

### RED FLAGS

History of cancer

Age of onset – dependent upon which texts you read, first episode of low back pain in somebody over 55 years is red flag and if under 18 years of age. This is important but important to take in context of the rest of history.

Systemically unwell/fever/weight loss?

Bilateral pins and needles or numbness in both legs

Bladder or bowel dysfunction – incontinence or retention, saddle anaesthesia, possibly indicating cauda equina compression?

Loss of pulses in lower limb, appearance and palpation for pulses if suspected vascular compromise

Significant trauma, such as a fall, that could have caused a spinal fracture, cord injury, clarify if they have been investigated in presence of trauma.

### ***Symptoms and behaviour.***

**Aggravating factors** – posture sitting, standing, lying, movements (bending, leaning back, rotation), specific activity,

**Easing factors** – change of position, laid (supine, side lying prone), pain relief, heat

**Severity** – pain score typically VAS

**Irritability** – how easily/quickly does the pain come on?

**Nature** – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic? Think type of pain arthrogenic, myogenic, neurogenic

You can then formulate a MUST, SHOULD & COULD list for the objective assessment

## **OBJECTIVE ASSESSMENT**

**Always establish state at rest/ current symptoms**

### **Posture**

Observation to start in waiting area, are they sat, how are sat? Observe willingness to move, from sit to stand, walking, what's their posture like e.g. flexed or antalgic.

Standing, sitting and dynamic

Skeletal alignment, symmetry, curves, sciatic shift, scoliosis, waist creases, iliac crest levels, gluteal creases, shoulder height, knee position, foot position, how are they weight bearing. Muscle wastage, calf, quadriceps could indicate nerve root irritation and atrophy can be fairly rapid or is the atrophy chronic?

Postural type – kyphosis-lordosis, flat back, sway back, handedness

Muscle tone – paravertebral tone/spasm, imbalance

If you correct any abnormal position or posture how does it feel for the patient, they sustain or tolerate that position?

Trendelenburg test – single leg stand for 30seconds, looks at pelvic stability and control. Good indicator of control, easy to do and reproducible.

### Active movements

- Range
- Pain
- Willingness
- Flexion, extension, lateral flexion, rotation, side glide

### Passive movements

If active movements pain free

Can add combined movements (extension/side flexion, flexion/side flexion)

Can add repeated movements or sustained positions

### Other joints

Thoracic spine, Hip, SIJ, possibly knee and ankle.

You may want to test function so how do they squat, sit to stand, lift, reach – do you need to challenge to replicate symptoms of see any dysfunction?

### Neurological assessment

Sensation - Light touch (A Alpha & A beta fibres large myelinated with increase blood supply), pin prick (A delta and C fibres).

<b>Muscle Power</b>	Psoas	L2
	Quadriceps	L3
	Tibialis anterior	L4
	Extensor HL	L5
	Peronei	S1
	Hamstrings	S2
	Toe standing	S2

**Reflexes**    Quadriceps L3/4, Tendon-achilles S1

**Upper motor neurone** – babinski, clonus

**Neurodynamic tests** – Straight leg raise, femoral nerve stretch prone knee bend, Laseuges test, slump test

### Palpation

Prone position if patient comfortable and aids clinician to identify anatomy easier. Temperature of area, sweating, soft tissue mobility, tightness or muscle spasm. Can palpate in sitting if easier for patient.

*Passive accessory intervertebral movements (PAIVMs)* – application of posterior to anterior pressure over the spinous process or articular pillar, assessing movement, pain and muscle spasm if present.

*Passive physiological intervertebral movements (PPIVM's)* – passive movement of the lumbar spine whilst palpating the movement between the spinous processes or facet joints. Palpating for restriction of movement as well as muscle spasm

Vertebrae can palpate spinous process centrally, transverse processes, facet joints, laminar trough).

Sacrum – sacral thrust

Muscles – quadratus lumborum, paraspinals, erector spinae, thoracolumbar fascia

### Some Examples of pathology

**Lumbar disc herniation** – this can be related to the natural ageing of the spine, the disc is more hydrated when we are younger. The first symptom of disc herniation is typically back pain, however leg pain can present primarily and/or independently if there is irritation of the nerve (possibly from disc material or inflammation). The patient may describe back pain, leg or foot pain (sciatica), there maybe associated neurological deficit (weakness or loss of sensation) and cauda equina signs and symptoms must be ruled out

Risk factors include being male aged 30 to 50, repetitive strain of the spine such as manual workers, frequent driving, sedentary lifestyle and smoking.

**Lumbar spinal stenosis** – this is typically related to degeneration of the lumbar spine, where there is narrowing of the space available for the spinal cord or spinal nerve roots, it can cause pain, numbness or weakness in the legs. With degeneration of the lumbar spine there is loss of disc height, which places more pressure on the facet joints, this can wear the cartilage of the facet joint, which can cause osteophytes to form narrowing the outlet for the nerve.

Patients may present with back pain, burning/aching into the buttocks, pain into the legs and/or weakness of the legs, typically worse with extended periods of walking. They may describe sitting down or leaning forward as relieving their symptoms, as this 'unloads' the joints.

**Osteoporosis and spinal fractures** – thinning of the bones occurs with age and is more prevalent in post menopausal women, it can be a gradual process with thinning of the bones over the years. The vertebral compression fracture occurs when too much pressure is placed on a weakened vertebrae and the front of it cracks. The pain associated to this can be the first symptom of osteoporosis. Vertebral fractures can occur following a fall or if the person has osteoporosis, with innocuous daily activities such as cleaning.

The patient may present with pain that is worse with sitting or standing for an extended period, they typically have relevant risk factors i.e. age, fall etc. Clinically they may have a kyphotic posture and are unable to extend. Investigation is indicated for these individual, X ray is used as a first line; however CT, MRI scan and bone density scans may be used as well. They are usually managed conservatively with relative rest and pain relief; bisphosphonates are commenced if osteoporosis is present.

**Mechanical low back pain** – a general term that refers to back pain caused by strain on the muscles of the vertebral column and abnormal stress. This includes low back pain that gets worse with certain activities, certain postures and is better with rest. The underlying structures that effected are often unknown, as there may be dysfunction present throughout, what is important is the pain and loss of function that it is causing the patient.

### **Further reading**

Adams et al (2000) Mechanical Initiation of Intervertebral Disc Degeneration. *Spine* 25(13), p1625-1636.

Foley et al (2012) Soft tissue injuries: 3.Paraspinal. *Emergency medicine Journal*, 25, p514-521.

Hides et al (2008) Multifidus size and symmetry among chronic LBP and healthy asymptomatic subjects. *Manual Therapy*, 13, p43-49.

Hurri, H. Karppinen, J. (2004) Discogenic pain. *Pain*, 112, 225-228

MacDonald et al (2006) The lumbar multifidus: Does the evidence support clinical beliefs? *Manual Therapy*, 11, p254-263.

Van den Bosch, et al (2004) Evidence against the use of lumbar spine radiography for low back pain. *Clinical Radiology*, 59, 69-76.

Walker, B. Williamson, O.D. (2009) Mechanical or inflammatory low back pain. What are potential signs and symptoms? *Manual Therapy*, 314-320

## HIP ASSESSMENT

### Face, Gait, Posture

### SUBJECTIVE HISTORY

**History** – Insidious or traumatic. Snapping, clicking or grinding?

**Age.** Degeneration, Perthes (boys 4-10), slipped epiphysis (linked overweight adolescents), juvenile chronic arthritis.

**Occupation,** manual workers electrician and plumbers working in confined spaces

**Sports** (young adults in endurance and high intensity events consider stress fracture of femoral neck – need to prevent progression to avascular necrosis.

**Hobbies and lifestyle** Muscular injury particularly as involvement of two joint muscles.

**Site and spread** Think lumbar spine and Sacro iliac joint eliminate. Radicular pain or paraesthesia

**Onset and duration Gradual or sudden.** OA usually gradual onset and worsened in weight bearing. Minor trauma in elderly can lead to fracture – severe pain of sudden onset. Loose bodies and muscular lesions present suddenly. Overuse or repetitive type lesions – chronic contractile lesions or bursitis.

**Duration** OA typically gradual onset and worsening pain. Bursitis tends to be gradual onset of aching pain and patient only seeks help after several months of suffering pain.

Serious pathology would present as severe pain, worsening in intensity – may be indicated by sign of the buttock (limited painful lumbar flexion, passive hip flexion as limited and as painful as SLR, pain on some resisted tests) Neoplasm, fracture, abscess, sepsis, osteomyelitis

### RED FLAGS

History of cancer

Systemically unwell/fever/weight loss?

Bilateral pins and needles or numbness in both legs

Bladder or bowel dysfunction – incontinence or retention, saddle anaesthesia, possibly indicating cauda equina compression?

Loss of pulses in lower limb, appearance and palpation for pulses if suspected vascular compromise

Obvious bony deformity suggesting fracture – check history and risk factors from past medical history. (history of trauma, has this been assessed medically?)

**Symptoms and behaviour.** Indicate nature of lesion e.g. OA worsened with activity and weight bearing, Bursitis or muscle strains worsened with activity.

Bursae painful if squeezed or compressed – e.g. lying or sitting.

*Loose bodies* – twinging pain and feeling of giving way.

OA – morning stiffness due to accumulation of intracapsular swelling overnight.

Beware of unrelenting pain, associated fever, night sweats and rigors. Unexplained weight loss – secondary lesions common in hip and pelvis.

## OBJECTIVE ASSESSMENT

### **ALWAYS ESTABLISH STATE AT REST**

#### INSPECTION

**Bony deformity** – asymmetry, gluteal creases, PSIS, level of iliac crests, position of feet (rotated from hip?)

**Colour changes** – hip deep structure not expect, but possible soft tissue injury.

**Wasting** – Gluteal and quadriceps muscle.

**Swelling** – occasionally around greater trochanter but not common.

#### **Active movements**

- Range
- Pain Power
- Willingness
- Painful Arc
- Hip flexion (120-130<sup>o</sup>), Extension (10-20<sup>o</sup>), Medial rotation (40-50<sup>o</sup>), Lateral rotation (35-45<sup>o</sup>), abduction (40-45<sup>o</sup>), adduction (20-30<sup>o</sup>).

<b>Passive movements</b>	<i>Normal End feel</i>	<i>Abnormal end feel</i>
<ul style="list-style-type: none"> <li>• Pain</li> <li>• Range</li> <li>• End feel</li> </ul>	Hard Soft Elastic	Hard Springy Spasm  Empty

### **Capsular pattern**

- Indicates arthritis – acute or chronic.
- Varies from joint to joint.
- Is limitation of movement in a fixed proportion

HIP – **My Father Abducts Elephants**. Medial rotation, flexion, abduction, extension

### **Non Capsular pattern**

- Intra-articular displacement.
- Ligamentous lesion
- Extra-articular lesion

### **Resisted tests**

- Pain                                      Muscle bulk 5,8,15 and 23cm above base patella
- Power                                      (Petty & Moore, 2001)

**Neurological assessment** – screen lower limb myotomes (L3 Knee extension, L4 ankle dorsiflexion, L5 Big toe extension, S1 Ankle eversion. Dermatomes (see body chart), reflexes knee (L3/4), Ankle (L5/S1). Neural tension Straight leg raise, femoral nerve stretch.

### **Special tests**

**Trendelenburg's sign** Patient stands on one leg and contralateral side of pelvis should rise. If drops indicative of gluteus medius weakness. Always check normal side first (Magee, 1997 p473).

**Craig's test** – measures degree of femoral ante version. In prone the patient's knee is flexed to 90° then the examiner rotates hip until the greater trochanter lies parallel with the table or reaches its most lateral position. Degree of ante version can be calculated by the angle of the lower leg with the vertical (Magee, 1997 p475).

**True leg length** Ensure pelvis level first and that the hips are not adducted or abducted. Abduction will bring the medial malleolus closer to ASIS and adduction

the opposite. Measure ASIS to medial or lateral malleolus (lateral will be more affected by muscle bulk). Difference of 1-1.5cm is within normal limits, but can still cause symptoms' (Magee, 1997 p479)

**Thomas test.** Assess hip flexion contracture. Patient lies supine, check for excessive lumbar lordosis which is usually present with tight hip flexors. Flex one of the hips, the other leg should remain on the table, if lifts indicate flexion contracture. If passively push leg to the table may note increase lumbar lordosis. If the leg does stay on table, but abducts is called "J" and indicates tight ITB. (Magee, 1997 p483)

**Rectus femoris contracture test** – as above but the test leg over the edge so knee at 90°. Flexing the other hip and knee up to 90° the test leg should stay flexed 90° the hip.

**Fabers test.** Patient laid supine test leg is placed with foot on the opposite knee, then slowly lower the leg towards the table (into **F**lexion, **A**Bduction and **E**xternal **R**otation). Negative test the leg falls level with the other. Positive test leg remains above the other. Indicative of iliopsoas spasm or sacroiliac joint effected.

**SIJ tests** – faber test, sacral compression (side lying), shear test (hip flexion, adduction, compression), sacral thrust (prone compression), see Laslett et al (2004) consensus needed as not sensitive as individual tests.

**Labral test** – anterior labrum tested with hip at 90 degrees and adduction assessing for pain and catching as positive test. Posterior labrum extension and lateral rotation – uncertain of sensitivity and specificity of this test

### Some Examples of pathology

**Psoas bursitis** usually produces local deep groin pain. Can be associated to overuse or repetitive movements. Aggravated by hip flexion movements e.g. putting shoes on, walking up hills or stairs, rising from sitting with hips flexed, jogging or kicking.

Examination – non capsular pattern, pain on hip flexion and adduction squeezing the bursa. Mid point of inguinal ligament juts distal to this move 5cm laterally and then distally.

**Greater trochanteric pain syndrome** – most common. Can be traumatic cause but usually overuse occupational or sporting. Common in obese overweight middle aged women and can be secondary to OA hip.

Aggravating factors walking, climbing stairs, standing for long periods and crossing legs in lying or sitting.

Examination – muddled picture can be positive on FABER test (flexion, abduction, lateral rotation) as squeeze bursa. Palpate over supero lateral aspect of greater trochanter . Can get pseudo trochanteric bursitis which is referred pain from lumbar

spine or sacroiliac joint. Can be complicated by calcification, so resistant to normal conservative measures

Ischial bursitis. Can be painful at end range SLR, tenderness of ischial tuberosity.

### **Articular lesions (and surgical procedures)**

*Femoral acetabular impingement (FAI)* – may present in young person sports related where there has been a history of injury, with possible twist, Can be related to bony architecture Cam or pincer lesions. May have mechanical locking or giving way of the hip. Need to rule out possible contractile structures or bursa etc. If labral lesion exam may indicate click – flexion at 90, with adduction (anterior labrum only), often can be difficult to diagnose and gold standard investigation is MRA.

May progress to hip arthroscopy if symptomatic, confirmed pathology and appropriate candidate for surgery. The referral details will confirm exact details and post operative instruction, typically limitations in weight bearing status and range of movement, with phased rehabilitation.

Osteoarthritis – typically age related, but can present if rheumatoid, history of perthes or trauma. Exam may be evident in gait (possibly antalgic, trendelenburg, external rotation of leg from hip). Range of movement loss in capsular pattern Medial rotation, flexion, abduction, looking for hard end feel and signs of pain.

### **Contractile lesions**

*Hamstrings* – Ischial tuberosity, teno-osseus insertion or muscle belly. Usually sudden onset of pain and often related to sudden stretch or rapid contraction. Can be related to altered posture, poor condition, inadequate warm up and fatigue. Patient may report tightness or pain in posterior of thigh. Pain on resisted knee flexion and pain on passive straight leg raise, lesion site confirmed with palpation.

*Quadriceps muscle* – anterior thigh pain. Pain on resisted hip flexion and resisted knee extension. As a two joint muscle rectus femoris is most prone to injury. Palpation again confirms site of lesion. Can get lesions at iliac crest at quadriceps insertion, particularly in adolescent sport individuals (soft bones and strong pull of muscle insertion)

*Adductor longus* – most commonly injured adductor. ‘Riders strain’ due to overuse of adductor longus in working a horse while riding. Patient has medial groin or thigh pain. Pain on resisted adduction and passive abduction. Lesion can be in two places in the origin from the pubis or the musculotendinous junction.

*Osteitis pubis* – central pelvic pain, often result of repetitive trauma, such as long distance runners, martial arts amongst other sports

## **Gilmore's Groin Signs & Symptoms**

The symptoms of Gilmore's Groin are characterised by pain during sports movements, particularly twisting and turning. This pain usually radiates to the Adductor muscle region and even the Testicles, although it is often difficult for the patient to pin-point.

Following sporting activity the person with Gilmore's Groin will be stiff and sore. The day after sports activity, getting out of bed or a car will be difficult. Any exertion that increases intra-abdominal pressure, such as coughing, sneezing or sporting activity can cause pain. In the early stages, the person may be able to continue playing their sport, but the problem usually gets progressively worse.

Pain in the groin and pelvis can be referred from a number of problems, including injuries to the lumbar spine, the hip joint, the sacro-iliac joint, the abdomen and the genito-urinary system, so diagnosis of Gilmore's Groin requires skilful differentiation.

The diagnosis of Gilmore's Groin is based on the patient's history and clinical signs. The most notable clinical sign is widening of the superficial Inguinal ring on the affected side, which can be palpated during the physical examination when the scrotum is inverted with the doctor's finger. Typically, there is specific pain on coughing and sneezing, as well as sitting up and squeezing the legs together.

## **Gilmore's Groin Treatment**

Conservative treatment with a Chartered Physiotherapist involves stabilising and strengthening the muscles of the pelvic region but this is a stop gap at best. In most cases it is usually possible to continue playing sports while wearing [Warm Pants \(Compression Shorts\)](#), until an opportune time can be arranged for surgery. Core strength and stability exercises can be helpful and allow the person to continue competing for a little while longer. However, there usually comes a time when the person can no longer continue because sports performance becomes so impaired. A surgical approach is required to cure the problem.

Successful surgery is dependent upon accurate diagnosis, meticulous repair and adherence to a standard rehabilitation program. Between 1980 and 2000, of 4,500 patients referred to Jerry Gilmore's clinic in London, 2,700 were treated surgically. Of the professional soccer players treated surgically, Gilmore reported a success rate of 97%.

A specific rehab program must be carefully adhered to. This prohibits sudden twisting and turning movements, with a gradual progression of pelvic muscle stability, flexibility and strength. Upright standing and walking is encouraged from day one. Straight line jogging can be initiated between 10 and 14 days post-op and straight line sprinting is usually started after 3 weeks. Thereafter, sports specific rehabilitation is graduated, with a return to competition usually possible after five weeks.

The Gilmore protocol warns that some stiffness and discomfort may occur the day after sporting activity and advocates some activity 7 days a week to remedy this.

## **Gilmore's Groin Prevention**

Core Strength and Core Stability exercises can improve muscle function across the trunk and pelvis. Core strength exercises on a mat using a [Swiss Ball](#) and [resistance bands](#) are ideal, because the improved muscular strength and stability can help to counteract the large forces that are applied to the lower abdomen and pelvis. This can reduce the risk of developing Gilmore's

### **Further reading**

Del Buono, A. et al (2011) Management of the greater trochanteric pain syndrome: a systematic review. *British Medical Bulletin*, 102, p115-131.

Dwyer, M.K et al (2014) The Acetabular Labrum Regulates Fluid circulation of the Hip Joint During Functional Activities. *The American Journal of Sports Medicine*, 42 (4), p812-819.

Ranawat, A.S. & Kelly, B.T. (2005) Function of the Labrum and Management of Labral Pathology, *Operative Techniques in Orthopaedics*, 15, p239-246

Reinhold et al (2008) The Etiology of Osteoarthritis of The Hip. *Clinical Orthopaedics Relevant Research*. 466(2), p264-272.

Reinman, M.P. et al (2012) A literature review of studies evaluating gluteus maximus and gluteus medius activation during rehabilitation. *Physiotherapy Theory & Practice*, 28(4), p257-268.

Ruane, j.j, Rossi, T.A. (1998) When Groin Pain is More than 'Just a strain'. *The Physician & Sports Medicine*. 26(4), p78-103

Sims, K (1999) Assessment and treatment of hip osteoarthritis. *Manual Therapy*, 4(3), p136-144.

Williams, B. & Cohen, S.P. (2009) Greater Trochanteric Pain syndrome: A Review of Anatomy, Diagnosis and Treatment. *Anaesthesia & Analgesia*, 108(5),p1662-1670.

## **KNEE ASSESSMENT**

### **Subjective history**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op).

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

### *History*

Consider mechanism of injury, trauma, high velocity, sports, occupational?

Any history of locking, popping, giving way, clicking?

Insidious or repetitive. Loading of joint and or tissue suddenly with an increased level of activity? Think of structures relating to the knee, articular, myogenic.

If there was trauma try to understand the mechanism of this e.g valgus stress with foot fixed.

Was there immediate swelling after injury (possible haemarthrosis), or delayed swelling.

Any hip pain, possibly referring into the knee?

Work related – do they have a physically demanding job, what are the mechanics of the job, probe and understand what it is they do

Any change in occupation, level of activity or general health?

Runners/walkers what distances are they doing, frequency, increase in mileage, what type of surfaces. Do they compete?

Is the problem dynamic or static?

How does different surfaces or gradients effect the pain?

Any dermatomal pattern of parathesia/anesthesia, motor loss?\* (Neurological questions if positive)

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past, previous injury, episodes or surgery

Aggravating factors – weight bearing, walking, running (speed/distance), standing, squatting, kneeling, twist/turn, descending steps or descending hills?

Easing factors – rest, non weight bearing, positional, different footwear, different gradients,

24 Hour/diurnal pattern, on waking non mechanical? Worse as day goes on perhaps activity dependent?

**Severity** – pain score typically VAS

**Irritability** – how easily/quickly does the pain come on?

**Nature** – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic? Think type of pain arthrogenic, myogenic, neurogenic

### *Past Medical History*

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?  
History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

### RED FLAGS

History of cancer

Systemically unwell/fever/weight loss?

Bilateral pins and needles or numbness in both legs

Bladder or bowel dysfunction – incontinence or retention, saddle anaesthesia, possibly indicating cauda equina compression?

Loss of pulses in lower limb, appearance and palpation for pulses if suspected vascular compromise

Obvious bony deformity suggesting fracture – check history and risk factors from past medical history. (history of trauma, has this been assessed medically?)

Subjective – after this you should have a working hypothesis, which structures may be at fault, idea of SIN, precautions and contraindications from PMH. Think MUST COULD, SHOULD for your objective assessment.

## **OBJECTIVE ASSESSMENT**

### **ALWAYS ESTABLISH STATE AT REST**

#### Observation

Statically – willingness to weight bear on each side. Alignment of hip, knee, ankle, foot, toes. Is the knee aligned or is there valgus or varus angle, relative to normal and opposite side. Fixed flexion deformity of the knee? Thickening of joint – acute, degenerative, rheumatoid. Muscle wasting – quadriceps wasting can be indicative of early OA, which is not yet seen on x ray

Double leg squat – control and quality of movement, function of quadriceps and other muscles of lower limb, is it painful. Feel for crepitus – patellofemoral, medial and lateral compartment?

Static balance single leg – 30seconds is true trendelenburg test (look at whole kinetic chain hip, knee, ankle/foot). If poor gluteal function think of the impact on the knee in terms of alignment, movement of lower limb and function

Single leg squat – if good static balance, challenge them, is it painful, what's their control like?

Bony deformity – alignment, asymmetry?

Colour changes – bruising, redness, and any discolouration?

Wasting – muscle bulk, asymmetry?

Swelling – soft tissue joint, thickened joints?

Gait – equal weight bearing? Look at movement of hip, knee, ankle, mid foot, big toes – is there a loss of normal movement function in one or more of these areas. Look at control of movement, hip internal rotation, valgus of knee, flexed knee/loss of extension, pronation of foot, excessive or controlled?

Assess in supine so hip neutral position, non weight bearing position for knee

Bony deformity, colour changes, wasting, swelling

Sweep test for an effusion of the joint

#### Range of movement

Active movement – willingness to move and quality of movement, is it jerky or shaky suggesting pain inhibition or fatigue

Passive movement – range of movement, pain and is end feel normal, what you would expect. Impinging at end range? What structures are being stressed, compressed?

Knee Extension 0°

Flexion 135°

Resisted tests for the above movements- isometric so testing contractile structures, so in a comfortable mid joint position (sitting, prone)

Joint above and below. Hip joint range of movement, pain, loss of range, end feel any reproduced symptoms in the knee. Ankle range of movement, pain, loss of range end feel,

*Neurological assessment* – indicated if subjective history found suggestion of paraesthesia (numbness, tingling, pins and needles) or more significantly motor deficit. Assess myotomes, dermatomes and reflexes.

*Vascular assessment* – does the subjective history suggest possible vascular cause of symptoms. Past medical history important here – signs of vascular compromise e.g. diabetic, smoker, history of heart problems etc.

#### *Special tests*

Lots of tests available for specific structures, which structures are you assessing?

Lachmanns/modified Lachmanns– ACL integrity

Posterior sag – PCL integrity  
Anterior/posterior draw – ACL/PCL tests.  
Valgus and varus stress tests – MCL/LCL  
Dial test – PLC test if indicated  
Patella apprehension test /moving patella apprehension test – MPFL

McMurrays – meniscal lesion  
Apleys test – meniscal lesion

Clarks sign- PFJ

Flexibility

*Thomas test* – quadriceps muscle

*Popliteal angle* – hamstring flexibility

*Obers test* – Iliotibial band

Gastrocnemius flexibility, dorsiflexion, knee to wall and measure gap between big toe and wall

Palpation – flexed knee for better access, medial and lateral tibiofemoral joint line, inferior and superior patella tendon. Retinaculum of patella. Tibial tubercle of patella tendon or Osgood schlatters? Hamstring insertion – fibula head, pes anserinus.

### **Common conditions and pathologies**

*Total knee joint replacement* – referral will give date of surgery, weight bearing status, discharge details (range of movement, mobility and typically other past medical history). If a different prosthesis or specific instructions this will be on the referral

*Osteoarthritis(age related, traumatic)*- what stage of OA, investigations? Which compartment affected, tibiofemoral, patellofemoral?

### **Soft tissue Injury**

*Meniscal tear* – trauma related.

*Degenerate meniscal tear* – age related.

*Patella tendinopathy (jumpers knee)* – inferior or superior.

*Fat pad impingement* – inferior pole of patella can be associated or present similar to tendinopathy

*Iliotibial band syndrome* – lateral knee pain, possibly relating to increased running or activity.

*Anterior cruciate ligament* – involve traumatic incidence, typically with fixed foot, valgus stress and possible element of rotation.

*Posterior cruciate ligament* – history of trauma, often mentioned dashboard injury with flexed knee and posterior pressure onto the tibia.

*Medial collateral ligament* – medial pain, linked typically to valgus stress.

*Lateral collateral ligament* – less common than MCL injury, strain of lateral structures

*Patella dislocation* – incident of patella coming ‘out of place’, important to ascertain if first episode or recurrent.

*Patella subluxation* – instability, is it a recurrent problem, relating to other joint problems, such as hypermobility

*Patellofemoral pain syndrome (PFPS)* – complex interaction of the knee, soft tissue and articular structures, typically due to adverse mechanics or imbalance of the soft tissue structures of the knee

#### Adolescent knee pain

*Osgood schlatters syndrome./Sinding Larsson syndrome* – seen in adolescence

*Osteochondritis dessicans* – joint related problem, pain on weight bearing, consistent problems, needs further orthopaedic opinion.

#### **Further reading**

Bicos et al (2007) The Medial Patellofemoral Ligament. *The American Journal of Sports Health Sports Medicine*, 35(3), p484-492.

Chivers, M.D. & Howitt, S.D. (2009) Anatomy and Physical examination of the knee menisci: a narrative review of the orthopaedic literature. *Journal of Candian Chiropracter association*, 53(4), p319-332.

Chun-Hao, T et al (2012) Primary Traumatic patellar dislocation. *Journal of Orthopaedic Surgery & Research*, 7(21)

Fox, A.J, et al (2012) The Basic Science of Human Knee Mensici: structure, composition and function.

Laprade, R.F. & Wijdicks (2012) The Management of Injuries to the Medial side of the knee. *Journal of Orthopaedic & Sports Physical Therapy*, 42(3), p221-233.

Marchant, M et al (2011) Management of Medial-Sided Knee Injuries, Part 1, Medial Collateral Ligament. *The American Journal of Sports Medicine*, 39(5), p1102-1113.

McConnell, J (1996) Management of patellofemoral problems. *Manual Therapy*, 1, p60-66.

McConnell, J (2007) Rehabilitation and Non operative treatment of patella instability. *Sports Medicine arthroscopy review* 15(2), p95-104.

Tibor, L et al (2011) Management of Medial-Sided Knee Injuries, Part 2. Posteromedial Corner. *The American Journal of Sports Medicine*, 39(6) p 1332-1339.

## **FOOT & ANKLE ASSESSMENT**

### **Subjective history**

How much information does the referral tell you, is the referral from GP, orthopaedics (post op).

Consider age

How might this relate to potential for pathology (soft tissue and bone/joint)?

### **History**

Consider mechanism of injury, trauma, high velocity, sports, occupational?

Any history of locking, popping, giving way?

Insidious or repetitive. Loading of tendon tissue suddenly with an increased level of activity? Think of structures relating to the foot and overuse or injury.

Work related – do they stand for long periods, level of activity with work, sedentary role?

Any change in occupation, level of activity or general health?

Runners/walkers what distances are they doing, frequency, increase in mileage, what type of surfaces. Do they compete?

Is the problem dynamic or static?

How does walking on different ground/surfaces affect the problem

Any dermatomal pattern of paraesthesia/anaesthesia, motor loss?\* (Neurological questions if positive)

How long have they had the problem for and is it getting worse, better or is it the same?

Have they had similar problems in the past, injury to foot and ankle or other condition?

Aggravating factors – weight bearing, walking, running, standing, uneven ground?

Easing factors – non weight bearing, positional, different footwear, different surfaces

24 Hour/diurnal pattern, on waking non mechanical? Worse as day goes on perhaps activity dependent?

Severity – pain score typically VAS

Irritability – how easily/quickly does the pain come on?

Nature – type of pain peripheral nociceptive, peripheral neurogenic, central neurogenic?

### Past Medical History

General health

Current medical problems – special questions think THREAD

Thyroid, hypertension, rheumatoid arthritis, epilepsy, asthma and diabetes?

History of surgery or major illness?

### Drug history

Current medication for any medical problems, analgesia, NSAIDs, neuralgic medication.

Pain relieving drugs, you might want to know how long they have been on them for and how often they take them?

### Social history

Current occupation, are they at work, on sick leave, light duties if at work? How long have they done their current job, particularly relevant if change in role perhaps from more sedentary to physical role.

Hobbies again to gauge level of activity that is normal for them, static, dynamic or sedentary. Volume of activity may be relevant are they doing the activity every day or once per week, what does it feel like after that activity?

Living circumstances, who they are living with and level of ADL's may be relevant dependent on the level of disability or loss of function.

### RED FLAGS

Bilateral pins and needles or numbness in both legs

Loss of pulses in lower limb, appearance and palpation for pulses if suspected vascular compromise

Obvious bony deformity suggesting fracture – check history and risk factors from past medical history

Subjective – after this you should have a working hypothesis, which structures may be at fault, idea of SIN, precautions and contraindications from PMH. Think MUST COULD, SHOULD for your objective assessment.

## **OBJECTIVE EXAMINATION**

### ***ALWAYS ESTABLISH STATE AT REST***

#### Observation

Statically – willingness to weight bear on each side. Alignment of hip, knee, ankle, foot, toes. Foot posture valgus/varus? Fallen arch's? Thickening of tissue Tendo Achilles. Hallux valgus.

Static balance – 30seconds is true trendelenburg test (look at whole kinetic chain hip, knee, ankle/foot)

Single leg squat – if good static balance, challenge them, is it painful, what's their control like?

**Bony deformity** – alignment, asymmetry?

**Colour changes** – bruising, redness, and any discolouration?

**Wasting** – muscle bulk, asymmetry?

**Swelling** – soft tissue joint, thickened joints?

Gait – equal weight bearing? Look at movement of hip, knee, ankle, mid foot, big toes – is there a loss of normal movement function in one or more of these areas.

Look at control of movement, hip internal rotation, valgus of knee, pronation of foot, excessive or controlled?

Heel raise – ability to do, maintenance of arch, forefoot raise assess dorsiflexion, toe walking – peronei and Tendo Achilles control

Single leg balance can they maintain this, can they do single leg squat, single leg heel raise.

Swelling where it is, can you measure it?

### Range of movement

Can be assessed in sitting for more functional position of the foot and ankle and take the strain off gastrocnemius so joint mobility, rather than soft tissue length being assessed.

Active movement – willingness to move and quality of movement, is it jerky or shaky suggesting pain inhibition or fatigue

Passive movement – range of movement, pain and is end feel normal, what you would expect. Impinging at end range? What structures are being stressed, compressed?

Ankle Dorsiflexion active and passive (10-15°)

Plantar flexion active and passive (45-55°)

Inversion active and passive (30-40°)

Eversion (15-25°)

Resisted tests for the above movements- isometric so testing contractile structures, so in a comfortable mid joint position.

1<sup>st</sup> Metatarsal phalangeal joint extension, passive non weight bearing and standing (hubscher test for functional extension in standing)

Neurological assessment – indicated if subjective history found suggestion of paraesthesia (numbness, tingling, pins and needles) or more significantly motor deficit. Assess myotomes, dermatomes and reflexes.

Vascular assessment – does the subjective history suggest possible vascular cause of symptoms. Past medical history important here – signs of vascular compromise e.g. diabetic, smoker, history of heart problems etc.

Palpation – consider relevant structures to history and examination so far, confirming the effected anatomy and the pathology.

*Contractile structures* - Achilles, insertion/body, musculotendinous junction. Peroneal tendons, peroneal tubercle, insertion of brevis and longus – easy to follow tendon on contraction. Plantar fascia, tendon and insertion at medial tubercle of calcaneus  
Ligaments – ATFL, CFL, PTFL, deltoid.

Articular – pain, heat, thickening or tenderness, stiffness of accessory movements?  
Anterior joint line talocrural joint, 1<sup>st</sup> MTPJ, mid tarsal joints, transverse tarsal joint, inferior and superior tibiofibular joint

### *Special tests*

Lots of tests available for specific structures, which structures are you assessing?

Anterior draw – integrity of ATFL

Talar tilt – integrity of calcaneofibular

Thompsons test – integrity of TA

External rotation stress test – interosseous ligament/syndesmosis

Hubscher – 1<sup>st</sup> MTPJ extension.

Jacks test – single leg heel raise, for tibialis posterior tendon competency.

## **Common conditions and pathologies**

*Ankle fracture.* the referral should come with the type of fracture, what has been fractured, if there has been surgical intervention typically Open Reduction Internal Fixation (ORIF). There should be weight bearing status stated on the referral, but a thorough subjective history can assist with confirming some of the details or finding more when required.

*Osteoarthritis,* consider all joints of the foot and ankle, typically effected included talocrural joint, subtalar joint and 1<sup>st</sup> Metatarsal phalangeal joint.

*Achilles tendinopathy* – acute and chronic

*Achilles tendon rupture* – there is a protocol for the management of Achilles tendon ruptures seen at JCUH. This involves the use of vacuped boot and specific guidance from the lower limb Extended Scope Practitioner at JCUH.

*Plantar heel pain* (aka plantar fasciitis)

Ankle sprain – ligament, tendon, syndesmosis, with varying grade depending on mechanism of injury such as the velocity of the injury. Nerve involvement?

## **Less common**

Tibialis posterior dysfunction

Compartment syndrome

Gout

Tarsal tunnel syndrome

Mortons Neuroma

Turf Toe

Mortons Neuroma

### **Further reading**

#### Achilles

Alfredson, A. Cook, J. (2007) A treatment algorithm for managing Achilles tendinopathy: new treatment options. *British Journal of Sports Medicine*, 41, p211-216.

Freedman, B.J. Gordon, J.A. Soslowsky, L.J (2014) The Achilles tendon: fundamental properties and mechanisms governing healing. *Muscles, Ligaments and Tendons Journal*, 4(2), p245-255.

Kader, D. Saxena, A. Movin, T. Maffulli, N. (2002) Achilles tendinopathy: some aspects of basic science and clinical management. *British Journal of Sports Medicine*, 36: p239- 249.

#### Plantar fascia

Aquino, A. Payne, C. (1999) Function of plantar fascia. *The Foot*, 9, 73-78.

Rathleff, M.S. et al (2014) High load strength training improves outcome in patients with plantar fasciitis: A randomized controlled trial with 12 month follow up. *Scandinavian Journal of Medicine & Science in Sports*.

#### Tendon pathology

Cook, J.L. Purdam, C. (2012) Is compressive load a factor in the development of tendinopathy? *British Journal of Sports medicine*, 46, 163-168.

Cook, J.L. Purdam, C.R. (2014) Is tendon pathology a continuum? A pathology model to explain the clinical presentation of load-induced tendinopathy. *British Journal of Sports Medicine*, 43, 409-416.

Simpson, M. Howard, T.M. (2009) Tendinopathies of the Foot & Ankle. *American Family Physician*, 80(10), p1107-1114.

#### Other

Abboud, R.J. (2002) Mini Symposium: The Elective Foot (i) Relevant foot biomechanics. *Current Orthopaedics*, 16, 165-179.

Evans, P. (1990) Clinical Biomechanics of the Subtalar joint. *Physiotherapy*, 76(1), 47-51.

Lang, L.M.G. et al (1997) Static biomechanical evaluation of the foot and lower limb: the podiatrist's perspective. *Manual therapy*, 2(2), 58-66

Pahor, S. Toppenberg, R (1996) An investigation of neural tissue involvement in ankle inversion sprains. *Manual Therapy*, 1(4), 192-197.

Ankle Joint		Comments
Type of joint	Synovial hinge joint	Appearance of mortis and tenon. Mortise formed by ends of tibia and fibula, body of talus is tenon.
Bones articulating	Talus, with fibula laterally and tibia medially	<p>Talus convex anterior/posteriorly, slightly broader in front.</p> <p>Tibia receives medial head of talus, concave anterior posteriorly, slightly convex transversely, posterior part projects slightly posteriorly – sometimes called posterior malleolus.</p> <p>Fibula medially and triangular with slightly convex apex.</p> <p>Fibrous capsule surrounds the joint, which is thin anteriorly and posteriorly to allow dorsiflexion/plantar flexion, strengthened medially and laterally by collateral ligaments</p>
Movements & Muscle	Dorsiflexion (20-30°)- deep fibular nerve L3-L5, S1). Plantar flexion (30-50°)	<p><b>Tibialis anterior</b> – upper 2/3rds of lateral tibia and adjoining interosseous membrane, passes under extensor retinaculum and become tendonous inserting into medial cuneiform and base of 1<sup>st</sup> MT.</p> <p><b>Extensor digitorum longus</b> lateral to tib anterior and overlies <i>extensor hallucis longus</i>, originates upper 2/3rds fibula and interosseous membrane, share a common sheath then at level of inferior extensor retinaculum gives rise to four tendons pass to four lateral proximal phalanx- each tendon forms extensor hood- joined medially by tendon of lumbrical medially and then then laterally by extensor digitorum brevis. Extensor hood passes over proximal phalanx, attaches base of middle phalanx and distal phalanx. <b>Extensor hallucis longus</b> – arising middle half of anterior surface of fibula and adjacent interossous membrane, passes to base of distal phalanx on the dorsal surface.</p> <p><b>Fibularis tertius</b> – appears to have been part of extensor digitorum longus, arises front lower quarter of fibula, inserts medial and dorsal aspect of the 5<sup>th</sup> metatarsal.</p>
Ligaments (p346)	Deltoid medially Lateral ligaments	<p><b>Deltoid</b> strong triangular ligament, deep and superficial parts. Deeper parts anterior and posterior tibiotalar bands, tibionavicular band runs down toward tuberosity of navicular, continues backwards this band blends with spring ligament (calcaneonavicular ligament), posteriorly is tibionavicular ligament.</p> <p>Lateral ligaments, anterior and posterior talofibular and calcaneofibular ligaments. <b>ATFL</b> from tip of lateral malleolus to neck of talus- fibres run anteromedially. <b>PTFL</b> strong, thick ligament, running horizontally from bottom of malleolar fossa of lateral malleolus to the lateral tubercle of the posterior process of talus. <b>Calcaneofibular ligament</b> between, attaches peroneal tubercle.</p> <p>Others <b>anterior tibiofibular ligament, anterior ligament, posterior tibiotalar ligament, posterior talocalcaneal ligament</b></p>

### **Suggested pre-placement reading for placement**

Atkins E. Kerr.J. **A Practical Approach to Orthopaedic Medicine: Assessment, Diagnosis, Treatment**, 3e Paperback – 1 Mar 2010

Banks, K. Hengeveld, E. **Maitland's Clinical Companion: An Essential Guide for Students**. 2009. Churchill Livingstone.

Brukner, P. Kahn, K. **Clinical Sports Medicine** 2012, 4<sup>th</sup> Ed

Donatelli RA. **Physical Therapy of the Shoulder** 2004 4th. Ed. Churchill Livingstone.

Greenhalgh S. Selfe J. 2006: **Red Flags: A Guide to Identifying Serious Pathology of the Spine**. Churchill Livingstone

Norris CM. **Sports Injuries. Diagnosis and Management Chapter 2: Healing** Butterworth Heinman

Moseley. L, Butler. D. **Explain Pain** 2nd Edition Paperback – 2013

### **Internet resources**

Shoulderdoc.co.uk  
<http://www.shoulderdoc.co.uk/>

Clinical Examination of the Back  
<http://anatomy.ncl.ac.uk/tutorials/clinical/back/text/index.html>

Hip Replacement: Physical Therapy  
<http://www.nlm.nih.gov/medlineplus/tutorials/hipreplacementphysicaltherapy/htm/index.htm>

Blackburn Foot and Ankle Hyperbook  
<http://www.blackburnfeet.org.uk/hyperbook/>

Spine Animations  
<http://www.spine-health.com/dir/dir01.html>

Orthoteers Orthopaedic Education Resource  
<http://www.orthoteers.com/>

<http://www.physio-wizz.co.uk/>

[http://www.physio-pedia.com/Main\\_Page](http://www.physio-pedia.com/Main_Page)

## **Databases**

A selection of databases available on the Web that provide the facility to search or browse for bibliographic, factual, or statistical information.

### PubMed

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>

A bibliographic database currently providing access to over 16 million MEDLINE citations from the US National Library of Medicine and additional life science journals worldwide. Searching is by subject, author or journal. For most items – regardless of original language of publication – an abstract is available in English.

### PEDro: the Physiotherapy Evidence Database

<http://www.pedro.fhs.usyd.edu.au/>

An initiative of the Centre for Evidence-Based Physiotherapy at the University of Sydney, PEDro provides bibliographic details and abstracts of randomised controlled trials in physiotherapy. Most trials on the database have also been rated for quality.

### Cochrane Library

<http://www3.interscience.wiley.com/cgi-bin/mrwhome/106568753/HOME>

The Cochrane Library provides access to high quality, independent, evidence based reviews and clinical trials to inform decision making in medicine and healthcare. The Library is searchable and contains reviews on subjects relevant to physiotherapy and orthopaedics.

### AMED: Allied and Complementary Medicine Database

<http://www.bl.uk/collections/health/amed.html>

A bibliographic database produced by the British Library providing information on allied health and complementary medicine literature.

## **Online full-text resources**

Many journals, textbooks and reports are freely available in full on the Internet.

### Internet Journal of Orthopedic Surgery

<http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijos/front.xml>

This peer reviewed online journal provides access to the full text of original research articles, case reports, reviews, and multimedia material.

### Arthritis Research Campaign (ARC): Reports on Rheumatic Diseases

[http://www.arc.org.uk/about\\_arth/rdr.htm](http://www.arc.org.uk/about_arth/rdr.htm)

A collection of full-text publications providing overviews of current research and

clinical practice on rheumatic diseases and musculoskeletal conditions.

#### BMC Musculoskeletal Disorders

<http://www.biomedcentral.com/bmcmusculoskeletdisord/>

A free full-text journal from BioMed Central. It includes original peer-reviewed research articles on all aspects of the prevention, diagnosis and management of musculoskeletal and associated disorders, as well as related molecular genetics, pathophysiology, and epidemiology.

#### Wheeless' Textbook of Orthopaedics

<http://www.wheelessonline.com/>

This regularly updated reference source covers a wide range of orthopaedics topics of interest to medical, nursing and physiotherapy professionals. Short factual entries often include abstracts of journal articles.

There are broad subject, specialist orthopaedics, and drug indexes, as well as a search engine for the site.

#### IFOMT Newsletter

<http://www.ifomt.org/ifomt/publications>

A twice-yearly newsletter produced by the International Federation of Orthopaedic Manipulative Therapists.

IFOMT represents manipulative therapists worldwide, sets educational and clinical standards in this area of physiotherapy, and actively endorses evidence based practice. Links are provided to associated national organisations.

#### Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities

<http://www.nap.edu/books/0309072840/html/>

The full text of a book published in 2001, produced by the US National Research Council and the Institute of Medicine, in response to a request for a comprehensive review on the relationship of work and the workplace to musculoskeletal disorders of the low back and upper extremities.

Internet resources for physiotherapy and orthopaedics

[www.intute.ac.uk/healthandlifesciences/](http://www.intute.ac.uk/healthandlifesciences/) 5

#### Worldortho Electronic Textbook

<http://www.worldortho.com/database/etext/>

A full-text electronic textbook covering a range of orthopaedic topics, with 16 chapters including paediatric orthopaedics, infections of bone and joints, normal and abnormal joints, and orthopaedic pathology.

#### Biomechanics: the Magazine of Body Movement and Medicine

<http://www.biomech.com/>

A monthly news magazine for those working in sports medicine, orthopaedic surgery, physical therapy, rehabilitation and occupational therapy, and related fields.

### Discussion groups and mailing lists

Online communities where healthcare professionals and students can share ideas, information and concerns with their colleagues.

#### Physio Mailing List

<http://www.jiscmail.ac.uk/lists/physio.html>

A mailing list for general information and discussion about matters relevant to physiotherapists, in the UK and beyond, with participation invited from anyone interested in physiotherapy, including undergraduate students, researchers, educators, clinicians, and administrators.

#### InteractiveCSP

<http://www.csp.org.uk/director/groupandnetworks/icsp.cfm>

InteractiveCSP is a resource for physiotherapists to gather and exchange information about clinical, professional and workplace interests. Provided by the Chartered Society of Physiotherapy, it enables members to communicate and interact, and to access practical physiotherapy resources, including documents, news, events, and discussion forums.

#### Pain-Talk

<http://www.pain-talk.co.uk/>

An online discussion forum for UK doctors, nurses, and allied health professionals with an interest in the fields of acute, chronic, or palliative pain management.

#### Arthritis Care's Discussion Forum

[www.arthritiscare.org.uk/GetInvolved/Discussionforum](http://www.arthritiscare.org.uk/GetInvolved/Discussionforum)

An online discussion forum provided by the charitable organisation Arthritis Care for the exchange of information and the sharing of experiences of arthritis.

#### Physio Forum - the Home of Online Physiotherapy Discussion

<http://www.physiobob.com/forum/>

A website providing access to several online physiotherapy discussion forums where members can exchange information and knowledge. The forums available include sports-, paediatric-, cardiorespiratory- and neurological- physiotherapy, plus separate forums for physiotherapy students and assistants.