

# The Paediatric Regional Examination of the Musculoskeletal System (pREMS)

## General Principles

### **Introduction**

- Introduce yourself to child and parent / carer
- Explain what you want to examine, gain verbal consent to examine
- Be aware of normal variants in leg alignment, joint range, gait, developmental milestones

### **Look for:**

- Swellings, Rashes (e.g. psoriasis/vasculitis), Muscle wasting, Scars, Leg Length Discrepancy
- Deformity / Dysmorphism / "Disproportions" / Discomfort (nonverbal signals)

### **Feel for:**

- Temperature, Swelling, Tenderness (along bones and joint line)

### **Move**

- Full range of movement – active and passive (note any asymmetry)
- Restriction – mild, moderate or severe

### **Function and measure**

- Functional assessment of joint / anatomic region to include power of muscles and stability
- Measurement of height / leg length

## pREMS - Examination Schedules by Anatomical Region

The Options refer to additional manoeuvres suggested pending common clinical scenarios.

### **Examination of the hand and wrist**

- Inspect hands (palms and backs) for muscle wasting, skin and nail changes
- Feel for radial pulse, tendon thickening and bulk of thenar and hypothenar eminences
- Feel for skin temperature
- Squeeze metacarpophalangeal joints
- Bimanually palpate swollen or painful joints, including wrists
- Look and feel along ulnar border
- Assess full finger extension and full finger tuck
- Assess wrist flexion and extension, abduction and adduction – active and passive
- Assess function: grip and pinch, picking up small object, writing / drawing
- Options – assess for hypermobility syndromes, muscle power, capillaroscopy, peripheral neuropathy

### **Examination of the elbow**

- Look for carrying angle, scars, swellings or rashes, deformity
- Feel for skin temperature
- Palpate over head of radius, joint line, medial and lateral epicondyles
- Assess full flexion and extension, pronation and supination – actively and passively
- Assess function – e.g. hand to nose or mouth, hands behind head
- Options – assess for hypermobility syndromes, muscle power, instability tests, enthesitis

### **Examination of the shoulder**

#### **With the patient standing or sitting:**

- Inspect shoulders, clavicles and sternoclavicular joints from the front, side and behind and assess shoulder height
- Inspect skin in axillae and palpate for lymphadenopathy
- Assess skin temperature
- Palpate bony landmarks and surrounding muscles
- Assess movement and function: hands behind head, hands behind back
- Assess (actively and passively) external rotation, flexion, extension and abduction
- Observe scapular movement
- Options – assess for hypermobility syndromes, muscle power, instability

### **Examination of the hip**

#### **With the patient supine lying on couch:**

- Look for flexion deformity and leg length disparity
- Check for scars, rashes
- Feel the greater trochanter for tenderness
- Assess full hip flexion, internal and external rotation, abduction and adduction
- Perform Thomas' test
- Hip abduction (lying on side)

#### **Patient lying prone on couch**

- Sacroiliac joint palpation
- Hip internal (and external) rotation

#### **With the patient standing:**

- Assess posture and leg alignment
- Look for gluteal muscle bulk
- Perform the Trendelenberg test
- Assess function (gait with turning and running, ancillary movements)
- Options – assess for hypermobility, muscle power, enthesitis, thigh-foot angle (child with intoeing)

### **Examination of the knee**

#### **With the patient standing:**

- Look for varus/valgus deformity, hyperextension and popliteal swellings
- Inspect skin for pattern of bruising and rashes
- Assess gait (see hip)

#### **With the patient lying on couch:**

- Look from the end of the couch for varus/valgus deformity, muscle wasting, scars and swellings
- Look from the side for fixed flexion deformity
- Check for passive hyperextension and leg length discrepancy
- Feel skin temperature
- With the knee slightly flexed palpate the joint line and the borders of the patella
- Feel the popliteal fossa
- Perform a patellar tap and cross fluctuation (bulge sign)
- Assess full flexion and extension (actively and passively)
- Option - Assess stability of knee ligaments – medial and lateral collateral – and perform anterior draw test
- Option – tests for anterior knee pain, patellar maltracking
- Option – assess for hypermobility, enthesitis, hamstring tightness, iliotibial band tightness, thigh-foot angle

### **Examination of the foot and ankle**

#### **With the patient lying supine on couch:**

- Look at dorsal and plantar surfaces of the foot
- Feel the skin temperature
- Palpate for peripheral pulses
- Squeeze the MTPJs
- Palpate the mid-foot, ankle joint line and subtalar joint
- Assess movement (actively and passively) at the subtalar joint (inversion and eversion), the big toe (dorsi- and plantar flexion), the ankle joint (dorsi- and plantar flexion) and mid-tarsal joints (passive rotation)
- Look at the patient's footwear
- Option – assess for hypermobility, thigh-foot angle, enthesitis, muscle power, capillaroscopy

#### **With the patient standing:**

- Look at the forefoot, mid-foot (foot arch) and the hindfoot
- Assess gait cycle (heel strike, stance, toe off), running and turning, ancillary movement
- Assess muscle bulk (calves)

### **Examination of the spine**

#### **With the patient standing:**

- Inspect from the side and from behind
- Inspect skin and natal cleft
- Inspect limb / trunk proportions
- Inspect facial and jaw profile
- Palpate the spinal processes and paraspinal muscles and Temporomandibular joints (TMJs)
- Assess movement: lumbar flexion and extension and lateral flexion; cervical flexion, extension, rotation and lateral flexion, thoracic rotation
- Assess TMJ opening
- Options – Schober's test, "Stork test" [*Standing on one leg, extension of spine causes pain*]

#### **With the patient sitting on couch (standing in younger child):**

- Assess thoracic rotation

#### **With the patient lying on couch:**

- Perform straight leg raising and dorsi-flexion of the big toe
- Assess limb reflexes
- Options – assess leg length, check for hypermobility, sacroiliac joint irritation on palpation