Orthopaedic Examination of a Patient

Compiled by Dr. Sreekanth R
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</table>
1. Examination of a Patient

1. Always stand on right side of patient
2. Always introduce yourself to patient
3. Always explain the procedure to patient
4. Demonstrate first on normal side
5. Reassure the patient
6. Always call the patient mr. X/ms. Y

HISTORY

Age Sex Place occupation
Informer-reliable/not
Presenting complaints
History of presenting complaints
Past H
Personal H
Treatment H
Prenatal, natal, postnatal H
Developmental H
Drugs H
Immunization H
Socioeconomic H

ALWAYS ASK FOR DISABILITIES

<table>
<thead>
<tr>
<th>Grade 0</th>
<th>normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Limited recreational</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Limited professional</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Self-care restriction</td>
</tr>
<tr>
<td>Grade 4</td>
<td>Bedridden</td>
</tr>
</tbody>
</table>
Disabilities

1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down
6. taking food
7. washing face ;
8. brushing teeth
9. drying hairs
10. donning of clothes
11. writing
12. jumping
13. holding & carrying objects in hand

ALL CASES OF LOWER LIMBS-

Footwear examination
- Unusual wear and tear
- Any modification

VASCULAR PULSE

5+ abnormal pulse with aneurysm
4+ normal good volume pulse
3+ good with suboptimal volume
2+ feeble but without interobserver dispute
+ very feeble with interobserver dispute

EXAMINATION OF SKIN & NAILS

FOR TROPHIC CHANGES

ANY DEFORMITY
- FIXED OR DYNAMIC
- GRADE
  o Grade I    FULLY CORRECTABLE & CAN BE FORCED TO OPPOSITE DEFORMITY
  o Grade II   ONLY FULLY CORRECTABLE
  o Grade III  NOT FULLY CORRECTABLE
2. Characteristics of PAIN

1. site of pain
2. mode of onset
3. severity of pain
4. nature of pain
   - vague aching
   - burning (tractopathy)
   - throbbing
   - scalding
   - pins & needles
   - shooting
   - stabbing
   - constricting
5. progression of pain
6. duration of pain
7. movement of pain
   - radiation of pain (pain at original site persists)
   - referred pain (no pain at original site)
   - shifting, migration of pain
8. special time of occurrence
9. periodicity of pain
10. precipitating / aggravating factors
11. relieving factors
12. associated symptoms
13. H/o Tuberculosis
14. spasm of muscles
3. GENERAL EXAMINATION

1. Vital index

2. HEAD TO FOOT

- Craniofacial anomaly, dysmorphism, crowding of teeth, maxillary hypoplasia, hypertelorism (canthal index = inner canthal distance/outer canthal distance \times 100 ; 38 males & 38.5 females); teeth (dentigenous imperfecta), tongue (storage disorder & hypothyroidism)

  Plagiocephaly = asymmetrical head
  Scaphocephaly = elongated boat shaped head
  Oxycephaly = tower or high skull
  Clover leaf skull = premature suture fusion
  Caput quadratum = narrow based head

- Chest - pectig chest, pectus carinatum, excavatum, kyphoscoliosis, spinabifida occulta.
- Café-au-lait spots (post pubertal > 6 in number & each > 1.5 cm in diameter
  Prepubertal > 5 in number of each > 0.5 cm)
- Extremities - hyperelasticity, congenital deformities.
- Small joint nodules, rheumatoid nodules
- Neurocutaneous markers
- Genitourinary abnormalities
- Sexual development
- Dentition
- Hypothyroidism - muscle tone, fasciculation, tremor, nystagmus
- Weight, armspan, US/LS ratio
- Dwarfism/gigantism

<table>
<thead>
<tr>
<th>Short stature</th>
<th>rhizomelic</th>
</tr>
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<tbody>
<tr>
<td>Mesomelic</td>
<td></td>
</tr>
<tr>
<td>Acromelic</td>
<td></td>
</tr>
<tr>
<td>micromelic</td>
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</table>
Orthopaedic Examination of a patient

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>1-3 mon</td>
<td>3cm/mon</td>
</tr>
<tr>
<td>4-6 mon</td>
<td>2cm/mon</td>
</tr>
<tr>
<td>7-12 mon</td>
<td>1.6cm/mon</td>
</tr>
<tr>
<td>13-24 mon</td>
<td>1 cm/mon</td>
</tr>
<tr>
<td>2-12 yrs</td>
<td>(weech formula) 6A + 77 cms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3-12 months</td>
<td>(9 + A)/2 kgs</td>
</tr>
<tr>
<td>1-6 yrs</td>
<td>2A + 8 kgs</td>
</tr>
<tr>
<td>7-12 yrs</td>
<td>(7A-5)/2 kgs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ARM SPAN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 yrs</td>
<td>H - 2 cm</td>
</tr>
<tr>
<td>5-9 yrs</td>
<td>H - 1 cm</td>
</tr>
<tr>
<td>10 yrs</td>
<td>H cm</td>
</tr>
<tr>
<td>adults</td>
<td>H + 2 cm</td>
</tr>
</tbody>
</table>

**WYNE DAVIES CRITERIA FOR HYPERELASTICITY**

- A. flexion of the thumb to touch the forearm
- B. dorsiflexion of the fingers parallel to forearm
- C. hyperextension of elbow 15° or more
- D. hyperextension of knee 15° or more
- E. dorsiflexion of ankle 60° or more

US/LS ratio =

- 1.7 at birth
- 1 at birth
- 0.8 after 10 years

Riser sign

Turner index of maturity

Peak height velocity-

- 8.0 cm in females
- 9.5 cms in males
## TANNER SEXUAL MATURITY RATING

### TANNER SMR GIRLS

<table>
<thead>
<tr>
<th>STAGE</th>
<th>PUBIC STAGE</th>
<th>BREASTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preadolescent</td>
<td>Preadolescent</td>
</tr>
<tr>
<td>2</td>
<td>Sparse, lightly pigmented, slightly pigmented, medial border of labia</td>
<td>Breast papilla elevated as small mound, areola diameter increased</td>
</tr>
<tr>
<td>3</td>
<td>Darker, beginning to curl, increased amount</td>
<td>Breast and areola enlarged, no contour separation</td>
</tr>
<tr>
<td>4</td>
<td>Coarse, curvy, abundant but amount less than adult</td>
<td>Areola and papilla form secondary mound</td>
</tr>
<tr>
<td>5</td>
<td>Adult feminine triangle, spread to medial side of thigh</td>
<td>Mature, nipple projects, areola part of general contour</td>
</tr>
</tbody>
</table>

### TANNER SMR boys

<table>
<thead>
<tr>
<th>STAGE</th>
<th>PUBIC hair</th>
<th>PENIS</th>
<th>TESTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NONE</td>
<td>Preadolescent</td>
<td>Preadolescent length &lt; 2.5 cm</td>
</tr>
<tr>
<td>2</td>
<td>Scanty, long, slightly pigmented</td>
<td>Slight enlargement</td>
<td>Enlarged scrotum, pink, texture altered length &gt; 2.5 cm</td>
</tr>
<tr>
<td>3</td>
<td>Darker starts to curl, small amount</td>
<td>Longer</td>
<td>Larger length 3.3-4 cm</td>
</tr>
<tr>
<td>4</td>
<td>Resembles adult type, but less in amount</td>
<td>Larger, glans and breath increase in size</td>
<td>Larger scrotum darkens length 4-4.5 cm</td>
</tr>
<tr>
<td>5</td>
<td>Adult distribution spread to medial surface of thighs</td>
<td>Adult size</td>
<td>Adult</td>
</tr>
</tbody>
</table>
4. EXAMINATION OF A DISEASED BONE

HISTORY
1. Age
2. Onset & progress
3. Pain
4. Duration
5. Fever
6. Sinuses - passage of pieces of bone
7. Any similar disease, other bones
8. Past history - DM, Typhoid, Tuberculosis, Actinomycosis, h/o open fractures, surgeries, implant insitu
9. Family history - Sickle cell disease

GENERAL EXAMINATION

General condition
Cachexia
Neurocutaneous markers; café-au-lait spots, hemangioma etc

LOCAL EXAMINATION

INSPECTION
1. Attitude & deformity
2. Swelling
3. Skin over the swelling; sinuses scar
4. Dilated veins
5. Inflammatory signs
4. Pressure effects distal neurovascular deficit
5. Neighbouring joints
6. Muscle wasting
7. Shortening or lengthening of limb

PALPATION
1. Local rise in temperature
2. Tenderness – entire bone
   - Joint line
3. Swelling
4. Bony irregularity
5. Thickening of bone
6. Bowing
7. Steps on bone
8. Ulcers & sinuses - fixity to bone
9. Presence of fracture
10. Neighbouring structures
   - Muscles
Orthopaedic Examination of a patient

- nerves
- vessels

PERCUSSION
AUSCULTATION - BRUIT
MEASUREMENTS
1. LENGTH of bone/limb
2. circumference of limb

LOOK FOR
1. NEIGHBOURING JOINTS
2. LYMPH NODES
3. PRESSURE EFFECTS

DON`T MISS
1. DISTAL – NEUROVASCULAR DEFICIT
2. PROXIMAL - LYMPHATICS
3. RULE OF TWO

ALL SWELLING ARISING FROM BONE WILL BE FIXED TO IT
ANY JOINT LOOK FOR ANY SURROUNDING MASS (MYOSITIS)
5. EXAMINATION OF A SWELLING/LUMP

HISTORY
1. duration
2. mode of onset
3. other symptoms
4. pain-
   - site
   - time of onset
   - nature
5. progress of swelling
6. exact site
7. fever & other constitutional symptoms
8. presence of other lumps
9. secondary changes
   - softening
   - fungation
   - ulceration
   - inflammatory changes
10. impairment of function
11. recurrence of swelling
12. loss of body weight
13. past history
   - similar history
   - recurrence
   - tuberculosis
   - syphilis
   - leprosy
14. personal history
15. family history
   - similar swelling in family members
   - history of malignancy

Disabilities
1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down
6. taking food
7. washing face ;
8. brushing teeth
9. drying hairs
10. donning of clothes
11. writing
12. jumping
13. holding & carrying objects in hand
PHYSICAL EXAMINATION

GENERAL EXAMINATION
1. features of cachexia
2. attitude of limb
3. pallor/jaundice/cyanosis/clubbing/pedal edema/generalized lymphadenopathy

LOCAL EXAMINATION

INSPECTION
1. Attitude of limbs
2. gait
3. situation
4. colour
5. shape
6. size
7. surface
8. edge
9. number
10. plane of swelling
11. pulsation
12. movement with
   a. respiration
   b. deglutition
   c. protrusion of tongue
   d. movt of adj joints,muscle contraction etc
   e. direction of movts
13. peristalsis
14. impulse on coughing
15. skin over the swelling
   a. sinuses
   b. scar (primary or secondary intention healing)
   c. inflammatory changes
   d. engorged veins

PALPATION
1. INSPECTORY FINDINGS CONFIRMED
2. local rise in temperature
3. tenderness
4. size, shape, extend
5. surface
6. edge-ill/well defined
7. consistency uniform/variable, soft/firm/hard/bony hard
8. fluctuation
9. fluid trill
10. pulsation
11. mobility/fixed- fixity to skin/pinch ability of skin
   1. fixed to surrounding structures
   2. direction of mobility, structure to which fixed

12. translucency
13. impulse on coughing
14. reducibility
15. compressibility
16. pulsations
17. fixity to overlying skin-skin pinchable or not
18. relation to surrounding structures
19. palpable thrill

RELATIVE PROMINENCE OF SWELLING W.R.T DIFFERENT POSITION OF JOINT

PERCUSSION

AUSCULTATION – bruit

MEASUREMENT
   - LENGTH OF LIMB
   - SEGMENTAL LENGTH OF LIMB

EXAMINATION OF NEIGHBOURING JOINTS
   - RESTRICTION OF MOVTS
   - Effusion

EXAMINATION OF DISTAL NEUROVASCULARITY

EXAMINATION OF PROXIMAL LYMPH NODES

EXAMINATION OF PRESSURE EFFECTS ON
   - SURROUNDING & DISTAL STRUCTURES

EXAMINATION OF CHEST

EXAMINATION OF THYROID, BREAST, PROSTATE ETC AND PRIMARY AREA OF MALIGNANCY.
6. EXAMINATION OF PATHOLOGICAL JOINTS

HISTORY
1. Age, sex
2. occupation
3. mode of onset & progress
4. pain-
   - site
   - character
   - night cry
   - relation to activities
   - aggravating & relieving factors
5. locking
6. deformity
7. past history
   - leprosy
   - tuberculosis
   - gonorrhoea
   - syphilis
   - typhoid
   - constitutional symptoms
   - arthritis symptoms
   - psoriasis
   - urethritis
   - rheumatic fever

8. TREATMENT HISTORY
9. FAMILY HISTORY
   - hemophilia
   - blood dyscrasia
   - tuberculosis
   - gout
   - leprosy
   - syphilis

Disabilities
1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down
6. taking food
7. washing face;
8. brushing teeth
9. drying hairs
10. donning of clothes
11. writing
12. jumping, running
13. holding & carrying objects in hand
PHYSICAL EXAMINATION

GENERAL EXAMINATION
1. toxemia
2. cachexia
3. pyrexia

LOCAL EXAMINATION
FULLY EXPOSE BOTH JOINTS & PLACE IN SAME POSITION
INSPECT FROM ALL SIDES
1. GAIT
2. attitude & deformity
3. swelling – generalized (effusion)
   - localized

   Position of ease
   1. hip -- flexion abduction external rotation
   2. shoulder—flexion adduction internal rotation
   3. elbow—semiflexion pronation
   4. knee—slight flexion
   5. wrist—slight flexion
   6. ankle—slight plantar flexion inversion

4. skin over the joint
   - sinuses, scar, ulcers, engorged veins, inflammatory signs

5. muscle wasting
6. signs of skin lesions -- café au lait spots, psoriasis, hemangiomas

PALPATION
1. local rise in temperature
2. tenderness—joint line & other structures
3. palpation of bones
   • swelling
   • irregularities
   • crepitus
   • deformity

4. swelling – take form of the joint = effusion
   • synovial thickening
   • effusion—fluctuation, tap

5. muscle wasting
6. signs of hyper elasticity
WYNE DAVIES CRITERIA FOR HYPERELASTICITY

A. flexion of the thumb to touch the forearm
B. dorsiflexion of the fingers parallel to forearm
C. hyperextension of elbow 15° or more
D. hyperextension of knee 15° or more
E. dorsiflexion of ankle 60° or more

7. TESTS FOR INSTABILITY

MOVEMENTS & DEFORMITY

1. FIXED DEFORMITIES
2. reveal concealed deformities
3. both active & passive movements
4. both joints to examined
5. movement
   — range of motion
   — arc of motion
   — axis deviation
   — movement in different planes
   — restriction of movements (all or specific)
   — gear stick phenomenon
   — pain spasm crepitus
   — abnormal movements

MEASUREMENTS

APPARENT LENGTH – KEEP BOTH LIMBS PARALLEL

TRUE LENGTH—SQUARE THE PELVIS
   -- KEEP NORMAL LIMB IN SAME POSITION AS THAT OF AFFECTED LIMB

BRAYANTS `S TRIANGLE —SQUARE THE PELVIS
   -- KEEP NORMAL LIMB IN SAME POSITION AS THAT OF AFFECTED LIMB
1. Length of limb
   1. Upper limb -
      • angle of acromion
      • Lateral epicondyle
      • Radial styloid

   2. Lower limb
      • ASIS
      • Medial joint line of knee
      • Medial malleolus

2. Circumference of the limb

3. Special measurements

EXAMINATION OF SPINE & ALL OTHER JOINTS

CHEST EXPANSION

STRAIGHT WALL TEST
EXAMINATION OF GENITALIA
EXAMINATION OF DISTAL VASCULARITY
EXAMINATION OF PROXIMAL LYMPHNODES

NEUROLOGICAL EXAMINATION
  o MOTOR
    1. BULK OF muscles
    2. tone of muscles
    3. power of muscles (test against gravity first)
    4. reflexes
    5. coordination

  o SENSORY
  o Autonomous nervous system
7. EXAMINATION OF HIP JOINT

History
1. Pain
2. Inability to walk
3. Stiffness
4. Drug intake, STERIODS
5. Childhood problems
6. Alcohol intake, SMOKING
7. Other joint involvement
8. bleeding disorders
9. storage disorders
10. evening rise of temperature
11. spine disease
12. shoe modification
13. use of brace or canes
14. deep sea diving
15. endocrine diseases
16. storage disorder
17. Instability
18. LLD
19. Limp
20. Injury
21. h/o small joint disease
22. h/o pain opposite hip
23. surgery around hip
24. major trauma to hip

Disabilities
1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down

GENERAL INSPECTION
1. small joint disease
2. cushingoid features
3. short stature US/LS RATIO
4. features of cerebral palsy
5. endocrine disease
6. bleeding diseases
7. storage disorder
8. steroid treating disease
9. features of chronic alcoholism
10. rheumatoid nodules
11. features of skeletal dysplasia

LOCAL EXAMINATION

INSPECTION

GAIT

ANTERIORLY
- attitude & deformity
- level of shoulders, nipple, umbilicus
- trunk furrows
- external iliac fossa
- level of ASIS
- position of patella
- level of medial malleolus & heel
- apparent shortening
Orthopaedic Examination of a patient

- scarspas triangle –fullness
  - swelling
  - mass
  - pulsations
  - sinus
  - scar

  - creases in inguinal region & thigh
    - visible pulsations
    - engorged veins
    - wasting of muscles
    - broadened perineum
    - cold abscess areas

LATERALLY
- kyphosis
- lumbar lordosis
- protrubent abdomen
- position of trochanter
- fullness, prominence
- Sinus, scar, pulsations, engorged veins

POSTERIORLY
- scoliosis, rib hump
- level of scapulae
- gluteal folds (symmetric/asymmetric)
- atrophy of gluteal muscles- g.maximus,g.medii & minimii
- atrophy of calf muscles
- sinus, scar, pulsations, engorged veins

EXAMINATION IN SITTING POSITION ON A STOOL
SEE FOR OBLITERATION OF SCOLIOSIS, LORDOSIS
EXAMINATION IN LYING DOWN POSITION
Prone
Supine
Lateral
**PALPATION**

IN LYING DOWN POSITION

ANTERIORLY
- local rise in temperature
- anterior joint line tenderness
- level of asis
- scarpas triangle
  - normal resistance
  - femoral pulsation
  - fullness, mass
- hernial orifices
- cold abscess areas
- palpation of proximal femur
- any myositic mass

LATERALLY
- greater trochanter
  - tenderness local & joint
  - level elevated/depressed
  - Thickened
- any myositic mass

POSTERIORLY
- any bony mass
- tenderness
- other mass
- any myositic mass
- PROXIMAL FEMUR

**MOVEMENT & DEFORMITIES**

FIXED FLEXION, ABDUCTION, ADDUCTION & ROTATIONAL DEFORMITIES
FURTHER MOVEMENTS POSSIBLE (active then passive)
EACH MOVEMENT – EXAGGERATED
- RESTRICTED BY PAIN & SPASM
- ASSOCIATED CREPITUS
- AXIS DEVIATION

BOTH ACTIVE & PASSIVE MOVEMENTS

<table>
<thead>
<tr>
<th>NORMAL LIMB</th>
<th>AFFECTED LIMB</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLEXION</td>
<td>120°</td>
</tr>
<tr>
<td>EXTENSION</td>
<td>15°</td>
</tr>
<tr>
<td>ABDUCTION</td>
<td>40°</td>
</tr>
<tr>
<td>ADDUCTION</td>
<td>30°</td>
</tr>
<tr>
<td>INTERNAL ROTATION</td>
<td>30°</td>
</tr>
<tr>
<td>EXTERNAL ROTATION</td>
<td>45°</td>
</tr>
</tbody>
</table>
**MEASUREMENT**

APPARENT LENGTH ---- KEEP LIMBS PARALLEL & IN LINE WITH TRUNK
TRUE LENGTH -- SQUARE THE PELVIS & KEEP NORMAL LIMB IN POSITION AS AFFECTED ONE

<table>
<thead>
<tr>
<th>NORMAL</th>
<th>AFFECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPARENT</td>
<td>TRUE</td>
</tr>
<tr>
<td>SUPRATROCHANTERIC</td>
<td></td>
</tr>
<tr>
<td>BRAYANT’S METHOD</td>
<td></td>
</tr>
<tr>
<td>NELATOM’S LINE</td>
<td></td>
</tr>
<tr>
<td>THIGH</td>
<td></td>
</tr>
<tr>
<td>LEG</td>
<td></td>
</tr>
<tr>
<td>SCHOEMAKER’S LINE</td>
<td></td>
</tr>
<tr>
<td>MORRIS’ BITROCHANTERIC TEST</td>
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<tr>
<td>CHIENE’S TEST</td>
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<tr>
<td>KOTHRARIS LINE</td>
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</tbody>
</table>

MEASUREMENT OF GIRTH
THIGH
LEG

**STABILITY TESTS**

TELESCOPY
TRENDELENBERG TEST (CONVENTIONAL; DELAYED; STRESS)
ORTOLANI TEST
BARLOW TEST

**SPECIAL TESTS**

GAUVAIN’S TEST
PATERIC (FABER) TEST
CRAIG TEST (RYDER METHOD OF VERSION OF FEMUR)
GALEAZZI TEST FOR THIGH
ALLIS TEST FOR LEG
ELY’S PRONE RECTUS FEMORIS CONTRACTURE TEST
NOBLE COMPRESSION TEST
OBER TEST
ERICHSOŃ’S TEST
HART’S SIGN
OBER TEST
PER RECTAL DIGITAL EXAMINATION
EXAMINATION OF LYMPH NODES
EXAMINATION OF PERIPHERAL NERVES
EXAMINATION OF OPPOSITE HIP, KNEES, SPINE
CHEST EXPANSION
EXAMINATION OF GENITALIA

EXAMINATION OF FOOT WEAR

EXAMINATION OF SACROILIAC JOINTS
1. GENSELEN`S TEST
2. GILLES TEST
3. PUMP HANDLE TEST
4. ACTIVE SLRT
8. EXAMINATION OF PERIPHERAL NERVES

HISTORY
1. age, sex
2. occupation (painter; industrial worker; fireexposive worker etc)
3. numbness, parasthesia
4. diabetes mellitus
5. leprosy, syphilis
6. seizure disorder
7. loosening of slippers
8. able get up from squatting position
9. able get things over head
10. areas of skin that is dry always
11. varizella zoster infection
12. arthritis
13. skin lesions –SLE, other autoimmune disorders
14. neurocutaneous markers café au lait spots
15. poliomyelitis, cerebral palsy
16. FAMILY HISTORY of neurological illness

Disabilities
1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down
6. taking food
7. washing face;
8. brushing teeth
9. drying hairs
10. donning of clothes
11. writing
12. jumping
13. holding & carrying objects in hand
14. SEXUAL FUNCTION
15. BOWEL BLADDER FUNCTION

INSPECTION
1. attitude & deformity
   (wrist drop, winging of scapula, claw hand, ape thumb, pointing index, foot drop)
2. wasting of muscles
3. skin
   • dry glossy, smooth
   • disappearance of cutaneous folds & subcutaneous fat
   • causalgia
   • vasomotor changes –pallor, cyanosis
   • tropic changes of nails
   • trophic ulcers
4. scars, or wounds
PALPATION

1. TEMPERATURE
2. MUSCLES – wasted soft flabby
3. skin – anaeasthesia
4. scar
5. any myositic mass
6. thickening of nerves
   - ulnar nerve at elbow
   - CPN at fibula neck
   - Supratrochlear nerves
   - Facial nerve

MUSCLE POWER

1. ACCESSORY NERVE – trapezius
2. hypoglossal nerve- muscles of tongue
3. long thoracic nerve- serratus anterior
4. axillary nerve- deltoid
5. radial nerve
   - brachioradialis
   - triceps
   - ext. digitorum communis
   - extensors of wrist
6. medial nerve
   - FPL
   - FDS,FDP( LATERAL HALF) oschsners clasing test
   - Abductor pollicis brevis (PEN TEST)
   - Opponens pollicis
7. ulnar nerve
   - FCU
   - FIRST DORSAL INTEROSSEUS & ADDUCTOR POL LICIS – FORMET’S SIGN
   - INTEROSSEII
   - --ABDUCTION OF FINGERS
     - CARD TEST
     - EGAWA TEST( PITRES-TESTUT SIGN)
     - EXTENSION OF PIP DIP JOINTS
7. SCIATIC NERVE- CPN; TIBIAL NERVE
8. FEMORAL NEVE – QUADRICEPS FEMORIS
ULNAR NERVE PALSY
1. DUCHENNE SIGN – clawing of RF,LF
2. loss of flexion of MCPJ
3. BOUVIER’S MANEUVER- if hyperextension prevented by dorsal pressure EDC can extend PIP DIP joints
4. ANDRE-THOMAS SIGN- AN unconscious effort to extend the fingers by tenodesing the extensor tendons with palmar flexion of wrist will only increase the deformity
5. CROSS YOUR FINGER TEST-inability to cross the flexed middle finger dorsally over the index finger or index over the long finger(MF) when palm and finger are placed on a flat surface
6. PITRES-TESTUT SIGN== EGAWAS TEST
7. LOSS OF INTEGRATION OF FLEXION OF MCP,DIP,PIP—FINGERS ROLL ONTO PALM
8. LOSS OF LATERAL OR KEY PINCH ( ADD POLLICIS PALSY
   JEANNES’S SIGN –loss of key pinch with hyperextension of I MCP to 10-15°
9. MASSES’S SIGN – flattened metacarpal arch & loss of hypothenar eminence
10. POLLOCK SIGN- loss of extrinsic power of ulnar inverted FDP with inability to flex distal phalanges of RF & LF
11. impairment of precision grip
12. BUNNELL’S O SIGN- or NEWS PAPER SIGN-IP of thumb flexes to 80-90°as FPL attempts to hold an object

SENSATION
1. tactile sensitivity
2. pain
3. temperature (cold & hot)
4. stereognosis
5. position sense ( hold on sides of phalanx only)
6. vibration sense (128 Hz)

REFLEXES

EXAMINATION OF NERVE AS A WHOLE- TINEL SIGN; thichening

AUTONOMOUS FUNCTION
1. anhydrosis
2. causalgia
3. trophic changes ( ulcers, pulp atrophy, nail changes )
4. oedema ( CRPS)
5. atrophy of skin
Orthopaedic Examination of a patient

MOVEMENTS
- ACTIVE
- PASSIVE

EXAMINATION OF TENDONS ELIGIBLE FOR TENDON TRANSFERS
- PALMARIS LONGUS
- PLANTARIS
- ECRL & B
- ECU
- EDC
- EI, EDM
9. EXAMINATION OF SHOULDER JOINT

HISTORY
1. trauma
2. dislocation
3. pain
4. diabetes mellitus
5. cervical spine pain
6. brachial plexus injury
7. past history-
8. birth injury

Disabilities
1. taking food
2. washing face ;
3. brushing teeth
4. drying hairs
5. donning of clothes
6. writing
7. jumping
8. holding & carrying objects in hand

INSPECTION (anteriorly,laterally, superiorly, posteriorly)
1. attitude & deformity
2. DROOPING OF SHOULDER
3. contour of shoulder; abnormal prominence of acromion
4. sulcus sign
5. abnormal swelling
6. skin – sinus, scar, engorged veins
7. axilla
8. winging of scapula
9. sternoclavicular joint
10. clavicle
11. scapula (level, borders and angles, spine, acromion)
12. acromion (size, shape)
13. acromoclavicular joint
14. axilla

PALPATION
1. local rise in temperature
2. tenderness
3. three bony point relation
   • tip of corocoid
   • tip of acromion
   • greater tuberosity
4. palpation of bones
   • thickening
   • irregularity
5. CODMANN METHOD OF PALPATION
6. swelling
7. axilla – swelling, sinus scar etc
8. sternoclavicular & acromioclavicular joints
9. any myositic mass
10. DOWBARN’S SIGN

DON’T MISS THE AXILLA
Orthopaedic Examination of a patient

MOVEMENTS

ABDUCTION - $180^0$                      ADDUCTION- $50^0$

FLEXION  $90^0$                           EXTENSION - $45^0$

<table>
<thead>
<tr>
<th></th>
<th>IN FULL ADDUCTION</th>
<th>IN FULL ABDUCTION</th>
<th>IN FULL EXTENSION</th>
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<tbody>
<tr>
<td>EXTERNAL ROTAION</td>
<td>$45^0$</td>
<td>$90^0$</td>
<td>$70^0$</td>
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<tr>
<td>INTERNAL ROTATION</td>
<td>$45^0$</td>
<td>$70^0$</td>
<td>$70^0$</td>
</tr>
</tbody>
</table>

PAIN SPASM CREPITUS WITH EACH MOVEMENT

MOVEMENTS OF SHOULDER GIRDLE

1. ELEVATION
2. DEPRESSION
3. PROTRACTION
4. RETRACTION

SPECIAL TESTS

1. rotator cuff – NEER’s impingement test & sign
2. apprehension test
3. jobes relocation test
4. drawertest of gerber & ganz
5. jerk test
6. sulcus test
7. sulcus test at $0^0$ & $45^0$ abduction
8. shift and load test
9. anterior apprehension test
10. posterior clunk test
11. speed’s test
12. drop arm test
13. yegarson’s test
14. Hawkin’s test
15. Dougas test
16. Hamilton ruller test
17. Andrew’s prone apprehension test
18. callaway sign
19. bryant test

( sulcus test $0^0$ RC interval laxity & $45^0$ inferior capsule
+ 1 < 1cm ; + 2 1-2 cm ; +3cm >2cm )

NEUROLOGICAL EXAMINATION

1. AXILLARY NERVE – DELTOID
2. SUPRASCAPULAR NERVE- SUPRA & INFRASPINATUS
3. LONG THORACIC NERVE—WINGING OF SCAPULA
4. BRACHIAL PLEXUS EXAMINATION

EXAMINATION OF CERVICAL SPINE
EXAMINATION OF AXILLARY LYPHNODES
EXAMINATION OF CHEST, ELBOW OPPOSITE SHOULDER ABDOMEN
10. EXAMINATION OF ELBOW JOINT

HISTORY

1. TRAUMA; treatment history
2. tuberculosis
3. arthritis history
4. urethritis

inspection
1. attitude & deformity
2. carrying angle
3. swelling
   - para olecranon areas
   - anconeus soft spot
   - radicapitellar joint
   - general diffuse swelling - effusion
4. skin
   - sinus scar engorged veins
5. muscle wasting

PALPATION
1. local rise in temperature
2. tenderness
3. bony components esp radial head
   - irregularity
   - bowing
   - thickening
   - steps
4. three bony points
   • olecranon
   • medial epicondyle
   • lateral epicondyle
5. swelling
   - effusion
6. supratrochlear lymph nodes
   - anterior to medial intermuscular septum I cm above medial condyle
7. any myositis mass
8. ulnar nerve dis/subluxable
9. DRUJ
10. radial head
11. instability
Orthopaedic Examination of a patient

**MOVEMENTS**

- FLEXION $180^\circ$
- EXTENSION $0^\circ$

**HYPEREXTENSION**

- SUPINATION $90^\circ$
- PRONATION $90^\circ$

**MEASUREMENT**

1. UPPER LIMB
2. ARM SEGMENT
3. FOREARM SEGMENT (7 cm distal to medial epicondyle)
4. MUSCLE WASTING
   - ARM
   - FOREARM

**SPECIAL TESTS**

1. COZEN’S TEST
2. MILLS MANUOVER
3. YEAGARSONS TEST
4. POSTEROLATERAL ROTATORY INSTABILITY TEST
5. VALGUS TEST @
   - FULL EXTENSION } FULL SUPINATED & FULL PRONATED
   - $30^\circ$ FLEXION } END POINT SOFT/HARD
6. VARUS INSTABILITY

**NEUROLOGICAL EXAMINATION**

SENSORY

MOTOR

**EXAMINATION OF ULNAR NERVE -THICKENING & STABILITY**

**EXAMINATION OF BRACHIAL ARTERY PULSE**

**EXAMINATION OF CERVICAL SPINE**

**EXAMINATION OF SHOULDER, WRIST, OPPOSITE ELBOW**

**POSTEROLATERAL INSTABILITY TEST**

Pt supine shoulder $90^\circ$ abducted and externally rotated. Forearm fully supinated and axial and valgus force applied. Elbow is flexed from $0^\circ$ flexion to $90^\circ$. At about $30^\circ$ flexion the radial head subluxates and spontaneously relocates on further flexion.

**VALGUS INSTABILITY**

AT FULL SUPINATION = MEDIAL OR LATERAL INSTABILITY
AT FULL PRONATION = ONLY DUE TO MEDIAL INSTABILITY
11. MEASUREMENT OF LIMB LENGTH

1. upper limb has only one length i.e. true length since pectoral girdle are not interconnected to conceal the deformity
2. lower limb has two lengths
3. for true length both limbs to be kept in the same position and in lower limbs square the pelvis also
4. apparent length keep both limbs parallel to each other

<table>
<thead>
<tr>
<th>segment</th>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. upper limb</td>
<td>Angle of acromion</td>
<td>Radial styloid</td>
</tr>
<tr>
<td>2. arm</td>
<td>Angle of acromion</td>
<td>Lateral epicondyle</td>
</tr>
<tr>
<td>3. fore arm</td>
<td>Lateral epicondyle</td>
<td>Radial styloid</td>
</tr>
<tr>
<td>4. radial column</td>
<td>Lateral epicondyle</td>
<td>Radial styloid</td>
</tr>
<tr>
<td>5. ulnar column</td>
<td>Medial epicondyle</td>
<td>Ulnar styloid</td>
</tr>
<tr>
<td>6. lower limb</td>
<td>Xiphisternum</td>
<td>Tip of Medial malleolus</td>
</tr>
<tr>
<td></td>
<td>ASIS</td>
<td>Tip of Medial malleolus</td>
</tr>
<tr>
<td>7. supratrochanter</td>
<td>Base of Bryant’s triangle</td>
<td></td>
</tr>
<tr>
<td>8. thigh</td>
<td>Tip of trochanter</td>
<td>Medial knee joint line</td>
</tr>
<tr>
<td>9. leg</td>
<td>Medial knee joint line</td>
<td>Tip of Medial malleolus</td>
</tr>
<tr>
<td>10. tibial column</td>
<td>Medial knee joint line</td>
<td>Tip of Medial malleolus</td>
</tr>
<tr>
<td>11. fibular column</td>
<td>Lateral knee joint line</td>
<td>Tip of lateral malleolus</td>
</tr>
<tr>
<td>12. foot</td>
<td>Tip of Medial malleolus</td>
<td>Tip of head of I metatarsal</td>
</tr>
<tr>
<td>13. FOOT medial column</td>
<td>Tip of Medial malleolus</td>
<td>Tip of head of I metatarsal</td>
</tr>
<tr>
<td>14. FOOT lateral column</td>
<td>Tip of lateral malleolus</td>
<td>Tip of head of V metatarsal</td>
</tr>
<tr>
<td>15. HEEL VERTICAL</td>
<td>HEIGHT OF MEDIAL &amp; LATERAL MALLEOLI FROM SOLE</td>
<td></td>
</tr>
<tr>
<td>16. HEEL TRANSVERSE</td>
<td>MEDIOLATERAL LENGTH</td>
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</tbody>
</table>

APPARENT LENGTH – KEEP BOTH LIMBS PARALLEL

TRUE LENGTH—SQUARE THE PELVIS
-- KEEP NORMAL LIMB IN SAME POSITION AS THAT OF AFFECTED LIMB

BRAYANTS ’S TRIANGLE —SQUARE THE PELVIS
-- KEEP NORMAL LIMB IN SAME POSITION AS THAT OF AFFECTED LIMB
12. EXAMINATION OF WRIST AND HAND

HISTORY
1. trauma
2. arthritis
3. autoimmune disorders
4. leprosy
5. tuberculosis
6. nerve injuries
7. cervical spine shoulder elbow diseases
8. burns
9. iv drug abuse

Disabilities
1. taking food
2. washing face
3. brushing teeth
4. drying hairs
5. donning of clothes
6. writing
7. jumping
8. holding & carrying objects in hand

INSPECTION
1. attitude & deformity
2. swelling
   - effusion of wrist joint
   - effusion of tenovaginal sheath
   - others
3. skin
   - sinus scar burns engorged veins
4. web spaces maintained or contracted
5. palmar arch
6. trophic changes
7. orientation of fingers to scaphoid
8. wasting
   - forearm
   - thenar
   - hypothenar

PALPATION
1. LOCAL RISE IN TEMPERATURE
2. tenderness
   - I CMC J
   - UCL of IP thumb
   - Radiocarpal
   - DRUJ
Orthopaedic Examination of a patient

- EPL; EPB
- Tendons
- Anatomical snuff box

3. swelling
4. palpation of bones
   - deformities
   - thickening
   - irregularity
   - step

5. styloid relation
6. DRUJ
   - instability (piano key sign)
7. volkmann’s sign
8. joint hypermobility

MOVEMENTS

1. WRIST
   - Palmar flexion - 80°
   - Dosiflexion - 70°
   - Radial deviation -20°
   - Ulnar deviation - 30°
2. pronation
3. supination

<table>
<thead>
<tr>
<th>FINGERS</th>
<th>FLEXION</th>
<th>EXTENSION</th>
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<tr>
<td>MCP</td>
<td>0°</td>
<td>90°</td>
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<tr>
<td>DIP</td>
<td>0°</td>
<td>80°</td>
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<tr>
<td>PIP</td>
<td>0°</td>
<td>100°</td>
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<table>
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<tr>
<th>THUMB</th>
<th>ABDUCTION</th>
<th>ADDUCTION</th>
<th>FLEXION</th>
<th>EXTENSION</th>
</tr>
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<tr>
<td>CMC</td>
<td>90°</td>
<td>0°</td>
<td>90°</td>
<td>20°</td>
</tr>
<tr>
<td>MCP</td>
<td>85°</td>
<td>5°</td>
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</tr>
<tr>
<td>IP</td>
<td>80°</td>
<td>20°</td>
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<tr>
<td>OPPOSITION</td>
<td></td>
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</tbody>
</table>
Orthopaedic Examination of a patient

SPECIAL TESTS
1. FINKESTEIN TEST
2. PHALEN`S & REVERSE PHALEN`S TEST
3. TOURNIQUET TEST
4. MEDIAN NERVE COMPRESSION TEST
5. CARPAL INSTABILITY
   - WASTSON TEST (SCAPHOID)
   - BALLOTEMENT TEST (TRIQUETREAL)
6. ALLEN TEST
7. COZEN`S TEST
8. MILLS MANOUER

EXAMINATION FOR ELIGILBLE TENDONS FOR TENDON TRANSFERS

EXAMINATION OF HAND FUNCTION
1. POWER GRIP
   - CYLINDRICAL GRIP
   - SPHERICAL GRIP
   - HOOK GRIP
   - LATERAL PREHENSION
2. PRECISION GRIP
   - PAD TO PAD PREHENSION
   - TIP TO TIP PREHENSION
   - PAD TO SIDE PREHENSION

EXAMINATION OF ELBOW HEAD OF RADIUS
13. EXAMINATION OF KNEE JOINT

HISTORY
1. TRAUMA
   - twisting
   - contact
2. swelling
3. locking
4. instability (giving way)
5. pivot
6. audible pop. click
7. limp
8. constitutional symptoms
9. arthritis
10. low back ache
11. hip ankle problems
12. other joints
13. tuberculosis
14. diabetes
15. hemophilia & other bleeding diseases
16. black urine

Disabilities
1. Walking (aided or unaided),
2. side of using walking stick
3. sitting cross-legged,
4. squatting
5. climbing stairs, coming down
6. BYCYCLING

INSPECTION

<table>
<thead>
<tr>
<th>I</th>
<th>STANDING POSITION</th>
<th>DON’T MISS TO EXAMINE THE POPLITEAL FOSSA</th>
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<tr>
<td></td>
<td>ANTERIORLY</td>
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<td>POSTERIORLY</td>
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</tr>
<tr>
<td>II</td>
<td>SITTING POSITION</td>
<td></td>
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<tr>
<td>III</td>
<td>SUPINE</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>PRONE</td>
<td></td>
</tr>
</tbody>
</table>

1. GAIT
2. attitude & deformity
   - flexion
   - triple deformity
   - genu varum/valgum/recurvatum
   - DEFORMITY INCREASE OR DECREASE ON FLEXION OF JOINT
3. swelling
   - parapatellar
   - housemaids
   - clergyman
   - bakers cyst
   - semimembranous
   - bony
4. position of patella
5. shape of patella
6. muscle wasting
   - quadriceps – VMO
   - calf muscles
   - hamstrings

7. skin – sinus scars engorged veins

PALPATION

1. LOCAL RISE in temperature
2. local tenderness
   - medial & lateral joint line – anterior/ middle / posterior
   - ligamentum patellae
   - poles of patella
   - bursal sites
3. swelling
4. effusion
   - stroke test
   - fluctuation
   - patellar tap

5. synovial hypertrophy & plica
6. popliteal fossa palpation
7. palpation of bones
   - swelling
   - irregularities
   - thickening
   - step

8. clicks
   - iliotibial band
   - menisci
   - medial plica
   - bicepsfemoris

9. popliteal artery pulsation
10. patella under surface
11. retinaculum rent or tear
12. palpable thud
13. PATELLA
   - Size
   - Shape
   - Tracking
   - Apprehension test
   - Glide test
   - Sliding
   - Alta/baja
Orthopaedic Examination of a patient

**MOVEMENT**

1. Flexion
2. Extension
   - extensor lag
3. abnormal movements – abduction/adduction/rotation
4. patella tracking

**MEASUREMENTS**

1. Leg length
2. Femoral length
3. Muscle bulk
   - femoral
   - calf
4. Q angle
5. Insal salviti index
6. INTERMALLEOALAR DISTANCE
7. INTERCONDYLAR DISTANCE

**SPECIAL TESTS**

1. VARUS / VALGUS stress test @ 0° and 30° flexion
2. lachman test
3. anterior drawer test
4. geodfrey’s sign (posterior sag sign)
5. posterior drawer test
6. slocum anterior rotation drawer test
7. jerk test of houghston
8. lateral pivot test
9. flexion rotation drawer test
10. external rotation recurvatum test
11. reverse pivot test
12. tibial external rotation test
13. dymanic posterior shift test
14. FAIBANK apprehension test
15. Wilson test for ostch: dissecans (like macmurray)
16. appley frinding test
17. appley distraction test
18. pissani sign

EXAMINATION OF POLITEAL LYMPH NODES
NEUROLOGICAL EXAMINATION
EXAMINATION OF SPINE HIP ANKLE OPPOSITE KNEE

TESTS FOR ROTATORY INSTABILITY OF KNEE
<table>
<thead>
<tr>
<th>TEST</th>
<th>FORCE APPLIED</th>
<th>MOVEMENT</th>
<th>RESULT</th>
<th>INFEERENCE</th>
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<tbody>
<tr>
<td>SLOCUN ANTERIOR ROTATION DRAWER</td>
<td>ANTERIOR 15° INTERNAT ROT 30° EXTERNAL ROT</td>
<td>ANTERIOR DISPLACEMENT OF TIBIA</td>
<td>MORE ON IR LESS ER</td>
<td>ANTEROLATERAL</td>
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<td></td>
<td>LESS ON IR MORE ER</td>
<td>ANTEROMEDIAL</td>
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<td>JERK TEST</td>
<td>VALGUS INTERNAL ROTATION</td>
<td>90° FLEXION TO FULLEXTENSION</td>
<td>ANTEROLATERAL SUBLUXATION OF TIBIA AT 20-40° FLNX</td>
<td>ACL</td>
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<tr>
<td>LATERAL PIVOT SHIFT</td>
<td>VALGUS INTERNAL ROTATION</td>
<td>FLEXION FROM FULL EXTENSION</td>
<td>REDUCTION OF ANT LAT SUBLUXATED TIBIA AT 20-40° FLNX</td>
<td>ACL, LATERAL CAPSULE</td>
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<td>FLEXION ROTATION DRAWER TEST</td>
<td>ANTERIOR POSTERIOR FORCE</td>
<td>FLEXION EXTENSION ALTERNATELY</td>
<td>ROTATION OF FEMUR &amp; TIBIA</td>
<td>ACL</td>
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<td>EXTERNAL ROTATION CURVATUM TEST</td>
<td>HYPEREXTENSION EXTERNAL ROTATION</td>
<td>HYPEREXTENSION EXTERNAL ROTATION</td>
<td>HYPEREXTENSION EXTERNAL ROTATION</td>
<td>PCL, PSTLATERAL CAP, PCL</td>
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<tr>
<td>REVERSE PIVOT SHIFT</td>
<td>VALGUS EXTERNAL ROTATION</td>
<td>EXTENSION FROM FLEXION &amp; VICE VERSA</td>
<td>REDUCTION OF POSTEROLATERLY SUBLUXATED TIBIA AT 20-40° FLNX</td>
<td>PCL, ARCUATE COMPLEX, PCL</td>
</tr>
<tr>
<td>Tibial External Rotation Test</td>
<td>EXTERNAL ROTATION</td>
<td>EXTERNAL ROTATION AT 30° &amp; 90° FLEXION</td>
<td>&gt; 10° ER AT 30° ONLY</td>
<td>POSTLAT</td>
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<tr>
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<td>&gt; 10° ER AT 30° &amp; 90°</td>
<td>POSTLAT + PCL</td>
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<tr>
<td>Posterolateral Drawer Test</td>
<td>POSTEROLATERAL FORCE</td>
<td>POSTEROLATERAL DISPLACEMENT</td>
<td>POSTEROLATERAL DISPLACEMENT</td>
<td>PCL + POSTLAT CORNER</td>
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<tr>
<td>Dynamic Posterior Shift Test</td>
<td>HIP 90° KNEE 80°</td>
<td>EXTENSION FROM 90° TO FULL EXTENSION</td>
<td>REDUCTION OF POSTEROLATERALLY SUBLUXATED TIBIA</td>
<td>POSTERIOR &amp; POSTEROLATERAL</td>
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</tbody>
</table>
14. EXAMINATION OF ANKLE AND FOOT

HISTORY
1. diabetes mellitus  
2. peripheral neuropathy  
3. arthritis  
4. leprosy  
5. spine disease  
6. trauma & fracture  
7. myopathy  
8. gout, syphilis  
9. habit of shoe wearing  
10. wear & tear of shoe

Disabilities
1. Walking (aided or unaided), 
2. side of using walking stick 
3. sitting cross-legged, 
4. squatting 
5. climbing stairs, coming down

INSPECTION
1. ATTITUDE & DEFORMITY 
2. swelling 
3. skin 
   - callocities 
   - adventitious bursae  
   - abnormal thickening of skin 
   - sinus scar warts 
4. muscle wasting 
5. big toe & other toes  
6. arches of foot  
7. obliteration of arch on weight bearing  
8. gouty tophi  
9. abnormal creases  
10. deformities  
11. trophic changes in skin & nails

PALPATION
1. local rise in temperature  
2. tenderness  
3. palpation of bones  
4. heel  
5. arches of foot  
6. manual forceful reduction of deformity  
7. presence of tibia, tibial torsion  
8. palpation of sesamoids  
9. relation of malleoli  
10. anterior or posterior displacement of foot  
11. forefoot-midfoot-hindfoot relation

MOVEMENTS
1. ANKLE 
   - plantar flexion 35°  
   - dorsiflexion 25°
2. SUBTALAR 
   i. INVERSION
ii. EVERSION
3. TARSOMETATARSAL
   - ADDUCTION
   - ADDUCTION
4. HEEL MOVEMENTS
5. MOVEMENT OF BIG TOE AND OTHER TOES
6. COMBINATION
   i. SUPINATION
   ii. PRONATION

MEASUREMENTS

a) CALF WASTING
b) MEDIAL & LATERAL COLUMNS OF FOOT
c) HEEL MALLEOLI LENGTH
d) HEEL
   a. VERTICAL
   b. TRANSVERSE

SPECIAL TESTS
1. pendulum test (tibial torsion)
2. anterior drawer test
3. posterior drawer test
4. valgus/varus stress test
5. TESTS OF TENDO ACHILLES
   a. Thomson test for tendo Achilles
   b. O'Brien's needle test of TA
   c. Sphygmomanometer test
   d. Knee flexion test

6. mulder's test (compression of metatarsals produce paresthesia in morton's diseses)
7. tarsal tunnel compression
   - dorsiflexion-exversion test of kinoshita
   - tourniquet test

EXAMINATION TIBIOFIBULAR JOINT
   a) SQUEEZE TEST OF HOPKINSON
   b) EXTERNAL ROTATION STRESS TEST (KNEE & FOOT 90°; FOOT ER)

EXAMINATION OF DISTAL VASCULARITY

NEUROLOGICAL EXAMINATION

VIBRATION SENSE

EXAMINATION OF FOOT WEAR

EXAMINATION OF SPINE; HIPS; KNEE; OPPOSITE ANKLE
15. EXAMINATION OF CTEV

HISTORY
1. age sex
2. antenatal history – drugs; diseases (TORCH)
3. family h/o congenital anomalies
4. symptoms suggestive of myopathy
5. symptoms suggestive of neurological lesion

PHYSICAL EXAMINATION

Fully undress the patient
Inspect head to toe from all sides

HEAD TO TOE EXAMINATION
1. general built
2. café au lait spots
3. craniofacial dysmorphism
4. congenital anomalies of neck, genitalia, chest, abdomen, extremities
5. features of terratogenicity
6. SPINE –
   • Swelling
   • Tuft of hair
   • macules
7. JOINT CONTRACTURES

LOCAL EXAMINATION

INSPECTION
1. GAIT
2. attitude & deformity
   • ankle equinus
   • heel varus
   • fore foot adduction
   • cavus
3. deformities of toes
4. other deformities
5. skin creases thigh, leg, foot (posterior & medial aspects)
6. joint contractures
7. bilaterality
8. skin callosities, adventitious bursa
9. size of calf, leg, heel & foot
10. tibial torsion
11. high riding of calf muscles
12. trophic changes in skin nails, ulcers
PALPATION

1. local rise in temperature
2. tenderness
3. presence of tibia, bending
4. tightness of tendoachilllis; tibialis posterior, other tendons
5. retraction of triceps surae
6. adduction & inversion of calcaneum
7. position of navicular bone
8. position of cuboid
9. palpation of cuneiforms
10. palpation of metatarsals
11. resistance to reduction of each deformity by force
12. Curvature of the lateral boarder (CLB)
13. Medial crease (MC)
14. Uncovering of the lat. head of talus (LHT)
15. Posterior crease (PC)
16. Emptiness of heel (EH)
17. VASULARITY ON FULL CORRECTION
18. PLANTAR FASCIA TIGHTNESS

MEASUREMENT

<table>
<thead>
<tr>
<th>1. DEFORMITY( supple or fixed)</th>
<th>TRUE</th>
<th>REDUCIBLE TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EQUINUS</td>
<td></td>
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<tr>
<td>2. HEEL VARUS</td>
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<tr>
<td>3. FOREFOOT ADDUCTION</td>
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<td>4. CAVUS</td>
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<table>
<thead>
<tr>
<th>2. MOVENENTS</th>
<th>AFFECTED</th>
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<tbody>
<tr>
<td>1. DORSIFLEXION</td>
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<tr>
<td>2. PLANTAR FFLEXION</td>
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<td>3. INVERSION</td>
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<td>4. EVERSION</td>
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<tr>
<td>5. FOREFOOT ABDUCTION</td>
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<td></td>
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<tr>
<td>6. FOREFOOT ADDUCTION</td>
<td></td>
<td></td>
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<tr>
<td>7. SUPINATION</td>
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</tbody>
</table>

3. LENGTH OF LEG, CALF CIRCUMFERENCE
4. LENGTH OF MEDIAL & LATERAL COLUMN OF FOOT
5. SIZE OF HEEL
   a. Transverse
   b. vertical
Orthopaedic Examination of a patient

REDUCTION OF DEFORMITY BY SUPINATION & ABDUCTION OF FORE FOOT
- reduction of heel varus, reduction of TCN joint

SPECIAL TESTS
1. SILVERSKEOID TEST
2. PENDULAR TEST (TIBIAL TORSION)

EXAMINATION OF SPINE
TO rule out spina bifida; diastenomelia

NEUROLOGICAL EXAMINATION

EXAMINATION OF DISTAL VASCULARITY

VASCULARITY ON FULL CORRECTION

EXAMINATION OF OTHER JOINTS
1. HIPS
2. KNEES
16 EXAMINATION OF SPINE

1. Examination of vertebral column
2. Examination of spinal cord
3. Examination of spinal roots (complete neurological examination is always better)

GENERAL EXAMINATION

1. Squint
2. Nystagmus
3. TREMOURS (pill rolling & intentional)
4. Chorea; hemiballism & athetolic movements

EXAMINATION OF VERTEBRAL COLUMN

1. GAIT and posture
2. Altitude and deformity

INSPECTION

1. Posteriorly
   - Position of head
   - Level of hair line
   - Length of neck
   - Level of shoulders
   - Level of scapulae
   - Spinous processes
   - Iliac crest
   - Paraspinal muscle spasm or not
   - Any swelling, cold abscess
   - Renal angle
   - Skin- dimple; hair tufts; nevus; scar; sinus; café-au- lait spots
   - Step
   - Abnormal trunk furrows
   - Apparent shortening of lower limbs
   - Pelvic obliquity

2. Laterally

   - Spinal curves

3. Anteriorly

   - Chest shape pectus carinatum; excavatum
   - Rib hump
   - Abdomen protusion
PALPATION

1. Local rise in temperature
2. Tenderness (occiput to coccyx)
   a. Direct pressure
   b. Twist tenderness
   c. Deep thrust tenderness
   d. Anvil test
3. Step or deformity
4. Any swelling
5. Cold abscess
6. Sacroiliac joint
7. Trigger points
8. Pelvic obliquity

PERCUSSION

- TENDERNESS

Abnormal curvatures of spinal column

1. Torticollis
2. Scoliosis
   a. Site
   b. Adam forward bending test
   c. Number of curves
   d. Convexity
   e. Associated kyphosis
   f. Chest rib hump (razor back)
   g. Rib iliac crest distance
   h. Facial asymmetry
   i. Squint
   j. Mobile or fixed
3. Kyphosis
   a. Labile/fixed
   b. Fixed
      i. Knuckle
      ii. Angular
      iii. Round
4. Lordosis
   a. Kyrtorhacchic
   b. Ophithotonus
MOVEMENTS

1. Atlantooccipital joint – nodding
2. Atlantoaxial joint- rotation
3. Cervical spine
   a. Flexion
   b. Extension
   c. Lateral bending
   d. Rotation
4. Dorsal spine
   a. Practically nil
5. Lumbar spine
   a. Forward bending – standing (finger tip floor distance)
      -sitting with fixed pelvis
   b. Back ward bending (angle between axes of lower limb & body)
   c. Lateral bending (distance between finger tip & floor)
6. Segmental mobility
   a. Schober’s & modified schober’s test
7. Sacroiliac stress tests

MEASUREMENTS

1. Linear measurements
   a. From external occipital protubence to tip of coccyx
   b. Iliocostal distance (tip off last rib to iliac crest)
   c. Segmental measurement
   d. Acromiooccipital distance
   e. Schober’s test
   f. Otto test
2. Chest expansion
3. Limb length discrepancy

SPECIAL TESTS OF SPINE

1. Stress test of spine( Lhermitte test)
2. Cervical root stretch test
   a. Lateral stretch test
   b. Cervical compression test (Spurling test)
3. Distraction test
4. Thoracic outlet test
   a. Adson` test
   b. Roos test
   c. Hyperabduction manoeure (90° abduction and full external rotation)
   d. Exaggerated military position test (scapula fully depressed and retracted-costoclavicular compression manoeure
   e. Halsted rest (45° shoulder abd + downward pull of upper limb with head turned to opposite side)
5. Lumbar root tension test
   a. Straight leg raising test
Orthopaedic Examination of a patient

i. SLRT ( LASEGUE TEST )
ii. DISSAPEANCE OF PAIN BY LOWER LEG
iii. FRAJARZTANZ TEST
iv. BOWSTRING TEST

b. Well leg SLRT
c. Sitting root test
d. FNST

6. Test for pyriformiss syndrome
   i. FRIEBEGER SIGN
   ii. PACE-NAGLE SIGN

NEUROLOGICAL EXAMINATION

1. Higher mental function
2. Cranial nerves
3. Gait & posture
4. Motor system
   a. Bulk of muscle (wasting or hypertrophy)
   b. Tone of muscle
      i. Hypertonia
         1. Spasticity
         2. Rigidity
         3. gegenhalten
      ii. hypotonia
   c. Power of muscle
   d. Reflexes

5. Sensory system
   a. Temperature
      i. Hot
      ii. cold
   b. Touch
      i. Deep
      ii. Crude
      iii. Light
   c. Posterior column sensations
      i. Two point discrimination
      ii. Vibration sense (128 Hz)
      iii. Position sense
      iv. stereognosis

6. Visceral system
   a. Bowel
   b. Bladder functions

7. Coordination mechanism
   a. Straight line walking
   b. Finger to nose & finger test
   c. Heel to knee test
   d. Romberg sign
   e. Pastpointing
Orthopaedic Examination of a patient

f. Dysdidokinesia
g. Rebound phenomenon
8. Vasomotor changes & pressure sores

<table>
<thead>
<tr>
<th>MUSCLE CHART</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
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<td>12</td>
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</tbody>
</table>

ASIA SORE FOR SPINAL CORD INJURY

| A | Complete: | No sensory or motor function is preserved in sacral segments S4-S5. |

| B | INCOMPLETE | Sensory, but not motor, function is preserved below the neurologic level and extends through sacral segments S4-S5 |

| C | INCOMPLETE | Motor function is preserved below the neurologic level, and most key muscles below the neurologic level have muscle grade <3. |

| D | INCOMPLETE | Motor function is preserved below the neurologic level, and most key muscles below the neurologic level have muscle grade greater than or equal to 3. |

| E | NORMAL | Sensory and motor functions are normal. |
9. REFLEXES
- SUPERFICIAL REFLEXES

1. PHARYNGEAL
2. LARYNGEAL
3. ABDOMINAL (ALL FOUR QUADRANTS & Beevor’s sign)
4. CREMASTRIC REFLEX
5. ANAL WINK
6. BULBOCAVERNOUS REFLEX (stimulation of glans or catheter pulling)
7. PLANTAR REFLEX
8. SCAPULAE REFLEX

- DEEP TENDON REFLEXES

<table>
<thead>
<tr>
<th>ROOT</th>
<th>MUSCLE</th>
<th>ROOT</th>
<th>MUSCLE</th>
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</thead>
<tbody>
<tr>
<td>C5</td>
<td>ELBOW FLEXION; DELTOID</td>
<td>L2</td>
<td>HIP FLEXION</td>
</tr>
<tr>
<td>C6</td>
<td>WRIST EXTENSORS</td>
<td>L3</td>
<td>QUADRICEPS</td>
</tr>
<tr>
<td>C7</td>
<td>TRICEPS</td>
<td>L4</td>
<td>ANKLE DORSIFLEXION</td>
</tr>
<tr>
<td>C8</td>
<td>FDP-MF</td>
<td>L5</td>
<td>EHL; GIU.MEDIUS</td>
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<tr>
<td>T1</td>
<td>FINGER ABDUCTION</td>
<td>S1</td>
<td>ANKLE PF; G.MAXIMUS</td>
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DEEP TENDON REFLEXES

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>absent</td>
</tr>
<tr>
<td>+1</td>
<td>present (as ankle jerk)</td>
</tr>
<tr>
<td>+2</td>
<td>brisk (as knee jerk)</td>
</tr>
<tr>
<td>+3</td>
<td>very brisk</td>
</tr>
<tr>
<td>+4</td>
<td>clonus</td>
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<thead>
<tr>
<th>ANATOMICAL LANDMARKS</th>
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<tbody>
<tr>
<td>T2 STERNAL NOTCH</td>
</tr>
<tr>
<td>C1 BELOW &amp; ANTERIOR TO MASTIOD PROCESS</td>
</tr>
<tr>
<td>C3 HYOID BONE</td>
</tr>
<tr>
<td>C4 THYROID CARTILAGE</td>
</tr>
<tr>
<td>C6 CRICOID</td>
</tr>
<tr>
<td>C7 V.PROMINENCES</td>
</tr>
<tr>
<td>T3 BASE OF SPINE OF SCAPULA</td>
</tr>
<tr>
<td>T4 ANGLE OF LOUIS</td>
</tr>
<tr>
<td>T7 INFERIOR ANGLE OF SCAPULA</td>
</tr>
<tr>
<td>L4 ILLIAC CREST</td>
</tr>
<tr>
<td>S1 PSIS</td>
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<table>
<thead>
<tr>
<th>SPINAL SEGMENT LEVELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1-C7 +1 T11 L3;L4</td>
</tr>
<tr>
<td>T1-T6 +2 T12 L5</td>
</tr>
<tr>
<td>T7-T9 +3 L1 S1-S5 ; CX</td>
</tr>
<tr>
<td>T10 L1;L2 L2 CAUDA EQUINA</td>
</tr>
</tbody>
</table>

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<tr>
<th>SENSORY LEVELS</th>
</tr>
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<tbody>
<tr>
<td>CLAVIVLE- C4-T2 AXIAL LINE</td>
</tr>
<tr>
<td>NIPPLE T4</td>
</tr>
<tr>
<td>XHIPHISTERNUM T6</td>
</tr>
</tbody>
</table>
Orthopaedic Examination of a patient
17 EXAMINATION OF PERIPHERAL VASCULAR DISEASE AND GANGRENES

HISTORY
1. Age and sex
2. Limbs affected
3. Bilateral or unilateral
4. Mode of onset
5. Pain
   a. Intermittent claudication
      i. Boyd’s classification
         1. Grade 1 pain dissipated on continued walking
         2. Grade 2 pain present but can walk with pain
         3. Grade 3 can’t walk with pain need to take rest
   b. Rest pain
6. Effects of heat and cold (reynaud’s phenomenon)
7. Parasthesia
8. h/o superficial thrombophlebitis
9. Symptoms s/o macrovascular disease
   (syncope; chest pain; blurred vision; abdominal pain)
10. Impotence
11. Past history
12. Personal history
   a. Smoking
   b. Alcoholism
13. Family history

LOCAL EXAMINATION

1. INSPECTION
   a. CHANGE IN COLOUR
   b. Signs of ischemia
      i. Thinning of skin
      ii. Hair loss
      iii. Loss of subcutaneous fat
      iv. Nail changes
      v. Ulcers
   c. Buerger’s angle (<30° indicates severe ischemia)
   d. Capillary filling time
   e. Venous refilling time
   f. Established gangrene
      i. Extent and color
      ii. Type – dry/wet
      iii. Line of demarcation
2. PALPATION
   a. Skin temperature
   b. Capillary refilling
   c. Venous refilling
   d. Cold and warm water test
   e. Limb above gangrene
   f. Palpation of blood vessels
      i. Dorsalis pedis & anterior tibial
      ii. Posterior tibial
      iii. Popliteal
      iv. Femoral
      v. Radial & ulnar
      vi. Brachial
      vii. Subclavian
      viii. Superficial temporal
      ix. Common carotid

3. AUSCULTATION
   a. Bruit

4. NEUROLOGICAL EXAMINATION OF LIMB

---

PALPATION OF VESSEL

1. Pulse volume
2. Condition of vessel wall
3. Thrombosed
4. thrill
19. Evaluation of rotation of lower limb (staheli)

History
1. onset,
2. severity,
3. disability
4. previous treatment
5. developmental history.
6. family history of a rotational problem.

Screening examination
i. hip dysplasia
ii. cerebral palsy.

Rotational. Evaluate in four steps:

1. Observe the child walking and running. foot progression angle (FPA)
   Intoeing
   -5° to -10° mild
   -10° to -15° moderate,
   more than -15° severe

2. Assess femoral version
   hip rotation external rotation (ER)
   internal rotation (IR) with the child prone
   ROTATION ARC CHANGE TO
   I. Externally = retro torsion
   II. Internally = ante torsion
   TMA GIVES TIBIAL TORSION
   TFA-TMA = HIND FOOT TORSION

3. Quantitate tibial version
   the thigh-foot angle (TFA)
   TMA.

4. Assess the foot
   forefoot adductus.
   BECK'S HEEL BISECTOR METATRUS ADDUCTUS
   Normal = bisects 2 & 3rd toes
   Mild = bisects 3rd toe
   Moderate = bisects 3 & 4th toes
   Severe = bisects 4 & 5th toes
A Foot progression angle The foot progression angle is estimated by observing the child walking. The normal range is shown in green.

B Hip rotation Hip rotation is assessed with the child prone (A). Internal rotation (B) and external rotation (C) are measured. Normal ranges are shown in green.
D Assessing rotational status of tibia and foot The rotational status of the tibia and foot are best assessed by evaluating the child in the prone position (A), allowing the foot to fall into a natural resting position. The thigh-foot axis (B) and shape of the foot (C) are readily determined. The range of normal is shown in green.
17. **DEVELOPMENTAL MILESTONES**

1. **Cognitive Milestones**
   1. Month 3-5: Attends to and Reaches for objects
   2. Month 4-8: Pulls string to secure a ring
   3. Month 8-15: Imitates patting doll
   4. Month 14-20: Finds Hidden Object
   5. Month 18-28: Completes simple puzzles

2. **Language Milestones**
   1. Month 1.5-3: Squeals
   2. Month 3.5-8: Turns to locate a voice
   3. Month 9-13: Says Mama or Dada
   4. Month 14-24: Combines two different words
   5. Month 21-36: Uses plurals

3. **Social and Emotional Milestones**
   1. Month 1.5-4: Smiles at others
   2. Month 4-9: Seeks primary caregiver
   3. Month 8-15: Stranger anxiety
   4. Month 10-15: Displays 2 or more recognizable emotions
   5. Month: 11-20: Exploratory play by self
   6. Month 21-36: Cooperative play in small groups

4. **Gross Motor Milestones**
   1. Month 2-4.5: Rolls Over
   2. Month 5-8: Sits without support
   3. Month 10-14: Stands Alone
   4. Month 14-20: Walks up steps
   5. Month 21-28: Pedals tricycle
   6. Month 30-44: Balances on one foot
   7. By age 6: Rhythmic skipping
   8. By age 8.5: Alternates foot-hop in place
   9. By age 10: Holds tandem stance for 10 sec (eyes closed)

5. **Fine Motor Milestones**
   1. Month 2.5-4: Grasps rattle
   2. Month 4.5-7: Transfers cube hand to hand
   3. Month 8-12: Has neat pincer grasp
   4. Month 15-20: Builds tower of four cubes
   5. Month 18-24: Imitates vertical line
   6. Month 28-36: Copies circle
   7. By age 5 years: Draws a square
   8. By age 5.5 years: Tripod pencil grasp
   9. By age 7 years: Draws diagonal line
   10. By age 9: Draws cross with same dimensions
   11. By age 12: Draws three dimensional cube

Frankenburg (1990) Denver II Developmental Screening
Orthopaedic Examination of a patient