LOWER QUARTER SCREENING

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INTRODUCTION

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OBJECTIVES

Be able to perform a lower quarter screening examination

Recognize importance and be able to accurately take detailed history

Efficiently perform neurological examination

Link static and dynamic examination to effective treatment strategy

Understand the concept of regional interdependence

Be able to perform manual reset technique for the hip, knee, and ankle

TAKING A DETAILED HISTORY

Initial Observation

- Note the unusual (things you can see from across the room)

History and Interview

- Goals of Subjective Interview
- Interview Format

HISTORY – INITIAL OBSERVATION

Deformity

Gait

Assistive Devices

Patient's Behavior / Attitude

Quality of Movement Patterns

Handshake

General Appearance

Red Flags

HISTORY – SUBJECTIVE INTERVIEW

Goals of Subjective Interview

- To determine "kind" of disorder present
- Detailed symptom description and behavior
- Chronological history
- Make assessments of several key areas
- Determine contraindications to further exam and/or treatment techniques
- Form a baseline to which progress can be measured

HISTORY – INTERVIEW FORMAT

Patient description of problem

Onset

Pain description

Aggravates / Alleviates

Interceding episodes

Medical history

Special considerations

NEUROLOGICAL EXAMINATION

Can help determine what part of nervous system involved

Consists of the following:

- Myotomes
- Dermatomes
- DTR's
- Neural Tissue Tension
- Neurovasular testing when indicated

NEUROLOGICAL TESTING - MYOTOMES

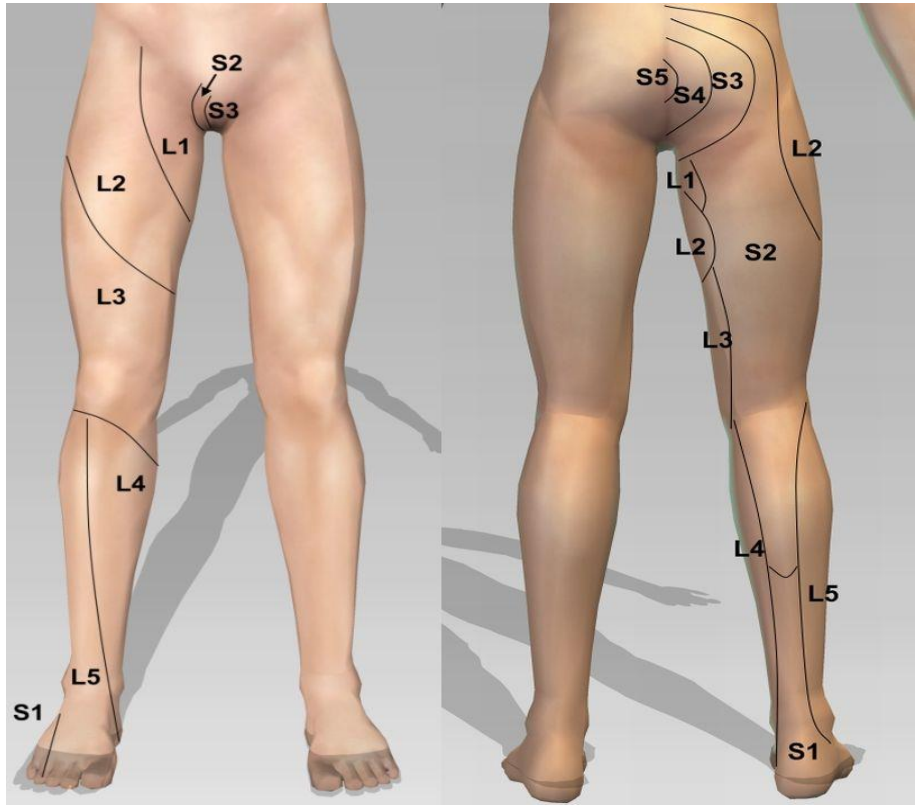
Lower Extremity

- L2: Hip Flexion – Key Muscle: Iliopsoas
- L3: Knee Extension – Key Muscle: Quadriceps
- L4: Ankle Dorsiflexion – Key Muscle: Tibialis Anterior
- L5: Great Toe Extension – Key Muscle: EHL
- L5-S1: Ankle Eversion – Key Muscle: Peroneals
- S1: Ankle Plantar Flexion – Key Muscle: Gastrocnemius
- S2: Knee Flexion – Key Muscle: Hamstrings

NEUROLOGICAL TESTING - DERMATOMES

These are the “most represented” cutaneous innervated areas of individual nerve roots:

- L1: Inguinal Region
- L2: Middle Anterior Thigh
- L3: Medial Aspect of Knee
- L4: Medial Lower Leg and Ankle
- L5: Web Space between First and Second Toes
- S1: Lateral Border of Foot
- S2: Popliteal Space
- S3-4: Saddle / Perianal Region



NEUROLOGICAL TESTING – DTR'S

DTR's and Lumbar Reflexes

- Patellar Tendon Reflex: L3-4
- Medial Hamstring (L5-S1); Lateral Hamstring (S1-S2)
- Achilles Tendon Reflex: S1
- Babinski Reflex:
  - Normal Response?
- Clonus:
  - What is acceptable?

LUMBAR ROOT SYNDROMES

L3:
- Pain Distribution:
- Cutaneous Innervation:
- Reflex:
- Myotome:

L4
- Pain Distribution:
- Cutaneous Innervation:
- Reflex:
- Myotome:

L5
- Pain Distribution:
- Cutaneous Innervation:
- Reflex:
- Myotome:

S1:
- Pain Distribution:
- Cutaneous Innervation:
- Reflex:
- Myotome:

S2-3-4:
- Pain Distribution:
- Cutaneous Innervation:
- Reflex:
- Myotome:

NEURAL TISSUE TENSION / NEURODYNAMIC TESTING

Slump Test or variant

Straight Leg Raise or variant

Well Leg Raise

Cram's Test

Femoral Nerve Tension Test

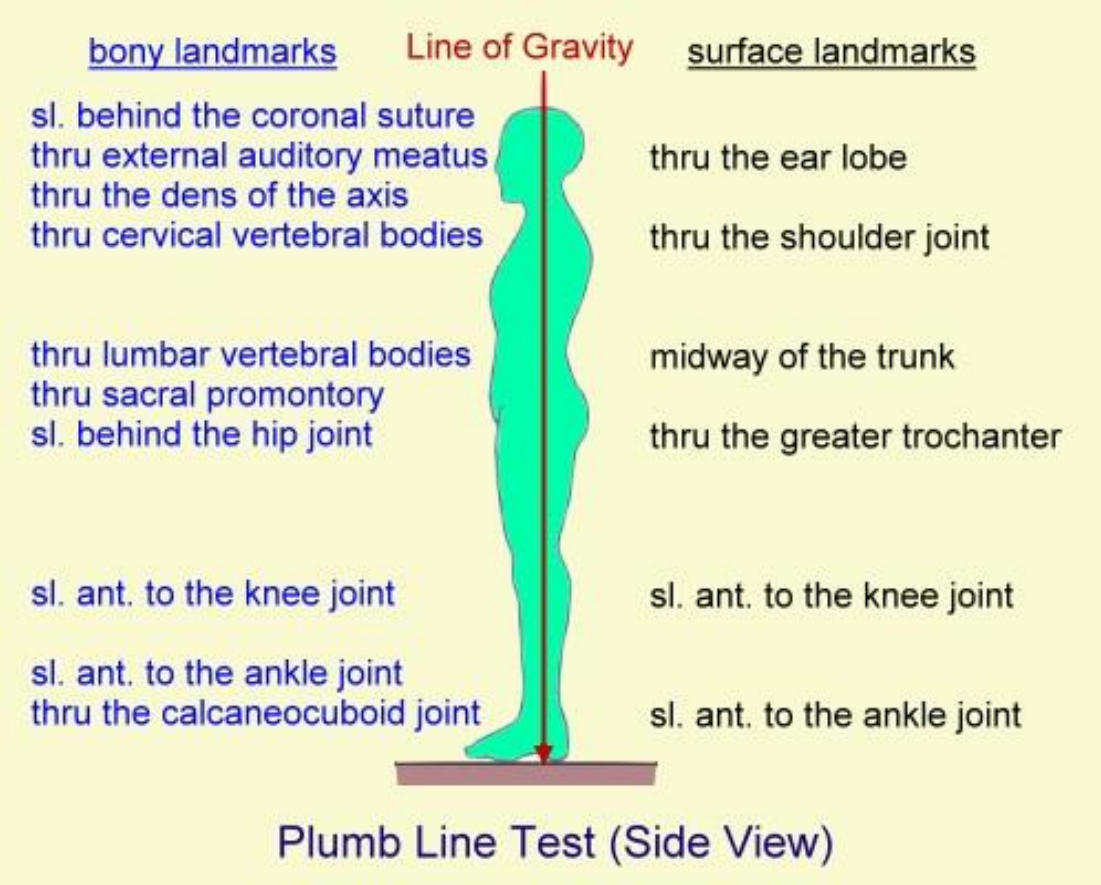
CLEARING LUMBAR SPINE

Movement Testing

- AROM
- Overpressure
- Sustained / Combined / Repeated Movements (when indicated in subjective)
- Quadrant Testing

STATIC EXAMINATION: POSTURE – LATERAL VIEW

Plumb line



STATIC EXAMINATION: POSTURE – FRONT/BACK

Symmetry

Trunk – rotation, creases

Pelvis – PSIS/ASIS/Iliac crest

Hips – neutral

Knees – neutral, varus, valgus

Feet – parallel, pointed in, pointed out

Achilles – are they straight?

Equal weight bearing?

DYNAMIC EXAMINATION - SFMA

Why do we need a movement assessment?

REGIONAL INTERDEPENDENCE

Clinically relevant relationships exist between separate regions of the body

Impairments in one region of the body are often associated with impairments in other regions of the body

Wainner, Whitman, Cleland, Flynn 2007

PAIN

Pain changes motor control and the way we move

Dysfunctional movement as a result of the changes to motor control

Need a movement assessment in order to detect movement variation

COMPENSATION

Practical and high-level performance is possible using compensatory patterns, but you are more likely to be injured secondary to…

- Altered mobility
- Altered stability
- Asymmetry

Cook, Burton, Hoogenboom

SFMA OVERVIEW

Looks at movement patterns and compares them to a baseline

Systematically breaks down movement to locate the problem

Top Tier Tests

Breakout tests with each top tier

SCORING THE SFMA

Dysfunctional

Functional

Painful

Non-Painful

SCORING

Functional = any movement that is not limited or restricted and meets the baseline criteria

Dysfunctional = movements that are limited or restricted and do not meet the baseline criteria

Painful = reproduction of symptoms, increase of symptoms, secondary symptom reproduction

TOP TIER MOVEMENTS

Cervical Flexion

Cervical Extension

Cervical Rotation

Upper Extremity Pattern 1

Upper Extremity Pattern 2

Multisegmental Flexion

Multisegmental Extension

Multisegmental Rotation

Single Leg Stance

Overhead Deep Squat

THE SELECTIVE FUNCTIONAL MOVEMENT ASSESSMENT

SFMA SCORING		FN	FP	DP	DN
Active Cervical Flexion					
Active Cervical Extension					
Cervical Rotation		L R			
Upper Extremity Pattern 1(MRE)		L R			
Upper Extremity Pattern 2 (LRF)		L R			
Multi-Segmental Flexion					
Multi-Segmental Extension					
Multi-Segmental Rotation		L R			
Single Leg Stance		L R			
Overhead Deep Squat					

THE SELECTIVE FUNCTIONAL MOVEMENT ASSESSMENT

Name: **Date:** **Total Score:**

Cervical Flexion ☐ Painful
- ☐ Can't touch Sternum to Chin
- ☐ Excessive effort and/or lack of motor control

Cervical Extension ☐ Painful
- ☐ Not within 10 degrees of parallel
- ☐ Excessive effort and/or lack of motor control

Cervical Rotation ☐ Painful Right ☐ Painful Left

☐ Right	☐ Left	Nose not in line with mid-clavicle
☐ Right	☐ Left	Excessive effort and/or appreciable asymmetry or lack of motor control

Pattern #1 – MRE ☐ Painful Right ☐ Painful Left

☐ Right	☐ Left	Does not reach inferior angle of scapula
☐ Right	☐ Left	Excessive effort and/or appreciable asymmetry or lack of motor control

Pattern #2 – LRF ☐ Painful Right ☐ Painful Left

☐ Right	☐ Left	Does not reach spine of scapula
☐ Right	☐ Left	Excessive effort and/or appreciable asymmetry or lack of motor control

Multi-Segmental Flexion ☐ Painful
- ☐ Cannot touch toes
- ☐ Sacral angle <70 degrees
- ☐ Non-uniform spinal curve
- ☐ Lack of posterior weight shift
- ☐ Excessive effort and/or appreciable asymmetry or lack of motor control

Multi-Segmental Extension ☐ Painful
- ☐ UE does not achieve or maintain 170
- ☐ ASIS does not clear toes
- ☐ Spine of scapula does not clear heels
- ☐ Non-Uniform spinal curve
- ☐ Excessive effort and/or lack motor control

Multi-Segmental Rotation ☐ Painful Right ☐ Painful Left

☐ Right	☐ Left	Pelvis Rotation <50 degrees
☐ Right	☐ Left	Shoulders rotation <50 degrees
☐ Right	☐ Left	Spine/pelvic deviation
☐ Right	☐ Left	Excessive Knee flexion
☐ Right	☐ Left	Excessive effort and/or lack of symmetry or motor control

Single Leg Stance ☐ Painful Right ☐ Painful Left

☐ Right	☐ Left	Eyes open <10 seconds
☐ Right	☐ Left	Eyes closed < 10 seconds
☐ Right	☐ Left	Loss of Height
☐ Right	☐ Left	Excessive effort or lack of symmetry or motor control

Overhead Deep Squat ☐ Painful
- ☐ Loss of UE start position
- ☐ Tibia and Torso are not parallel or better
- ☐ Thighs do not break parallel
- ☐ Loss of sagittal plane alignment: Right____ Left _____
- ☐ Excessive effort, weight shift, or motor control

SFMA

MOVEMENT DIAGNOSIS

Mobility

- Tissue (TED)
- Joint (JMD)

Stability and Motor Control Problem (SMCD)

Breakouts

Local Biomechanical Examination

BREAKOUT LOGIC

Unilateral vs Bilateral – remove a body part

Loaded vs Unloaded – move to a gravity lessened position

- Equally limited with unloaded and loaded = mobility dysfunction
- More movement with unloaded = stability and motor control dysfunction

Active vs Passive

- If passive movement is within 10 deg of active = mobility dysfunction
- If passive movement is much greater = stability and motor control dysfunction

Consistent vs Inconsistent

- Consistent = mobility dysfunction
- Inconsistnet = stability and motor control dysfunction

JOINT SPECIFIC EVALUATION

Hip / Knee / Ankle

- Anatomy Review
- Relationship to Movement Diagnosis
- Patho-Anatomy Quick Assessment Logic
  - Bone
  - Joint / Cartilage
  - Ligament
  - Muscle / Tendon
  - Peripheral Nerve
  - Spinal Nerve

JOINT SPECIFIC EVALUATION - HIP

Anatomy

Clinical Implications

Patho-Anatomy Quick Assessment

Relationship to Movement Diagnosis

JOINT SPECIFIC EVALUATION - KNEE

Anatomy

Clinical

Patho-Anatomy Quick Assessment

Relationship to Movement Diagnosis

JOINT SPECIFIC EVALUATION - ANKLE

Anatomy

Clinical

Patho-Anatomy Quick Assessment

Relationship to Movement Diagnosis

TREATMENT

Reset – typically manual intervention to reset dysfunction

Reinforce – reinforce what has been reset with therapeutic activity, stretching, taping, etc.

Reload – new movement patterns with therapeutic exercise and neuromuscular re-education

RESET

Manual intervention

- Joint mobilizations
- HVLA
- Soft Tissue Mobilization
- Myofascial Release
- Instrumented assisted soft tissue mobilization
- Active soft tissue release
- Dry Needling

HIP

RESET – HIP

Hip distraction

Hip mobilizations with belt

PA in Fig 4

Prone IR

REINFORCE - HIP

Stretching

Positional/postural advise

Taping

RELOAD - HIP

Therapeutic exercise and neuromuscular re-education

- ½ kneeling
- Tall kneeling
- Patterns (squat, inline lunge, single leg stance)

KNEE

RESET – KNEE

Flexion Mobs

Extension Mobs

Patellar Glides

Proximal Tib/Fib Mobs

Dry needling

REINFORCE – KNEE

Stretching

Therapeutic Activities

Taping

ANKLE

RESET - ANKLE

DF Mob

PF Mob

Inversion/Eversion at TC and STJ

TC PA/AP Prone and supine

Distal Tib/Fib

Rearfoot distraction thrust manipulation

Cuboid

Lateral/Medial Glides

Standing MWM – DF

1st MTJ

REINFORCE – ANKLE

Discussion / Education

Taping

RELOAD – ANKLE

Once mobility is established, treat the joint as if it were a stability – motor control issue

Functional Strengthening

Return to Sport

NEURAL TENSION

RESET – NEURAL TISSUE TENSION

Techniques

- Adverse Neural Tissue Tension
  - STM to Sciatic, Tibial, Peroneal Nerve
  - SLR in and out of tension positions
- Modified Slump mobilizations

REINFORCE – NEURAL TENSION

Taping

Stretches

Self Mobilizations

- Sliders and Tensioners

RELOAD – NEURAL TENSION

Therapeutic Exercise

Neuromuscular Re-education

CONCLUSION

QUESTIONS?