

NBCOT Exam Prep

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For updates to this guide and more NBCOT Exam Prep material,
visit: occupational-therapy-assistant.org/NBCOT

OTR Review

This section is the complete OTR NBCOT review consisting of 600+ OT terms and questions.

The left column contains the term/question and the right column contains the definition/answer. Fold the page in half down the middle or cover the answers/definitions as you study.

Review this material for 2 weeks taking note of topics you feel weak in. Then fill out your study schedule in the next section focusing on those weak areas.



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<p>Allen Cognitive Level Test</p>	<p>Population: Psychotic disorders, brain injury, Dementia Use: Screening tool to estimate cognitive level of function</p>
<p>ACL 1</p>	<p>Automatic Actions/Reflexive--> TOTAL ASSIST</p> <p>Motor Actions: walking, eating, drinking, standing Attention Span: Seconds Activities: Sensory Stimulation</p>
<p>ACL 2</p>	<p>Unable to imitate/complete 'running stitch' Postural Actions/Gross Body Movement-->MAX ASSIST</p> <p>Motor Actions: Approximate imitations, Pacing, bending, stretches Activities: gross motor games, dance Attention Span: Minutes</p>
<p>ACL 3</p>	<p>Imitates 3 'running stitches' Repetitive Actions-->MOD ASSIST</p> <p>Motor Actions: manipulation of familiar objects, react spontaneously to tactile stimulation Attention: 30 minutes; no written directions; increased distractability Activities: performs familiar ADL's (face washing, etc)</p>
<p>ACL 4</p>	<p>imitates 3 'whip stitches' Goal Directed/Familiar Activities-->MIN ASSIST</p> <p>Sensory Responds to Visual Stimuli Activities: Visual cues to complete tasks, matching, several step-tasks, simple crafts (2-3 steps); NO NEW LEARNING/GENERALIZATION Attention Span: Hours</p>

ACL 5

imitates 'simple cordovan stitch' using pvert trial and error X 3 stitches

Independent learning/Exploratory --> self control/inclusive reasoning

Alters actions with overt trial and error; poor organization, planning, and socialization

Activities: Concrete tasks; NEW LEARNING AND GENERALIZATION
Attention Span: Weeks

ACL 6

imitates 'single cordovan stitch' X 3 with overt trial and error

Planned Action--> INDEPENDENT/Conceptual

Considers consequence of actions
Follows multistep verbal/written cues
ABSENCE OF COG DISABILITY

Age-related macular degeneration (ARMD or AMD)

1. Dry: drusen deposits form in the retina, increasing in number for form scotomas in macula,
2. Wet: abnormal vessel growth under the retina; the vessels leak fluid, causing damage to cells of macula.

Astigmatism

A condition in which the cornea is oval instead of round. Light rays converge at more than one point of focus

Diabetic retinopathy

Bleeding from small blood vessels in retina can lead to serious vision loss. One can develop: scotomas, decreased contrast sensitivity, dec'd color discrimination, dec'd night vision & fluctuations in vision.

Fixation

The process of locating and focusing on an object on the fovea; foundation of oculomotor control

Fovea

Center 10* of visual field; responsible for identifying details.

Visual acuity

The ability to recognize small details of the object; allows for speed and accuracy in processing what is seen; also aids in decision making.

Glaucoma

1. Acute narrow angle glaucoma (closed angle glaucoma): acute episode
 - a. Severe redness, pain in eye, headaches, nausea.
2. Chronic open angle glaucoma (COAG): chronic episode
 - a. Most common type,
 - b. Decreased visual acuity and peripheral fields; light sensitivity in some cases, no pain

Hyperopia

Farsightedness; difficulty seeing close objects when light rays are focused on a point behind the retina.

Legal blindness

1. A visual acuity of 20/200 or less (in the better eye with the best optical correction),
2. A visual field of 20* or less in the best eye.

Macula

Area of the retina that is the area of best vision.

Myopia

Nearsightedness; the condition in which parallel rays of light are brought into focus in front of the retina, rather than on it

Normal limits of visual field

Superior 60; **inferior 75**; nasal side 60; **temporal side 100**.

Presbyopia

Age-related loss of accommodation.

Retina

Multilayer, sensory structure for the eye that contains rods and cones; initiates impulses to visual cortex via the optic nerve.

Saccadic eye movement

Quick eye movements that change the fixation from one point to another and allow us to redirect our line of sight.

Smooth pursuits/tracking

Those eye movements that maintain continued fixation on a moving target.

Esophoria

Tendency for the eye to turn inward when both eyes are fixating on an object; controlled by fusion.

Esotropia

Inward deviation of the eye when the other is focusing on an object.

Exophoria

Tendency for the eye to turn outward when both eyes are fixating on an object; controlled by fusion.

Exotropia

Outward turning of the eye when the other is focusing on an object.

Extinction	Lack of awareness of one object when objects are presented in both sides of the body at a time, even though they are recognized when presented individually.
Generalization	The ability to apply learned compensatory strategies to new environments or situations; occurs with intact executive function and short-term memory.
Hyperphoria	Tendency for the eye to turn upward when both eyes are fixating on an object; controlled by fusion.
Hypokinesia	Delayed movement of limb.
Hypometria	Decreased amplitude of movement.

Hypotropia

Downward turning of the eye when the other is focusing on an object.

Impersistence

Difficulty sustaining movement of posture.

Limb akinesia

Absence of ability to move limb.

Motor preservation

Difficulty ending movement.

Accommodation

Ability of the eye to adjust focus of vision at different distances.

Convergence	Ability to maintain focus as an object moves towards you; eyes move medially toward nose.
Divergence	Ability to maintain focus as an object moves away from you; eyes move laterally away from nose.
Diplopia	Double vision; occurs when the fovea of both eyes are not aligned on the same target, so the brain is not able to fuse the image.
Optic nerve	Carries the picture to the brain for interpretation.
Cranial nerves impacting vision	<ol style="list-style-type: none">1. Optic nerve- II2. Oculomotor nerve- III3. Trochlear nerve- IV4. Trigeminal nerve- V5. Abducens nerve- VI

Visual perceptual hierarchy

1. Foundational skills:
 - a. Oculomotor control
 - b. Visual field
 - c. Visual acuity
2. Intermediate-level skills:
 - a. Attention
 - b. Scanning or visual search
 - c. Pattern recognition
3. Advanced-level skills:
 - a. Visual memory
 - b. Visuo-cognition.

Cataracts

Cloudiness of the lens of the eye; decreased acuity; progressively blurred vision; both central and peripheral; glare sensitivity; near vision may be better than distance vision.

Hypophoria

Tendency for the eye to turn downward when both eyes are fixating on an object; controlled by fusion.

Hypertropia

Upward turning of the eye when the other eye is focusing on an object.

Snellen chart

An assessment of visual acuity; measured by the ratio of the size of a letter a client can read over the distance their eyes are from the chart.

Peripheral visual field	All of the field except the fovea (center); responsible for identification of shape and form and movement in the environment; aids mobility.
Confrontation testing	A gross assessment of visual field; therapist brings in targets from different areas in the field & client indicates when targets are seen and their location.
Central field assessments	<ol style="list-style-type: none">1. Damato 30-Point Campimeter: Portable test card that measures the central 30* of visual field; part of the Brain Injury Visual Assessment Battery for Adults (biVABA),2. Pepper Visual Skills for Reading Test (VSRT): Functional test that indicates scotomas and their affects on function.
Contrast sensitivity assessments	<ol style="list-style-type: none">1. Vistech contrast sensitivity chart (not portable),2. Lea charts (portable, inexpensive),3. Clinical observation list in biVABA
Saccadic eye movements	<ol style="list-style-type: none">1. biVABA,2. VSRT,3. Hold two different targets 16 inches from clients face and approx 8 inches apart; ask client to look from one to the other when verbally cued; repeat 10 fixations (5 cycles).

Divergence assessment	Place target near clients bridge of nose; slowly move target away from nose; observe eye movements; client indicates if/when two targets are seen.
Convergence assessment	Place target 16 inches away from clients bridge of nose; slowly move target towards nose; observe eye movements; client indicates if/when two targets are seen.
Visual attention assessments	<ol style="list-style-type: none"> 1. Cancellation tests 2. biVABA 3. Figure and shape copying tests, line bisection test
Apraxia (motor)	<p>Inability to carry out a movement even though the sensory system, muscles, and coordination are intact.</p> <p>INTERVENTION: (same as for ideomotor apraxia)</p> <ol style="list-style-type: none"> a. Utilize general verbal cues as opposed to specific b. Decrease manipulation demands c. Provide hand over hand tactile-kinesthetic input d. Utilize visual cues
Ideational apraxia	<p>Difficulty with sequencing steps within a task.</p> <p>INTERVENTIONS:</p> <ol style="list-style-type: none"> a. Provide step by step instructions b. Use hand over hand guiding techniques c. Provide opportunities for motor planning & motor execution.

Ideomotor apraxia

Production error; can use tools but appears awkward or clumsy.
INTERVENTION: (same as for apraxia (motor))
a. Utilize general verbal cues as opposed to specific
b. Decrease manipulation demands
c. Provide hand over hand tactile-kinesthetic input
d. Utilize visual cues

Agnosia

Impairment in the ability to recognize and identify objects using only visual means; caused by lesions to the right occipital lobe

Color agnosia

Inability to recognize or remember specific colors for common objects.

Color anomia

Inability to name the specific color of objects.

Object agnosia

Inability to recognize objects using only vision.

Metamorphopsia	Visual distortion of objects although they might be recognizable to the client.
Prosopagnosia (facial agnosia)	Inability to recognize a known face or individual.
Simultanagnosia	Inability to recognize and interpret an entire visual array (more than one thing) at a time; usually due to damage to the right hemisphere.
Visual spatial perception (AKA visual discrimination)	The ability to distinguish the space around one's body, objects in relation to the body and environment, and the relationship between two objects in the environment.
Figure ground	Ability to recognize the foreground from the background based on differences in color, luminance, depth, texture, or motion.

Form constancy or discrimination

The ability to distinguish a form, shape, or object despite its location, position, color or size.

Spacial relations (position in space)

Ability to perceive the position of one's self in relations to objects in the environment.

Depth perception

The ability to judge distances and depth.

Stereopsis

The ability to see things in three dimensions; lack of this can affect depth perception and makes the environment appear flat.

Topographical orientation

The ability to navigate from one place to the next; requires ability to determine current location, goal locations, and problem solving to implement an action.

Stereognosis

Ability to identify everyday objects using their tactile properties and no vision.

Graphesthesia

Ability to identify forms, numbers, letters written on hand.

Autotopagnosia

Inability to identify body parts on self or someone else or the relationship between parts.

Finger agnosia

Inability to recognize which finger was touched or is being used.

Anosognosia

Lack of recognition or awareness of one's deficits.

Right/left discrimination

Ability to identify, discriminate, and understand the concept of right and left; can be affected by short-term memory, aphasia.

INTERVENTION:

- a. Utilize activities that challenge underlying spatial skills.
- b. Utilize tasks that require discrimination of right/left.

Metacognition

The ability to choose and use specific mental skills to complete a task.

Executive function

Higher level cognition, higher order thinking abilities; involves decision making, planning, sequencing, and executing.

INTERVENTION:

- a. Use external cues (eg. written directions, daily planners).
- b. Grade tasks that are increasingly complex in terms of # of steps required.

Dyscalculia

Inability to solve a simple problem; includes dyslexia and dysgraphia.

Occipital lobe

Contains visual cortex; scanning; identification of objects; awareness, and discrimination.

Frontal lobe	Planning, problem solving, organizing, attention, appropriate behavior, and initiation of movement.
Parietal and temporal lobes	Right parietal: visual spatial relations, Left parietal: understanding spoken and written language. Right temporal: visual discrimination/recognition and memory, Left temporal: verbal memory.
Thalamus	Eye movement; integration of visual and cognitive information.
Cerebellum	Eye control and coordination.
Brainstem	Has the cranial nerves running through it; protective eye responses.

<p>Hemi-inattention</p>	<p>Decreased search to left field; right hemisphere deficit. INTERVENTIONS: a. Provide bilateral activities b. Guide the affected side through the activity c. Increase sensory stimulation to the affected side.</p>
<p>Visual inattention</p>	<p>Both visual field loss and hemi-inattention; may be referred to as visual neglect; right hemisphere deficit.</p>
<p>Left hemisphere deficit</p>	<p>Focus is on details; difficulty identifying objects; apraxia is more common vs. rt. hemisphere deficit.</p>
<p>Right hemisphere deficit</p>	<p>Focus is on whole; visual spatial perception disorders; hemi-inattention; visual inattention.</p>
<p>Allen Cognitive Level test (ACL-90)</p>	<p>Format: Task analysis of a standardized visual-motor task. Purpose: is a brief screening test to estimate the client's cognitive functioning & capacity to learn & to guide treatment goal setting. Subject is scored on the cognitive level (1 to 6) & receives a score between 3.0 - 5.8 according to completion of stitches & method described by author. Population: Adults w/psychiatric illness, cognitive impairment following TBI, dementia.</p>

<p>Allen Cognitive Level 6</p>	<p>"Planned action" Scoring: Able to imitate single cordovan stitch using covert (mental) trial & error absence of disability. Able to plan ahead to avoid mistakes.</p>
<p>Allen Cognitive Level 5</p>	<p>"Exploratory actions" Scoring: Able to imitate a single cordovan stitch using overt (physical) trial & error; 3 stitches. New learning occurs. May be typical level of function for 20% of population.</p>
<p>Allen Cognitive Level 4</p>	<p>"Goal directed actions" Scoring: Able to imitate whip stitch; 3 stitches. Ability to carry out simple tasks to completion. Relies heavily on visual cues. May be able to perform established routines but cannot cope w/unexpected events.</p>
<p>Allen Cognitive Level 3</p>	<p>"Manual action" Scoring: Able to imitate running stitch; 3 stitches. Uses hands to manipulate objects. May be able to perform a limited # of tasks w long-term repetitive training.</p>
<p>Allen Cognitive Level 2</p>	<p>"Postural reaction" Scoring: Unable to imitate running stitch Movement is associated with comfort. Some awareness of large objects in environment may assist caregiver with simple tasks.</p>

<p>Allen Cognitive Level 1</p>	<p>"Automatic action" Scoring: Automatic motor responses & changes in ANS. Minimal conscious response to external environment.</p>
<p>Erhardt Developmental Vision Assessment (EDVA) & Short Screening Form (EDVA-S)</p>	<p>This test is designed to evaluate visuomotor development and identify delays, gaps in skill sequences, and inappropriate patterns.</p>
<p>Brain Injury Visual Assessment Battery for Adults (biVABA)</p>	<p>This battery identifies functional limitations resulting from visual impairment. The series of eye and visual tests includes papillary response, oculomotor performance, eye dominance, visual attention, visual search, acuity, reading acuity, contrast sensitivity, and visual fields.</p>
<p>Drivers Vision Screener</p>	<p>This single machine tests several visual skills, including acuity, color perception, depth, phorias, horizontal peripheral fields, and night vision.</p>
<p>Lea Test System</p>	<p>The cards measure static visual acuity or contrast sensitivity using numbers or letters as targets to avoid issues of literacy or language barriers.</p>

Visual Functioning Assessment
Tool

This battery assesses the student's visual functioning in educational settings; It yields relative strengths and weaknesses as a baseline for the individualized education plan.

Anomia

Loss of ability to name objects or retrieve names of people.

Brocha's aphasia

Loss of expressive language indicated by a loss of speech production.

INTERVENTION:

- a. Decrease external auditory stimuli
- b. Give the individual increased response time.
- c. Use visual cues & gestures
- d. Use concise sentences
- e. Investigate the use of augmentative communication devices.

Wernicke's aphasia

A deficit in auditory comprehension that affects semantic speech performance, manifested in paraphasia or nonsensical syllables.

INTERVENTION:

- a. Decrease external auditory stimuli
- b. Give the individual increased response time.
- c. Use visual cues & gestures
- d. Use concise sentences
- e. Investigate the use of augmentative communication devices.

Global aphasia

The symptoms are those of severe Brocha's aphasia and Wernicke's aphasia combined. An almost total reduction of all aspects of spoken and written language in expression and comprehension.

Perseveration

The continuation or repetition of a motor act or task.

INTERVENTION:

- a. Bring perseveration to a conscious level & train the person to inhibit the behavior.
- b. Redirect attention
- c. Engage the individual in tasks that require repetitive action.

Acalculia

The acquired inability to perform calculations.

Alexia

The acquired inability to read

Agraphia

The acquired inability to write.

Rivermead Perceptual Assessment Battery (RPAB)

Tasks are designed to assess visual-perceptual dysfunction after a stroke or head injury; Utilizes deficit-specific tasks in isolation from ADL tasks.

Mini-mental state examination
(MMSE)

Brief 30-point questionnaire test that is used to screen for cognitive impairment; commonly used to screen for dementia.

Lowenstein Occupational
Therapy Cognitive Assessment
(LOTCA)

Utilized for persons who have experienced a stroke, TBI, or tumor. Measures basic cognitive functions that are prerequisite for managing everyday tasks. Consists of 20 subtests in 5 areas: orientation, visual, spatial perception, visuo-motor organization, thinking operations.

Cognistat Neurobehavioral
Cognitive Status Examination

Usually takes less than 45 min; Test explores, quantifies, and describes performance in central areas of brain-behavior relations: Level of consciousness, orientation, attention, language, constructional ability, memory, calculations, and reasoning.

Total Hip Arthroplasty

Total hip replacement (THA)

- Types:

1. Total hip joint implant: replaces acetabulum and femoral head.
2. Austin Moore: partial hip replacement; replaces femoral head.

- Surgical procedures

1. Cemented or uncemented
2. Anterolateral or posterolateral (more common).

Avascular necrosis

Death of bone cells due to poor blood supply.

Minimally invasive technique

- Surgical technique used for hip replacement.

- Two 2-inch incisions are needed and
- No detachment of muscles is required.

Open reduction and internal fixation

ORIF, surgical alignment of fractured bones using screws, pins, wires, or nails to maintain bone alignment.

Osteoporosis

- A common bone disease resulting in decreased bone density
- Common sites: vertebral bodies, neck of the femur, humerus, and distal end of radius

<p>Above-knee/Transfemoral amputation</p>	<ul style="list-style-type: none"> - AKA, amputation above knee at any level on the thigh. - elevate for first 24 hours on pillow - position prone daily to provide for hip extension.
<p>Below-knee/Transtibial amputation</p>	<ul style="list-style-type: none"> - BKA, amputation below knee at any level on the calf. (most common) - BKA is preferred to an AKA due to the importance of preserving the knee joint, and energy requirements for walking. - elevate foot of bed for first 24 hours - position prone daily to provide for hip ext.
<p>Phantom limb</p>	<ul style="list-style-type: none"> - Perceived sensation following amputation of a limb that the limb still exists. - occurs in 7 out of 10 patients
<p>Phantom sensation</p>	<p>Sensations of the limb that may include:</p> <ul style="list-style-type: none"> - cramping, squeezing, relaxed, numb, tingling, painful, moving, stuck, shooting, burning, cold, hot, or achy - different from "phantom limb" in that these are "detailed" sensations
<p>Residual limb</p>	<p>Remaining part of limb following surgery.</p> <ul style="list-style-type: none"> - maintains good skin coverage and vascularization

Crepitis

Audible or palpable crunching or popping in joints.
Caused by irregularity of opposing cartilage surfaces.

Gelling

Morning stiffness (less than 30 minutes) and stiffness after periods of inactivity.

Joint laxity

Instability of individual joints in medial/lateral and anterior/posterior directions.

Nodes

Bony enlargements indicative of cartilage damage from osteoarthritis.

Nodules

Soft tissue masses.
- commonly found over the extensor surface of the proximal ulna or at the olecranon.

Subluxation	<p>Any degree of malalignment where articular structures are only in partial contact.</p> <p>Characterized by volar or dorsal displacement of joints.</p>
Tenosynovitis	Inflammation of the tendon sheath
Synovitis	Inflammation of the synovial membrane that lines the joint capsule of diarthrodial joints.
Anemia	<p>Reduction below normal of the number of erythrocytes, quantity of hemoglobin, or the volume of packed red cells in the blood</p> <p>- a symptom of various diseases and disorders</p>
Ankylosis	<p>Abnormal condition of stiffness.</p> <p>- usu. referring to a joint, such as the result of chronic RA</p>

Apophysis	<p>Any small projection, process, or outgrowth, usually on a bone without an independent center of ossification.</p> <ul style="list-style-type: none">- Examples: the zygomatic apophysis of the temporal bone and the basilar apophysis of the occipital bone.
Rheumatoid Arthritis (RA): Boutonniere deformity	<ul style="list-style-type: none">- Flexion of PIP, and hyperextension of DIP- DIP joints are forced into hyperextension- Splinting: silver rings or dynamic PIP extension splint
Diarthrosis	<p>A functional classification term for the freely movable synovial joints including:</p> <ul style="list-style-type: none">- gliding, hinge, pivot, condyloid, saddle, and ball-and-socket joints
Pannus	<p>An abnormal tissue that clings to and erodes articular cartilages</p> <ul style="list-style-type: none">- Common with RA
Rheumatoid factor	<p>(RF or RhF) is an autoantibody (antibody directed against an organism's own tissues).</p> <ul style="list-style-type: none">- a substance often found with RA

Sjogren syndrome	<p>Systemic autoimmune disease in which immune cells attack and destroy the exocrine glands that produce tears and saliva.</p> <ul style="list-style-type: none">- more common in older women- associated with RA
Rheumatoid Arthritis (RA): Swan neck deformity	<ul style="list-style-type: none">- Hyperextension of PIP joint & flexion of DIP joint.- Splinting: silver rings or dynamic PIP ext. splint.
Synovial	<p>Pertaining to, consisting of, or secreting synovia, the lubricating fluid of the joints, bursae, and tendon sheaths.</p>
Acute coronary syndrome	<p>S/S: plaque buildup or formation of a thrombus, or spasm w/in a coronary artery.</p> <ul style="list-style-type: none">- causes a reduction or loss of blood flow to myocardial tissue- includes unstable angina and other pathological events leading to MI.
Angina	<p>Chest pain due to lack of blood flow to heart myo</p> <ul style="list-style-type: none">- S/S include: pain, dyspnea, pallor, sweating, palpitations & tachycardia, dizziness & faintness, hypertension & digestive disturbances.

<p>Atherogenic</p>	<p>The ability to initiate or accelerate atherogenesis.</p> <ul style="list-style-type: none"> - deposition of atheromas, lipids, and calcium in arteries
<p>Atrial fibrillation (A fib)</p>	<p>Normal rhythmic contractions of the atria are replaced by rapid irregular atrial rhythm of the heart myo wall.</p> <ul style="list-style-type: none"> - S/S: palpitations, occasional weakness and presyncope. - Can lead to a CVA.
<p>Ischemic heart disease</p>	<ul style="list-style-type: none"> - One or more of the coronary arteries is narrowed or obstructed - interfering with normal blood flow to the heart
<p>Myocardial infarction</p>	<p>MI - prolonged (angina) ischemia, injury, and death of an area of the myocardium.</p> <ul style="list-style-type: none"> - occlusion of one or more of coronary arteries. - necrosis of heart tissue - S/S: severe substernal pain of more than 20 minutes, may radiate to neck, jaw, arm, epigastric area; SOB, fatigue, nausea/vomiting.
<p>Congestive heart failure</p>	<p>CHF - The heart is unable to maintain adequate circulation of the blood to meet the metabolic needs of the body.</p> <ul style="list-style-type: none"> - S/S: increased weight over several days, - inability to sleep - persistent dry, hacking cough, SOB - swelling in ankles or feet - fatigue

<p>Dypsnea</p>	<p>Labored breathing occurs and gets progressively worse</p>
<p>Oxygen transport</p>	<p>The delivery of fully oxygenated blood to peripheral tissues >> the cellular uptake of oxygen >> the utilization of oxygen from the blood >> and the return of partially desaturated blood to the lungs.</p>
<p>Pneumonia</p>	<p>An inflammation of lung tissue, wherer the alveoli in the affected areas fill w/fluid. - caused by bacteria, viruses, aspiration, or immobility.</p>
<p>Spirometry</p>	<p>A measurement of breathing (or lung volumes)</p>
<p>Hip Fractures & Hip Replacements WBing RESTRICTIONS 6-8 weeks post op.</p>	<p>NWB (0%) - walker/crutches TTWB (touch down or toe touch, 10-15%) - walker/crutches PWB (partial, 30%) - walker/crutches 50% WB - cane WBAT - pt. judges amount of weight placed on affected leg, w/o causing too much pain FWB (75-100%) - cane/no device</p>

Hip Fractures & Hip Replacements:
PRECAUTIONS & CONTRAINDICATIONS

- Posterolateral approach:
- no hip flexion > 90 degrees
 - no internal rotation
 - no ADDuction (no crossing legs/feet)
- Anterolateral approach 6-12 weeks:
- no hip extension
 - no external rotation
 - no ADDuction

Hip Fractures & Hip Replacements:
INTERVENTION/Tx AREAS

1. Client education (fall prevention, home modification, safe transfers, transportation)
2. Bed mobility & bedside ADL
3. UE strengthening
4. Functional ambulation & transfers with appropriate WBing status & approp. ambulation device (determined by pt's WBing status)
5. Use of AD
6. Practice role activities using proper WBing status and ambulatory device
7. Caregiver training - educate precautions, transfers

Hip Fractures & Hip Replacements:
PROCEDURES FOR PRACTICE

- List of Problem & Adaptations
1. Bathe feet: longhanded bath sponge
 2. Tub: non-skid bath mat, grab bar, tub bench
 3. Don/doff shoes: long-handled shoe horn, elastic laces
 4. Don/doff socks: sock aide
 5. Don pants: reacher or dressing stick
 6. Transfers: raised toilet seat, increase height of chair & bed
 7. Sitting: wedge cushion w/thick end of wedge at back of chair
 8. Open/close cabinet: relocate frequently used items to eliminate need to bend, reacher

Low Back Pain:
Pathology

1. Scoliosis (lateral curvature of spine)
2. Kyphosis (outward curvation of spine/ hunch back)
3. Sciatica (nerve is entrapped by disc herniation)
4. Spinal Stenosis (narrowing of the intervertebral foramen; the space where the nerve exits or enters the spine)
5. Facet Joint Pain (inflammation or joint changes of spinal joints)
6. Spondylolysis (stress fracture of the dorsal to the transverse process)
7. Spondylolisthesis (slippage of one vertebra on another)
8. Herniated Nucleus Pulposus (stress may tare fibers of the disc, results in outward bulge of enclosed nucleus pulposus, bulge may press on spinal nerves and cause various symptoms including nerve entrapment)

Low Back Pain:
INTERVENTION/Tx AREAS

1. Client Education
2. Back Stabilization & Neutral Spine - position for LB back before activities, monitor & cue pt. Teach positions/lifts to use throughout tx, the Squat, Diagonal Lift, Golfers Lift
3. Body Mechanics
4. Adaptive Equipment - Long handled sponges/brushes/shoe horns, reachers, sock aides, raised toilet seats, hand-held shower sprayers, and footstools.
5. Ergonomics
6. Energy Conservation
7. Stress Reduction, coping techniques

Low Back Pain:
INTERVENTION/Tx AREAS - ADL

1. Bathing - shower not bath, keep items w/in easy reach, long handled brushes/sponges, hand-held shower hose, bath mat, shower chair.
2. Dressing - sit while dressing, keep back straight or lie flat on bed, avoid bending forward, slip on shoes as alternate, thread belt on pants before donning pants, AD.
3. Functional Mobility - logroll,, maintain straight back and neutral spine, tighten abdominal myos to support back.
4. Personal Hygiene - at sink, place a foot inside the base cabinet.
5. Sexual Activity - positions that place the low back in neutral, passive position, pillow under upper back or buttocks to decrease arching of back, warm shower or bath before may relax myos & decrease pain.
6. Sleep - firm supportive mattress, pillow should support neck and head w/o neck flexion, sidelying place pillow btw. knees to decrease twisting.
7. Toileting - reach btw. legs, no twisting.

Low Back Pain:
INTERVENTION/Tx AREAS - IADL

1. Childcare - elevated changing table/surface for dressing, bathe in sink or elevated surface, drop down rails on crib, bend at hips & keep back straight.
2. Computer Use - monitor eye level, proper seat height with feet flat on ground, wrist in neutral, forearms parallel with the floor, elbows 90*
3. Driving - sit on seat & turn body to get in/out, knees no higher than hips, rolled towel for lumbar support, cruise control.
4. Home Establishment & Management - golfer reach for washer, squat for dryer.
5. Shopping - squat, use shelf as support to stand, golfers reach to unload.
6. Work - work station assess. & mod., proper lift techniques/equipment, pacing
7. Leisure - pull suit case, fanny pack, back pack, raised garden beds, carts

Amputations:
Classification System

- * Transhumeral (short above-elbow amputation (short AE))
- * Transhumeral (stander AE)
- * Transradial (radius ulna (BE))
- * Transfemoral (above knee (AK))
- * Transtibial (BK)
- * Syme's ankle (complete tarsal) disarticulation

Amputations:
PRECAUTIONS & CONTRAINDICATIONS

- Joint complications: decrease ROM
Skin complications:
- * Preprosthetic phase - delayed healing, extensive skin grafts, reduction of edema
 - * Prosthetic Phase - decubitus ulcers, infected sebaceous cysts, allergic reactions
 - * Postprosthetic Phase - skin breakdown, scar adhesions
 - * Sensory complications: pain, body scheme/image
 - * Psychological Complications: severe depression, suicidal impulses

Amputations:
INTERVENTION/Tx AREAS

1. Improve body image, self-image, psychosocial adjustment
2. Promote I fxn during ADLs and IADLs
3. Promote wound healing
4. Improve desensitization of the limb
5. Pain management
6. Residual limb shaping & shrinking
7. Promote proper skin hygiene
8. Promote care of insensate skin
9. Maintain & restore passive & active ROM
10. Maintain & restore UE strength & end.
11. Improve understanding of prosthetic components

Amputations:
INTERVENTION - Pre-prosthetic phase

1. Provide emotional support
2. Instruct in limb hygiene & expedite wound healing
3. Maximize limb shrinkage with limb shaping:
 - Elastic bandage
 - Elastic shrinker
 - Removable rigid dressing
 - Immediate post-operative prosthesis
 - Early post-operative prosthesis
4. Desensitize the Residual limb (bear weight, massage, tapping/rubbing, wrapping)
5. Maintain or decrease ROM & Strength of the limb
6. Facilitate I in daily living activities (unilateral vs bilateral)

Osteoarthritis (OA):
Diagnostic Criteria

- Hand pain, aching, stiffness of 3-4 of the following are required for a classification of OA of the hand;
1. Hard tissue enlargement of 2+ of 10 selected jts
 2. Hard tissue enlargement of 2+ distal IP jts
 3. Fewer than 3 swollen metacarpal joints
 4. Deformity of at least 1 of 10 selected joints
- History and physical exam
 - Radiographic information (presence of osteophytes, assymetrical jt space narrowing, subchondral bone sclerosis)

Osteoarthritis (OA):
PRECAUTIONS & CONTRAINDICATIONS

1. Osteophytes, erosions, jt narrowing, other skeletal problems
2. Pain, fatigue
3. Inflamed or unstable joints
4. Perform resistive activity or ex. w/caution
5. Possible sensory impairments
6. Fragile skin 2* disease or Rx side effects

Rheumatoid Arthritis (RA):
PRECAUTIONS & CONTRAINDICATIONS

1. Potential intolerance of thermal modal.
2. Respect pain
3. <> fatigue
4. <> placing stress on inflamed/unstable jts
5. Use resistive exercise/activity w/caution
6. Be aware of sensory impairments
7. Be cautious with fragile skin
8. Inflammation can be exacerbated with heat
9. Cold modalities are contraindicated for pts w/ Raynauds phenom

OA and RA
Principles of Joint Protection

- Respect pain as a signal to stop the activity.
- Reduce the force.
- Maintain muscle strength and joint ROM.
- Use each joint in its most stable anatomical and functional plane.
- Avoid positions of deformity & forces in their direction.
- Use the largest, strongest joints avail. for the job.
- Ensure correct patterns of movement.
- Avoid staying in one position for long periods.
- Avoid starting an activity that cannot be stopped immediately if it proves to be beyond capability.
- Balance rest and activity.

OA and RA:
Home Environmental Modifications

- Remove doors of cabinets or attach loops to door handles
- Lower the height of above counter cupboards
- Use swivel or pull-out shelves
- Replace standard oven with a microwave oven on a surface that accommodates available reach
- Replace doorknobs with long lever handles
- Replace faucet handles with long lever handles
- Use remote control devices to automate on/off switching of common electrical devices
- Lower closet rods if reach is limited

OA and RA:
Common Assistive Devices

- * Dressing: dressing stick, shoe horn, sock aid, button hook, zipper pull, elastic shoe laces
- * Bathing: hand held shower hose, bath bench, grab bars, long handled sponge
- * Toileting: Raised toilet seat, grab bars
- * Hygiene and grooming: built up or extended handle toothbrush, suction denture brush, extended handle hair brush/comb, suction nail brush, mounted nail clipper
- * Feeding: Built up or extended handle utensil, light weight T-handle mug
- * Meal Prep: Electric can/jar opener, adapted cutting board, built up handle utensils, ergonomic right-angled knives, rolling utility cart, reacher, spring lever scissors, electric chopper, high kitchen stool, stool on rollers
- * Home Maintenance: long handled dust pan, bucket on rollers
- * Work and School: Luggage cart, rolling cart, backpack, fanny pack, computer forearm-wrist rest, adapted key holder, built up handle for writing, telephone head set, adapted hand tools, electric stapler and pencil sharpener
- * Leisure: adapted gardening tools, rolling stool for gardening, card holder, reading rack, knob turner

Fibromyalgia
INTERVENTION/Tx AREAS

1. Self Management Approaches
2. Patient Education - fatigue management, energy conservation, body mechanics, pacing
3. Lifestyle Changes
4. Basic Sleep hygiene measures:
 - a. Develop a regular sleep-wakefulness schedule
 - b. develop a relaxing routine b4 bed time
 - c. reduce the irritation of noises inside outside the room and/or use ear plugs/white noise machines
 - d. spend some quiet time by ones self
5. Fatigue Management
6. Cognitive Dysfunction - memory aids, use PDA for schedules and alarms, lists
7. Pain & Stress management

Cardiopulmonary Conditions
PRECAUTIONS & CONTRAINDICATIONS

1. ****Exercise intolerance****
2. Chest pain or pain referred to teeth, jaw, ear, or mouth
3. Excessive fatigue, SOB
4. Lightheadedness or dizziness
5. Nausea or vomiting
6. Unusual weight gain of 3-5lbs in 1-3days

Pulmonary Rehabilitation

1. ADL Evaluation and Training - limitations 2 **dyspnea, myo wasting** 2 disuse, O2 during activity prn, monitor vitals
2. Breathing Techniques
3. UE strengthening - use free weights, therapy band, arm ergometer.
4. Work Simplification and Energy Conservation -
 - * bathing w/vent fan OR leaving the door open to decrease humidity.
 - * shower chair and thick terry robe to decrease energy expenditure.
 - * use of AD to conserve energy
 - * schedule activities that require more energy after use of inhaler.
 - * adapt previous activities to fit current health.
5. Stress Management

Pulmonary Rehabilitation: Breathing Techniques

1. Pursed Lip Breathing:
 - * Breathe in through your nose
 - * With your lips pursed > exhale air slowly
 - * Exhale twice as long as inhaling, if possible
2. Diaphragmatic Breathing:
 - * Sit in relaxed position (elevate feet preferably)
 - * Place hand on your abdomen > as you inhale through your nose, try to feel stomach > push out at your lungs fill with oxygen
 - * Next, feel your stomach go down as you slowly breathe out through pursed lips.
 - * Stop the diaphragmatic breathing if you become lightheaded or fatigued

Respiratory Diseases: PRECAUTIONS & CONTRAINDICATIONS

Oxygen saturation below 90%
Altered breathing patterns
SOB
Perspiration
Anxiety
Cough
Cyanosis (bluish discoloration of skin 2*
decreased circulation, decreased O2 in blood)

OA & RA INTERVENTION/Tx AREAS

1. Splinting:
 - a. Resting hand splints in the acute stage
 - b. Wrist splint only if arthritis specific to wrist
 - c. Ulnar drift splint to prevent deformity
 - d. Silver ring splints to prevent boutonniere & swan neck deformities
 - e. Dynamic MCP extension splint w/radial pull for post-operative MCP arthroplasties
 - f. Hand base thumb splint for CMC arthritis
2. Incorporate joint protection & energy conservation during ADL & functional activities.
4. ROM: focus on AROM - should be pain free
5. Heat modalities
 - a. Hot packs before exercise
 - b. Paraffin recommended for the hands
6. Strengthening:
 - a. Avoid during inflammatory stage
 - b. Avoid deformity positions
7. AE to prevent deformity, decrease stress on small joints, & extend reach

SPLINTS for: Nerve Injuries

1. Brachial plexus injury: flail arm splint
2. Radial nerve palsy: dynamic wrist, finger, & thumb extension splint
3. Median nerve injury: opponens splint, C-Bar or thumb post splint
4. Ulnar nerve injury: dynamic/static splint to position MPs in flexion
5. Combined median ulnar: figure-of-eight or dynamic MCP flexion splint
6. Carpal tunnel syndrome: wrist splint positioned 0-15* extension

SPLINTS for: Nervous system Injuries

1. Spinal cord (C6-C7): tenodesis splint
2. Flaccidity: resting splint
3. Spasticity: spasticity splint or cone splint
4. Muscle weakness (ALS, SCI, Guillain-Barre): balanced forearm orthosis (BFO), deltoid sling/suspension sling

SPLINTS for:
OA & RA Conditions

Arthritis: functional splint or safe (resting) splint, depending on stage

1. DeQuervains: thumb splint, includes wrist, IP joint free
2. Skier's thumb: (UCL) hand based thumb splint
3. CMC arthritis: hand based thumb splint
4. Ulnar drift: ulnar drift splint
5. Boutonniere & swan neck deformities: silver ring splint
6. CMC arthritis: hand based thumb splint
7. Post-operative MCP arthroplasties: dynamic MCP extension splint w/radial pull

SPLINTS for:
Flexor Tendon Injury

Kleinert or Duran dorsal protection
splint

Splinting Positions

1. Functional position:
 - a. Wrist 20-30* extension
 - b. MCPs 45* flexion
 - c. IPs 20-30* flexion
 - d. Thumb ABDucted
2. Safe (resting) position:
 - a. Wrist 0-20* extension
 - b. MCPs 70-90* flexion
 - c. IPs in extension
 - d. Thumb ABDucted and extended

Deformity Positions
AVOID the following positions:

1. Wrist flexion
2. MCP hyperextension
3. IP joints flexed
4. Thumb ADDuction

which shoulder dysfunction is being described...loss of AROM & PROM in shoulder particularly ext rotation and to a lesser degree, abduction and internal rot?

adhesive capsulitis

what shoulder condition is being described...painful arc of motion between 80-100 degrees elevation or at end range of active elevation?

subacromial impingement

what shoulder condition is being described...painful AROM or resistive rotator cuff muscle use?

rotator cuff tendinitis

what shoulder condition is being described...significant substitution of scapula with attempted arm elevation?

rotator cuff tear

which test is being described and which condition would you use this test...examiner passively overpressures the client's arm into end-range elevation. This movement causes a jamming of the greater tuberosity against the anterior inferior acromial surface. If test is positive client expresses pain.

Impingement Test--subacromial impingement

which shoulder test is being described and what condition would you use this test...passively abduct the client's arm to 90 degrees with the palm down. Ask client to lower the arm. If they experience pain or are unable to lower smoothly with good motor control then this is considered a positive test result.

Drop arm test--rotator cuff tear

describe Adson Maneuver and what condition a positive test would suggest?

palpate the radial pulse on the testing arm. Client rotates head toward testing arm, extends the head and holds a deep breath while the arm is being laterally rotated and extended. Positive sign is the disappearance or slowing of pulse rate. Thoracic outlet syndrome

describe Roos test and what condition a positive sign would suggest?

Client abducts both arms to 90 degrees, shoulder external rotation, and elbow flexion to 90 degrees for 3 min while slowly alternating between an open hand and a clenched fist. Positive sign is inability to maintain position for full time or symptoms arise before the end of 3 mins. Thoracic Outlet Syndrome

describe Tinel's Sign and most common condition a positive test is linked to

gently tapping along the course of a peripheral nerve, starting distally and moving proximally to elicit a tingling sensation in fingertip. Point where tingling is noted indicates the approximate location of nerve compression. Carpal Tunnel Syndrome

Describe Phalen's Test and reverse Phalen's Test

pressing back of hands together with fully flexing wrists, reverse is palms pressing together with fully extended wrists for 1 min.

<p>describe carpal compression test</p>	<p>pressure is placed over median nerve in the carpal tunnel for up to 30 sec looking for provocative signs</p>
<p>describe elbow flexion test and what condition would elicit a positive sign</p>	<p>client fully flexes the elbows with the wrists fully extended for a period of 3-5 mins. positive test is tingling along ulnar nerve area along forearm and hand. Screens for Cubital Tunnel Syndrome</p>
<p>describe Froment's Sign and Jeanne's Sign</p>	<p>have client grasp piece of paper between thumb and index finger. Paper is pulled from client and the tip of the thumb flexes because of absence of adductor pollicus--if the MP joint of the thumb also extends at the same time it is called Jeanne's Sign. Sign of Ulnar nerve Palsy</p>
<p>what is Wartenberg's Sign</p>	<p>client is unable to adduct the small finger when the hand is placed palm down on the table with the fingers passively abducted</p>
<p>describe quick way to assess radial nerve motor function</p>	<p>ask client to extend wrist and fingers</p>

describe quick way to assess median nerve motor function

ask client to oppose the thumb to the fingers and flex the fingers

what is the direction sensory mapping of the volar surface of hand be done and how frequently should mapping be done during nerve regeneration?

should be done from proximal to distal and radial and ulnar to medial directions. should repeat monthly during nerve regeneration.

name and describe 2 objective tests of sympathetic function done with nerve function?

Wrinkle Test--immerse hand in water for 5 mins and note the presence or absence of skin wrinkling. denervated skin does not wrinkle
Ninhydrin Test--evaluates sweating of the finger. absence of sweating has been correlated with the lack of discriminatory sensation

name some signs of sympathetic dysfunction seen in peripheral nerve conditions

smooth, shiny skin
nail changes
tapering of fingers (pencil-pointing)

normal 2 pt discrimination distance at the fingertip is...

6 mm or less

describe modified moberg pick-up test

9 or 10 small objects placed on a table then client is asked to pick them up and place in small container as quickly as possible with vision. client is timed. client repeats with other hand. Then whole test is repeated with vision occluded. client is asked to identify each item with and without vision.

why would you measure hand volume at different points during the day

to assess the effect of intervention and activities and rest vs activity, benefits of splinting on client's edema

when using a dynamometer or pinch gauge how many trials to you take to find the average

a mean of 3 trials for each hand should be noted

should a physical assessment be done before or after a functional assessment?

Before-so that the therapist can be aware of the physical dysfunction before so that the therapist can critically analyze how it impacts their functional impairment and understand the reasons they function the way they do.

describe intervention process postoperative nerve repair?

Immobilization (2-3 weeks):
-position of minimal tension on repaired nerve
Protective ROM (4-6 weeks):
-protective stretching with active ROM
-dynamic splinting to gradually reduce contractures and assist weak muscles
-as motor function returns use of PNF techniques and NMES can help to strengthen

name 3 types of modality tests for nerve injuries/

-pain
-heat/cold
-touch pressure

name 2 functional tests used with nerve injuries

two-point discrimination
Moberg Pick-Up Test

List 3 objective tests for nerve injuries?

-Wrinkle Test
-Ninhydrin Test
-Nerve-conduction Test

describe sensory distribution of Median Nerve?

-Volar surface of the thumb, index, middle, and radial half of the ring finger
-Dorsal surface of the index, middle, and radial half of the ring finger distal to the PIP joint

describe sensory distribution of Ulnar Nerve?

-Dorsal and volar surface of the small finger
-Dorsal and volar surface of the ulnar half of the ring finger

Describe sensory distribution of Radial Nerve?

- Posterior upper arm and forearm
- Dorsum of the thumb, index, middle, radial half of the ring finger to the PIP joints

list 3 primary tx's of hand or wrist fractures?

- closed reduction (nonoperative)
- ORIF (operative)
- External Fixation (cast or splint may be used to maintain immobilization)

list clinical signs of a high level median nerve injuries?

- Ulnar flexion of wrist
- loss of palmar abduction and opposition
- loss of pronation
- sensory loss

clinical signs of low level (wrist) median nerve injury?

- loss of thenar eminence
- loss of palmar abduction
- loss of opposition
- sensory loss

difference between anterior interosseous nerve injury and a median nerve injury?

- sensory loss does not occur
- loss of flexion to thumb, index and middle fingers--pinch is impacted
- pronation is not impacted

<p>clinical signs of low ulnar nerve injury at wrist level?</p>	<ul style="list-style-type: none"> -clawing of the ring and small fingers -loss of hypothenar muscles -loss of intrinsic muscles -greater IP flexion deformity
<p>clinical signs of high ulnar nerve injury at or proximal to the elbow?</p>	<ul style="list-style-type: none"> -clawing of the ring and small finger -wrist positioned in radial extension- -MAIN DIFFERENCE -slight IP joint flexion deformity -loss of hypothenar muscles -loss of intrinsic muscles
<p>what is one of the main functions of splinting for a ulnar nerve injury?</p>	<p>-to prevent hyperextension of the MCP's of the ring and small finger by using an extension block splint. Places the ring and little finger in slight flexion at the MCP's.</p>
<p>clinical signs of high (above supinator) radial nerve injury?</p>	<ul style="list-style-type: none"> -pronation of forearm -wrist flexion -thumb in palmar abduction -Incomplete MP joint extension -loss of sensation in radial nerve distribution in forearm and hand
<p>clinical signs of posterior interosseous nerve syndrome or radial nerve compression?</p>	<ul style="list-style-type: none"> -radial wrist extension -loss of finger and thumb extension -NORMAL SENSATION

clinical signs of low radial nerve lesion (posterior interosseous palsy)

- incomplete MP joint extension of fingers and thumb
- radial wrist extension
- distal sensory loss

describe the dynamic extension splint/dorsal forearm-based splint used with radial nerve injuries--

- wrist extension
- MCP joint extension
- Thumb extension
- and the dynamic part protects extensors from being overstretched while allowing active use of the hand with functional activities.

which test was designed to measure one's ability to perform general arm and hand activities used in daily living. Developed from assumption that complex UE movements used to perform ordinary ADL's can be reduced to specific grasp patterns of hand, supination & pronation of forearm, flexion & extension of elbow, and elevation of arm.

The Quantitative Test of Upper Extremity Function

what are the 6 subtests of the Quantitative Test of Upper Extremity Function?

- grasping & lifting 4 blocks of different sizes
- grasping & lifting 2 pipes of graduated sizes (cylindrical grip)
- grasping and placing a ball (spherical grasp)
- pick up and place marbles of different sizes to test fingertip prehension or pinch
- putting washer over a nail & putting an iron on a shelf to test placing
- pouring water from pitcher to glass and glass to glass

Name 4 more tests of hand dexterity in addition to the Quantitative Test of Upper Extremity Function?

- Crawford Small Parts Dexterity Test
- Bennett Hand Tool Dexterity Test
- Purdue Pegboard Test
- Minnesota Manual Dexterity Test

what 2 things should be done after a cast or brace is removed after a fracture?

-establish baseline ROM
-measure for edema and begin management

Give 2 reasons why a splint might be indicated post immobilization period for a fracture?

-to correct abnormal joint changes resulting from immobilization
-to protect the finger from additional trauma to fracture site

most common wrist injury

Colles fracture of the distal radius

what is the 2nd most injured bone in the wrist?

scaphoid-often fractured when wrist is dorsiflexed at time of injury. often requires extended immobilization

Trauma to the lunate bone of wrist may result in avascular necrosis of the lunate--what disease is this?

Kienbock's Disease and can be treated with a bone graft, removal of the proximal carpal row, or partial wrist fusion.

name & describe the 3 categories of nerve injuries

Neuropraxia:
-bruising contusion of nerve without wallerian degeneration. nerve recovers function without intervention within a few days or weeks
Axonotmesis:
-nerve fibers distal to site of injury degenerate but internal structure of nerve remains intact. no surgical intervention needed. typically 6 mons recovery
Neurotmesis:
-complete laceration of both nerve and fibrous tissues. Surgery required

at what point after a nerve repair might a surgeon consider a tendon transfer

-1 year if a motor nerve has not reinnervated its muscle

where is zone 2 or no man's land?
why is this the most difficult area to treat?

between the distal palmar crease and the insertion of the flexor digitorum superficialis
-tendons lie in their sheaths in this area beneath the fibrous pulley system and any scarring causes adhesions

describe the Kleinert technique for treating flexor tendon repairs in zone two-present timeline

Rubber Band Traction Technique:
Part I-wear 24 hrs daily for 3 weeks
-Post surgery, rubber bands attached to nails of involved fingers attached to a safety pin on palm and attached to distal strap of splint. PIP joints with rubber bands will be positioned in 40-60 degrees of flexion without tension on the rubber bands. Person should be able to actively extend PIP joints fully to prevent contractures
-Dorsal blocking splint is made to maintain MCP joints in 60 degrees of flexion.
-Pt should actively extend the fingers several times a day in splint allowing rubber bands to pull the fingers into flexion-this should allow the tendons to move through the tendon sheath and pulley system to minimize scar adhesions
Part II-Dorsal Blocking Splint removed at 3 weeks
Part III-Rubber band(s) is attached to a wristband which is worn for an additional 1-5 weeks

what is the primary disadvantage of using the Kleinert Technique for flexor tendon repair?

Contractures of the PIP joint frequently occur as a result of excessive tension on the rubber band or incomplete PIP extension within the splint

how might flexor tendon injuries be treated with people who have multiple injuries, fracture/nerve or tendon injuries?

Complete immobilization for roughly 3-4 weeks

what resides in zone IV & V

IV=Carpal Tunnel
V=forearm

What resides in zone I & III

I=insertion of flexor digitorum profundus to insertion of flexor digitorum superficialis
III=A1 Pulley to the distal edge of the carpal tunnel

describe the Duran Method or controlled passive motion approach in treating flexor tendon repair?

-dorsal blocking splint is worn-keeping wrist flexed and MCP at 70 degrees flexion.
-day 3 post surgery, client instructed on a 2x's a day regime of passive flexion and extension of 6 to 8 motions for each tendon.
-4.5 weeks dorsal splint removed and rubber band traction is attached to a wristband. active extension & passive flexion performed for an additional week and then gradually progresses.

when are tendon gliding exercises introduced to flexor tendon repairs?
when can passive extension be introduced?

postacute phase once splints are discontinued
-6 weeks postop safe to do passive extension

what can be done at 8 weeks post flexor tendon repair?

resistive exercise can begin

in hand injuries where is pitting edema most likely found on the hand and why?

dorsal surface, where venous and lymphatic systems provide return of fluid to heart.

describe procedure for using a contrast bath for edema maintenance post hand injury?

--cold (66 degrees) tub and warm (96 degrees) tub should be placed as high as possible to provide elevation of the extremity.
--start with cool bath 1 min then warm 1 min for a total of 20 min.
--place a sponge in each bath and gently squeeze sponge
--always start and end with cool

symptoms of carpal tunnel syndrome?

- parathesia over thumb and 2 & 1/2 fingers
- burning pain
- decreased thumb opposition/abduction
- awakened at night
- clumsiness
- sensory loss

list some tx options for carpal tunnel syndrome during acute phase

- rest
- modify activity for wrist posture, vibration and decrease repetition
- NSAID's
- local steroid injection
- tendon-gliding exercises
- wrist neutral splint at night and during strenuous activity

if you have aching or sharp pain along the proximal and medial forearm along with decreased sensation in the dorsal and palmar surface of the small finger and ulnar half of ring finger, what might you have?

cubital tunnel syndrome,
compression of ulnar nerve
between medial epicondyle and
olecranon

what provocative tests could you do if you suspect cubital tunnel syndrome?

Tinel
elbow flexion test with wrist neutral
wartenberg sign
froment sign

how to splint cubital tunnel syndrome

elbow flexed at ~ 30-45 degrees
wrist neutral
wear at night up to 3 months
use of elbow pads or soft splints
during day

name 6 cumulative trauma disorders

- carpal tunnel syndrome
- medial epicondylitis
- lateral epicondylitis
- trigger finger
- cubital tunnel syndrome
- de Quervain Disease

signs & symptoms of lateral epicondylitis (tennis elbow)

- pain tenderness extensor wad and lateral epicondyle, pain might radiate into ring and little fingers
- redness and warm
- inflammation

what muscle most likely has tears and contributes to lateral epicondylitis

extensor carpi radialis brevis

how might you diagnose lateral epicondylitis

--look for pain with resistive wrist extension and passive wrist flexion, however no pain with resistive wrist flexion or with elbow flexion or extension
-tinel test of radial nerve

what type of splint would be best for lateral epicondylitis?

wrist cock-up splint (wrist 0-30 degrees extension)

primary muscle involved with medial epicondylitis (golfers elbow)

-Flexor carpi radialis

what areas would be painful with medial epicondylitis

flexor wad and medial epicondyle

how would you test for medial epicondylitis

resist wrist flexion and look for pain
pain with passive wrist extension

what kind of splint should be used with medial epicondylitis

neutral wrist splint

what 2 muscles are involved in de Quervain's

abductor pollicis longus
extensor pollicis brevis

whats the pain pattern associated with de Quervain's

pain over radial styloid which may travel distal or proximal.
pain with thumb flexion and ulnar deviation.
pain with gripping

what provocative test should you do for de Quervain's

Finkelstein's Test

what type of splint would work best for de Quervain's?

forearm based thumb spica

what is this describing...catching or snapping during active flexion or extension of finger? why is this occurring?

Trigger Finger

- flexor tendon nodules proximal to A1 pulley are struggling to pass through resulting in pain and decreased ROM
- due to inflammation of flexor tendon or stenosis of pulley sheath

describe some functional problems associated with median nerve injury

- safety issues due to sensation loss to volar surface of hand--as a result people will use their hand less and are less aware of their hand.
- grip greatly impacted
- need to learn to use vision when using hand

describe some functional problems associated with radial nerve injuries

- ineffective grip due to tendency for wrist to be flexed
- loss of tenodesis action of hand
- more prone to wrist flexion contracture

describe some functional problems associated with ulnar nerve injuries

- ineffective grip
- inability to open hand to grasp large objects
- inability to use pinch grip due to loss of thumb adduction control
- sensory loss to ulnar side of hand

Behavioral Rehearsal

- specific learning activities that incorporate role-playing
 - used to teach new behaviors
- OR
- to provide support to individuals in allowing them to explore multiple resources to problem solutions

Corrective Learning

- may be used to describe OT intervention
- pt's. learn to recognize inappropriate behavior and replace it with more adaptive behavior.
- often occurs in context of social skills and parenting experiences

Habit Maps (aka: frameworks of habits)

- these are behind habits
- are framework for:
1. perceiving familiar events and context
 2. guides for habitual behavior

Maladaptive Behavior

- includes behavior excesses
- can occur when an individual who is trying to act in an acceptable manner, does not recognize that his/her behavior is unacceptable.

Performance Deficit

- the person is able to perform the desired skill, but fails to do so in a situation that calls for it
- OR
- fails to demonstrate the skill with the necessary consistency (intensity, duration, or frequency)

Psychotropic Medication

- antipsychotic medications
- used in the treatment of schizophrenia and mania

Behavioral Excess

- a behavior is occurring at too great a frequency, intensity, and/or duration
- behavior problems can result from these
- not all behavioral excesses represent behavior to be eliminated, but may just need to be reduced
- carefully avoid reinforcing it to reduce/eliminate it

Adaptive Behaviors

- Enable the individual to:
1. satisfy personal needs
 2. live according to his/her values
 3. achieve independence
 4. achieve pleasure
 5. live in harmony with others in society

Behavior Contract

Sometimes performance goals and intervention strategies are written in form of contract.

- A verbal or written agreement between pt. and therapist (or another person) that defines the:
- roles of each during therapy
 - behavioral goals, reinforcements, and their schedules
 - strategies used to enhance learning
 - and other related negotiations
 - if written, both therapist and pt. sign

Adaptive response	<p>An appropriate action in which the individual responds successfully to some environmental demand.</p> <p>Adaptive responses require good sensory integration, and they also further the sensory integrative process.</p>
Dexterity	Skill & speed in doing something w/your hands.
Equilibrium	A state of balance or equality between opposing forces.
Fine motor coordination	<ul style="list-style-type: none">- involves small muscle groups- usually includes finger dexterity and/or skilled manipulation of objects with the hands
In-hand manipulation	<ul style="list-style-type: none">- Shift- Translation (fingers to palm)- Translation (palm to fingers)- Rotation (may be simple or complex depending on object's orientation)

<p>Nutritive sucking</p>	<ul style="list-style-type: none"> - to obtain nutrition - initial continuous sucking burst, >> intermittent sucking bursts, bursts become shorter & pauses longer over course of feeding - rate of 1 suck per second Suck/Swallow ratio: <ul style="list-style-type: none"> - Young infant 1:1 - Older infant 2:1 or 3:1
<p>Visual-motor integration</p>	<ul style="list-style-type: none"> - Involves coordinating the interaction of information from the eyes and body movement. - Dependent upon: visual attention, visual memory, visual discrimination, kinesthesia, position in space, figure ground, form constancy, and spatial relations.
<p>Inclusion</p>	<p>An approach to educating children with special needs in which they are included in regular classrooms, with "appropriate aids and services", as required by law</p>
<p>Individualized education program (IEP)</p>	<ul style="list-style-type: none"> - A management tool required for every student covered by the provisions of the Individuals with Disabilities Education Act. - Must indicate a student's current level of performance, ST & LT instructional objectives, services to be provided, and criteria & schedules for evaluation of progress.
<p>Individuals with Disabilities Education Act (IDEA)</p>	<ul style="list-style-type: none"> - Federal law passed in 1990 and reauthorized in 1997 and 2004, which extends full education services and provisions to people with cognitive, emotional, or physical disabilities from birth until age 21 IDEA operates under six basic principles: <ol style="list-style-type: none"> 1. zero reject 2. nondiscriminatory identification and evaluation 3. free and appropriate public education 4. least restrictive environment 5. due process 6. parent and student participation in shared decision making with regard to educational planning.

Overresponsiveness

Disorder used interchangeably with hyperresponsivity

Sensory modulation

- Ability to maintain an alert and focused state.
- Tendency to generate responses that are appropriately graded in relation to incoming sensory stimuli, rather than hyporesponsivity ---- hyperresponsivity.

Gravitational insecurity

Extreme fear and anxiety that one will fall when one's head position changes or when moving through space, resulting from poor vestibular and proprioceptive processing.

Intervention settings

1. Early intervention
2. Schol based
3. Hospital-based acute
4. Hospital-based outpatient

Fine motor grasp patterns

1. Hook
2. Power
3. Lateral pinch
4. Pad to pad, 2-point pinch
5. Tip pinch
6. Ulnar-palmar grasp
7. Radial-digital grasp
8. Spherical grasp
9. Cylindrical grasp
10. Disc grasp

<p>Sensory diet</p>	<p>The multisensory experiences that one normally seeks on a daily basis to satisfy one's sensory appetite.</p> <p>A planned and scheduled activity program that an occupational therapist develops to help a person become more self-regulated.</p>
<p>Sensory Integration (aka Sensory processing)</p>	<p>The organization of sensory input for use.</p> <p>The "use" may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function.</p> <p>Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction.</p>
<p>Sensory Integrative Processing Disorder (SPD)</p>	<p>An irregularity or disorder in brain function that makes it difficult to integrate sensory input effectively.</p> <p>Sensory integrative dysfunction may be present in motor, learning, social/emotional, speech/ language or attention disorders.</p>
<p>Sensory Integrative Processing Disorder (SPD)</p> <p>Sensory systems addressed</p>	<ol style="list-style-type: none"> 1. Tactile <ul style="list-style-type: none"> - Tactile modulation for tactile defensiveness, over-responsivity/under-responsivity and sensory seeking. - Tactile discrimination 2. Proprioception <ul style="list-style-type: none"> - Deficits in modulation demonstrated by over-responsivity/under-responsivity & sensory seeking - Discrimination deficits 3. Vestibular <ul style="list-style-type: none"> - Deficits include: over-responsivity/under-responsivity, hypersensitivity (aversion response), sensory seeking, & gravitational insecurity (fear response).
<p>Sensory Integrative Processing Disorder (SPD) Interventions</p> <p>Tactile Modulation deficits</p>	<ol style="list-style-type: none"> a. self-applied stimuli are more tolerable b. provide deep touch/firm pressure where child can see source of stimuli c. provide controlled sensory activities that simultaneously provide tactile and vestibular-prop info. d. begin with slow linear movements e. apply tactile stimulation in direction of hair growth f. follow tactile stimuli with joint compression g. monitor/adjust stimuli the influences modulation (eg. lighting, sound, etc.)

<p>Sensory Integrative Processing Disorder (SPD) Interventions</p> <p>Tactile Discrimination deficits</p>	<p>a. provide deep touch pressure to the hands + body.</p> <p>b. usu. provided along with tx for deficits in motor planning.</p> <p>c. graded activities via a mixture of textures & items.</p>
<p>Sensory processing disorder Interventions</p> <p>Proprioceptive Modulation deficits</p>	<p>a. over-responsivity/under-responsivity and sensory seeking</p> <p>b. provide firm touch, pressure, joint compression or traction</p> <p>c. provide activities in various body positions combining vestibular proprioceptive info.</p> <p>d. provide slow linear mvmt., resistance, & deep pressure</p> <p>e. use adaptive techniques (eg weighted vest)</p>
<p>Sensory Integrative Processing Disorder (SPD) Interventions</p> <p>Proprioceptive Discrimination deficits</p>	<p>a. provide same tx as for prop. modulation</p> <p>b. provide activities requiring child to demonstrate ability to grade the force or efforts of mvmt.</p>
<p>Sensory Integrative Processing Disorder (SPD) Interventions</p> <p>Vestibular Modulation deficits</p>	<p>a. grade for type & rate of mvmt. & for amount of resistance. Observe precautions!</p> <p>b. introduce linear mvmt. with touch pressure in prone & provide resistance to active mvmts., especially for gravitational insecurity.</p> <p>c. use linear vestibular stimuli to increase awareness of spatial orientation.</p> <p>d. provide rapid rotary & angular mvmts. with frequent starts/stops & acceleration/deceleration to increase ability to distinguish the pace of mvmt. (semicircular canals).</p>
<p>Pediatric Pulmonary Disorders</p> <p>Cystic Fibrosis (CF)</p>	<p>a. Genetically inherited autosomal recessive trait, gene mutation.</p> <p>b. Both parents must be carriers. neither parent will have the disease.</p> <p>c. Life expectancy up to 26 years.</p>

Pediatric Pulmonary Disorders

Cystic Fibrosis (CF)
S/S

1. Chronic, progressive lung disease (abnormal mucus)
2. Salt concentration in the sweat.
3. Decreased release of certain enzymes by the pancreas.
4. Failure to grow properly.

Pediatric Pulmonary Disorders

Cystic Fibrosis (CF)
INTERVENTION

1. Energy conservation
2. Environmental adaptations to enhance performance
3. Positioning to promote postural drainage
4. NDT to improve endurance & postural stability.
5. Facilitation of fine, gross, visual motor, cognitive, & psychosocial development
6. Parent education
7. Observe medical precautions (respiratory cardiac contraindications).

Pediatric Pulmonary Disorders

Respiratory Distress Syndrome
(RDS)

- a. premature birth
- c. insufficient production of surfactant to keep alveoli (air pockets of the lungs) open

Pediatric Pulmonary Disorders

Respiratory Distress Syndrome
(RDS)
S/S

1. Lungs collapse after each breath
2. x-ray of lungs reveals "ground glass" appearance

Pediatric Pulmonary Disorders

Respiratory Distress Syndrome
(RDS)
INTERVENTION

1. Monitor development
2. Facilitate sensori-motor & cognitive development
3. Address psychosocial issues
4. Parent education - handling, positioning, energy conservation
5. Adapt environment prn
6. Observe medical precautions

<p>Pediatric Pulmonary Disorders</p> <p>Bronchopulmonary Dysplasia (BPD)</p>	<p>a. respiratory disorder usu. result of barotrauma: high inflating pressures, infection, meconium aspiration, asphyxia</p> <p>b. a complication of prematurity</p> <p>c. walls of lungs thicken, making the exchange of O₂ & carbon dioxide more difficult</p> <p>d. mucous lining of the lung is reduced along with the airway diameter</p>
<p>Pediatric Pulmonary Disorders</p> <p>Bronchopulmonary Dysplasia (BPD)</p> <p>INTERVENTION</p>	<ol style="list-style-type: none"> 1. facilitate sensori-motor & cognitive development 2. address psychosocial issues 3. adapt environment 4. parent education 5. parent advocacy related to acquiring necessary services & equipment 6. observe medical precautions
<p>Muscular Dystrophies/Atrophies</p> <p>Major Types (8)</p>	<p>A group of degenerative disorders due to a hereditary disease process.</p> <p>Types:</p> <ol style="list-style-type: none"> 1. Duchenne MD - the most common 2. Arthrogryposis multiplex congenita 3. Limb-girdle MD 4. Fascioscapulohumeral MD 5. Spinal MD 6. Congenital myasthenia gravis 7. Charcot-Marie-Tooth disease 8. Myopathies
<p>Muscular Dystrophies/Atrophies</p> <p>Duchenne's MD</p> <p>S/S</p>	<ul style="list-style-type: none"> - detected between 2-6 years old - is inherited, sex-linked and recessive occurring in males 1/3,500 births - individuals rarely survive beyond their early 20s* to respiratory problems, infections, and/or cardiovascular complications <ol style="list-style-type: none"> 1. enlargement of the muscles &/or forearm and thigh muscles giving an appearance the child is healthy 2. weakness of the proximal joints progresses to the point that the child has to crawl up his thighs w/his hands to stand 3. weakness occurs in all voluntary muscles, including the heart and diaphragm
<p>Muscular Dystrophies/Atrophies</p> <p>S/S</p>	<ol style="list-style-type: none"> 1. low muscle tone & weakness 2. possible difficulty with oral motor feeding >> ng or gastrostomy tube 3. weakness contributes to deformities of the extremities & spine. 4. difficulty w/breathing may require tracheostomies or mechanical ventilators, and frequently results in death.

Neurological System Disorders

GENERAL INTERVENTION GUIDELINES

1. positioning
2. postural control training
3. motor learning approaches
4. motor control retraining/relearning for functional integration of affected limbs
5. specific ADL training/retraining/adaptation
6. prescription of AD and technology
7. splinting for contracture prevention &/or enhancement of function (eg. tenodesis splint)
8. family education
9. visual skills training and/or adaptation
10. collaboration with educational team

Attention-deficit/hyperactivity disorder (ADHD)

Is a neurodevelopmental/mental health condition

Diagnostic criteria:

1. Inattention/distractibility
2. Hyperactivity
3. Impulsivity

Pervasive developmental disorders (PDD)

One of the autism spectrum disorders

A group of 5 disorders characterized by delays in development of multiple basic functions including socialization and communication:

1. PDD-NOS
2. Autism
3. Asperger syndrome
4. Rett syndrome
5. Childhood disintegrative disorder (CDD)

Developmental disabilities

A group of chronic conditions

An impairment in physical cognitive, speech or language, psychological, or self-care areas

Manifested during the dev. period (< 21 y.o.)

Neoplastic disorders

- a. Leukemia
- b. Brain tumors
- c. Hodgkin disease
- d. Bone tumors

Cardiopulmonary dysfunctions

1. Congenital heart disease: chromosomal abnormalities; increased, decreased, or obstructed pulmonary blood flow
2. Dysrhythmias: bradydysrhythmia, tachydysrhythmia
3. Respiratory problems: respiratory distress syndrome, bronchopulmonary dysplasia (BPD), asthma, cystic fibrosis
4. Hematologic disorders: sickle cell anemia, hemophilia

Congenital heart disease

A group of inherited muscle disorders associated with mitochondrial dysfunction.

Musculoskeletal disorders

1. Congenital anomalies: osteogenesis imperfecta, marfan syndrome, achondroplasia, multiplex congenital; congenital clubfoot, club hand, hip dislocation
2. Limb deficiencies: polydactyly, syndactyly, bradydactyly, microdactyly
3. Juvenile rheumatoid arthritis (JRA): pauciarticular, polyarticular, systemic
4. Soft tissue injuries: contusions, crush injuries, dislocation, sprain
5. Fractures
6. Curvature of the spine: lordosis, kyphosis, scoliosis

Neuromuscular disorders

1. Cerebral palsy
2. Epilepsy
3. Seizure disorders: general, partial, mixed seizure disorder
4. Muscular dystrophies: limb-girdle, facioscapulohumeral, congenital, Duchenne
5. Neural tube defects: encephalocele, anencephaly, spina bifida
6. Hydrocephalus
7. Peripheral nerve injuries: brachial plexus lesions (Erb-Duchenne palsy, Klumpke palsy), traumatic injury of peripheral nerves

Developmental disabilities

Types (9)

1. Mental retardation
2. PDD
3. ADHD
4. Learning disabilities
5. Tourette syndrome
6. Genetic & chromosomal abnormalities
7. Inborn errors of metabolism
8. Developmental coordination disorder
9. Sensory integrative processing disorder

Infectious conditions - maternal	<ol style="list-style-type: none">a. Syphilisb. Toxoplasmosisc. Rubellad. Cytomegaloviruse. Herpes
Hearing loss	<p>Conductive Sensorineural</p>
Mental disorders commonly affecting children & adolescents	<ol style="list-style-type: none">1. Mood disorders2. Anxiety disorders3. Obsessive-compulsive disorder4. ADHD5. PDD
Cystic fibrosis	<p>An autosomal recessively inherited disorder of the secretory glands leading to malabsorption & lung disease.</p>
Hemophilia	<ul style="list-style-type: none">- A rare bleeding disorder in which the blood doesn't clot normally.- Usually inherited- Bleeding can damage organs and tissues and may become life threatening

Sickle cell anemia

- Most common form of sickle cell disease
- Serious disorder; blood cells are crescent-shaped
- Block blood flow in the blood vessels of the limbs and organs.
- Blocked blood flow can cause pain, serious infections, and organ damage.

Osteogenesis imperfecta

A genetic disorder characterized by bones that break easily, often from little or no apparent cause.

Limb deficiencies

1. polydactyly
2. syndactyly
3. brachydactyly
4. microdactyly

Juvenile rheumatoid arthritis (JRA)

1. pauciarticular
2. polyarticular
3. systemic

Cerebral palsy

- A developmental disorder of mvmt. & posture due to a nonprogressive defect of the immature brain.
- May have associated nonmotor impairments: sensation, cognition, communication, and behavior, seizures

Epilepsy

A brain disorder in which a person has repeated seizures (convulsions) over time.

Epilepsy occurs when permanent changes in brain tissue cause the brain to be too excitable or jumpy. The brain sends out abnormal signals. This results in repeated, unpredictable seizures.

Seizure disorders

Seizures are episodes of disturbed brain activity that cause changes in attention or behavior.

Types: general, partial, mixed seizure disorder

Muscular dystrophies

Muscular dystrophy is a group of inherited disorders that involve muscle weakness & loss of muscle tissue, which get worse over time.

- Typically inherited
- No known cure
- Types: limb-girdle, facioscapulohumeral, congenital, Duchenne

Neural Tube Defects

Types (3)

A group of malformations of the SC, brain, and vertebrae. Three major types:

1. SPINA BIFIDA: most common type. Is a split of the vertebral arches
2. ENCEPHALOCELE: a malformation of the skull that allows a portion of the brain to protrude. Use. have intellectual disability, hydrocephalus, spastic legs/seizures.
3. ANENCEPHALY: more severe, where no neural development occurs above the brainstem. 50% of fetuses are spontaneously aborted.

Peripheral Nerve Injuries

Erb-Duchenne palsy: is a paralysis of the arm caused by injury to the upper group of the arm's main nerves, specifically the upper trunk C5-C6 is severed. Depending on severity, it may resolve on its own, require rehab, or surgery.

Klumpke palsy: is a form of paralysis of the muscles of the forearm & hand, resulting from a brachial plexus injury of the (C8) and (T1) nerves

Sensory Integration (SI)
(aka sensory processing)

- refers to the way the nervous system receives messages from the senses & turns them into appropriate motor and behavioral responses.
- senses include: the 5 senses + proprioception and vestibular senses

Sensory Integration (SI)
(aka sensory processing)

Principles/assumptions

1. Plasticity (structural changes) of the CNS allows for modification of the CNS.
2. SI occurs in a developmental sequential manner.
3. Higher cortical processing functions are dependent on adequate processing & organization of sensory stimuli by lower brain centers.
4. Adequate modulation of sensory stimuli must occur for an adaptive response to occur. Note: stimuli can be either facilitatory or inhibitory, and each sensory system influences other sensory systems.
5. Adaptive responses facilitate the integration of sensory stimuli.
6. Individuals seek out sensorimotor experiences that have an organizing effect.

Sensory Integrative Processing
Disorder (SPD)

(formerly known as sensory
integration dysfunction)

- a condition that exists when sensory signals don't get organized into appropriate responses.
- a neurological "traffic jam" that prevents certain parts of the brain from receiving the information needed to interpret sensory information correctly.
- difficult to process & act upon information received through the senses, >> challenges in performing countless everyday tasks.
- motor clumsiness, behavioral problems, anxiety, depression, school failure, & other impacts may result if not treated effectively.

Sensory Integrative Processing
Disorder (SPD)

S/S

1. overly sensitive to touch, mvmt, sights, or sounds
2. under-reactive to sensory stimulation
3. activity level that is unusually high or low
4. coordination problems
5. delays in speech, language, motor skills, or academic achievement
6. poor organization of behavior
7. poor self-concept

Modulation

- The brain's regulation of its own activity.
- Modulation involves facilitating some neural messages to maximize a response, and inhibiting other messages to reduce irrelevant activity.

<p>Vestibular sense (the balance and movement sense)</p>	<ul style="list-style-type: none"> - The sensory system that responds to the pull of gravity. - Provides information about the head's position in relation to the surface of the earth, and coordinating movements of the eyes, head, and body that affect equilibrium, muscle tone, vision, hearing, and emotional security. - Receptors are in the inner ear.
<p>Peripheral Nerve Injuries Erb-Duchenne palsy S/S</p>	<p>Paralysis of the muscles of the shoulder and arm supplied by C5-C6 following upper brachial plexus injury. Appearance: Upper limb with adducted shoulder, medially rotated arm, extended elbow. Lateral aspect of the arm also loses sensation. Specific causes: difficult birth, fall or blow to the shoulder, heavy weight falling on the shoulder.</p>
<p>Peripheral Nerve Injuries Klumpke palsy S/S</p>	<p>A type of brachial plexus injury involving C8-T1: lower arm paralysis, involves intrinsic muscles of hand, flexors and extensors of wrist and fingers. Characteristics: hand paralyzed, grasp reflex absent. Common causes: forcefully pulled humerus, individual falling from a height and clutching an object to save themselves, forceful pull of the shoulder of infant during birth process.</p>
<p>Spina Bifida Classification (3)</p>	<ol style="list-style-type: none"> 1. Spina bifida occulta <ol style="list-style-type: none"> a. Occult spinal dysraphism (OSD) b. Spina bifida cystica 2. Spina bifida with meningocele 3. Spina bifida with myelomeningocele
<p>Spina Bifida Spina bifida occulta + 2 subtypes</p>	<p>Spina bifida occulta: A bony malformation with separation of vertebral arches of 1+ vertebrae with no external manifestations. S/S: - Does not usu. result in any symptoms. - Occasionally slight instability and neuromyo impairments, eg. mild gait involvement & bowel or bladder problems. Subtypes: a. Occult spinal dysraphism (OSD): when external manifestations covering the site are present - eg. red birthmark, patch of hair, a dermal sinus (opening in skin), a fatty benign tumor, or dimple. S/S: SC is split or being tied down and tethered; may lead to neuro damage & developmental abnormality as child grows. b. Spina bifida cystica: an exposed pouch.</p>

<p style="text-align: center;">Spina Bifida</p> <p style="text-align: center;">Spina bifida with meningocele</p>	<p>Protrusion of a sac thru spine, containing CSF and meninges; does not include the SC.</p> <p>S/S:</p> <ul style="list-style-type: none"> - Usu. does not present w/symptoms impacting on fxn. as the SC itself is not entrapped. - Occasional slight instability and neuromyo impairments; eg. mild gait involvement & BI or B problems.
<p style="text-align: center;">Spina Bifida</p> <p style="text-align: center;">Spina bifida with a myelomeningocele</p>	<p>Protrusion of a sac thru the spine, containing CSF and meninges + SC or nerve roots.</p> <p>S/S:</p> <ol style="list-style-type: none"> 1. Sensory & motor deficits below the level of lesion; may result in LE paralysis &/or deformities, & B & B incontinence. 2. Level of lesions impact leg movements 3. Lesions of S2-S4 results in B & B problems. <ol style="list-style-type: none"> a. A neurogenic bladder impacts on sensation to urinate & the control of the urinary sphincter. b. Incompletes emptying of the bladder results; often leads to infections. c. A neurogenic bowel causes constipation & incontinence.
<p style="text-align: center;">Spina Bifida</p> <p style="text-align: center;">Medical Management</p>	<ol style="list-style-type: none"> a. During neonatal period precautions are taken to protect the sac from rupturing & from infection – which may result in meningitis. All or part of sac may be removed 24-48 hours after birth. b. Shunt: ventriculoperitoneal or other type is indicated if hydrocephalus occur, where the CSF is not absorbed resulting in and increase of size of the ventricles & infant's head. <ol style="list-style-type: none"> 1. Brain damage* increased intracranial pressure can cause mental retardation. 2. Arnold-Chiari Syndrome* increased pressure, a portion of the cerebellum & medulla oblongata slip down thru the foramen magnum to the cervical SC. 3. Shunts can become blocked resulting in increased intro-cranial pressure - extreme head growth, vomiting, severe headache, seizures. 4. Shunts can become infected - vomiting, lethargy, fever, seizures. c. Urological management. d. Orthopedic mgmt for motor deficits e. Surgical intervention
<p style="text-align: center;">Spina Bifida</p> <p style="text-align: center;">Interventions for Shunts</p>	<p>Issues with shunts can be life threatening:</p> <ol style="list-style-type: none"> 1. Immediate notification of S/S to the neurosurgeon is required. 2. Blocked shunts are revised by removing the blocked section & replacing it w/a catheter. 3. Infections are treated by withdrawing fluid thru or replacing the tubing. intravenous antibiotics are also administered. 4. Medications to reduce CFS production & intra-cranial pressure are sometimes used as an interim measure.
<p style="text-align: center;">Sensory Integrative Processing Disorder (SPD)</p> <p style="text-align: center;">Categories (3)</p>	<ol style="list-style-type: none"> 1. Sensory modulation disorder (SMD) 2. Sensory-based motor disorder (SBMD) 3. Sensory discrimination disorder (SDD)

<p>Sensory Integrative Processing Disorder (SPD)</p> <p>Sensory modulation disorder</p>	<p>a. Atypical response to sensory situations/experiences.</p> <p>b. Over or under responsiveness to sensory situations. excessive seeking or avoiding sensory situations/experiences.</p>
<p>Sensory Integrative Processing Disorder (SPD)</p> <p>Sensory-based motor disorder</p>	<p>a. deficits in proprioceptive and vestibular systems</p> <p>b. dyspraxia-difficulty planning movements, particularly those that are complex & new.</p>
<p>Sensory Integrative Processing Disorder (SPD)</p> <p>Sensory discrimination disorder</p>	<p>a. difficulty interpreting sensory information.</p> <p>b. persons with this disorder have difficulty perceiving "similarities and differences among stimuli</p> <p>c. may manifest itself with slow or awkward motor performance</p>
<p>Grasp patterns and reflexes</p>	<p>See TherapyEd: Human development and aging chapter for details.</p>

Arena assessments

- a team of professionals evaluates child.
- a transdisciplinary approach is used that allows child & caregiver to interact with only one professional throughout eval session

ADL for pediatrics

- ADL play a major role in a child's overall functional growth, confidence and independence.
 - skills include eating, feeding, toileting, bathing and grooming activities.
- Deficits in this area may be due to an underlying problem:
- impaired Sensory Integration
 - diminished Fine Motor / UE Coordination
 - poor motor planning which impacts ability to sequence, time & grade motor activities.

Criterion-referenced measurement

- the assessment/score on test performance that is based on the type of behavior expected of a person w/a given score.
- each criterion is established prior to the exam. Eg. a student may be shown 10 pictures for 2 minutes & then asked to recall as many as possible. The # of pictures recalled determines the score with, for eg., 3 pictures recalled as the average.
- the measurement may be expressed in: including checklists, rating scales, grades, rubrics, & %age of accuracy.

Feeding evaluation

- Assess the ability of the client to bring food or fluids to the mouth.
- A thorough feeding evaluation includes:
- medical history & physical exam
 - neurodevelopmental assessment
 - oral-pharyngeal evaluation
 - feeding hx
 - mealtime observation
 - a nutritional analysis: 3-day record of intake

Handwriting components

1. Memory: Remembering & writing dictated letters & #s
2. Orientation: Facing letters & #s in the correct direction.
3. Placement: Putting letter & #s on the baseline
4. Size: How big or small a child chooses to write
5. Start: Where each letter or number begins
6. Sequence: Order & stroke direction of the letter or number parts.
7. Control: Neatness & proportion of letters & #s
8. Spacing: Amount of space btw. letters in words, & between words in sentences.

<p>Developmental sequence</p>	<p>See charts</p>
<p>Battelle Developmental Inventory</p>	<p>Purpose: This inventory is designed to assess the achievement of specific early developmental skills and to identify developmental delays or disabilities. A screening version of the instrument is available.</p> <p>Population: Children birth through age 7; accommodations may be used for children with special needs.</p>
<p>Adolescent/Adult Sensory Profile</p>	<p>This self-questionnaire for individuals 11 years of age or older. Measures possible contributions of sensory processing to the person's daily performance patterns.</p>
<p>Ages & Stages Questionnaires</p>	<p>Screens children from birth to 5 years in communication, gross motor, fine motor, problem solving, and personal-social development.</p>
<p>Assessment of Motor & Process Skills (AMPS)</p>	<p>Measures the quality of a person's performance on goal-directed tasks of ADL and IADL.</p>

<p>Battelle Developmental Inventory (BDI)</p>	<p>Measures the development of children from birth to 8 years old. Domains assessed include personal-social, adaptive (self help), motor, communication, and cognition. A short version is available for screening.</p>
<p>Bayley Scales of Infant Development (second edition)</p>	<p>Measures the cognitive and motor development of infants from 1 to 42 months of age.</p>
<p>Bruininks-Oseretsky Test of Motor Proficiency</p>	<p>A measure of gross motor, upper limb, and fine motor proficiency in children 4.5 to 14.5 years old. A short form is available for brief screening.</p>
<p>Canadian Occupational Performance Measure</p>	<p>Helps identify the family's priorities for their child with special needs and assists in developing therapy goals with the child's primary caregivers.</p>
<p>Childhood Autism Rating Scale (CARS)</p>	<p>Identifies children over 2 years old who have mild, moderate, or severe autism & to distinguish those children from children w/developmental delay w/o autism.</p>

Denver Developmental Screening Test (revised) (Denver-II)

A standardized screening tool for children 1 month to 6 years old who are at risk for developmental problems in the areas of personal-social, fine motor adaptive, language, and gross motor skills.

Developmental Test of Visual Motor Integration (fourth edition) (VMI-4)

Identifies visual-motor integration deficits in children ages 3 to 8 years (short form) and ages 3 to 18 (long form) that can lead to learning and behavior problems.

Developmental Test of Visual Perception (second edition) (DTVP-2)

A norm-referenced tool
Measures the visual perception and visual-motor integration skills in children 4 to 10 years of age.

Developmental Test of Visual Perception - Adolescent and Adult

A battery of six sub-tests that measures different but interrelated visual-perceptual and visual-motor abilities in individuals 11 to 75 years of age.

Erhardt Development Prehension Assessment (revised)

Measures components of arm/hand development in children w/cerebral palsy or other neurodevelopmental disorders (all ages & cognitive levels).

<p>Evaluation Tool of Children's Handwriting (ETCH)</p>	<p>Evaluates the manuscript and cursive handwriting skills of children in grades 1 through 6.</p>
<p>Functional Independence Measure for Children (WeeFIM)</p>	<p>Assesses the functional outcomes in children & adolescents with acquired or congenital disabilities. Developmental level of 6 months to 7 years in the areas of self-care, mobility, & cognition.</p>
<p>Gross Motor Function Measure(revised)(GMFM)</p>	<p>Evaluates change in gross motor function in children with cerebral palsy. The measure is appropriate for children whose motor skills are at or below those of a 5 y.o. child w/o any motor disability.</p>
<p>Hawaii Early Learning Profile (HELP)</p>	<p>Curriculum-based assessment Used with infants, toddlers, young children, and their families to identify developmental needs, determine intervention goals, and track children's progress.</p>
<p>Motor-Free Visual Perception Test (MVPT-3)</p>	<p>This is a norm-referenced test used for individuals 4 to 70 years of age to assess visual-perceptual abilities that do not required more involvement to make a response.</p>

<p>Peabody Developmental Motor Scales (2nd edition) (PDMS-2)</p>	<p>This is a norm-referenced measure of gross & fine motor skills used for children from birth through 5 years.</p>
<p>Pediatric Evaluation of Disability Inventory (PEDI)</p>	<p>This is a standardized tool used to measure functional abilities (e.g. self-care, mobility, and social function) in children 6 months up to 9 years old.</p>
<p>Quality of Upper Extremity Skills Test (QUEST)</p>	<p>Evaluates movement patterns and hand function in children with cerebral palsy from 8 months to 8 years old. The four domains measured include dissociated movements, grasp patterns, protective extension reactions, and weight-bearing ability.</p>
<p>School Assessment of Motor and Process Skills (School AMPS)</p>	<p>Used to measure the student's schoolwork and task performance in typical classroom settings during the student's typical school routines.</p>
<p>Sensory Profile</p>	<p>Caregiver questionnaire was designed to measure the frequency of behaviors related to sensory processing, modulation, and emotional responsivity to sensory input in children 2 to 12 years old.</p>

Test of Visual-Motor Skills
(revised) (TVMS-R)

Measures eye-hand coordination skills needed to copy geometric designs in children 3 to 13 years of age.

Test of Visual-Motor Skills-
Upper Level (TVMS-UL)

Measures eye-hand coordination skills needed to copy geometric designs in individuals 12 to 40 years of age.

Test of Visual-Perceptual Skills
(revised) (TVPS-R)

Assesses visual-perceptual skills (e.g., discrimination, memory, spatial relations, form consistency, sequential memory, figure-ground and closure) in children 4 to 13 years old.

Test of Visual-Perceptual Skills -
Upper level (revised) (TVPS-R:UL)

Measures visual-perceptual skills in individuals 12 to 17 years old.

Sensory Integration and Praxis
Tests (SIPT)

Norm-referenced test. Measures the SI processes that underlie learning and behavior in children ages 4-9.

The 17 tests assess functioning in:

- visual perception
 - somatosensory processing (touch & prop)
 - vestibular processing
 - eye-hand coordination
 - motor planning or praxis
- Formal trng. is required to administer test.

Learning disorder

A difficulty in learning to read, write, compute, or do school work that cannot be attributed to impaired sight or hearing, or to mental retardation.

Dupytren's Disease

-disease of the fascia of the palm and digits that results in flexion deformities of the involved digits.
-etiology unknown
-conservative treatment has not been successful
-surgery is required (3 options: fasciotomy with Z plasty, aponeurotomy, McCash procedure <open palm>

OT intervention for Dupytren's Disease

1. wound care: dressing changes. Whirlpool if infection is suspected.
2. edema control: elevation above the heart
3. extension splint: initially at all times except to remove for ROM and bathing
4. A/PROM and progress to strengthening when wounds are healed
5. scar management (massage, scar pad, and compression garments).
6. functional tasks that emphasize flexion (gripping) and extension (release).

Skier's Thumb (Gamekeeper's Thumb)

-Rupture of the ulnar collateral ligament of the MCP joint of the thumb.
-most common etiology is a fall while skiing with the thumb held in a skii pole.

OT intervention for Skier's Thumb

1. Conservative treatment including a thumb splint 4-6 weeks
2. AROM and pinch strengthening (at 6 weeks)
3. Focus on ADL that require opposition and pinch strength
4. post-operative, treatment includes thumb splint for 6 weeks, followed by AROM. PROM can begin at 8 weeks and strengthening at 10 weeks.

Complex Regional Pain Syndrome (CRPS)

-Type I formerly known as reflex sympathetic dystrophy (RSD)
-Type II formerly known as causalgia
-Vasomotor dysfunction as a result of an abnormal reflex
-It can be localized to one specific area or spread to other parts of the extremity.
-Etiology: may follow trauma or surgery, but actual cause is unknown.
-symptoms include: severe pain, edema, discoloration, osteoporosis, sudomotor changes, and vasomotor instability.

OT intervention for CRPS

1. modalities to decrease pain
2. AROM to involved joints
3. ADL to encourage pain-free active use
4. Stress loading (weight bearing and joint distraction activities, including scrubbing and carrying activities)
5. splinting to prevent contractures and enable ability to engage in leisure/productive activities.
6. encourage self management

Interventions to AVOID with CRPS

PROM, passive stretching, joint mobilization, dynamic splinting, and casting.

Types of Fractures

1. intraarticular versus extraarticular
2. closed versus open
3. dorsal displacement versus volar displacement
4. midshaft versus neck versus base
5. complete versus incomplete
6. transverse versus spiral versus oblique.
7. comminuted.

Medical treatment for fractures

1. closed reduction: types of stabilization include short arm cast (SAC), long arm cast (LAC), splint, sling, or fracture base.
2. Open reduction internal fixation (ORIF), types include nails, screws, plates, or wire.
3. External fixation
4. Athrodesis: fusion
5. Athroplasty: joint replacement

Colles' fracture

fracture of the distal radius with dorsal displacement

Smith's fracture

fracture of the distal radius with volar displacement

carpal fractures

most common is scaphoid fracture (60% of carpal fractures). The proximal scaphoid has a poor blood supply and may become necrotic.

metacarpal fractures

classified according to location (head, neck, shaft, or base). a common complication is rotational deformities. A Boxer's fracture is a fracture of the 5th metacarpal (requires an ulnar gutter splint).

proximal phalanx fractures

most common with thumb and index. a common complication is loss of PIP A/PROM.

middle phalanx fractures

not commonly fractured

distal phalynx fracture

most common finger fracture.
May result in mallet finger
(which involves terminal
extensor tendon).

elbow fracture

involvement of the radial head
may result in limited forearm
rotation

humerus fractures:
nondisplaced vs. displaced

- etiology: fall onto an outstretched upper extremity
- fractures of the greater tuberosity may result in rotator cuff injuries
- humeral shaft fractures may cause injury to the radial nerve resulting in wrist drop

OT evaluation for UE fractures

- history should include mechanism of injury and fracture management.
- results of special tests (x-ray, MRI, CT scans)
- edema
- pain
- AROM- note: do not assess PROM or strength until ordered by a physician (exceptions are humerus fractures which often begin with PROM or AAROM).
- sensation
- roles, occupations, ADL and activities related to roles.

OT intervention for fractures
during the immobilization
phase of UE fractures:

- stabilization and healing are the goals.
1. AROM of joints above and below the stabilized part
 2. edema control: elevation, retrograde massage, and compression garments.
 3. Light ADL and role activities with no resistance, progress as tolerated

<p>OT intervention for fractures during the mobilization phase of UE fractures:</p>	<p>consolidation is the goal.</p> <ol style="list-style-type: none"> 1. edema control: elevation, retrograde massage, contrast baths, and compression garments. 2. AROM
<p>With humerus fractures, OT intervention during the mobilization phase consists of:</p>	<p>(a). Often begins with PROM or AAROM</p> <ol style="list-style-type: none"> 1. light functional/purposeful activity 2. pain management: positioning and physical agent modalities 3. strengthening: begin with isometrics when approved by physician.
<p>Cumulative Trauma Disorders (CTD)</p>	<ul style="list-style-type: none"> -AKA repetitive strain injuries (RSI), overuse syndromes, and/or musculoskeletal disorders. -risk factors: repetition, static position, awkward postures, forceful exertions, and vibration. -non-work risk factors: acute trauma, pregnancy, diabetes, arthritis, and wrist size/shape.
<p>Most common types of CTD</p>	<p>DeQuervain's, lateral and medial epicondylitis, trigger finger, nerve compressions.</p>
<p>DeQuervain's</p>	<ul style="list-style-type: none"> - Stenosing tenosynovitis of the abductor pollicis longus (APL) and the extensor pollicis brevis (EPB). -pain and swelling over the radial styloid -positive finkelstein's test

<p>Conservative treatment of DeQuervain's</p>	<ul style="list-style-type: none">-thumb spica splint-activity/work modification-ice massage over radial wrist-gentle AROM of wrist and thumb to prevent stiffness
<p>Post operative treatment</p>	<ul style="list-style-type: none">-thumb spica splint and gentle AROM (0-2 weeks)-strengthening, ADL, and role activities (2-6 weeks)-unrestricted activity (6 weeks)
<p>Lateral and medial epicondylitis</p>	<p>-degeneration of the tendon origin as a result of repetitive microtrauma</p>
<p>Lateral epicondylitis</p>	<p>AKA tennis elbow. Overuse of wrist extensors, especially the extensor carpi radialis brevis.</p>
<p>Medial epicondylitis</p>	<p>AKA golfer's elbow. overuse of wrist flexors.</p>

conservative treatment of lateral and medial epicondylitis

- elbow strap, wrist splint
- ice and deep friction massage
- stretching
- activity/work modification
- as pain decreases, begin strengthening

Trigger finger

- Tenosynovitis of the finger flexors: most commonly is the A1 Pulley.
- Caused by repetition and the use of tools that are placed too far apart

Conservative treatment of trigger finger

- hand based trigger finger splint (MCP extended, IP joint is free)
- scar massage
- edema control
- tendon gliding
- activity/work modification: avoid repetitive gripping activities and using tools with handles too far apart.

Allen's Test

- Used to assess the arterial blood flow to the hand
- Examiner applies pressure to the radial and ulnar arteries at the wrist and has the patient make a tight fist, opening and closing his/her hand 10x (the palm of the hand should appear white). The examiner then removes pressure from one artery.
- A positive test occurs when it takes >5 seconds for color to return to the palm of the hand

Quick DASH

- Designed to evaluate disorders of the upper limbs and monitor change or function over time
- 30-item self-report questionnaire
- Can be used to assess any joint in the upper limbs

Proximal fracture

A metacarpal fracture

Boxer's fracture

fracture of the 4th or 5th metacarpal

Carpal fracture

Fracture to individual carpal bones

Keinbock's Disease	A condition where the blood supply to one of the small bones in the wrist, the lunate, is interrupted
Avulsion injuries	Occur when the tendon separates from the bone and its insertion and removes bone material with the tendon
Mallet finger	<ul style="list-style-type: none">- Avulsion of the terminal tendon- Is splinted in full extension for 6 weeks
Boutonniere Deformity	<ul style="list-style-type: none">- Disruption of the central slip of the extensor tendon characterized by PIP flexion and DIP hyperextension- The PIP is splinted in extension and isolated DIP flexion exercises are performed
Swan neck deformity	<ul style="list-style-type: none">- Injury to the MCP, PIP, or DIP joints characterized by PIP hyperextension and DIP flexion- The PIP is splinted in slight flexion

Epiphyseal fracture

A fracture at on of the ends of a long bone in a growing child involving its growth plate

Fracture healing:
Inflammation phase

- A phase of fracture healing
- Provides the cellular activity needed for healing

Fracture healing: Repair phase

- A phase of fracture healing
- Forms the callus for stabilization

Fracture healing:
Remodeling phase

- A phase of fracture healing
- Deposits bone

Colles fracture

- Complete fracture of the distal radius with dorsal displacement
- Most common kind of wrist fracture

Smith's fracture

Complete fracture of the distal radius with palmar displacement

Bennet's fracture

Fracture of the 1st metacarpal base (the base of the thumb)

Median nerve injury

- Produces carpal tunnel-like symptoms, such as palmar numbness and numbness of the 1st digit to half of the 4th digit, with generalized weakness and pain
- Causes ape hand deformity; sensory loss in the index, middle, and radial side of the ring finger, loss of pinch, thumb opposition, and index finger MCP and PIP flexion; and decreased pronation

Ape hand deformity

- Thumb is stuck in hyperextension and adduction with a flat thenar eminence
- Unable to oppose or abduct thumb
- Occurs when the median nerve injury is at the wrist

Hand of benediction

- Caused by median nerve injury at the elbow
- When asked to make a fist, the patient is unable to flex thumb, index, or middle finger

Ulnar nerve injury

Results in ulnar claw deformity and numbness of the ulnar side of the hand and the 5th and half of the 4th digits, with generalized weakness of the ulnar side of the hand and pain

Radial head fracture: Type I

- Type of radial head fracture
- Nondisplaced
- Can be treated with a long arm splint

Radial head fracture: Type II

- Type of radial head fracture
- Displaces with a single fragment
- Is typically treated nonoperatively with immobilization for 2-3 weeks and early motion with medical clearance

Radial head fracture: Type III

- Type of radial head fracture
- Comminuted
- Is treated operatively, with immobilization and early motion within the first postoperative week as medically prescribed
- Most appropriate treatment is fragment excision with a long arm cast for 3-4 weeks

Comminuted

Broken or crushed into small pieces

Complex Regional Pain Syndrome (CRPS)

Pain disproportionate to an injury that is either sympathetically maintained or independent of the sympathetic nervous system (previously known as reflex sympathetic dystrophy)

CRPS: Type I

- A type of Complex Regional Pain Syndrome
- Develops after a noxious event

Noxious

Harmful, injurious, or detrimental to health

CRPS: Type II

- A type of Complex Regional Pain Syndrome
- Develops after a nerve injury

Allodynia

Sensation misinterpreted as pain

Hyperalgia

Increased response to painful stimuli

Hyperpathia

Pain that continues after stimuli are removed

Stellate/Sympathetic block

- Treatment for CRPS
- An injection of local anesthetic into the front of the neck or lumbar region of the back to block pain

Intrathecal analgesia

- Treatment for CRPS
- Injection of pain medication into the spinal cord

Removal of neuroma

- Treatment for CRPS
- Removal of a thickened nerve

<p>Installation of spinal cord stimulator</p>	<ul style="list-style-type: none">- Treatment for CRPS- A small electrical pulse generator is implanted in the back to control pain
<p>Installation of peripheral nerve stimulator</p>	<ul style="list-style-type: none">- Treatment for CRPS- Electrodes are placed on the peripheral nerves to send electrical impulses to control pain
<p>Cumulative trauma disorder (CTD)</p>	<ul style="list-style-type: none">- Trauma to soft tissue caused by repeated force- AKA: Overuse syndrome and Repetitive strain injury- Indicates the mechanism of the injury but is not a diagnosis
<p>CTD: Grade I</p>	<ul style="list-style-type: none">- Cumulative trauma disorder classification, by severity- Pain after activity, resolves quickly
<p>CTD: Grade II</p>	<ul style="list-style-type: none">- Cumulative trauma disorder classification, by severity- Pain during activity, resolves when activity is stopped

CTD: Grade III	<ul style="list-style-type: none">- Cumulative trauma disorder classification, by severity- Pain persists after activity, affects work productivity, and involves objective weakness and sensory loss
CTD: Grade IV	<ul style="list-style-type: none">- Cumulative trauma disorder classification, by severity- Use of extremity results in pain up to 75% of the time and work is limited
CTD: Grade V	<ul style="list-style-type: none">- Cumulative trauma disorder classification, by severity- Unrelenting pain, unable to work
Duran protocol	<ul style="list-style-type: none">- An early passive ROM program- The DIP and PIP joints can be passively extended if the other joints of the digit are flexed to initiate tendon glides
Kleinert protocol	Involves active extension of digits with passive flexion via traction, typically a rubberband

<p>Early active motion protocol</p>	<p>Begins within days of surgery to prevent adhesions and promote tendon gliding and excursion</p>
<p>Immobilization protocol</p>	<ul style="list-style-type: none">- Is advisable only for patients who are unable to care for themselves or who do not have the cognitive capacity to ensure safety postoperatively- Is sometimes used with children to prevent rupture of the repair
<p>Tendon glides</p>	<ul style="list-style-type: none">- A sequence of movements used to promote full tendon excursion and full ROM and prevent adhesions- The sequence of movements is fingers straight, MCP flexion, hook fist, then flat fist
<p>Radial nerve injury</p>	<p>Injury to the radial nerve resulting in wrist drop and possible lack of finger and thumb extension</p>
<p>Radial tunnel syndrome</p>	<p>Entrapment of the radial nerve in an area extending from the radial head to the supinator muscle causing burning pain in the lateral forearm</p>

<p>Anterior interosseous syndrome</p>	<p>Compression to the anterior interosseous nerve resulting in a motor loss involving the flexor digitorum longus, flexor profundus to the index finger, and pronator quadratus</p>
<p>Pronator syndrome</p>	<p>Entrapment of the proximal median nerve between the heads of the pronator muscles causing deep pain in the proximal forearm with activity</p>
<p>Double crush syndrome</p>	<p>Occurs when a peripheral nerve is entrapped in more than one location causing intermittent diffuse arm pain and parathesias with specific postures</p>
<p>Parasthesia</p>	<p>A sensation of tingling, prickling, pricking, or burning of a person's skin with no apparent long-term physical effect</p>
<p>Carpal tunnel syndrome</p>	<ul style="list-style-type: none">- Caused by entrapment of the median nerve as it courses through the carpal tunnel- Sensory impairment involves numbness and tingling in the thumb, index, and middle fingers, especially at night- Motor impairment presents as diminished fine motor coordination and in advanced cases, the adductor pollicis muscle may be atrophied

Tinel's sign

- For carpal tunnel syndrome: A tap on the median nerve at the wrist to elicit symptoms
- For cubital tunnel syndrome: A tap over the cubital tunnel to elicit symptoms

Phalen's test

Holding the wrist in full flexion for 1 minute to elicit changes in sensation

Moberg pickup test

- A timed test involving picking up, holding, manipulating, and identifying small objects
- It is used with children and cognitively impaired adults to test median nerve function

Pillar pain

Pain on either side of the surgical release after carpal tunnel surgery

Cubital tunnel syndrome

- Caused by proximal ulnar nerve compression at the elbow between the medial epicondyle and the olecranon process
- May cause decreased sensation in the little finger and ulnar half of the ring finger, as well as decreased grip and pinch strength because of weak interossei, adductor pollicis, and flexor carpi ulnaris muscles

Froment's sign

Flexion of the IP of the thumb when a lateral pinch is attempted

Wartenberg's sign

The 5th finger held abducted from the 4th finger

Elbow flexion test

Involves holding the elbow in flexion for 5 minutes with the wrist neutral to elicit symptoms

de Quervain syndrome

- Caused by cumulative microtrauma resulting in tenosynovitis of the thumb muscle tendon unit, the abductor pollicis brevis, and the tendons in the first dorsal compartment of the wrist
- Symptoms include pain at the base of the thumb and extending into the lower arm

Finkelstein test

- Make a fist with the thumb places in the palm and then ulnarly deviate the wrist
- The test is positive if pain is felt with this motion

Claw deformity

- Distal ulnar nerve compression or lesion at the wrist
- Results in deformity in which the MCPs hyperextend and the IPs of the ring and little finger flex, hand arches are flattened, and pinch strength is lost

Jeanne's sign

Hyperextension of the thumb MCP

Digital stenosing tenosynovitis

- More commonly known as trigger finger
- Occurs with sheath inflammation or nodules near the A1 pulley
- Treated by splinting the MCP at 0 degrees for 3-6 weeks OR surgically releasing the A1 pulley

Protective reeducation

Educates clients to visually compensate for sensory loss and to avoid working with machinery and temperatures below 60 degrees

Discrimination reeducation

Uses motivation and repetition in a vision-tactile matching process in which clients identify objects with and without vision

Desensitization	A process of applying different textures and tactile stimulation to reeducate the nervous system so clients can tolerate the sensations during functional use of the upper extremity
Cryotherapy	<ul style="list-style-type: none">- Cools tissue to 1-2 cm depth- Includes ice massage, ice, towels, cold packs, cold water immersion baths, cool whirl pools, cold compression units, and vapocoolant sprays
Thermotherapy	<ul style="list-style-type: none">- Heats tissue to 1-2 cm depth- Includes warm whirlpools, fluidotherapy, hot packs, contrast baths, and paraffin baths
Ultrasound	<ul style="list-style-type: none">- Heats tissue to 1-5 cm depth- Has thermal and nonthermal effects
Phonophoresis	The use of ultrasound to promote absorption of topically applied medication to accelerate tissue repair and decrease inflammation

<p>Electrical stimulation</p>	<p>Includes Neuromuscular Electrical Stimulation (NMES), Transcutaneous Electrical Nerve Stimulation (TENS), and iontophoresis</p>
<p>Low-level laser and light therapy</p>	<p>Includes light emitting diodes, super luminous diodes, and low-level laser diodes</p>
<p>Resting hand splint</p>	<ul style="list-style-type: none"> - Wrist at 20-30 degrees of extension - Thumb at 45 degree palmar abduction - MCPs at 35-45 degrees flexion - PIPs and DIPs in slight flexion
<p>Antideformity resting hand splint</p>	<ul style="list-style-type: none"> - Used often for burns - Intrinsic plus position - Wrist at 30-40 degrees extension - Thumb at 45 degrees palmar abduction - MCPs at 70-90 degrees flexion - PIPs and DIPs in full extension
<p>Ball or cone antispacticity splints</p>	<p>Are ulnar or volar based and provide thumb palmar or radial abduction, and hard surface in contact with finger flexors, and serial casting for the wrist, elbow, knee or ankle to decrease soft tissue contractures</p>

Wrist cock-up splints

- Dorsal or volar wrist immobilization
- Maintains hand arches, full thumb movement, and full MP flexion

Thumb spica splints

- Volar thumb or radial gutter thumb immobilization
- Are used on the long or short opponens to provide CMC immobilization

Anti-foot drop splints

Maintain 90 degrees ankle dorsiflexion

Dynamic splints

- Having moving parts
- Are designed to correct contractures, increase passive motion, protect recent surgery, or substitute for lost active motion

Pressure ulcer severity:
Stage 1

- A classification of ulcer severity
- Intact skin with non-blanchable redness of a localized area, usually over a bony prominence
- Darkly pigmented skin may not have visible blanching, its color may differ from the surrounding area
- The area may be painful, firm, soft, warmer, or cooler compared to adjacent tissue

Pressure ulcer severity:
Stage 2

- A classification of ulcer severity
- Partial thickness loss of dermis presenting as a shallow open ulcer with a red/pink wound bed, without slough
- May also present as an intact or open/ruptures serum filled blister

Slough

A layer or mass of dead tissue separated from living tissue

Pressure ulcer severity:
Stage 3

- A classification of ulcer severity
- Full thickness skin loss
- Subcutaneous fat may be visible but bone, tendon, or muscle are not exposed
- Slough may be present, but does not obscure the depth of tissue loss
- May include undermining/tunneling

Pressure ulcer severity:
Stage 4

- A classification of ulcer severity
- Full thickness skin loss with exposed bone, tendon, or muscle
- Slough or eschar may be present on some parts of the wound bed
- Often include undermining and tunneling

Primary wound closure

Wound is closed with sutures

Secondary wound closure

Wound is left open and allowed to close on its own

Delayed wound closure

Wound is cleaned, debrided, and observed 4-5 days before suturing it closed

Wound healing:
Inflammatory Phase

- A phase of wound healing
- Includes clotting and vasoconstriction, white blood cell migration, and release of histamines and prostaglandins that cause vasodilation and increased tissue permeability
- Acute phase lasts 24-48 hours to 7 days
- Subacute phase lasts 7-14 days
- Local signs include redness, swelling, heat, and pain

Wound healing:
Proliferative phase

- A phase of wound healing
- Epithelialization resurfaces the wound, tissue granulation forms new collagen and blood vessels, and myofibroblasts connect to the wound margins
- Wound contraction lasts 5 days to 2-3 weeks

Wound healing:
Remodeling phase

- A phase of wound healing
- Scar tissue first consists of randomly arranged collagen fibers, and as the scar matures, the collagen is broken down and remodeled. The scar is then more elastic, smoother, and stronger.
- This phase lasts 2 weeks to 1-2 years

Level 1	No Response: Total Assist - no observable change in behavior when presented with stimuli
Level 2	Generalized Response: Total Assist - responds to stimuli by physiological change, gross movement, or non-purposeful vocalization - responses may be delayed
Level 3	Localized Response: Total Assist - inconsistent response to simple commands - responses directly related to type of stimuli - may respond to particular people (friends, family)
Level 4	Confused/Agitated: Max Assist - unable to cooperate with treatment efforts - responses/actions may be inappropriate or disproportionate
Level 5	Confused/Inappropriate Non-Agitated: Max Assist - not oriented to person/place/time - unable to learn new information, but may be able to perform previously learned actions if structured and cued - responds to simple commands consistently

<p>Level 6</p>	<p>Confused/Appropriate: Mod Assist</p> <ul style="list-style-type: none"> - inconsistent orientation to person/place/time - attends to familiar tasks in non -distracting environment for 30 minutes - basic problem solving for tasks - supervised for very familiar tasks (ie. self-care) - unaware of ability limitations or safety risks - responds to simple commands consistently
<p>Level 7</p>	<p>Automatic/Appropriate: Min Assist for ADLs</p> <ul style="list-style-type: none"> - consistent orientation to person/place, mod assist for time - attends to familiar tasks in distracting environment 30 minutes - some carry over of new learning - aware of task performance, requires min assist to modify plan - largely unaware of ability limitations or safety risks - lacks awareness for others needs/feelings - oppositional/uncooperative - unable to recognize if socially inappropriate
<p>Level 8</p>	<p>Purposeful/Appropriate: Stand-by Assist</p> <ul style="list-style-type: none"> - consistently orients to person/place/time - independently completes familiar task in distracting environment for 1 hour - stand-by assist for use of memory aides/devices - completes familiar ADLs/some IADLs with stand-by assist, requires min assist to modify plan - aware of impairments/disability when interfering with task - awareness of others needs/feeling with min assist - irritable/low frustration tolerance/depressed - able to recognize if socially inappropriate, min assist to correct
<p>Level 9</p>	<p>Purposeful/Appropriate: Stand-by Assist on request</p> <ul style="list-style-type: none"> - independently manages multiple tasks for at least 2 hours - independently uses memory aides/devices - independent with ADLs, most IADLs - accurately estimates ability - acknowledges needs/feelings of others - low frustration tolerance, depression, irritability may continue - socially appropriate with stand-by assist
<p>Level 10</p>	<p>Purposeful/Appropriate: Modified Independent</p> <ul style="list-style-type: none"> - able to complete multiple tasks but may require breaks - able to implement own memory aides/devices - independent with ADLs and IADLs, may require extra time - acknowledges needs/feelings of others, responds appropriate - periodic depression, irritability and frustration in stress periods - socially appropriate while consistently independent

Stage 1

No disability is noted

Stage 2

Person complains of forgetting
typical age-related information

ie. location of keys, wallet, etc.

Stage 3

Beginning signs of impairment emerging
Strengths:
1) Independent in IADL
2) Recognizes challenges to avoid to minimize impact of deficits
3) Can compensate as an adaptive mechanism
Weakness:
1) Forgets important information (a first)
2) Difficulty with complex tasks
3) Difficulty negotiating new locations/directions

Stage 4

Deficits notable in IADLs
Strengths:
1) Performs simple, repetitive ADLs independently
2) Can live at home with support
3) Can follow simple verbal/demonstrated instructions
Weakness:
1) Increasingly forgetful
2) Unable to follow/sequence written cues
3) Unable to perform familiar but challenging tasks
4) Challenged by word-finding
5) Requires assistance at home

Stage 5

Cannot function independently

Strengths:
1) Performs ADLs (and some IADLs) with cues/assistance
2) Responds to encouragement

Weakness:
1) Poor judgement
2) Difficulty with decision making
3) Forgets to maintain hygiene
4) Unable to safely drive

Stage 6

Cannot perform ADLs without cues

Strengths:

- 1) Performs components of familiar tasks
- 2) Follows demonstrations/hand-over-hand cueing

Weakness:

- 1) Significant deficits following 2-step directions
 - 2) Cannot sequence steps of ADL tasks
 - 3) Cannot speak full sentences
 - 4) Incontinent of bowel/bladder
-

Stage 7

May be in vegetative state.

Likely bedbound and unable to respond verbally/non-verbally

Tinel's

percussion over site of possible entrapment
+ = parasthesia's produced

Phalen/Reverse Phalen

wrist in max flexion/ext
= + produces parasthesias

Allen's test

for arterial patency
palpate radial and ulnar arteries at the wrist/ occlude-
pt. flex/ext digits to blanching, open hand- compare hands to each other
normal = 3-5 seconds to return to normal

CMC grind test

approximate CMC jt and rotate on the scaphoid
+ = increased pain= CMC arthritis

Finklestein's test

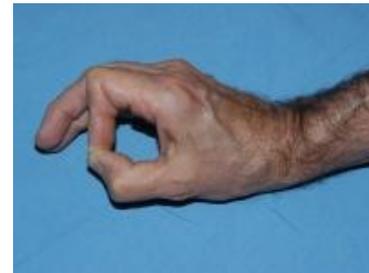
flex thumb across palm and bend fingers over top- pt then ulnarly deviates wrist
+ = pain in thumb extensors

Froments sign



pt pinches paper with key pinch
+ = exaggerated IPJ which suggests FPL substitution
+ = weakness of AP (ULNAR) and FPB (ulnar & median)

Jeanne's sign



pt pinches paper with key pinch
+ = extreme hyperextension of MPJ
+ = weakness of adductor pollicis (AP) (ULNAR INNERV)

Wartenberg's sign

pt adducts small finger from an abducted position towards the ring finger
+ = unable to adduct
tests ULNAR nerve function (specifically 3rd palmar interosseous muscle -PAD)

Radial nerve test

apply manual resistance to extended middle finger, with elbow extended and neutral wrist
+ = aching pain
be sure to R/O lateral epicondylitis

Radial nerve test for Radial tunnel syndrome

with elbow in extension, manually resist supination
+ = pain 4 cm distal to lat. epic.
indicating compression of PIN branch of radial nerve (probably b/t 2 heads of supinator muscle)

Tennis elbow test for lateral epicondylitis

with elbow in extension, resist middle finger extension
+ = pain at origin of extensor muscles at lat. epic.
(some say elbow can be in flexion with this test)

Cozen's test



put hand on pt's lat. epic- position patient with arm in pronation & elbow flexed (or extended?) with a fist: pt then asked to extend wrist while radially deviating as the movement is manually resisted
+ = sudden and severe pain at the lat. epic.
*****check mackin p.1274-1276

Medial epicondyle test

pt flexes elbow and forearm is neutral: therapist manually resists wrist flexion and FA pronation
+ = pain at the medial epicondyle

Scaphoid shift test/Watson's test

sit in arm wrestle position- grasp wrist from radial side, putting thumb on palmar aspect of scaphoid & wrap fingers around radius- use other hand to hold over pt's metacarpals- begin in UD and slight ext. and move wrist radially and into slight flex. holding pressure over the scaphoid
+ = 'clunk' with release of therapist's fingers or patient has pain
+= scaphoid ligamentous instability

Ballottement test

stabilize lunate (palmar and dorsal) with my thumb and index fingers- with my other hand try to move the triquetrum and pisiform dorsally & then palmarly
+ = patient has pain, laxity or crepitis
+ = Luno-triquetral instability

Piano key test

stabilize radius with one hand- with 2nd hand press volarly on ulna and then dorsally- test in BOTH pronation and supination, compare to other side
+ = "spring back" reaction of the ulna
+ = DRUJ instability

Oblique retinacular ligament test

stabilize digit w/one hand while passively flexing DIPJ with PIPJ in extension- then retest DIPJ flexion with the PIPJ in flexion
+ = DIPJ greater flexion with PIPJ flexed (if same limitation in both, then pt has jt contracture)

Chair test

patient is asked to lift a chair with the shoulder adducted, the elbow extended, and the wrist pronated
+ = pain at lateral epicondyle suggesting tennis elbow

Mills test



test for lateral epicondylitis
extend elbow, flex wrist while palpating lateral epicondyle
+= pain at lat. epic.

Valgus stress test

tests integrity of Medial Collateral Ligament aka (Ulnar Collateral Ligament)
tests Lateral Collateral Ligament (Radial Ligament)
Elbow flexed 20-30 degrees- examiners hand at proximal wrist and on medial epicondyle- apply an abduction or valgus force at the distal forearm to test medial ligament stability

Varus stress test

tests Lateral Collateral Ligament (Radial Ligament)
Elbow flexed 20-30 degrees
Patients arm is stabilized with one of the examiners hands at the medial distal humerus (elbow), and the other hand is placed above the patients lateral distal radius (wrist). An adduction or varus force is applied at the distal forearm by the examiner to test the radial collateral ligament.

Hitch-hikers test

resist thumb extension at the MPJ of thumb
-tests for DeQuervain's syndrome, specifically EPB

Duchenne's sign



clawing of ring and little finger from ULNAR NERVE compression

Sunderland's sign

inability to rotate, oppose or supinate the little finger towards the thumb- ulnar nerve problem

Bunnell's sign

thumb unable to pinch against the index finger to make a full circle- ULNAR NERVE problem

Egawa's sign

inability of flexed middle finger to abduct radially and ulnarly and to rotate at the MPJ-ULNAR NERVE problem at interossei

Mannerfelt's sign



hyperflexion sign: thumb IPJ is flexed and the MPJ slightly hyperextended, thumb supinated
index finger- w/pinching displays PIP flexion and DIP hyperextension- ulnar nerve

Hook test

- patient actively supinates the flexed elbow;
 - intact hook test permits the examiner to hook his or her index finger under the intact biceps tendon from the lateral side;
 - w/ an abnormal hook test (distal avulsion), there is no cord-like structure to palpate or hook;
- tests for distal biceps tendon rupture

Catch up clunk test

Tests for midcarpal instability
active RD to UD of wrist and back
+ test= clunk and pain just beyond neutral as wrist moves into ulnar deviation
Pretty much same as Watson's shift test

TFCC test

Tests central TFCC- area of weightbearing w/poor bld
Examiner moves pt. into UD and moves proximal carpal row dorsal to volar w/gentle compression over TFCC

Bouvier test



Tests if PIPJ and extensor mechanism is working
Place MP in slight flexion and see if IP's extend- if so EDC and sagittal bands are working
Can use MP blocking splint to increase function

Allen test

tests radial and ulnar artery patency
(per Rehab of hand, the norm is 3-5 seconds)
Norm= 7 seconds for color to return
Occlude each artery for 30 seconds by elevating and fisting: Still elevated, the hand is then opened. It should appear blanched (pallor can be observed at the finger nails). Ulnar pressure is released and the color should return in 7 seconds.

Spurling's test

aka Foraminal compression test for radiculopathy
-extend the neck, rotate the head and then apply downward pressure
+ if pain radiates to opposite side of rotation side

Andre-Thomas sign:

Wrist falls into volar flexion during middle finger extension- ULNAR NERVE

Masse sign:

Flattening of the metacarpal arch-
ULNAR NERVE

"Cross - fingers test" :

unable to cross index over middle or
vice versa
ULNAR NERVE

Pitres-Testut sign:

Inability to abduct the middle finger
either radially or ulnarly with the hand
flat on a surface -ULNAR

Handshake test:

****tennis elbow test- mackin p.1274-
1276

Dumbbell test:

****tennis elbow test-mackin p.1274-
1276

Berger test:

patient has swelling at volar wrist thus
indicating a flexor synovitis - a
"compulsive gripper"
-may be seen with carpal tunnel

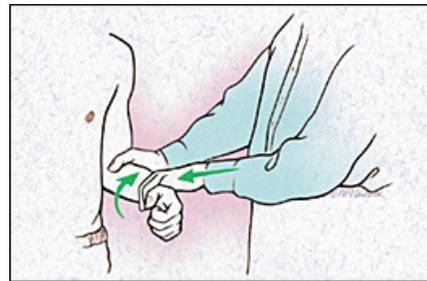
Superficial branch of radial nerve compression test position:

elbow in extension, forearm hyperpronated, wrist in ulnar flexion x 1 minute- + = numbness and tingling on dorsal radial aspect of hand

Superficial branch of radial nerve emerges where in the forearm?

between the tendons of BR and ECRL

Yergason test:



determines whether head of biceps is stable in the bicipital groove- pt fully flexes elbow while examiner grasps elbow and wrist- pt resists motion while examiner simultaneously extends elbow and externally rotates the

GRIT test:

measure of grip strength in full supination, full pronation and neutral FA positions- calculate values as ratio of supination/pronation. If pt has GRIT value >1.0 on involved side & <1 on uninvolved side, the potential for disk tear is high

TFCC load test:

indicates either a peripheral or central lesion- axial load put thru pronated and ulnarly deviated wrist (rotation sometimes mentioned)
test+ = pain

Articular disk shear test:

assess central lesions of TFCC- elbow on table, FA in neutral- stabilize radius w/1 hand while place thumb of other hand dorsally over distal ulna and other finger on pisotriquetral complex volarly- squeeze fingers causing dorsal glide of pisotriquetral on ulnar head and shearing of central disk

"Squeeze" test for DRUJ instability:

squeeze radius and ulna together and passively rotate forearm- no pain seen with TFCC tears

Shoulder Dislocation Tests

Anterior Apprehension Sign, Posterior Apprehension Sign

Bicep Tendon Pathology

Ludington's test, Speed's test, Yergason's test

Rotator Cuff Pathology/Impingement

Drop arm test, Hawkins-Kennedy impingement test, Neer impingement test, Supraspinatus test

Thoracic Outlet Syndrome

Adson's Test, Allen test, Costoclavicular syndrome test, Roos test, Wright (hyperabduction) test

Glenoid Labrum Pathology

Clunk Test

Anterior Apprehension Sign for Shoulder

pt in supine with shoulder ABD 90 deg & elbow flexed 90 deg. PT places one hand on the elbow for stabilization and other on the wrist. PT slowly ER the shoulder. (+) a look of apprehension or facial grimace prior to reaching the end point. Identifies (past hx of) anterior shoulder dislocation. AKA: Crank Test.

Posterior Apprehension Sign for Shoulder

pt in supine with shoulder ABD 90 deg (in scapular plane) with scapula stabilized by the table with elbow flexed 90 deg. PT places one hand on the elbow and the other at the wrist. PT applies a posterior force through the shoulder via force on the elbow while simultaneously moving shoulder into IR and horizontal ADD. (+) a look of apprehension or facial grimace prior to reaching the end point. Identifies (past hx of) posterior shoulder dislocation. AKA: Stress Test

Ludington's test

pt in sitting. PT instructs pt to clasp both hands behind the head with the fingers interlocked f/b alternately contracted and relax the biceps muscles. (+) absence of movement in the biceps tendon. Indicates of a rupture of the long head of the biceps.

Speed's test



pt in sitting or standing with elbow in full extension and forearm supinated. PT places one hand over the bicipital groove and other hand on volar surface of forearm. pt instructed to resist shoulder flexion. (+) pain or tenderness in bicipital groove. Identifies bicipital tendonitis/tendonosis. AKA: Biceps Straight Arm Test

Yergason's test

pt in sitting with shoulder in neutral/stabilized against trunk, elbow flexed 90 deg and forearm pronated. PT places one hand on patient's forearm and other over bicipital groove. pt instructed to actively supinate and laterally rotate against resistance. (+) tendon of biceps long head will "pop out" of groove, (+) pain or tenderness in bicipital groove. Identifies bicipital tendonitis and integrity of transverse ligament.

Drop arm test

pt in sitting with shoulder passively ABD 120 deg. PT guards pt's arm from falling in case it gives way. pt instructed to SLOWLY bring arm down to side. (+) pt unable to lower arm slowly back down to side, (+) presence of severe pain. Identifies tear and/or full rupture of rotator cuff.

Hawkins-Kennedy impingement test

pt in sitting or standing. PT flexes the patient's shoulder to 90 degrees and forcibly IR the shoulder. (+) pain. Indicates shoulder impingement involving the supraspinatus tendon.

Neer impingement test

pt in sitting or standing-pt places affected side hand on opposite shldr. PT positions one hand on the posterior aspect of the patient's scapula and the other hand stabilizing the elbow. PT passively IR the shoulder into full shoulder ABD. (+) facial grimace or pain. Indicates shoulder impingement involving the supraspinatus tendon and long head of the biceps.

Supraspinatus test	STEP 1: pt in sitting w/ shoulder ABD 90 deg & no rotation (thumbs up) and elbow fully extended. pt instructed to resist shoulder ABD as PT is giving force to distal forearm. STEP 2: pt in sitting w/ shoulder in "empty can" position (thumbs down). pt instructed to resist shoulder ABD as PT is giving force to distal forearm. (+) weakness while in "empty can" or pain in supraspinatus. Identifies tear &/or impingement of supraspinatus tendon or suprascapular nerve involvement.
Adson's Test	pt in sitting or standing. PT monitors the radial pulse. pt instructed to rotate the head towards the test shoulder then extends head- and arm is extended and ER as patient takes a deep breath. (+) absent or diminished radial pulse. Indicates thoracic outlet pathology.
Allen Test for Shoulder	pt in sitting or standing with the test arm resting at side. PT monitors the radial pulse while placing the arm in 90 deg of ABD, ER, and elbow flexion. pt instructed to rotate the head away from the test shoulder. (+) absent or diminished pulse. Identifies throacic outlet syndrome. AKA: Modified Wright Test
Costoclavicular syndrome test	pt in sitting. PT monitors the patient's radial pulse and instructs pt to assume a military posture. PT draws the pt's shoulder down (w/ elbow fully extended) and back into shoulder extension. (+) absent or diminished radial pulse. Identifies thoracic outlet syndrome (costoclavicular syndrome) caused by compression of the subclavian artery b/w the first rib and the clavicle.
Wright (hyperabduction) test	pt in sitting or supine. PT monitors radial pulse while moving pt's arm into max shoulder ABD and ER. pt may accentuate symptoms by taking a deep breath and actively rotating the head opposite to side being tested. (+) absent or diminished radial pulse. Detects compression in the costoclavicular space (associated with thoracic outlet pathology).

<p>Clunk Test</p>	<p>pt in supine. PT places one hand on the posterior aspect of the pt's humeral head and other hand stabilizes the humerus proximal to the elbow. PT passively fully ABD and ER the arm f/b applying an anterior directed force to the humerus. (+) audible "clunk" or grinding while performing test. Identifies a glenoid labrum tear.</p>
<p>Costoclavicular syndrome</p>	<p>pt typically c/o thoracic outlet sx while wearing a backpack or heavy coat.</p>
<p>Acromioclavicular Shear Test</p>	<p>pt in sitting w/ arms resting @ side. PT clasps hands and places heel of 1 hand on spine of scapula and heel of other on clavicle. PT squeezes hands together causing compression of AC joint. (+) reproduces pain in AC joint. Identifies dysfunction of AC joint (ie. arthritis, seperation, etc)</p>
<p>Roos Test</p>	<p>pt in sitting or standing. PT moves pts shoulder into ABD 90 deg, full ER, & elbow flexion 90 deg. pt instructed to open and close the hands slowly for 3 minutes. (+) pt unable to keep arms in starting position for 3 min, suffers ischemic pain, heaviness or profound weakness of the arm, numbness & tingling of the hand. (-) if only minor fatigue and distress. Indicates thoracic outlet pathology.</p>
<p>Halstead maneuver:</p>	<p>locate radial pulse, then apply downward traction on arm while pt. hyperextends neck and rotates to opposite side += diminished or absent pulse Indicates thoracic outlet pathology</p>

<p>Allen's test</p>	<p>for arterial patency palpate radial and ulnar arteries at the wrist/ occlude- pt. flex/ext digits to blanching, open hand- compare hands to each other normal = 3-5 seconds to return to normal 7 seconds = abnormal?</p>
<p>Froments sign</p>	<p>pt pinches paper with key pinch + = exaggerated IPJ which suggests FPL substitution + = weakness of AP (ULNAR) and FPB (ulnar & median)</p>
<p>Jeanne's sign</p>	<p>pt pinches paper with key pinch + = extreme hyperextension of MPJ + = weakness of adductor pollicis (AP) (ULNAR INNERV)</p>
<p>Radial nerve test for Radial tunnel syndrome</p>	<p>with elbow in extension, wrist in flexion then patient manually resists supination and elbow flexion + = pain 4 cm distal to lat. epic. indicating compression of PIN branch of radial nerve (probably b/t 2 heads of supinator muscle)</p>
<p>Cozen's test aka tennis elbow test</p>	<p>put hand on pt's lat. epic.- position patient with arm in pronation & elbow in slight flexion with them making a fist: pt then asked to extend wrist while radially deviating as the movement is manually resisted + = sudden and severe pain at the lat. epic. per Macklin</p>

Mills test	test for lateral epicondylitis extend elbow, flex wrist while palpating lateral epicondyle- no patient movement += pain at lat. epic.
Valgus stress test	tests integrity of Medial Collateral Ligament aka (Ulnar Collateral Ligament) Elbow flexed 20-30 degrees- examiners hand at proximal wrist and on medial epicondyle- apply an abduction or valgus force at the distal forearm to test medial ligament stability
Varus stress test	tests Lateral Collateral Ligament (Radial coll. Ligament, specifically the lateral ulnar collateral ligament) Elbow flexed 20-30 degrees Patients arm is stabilized with one of the examiners hands at the medial distal humerus (elbow), and the other hand is placed above the patients lateral distal radius (wrist). An adduction or varus force is applied at the distal forearm by the examiner to test the radial collateral ligament.
Hitch-hikers test	resist thumb extension at the MPJ of thumb -tests for DeQuervain's syndrome, specifically EPB :)
Duchenne's sign	clawing of ring and little finger from ULNAR NERVE compression

Mannerfelt's sign

hyperflexion sign: thumb IPJ is flexed and the MPJ slightly hyperextended, thumb supinated
index finger- w/pinching displays PIP flexion and DIP hyperextension- ulnar nerve problem

Scaphoid shift test/Watson's test

sit in arm wrestle position- grasp wrist from radial side, putting thumb on palmar aspect of scaphoid & wrap fingers around radius- use other hand to hold over pt's metacarpals- begin in UD and slight ext. and move wrist radially and into slight flex. holding pressure over the scaphoid
+ = 'clunk' with release of therapist's fingers or patient has pain
+= scaphoid ligamentous instability
awkward hand positions!!!!

Ulnar deviation w/ext into Radial deviation w/wrist flex
NORMAL HAND BIOMECHANICS= WRIST EXT W/RD AND WRIST FLEX W/UD=
DART THROWER MOTION
WATSON'S TEST= THE OPPOSITE OF THAT=AWKWARD

Bouvier test/maneuver



Tests if PIP and extensor mechanism/EDC is working
+ TEST= MODIFICATION WORKS & DIGIT EXTENDS

Place MP in slight flexion and see if can actively extend IPJts- if so, EDC and sagittal bands are working
Can use MP blocking splint to increase function

*picture above is positive sign- negative sign would be flexed MPjt and unable to extend(=lateral band prob?)
- BY PLACING PROXIMAL JT IN FLEXION, ALLOWS MORE PULL THROUGH AT DISTAL JTS- IF UNABLE TO GET EXTENSION WITH PROXIMAL FLEXION, THEN THERE IS A PROBLEM

Allen test

tests radial and ulnar artery patency
Norm= 3-5 seconds for color to return
Occlude each artery for 30 seconds by elevating and fisting: Still elevated, the hand is then opened. It should appear blanched (pallor can be observed at the finger nails). Ulnar pressure is released and the color should return in 3-5 seconds.
ASHT says 7 sec?

Pitres-Testut sign:

Inability to abduct the middle finger either radially or ulnarly with the hand flat on a surface OR unable to bring tips of extended fingers together into a cone= due to loss of ulnar adductor poll, interos. and hypothenars and clawing of rf/sf so cant make shape of cone

Handshake test:

Kraushaar/Nirschl- determines which pts have good outcomes-
#1 shake hands with elbow extended and supinate against resistance
#2 shake hands with elbow @ 90 and supinate against resistance
If pain is less in flexed position, non-op mgmt should be more successful- if same then operation probably needed-
FLEXED=GOOD- this is because its supposed to be less painful in flexed rather than extension.

Dumbbell test:

Solveborn- functional test to assess pain w/resisted wrist ext & supination- pick up 2kg (4-5#)dumbbell from tabletop using wrist extension, then supinate the FA- pain 0-4: 4=fainting 0=no pain

Berger test: more of a sign

patient has swelling at volar wrist thus indicating a flexor synovitis - a "compulsive gripper"
-may be seen with carpal tunnel=
AKA Lumbrical incursion test

Superficial branch of radial nerve emerges where in the forearm?

between the tendons of BR and ECRL-
distal radial FA

Yergason test:

determines whether head of biceps is stable in the bicipital groove- pt fully flexes elbow while examiner grasps elbow and wrist- pt resists motion while examiner simultaneously extends elbow and externally rotates the arm

<p>GRIT test:</p>	<p>measure of grip strength in full supination, full pronation and neutral FA positions- calculate values as ratio of supination/pronation. If pt has GRIT value >1.0 on involved side & <1 on uninvolved side, the potential for disk tear is high >1 indicates pathology</p>
<p>TFCC test for central tear</p>	<p>Tests central TFCC- area of weightbearing w/poor bld Examiner moves pt. into UD and moves proximal carpal row dorsal to volar w/gentle compression over TFCC</p>
<p>Articular disk shear test:</p>	<p>assess central lesions of TFCC- elbow on table, FA in neutral- stabilize radius w/1 hand while place thumb of other hand dorsally over distal ulna and other finger on pisotriquetral complex volarly- squeeze fingers causing dorsal glide of pisotriquetral on ulnar head and shearing of central disk NO DEVIATION NEEDED</p>
<p>Hueston's table top test</p>	<p>When there is 30 degrees of flexion deformity at the MCP joint, the patient is unable to place their palm flat against a hard surface, for example a table= (+)</p>
<p>McMurtry's test: aka compression test</p>	<p>Carpal tunnel compression test- apply pressure at the BASE OF THE PALM OVER THE MEDIAN NERVE AT THE PROXIMAL EDGE OF THE TRANSVERSE CARPAL LIGAMENT, just B4 it enters the canal. similar to Durkan's test</p>

Murphy sign:

lunate dislocation
- chronic wrist pain, patient's third metacarpal head is "sunken" and is the same height as the second and fourth metacarpal head while the patient is making a fist. Normally the knuckle formed by the head of the third metacarpal is more prominent and protrudes further distally as compared to the knuckles of the second and fourth metacarpal heads. If the knuckle of the third metacarpal head is level with the knuckles of the second and fourth metacarpal heads, the sign is positive and indicative of a lunate dislocation.

scapular "Flip" sign (+):

seen as lift/flip/isolated winging of medial border of scapula with ER of shoulder, NOT elevation, associated with spinal accessory nerve and trapezius weakness
-identifies a patient with SANP= spinal accessory nerve palsy

Lumbrical provocation test:

LPT: hold hand as fist for 1 minute (to evaluate changes in paresthesia) - if positive then also has median nerve compression distal to carpal tunnel at the lumbrical level
aka BERGER'S TEST

Pollock's sign:

due to loss of ulnar innervated FDP in high ulnar lesion, therefore CANNOT flex DIP of small finger

Bowler's thumb:

neuroma of ulnar digital nerve of thumb

Elson's test:

- for early boutonniere- only reliable test
MPs in extension and PIP jt flexed over table edge and held by examiner- pt asked to extend PIP against resistance- any pressure felt over middle phalanx can be exerted ONLY by intact central slip and the DIP jt will NOT extend because a competent EDC/central slip will prevent lateral bands from acting distally

-If complete central slip disruption, the DIP jt will go rigid OR extend due to effort of lateral bands

"Buehler elbow flexion test:

up to 3 min of elbow flex to 90
w/supination and extended wrist- +=
aching or parasthesias
tests for cubital tunnel

CIND aka "catch up clunk" test

tests mid carpal instability of proximal row
-the wrist moving from radial to ulnar deviation and back. Begin radial dev and go to ulnar deviation.

A positive test will result in a dunk, jump, or thud and hurt at some point just beyond the neutral wrist position towards ulnar deviation where the unstable bone or segment of bones suddenly attains its normal position for a deviated hand.

In a typical CIND, the proximal carpal row will flex as the hand is in radial deviation, but as the hand moves toward the mid position and into ulnar deviation, the proximal row remains flexed= abnormal, its supposed to extend as wrist UD. It is not until the extremes of ulnar deviation that the proximal row suddenly shifts into extension, thus causing the dunk.

A positive test indicates instability, but not specifically whether it is at the midcarpal or radiocarpal joint or at both levels. A similar dunk may be heard in the presence of scaphoid or LT instability; therefore, carpal instability provocative maneuvers should also be performed to rule out these other lesions.

Hunter book

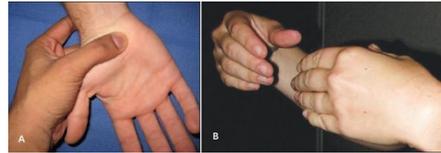
Clamp sign:

indicates scaphoid fracture- when asked where the pain is the patient will clamp their hand around their wrist at the scaphoid bone area

ECU synergy test: for ECU tendonitis/tear

FA held in full supination, elbow flexed on table- pt resists thumb-index abduction recreating pain at ECU

Durkin's compression test: aka CCT or carpal compression test



Dirken's median nerve compression test is the most sensitive physical test for detecting carpal tunnel syndrome. The examiner performs the test by applying direct pressure on the median nerve AT THE MIDDLE OF THE TRANSVERSE CARPAL TUNNEL WITH BOTH THUMBS FOR 30 SECONDS- typically done with a piece of equipment for standardized pressure.

similar to McMurtry's test

Shoulder or Step sign:



thumb sign seen in OA- radial prominence at base of thumb from dorsal subluxation of of thumb

Crank test: thumb



similar to grind test (rotation)
-axial loading then passive flex/ext of 1 MC at the CMC joint

Linscheid test:

performed in the CENTRAL DORSAL ZONE of the wrist to detect ligament injury and instability of the 2nd and 3rd CMC joints.

The Linscheid test is performed to detect ligament injury and instability of the second and third CMC joints.[50] This test is performed by supporting the metacarpal shafts and pressing distally over the metacarpal heads in a palmar and dorsal direction. A positive test produces pain localized to the CMC joints.

AER test:

90/90 shldr/ER for several minutes- to produce traction on the brachial plexus and subclavian vessels as they are pulled under the coracoid process and pec minor muscle insertion
- tests for superior thoracic outlet= 1st rib, manubrium of sternum, first 1 or 2 cervical ribs posteriorly= a bony boundary the plexus must pass- the troublemaker is the first rib if its elevated

EAST test:

aka elevated arm stress test
aka ROOS test for TOS

O'Donoghue's maneuver:

a finding of AROM that is greater than PROM that raises the possibility of symptoms magnification

Mankopf's test-

absence of increased HR of at least 5% upon palpation of reportedly painful area- sign of symptom magnification

BALLENTINE SIGN-

collapse of DIP of index and IP of thumb when attempting pinch= AIN neuropathy

VOLKMANN'S TEST= AKA VOLKMANS
PASSIVE MUSCLE STRETCH TEST

TESTS FOR DIGITAL FLEXOR TENDON TIGHTNESS AND VOLKMAN'S ANGLE
1. HOLD DIGITS IN EXTENSION AND FLEX WRIST
2. EXTEND WRIST WITH FINGERS EXTENDED- IF NO FLEXOR TENDON TIGHTNESS, FULL EXTENSION OF THE WRIST IS POSSIBLE. WRIST EXT TO LESS THAN NEUTRAL (VOLKMAN'S ANGLE) GRADES SEVERITY OF MUSCLE CONTRACTURE

VOLKMAN'S ANGLE= ANGLE FROM FULL WRIST FLEXION TO NEUTRAL WRIST
-TEST USED WITH COMPARTMENT SYNDROME, SOMETIMES WITH SUPRACONDYLAR FX'S

Describe the position of deformity

wrist flexion, MCP hyperextension, IP flexion, thumb adduction

Describe the resting hand position

wrist 10-20 degrees extension, MCP 30-45 degrees flexion, IP 0-20 degrees flexion, thumb abducted

Describe the safe hand position

wrist 20-30 degrees extension, MCP 50-70 degrees flexion, IP in extension, thumb abducted and extended

Brachial plexus and erb palsy injury splint

flail arm splint for brachial plexus, elbow lock splint for erb palsy

radial nerve palsy splint

dynamic wrist, finger, and thumb extension splint

median nerve injury
splint

opponens splint, c-
bar or thumb post
splint

ulnar nerve injury
splint

dynamic/static splint
to position MCP's in
flexion

Combined ulnar and
median injury splint

figure-of-eight or
dynamic MCP flexion
splint

spinal cord injury
(C6-C7) splint

tenodesis splint

carpal tunnel
syndrome splint

wrist in neutral, should be
worn at night and during
the day if performing
repetitive activity

cubital tunnel
syndrome splint

elbow in 30 degrees
of flexion

DeQuervian's splint

thumb splint include
wrist, IP joint free

Pronator Teres
Syndrome splint

elbow splint at 90
degrees flexion with
forearm in neutral

Guyon's Canal splint

wrist splint in neutral
(ulnar n.)

median nerve
laceration splint

dorsal protection splint with
wrist in 30 degrees flexion for
low lesion, elbow in 90
degrees flexion for high lesion

ulnar nerve
laceration splint

MCP flexion block
splint

radial nerve
laceration splint

dynamic extension
splint

dupuytren's disease
splint

extension splint
initially at all times

Describe
Dupuytren's disease

fascia becomes thick and
contracted, results in
flexion deformities of
the involved digits

Describe skiers
(gamekeepers)
thumb

rupture of UCL of the
MCP joint of the
thumb

Skiers (gamekeepers)
thumb splint

hand based thumb
splint for UCL tear

Describe
DeQuervain's

stenosing tenosynovitis of
the abductor pollicis longus
(APL) and the extensor
pollicis brevis (EPB)

Trigger finger splint

hand based, MCP
extended, IP joint
free

Describe Trigger
finger

tenosynovitis of the
finger flexors, most
commonly the A1 pulley

Describe carpal
tunnel syndrome

median nerve
compression

Describe Pronator
Teres Syndrome

median nerve
compression between
the two heads of the
pronator teres

Describe Guyon's
canal

ulnar nerve
compression at the
wrist

Describe lateral
epicondylitis (tennis
elbow)

overuse of wrist
extensors, especially
ECRB

Describe medial
epicondylitis (golfers
elbow)

overuse of wrist
flexors

Describe radial nerve
palsy

radial nerve
compression

swan neck deformity

hyperextension of PIP joint and flexion of DIP joint

Describe Boutonniere deformity

flexion of PIP joint and hyperextension of DIP joint

CMC arthritis splint

hand based thumb splint for arthritis of the thumb

ulnar drift splint

ulnar gutter

flexor tendon injury splint

dorsal protection splint

swan neck splint	silver rings or buttonhole splint; PIP splinted in slight flexion
Boutonniere splint	silver rings or PIP extension splint
Arthritis (acute) splint	resting hand splint for acute stage
Flaccidity splint	resting hand splint for lack of movement following injury
spasticity splint	spasticity splint or cone splint

<p>muscle weakness (ALS, SCI, GB)</p>	<p>balanced forearm orthosis (BFO), deltoid sling/suspension sling</p>
<p>Hand burns splint</p>	<p>wrist 15-30 degrees extension, MCP 50-70 degrees flexion, and IP in full extension</p>
<p>wrist cock up splint</p>	<p>wrist in 10-20 degrees of extension to prevent contracture, allows for digits to function</p>
<p>Describe use of resting hand splint</p>	<p>Used for people who need to have their wrist, digits, and thumb supported in a functional position for a prolonged period of time</p>
<p>Describe opponens splint</p>	<p>may be short or long, designed to support the thumb in a position of abduction and opposition, utilized during functional activities to compensate for weakness patterns</p>

Kleinert protocol	passive flexion using rubber band traction and active extension to the hood of the splint
Duran protocol	passive flexion and extension of digit
Result of radial nerve injury	wrist drop
Result of median nerve laceration	flattening of thenar eminence (ape hand), clawing of index and middle fingers for low lesion, Benediction sign for a high lesion when asked to make a fist
Result of ulnar nerve laceration	claw hand, flattened metacarpal arch, + Froment's sign

Mallet finger and
splint

flexion of DIP joint,
splinted in full
extension for 6 weeks

Ulnar Gutter Splint



boxer's fracture (5th metacarpal)

Thumb Spica Splint



DeQuervain's, RA, Skier's Thumb, CMC Arthritis

Resting Hand Splint



RA, Crush injuries, burns, spasticity due to upper motor neuron lesions, flaccidity

Hand based finger splint for immobilizing MCP in extension with IP joint free

trigger finger

Cock-Up Splint



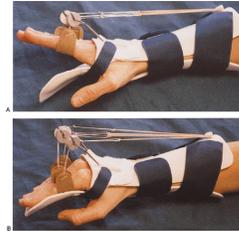
carpal tunnel, radial nerve palsy, wrist extensor tendonitis, colles' fracture, RA, RSD,

Oval-8 Finger Splint



boutonniere deformity, swan neck deformity,
combined median/ulnar injury

dynamic PIP extension splint



boutonniere deformity

flail arm splint



brachial plexus injury (holds arm close to
body)

Dynamic Wrist Finger Thumb Extension Splint



Radial nerve palsy

Opponens Splint



median nerve injury

C-Bar splint



median nerve injury (prevents web space contractures with night wear)

thumb post splint

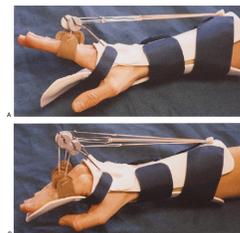


median nerve injury

Dynamic/Static Splint with
MPs in flexion

ulnar nerve injury

Dynamic MCP Flexion Splint



combined median/ulnar nerve injury

Tenodesis Splint



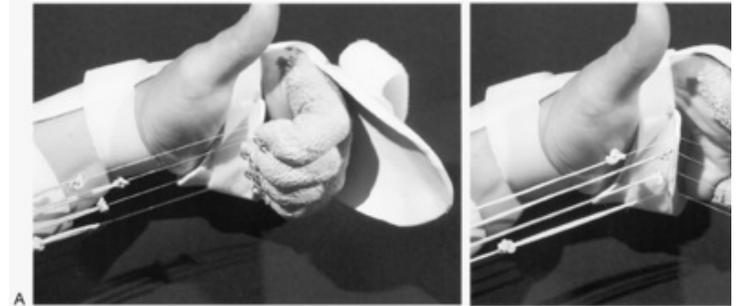
C6 to C7 SCI

Ulnar Drift Splint



ulnar drift (common with RA)

Kleinert/Duran Dorsal Protection Splint



flexor tendon injury

Cone Splint



spasticity (also called spasticity splint)

forearm orthosis

mounts to wc, must have
shoulder/trunk movement,
ALS, SCI, Guillan
Barrebalanced

Airplane Splint



burns, especially axilla

Overhead Suspension Sling



proximal weakness, muscle grades 1/5-3/5

STUDY SCHEDULE

We recommend studying for at least 6 weeks prior to your NBCOT testing date. However this will vary from person to person, some may need 8-10 weeks.

A good practice is spending 2 weeks on the study material and questions in this guide and taking note of any topics you feel weak in. Then fill out the 6 week calendar and focus your study time on your weakest topics. During this 6 weeks we recommend using any of the AOTA, NBCOT, or TherapyEd NBCOT Exam prep courses.

Today is the best day to start preparing 😊



For updates to this guide and more NBCOT Exam Prep material,
visit: occupational-therapy-assistant.org/NBCOT

Fill in all your daily activities so you know when you're busy and cannot study (work, leisure, etc)

Now write in all the blocks of time you will study. Specify the topic & activity. Ie: Splints, flashcards, practice test, review notes etc.

Once completely full, make sure you scheduled time to go over *every topic* that will be tested.

Try to schedule a few group study sessions as well. Use this time to have other students help you with the material you're struggling with

Week 1

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

Week 4

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

Week 5

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

Week 6

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

NBCOT Exam

FAQs

We've compiled the most frequently asked questions regarding the NBCOT Exam. We answered the administrative questions and we then surveyed COTAs & OTRs to get answers from a group of students who passed the exam about the exam prep questions.



For updates to this guide and more NBCOT Exam Prep material, visit: occupational-therapy-assistant.org/NBCOT

NBCOT Exam FAQs

Q: What is the cost of the exam?

A: The application fee is \$500 online or \$540 mailed in. There is also a \$40 fee for score transfers plus a \$45 confirmation fee.

Q: How long is the exam?

A: The time allotted is 4 hours

Q: What can/can't I bring into the testing room?

A: You **can** bring:

- Earplugs (not headphones)
- Medical devices (insulin pump, hearing aid, etc)

You **cannot** bring:

- Electronics
- Paper notebooks or books
- Head covering such as a hat or hood

Q: Where do I schedule my exam?

A: Submit an online application at nbcot.org or mail one in. Then send in your college transcript and fieldwork verification to NBCOT. You will then be issued an Authorization to Test (ATT) letter. At this point you may schedule your exam through Prometric at www.prometric.com choosing the closest testing center to your location.

Q: What happens if I fail?

A: Test takers must wait 45 days from the failed exam date before they may test again. There is a 15 day wait period after your last test before you may re-apply. You then restart the process of paying the fee and being issued an ATT letter. You may retake the test as many times as needed to pass.

Q: What are the pass rates for the NBCOT?

A: NBCOT OTR Exam = 78% / COTA Exam = 86%

Q: Will questions be asked one at a time?

A: Yes

Q: Are you able to mark questions and go back to them?

A: Yes, you can revisit questions and change your answers.

Q: After you answer a question, making your selection, are you able to go back and change your answer selection?

A: Yes, you can change your answers

Q: If you could give one piece of advice to a student preparing for the NBCOT, what would it be?

A: Read the question and all of the answer choices. You should usually be able to eliminate 2 of the 4 answers. Then reread the question and select from the remaining two answers.

Q: Describe your testing environment in detail.

A: Typical exam room with rows of computers set up in cubicles dividing them. You're able to wear headphones to cancel outside noise. You'll be in a room with folks taking a variety of exams such as the SAT and ACT. There are about 30 people in a test room.

Q: What items are students allowed to bring into the exam room?

A: Exam takers will be given blank paper and pen. You're not allowed to bring water but you are allowed to take bathroom breaks (although they use up your test time). You will be given access to a locker for bags, purses, sweatshirts etc., it will be right outside the exam room.

Q: How many questions does the exam have?

A: The OTR exam has 170 Multiple Choice questions and 3 clinical simulation questions. The COTA exam has 200 multiple choice questions.

Q: Can I take breaks?

A: Yes but they take up your time limit.

Q: Can I make notes during the exam?

A: The testing center will provide pencil and paper or a marker and dry erase board for you to take notes

Q: How do I obtain my test score?

A: NBCOT scores exams twice monthly. Wait about 1-3 days after your exam and you will be able to check online to see if you passed or failed, just [visit this webpage](#). 4-6 weeks after you test date you will be mailed an official score report. In order to have the score report sent to your state licensing board, you must fill out an Official Score Transfer Request during the application process or right after you take the test.

Q: Is there a list of books or study material used to create the exam?

A: The NBCOT maintains a list of the top 10 textbooks used to create both the OTR and COTA exams. They create an in depth report every so often that lists the textbook names and how much of the exam was created from them as well as which parts of the exam were created from each book. You can find the most recent updated [reports for both the OTR and COTA exam here](#).

Q: Which mnemonics or charts were most helpful when studying for the NBCOT?

A: Charts and handouts on topics like Moro, STNR, ATNR, and Babinski were extremely helpful. Also, charts of common splints were extremely helpful. Try creating a page for each splint with an image and description of it that includes the splint name and use. Also make sure to review Ranchos, Glasgow, MMT, Brunnstrum, Coma Scale, and ROM norms/scales.

Q: Do you have any tips for the multiple choice questions?

A: Practice your clinical reasoning skills. You need to be able to read a treatment scenario and choose the best option. Most of the time two of the multiple choice answers will clearly be wrong and you can immediately eliminate them. Then you are down to just two options.

Q: Is there a tutorial to show you how to take the exam?

A: You can watch a tutorial before your exam time begins that will teach you how to proceed with the exam.

Q: Do you have any other advice at all that may be helpful to students preparing for the NBCOT?

A: The best advice is to take practice exams repeatedly. Take one early just to gauge where you are. Then go back and repeatedly take practice tests focusing on the study areas that you get wrong. Also, don't forget to go over the basics, they are important and should be embedded in your memory to help with the many types of questions you will see. Make sure you know your norms, scales, common splints, reflexes, as well as diagnoses contraindications. Study alone, but also participate in study groups. Quiz each other and discuss why the right answer is right.

NBCOT Exam

Tips

We compiled the best tips we've heard from OTRs and COTAs in regards to preparing for, studying for, and passing the NBCOT exam. Everything from study tips to dressing comfortable for the exam will be covered here.



For updates to this guide and more NBCOT Exam Prep material, visit: occupational-therapy-assistant.org/NBCOT

NBCOT Exam Tips

PICK YOUR RESOURCES

As soon as possible you want to start gathering your study resources for the NBCOT exam. There are tons of paid and free options for study materials and you don't want to get bogged down with trying to study too many. Try a few of the free resources to get a feel for the study material and to see what is missing from them that you may need to purchase separately.

Once you have your resources chosen, you can lay out a schedule for exactly how you're going to go about studying. Such as how much time you will dedicate to each topic and question type.

SCHEDULE YOUR EXAM (RIGHT AFTER GRADUATION)

Scheduling your exam is really important. It creates a deadline which will help you to buckle down on your study schedule and get prepared. Also, the sooner you schedule it after graduation the more momentum you will have going in. The material you've learned will be fresh and you won't build up anxiety by waiting for a long period of time after graduation to sit for the exam.

CREATE A STUDY SCHEDULE (6 WEEKS MINIMUM)

As mentioned above, as soon as you have your study resources chosen, schedule the exam and create an attack plan for how you are going to consume all of the study resources you chose.

Everyone is different but we surveyed some OTRs and COTAs to see what they recommended for studying and everyone said at least 6-8 weeks of studying was necessary with at least 2 – 4 hours of studying per day. Of course these metrics will vary, but this should provide a good starting point.

TAKE PRACTICE TESTS

Good job, I know you are already working on this. Remember, you were ~~freaking out about the NBCOT exam~~ searching for NBCOT practice tests when you found this post.

Practice tests are an essential part of NBCOT exam prep as they provide insight into the test format, types of multiple choice questions, and example clinical simulation questions. After taking a few practice tests you will have developed a good pace for getting through the exam and you will have a good feel for the questioning which will increase your confidence.

ESSENTIAL TOPICS

We surveyed OTRs and COTAs to see what topics appeared most often on the NBCOT exam. We put together this short list of the most common testing topics that you should definitely be well versed on before taking the NBCOT:

- Glasgow Coma Scale
- Types of reflexes
- Ranchos Los Amigos scale
- Developmental milestones
- SCI levels (specifically know which motor function is available at each sci level)
- AOTA ethical standards (For example, you should be familiar with non-maleficence, beneficence, and social justice etc.)
- types of groups for mental health
- Medical conditions (most of the conditions you see in the study guides will be on the exam)

NIGHT BEFORE EXAM

Believe it or not, the night before your NBCOT exam is not best spent cramming. At this point, you should try to relax and spend your time preparing for exam day. The night before should be spent getting everything ready that you'll need the next day. Here is what you'll need on test day:

- 2 forms of ID
- ATT Letter
- Print out of your appointment confirmation
- Comfy outfit
- Healthy breakfast (eat carbs and protein for the best and most sustained energy)

Although some review the night before can be helpful, don't study too hard. At this point you really do know most of the information that you will be able to know before the exam. It is wise to spend some time reviewing what you know but studying new material or material you don't know this late will not help you.

Your time will be better spent doing something relaxing to rest your mind and relieve some stress so that you sleep well (try to get 8hrs) and go into the exam fresh. Take a walk, run a bubble bath, watch re-runs of your favorite funny show, call your sibling... whatever your cup of tea is, make a cup.

EXAM DAY TIPS

The best advice for exam day is pretty simple. Keep in mind that the clinical simulation questions will come first and then you will take the multiple choice section. Here are some helpful tips for exam day.

- Dress comfortable
- Eat a healthy breakfast
- Don't drink too much fluid before the exam (or you will waste time scanning in and out to go pee)
- Save time by using the 10 minute break in between clinical simulation and multiple choice to use the restroom
- Try spending about 1 minute on each multiple choice question, then you should have about 30 minutes to review your answers