

Neuropathies Conditions		Neuropathies testing (cont)		tendon repairs (cont)		Splints (cont)	
ulnar claw	ulnar nerve (hyperextension of 4/5th digits)	ulnar nerve testing motor innervation of thumb	positive froments test - flexion of IP joint of thumb	- 8-12 weeks	strengthening, work, leisure	carpal tunnel syndrome	wrist splint positioned in neutral - decrease carpal canal pressure
hand of benediction	high median nerve - only occurs when attempt to make a fist			duran	passive flexion and extension of digit		
ape hand	median nerve - injured hand at rest - thumb adducted, cannot abduct/oppose thumb			- 0-4.5 weeks	dorsal blocking splint, exercises in splint include flexion of PIP joint, DIP joint	cubital tunnel syndrome	elbow splint position at 30 degrees of flexion - prevent elbow flexion at night
wrist drop	ulnar nerve issue			- 4.5-6 weeks	active flexion and extension within limits of splint	de quervains	thumb splint, includes wrist, IP joints free
carpal tunnel	median nerve compression at wrist			- 6-8 weeks	tendon glides, differential tendon gliding, scar management	skiers thumb	UCL hand based thumb splint - protect the ulnar collateral ligament of MCP
cubital tunnel	ulnar nerve compression at elbow			- 8-12 weeks	strengthening/work activities	CMC arthritis	hand based thumb splint - for hand to be at rest to decrease inflammation
ulnar tunnel - handle palsy	ulnar nerve compression at guyons canal					ulnar drift	ulnar wrist/deviation splint - decrease pain, provide stability, realign MCP
radial tunnel	radial tunnel compression					flexor tendon injury	dorsal protection splint - for protection of site
Neuropathies testing		Finger issues		Splints			
carpal tunnel testing	tinels and phalens - prayer/reverse prayer sign	trigger finger	A1 pulley	brachial plexus injury	flail arm splint - for positioning		
cubital tunnel testing	tinels	swan neck deformity	proximal interphalangeal (PIP) joint hyperextension and the distal interphalangeal (DIP) joint flexion	radial nerve injury	colditz or radial nerve splint -for function		
de quervains	positive finkelstein "hook grip"	boutonniere deformity	flexed at the proximal interphalangeal joint (PIP) and hyperextended at the distal interphalangeal joint (DIP)	medial nerve injury	opponens splint (for functional activities), Cbar, thumb post		
semmes wienstein - sensory	occlude pts eye; touch different areas of hand	ulnar drift	fingers shift towards ulnar side - RA	ulnar nerve injury	anticalw splint, lumbrical bar splint - prevent clawing		
guyons canal syndrome testing	testing over guyons canal			spinal cord - C6-C7	tenodesis splint - facilitate grasp and release		
		tendon repairs					
		kleinert	passive flexion using rubber band traction and active extension to the hood of the splint				
		- 0-4 weeks	dorsal block splint				
		early phase					
		- 4-7 weeks	continue dorsal block splint, but adjust wrist to neutral				
		intermediate phase					
		- 6-8 weeks	no splint, AROM, light OT activities				
		AROM					



Splints (cont)		Range of motion		muscle strength testing and interventions (cont)		muscle strength testing and interventions (cont)	
swan neck	silver rings, button-hole/hyperextension block splint - prevent further deformity	goniometer	measurement tool	4 good	Complete ROM against gravity and moderate resistance. Resistive exercise is used to increase strength. Example: Tossing a beach ball with weighted cuffs strapped to the patient's wrists. Tossing a therapy ball.	3- / fair minus	More than 50% ROM against gravity. Example: Structure an activity to encourage the patient to lift his arm up in a vertical plane, against gravity. As the patient will not be able to achieve a complete ROM, place the goal at the highest level which the patient is able to reach.
boutonniere deformity	silver ring or PIP extension	functional ROM	rom needed to perform functional movements - reaching to top of head, small of back	3+ fair plus	Complete ROM against gravity and slight resistance. Resistive exercise is used to increase strength. Example: Tossing a beach ball.	2+ poor plus	Less than 50% ROM against gravity / complete ROM gravity eliminated slight resistance. Example: Place the patient's arm on top of a table. Structure a table top activity which requires the patient to slide their arm along the surface of the table, through a complete ROM (in a gravity eliminated plane). Using a regular surface and introducing weighted game pieces, will add resistance to the movement.
arthritis	functional splint or safe splint - decrease inflammation	active ROM - AROM	contractile structures - movement produced by ones own muscle	3 fair	Complete ROM against gravity. When a grade of 3 is reached, the activity can be structured to move against gravity. Example: Balloon volleyball / throwing a balloon at a target, which requires the patient to lift their arm up against gravity. Adapted volleyball type game.		
flaccidity	resting/functional hand splint - prevent joint contracture, common wearing and at night then on off during the day	passive ROM - PROM	noncontractile structures - movement produced by an external force				
spasticity	spasticity splint or cone splint - prevent joint contracture	active assisted range of motion - AAROM	movement produced by ones own muscles and assisted by an external force				
muscle weakness - ALS, SCI, guillain barre	balanced forearm orthosis (BFO), deltoid sling/suspension sling - supports	<b>muscle strength testing and interventions</b>					
hand burns	wrist 15-30 degrees extension, MCP 50-70 degrees flexion, IPs in full extension	MMT	break test is most common	5 normal	Complete ROM against gravity and maximal resistance. Resistive exercise is used to increase strength. Example: Tossing a medicine ball while standing.		



### muscle strength testing and interventions (cont)

2- / poor minus Complete ROM with gravity eliminated. For exercises/activities performed in a gravity-reduced plane, use a powdered surface or skateboard to reduce the resistance produced by friction on a supporting surface. Example: Place the patient's arm on top of a table which has been covered with powder. Structure a table top activity which requires the patient to slide their arm along the surface of the table, through a complete ROM (in a gravity eliminated plane). Play a board game with light game pieces, or table cricket.

### muscle strength testing and interventions (cont)

2- / poor minus Incomplete ROM with gravity eliminated. Patient moves the joint through partial ROM and the therapist or mechanical device completes the ROM. Example: Support the patient's arm and allow the patient to actively move through as much range as is possible, in a gravity eliminated plane. As soon as the therapist feels/observes that the patient has stopped actively moving, the therapist continues to support and move the patient's arm through the complete ROM. Incorporate a goal into the exercise e.g. incorporate using a suspension mobile arm support with a meaningful activity.

### muscle strength testing and interventions (cont)

1 trace No movement but can contract muscle. Facilitate muscle contraction – Tap, rub, vibrate muscle to facilitate a stronger contraction. Active-Assisted Exercise. The patient contracts their muscle, and the therapist or a mechanical device completes the entire ROM. Slings, pulleys, weights, springs, or elastic bands may be used to provide mechanical assistance. This exercise is graded by decreasing the amount of assistance until the patient can perform active exercises. Example: Supporting and moving the patient's arm through a full ROM in a gravity eliminated plane. Incorporate a goal into the exercise e.g. support the patient's arm on a large ball and assist the patient in rolling the ball through a full ROM, to play a variation of traditional ten-pin bowling.

### muscle strength testing and interventions (cont)

0 zero No muscle contraction. Paralysis. Maintain PROM. The purpose of passive exercise is to prevent contractures, adhesions, and deformity by maintaining ROM.

### simple interventions

increasing strength	high resistance, low reps
increasing endurance	increase reps, low weight/resistance
edema reduction	elevation, retrograde massage, compression, contrast baths
scar mgt	ROM, massage, compression, scar pad with compression, splinting, edema control
sensory training - desensitization for hypersensitivity	massage, textures, vibration, fluidotherapy
sensory training - re-education	massage, textures, vibration, fluidotherapy *high risk for injury since they are not feeling
joint protection	use hips/knees, push large items with full body, carry bags on forearm



simple interventions (cont)			PAMS (cont)			PAMS (cont)			PAMS (cont)		
body mechanics	do not move items that are too heavy, keep objects close to the body during lifting, hold object centered at waist level		cold pack	pain management, anti inflammation, edema control, decrease of muscle guarding, spasm.	Hypersensitivity or poor tolerance to cold • Raynaud's disease and phenomenon • <b>Circulatory impairment – e.g. hemorrhaging tissue or untreated hemorrhagic disorders • Peripheral vascular disease • Active DVT • Impaired sensation (neuropathy) • Open wounds, near chronic wounds • Cryoglobulinemia* •</b> Over regenerating nerves • Impaired cognition and/or ability to communicate	hot pack	subacute and chronic conditions. Relieves pain, increases soft tissue extensibility, reduces muscle spasm, relaxes skeletal muscles, decreases joint stiffness, and promotes wound healing.	Peripheral vascular disease • Impaired circulation, bleeding disorder, DVT or thrombophlebitis • Local malignancy and recently radiated areas • Acute inflammation or trauma, edema, infection • Open wounds • Over large scars • Impaired sensation (neuropathy) • Large areas, or at sufficient intensity to raise core temperature-pregnancy, severe cardiac disease/in cardiac failure • Impaired ability to communicate-cognition or communication impairments	fluidotherapy - heat	help patients with their hands and wrists. Arthritis, chronic tendonitis, postoperative conditions, post fracture management, and Raynaud's syndrome.	open wounds
PAMS											
pam	indication	precautions/contraindication							neuromuscular electrical stimulation NMES - muscle stimulation	stimulate paralyzed, paretic muscle weakness, peripheral neuropathy, and muscle spasm.	Pregnancy • Cancer Presence of a cardiac pacemaker or any other electrical stimulators Precautions include obesity, impaired sensation and over relatively superficial metal implants.

sufficient to prevent patient from giving accurate and timely feedback • Areas affected by heat-sensitive skin diseases (e.g., eczema) • Areas of skin breakdown or damage producing uneven heat conduction across the skin • Reproductive organs (testes)



PAMS (cont)			PAMS (cont)			PAMS (cont)			PAMS (cont)		
paraffin	useful for	if patient	transcutaneous electrical stimulation - TENS - used for PAIN	Stimulates nerve fibers and provides symptomatic relief of pain. Used to treat chronic pain syndrome, spinal radiculopathy, low back pain, reflex sympathetic dystrophy, etc.	Pregnancy Pacemakers • Prone to seizures- Tens "pulses" have the potential to trigger a seizure.	ultrasound	Penetrates deep into the musculature and joint tissues. • Increase the extensibility of collagen fibers in tendons and joint capsules • Reduce muscle spasms • Aids tissue healing – speeds up the rate of healing & enhance the quality of the repair • Modulate pain, goes to the deepest layer for pain	Pacemaker • Areas of decreased circulation • Impaired sensation • Pregnancy • Along the cervical sympathetic ganglion (or over the anterolateral neck) • Directly over the spinal column after laminectomy • Severe arterial disease or DVT • Bleeding disorders • Over a bony prominence • Over epiphyseal plates • Any surgically implanted artificial product (e.g., Gortex or mesh) may build up heat in an area.	whirlpool	Pain management • Wound management, particularly in the management of burn patients • To facilitate debridement in infected wounds, non-draining wounds, thick eschar, and on wounds with loosely adherent necrotic tissue • Helps dressings to be removed slowly and gently, reducing the pain of dressing changes. • ROM exercises • Promoting muscular relaxation	Fever • Recent skin gra • Circulatory impair • Active bleedin hemorr haging Open wounds Sensor vascula impair



### PAMS (cont)

contrast	Hot/cold	Same
baths	immersion	as
	therapy is a	Superf
	method of	icial
	treating: •	Heat
	Muscle	and
	soreness •	Cold
	Swelling •	
	Inflam-	
	mation. •	
	Joint	
	injuries, mild	
	sprains, •	
	Symptoms	
	of chronic	
	pain and	
	repetitive	
	strain	
	injuries •	
	Edema	



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