PHYSIOTHERAPY MANAGEMENT OF TRAUMATIC BRACHIAL PLEXUS INJURIES

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SO FAR TODAY WE HAVE REVIEWED…

- Mechanism of injury
- Surgical and Conservative Management
- Video of Assessment of tBPI
- How to access the service

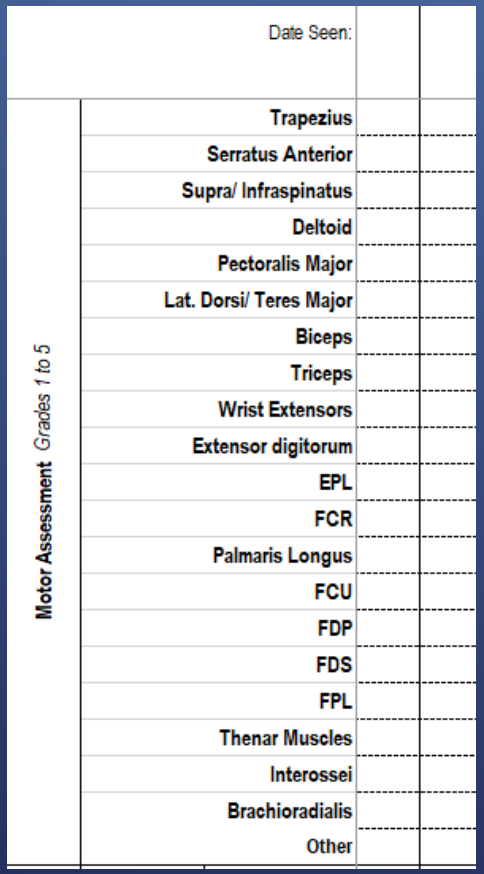
CLINICAL SPECIALIST PT'S ROLE

- Assess
- Support patient through their journey
- Support local therapist
- Liaison
- Education
- Clinical development

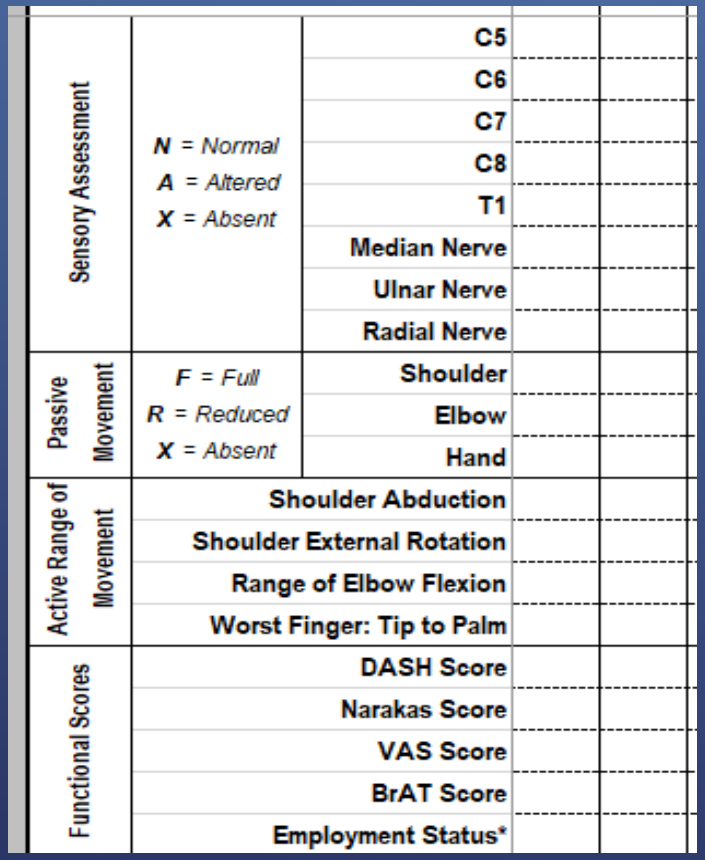
PHYSIOTHERAPY ASSESSMENT

- No different from standard MSK assessment – no restrictions
- Difficulties can lie
    - with assessment at lower MRC grades
    - Severe neuropathic pain
    - Upper limb trauma in protective phase
    - Polytrauma
- Palpate the muscle
- Charting can be helpful, but not too often
- Observe and encourage function
- Be mindful of rotator cuff pathology if not been considered at initial injury

CHARTING



	Date Seen:		
Motor Assessment *Grades 1 to 5*	Trapezius		
	Serratus Anterior		
	Supra/ Infraspinatus		
	Deltoid		
	Pectoralis Major		
	Lat. Dorsi/ Teres Major		
	Biceps		
	Triceps		
	Wrist Extensors		
	Extensor digitorum		
	EPL		
	FCR		
	Palmaris Longus		
	FCU		
	FDP		
	FDS		
	FPL		
	Thenar Muscles		
	Interossei		
	Brachioradialis		
	Other		



Sensory Assessment	*N* = *Normal* *A* = *Altered* *X* = *Absent*	C5		
		C6		
		C7		
		C8		
		T1		
		Median Nerve		
		Ulnar Nerve		
		Radial Nerve		
Passive Movement	*F* = *Full* *R* = *Reduced* *X* = *Absent*	Shoulder		
		Elbow		
		Hand		
Active Range of Movement		Shoulder Abduction		
		Shoulder External Rotation		
		Range of Elbow Flexion		
		Worst Finger: Tip to Palm		
Functional Scores		DASH Score		
		Narakas Score		
		VAS Score		
		BrAT Score		
		Employment Status*		

Assessment forms used in clinic are available on the SNPBPI website

THERAPY MANAGEMENT

Principles of management are the same no matter the level or degree of injury.

- Maintain joint ROM
- Strengthen unaffected muscle groups particularly if tendon transfer may be an option at a later date
- Strengthen affected muscle groups as recovery becomes apparent
- Pain management

- Optimise function
- Use static splinting to maintain good resting position of the hand if required
- Encourage independence
- Psychological Support where required
- Support for return to work and social activities including driving

EXERCISES AND MOBILISATION

- Active assisted/passive shoulder and elbow ROM exercises with paralysed hand
- Ensure good technique (esp. hand)
- Strengthen/ maintain what they do have
- Strengthening exercises when they start to recover
  - Consider what transfers have taken place
  - Recruit transfer
  - Isotonic/ Gravity neutral etc.

- Remedial work with OT to facilitate function especially at later stages when patient has favoured unaffected arm
- Stim when flicker of contraction begins
- Hydrotherapy
- Recruit family if indicated
- General exercise alternatives and maintenance of fitness
- Patient and PT information booklets available

STIM

An international survey of the current use of Electrical Stimulation for Adult Traumatic Brachial Plexus Injuries

Hazel Brown Highly Specialist Physiotherapist, Royal National Orthopaedic Hospital, Stanmore

Key words: Neuromusculoskeletal | Electrotherapy | Current practice | @hoopoe_swana

Background

- Electrical Stimulation (ES) of muscles following nerve injury was a frequently used adjunct for rehabilitation; recently its use has declined
- An international collaborative group of therapists with a special interest in Traumatic Brachial Plexus Injuries (TBPI) was formed in 2017
- One of the objectives of the group is to assess and improve the evidence base around treatment modalities for TBPI
- A survey of the use of ES within 'expert practitioners' was undertaken to:
  1. Explore current practice
  2. Ascertain the reasons for and against its use

Methods

- An online 'Google forms' survey was developed
- The form was disseminated to specialist clinicians in **four countries**
- Specialisation in nerve injuries ranged from 3 years up to 25 years (mode 10 years)

12 Physiotherapists and
5 Occupational Therapists consented to participate and completed the survey

Conclusions and Implications

- ES does appear to be a treatment modality that specialist clinicians are using; but not often
- The main reasons for non use included lack of training and limited supporting literature
- Poor consensus with settings may be reflective of a limited evidence base in this area
- This has been recognised by the international collaborative group of therapists specialising in TBPI and further work will be directed to address these barriers

General consensus for settings:

20 to 50 Hz, 250µs, Modulated and move to burst

How To Apply Neuromuscular Electrical Stimulation (NMES)? - Electrical Stimulation (electrical-stimulation.com)

HAND

- Hand can become very neglected
- Technique for exercise crucial
- Splinting of hand for good positioning
- Dynamic splinting to facilitate function
- hand therapist involvement

SPLINTING

SHOULDER SUPPORT

- If patients are having problems with shoulder subluxation wearing an off the shelf support may be beneficial.

- Can have an immediate affect in relieving mechanical shoulder pain

- Speak to us if having difficulty accessing equipment

PAIN MANAGEMENT

- Treat what you find
- Are they on the right meds?
- Explain pain, help them understand their pain
- Educate
  - Address fear/ misconceptions
- Pain clinic involvement

SENSORY FEEDBACK

- Graded motor imagery
  - Laterality (Left right discrimination – apps available)
  - Imagery
  - Mirror therapy
  - Caution with pain – can aggravate
- Tactile stimulation/massage
- EMG/ biofeedback if access

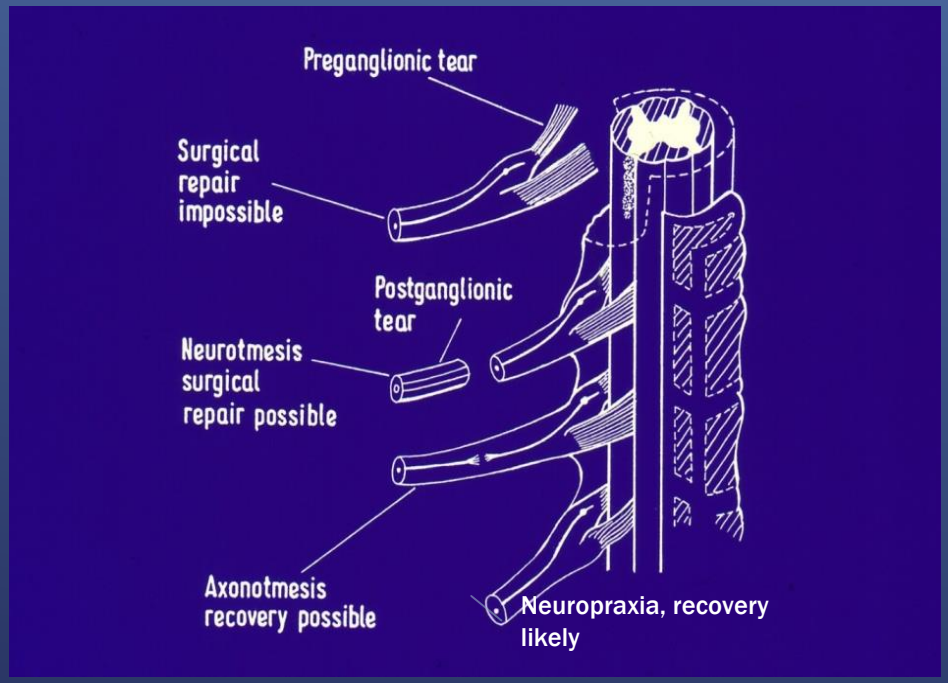
FACILITATE FUNCTION

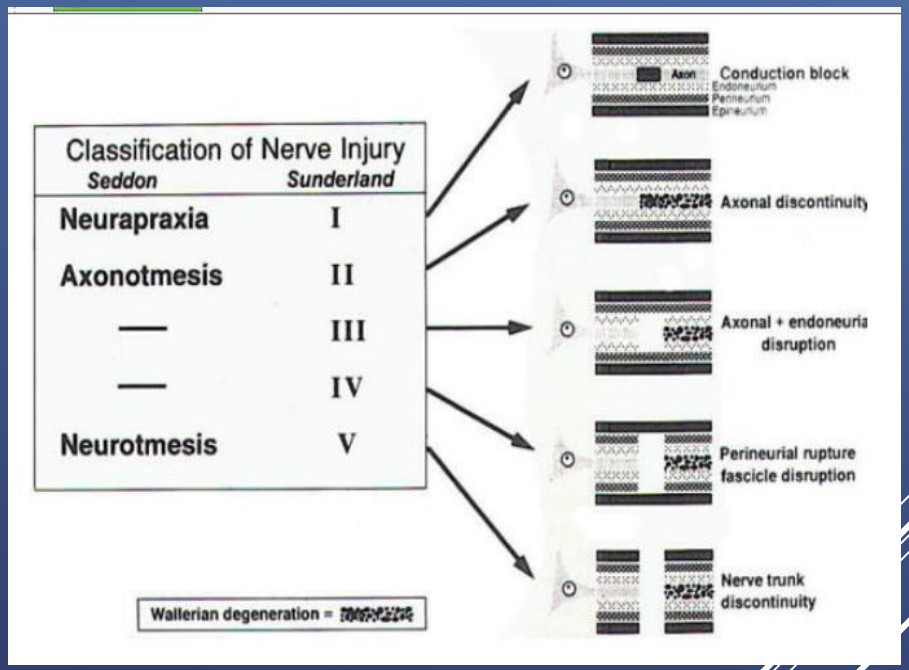
- Assist with functional independence – liaise with OT if you have access to outpatient OT
- Alternative Exercise ideas
- Alternative Hobby Ideas
- Driving – DVLA
- General physical and psychological wellbeing

USEFUL/ADDITIONAL INFORMATION

- SNBPIS website: www.brachialplexus.scot.nhs.uk
  - Patient Information
  - Info for Physiotherapists booklet
  - Useful references
  - Referral and assessment forms
  - Educational materials
- Support Groups
  - www.scottishbpigroup.co.uk
  - www.tbpi-group.org
- https://www.trinity-creative.co.uk/
- Active Hands Gripping Aids | Limited Mobility Gripping Aids
- Saebo UK
- Athletic Arm Sling (ubpn.org)
- Graded Motor Imagery

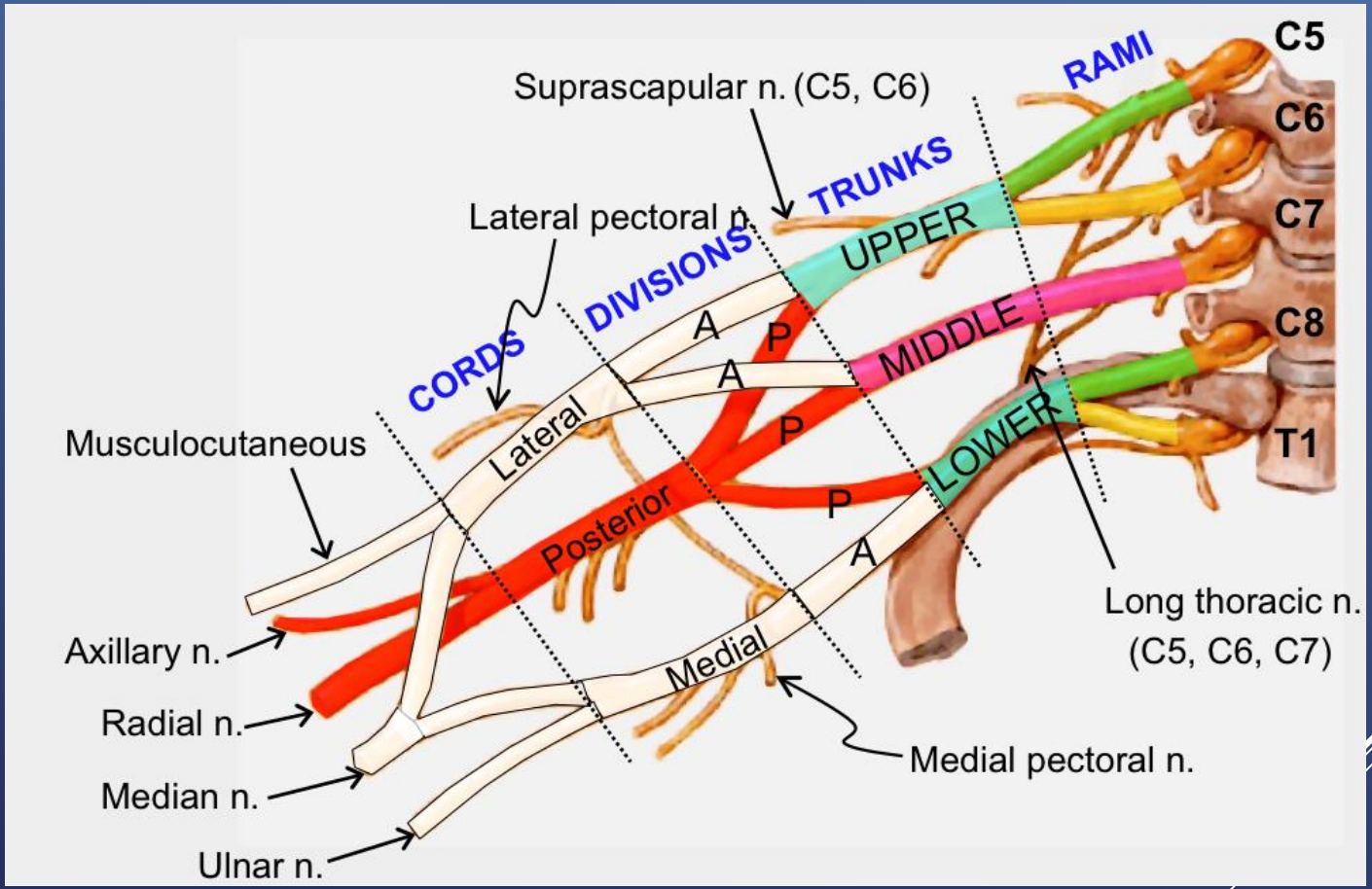
GRADES OF INJURY TO THE BRACHIAL PLEXUS





- Dominic Power – Upper limb surgeon: https://www.youtube.com/watch?v=_XOD9Tzn2KQ

ANATOMY OF THE BRACHIAL PLEXUS



Nerves	Muscles	Functional limitations
Suprascapular nerve C5, 6 *(Shoulder girdle)*	Supraspinatus Infraspinatus	Weakened lateral rotation of humerus.
Long thoracic nerve C5 - 7 *(Shoulder girdle)*	Serratus anterior	'Winged scapula'. Difficulty flexing outstretched arm above level of shoulder. Difficulty protracting shoulder.
Axillary nerve C5, 6	Teres minor Deltoid	Loss of arm abduction. Weakened lateral rotation of humerus.
Musculocutaneous nerve C5 – 7 *(Arm)*	Biceps Coracobrachialis Brachialis	Loss of forearm flexion and supination.
Median nerve C5 - T1	Pronator terres Pronator quadratus APB; Opponens; FCR, Palmar longus; FDS; FDP (to index and middle); FPB (lateral head), Lumbricals	'Monkey hand' deformity. Weakened grip. Thenar atrophy. Unopposed thumb, loss of pinch grip.
Radial nerve C5 - T1 *(Arm)*	Triceps (long, lateral and medial head) Brachioradialis	Absent / weak supination. 'Wrist drop' Extensor paralysis of fingers and thumb.
Radial nerve C5 - T1 *(Forearm and hand)*	ECRL; ECRB, Supinator EDC; EDM; ECU; APL; EPB; EI	Loss of wrist, thumb and finger extension.
Ulnar nerve C8 - T1 *(Forearm and hand)*	FCU,FDP (ring and little),FDMB; ADM; ODM Interossei, Lumbricals, AP; FPB (medial head)	'Clawhand deformity'. Interosseus atrophy. Loss of thumb abduction.

GOOD TEXTBOOK CHAPTER

Brown, H., Johnson, K., Beale, S., Miller, C. (2021). Rehabilitation of Nerve Injuries. In: Phillips, J., Hercher, D., Hausner, T. (eds) Peripheral Nerve Tissue Engineering and Regeneration. Reference Series in Biomedical Engineering(). Springer, Cham. https://doi.org/10.1007/978-3-030-06217-0_17-1

ANY QUESTIONS?