Stroke/CVA & TBI

Biomechanical Interventions in Occupational Therapy II
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• Readings:
  - *Quick Reference Neuroscience 2nd edition* by Gutman: Sections 7 & 19
  - Radomski & Trombly: Chapter 38 (beginning p. 1001) on Stroke; chapter on TBI and Chapter 13 (beginning p. 358) on activity selection, grading, adapting, and analysis.
Nature of CVA

Ischemia leading to necrosis: Interruption of blood flow from involvement of one or more branches of internal carotid artery (typically damages portions of primary motor and sensory areas as well as various association areas, visual area, speech area); if basilar artery or vertebral arteries (damage in brainstem)

- thrombosis/embolism/blockage cause too little blood/oxygen
- hemorrhage (too much blood flooding area outside of capillary beds where exchange takes place) - hemorrhagic strokes have a higher mortality rate
Left CVA = motor speech area
damaged=expressive aphasia, also receptive
aphasia; right hemiplegia or paresis typically
with some degree of spasticity within 3 to 4
weeks; right homonymous hemianopsia  (*draw
on board*)

Right CVA = left hemiplegia/paresis typically
with spasticity; **left homonymous hemianopsia**
with or without left unilateral neglect; possible
apraxias (Gutman p. 229)

Brainstem stroke – more global damage and
effects
Hemorrhagic Stroke

Weakened/diseased blood vessels rupture.

Blood leaks into brain tissue

© Heart and Stroke Foundation of Canada
Ischemic Stroke

Blood clot stops the flow of blood to an area of the brain

©Heart and Stroke Foundation of Canada
CT Scan
Nature of TBI

Can be more diffuse axonal damage; cognitive problems.

Above illustrates “coup-contra coup.”

www.calbraininjury.com/Articles1.shtml
Traumatic Injuries
Major Causes of Traumatic Brain Injuries

- Falls: 28%
- Motor Vehicle Accident: 20%
- Struck by... (incl. Sports): 19%
- Assault: 11%
- Suicide: 1%
- Other: 21%

Source: National Center for Injury Prevention and Control, CDC
• Common to all lesions (including TBI with more unilateral damage):
  – postural difficulties – especially difficulty leaning forward into a transfer (person will typically sense your nudge forward as a threat to balance and push back forcefully to correct for disturbance).
  – Posturing: UE predominant tone is flexor = scap retraction, GH adduction-internal rotation, elbow flexion, forearm pronation, wrist and finger flexion. All worsens with effort in any direction or a rise in emotions.
• Common to all lesions (cont.):
  - Synergies – stereotypical combinations when attempting voluntary motions; not as often seen – make sure to differentiate from posture describe above – which is not associated with movement
  - Dysarthria-slurred speech; dysphagia
  - Stand-pivot transfers possible/probable with different levels of independence
• **OT Intervention:** Biomechanical AND Neurological problems

• **Approach = OTIPM** – Helps with thorough background and MAKES YOU decide whether to go restoration versus compensation route (or combo of both); within OTIPM use biomechanical, CIT? or another neuro approach, rehab/compensatory.

• **Evaluations:** FIM, spasticity assessment, need for adaptive equipment, edema, possibly goniometric or functional ROM assessment, MMT ONLY LATER – after return of voluntary control, wheelchair prescription (simple), home assessment, dirving assessment; nine dimensions in OTIPM:
Occupational performance occurs as a “transaction between the person and the environment as he or she enacts a task” (p. 514). Therapists must be aware of the client’s performance context (comprised of temporal, environmental, cultural, societal, social, role, motivational, capacity, and task dimensions) to understand, evaluate, and interpret a person’s occupational performance.

Also – check pp. 69-79 in R & T.
Assessments


List of Common Assessments:

• Spasticity
• Motor: Fulg-Meyer Scale
• ADL: FIM
List of Common Assessments (cont.):

- **ADL: Barthel Index**
- Need for adaptive equipment
- Edema and UE management (including subluxation)
- Driving eval
- Wheelchair prescription
- Home assessment
Probable problem list – CVA & TBI:

• All of the following interfere with role fulfillment; many are due to biomechanical problems IN ADDITION TO cognitive and perceptual problems:

• Spastic hemiplegia possibly leading to
  – immobile scapula (secondary to tight rhomboids; leading to inability to flex/abduct arm),
  – shoulder adduction/extension/int rotation contractures (secondary to tight capsule AND muscle contractures in pec major, latissimus)
  – elbow, wrist, fingers flexion contractures (joint AND muscle)
Problem List – CVA/TBI cont.

- dependence/difficulty in all ADL (self care – showering, toileting, dressing; and IADL – meal prep, grocery, home management)
- unilateral field cut – with or without unilateral neglect
- dependence/difficulty/safety risks in transfers (to/from bed, toilet, shower-bath tub, car, favorite chair-sofa)
- lack of safety awareness in general; possibly impulsiveness
- edema in affected UE (secondary to inability to move and placement in dependent position)
Problem List – CVA/TBI cont.

• hygiene problems in affected hand
• mobility problems – unable to walk and does not know how to propel wc
• pain in affected UE – *Fig 38-4*
• shoulder subluxation on affected side
• dependence/difficulty in feeding self – may pocket food; may have dysphagia
• problems with driving
• Increased likelihood of falling (during transfers)
• Difficulty in bed mobility
Problem List – CVA/TBI cont.

- WC positioning problems – asymmetries – see p. 1014 in text
- Fatigue
- Apraxia
- Aphasia
- Numerous precautions – see p. 1022
- Skin integrity on affected side (trauma to skin of affected UE, pressure sores on IT or sacrum)
Interventions: MUST SEE: Stroke Engine = http://www.medicine.mcgill.ca/strokengine/: go down list on left-hand side and see CIMT, FES, and others

General Thinking about intervention:
• Go down the list of problems and figure for each the nature of the problem (biomechanical, cognitive, perceptual) then plan treatment.
• Ideas can be found in R & T text Section 5 (and will see these in Neuro course) AND Ch 38 beginning p.1001: look above in italicized font
• see Procedures p. 1026.
• See evidence table p. 1036
• Mirror Therapy

Add’l reading: www.OTCATS.COM – find appraisal of lit on shoulder subluxation
The Basal Ganglia and the Serial Order of Communicative Signs

Robert N. St. Clair, Walter E. Rodriguez, and Irving Joshua

University of Louisville