ASSESSMENT OF POSTURAL DISORDERS

see: Chapter 10 in Motor Control Textbook (Shumway-Cook & Woollacott, 1995)

In a task-oriented approach to posture/balance assessment (as opposed to a systems approach) there are three levels of assessment:

- 1. The <u>functional</u> skills requiring postural control
- 2. The sensory and motor <u>strategies</u> used to maintain posture in various contexts and tasks
- 3. The underlying sensory, motor and cognitive <u>impairments</u> that constrain posture control

FIRST CONCERN = SAFETY, especially when dealing with the elderly/disabled.

When evaluating postural control, subjects will be asked to perform a number of tasks that will likely destabilize them. It is a good idea to have subjects wear an ambulation belt during all testing. Subjects should be closely guarded at all times.

It is important that the subject be allowed to experience instability in order to determine their limits. The assessor should protect the subject at all times and prevent a fall whenever possible.

FUNCTIONAL ASSESSMENT:

Provides the assessor with clinical information on the subject's level of performance compared to standards established with normal subjects. Results can serve as a baseline for comparison when tests are repeated after successive rounds of therapy.

- 1. <u>Balance and Falls History</u> see overhead
- 2. <u>Get up and Go test</u> developed as a quick screening tool for elderly subjects Requires subject to stand up from a chair, walk 3 meters, turn around, and return.

Scoring:	1 = normal
	2 = very slightly abnormal
	3 = mildly abnormal
	4 = moderately abnormal
	5 = severely abnormal

an increased risk of falls found in elderly subjects who score greater than 2

The '<u>Up and Go</u>' test is a modification to the above, with the addition of a timing component. Normal adults can complete the test in under 10 seconds. Adults taking greater than 30 seconds to complete the test are found to be dependent in most activities of daily living and mobility skills.

3. <u>Functional Reach Test</u> - another single item quick screen for balance in older adults. Subjects stand with feet shoulder width apart, with the arm raised to 90 degrees shoulder flexion. Without moving their feet, subjects reach as far forward as they can while still maintaining their balance. The distance reached is measured and compared to age-related norms.

This test has been shown to have high inter-rater reliability and is highly predictive of falls in the elderly.

4. Performance Oriented Mobility Assessment - Developed by Tinetti, screens for balance and mobility skills in older adults, helping to determine the likelihood of falls.

See hand-out. Note: error in scoring item number 8.

5. <u>Functional Balance Scale</u> - 14 different items scored from 0 to 4. See appendix A of Motor control textbook.

Read the rest of Chapter 10 - covering the Strategy and Impairment Assessments. This, and the active learning module at the end of the chapter will help you in producing the final report.

ASSESSMENT OF MOBILITY DISORDERS

see Chapter 14 in Motor Control Textbook

Functional Testing: Based on comparison to normal adults

- normal males between 20-60 years old walk about 82 m/min (3.06 mph)
 - normal females between 20-60 years old walk about 76 m/min (2.83 mph)

In order to be deemed a 'community ambulator', patients need to be able to walk at greater than 33% of a normal adult's velocity, and must be able to cover a minimum of 300 m. This would need to be covered in 11.5 minutes.

Other suggestions include:

- 1. The ability to walk 300 m.
- 2. The ability to reach 80 m/min for 13-27 m (to cross a street safely during normal stoplight operation
- 3. The ability to negotiate 7-8 inch curbs independently (can use assistive devices)
- 4. The ability to turn the head while walking, without losing balance.

If the subject meets the requirements, but becomes fatigued to the point of exhaustion (due to decreased cardiovascular conditioning) cannot be considered a functional community ambulator.

The subject must be able to meet the conditions while being able to integrate reactive balance strategies when stability is stressed by unexpected variables. The subject must be able to react in anticipation of upcoming obstacles.

Examples of tests:

.

1. <u>Three-Minute Walk Test</u> - Subjects asked to walk along a pre-measured route at a self-selected pace for three minutes. The final distance, number of stops and number of deviations from a 15 inch path.

Studies showed that healthy older adults (aged 65 to 90 yrs.) were able to cover an average of 727 feet in 3 minutes with no loss of balance. This compares to 323 feet for a group of 'fallers', who also lost their balance an average of four times.

- 2. <u>Duke Mobility Skills Profile</u> see overhead. Another highly reliable test that is a good predictor of falls in elderly subjects.
- 3. <u>Dynamic Gait Index</u> see overhead. Evaluates the subject's ability to modify gait in response to changing task demands. Another reliable predictor of falls in the elderly. Healthy older adults score an average of 21 points. 'Fallers' with no neurological diagnosis (Parkinson's, Stroke) score an average of 11.

UPPER EXTREMITY CONTROL ASSESSMENT

see Chapter 18 in Motor Control Textbook

Functional Testing:

.

- Standardized tests of Manipulation and Dexterity
 - · Crawford
 - · Minnesota
 - · Pennsylvania
 - · Bennet
 - · Valpar 4
 - Purdue Pegboard

Strategy Testing:

.

- · Locating a target (eye-head coordination)
- Eye-hand coordination
- · Reach and Grasp
- · In-hand Manipulation

Impairment Testing:

- Range of motion use goniometers
- Strength use dynamometers (grip and pinch)
- · Sensation Testing
 - single point touch pressure use graded monofilaments
 - two-point discrimination use 2-point discriminator
 - ability to discriminate textures (roughest to smoothest)
 - object recognition
- Edema use tape measure or volumetric displacement
- Pain use diagrams, visual/analogue scales