Physiotherapy Geriatrics Lab

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PHYSIOTHERAPY

GERIATRICS LAB MANUAL

NAME: _____ SURNAME_____

STUDENT ID: _____ DATE: _____

CRUTCH WALKING LAB

There are different crutches that can be used to aid the patient in walking. These are Elbow crutch, gutter crutch, axillary crutches. In this lab students are going to learn how to:

Activity 1: Do measurements of all the crutches
Activity 2: How to ambulate patients with different crutches
Activity 3: How to stand and sit with crutches
Activity 4: How to climb and descend stairs with crutches

ACTIVITY ONE: A preceptor will show students how to take measurements using elbow crutches, axillary crutches and gutter crutches. After they have understood they are then divided into two groups of 3 students each and led on how to go about taking measurements, then after that they put it in practice individually.

ACTIVITY TWO: A preceptor will demonstrate on how to walk with the aid of crutches i.e. elbow crutches, then after that they are divided into two groups of 3 students each. They will be asked to practice on their own under the supervision of the preceptor.

ACTIVITY THREE: A preceptor will demonstrate on how to stand and sit using crutches. They will then be divided into two groups of 3 students each and asked to perform the activity on their own.

ACTIVITY ONE:

ELBOW CRUTCH MEASUREMENTS

A. IN SUPINE LYING: (shoes on)

Elbow is flexed to 15 degrees; measurement is taken from the ulnar styloid process to a point 20 cm lateral to the heel of the shoe.

B. IN STANDING:

Two Inches laterally and 6 inches anteriorly to the foot.

Height should be adjusted with relaxed shoulders to provide 20-30 degrees of elbow flexion.

AXILLARY CRUTCH MEASUREMENTS

MEASUREMENT OF LENGTH:

A. IN SUPINE LYING:

WITH SHOES OFF:

- (Most reliable method) measurement is with the help of inch tape from apex of axilla till the lower margin of medial malleolus.

WITH SHOES ON:

- 5cm vertically down from apex of axilla till 20 cm lateral to the heel of the shoes.

Measurement from axillary pad to hand grip:

- Elbow is flexed 15 degrees, mark a point 5 cm below the apex of axilla and measure till the ulnar styloid process.

B. IN STANDING:

- Two inches below the axilla to a point 2" lateral and 6" anterior to the foot.

With shoulder relaxed, the hand piece should be adjusted to provide 20-30 degrees of elbow flexion.

GUTTER CRUTCHES MEASUREMENTS

1. Place the person's regular walking shoes on and assist them to a standing position.
2. Instruct them to flex their elbow so the crease of his wrist is level with his hip joint.
3. Measure the forearm from 3 inches below the elbow and then add the distance between the wrist and floor.
4. Measure around the largest part of the forearm for the cuff size.

5. Select a pair of crutches based on the person's measurements. Adjust the length of the crutches up or down to match the measurements.

ACTIVITY TWO AND THREE

HOW TO AMBULATE PATIENTS WITH CRUTCHES

Instruct the patient to

- hold both of the crutches on the side that is not affected
- move towards the edge of the bed/plinth or chair
- use the other hand to help themselves stand from where they are sitting
- after they have stood up, they should now put on their crutches and start walking

NB: When they turn they shouldn't pivot with their feet, they move in a circular motion.

ACTIVITY FOUR

HOW TO CLIMB AND DESCEND STAIRS WITH CRUTCHES

Mnemonic: Good leg to heaven (up) and bad leg to hell (down)- this mnemonic is used when you ascend and descend the stairs.

CLIMBING THE STAIRS- Good leg to heaven (up)

INSTRUCTIONS

- Hold onto the handrail with one hand. Hold both crutches under your opposite arm. (If there's no handrail, keep one crutch under each arm.) Crutches should be in the middle of the step, away from the edge.
- Start close to the bottom step.

- Keep the crutches on the step where you're standing. Step up with your stronger leg (see image at right).
- Push down on your crutches, and then step up with your weaker leg.
- Once both feet are on the same step, bring your crutches up to that step.
- Check your balance before you move to the next step. Repeat one through six.

GOING DOWN THE STAIRS- Bad leg to hell (down)

- Hold onto the handrail with one hand. Hold both crutches under your opposite arm. (If there's no handrail, keep one crutch under each arm.) Keep crutches in the middle of the step, away from the edge.
- Start near the edge of the step
- Put your crutches down on the next step below.
- Step down with your weaker leg.
- Step down with your stronger leg.
- Check your balance before you move to the next step.

QUESTIONS:

Your patient will be using crutches for mobility. After educating the patient on how to adjust the crutches to fit correctly, you assess how well the patient understood the instructions. What findings demonstrate that the crutches were adjusted correctly by the patient?

_____
_____
_____
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_____.

Your patient has been instructed to use crutches for ambulation. The patient can bear partial weight and needs to be taught how to use the two-point gait while using crutches. Describe this type of gait with crutches?

_____
_____
_____
_____
_____
_____
_____.

BALANCE AND FALLS

Balance is the ability to collect sensory and proprioceptive signals related to a person's position in space and to produce the right motor responses to control body movement. When this ability deteriorates due to both disease and the normal aging process, the risk of falling increases in the elderly. Thus, there is relationship between balance and falls.

In this Lab students will be learning about the tests that are used to test for balance, these tests include:

- Romberg's test (half tandem and full tandem)
- Five Times Sit To- Stand Test
- The 4 stage balance test
- Single leg standing

ACTIVITY 1

1. FIVE TIMES SIT TO STAND TEST

Used to assess functional lower extremity strength, transitional movements, balance, and fall risk in older adults (de Melo TA et al. 2019).

METHOD OF USE

- The five times sit to stand scoring is based on the amount of time a patient is able to transfer from a seated to a standing position and back to sitting five times.
- The equipment need in performing 5TSST test includes: Stopwatch and standard height chair with straight back (43-45 cm, 17-18 inches high).
- Then the instruction is given by asking the test taker to sit on the chair by resting their back.
- The test taker is instructed to fold their arms across their chest. Then the test taker should be instructed to do sit-to-stand five times, as quickly as possible, at the count of go and without their back or leg resting on the chair between the interval of repetition.

- The lower the time to complete the test the better the outcome of the test.
- The Minimal Detectable Change (MDC) time for the test is within **3.6 to 4.2 seconds** (Schaubert KL et al. 2005)

- Minimal clinically important difference (MCID) is 2.3 seconds (Meretta BM et al. 2006)

NB: Five times sit to stand test has good intra- rater reliability (ICC ranges from **0.914 and 0.933**) and excellent test- retest reliability (ICC range between **0.988 and 0. 995**) in older adults (Teo TW et al. 2013).

ACTIVTY 2

2. RHOMBERG TEST:

Rhomberg test measures an individual's sense of balance. It assesses the function of the dorsal column (responsible for proprioception) of the spinal cord. Rhomberg test, tests the function of Dorsal Column Medial Lemniscal Pathway. Rhomberg test is the appropriate tool to diagnose sensory ataxia.

TECHNIQUE

A. The patient/ client are asked to remove the shoes and stand with his two feet together. The arms are held next to the body or crossed in front of the body.
B. The PT asks the patient to stand first quietly with eyes open, and subsequently with eyes closed. The patient tries to maintain the balance. For safety reasons, the observer should make sure they stand next to the patient to prevent potential injury if the patient were to fall
C. The Rhomberg test is scored by counting the seconds the patient is able to stand with eyes closed.

D. To make the test more challenging, the clinician can disturb the patient's balance with a perturbation.
E. The test is positive when the patient is unable to maintain balance with their eyes closed.

2) a. TANDEM RHOMBERG TEST

Is a variation of the original test.

- In this test the patient has to place his feet heel to toe position, with one foot directly in front of the other.
- Like with the original test, the assessment is performed with eyes open first, then with the eyes closed.
- The patient crosses his/her arms over the chest. The patient also distributes weight over both his feet and holds his chin parallel with the floor.

ACTIVITY 3

3. SINGLE LEG STANDING

SLT assesses static postural and balance control.

METHOD

A. Performed with eyes open and hand s on the sides
B. Client must stand unassisted on one leg, timed from the time the other foot leaves the ground until when the foot touches the ground again or the arms leave the hip
C. If unable to stand for 5 seconds or less the client is at risk of injury from fall

NB: Ability to control anticipatory postural adjustments prior to lifting one leg while standing in unsupported equilibrium represents a complex motor task that is significantly impaired. i.e. Multiple sclerosis, PD and dementia.- TBI, general geriatric population

ACTIVITY 4

4. THE FOUR STAGE BALANCE TEST

It is used to assess the static balance.

It is based on the person ability to hold four progressively more challenging positions. Intended population is older adults.

METHOD

There are four standing positions that progressively harder to maintain.

1. Stand with feet side by side
2. Place the instep of one foot so it is touching the big toe of the other foot.
3. Tandem stance: place one foot in front of the other, heel touching toes.
4. Stand on one foot.

NB: if the patient can hold a position for 10 seconds without moving their feet or needing support, go on to the next position. If they are unable to hold the position, stop the test. Patients should not use an assistive device and they should keep their eyes open.

OUTCOME

The inability to hold the tandem stance for **10 seconds** is an indication of increased risk of fall. To reduce their risk of falling, consider implementing gait and balance exercises.

ACTIVITY 5

DIX HALLPIKE MANOEUVRE

Dix Hallpike Maneuver is designed to assess for the most common cause of dizziness arising from the ears- called Benign Paroxysmal Positional Vertigo (BPPV) - **Calcium carbonate crystals** (**otoliths)** displacement.

PROCEDURE

1. The patient is asked to sit upright on the an examination plinth
2. PT stands at the patient's side to be tested
3. The patient's head is passively rotated to 45 degrees, either to the right or o the left. The patient should be asked to keep their eyes open throughout the whole procedure as it is very important for us to see the eyes.
4. The patient s then lowered quickly to supine position with the head over the table edge, 45 degrees below horizontal.
5. Then extend the patient's neck until the chin is pointing slightly upward. Note latency, duration and the direction of nystagmus if it occurs.
6. Once in supine, the patient's eyes are observed for positional nystagmus for about 30 seconds.
7. The test is positive when the patient present with nystagmus.

The patient is seated on a table with the head and eyes directed forward and are then quickly lowered to a supine position with the head over the table edge, 45 degrees below horizontal. The test is repeated with the patient's head and eyes turned 45 degrees to the right and again with the head and eyes turned 45 degrees to the left. The eyes are observed for nystagmus, and the patient is asked to note the onset, severity and cessation of vertigo.

NYSTAGMUS: is an involuntary, rapid and repetitive movement of the eye.

REPOSITIONING (EPLEY) MANEUVRE

In normal circumstances, the liquid within the canal is the one that moves- transmitting information to the brain that the head is moving. In cases of ***otolith*** being displaced into the lateral, posterior and superior canal of the inner ear, the liquid movement will be due to the crystal rather than the head. Then the information will be sent to the brain that the head is moving whilst in actual fact there is no head movement. To correct this problem, the crystal should be moved back to vestibule.

Epley maneuver employ the force of gravity to move endolymphatic debris out of the semicircular canal and into the vestibule, where it can be reabsorbed.

PROCEDURE

a. The patient is instructed to sit on the plinth
b. The patient's head is turned 45 degrees in the direction of the affected ear and the patient reclines to a supine position with the head (45 degrees) hanging down over the edge of the plinth.
c. The head still hanging down is then turned 90 degrees in the opposite direction, 45 degrees toward the opposite ear.
d. Next, the patient rolls to a lateral decubitus position with the affected ear up and the head still turned 45 degrees toward the unaffected ear and hanging down
e. Finally, the patient turns to a prone position and sits up.

NB: It takes about 30 to 60 seconds for the crystal to settle into the most dependent position in the canal. Thus, each position should be held for 30 to 60 seconds. If these positions are not performed properly, the treatment will not be effective.