Muscle Power and Strength Examination

OBJECTIVE: To correctly test individual muscle groups for strength and power as a part of complete neurological examination.

MATERIALS: Well illuminated examination room, examination table.

D: Appropriately done PD: Partially done ND: Not done/Incorrectly done

		D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure to the patient and re-assure him. Make sure that the patient is aware of how the procedure will be carried out.			
4.	Get patient's consent.			
5.	Prepare the necessary materials.			
6.	Ensure the privacy of the patient.			
7.	Ask the patient to expose those parts of the body where the testing needs to be done i.e. the arms and the legs.			
	Positioning of the patient.			
8.	The patient should be in the lying or sitting position.			
	Procedure			
9.	Wash your hands			
10.	Before you start testing for strength and power for each muscle group • Note the appearance or muscularity of the muscle (wasted, highly developed, normal). • Feel the tone of the muscle (flaccid, clonic, normal).			
11.	Start to test the strength of each muscle group systematically.			
12.	Power in the upper limb			
13.	• Starting with the deltoids, ask the patient to raise both their arms in front of them simultaneously as strongly as then can while the examiner provides resistance to this movement. Compare the strength of each arm. • Next, ask the patient to extend and raise both arms in front of them as if they were carrying a pizza. Ask the patient to keep their arms in place while they close their eyes and count to 10. Normally their arms will remain in place. If there is upper extremity weakness there will be a positive pronator drift, in which the affected arm will pronate and fall. This is one of the most sensitive tests for upper extremity weakness. • Test the strength of lower arm flexion by holding the patient's wrist from above and instructing them to "flex their hand up to their shoulder". Provide resistance at the wrist. Repeat and compare to the opposite arm. This tests the biceps muscle. • Now have the patient extend their forearm against the examiner's resistance. Make certain that the patient begins their extension from a fully flexed position because this part of the movement is most sensitive to a loss in strength. This tests the			

	triceps. Note any asymmetry in the other arm. • Test the strength of wrist extension by asking the patient to extend their wrist while the examiner resists the movement. This tests the forearm extensors. Repeat with the other arm. • Examine the patient's hands and test the patient's grip by having the patient hold the examiner's fingers in their fist tightly and instructing them not to let go while the examiner attempts to remove them. Normally the examiner cannot remove their fingers. This tests the forearm flexors and the intrinsic hand muscles. Compare the hands for strength asymmetry. • Test the intrinsic hand muscles once again by having the patient abduct or "fan out" all of their fingers. Instruct the patient to not allow the examiner to compress them back in. Normally, one can resist the examiner from replacing the fingers. • To complete, test the strength of the thumb opposition by telling the patient to touch the tip of their thumb to the tip of their little finger. Apply resistance to the thumb with your index finger. Repeat with the other thumb and compare.			
	Power in the lower limb			
14.	• Start with the flexion of the hip by asking the patient to lie down and raise each leg separately while the examiner resists. Repeat and compare with the other leg. This tests the iliopsoas muscles. • Test the adduction of the legs by placing your hands on the inner thighs of the patient and asking them to bring both legs together. This tests the adductors of the medial thigh. • Test the abduction of the legs by placing your hands on the outer thighs and asking the patient to move their legs apart. This tests the gluteus maximus and gluteus minimus. • Next, test the extension of the hip by instructing the patient to press down on the examiner's hand which is placed underneath the patient's thigh. Repeat and compare to the other leg. This tests the gluteus maximus. • Test extension at the knee by placing one hand under the knee and the other on top of the lower leg to provide resistance. Ask the patient to "kick out" or extend the lower leg at the knee. Repeat and compare to the other leg. This tests the quadriceps muscle. • Test flexion at the knee by holding the knee from the side and applying resistance under the ankle and instructing the patient to pull the lower leg towards their buttock as hard as possible. Repeat with the other leg. This tests the hamstrings. • Test dorsiflexion of the ankle by holding the top of the ankle and have the patient pull their foot up towards their face as hard as possible. Repeat with the other foot. This tests the muscles in the anterior compartment of the lower leg. Holding the bottom of the foot, ask the patient to "press down on the gas pedal" as hard as possible. Repeat with the other foot and compare. This tests the gastrocnemius and soleus muscles in the posterior compartment of the lower leg. • To complete the power exam of the lower extremity ask the patient to move the large toe against the examiner's resistance "up towards the patient's face. This tests			

	the extensor halucis longus muscle.			
15.	After the examination			
16.	Wash hands.			
17.	Ensure the comfort of the patient and answer any question or concerns he/she may have.			
18.	Document the procedure.			
19.	Present your findings in a systematic manner and offer a differential diagnosis.			