

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# Introduction to Physical Therapy Procedures

RHS 221

Manual Muscle Testing

Theory – 1 hour

practical – 2 hours

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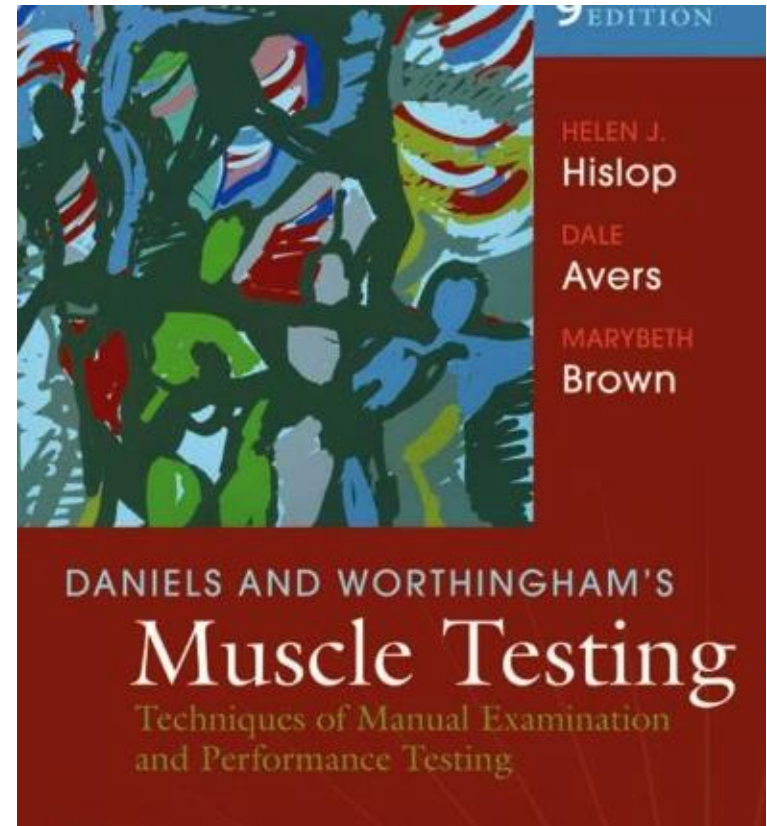
# RHS 221

- \* **Manual Muscle testing**
- \* Theory – 1 credit hour
- \* Practical – 2 credit hours
- \* A principal course in which the students are Trained on methods of assessment of Musculoskeletal system from PT view. It includes the manual muscle testing, measurement of range of motion for body joints generally, in addition to postural assessment and activity of daily living.

# Required Text:

1. Muscle Testing  
Techniques of Manual  
Examination, by Daniels  
and Worthingham's  
**ISBN:** 0-7216-9299-0
2. Introduction to Physical  
Therapy and Patient  
Skills, by Mark Dutton  
**ISBN:** 978-0-07-177241-9

✕ There will also be other reading and handouts assigned during the course of the semester.



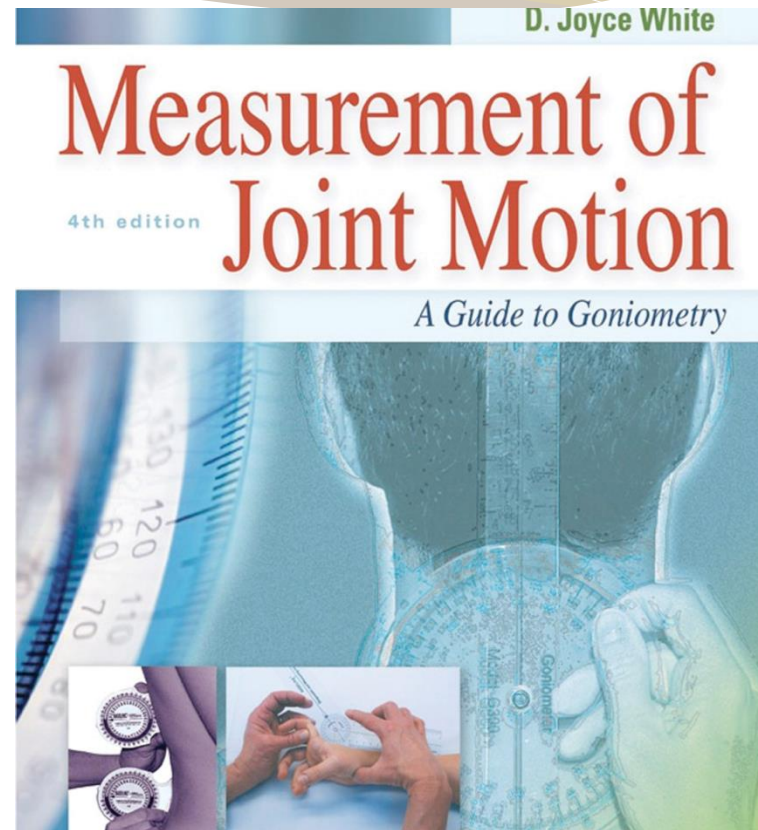
# Principles of manual muscle testing

✕ Please read Chapter 1 in the text book# 1

# Recommended book

- \* Measurement of Joint Motion: A Guide to Goniometry

ISBN-10: 0803620667



# Lab requirements

- \* Lab coat (white).
- \* **Medical Scrub Uniform**  
(Comfortable scrubs)
- \* Short wear.
- \* Goniometer.
- \* Tape measurement.
- \* Remarkable pen (black).



# Rehabilitation

- \* Physical therapy: A branch of Rehabilitative health that uses specially designed exercises and equipment to help patients regain or improve their physical abilities. Physical therapists work with many types of patients, from infants born with musculoskeletal birth defects, to adults suffering from sciatica or the after- effects of injury, to elderly post-stroke patients.
- \* Rehabilitation - the treatment of physical disabilities by exercises ,massage and electrotherapy and..etc.



# What is physical therapy?

- \* Physical Therapy's Idea? 1917<sub>G</sub>
- \* Physical therapy (PT) is the science of treating injury and disease by using physical agents such as light, heat, water, electricity and mechanical agents. It also involves treatment and training of disabled person, that he may attain his maximal potential for normal or near normal living.
- \* Physical therapists (PTs) who can help patients reduce pain and improve or restore mobility - in many cases without expensive surgery and often reducing the need for long-term use of prescription medications and their side effects."apta.org)
- \* The goal of physical therapy is to help patients reach their maximum functional performance potentials while learning to live within the limits of their capabilities.

# physical therapist **profession**

- ✕ Physical therapy involves examination, evaluation, treatment interventions, instruction, consultative services, and supervision of support personnel.
- ✕ Evaluate, diagnose, and manage individuals of all ages (who have impairments, activity limitations due to musculoskeletal, neuromuscular, cardiovascular/pulmonary disorders.) "apta.org"
- ✕ Also collaborate with other healthcare professionals to address patient needs, increase communication, and provide efficient and effective care.
- ✕ Provide consulting, education, and research.

# physical therapist can do:

- \* Physical therapists can teach patients how to prevent or manage their condition so that they will achieve long-term health benefits. PTs examine each individual and develop a plan, using treatment techniques to promote the ability to move, reduce pain, restore function, and prevent disability. In addition, PTs work with individuals to prevent the loss of mobility before it occurs by developing fitness- and wellness-oriented programs for healthier and more active lifestyles..["apt.org"](http://apt.org)

# Aims of PT Treatment

- \* Maintain or restore muscle power, joint mobility, and neuro-muscular co-ordination.
- \* Relieve pain.
- \* Maintain or increase blood flow and lymphatic circulation.
- \* Prevent or correct deformities.
- \* Aid and maintain good respiration.
- \* Rehabilitation towards maximal independence.

# Therapeutic methods

- \* The therapeutic properties of **exercise, heat, cold, electricity, ultrasound, massage**, and other rehabilitative procedures are used during treatment.
- \* Areas of board certified specialization with physical therapy include cardiopulmonary, electrophysiology, geriatrics, neurology, orthopedics, pediatrics, and sports physical therapy.

# RHS 221-Course Description

- \* This course consists of **theoretical** and **laboratory** sessions.
- \* This course is designed to give the student the skills and knowledge necessary to perform a complete manual muscle test to measure the range of motion for all joints in the body, utilizing a Goniometer and to carry out length and circumference measurements with a tape measure.
- \* Teaching and learning in this course will be through lectures and practice in the laboratory Preparation of the level 3(muscle testing) student to deal with patients, allowing them to take personal and medical and family History.

## ***On successfully completing the course, the student must:***

- \* Appraise the importance and clinical benefits of test and measurements.**
- \* Demonstrate how to prepare environment, equipment and patient for evaluation procedures.**
- \* Identify the difference between muscle weakness and contracture.**
- \* Have the ability to conduct gross and individual muscle testing.**
- \* Classify and identify different grades of muscle evaluation.**
- \* Apply different techniques of muscle testing with respect to both therapist and patient mechanical advantage.**
- \* Show professional behaviour and attitude.**
- \* Demonstrate how to measure the joint range of motion.**

# Manual muscle testing?

- \* **Manual Muscle Testing (MMT)** is a procedure for the evaluation of the function and strength of individual muscles and muscles group based on effective performance of a movement in relation to the forces of gravity and manual resistance through the available ROM. This procedure depends on the knowledge, skill, and experience of the examiner.
- \* Muscle testing is an integral part of physical examination. It provides information, not obtained by other procedures, that is useful in differential diagnosis, prognosis and treatment of neuromuscular and musculoskeletal disorders.

“Muscle Testing and Function with Posture and Pain by Kendall,

5<sup>th</sup> edition, 2005”



# Purpose of MMT

- \* The therapist must be a **keen** observer and be **experienced** in muscle testing to detect minimal muscle contraction, movement, and/or muscle wasting and substitutions or trick movements.
- \* Is to **provide** information that may assist to a number of health professionals in differential diagnosis, treatment planning and prognosis, but it has limitations in the treatment of neurological disorders where there is an alteration in muscle tone if reflex activity is altered or if there is a loss of cortical control due to lesions of the central nervous system.

# Purpose of MMT

- \* To assess muscle strength, the therapist must have a sound knowledge of anatomy (including joint motions, muscle origin and insertion, and muscle function) and surface anatomy (to know where a muscle or its tendon is best palpated).
- \* A consistent method of manually testing muscle strength is essential to assess accurately a patient's present status, progress, and the effectiveness, of the treatment program.
- **Assessment of Range of Motion(ROM) using Goniometry and Strength using MMT are critical skills for Physiotherapist.**

# Cardiovascular & pulmonary Physical Therapy

- \* increasing endurance and functional independence after cardiopulmonary disorder and/or surgery



# Orthopedic (musculoskeletal) physical therapy

- \* Evaluate, diagnose, and manage disorders and injuries of the musculoskeletal system (bones, muscles, tendons, ligaments, joint capsule, and other connective tissues) including rehabilitation after orthopedic surgery
- \* Ortho post-op rehab
- \* Main specialty in PT



# Neurological physical therapy

- \* evaluation and treatment of individuals with movement problems due to disease or injury of the nervous system.
- \* E.g., Stroke, Vestibular disorder, MS,...etc.



# Pediatric physical therapy

- \* Diagnosis, treatment, and management of infants, children, and adolescents with a variety of congenital, developmental, neuromuscular, skeletal, or acquired disorders/diseases.
- \* Manage cases like: developmental disorders, cerebral palsy, spina bifida, torticollis.





# Sports physical therapy

- \* Prevention, evaluation, treatment, rehabilitation of injuries related to some kind of sport.
- \* Performance enhancement of the physically-active individual and athletes.



# Geriatric physical therapy

- \* Examination and treatment of disorders and physical limitations related to aging.
- \* Osteoporosis, arthritis, Alzheimer's disease, cancer, joint replacement, hip replacement, and more.
- \* The form of therapy is used in order to restore mobility, increase fitness levels, reduce pain, and much more.





# Integumentary physical therapy

- \* Examination and treatment of the integument system (skin and its associated structures such as hair, nails and glands) and the diseases/conditions associated with this system.
- \* Diagnoses include wounds, burns, skin ulcers, traumatic injuries, scars... etc.



# PT curriculum

- \* Surface & Functional Anatomy
- \* Neuroanatomy
- \* Exercise physiology
- \* Neurophysiology
- \* Assessment Procedures
- \* Therapeutic Exercise Procedures
- \* Biomechanics
- \* Kinesiology
- \* Neuroscience
- \* Clinical pathology
- \* Differential Diagnosis
- \* Communication
- \* Ethics
- \* Other coursework.

# How to assess\evaluate any cases in generally? Examining The Pt?

- Medical record. (pt medical file. chart, or sheet)..

## SOAP note

### 1. Subjective: by History taking:

A. Personal history ( name, sex, age, occupation, address, and marital status.). B. present history\illness (chief complaint-"c\o" when did it start, cause, behavior of symptoms, visioual analogue scale "VAS"..). C. past history (any related disease\illness, surgery, DM,HTN, or Osteomyelitis...)

### 2. Objective\physical examination: by

- |                    |                          |
|--------------------|--------------------------|
| A. Inspection      | D. Manual Muscle testing |
| B. palpation.      | E. Special tests         |
| C. Range of Motion |                          |

# Examining The Pt?

3. **Assessment:** all present problems( postural deformity, abnormal Gait pattern, redness, swelling, edema\odema, abnormal skin temperature, tenderness, shorting\ tightness, abnormal muscle tone, atrophy\weakness, limiting ROM.....)

4. **Plane of treatment:**

A. Goals (short and long goals).

B. Methods (PT managements).

# Some MMT and ROM contraindications

- \* **Acute phase of injuries**
- \* **Inflammation**
- \* **Fracture or suspected fracture**
- \* **Severe pain**
- \* **Recent surgeries without a doctor note**

# Some MMT and ROM precautions

- \* History of cardiopulmonary disease
  - \* High blood pressure
- \* Conditions where fatigue may exacerbate condition (e.g., **MS**)
- \* Arthritis or abnormal joint conditions.
- ❖ **Multiple Sclerosis:** "a chronic, typically progressive disease involving damage to the sheaths of nerve cells in the brain and spinal cord, whose symptoms may include numbness, impairment of speech and of muscular coordination, blurred vision, and severe fatigue."

# Some factors that affect muscle strength

- \* Age
- \* Sex
- \* Fitness condition

# Preparing for the muscle test

- \* The environment for the testing should be quiet, nondistracting, and comfortable (e.g., Temp)
- \* Firm plinth or treatment tables to help in stabilization and friction should be noticed. The plinth should have height adjustment.
- \* Positioning of the patient should take into account proper leverage, body mechanic and easier stabilization.
- \* Organize your test so you minimize changing position. (i.e., movements easier in supine followed by movements easier in prone and so on.



# Manual muscle testing?

- There are many ways for measurements:
  1. Quick muscle testing. Ankle\shoulder\ hip..
  2. Gross muscle testing.
  3. Individual muscle testing.
  4. Functional muscle testing.

Other equipments:

- Isokinetic Dynamometer.
- Isometric Dynamometer.
- Tensiometer.

“Muscle Testing and Function with Posture and Pain by Kendall,

5<sup>th</sup> edition,2005”

# Grading system

- \* Grades represent an examiner's assessment of the strength or weakness of a muscle or a muscle group. In manual muscle testing, grading is based on a system in which the ability to hold the tested part in a given position :
  - With gravity.
  - Against gravity.
  - With gravity eliminated.
- \* The grade of Fair (3) is the **most objective** grade because the pull of gravity is a constant factor.

“Muscle Testing and Function with Posture and Pain by Kendall,  
5<sup>th</sup> edition,2005”

# Grading system

- **There are many steps to do manual muscle testing:**

1. Gravity. It is important to know the force of a muscle.
2. Resistance. Use it when a muscle can perform action against gravity, this include either:
  - ✓ Minimal resistance.
  - ✓ Moderate resistance.
  - ✓ Maximal resistance.
3. Range of motion. Is it complete\ full or incomplete\ partial ROM.
4. Position of patient. Supine, sideline, prone, sitting, standing.....
5. Position of therapist\ examiner. Inner hand\outer hand, stabilization...
6. Substitutions\ trick movements.
7. Verbal command\instruction.

# Grading system

- **Normal** (5) *full and normal muscle power to move a limb against gravity and against maximum resistance plus 3sec hold at the end.*
- **Good** (4) *enough power to move a limb against gravity and against moderate resistance.*
- **Fair** (3) *enough power to move a limb against gravity.*
- **Poor** (2) *enough power to move a joint with gravity eliminated.*
- **trace** (1) *a flicker of contraction can be felt in a muscle that can be palpated only/ no movement of the part is visible.*
- **Zero** (0) *no evidence of any muscle contraction |flicker is visible or palpable.*

# Assignment

- \* **Define:**

- ❖ Fascia
- ❖ Tendons
- ❖ Ligaments
- ❖ cartilage
- ❖ Bone
- ❖ Nervous tissue
- ❖ Muscle fibers

- \* Types of muscle Contractions
- \* Flexibility
- \* Range of Motion
- \* Disability



Questions?

*Thank you*