Canadian Physiotherapy Association | l'Association canadienne de physiothérapie

Orthopaedic Division
Groupe d'orthopédie

CANADIAN PHYSIOTHERAPY ASSOCIATION

DIPLOMA OF ADVANCED ORTHOPAEDIC MANUAL AND MANIPULATIVE PHYSIOTHERAPY

POLICIES AND PROCEDURES
EDUCATION AND EXAMINATION STANDARDS
DOCUMENT

CURRICULUM

C.P.A. Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Policies and Procedures Education and Examination Standards Document Curriculum

CONTENTS **PAGE**

History of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy

Canadian Physiotherapy History on Manual and Manipulative Physiotherapy:

Please refer to the following documents available from the:

Canadian Physiotherapy Association National Office
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Canadian Physiotherapy Association: Proposed Vision for Manual Therapy Education

- Manual Therapy Steering Committee: Proposed Vision for Manual Therapy Education
- College of Physical Therapists of Alberta: Competencies Required to Safely Perform Spinal Manipulation as a Physical Therapy Intervention
- College of Physical Therapists of Ontario: Controlled acts

The development of the Canadian Manual therapy system parallels the formation of IFOMPT. Amongst the first of our Fathers of Manual therapy were David Lamb, John Oldham and Cliff Fowler.

- 1973 – Canary Islands: As part of the development of the International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) a special meeting was held where 74 manual therapists from around the world attended workshops over a period of 4 weeks. In the end an examination in manual therapy theory and techniques set by Drs. Cyriax, Brodin, Stoddard, and Frisch examined participants. David Lamb, John Oldham and Cliff Fowler were the Canadians who passed the exam. Upon their return to Canada, they began teaching manual therapy techniques across the country marking the beginning of the Canadian Manual Therapy program.

- 1974 WCPT in Montreal: The Canadian Physiotherapy Association (CPA) voted to allow the formation of the Orthopaedic Division (OD).

- 1978: Canada became an associate member of IFOMPT and ran it's first certification examination using international standards. These exams were named the Part A and B examinations. The Part A examined manual therapy theory, clinical reasoning, mobilization and peripheral manipulation.

The Part B exam was a practical examination on spinal manipulation. The exams were set in these two parts to allow candidates to split up the demanding process, and to allow individuals not interested in spinal manipulation to acquire theory in manual therapy.

- 1983: Manipulative therapists passing the Part B exam at the first orthopaedic division national conference in Victoria, BC, established The Canadian Orthopaedic Manipulative Physiotherapy (COMP) group. The intention of COMP was to provide an informal exchange of clinical experiences and knowledge between individuals who had demonstrated the greatest degree of clinical competency through examination available at that time. This group also acted as Canada's representative body to IFOMPT.

- 1984 IFOMPT meeting in Vancouver, Canada: Canada became a full voting member of IFOMPT

- 1985: CPA first approved the curriculum of the OD. This marked the birth of its educational system of manual therapy courses. The curriculum was amended in 1986, and revamped from 1997-1999 to become a 5 level system of courses leading to a Diploma of Advanced Orthopaedic Manual and Manipulative Therapy. The most recent curriculum revisions and update were completed in 2005 with an increased emphasis placed on evidence based practice and clinical reasoning and a multimodal approach to manual therapy.

- 1995: The Canadian Academy of Manipulative Therapists (CAMT) was formed. CAMT is the direct offspring of COMP and thereby replaced COMP. CAMT was voted to become a formal academy with a constitution and a more focused approach to clinical manual therapy.

- 2009: The Canadian Academy of Manipulative Therapists was changed to the "The Canadian Academy of Manipulative Physical Therapists" (CAMPT) in parallel with IFOMPT

CURRICULUM OF THE CPA - ORTHOPAEDIC DIVISION

DIPLOMA OF ADVANCED MANUAL AND MANIPULATIVE THERAPY

I. PURPOSE:

The purpose of the curriculum of the Orthopaedic Division of the Canadian Physiotherapy Association is to provide direction for the development of Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses which are aimed at producing informed and skilled manual orthopaedic physiotherapists who will achieve a Diploma in Advanced Manual and Manipulative Physiotherapy. The Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses are designed to be a continuum of learning with evaluation from the start of the Level I course to the completion of the Level V course and subsequent Advanced Manual and Manipulative Physiotherapy Examination. The framework of the curriculum provides for regular review and updating in order that subsequent course development will be consistent with an established body of knowledge, with current professional standards of practice and accepted professional ethics.

The Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy - Curriculum, as presented, outlines the minimum requirements for courses which are designed to prepare a candidate for each level of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy certification. It also requires that candidates develop self-reliant learning strategies which will be directed towards continued self-development. Courses taught following the guidelines established by the Orthopaedic Division will be aimed towards preparing candidates for each level of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy examinations and subsequent Diploma of Advanced Manual and Manipulative Physiotherapy. The major objectives of the curriculum fall broadly under three areas:

- **A.** Information and knowledge
- **B.** Skills
- **C.** Attitudes

It is not the intent of the curriculum to breach intellectual content issues of the various parties that may be mentioned in the document. Rather it is to ensure that the students have been exposed to the general concepts regarding this information. It is advised that if the student desires more information on any specific topic, that they augment their learning with additional research in the form of reading and / or course work.

All successful examination candidates of each course level, as well as the final Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy, will have demonstrated ability and competence in using the curriculum major objectives to problem solve and in the application of critical reflection.

Specific Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy - Course objectives have been developed, are consistent with the overall broad

objectives, and take into account the content and scope of the examinations as set down in the Curriculum.

Candidates will meet the following objectives with regard to the curriculum for each Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy – Course Level prior to becoming eligible for each subsequent level of certification.

A. Information and Knowledge

1. Demonstrate an integration of evidence based practice in all assessment and treatment theory and practical applications.
2. Demonstrate a clear understanding of the detailed structure and function of normal musculoskeletal tissues.
3. Demonstrate a clear understanding of the contraindications to physical techniques and procedures commonly used in orthopaedic physiotherapy.
4. Demonstrate an understanding of the diagnosis, prognosis and overall management of patient problems.
5. Demonstrate an ability to analyze and integrate the various aspects of the required theoretical knowledge and skills in the overall management of patient problems.
6. Explain the pathophysiology relating to musculoskeletal disorders together with the resultant functional deficits.
7. Briefly describe the theory of the effects of physical agents used in physiotherapy on normal and abnormal tissues.
8. Recognize and explain the limitations of specific techniques employed in orthopaedic physiotherapy.

B. Skills

1. Demonstrate an integration of evidence based practice in all assessment and treatment applications.
2. Select and apply appropriate assessment procedures prior to, during and following treatment.
3. Analyze and interpret assessment procedures in order to identify, prioritize and plan and modify treatment.
4. Records clearly and concisely all assessment findings, treatment(s) performed and reassessment findings.
5. Explain and demonstrate how general and specific management plans, including manipulation, will provide symptomatic relief and restoration to optimum function.
6. Explain and instruct in the proper use of body mechanics in both therapeutic and prophylactic situations.
7. Identify patient's diagnosis, special problems, nature and extent of dysfunction, cause, contributing factors and generally related problems, to establish an appropriate management plan.
8. Identify the need for additional referral/assessment/consultation.

C. Attributes

Develop self-reliant learning strategies directed towards the maintenance and improvement of both knowledge and skills.

D. Required Levels of Instruction

The required levels of instruction for the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy - Courses are detailed in the Curriculum Content and are in accordance with the IFOMPT standards document.

II. POLICIES AND PROCEDURES GOVERNING COURSES:

The following guidelines will apply:

1. All Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy – Courses and Examinations will follow the guidelines outlined in the C.P.A. Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy: Policies and Procedures – Education and Examination Standards Document: Curriculum/ Instructors/ Provincial Orthopaedic Division Course Representative (PODCR) Handbook/ Examinations/ Education Committee / Transition Policies.

2. All courses offered must be consistent with:
    a. an established body of knowledge;
    b. current professional standards of practice;
    c. accepted professional ethics.

3. Courses must be taken in a specific order, outlined in the C.P.A. Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Policies and Procedures – Education and Examination Standards Document - Curriculum.

4. A full course of study, by definition, includes all course levels and appropriate examinations of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy and fulfills the total objectives and content of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy – Curriculum.

5. Courses may be offered on a full time or part time basis.

6. Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses are open to all physiotherapists who fulfill the registration requirements for the course level in question.

7. Due to the rate of rapid change in the supporting literature for orthopaedic manual therapy, it is recommended that the maximum time duration between courses not exceed 5 years.

8. All Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy – Courses must be organized by the Provincial Orthopaedic Division Course

Representative unless written permission has been obtained from the Education Committee Executive.

9. Course organizers/instructors have a responsibility to ensure that any proposed Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy - Course fulfills, in whole, the objectives of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy – Curriculum and the content and scope of the corresponding Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy examinations.

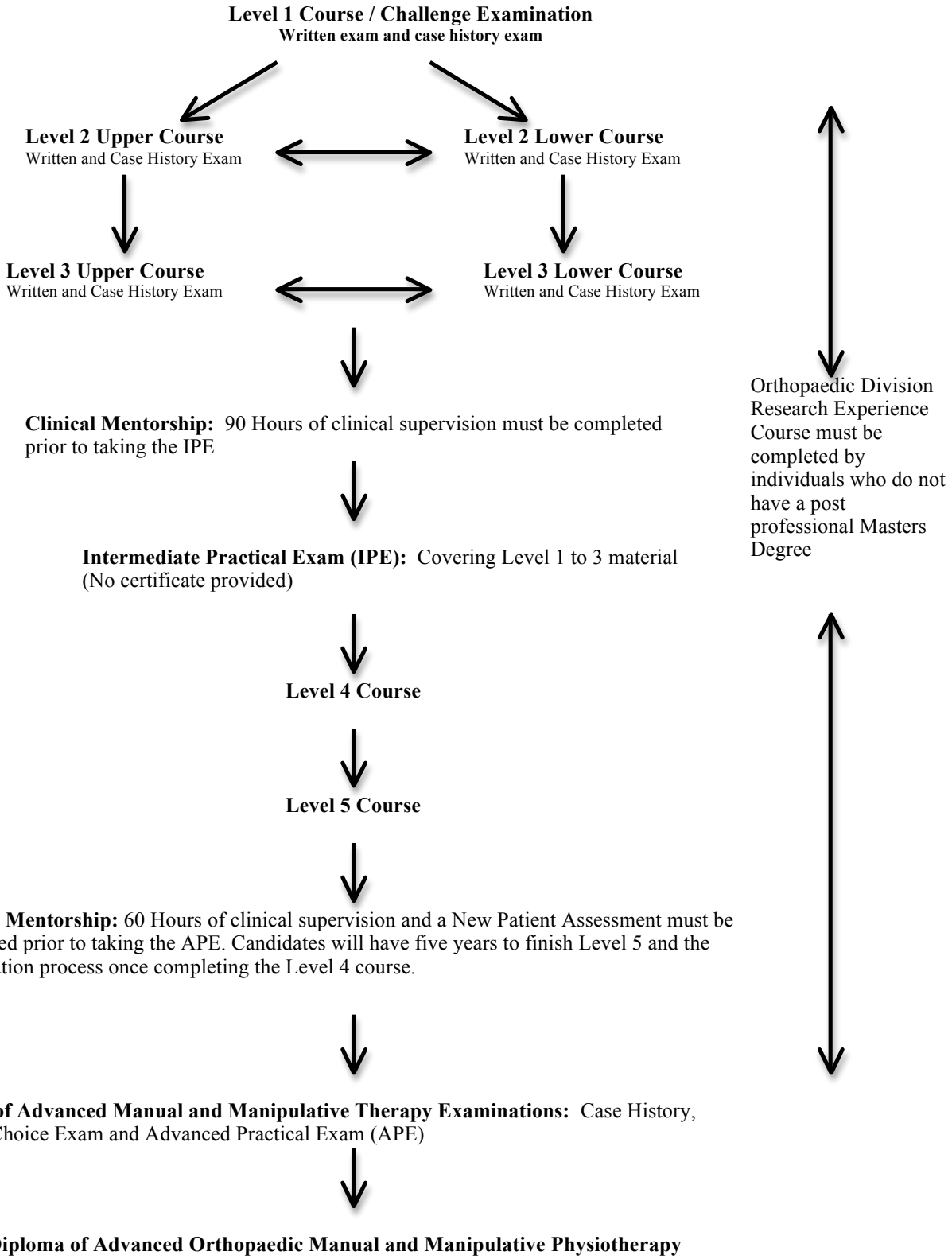
10. All Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy - Courses offered must:
    a. accurately reflect the title of the course;
    b. clearly state the purpose and objectives of the course;
    c. clearly state the preparatory reading material;
    d. clearly state the format and content of examinations or quizzes;
    e. clearly state the appropriate reference list;
    f. clearly describe the course content.

III. POLICIES AND PROCEDURES GOVERNING CLINICAL MENTORSHIP REQUIREMENT

Clinical practice is an essential and integral part of the curriculum. Candidates are required to provide evidence to course organizers/instructors that they have undertaken a period of clinical practice mentorship covering the scope of preparatory courses. Please refer to the Mentorship Policies and Procedures document for full details of the mentorship requirements for candidates within the Orthopaedic Division Education program.

Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy
Curriculum Continuum Summary

The following chart is the mandatory order of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses and Examinations. *Note that successful completion of each examination level is required to be eligible to take the next level of course.



Hours of Instruction and Examination of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy

Each Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Course outline has a suggested amount of instructional hours beside the breakdown of the topic matter.

A combination of any of the following instructional methods is suggested:

- Didactic lectures (factual, theoretical)
- Audio-visual aids: slides, overheads, videos, anatomical models, manual supplementation
- Online audio power point presentations and video lectures.
- Synchronous and asynchronous web based e-learning. This applies to theory content and the research experience component of curriculum.
- Mock or live patient case studies and clinical examples using clinical reasoning skills
- Self study (pre / during / post course reading)
- Practical demonstrations
- Examinations

Total Hours of Instruction and Examination of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses – Level I - Level V and the Advanced Examination:

Total Instructional Hours:	456	**hours**
Total Examination Hours:	21	**hours**
Total:	**477**	**hours**

Total Hours of Clinical Supervision / Mentorship of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses – Level I – Level V:

Total hours prior to the Intermediate Examination:	90	**hours**
Total hours prior to the Advanced Examination:	60	**hours**
Total:	**150**	**hours**

The Orthopaedic Division Executive expects that the candidates of the Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy will augment the above instruction and examination hours with the following:

- Clinical practice
- Group study
- Online discussion groups
- Utilization of a Preceptor / Mentor
- Literature review
- Participation in research projects

**A typical candidate will spend a minimum of 500 to 1000 augmented hours.

Recommended Content For Diploma of Advanced Orthopaedic Manual and Manipulative Physiotherapy Courses
Level I, II and III Upper and Lower Quadrant Course, IV, V

I. LEVEL I - PERIPHERAL - VERTEBRAL COURSE (8 days)

Total Hours: 57 hours (54 instruction / 3.0 examination)

A. PURPOSE

Participants of this course will be able to apply clinical reasoning and patient handling skills to perform basic subjective and objective musculoskeletal assessments to generate a provisional differential diagnosis and treatment plan for musculoskeletal patients.

B. OBJECTIVES

At the completion of this course, participants will be able to:

1. Demonstrate clinical reasoning skills in a basic musculoskeletal subjective and physical examination

2. Perform a subjective examination and identify the nature, severity and irritability of the patient's problem

3. Perform an objective musculoskeletal examination and identify neuromusculoskeletal structures that require treatment or further examination; including architectural designs, articular signs, neurological signs, neuromeningeal tests, compression and traction tests, accessory motion testing of the spine, arterial patency tests, peripheral joint screening tests, basic palpation of articular and soft tissue structures

4. Perform a specific peripheral joint examination including observation, active, passive, resisted movements, muscle length and recruitment, and ligament stress tests

5. Integrate into clinical reasoning the principles of peripheral selective tissue tension examination including the concepts of:
    a. inert vs. contractile lesions;
    b. normal and abnormal end-feels;
    c. interpretation of results of resisted testing

6. Integrate into clinical reasoning the organization of the central and peripheral nervous systems, the neurology of joints, and the anatomical bases for somatic and neuropathic pain

7. Integrate into clinical reasoning the nature, early signs and symptoms and differential diagnosis of compromise / compression to the brain, spinal cord, spinal nerves, and peripheral nervous system (cords / trunks and nerves);

8. Integrate into clinical reasoning the basic components of vertebrobasilar insufficiency and disorders presentation, clinical assessment and differential diagnosis

9. Integrate into clinical reasoning an understanding of evidence based physiotherapy practice with regards to the theory and practical application of assessment and treatment techniques including:
    a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
    b. knowledge of prognostic indicators;
    c. attributing a cause and planning a prevention program;
    d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment

10. Analyze the examination data including relevant pathology to establish the patient's problems and understand the process of wound repair and the role of physiotherapy in this process

11. Show knowledge of the clinical manifestations of pain and dysaesthesias

12. Recognize non-mechanical disorder, clinical features and differential diagnosis

13. Identify the indications and / or contraindications to:
    a. deep transverse frictions;
    b. traction (mechanical and manual);
    c. neurological testing;
    d. neuromeningeal testing;
    e. arterial patency testing;
    f. passive stability or stress testing

14. Apply deep transverse frictions to soft tissue lesions

15. Apply manual traction to the cervical, thoracic and lumbar spine

16. Understand the theory / principles as well as instruct the patient in basic spinal exercises

17. Instruct patient in prophylactic care of the back

18. Evaluate a patient's need for a spinal and peripheral orthosis

19. Record examination data, problems, plans and procedures.

C. TOPICAL OUTLINE

1. **Clinical Reasoning: (8 hours)**
   - definition and principles of application
   - integration of the ICF model (International Classification of Function Disability and Health (WHO)
   - introduction and incorporation of outcome measures: i.e. Neck Disability Index (NDI), Roland Morris Questionnaire (RMQ), Patient Specific Functional Scale (PSFS)

2. **Anatomy, Physiology: (6 hours)**

musculoskeletal embryology and its clinical relevance: derivation of the mobile segment including myotomes, dermatomes and sclerotomes

a) basic anatomy and function of connective tissue including ligaments
b) basic anatomy of the mobile segment
c) intervertebral foramen boundaries and content
d) anatomy as required for spinal and peripheral surface anatomy and assessment
e) anatomy and function of the spinal cord, nerve roots, peripheral nerves, autonomic nervous system, cranial nerves and neuromeningeal tissue
f) anatomy and function of the bone, cartilage and muscle tissue
g) introduction to signs and symptoms of neurovascular compromise of the peripheral and central nervous system
h) indications and contraindications for assessment of the neurovascular system
i) basic anatomy and function, including clinical relevance, of the visceral system
j) introduction to posture, triaxial compensation and the interrelationship of the functional units of the body (0.5 **hours**)
k) introduction to tissue mechanics: viscoelastic tissues (types and properties), response of viscoelastic tissue with age, trauma, overuse, immobilization and during the repair process (1 **hour**)
l) introduction to injury and wound healing principles (bone, cartilage, connective tissue, muscle, nerves) (1 **hour**)
m) introduction to Panjabi's Neutral Zone theory (0.5 **hours**)
n) introduction of motion states: normal / hypomobile / hypermobile / unstable (0.5 **hours**).
o) indications and contraindications of stability testing spinal and peripheral joint complexes
p) introduction to the biomechanical examination terminology of osteokinematics and arthrokinematics, practical examples of each to be shown

3. **Neurophysiology: (3 hours)**
   - Basic mechanisms of nociception:
     - Transmission
     - Modulation: inhibitory and excitatory pain control (gate control)
     - Receptors

- Introduction to pain mechanisms:
    a) input mechanisms: nociceptive, peripheral evoked neurogenic, processing mechanisms
    b) processing mechanisms: centrally evoked neurogenic, patient's perspectives, cognitive / affective influences
    c) output mechanisms: motor and autonomic mechanisms

- Introduction to segmental facilitation: normal and dysfunctional including signs of segmental facilitation
    a) sympathetic response
    b) peau d'orange
    c) trophodema
    d) segmental muscle spasm

4. **Subjective Examination:** (4 hours)
    a) mandatory questions for all musculoskeletal disorders (screening for red flags)
    b) specific additional questions pertaining to each joint and/or region
    c) interpretation on completion of subjective examination (refer to clinical reasoning reflection form – appendix)

5. **Physical Examination** – testing and interpretation of results to determine diagnosis:
    a.) architectural design - observation of postural status in three planes in both standing and sitting (1 hour)
    b.) selective tissue tension differentiation (1 hour)

    1) Theory:
        a) inert vs. contractile tissue lesions
        b) capsular vs. noncapsular patterns of restriction
        c) end feels; normal and abnormal
        d) interpretation of resisted tests

    2) Practical: (for all vertebral and peripheral joint complexes unless otherwise indicated) (24.5 hours)
        a) palpation of spine and peripheral articular and soft tissue structures including bony landmarks, muscle bellies, tendons and insertions, ligaments and nerves, as well as segmental versus multi-segmental muscle tone/fibrosis, temperature, oedema and pulses.

        Lumbo-pelvic Region
        -ischial tuberosities
        -posterior superior iliac spines
        -sacral sulci / hiatus / cornu
        -sacral inferior lateral angle
        -pubic tubercles

-sacral sulcus depth
-S2
-anterior superior iliac spines
-L1-5 spinous processes / transverse processes
- erector spinae, abdominal, psoas and multifidus muscles
-sacrotuberous ligament
-long dorsal ligament
-abdominal aorta pulse

Hip
-greater and lesser trochanter
-iliopsoas and rectus femoris tendon
-psoas and greater trochanteric bursa
-inguinal ligament
-tensor fascia latae, gluteus maximus and medius, piriformis, rectus femoris, psoas, adductors, sartorius, hamstrings
-femoral triangle and contents

Knee
-tibial tuberosity
-patella
-tibial and femoral condyles
-tibiofemoral joint line
-fibular head
-superior tibio-fibular joint
-adductor tubercle
-quadriceps expansions
-vastus medialis oblique
-iliotibial band
-adductor magnus tendon
-infra and suprapatellar tendons
-gastrocnemius medial and lateral heads
-hamstring tendons
-pes anserinus
-medial and lateral collateral ligaments
-associated bursae
-meniscotibial (coronary) ligament
-meniscus
-common peroneal nerve

Foot and Ankle
-medial malleolus
-lateral malleolus
-dome of talus
-calcaneus
-navicular
-cuboid
-cuneiforms

-metatarsals
-phalanges
-joint lines: entire foot and ankle
-tendons: achilles tendon, tibialis posterior, flexor hallucis longus, flexor digitorum longus, tibialis anterior, extensor digitorum longus, peroneus longus/brevis, peroneus tertius
-ligaments: anterior talofibular, calcaneofibular, posterior talofibular, anterior tibiotalar, tibionavicular, tibiocalcaneal, posterior tibiotalar
-dorsalis pedis pulse
-posterior tibial pulse

Cervical Region
-external occipital protuberance
-occiput
-mastoid
-zygomatic arch
-temporomandibular joints
-mandible
-C2 –7 spinous process
-C1-7 transverse process (anterior, lateral and posterior aspects)
-C1-7 articular pillars
-hyoid bone
-thyroid cartilage
-thyroid notch
-cricoid cartilage rings
-posterior sub-occipital muscles
-sternocleidomastoid, trapezius, splenius muscles
-superior and inferior cervical ganglion
-carotid pulse

Shoulder Girdle
-greater and lesser tuberosities / bicipital groove
-coracoid process
-glenohumeral joint lines
-clavicle
-acromioclavicular joint
-sternoclavicular joint
-superior and inferior scapular angles
-vertebral border of the scapula
-infraglenoid tubercle
-anterior and posterior aspects of the 1st and 2nd ribs
-biceps long head tendon
-insertions of the rotator cuff muscles
-pectoralis major and minor, latissimus dorsi, deltoid, biceps, triceps, serratus anterior, levator scapula, trapezius, rhomboids
-transverse humeral, costoclavicular ligaments

Elbow
-lateral epicondyle
-olecranon process
-medial epicondyle
-supracondylar ridge
-radial head
-radio-humeral / superior radio-ulnar / ulno-humeral joints
-insertion of the common extensor tendon
-common extensor tendon body
-biceps tendon
-biceps aponeurosis
-common flexor tendon
-brachioradialis muscle and tendon
-brachialis
-triceps, anconeus
-supinator, pronator teres muscle
-medial and lateral collateral ligaments
-brachial pulse
-ulnar nerve

Wrist and Hand
-radial styloid
-ulnar styloid
-scaphoid
-tubercle of the scaphoid
-trapezium
-pisiform
-lunate
-triquetrum
-trapezoid
-capitate
-hamate
-hook of hamate
-base of metacarpals
-phalanges
-inferior radio-ulnar joint
-tendons of wrist and hand
-thenar and hypothenar muscle bulk
-triangular fibrocartilage complex (TFCC)
-radial artery/ulnar artery

Thoracic Region
-T1-12 spinous processes and transverse processes
-T1-12 rib angles and shafts
-manubrium
-sternum

-xyphoid process
-sternomanubrial junction
-infrasternal angle
-T1-10 costochondral and sternochondral junctions
-T1-12 intercostal muscles
-pectoralis major, latissimus dorsi, serratus anterior, abdominal, erector spinae and segmental muscles

b) peripheral joint screening examination
c) active physiological ROM
d) passive physiological ROM (overpressure)
e) resisted tests
- submaximal for contractile lesion
- maximal for strength (0 – 5 on Oxford Scale)
- repeated for endurance

f) ligamentous stress testing
g) directional stability tests

Hip
-lateral distraction, anterior, posterior, superior and inferior directions in resting
-torque test
-distraction and compression

Knee
Tibiofemoral:
-valgus at 0, 30, 90 knee flexion
-varus at 0^0 - 30^0 knee flexion
-Anterior Drawer Test
-Lachman's Test
-Posterior Sag Test
-Posterior Drawer Test
-distraction and compression

Talocrural Joint
-Anterior Drawer Test
-Varus and Valgus stability test
-Posterior Drawer test
-distraction & compression

Glenohumeral
-anterior: apprehension test
-inferior: sulcus sign test
-distraction & compression

Elbow (radiohumeral/ulnohumeral)
-valgus at 0, 30, 90^0 elbow flexion

-varus at 0 to 30^0 elbow flexion
-distraction & compression

Wrist and Hand
-collateral ligaments of the radiocarpal joint
-TFCC load test
-Watson Shift test
-distraction & compression of all carpals and triangular fibrocartilage complex (TFCC)
-anterior/posterior shear of all carpals
-distraction & compression all other joint complexes
-1-5 MCP / IP/ DIP joint valgus shear in full extension & flexion of MCP
-1-5 MCP / IP/ DIP joint varus shear in full extension & flexion of MCP
-1st CMC distraction and compression in close pack position

Lumbar Spine
-distraction
-compression
-anterior
-posterior
-rotation (segmental and regional)
-lateral shear – pain provocation test

Sacroiliac Joint
-anterior gapping
-posterior gapping
-cranial/caudal shear
-posterior shear

Craniovertebral Joints (OA &AA)
-anterior
-posterior
-lateral (including osseous ligamentous ring)
-vertical (distraction/compression)
-rotary combined CV region (side flexion testing)
-Sharp-Purser test
-compression
-distraction

Cervical Spine
-anterior
-posterior
-lateral
-torsion
-compression
-distraction

Thoracic Spine
-anterior
-posterior
-torsion
-compression
-distraction

h) generalized congenital hypermobility assessment (Beighton Scale)
i) neurological signs – theory and practical
- sensory testing
- key muscle testing
- reflexes
- additional long tract tests:
    i) plantar response test (Babinski)
    ii) ankle & wrist clonus
    iii) Oppenheimer
    iv) Hoffman
- cranial nerve testing

j) neuromeningeal tests: theory, indications, contraindications and practical.

Upper quadrant:
- neck flexion test
- scapular retraction
- upper limb neurodynamic tests (ULNT)

Lower quadrant:
- prone knee bend
- straight leg raise test
    i) bowstring
    ii) neck flexion
    iii) dorsiflexion of the foot (Lasegue's)
- slump test

k) arterial patency tests
- peripheral pulses
- cervical arterial screening (refer to OPD guidelines in appendix/IFOMPT standards document)

l) knee effusion tests:
- patellar tap
- milking

m) physiotherapy clinical relevance of medical testing / treatment including:
* may be included as a reading assignment

- radiography
- myelography
- epidurography
- arthrography
- X-ray angiogram
- computerized axial tomography (CAT or CT scan)
- radionuclide scanning
- magnetic resonance imaging (MRI)
- magnetic resonance angiography (MRA)
- diagnostic ultrasound / ultrasonography
- arthroscopy
- anaesthesia (induced)
    - i) general anaesthesia
    - ii) epidural anaesthesia
    - iii) local anaesthesia
    - iv) ganglion block
- proliferation therapy / prolotherapy/sclerotherapy
- electroencephalogram (EEG)
- electromyography (EMG)
- nerve conduction studies
- somatic evoked potential (SEP)
- pharmacology
- blood tests

6. <u>At this level the participant, through analyzing the examination data, should be able to identify the following conditions, which should therefore be discussed, be reviewed in the manual and / or given in a case history format</u>

a. **Spinal:** (1 hour)
1) cervical / thoracic / lumbar / sacral root palsy
2) vertebrobasilar insufficiency (basic information) i.e. ischemic and non-ischemic signs and symptoms; screening tests history
3) hyper / hypo mobility of the spine (introduction)
4) cauda equina syndrome
5) spinal cord compression
6) lumbar disc herniation
7) lumbar spinal stenosis

b. **Peripheral:** (1 hour)
1) inert tissue lesions - capsular patterns, ligament injuries, acute bursitis, painful arc syndromes, meniscal tears
2) contractile tissue lesions – muscle strain, tendonopathy

c. **General:** (1 hour)
1) neurological compromise:
-central nervous system
-peripheral nervous system

-autonomic nervous system
2) osteoarthritis including post-traumatic arthritis
3) systemic and connective tissue disorders / conditions
4) tumors
5) viscerogenic pain

7. Deep Transverse Frictions and Traction - Theory (0.5 hour)
   a. during the three stages of healing:
      1) substrate
      2) fibroblastic
      3) remodeling
   b. indications
   c. contraindications

8. Deep Transverse Frictions - Application (0.5 hour)
   a. positioning of the structure
   b. depth
   c. duration
   d. sweep
   e. therapist biomechanics

9. Manual and Mechanical Traction (cervical/thoracic/lumbar) (0.5 hour)
   a. indications
   b. contraindications
   c. method:
      1) position
      2) static vs. intermittent
      3) progression - time vs. poundage

10. Basic Spinal Care (1 hour)
    a. resting positions: pillows, beds, etc.
    b. evidence informed working positions: static and dynamic
    c. lifting techniques: basic mechanics of lifting
    d. evidence informed principles of trunk muscle recruitment-segmental and regional

11. Basic Acute Treatment Principles: (0.5 hour)
    a. rest
    b. thermo – hydro - electrophysical agents
    c. exercise
    d. ergonomic analysis and appropriate modification
    e. introduction to manual therapy
    f. discussion of medical emergency / medical urgency care procedures

12. Orthoses: Collars and Supports (0.5 hour)
    a. collars:
       • indications for hard/soft collars
       • patient education regarding the use of the collar

b. lumbar supports/sacroiliac belts:
- indications
- patient education regarding the use of the support

c. peripheral orthosis:
- indications
- patient education regarding the use of the orthosis

13. Recording Examination Data (0.5 hour)
a. use of body charts and articular diagrams

14. Legal Aspects of Manual Therapy (0.5 hour)
*may be included as a reading assignment
a. informed consent and consent to treat
b. record keeping
c. the rights and obligations of third parties and patient information release
d. sexual harassment
e. malpractice
f. product endorsement
g. medical legal reports
h. giving expert witness to testimony
i. direct access
j. federal and provincial laws on manipulative therapy

15. Overview of other disciplines involved with musculoskeletal treatment:(0.5 hour)
a. osteopathic
b. chiropractic
c. acupuncture
d. dentistry
e. vestibular retraining
f. athletic therapy
g. massage therapy
h. occupational therapy
i. kinesiologist
j. cranial sacral therapy
k. Pilates
l. yoga
m. physicians (physical medicine specialists, orthopaedic surgeons, etc)

16. Communication and Patient Education - a brief familiarization of the following:
(0.5 hour) * may be included as a reading assignment
a. record keeping and documentation methods
b. basic manual therapy terminology
c. consent to release patient information
d. patient informed consent and consent to treat
e. adult education

f. communication methods and pitfalls especially with regards to:
   - therapist-patient communication
   - therapist-physician communication
   - therapist-layman communication
   - medical legal communication

17. History of Manual Therapy – a brief familiarization of the following: (0.5 hour)
    * may be included as a reading assignment
    a. leading figures in manual therapy
    b. various philosophies and approaches to manual therapy
    c. other professions engaged in manual therapy
    d. national and international manual therapy organizations i.e. International Federation of Manipulative Physical Therapists (IFOMPT), Canadian Academy of Manipulative Physical Therapists (CAMPT)
    e. current professional issues relevant to the practice of orthopaedic manual therapy

18. Scientific inquiry (1.0 hour – see guidelines in appendix for topics)
    To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:
    a. epidemiology (populations, samples, allocation of subjects);
    b. the terms validity/ reliability/ variables/ pre and post test probability/ sensitivity/ specificity/ positive and negative likelihood ratios);
    c. research methodology and design (measurement; experimental, quasi-experimental and non-experimental);
    d. ethics in research;
    e. methods of literature searches;
    f. scientific inquiry in clinical practice and with writing / reading scientific papers.

II. LEVEL II – LOWER QUADRANT COURSE (12 days)

Total Hours: 85 hours (83 instruction / 2.0 examination)

A. PURPOSE:

To teach the current theories of biomechanics of the lower quadrant including the lumbar spine, pelvic joints and lower extremity peripheral joints. To teach the application of these biomechanics in the detailed examination and treatment of lower quadrant dysfunctions. To teach the principles, effects, rationale and practical application of manual therapy assessment and treatment techniques of the lower quadrant. An emphasis will be placed on a clinical reasoning approach. Treatment techniques include: manual traction, active and passive mobilization throughout range of motion, peripheral manipulation, exercise prescription, neuromobilization, and spinal care. Introduce the concept of the influence of distal and proximal tissues (static and dynamic) on normal and pathological musculoskeletal states.

B. OBJECTIVES:

At the completion of this course, participants will be able to:

1. Understand biomechanical terminology;

2. Understand the presentation, clinical implications and management of instabilities of the lower quadrant including the lumbar spine and pelvis;

3. Understand the indications for and the nature of medical and / or surgical intervention for lower quadrant neuro-muscular-articular disorders;

4. Integrate into clinical reasoning current knowledge on the etiology, pathomechanics, pathogenesis, and pathologies of benign mechanical and degenerative disorders of the lower quadrant;

5. Integrate into clinical reasoning a basic understanding of the influence of distal and proximal tissues on (static and dynamic) on normal and pathological musculoskeletal states;

6. Integrate into clinical reasoning the theoretical principles and the practical application of soft tissue and articular assessment / treatment procedures to each of the lower quadrant peripheral joints, pelvic and lumbar joints with regard to the correct grade, direction and duration of the technique and expected mechanical and physiological effects;

7. Integrate the principles and practical application of safe and effective high velocity manipulative procedures to specific lower quadrant peripheral joints;

8. Describe the osteokinematic, arthrokinematic, and neuromeningeal tension principles for the lower quadrant;

9. Describe current theories of joint rheology and neurophysiology;

10. Assess and analyze static and dynamic postures / ergonomics (standing, sitting, squatting, lifting, lying) to determine if they are efficient or inefficient for the patient. Implement appropriate correction when it is indicated;

11. Using a clinical reasoning approach, analyze the total examination data to establish the patient's pathology and treatment rationale;

12. Identify the indications and contraindications for the application of discussed assessment and treatment procedures to the lower quadrant;

13. Develop independent life long learning strategies;

14. Develop an understanding of and integrate evidence based practice with regards to the theory and practical application of assessment and treatment techniques including:
    a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment
    b. knowledge of prognostic indicators, clinical prediction rules
    c. knowledge of diagnostic testing (sensitivity, specificity, likelihood ratios)
    d. implementation of clinical practice guidelines / pathways / algorithms

15. Perform:
    a. a subjective examination;
    b. a detailed physical examination of the lower quadrant. The physical examination will include:
        1) palpation of articular and soft tissue structures;
        2) muscle length tension testing
        3) active physiological mobility tests;
        4) passive physiological and accessory mobility tests;
        5) stability and stress tests (passive and dynamic);
        6) neuromeningeal tests;
        7) neurological conduction testing;
        8) relevant special tests for the region.

16. Record examination data, problems, plans and procedures in a standardized format;

17. Plan an effective home program and instruct patient in the same.

C. TOPICAL OUTLINE:

1. Anatomy: (also see Biomechanics of Joints) (10 hours)
    a. detailed osteology, arthrology, myology, neurology, vascularization, function, dynamic and static stability of the lumbar vertebral joints (including discs), pelvic region and lower quadrant peripheral joints;
    b. inter and intra regional differences of the lumbar zygapophyseal joints and intervertebral discs;
    c. form and force closure in the pelvic region;
    d. joint lubrication of the lower quadrant peripheral joints.

2. Congenital Anomalies: (0.5 hour)
   bone: asymmetry of facets, alternating tropism, transitional vertebrae, lumbarization, sacralization, trapezoidal L5, asymmetry of the sacrum, block vertebrae, hemi-vertebrae, congenital stenosis, spina bifida, hip anomalies i.e. congenital hip dysplasia, leg length discrepancy, knee anomalies i.e. patella alta / baja, structural deformities of the foot and ankle i.e. pes planus, pes cavus

3. Biomechanics of Joints (4 hours)
   Understand the definition and clinical significance of the following for the lower quadrant including the lumbar spine and pelvis:
   a. osteokinematics and arthrokinematics
   b. mechanical axis, instantaneous axis of rotation;
   c. movement of bones: spins and swings;
   d. movement of joints: rolls, spins and slides, close packing and rest position of joints, coupling motions;
   e. congruent, adjunct, conjunct rotation of bones;
   f. classification of joints: simple, compound, complex;
   g. classification of joint surface shape: modified and unmodified ovoid and modified and unmodified sellar joints, convex, concave;
   h. range of motion and degrees of freedom of movement for the lower quadrant including the lumbar spine (visual, manual, goniometric, inclinometer);
   i. normal and abnormal motion states (normal, hypomobile, hypermobile, unstable);
   j. normal and abnormal loading of the spine (especially with reference to the lumbar spine and pelvis i.e. pelvic form and force closure);
   k. normal biomechanics of lifting, standing, sitting;
   l. efficient and inefficient posture;
   m. habitual movements;
   n. introduction to the functional and dysfunctional biomechanical interrelationship of adjacent joint and surrounding tissue;
   o. normal and pathological mechanical deformation of neural and vascular structures of the lower quadrant including the lumbar spine and pelvis during spinal and peripheral movement;
   p. theoretical and practical considerations of biomechanical assessment and treatment.

4. Examination:
   ***Note**: Each region's muscular length / strength / recruitment will be evaluated in detail in Level III Lower and Upper Quadrant Courses*

   Detailed manual therapy physical examination of the lower quadrant including the lumbar spine and pelvis.

   The physical examination will include:
   a. review of palpation of articular and soft tissue structures (per Level 1-please refer): (4 hours)

Lumbo-pelvic Region
-per Level 1

Hip
-per Level 1

Knee
-per Level 1

Foot and Ankle
-per Level 1
-in addition to Level 1 the following should be reviewed at Level 2
-ligaments: - anterior / posterior inferior tib-fib ligaments, cervical, interosseous, lateral and medial talocalcaneal, bifurcate, dorsal talonavicular, plantar calcaneonavicular, long and short plantar ligaments, dorsal calcaneocuboid
-plantar fascia
-tibial nerve

c. active physiological mobility tests (uniplanar and combined); (3 hours)

d. passive physiological and accessory mobility tests (uniplanar and combined) (8 hours);

e. directional stability and stress tests: (passive and dynamic) (6 hours)
***Note**: The Orthopaedic Division recognizes that stability testing assesses multiple structures i.e. there will be both primary and secondary stabilizers to a single plane of motion.*

Hip:
-distraction, compression, torque test

Knee:
-Tibiofemoral:
- valgus at 0°, 30°, 90° knee flexion
- varus at 0° - 30° knee flexion
- anterior: -Anterior Drawer Test
-Slocum's Test
-Lachman's Test (supine & prone)
- anterolateral: Pivot Shift
- posterior: -Posterior Sag Test
-Posterior Drawer Test
- Reverse Lachman's test at 30° knee flexion
- Reverse pivot shift
- Dynamic posterior shift

- distraction & compression at varying ranges of motion of flexion-extension and internal-external rotation

-Patello-femoral joint:
-apprehension test
-directional: superior, inferior, medial, lateral
-distraction & compression

Foot and Ankle:
-Inferior tibio-fibular joint:
-anterior shear
-posterior shear
-distraction & compression
-squeeze test
-dorsiflexion external rotation test (Kleiger)
-WB dorsiflexion splay with measurement
-Talo-crural joint:
-distraction & compression
-anterior drawer
-posterior drawer
-varus and valgus stability testing in varying degrees of DF/PF
-Subtalar joint:
-distraction & compression
-anterior shear
-posterior shear
-valgus
-varus
-Mid and forefoot:
-distraction & compression
-all mid and forefoot joints: dorsal/plantar stress
-specialized testing for:
-bifurcate ligament
-spring ligament
-dorsal talonavicular ligament
-dorsal calcaneocuboid ligament
-long and short plantar ligaments
-plantar fascia
-collateral ligaments of MTP / IP

Lumbar Spine:
-distraction
-compression
-anterior shear
-posterior shear
-torsion (segmental and regional torsional i.e. Farfan's torsion test)
-lateral shear (symptom provocation only-stress testing)

Pelvic Region:
-Sacroiliac joint:
-anterior shear (innominate/sacrum)
-posterior shear (innominate/sacrum)
-superior shear (innominate/sacrum)
-inferior shear (innominate/sacrum)
-active straight leg raise
-load transfer test
-Pain Provocation tests: P4, Patrick fabers test, palpation of long dorsal ligament and sacrotuberous, Gaenslen's, sacral thrust (Laslet), Anterior and Posterior Gapping
-Pubic symphysis:
-inferior shear
-superior shear

f. Neuromeningeal tests including adjunct testing: (4.5 hours)
1) femoral
2) obturator
3) lateral cutaneous nerve of thigh
5) saphenous
6) sciatic – Slump, SLR
7) tibial
8) superficial peroneal
9) deep peroneal
10) sural

g. Neurological conduction testing (0.5 hours)

h. Relevant special tests for the region: (3 hours)
1) bursal testing: - all regions
2) leg length testing
3) hip: - FABER test (Patrick's test)
- quadrant tests
4) knee - Apley's compression / distraction test
- McMurray's test
-Thessaly test
- joint line palpation
- patello-femoral compression
- Q-angle
5) foot and ankle
- Homan's test
- talar swing test
6) lumbar
- combined active movements (H and I patterns)

5. Analyze the total examination data (7 hours)

a. **General**:
Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:

1) patient's diagnosis;
2) indications and contraindications to manual therapy assessment and treatment;
3) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment or indication of non-mechanical pain requiring further medical investigation.

b. **Specific:**

1.a) subjective examination
i. determine a hypothesis of pathology
ii. determine co-existing factors or pre-existing history of trauma
iii. determine the components of the physical examination to assess
b) palpation of articular and soft tissue structures
c) active uniplanar and combined physiological mobility tests
d) passive uniplanar and combined physiological and accessory mobility tests
e) directional stability and stress tests (passive and dynamic)
f) neuromeningeal mobility and sensitivity tests
g) neurological conduction testing
h) relevant special tests for the region.

For the above section should be able to describe the following:
a) the relationship of pain, resistance and spasm
b) rationale for motion and / or strength limitation
c) end feels and their relationships to available motion and quality of motion
d) consistency with subjective examination
e) confirmation or negation of the generated hypothesis of pathology;
f) determination of co-existing factors;
g) additional components of the physical examination that need to be done with expected outcomes.

6. <u>The emphasis of this course is lower quadrant musculo-skeletal function and dysfunction and the following conditions should be covered via lectures, course manual and / or in case histories:</u> (relate functional findings to underlying pathology)

a. **General**:

1) capsular and non-capsular lesions
2) connective tissue injuries i.e. ligament injuries
3) bursitis
4) peripheral articular dysfunction including fixations, instabilities
5) peripheral arthritides including ankylosing spondylitis
6) Paget's disease
7) adverse neuromeningeal tension

8) non-mechanical pain i.e. viscero-genic causes of pain
9) immobilization stiffness
10) specific age and or sex related pathologies
11) fractures
12) impingements (general information)

b. **Knee joint**:
1. cysts, loose bodies and meniscus tears
2. Instabilities

c. **Ankle & foot joints**:
1) Local plantar fasciitis
2) Achilles tendonopathy
3) Lateral Ankle Sprains
4) Osteochondritis dessicans
5) OA 1st MTP
6) Hallux Valgus

d. **Spinal conditions – general**:
1) disc pathology (Age related changes, traumatic lesions)
2) central and lateral spinal stenosis/intermittent claudication
3) spondylosis, spondylolysis and spondylolisthesis
4) segmental articular dysfunction: articular/hypomobilities, hypermobilities/ instabilities/facilitation

7. Treatment of acute and non-acute pathology of the lower quadrant:
a. **General:** (3 hours)
Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:

1) an initial treatment regime or alternate action;
2) generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
3) principles of treatment progression and reasons for discontinuation;
4) knowledge of prognostic indicators;
5) a planned prevention program;
6) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of treatment.

b. Joint mobilization procedures: (12 hours)
*Mobilization is defined as the skillful active, active assisted and/or passive physiological (compression/distraction/glides) movement of a joint complex within its physiological range of motion.

1) Uniplanar/combined/conjunct motion

2) Manual traction and compression

3) Reference to local mobilization effects on the normal and abnormal motion states of distal and proximal tissues

4) Selection of technique
   a) grade and duration as related to the aims of treatment and stages of healing
   b) application of technique in all ranges of motion of the joint (relate the indications to the appropriate range of motion for treatment)
   c) indications and contraindications for the application of mobilization procedures to the lower quadrant including lumbar spine and pelvis
   d) basic introduction to the principles of the following mobilization approaches:
      Maitland, McKenzie, Kaltenborn (Norwegian approach), Mulligan (NAGS and SNAGS), Medical Exercise Therapy (MET)
   e) theory: relationship of manual therapy and adjunct non-manual therapy to the following:
      i) joint rheology:
         - theories of joint lubrication
         - morphology and physiology of connective tissue (effects of mobilization and immobilization)
      ii) morphology and physiology of articular cartilage and the degenerative process
      iii) joint neurophysiology:
         - classification of joint receptors
         - effects of treatment
      iv) effect of mobilization on pain:
         - mechanical
         - chemical/inflammatory
         - spinal modulation of pain (gate control)
         - central modulation of pain

c. Peripheral joint manipulation* with reference to local effects on the normal and abnormal motion states of distal and proximal tissues): (2 hours)

*Manipulation is defined as a skillful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

1) Theory:
   a) discuss in detail the theories of joint fixation of the peripheral, spinal and pelvic joints

   b) types of manipulation:
      i) physiological glides / linear translations
      ii) non-physiological gap / distraction of joint surfaces
      iii) osteokinematic

   c) effects of manipulation:

i) on pain
ii) neurophysiology
iii) muscular
iv) articular
v) collagen tissue i.e. adhesions

2) Selection of technique

3) Application of technique

4) Indications and contraindications for the application of manipulation procedures to the lower quadrant periphery/spinal
   a. talo-crural manipulation – distraction
   b. talo-crural manipulation – posterior translation
   c. subtalar joint eversion – dynamic
   d. hip joint loose body
   e. knee joint – loose body
   f. 1st metatarsal phalangeal joint distraction
   g. sacro-iliac joint inferior thrust (prone/supine)
   h. lumbar spine oblique gap

d. Neuromeningeal mobilization (2 hours)
   1) selection of treatment technique

   2) application of technique (basic sliders with one or two basic home exercises)

   3) indications and contraindications

   4) effect of neuromobilization on pain:
      a. mechanical
      b. chemical/inflammatory
      c. spinal modulation of pain (gate control)
      d. central modulation of pain
      e. effect of mobilization on tissue mobility

e. Principles of clinical reasoning with the manual and manipulative physiotherapy treatment approach of abnormal motion states (hypomobilities, hypermobilities, instabilities). Instruction of these principles by case study demonstration (4 hours)

   1) joint mobilization / manipulation

   2) neuromeningeal mobilization

   3) exercise therapy
      a. posture correction (position of optimal postural balance - static and dynamic postures)

b. therapeutic care and home program including dynamic postural integration into activities of daily living
c. muscle imbalance
d. rationale and indications of adjunct non-manual therapy modalities (thermo – hydro - electrophysical agents, taping, orthosis)

8. Recording Data: (0.5 hour) * may be included as a reading assignment
   Handouts of various standardized forms

9. Clinical relevance of medical testing / treatment for the lower quadrant including: (1 hour)* may be included as a reading assignment
   -per Level 1 (please refer)

10. Scientific Inquiry (2 hours) *may be included as a reading assignment
    To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding of the following basic principles:
    -per Level 1 (please refer)

11. Current Issues in Physiotherapy (0.5 hour)
    a. current professional issues relevant to the practice of orthopaedic manual therapy
    b. jurisprudence (medical-legal issues)

III. LEVEL II – UPPER QUADRANT COURSE (12 days)

Total Hours: 85 hours (83 instruction / 2.0 examination)

A. PURPOSE:

To teach the current theories of biomechanics of the upper quadrant including the peripheral joints, costal region, the cervical and thoracic spine. Teach the application of these biomechanics in the detailed examination and treatment of upper quadrant dysfunctions. To teach the principles, effects, rationale and practical application of manual therapy assessment and treatment techniques of the upper quadrant. An emphasis will be placed on a clinical reasoning approach. Treatment techniques include: manual traction, active and passive mobilization throughout range of motion, neuromobilization and spinal care. Introduce the concept of the influence of distal and proximal tissues on normal and pathological musculoskeletal states.

B. OBJECTIVES:

At the completion of this course, participants will be able to:

1. Describe the osteokinematic, arthrokinematic, and neuromeningeal tension principles for the upper quadrant.

2. Perform:
   a. subjective examination;
   b. a detailed manual therapy physical examination of the upper quadrant. The physical examination will include:
      1) palpation of articular and soft tissue structures;
      2) static and dynamic positional testing of the cervical, thoracic and costal joints in neutral / hyperextension / hyperflexion;
      3) active physiological mobility tests;
      4) passive physiological and accessory mobility tests;
      5) stability and stress tests (passive and dynamic);
      6) neuromeningeal tests;
      7) neurological conduction testing;
      8) relevant special tests for the region.

3. Assess and analyze static and dynamic postures/ergonomics (standing, sitting, squatting, lifting, lying, walking, running, throwing) to determine if they are efficient or inefficient for the patient. Implement appropriate correction when it is indicated.

4. Using a clinical reasoning approach, analyze the total examination data to establish the patient's pathology and treatment rationale.

5. Understand the presentation, clinical implications and management of instabilities of the upper quadrant.

6. Understand the indications for and the nature of medical and / or surgical intervention for neuro-muscular-articular disorders of the upper quadrant.

7. Integrate into clinical reasoning a basic understanding of the influence of distal and proximal tissues as well as ergonomics (static and dynamic) on normal and pathological musculoskeletal states.

8. Integrate into clinical reasoning the current knowledge on the etiology, pathomechanics, pathogenesis, and pathologies of benign mechanical and degenerative disorders of the upper quadrant.

9. Integrate into clinical reasoning the theoretical principles and the practical application of uniplanar and combined soft tissue and articular assessment / treatment procedures for each of the upper quadrant joints, with respect to using the correct grade, direction and duration of treatment technique and the mechanical and physiological effects.

10. Integrate the principles and practical application of safe and effective high velocity manipulative procedures to specific upper quadrant peripheral joints.

11. Integrate into clinical reasoning an understanding of evidence based practice with regards to the theory and practical application of assessment and treatment techniques including:
    a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment (Neck Disability Index, quick-DASH, Upper Extremity Functional Index, Patient Specific Functional Scale)
    b. knowledge of prognostic indicators
    c. attributing a cause and planning a prevention program
    d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment.

12. Identify the indications and contraindications for the application of discussed assessment and treatment procedures to the upper quadrant.

13. Record examination data, problems, plans and procedures.

14. Plan an effective home program and instruct patient in the same.

C. TOPICAL OUTLINE:

1. Anatomy: (also see Biomechanics of Joints) 11.5 hours
    a. cervical and thoracic vertebral joints (including discs), costal joints and upper quadrant peripheral joints: detailed osteology, arthrology, myology, vascularization, function, dynamic and static stability;
    b. inter and intra regional differences in cervical and thoracic zygapophyseal joints and intervertebral discs;
    c. neurology of the cranial nerves and autonomic nervous system;
    d. general organization, structure and function of the components of the visual, vestibular and auditory system;

e. anatomy of the blood supply of the peripheral nervous system and central nervous system with emphasis on brain, spinal cord, meninges and nerve roots including the vertebral and carotid artery.

2. Congenital Anomalies: (1 hour)
   b. neural: spinal dysraphism (neural tube defects) and inequality of the spinal cord and vertebral column length, pre and post fixation of plexuses.
   c. bony: spinal and upper extremity anomalies

3. Biomechanics of Joints (4 hours)
   Understand the definition and clinical significance of the following for the upper quadrant:
   a. osteokinematics and arthrokinematics
   b. mechanical axis, instantaneous axis of rotation
   c. movement of bones: spins and swings
   d. movement of joints: rolls, spins and slides, close packing and rest position of joints, coupling motions
   e. congruent, adjunct, conjunct rotation of bones
   f. classification of joints: simple, compound, complex
   g. classification of joint surface shape: modified and unmodified ovoid and modified and unmodified sellar joints, convex, concave
   h. range of motion and degrees of freedom of movement for the upper quadrant spine (visual, manual, goniometric, inclinometer measurements)
   i. normal biomechanical classification of the upper quadrant
   j. normal and abnormal motion states (normal, hypomobile, hypermobile, unstable)
   k. normal biomechanics of lifting, standing, sitting
   l. efficient and inefficient posture
   m. habitual movements
   n. introduction to the biomechanical interrelationship of adjacent joint and surrounding tissue
   o. mechanical deformation of neural and vascular structures of the upper quadrant during spinal and peripheral movement
   p. theoretical aspects and practical considerations of biomechanical treatment

4. Examination:
   Detailed physical examination of the upper quadrant. The physical examination will include:
   a. review of palpation of articular and soft tissue structures: (4.5 hours)

Cervical Region

-per Level 1 (please refer)

Shoulder Girdle

-per Level 1 (please refer)

Elbow
-per Level 1 (please refer)

Wrist and Hand
-per Level 1 (please refer)
-in addition for Level 2; interosseous ligaments (scapholunate interosseous, lunotriquetral interosseous), long radiolunate, ulnar collateral

Thoracic Region
-per Level 1 (please refer)
-in addition for Level 2;
-manubrium
-sternum
-xyphoid process
-sternomanubrial junction
-infrasternal angle
-T1-6 costochondral and sternochondral junctions
-T7-10 costochondral cartilage
-T1-12 intercostal muscles
-pectoralis major, latissimus dorsi, serratus anterior, abdominal, erector spinae, and segmental muscles

b. active uniplanar and combined physiological mobility test (2 hours)

c. passive uniplanar and combined physiological (flexion, extension, ipsilateral coupling sideflexion pattern in neutral, flexion and extension-should focus on traditional clinical patterns for region) and accessory mobility tests (8.5 hours)

d. directional stability and stress tests: (passive and dynamic) (8 hours)

Shoulder:
-Gleno-humeral:
-anterior: -apprehension test
-anterior shear test with varying degrees of abduction (0°, 45° and 90° of abduction/ER)
-posterior translation test with varying degrees of flexion, adduction, IR (0°, 45°and 90° degrees of flexion)
-inferior: -sulcus sign
-internal / external rotation

-Acromio-clavicular:
-distraction & compression
-anterior / posterior / inferior / superior shear
-Paxino's test

-Sterno-clavicular:
-distraction & compression
-anterior / posterior / inferior / superior shear

Elbow:
-Ulno-humeral/radio-humeral:
-valgus at 0°, 30° and 90° elbow flexion
-varus at 0° and 30° elbow flexion
-distraction & compression
-posterolateral shear of radius
-Superior and Inferior Radio-ulnar:
-distraction & compression
-anterior shear
-posterior shear

Wrist and Hand:
-distraction & compression of all carpals and triangular fibrocartilage complex (TFCC) with anterior/posterior/radial and ulnar shear
-distraction & compression all other joint complexes
-1-5 MCP / IP/ DIP joint valgus shear
-1-5 MCP / IP/ DIP joint varus shear
-specialized tests:
-1st CMC palmar / dorsal and radial ligaments
-Watson's Scaphoid Shift test
-TFCC grind test

Craniovertebral Joints:
-anterior (O/C1, C1/C2)
-posterior (O/C1, C1/C2)
-lateral (including osseous ligamentous ring) (O/C1, C1/C2)
-vertical (distraction and compression) (O/CV complex)
-rotational (O/CV complex)
-Sharp-Purser test

Cervical joints:
-compression
-distraction
-lateral shear
-anterior shear
-posterior shear
-rotation

Thoracic joints:
-compression
-distraction
-anterior shear
-posterior shear

-rotation
-lateral shear (entire thoracic – rib complex involved)

Costotransverse joints (vertebrosternal/vertebrochondral region):
-distraction
-inferior/superior shear

Costochondral / Sternochondral joints:
-compression
-distraction
-posterior shear
-inferior shear
-superior shear

e. neuromeningeal tests including adjunct testing (2 hours)
- upper limb neurodynamic test I
- upper limb neurodynamic test II (median nerve bias)
- upper limb neurodynamic test II (radial nerve bias)
- upper limb neurodynamic test III (ulnar nerve bias)

f. neurological conduction testing including cranial nerves (1 hour)

g. dizziness differentiation tests including vertebral artery tests (1 hour)

h. relevant special tests for the region: (3 hours)
- Shoulder

-Speed's test
-drop arm test
-empty can test (supraspinatus)
-impingement tests (Hawkin's, Neer's)

- Hand and wrist

-Finklestein's test
-Allen's test
-extrinsic tightness test
-retinacular tightness test
-Phalen's test
-Froment's sign

5. Analyze the total examination data (5 hours)

a. **General:**
Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:
1) patient's diagnosis
2) indications and contraindications to manual therapy assessment and treatment

3) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment or of non-mechanical pain indicating further medical assessment.

b. **Specific:**

1a) subjective examination
- determining a hypothesis of pathology;
- determining co-existing factors or pre-existing history of trauma;
- determine the components of the physical examination to assess;

b) palpation of articular and soft tissue structures;
c) static and dynamic position testing;
d) active uniplanar and combined physiological mobility tests;
e) passive uniplanar and combined physiological and accessory mobility tests (distraction, compression, glides);
f) stability and stress tests (passive and dynamic);
g) neuromeningeal tests;
h) neurological conduction testing
i) relevant special tests for the region.

For the above section should be able to describe the following;
a) the relationship of pain resistance, spasm;
b) rationale for motion and / or strength limitation;
c) end feels and their relationships to available motion and quality of motion;
d) consistency with subjective examination;
e) confirming or negating the generated hypothesis of pathology;
f) further determining co-existing factors;
g) additional components of the physical examination that need to be done with expected outcomes.

6. The emphasis of this course is upper quadrant musculo-skeletal function and dysfunction and the following conditions should be covered via lectures, case histories, and / or the manual:(related functional findings to underlying pathology)

a. **General**:

1) neurological compromise:
   a) central nervous system
   b) peripheral nervous system
   c) autonomic nervous system
2) tumors
3) muscular trigger points, myofascial pain syndrome
4) complex regional pain syndrome
5) capsular and non-capsular lesions

6) connective tissue injuries i.e. ligament injuries
7) bursitis
8) peripheral articular dysfunction including fixations, instabilities and dislocations
9) peripheral arthritides including rheumatoid arthritis
10) adverse neuromeningeal sensitivity
11) non-mechanical pain i.e. viscerogenic causes of pain
12) immobilization stiffness
13) specific age and or gender related pathologies
14) fractures
15) impingements

b. **Shoulder girdle:**
1) acromioclavicular joint sprain / dislocation
2) scapulothoracic restrictions
3) adhesive capsulitis (idiopathic or post traumatic stiff shoulder)
4) traumatic/atraumatic anterior instability of the shoulder
5) rotator cuff pathology - local

c. **Elbow and radioulnar joints**:
1) Colles' fracture

d. **Wrist and hand**:
1) 1st CMC sprain
2) triangular fibrocartilage complex (TFCC) lesions

e. **Spinal conditions – general**:
1) disc lesions (age related and traumatic lesions, rim lesions)
2) central and lateral spinal stenosis
3) spondylosis, spondylolysis and spondylolisthesis
4) segmental articular dysfunction: articular including hypomobilities, hypermobilities / instabilities

f. **Cervical spine**:
1) cervical root palsies
2) whiplash
3) headaches (headache classification, various causes of headache, as well as neuro-muscular-articular headaches clinical features, assessment, differential diagnosis and management)
4) vertebrobasilar insufficiency and disorders: presentation, basic clinical assessment

g. **Thoracic spine**:
1) Scheuermann's Disease, AKS, DISH, Osteoporosis, visceral referral and metastases
2) Disc prolapse
3) Postural dysfunction
4) Hypomobility

7. Treatment of acute and non-acute pathology the upper quadrant
   a. **General:** (4 hours)
   Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:
      1) initial treatment regime or alternate action;
      2) generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
      3) principles of treatment progression and discontinuation;
      4) knowledge of prognostic indicators;
      5) planned prevention program;
      6) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of treatment, or non-mechanical pain indicating further medical assessment.

   b. Joint mobilization procedures: (12 hours)
   *Mobilization is defined as the skilful active, active assisted and/or passive physiological and/or accessory(compression/distraction/glides) movement of a joint complex within its physiological range of motion.

      1) uniplanar / combined / conjunct motion

      2) reference to local mobilization effects on the normal and abnormal motion states of distal and proximal tissues

      3) selection of technique:
         - grade and duration as related to the aims of treatment and stages of healing;
         - application of technique in the all ranges of motion of the joint
         - indications and contraindications for the application of mobilization procedures to the upper quadrant;
         - theory: relationship of manual therapy and adjunct non-manual therapy to the following:

      i) joint rheology:
         - theories of joint lubrication
         - morphology and physiology of connective tissue (effects of mobilization and immobilization)
      ii) morphology and physiology of articular cartilage and the degenerative process
      iii) joint neurophysiology:
         - classification of joint receptors
         - effects of treatment
      iv) effect of mobilization on pain:

- mechanical
- chemical/inflammatory
- spinal modulation of pain (gate control)
- central modulation of pain

c. Spinal and Peripheral Joint Manipulation* with reference to local effects on the normal and abnormal motion states of distal and proximal tissues): (2 hours)

*Manipulation is defined as a skillful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

1) **Theory:**
   a) discuss in detail the theories of joint fixation of the peripheral, spinal and pelvic joints
   b) types of manipulation:
      i) physiological
      ii) non-physiological gap, distraction or glides of joint surfaces
      iii) osteokinematic/dynamic
   c) effects of manipulation:
      i) on pain
      ii) neurophysiology
      iii) muscular
      iv) articular
      v) collagen tissue i.e. adhesions

2) selection of technique

3) application of technique

4) indications and contraindications for the application of manipulation procedures to the upper quadrant spinal and peripheral
seated axial traction T/S
carpal manipulation: dorsal/palmar thrust of the lunate (dynamic flick)
distraction of radio-scaphoid joint
distraction of radio-humeral joint

d. Neuromeningeal mobilization (2 hours)
   1) selection of technique
   2) application of technique in the all ranges of motion (relate to the indications to the appropriate range of motion for treatment)
   3) indications and contraindications for the application of mobilization procedures to the upper quadrant theory
      a) effect of mobilization on pain:
         i) mechanical

ii) chemical/inflammatory
iii) spinal modulation of pain (gate control)
iv) central modulation of pain

b) effect of mobilization on tissue mobility

e. Principles of clinical reasoning with the manual and manipulative physiotherapy treatment approach of abnormal motion states (hypomobilities, hypermobilities, instabilities). Instruction of these principles by case study demonstration using the elbow joint complex: (3 hours)

1) joint mobilization /manipulation
2) neuromeningeal mobilization
3) exercise therapy
   a) posture correction (position of optimal postural balance - static and dynamic postures)
   b) therapeutic care and home program including dynamic postural integration into activities of daily living
   c) muscle imbalance
   d) rationale and indications of adjunct non-manual therapy modalities (thermo – hydro - electrophysical agents, taping, orthosis)

8. Recording Data: (0.5 hour) * may be included as a reading assignment
Handouts of various standardized forms

9. Physiotherapy Clinical Relevance of Medical testing / treatment for the upper quadrant including: (1 hour) * may be included as a reading assignment

a. radiography
b. computerized axial tomography (CT scan)
c. bone scan
d. magnetic resonance imaging (MRI)
e. myelograms
f. blood tests
g. electroencephalogram (EEG)
h. electromyography (EMG)
i. nerve conduction studies
j. arthrography
k. epidurography
l. vertebral artery angiogram
m. paravertebral ganglion block
n. epidural anaesthesia
o. arthroscopy
p. ultrasonography
q. local anaesthesia
r. proliferation therapy
s. pharmacology: commonly used medications
t. surgical intervention

10. Current Issues in Physiotherapy (0.5 hour)

a. current professional issues relevant to the practice of orthopaedic manual therapy
b. jurisprudence (medical-legal issues)

11. Scientific inquiry

To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:

a) epidemiology (populations, samples, allocation of subjects);
b) the terms validity/ reliability/ variables/ pre/post test probability/sensitivity, specificity/ likelihood ratios);
c) biomedical statistics (descriptive and inferential; parametric and non-parametric);
d) research methodology and design (measurement; experimental, quasi-experimental and non-experimental);
e) ethics in research;
f) methods of literature searches;
g) scientific inquiry in clinical practice and with writing / reading scientific papers.

IV. LEVEL III – LOWER QUADRANT COURSE (12 days or combination of face to face time and web based e-learning maintaining total number of required course hours) Total Hours: 85 hours (83 instruction / 2.0 examination)

A. PURPOSE:

To teach the principles, effects, rationale and practical application of advanced lower quadrant manual therapy assessment and treatment techniques, including mobilization, manipulation, functional exercise, myokinetics, myokinematics, and neuromobilization. Develop an advanced understanding of the influence of distal and proximal tissues, on normal and pathological musculoskeletal states with regard to the lower quadrant including lower extremity peripheral joints, lumbar spine and pelvic joints. To promote a clinical reasoning approach to the interrelationship of normal and abnormal biomechanics of the lower quadrant.

B. OBJECTIVES:

At the completion of this course, participants will be able to:

1. Perform for the lower quadrant:
   a.) a subjective examination;
   b.) a detailed manual therapy physical examination including:
   - palpation of articular and soft tissue structures;
   - active physiological mobility tests (combined / conjunct motion);
   - passive physiological and accessory mobility tests (combined / conjunct motion);
   - muscular length/strength/recruitment tests;
   - neuromeningeal tests (differential diagnosis testing).;
   - relevant special tests for the region.

2. Analyze the total examination data to establish the patient's lower quadrant pathology and treatment rationale using a clinical reasoning approach

3. Analyze static and dynamic posture of walking and running to determine if they are efficient or inefficient for the patient. Implement appropriate correction when it is indicated.

4. Integrate into clinical reasoning of patient evaluation and treatment, the current knowledge on the etiology, pathogenesis, and pathologies of benign mechanical and degenerative disorders of the lower quadrant

5. Integrate into clinical reasoning of patient evaluation and treatment, advanced normal and pathological biomechanics of the lower quadrant

6. Integrate the theoretical principles and the practical application of advanced soft tissue and articular assessment / treatment procedures with regard to using the correct grade, direction and duration of techniques, and the expected mechanical and physiological effect

7. Integrate the principles and practical application of safe and effective high velocity manipulative procedures to specific lower quadrant peripheral and spinal joints

8. Evaluate treatment effectiveness in order to progress or modify treatment

9. Identify the indications and contraindications for the application of discussed assessment and treatment procedures of the lower quadrant

10. Develop an advanced understanding of the influence of distal and proximal tissues on normal and pathological musculoskeletal states of the lower quadrant

11. Develop an understanding of evidence based practice with regards to the theory and practical application of assessment and treatment techniques including:
    a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
    b. prognostic indicators;
    c. planning a prevention program;
    d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment or non-mechanical pain indicating further medical assessment.

C. TOPICAL OUTLINE:

1. Biomechanics of Joints and Muscles (4.5 hours) available as an on-line audio power point. Encourage student review with in class quiz.

Understand the definition and clinical significance of the following for the lower quadrant including the thoraco-lumbar junction, lumbar spine and pelvic region:

- normal biomechanics of gait;
- advanced functional and dysfunctional biomechanical interrelationship of adjacent joint and surrounding tissue i.e. lumbo-pelvic-hip relationship, lumbo-pelvic-hip-knee relationship, foot/ankle-knee-hip relationship;
- theoretical aspects and practical considerations of biomechanical treatment.

2. Myokinematics and Myokinetics: (2 hours) available as an on-line power point.
    a. definition and clinical significance of myokinematics and myokinetics
    b. muscle fiber/tendon partition ration i.e. pennate muscle
    c. motor unit components and motor unit recruitment principles
    d. slow and fast twitch muscle fibers, shunt/spurt action, innervation ratio
    e. anatomy and length/tension relationship (isotonic, isometric, isolytic, concentric / eccentric contractions), laws of approximation/detorsion for the lower quadrant
    f. role of the muscles with respect to stability and normal function of the lower quadrant

3. Examination:
   Detailed physical examination of the lower quadrant including:
   a. review palpation of articular and soft tissue structures (1 hour)
   b. review of active physiological mobility tests (combined / conjunct movement testing) (2 hours)
   c. review of passive physiological and accessory mobility tests (combined / conjunct movement testing) (5 hour)
   d. muscular length /strength /recruitment tests (5.5 hours)
   e. neuromeningeal tests (1 hour)
   f. relevant special tests for the region (0.5 hour)
   g. gait assessment (0.5 hour)

4. Analyze the total examination data: (8 hours)

   a. **General:**
      Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:
      1) patient's diagnosis;
      2) indications and contraindications to manual therapy assessment and treatment;
      3) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment or non-mechanical pain indicating further medical assessment.

   b. **Specific:**
      1) palpation of articular and soft tissue structures
      2) active physiological mobility tests (combined / conjunct movement testing)
      3) passive physiological and accessory mobility tests (combined / conjunct movement testing)
      4) muscular length/strength/recruitment tests
      5) neuromeningeal tests (differential diagnosis testing)
      6) relevant special tests for the region

      For the above section should be able to describe all of the following:
      1) the relationship of pain resistance, spasm;
      2) rationale for motion and / or strength limitation;
      3) end feel and their relationships to available motion and quality of motion;
      4) confirming or negating the generated hypothesis of pathology further determining co-existing factors;
      5) determine additional components of the physical examination that need to be done with expected outcomes.

5. The emphasis of this course is lower quadrant musculo-skeletal function and dysfunction and the following conditions should be covered via lectures, case histories and / or in the manual: (relate functional findings to underlying pathology) (9 hours)

   a. joint fixation
   b. instability (spinal and peripheral)
   c. segmental facilitation
   d. overuse syndromes
   e. postural deficiency syndromes
   f. compartment syndromes
   g. double crush syndromes
   h. peripheral joint loose bodies
   i. epiphyseal injuries / diseases
   j. muscular dysfunction including muscle lesions, muscle atrophy, tendonopathy, myositis ossificans, decreased muscle strength and/or recruitment / balance
   k. trigger points
   l. vascular disorders: abdominal aortic aneurysm, haemophilia
   m. autonomic disorders including complex regional pain syndrome
   n. anterior knee pain syndromes
   o. iliotibial band syndromes
   p. hip syndromes (hip OA, labral lesions, femoral impingement syndrome)
   q. lumbo-pelvic-hip muscle imbalance syndromes
   r. groin syndromes (differential diagnosis of groin pain)
   s. pathologies affecting the thoraco-lumbar junction: disc herniation with cord versus cauda equine differentiation, zygapophyseal joint arthrosis with specific considerations for the region

6. Treatment of acute and non-acute pathology of the lower quadrant including the lumbar spine and pelvis:

   a. **General**: (5 hours)
      Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:
      1) initial treatment regime or alternate action;
      2) generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
      3) principles of treatment progression and discontinuation;
      4) prognostic indicators;
      5) a planned prevention program;
      6) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of treatment or non-mechanical pain indicating medical assessment.

b. Review joint mobilization procedures: active, active assisted and passive physiological and accessory mobilizations (8 hours)
    1) combined / conjunct motion
    2) reference to local mobilization effects on the normal and abnormal motion states of distal and proximal tissues
        a) selection of technique
        b) grade and duration as related to the aims of treatment and stages of healing
        c) application of technique in the all ranges of motion of the joint
        d) indications and contraindications for the application of mobilization procedures to the lower quadrant

c. Spinal and peripheral joint manipulation* with reference to local effects on the normal and abnormal motion states of distal and proximal tissues): (10 hours)

    * Manipulation is defined as a skillful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

    1) **Theory:**
        a) review the theories of joint fixation of the peripheral, spinal and pelvic joints
        b) review the types of manipulation:
            i) physiological
            ii) non-physiological (gaps/glides/distraction of joint surfaces)
            iii) osteokinematic/dynamic
        c) review the effects of manipulation:
            i) on pain
            ii) neurophysiology
            iii) muscular
            iv) articular
            v) collagen tissue i.e. adhesions

    2) selection of technique

    3) application of technique

    4) indications and contraindications for the application of manipulation procedures to the lower quadrant
        a) hip/knee/talocrural/ subtalar joints: manipulation of a loose body – distraction
        b) tibio-femoral manipulation – lateral translation
        c) tibio-femoral manipulation – medial translation
        d) superior tibio-femoral manipulation – anterior translation
        e) superior tibio-femoral manipulation - posterior translation
        f) talo-crural manipulation – distraction (review)
        g) talo-crural manipulation – posterior translation (review)

h) talo-crural manipulation – posterior translation with distraction (j-stroke)
i) subtalar anterior / posterior joint manipulation – medial translation
j) subtalar anterior / posterior joint manipulation – lateral translation
k) subtalar joint distraction
l) subtalar dynamic flick manipulations into supination or pronation, loose body
m) mid and forefoot manipulations: distraction, plantar translation, dorsal translation, dynamic flick for plantar cuboid or navicular
n) sacroiliac joint manipulations: - innominate inferior translation (supine or prone) and supine gap technique
o) lumbar joint manipulations: - zygapophyseal joint unilateral oblique distraction (gap), unilateral extension technique

d. Advanced soft tissue mobilization procedures: (muscle lengthening and soft tissue techniques i.e. trigger point, adhesion and scar management and exercise) (20 hours)
    1) selection of technique;
    2) grade and duration as related to the aims of treatment and stages of healing;
    3) application of technique in the all ranges of motion of the soft tissue (relate to the indications to the appropriate range of motion for treatment);
    4) indications and contraindications for the application of mobilization procedures to the lower quadrant
    5) effect of soft tissue mobilization of tissue mobility
    6) effect of soft tissue mobilization on trigger points
    7) exercise science: theory and practical application
        -muscle physiology
        -exercise for range of motion increase or maintenance
        -exercise of movement re-education
        -exercise post ligamentous and / or muscle injury
        -exercise and “stabilization therapy” (Hodges, Hides, Richardson, Jull, Janda, Sarhmann, etc.)
        -exercise and fitness (improvement or maintenance)
        -exercise as an adjunct / alternative to manual therapy
        -postural correction exercise position of optimal postural balance (static and dynamic postures)
        -therapeutic care and home exercise programs for the prevention of neuromuscular-articular disorders

7. Recording Data: (0.5 hour) * may be included as a reading assignment
Handouts of various standardized forms

8. Current Issues in Physiotherapy (0.5 hour)

a. current professional issues relevant to the practice of orthopaedic manual therapy
b. jurisprudence (medical-legal issues)

9. Scientific inquiry
To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:

1) epidemiology (populations, samples, allocation of subjects);

2) the terms validity/ reliability/ variables/ probability/ sensitivity/speciifiy, likelihood ratios);

3) biomedical statistics (descriptive and inferential; parametric and non-parametric);

4) research methodology and design (measurement; experimental, quasi-experimental and non-experimental);

5) ethics in research;

6) methods of literature searches;

7) scientific inquiry in clinical practice and with writing / reading scientific papers.

V. LEVEL III – UPPER QUADRANT COURSE (12 days or combination of face to face time and web based e-learning maintaining total number of required course hours) Total Hours: 85 hours (82 instruction / 3.0 examination)

To teach the principles, effects, rationale and practical application of advanced manual therapy upper quadrant assessment and treatment, including mobilization, manipulation (peripheral), functional exercise, and neuromobilization. Develop an advanced understanding of the influence of distal and proximal tissues, including ergonomics (static and dynamic), on normal and pathological musculoskeletal states. To promote clinical reasoning with regard to the interrelationship of the normal and abnormal biomechanics and dysfunctional states of the upper quadrant including the cervical spine, thoracic spine, costal joints and temporomandibular joints.

B. OBJECTIVES

At the completion of this course, participants will be able to:

1. Perform:
   a. a subjective examination;
   b. a detailed advanced physical examination of the upper quadrant including:
      1) palpation of articular and soft tissue structures;
      2) active physiological mobility tests (combine / conjunct motion);
      3) passive physiological and accessory mobility (combine / conjunct motion);
      4) muscular length/strength/recruitment tests;
      5) neuromeningeal tests (differential diagnosis testing);
      6) relevant special tests for the region;

2. Analyze the total examination data to establish the patient's upper quadrant pathology and treatment rationale using a clinical reasoning approach;

3. Integrate into clinical reasoning, current knowledge on the etiology, pathogenesis, and pathologies of benign mechanical and degenerative disorders of the upper quadrant;

4. Integrate the advanced normal and pathological biomechanics of the upper quadrant;

5. Integrate the theoretical principles and practical application of soft tissue and articular assessment / treatment procedures to the upper quadrant with regard to using the correct grade, direction and duration of the treatment technique, and the expected mechanical and physiological effects;

6. Identify the indications and contraindications for the application of discussed assessment and treatment procedures;

7. Develop an advanced understanding of the influence of distal and proximal tissues as well as ergonomics (static and dynamic) on normal and pathological musculoskeletal states of the upper quadrant;

8. Develop an understanding of evidence based practice with regards to the theory and practical application of assessment and treatment techniques including:

   a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
   b. knowledge of prognostic indicators;
   c. planning a prevention program;
   d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment, or non-mechanical pain indicating further medical assessment.

9. Understand the principles and the practical application of safe and effective high velocity manipulative procedures to specific upper quadrant peripheral and spinal joints;

10. Understand the indications for and the nature of medical and / or surgical intervention for neuro-muscular-articular disorders.

C. TOPICAL OUTLINE

1. Anatomy: (encouraged as on-line lecture with brief in class lecture review)
   a. cervicothoracic and thoracolumbar junction vertebral joints (including discs): Inter and intra regional differences in zygapophyseal joints and intervertebral discs; detailed osteology, arthrology, myology, neurology , vascularization, function, dynamic and static stability.

   b. temporomandibular joint: embryology (as it relates to the cervical spine), osteology, arthrology, myology, neurology, vascularization, function, joint lubrication, dynamic and static stability. (1 hour)

2. Biomechanics of Joints and Muscles (12 hours) (encouraged as on-line lecture with brief in class lecture review
   a. Understand the definition and clinical significance of the following for the upper quadrant:

      1) normal and abnormal motion states (normal, hypomobile including fixation, hypermobile, unstable);
      2) advanced functional and dysfunctional biomechanical interrelationship of adjacent joint and surrounding tissue i.e. cervical – shoulder – thorax - upper extremity - temporomandibular joint;
      3) theoretical aspects and practical considerations of biomechanical treatment.

   b. Myokinematics and Myokinetics: (1 hour) (encouraged as on-line audio power point with optional brief in class review)
      anatomy and length/tension relationship (isotonic, isometric, isolytic, concentric and eccentric muscle contractions), laws of approximation/detorsion for the upper quadrant

3. Examination:
Detailed physical examination of the upper quadrant including:

a. review of palpation of the upper quadrant; (1 hour)

b. review active physiological mobility tests (combined / conjunct motion); (4 hours)

c. review passive physiological and accessory mobility (combine / conjunct motion); (6 hours)

d. review directional stability and stress tests

e. differential testing of vertigo with investigation of central circulatory supply according to IFOMPT guidelines

f. palpation of the temporomandibular joint: (1.5 hours)
-temporomandibular joint line
-mandibular angle
-zygomatic arch
-muscles:-temporalis, masseter, medial and lateral ptyergoid, suprahyoid

g. directional stability and stress testing of the temporomandibular joint:
-compression
-distraction
-posterior shear
-anterior shear
-lateral shear
-combined planes shear

h. mobility testing of the temporomandibular joint

i. muscular length/strength/recruitment tests (i.e. scapular muscles, deep neck flexors); (10 hours)

j. neuromeningeal tests; (2 hour)

k. relevant special tests for the region including TMJ meniscal grind tests (0.5 hours)

4. Analyze the total examination data (10 hours)
a. **General:**
Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:

1) patient's diagnosis;
2) indications and contraindications to manual therapy assessment and treatment;
3) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment or non-mechanical pain indicating medical assessment.

b. **Specific:**
1) review palpation of articular and soft tissue structures
2) review active physiological mobility tests (combine / conjunct motion)
3) review passive physiological and accessory mobility (combine / conjunct motion)
4) muscular length/strength/recruitment tests
5) neuromeningeal tests
6) relevant special tests for the region

For the above section should be able to describe the following:
1) the relationship of pain resistance, spasm;
2) rationale for motion and/or strength limitation;
3) end feel and their relationships to available motion and quality of motion;
4) consistency with subjective examination;
5) confirming or negating the generated hypothesis of pathology;
6) further determining co-existing factors;
7) determine additional components of the physical examination that need to be done with expected outcomes.

5. The emphasis of this course is upper quadrant musculo-skeletal function and dysfunction and the following conditions should be covered via lectures, case histories and / or in manual: (relate functional findings to underlying pathology) (6.5 **hours**)

a. peripheral and segmental articular dysfunction: articular / myofascial dysfunction including hypomobilities, hypermobilities and instabilities
b. muscle imbalances
c. adverse neuromenigeal tension
d. muscular dysfunction including muscle lesions, muscle atrophy, decreased muscle strength and/or recruitment / balance, tendinopathy, myositis ossificans
e. segmental facilitation
f. spinal cord, brain stem, cerebellum, cortex vascular insufficiency
g. overuse syndromes
h. postural deficiency syndromes
i. compartment syndromes
j. double crush syndromes
k. peripheral joint loose bodies

l. epiphyseal injuries / diseases
m. trigger points
n. vascular disorders: angina, migraine, Volkmann's ischemic contracture, Raynaud's disease, hypertension, aneurysms, haemophilia
cervicogenic headache
o. temporomandibular joint meniscal injury
p. pathology of the rotator cuff
q. thoracic outlet/inlet syndromes
r. Complex Regional Pain Syndrome
s. De Quervain's tenosynovitiis
t. lateral / medial epicondylagia syndromes
u. carpal tunnel syndrome
v. carpal instabilities: volarflexed intercalated segment instability (VISI) and dorsiflexed intercalated segment instability (DISI)
w. autonomic disorders including sympathetic dystrophy
x. equilibrium disorders: cervical spondylogenic, vestibulocochlear nerve, endolymphatic disorders (Meniere's disease), vascular disorders (vertebrobasilar insufficiency), hypotension, cerebellar disease, otitis media

6. Treatment of acute and non-acute pathology the upper quadrant including the cervical spine, thoracic spine, costal joints and temporo-mandibular joint:

a. **General:** (4 **hours**)
Demonstrate the ability to use clinical reasoning and evidence based principles to analyze the total examination data to identify the following:
    1) initial treatment regime or alternate action;
    2) generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
    3) principles of treatment progression and discontinuation;
    4) prognostic indicators;
    5) a planned prevention program;
    6) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of treatment, or non-mechanical pain indicating medical assessment.

b. Review joint mobilization procedures: (active, active assisted and passive physiological and accessory (compression/distraction/glides) mobilizations) (5 **hours**)
    1) combined / conjunct motion
    2) reference to local mobilization effects on the normal and abnormal motion states of distal and proximal tissues
        a) selection of technique (focused techniques in periphery / spinal regions; focused techniques using a lever arm in the spinal region)
        b) grade and duration as related to the aims of treatment and stages of healing

c) application of technique in all ranges of motion of the joint (relate the indications to the appropriate range of motion for treatment)
d) indications and contraindications for the application of mobilization procedures to the upper quadrant

c. Thoracic and peripheral joint manipulation* procedures: (reference to local effects on the normal and abnormal motion states of distal and proximal tissues) (6 **hours**)

*Manipulation is defined as a skilful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

1) selection and application of technique

2) indications and contraindications for the application of manipulation procedures to the upper quadrant periphery
   a) elbow manipulation – lateral translation
   b) elbow manipulation – medial translation
   c) radio-humeral joint manipulation – anterior & posterior translations
   d) radio-ulnar joint manipulation – anterior & posterior translations
   e) radio-humeral joint manipulation – distraction (review)
   f) ulno-humeral joint manipulation (review)
   g) carpal manipulations – anterior and posterior translations
   h) CMC / MCP / IP / DIP distraction manipulations
   h) Mill's manipulation

3) indications and contraindications for the application of manipulation procedures to the thoracic spine
   a) T3-9 segmental manipulation: bilateral zygapophyseal joint superior translation (flexion glide) and intervertebral disc joint distraction
   *non-specific sitting technique (i.e. with towel roll localization)
   *specific supine technique
   b) specific mid-cervical traction

d. Advanced soft tissue mobilization procedures: includes neuromeningeal mobilization, muscle lengthening, massage, soft tissue manipulations (i.e. exercise, trigger point treatment, adhesions and scar management i.e. "Mill's Manipulation") 14.5 hours

1) selection of technique

2) grade and duration as related to the aims of treatment and stages of healing

3) application of technique in all ranges of motion of the soft tissue

4) indications and contraindications for the application of soft tissue mobilization procedures to the upper quadrant

5) theory:
   a) effect of soft tissue mobilization on pain:
      i) mechanical
      ii) chemical/inflammatory
      iii) spinal modulation of pain (gate control)
      iv) central modulation of pain

   b) effect of soft tissue mobilization on tissue mobility

   c) effect of soft tissue mobilization on trigger points

   d) exercise science: (theory and practical application)
      -exercise for range of motion increase or maintenance
      -exercise of movement re-education
      -exercise for vestibular rehabilitation
      -exercise post ligamentous and / or muscle injury
      -prophylactic exercise
      -exercise and "stabilization therapy" (ala Hodges, Hides, Richardson, Jull, Janda, Sarhmann)
      -exercise and fitness (increase or maintenance)
      -exercise as an adjunct / alternative to manual therapy
      -postural correction exercises position of optimal postural balance (static and dynamic postures)
      -therapeutic care and home exercise programs for the prevention of neuro-muscular-articular disorders of the upper quadrant

e. rationale and indications of adjunct non-manual therapy modalities in the upper quadrant (thermo – hydro - electrophysical agents, taping, orthosis) (1 hour)

7. Recording Data: (0.5 hour) * may be included as a reading assignment
   Handouts of various standardized forms

8. Current Issues in Physiotherapy (0.5 hour)
   a. current professional issues relevant to the practice of orthopaedic manual therapy
   b. jurisprudence (medical-legal issues)

9. Scientific inquiry
   To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:

   a) epidemiology (populations, samples, allocation of subjects);

b) the terms validity/ reliability/ variables/ pre post test probability, sensitivity/specificity, likelihood ratios);

c) biomedical statistics (descriptive and inferential; parametric and non-parametric);

d) research methodology and design (measurement; experimental, quasi-experimental and non-experimental);

e) ethics in research;

f) methods of literature searches;

g) scientific inquiry in clinical practice and with writing / reading scientific papers.

VI. LEVEL IV - VERTEBRAL JOINT COURSE (5 days)
Total Hours: 35 hours (35 instruction)

A. PURPOSE
To teach the treatment of spinal, pelvic and costal joint dysfunction safely and effectively by manipulation* techniques with emphasis on clinical reasoning and the indications and contraindications for their use.

* Manipulation is defined as a skilful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

B. OBJECTIVES
At the completion of this course participants will be able to:

1. Analyze examination data to establish the indications and contraindications for the use of high velocity, low amplitude thrust techniques to the spinal column, pelvis and costal joints;
2. Understand the theories of spinal joint fixation;
3. Understand the theory of high velocity, low amplitude thrust techniques to the spinal, pelvic and costal region;
4. Apply high velocity, low amplitude thrust techniques to specific spinal, pelvic and costal joint dysfunction;
5. Integrate high velocity, low amplitude thrust techniques into the treatment regime for the correction of spinal, pelvic and costal dysfunction;
6. Develop an understanding of evidence based practice with regards to the theory and practical application of discussed diagnostic testing (assessment) and treatment techniques including:
    a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
    b. knowledge of prognostic indicators;
    c. a planned prevention program;
    d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment.

C. TOPICAL OUTLINE
1. Analyze Examination Data: (9 hours)
    a. review biomechanics and examination as per Level II & III Upper and Lower Quadrants.
    b. review clinical musculoskeletal anatomy and clinical relevance of the same, including neurovascular anatomy of spinal, pelvic and costal joints and their related central and peripheral neurological innervation as well as neurological tests of their function.

2. Demonstrate the ability to use clinical reasoning and evidence based principles in the discussion of the following: (6 hours)
    a. determination of the patient's diagnosis

b. theories of joint fixation of the spinal pelvic and costal joints
c. philosophies, indications and contraindications of high velocity, low amplitude thrust techniques of the spinal, pelvic and costal joints
d. conditions of central circulatory insufficiency and craniovertebral instability
e. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment
f. the principles of treatment progression and discontinuation
g. prognostic indicators
h. the appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment
i. a cause and a planned prevention program.

3. Instruct high velocity, low amplitude thrust techniques to each mobile segment of the spine:

Cranio-vertebral: (1 hour)
a. OA distraction
b. AA distraction

Cervical: (4 hours)
a. zygapophyseal joint unilateral distraction
b. zygapophyseal joint unilateral inferior translation (extension glide)
c. zygapophyseal joint unilateral superior translation (flexion glide)
d. osteokinematic (flexion rotation)

Cervico-thoracic Junction: (2 hours)
a. C7-T3 zygapophyseal joint bilateral superior translation (glide)
    1) non-specific sitting technique
    2) specific supine technique

Thoracic: (4 hours)
a. T3-9 segmental manipulation: bilateral zygapophyseal joint superior translation (flexion glide) and intervertebral disc joint distraction
    1) non-specific sitting technique (i.e. with towel roll localization)
    2) specific supine technique
b. T3-9 zygapophyseal joint bilateral inferior translation (extension glide):
    1) specific supine technique
c. T3-12 zygapophyseal joint unilateral inferior translation (extension glide)
d. T3-12 zygapophyseal joint unilateral superior translation (flexion glide)

Lumbar: (4 hours)
a. zygapophyseal joint unilateral oblique distraction (gap) (review)
b. zygapophyseal joint unilateral superior translation (flexion glide)
c. zygapophyseal joint unilateral inferior translation (extension glide) (review)

Pelvic Joints (3 hours)
a. sacroiliac joint unilateral distraction - supine technique (review)

b. sacroiliac joint unilateral innominate superior translation (glide) (review)
c. sacroiliac joint unilateral innominate inferior translation (glide) - prone & supine techniques (review)
d. side lying unilateral innominate posterior rotation
e. prone unilateral innominate anterior rotation
f. prone unilateral anterior glide (nutation)
g. prone unilateral posterior glide (counternutation)

Costal Joints (1 hour)

a. first rib costo-transverse joint inferior translation ('inspiration' glide)
b. first rib costo-transverse joint distraction (gap)
c. 2-10 costo-transverse joint distraction

4. Integration into Total Treatment Program: (5.5 hours)
   Instruct the integration of high velocity, low amplitude techniques as adjunctive therapy in the correction of spinal, pelvic and costal dysfunction.

5. Discuss the legal and ethical considerations in the use of high velocity, low amplitude thrust techniques.
   (1 hour) * may be included as a reading assignment

6. Current Issues in Physiotherapy (0.5 hour)
   a. current professional issues relevant to the practice of orthopaedic manual therapy. Please consider and inform regarding relevant provincial regulations surrounding i.e. rostering
   b. jurisprudence (medical-legal issues with reference to CAMPT written consent document). Please consider and inform regarding relevant provincial regulations surrounding consent to treat. An on-line audio power point will be available for student review regarding the legal aspects of informed consent.

7. Scientific inquiry
   To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:
   1) epidemiology (populations, samples, allocation of subjects)
   2) the terms validity/ reliability/ variables/ pre post test probability, sensitivity/ specificity, likelihood ratios)
   3) biomedical statistics (descriptive and inferential; parametric and non-parametric)
   4) research methodology and design (measurement; experimental, quasi-experimental and non-experimental)
   5) ethics in research
   6) methods of literature searches
   7) scientific inquiry in clinical practice and with writing / reading scientific papers.

VII. LEVEL V - VERTEBRAL JOINT COURSE (5 days)
Total Hours: 35 hours (35 instruction)
Note: Examination is the Advanced Orthopaedic Manual and Manipulative Physiotherapy Examination

A. PURPOSE
To teach the assessment and treatment of spinal, pelvic and costal joint dysfunction safely and effectively by advanced manipulation* techniques. An emphasis will be placed on the clinical reasoning integration of the mechanical and anatomical influences of local and distal tissues. Assessment and treatment technique indications and contraindications of use will also be emphasized.

* Manipulation is defined as a skilful passive high velocity, low amplitude thrust movement of a joint (peripheral or spinal) beyond its physiological limit of motion but inside the limit of its anatomical integrity with the purpose of restoring motion and function.

B. OBJECTIVES
At the completion of this course participants will be able to:
1. Analyze examination data to establish the indications and contraindications for the use of advanced high velocity, low amplitude thrust techniques to the spinal column, pelvis and costal joints
2. Apply advanced high velocity, low amplitude thrust techniques to specific spinal, pelvic and costal joint dysfunction
3. Apply advanced high velocity, low amplitude thrust techniques to specific spinal, pelvic and costal joint dysfunction in the presence of proximal or distal hypermobilities, instabilities and / or adverse neuromeningeal tension
4. Integrate advanced high velocity, low amplitude thrust techniques into the treatment regime for the correction of spinal, pelvic and costal dysfunction
5. Develop an understanding of evidence based physiotherapy practice with regards to the theory and practical application of discussed diagnostic testing (assessment) and treatment techniques including:
   a. generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment
   b. knowledge of prognostic indicators
   c. a cause and a planned prevention program
   d. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and / or treatment.

C. TOPICAL OUTLINE
1. Demonstrate the ability to use clinical reasoning and evidence based principles in the discussion of the following: (2 hours)
   a. analysis of examination data to establish the patient's diagnosis;
   b. analysis of the examination data to establish the indications and contraindications for the use of advanced high velocity, low amplitude thrust techniques to the spinal column, pelvis and costal joints;

c. appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment and /or treatment.

2. Instruct Advanced High Velocity, Low Amplitude Thrust Techniques to each mobile segment of the spine:

Cranio-vertebral: (4 hours)

a. OA distraction (review)
b. AA distraction (review)
c. OA unilateral anterior translation (extension glide) (appendix)
d. OA unilateral posterior translation (flexion glide)
e. AA unilateral anterior translation (glide)
f. AA unilateral posterior translation (glide)

Cervical: (4 hours)

a. zygapophyseal joint unilateral distraction (review)
b. zygapophyseal joint unilateral inferior translation (extension glide)
    1) review
    2) manipulation techniques in the presence of hypermobility (instability) above or below the joint be manipulated and / or in the presence of adverse neuromeningeal tissue mobility
c. zygapophyseal joint unilateral superior translation (flexion glide)
    1) review
    2) when level above joint to be manipulated is hypermobile (unstable)
    3) when level below joint to be manipulated is hypermobile (unstable)
d. uncovertebral joint unilateral translation to restore right sidebend (medial translation glide)
e. uncovertebral joint unilateral translation to restore left sidebend (medial translation glide)

Cervio-thoracic: (1 hour)

a. C7-T3 zygapophyseal joint bilateral superior translation (glide)
    1) non-specific sitting technique (review)
    2) specific supine technique (review)
b. C7-T3 zygapophyseal joint unilateral inferior translation (extension glide)
c. C7-T3 zygapophyseal joint unilateral superior translation (flexion glide)
d. manipulation techniques in the presence of hypermobility (instability) above or below the joint be manipulated and / or in the presence of adverse neuromeningeal tissue mobility

Thoracic: (2 hours)

a. manipulation techniques in the presence of hypermobility (instability) above or below the joint be manipulated and / or in the presence of adverse neuromeningeal tissue mobility

Lumbar: (2 hours)

a. manipulation techniques in the presence of hypermobility (instability) above or below the joint be manipulated and / or in the presence of adverse neuromeningeal tissue mobility

Pelvic joints (4 hours)

a. sacroiliac joint unilateral anterior glide (unilateral sacral nutation)
   1) prone technique
b. sacroiliac joint glide, unilateral innominate posterior rotation
   1) supine techinique 2) side lying technique
c. sacroiliac joint unilateral posterior glide (unilateral sacral counternutation)
   1) prone technique - review 2) side lying technique
d. sacroiliac joint unilateral innominate anterior rotation - parallel
   1) prone technique - review 2) side lying technique
e. sacroiliac joint unilateral distraction
   1) supine technique (review) 2) side lying technique
f. manipulation techniques in the presence of hypermobility (instability) above or below the joint to be manipulated and / or in the presence of adverse neuromeningeal tissue mobility

Costal: (2 hour)

a. 1-10 costo-transverse joint distraction (review)
b. 1-10 costo-transverse joint inferior translation ('inspiration' glide)
c. 1-10 costo-transverse joint superior translation ('expiration' glide)

3. Integration into Total Treatment Program: (13.5 hours)
   a. instruct the integration of advanced high velocity, low amplitude techniques as adjunctive therapy in the correction of spinal, pelvic and costal dysfunction.
   b. case history scenarios for each region: review history features, assessment and treatment of all tissues (articular, muscular, neuromeningeal, vascular). include the following:
      1) generic, condition specific and patient specific outcome measures regarding treatment effectiveness in order to progress or modify treatment;
      2) principles of treatment progression and discontinuation;
      3) prognostic indicators;
      4) attributing a cause and planning a prevention program;
      5) appropriate referral and communication to other members of the health care team in the presence of adverse effects/complications of assessment .

4. Current Issues in Physiotherapy (0.5 hour)
   a. current professional issues relevant to the practice of orthopaedic manual therapy
   b. jurisprudence (medical-legal issues)
   c. students should be directed to on-line audio power point regarding patient informed consent

5. Scientific inquiry

To enhance the knowledge of the theory of manual therapy practice and encourage critical review of its scientific merit there must be an understanding the following basic principles:

1) epidemiology (populations, samples, allocation of subjects)
2) the terms validity/ reliability/ variables/ pre post test probability, sensitivity/ specificity, likelihood ratios)
3) biomedical statistics (descriptive and inferential; parametric and non-parametric)
4) research methodology and design (measurement; experimental, quasi- experimental and non-experimental)
5) ethics in research
6) methods of literature searches
7) scientific inquiry in clinical practice and with writing/reading scientific papers.

VIII. ON-LINE CRITICAL APPRAISAL AND RESEARCH DESIGN (10 weeks)

Total Hours: 35 hours (35 instruction)

1) interactive on-line course investigating the parameters of research design and inquiry
2) familiarize the participant with available research appraisal tools applicable to randomized clinical trials, CPR's, systematic reviews
3) familiarize the participant the validation process of self report outcome measures and psychometric properties of the many of these tools