HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA

PROFESSIONAL BOARD FOR OCCUPATIONAL THERAPY MEDICAL, ORTHOTICS & PROSTHETICS AND ARTS THERAPY.

MINIMUM STANDARDS OF TRAINING FOR MEDICAL ORTHOTISTS & PROSTHETISTS

BACKGROUND

The Professional Board for Occupational Therapy, Medical Orthotics/Prosthetics and Arts Therapy undertook the task to review the document "Minimum Standards for the Training of Medical Orthotists and Prosthetists". The revision was necessitated by developments in the profession, the publication of ISPO education standard for prosthetics / Orthotics occupations in 2017 as well as changes within services delivery areas in South Africa.

The content of the Minimum Standards was based on the information contained in the documentation that was compiled by the Standards Generating Body (SGB) of the Professional Board for Occupational Therapy, Medical Orthotics/Prosthetics and Arts Therapy and was submitted to the South African Qualifications Authority (SAQA) in December 2006.

In 2014 the minimum standards for training of medical orthotists and prosthetists was revised and approved by the OCP Board.

The process for the revision of the Minimum Standards for medical orthotists and prosthetists commenced in September 2018 at the Board Stakeholder meeting with relevant stakeholders present.

INTRODUCTION

The Bachelor of Health Science Medical Orthotics and Prosthetics is a professional Bachelor's degree learning programme culminating in a NQF level 8 qualification, which will be offered through contact delivery mode over a minimum of 4 years.

On successful completion of this qualification, the student is eligible for registration with the relevant statutory body (currently the Health Professions Council of South Africa) as qualified Orthotics and Prosthetics Practitioners. Successful registration will license the qualified practitioner to practise as an independent health science practitioner within the field of Orthotics and Prosthetics. The Health Professions Act (no 56 of 1974) is applicable to this profession and describes a Medical Orthotist and Prosthetics as a health care professional who gives treatment to disabled persons and persons in need of orthotics and prosthetics for rehabilitation purposes. Orthotists and Prosthetists assess, evaluate, measure, design, takes images of the patients', manufacture or issue of the shelf orthotics or prosthetics depending on the need of the patient. They fit these devices, adjust the devices and teach the patient how to function with the assistive device. These practitioners also have the skills to repair devices that needs reparations. The Medical Orthotist and Prosthetist is a first line practitioner and works in cooperation with the rehabilitation team. A Medical Orthotist and

Prosthetist may use advanced high-tech equipment and techniques that differentiate their skills from other and is an important member of the health care team.

More specifically, the qualification aims to produce graduates to be independent practitioners able to practice in a safe and competent manner within the scope of practice based on education, competency, knowledge, extent of experience and registration. Furthermore, these professionals need to abide by current legislation and health care policies in general.

This document should be read with the International Society of Prosthetics and Orthotics (ISPO) Education Standards that was developed and published in 2018.

PURPOSE OF THE MINIMUM STANDARDS

- Ensure that graduates are competent practitioners who are able to deliver contextually appropriate services within local and international contexts.
- Inform the basis of the development of curricula in terms of the minimum requirements for the training of MOP students.
- Serve as both an internal and external quality control measure.

Form the basis for accreditation of existing and new training programmes

PURPOSE OF THE QUALIFICATION

- The purpose of the qualification is to transform the graduate into a competent orthotic and prosthetic professional with the required knowledge, attitudes, insights and skills that addresses the African socio-economic and physical challenges. The graduate will be empowered to establish and manage an independent practice.
- The qualifying graduate will be able to competently apply and integrate theoretical principles, evidence-based techniques, practical experience, clinical procedures and appropriate skills in order to holistically rehabilitate orthotic and prosthetic patients. This will be done in a non-discriminatory, social accountable and ethical manner.
- The graduate will be capable of working as a member functioning within a multidisciplinary team and moving the profession forward in an environmentally responsible manner. This graduate will also be able to adapt to and apply new research, innovations and technologies to the benefit of the patient and the profession, under the guidance and regulation of the HPCSA.

1. FUNDAMENTAL CHARACTERISTICS

The programme is committed to:

- Transfer relevant medical related, orthotics and prosthetics specific knowledge, skills, attitudes and competencies to undergraduate students;
- Ensure innovative student-centered teaching and learning strategies and utilize modern and advanced teaching and learning technologies;
- Serve the community with professionalism and evidence-informed health care.

- Embark on community-based innovative involvement through applicable service-learning projects;
- Establish partnerships within the health industry, both nationally and internationally;
- Recruit, develop and retain excellent staff and students and empower these individuals with knowledge, skills and competencies;
- Foster the value of professionalism to produce sought-after graduates;
- Foster the value of a team spirit to enhance co-operation and productivity in the learning programme;
- Grow and sustain the learning programme using a positive attitude and sound management principles.

2. CORE THEORETICAL CONTENT

Students are required to:

2.1. Demonstrate applied engagement as a Clinician using the required techniques and skills to attend to patient care. They must be able to assess, measure, design and fit applicable technology. In addition, they must be able to communicate results and rehabilitation engagement using written and oral reports towards the multi-disciplinary team also considering the psychological aspects of the patient.

2.2. Demonstrate competence in conducting appropriate examination, evaluation, and assessment of patients within a broad continuum of care.

2.3. Function as an independent registered practitioner engaging in all ethical aspects required within the field of Orthotics and Prosthetics, they must be able to comply with occupational safety and health regulations. In addition, they must be competent to adhere to current acts, policies and procedures within the field of medical Orthotics and Prosthetics.

2.4. Demonstrate the skills and competency to engage with good laboratory practice, maintenance of instruments and machinery. Demonstrate accountability by complying with the standards of manufacturing orthotics and prosthetic devices within the laboratory.

2.5. Apply entrepreneurial / management and supervisory skills. They must have the ability to act in a supervisory capacity towards supervised practitioners within the Medical Orthotics and Prosthetics field: Technicians, Orthopaedic Footwear Technicians, Interns and students.

2.6. Implement good communication and interpretation skills within the multi-disciplinary team. In addition, they must interact with allied health professionals to enhance the rehabilitation process of the patient. They must be able to make decisions and act appropriately in a medical environment. As consultant they must be able to give informed feedback and suggestions regarding the rehabilitation process.

2.7. The graduate will be able to design, formulate and implement a treatment plan for the rehabilitation process of the patient. In addition, they will demonstrate the ability to apply scientific theories and outcomes in their work environments

2.8. Manage and maintain continuous professional development (CPD) in health

2.9. Apply theories, research, methodology and methods skills in the field of Medical Orthotics and Prosthetics. In addition, the practitioner is challenged to keep up with new technologies and developments within the field of orthotics and prosthetics.

2.10. Demonstrate in a systematic and effective manner the ability to provide patients and carers with information and knowledge needed for care.

See Addendum A for more detail.

3. CORE PRACTICE CONTENT

3.1 LABORATORY

The laboratory must function under the management of a Medical Orthotist and Prosthetist who is registered with the HPCSA.

The laboratory must be appropriately equipment to train students in the field of medical orthotics and prosthetics, as determined in the approved curriculum.

It will be required of the laboratory to adhere to the Health and Safety standards.

The laboratory must provide adequate facilities. The laboratory must consist of appropriate designated areas for manufacturing that include working with plaster, lamination, draping, an area where bench work can take place and storerooms. Laboratory and clinical areas must be in walking distance to each other.

First, second and third-year students must practice under direct supervision of a registered medical orthotist and prosthetist. Final year students have the flexibility to work under indirect supervision (always subjected to the responsibility of a senior).

3.2 CLINICAL

Clinical facilitation must always be under the guidance of a Medical Orthotist and Prosthetist who is registered with the HPCSA.

The clinical area must include a secretary or administration officer to receive patients. Other clinical areas such as waiting rooms, adequate walking / gait areas, plaster casting rooms and fitting rooms are mandatory.

Adequate sanitary facilities for staff and patients and access to the building are essential. Laboratory and clinical areas must be in walking distance to each other.

First, second and third-year students must practice under direct supervision of a registered medical orthotist and prosthetist. Final year students have the flexibility to work under indirect supervision (always subjected to the responsibility of a senior).

All students must complete a minimum of 1000 hours of practice. Between 60-80% of these hours must be obtained in the third and fourth years of the four-year programme. The record

of the 1000 hours of practice must be documented and verified by the training centre prior to obtaining the degree and registration with HPCSA.

4. ASSESSMENTS

The assessment strategy for this programme is based on an integrated assessment approach including formative-, summative and continuous assessment leading to examination or continuous assessment for non-examination purposes. Formative assessment may be in the form of informal and formal assessment types, and summative assessment will mainly be in the form of an exam.

4.1 FINAL EXAMINATION

Integration of the modules presented in the four years of the programme, must be evident in the performance of the students in the qualifying examination.

4.1.1. The profession-specific content (medical orthotics and prosthetics) must be evaluated by means of written paper(s) and practical examination(s) to demonstrate the students' understanding of medical orthotics and prosthetics.

4.1.2. The prescribed examinations may be arranged at the discretion of the education authority, provided that the professional specific content is included in the final qualifying examinations.

4.1.3. The final examination must include clinical practical examinations that should be done to demonstrate exit level clinical competencies; these should be externally moderated.

5. GENERAL RULES

5.1 Registration with HPCSA as a student is compulsory

5.2 Student must be in the possession of a valid 1st aid certificate for the qualification to be issued –

5.3 While reflecting the aims of the profession, the education / learning should be flexible enough to accommodate changes in this field and advances in technology and knowledge of Medical Orthotics & Prosthetics sciences. The course of study should make students receptive to change and encourage interest in continuing education after qualification through existing academic structures.

5.4 Lecturers who deliver profession specific subjects or modules must be registered Orthotists and Prosthetist with the HPCSA.

5.5 No candidate shall be registered by the Health Professions Council, unless:

- He/she has completed a Bachelor Degree programme at NQF Exit Level 8 with a minimum total of 480 credits according to the Higher Education Qualifications Framework (HEQC) document dated 14 December 2012.
- Between 60-80% of these hours must be obtained in the third and fourth years of the four-year programme.

ADDENDUM A

1. The course should be composed of the named primary, clinical and professional subjects and if decided an elective subject. The educational authority may however arrange or name subjects according to their circumstances provided that the course meets the requirements stated in this regulation.

2. The course may be offered either as an annual or a semesterised delivery.

3. Instruction in ethical rules and regulations must be given in the statutory obligations of the student and qualified Orthotists & Prosthetists, as laid down by the Health Professionals Council of South Africa. An understanding of ethical principles should be achieved, in order to help students to practice sound behavior and develop appropriate relationships with colleagues and professionals.

Subjects typically include the following:

4. <u>Primary Subjects</u>

4.1 Anatomy and Physiology

The student should have an understanding of the function of individual joints and muscles and the proficient in explaining their interaction. He/she should be knowledgeable in the area of pathological deviations and be able to analyse them by means of appropriate measuring instruments as well as by applying his/her knowledge of range of motion in order to be able to identify a viable prosthetic/orthotic treatment. The student should recognize that biomechanical as well as pathological factors must be viewed concurrently with anatomical factors.

In the area of anatomy and physiology the student should have knowledge of the following:

- basic cell biology and histology
- the structure of the skeletal system, particularly the bones and joints of the lower and upper limbs, the shoulder girdle, the spine and the thorax
- the structure and function of the muscular system, with emphasis on the muscular systems of the lower and upper limbs, the shoulder girdle and the spine and thorax
- the structure and function of joints, including axes of rotation, range of movements and stabilization
- consideration of the body as a whole system, identification of physiological deviations and of their significance
- the nervous system, tissues, cardiovascular system, pulmonary system, immune system, endocrine system, and the secretor organs.

4.2 Pathology

The student should be able to comment on the aetiology and progression of the disease in question, as well as on its care and treatment. He/she must demonstrate proficiency in anatomy, physiology, biomechanics and pathology as well as the ability to coordinate these factors and arrive at the appropriate end result in his/her role in the multi-disciplinary team.

The student will have an understanding of the following:

- inflammatory diseases
- degenerative diseases
- post-traumatic conditions
- tumours
- metabolic disorder
- abnormalities present at birth (congenital deformities)
- aseptic bone necrosis
- paralysis resulting from nerve lesions
- circulatory disorders
- amputations
- post-traumatic osteoporosis
- diseases of the spine
- spinal and thoracic deformities
- diseases of the pelvis and hip
- diseases of the knee
- diseases of the foot
- diseases of the shoulder, elbow and hand
- limb deformities
- skin disorders and wound repair.

4.3 Materials Technology

The student will have an understanding of the characteristics, properties and the processing of the following commonly used materials with particular reference to their applications in orthotics & prosthetics:

- steel and its alloys
- non-ferrous metals and their alloys
- plastics: thermoforming, thermosetting, composites
- wood
- leather
- plaster of Paris
- adhesives

4.4 Clinic, Laboratory and Business Management

The student will have knowledge of the theory and application of:

- materials acquisition, handling and stock control
- workforce management
- production cost calculations
- budgeting, invoicing, receipting and accounting
- clinic management, appointment systems, record keeping
- property management, care and maintenance
- environmental/ecological considerations

4.5 Mechanics

The student will have an understanding of the applications of the following in that area of Biomechanics and Orthotics & Prosthetics Science:

- terminology and units
- vector and scalar quantities

- linear/angular motion and motion of a solid body
- resolution of forces and moments in two dimensions
- equations of equilibrium
- free body diagrams
- calculations of centre of gravity and mass
- Newton's Laws of Motion
- work, power and energy
- strength of materials: stress, strain and Hooke's Law.

5. Clinical Subject

5.1 Clinical Practice (1000 Hours)

The student will be proficient in the following practical areas and clinical applications with an understanding based on the integration of his/her theoretical studies:

- Patient assessment / evaluation and prescription.
    - Describe the clinical condition
    - Able to have a background of the medical and surgical interventions by the multi-disciplinary team
    - Understand the psychological factors of the patient and able to supply advice regarding the devices
    - To accurately apply evaluation / assessment techniques
    - Able to take a clinical history respectfully and comprehensively
    - To interpret finding within the assessment that may have an impact on the rehabilitation process
- Measuring and casting, fitting, aligning
    - Accurately taking measurements and casting according to the design that has been decided on
    - Different techniques could be used
    - A thorough fitting and testing session with the device manufactured
    - To apply changes as needed by the individual patients
- Patient education and training with the device
    - Explaining and demonstrating the functioning of the device and how to apply the device
    - Explaining and demonstrating how to care for the device
- Arrangements for follow-up appointments

- Ankle/partial foot prostheses
- Trans-tibial prostheses
- Knee disarticulation prostheses
- Trans-femoral prostheses
- Hip Disarticulation prostheses
- Upper Limb prostheses
    - All levels
- Shoe modifications
- Shoe inserts/foot orthoses
- Ankle-foot orthoses
- Knee-ankle-foot orthoses
- Hip-knee-ankle-foot orthoses
- Spinal Orthoses
    - Cervical orthoses
    - Cervico-thoraco-lumbo-sacral orthoses

- Upper extremity orthotics
    - All levels

6. Professional Subjects

The following subjects should be included in the curriculum for each semester of study and should be examined accordingly:

6.1 Biomechanics and Orthotics & Prosthetics Science

The student should have an understanding of the following topics:

- the anatomical planes and reference points of the body
- prosthetic and orthotic measurement techniques
- anatomical joint types, their functions and interaction
- muscle physiology and biomechanics in relation to joint functions
- the interaction of anatomical joints and prosthetic/orthotic joints
- normal human locomotion and the gait cycle
- kinetic and kinematic analysis and the calculation of external and internal force actions
- biomechanics of the lower limb
- lower limb prosthetic components and their application
- stump/socket forces and lower limb socket design
- bench, static and dynamic alignment of lower limb prostheses with reference to biomechanical implications
- pathological gait, its analysis and the application of appropriate orthotic treatment
- body/orthoses forces and interface design
- orthoses for lower limb diseases
- lower limb orthoses for upper motor neurone diseases
- lower limb orthotic components and their application
- biomechanics of the spine and thorax
- orthoses for diseases and deformation of the spine and thorax
- biomechanics of the upper limb
    - upper limb prosthetic fitting, alignment and function
    - upper limb prosthetic components and their application
    - upper limb orthotic fitting, alignment and function
    - upper limb orthotic components and their application

The student requires the above knowledge in order to provide optimal orthotic & prosthetic care to the patient.

6.2 Orthotics & Prosthetics Laboratory Technology

The student will understand and be able to apply, in the field of orthopaedic technology, the following areas of knowledge:

- hand tools: their selection, use and maintenance
- measuring instruments: use and methods of application
- machine tools: selection, installation, use and maintenance
- welding processes and equipment for metals and plastics
- sewing machines: selection, use and maintenance
- general equipment: ovens, compressors, vacuum pumps, fume and dust extraction apparatus
- workshop layout

- health and safety regulations and practice

6.3 Orthotics & Prosthetics principles and Practice (in at least three years of study)

The student should have a thorough knowledge and understanding in the following areas of Orthotics & Prosthetics Science:

- General laboratory practice: use of hand tools, machine tools and materials, component production
- Cast rectification
- Fabrication of devices
- Reparation and Completion of devices

6.3.1. Orthotics

Basic workshop techniques

- Use of machinery and equipment e.g. sewing machines, vacuum machines, routers etc.

Devices

- Orthoses for segment instability
- Joint Orthoses
  Negative mould taking, positive cast rectification, construction, assembly and fitting of:
  - knee orthosis
  - ankle orthosis
  - cervical orthosis - semi-shell
  - spinal support orthoses with posterior pad Orthoses
- Lower limb orthoses
  Negative mould-taking, positive cast rectification, manufacture and fitting of orthoses:
  - Knee-ankle-foot (long leg night splint) Ankle-foot (drop foot for use in shoe) Ankle-foot (for positioning or unloading) Knee-ankle-foot (for positioning or unloading) Knee-ankle-foot (with ring socket - Thomas splint)
  - Ischial load bearing knee-ankle-foot Orthosis
  - Ring socket knee-ankle-foot-orthosis (Thomas splint)
- Foot orthoses - arch supports for flat, varus or club foot deformities shoe modifications
  - Tracing/negative mould-taking, positive cast rectification, fabrication, fitting, adjustment and delivery
- Ankle-foot orthoses (short night splint) for club foot
  Negative mould-taking, positive cast rectification, manufacture, trimming, fitting, and attachment of straps
- Upper limb orthoses
  Negative mould taking, positive cast rectification, construction, assembly and fitting of:
  - Opposition orthoses for immobilisation of thumb
  - Wrist-hand positioning orthosis
  - Wrist-hand orthosis
  - Finger extension and flexion orthosis Wrist-hand orthosis for finger flexion/ extention
- Hand orthoses

Negative mould-taking, positive cast rectification, manufacture and fitting of orthoses :
- Wrist-hand (positioning)
- Hand (thumb immobilisation)
- Hand (immobilisation of DIP joint)

- Spinal orthoses
  Negative mould-taking, positive cast rectification, manufacture and fitting of orthoses:
  - Thoraco-lumbo-sacral (body jacket from thermoplastic)
  - Thoraco-lumbo-sacral (scoliosis-Cheneau type)
- Modular lumbo-sacral orthoses
  - Measuring, fitting and finishing
- Thoraco-lumbo-sacral orthoses
  - Negative mould taking, positive cast rectification, construction, assembly and fitting
- Spinal immobilisation orthoses
  Negative mould-taking, positive cast rectification, Construction and fitting of plastic spinal immobilisation orthosis.
- Spinal correctional orthoses
  - ('Cheneau' or other type)
  - Negative mould-taking, positive cast rectification, Assembly and initial fitting.

Clinical activity as described above

6.3.2 Prosthetics

- Production of prosthetic components
  - Construction of Solid Ankle Cushion Heel (SACH) Foot; construction of single axis knee/shin components with or without knee lock; repairing worn prostheses.
- Lower-limb prostheses
  Negative mould-taking, positive cast rectification, construction, assembly, alignment and fitting of prostheses:
  - Ankle disarticulation or partial foot Trans-tibial (KBM, PTB or other)
  - Trans-tibial (with side joints and thigh corset)
  - Knee disarticulation (modular with 4-bar knee joint or crustacean construction)
  - Trans-femoral (non-suction with auxiliary suspension) Transfemoral (total contact, suction socket) Hip disarticulation (Canadian type)

- Lower limb negative mould-taking
  Mould-taking techniques for prostheses:
  - Patellar Tendon Bearing (PTB)
  - Kondylar Beitung Munster (KBM) Supra-patellar Tendon Bearing (PTS)
  - Foot amputations (Syme, Piragoff and fore-foot) Trans-femoral
- Trans-tibial and ankle disarticulation prostheses
  Negative mould-taking, positive cast rectification, construction, assembly, alignment and fitting of:
  - Ankle disarticulation
  - Trans-tibial with supracondylar suspension Trans-tibial with lateral side bar and joints, leather thigh corset
  - Trans-tibial-selective revision
- Trans-femoral prostheses

Negative mould-taking, positive cast rectification, construction, assembly, alignment and fitting of prostheses:
  - Trans-femoral with single axis knee and ankle joints and clear check socket
  - Trans-femoral as above with laminated socket Trans-femoral with single axis knee joint, SACH foot and quadrilateral wooden socket
  - Trans-femoral-selective revision
- Upper limb prosthetics
  Negative mould-taking, positive cast rectification, construction, assembly and fitting of prostheses:
  - Supracondylar suspension socket
  - Trans-radial
  - Trans-humeral
- Hip disarticulation/transpelvic prostheses
  Negative mould-taking, positive cast rectification, manufacture and fitting of socket

Clinical activity as described above

6. 4 Principles of Engineering for New Technology in MOP

The student will have an understanding of the change in technology in the profession and the subject have to include all the new trends in MOP. This will include:

- 3D scanning & printing
- 4D scanning & printing
- Bionic / Electronic orthotics and prosthetics
- Myo-electric prosthesis
- New and advance feet
- New and advanced knees
- Silicone

Draft 3 Tuesday, June 14, 2019
Draft 4 Reviewed on 27 Jan 2020
Approved by Board 22 May 2020

--- oOo ---