Higher National Unit specification

General information

Unit title: Electrotherapy (SCQF level 8)

Unit code: H71N 35

Superclass: PB

Publication date: May 2014

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to provide the learner with a working knowledge and understanding of the principles and application of a selective range of electrotherapy, mechanical and thermal modalities commonly used in the management of sports injuries. This Unit is aimed at learners that work in the Sports Therapy industry and includes competencies and scope of practise as specified by The Society of Sports Therapists.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Explain the physical and mechanical principles of electrical, mechanical and thermal modalities.
2 Explain the physiological effects and contraindications of electrical, mechanical and thermal modalities.
3 Apply electrical, mechanical and thermal modalities.

Credit points and level

1 Higher National Unit credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Higher National Unit Specification: General information (cont)

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Recommended entry to the Unit

Access to the Unit will be at the discretion of the centre. However, knowledge of Functional Anatomy, Sports Therapy: Anatomy and Physiology, Basic Subjective and Objective Assessment, Clinical Sports Massage, Pathology and Aetiology of Sports Injury, Prevention and Management of Sports Injury Sports Therapy: Exercise Principles and Testing, Sports Therapy: Professional Standards and First Aid for Sport and Fitness as evidenced by SCQF levels 7/8, or occupational equivalencies would be of benefit. Learners should also have good communication and numeracy skills. These may be evidenced by achievement of *Communication* and *Numeracy* at Higher level or by the possession of suitable NQ Units (SCQF levels 5/6).

Learners would also benefit from regular participation in supervised sport injury management activities (extra-curricular sports events and work placement).

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Higher National Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the physical and mechanical principles of electrical and thermal modalities.

Knowledge and/or Skills

- Physics of electricity
- Mechanics of waves and sound
- Heat and radiation

Outcome 2

Explain the physiological effects and contraindications of electrical, mechanical and thermal modalities.

Knowledge and/or Skills

- Ultrasound
- Interferential
- Transcutaneous Electrical Nerve Stimulation (TENS)
- Thermal

Outcome 3

Apply electrical, mechanical and thermal modalities.

Knowledge and/or Skills

- Ultrasound
- Interferential
- Transcutaneous Electrical Nerve Stimulation (TENS)
- Thermal

Higher National Unit specification: Statement of standards (cont)

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Evidence Requirements for this Unit

Learners will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes.

Outcome 1

Evidence should be generated by a closed-book restricted response question paper designed in sections. Learners should answer a minimum of 10 questions under controlled conditions. Learners should be assessed on the following:

Basic physics of electricity:	Basic electrical components, bioelectricity, atomic particles and atomic structure, electrical conductors and non conductors, voltage, direct and alternating current, interrupted direct current, thermal effect of electrical current, frequency, resistance (Ohms law), intensity, capacitance and inductance.
Mechanics sound waves:	Nature of sound waves, production of therapeutic ultrasound, transmission, wavelength, frequency, velocity, intensity, pulsemark ratio, electrode tissue interface conduction transmission, attenuation (1/2 value depth, Absorption and Scatter — reflection and refraction).
Methods of thermal transfer:	Conduction, convection, conversion and radiation.

Outcome 2

Evidence should be generated by open-book extended response questions. under supervised conditions.

Bioelectricity:	Cellular electrical activity, action potential in nerve conduction and muscle contraction.
Physiological effects:	Explain the physiological effects of each modality. Ultrasound: Thermal; increased metabolic activity, decreased muscle spasm, increased blood flow and increased collagen elasticity Non-thermal; micro massage, increased cell permeability and increased collagen mobilisation Interferential: Pain management, muscle stimulation, increased blood flow and reduced oedema TENS: pain management and muscle stimulation Thermal: Increased local circulation and reduced muscle spasm Healing phases: Acute, sub-acute and chronic

Higher National Unit specification: Statement of standards (cont)

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Explain treatment:	Treatment and dose parameters for each modality — duration, intensity, frequency, duty cycle, mode and size and location of injury
Identify contraindications:	For each modality as appropriate
Explain dangers:	Of each modality as appropriate

Outcome 3

The learner will be required demonstrate practical competence and understanding in each of the modalities based on a variety of injury scenarios. An assessor checklist should be used to generate evidence. Learners will need to provide evidence to demonstrate all Knowledge and/or Skills by showing that they can:

- prepare the client and body part for treatment.
- explain, instruct and inform the client prior to and during treatment**:** warning and informed consent.
- select appropriate dosage, method and technique for the location and status of injury.
- safety check of equipment, equipment test and operate equipment according to good practice.
- conclude treatment and give appropriate advice on aftercare.
- record treatment in recognised notation.
- explain maintenance, care and Health and Safety requirements of equipment and materials, infection control, cleaning post treatment, Health and Safety legislation relating to electrical equipment, calibration requirements, general care and storage.

Higher National Unit Support Notes

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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is part of a Group Award and is intended to give learners an understanding of the theoretical and practical application of the following electrotherapeutic modalities; ultrasound, interferential, TENS and thermal treatment. Electrotherapy is an adjunct treatment for Sports Therapists and is significant in assisting with the healing process and reducing the likelihood of re-injury.

Outcome 1 requires the learner to demonstrate an understanding of:

- Examples of bioelectricity including; cell membrane potential, action potential generation, growth plate activity and nerve conduction.
- Sound wave parameters; frequency, intensity, wavelength and standard SI Units.
- Generation of an ultrasound signal; high frequency electrical signal, quartz crystal, energy conversion, piezo-electric effect and duty cycle.
- Signal attenuation; absorption, scatter (reflection and refraction) and ½ value depth.

Outcome 2 requires the learner to demonstrate an understanding of:

- Physiological effects of each modality; pain relief, muscle stimulation, reduction of oedema, improve circulation, reduce muscle spasm assist with tissue repair.
- Examples of bioelectricity including; cell membrane potential, neuromuscular junction and nerve conduction.
- Contraindications of treatment; cancer, thrombosis, exposed nerve tissue, loss of sensation, allergic to materials, pacemaker, tissue implants, circulatory disorders, coronary artery disease and abnormal lumps and bumps.
- Dangers of treatment; electrocution, burns, overdose, exacerbate injury and non-conformity to Health & Safety guidelines (HSE).

Outcome 3 requires the learner to demonstrate practical competence in all modalities showing:

- Practical ability in handling and setting up each modality safely and effectively.
- Correct choice of treatment dose for any given scenario.
- Full understanding of dangers of all modalities.
- An ability to give patients sound aftercare advice following treatment.

Higher National Unit Support Notes (cont)

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Guidance on approaches to delivery of this Unit

Delivery requires an appropriately qualified professional and it is suggested that the following professionals may deliver: Chartered Physiotherapist/Sports Therapist. The Unit should be delivered within a clinical environment making use of appropriate facilities and equipment.

Appropriate equipment from the ranges available:

Therapeutic Ultrasound — dual frequency.

Interferential Unit — For analgesic relief, muscle stimulation, improved circulation and reduction of oedema.

TENS — For analgesic relief and muscle stimulation.

Thermal — Hydro-collator, wax baths and infra-red.

Guidance on approaches to assessment of this Unit

Outcome 1

This Outcome should be assessed in the form of a closed-book assessment under supervised conditions.

Outcome 2

This Outcome should be assessed in the form of an open-book, extended response question paper conducted under supervised conditions.

Outcome 3

Direct observation of practical performance as learner applies a treatment of each modality, using an assessor checklist. The learner is required to demonstrate the safe and competent application of the treatment modality for any given scenario. The scenario may be chosen by the assessor and the learner will have no prior knowledge of the injury site, type of tissue or stage of healing.

The learner should choose method, dose and position for treatment appropriately and justify the rationale of this choice. Where evidence cannot be gathered by direct/video observation written/oral questioning may be used to support performance.

The assessment will take place at an appropriate time within the delivery of the Unit determined by learners' progress.

Higher National Unit Support Notes (cont)

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Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

Core Skills: There may be opportunities to gather evidence towards Core Skills in this Unit, especially *Communication, Working with Others* and *Problem Solving*, *Numeracy* and Literacy, although there is no automatic certification of Core Skills or Core Skills components.

These skills can be developed through practical application of a variety of treatment modalities and dose calculation. Further to this, communication is developed during treatment of patients in practical components. In addition to this, literacy is further developed through report writing and recording in patient records. These Core Skills are measured at a level appropriate to this Unit (level 8).

These are transferrable skills that can be utilised in industry enhancing employment prospects and in progressing on to higher education programmes.

History of changes to Unit

Version	Description of change	Date

General information for learners

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This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit offers you the opportunity to enhance your selection of treatment modalities for sports injuries. You will take advantage of the use of ultrasound, transcutaneous electrical nerve stimulation, interferential and thermal modalities using equipment in a practical environment and achieving competency in the safe application of each method.

The clinical reasoning skills and confidence gained as you work through this Unit will prepare you for work and further study as a Sports Therapist. This Unit will provide you with a solid foundation for clinical practice.

Self-directed learning is encouraged and it is estimated that at least a further 40 hours of self-study will be required. Previous learning from all Year 1 Units will enhance the experience and you will find that the holistic approach to delivery and assessment will encourage you to put together all the skills and knowledge you have achieved so far.

The following sources of information may be of assistance to you as you undertake this Unit.

Glow and Reed A., (1990), *Electrotherapy Explained: Principles and Practice*, Butterworth Heinemann.

Denegar, C., (2000), *Therapeutic Modalities for Athletic Injuries*, *Athletic Training Education Series, Human Kinetics*, USA

Partridge, C. and Kitchen, S., 1999. *Physiotherapy.* Adverse Effects of Electrotherapy Used by Physiotherapists. 85(6)