



Higher National Unit specification

General information

Unit title: Functional Anatomy 2 (SCQF level 8)

Unit code: H71P 35

Superclass: RH

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Unit purpose

This Unit is designed to provide the learner with an understanding of the musculoskeletal system in terms of muscular and myofascial movement, performance, injury and injury prevention. On completion of the Unit, the learner should be able to screen/assess the strength and length of skeletal muscles and treat them accordingly. The learner should also be able to recognise and treat muscular imbalance and understand the importance of core stability and myofascial slings with regards to movement and injury.

The Unit is aimed at learners who wish to work within the Sports Therapy scope of practice. The Unit includes competencies and scope of practice as specified by the Society of Sports Therapists.

Outcomes

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

- 1 Assess the strength and length of skeletal muscles, screen for dysfunction and treat the muscles accordingly.
- 2 Describe the concept of muscle imbalance, associated syndromes/related injuries, muscle firing sequencing and provide treatment solutions.
- 3 Explain the importance of core stability and myofascial slings in relation to injury and rehabilitation.

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

It is recommended that learners have completed the Units *Anatomy and Physiology*, *Functional Anatomy*, *Basic Subjective and Objective Assessment*, *Sports Therapy: Exercise Principles and Testing*, *Prevention and Management of Sports Injury*.

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).

Core Skills

Achievement of this Unit gives automatic certification of the following:

Complete Core Skills	None
Core Skill component(s)	Critical Thinking at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit Specification.

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.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

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

Assess the strength and length of skeletal muscles, screen for dysfunction and treat the muscles accordingly.

Knowledge and/or Skills

- ◆ Upper and lower limb length and strength tests
- ◆ Interpretation of above tests
- ◆ Treatment of dysfunctional muscles in view of above test results

Outcome 2

Describe the concept of muscle imbalance, associated syndromes/related injuries, muscle firing sequencing and provide treatment solutions.

Knowledge and/or Skills

- ◆ Cause of muscle imbalance
- ◆ Tonic Vs Phasic muscles
- ◆ Janda's Syndromes — Upper Crossed Syndrome, Lower Crossed Syndrome, Layer Syndrome, Pronation Distortion Syndrome
- ◆ Muscle firing sequencing
- ◆ Integrated treatment solutions

Higher National Unit specification: Statement of standards (cont)

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Outcome 3

Explain the importance of core stability and myofascial slings in relation to injury and rehabilitation.

Knowledge and/or Skills

- ◆ Transverses Abdominis/Multifidus/Diaphragm and Pelvic Floor = Core
- ◆ Activation and training/ rehabilitation of core
- ◆ Active Straight Leg Raise Test
- ◆ Myofascial slings — Deep Longitudinal Sling, Lateral Sling, Anterior Oblique Sling, Posterior Oblique Sling
- ◆ Common injuries related to dysfunctional slings
- ◆ Enhancing performance and programming of slings

Evidence Requirements for this Unit

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

Outcome 1

Bullet points 1, 2 and 3 should be assessed practically, at the same time, where learners demonstrate accurate testing of five length and five strength tests from the list below.

Bullet point 4 should be a reflective open-book written account based upon the above practical assessment.

- ◆ Perform Upper and Lower limb muscle length tests (upper Trapezius, Levator scapulae, Pectoralis minor, Iliopsoas/Rectus femoris (Thomas Test), Hamstrings, Tensor fascia latae (TFL)/Ilio-tibial band (Ober's Test), Adductors, Piriformis, Gastrocnemius, Quadratus lumborum).
- ◆ Perform Upper and Lower limb strength tests (above muscles and other major muscle groups — Quadriceps, Rotator Cuff, Gluteals).
- ◆ Interpretation of above tests. Identify muscles that are too short/tight/strong and muscles that are too long/overstretched/weak.
- ◆ Treatment of dysfunctional muscles in view of above test results. Various stretching/strengthening exercises based upon above results.

Higher National Unit specification: Statement of standards (cont)

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Outcome 2

All Evidence Requirements for this Outcome should always be assessed through a closed-book supervised assessment.

- ◆ Describe the cause of muscle imbalance.
- ◆ List the Tonic 'flexor' muscles that are prone to tightness or shortness — Gastroc-soleus, Tibialis posterior, hip adductors, Hamstrings, Rectus femoris, Iliopsoas, TFL, Piriformis, Quadratus lumborum, Pectoralis major/minor, upper Trapezius, Levator scapula, Sternocleidomastoid (SCM), Scalenes, Suboccipitals, upper limb flexors.
- ◆ List the Phasic 'extensor' muscles that are prone to weakness or inhibition — Peroneals, Tibialis anterior, Vastus medialis/lateralis, Gluteus medius/minimus, Gluteus maximus, Transverses abdominis, Serratus anterior, Rhomboids, middle/ lower Trapezius, deep neck flexors (DNF), upper limb extensors.
- ◆ Describe Janda's Syndromes — Upper Crossed Syndrome, Lower Crossed Syndrome, Layer Syndrome, Pronation Distortion Syndrome.
- ◆ Explain how muscle imbalance can have an influence on shoulder impingement, mechanical lower back pain and anterior knee pain.
- ◆ Describe normal and abnormal muscle firing sequencing in the following movements: hip extension, hip abduction, and shoulder abduction.
- ◆ Implement an integrated treatment solution for problems associated with muscle imbalance (inhibit overactive muscles, lengthen short, overactive muscles, activate weak, under-active muscles then integrate the muscles back into their functional strategies).

Outcome 3

Bullet points 1 to 3 should be assessed practically where learners describe accurately the core stability concept, demonstrate how to initiate and progress core training, and assess the ASLR test.

Bullets 4 to 6 can be assessed through a closed-book supervised assessment.

- ◆ Describe core stability in terms of Transverses abdominis/Multifidus/Diaphragm and Pelvic Floor.
- ◆ Demonstrate the basic activation of the core muscles and explain how to progress core training/rehabilitation (Sahrmann/Comerford).
- ◆ Assess functional stability using Active Straight Leg Raise (ASLR).
- ◆ Describe the component parts of each of the named Myofascial slings — Deep Longitudinal Sling, Lateral Sling, Anterior Oblique Sling, Posterior Oblique Sling.
- ◆ Identify common injuries related to dysfunctional slings.
- ◆ Describe how to enhance performance and programming of slings.



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

Outcome 1

Learners should demonstrate accurate testing of the 10 length tests: upper Trapezius, Levator scapulae, Pectoralis minor, Iliopsoas/Rectus femoris (Thomas Test), Hamstrings, Tensor fascia latae/Ilio-Tibial Band (Ober's Test), Adductors, Piriformis, Gastrocnemius, Quadratus lumborum.

Learners should not know the selection in advance.

Learners should demonstrate accurate testing of strength tests from the list of 13 below: upper Trapezius, Levator scapulae, Pectoralis minor, Iliopsoas/Rectus femoris, Hamstrings, Tensor fascia latae/Ilio-tibial band, Adductors, Piriformis, Gastrocnemius, Quadratus lumborum, Quadriceps, Rotator Cuff, Gluteals.

Learners should not know the selection in advance.

Learners should interpret which muscles that are too short/tight/strong and muscles that are too long/overstretched/weak.

From this interpretation appropriate stretching and or strengthening should be undertaken. For example, if the Thomas Test is positive for a tight, shortened Rectus femoris then an appropriate quadriceps and hip flexor stretching routine should be initiated. Also, if a muscle was found to be weak, commonly seen in Quadriceps or Gluteals, then an appropriate strengthening programme should be initiated.

Outcome 2

Causes of muscle imbalance:

Repetitive movements/postural stress, pattern overload, poor technical skill, immobilisation, cumulative stress, poor neuromuscular control, poor core strength.

Tonic 'flexor' muscles that are prone to tightness or shortness — Gastroc-soleus, Tibialis posterior, hip adductors, Hamstrings, Rectus femoris, Iliopsoas, TFL, Piriformis, Quadratus lumborum, Pectoralis major/minor, upper Trapezius, Levator scapula, Sternocleidomastoid (SCM), Scalenes, Suboccipitals, upper limb flexors.

Higher National Unit Support Notes (cont)

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Tonic muscles in the Upper extremities tend to follow the pattern:
Flexion, Internal Rotation, Adduction, Pronation.

Tonic muscles in the Lower extremities tend to follow the pattern:
Plantar flexion and Inversion, Hip flexion, Internal Rotation, Adduction.

Phasic 'extensor' muscles that are prone to weakness or inhibition — Peroneals, Tibialis anterior, Vastus medialis/lateralis, Gluteus medius/minimus, Gluteus maximus, Transverses abdominis, Serratus anterior, Rhomboids, middle/lower Trapezius, deep neck flexors (DNF), upper limb extensors

Phasic muscles in the Upper extremities tend to follow the pattern:
Extension, External Rotation, Abduction, Supination.

Phasic muscles in the Lower extremities tend to follow the pattern:
Dorsiflexion and Eversion, Hip external rotation, Abduction.

Janda's Syndromes

Upper Crossed Syndrome — forward head, rounded shoulders.

Lower Crossed Syndrome — increased lumbar lordosis and anterior pelvic tilt

Layer Syndrome - both upper and lower crossed

Pronation Distortion Syndrome — valgus knee and pronated foot

Shoulder impingement

Weak: Serratus anterior, lower Trapezius, external rotators

Tight: Pectoralis Minor

Movement Dysfunction: dysfunctional Scapular elevation or protraction

Mechanical lower back pain

Weak: Gluteus medius/maximus, Abdominals

Tight: Hip flexors, Adductors, Hamstrings, Piriformis

Movement Dysfunction: Substitute back extension for hip extension

Anterior knee pain

Weak: Vastus medialis, Gluteus medius

Tight: Hamstrings, ITB

Movement Dysfunction: Hip compensation

Muscle firing sequencing in the following movements:

Hip extension:

Hamstrings/Gluteus maximus (together) then, contralateral lumbar extensors, ipsilateral lumbar extensors, contralateral thoracolumbar extensors, ipsilateral thoracolumbar extensors.

Hip abduction:

Gluteus medius/minimus, then Tensor fascia latae, Quadratus lumborum, abdominals, Iliopsoas, Rectus femoris.

Higher National Unit Support Notes (cont)

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Shoulder abduction:

Supraspinatus/Deltoid (together), both sides of upper Trapezius, contralateral Quadratus lumborum, contralateral Peronei.

Integrated treatment solution for problems associated with muscle imbalance:

Inhibit overactive muscles — many soft tissue techniques

Lengthen short, overactive muscles — static stretching, PNF

Activate weak, under-active muscles — isometrics

Integrate the muscles back into their functional strategies.

Outcome 3

Core stability in terms of a strong cylinder: Transversus abdominis/Multifidus, the sides of cylinder, Diaphragm, the top of the cylinder and Pelvic Floor, the bottom of the cylinder.

Basic activation of the core muscles: Drawing-in manoeuvre, abdominal bracing or posterior pelvic tilt. To learn to prevent lumbar spine motions associated with leg motion.

Progress core training/ rehabilitation (Sahrmann/Comerford): Using gym equipment, Swiss balls as well as body weight.

Functional stability is assessed using Active Straight Leg Raise (ASLR) test.

Myofascial slings:

Deep Longitudinal Sling — erector Spinae, Sacrotuberus ligament (and Multifidus), Biceps femoris, Peroneus longus, Tibialis anterior.

Lateral Sling — Gluteus medius and minimus, contralateral Adductors, contralateral Quadratus lumborum.

Anterior Oblique Sling — External oblique, contralateral internal oblique, contralateral Adductors.

Posterior Oblique Sling — Latissimus dorsi, Thoracolumbar fascia, contralateral Gluteus maximus

Common injuries related to dysfunctional slings:

Deep Longitudinal sling — low back pain, hamstring strain, ankle sprain, Patella Femoral Pain Syndrome

Anterior Oblique sling — groin strain, oblique strain, sports hernia, pubic ramus stress fracture, hip labral pathologies.

Lateral sling — Patella Femoral Pain Syndrome, Anterior Hip impingement, Low Back Pain

Posterior Oblique Sling — Hamstring strain, Low Back Pain, shoulder pain/impingement

Enhance performance of slings: exercises performed when vertical, increasing spinal compressive forces and decreasing shear and tensile forces. Spinal neutral. Avoid full flexion and full extension. Broomstick on shoulders — perform trunk rotations.

Higher National Unit Support Notes (cont)

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Programming of slings:

Add a Theraband to ends of broomstick to increase resistance through 10 degrees each side.

Add two Therabands to ends of broomstick to increase resistance through 20 degrees each side.

Continue to add Therabands (or add bands of greater resistance) and extend range to 45 degrees each side. Ten repetitions are completed and modify the exercise accordingly for different sports.

Guidance on approaches to delivery of this Unit

This Unit is designed to provide the learner with an understanding of the musculoskeletal system in terms of muscular and myofascial movement, performance, injury and injury prevention.

The Unit provides supporting knowledge for many other Units in the HNC Soft Tissue Therapy and HND Sports Therapy awards, as well as covering elements of National Occupation Standards for Sports Therapy (SFHD528 and cnh522).

It will provide underpinning knowledge for other Units and is anticipated that it would be delivered following *Sports Therapy: Anatomy and Physiology, Functional Anatomy 1, Basic Subjective and Objective Assessment, Sports Therapy: Exercise Principles and Testing, Prevention and Management of Sports Injury* and concurrently with *Clinical Assessment of Sports Injuries, Plan and Deliver Exercise Based Sports Rehabilitation and Sports Fitness and Return to Participation Criteria*.

It is suggested that delivery should include as many practical activities as possible.

The presentation of this Unit will allow the learner the opportunity to participate in both practical and theory sessions. The content will be delivered in a structured format leading to a number of assessments with provision for remediation and reassessment.

Practical procedures set within a clinical treatment room environment and using a live subject should provide the learner with the opportunity to demonstrate patient care and management skills. Recorded observations should be used to provide further written evidence of ranges. Oral questioning post physical examination will be undertaken for any range not covered by performance evidence. Where a live clinical environment is not feasible, case study scenarios can be interpreted which replicate the clinical environment.

Higher National Unit Support Notes (cont)

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Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Outcome 1

Bullet points 1, 2 and 3 should be assessed practically, at the same time, where learners demonstrate accurate testing of five length and five strength tests from the list below.

Bullet point 4 should be a reflective open-book written account based upon the above practical assessment.

Outcome 2

All Evidence Requirements for this Outcome should always be assessed through a closed-book supervised assessment.

Outcome 3

Bullet points 1 to 3 should be assessed practically where learners describe accurately the core stability concept, demonstrate how to initiate and progress core training, and assess the ASLR test.

Bullets 4 to 6 can be assessed through a closed-book supervised assessment.

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.

Higher National Unit Support Notes (cont)

Unit title: Functional Anatomy 2 (SCQF level 8)

Opportunities for developing Core and other essential skills

This Unit has the Problem Solving component Critical Thinking embedded in it. This means that when the candidates achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 5.

There is the opportunity for learners to develop skills in working together throughout this Unit.

Learners will gain valuable skills in verbal and non-verbal communication, through screening for dysfunction of the skeletal muscles in Outcome 1. The learner will use problem-solving skills throughout to analyse muscular imbalances and providing treatment solutions in Outcome 2. Some use of *Information and Communication Technology (ICT)* could be developed when providing rehabilitation programmes in Outcome 3.

The learners will gain confidence in working as individuals as they would in a clinical situation, albeit using group work and group discussions to develop the themes involved. The content is industry relevant and should aid learners in the clinical environment and in terms of employability. Learners will naturally use and develop aspects of the Core Skills as they work through the assessment requirements for the Unit.

History of changes to Unit

Version	Description of change	Date
02	Core Skills Components Critical Thinking at SCQF level 5 embedded.	03/06/14

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General information for learners

Unit title: Functional Anatomy 2 (SCQF level 8)

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 allows you to build on your knowledge of Anatomy with particular emphasis on assessing the musculoskeletal system in terms of muscular and myofascial movement, performance, injury and injury prevention.

You will be given opportunities to develop competencies in areas of muscle length and strength testing, muscular imbalance, core stability and myofascial slings. The content will support your clinical skills that you will have gained in previous Units and underpin knowledge leading into the *Clinical Assessment of Sports Injuries* (DP65 35) Unit.

On completion of the Unit, you should be able to screen/assess the strength and length of skeletal muscles and treat them accordingly. You will be able to recognise/treat muscular imbalance and understand the importance of core stability and myofascial slings with regards to movement and injury.

There are three Outcomes.

Outcome 1 will demonstrate how to assess the strength and length of skeletal muscles, screen for dysfunction and treat the muscles accordingly.

Most of the Unit will be assessed practically but there is also an open-book reflective assessment to produce.

Outcome 2 covers the concept of muscle imbalance, associated syndromes/related injuries, muscle firing sequencing and implement treatment solutions. All of these concepts will be invaluable for you in the clinic situation.

All Evidence Requirements for this Outcome should always be assessed through a closed-book supervised assessment.

Outcome 3 will explain the importance of core stability and myofascial slings in relation to injury and rehabilitation.

Some of the Unit will be assessed practically but there is also a closed-book assessment to produce.