Overview

This unit will provide all of the necessary underpinning knowledge for nail anatomy and physiology which will enable learners to understand the skin and nail structure.

Learning outcomes

On completion of this unit, learners will:

LO1 Know the structure and function of the skin and nail
LO2 Know the anatomy and physiology of the hand, arm, foot and leg
LO3 Understand common pathologies of the skin and nails
Assessment requirements

Learners must complete the assessment requirements related to this unit:

1. External examination
2. Graded synoptic assessment

1. External examination

The theory content of LO1, LO2 and LO3 will be tested by external examinations at the end of the period of learning.

External examinations will test knowledge and understanding from across the whole vocational area (mandatory units). Learners should use the unit content section of this unit to aid revision since exam questions will test the full breadth of this section.

External examinations will be set and marked by VTCT and will contribute to the overall qualification grade.

2. Graded synoptic assessment

In the last term or final third of their qualification learners will be required to undertake a graded synoptic assessment. This will require learners to carry out a range of treatment from across the whole vocational area (mandatory units). Assessment coverage will vary year on year, although all services will be covered over time.

VTCT will set a brief for centres which will detail the treatments to be covered in the graded synoptic assessment. Grading descriptors for the synoptic assessment will also be provided by VTCT.

The graded synoptic assessment will be marked and graded by centre staff and externally quality assured by VTCT.

The graded synoptic assessment will contribute to the overall qualification grade.
UNIT CONTENT

LO1 Know the structure and function of the skin and nail

Learners must know the structure and function of the skin and nail:

- **Epidermis**
  - Stratum corneum (horny layer), stratum lucidum (transparent layer), stratum granulosum (granular layer), stratum spinosum (prickle cell layer), stratum germinativum (basal layer), keratinisation, melanocytes, Malpighian layer, columnar cells, keratinocytes, desquamation, acid mantle

- **Dermis**
  - Papillary, reticular, Langers lines, sebaceous gland, arrector pili muscle, dermal papillae, hair shaft, hair follicle, hair follicle walls (outer root sheath), hair bulb, sweat gland – eccrine and apocrine, sweat pore, sweat duct, Langerhans cells, fibroblasts, mast cells, leucocytes, sensory nerves, motor nerves, Pacinian corpuscle, Ruffini corpuscle, Meissner corpuscle, arteriole, venule, lymphatic vessel, collagen, elastin

- **Subcutaneous (hypodermis)**, areolar, adipose, fat cells

- **Functions of the skin**
  - Secretion, heat regulation, absorption, protection, excretion, sensation, vitamin D formation (7-dehydrocholesterol), melanin formation

- **Growth and repair stages of the skin**
  - Keratinisation, desquamation, wound healing

- **Recognise different skin conditions**
  - Sensitive, dehydrated, mature

- **Structure of the nail**
  - Nail plate, nail bed, nail grooves, germinal matrix, eponychium, perionychium, hyponychium, nail mantle or proximal nail fold, lunula, nail wall, free edge, cuticle

- **The process by which the nail grows**
  - Formed in the matrix, three layers, keratin, rate of growth

- **The factors which affect nail growth**
  - Health, lifestyle, diet, age, climate, illness, medication, nail damage, skin texture, chemotherapy, radiotherapy, smoking, alcohol, stress, lack of sleep, current hand and nail care routine

**Different nail shapes:**
- Oval, pointed, square, wide, long square, round

**Factors that affect different nail shapes:**
- Nail condition, hand shape, damage to the germinal matrix

**Functions of the nail:**
- Dexterity – picking up of small objects, scratching, protection of the digits to the environment

**Effect of age on the nails:**
- Blood and lymph circulation less efficient, poor diet, e.g. lack of iron, hypertrophy or onychauxis of the nails, free edge splits causing longitudinal fissures, nails become opaque - yellow or grey, longitudinal ridges evident, nails do not have the capacity to hold moisture as well – fragilitas unguium
LO2 Know the anatomy and physiology of the hand, arm, foot and leg

Learners must know about bones:
- Structure and formation of a long bone
  - Compact, cancellous, ossification, osteoblasts, osteoclasts, osteocytes, lamellae, mineral calcium, epiphysis, diaphysis, medullary canal, periosteum, epiphyseal cartilage, chondrocytes
- Types of bones
  - Long, short, irregular, flat, sesamoid, with examples
- Types of joints
  - Fixed or fibrous/immoveable, slightly moveable or cartilaginous, freely moveable or synovial, with examples
- Types of synovial joints
  - Pivot, hinge, condyloid, ball and socket, saddle, gliding, with examples
- Functions of the skeletal system
  - Gives shape and support forming a framework for the body, protection, provides attachment for tendons and muscles, forms joints to give movement; red blood cells are made in the red bone marrow located in the cancellous bone
- The function of ligaments
- Position of bones:
  - Arm and hand
    - Humerus, radius, ulna, carpals, metacarpals, phalanges
  - Bones of the wrist – carpals
    - Scaphoid, lunate, triquetrum, pisiform, trapezium, trapezoid, capitate, hamate
  - Leg and foot
    - Femur, patella, tibia, fibula, tarsals, metatarsals, phalanges
    - Bones of the ankle – tarsals
      - Calcaneus, talus, navicular, cuboid, cuneiform x3

Learners must know about muscles:
- Type and structure of muscle tissue
  - Voluntary or skeletal or striated, involuntary or smooth or non-striated, cardiac, myofibril, sarcolemma, nuclei, endomysium, perimysium, epimysium, tendon, actin, myosin
- Characteristics of muscle tissue
  - Power of contraction, elasticity, fatigue, muscle tone
- Functions of muscle tissue
  - Heat production, maintaining posture, movement

Position, action, origin and insertion of muscles:
- Forearm, wrist and hand
  - Brachialis, brachioradialis, coracobrachialis, pronator teres, supinator radii brevis, flexor carpi radialis, flexor carpi ulnaris, flexor digitorum sublimis, palmaris longus, palmar aponeurosis, flexor digitorum profundus, flexor carpi digitorum, flexor digitorum superficialis, thenar, hypothenar, flexor pollicis brevis, abductor pollicis brevis, extensor carpi radialis, extensor carpi ulnaris, extensor pollicis longus, extensor carpi digitorum, tendons of extensor digitorum
Lower leg and foot
- Extensor digitorum longus, extensor hallucis longus, extensor digitorum brevis, peroneus longus, peroneus brevis, peroneus tertius, abductor hallucis, pronator teres, tibialis anterior, gastrocnemius, soleus, achilles tendon, tibialis posterior, flexor digitorum longus, flexor hallucis longus

Contraction of a muscle
- Myofibril, actin, myosin, glycogen, glucose, lactic acid, aerobic, anaerobic, oxygen debt, isotonic, isometric, motor nerve, factors affecting muscle tone, muscle tension, muscle fatigue

Movement of a muscle
- Tendon, joint, agonist, antagonist, cerebrum, motor nerves, contraction, fascia

Learners must know about blood:
- Erythrocytes, leucocytes – granulocytes, monocytes and ‘T’ and ‘B’ lymphocytes (effector and memory cells), thrombocytes (platelets), plasma, transportation, protection, immunity, regulation of temperature, homeostasis, clotting, blood groups

Structure and transportation of blood vessels
- Lumen, arteries, arterioles, capillaries, venules, veins, valves, tunica intima (endothelium), tunica media, tunica adventitia, cell nutrition - semi-permeable membrane, osmosis, diffusion and active transport

The process of blood clotting
- 12 clotting factors
- Understand only 5 clotting factors: thromboplastin, prothrombin, thrombin, fibrinogen, fibrin
- Essential mineral – calcium

Main arteries:
- Arm
  - Brachial, ulnar, radial, deep palmar arch, superficial palmar arch, digital
- Leg
  - Popliteal, peroneal, anterior tibial, posterior tibial, dorsalis pedis artery

Main veins:
- Arm
  - Basilic, cephalic, palmar digital, axillary, brachial
- Leg
  - Long saphenous, short saphenous, popliteal, anterior tibial, posterior tibial, dorsalis pedis vein

Learners must have an understanding of the composition of lymph:
- The lymphatic system
  - Lymphatic fluid (interstitial fluid), lymphatic capillary, lymphatic vessel, semi-lunar valves, lymphatic node, lymphocytes

Movement of lymph
- No central pump, skeletal/muscular contractions, pressure changes in the thorax

Functions of the lymphatic system
- Defence against harmful pathogens, immunity function, maintains correct balance of body fluids
- Position of lymph nodes:
  - Arm
    - Supra-trochlear, axillary
  - Leg
    - Popliteal, inguinal

Learners must understand the inter-relationship between the lymphatic and the venous system:
- Thoracic and right lymphatic duct, right and left subclavian veins
- Definition and understanding of the inter-relationship between blood and lymph

Learners must know about nerves:
- Structure and function of the nerve cell
  - Neurone, neuroglia, nerve cell body, axon, Schwann cells, dendrite, myelin sheath, nodes of Ranvier, axon terminals, synapse, ganglia, reflex arc, grey matter, white matter, sensory nerve (afferent), motor nerve (efferent), mixed nerve, neurilemma, neuro-transmitters – acetylcholine and noradrenaline, synaptic cleft, plexus
- Characteristics of nervous tissue
  - Irritability, conductivity
- Main nerves:
  - Arm and hand
    - Sensory, motor, ulnaris, radialis, median, digital
  - Leg and foot
    - Sensory, motor, tibial, peroneal
LO3 Understand common pathologies of the skin and nails

Learners must be able to recognise and have an understanding of the diseases and disorders of the nail:
- Onycholysis, onychophagy, hang nails, onychocryptosis, fragilitas unguium, pterygium unguium, leuconychia, onychorrhexis, onychoschizia, Beau’s lines, longitudinal ridges, eggshell nails, blue nails, black or brown patches, black streaks, paronychia, onychia, pitting of the nail, hypertrophy (onychauxis), atrophy (onychotrophia), tinea unguium (onychomycosis), koilonychia, onychogryphosis, onychoptosis

Learners must be able to recognise and have an understanding of the diseases and disorders of the skin:
- Allergic reaction, bruise, bulla, crust, erythema, excoriation, fissures, haemangioma, hyperaemia, inflammation, keloid, macule, malignant, papule, nodule or cyst, oedema, scales, scar, tumour, ulcer, vesicle, weal, weeping, chill blains, hyper-keratosis, urticaria, hyperpigmentation, hypopigmentation, atopic eczema, atopic dermatitis, psoriasis, herpes zoster, warts, verrucae, tinea corporis, tinea pedis, albinism, chloasma, dermatosis papulosa nigra, ephelides, lentigo, leucoderma, naeaeae, papilloma, port wine stain (capillary naevus), vitiligo, skin tags (fibroma, verrucae filiformis), hyperhidrosis (excessive sweating), prickly heat (miliaria rubra), tinea manum

Learners must have an understanding of the diseases and disorders of the skeletal system:
- Hammer toes, hallux valgus (bunions), corns, calluses, arthritis, bone cancer, carpal tunnel syndrome (CTS), cervical spondylitis, fractures, ganglion cyst, gout, osteoporosis, rheumatoid arthritis, synovitis, whiplash, psoriatic arthritis, Paget’s disease, spinal stenosis

Learners must have an understanding of the disorders of the muscular tissue:
- Atony, atrophy, Achilles tendonitis, rheumatism, bursitis, cramp, housemaid’s knee, lateral epicondylitis (tennis elbow), medial epicondylitis (golfer’s elbow), microtrauma, myositis, repetitive strain injury, rupture, shin splints, spasm, sprain, strain, stress, tendonitis, Achilles bursitis

Learners must have an understanding of the diseases and disorders of the circulatory system:
- Aneurism, arteriosclerosis, AIDS/HIV, coronary thrombosis, haemophilia, high and low blood pressure, hepatitis A, B and C, leukaemia, phlebitis, septicaemia, stress, thrombosis, varicose veins, cardiac arrhythmia, cardiac failure, gangrene, heart disease, intermittent claudication, myocardial infarction, palpitations, pulmonary embolism, Raynaud’s disease, sickle cell anaemia, thalassaemia, varicose ulcers

Learners must have an understanding of the diseases and disorders of the lymphatic system:
- Hodgkin’s disease, non-Hodgkin’s lymphoma, lymphoma

Learners must have an understanding of the diseases and disorders of the nervous system:
- Cerebral palsy, depression – clinical, bipolar, seasonal affective disorder (SAD), post-natal, epilepsy, motor neurone disease, multiple sclerosis, myalgic encephalomyelitis (ME), neuralgia, neuritis, Parkinson’s disease, sciatica, stress, stroke, transient ischaemic attack (TIA), Alzheimer’s disease, concussion, dementia, meningitis, myasthenia gravis, paralysis, peripheral neuropathy, poliomyelitis, spinal cord injury
Skin cancer awareness

Please note this information will not be assessed for the achievement of this unit.
Public awareness of skin cancer has never been higher, and yet skin cancer remains the fastest growing cancer in the UK, especially amongst young people. The chances of a positive outcome can be dramatically increased with early identification and diagnosis.

Professionals in hair, beauty, sports massage and health and wellbeing industries work closely with clients and in many cases have sight of areas of skin which may not be easily visible to the client. An informed awareness of the signs, symptoms and changes of appearance to be aware of when checking for early signs of cancer is a crucial tool for the conscientious practitioner in order to provide the most thorough service and in some cases, possibly lifesaving information signposting.

Signs to look for when checking moles include utilising the ABCDE guide:

A - Asymmetry – the two halves of the area/mole may differ in their shape and not match.

B - Border – the edges of the mole area may be irregular or blurred and sometimes show notches or look ‘ragged’.

C - Colour – this may be uneven and patchy. Different shades of black, brown and pink may be seen.

D - Diameter – most but not all melanomas are at least 6mm in diameter. If any mole gets bigger or changes see your doctor.

E - Elevation/evolving – elevation means the mole is raised above the surface and has an uneven surface. Looks different from the rest or changing in size, shape or colour. Anyone can get a suspicious mole or patch of skin checked out for free by the NHS by visiting their doctor, who may then refer to a dermatologist (an expert in diagnosing skin cancer).

If you require any additional NHS information please refer to https://www.nhs.uk/be-clear-on-cancer/symptoms/skin-cancer

If your learners are interested in learning more about skin cancer awareness alongside this qualification, VTCT runs the following qualification: VTCT Level 2 Award in Skin Cancer Awareness for Non-Healthcare Professionals.

This qualification has been specifically designed for those working in the sports massage, health and wellbeing, beauty, hairdressing and barbering sectors. It will enable learners to identify any changes to their client’s skin and to highlight those changes to the client using appropriate language and communication skills. It will enable the learner to raise awareness of skin cancer and signpost their clients to public information about skin cancer.

This qualification will enable hair, beauty and wellbeing professionals to gain the appropriate knowledge and communication skills required to provide non-diagnostic, professional advice and information to clients in a discrete, empathetic and confidential manner.

For more information please refer to the Record of Assessment book: https://qualifications.vtct.org.uk/finder/qualfinder/1Record%20of%20Assessment%20Book/AG20529.pdf
Resources

The special resources required for this unit are access to a real or realistic working environment which supports the provision of good quality anatomy and physiology books, DVDs or CD ROMs.

Delivery guidance

Teachers are encouraged to use innovative, practical and engaging delivery methods to enhance the learning experience. Learners may benefit from:

- Using interactive information and technology systems and hardware so they can learn about concepts and theories of anatomy and physiology, research disorders and diseases, use and produce visual aids

Links with other units

This unit is closely linked with the following units:

UBT107M/UBT107X Spa pedicure
This unit will provide all of the required knowledge for learners to be able to provide spa pedicure treatments.

UBT108M/UBT108X Spa manicure
This unit will provide all of the required knowledge for learners to be able to provide spa manicure treatments.

UBT109M Nail enhancements using light cured gel
This unit will provide all of the required knowledge for learners to be able to provide nail enhancements using UV gel services.

UBT110M Nail enhancements using liquid and powder
This unit will provide all of the required knowledge for learners to be able to provide nail enhancements using liquid and powder services.

UBT111M Electric filing for nails
This unit will provide all of the required knowledge for learners to be able to provide nail treatments with electric files systems.

UBT114M/UBT114X Design and apply nail art
This unit will provide all of the required knowledge for learners to be able to design and apply nail art.

UBT116M Airbrush nail art
This unit will provide all of the required knowledge for learners to be able to provide airbrushed nail art services.

UBT117M/UBT117X Gel polish for nails
This unit will provide all of the required knowledge for learners to be able to provide gel polish services for the nails.
Graded synoptic assessment

At the end of the qualification of which this unit forms part, there will be a graded synoptic assessment which will assess the learner’s ability to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from a number of units from within the qualification. It is therefore necessary and important that units are delivered and assessed together and synoptically to prepare learners suitably for their final graded assessment.
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<td>v7</td>
<td>Skin cancer awareness page added</td>
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