7

# Module 7:

## Cognitive and perceptual assessment

## Introduction

The cognitive and perceptual assessment covers three main areas:

1) General mental status and cognition
2) Sensation and perception
3) Motor function.

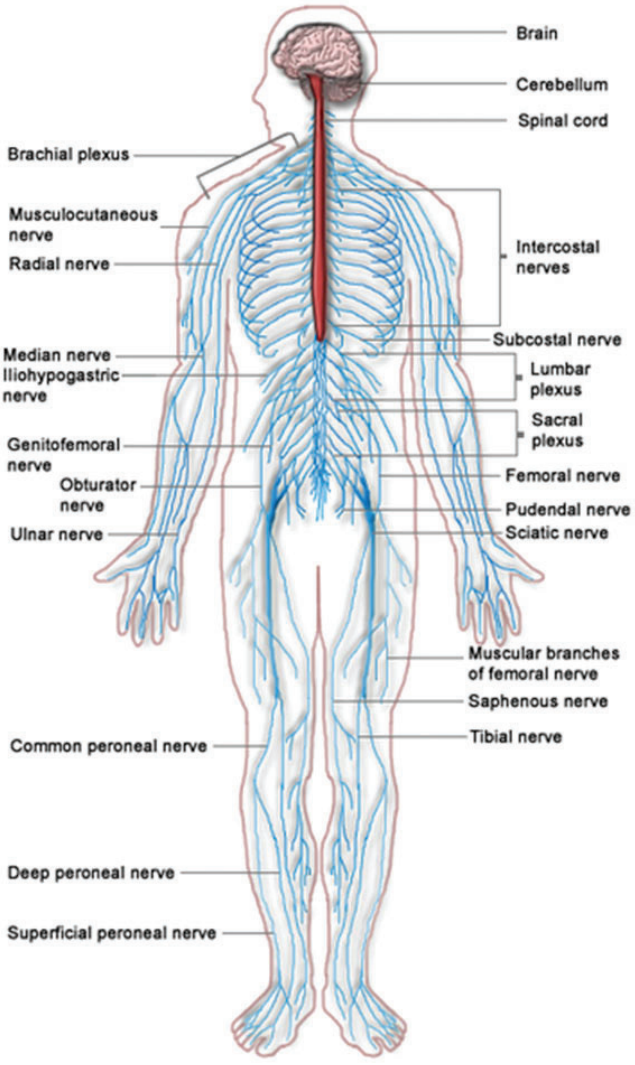
Specific assessments of the neurological system will be covered here, but you assess nerve, sensory and cognitive function in every body system.

In order to obtain an accurate cognitive perceptual assessment, an understanding of the underlying anatomy and physiology of the peripheral nervous system (PNS) and the central nervous system (CNS) is needed. The senses of vision, hearing, taste, smell and touch also need to be understood. In addition, pain perception and thought and language processes need to be recognised. It may be necessary for you to review certain areas of the related anatomy and physiology.

Some of the commonly used terms within the pattern will be identified. In addition, the impact of ageing on these things will be referred to, as an understanding of this plays a significant role in the accuracy of a cognitive perceptual assessment. Aspects which must be included in the interview will be addressed, as will the main areas for physical assessment, including mental status/cognitive functioning, and examining the eyes, ears, sensation and motor function.

Anatomy and physiology of the neurological system

**Diagram 1: The nervous system**



# Module 7:

## Cognitive and perceptual assessment

**Diagram 2: Structures of the brain**

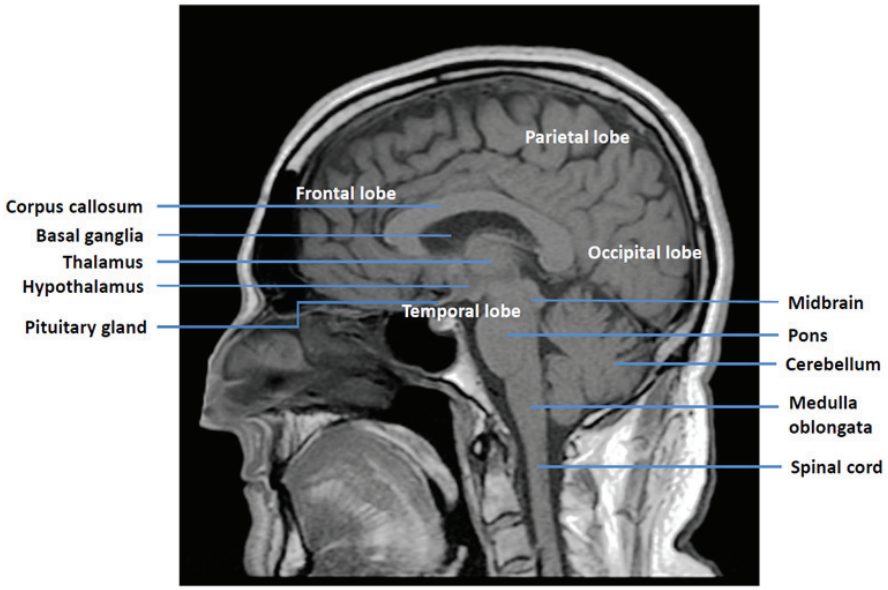
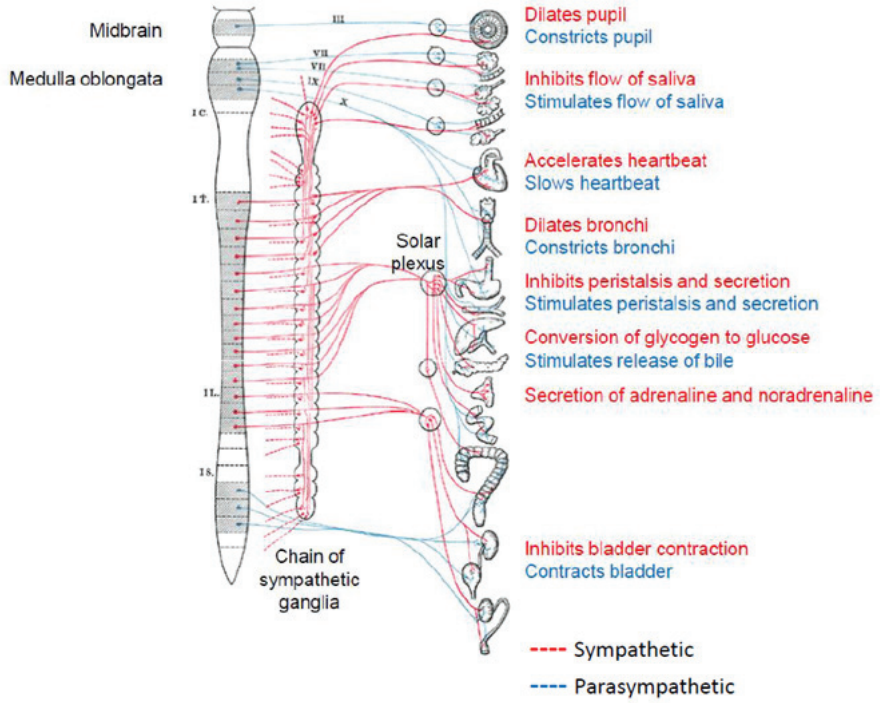



**Diagram 3: Main functions of the autonomic nervous system**




The nervous system is divided into two parts—the central and peripheral nervous system. The CNS is comprised of the brain and spinal cord. The CNS is protected by the skull and vertebra, the meninges and cerebrospinal fluid.

The meninges consist of:

- The ***dura mater*** is the tough, outermost meningeal membrane that covers and protects the surface of the brain and spinal cord
- The ***arachnoid mater*** is the middle meningeal membrane that contains web-like spaces for storing and circulating cerebrospinal fluid
- The ***pia mater*** is the innermost meningeal membrane that covers the surface of the brain and spinal cord in a very close, protective fashion.

The PNS has 12 pairs of cranial nerves and 31 pairs of spinal nerves and branches. Sensory (afferent) messages travel to the CNS from sensory receptors. Motor (efferent) messages travel from the CNS to the muscles and endocrine organs.

The autonomic (involuntary) aspect of the brain controls organ function. It is divided into sympathetic and parasympathetic control. Sympathetic stimulation prompts action when a rapid response is required, such as a stressful situation or a threat to safety. The parasympathetic counters this and maintains day-to-day functioning and the maintenance of body resources, such as metabolism.

# Module 7:

## Cognitive and perceptual assessment

Central nervous system (the following content identifies key areas only)

- ***Cerebral cortex*** is the outer layer of the cerebrum that consists of grey matter and is the centre for higher order cognition and function, voluntary movement, sensation, memory, communication, reasoning, emotions and intelligence.
- ***Grey matter*** is dark cerebral tissue made up of cell bodies and nuclei.
- ***White matter*** is light cerebral tissue made up of myelinated nerve cell processes (dendrites and axons).

The cerebrum is divided into two hemispheres with the left (controlling the right hand side of the body) being dominant in most people. Each hemisphere has four (4) lobes:

- The ***frontal lobe*** controls conscious muscle action, planning for movements, motor memory and voluntary eye movements. Broca's area in the frontal lobe controls a person's ability to speak; when this is damaged the person is unable to speak or say what they want (expressive aphasia)
- The ***parietal lobe*** controls the conscious interpretation of sensation from muscles, tongue and cutaneous areas
- The ***occipital lobe*** is the most posterior lobe of the cerebrum and is involved with conscious seeing, eye focus and integrating visual memory with other sensations
- The ***temporal lobe*** (behind the ear) is involved with conscious interpretation and memory of auditory and olfactory sensations. In the temporal lobe Wernicke's area is involved with understanding language. When this is damaged in the dominant hemisphere, such as with a cerebrovascular accident (CVA), the person has problems interpreting what is said to them (receptive aphasia).

The ***central sulcus*** is a deep groove that serves as a dividing line between the frontal and parietal lobe.

***Sensory areas of the cerebral cortex*** are located posteriorly to the central sulcus. These areas receive and interpret conscious sensory impulses. The post-central gyrus of the parietal lobe is a key ridge of grey matter that allows a person to judge the source of sensory stimuli.

***Motor areas of the cerebral cortex*** are located anteriorly to the central sulcus and give rise to planning and the initiation of impulses for conscious motor movements.

The pre-central gyrus of the frontal lobe is another key ridge of grey matter that allows a person to operate specific areas of the body.

- ***Basal ganglia*** are masses of grey matter located in the cerebral white matter which monitor, start and stop motor output from the cerebral cortex. For example, they help to regulate walking, arm movement, talking and skills memory.
- The ***thalamus*** is where sensory information is sorted and relayed to the cerebral cortex from other brain areas.
- The ***hypothalamus*** is the main visceral control centre and contributes to homeostasis of blood pressure, heart action, respiration, body temperature, digestion and hydration, pupil size, emotions, sex drive, sleep–wake cycles and the endocrine system.
- The ***cerebellum*** interconnects with the medulla oblongata, pons, midbrain and motor areas of the cerebrum in order to provide instructions that result in proper balance, posture and smooth, coordinated muscle movements. It controls involuntary movement by fine-tuning voluntary movements so that posture, balance and muscle tone support the initiated movement.
- The brain stem is comprised of:
  - The ***midbrain*** is a central section in the brain interiorly that is located between the pons and thalamus. This brain region is the most superior part of the brain stem and contains visual reflex centres, auditory reflex centres and motor control centres (e.g. substantia nigra and the red nucleus) related to basal ganglia
  - The ***pons*** is a part of the brain stem that serves as a relay between the medulla oblongata, cerebellum and the midbrain. The pons also contains the pneumotaxic (depth of respiration) and apneustic (respiratory rate) centres for secondary control of breathing
  - ***Medulla oblongata*** is the most inferior part of the brain stem which relays information between the spinal cord, the pons and cerebellum. The medulla also contains control centres for regulating vital signs such heart rate, blood pressure and primary respiration rate.

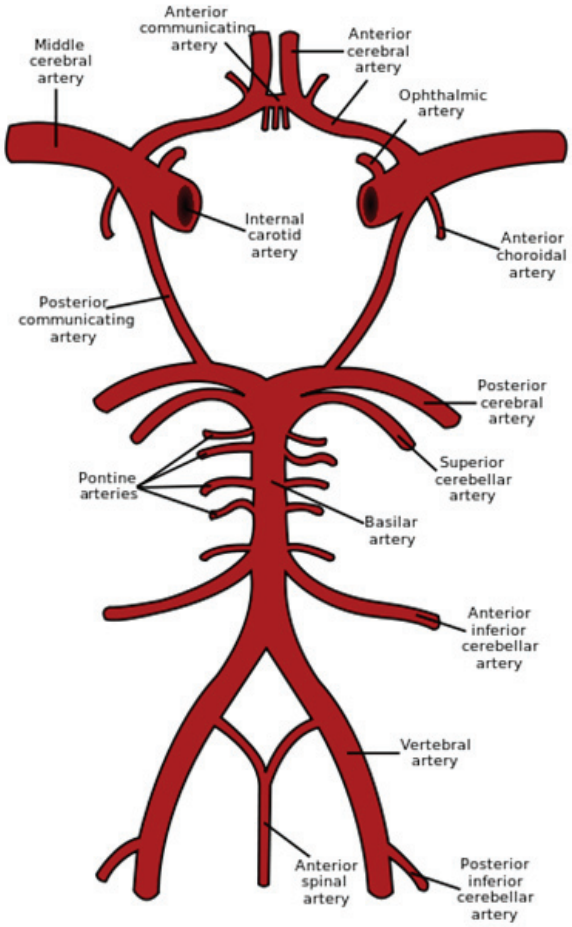
# Module 7:

Cognitive and perceptual assessment

## Major blood vessels that supply blood to the brain

- The ***vertebral arteries*** transfer oxygenated blood from the subclavian arteries, up through the transverse foramina of the cervical vertebrae and to the basilar artery of the brain
- The ***internal carotid arteries*** transfer oxygenated blood from the common carotid arteries of the neck to the Circle of Willis. Approximately 15–20% of cardiac output travels to the brain via these arteries. These arteries supply 80% of the blood to the brain
- The ***basilar artery*** is the union of the two verterbral arteries and transfers oxygenated blood to the Circle of Willis of the brain. This artery supplies 20% of blood the brain
- The ***Circle of Willis*** is a ring of arteries, made up of the internal carotid arteries and the basilar artery, at the base of the brain. It transfers oxygenated blood from incoming arteries to deep internal arteries of the brain
- The ***internal jugular veins*** are the major vessels that take blood away from the brain.

**Diagram 4: Circle of Willis**




## The blood brain barrier

- A special arrangement of capillaries surrounded by connective tissue and processes of special brain glial cells called astrocytes. This type of structural organisation selectively determines which substances can move from the blood plasma to the extracellular fluid of the brain.

## Oxygen and glucose requirements of the brain

- The brain is very active and uses about 20% of the total oxygen supply in the body. The primary nutrient of the brain is glucose. The brain gets all of its functional energy from glucose, but has no capacity to store glucose, so is reliant on blood supply to provide glucose. Glucose is broken down aerobically; that is in the presence of oxygen, in order to yield large quantities of adenosinetriphosphate (ATP). ATP moves substances across cell membranes and provides energy for body function and metabolism.

Peripheral nervous system (in this discussion the focus will be on the cranial nerves)

- Cranial Nerve I – ***Olfactory nerve*** (a sensory nerve). This nerve conducts olfactory impulses from the nose to the olfactory bulb and assists the sense of smell.
- Cranial nerve II – ***Optic nerve*** (a sensory nerve). This nerve conducts nerve impulses from the retina to the thalamus and assists development of the sense of sight.
- Cranial nerve III – ***Oculomotor nerve*** (a mixed [motor and parasympathetic] nerve). This nerve conducts nerve impulses from the midbrain to four of the six eye muscles, the eyelids and the iris. Movement of the eye, eyelids, lens shape and change in pupil size are part of the actions of this nerve.
- Cranial nerve IV – ***Trochlear nerve*** (a motor nerve.) This nerve conducts nerve impulses from the midbrain to the superior oblique eye muscle and assists in downward and inward movement of the eye.
- Cranial nerve V– ***Trigeminal nerve*** (a mixed [sensory and motor] nerve). This nerve conducts motor impulses from the pons to muscles for chewing (mastication) and sensory impulses from the cornea, scalp, face, lips, tongue and teeth.
- Cranial nerve VI – ***Abducens nerve*** (a

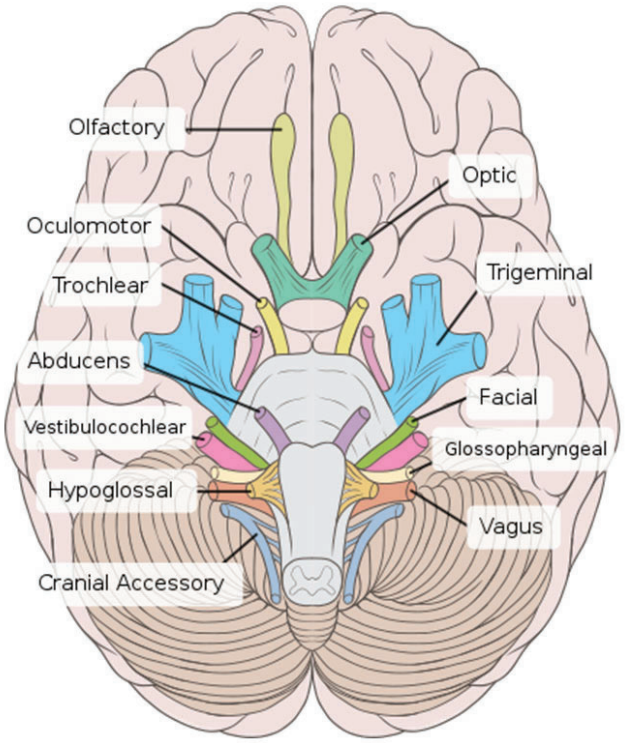
# Module 7:
Cognitive and perceptual assessment

motor nerve). This nerve conducts impulses from the pons to the lateral rectus muscle of the eye and assists lateral movement of the eye.

- Cranial nerve VII – ***Facial nerve*** (a mixed [motor, sensory and parasympathetic] nerve). This nerve conducts sensory impulses from the facial muscles and anterior taste buds to the pons and conducts motor impulses from the pons to the facial muscles. Functions include facial expression, taste in the front of the tongue, and saliva and tear secretion.
- Cranial nerve VIII –***Vestibulocochlear*** (Acoustic) ***nerve*** (a sensory nerve). This nerve conducts impulses from organs of hearing and balance in the inner ear to the temporal lobe and assists the senses of hearing and balance.
- Cranial nerve IX – ***Glossopharyngeal nerve*** (a mixed [motor, sensory and parasympathetic] nerve). This nerve conducts sensory impulses from the pharynx, posterior taste buds and carotid receptors to the medulla and motor impulses from the medulla to pharyngeal muscles. Functions include swallowing, taste in the rear of the tongue, blood pressure control and gag reflex.
- Cranial nerve X – ***Vagus nerve*** (a mixed [motor, sensory and parasympathetic] nerve). This nerve conducts sensory impulses from the major organs to the medulla and motor impulses from the medulla to visceral glands and muscles. Functions include visceral muscle movement in the gut, gut secretions, visceral sensation, and motor and muscle sense to muscles of the pharynx (swallowing) and larynx (talking).
- Cranial nerve XI – ***Accessory nerve*** (a motor nerve). This nerve conducts motor impulses from the medulla to throat and neck muscles. Functions include swallowing and head movements.
- Cranial nerve XII – ***Hypoglossal nerve*** (a motor nerve). This nerve conducts motor impulses from the medulla to the tongue muscles. Functions include swallowing and speech movements.

## Normal age-related changes

**Diagram 5: Cranial nerves**




The perception of most people is that the deterioration of the brain as we age is significant, irreversible and inevitable. While this may be true for some people, it is not so for all. The brain has the ability to adapt and compensate for deterioration (termed neuroplasticity).

### Changes to the brain

The size of the brain gets smaller at a rate of about 5% per decade after the age of 40, with that decline increasing in certain areas after the age of 70 years of age. The frontal and parietal lobes are affected more than the occipital and temporal lobes. The incidence of cognitive impairment increases significantly from 65 years of age with a third of people aged 85 years of age showing signs of cognitive impairment. As with most issues related to ageing you can only talk across populations, as individual ageing is dependent on many factors and a person's chronological age may not reflect their biological age.

Blood vessels age, as do most circulatory vessels, with narrowing of the lumen and less ability to supply blood to areas.

The vessel walls thicken and fibrose and become mis-shapen. Microcirculation of the

# Module 7:
## Cognitive and perceptual assessment

brain also changes and may play a role in dementia associated with vascular disease and Alzheimer's disease.

### Cognitive changes

Most cognitive changes in the absence of neurological disease don't have significant effect until after the age of 70. Some of these changes have implications for how clinicians carry out assessments. E.g. time should be allowed for people to come up with a response to questions.

**General intelligence and language**

General knowledge of words and vocabulary does not change. The ability to retrieve words for use does slow down. The ability to abstract, conceptualise and problem-solve deteriorates with age, but comprehension and mathematic ability remains the same and new learning is possible.

**Memory**

Memory loss is a widely reported problem in the older person. Short-term memory decreases while long-term memory remains relatively intact. Information processing slows, especially in relation to how a person makes sense of a piece of information (encoding) so that it stays, preferably, in a person's long-term memory. This may occur partially because of other sensory deficits, such as poor vision, that make it more difficult for our brains to make connections between pieces of information that assists us to retrieve (recall) that information as needed. The time needed to process information increases with ageing and the complexity of the information adds to the time.

**Visual-spatial ability**

The ability to recognise patterns or incomplete patterns deteriorates, as does the ability to perceive three-dimensional objects.

### Sensory Changes

**Vision**

The major change to eyesight with ageing is the progressive weakening of accommodation or the ability to focus (presbyopia). From about the age of 45, the lens becomes more rigid and the ciliary muscles become weaker. Presbyopia occurs as the lens becomes rigid and loses its glass-like quality, meaning the lens loses the ability to change shape to accommodate for near vision. Fibres continue to form in the lens and as this occurs, the old fibres condense together in the centre leading to blurring of vision, which can be a cause of cataracts. These changes also affect the perception of some colours, such as blue or shades of blue (it looks green).

Other changes occur as a result of tissue and muscle atrophy; the eyes are drier, which leads to irritation and a burning feeling which compounds a general decrease in the production of tears by the eye. The pupil decreases in size and is slower to react to changes in light. Retinal function changes as a result of decreased blood supply and sensitivity to glare and bright light becomes more marked. The ability to discriminate between black and white decreases.

**Hearing**

Hearing loss occurs with age for a variety of reasons. Loss of hair cells in the cochlea and over-growth of bone stops vibration of the stapes. Fewer sebaceous cells means that ear wax is dry and sticky and more likely to cause obstruction of the ear canal. Hearing loss first occurs with high frequency sounds (presbycusis) and then progresses to include low frequency sounds. With the hearing loss, there is a decreased ability in speech discrimination. Hearing loss can occur for a number of reasons including medications such as ototoxic gentamycin, and chronic conditions such as diabetes.

The person's length of exposure to environmental noise may contribute to the development of tinnitus, which is more common in older people.

Balance can be affected as the vestibular apparatus in the ear degenerates.

**Smell** is diminished with age with the result that by the age of 80, smell is reduced by 50%. Smell is necessary for taste and appetite stimulation and the loss of this sense can contribute to poor nutrition.

**Taste** diminishes with age probably due to a decrease in olfactory nerve fibres, with the result that the sense of smell decreases from about the age of 60 and continues to decline

# Module 7:
## Cognitive and perceptual assessment

with age; the tongue atrophies and up to 80% of taste buds are lost. This, combined with decreased saliva production, means that the sense of taste is significantly diminished in the older person. These two factors, even though they are part of normal ageing, can be significant contributors to poor nutrition in older people.

**Touch**

Heat and cold touch discrimination and response to painful stimuli decreases with age and can pose a risk to safety for the older person.

**Examples of neurological conditions common in older people.**

Cerebrovascular accident (Stroke)

- Destruction of brain cells due to haemorrhage, thrombosis, embolism or narrowed hardened arteries
  - Symptoms and prognosis include severe headache, vomiting, convulsions, coma, loss of motor functions, muscle weakness, loss of balance, loss of sensation and loss of speech.

Parkinson's disease

- Degeneration and loss of cells in the substantia nigra of the midbrain due to age or physical damage
  - Symptoms and prognosis include decreased dopamine production and changes in muscle use and coordination (slow, shuffling steps, stiff arm movements, stooped posture, slurred speech, tremors and limb jerking).

Alzheimer's disease

- Degeneration and atrophy of the cerebral cortex and hippocampus due to neurofibrillary tangles and plaques of beta amyloid protein (See TIME for dementia Module 1: Overview of Dementia at www.dtsc.com.au for more information about Alzheimer's disease)
  - Symptoms and disease prognosis include memory loss, confusion, mood change, paranoia, hallucinations, aggression, loss of reading, writing, talking, walking ability.

## Preparation

Equipment

- Ophthalmoscope
- Pen torch
- Auroscope
- Tongue depressor
- Cotton wool
- Familiar objects
- Tendon hammer
- Tuning fork
- If testing taste and smell – samples of different substances.

Environment

- Quiet surroundings
- Good lighting
- Bed at appropriate height – eye to eye
- Remove clutter.

Older person

- Privacy and comfort
- Sitting upright if that is comfortable
- Information and consent.

Clinician

- Anatomy and physiology, anatomical landmarks
- Normal ranges for findings
- Sequencing of assessment, head to toe
- Documentation
- Wash your hands.

## Subjective data

Subjective interview assessment for cognitive perceptual assessment.

7

# Module 7:

## Cognitive and perceptual assessment

The history will be obtained by interviewing the older person, or, when this is not possible, family members or significant others. In assessing the older person's cognition and perception your interview will be focused on eliciting information relating to sensory function, general neurological status and cognitive processes. Remember, it is important to obtain data concerning the older person's past history and any medications they may be taking. While you are interviewing the older person you will also be able to ascertain information about their cerebral functions; e.g. level of consciousness, orientation to time, place and person and pattern of communication.

**Table 1: Commonly used terms relevant to the cognitive-perceptual assessment**

| Term | Definition |
|---|---|
| **Consciousness** | Being aware of one's own existence, feelings, and thoughts and aware of the physical environment. This is the most elementary of mental status functions. |
| **Language** | Using the voice to communicate one's thoughts and feelings. This is a basic tool of humans and its loss has a heavy social impact on the individual. |
| **Mood and affect** | Both these elements deal with prevailing feelings: affect is a temporary expression of feelings or state of mind; mood is more durable, a prolonged display of feelings that colour the whole emotional life. |
| **Orientation** | The awareness of the objective world in relation to the self. |
| **Attention** | The power of concentration, the ability to focus on one specific thing without being distracted by many environmental stimuli. |
| **Memory** | The ability to lay down and store experiences and perceptions for later recall. Recent memory evokes day-to-day events; remote memory brings up years' worth of experiences. |
| **Abstract reasoning** | Pondering a deeper meaning beyond the concrete and literal. |
| **Thought process** | The way a person thinks; the logical train of thought. |
| **Thought content** | What the person thinks; specific ideas, beliefs, the use of words. |
| **Perceptions** | An awareness of objects through any of the five senses. |
| **Cognition** | Mental activities associated with thinking, learning and memory and the acquisition of knowledge. |
| **Delirium** | An altered state of consciousness, consisting of confusion, disorientations, distraction, disordered thinking, memory and perception, hyperactivity and agitation. A reversible acute condition occurring as a result of medications, systemic and metabolic disorders. |
| **Depression** | An acute or chronic mental disorder associated with feelings of sadness, loneliness despair, low self-esteem and self-reproach. May be accompanied with withdrawal from social contact, loss of affect, psychomotor dysfunction, loss of appetite and insomnia. |
| **Dementia** | The progressive loss of cognitive and intellectual functions, without impairment of perception or consciousness. Presents as disorientation, impaired memory, judgement and intellect and a shallow labile affect. Commonly caused by structural brain disease. Not reversible. |



Chapter 21: Mental status assessment (2012). In Forbes, H., & Watt, E. (Eds.), *Jarvis's physical examination & health assessment [Australian & New Zealand edition (pp. 555-574)]*. New South Wales: Elsevier Australia.

# Module 7:

## Cognitive and perceptual assessment

**Ask the person about:**

- Their level of education; that is, what age they left school or highest qualification gained
- Their perception of their memory, ability to read, write and learn
- Their emotional status, such as any history of depression or anxiety:
  - Troubling thoughts or feelings? Feelings of hopelessness or helplessness? Inability to control feelings? Repeated thoughts about dying?
  - Have they experienced or continue to experience sudden feelings of panic or anxiety for no reason?
  - Do they avoid interacting with people?
  - Do they find themselves acting compulsively or obsessing about things?
  - How long have they felt like this?
  - What are their energy levels like? Do they feel better in the morning or at night?
  - Any recent events that might have triggered these feelings, like the death of someone close; significant change in health or living circumstances?
  - Have or are these feelings getting worse or becoming stronger?
  - What do they do or have they done about these feelings?
  - Have they sought or received professional help with these feelings and behaviours?
  - Are they taking any medications for these feelings?
- Whether they have experienced any changes in mental functioning, such as disorientation or confusion:
  - When does it occur? Is it associated with a physical condition?
  - How long does it last for; e.g. hours, days?
  - Are the changes associated with any other symptoms or signs, such as loss of vision, existing neurological or metabolic disease?

There are tools that can be used to assess cognitive impairment and decline, such as the Psychogeriatric Assessment Scale (PAS). The PAS is a tool that assists in the diagnosis of dementia and depression, but it has been designed for use by any clinician and not just psychiatric specialists. This tool views dementia and depression as part of a continuum of altered thought and behavioural disorders and is designed so that disorders are ranked along a scale rather than identified as distinct diagnostic categories. The PAS provides a way to gather data about dementia and depression in a systematic way and view it all together. While it provides a way to interpret the findings, it doesn't tell clinicians how to respond to the findings. Information about this tool and others that serve a similar function can be found at the following website http://www.dementia-assessment.com.au/cognitive/.

### History – current or past

*With all these questions, you are interested in the effect any problems uncovered have upon the older person's ability to be self-caring.*

### Headache

- Frequency – how often do they get headaches?
- Severity – can they rate the degree of discomfort with 0 no pain and 10 worst pain imaginable?
- Duration – how long do they last for?
- Precipitating factors – can they identify any factors that bring on the headache, such as foods, stress, eye strain?
- Has the presentation of the headache changed over time?
- Associated signs or symptoms – do they experience any other physical responses to the headache, such as nausea or vomiting, sensitivity to light, sleepiness?
- What do they do when they have a headache; e.g. medications prescribed and over the counter, rest, heat or cold therapy?

### Head/spinal/nerve injury

- Have they ever had a head/spinal/nerve injury?
  - If so, ask them to describe the injury?
  - Where did the injury occur?
  - How was the injury treated?
  - Do they still experience effects from the injury?
  - Can they describe their residual signs and symptoms?

### Dizziness/vertigo

- Do they ever experience a feeling of light-headedness or dizziness, a swimming or spinning sensation, or feeling like they're going to faint?
  - When does it occur; e.g. if they stand up suddenly or stand close to a steep edge or height?
  - Have they ever blacked out?

# Module 7:
## Cognitive and perceptual assessment

  - Can they describe the sensation they experience; e.g. if they experience vertigo do they feel like they're spinning or the room is spinning?
  - Are they receiving treatment for anything related to these symptoms?

### Seizures

- Have they ever experienced seizures? If so, collect the following information:
  - Sequence of events – describes anything involved in the seizure. Eye witness reports may also be used. The clinician wants to collect information about precipitating factors, signal of impending seizure, such as an aura, actual seizure activity and associated noises, change in colour and consciousness and what happens after the seizure; e.g. consciousness level, sleep, or incontinence, and any injuries sustained such as tongue biting
  - Duration – length of seizure activity
  - Character of symptoms
  - Description of the aura; e.g. smell, auditory, blurred vision, irritability, confusion
  - Precipitating factors
  - Can they identify any thing/s that make it more likely that they'll have a seizure; e.g. going off their medications, tiredness or illness, stress, audiovisual stimuli?
- Motor activity:
  - Where do the seizures begin in the body?
  - Are they uni- or bi-lateral?
  - Are their muscles stiff or relaxed?
  - Did the activity move through their body?
  - Did the activity change during the seizure?
- Associated actions: e.g. chewing, lip smacking, eyelid fluttering
- Level of consciousness:
  - Loss of consciousness and when did this occur?
  - Duration of loss of consciousness.
- Postictal (after seizure):
  - What do they do after the seizure; e.g. fall into a deep sleep, experience decreased consciousness, confusion, muscle aches or weakness, headache?
- Current medication:
  - Are they currently taking any drugs for their seizures? If yes, what are they? Have they been prescribed medications for epilepsy?
  - Any other treatment current or past for seizures; e.g. surgery?

### Tremors

- Have they/do they experience any shaking or trembling?
- When does it occur; e.g. with rest or intentional movement?
- Where does it occur; e.g. the hands or head?
- How long have they experienced it for?
- Has it changed over time?
- Was it a sudden onset or gradual?
- How does it interfere with their daily activities?
- Is it associated with anything else, such as a medical diagnosis, Parkinson's or hyperthyroidism?
- How do they manage it?
  - What do they do to relieve it; e.g. rest?
  - What medications do they take?

### Weakness/paraesthesia

- Have they experienced any weakness or difficulty moving a particular body part or carrying out activities, such as opening a jar or writing (small distal muscles) or walking or standing up from a chair (large proximal muscles)?
- Can they describe the experience of weakness?
  - When does it occur?
  - Is it generalised or localised to a particular area of the body?
  - Does it occur suddenly, or when they initiate something, or after they have been doing an activity for a while?
  - Is it in both limbs or sides of the body, or just on one side?
  - How long does it last for?
  - What, if anything, relieves it?
- Is it associated with other symptoms, such as numbness or tingling (pins and needles), loss of balance, changes to speech or vision, pain, confusion, muscle or joint spasms, or urinary or faecal incontinence?
- Has a medical cause been diagnosed; e.g. multiple sclerosis or neuromuscular disease or peripheral neuropathy?

# Module 7:
Cognitive and perceptual assessment

### Gait and motor coordination

- Ask the person to describe their perception of how good their balance is.
- Do they have a history of falls?
  - Frequency
  - Are the falls associated with any particular activity/ies; e.g. when standing up from a chair.
- Do they have any problems with their legs?
  - Altered sensation, such as numbness?
  - Any weakness?
  - Any difficulty walking or coordinating walking?
- Associated conditions, such as syncope or diabetic neuropathy.
- Alcohol intake; e.g. hepatic encephalopathy is associated with an altered gait (an exaggerated base of support).
- Medications.

### Difficulty swallowing (dysphagia)

- Do they have any difficulty swallowing?
- When does it occur, with what types of food; that is, liquid or solids?
- How long has the difficulty existed?
- Has it got worse?
- What do they do about it?
- Have they received any treatment for it?
- Do they have associated symptoms, such as excessive drooling or neck musculoskeletal problems?

### Difficulty speaking

- Do they have any difficulty speaking?
- When does it occur; e.g. when they try to form words (dysarthria) or say something and it comes out the wrong way (dysphasia)?
- How long has the difficulty existed?
- Has it got worse?
- What do they do about it?
- Have they received any treatment for it?
- Do they have associated symptoms, such as excessive drooling or neck musculoskeletal problems?

### History

- Medical history:
  - Trauma, such as head or spinal injury, stroke, birth trauma
  - Cerebral or systemic infections, such as meningitis, encephalitis, poliomyelitis
  - Congenital deformities
  - Cardiovascular disease – hypertension, aneurysm, transient ischaemic attacks (TIAs)
  - Brain surgery
  - Neurological conditions; e.g. multiple sclerosis, Parkinson's
  - Medical conditions, such as diabetes.
- Family history:
  - Hereditary disorders, such as muscular dystrophy or Huntington's Chorea
  - Epilepsy
  - Alcoholism
  - Learning disorders
  - Alzheimer's disease
  - Medical or metabolic disorders, such as hypertension or diabetes.

## Subjective data: Sensation and perception

### Vision and hearing

- Personal history; e.g. vision or hearing problems, surgery, trauma, infections, exposure to loud noise, earaches, use of cotton tipped applicators:
  - What is the problem?
  - Was it a sudden or gradual onset? If the onset is sudden and particularly associated with pain, it is a medical emergency and should be addressed immediately. Cataracts may be a gradual loss or blurring of vision
  - Are both eyes or ears affected?
- Frequency of eye and ear examinations, and testing of vision and hearing
- Medications for problems, are they systemic or topical?
- If they have a sight or hearing problem, what do they do to compensate; e.g. talking books or Braille; turn the volume up on the television?

# Module 7:

## Cognitive and perceptual assessment

- Family history relating to vision, eye problems, hearing loss, or hearing problems; e.g. a history of cataracts or glaucoma?
- What resources or aids do they have; e.g. hearing aid, glasses, contact lenses?
- How does the impairment impact upon their ability to be self-caring?
- How does the disability make them feel?
- *Common eye symptoms*

  Ask the person if they experience any of the following:
  - Blurring, halos, 'floaters' or blind spots; e.g. halos and blind spots occur with glaucoma
  - Night blindness; with ageing a degree of ocular atrophy occurs and vision at night deteriorates. It can also occur as part of disease such as with glaucoma
  - Loss of central vision occurs with macular degeneration as the cells in the macula of the retina break down. Women are affected more than men. Peripheral vision is not affected, so often the older person can be self-caring, but they may have decreased quality of life as they are unable to participate in activities like reading, things that require fine work or detail; faces are also harder to recognise
  - Pain: pain assessment should include assessment of:
    - Onset – sudden or gradual?
    - Location
    - Quality – what does it feel like, e.g. burning or itching?
    - Duration
    - What causes it and what relieves it?
  - Redness, swelling, dryness, tearing and/or discharge. The tear ducts may be involved. Tear ducts can be blocked and increased tearing is the body's attempt to flush out the blockage. Increased tears can also result from a foreign body or infection in the eye, such as conjunctivitis. Redness, crusting in the morning, tearing and swelling would indicate infection. Decreased tearing occurs as part of ageing and leads to dryness of the eyes
- Allergies that may cause swelling and tearing
- Diplopia (seeing double) or strabismus (crossed eyes)
- Photophobia (intolerance to light) can occur when meninges are involved; e.g. meningitis.
- *Common ear symptoms*

  Ask the person if they experience any of the following:
  - Hearing loss:
    - Has their hearing deteriorated?
    - Did it happen suddenly or gradually? Is it associated with anything; e.g. plane travel?
    - What can they hear?
    - When do they most notice difficulty hearing; e.g. with background noise, listening to the television or on the phone?
    - What is the quality of the sound; e.g. does it sound hollow or muffled?
    - Do they find themselves trying to read people's lips?
    - Do people "shout" at them or repeat things?
    - Have family members or health professionals ever commented on their hearing?
    - Have they received or would they like treatment?
    - How does the hearing loss affect their daily life?
    - How do they feel about it?
  - For earache you would assess for type and degree of discomfort noting what makes the pain worse, such as movement of the head and any accompanying symptoms such as evidence of a cold or poor dental hygiene as ear pain can be referred from the teeth
  - History of chronic infections
  - Do they experience a ringing or buzzing in the ears (tinnitus)?
    - How long have they experienced it for?
    - Do they know what caused it? Often, if a cause for tinnitus is known it can be treated
  - Drainage from the ear can be due to infection or build up of cerumen (wax). If it is accompanied with pain that gets worse over a period of time and then goes away prior to the appearance of discharge it is likely to be infection. The pain disappears because the tympanic membrane has perforated and the fluid that was building up and causing pain through pressure is now released.

# Module 7:

## Cognitive and perceptual assessment

**Taste and smell** (subjective assessment of the mouth can be found under respiratory and gastrointestinal focused assessment)

- The older person's perception of their ability to taste and smell.
- Any recent changes?

### Touch

- Their perception of ability to discriminate temperatures.
- Any abnormal skin sensations; e.g. burning, tingling, paraesthesia?

### Pain perception

Pain is what the person says it is. It is also described as a noxious stimuli and an unpleasant sensation. Pain in the older person is commonly ignored by clinicians and sometimes by the older person themselves, because it is perceived to be an expected part of ageing and that not much can be done about it. When pain in the older person is recognised it is often under-treated. In acute care, older adults receive less opioids than younger patients. Drug metabolism is affected by age and while it is appropriate that older adults have lower doses of opioids, this should be accompanied by ongoing pain assessment to monitor effectiveness of treatment. If pain continues, more analgesia should be given.

Chronic pain is prevalent in Australia with 1 in 20 people experiencing it. Chronic pain of non-malignant origin is common among older people living in the community or in aged care facilities. A prevalence study of pain among older people living in rural NSW nursing homes found that 27.8% were in pain at the time of the study interview (McLean & Higginbotham, 2002). Unrelieved pain can progress to persistent pain. More than 20% of adults over the age of 65 live with persistent pain, with this number rising to 80% in the residential aged care sector (Helme & Gibson 2001).

Consequences of untreated pain include unnecessary suffering, physical and psychosocial dysfunction, impaired recovery from acute illness and surgery, immuno-suppression, and sleep disturbances. The reasons for under-treatment of pain are varied. Among health care providers, these include (1) inadequate knowledge and skills to assess and treat pain; (2) unwillingness to believe report of pain; (3) lack of time, expertise, and perceived unimportance of making regular pain assessments; and (4) inaccurate and inadequate information about addiction, tolerance, respiratory depression, and other side effects of opioids. In addition, some health care providers fear that aggressive pain management may hasten or cause death.

Among older people and family caregivers, attitudes toward pain and opioids play a major role in the under-reporting and under-treatment of pain. Fear of addiction, tolerance, and side effects often make the older person reluctant to report pain or comply with a regimen that involves opioid drugs. Other hindrances include the belief that pain is the inevitable result of worsening disease, and the expectation that the drugs will not relieve pain. The belief that pain is inevitable and the desire to be a "good" resident/patient/client who does not complain are also reasons; this is particularly common among older adults. The type of language used to ask about pain has to be age-appropriate so that it has meaning for the older person; interruption when questioning about pain is particularly distracting for the older person.

There are many pain assessment tools. A simple one is to ask the person to rate their pain against a numerical rating scale with 0 no pain and 10 worst pain experienced. For a more detailed assessment of chronic pain the McGill pain questionnaire can be used. The Abbey pain scale was developed for people with dementia who are unable to report their pain. It can be used to assess both acute and chronic pain. This tool consists of six indicators of alterations in behaviour and physiology. It takes only one minute to complete and can provide clear indications of changes most likely to represent pain and its intensity. This scale, validated by research, provides the opportunity for improved pain management for older people unable to communicate their pain.

http://www.dementiacareaustralia.com/index.php/library/abbey-pain-scale.html

Key points when assessing pain:

- Pain assessment is a formal process and not just something done as part of the drug round or social interaction
- Time – make time to assess for pain and allow time for the older person to tell you about their pain
- Use an appropriate tool – one that is suitable for the person's level of cognition, and meaningful in terms of language and ease of use for the older person
- Pain can be relieved most of the time, and if not totally relieved then improved

# Module 7:
## Cognitive and perceptual assessment

- Incorporate non-verbal pain behaviours and cues into your assessment. Be aware that many of these behaviours may be absent or very mild in the presence of chronic pain as the older person adapts to the presence of pain
- Clinicians must be knowledgeable about pharmacology and how analgesics and other pain relief medication, such as neuroleptics and anti-inflammatories, work for the different sources of pain
- Reassessment – clinicians must go back and ask the older person about their pain to see if the pain intervention worked and if more is required to be done
- Document your assessment findings and responses.

**Table 2: Acute and chronic pain non-verbal indicators**

| Acute pain non-verbal behaviours | Chronic pain non-verbal behaviours |
|---|---|
| Cardiac – tachycardia, hypertension | Rubbing a spot |
| Respiratory – shallow breathing, hypoxia | Limiting activity or increasing movement |
| Gastrointestinal – nausea and vomiting, loss of appetite, muscle guarding | Frequent sighing |
| Musculoskeletal – stiffness | Loss of appetite |
| Facial grimacing | Bracing when moving |
| Vocalisations, such as moaning, crying | Increased sleeping |
| Restlessness or agitation | Seeking distraction |
| Pallor and diaphoresis | Depression |
| Confusion | Isolation |
| Delirium | Diminished quality of life |

Chapter 10: Pain assessment: The fifth vital sign (2012). In Forbes, H., & Watt, E. (Eds.), *Jarvis's physical examination & health assessment [Australian & New Zealand edition (pp. 153-172)]*. New South Wales: Elsevier Australia.

**Essential information for a pain assessment:**

- Location
- Intensity
- Quality
- Relieving factors
- Aggravating factors
- Effects on other functions.

Motor function:

- Perception of general capabilities with daily activities; walking, running, lifting, carrying etc.
- Perception of ability with home management; cooking, cleaning etc.
- Exercise: type, frequency.

## Objective data: Cognition and perception

Assessing mental status/ cognitive functioning:

Functions that are controlled by the cerebral cortex include the ability to think, understand, communicate, and interact with the environment. The assessment of mental status is usually divided into five main areas: general appearance; level of consciousness; awareness; thought processes; and communication abilities. A general inspection of the older person's appearance is carried out initially as this can provide information which gives cues to the older person's cognitive and perceptual ability and any problems that may exist.

**1. Assessment of level of consciousness**

Whether the older person is awake, alert, lethargic, obtunded (can't be fully aroused, more depressed level of consciousness, slowed response and increased sleepiness), stuporous (responds by groaning and drawing away) or comatose (no response).

Further testing of consciousness can be performed using a tool, such as the Glasgow Coma Scale (GCS). This would be used if the person's conscious state was in doubt. The GCS is a commonly used objective measure for assessing an individual's level of consciousness. The scale has three components: whether eyes are open; best verbal response; and best motor response. Each individual performance level in the three areas is assigned a number, and the total score gives an indication of the

# Module 7:

## Cognitive and perceptual assessment

individual's level of consciousness. Scores of seven or less represent coma.

Some conditions that may alter consciousness include brain injury, trauma, cancer, dementia, alcohol, drugs, multiple sclerosis, motor neurone disease, stroke and diabetes.

**2. Assessment of general appearance**

- Facial appearance:
  - Face should be relaxed and the person should make eye contact
  - Lack of facial expression may indicate depression or Parkinson's disease.
- Hygiene and grooming:
  - Dress should be appropriate to age, gender, context and weather
  - Disordered dress or poor hygiene may indicate depression or dementia
  - Grooming is evident; e.g. hair brushed, shaved.
- Gait and body posture:
  - Posture should be upright and erect
  - The person should be able to move around an area without bumping into things.
- Body movements:
  - Should be relaxed and appropriate for the situation
  - Coordinated and voluntary
  - Smooth and even.

The next assessment can be done at the same time, but they have been broken down so you are aware of what is involved.

**3. Assessment of awareness**

- Orientation to person, place and time:
  - Person disorientation may be a result of cerebral trauma
  - Place disorientation may be associated with acute brain syndromes or psychiatric disorders
  - Time disorientation can be related to depression or anxiety.

**4. Assessment of thought processes**

- Does what the person says make sense? Do they complete a thought? Are their thought processes logical?
- Emotional stability
- Verbal and non-verbal communications are suitable for the situation.
- Asking the person's feelings about their current situation. This should elicit responses relating to living in an aged care facility or their health status.
- Thought processes should be ordered and sequential. Patterns in thinking should be evident throughout the conversation and they should be logical, relevant and coherent.
- Disordered thinking or unrealistic expectations of their current situation may indicate psychological problems.
- Pressure of speech, compulsive or delusional behaviours are all indications of psychiatric illness.
- Perceptual distortions, such as auditory or visual hallucinations.
- Abstract thinking ability:
  - Ask the person to explain the meaning of a well-known saying, such as "A bird in the hand is worth two in the bush."
- Concentration ability:
  - Attention span can be tested by asking the person to listen to a short story and then repeat it back to you
  - You can also ask the person to carry out a series of short commands and see that they are executed
  - Note any lack of attention or concentration, or if the person is easily distracted.
- Memory:
  - Assess immediate, recent and distant memory
  - Immediate – ask the person to repeat back to you a series of numbers or a sentence
  - Recent – ask the person to look at a number of objects or listen to a list of words. Wait for about 10 minutes and then ask the person to recall them for you
  - Distant – ask the person about verifiable information from their past; e.g. where they grew up or what school they went to.
- Judgement:
  - Evaluate the appropriateness of a person's decisions in relation to hypothetical situations; e.g. "What would you do if you saw someone breaking into your neighbour's house?"

# Module 7:
## Cognitive and perceptual assessment

- Observe general day-to-day decision-making
- Problem-solving can also be assessed with mathematical exercises.

**5. Assessment of communication abilities**

- Quality of speech:
  - Are there any difficulties with making sounds?
  - Speech is moderately paced and fluent
  - Choice of language is comprehensible and appropriate to the situation.
- Comprehension:
  - Assessment of the person's understanding occurs while the person follows simple and more complex directions for tasks you ask them to perform.
- Writing:
  - The person should be able to write their name, address or a sentence you recite for them
  - Writing should be legible and document what the clinician asked
  - If literacy is an issue, ask the person to draw a familiar shape
  - Deterioration from their previous ability could indicate dementia or cerebellar dysfunction, such as with encephalopathy.
- Non-verbal communication:
  - Body language matches the situation (see General Assessment Module for congruency between verbal and non-verbal communication).
- Articulation:
  - Observe pronunciation, fluency, rhythm and expression
  - The conversation is coherent and the person is able to communicate their meaning to you.

### Activity

Read the sections on delirium, depression and dementia in the TIME or dementia module Diagnosing Dementia (www.dtsc.com.au)

**Testing the cranial nerves**

**Cranial nerve I** – ***Olfactory nerve***. You don't routinely test smell unless you need to; e.g. if it comes up as a problem as part of the subjective assessment.

- Technique
  - Test nasal patency (techniques described in the Respiratory Module)
  - Once you establish that the nostrils are patent, ask the older person to close their eyes, occlude one nostril; ask the older person to smell a substance you hold under their nose. Make sure it is something that can be easily recognised (e.g. coffee or vanilla essence). Then test the other nostril with the same smell. Use a variety of smells.
- Normal findings:
  - Should be able to identify the odour with both nostrils. Remember that smell does diminish with ageing, but you would expect that to be bilateral. Diminished smell can also occur with smoking and sinusitis and hay fever. Unilateral difference in smell is a problem and the cause needs investigation.

**Cranial nerve II** – ***Optic nerve.*** For this module the focus will be on testing what is commonly used in practice by general clinicians, rather than ocular specialists. Charts are used, such as Snellen charts or Jaeger cards, to test visual acuity and near vision. A simple way to test vision is to ask the older person to read a newspaper or identify objects at a distance.

General inspection of the eyes

- Eye brows:
  - Bilateral
  - Should move in unison and be appropriate to facial expression
  - In the older person it is normal to have up to half of the eyebrows missing from the middle to outer third of the brow. This is because of fewer hair follicles.

*With the availability of Botox clinicians do need to be aware that facial movement such as the forehead and eyebrows may be altered artificially, rather than due to disease process.*

- Eyelids and eyelashes:
  - There should be no redness, swelling, discharge or lesions
  - Eyelashes should be present and evenly distributed along the lids
  - Eyelids should close when brought together. If they don't, there is a potential risk for corneal damage
  - Note degree of wrinkling and crow's feet
  - Problems:

# Module 7:
## Cognitive and perceptual assessment

- Ptosis - drooping of eyelid over the eye, usually unilateral
- Ectropion - with ageing there is atrophy of the elastic and fibrous tissues and in this condition the lower lid is loose and rolls outwards. While it is associated with excess tearing, the eyes are dry because tears don't flow over the cornea. There is increased risk of inflammation of the conjunctiva
- Entropian - this is where the lid rolls inwards because of spasm. The eyelashes rub against the cornea and cause irritation
- Xanthelasma - these are soft, raised yellow plaques on the lids of the inner canthus. They commonly occur around the fifth decade of life and are more frequently seen in women. They have no pathological significance.

(See pictures in presentation slides)

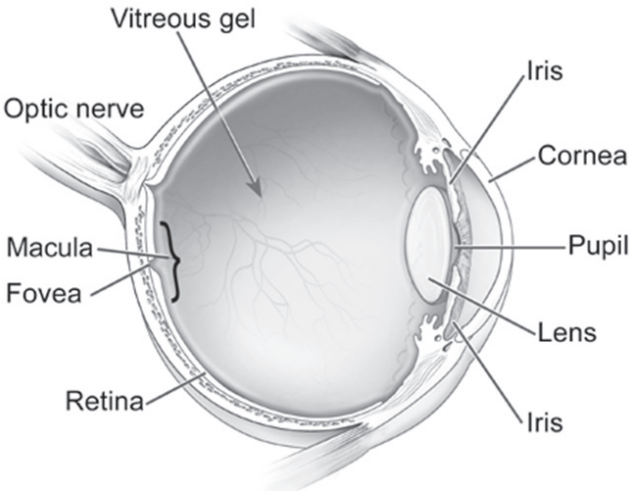
- Eyeballs:
  - The eyeballs should be aligned with no protrusions (exopthalamus) or sunken appearance (enopthalmos)
  - Eyeballs in the older person may appear sunken as the fat around the eye atrophies
  - The cornea in the eye of an older person may develop a white cloudy ring around it and this is due to lipid deposits. It is known as arcus senilis and does not affect sight.
- Conjunctiva and sclera:
  - Sclera should be white with some vascularity.

Yellowish nodular spots at 3 and 9 o'clock on the bulbar conjunctiva near the junction of the sclera and cornea may be found in the older person. They are called pingueculae and are normal. They are likely related to ultraviolet light exposure and chronic environmental irritation. They are seen in older people with an extensive history of sun exposure.

Inspection of internal eye structures

- Technique
  - An opthalmoscope is an instrument used to examine the health of the interior of the eye including the lens, retina and optic nerve

**Diagram 6: The Structures of the Eye**

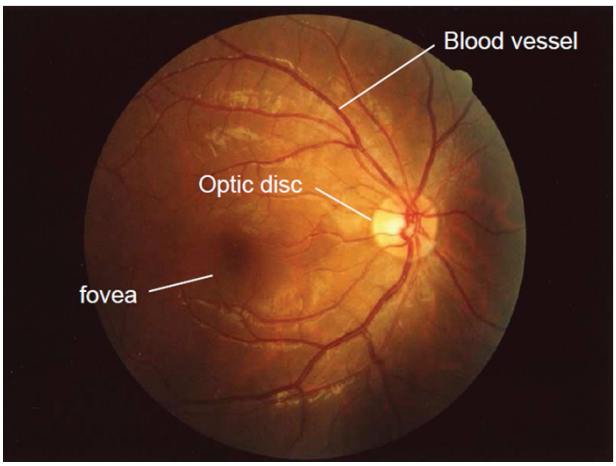



  - Check that the ophthalmoscope actually works and practise with it before you use it with an older person
  - The light should be bright, white and circular. There are a number of dials and slits (just ignore them) and select the large or small round aperture – depending on pupil size
  - Dim the room light and have the older person sitting in an upright position. You need to be virtually cheek to cheek, so make sure you are positioned eye to eye with the person and you are able to get close
  - Ask the older person to focus on the corner of the room or some other object and to keep staring even if your head gets in the way. You want them to stare at something distant as this will dilate the pupils. If you are examining the left eye have them look at the right corner and vice versa
  - If you are examining the right eye, then put the scope in your right hand and hold it up to your right eye and vice versa for the left
  - Hold the scope right up to your eye and hold it against your cheek and brow firmly. Your index finger can be extended to change the focus dials so you don't need to disrupt the examination. Both your eyes should be open. Ask the older person to remove their glasses and you may or may not remove yours—if you do, you can adjust the focus so you can see clearly. Contact lenses can be left in

# Module 7:
## Cognitive and perceptual assessment

- Place your free hand on the person's forehead and use the thumb to hold the top lid open. The thumb also helps you know when to stop so you don't bump heads; you can rest your forehead on the thumb
- Start from about 25cm away at about a 15° angle lateral to the person's line of vision. You should see the red reflex, which means you have the light shining on the retina. Move steadily closer keeping the red reflex in view; if you lose it start again. The order in which you view landmarks is: the red reflex, retina, disc, vessels and macula. As you move forward, adjust the lens to +6 and note any dark areas in the red light. Adjust to +10 to view the macula.

**Diagram 7: Key optic structures seen with opthalamoscope**




Normal findings:

- Optic disc:
  - Colour – creamy yellow – orange to pink
  - Shape – round or oval
  - Margins – distinct.
- Retinal vessels:
  - Vessels look straighter at the nasal side
  - Arteries are brighter red than veins.
- Macula:
  - Appears darker, but the colour is evenly spread and the same density. Clumps of darkness suggest trauma or retinal detachment
  - You may see a small white light at the fovea, which is a reflection of the light from the ophthalmoscope. The fovea is in the centre of the macula of the retina and is the point where the optic nerve enters the eye. This is the area responsible for sharp central vision needed for activities that require visual accurateness for detail.

In the older person, the internal structures of the eyes tend to be paler and the vessels are narrower and straighter.

**Cranial Nerves: III – *Oculomotor*, IV – *Trochlear*, and VI – [a]ABDUCENS**

Pupillary light reflexes

- Technique
  - Darken the room and ask the person to look straight ahead
  - With the pen torch on, move the light from the side and watch what the pupils do.
- Normal findings:
  - The pupil will constrict (direct response) and the pupil on the other side should also do the same thing (consensual pupillary response)
  - In the older person the pupillary light reflex may be slower, but should still be consensual
  - The pupils may be smaller in the older person.

Accommodation – P(pupils), E(equal), R(round), RL(reacting to light), A(accommodating)

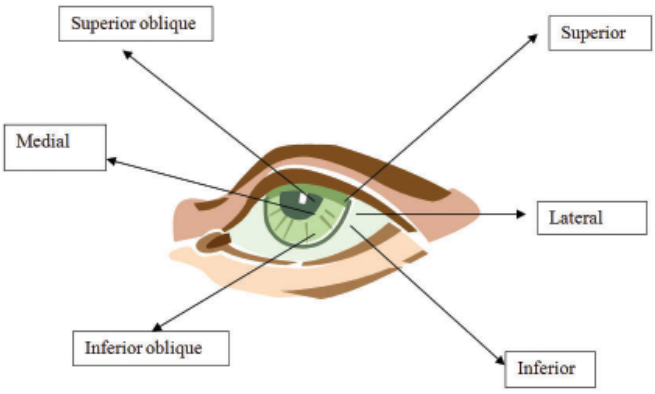
- Technique
  - Test pupillary light reflex first, and then
  - Ask the person to look straight ahead at something in the distance (dilates pupils) and then ask them to look at something close, like your finger or a pen held about 7cm from their nose.
- Normal findings:
  - The pupils should be equal in size, round and regular in shape
  - With light shone directly into the pupils they should constrict equally
  - There should be convergence (slight crossing) of the eyes as they focus on the finger or pen.

Cardinal positions

- Technique
  - Stand about 60cm away and ask the person to hold their head steady and follow the movement of your pen with their eyes only
  - Hold the pen about 1.5 metres from their face and move through the 6 cardinal positions of gaze.

# Module 7:
## Cognitive and perceptual assessment

**Diagram 8: Six cardinal positions of gaze**

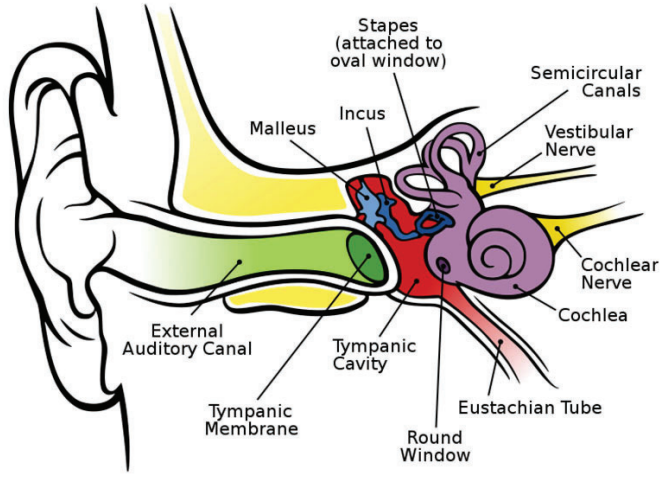



- Normal findings:
  - Both eyes should move in unison. Unequal tracking between the eyes may indicate weak extraocular muscles or damage to the cranial nerve.
- Problems:
  - Nystagmus, which is a fine tremor that is best seen around the iris. It is normal for a slight tremor at the limit of the lateral gaze, but otherwise it should not be present. Possible causes of nystagmus include paresis of the eye muscles or multiple sclerosis.

Guide to examining ears

- Anatomy
  - Auricle
  - External ear canal – 2-5cm long
  - Tympanic membrane.

**Diagram 9: The anatomy of the ear**



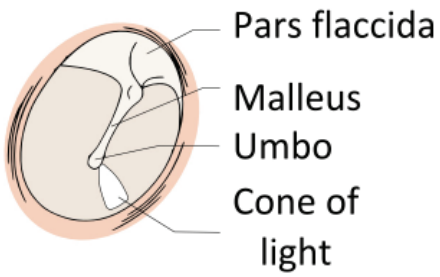

As with examining the eyes, the clinician should assess the older person's ears by comparing one ear to the other. Commence with inspection and palpation of the external structures of the ear. This includes the ear shape, size and symmetry, condition of the skin integrity, presence of lesions and tenderness. The ear canal can be inspected using an auroscope. The canal is assessed for patency, discharge, inflammation, hair growth and cerumen. The tympanic membrane can be visualised and its colour, surface, and configuration inspected. To assess hearing, the clinician generally performs a watch-tick test or a voice/ whisper test.

- Technique
  - Explanation
  - Check your equipment – bright light, batteries, speculum the correct size
  - Examine outside ear structures first. Check for deformities, lesions, lumps and discharge
  - Hold auroscope in same hand as the ear you are examining
  - Pull the auricle/pinna upwards and backwards to straighten the ear canal. Movement of the auricle up & down is painful if the ear canal is inflammed (acute otitis externa), but not with inflammation of the middle ear (otitis media). There may be tenderness behind the ear (mastoid process) in otitis media
  - Hold the auroscope in a pencil or hammer grip. Pencil grip is safer as it allows you to rest your hand against the person's temple, which gives you more control if the person moves suddenly
    There is more than one way to hold the auroscope, so experiment and find one that is comfortable for you, but safe for the person you are examining
  - If a problem has been identified in an ear, examine the good ear first for a baseline and to prevent spread of infection
  - Move into the external ear canal until you can see the tympanic membrane
  - Move towards the membrane and observe it:
    - The normal ear drum is shiny and translucent with a pearl-grey colour
    - The ear drum is intact, flat and slightly puckered in the centre.
  - Then move the auroscope around looking up and down and pull back a little so that you get a 360° view of the tympanic membrane.

The Cone of light is seen at 7 o'clock in the left ear and 5 o'clock in the right ear.

# Module 7:
## Cognitive and perceptual assessment

**Diagram 10: The tympanic membrane**




### Cranial nerve VII – *Vestibulocochlear (acoustic) nerve*

Testing the older person's ability to hear normal conversation.

**Whispered voice test**

- Technique
  - Stand behind the person or to the side so they can't see your lips
  - Block the ear not being tested
  - Whisper into the other ear two syllable words, such as 'hooray', 'today'
  - Have the person repeat it back
  - Then test the other ear.
- Normal finding:
  - The person should be able to hear the whisper and if they can't this may indicate high frequency hearing loss.

**Weber tuning fork** test measures by bone conduction

- Technique
  - Strike the tuning fork so that is vibrates
  - Place the stem of the vibrating tuning fork in the middle of the person's head
  - Ask the person where they can hear the vibration sound.
- Normal finding:
  - The person should be able to hear the tone in both ears.

**Rinne tuning fork test** compares sound via air conduction with sound via bone conduction

- Technique
  - Place the stem of the vibrating tuning fork on the mastoid process behind the ear and ask the person to signal when they can no longer hear the tone
  - Note the length of time over which they could hear the sound
  - Quickly move the tines of the tuning fork near the ear canal and ask the person if they can still hear the sound
  - Ask the person to indicate when they can no longer hear the sound
  - Note the time difference between step one and step two.
- Normal finding:
  - The person should be able to hear the tone at the ear canal for twice the length of time as over the mastoid process, because air conducts sound for longer than bone.

The remaining cranial nerves.

Cranial Nerve V– ***Trigeminal nerve***

For this nerve you test motor and sensory function.

- Technique for testing **motor** function
  - Ask the older person to clench their teeth as strongly as is comfortable
  - Palpate the temporal and masseter muscles
  - Then push down on the chin trying to separate the jaws.
- Normal findings:
  - The muscles should feel strong and the jaws should not be easily pushed apart.
- Technique for testing **sensory** function – the trigeminal nerve has three branches: the ophthalmic (forehead), maxillary (cheek) and mandibular (jaw line)
  - Ask the person to close their eyes
  - With a piece of cotton wool or tissue, lightly brush each of the areas
  - Ask the person to let you know when they can feel the touch in an area
  - Test both sides of the face in each area
  - You don't need to do it sequentially, but make sure you test each area bilaterally.
- Normal findings:
  - There should be equal sensation on both sides of the face and in all areas.

Cranial Nerve VII – ***Facial nerve***

The sensory component of this nerve is only tested if a problem is suspected.

# Module 7:
## Cognitive and perceptual assessment

To test the sensory component, you test taste and the person's ability to bilaterally taste sweet, sour, salty etc. on different parts of the tongue.

- Technique for testing motor function
  - Ask the older person to go through a range of actions
  - Smile, frown, lift eyebrows, show cheeks
- Normal findings:
  - Movements should be symmetrical
  - Observe for any drooping of the face, assymetrical movement or muscle weakness which can indicate central (stroke) or peripheral (Bell's palsy) nervous system problems.

### Cranial nerve IX – *Glossopharyngeal nerve* and Cranial nerve X – *Vagus nerve*

- Technique for **motor** function
  - Ask the person to open their mouth
  - Depress the tongue with a tongue blade and observe that the uvula is midline
  - Ask the person to say "aaah" and as they do the uvula and soft palate should rise in the midline and the soft tissue walls move midline
  - You can test gag by touching the tongue blade to the posterior pharyngeal wall. The gag reflex may be reduced in the older person
  - Voice should sound relaxed.
- Problems:
  - Absence of movement of uvula or deviation to one side
  - A hoarse voice indicates a laryngeal problem
  - Nasally voice could be related to a weak soft palate.

### Cranial nerve XI – *Spinal accessory nerve*

- Technique
  - Inspect and palpate the sternomastoid and trapezius muscles for symmetry, development and size
  - Put your hand on the person's face and chin and ask them to rotate forcibly against your hand while you apply resistance
  - Place your hands on the person's shoulder and ask them to shrug against resistance.
- Normal finding:
  - There should be equal strength on both sides.

### Cranial nerve XII – *Hypoglossal nerve*

- Technique
  - Ask the person to poke out their tongue
  - Inspect it for colour, texture and shape
  - It should be midline with no tremor
  - Ask the person to say "light", "tight", "dynamite" and check that the l, d, t, sounds are clear and concise.

## Assessment of sensation

Sensory testing is carried out by applying stimuli to the older person's skin surface and assessing the older person's ability to perceive the stimuli. The clinician needs to assess the client's ability to sense light touch, discriminate sharp and dull pain and test deep pain sensation. The stimuli are used to assess the person's ability to sense:

- Light touch
- Discriminate sharp and dull pain
- Test deep pain sensation.

- Technique
  - Explain what is happening and the person's role in the sensory testing
  - Use neutral questions, such as "can you feel this?"
  - Always remember to compare one side of the body with the other
  - A complete examination can be very tiring for the client, so the clinician usually performs a gross screening of the dermatomes
  - Areas such as the face, hand, forearm, abdomen, lower leg and foot are assessed
  - If no dysfunction is apparent then more specific testing is not usually carried out.

### Light touch sensation

- Technique
  - Use the cotton wool to test light touch sensation
  - Ask the person to close their eyes and tell you when they feel something and where
  - You can touch places randomly.
- Normal finding: The person detects the sensation in the areas tested.
- Abnormal finding: Decreased sensation (hypoaesthesia), increased sensation (hyperaesthesia), and no sensation (anaesthesia).

# Module 7:
## Cognitive and perceptual assessment

### Dull and sharp sensation

- Technique
  - Use one end of a paper clip or break a tongue blade to get a pointy tip and use this to test pain. Use both ends to test the person's ability to differentiate between sharp and dull
  - Alternating between a sharp object and a blunt object, touch the skin lightly and ask the person to tell you whether the object is sharp or blunt
  - Move around the body, comparing sides
  - Allow a couple of seconds between each application of a stimulus
  - If pain response is abnormal you should also test hot and cold. Use ice and warm water.

### Vibration

- Technique
  - Use the tuning fork
  - While it is vibrating place it over bony prominences on the lower extremities. Start on the big toe
  - Ask the person to tell you when they can first feel the vibration and when it stops
  - If vibration can be felt there, no further testing need occur
  - If it can't be felt, move to the ulna processes and ankle, and the knee, until vibration can be felt.
- Normal finding: The person detects the vibration at the lowest extremity point.
- Abnormal finding: The absence of vibration detection is found in peripheral neuropathy and alcoholism. The sensation may be absent at the feet, but improve further up the legs.

### Tactile and point discrimination

***Stereognosis*** (ability to recognise objects with touch)

- Technique
  - Ask the person to close their eyes
  - Place a familiar object in their hand, such as a coin or key
  - Ask them to identify it
  - Test both hands using different objects.
- Normal finding: The person identifies the object.
- Abnormal finding: The person can't identify the object with touch. This can occur following a stroke.

***Graphaesthesia*** (can be used instead of stereognosis)

- Technique
  - Ask the person to close their eyes and open their palm
  - Using a blunt instrument trace a letter or number on their palm
  - Ask them to identify it
  - Test both hands.
- Normal finding: The person identifies the tracing.
- Abnormal finding: The person can't identify the number or letter. This may indicate sensory cortex lesions.

***Two-point Discrimination*** (ability to recognise objects with touch)

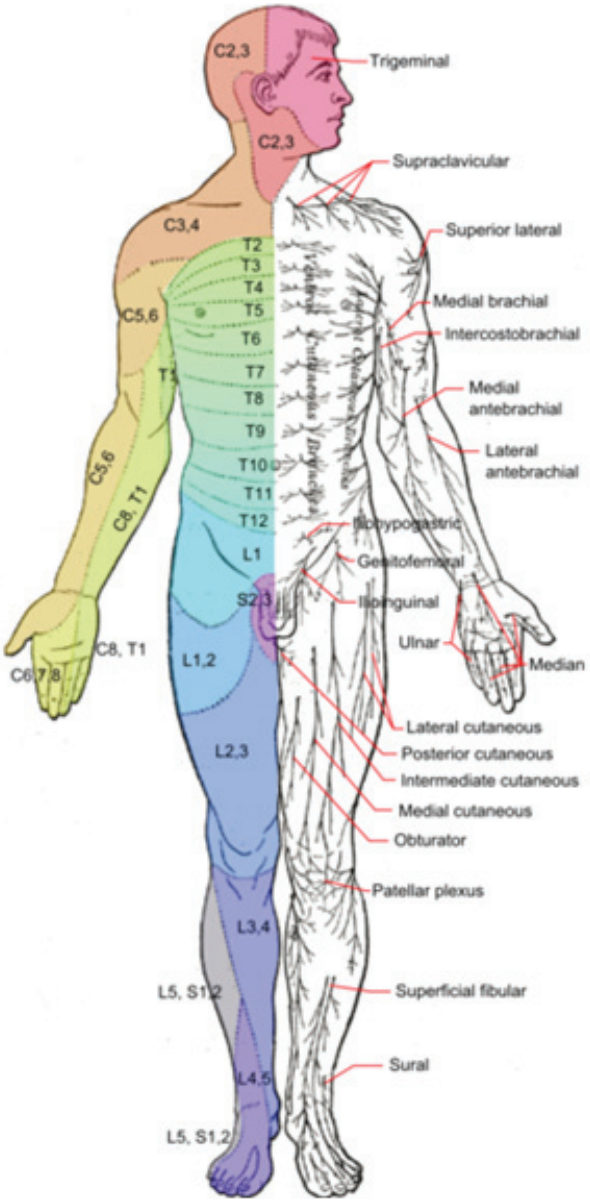
- Technique
  - Ask the person to close their eyes
  - Apply blunt stimulation at two points simultaneously at the major dermatome areas and compare bilaterally.

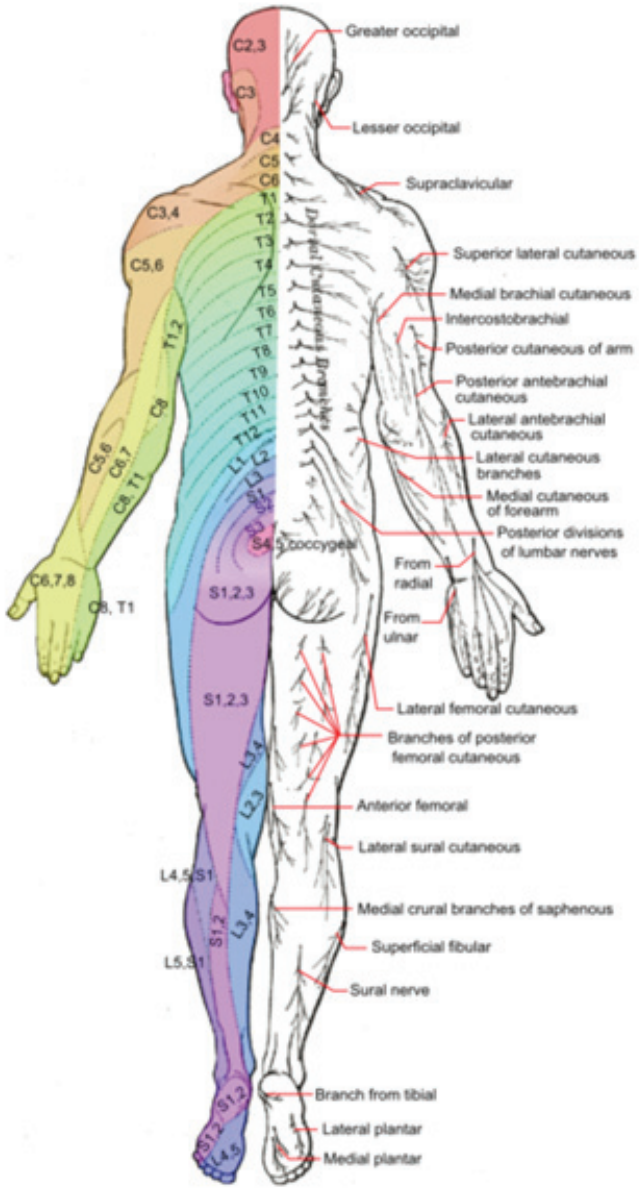
A dermatome is an area of skin supplied by a single spinal nerve. Dermatomes correlate with the major nerves from the spinal cord. There are 8 cervical, 12 thoracic, 5 lumbar and 5 sacral nerves. E.g. the 6th cervical (C6) is the radial nerve that provides sensation to the thumb and 2nd and 3rd sacral nerves (S2–3) supply the genitalia. They relay sensation including pain to the brain and can be used to diagnose areas of neurological damage (sensation would be missing). Therapeutically they can be used to test epidural and spinal anaesthetics' effectiveness when neural blocks are wanted for pain relief.

  - Initially apply at a wide distance and then move stimuli closer to each other
  - Ask them to identify the sensation at the two points until it can no longer be distinguished as two stimuli
  - Note the distance between the two points when this occurs
  - Move through the major dermatome areas as for the other tests.
- Normal finding: The person should distinguish the two points for longer at the finger tips (2–8 mm) and less in the larger areas, such as back and thighs (40–75mm).
- Abnormal finding: The distance is wider than expected or compared to the other side. This may indicate sensory cortex lesions.

# Module 7:
## Cognitive and perceptual assessment

**Diagram 11: Dermatomes**




Assessment of motor function

***Gait*** (assess cerebellar function and balance)

- Technique
  - Observe usual walking gait
  - Ask the person to walk away from you for a distance, turn around and return
  - Then ask them to repeat, but this time walk heel to toe (i.e. decrease their base of support) in a straight line (like testing for drunkenness).
- Normal finding: The person's gait is even, smooth, usually accompanied by symmetrical arm swinging and is coordinated. The person is balanced, even with a decreased base of support. Abnormal finding: Ataxia (uncoordination), dragging or slapping one foot, a wide base of support. Any problem not detected with usual gait may become apparent with the shortened gait, such as multiple sclerosis.

# Module 7:
## Cognitive and perceptual assessment

***Romberg test***

The Romberg test tests the ability of the vestibular apparatus to maintain balance.

- Technique
  - Ask the person to stand straight with feet together and hands by their side
  - When they feel stable ask them to close their eyes and stay in that position for about 20–30 seconds
  - The clinician should stand next to the person with one arm in front and back, but not touching, just in case the person loses their balance.
- Normal finding: The person should be able to hold the position. Some slight swaying is acceptable.
- Abnormal finding: A positive Romberg = loss of balance when the eyes closed.

### Coordination and fine motor movements

A number of tests can be done to assess coordination and fine motor movement; e.g. touching thumb to fingers, as described in the Musculoskeletal Assessment Module. The examiner is looking for coordination and the ability to repeat the activities faster on repetition. The following are some examples:

***Finger-to-nose test***

- Technique
  - Ask the person to stand straight with their eyes closed and arms stretched out to the side
  - Ask the person to touch their index finger to their nose
  - Ask the person to alternate hands and increase speed of performing the activity.
- Normal finding: The person should be able to touch their nose with alternating hands and increasing speed
- Abnormal finding: person misses their nose.

***Pronation – supination test***

- Technique
  - Ask the person to stand or sit
  - Hold their arms and forearms in front of them with palms down (pronate). They can rest their palms on the knees if sitting
  - Then turn their palms up (supine)
  - Repeat the pronation–supination sequence with increasing speed.
- Normal finding: the person should be able to carry out the tests with both hands and increasing speed
- Abnormal finding: The person can't do the tests. This indicates cerebellar disease.

### Muscles strength and resistance

- Muscles are assessed for size and symmetry of the upper and the lower extremities.
- Muscle strength is ascertained by assessing movement against full resistance (normal), some resistance or only against gravity.
- Assessing and comparing muscle tone and the presence of involuntary movements is also carried out.

### Tendon reflexes

This testing could also be performed for musculoskeletal functioning. The technique is described in this module because altered tendon reflexes are generally symptomatic of spinal cord problems. This is one of those tests that not all clinicians would find relevant to their scope of practice.

- Technique
  - Similar to percussion
  - A short sharp rap with the tendon hammer either directly onto the person's skin or indirectly onto the examiner's thumb
  - Use the pointed end for small tendons and the flat end for larger tendons
  - Make sure the limb or area is relaxed
  - If no response try again, paying attention to the person's relaxed state and your technique.

# Module 7:
## Cognitive and perceptual assessment

**Table 3: Grading for tendon reflex response**

| Grade | Response |
|---|---|
| **4+** | Very brisk (hyperreflexia), hyperreactive, clonus (rhythmic muscle contractions stimulated by testing), indicates disease. |
| **3+** | Brisker than normal |
| **2+** | Normal |
| **1+** | Below normal (hyporeflexia) |
| **0** | No response |

Chapter 22: Neurological system (2012). In Forbes, H., & Watt, E. (Eds.), *Jarvis's physical examination & health assessment [Australian & New Zealand edition (pp. 575-643)]*. New South Wales: Elsevier Australia.

**Table 4: Some of the major reflex areas**

| Reflex | Technique | Normal Response |
|---|---|---|
| **Biceps (C5–C6)** | With the person's forearm resting on your non-dominant forearm, place your thumb on bicep tendon and strike your thumb with the tendon hammer | Contraction of bicep and straightening of forearm |
| **Triceps (C7–C8)** | Hold the upper arm and let it flop. Strike the arm with the tendon hammer just above the elbow | Extension of the forearm |
| **Quadriceps (L2–L4)** | Have the person sitting with legs dangling over the edge. Strike the tendon hammer just below the patella (knee cap) | Extension of the lower leg: "knee jerk" |
| **Achilles (L5–S2)** | Have person sitting (or lying) so that the knee is flexed and the hip is externally rotated. Dorsiflex the foot and hold with your hand. Strike the Achilles tendon with the tendon hammer | The foot plantar flexes against your hand |

Chapter 22: Neurological system (2012). In Forbes, H., & Watt, E. (Eds.), *Jarvis's physical examination & health assessment [Australian & New Zealand edition (pp. 575-643)]*. New South Wales: Elsevier Australia.

# Module 7:

Cognitive and perceptual assessment

## Example

Let's re-visit Miss K., whose case we considered in the Musculoskeletal Module, and analyse it from a cognitive perceptual perspective.

Miss K. presents with increasing confusion and restlessness over a three-day period, particularly during the night after the lights are turned off. She calls out frequently and cries a lot. She cannot provide a coherent response to questions about what the matter might be, but she appears to be in some discomfort. You go in to help her settle for the night and perform an assessment.

Her medical records reveal that she has been receiving paracetamol x 2 6/24 with little effect and that the GP is coming to see her the following morning. Routine blood tests have been ordered for the following day. There has been no obvious trigger for her current state. She has been taking her diet as usual. One entry in her medical record states that she slipped and partially fell against the side of the bath about 5 days ago, but as there was no obvious injury, no further action, other than vital signs and observation, was taken. She was taken back to her room in a wheel chair after the incident. She has been reluctant to ambulate with some assistance, but that is not so unusual, and has walked with encouragement.

She moved into residential care 5 months ago because her family believed she was not coping. She was forgetting to turn off the gas and put the electric kettle on the stove over a flame and caused a small fire in her kitchen. They described a women who was normally immaculately groomed, but this changed and she started wearing odd articles of clothing, such as her 'nightdress' over a skirt. She would go to the shops and forget to buy any food or household supplies.

Her medical history reveals loss of short-term memory, osteoarthritis and hypertension which is treated with metoprolol.

General inspection

- Pallor
- Grimacing
- Groaning, particularly with movement
- Vital signs: P 98 bpm – weak and thready; BP 135/87; R. 26 bpm; T 36.4°C.

You note when you put your hand under her right leg to help her move in bed that her vocalisations increase as does her facial expression.

You examine her right leg.

### General observation

- Shorter than left leg
- Alignment – the right leg has an external rotation.

### Focused joint assessment

Ankle and knee – no abnormalities detected

Hip

- Swelling over greater trochanteric (hip) area
- Area cool to touch
- Pain – using the Abbey Pain Scale you calculate her pain as moderate (12/13) at rest and a severe (> 14) with movement.
- Gentle range of movement tests show limited range, particularly with internal rotation.

### Activity

Using this data:

1. Cluster the data into related groups; e.g. data that relate to pain.
2. Examine the grouped data and list your hypothesis about the cognitive changes occurring. E.g. is she showing signs or symptoms of depression? What are those indications?
3. Can you confirm any actual problems or the very high risk for developing a problem? That is, identify a problem, because you have enough information to say it exists or the person is very likely to develop it.
4. List your identified problems.
5. Identify what further data you would need to obtain in order to identify any further problems.

A useful article: Milisen, K., Braes, T., Fick, D.M., & Foreman, M.D. (2006). Cognitive assessment and differentiating the 3Ds (Dementia, Depression, Delirium). Nursing Clinics of North America, 41:1-22.

# Module 7:

Cognitive and perceptual assessment

## Resources

TIME *for dementia:* The Victoria and Tasmania Dementia Training Study Centre (www.dtsc.com.au)

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# Module 7:

Cognitive and perceptual assessment

## Image reference


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*Diagram 2*: LeBlanc, R. (2009). Annotated sagittal T1 midline MRI scan of Reigh's brain [Image]. Retrieved from http://www.flickr.com/photos/reighleblanc/3854684694/.

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*Diagram 5*: Patrick J. Lynch, medical illustrator; C. Carl Jaffe, MD, cardiologist. (2009). Brain human normal inferior view [Illustration]. Retrieved from http://wiki.healthhaven.com/File:Brain_human_normal_inferior_view_with_labels_en.svg.

*Diagram 6*: Courtesy: National Eye Institute, National Institutes of Health http://www.nei.nih.gov/photo/termsofuse.asp.

*Diagram 7*: Ignis. (2007). An opthalmogram, an image of the fundus of an eye, of a healthy human male. [Image]. Retrieved from http://en.wikipedia.org/wiki/File:Fundus_of_eye_normal.jpg.

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