Vertigo Rehabilitation Exercises:
Principles and practice of Cawthorne-Cooksey treatment for dizziness due to labyrinthitis and other forms of inner ear balance organ damage

Definition of vertigo

Vertigo is a particular form of dizziness or giddiness. Rather than just feeling faint or light headed, it is **an illusion of motion.** The sufferer feels as though they, or their surroundings, are turning, spinning, falling, or some other form of movement when in fact they are not. Like sea-sickness, vertigo is often accompanied by nausea and vomiting.

After acute vertigo settles, it is often followed by dysequilibrium ,an uneasy feeling of imbalance, as though one might be about to fall over.

Vertigo and dysequilibrium can be very frightening, but do not usually signify any serious or life-threatening disease.

How damage to the inner ear causes vertigo

Vertigo can result from many causes, but is most often caused by damage to the balance organ of the inner ear. As well as the cochlea for hearing, the inner ear contains a very sensitive organ, the vestibular labyrinth, designed to help maintain balance.

- The vestibular labyrinth is made up of three semicircular canals - lateral, posterior and superior. They join together at the vestibule.
- The semicircular canals are arranged at right angles to one another. They can detect and measure movements and acceleration in all three planes of space.
- The inner ear balance organ can also detect the direction of gravity.
- The right and left balance organs work together, constantly sending signals via the audiovestibular nerves to the brain, telling you which way up you are, whether you are moving, turning, etc. and in which direction.
- When your inner ear balance organ is damaged, it sends a false signal to the brain.
- **Vertigo results when the brain believes the false signal and acts accordingly.**
- The commonest condition to affect the inner ear is labyrinthitis, which means inflammation of the labyrinth and causes severe rotatory vertigo.
- Labyrinthitis often causes permanent and irreversible damage to the inner ear. The recovery that follows is not because the inner ear gets better, but because the brain learns to ignore, adjust to or compensate for the false signal.
- The brain learning to make allowances for the faulty information coming from the inner ear is known as **central compensation.**

Other important factors for balance

The inner ear is not the only source of information to help you balance. You also receive information from:

- The eyes - you can see which way up you are, whether you are moving and in which direction.
- The soles of your feet (if you are standing) or the seat of your pants (if you are sitting down). You can feel where you are.
- All of your joints and muscles - including the joints in your neck, back, legs, feet, arms and hands - have sense-organs in them which send signals up the nerves and spine, telling the brain what position they are in. You don't need to look to see whether your arms are outstretched or by your side - they tell you where they are. This position-sense is known as proprioception. Proprioception is reduced in various medical conditions including arthritis and diabetes.

The information coming from the eyes, skin, muscle and joints is integrated with the information coming from the inner ears and processed in the brain.

- If there is plenty of information coming from the eyes, skin and joints, you do not really need to rely on information from the inner ear to help you balance.
- If the information coming from the other sources is reduced, lost or confused - for example in the dark, on soft or uneven ground - your brain has to rely more on the information coming from the inner ears.
- This is why your balance will be worse in the dark, on soft or uneven ground, if you have a problem with your inner ear.

Your brain - the pilot. Your inner ear - an aeroplane instrument.

Like the signals from the damaged inner ear, faulty aircraft instruments can be ignored in good conditions, but must be relied upon in cloud

The balance control area of your brain acts like the pilot of an aeroplane. It is constantly making adjustments to the controls, to keep your body in balance. The pilot of an aeroplane does not need instruments to fly straight

and level if the weather outside is good, and he can see the horizon. Even if the aeroplane instruments are faulty and give a false reading, it does not have to cause a problem with the flight, provided that

- The pilot knows to ignore the faulty instrument,
  or
  the faulty instrument gives a predictable and stable mis-read, and the pilot knows by how much, and in what direction, so that he can compensate for the error.
- He will always find it much easier if he has other independent sources of the necessary information
- If, however, the aeroplane has faulty instruments and the pilot tries to fly through cloud, he is then forced to rely on those faulty instruments.
- If he then takes those false readings at face value, believes them to be true, and makes adjustments to the controls accordingly, he will almost certainly end up crashing.
- This is what happens to a person with false signals from a damaged inner ear who tries to walk in the dark across uneven ground.

Central processing of information in the brain is essential for balance

It is obvious you need brain power to keep your balance. The two-legged human is not inherently stable. If your brain stops working, you will collapse into a heap on the ground. To be able to sit, stand, keep your balance, walk, run and jump, are **learned skills.**

- Even sitting up straight requires an immensely complex series of calculations, carried out microsecond by microsecond.
- Instructions are sent from the brain down the nerve fibres to the muscles which control your head position, neck and spine, allowing you to stay upright.
- The instructions are constantly updated by feedback from the joints and muscles themselves (proprioception) from the skin which feels the pressure of the seat, from the eyes which can see where you are, and from the inner ear which knows whether you are tilted backward, forward, sideways or moving.

Cawthorne-Cooksey exercises

Important note: Please make sure it is safe to do these exercises. There should be nothing in the room that might get in the way, or for you to trip over. You might find it helpful to have another person with you.

The idea behind the exercises is a graded series of steps to help the brain compensate, or work around, the false information. The lack of any signal from one side, with normal signal from the other, is interpreted as a severe rotation. The brain has to re-programme itself to allow for, offset, and adapt to this defective signal. The exercises start with simple eye movements, and progress to complex activities.

You should aim to spend about an hour a day doing the exercises.

- Start with the simple, easy ones and work up to the more difficult.
- It is better to split the time up into short sessions of five to ten minutes each.
- Some of the exercises can easily fit in with your normal activities.
- The more time and effort you put in, the quicker you will see some improvement.
- You will find that some of the exercises make you feel dizzy and sick. Don't worry, they are meant to, that is how they work.
- By working through the vertigo, you are training the brain to compensate for the faulty signal from the defective inner ear.
- You should concentrate and spend extra time on any of the exercises you find difficult - there's no gain without pain.
- But do not overdo it to the extent that you vomit - that might put you off doing any more.
- You do not need to go to the gym for any of the eye, head, sitting or standing exercises, but you might prefer to do so for those involving moving about.

Eye exercises

- Look up and down 20 times. Start slowly at first, then speed up.
- Look from one side to the other 20 times. Start slowly at first, then speed up.
- Hold up one finger at arm's length. Focus on it. Move it slowly in towards you and out again 20 times.

Head exercises

- With your eyes open, bend your head forwards, then backwards, 20 times. Start slowly at first, then speed up.
- With your eyes open, turn your head from side to side 20 times. Start slowly at first, then speed up.
- As the dizziness improves, repeat the head exercises with your eyes closed.

Sitting exercises

- Shrug your shoulders 20 times.
- Turn your shoulders to the right and left 20 times.
- From the sitting position, bend down and pick up objects from the floor, and sit back up again. Repeat 20 times.

Standing exercises

- Move from sitting to standing up, and back again, with your eyes open, 20 times.
- Repeat with eyes closed.

- Throw a small ball from one hand to the other, above eye level, 20 times.
- Throw the ball from hand to hand at knee level, 20 times.
- Turn around 360 degrees on the spot, eyes open.
- Repeat with eyes closed.
- As vertigo lessens, speed up.

Moving about exercises

- Walk across the floor with your eyes open 20 times.
- Repeat with eyes closed.
- Walk up and down a slope with your eyes open 20 times.
- Repeat with eyes closed.
- Walk up and down steps 20 times with your eyes open.
- Repeat with eyes closed.
- Any game or exercise that involves stooping, turning, bending, stretching and hand-eye coordination - for example bowling, tennis - is good for improving your balance.

Tips to avoid injury during recovery

Some patients will take up to a year to make a proper recovery. Even after that, there may be situations where central compensation breaks down. The commonest situations where you may get a recurrence of vertigo symptoms are:

- Sudden rapid movements
- In the dark
- On soft or uneven ground
- Under the influence of sedative drugs or alcohol

Combinations of these situations are especially likely to result in recurrence of vertigo symptoms. It is probably best to avoid going to the pub late at night, drinking too much, then trying to walk home in the dark on an unlit stony path. The chances are you will end up in the ditch. What you should do is

- Make sure you do the exercises regularly, at least an hour a day, broken up into short sessions.
- Build up your confidence by achieving improvements with the exercises.
- Take a walking stick with you when you go out in public - it will amplify proprioception (positional sense). That is why tight-rope walkers carry a long stick. You shouldn't need to hobble along with it. You can twirl it like Fred Astaire - it will give you extra confidence.

- Wear sensible shoes - flat soles with good grips, don't ask for trouble by tottering along on stilleto heels.
- Make sure your spectacle prescription is up to date and your lenses are clean. Bifocals and varifocals can cause difficulties, it is probably better to have separate distance and reading glasses during recovery. Good vision helps balance.
- Leave a night light on in the bedroom, light the way to the bathroom. If you have to get up in the night, that is a high risk time for a fall.
- Make sure you get sufficient rest. Tiredness will reduce the effectiveness of the exercises and make you prone to falls. But don't spend too much time doing nothing. Early to bed and early to rise is the best policy. Pack in as much normal activity as you are able during the hours of daylight.

Medications and alcohol during vestibular rehabilitation

Most vertigo patients will have been prescribed vestibular sedative drugs such as prochlorperazine (Stemetil®) or cinnarazine (Stugeron®) during the acute phase of their illness. While these drugs are very useful in the early stages of vestibular damage, suppressing nausea as well as vertigo, they are counter-productive during the rehabilitation phase. This is because they act as a general sedative, slowing brain activity.

- Your brain has to work overtime during the process of central compensation.
- It is having to re-programme its circuits, and this requires a lot of processing power.
- Alcohol is also a general sedative and slows down brain processing speed.
- Taking vestibular sedatives and alcohol will slow down your recovery.
- Both should be avoided.
- Occasional use of a vestibular sedative may be necessary for certain activities, but any use is likely to prolong overall recovery time.

Psychological and motivational factors in vestibular rehabilitation

Vertigo can be a very frightening experience. There is a loss of control over the body. It is not surprising that it often causes

- Anxiety over the diagnosis - have I had a stroke, do I have a brain tumour?
- Anxiety over the future - especially job and driving worries
- Loss of self confidence
- Reluctance to go out in public - can progress to agoraphobia
- Depression - reactive depression may follow prolonged disability.

All of these factors can work against you. Motivation can be undermined and recovery delayed. Understanding more about the cause of the condition, a specialist examination and investigations to exclude serious disease, often help allay fears. Patients with severe

anxiety and depression may need medical treatment for those psychological conditions, as well as the vertigo rehabilitation exercises.