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Rehabilitation following facial paralysis

A talk by Diana Farragher OBE FCSP Reported by Chris Richards.



We were very pleased to welcome Diana Farragher to our meeting in July. Diana is a Chartered Physiotherapist who since the 1980s has applied her skills to the treatment of chronic facial problems. Further to her research at Liverpool University she has lectured nationally and internationally on the uses of Trophic Electrical Stimulation (TES), as well as treating hundreds of patients. For her work, which is not carried out by anyone else in the country, she has been awarded a Fellowship of the Chartered Society of Physiotherapists in 1990 and she was awarded an OBE in 2001.

In November 2000 The Lindens Clinic was opened in Manchester to provide a centre of excellence for TES. The centre has a dedicated team of four specialist physiotherapists and deals with a wide range of conditions, tailoring treatment to meet individual needs, and sees patients from all over the UK and Europe. More recently a centre has also been opened in Aberdeen and Diana and her colleague also run four clinics a year in London.

Treatment is offered for a variety of conditions, including peripheral nerve injuries such as 'foot drop', nerve injury following back, hip or knee surgery, chronic

neurological conditions such as stroke, cerebral palsy and multiple sclerosis, arthritic conditions, continence and chronic pain, however Diana has a special interest in facial conditions.

Facial palsy or paralysis can result from a number of different conditions including Bell's Palsy, acoustic neuroma, meningioma, facial nerve tumours, stroke, following facial reconstruction surgery, nerve repairs and transplants and trauma.

Nerves are made up of a central core carrying the nerve fibres which is protected by a myelin sheath. There are three degrees of injury to nerves:

- Simple or first degree nerve damage can be a result of concussion. There is swelling on the nerve related to trauma of some kind and this will usually resolve.
- Second degree or complicated nerve damage is when the centre of the nerve degenerates while the sheath is maintained. In this case the nerve fibres will eventually grow again.
- Third degree nerve damage is when the nerve sheath is also damaged and this injury will need to be repaired surgically. In some cases the sheath can be replaced to allow the nerve to regrow or else a nerve can be transplanted from somewhere else such as the tongue.

Assessment

When a patient first attends the Lindens Clinic an assessment of the nerve damage will be made. Testing can differentiate between second and third degree nerve damage. If there are no signs of nerve activity after a year then surgery will usually be required.

The history of onset is an important piece of information in the assessment of nerve damage and how it will progress.

- Nerve injury related to a **viral infection** (eg Bells Palsy) will usually resolve in about six weeks. After more serious viral infections such as shingles it may take much longer for the nerve to recover.
- **Slow onset** of nerve damage with no obvious cause will require investigation with MRI
- Nerve damage may be associated with a **skull fracture** and in this case there may also be brain damage which may affect the patient's ability to maintain treatment.
- **Birth injury** such as a forceps delivery, can cause facial nerve damage in children
- **Skull base surgery** to remove tumours such as acoustic neuroma. In this case the history of when the paralysis occurred is also important.
 - If the paralysis is present before surgery the prognosis is not so good, but it is possible to assess how much the nerve is affected and how close the tumour is to the facial nerve.
 - Paralysis may occur during surgery, or there may be full function at the end of surgery which becomes reduced in the hours following surgery.

- Paralysis that occurs several days after surgery is usually due to post operative swelling and has a better prognosis.

Diana maintains that the use of steroids for a short period after surgery would significantly reduce the amount of paralysis suffered by patients following surgery.

After taking a history a visual assessment of facial movement is taken using a camera to record the ability to move the different parts of the face. There is a grading system which scores between 0 – 100% for different parts of the face. Marks are deducted for poor quality of movement. This is a much more sensitive measure for assessment and recording progress than the standard scale used by surgeons, the House-Brackman scale which has only 6 grades. The assessment is recorded on video so patients can view their progress over time.

The facial nerve has 5 branches that all arise from the ear and spread across the face. (Fig 1) If the nerve is damaged where all the branches are together (as may happen in surgery for acoustic neuroma) this will require a large amount of regrowth – different branches can be affected at different levels. As the nerves grow back they may not be well insulated and this can contribute to synkinesis.

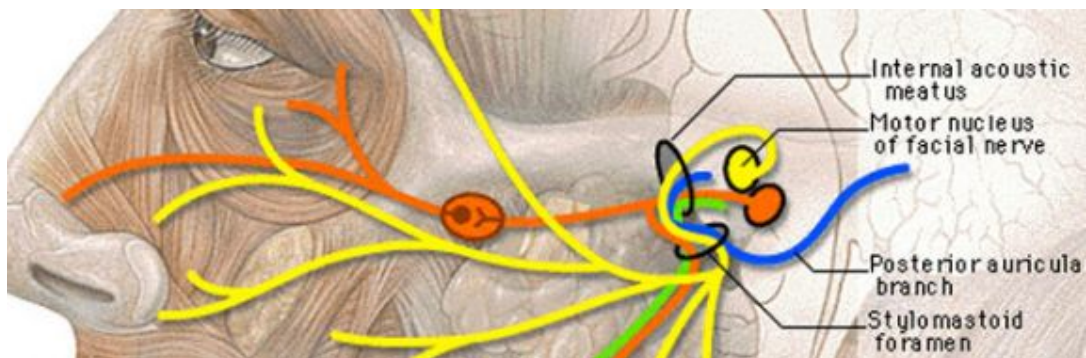


Fig 1 Facial nerves

Facial synkinesis is the involuntary movement of facial muscles that accompanies purposeful movement of some other set of muscles; for example, facial synkinesis may result in the mouth involuntarily closing or grimacing when the eyes are purposefully closed.

Each branch of the facial nerve is tested using electromyography (EMG). This is a quick and painless way of accurately testing the level of nerve function. Electrodes are placed on the face and these produce a graph comparing electrical (nerve) activity on the unaffected and the affected side of the face and the level on the affected side is measured as a percentage of that on the ‘good’ side. This test allows an assessment of where the weaknesses are which can help when planning treatment with the trophic stimulator.

Treatment

The main problem for someone who has a facial palsy is the imbalance in the strength of muscles and movement in the face, both in relation to the initial injury and also frequently once the nerve starts to grow. **Biofeedback** techniques are used to help patients to retain **balance** in their facial muscles by actively sensing the motion of their muscles. The method used at the Lindens clinic is electromyographic feedback in which the patient can see the EMG signals coming from both sides of the face on a computer screen and can try to control their muscles so that the two sides of the face are balanced. Keeping the facial muscles balanced is an important way of controlling synkinesis and this is helped by keeping the 'good' side very relaxed. Exercises are tailored to what the patient can actually do and patients can become aware of when the movement feels 'right' and then the movement will come more naturally. Once they have learned the exercises using EMG and the computer they can practice at home in a mirror.

Nerves stimulate muscles and promote movement so when nerves are not working this can cause the muscle fibres to break down and muscles become wasted. **Trophic Electrical Stimulation** (TES) is delivered via a small machine which is attached to electrodes placed on the face, the position determined by the EMG measurements. TES copies the underlying signals which nerves in normally functioning systems feed to the muscle to keep it in good health so there is not a mismatch between new nerve growth and wasted muscle. The repeated signal is the impetus for the muscle to rebuild itself, but it does take time. Patients are given a trophic stimulator that has been specifically programmed for their use and a photograph which shows them where to position the electrodes. The amount of time treatment is required varies in relation to the type of nerve injury. For a very 'floppy' nerve, treatment may be for as much as three hours a day, however once regrowth has started it is more likely to be a programme of about 30 minutes for four days a week – rather like a normal exercise programme.

Diana showed a series of pictures illustrating how patients, including children, had improved with treatment.



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There were a few questions and some discussion.

- Diana was asked how long after surgery for acoustic neuroma would the treatment be effective and she said that as long as there is some nerve activity it can be worked and the trophic stimulator can help to improve movement. She said that sometimes the nerve supply is there but is ignored as the patient is too busy working the 'good' side.
- She was asked about referral and said patients can self- refer but that some patient were managing to get PCT funding through their GP. Sometimes this is helped if an initial assessment had been carried out – an initial assessment will cost £125.
- When asked about how long treatment is continued she said that it does vary – for a chronic case it will usually be 12 – 20 months and a decision will be made at the beginning of treatment about how long to continue. Post surgery with a very 'floppy' nerve the plan may be for three years

We would like to thank Diana and her husband for traveling down from Manchester to speak to us and for providing such an interesting and enjoyable talk.