CASE STUDY

PART 1 - Patient with Brown-Sequard Syndrome

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Brown-Séquard syndrome is an incomplete lesion of the spinal cord characterized by ipsilateral upper motor neuron paralysis and loss of proprioception, with contralateral loss of pain and temperature sensation. A zone of partial preservation or segmental ipsilateral lower motor neuron weakness and analgesia may be noted.

Diagnosis and History

- Mr. A is a 62 year old ♂ working in the building industry (role includes office work and site visits)
- 1999 Cervical spondylosis, Left C6 and C7 radiculopathy, 2000 TIA
- Surgery: C4-7 laminoplasty (2000), C6/7 foramenotomy (Sept 2009)
- Symptoms: motor dysfunction on left side, with ↓ sensation and ↑ pain right side indicative of Brown-Sequard syndrome
Subjective Assessment

- Mr. A reports that his main problem is the high effort he needs to walk, particularly as his work requires lots of walking on uneven ground.
- His initial aim is to get rid of his hinged knee brace as it is causing all his trousers to get holes in them!

Objective Assessment

- Mr. A presents with predominant pattern of weakness in left lower limb with extensor tone in his calf when standing and walking.
- He wears a hinged knee brace and doesn’t use any walking aids.

Gait analysis

- Mr. A walks on his left toes and is unable to achieve heel strike due to increased tone in his calf.
- Left hip and knee collapse in stance phase of gait.
- Compensatory strategies- Mr. A side flexes on the right during left swing phase, circumducts his left hip during swing phase.

Treatment

Set-up

- Stimulation over the common peroneal nerve to treat Mr. A’s dropped foot was initially trialled. Although this aided some floor clearance it didn’t have a significant improvement in walking, mainly due to the increased tone in his calf resisting stimulation.
- Stimulation over quadriceps was trialled with the foot switch in the right shoe to come on at heel rise as Mr. A is unable to achieve heel strike on the left side. This was effective in improving stability at the knee.
- In discussion with Mr. A we decided to concentrate on his goal of no longer needing his hinged knee brace and therefore use stimulation over his quadriceps muscles as a first line of treatment and thought that improving his stability may help reduce his calf tone. We supplied Mr. A with a foot-up splint to correct the dropped foot in the short-term, with the view of introducing FES later on to correct his dropped foot.

6week R/V

- Mr. A was using quads stimulation on a daily basis. Mr. A’s wife and colleagues reported that he is walking more upright since starting FES.
- Mr. A didn’t yet feel confident enough to take off his knee brace.
- Due to skin breakdown on his 5th toe, Mr. A was unable to use his foot-up splint.

Changes to treatment

- Set up with exercise mode over quadriceps in order to focus Mr. A on “joining in" with the contraction and therefore improve his independent strength in his quadriceps, once improved we will move on to more functional, weightbearing exercises to improve stability e.g. squats.
• We were able to get Mr. A walking in clinic with no knee brace with quads stimulation. He was keen to carry this on at home.
• Mr. A agreed to re-trial his foot-up splint with softer shoes, beginning with intermittent use.

Outcomes
• Physiological Cost Index and walking speed are our main outcome measures as the effort of walking is one of the main goals Mr. A wants to improve. At the 6/52 review there weren’t any improvements in these outcome measures, however we will continue to re-assess these and it may be later on down the line that we see changes in these outcome measures.
• We will also be carrying out further gait analysis to gain information about what changes occur in different joints e.g. hip and knee

Discussion
Mr. A presents with Brown-Séquard syndrome, and therefore doesn’t have a simple dropped foot problem. It was clear that purely concentrating on his distal tone/weakness issues were not going to initially have a significant effect on his walking, which is why we decided to concentrate on stability at the knee firstly. Once his knee becomes more stable, this in itself may reduce his calf tone and he may then respond better to common peroneal nerve stimulation. We therefore will continue to work on his stability throughout his left leg with FES and physiotherapy and in the future re-try stimulation to correct his dropped foot and therefore hopefully work towards his goal of reducing the effort required to walk on uneven surfaces.

Mr. A is to be reviewed in 3/12 time for full gait lab assessment.

Watch this space……..