Patterns of use and users’ perceptions of the Odstock Dropped Foot Stimulator following stroke and multiple sclerosis

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Abstract

A purpose designed questionnaire was sent to 285 users of FES to assist walking who started their treatment between July 2000 and July 2002. 211 replies were received of which 145 were single-channel and 66 two-channel dropped foot stimulator users. Overall satisfaction with the device and the clinical service was high. The most commonly cited reason for using the device was that it reduced the effort of gait. The device also reduced tripping and increased the confidence while walking. Half of the users who had had a stroke reported a significant carryover effect. Some problems were reported with locating electrode positions and equipment reliability although these were less than previously reported. Skin irritation is a problem for some users.

1 Introduction

The Odstock Dropped Foot Stimulator (ODFS) is a single channel foot switch controlled external FES device used for correction of dropped foot following upper motor neurone lesions. Stimulation of the common peroneal nerve elicits dorsiflexion and eversion, which prevents the toe catching the ground in the swing phase and enables safer weight bearing due to improved loading response at heel strike. The ODFS has been used at the Salisbury FES clinic since 1995 and its use is a recognised treatment in the UK health service [1].

Following medical referral, patients are assessed to see if the device assists their gait. If gait can be improved (between 80% and 90% of those referred) the patient is asked to return for two clinic sessions on consecutive days. On the first day they taught how to use the ODFS and on the second, their ability to do so is checked and walking speed and PCI recorded. Follow up is made at 6 weeks, after a further 3 months, then after a further 6 months and then either 6 monthly or yearly depending on the individual for as long as the device is used. Patients are encouraged to contact the clinic if they experience a problem so that continuity of treatment can be maintained [2].

The purpose of this study was to analyse the success of the FES service and find out what the service users thought of their treatment and equipment [3]. This is a follow up to a questionnaire survey carried out in 1997 [4]. The new survey has an extended scope to give a more detailed picture of how the device is used and has been targeted at a more homogeneous group from a defined time span.

2 Method

A purpose designed questionnaire was sent by post in July 2003 to all patients who used FES to assist walking and started their treatment at the Salisbury FES clinic between July 2000 and July 2002. Replies were anonymous but coded reply envelopes were used to identify non-respondents enabling a second questionnaire to be sent out 6 weeks after the first.

3 Results

286 questionnaires were sent out and replies received from 211 (74%) of which 66 used a two channel FES device. The results presented here are restricted to the 112 ODFS users who had a dropped foot due to stroke (cerebral vascular accident - CVA) 69 or multiple sclerosis (MS) 43. The other ODFS users were people who had a spinal cord injury (7), a traumatic brain injury (4), cerebral palsy (2), Parkinsons Disease (1) or unspecified cause (19). The mean age of those with CVA was 59.0 years (SD 14.7 years) and MS was 53.6 years (SD 8.5 years). Of those who had used the ODFS, 9 CVA and 3 MS had stopped using the device.
How is the ODFS used?
48% of CVA and 40% of MS use the ODFS every day while 15% of CVA and 28% of MS use it 4 to 6 days a week and 23% of CVA and 15% of MS use it 2 to 3 days a week. While 8% of CVA and 5% of MS regularly walk in excess of a mile (1.6km) with the ODFS the majority walk more restricted distances, 33% CVA and 38% MS walking between 100 and 500m and 38% CVA and 40% MS between 10 and 100m. 60% of CVA and 63% of MS use the device in their home while 72% of CVA and 88% of MS use it outside. Popular uses include shopping, 63% CVA and 60% of MS; day trips out; CVA 50% and MS 65% and socialising; 45% CVA and 43% of MS. 17% of CVA and 8% of MS used the ODFS while working.

The ODFS was found beneficial in situations such as climbing stairs, 40% CVA and 48%MS, and also descending stairs, 35% CVA and 52% MS. It was also useful when walking up an incline, 72% CVA and 73% MS. The device was also considered useful where the floor surface increased the resistance to moving the foot. 56% of CVA and 81% of MS found it beneficial when walking on carpet and 70% of both CVA and MS found its use beneficial when walking on rough ground.

Why do ODFS users choose to continue its use?
A list of 14 possible reasons for using the device was derived from discussions with ODFS users and also the clinical team. Questionnaire recipients were asked to identify all the reasons that applied to them and ring the single most important reason. Additionally, there was an option to offer alternative reasons. The most important reason to use the ODFS in both groups was that it reduced the amount of effort while walking, 27% CVA and 33% MS. The other most important reasons for the CVA group was that their walking was better without the ODFS after they had used the device (short term carryover effect) 22% and the hope that their walking would be improved in the long term 20%. The other most important reasons for the MS group were that they were less likely to trip when using the ODFS 28% and could walk further 10%.

When the contributing reasons given for using the ODFS are analysed, again less effort was the answer most often identified, 83% CVA and 88% MS. Second in the CVA group was the hope that their walking would improve in the long term, 73%, while this was identified by only 55% of MS. Equally important to the MS group to the reduction in effort was that they were less likely to trip while using the ODFS, 88%, while both groups were more confident while walking 70% CVA and 78% MS. Being able to walk further was identified by 58% of CVA and 75% of MS while walking faster was identified by 60% of both groups. Short term carry over was identified by 50% of CVA and 23% of MS.

Problems
While 50% of CVA and 38% of MS found the electrode positions easily, 18% of CVA and 33% of MS found that it was difficult to locate the correct positions. 48% of CVA and 20% of MS found wearing the device made dressing more difficult and 27% of CVA and 20% of MS had problems when undressing and dressing for the toilet. 27% of CVA and 20% of MS experienced difficulties with the equipment when transferring to and from the car. The sensation of the stimulation was considered mild by 37% of CVA and 30% of MS or moderate by 47% of CVA and 55% of MS and uncomfortable by only 5% of each group. 25% of CVA and 10% of MS always required help to put the equipment on while 48% of CVA and 58% of MS were fully independent. The perceived time to put on the equipment was a mean of 7.4 minutes for the CVA group and 7.9 minutes for the MS. Of those CVA ODFS users who had stopped using the device, their perceived time to put the device on was a mean 13.3 minutes.

10% of CVA and 18% of MS had experienced some difficulty in using the equipment while 44% of the CVA who had stopped using the device experienced problems. 22% of both groups had had reliability problems with the stimulator and 33% had experienced problems with the foot switch. 25% of both groups had experienced problems with either the electrode or footswitch cable. 33% of both groups had experienced some skin irritation at the electrode site at some time.

Opinion
The questionnaire gave a series of statements and the respondent was asked if they agreed or disagreed with the statement. 92% of CVA and 98% of MS were glad they had the ODFS and 91% of CVA and 90% of MS would recommend it to another person. 70% of CVA and 73% of MS agreed that its use increased their independence and 85% of CVA and 83%
of MS agreed that they were more confident when using the ODFS. 69% of CVA and 71% of MS agreed that it improved their quality of life. Only 22% of CVA and 20% of MS agreed that the equipment was of good cosmetic appearance while 17% of CVA and 35% of MS disagreed with this statement.

Why had those that had discontinued using the equipment stopped?
A list of reasons for stopping use of the ODFS was drawn up from clinical experience. The questionnaire asked that all the reasons that were relevant were identified and the most important reason selected. Additional reasons could be given if required. Of the 9 CVA users who had stopped the most important reason for 4 people was that they received too little benefit from its use. Other reasons were that it was too difficult to use 1, skin allergy 1 and oedema 1. Two MS users stopped because their mobility deteriorated, 1 because the stimulation was painful and 1 because the benefit was too small. Adding the all other contributing reasons together for both groups, 6 people received too little benefit from the device, 4 thought it was too much bother to use, 4 found the electrode positions too difficult to find and 3 found the device too difficult to use. Of the 9 CVA users who stopped 7 used the device on their left side while 2 used it on their right side.

Clinical Service
Overall satisfaction with the clinical service was very high. Clinical treatment, the clinician’s explanation of the device, the instruction manual and technical and administrative service were all judged to be good or very good. The one area of complaint was the parking facilities, judged by 32% of CVA and 18% of MS to be inadequate or poor.

4 Discussion and Conclusions
While the questionnaire was answered anonymously, respondents would have been aware that it was sent from Salisbury and may therefore have been influenced in their replies. Overall compliance with treatment was high with only 12 discontinuing out of 145 ODFS users. However it is likely that there was a greater number of discontinuing ODFS users amongst the 74 people who did not return the questionnaire. The compliance rate may also be biased by the number of people who had progressed to using a 2 channel FES device for gait. This device is generally used where there are more severe gait problems such as bilateral dropped foot, insufficient knee flexion or hip extension.

Like the earlier survey, the reduction in effort was seen as the most important reason for using the device [4]. However, a change from the previous survey is the much greater proportion of CVA ODFS users reporting the short term carryover effect as a reason for using the device, 50% compared to 15%. Another difference was the number of people reporting problems with finding the electrode position, 18% CVA and 33% MS compared to an overall level of 44%. This change may be due to improved clinical methods derived from the FES team’s experience.

A number of problems were experienced with equipment but less than were reported previously. Foot switches in particular have a finite life, lasting on average 6 months and therefore must be considered as a consumable item. Recent changes to some components have addressed the main areas of unreliability. More concerning are the reports of skin irritation at the electrode site although this was only a contributing reason to discontinuing in one case. It is important to maintain skin and electrode hygiene and replace the electrodes regularly. Once the skin has healed, in most cases use of the device can continue with an alternative electrode type.

Overall it is clear that the device provides useful function, is well accepted and is viable in clinical service.

References

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