

Two Case Studies: Individuals with Multiple Sclerosis (MS) using Functional Electrical Stimulation (FES) for Drop-Foot and Constipation

Mrs K, 56 years old, diagnosed (Δ) RRMS in 2005, EDSS 6.5

PMH: Osteoarthritis, left foot stress fracture 2011, Coeliac disease Δ 2016

Main problems: Right-sided leg weakness, paraesthesia, mobile with 2 elbow crutches, occasional falls.

FES Treatment: Mrs J. used FES¹ for right foot support in walking from 2010 to 2016. Discontinued in 2016 in favour of splint. In 2019, after 2x relapses, restarted FES with a PACE dropped foot stimulator to right dorsiflexor muscles.

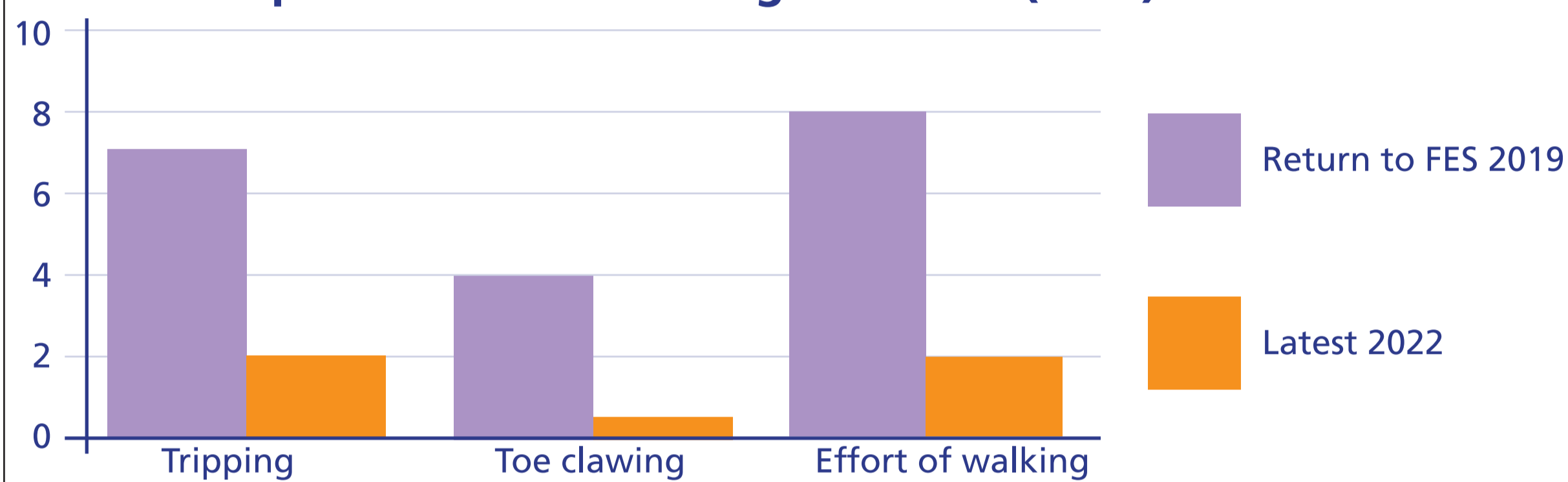
Gait with PACE:

↓ hip circumduction, effort of walking ↑ toe clearance, confidence & speed of walking



Gait Outcome Measures

Patient Reported Visual Analogue Scales (0-10)



Timed 10m Walk Test: Using 2x Elbow Crutches

	Baseline 2010	2019	Current Jan 2022
10m walk no FES	23.31s (+AFO)	21.0 s	18.41s, 27 steps
10m walk with FES	19.96s	18.11s	16.85s, 24 steps
Walk Speed with FES	0.50 m/s	0.55 m/s	0.59 m/s

Constipation: Onset since Δ MS 2005

HPC: Bowels open 1-2x per week, stools small and hard, difficult to pass. Abdominal pain, bloating, headaches, occasional bladder incontinence. Occasional enemas given by District Nurse.

Using Microstim (MS2) device to bilateral abdominal muscles² since March 2021. Twice daily for 30 mins as per protocol. Mode 7 (Frequency 40Hz), Current 35mA.



Constipation Outcome Measures

	Baseline March 2021	Current Jan 2022
Bristol Stool Chart	Type 1, 2	Type 4 (optimum)
Frequency of BO	1-2x/ week	3-5x/ week
Time spent on toilet	Up to 2 hours	5 minutes
Irrigation system	3-4x per week	1x per week
Macrogol	up to 21 sachets/ week	2-8 sachets/ week
Docusate	3x 100g daily	3x 100g daily

Significant improvements were seen in PAC SYM and PAC QOL questionnaires at 6 weeks, 3 months and 6 months.

Mrs K - comments after 7 weeks of abdominal FES

"I think it's brilliant! I feel like a normal person. I'm not stressed and I'm much quicker in the bathroom."

"I'm feeling 90% better than before. I don't have to strain like I used to."

Mr J: 54 years old, diagnosed RRMS 2000, now SPMS, EDSS 7

Main problems: Mobility limited to approx. 5m with 2x sticks or wall bars within home. Mr J confident with self-propelled wheelchair, but keen to maintain ability to transfer and to maximise benefits of weight-bearing.

Issued with a PACE dropped-foot stimulator¹ in November 2019.

Gait without FES: Right swing phase 8 secs duration



Weak hip and knee flexors; Vaults, rotates trunk



Toes remain on floor; adducts and drags right leg



Unable to clear left foot; high chance of tripping

Gait with FES: Right swing phase 2 secs duration



Achieves hip and knee flexion; neutral pelvis



Toe clearance in swing phase; greatly reduced effort



Steps beyond left foot increased stability



Constipation: Onset 2003

HPC: Bowels open 1-2x weekly, frequent UTIs, occasional incontinence. Bowel movements 'unpredictable and immediate'. Previous management included strict daily routine with glycerol suppositories and macrogol laxatives.

Issued with Microstim (MS2) device to bilateral abdominal muscles² since August 2020.

Followed protocol initially, now uses MS2 on alternate days for 60 mins; Mode 7 (Frequency 40Hz), Current 45mA.



Since using Abdominal FES

- Improved core strength and stability when seated
- Increased sitting and swimming endurance
- Improved stool consistency
- Halved laxative intake
- Reduced UTIs

Mr J's feedback

"I haven't had any toilet emergencies lately"

"I can swim up to 9 lengths of underwater dolphin stroke now!"

"It's easier to sit up in bed for longer now"

"I feel I have more ability to push to help void... I feel more in control"

With grateful thanks to Mrs K and Mr J for allowing me to share their experiences and to Christine Singleton, Team Lead at the FES Service, WMRC, for her clinical support and leadership.

Reference: 1. IPG278. January 2009. <http://guidance.nice.org.uk/IPG278>

2. Singleton, C. & Bakheit, A.M. (2013). J Medical Cases: 4(9). doi:10.4021/jmc1381w

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