

## BIODEX SD Case Report from an NHS Trust

### “Sue” a 69-year-old lady

Sue experienced an episode of vertigo that caused her to fall in September 2020. It had “really knocked her confidence”. She was anxious about walking outside.

After treatment for the vertigo, she started some home exercises:

1. Turning her head to left and right in standing
2. Walking down the kitchen with a stick in her right hand, turning her head to left and right as she walked
3. Walking down the kitchen with a stick in her right hand, moving her head up and down
4. Heel-toe standing with support, with either foot in front
5. Walking backwards, with support as needed
6. Heel-toe walking with support as needed

She first attended the outpatient Falls Clinic gym on 23rd September 2020. She found walking to the gym on her own quite traumatic, so she was met and accompanied.

#### Summary of Assessment findings

Falls Efficacy Scale-International (FES-I) score: 38/64 initially, improving to 19/64 by December 2020 (the lowest score/no fear of falling is 16/64).

She initially scored 5 activities as “very concerned she would fall”, two activities as “fairly concerned”, and three activities as “Somewhat concerned”.

By 14th December she was only very concerned about falling if walking on a slippery surface (e.g. wet or icy), which is an acceptable concern. She remained somewhat concerned she might fall when walking on uneven ground with just her stick.

She was not at all concerned she might fall for the other 14/16 of the activities listed.

#### Mobility

Sue initially arrived at the RSH hospital using a walking stick. She was met outside the main entrance as she needed accompaniment to enter the hospital due to the downward slope at the entrance. She was also anxious about walking along the corridors.

She was accompanied back along the corridors and up the slope to exit the hospital after each session. She was more confident if she had both her stick and my arm for support.

On 16th November I suggested you try walking with a four wheeled walker (4ww). Her posture and gait immediately improved, as did her confidence and gait speed. A 4ww was ordered for her personal use, which was delivered on 25th November.

By the 2nd December she had been outside several times with the 4ww, including over uneven pavements and to the shops. She no longer required accompaniment at the main entrance or along the corridors and did so using only her stick.

By March 2021 she was walking outside (to the corner of the road) with her stick.

#### Getting up from the floor

This was first practised on 7th October 2020 and proved difficult due to an old right arm injury.

By 14th December she was able to get up from the floor, leaning on furniture, without any prompting.

#### Stairs

She reported that she was able to go upstairs one foot after the other (reciprocally) using only one banister, such as when taking a cup of tea up to her husband. She said she came downstairs sideways, like a crab. Stepping down forwards (and up backwards) was practised at the bottom step of the practice stairs in the gym (holding 2 rails).

## BIODEX Balance platform results

### Clinical Test of Sensory Integration of Balance

(CTSIB) 30 secs each condition

Condition	Stability Index	Sway Index	Sway Index Norm
Eyes open firm surface	0.6	0.64	0.50
Eyes closed firm surface	2.3	0.67	1.00
Eyes open foam surface	1.3	1.29	0.75
Eyes closed foam surface	4.1	3.20	2.25

i.e. very good static balance. Her ability to balance on the foam cushion for 30 seconds with her eyes closed confirmed that the vertigo was resolved.

### Postural Stability

She was able to maintain her balance on unlocked platforms for 20 seconds to platform setting 7. (Platform setting 1 being the hardest & most unstable on the machine used).

### Weight shift & Limits of Stability (static platform)

She practised shifting weight over static feet in different directions on a static platform, progressing quickly to the task that looked like white Maltesers. The targets were set at the edge of her sway envelope. She worked with increasing time on targets, from 0.25 seconds to 0.50 seconds at each target. She achieved 6/8 direction control goals (>65% accuracy). Her ability to move your weight over her base of support (her feet) improved dramatically, along with her confidence in her balance abilities.

Sue attended a total of six x one-hour sessions, between 23/09/2020 and 21/12/2020 with the BIODEX balance platform, plus completed home exercises aimed at increasing strength and balance.

Further sessions were offered but she declined these due to concerns regarding the Covid pandemic and shielding her husband.

Test Item	Initial Score	Details	Final Score	Details
<b>Berg balance scale</b>	48/56	-	53/56	-
Stand to sit	4	No hands	4	-
Sitting unsupported	4	>120 secs	4	-
Sit to stand	4	No hands	4	-
Transfers	4	No hands	4	-
Standing with feet apart	4	120 secs	4	-
Standing with eyes closed	4	10 secs	4	30 secs
Standing with feet together	4	60 secs	4	-
Turning to look behind	4	Equal	4	-
Turning 360°	2	7 secs to right 6 secs to left	4	3.85 secs to right 3.51 secs to left
Standing with one foot in front	3	Small step 30 secs	4	Heel-toe 30 secs
Standing on one leg Average for her age: 11 secs	1	1 sec on each leg	1	2.85 secs on right 3.25 secs on left
Functional Reach (Av 28cm)	4	26cm	4	26cm
Bend to the floor	3	With supervision	4	Safely
Place alt foot on step x8	3	22.53 secs	4	12.33 secs

Turn 180°	-	5 steps both ways	-	4 steps both ways
Timed Up and Go Average for her age: 9 secs	-	19.24 secs with one stick	-	17.00 secs with one stick
30 second sit to stand Average for her age: x13 stands	-	X 7 stands in 30 secs	-	X11 stands in 30 secs

**Personal Goals**

1. To be able to cross the road safely (achieved)
2. Better balance (achieved)
3. To walk to the shops (achieved)
4. To be able to bend over to pick things up from the floor (achieved)

**Self-Management Plan**

To continue to maintain the improvement in her strength & balance, especially:

1. Stand on one leg with reduced support (she had been practising with a small ball under the supporting hand, until a visiting dog chewed it!)
2. Heel-toe stand without support for 30 seconds with each foot in front
3. Heel-toe walking with support as needed
4. Supported toe raises
5. Supported heel raises
6. Sit to stand x11 or more
7. Stand with eyes closed for 30 seconds
8. Step ups and step downs at the foot of the stairs

The evidence is that it takes six months of specific exercises to make lasting physiological changes to strength and balance. She accepted the offer of onward referral to the local Falls Revolution classes but only in their on-line format due to concerns about shielding her husband.

She was asked to continue with her home exercises three times a week until participating in the Falls Recovery sessions.

Sally Ann Belward  
Falls Clinical Lead Physiotherapist

**Appendix**

**Example of Limits of Stability Tests. Static platform & Easy skill level**

Trial	1	2	3	Goals	Range	Best (previous best)
Target time	.25	.25	.50	-	-	-
Trial time	47s	53s	61s	-	-	47s (50s)
Overall	54	46	51	0	46-54	54% (45%)
Forward	42	42	49	0	42-49	59%
Backward	<b>57</b>	28	<b>30</b>	2	28-57	<b>57% (52%)</b>
Right	<b>77</b>	<b>77</b>	<b>73</b>	3	73-77	<b>77% (67%)</b>
Left	<b>91</b>	<b>82</b>	<b>91</b>	3	82-91	<b>96%</b>
Forward/right	<b>77</b>	<b>73</b>	55	2	55-77	<b>77%</b> (60%)
Forward/left	56	59	45	0	45-59	59% (55%)
Backward/right	38	49	51	0	38-51	<b>67%</b>
Backward/left	40	21	44	0	21-44	<b>70%</b>
Goals achieved	4	3	3	10/24	-	4/8 (3/8) in one trial

**Entries in Bold** indicate that the goal of 65% accuracy was achieved (30% for Backward)

*This is the way I have found it easiest to analyse the results.*