

High-resolution and 3D anorectal manometric parameters based on the London Protocol as a useful tool in the evaluation and follow-up of incontinent women patients undergoing biofeedback therapy.

Table 1 Comparison of resting manometric parameters (pre and post-BF, 3 and 6m post-BF completion vs healthy volunteers)

Resting manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Mean maximum pressure (mmHg)	incontinent pre vs healthy	38.3 (13.7)	61.1 (16.3)	37.5 [16.2]	59.9 [22.1]	< 0.01
Mean maximum pressure (mmHg)	incontinent post vs healthy	44.6 (15.6)	61.1 (16.3)	44.3 [20.3]	59.9 [22.1]	< 0.01
Mean maximum pressure (mmHg)	incontinent 3m vs healthy	43.4 (15.2)	61.1 (16.3)	42.5 [25.2]	59.9 [22.1]	< 0.01
Mean maximum pressure (mmHg)	incontinent 6m vs healthy	38.8 (11.9)	61.1 (16.3)	37.3 [18.1]	59.9 [22.1]	< 0.01
Mean pressure (mmHg)	incontinent pre vs healthy	27.2 (7.9)	38.4 (9.6)	28.6 [11.8]	38.9 [15.3]	< 0.01
Mean pressure (mmHg)	incontinent post vs healthy	31.3 (7.9)	38.4 (9.6)	31.4 [12.2]	38.9 [15.3]	< 0.05
Mean pressure (mmHg)	incontinent 3m vs healthy	29.0 (7.7)	38.4 (9.6)	26.9 [10.3]	38.9 [15.3]	< 0.01
Mean pressure (mmHg)	incontinent 6m vs healthy	28.0 (7.5)	38.4 (9.6)	27.1 [10.5]	38.9 [15.3]	< 0.01
Functional anal canal length (cm)	incontinent pre vs healthy	2.6 (1.0)	3.5 (1.0)	2.5 [1.1]	3.6 [1.7]	< 0.01
Functional anal canal length (cm)	incontinent post vs healthy	3.0 (0.8)	3.5 (1.0)	3.0 [1.0]	3.6 [1.7]	0.076
Functional anal canal length (cm)	incontinent 3m vs healthy	2.8 (0.8)	3.5 (1.0)	2.7 [1.5]	3.6 [1.7]	<0.05
Functional anal canal length (cm)	incontinent 6m vs healthy	2.8 (0.7)	3.5 (1.0)	2.9 [1.0]	3.6 [1.7]	<0.05

Resting manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Resting PV (10 ⁴ mmHg ² .cm)	incontinent pre vs healthy	0.9 (0.7)	2.4 (1.5)	0.8 [0.7]	2.0 [2.2]	< 0.01
Resting PV (10 ⁴ mmHg ² .cm)	incontinent post vs healthy	1.3 (0.9)	2.4 (1.5)	1.1 [1.0]	2.0 [2.2]	< 0.01
Resting PV (10 ⁴ mmHg ² .cm)	incontinent 3m vs healthy	1.2 (0.8)	2.4 (1.5)	1.0 [1.0]	2.0 [2.2]	< 0.01
Resting PV (10 ⁴ mmHg ² .cm)	incontinent 6m vs healthy	1.0 (0.5)	2.4 (1.5)	0.9 [1.0]	2.0 [2.2]	< 0.01
Highest pressure asymmetry (%)	incontinent pre vs healthy	35.5 (13.9)	26.3 (9.8)	36.9 [22.7]	23.9 [10.6]	< 0.05
Highest pressure asymmetry (%)	incontinent post vs healthy	38.7 (13.1)	26.3 (9.8)	40.9 [11.1]	23.9 [10.6]	< 0.01
Highest pressure asymmetry (%)	incontinent 3m vs healthy	40.9 (11.7)	26.3 (9.8)	37.6 [14.8]	23.9 [10.6]	< 0.01
Highest pressure asymmetry (%)	incontinent 6m vs healthy	40.5 (16.1)	26.3 (9.8)	36.5 [18.9]	23.9 [10.6]	< 0.01
Lowest pressure asymmetry (%)	incontinent pre vs healthy	38.4 (18.7)	27.1 (13.0)	32.7 [19.7]	25.4 [13.0]	< 0.05
Lowest pressure asymmetry (%)	incontinent post vs healthy	41.6 (23.1)	27.1 (13.0)	37.4 [17.2]	25.4 [13.0]	< 0.05
Lowest pressure asymmetry (%)	incontinent 3m vs healthy	47.0 (18.0)	27.1 (13.0)	44.5 [21.9]	25.4 [13.0]	< 0.01
Lowest pressure asymmetry (%)	incontinent 6m vs healthy	42.9 (23.9)	27.1 (13.0)	38.3 [28.3]	25.4 [13.0]	< 0.05

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9 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

10 Bold values indicate statistically significant (p < 0.05)

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19 **Table 2 Comparison of squeeze manometric parameters (pre and post-BF, 3 and 6m post-BF**
20 **completion vs healthy volunteers)**

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Squeeze manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum incremental pressure (mmHg) short squeeze	incontinent pre vs healthy	43.3 (33.0)	108.7 (42.7)	38.6 [46.1]	102.5 [42.6]	<0.01
Maximum incremental pressure (mmHg) short squeeze	incontinent post vs healthy	60.6 (45.1)	108.7 (42.7)	43.5 [55.7]	102.5 [42.6]	<0.01
Maximum incremental pressure (mmHg) short squeeze	incontinent 3m vs healthy	58.0 (47.4)	108.7 (42.7)	43.3 [38.7]	102.5 [42.6]	<0.01
Maximum incremental pressure (mmHg) short squeeze	incontinent 6m vs healthy	47.3 (36.9)	108.7 (42.7)	36.8 [27.8]	102.5 [42.6]	<0.01
Mean pressure (mmHg) short squeeze	incontinent pre vs healthy	55.0 (25.7)	117.0 (40.6)	47 [36.4]	107.8 [38.4]	<0.01
Mean pressure (mmHg) short squeeze	incontinent post vs healthy	67.3 (29.8)	117.0 (40.6)	57.6 [43.2]	107.8 [38.4]	<0.01
Mean pressure (mmHg) short squeeze	incontinent 3m vs healthy	64.6 (30.2)	117.0 (40.6)	54.5 [25.0]	107.8 [38.4]	<0.01
Mean pressure (mmHg) short squeeze	incontinent 6m vs healthy	59.4 (28.4)	117.0 (40.6)	54.1 [25.0]	107.8 [38.4]	<0.01
Maximum absolute pressure (mmHg) short squeeze	incontinent pre vs healthy	77.9 (38.2)	169.9 (44.0)	66.6 [57.1]	168.5 [40.7]	<0.01
Maximum absolute pressure (mmHg) short squeeze	incontinent post vs healthy	101.8 (48.6)	169.9 (44.0)	89.4 [68.9]	168.5 [40.7]	<0.01
Maximum absolute pressure (mmHg) short squeeze	incontinent 3m vs healthy	97.7 (51.4)	169.9 (44.0)	85.7 [34.3]	168.5 [40.7]	<0.01
Maximum absolute pressure (mmHg) short squeeze	incontinent 6m vs healthy	83.9 (41.0)	169.9 (44.0)	74.9 [28.1]	168.5 [40.7]	<0.01

Squeeze manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Short squeeze PV (10 ⁴ mmHg ² .cm)	incontinent pre vs healthy	4.5 (5.5)	21.0 (13.1)	2.8 [4.4]	18.7 [10.4]	<0.01
Short squeeze PV (10 ⁴ mmHg ² .cm)	incontinent post vs healthy	7.3 (6.5)	21.0 (13.1)	5.0 [9.4]	18.7 [10.4]	<0.01
Short squeeze PV (10 ⁴ mmHg ² .cm)	incontinent 3m vs healthy	7.0 (8.1)	21.0 (13.1)	3.8 [3.3]	18.7 [10.4]	<0.01
Short squeeze PV (10 ⁴ mmHg ² .cm)	incontinent 6m vs healthy	5.4 (5.3)	21.0 (13.1)	3.7 [4.6]	18.7 [10.4]	<0.01
Highest pressure asymmetry (%) short squeeze	incontinent pre vs healthy	25.5 (10.9)	15.8 (5.6)	25.1 [11.4]	16.0 [7.5]	<0.01
Highest pressure asymmetry (%) short squeeze	incontinent post vs healthy	26.0 (11.6)	15.8 (5.6)	27.2 [16.5]	16.0 [7.5]	<0.01
Highest pressure asymmetry (%) short squeeze	incontinent 3m vs healthy	31.6 (14.5)	15.8 (5.6)	32.9 [19.5]	16.0 [7.5]	<0.01
Highest pressure asymmetry (%) short squeeze	incontinent 6m vs healthy	26.3 (13.0)	15.8 (5.6)	24.8 [19.1]	16.0 [7.5]	<0.01
Lowest pressure asymmetry (%) short squeeze	incontinent pre vs healthy	25.4 (11.4)	18.8 (9.2)	23.5 [15.2]	17.2 [11.9]	<0.05
Lowest pressure asymmetry (%) short squeeze	incontinent post vs healthy	24.2 (8.7)	18.8 (9.2)	21.5 [11.4]	17.2 [11.9]	<0.05
Lowest pressure asymmetry (%) short squeeze	incontinent 3m vs healthy	32.3 (16.0)	18.8 (9.2)	30.9 [29.7]	17.2 [11.9]	<0.01
Lowest pressure asymmetry (%) short squeeze	incontinent 6m vs healthy	26.0 (13.7)	18.8 (9.2)	24.3 [20.5]	17.2 [11.9]	0.076
Fatigue rate index long squeeze (min)	incontinent pre vs healthy	0.8 (0.7)	1.6 (2.2)	0.5 [0.3]	0.8 [0.9]	<0.05
Fatigue rate index long squeeze (min)	incontinent post vs healthy	0.7 (0.4)	1.6 (2.2)	0.6 [0.4]	0.8 [0.9]	0.081
Fatigue rate index long squeeze (min)	incontinent 3m vs healthy	0.9 (0.8)	1.6 (2.2)	0.7 [0.4]	0.8 [0.9]	0.174
Fatigue rate index long squeeze (min)	incontinent 6m vs healthy	2.1 (4.2)	1.6 (2.2)	0.7 [0.6]	0.8 [0.9]	0.914

Squeeze manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Fatigue rate long squeeze (mmHg)	incontinent pre vs healthy	-21.5 (41.4)	-74.9 (46.4)	-12.7 [32.2]	-69.8 [44.3]	<0.01
Fatigue rate long squeeze (mmHg)	incontinent post vs healthy	-34.4 (33.5)	-74.9 (46.4)	-31.9 [54.7]	-69.8 [44.3]	<0.01
Fatigue rate long squeeze (mmHg)	incontinent 3m vs healthy	-41.6 (45.9)	-74.9 (46.4)	-30.3 [36.9]	-69.8 [44.3]	<0.01
Fatigue rate long squeeze (mmHg)	incontinent 6m vs healthy	-19.5 (33.3)	-74.9 (46.4)	-17.5 [27.0]	-69.8 [44.3]	<0.01
Capacity to sustain (%) long squeeze	incontinent pre vs healthy	84.0 (25.5)	71.6 (14.8)	85.1 [33.2]	73.4 [19.0]	0.063
Capacity to sustain (%) long squeeze	incontinent post vs healthy	78.6 (20.3)	71.6 (14.8)	76.3 [29.9]	73.4 [19.0]	0.261
Capacity to sustain (%) long squeeze	incontinent 3m vs healthy	75.8 (21.0)	71.6 (14.8)	71.6 [28.9]	73.4 [19.0]	0.694
Capacity to sustain (%) long squeeze	incontinent 6m vs healthy	87.4 (23.2)	71.6 (14.8)	88.2 [26.4]	73.4 [19.0]	<0.05
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	incontinent pre vs healthy	2.0 (2.2)	11.8 (7.9)	1.5 [1.7]	9.8 [6.0]	<0.01
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	incontinent post vs healthy	3.8 (3.5)	11.8 (7.9)	2.9 [3.2]	9.8 [6.0]	<0.01
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	incontinent 3m vs healthy	4.3 (4.6)	11.8 (7.9)	2.7 [3.6]	9.8 [6.0]	<0.01
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	incontinent 6m vs healthy	2.9 (2.8)	11.8 (7.9)	2.2 [1.9]	9.8 [6.0]	<0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	incontinent pre vs healthy	1.7 (1.3)	9.8 (7.2)	1.3 [1.0]	7.7 [8.8]	<0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	incontinent post vs healthy	3.3 (3.1)	9.8 (7.2)	2.4 [1.9]	7.7 [8.8]	<0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	incontinent 3m vs healthy	3.1 (3.1)	9.8 (7.2)	2.1 [2.5]	7.7 [8.8]	<0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	incontinent 6m vs healthy	2.4 (2.6)	9.8 (7.2)	1.8 [1.5]	7.7 [8.8]	<0.01
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	incontinent pre vs healthy	1.6 (1.2)	8.3 (5.6)	1.3 [1.2]	7.2 [7.2]	<0.01
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	incontinent post vs healthy	3.1 (2.7)	8.3 (5.6)	2.2 [2.3]	7.2 [7.2]	<0.01
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	incontinent 3m vs healthy	3.0 (2.8)	8.3 (5.6)	1.8 [2.1]	7.2 [7.2]	<0.01

Squeeze manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	incontinent 6m vs healthy	2.3 (2.3)	8.3 (5.6)	1.9 [1.2]	7.2 [7.2]	<0.01

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23 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

24 Bold values indicate statistically significant ($p < 0.05$)

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51 **Table 3 Comparison of cough manometric parameters (pre and post-BF, 3 and 6m post-BF**
52 **completion vs healthy volunteers)**
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Cough manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum pressure anal canal (mmHg)	incontinent pre vs healthy	78.7 (25.2)	133.2 (31.6)	76.3 [20.0]	134.6 [27.4]	<0.01
Maximum pressure anal canal (mmHg)	incontinent post vs healthy	92.5 (30.7)	133.2 (31.6)	84.2 [26.6]	134.6 [27.4]	<0.01
Maximum pressure anal canal (mmHg)	incontinent 3m vs healthy	94.5 (26.3)	133.2 (31.6)	95.1 [20.8]	134.6 [27.4]	<0.01
Maximum pressure anal canal (mmHg)	incontinent 6m vs healthy	89.1 (29.3)	133.2 (31.6)	88.4 [29.4]	134.6 [27.4]	<0.01
Maximum pressure rectum (mmHg)	incontinent pre vs healthy	57.1 (20.6)	65.5 (23.8)	54.4 [25.3]	65.0 [32.3]	0.308
Maximum pressure rectum (mmHg)	incontinent post vs healthy	64.1 (23.0)	65.5 (23.8)	65.3 [25.6]	65.0 [32.3]	0.897
Maximum pressure rectum (mmHg)	incontinent 3m vs healthy	64.6 (20.1)	65.5 (23.8)	67.8 [18.5]	65.0 [32.3]	0.938
Maximum pressure rectum (mmHg)	incontinent 6m vs healthy	62.9 (21.2)	65.5 (23.8)	62.6 [27.5]	65.0 [32.3]	0.767
Anorectal gradient pressure (mmHg)	incontinent pre vs healthy	21.6 (17.2)	67.7 (22.1)	19.5 [28.1]	62.6 [35.3]	<0.01
Anorectal gradient pressure (mmHg)	incontinent post vs healthy	28.4 (26.2)	67.7 (22.1)	19.7 [27.1]	62.6 [35.3]	<0.01
Anorectal gradient pressure (mmHg)	incontinent 3m vs healthy	29.7 (25.7)	67.7 (22.1)	25.2 [38.2]	62.6 [35.3]	<0.01
Anorectal gradient pressure (mmHg)	incontinent 6m vs healthy	26.7 (24.0)	67.7 (22.1)	18.6 [27.4]	62.6 [35.3]	<0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	incontinent pre vs healthy	3.6 (2.6)	11.0 (4.8)	3.0 [3.0]	10.6 [5.7]	<0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	incontinent post vs healthy	5.0 (3.8)	11.0 (4.8)	4.2 [3.9]	10.6 [5.7]	<0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	incontinent 3m vs healthy	5.3 (3.5)	11.0 (4.8)	5.2 [2.9]	10.6 [5.7]	<0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	incontinent 6m vs healthy	4.3 (3.1)	11.0 (4.8)	3.8 [3.6]	10.6 [5.7]	<0.01

Cough manometric parameters	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Highest pressure asymmetry (%) anal canal	incontinent pre vs healthy	21.3 (9.7)	14.4 (5.9)	18.6 [14.9]	13.9 [6.9]	<0.05
Highest pressure asymmetry (%) anal canal	incontinent post vs healthy	19.8 (10.8)	14.4 (5.9)	17.4 [12.2]	13.9 [6.9]	0.069
Highest pressure asymmetry (%) anal canal	incontinent 3m vs healthy	22.8 (10.7)	14.4 (5.9)	20.5 [12.4]	13.9 [6.9]	<0.01
Highest pressure asymmetry (%) anal canal	incontinent 6m vs healthy	24.5 (13.5)	14.4 (5.9)	24.1 [14.4]	13.9 [6.9]	<0.01
Lowest pressure asymmetry (%) anal canal	incontinent pre vs healthy	17.8 (8.0)	14.7 (4.8)	16.9 [10.7]	14.9 [5.5]	0.258
Lowest pressure asymmetry (%) anal canal	incontinent post vs healthy	18.5 (14.9)	14.7 (4.8)	13.8 [11.9]	14.9 [5.5]	0.992
Lowest pressure asymmetry (%) anal canal	incontinent 3m vs healthy	19.7 (13.2)	14.7 (4.8)	14.9 [7.0]	14.9 [5.5]	0.453
Lowest pressure asymmetry (%) anal canal	incontinent 6m vs healthy	20.7 (15.3)	14.7 (4.8)	15.2 [15.4]	14.9 [5.5]	0.362

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55 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

56 Bold values indicate statistically significant ($p < 0.05$)

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Table 4 Comparison of rectal sensory thresholds and RAIR parameters (pre and post-BF, 3 and 6m post-BF completion vs healthy volunteers)

Rectal sensory thresholds; RAIR	Comparison incontinent (1) vs healthy (2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
First sensation volume (ml)	incontinent pre vs healthy	35.6 (22.3)	22.9 (17.9)	35.0 [34.2]	16.0 [22.0]	<0.05
First sensation volume (ml)	incontinent post vs healthy	26.6 (22.2)	22.9 (17.9)	18.5 [21.5]	16.0 [22.0]	0.652
First sensation volume (ml)	incontinent 3m vs healthy	30.4 (29.6)	22.9 (17.9)	22.0 [32.0]	16.0 [22.0]	0.611
First sensation volume (ml)	incontinent 6m vs healthy	22.5 (17.6)	22.9 (17.9)	18.0 [16.0]	16.0 [22.0]	0.915
Desire to defaecate volume (ml)	incontinent pre vs healthy	59.5 (28.3)	38.5 (19.7)	60.0 [31.7]	34.0 [25.0]	<0.01
Desire to defaecate volume (ml)	incontinent post vs healthy	54.7 (25.4)	38.5 (19.7)	52.0 [37.5]	34.0 [25.0]	<0.05
Desire to defaecate volume (ml)	incontinent 3m vs healthy	49.9 (30.2)	38.5 (19.7)	46.0 [49.0]	34.0 [25.0]	0.270
Desire to defaecate volume (ml)	incontinent 6m vs healthy	46.0 (21.4)	38.5 (19.7)	46.0 [30.0]	34.0 [25.0]	0.245
Maximum tolerated volume (ml)	incontinent pre vs healthy	95.5 (40.8)	141.4 (53.1)	93.0 [44.7]	132.0 [58.0]	<0.01
Maximum tolerated volume (ml)	incontinent post vs healthy	137.0 (37.7)	141.4 (53.1)	143.0 [53.7]	132.0 [58.0]	0.960
Maximum tolerated volume (ml)	incontinent 3m vs healthy	141.8 (42.5)	141.4 (53.1)	142.0 [52.0]	132.0 [58.0]	0.596
Maximum tolerated volume (ml)	incontinent 6m vs healthy	123.7 (33.9)	141.4 (53.1)	116.0 [52.0]	132.0 [58.0]	0.337
Anal canal relaxation (%)	incontinent pre vs healthy	35.7 (22.2)	36.8 (15.8)	25.0 [34.2]	33.3 [19.2]	0.490
Anal canal relaxation (%)	incontinent post vs healthy	31.2 (21.6)	36.8 (15.8)	26.1 [31.5]	33.3 [19.2]	0.143
Anal canal relaxation (%)	incontinent 3m vs healthy	32.3 (18.8)	36.8 (15.8)	30.7 [15.0]	33.3 [19.2]	0.360
Anal canal relaxation (%)	incontinent 6m vs healthy	32.2 (18.7)	36.8 (15.8)	35.3 [22.3]	33.3 [19.2]	0.554

BF (biofeedback); SD standard deviation, Med Median, IQR Interquartile range

Bold values indicate statistically significant ($p < 0.05$)

74 **Table 5 Comparison of fecal incontinence scores - incontinent patients (pre and post-BF, 3m and 6m**
75 **post-BF completion)**

Incontinence Scoring	Comparison (time 1; time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
CCFIS	pre vs post	13.2 (3.8)	3.6 (2.4)	13.0 [5.5]	3.0 [2.2]	< 0.01
CCFIS	pre vs 3m	13.2 (3.8)	2.7 (2.6)	13.0 [5.5]	2.0 [2.0]	< 0.01
CCFIS	pre vs 6m	13.2 (3.8)	2.4 (1.8)	13.0 [5.5]	2.0 [2.0]	< 0.01
CCFIS	post vs 3m	3.6 (2.4)	2.7 (2.6)	3.0 [2.2]	2.0 [2.0]	< 0.05
CCFIS	post vs 6m	3.6 (2.4)	2.4 (1.8)	3.0 [2.2]	2.0 [2.0]	< 0.01
CCFIS	3m vs 6m	2.7 (2.6)	2.4 (1.8)	2.0 [2.0]	2.0 [2.0]	0.609
SMIC	pre vs post	14.7 (4.5)	3.5 (3.1)	15.0 [3.5]	3.0 [1.5]	< 0.01
SMIC	pre vs 3m	14.7 (4.5)	2.7 (3.7)	15.0 [3.5]	1.0 [2.0]	< 0.01
SMIC	pre vs 6m	14.7 (4.5)	2.1 (2.3)	15.0 [3.5]	1.0 [2.0]	< 0.01
SMIC	post vs 3m	3.5 (3.1)	2.7 (3.7)	3.0 [1.5]	1.0 [2.0]	< 0.05
SMIC	post vs 6m	3.5 (3.1)	2.1 (2.3)	3.0 [1.5]	1.0 [2.0]	< 0.01
SMIC	3m vs 6m	2.7 (3.7)	2.1 (2.3)	1.0 [2.0]	1.0 [2.0]	0.493

99 CCFIS (Cleveland Clinic Fecal Incontinence Severity Scoring System)

100 SMIC (St. Mark's Incontinence Score)

101 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

102 Bold values indicate statistically significant (p < 0.05)

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109 **Table 6 Comparison of resting manometric parameters - incontinent patients (pre and post-BF, 3m**
110 **and 6m post-BF completion)**
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Resting manometric parameters	Comparison (time 1; time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Mean maximum pressure (mmHg)	pre vs post	38.3 (13.7)	44.6 (15.6)	37.5 [16.2]	44.3 [20.3]	0.056
Mean maximum pressure (mmHg)	pre vs 3m	38.3 (13.7)	43.4 (15.2)	37.5 [16.2]	42.5 [25.2]	0.071
Mean maximum pressure (mmHg)	pre vs 6m	38.3 (13.7)	38.8 (11.9)	37.5 [16.2]	37.3 [18.1]	0.490
Mean maximum pressure (mmHg)	post vs 3m	44.6 (15.6)	43.4 (15.2)	44.3 [20.3]	42.5 [25.2]	0.759
Mean maximum pressure (mmHg)	post vs 6m	44.6 (15.6)	39.0 (11.9)	44.3 [20.3]	37.3 [18.1]	0.145
Mean maximum pressure (mmHg)	3m vs 6m	43.4 (15.2)	39.0 (11.9)	42.5 [25.2]	37.3 [18.1]	0.170
Mean pressure (mmHg)	pre vs post	27.2 (7.9)	31.3 (7.9)	28.6 [11.8]	31.4 [12.2]	< 0.01
Mean pressure (mmHg)	pre vs 3m	27.2 (7.9)	29.0 (7.7)	28.6 [11.8]	26.9 [10.3]	0.100
Mean pressure (mmHg)	pre vs 6m	27.2 (7.9)	28.0 (7.5)	28.6 [11.8]	27.1 [10.5]	0.275
Mean pressure (mmHg)	post vs 3m	31.3 (7.9)	29.0 (7.7)	31.4 [12.2]	26.9 [10.3]	0.144
Mean pressure (mmHg)	post vs 6m	31.3 (7.9)	28.0 (7.5)	31.4 [12.2]	27.1 [10.5]	< 0.05
Mean pressure (mmHg)	3m vs 6m	29.0 (7.7)	28.0 (7.5)	26.9 [10.3]	27.1 [10.5]	0.841
Functional anal canal length (cm)	pre vs post	2.6 (1.0)	3.0 (0.8)	2.5 [1.1]	3.0 [1.0]	< 0.05
Functional anal canal length (cm)	pre vs 3m	2.6 (1.0)	2.8 (0.8)	2.5 [1.1]	2.7 [1.5]	< 0.05
Functional anal canal length (cm)	pre vs 6m	2.6 (1.0)	2.8 (0.7)	2.5 [1.1]	2.9 [1.0]	0.061
Functional anal canal length (cm)	post vs 3m	3.0 (0.8)	2.8 (0.8)	3.0 [1.0]	2.7 [1.5]	0.204

Resting manometric parameters	Comparison (time 1; time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Functional anal canal length (cm)	post vs 6m	3.0 (0.8)	2.8 (0.7)	3.0 [1.0]	2.9 [1.0]	0.376
Functional anal canal length (cm)	3m vs 6m	2.8 (0.8)	2.8 (0.7)	2.7 [1.5]	2.9 [1.0]	0.760
Resting PV (10 ⁴ mmHg ² .cm)	pre vs post	0.9 (0.7)	1.3 (0.9)	0.8 [0.7]	1.1 [1.0]	< 0.05
Resting PV (10 ⁴ mmHg ² .cm)	pre vs 3m	0.9 (0.7)	1.2 (0.8)	0.8 [0.7]	1.0 [1.0]	0.086
Resting PV (10 ⁴ mmHg ² .cm)	pre vs 6m	0.9 (0.7)	1.0 (0.5)	0.8 [0.7]	0.9 [1.0]	0.334
Resting PV (10 ⁴ mmHg ² .cm)	post vs 3m	1.3 (0.9)	1.2 (0.8)	1.1 [1.0]	1.0 [1.0]	0.472
Resting PV (10 ⁴ mmHg ² .cm)	post vs 6m	1.3 (0.9)	1.0 (0.5)	1.1 [1.0]	0.9 [1.0]	0.123
Resting PV (10 ⁴ mmHg ² .cm)	3m vs 6m	1.2 (0.8)	1.0 (0.5)	1.0 [1.0]	0.9 [1.0]	0.277
Highest pressure asymmetry (%)	pre vs post	35.5 (13.9)	38.7 (13.1)	36.9 [22.7]	40.9 [11.1]	0.242
Highest pressure asymmetry (%)	pre vs 3m	35.5 (13.9)	40.9 (11.7)	36.9 [22.7]	37.6 [14.8]	0.244
Highest pressure asymmetry (%)	pre vs 6m	35.5 (13.9)	40.5 (16.1)	36.9 [22.7]	36.5 [18.9]	0.156
Highest pressure asymmetry (%)	post vs 3m	38.7 (13.1)	40.9 (11.7)	40.9 [11.1]	37.6 [14.8]	0.495
Highest pressure asymmetry (%)	post vs 6m	38.7 (13.1)	40.5 (16.1)	40.9 [11.1]	36.5 [18.9]	0.643
Highest pressure asymmetry (%)	3m vs 6m	40.9 (11.7)	40.5 (16.1)	37.6 [14.8]	36.5 [18.9]	0.459
Lowest pressure asymmetry (%)	pre vs post	38.4 (18.7)	41.6 (23.1)	32.7 [19.7]	37.4 [17.2]	0.605
Lowest pressure asymmetry (%)	pre vs 3m	38.4 (18.7)	47.0 (18.0)	32.7 [19.7]	44.5 [21.9]	0.243
Lowest pressure asymmetry (%)	pre vs 6m	38.4 (18.7)	42.9 (23.9)	32.7 [19.7]	38.3 [28.3]	0.542
Lowest pressure asymmetry (%)	post vs 3m	41.6 (23.1)	47.0 (18.0)	37.4 [17.2]	44.5 [21.9]	0.495
Lowest pressure asymmetry (%)	post vs 6m	41.6 (23.1)	42.9 (23.9)	37.4 [17.2]	38.3 [28.3]	0.896

Resting manometric parameters	Comparison (time 1; time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Lowest pressure asymmetry (%)	3m vs 6m	47.0 (18.0)	42.9 (23.9)	44.5 [21.9]	38.3 [28.3]	0.182

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113 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

114 Bold values indicate statistically significant ($p < 0.05$)

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142 **Table7 Comparison of squeeze manometric parameters - incontinent patients (pre and post-BF, 3m**
143 **and 6m post-BF completion)**
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Squeeze manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum incremental pressure (mmHg) short squeeze	pre vs post	43.3 (33.0)	60.6 (45.1)	38.6 [46.1]	43.5 [55.7]	< 0.01
Maximum incremental pressure (mmHg) short squeeze	pre vs 3m	43.3 (33.0)	58.0 (47.4)	38.6 [46.1]	43.3 [38.7]	< 0.01
Maximum incremental pressure (mmHg) short squeeze	pre vs 6m	43.3 (33.0)	47.3 (36.9)	38.6 [46.1]	36.8 [27.8]	< 0.01
Maximum incremental pressure (mmHg) short squeeze	post vs 3m	60.6 (45.1)	58.0 (47.4)	43.5 [55.7]	43.3 [38.7]	0.609
Maximum incremental pressure (mmHg) short squeeze	post vs 6m	60.6 (45.1)	47.3 (36.9)	43.5 [55.7]	36.8 [27.8]	0.169
Maximum incremental pressure (mmHg) short squeeze	3m vs 6m	58.0 (47.4)	47.3 (36.9)	43.3 [38.7]	36.8 [27.8]	0.241
Mean pressure (mmHg) short squeeze	pre vs post	55.0 (25.7)	67.3 (29.8)	47.0 [36.4]	57.6 [43.2]	< 0.01
Mean pressure (mmHg) short squeeze	pre vs 3m	55.0 (25.7)	64.6 (30.2)	47.0 [36.4]	54.5 [25.0]	< 0.01
Mean pressure (mmHg) short squeeze	pre vs 6m	55.0 (25.7)	59.4 (28.4)	47.0 [36.4]	54.1 [25.0]	< 0.05
Mean pressure (mmHg) short squeeze	post vs 3m	67.3 (29.8)	64.6 (30.2)	57.6 [43.2]	54.5 [25.0]	0.812
Mean pressure (mmHg) short squeeze	post vs 6m	67.3 (29.8)	59.4 (28.4)	57.6 [43.2]	54.1 [25.0]	0.153
Mean pressure (mmHg) short squeeze	3m vs 6m	64.6 (30.2)	59.4 (28.4)	54.5 [25.0]	54.1 [25.0]	0.623
Maximum absolute pressure (mmHg) short squeeze	pre vs post	77.9 (38.2)	101.8 (48.7)	66.6 [57.1]	89.4 [68.9]	< 0.01
Maximum absolute pressure (mmHg) short squeeze	pre vs 3m	77.9 (38.2)	97.7 (51.4)	66.6 [57.1]	85.7 [34.3]	< 0.01
Maximum absolute pressure (mmHg) short squeeze	pre vs 6m	77.9 (38.2)	83.9 (41.0)	66.6 [57.1]	74.9 [28.1]	< 0.01

Squeeze manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum absolute pressure (mmHg) short squeeze	post vs 3m	101.8 (48.6)	97.7 (51.4)	89.4 [68.9]	85.7 [34.3]	0.838
Maximum absolute pressure (mmHg) short squeeze	post vs 6m	101.8 (48.6)	83.9 (41.0)	89.4 [68.9]	74.9 [28.1]	0.104
Maximum absolute pressure (mmHg) short squeeze	3m vs 6m	97.7 (51.4)	83.9 (41.0)	85.7 [34.3]	74.9 [28.1]	0.156
Short squeeze PV (10 ⁴ mmHg ² .cm)	pre vs post	4.5 (5.5)	7.3 (6.5)	2.8 [4.4]	5.0 [9.4]	< 0.01
Short squeeze PV (10 ⁴ mmHg ² .cm)	pre vs 3m	4.5 (5.5)	7.0 (8.1)	2.8 [4.4]	3.8 [3.3]	< 0.01
Short squeeze PV (10 ⁴ mmHg ² .cm)	pre vs 6m	4.5 (5.5)	5.4 (5.3)	2.8 [4.4]	3.7 [4.6]	< 0.05
Short squeeze PV (10 ⁴ mmHg ² .cm)	post vs 3m	7.3 (6.5)	7.0 (8.1)	5.0 [9.4]	3.8 [3.3]	0.837
Short squeeze PV (10 ⁴ mmHg ² .cm)	post vs 6m	7.3 (6.5)	5.4 (5.3)	5.0 [9.4]	3.7 [4.6]	0.196
Short squeeze PV (10 ⁴ mmHg ² .cm)	3m vs 6m	7.0 (8.1)	5.4 (5.3)	3.8 [3.3]	3.7 [4.6]	0.507
Highest pressure asymmetry (%) short squeeze	pre vs post	25.5 (10.9)	26.0 (11.6)	25.1 [11.4]	27.2 [16.5]	0.833
Highest pressure asymmetry (%) short squeeze	pre vs 3m	25.5 (10.9)	31.6 (14.5)	25.1 [11.4]	32.9 [19.5]	0.111
Highest pressure asymmetry (%) short squeeze	pre vs 6m	25.5 (10.9)	26.3 (12.9)	25.1 [11.4]	24.8 [19.1]	0.891
Highest pressure asymmetry (%) short squeeze	post vs 3m	26.0 (11.6)	31.6 (14.5)	27.2 [16.5]	32.9 [19.5]	0.076
Highest pressure asymmetry (%) short squeeze	post vs 6m	26.0 (11.6)	26.3 (13.0)	27.2 [16.5]	24.8 [19.1]	0.441
Highest pressure asymmetry (%) short squeeze	3m vs 6m	31.6 (14.5)	26.3 (13.0)	32.9 [19.5]	24.8 [19.1]	< 0.05
Lowest pressure asymmetry (%) short squeeze	pre vs post	25.4 (11.4)	24.2 (8.7)	23.5 [15.2]	21.5 [11.4]	0.684

Squeeze manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Lowest pressure asymmetry (%) short squeeze	pre vs 3m	25.4 (11.4)	32.3 (16.0)	23.5 [15.2]	30.9 [29.7]	0.076
Lowest pressure asymmetry (%) short squeeze	pre vs 6m	25.4 (11.4)	26.0 (13.7)	23.5 [15.2]	24.3 [20.5]	0.768
Lowest pressure asymmetry (%) short squeeze	post vs 3m	24.2 (8.7)	32.3 (16.0)	21.5 [11.4]	30.9 [29.7]	< 0.05
Lowest pressure asymmetry (%) short squeeze	post vs 6m	24.2 (8.7)	26.0 (13.7)	21.5 [11.4]	24.3 [20.5]	0.952
Lowest pressure asymmetry (%) short squeeze	3m vs 6m	32.3 (16.0)	26.0 (13.7)	30.9 [29.7]	24.3 [20.5]	< 0.05
Fatigue rate index long squeeze (min)	pre vs post	0.8 (0.7)	0.7 (0.4)	0.5 [0.3]	0.6 [0.4]	1.000
Fatigue rate index long squeeze (min)	pre vs 3m	0.8 (0.7)	0.9 (0.8)	0.5 [0.3]	0.7 [0.4]	0.812
Fatigue rate index long squeeze (min)	pre vs 6m	0.8 (0.7)	2.1 (4.2)	0.5 [0.3]	0.7 [0.6]	0.834
Fatigue rate index long squeeze (min)	post vs 3m	0.7 (0.4)	0.9 (0.8)	0.6 [0.4]	0.7 [0.4]	0.379
Fatigue rate index long squeeze (min)	post vs 6m	0.7 (0.4)	2.1 (4.2)	0.6 [0.4]	0.7 [0.6]	0.656
Fatigue rate index long squeeze (min)	3m vs 6m	0.9 (0.8)	2.1 (4.2)	0.7 [0.4]	0.7 [0.6]	0.450
Fatigue rate long squeeze (mmHg)	pre vs post	-21.5 (41.4)	-34.4 (33.5)	-12.7 [32.2]	-31.9 [54.7]	< 0.05
Fatigue rate long squeeze (mmHg)	pre vs 3m	-21.5 (41.4)	-41.6 (45.9)	-12.7 [32.2]	-30.3 [36.9]	< 0.01
Fatigue rate long squeeze (mmHg)	pre vs 6m	-21.5 (41.4)	-19.5 (33.3)	-12.7 [32.2]	-17.5 [27.0]	0.829
Fatigue rate long squeeze (mmHg)	post vs 3m	-34.4 (33.5)	-41.6 (45.9)	-31.9 [54.7]	-30.3 [36.9]	0.393
Fatigue rate long squeeze (mmHg)	post vs 6m	-34.4 (33.5)	-19.5 (33.3)	-31.9 [54.7]	-17.5 [27.0]	0.156
Fatigue rate long squeeze (mmHg)	3m vs 6m	-41.6 (45.9)	-19.5 (33.3)	-30.3 [36.9]	-17.5 [27.0]	< 0.01
Capacity to sustain (%) long squeeze	pre vs post	84.0 (25.5)	78.6 (20.3)	85.1 [33.2]	76.3 [29.9]	0.390

Squeeze manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Capacity to sustain (%) long squeeze	pre vs 3m	84.02 (25.5)	75.8 (21.0)	85.1 [33.2]	71.6 [28.9]	0.082
Capacity to sustain (%) long squeeze	pre vs 6m	84.0 (25.5)	87.4 (23.2)	85.1 [33.2]	88.2 [26.4]	0.922
Capacity to sustain (%) long squeeze	post vs 3m	78.6 (20.3)	75.8 (21.0)	76.3 [29.9]	71.6 [28.9]	0.287
Capacity to sustain (%) long squeeze	post vs 6m	78.6 (20.3)	87.4 (23.2)	76.3 [29.9]	88.2 [26.4]	0.312
Capacity to sustain (%) long squeeze	3m vs 6m	75.8 (21.0)	87.4 (23.2)	71.6 [28.9]	88.2 [26.4]	< 0.05
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	pre vs post	2.0 (2.2)	3.8 (3.5)	1.5 [1.7]	2.9 [3.2]	< 0.01
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	pre vs 3m	2.0 (2.2)	4.3 (4.6)	1.5 [1.7]	2.7 [3.6]	< 0.01
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	pre vs 6m	2.0 (2.2)	2.9 (2.8)	1.5 [1.7]	2.2 [1.9]	< 0.05
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	post vs 3m	3.8 (3.5)	4.3 (4.6)	2.9 [3.2]	2.7 [3.6]	0.332
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	post vs 6m	3.8 (3.5)	2.9 (2.8)	2.9 [3.2]	2.2 [1.9]	0.520
Long squeeze PV (1/3) 10 ⁴ mmHg ² .cm	3m vs 6m	4.3 (4.6)	2.9 (2.8)	2.7 [3.6]	2.2 [1.9]	0.121
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	pre vs post	1.7 (1.3)	3.3 (3.1)	1.3 [1.0]	2.4 [1.9]	< 0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	pre vs 3m	1.7 (1.3)	3.1 (3.1)	1.3 [1.0]	2.1 [2.5]	< 0.01
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	pre vs 6m	1.7 (1.3)	2.4 (2.6)	1.3 [1.0]	1.8 [1.5]	< 0.05
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	post vs 3m	3.3 (3.1)	3.1 (3.1)	2.4 [1.9]	2.1 [2.5]	1.000
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	post vs 6m	3.3 (3.1)	2.4 (2.6)	2.4 [1.9]	1.8 [1.5]	0.157
Long squeeze PV (2/3) 10 ⁴ mmHg ² .cm	3m vs 6m	3.1 (3.1)	2.4 (2.6)	2.1 [2.5]	1.8 [1.5]	0.185
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	pre vs post	1.6 (1.2)	3.1 (2.7)	1.3 [1.2]	2.2 [2.3]	< 0.01
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	pre vs 3m	1.6 (1.2)	3.0 (2.8)	1.3 [1.2]	1.8 [2.1]	< 0.01

Squeeze manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	pre vs 6m	1.6 (1.2)	2.3 (2.3)	1.3 [1.2]	1.9 [1.2]	< 0.05
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	post vs 3m	3.1 (2.7)	3.0 (2.8)	2.2 [2.3]	1.8 [2.1]	0.590
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	post vs 6m	3.1 (2.7)	2.3 (2.3)	2.2 [2.3]	1.9 [1.2]	0.286
Long squeeze PV (3/3) 10 ⁴ mmHg ² .cm	3m vs 6m	3.0 (2.8)	2.3 (2.3)	1.8 [2.1]	1.9 [1.2]	0.268

BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range)

Bold values indicate statistically significant ($p < 0.05$)

171 **Table 8 Comparison of cough manometric parameters - incontinent patients (pre and post-BF, 3m**
172 **and 6m post-BF completion)**
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Cough manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum pressure anal canal (mmHg)	pre vs post	78.7 (25.2)	92.5 (30.7)	76.3 [20.0]	84.2 [26.6]	< 0.01
Maximum pressure anal canal (mmHg)	pre vs 3m	78.7 (25.2)	94.5 (26.3)	76.3 [20.0]	95.1 [20.8]	< 0.01
Maximum pressure anal canal (mmHg)	pre vs 6m	78.7 (25.2)	89.1 (29.3)	76.3 [20.0]	88.4 [29.4]	< 0.01
Maximum pressure anal canal (mmHg)	post vs 3m	92.5 (30.7)	94.5 (26.3)	84.2 [26.6]	95.1 [20.8]	0.741
Maximum pressure anal canal (mmHg)	post vs 6m	92.5 (30.7)	89.1 (29.3)	84.2 [26.6]	88.4 [29.4]	0.494
Maximum pressure anal canal (mmHg)	3m vs 6m	94.5 (26.3)	89.1 (29.3)	95.1 [20.8]	88.4 [29.4]	0.441
Maximum pressure rectum (mmHg)	pre vs post	57.1 (20.6)	64.1 (23.0)	54.4 [25.3]	65.3 [25.6]	< 0.05
Maximum pressure rectum (mmHg)	pre vs 3m	57.1 (20.6)	64.6 (20.1)	54.4 [25.3]	67.8 [18.5]	< 0.05
Maximum pressure rectum (mmHg)	pre vs 6m	57.1 (20.6)	62.9 (21.2)	54.4 [25.3]	62.6 [27.5]	< 0.05
Maximum pressure rectum (mmHg)	post vs 3m	64.1 (23.0)	64.6 (20.1)	65.3 [25.6]	67.8 [18.5]	0.614
Maximum pressure rectum (mmHg)	post vs 6m	64.1 (23.0)	62.9 (21.2)	65.3 [25.6]	62.6 [27.5]	0.920
Maximum pressure rectum (mmHg)	3m vs 6m	64.6 (20.1)	62.9 (21.2)	67.8 [18.5]	62.6 [27.5]	0.984
Anorectal gradient pressure (mmHg)	pre vs post	21.6 (17.2)	28.4 (26.2)	19.5 [28.1]	19.7 [27.1]	0.089
Anorectal gradient pressure (mmHg)	pre vs 3m	21.6 (17.2)	29.7 (25.7)	19.5 [28.1]	25.2 [38.2]	< 0.05
Anorectal gradient pressure (mmHg)	pre vs 6m	21.6 (17.2)	26.7 (24.0)	19.5 [28.1]	18.6 [27.4]	0.123
Anorectal gradient pressure (mmHg)	post vs 3m	28.4 (26.2)	29.7 (25.7)	19.7 [27.1]	25.2 [38.2]	0.759
Anorectal gradient pressure (mmHg)	post vs 6m	28.4 (26.2)	27.0 (24.0)	19.7 [27.1]	18.6 [27.4]	0.658

Cough manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Anorectal gradient pressure (mmHg)	3m vs 6m	29.7 (25.7)	26.7 (24.0)	25.2 [38.2]	18.6 [27.4]	0.441
Anal canal PV (10 ⁴ mmHg ² .cm)	pre vs post	3.6 (2.6)	5.0 (3.8)	3.0 [3.0]	4.2 [3.9]	< 0.05
Anal canal PV (10 ⁴ mmHg ² .cm)	pre vs 3m	3.6 (2.6)	5.3 (3.5)	3.0 [3.0]	5.2 [2.9]	< 0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	pre vs 6m	3.6 (2.6)	4.3 (3.1)	3.0 [3.0]	3.8 [3.6]	< 0.01
Anal canal PV (10 ⁴ mmHg ² .cm)	post vs 3m	5.0 (3.8)	5.3 (3.5)	4.2 [3.9]	5.2 [2.9]	0.348
Anal canal PV (10 ⁴ mmHg ² .cm)	post vs 6m	5.0 (3.8)	4.3 (3.1)	4.2 [3.9]	3.8 [3.6]	0.984
Anal canal PV (10 ⁴ mmHg ² .cm)	3m vs 6m	5.3 (3.5)	4.3 (3.1)	5.2 [2.9]	3.8 [3.6]	0.162
Highest pressure asymmetry (%) anal canal	pre vs post	21.3 (9.7)	19.8 (10.8)	18.6 [14.9]	17.4 [12.2]	0.539
Highest pressure asymmetry (%) anal canal	pre vs 3m	21.3 (9.7)	22.8 (10.7)	18.6 [14.9]	20.5 [12.4]	0.602
Highest pressure asymmetry (%) anal canal	pre vs 6m	21.3 (9.7)	24.5 (13.5)	18.6 [14.9]	24.1 [14.4]	0.515
Highest pressure asymmetry (%) anal canal	post vs 3m	19.8 (10.8)	22.8 (10.7)	17.4 [12.2]	20.5 [12.4]	0.157
Highest pressure asymmetry (%) anal canal	post vs 6m	19.8 (10.8)	24.5 (13.5)	17.4 [12.2]	24.1 [14.4]	0.121
Highest pressure asymmetry (%) anal canal	3m vs 6m	22.8 (10.7)	24.5 (13.5)	20.5 [12.4]	24.1 [14.4]	0.481
Lowest pressure asymmetry (%) anal canal	pre vs post	17.8 (8.0)	18.5 (14.9)	16.9 [10.7]	13.8 [11.9]	0.922
Lowest pressure asymmetry (%) anal canal	pre vs 3m	17.8 (8.0)	19.7 (13.2)	16.9 [10.7]	14.9 [7.0]	0.191
Lowest pressure asymmetry (%) anal canal	pre vs 6m	17.8 (8.0)	20.7 (15.3)	16.9 [10.7]	15.2 [15.4]	0.457

Cough manometric parameters	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Lowest pressure asymmetry (%) anal canal	post vs 3m	18.5 (14.9)	19.7 (13.2)	13.8 [11.9]	14.9 [7.0]	0.940
Lowest pressure asymmetry (%) anal canal	post vs 6m	18.5 (14.9)	20.7 (15.3)	13.8 [11.9]	15.2 [15.4]	0.936
Lowest pressure asymmetry (%) anal canal	3m vs 6m	19.7 (13.2)	20.7 (15.3)	14.9 [7.0]	15.2 [15.4]	0.922

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175 BF (biofeedback); SD (standard deviation); Med (median); IQR (interquartile range); CI (confidence
176 interval)

177 Bold values indicate statistically significant ($p < 0.05$)

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200 **Table 9 Comparison of rectal sensory thresholds and RAIR parameters - incontinent patients (pre**
201 **and post-BF, 3m and 6m post-BF completion)**
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Rectal sensory thresholds; RAIR	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
First sensation volume (ml)	pre vs post	35.6 (22.3)	26.6 (22.2)	35.0 [34.2]	18.5 [21.5]	0.103
First sensation volume (ml)	pre vs 3m	35.6 (22.3)	30.4 (29.6)	35.0 [34.2]	22.0 [32.0]	0.444
First sensation volume (ml)	pre vs 6m	35.6 (22.3)	22.5 (17.6)	35.0 [34.2]	18.0 [16.0]	0.112
First sensation volume (ml)	post vs 3m	26.6 (22.2)	30.4 (29.6)	18.5 [21.5]	22.0 [32.0]	0.840
First sensation volume (ml)	post vs 6m	26.6 (22.2)	22.5 (17.6)	18.5 [21.5]	18.0 [16.0]	0.553
First sensation volume (ml)	3m vs 6m	30.4 (29.6)	22.5 (17.6)	22.0 [32.0]	18.0 [16.0]	0.255
Desire to defaecate volume (ml)	pre vs post	59.5 (28.3)	54.7 (25.4)	60.0 [31.7]	52.0 [37.5]	0.668
Desire to defaecate volume (ml)	pre vs 3m	59.5 (28.3)	49.9 (30.2)	60.0 [31.7]	46.0 [49.0]	0.304
Desire to defaecate volume (ml)	pre vs 6m	59.5 (28.3)	46.0 (21.4)	60.0 [31.7]	46.0 [30.0]	0.201
Desire to defaecate volume (ml)	post vs 3m	54.7 (25.4)	49.9 (30.2)	52.0 [37.5]	46.0 [49.0]	0.144
Desire to defaecate volume (ml)	post vs 6m	54.7 (25.4)	46.0 (21.4)	52.0 [37.5]	46.0 [30.0]	0.078
Desire to defaecate volume (ml)	3m vs 6m	49.9 (30.2)	46.0 (21.4)	46.0 [49.0]	46.0 [30.0]	0.948
Maximum tolerated volume (ml)	pre vs pos	95.5 (40.8)	137.0 (37.7)	93.0 [44.7]	143.0 [53.7]	<0.01
Maximum tolerated volume (ml)	pre vs 3m	95.5 (40.8)	141.8 (42.5)	93.0 [44.7]	142.0 [52.0]	<0.01
Maximum tolerated volume (ml)	pre vs 6m	95.5 (40.8)	123.7 (33.9)	93.0 [44.7]	116.0 [52.0]	<0.01
Maximum tolerated volume (ml)	post vs 3m	137.0 (37.7)	141.8 (42.5)	143.0 [53.7]	142.0 [52.0]	0.920
Maximum tolerated volume (ml)	post vs 6m	137.0 (37.7)	123.7 (33.9)	143.0 [53.7]	116.0 [52.0]	0.055

Rectal sensory thresholds; RAIR	Comparison (time 1 vs time 2)	Mean [SD] (1)	Mean [SD] (2)	Med [IQR] (1)	Med [IQR] (2)	p
Maximum tolerated volume (ml)	3m vs 6m	141.8 (42.5)	123.7 (33.9)	142.0 [52.0]	116.0 [52.0]	0.073
Anal canal relaxation (%)	pre vs post	35.7 (22.2)	31.2 (21.6)	25.0 [34.2]	26.1 [31.5]	0.375
Anal canal relaxation (%)	pre vs 3m	35.7 (22.2)	32.3 (18.8)	25.0 [34.2]	30.7 [15.0]	0.495
Anal canal relaxation (%)	pre vs 6m	35.7 (22.2)	32.2 (18.7)	25.0 [34.2]	35.3 [22.3]	0.709
Anal canal relaxation (%)	post vs 3m	31.2 (21.6)	32.3 (18.8)	26.1 [31.5]	30.7 [15.0]	0.432
Anal canal relaxation (%)	post vs 6m	31.17 (21.63)	32.2 (18.7)	26.1 [31.5]	35.3 [22.3]	0.768
Anal canal relaxation (%)	3m vs 6m	32.3 (18.8)	32.2 (18.7)	30.7 [15.0]	35.3 [22.3]	0.595

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204 BF (biofeedback); SD standard deviation, Med Median, IQR Interquartile range

205 Bold values indicate statistically significant ($p < 0.05$)

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