

## EFFECT OF PELVIC FLOOR CONTRACTION ON DESIRE TO VOID

### Hypothesis / aims of study

The aim was to study the mechanism whereby contraction of the pelvic floor can postpone urge incontinence.

### Study design, materials and methods

Ten healthy female volunteers with a mean age of 34.0 +/- 6.9 years (range 21-44 years) without urological or neurological symptoms, were included in a study approved by the Local Regional Ethics Committee. The subjects were asked to drink water (~1litre) to allow the bladder to fill naturally and bladder volume was assessed with ultrasound scanning. During the bladder filling period, subjects were asked to record their perception of desire to void on a 5 point scale using an 'urge box' (a validated patient operated key-pad device providing a record of sensations of desire). Desire levels were scored on a 5 point scale of 0 – 4 based on ICS definitions (see Table 1). Subjects were asked to contract their pelvic floor muscles for 8 – 14 seconds at intervals of approximately 1 minute and asked to register any change in their desire using the 'urge box'. Timings of the pelvic floor contractions were measured using an Aerolys vaginal pressure balloon transducer. Data was collected using a Phenix USB4 physiotherapy treatment module that was connected to a laptop computer. Pelvic floor strength (Modified Oxford Scale 1 – 5) and fatigability (with repeated contractions) were assessed by an experienced physiotherapist.

Desire Level	Definition
0	No sensation of bladder fullness
1	Mild desire – an awareness of bladder fullness that is of no consequence to the subject.
2	Moderate desire – an awareness of bladder fullness that would lead the subject to pass urine at the next convenient moment, but voiding can be delayed if necessary.
3	Strong desire – an awareness of bladder fullness associated with a persistent desire to void without the fear of leakage.
4	Desperate desire – an awareness of bladder fullness associated with a persistent desire to void which produces a fear of leakage.

Table 1: Definition of desire to void

### Results

The mean maximum bladder capacity as measured with ultrasound was 578.5 mls (+/- 297.1mls). All women commented that the desperate desire associated with maximum capacity would have been reached earlier had they not been supine. Eight subjects had a normal pelvic floor and two subjects had a weak pelvic floor (strength 1-2/5 Modified Oxford Scale).

There appears to be an inconsistent effect of pelvic floor contraction on desire at the lower levels (0, 1 and 2). However, during the strong desire (3) to void and early desperate state (4), pelvic floor contractions consistently alter the perception of desire within subjects. Pelvic floor contractions had no effect on desire level with an extremely full bladder (i.e. late desperate state 4).

We have found that there are 3 effects on desire with pelvic floor contraction.

- a) Desire decreases within approximately 3 seconds of the onset of a pelvic floor contraction (5 subjects).
- b) Desire decreases within approximately 2 seconds from the end of a pelvic floor contraction (3 subjects).
- c) Desire increases or no change in desire with a pelvic floor contraction (3 subjects).

One subject reported both effects **a** and **b**, occasionally with a biphasic response to a single pelvic floor contraction. Two of the three women in category **c** had weak pelvic floors.

Table 2 shows the mean length of contractions, latency between onset or end of contraction and change in desire and mean length of change in desire for subjects with a decrease in desire to void.

Subject	Mean length of contraction (seconds) +/- SD	Latency in change in desire level (seconds) +/- SD	Time of change in desire level (seconds) +/- SD
1	13.53 (5.73)	3.03 (1.37)	8.86 (5.07)
2	11.76 (2.78)	2.98 (0.63)	12.44 (2.76)
3	12.53 (3.58)	3.47 (2.04)	15.91 (2.58)
4	13.83 (5.64)	4.76 (2.21)	12.66 (7.77)
5	11.74 (5.84)	2.16 (0.96)	21.03 (7.01)
6 *	10.00 (2.44)	1.65 (0.55)	10.64 (2.92)
7 *	10.98 (2.33)	3.15 (3.15)	21.75 (5.33)
1 *	10.53 (3.23)	0.82 (0.59)	7.07 (4.57)

\* Subjects with decrease in desire after the end of the pelvic floor contraction.

### **Interpretation of results**

In the cohort of subjects we tested there are at least 3 different responses to desire associated with pelvic floor contraction.

Individuals recruiting different pelvic floor components or indeed abdominal contraction may explain the various effects of pelvic floor contraction upon the desire to void. The inhibitory effect on desire, secondary to the pelvic floor contraction is possibly due to voluntary contraction of the puborectalis and external urethral sphincter, which is thought to result in inhibition of the detrusor. (1)

We do not have an explanation as to why there is a decrease in the desire to void on completion of a contraction.

Pelvic floor dysfunction in terms of strength and endurance may explain the lack of change in desire to void in two of the three subjects in group **c**.

The results show that there is no simple relationship between pelvic floor contractions and changes in desire to void in supine women. We were only able to examine supine women because of the constraints of the experimental design and that we were training subjects for a future functional imaging experiment.

Further research will focus on the effect of pelvic floor contraction on desire to void in people who experience urgency.

### **Concluding message**

There is a complex pattern of response to pelvic floor contraction in relation to desire to void.

Pelvic floor dysfunction may result in symptoms of urgency because of a failure of a normal contraction decreasing the desire to void.

Changes in desire to void associated with pelvic floor contraction maybe due to central modulation and this is to be investigated with functional brain Imaging.

### **References**

1. Neural control of the urethra. Scandinavian Journal of Urology and Nephrology Supplement. 2001; (207):35-43.

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