

## MICTURITION AND DEFECATION: WHICH ACT HAS PREDOMINANCE?

### Hypothesis / aims of study

Bladder and rectum are closely related to each other as they are embryologically derived from the same structure (the cloaca), their peripheral innervation is through the same nerves and the central processing and perception of the afferent signals is in the same brain areas. Therefore it is not surprising that symptoms affecting both organs often coexist, and that therapeutic relief in one system can improve symptoms and function in the other. Furthermore, a sensory interaction between bladder and rectum has already been shown in healthy volunteers. To gain more insight in the interaction between bladder and rectum, the physiological sequence of the voluntary act of defecation and micturition is described in this observational study.

### Study design, materials and methods

One hundred healthy volunteers (24 men and 76 women, mean age  $24 \pm 7$  years) were asked to report on 5 events of defecation. They were asked to score bladder fullness and rectal fullness on a visual analog scale (VAG scale), when they went to the toilet with the intention to defecate. Furthermore they were asked to mark the sequence of micturition and defecation according to the following definitions.

- ..... Defecation occurred without micturition
- ..... Micturition and defecation started at the same time
- ..... Micturition started before defecation
- ..... Defecation started before micturition

### Results

A total of 500 events were observed. Mean scores for rectal and bladder fullness on the VAG scale respectively were  $6.8 \pm 2.3$  and  $3.8 \pm 3.0$ . Sixty defecations occurred without while 440 occurred with micturition. Although the rectal fullness score was not different between both groups ( $p=0.39$ ), bladder fullness was significantly less in the group without micturition, respectively  $0.5 \pm 0.9$  vs  $4.3 \pm 2.9$  ( $p<0.0001$ ).

In 14 events (3.2%) micturition and defecation started at the same time, micturition started before defecation in 267 events (60.7%), while defecation started before micturition in 159 (36.1%). Data on the scores of bladder and rectal fullness are given in the table.

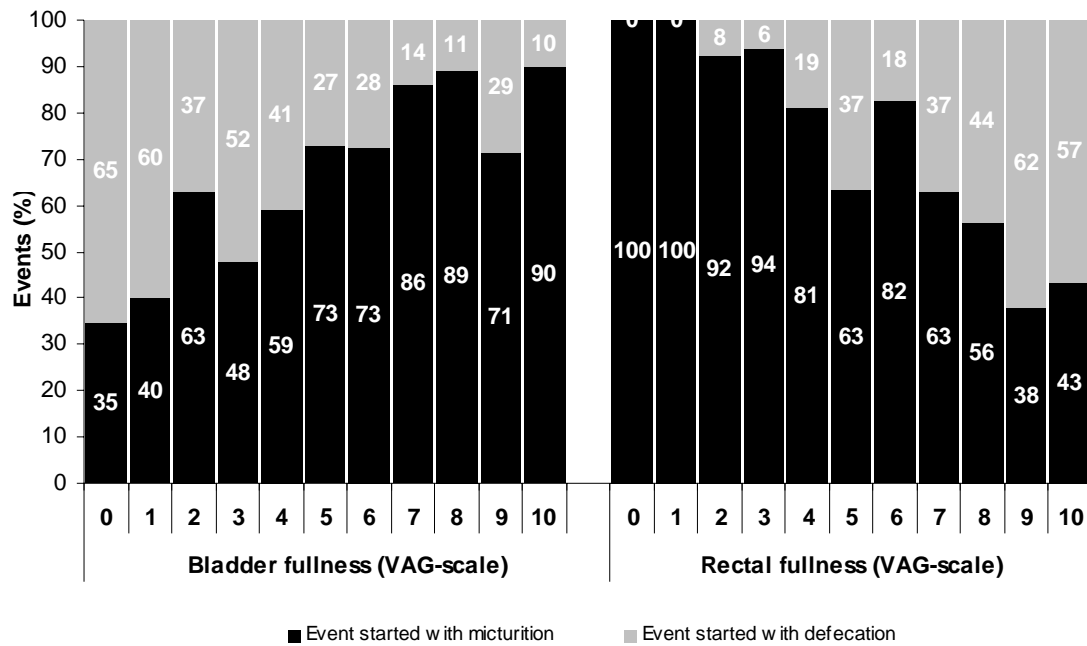
	Bladder fullness score	Rectal fullness score
Micturition started before defecation	$5.1 \pm 2.8$	$6.2 \pm 2.4$
Micturition and defecation started together	$4.3 \pm 3.7$	$6.6 \pm 1.8$
Defecation started before micturition	$3.0 \pm 2.7$	$7.7 \pm 1.7$

Data on the sequence of micturition and defecation are presented in graph 1 and are presented according to the perception grade of bladder and rectal fullness.

At low VAG-scale scores of bladder fullness (left side of the graph), defecation occurs more frequently before micturition. However already at score 4 of bladder fullness, micturition occurs before defecation and the percentage of events at which micturition occurs before defecation increases with higher scores of bladder fullness.

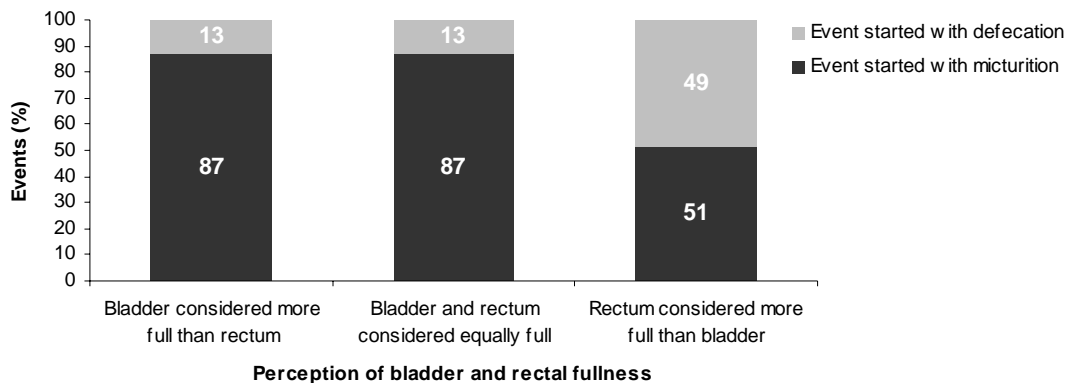
At low VAG-scale scores of rectal fullness (right side of the graph), micturition occurs more frequently before defecation. This sequence maintains up to a score 8 of rectal fullness. At higher scores of rectal fullness, defecation starts before micturition.

**Graph 1**



Graph 2 presents the data for the sequence of micturition and defecation integrated for both bladder and rectal fullness at the time of the event.

**Graph 2**



When both bladder and rectum are considered equally full, micturition occurs more frequently before defecation. The same sequence was noted when the bladder was considered fuller than the rectum. When the rectum is considered fuller than the bladder, micturition started before defecation in still almost half of the events.

Interpretation of results

These data suggest that micturition and defecation do not occur randomly to each other, but they follow a sequence related to the perception of fullness of both organs. Moreover micturition frequently starts before defecation, except when the bladder is considered almost empty (VAG < 4) or the rectum nearly full (VAG > 8). Therefore micturition seems to be predominant to defecation, which seems concordant with the finding that perception of bladder fullness is predominant to the perception of rectal fullness.

Concluding message

This observational study shows that there exists a sequence in the acts of micturition and defecation. Micturition seems to be predominant to defecation.