

# Digitation associated with defecation: what does it mean in urogynaecological patients?

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## Abstract

**Introduction and hypothesis** Obstructed defecation is a common symptom complex in urogynaecological patients, and perineal, vaginal and/or anal digitation may be required for defecation. Translabial ultrasound can be used to assess anorectal anatomy, similar to defecation proctography. The aim of the present study was to determine the association between different forms of digitation (vaginal, perineal and anal) and abnormal posterior compartment anatomy.

**Methods** A total of 271 patients were analysed in a retrospective study utilising archived ultrasound volume datasets. Symptoms of obstructed defecation (straining at stool, incomplete bowel emptying, perineal, vaginal and anal digitation) were ascertained on interview. Postprocessing of stored 3D/4D translabial ultrasound datasets obtained on maximal Valsalva was used to diagnose descent of the rectal ampulla, rectocele, enterocele and rectal intussusception at a later date, blinded to all clinical data.

**Results** Digitation was reported by 39 % of our population. The position of the rectal ampulla on Valsalva was associated with perineal ( $p=0.02$ ) and vaginal ( $p=0.02$ ) digitation. The

presence of a true rectocele was significantly associated with perineal ( $p=0.04$ ) and anal ( $p=0.03$ ) digitation. Rectocele depth was associated with all three forms of digitation ( $P=0.005$ – $0.02$ ). The both of symptoms of obstructed defecation was strongly associated with digitation (all  $P\leq 0.001$ ), with no appreciable difference in both among the three forms.

**Conclusion** Digitation is common, and all forms of digitation are associated with abnormal posterior compartment anatomy. It may not be necessary to distinguish between different forms of digitation in clinical practice.

**Keywords** Digitation · Obstructed defecation · Translabial ultrasound · Pelvic floor · Rectocele

## Introduction

Obstructed defecation (OD) is defined as difficulty in evacuating or emptying the rectum, and this complaint is common in women [1]. The symptom complex encompasses multiple complaints, including chronic constipation, incomplete bowel emptying, straining at stool and manual or digital assistance with defecation. Approximately 20 % women are reported to have “constipation” and 7–10 % reported the need for manual assistance to overcome evacuation difficulty [2]. More than half of constipated patients suffer from OD with straining at stool, a sense of incomplete evacuation, perineal heaviness and the need for self-digitation [3]. The known anatomical causes of OD include rectocele, enterocele, rectal intussusception and rectal prolapse. While rectocele and rectal prolapse may be diagnosed clinically, some authors hold that imaging is required for a full diagnostic work-up, usually in the shape of defecography, either by fluoroscopy or, more recently, by magnetic resonance imaging (MRI) [4]. The

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uptake of these diagnostic methods has been hampered by cost, limited availability and low patient acceptance. Translabial ultrasound (TLUS) offers a cheaper and more accessible alternative, and provides high spatial and temporal resolution. It is simple and safe, and has been shown to provide comprehensive information on posterior compartment abnormalities [5, 6]. This method allows the detection of rectocele, enterocele and rectal intussusception [5], with organ descent measured against the infero-posterior margin of the symphysis pubis [7].

In this study we aimed to define the association between different forms of manual assistance for defecation (“digitation”) and anatomical abnormalities of the posterior pelvic floor compartment diagnosed on translabial ultrasound.

## Materials and methods

This was a retrospective study involving 271 patients seen at a tertiary urogynaecological unit between February 2013 and October 2013. The inclusion period was opportunistic as we were unable to locate data for power calculations; hence, this has to be considered a pilot study. Patients had undergone a standardised interview, a clinical prolapse assessment according to the International Continence Society Prolapse Quantification (ICS POP-Q) [8] and a 3D/4D TLUS. The both of symptoms of OD, i.e. straining at stool, incomplete bowel emptying and digitation, was assessed using a visual analogue scale (VAS). Manual assistance on defecation was defined as perineal, vaginal and/or anal digitation. TLUS volumes were acquired supine and after voiding, using a Voluson 730 Expert system with a RAB 8–4 MHz transducer, as described previously [9]. To ensure an effective Valsalva manoeuvre, the patients were coached to avoid levator co-activation [10], and Valsalva manoeuvres were required to last at least 6 s [11]. At least three volumes on Valsalva were acquired.

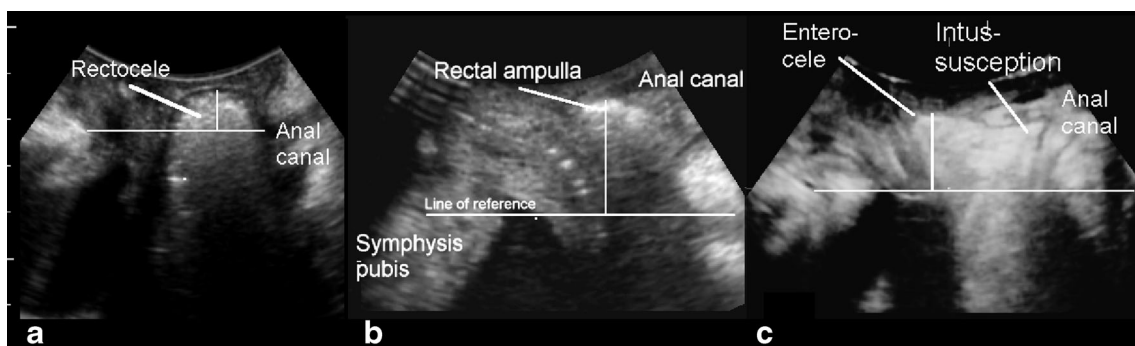
Offline analysis of TLUS volumes for the position of the rectal ampulla, the presence of a true rectocele and enterocele, and rectocele depth was undertaken at a later date by

the first author, blinded to all other data, using proprietary software (4D View version 10.0 by Kretz Medizintechnik, Zipf, Austria) Pelvic organ descent was determined relative to a horizontal reference line through the infero-posterior margin of the symphysis pubis [7]. Descent of the rectal ampulla, rectocele, enterocele and the depth of a true rectocele were measured (Fig. 1). A true rectocele, i.e. a herniation of the rectal ampulla, was diagnosed if there was a discontinuity in the anterior contour of the internal anal sphincter and anterior anorectal muscularis, resulting in the formation of a pocket. Rectocele depth was measured perpendicular to the expected contour of the anterior rectal wall, using a cut-off of 10 mm for the diagnosis of “true rectocele” [12]. An intussusception was diagnosed on observing a splaying of the anal canal and inversion of the anterior wall of the rectal ampulla (including the muscularis layer) into the anal canal, with the tip of the intussusciptens entering the anal canal, without there being an overt rectal prolapse [13].

A test–retest series of 20 ultrasound volume datasets was undertaken between the first author and senior trainees with 3 years’ experience in TLUS. This study was approved by the Nepean Blue Mountains Local Health District Human Research Ethics Committee (NBMLHD HREC reference no. 13-07). Statistical analysis was carried out using SPSS v12 (SPSS, Chicago, IL, USA) and Minitab version 10 (Minitab State College, PA, USA), using Student’s *t* tests and Fisher’s exact test. A *p* values of <0.05 was considered statistically significant.

## Results

The data sets of 271 consecutive patients seen during the inclusion period were analysed. Mean age was 57 (SD 14, range 21–89) years with a mean BMI of 29 (SD 6.0, range 15–51) kg/m<sup>2</sup>. Median parity was 3 (range 0–9) with 91 % (*n*=247) vaginally parous. Patients complained of stress urinary incontinence (*n*=188, 69 %), urge urinary incontinence (*n*=200, 74 %), frequency (*n*=98, 36 %), nocturia (*n*=111,



**Fig. 1** Anatomical abnormalities of the posterior vaginal compartment associated with symptoms of obstructed defecation, showing **a** a “true rectocele”, i.e. a defect of the rectovaginal septum, **b** descent of the rectal

ampulla without rectocele (“perineal hypermobility”) and **c** rectal intussusception

41 %) and symptoms of voiding dysfunction ( $n=105$ , 39 %). Symptoms of prolapse were reported by 55 % ( $n=149$ ) of the population, 63 % ( $n=172$ ) suffered symptoms of OD: 37 % ( $n=99$ ) straining at stool, 48 % ( $n=131$ ) incomplete bowel emptying and 28 % ( $n=75$ ) manual assistance, i.e., digitation. Perineal digitation was reported by 58 women (21 %), vaginal digitation by 34 (12 %) and anal digitation by 16 women (6 %). Median bother from OD symptoms was 1.4 (range, 0–10).

Clinically significant prolapse (ICS POP-Q stage 2 or higher) was diagnosed in 77 % of women ( $n=210$ ). Mean Ba, C and Bp were  $-0.7$  (SD 2, range,  $-3$  to  $+7$ ) cm,  $-4.2$  (SD 2.9, range  $-9$  to  $+7$ ) cm and  $-1$  (SD 1.4, range  $-3$  to  $+5.5$ ) cm respectively. On imaging, 42 % ( $n=114$ ) had a true rectocele, i.e. defects of the rectal–vaginal septum, and the mean depth of any visible pocket of the rectal ampulla was measured at 18 (SD 7, range 5–39) mm. The mean position of the rectal ampulla was 9 mm below the SP (SD 16, range 40 above to 53 below). Enterocoele and rectal intussusception were diagnosed in 26 (10 %) and 6 (2.2 %) respectively.

On univariate analysis, all three forms of digitation were associated with anatomical abnormalities of the posterior compartment (see Table 1). There was a significant association between the position of the rectal ampulla on Valsalva and perineal ( $p=0.02$ ), vaginal ( $p=0.02$ ) and anal ( $p=0.05$ ) digitation. Presence of a true rectocele was associated with perineal ( $p=0.04$ ) and anal ( $p=0.03$ ) digitation. Rectocele depth was associated with all three forms of digitation ( $p=0.005$  to  $0.02$ ). However, this was not the case for enterocoele and intussusception. The highest odds ratio was found for the association between intussusception and any digitation (OR 5.47, 95 % CI 0.98–30.49), although this did not reach significance because of the low number of patients with intussusception. The bother from symptoms of OD was strongly associated with digitation (all  $p\leq 0.001$ ), with no appreciable difference in bother among the three forms. Only 14 out of 75 women (19 %) who complained of digitation did not show any clinical or imaging evidence of abnormal posterior compartment anatomy.

On multivariate analysis controlling for BMI, age and parity, the association between vaginal digitation with the position of the rectal ampulla ( $p=0.01$ ) and rectocele depth ( $p=0.03$ ), the association between anal digitation and rectocele depth ( $p=0.02$ ), and the association between any digitation with the position of the rectal ampulla ( $p=0.04$ ) and rectocele depth ( $p=0.02$ ), all remained significant.

## Discussion

Obstructed defecation is often not elicited in clinical interviews of women with pelvic floor dysfunction. It deserves attention because of its association with pelvic organ prolapse, especially rectocele, enterocoele and rectal intussusception [13, 14], which can cause very substantial bother [15]. These conditions commonly manifest as prolapse of the posterior vaginal wall and vault, although they are usually not formally diagnosed owing to the limited availability of imaging confirmation [12]. Hence, few data are available in the literature on the associations between individual symptoms of OD and anatomical abnormalities detected on imaging. The increasing acceptance of ultrasound in the initial diagnosis of anorectal disorders, including defecation disorders, has changed this situation, facilitating both research and clinical practice [16–18].

A large proportion of urogynaecological patients report straining at stool, incomplete bowel emptying and manual assistance with defecation, the latter showing a prevalence of 28 % (75/271) in this study. Digitation may be performed externally by supporting the perineum, internally by applying pressure in the vagina or by helping to remove faeces from the anus by inserting a finger per rectum, with the latter being the least common. In this study, the three types of digitation seemed to give patients a similar degree of bother. They also seem to be similarly associated with anatomical abnormalities that are generally accepted to be involved in the causation of symptoms of OD, i.e. rectal descent, rectocele and enterocoele. “Any digitation” was about as strongly associated with

**Table 1** Association among different forms of digitation (to facilitate defecation in women with obstructed defecation) with sonographically determined posterior compartment anatomy and abnormalities. Statistical analysis using binary logistic regression

	Position of rectal ampulla (mm)	True rectocele (yes/no)	Rectocele depth (mm)	Enterocoele (yes/no)	Intussusception (yes/no)
Perineal digitation ( $n=58$ )	OR 0.98 (0.96–1.0); $p=0.04$	OR 1.87 (1.04–3.36); $p=0.04$	OR 1.04 (1.01–1.07); $p=0.02$	OR 1.73 (0.71–4.22); $p=0.23$	OR 3.82 (0.75–19.44); $p=0.11$
Vaginal digitation ( $n=34$ )	OR 0.97 (0.95–1.0); $p=0.02$	OR 1.89 (0.92–3.9); $p=0.09$	OR 1.04 (1.01–1.08); $p=0.02$	OR 2.33 (0.86–6.28); $p=0.096$	OR 3.64 (0.64–20.68); $p=0.15$
Anal digitation ( $n=16$ )	OR 0.97 (0.93–1.0); $p=0.05$	OR 3.11 (1.09–8.83); $p=0.03$	OR 1.08 (1.02–1.13); $p=0.005$	OR 1.38 (0.30–6.41); $p=0.69$	–
Any digitation ( $n=75$ )	OR 0.98 (0.96–1.0); $p=0.01$	OR 1.81 (1.05–3.11); $p=0.03$	OR 1.04 (1.01–1.07); $p=0.005$	OR 1.73 (0.75–4.01); $p=0.2$	OR 5.47 (0.98–30.49); $p=0.05$

these abnormalities as any single form of digitation. Hence, it does not appear necessary to elicit different forms of digitation separately, which is clinically helpful, given the degree of embarrassment suffered by patients when such symptoms are discussed.

There are a number of limitations of this study that need to be acknowledged. This was a retrospective study in a largely Caucasian population that was symptomatic for pelvic floor disorders. Any conclusions may therefore be limited to similar populations. Symptoms were elicited by a local, standardised, non-validated physician interview, rather than by a validated questionnaire. Therefore, our study design may have reduced the likelihood of patients sharing highly embarrassing symptoms. Furthermore, posterior compartment findings on TLUS seem to be less reliable than those obtained in the anterior and central compartments and may be dependent on stool quality and filling at the time of examination [18]. While there are a number of comparative studies of defecation proctography and ultrasound [17, 19, 20], it has to be acknowledged that a simple Valsalva manoeuvre may not always replicate anatomical changes that occur during defecation. Consequently, the use of other diagnostic methods such as defecation proctography or MR defecography may have strengthened our study owing to a higher sensitivity for the detection of anatomical abnormalities tested against symptoms of digitation in this study.

## Conclusion

Manual assistance with defecation, or “digitation”, is common in urogynaecological patients. All forms of manual assistance, such as perineal, vaginal and anal digitation, are associated with abnormal posterior compartment anatomy. It may not be necessary to distinguish among the different forms of digitation as this information is unlikely to assist with patient management.

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