Pelvic floor muscle function assessment by transabdominal ultrasound in men with Lower Urinary Tract Symptoms

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ABSTRACT

Aim The study aims to describe the pelvic floor muscle function of men with Lower Urinary Tract Symptoms (LUTS) measured by Trans Abdominal Ultra Sound (TAUS). An association was hypothesized between the Pelvic Floor Muscle Function (PFMF) and the severity of LUTS measured by IPSS.

Methods In a cross-sectional study PFMF was assessed by TAUS in Motion-mode (M-mode) in male outpatients with LUTS in a large regional hospital, by one pelvic floor physiotherapist. Severity of LUTS was assessed by the questionnaire International Prostate Symptom Score (IPSS).

Results Data of 26 of 30 male participants who could perform a contraction in the cephalad direction were analyzed. Four participants were excluded because of measurement error though incorrect performance of the test. BB displacement in M-mode TAUS showed means and spreads of 6,2 mm (SD 3,12) during contraction of the PFM and 6,12 mm (SD 2,96) during relaxation. Pearson's r for association between BB displacement during contraction and during relaxation was 0,936, p=0.000. Participants scored moderate LUTS with median 14,5 (IQR 9,5-21,0) on IPSS. No association was found between pelvic floor muscle function and severity of LUTS.

Conclusion TAUS in M-mode is a quick and well-tolerated method in which, after short instruction, 87% of male patients with moderate LUTS made an upward movement of the bladder base through contraction of the pelvic floor muscles and a similar sized downward movement of the bladder base through relaxation. An association between pelvic floor muscle function and the severity of LUTS was not found in an elderly male population with moderate LUTS.

Clinical Relevance TAUS can easily be used in men with LUTS as part of the assessment of PFMF and possibly for feedback during PFM training, especially when more invasive methods are contraindicated. Although not tested in this study it may also be used in populations with dysfunction of levator ani, like functional defecation disorders.

Keywords: Pelvic floor, ultrasonography, lower urinary tract symptoms, men.

INTRODUCTION

Lower Urinary Tract Symptoms (LUTS) like urinary incontinence, obstruction during urination, urgency and frequency are bothersome symptoms of bladder or urethra.(1) LUTS are burdensome for individuals and also for society concerning medical expenses and decreased participation in social and work activities.(2–4) The prevalence of LUTS in men is high. A large population based study in five European countries reported 51.3% of men over 18 years experiencing symptoms of storage of urine and 25.7% experiencing symptoms of voiding.(5) The frequency increases with age.(5,6) Benign prostate hypertrophy has classically been described as the most important cause of LUTS in older men.(7,8) However, it has been recognized that the cause of LUTS in men is multifactorial and comorbidities are prevalent. Pelvic floor muscles (PFM) play an important role in voiding and storage of urine and PFM training is described in clinical guidelines on LUTS.(1,8,9) A 2017 exploratory Randomized Controlled Trial in men with LUTS suggests a positive effect on symptoms that is comparable with alfa-blockers.(10)

Digital rectal examination (DRE), electromyography (EMG) and manometry are being used by pelvic floor physical therapists (PFPT) to assess the deep in the pelvis lying PFM.(9,11–13) All are invasive and can be burdensome or undesirable. Romero et al described rejection of DRE by 8% of the patients who were suspected for prostate cancer, mainly because of shame.(14) Clinical experience of PFPTs tells that some patients waive or withdraw from treatment because of the nature of assessment and feedback by DRE and EMG.

More recently dynamic two dimensional (2D) transabdominal ultrasound (TAUS) has been described as a well-tolerated and non-invasive method for assessment of PFM-function in men and women.(15–17) It is found to be valid and reliable for measuring pelvic floor muscle function (PFMF) through movement of the bladder base (BB). Nahon et al found moderate correlation between DRE and TAUS in men with a history of treatment for prostate cancer.(17) Measurements are mostly reported in bright-mode. (B-mode) B-mode shows the vertical movement of the bladder and its base during contraction and relaxation of the PFM. Data in B-mode in adults are available in women, in men with urinary incontinence after radical prostatectomy and in men with chronic pelvic pain.(15–19) Godbole et al described measurements in Motion-mode (M-mode) in children, which makes it more visible and understandable for the patients.(20) Information on PFMF assessed with TAUS in men with LUTS is lacking in B-mode as well as information on movement recorded in M-mode. Furthermore, the association between PFMF and severity of LUTS is not known. TAUS in M-mode could be a good and well tolerated method for assessment and also for feedback during training of the PFMF in men with LUTS, especially for those reluctant for invasive methods. The primary objective of the study is to assemble data on PFMF in men with LUTS by means of TAUS in M-mode and furthermore to test for the association between the severity of LUTS and PFMF.

METHODS

The study was conducted according to the principles of the Declaration of Helsinki and in accordance with the The Dutch Medical Research Involving Human Subjects Act (WMO) and the Dutch Personal Data Protection Act. The Medical Ethical Committee Vrije Universiteit Amsterdam stated under declaration number 2018.048 that the study does not fall under the Dutch Medical Research Involving Human Subjects Act (non-WMO). The Assessment Committee on Scientific Research in Gelderse Vallei Hospital Ede gave consent by declaration number 1802-035 for local feasibility.

The study describes PFMF in men with LUTS measured by TAUS in M-mode and an association is hypothesized between the PFMF and the severity of LUTS.

Study design

The study is exploratory because it is a novel physical therapy assessment of PFMF in men with LUTS. The design is cross-sectional because the aim is to find the association between ultrasound (US) measurements and severity of LUTS assessed during the time of the measurements.

Setting

The setting of the study was the urology department in a large regional hospital in the Netherlands.
Data collection was performed from March through May 2018. Analysis and reporting was done in May 2018.

Study population

Adult men with LUTS presenting as outpatient in a large regional hospital in the Netherlands participated in the study.

Inclusion criteria

Inclusion criteria are presented in table 1.

Table 1: inclusion criteria

In order to be included in this study, a subject had to meet all of the following criteria: - Being male and presenting at the urology department for evaluation or treatment - Being able to understand the Dutch language - Being able to understand instructions for contraction and relaxation of the PFM

Exclusion criteria

Exclusion criteria were conditions that effect structure or innervation of the urogenital region. They are specified in table 2.

Table 2: exclusion criteria

Exclusion criteria were:

- Cystitis present
- Present or past oncological disease of prostate, bladder, gut, brain or spinal cord
- Currently having or having had radiation therapy in the pelvic region
- Neurological disease in the pelvic region or lower extremities, central neurological diseases like Parkinson's disease, Multiple Sclerosis, stroke, spinal cord injury
- Having had surgery in the pelvic area, but not if transurethral resection of the prostate has been performed more than one year ago
- Being scheduled for transurethral resection of the prostate
- Using urinary catheter, indwelling, suprapubic of intermittent self-catheterization.

Sample size calculation

The study is explorative and cross-sectional with a convenience sample. Because of the novel assessment method for this category of patients with no present knowledge on the outcome measures and because of the nature of the study a sample size calculation was not done. The aim was to include 30 patients during three months. Measurements were performed by one PFPT with experience of six months in ultrasound measurements.

To get an idea about reliability of the M-Mode TAUS in this population intra-rater reliability was calculated on measurements in five participants.

Primary outcome measures:

- the displacement of the BB through PFM contraction in millimeters (mm) measured by TAUS in M-mode.
- the displacement of the BB through PFM relaxation in mm measured by TAUS in M-mode
- the association between the displacement of the BB in mm and the severity of LUTS by International Prostate Symptom Score (IPSS).

IPSS: is a valid and reliable disease-specific questionnaire, recommended in international guidelines on LUTS.(8,21,22) The range of the total score is 0-35. The questionnaire contains two subcategories: voiding, items 1,3,5,6, and storage of urine, items 2,4,7. The range of the voiding scale is 0-20 and of the storage scale 0-15. A score 0-7 means no or minor LUTS, 8-19 means moderate and 20-35 means severe LUTS. A question on Quality of Life (QOL) has been added that does not count in the scores. It ranges from 0 delighted, till 6 terrible. The appendix shows the IPSS in Dutch and in English.

TAUS by dynamic 2D US with a 3.6 Mega Herz (MHz) curved array probe was performed in Motion- mode (M-mode) with Siemens Acuson X 150.(23) Transversal and sagittal applied transabdominal dynamic 2D US are valid and reliable methods for measuring PFMF through BB displacement by experienced physical therapists.(15–17) In this study transversal measurements were performed; these are also applicable in obese men. High reliability is found using this method in in healthy men, in men with chronic pelvic pain syndrome and in

men who were treated for prostate cancer.(17,19) The displacement of the BB was recorded and measured in mm by the caliper function in M-mode. The caliper function has an accuracy of 0.3 mm. This mode has not been described before in adults, therefore exploratory intra-rater reliability of the reading of the images were performed in five patients. Measuring the displacement in each image was done three times and the mean of three readings was used. The displacement is calculated as mean of the three measurements. The reason for taking the mean measurement and not the maximum was that a moderately strong isolated contraction of the pelvic floor muscles was instructed and not a maximal contraction.
For visualizing the bladder by TAUS the bladder needs to be comfortably filled. This was achieved as described in the hospital's patient information folder on uroflowmetry, based on Thompson's protocol, to empty the bladder one hour before the test, then to drink 500 ml of water and not to void until after the test.(16)

Secondary outcome measures:

- the association by correlation coefficient Pearson's r between the displacement of the BB during contraction of the PFM and during relaxation.
- the association by correlation coefficient Spearman's ρ between displacement of the BB in mm and severity of voiding symptoms measured with IPPS
- the association by correlation coefficient Spearman's ρ between displacement of the BB in mm and severity of storage symptoms measured with IPSS.

Other study parameters:

- Demographic parameters: age, length in meters (m), weight in kilograms (kg), body mass index (BMI) in kg/m2
- Comorbidities: chronic obstructive pulmonary disease, cardiovascular disease, diabetes and low back pain
- Exploration on intra-rater reliability by Intraclass Correlation Coefficient ICC (Single Measurement, Two-way-mixed, Absolute Agreement).(24)

Recruitment and consent

The treating urology team at the urology department selected eligible patients with LUTS who were scheduled for evaluation or treatment. The urologic nurse informed the patients about the study and invited them to participate. The researcher was informed about eligible patients who were willing to participate. She provided additional information and applied in- and exclusion criteria. Informed Consent (IC) was signed during visit at the clinic.

Study procedures

One PFPT, with six months of experience in US measurements, conducted the tests during a regular urology appointment. The patient had prepared according to the hospital flyer for a comfortably filled bladder without the urge to urinate.

The following procedures were applied:

- Comorbidities were asked: present low back pain, cardiac complaints or treatment, COPD, DM.

- International Prostate Symptom Score (IPSS) was filled in.
- The patient was invited to lie down on the treatment table in supine with the head support 30 degrees up, head on a pillow, both hips and knees comfortably flexed to around 60 degrees, feet supported on the table and the abdomen exposed from xyfoid process until pubic bone. The head support was 30 degrees up anticipating on participants why could not lay flat comfortably because of cardiac problems. Patient was asked whether he was in a comfortable position. The PFPT stood at the right side of the patient, with the table and ultrasound machine in the position to be able to comfortably use the right hand to handle the probe and the left hand to operate the US machine. The ultrasound screen was visible for patient and PFPT and patients were free in watching it or not. The patient was informed about and instructed how to perform an isolated moderately strong PFM contraction and relaxation, without using other muscles. The instruction was: act as to hold urine and flatus by shortening the penis, lifting the scrotum and tightening and pulling in the anus without using any other muscles and without holding the breath.(25) The US machine was set in M-mode with double screen. The top of topscreen showed the image of the filled bladder including the bladder base. This image has a movable scan line. This is the line along which the second image shows the vertical movement during contraction of the PFM. The probe was transversally positioned suprapubical. The best position to visualize the filled bladder, the BB and the vertical displacement through PFM contraction was obtained by tilting the probe dorso-caudally.(16,17) Contractions of the PFM were asked to find the probe position in which the optimal movement of the BB along the vertical line on the ultrasound screen was visible. The researcher placed the line at the point where maximal vertical movement of the BB was visible during contraction. The position of the probe was maintained during the test. The PFPT switched to full screen M-mode and visual check on clear image was performed. In case of an unclear image the PFPT returned to the double screen to find optimal position and repeated the process. The US measurement in M-mode lasted five seconds during which one moderately strong isolated PFM contraction of two seconds was performed, followed by voluntary relaxation. Instruction was: contract and relax. Feedback for correct contraction was given to a maximum of six times per contraction.
- The M-mode image was saved on the machine. The test was performed three times. After each contraction 30 seconds of rest followed after which again the best position of the probe was found via double screen setting.
- Distance measurements by caliper function were performed immediately after completion of the test. Each image was measured three times and the mean was calculated later with Statistical Package for Social Sciences (SPSS).

STATISTICAL ANALYSIS

Statistical analysis was performed with SPSS (IBM Corp. Released 2017. IBM SPSS Statistics for Macintosh, Version 25.0. Armonk, NY: IBM Corp). Descriptive analysis was performed. Associations were calculated through correlation and rank correlation coefficients. Intra-rater reliability was explored by Intra-class Correlation Coefficient. Data were checked on missing data.

RESULTS

From March until May 2018 30 men with LUTS, presenting as outpatients in the urology department were included in the study. Not included were patients after of scheduled for prostate surgery, patients with oncological or neurological disorders affecting the pelvic area, patients wearing a urinary catheter and patients who were not able to understand the instructions. 26 of 30 participants were able to perform an upward vertical BB displacement. Four participants were straining during which the US-probe moved out of position and a downward movement of the BB was seen. The four patients were excluded. Data of 26 participants were used for analysis. The male population is characterized by mean age 67 years (SD=9) and mean Body Mass Index (BMI) 27 (SD=4). Of the 26 participants 35% were being treated for cardiac problems, 15% had Diabetes, 19% had Chronic Obstructive Pulmonary Disease (COPD) and 27 % had low back pain on the day of testing. The outcomes of the baseline characteristics calculated with all 30 participants, including the men who were excluded because of straining, were not different from those of the 26 participants who were not straining.

The IPSS-scores reflect the severity of LUTS and they are presented in table 2. Median of total score is 14,5 (IQR=9,50-21,00), moderate score. The median scores of the subscales are 8,5 (IQR=3,00-12,25) for voiding and 6,0 (IQR=4,00-10,00) for storage.

Table 2: IPSS outcome

	Median	IQR	Range
IPSS total	14,5	9,50 - 21,00	6-30
IPSS voiding	8,5	3,00 - 12,25	0-18
IPSS storage	6,0	4,00 - 10,25	3-15

Table 2: IQR=Inter Quartile Range,IPSS=International Prostate Symptom score: total 0-35, voiding 0-20, storage 0-15. Score 8-19 moderate LUTS

Primary Outcomes

The mean displacement of the bladderbase was 6,24 mm (SD 3,12) during contraction and 6,12 mm (SD 2,96) during relaxation. The mean difference in displacement between both was 0,12 (SD 1,1). 11 Patients showed smaller and 14 patients showed larger displacement during contraction than during relaxation. Shapiro-Wilk test was not significant for all measurements.

Table 3: Bladder base movement by pelvic floor muscle contraction

	Mean distance (mm)	SD	Mean minimum (mm)	Mean maximum (mm)
Contraction	6.24	3.12	1,59	11,89
Relaxation	6.12	2.96	1,87	12,38
Difference contraction-relaxation	0.12	1.10	-2,91	1,94

Table 3: mm=millimeters, SD=Standard Deviation

Spearman'ρ for the association between BB displacement during contraction and IPSS total score showed 0.061 and was not significant (p 0.766). For relaxation, the values were 0.118

(p=0.567).

Secondary outcomes

For the association between the displacement of the BB during voluntary contraction and the displacement during voluntary relaxation Spearman'ρ was 0.923 (p=0.000). Spearman'ρ for contraction and relaxation with IPSS subscales were not significant. See table 4.

Table 4: Associations pelvic floor muscle function and LUTS symptoms.

	Spearman's ρ	p
IPSS total and contraction	0.061	0.766
IPSS total and relaxation	0.118	0.567
Contraction and relaxation	0.936 (Pearson's r)	0.000*
IPSS voiding and contraction	0.212	0.299
IPSS voiding and relaxation	0.247	0.233
IPSS storage and contraction	-0.149	0.466
IPSS storage and relaxation	-0.119	0.562

Table 4: p= two-tailed significance at 0.05 level. IPSS=International Prostate Symptom Score,
*Two-tailed significant at 0.05 level

Other study parameters

Intra-class correlation coefficient for intra-rater reliability in 5 participants was 0,662 (95% CI -.0423-0.559, p=0.09).

DISCUSSION

The present study describes the pelvic floor muscle function of men with LUTS measured by TAUS in M-mode. An association was hypothesized between the PFMF and the severity of LUTS measured by IPSS and was not found. Exploration of PFMF through measurement of BB displacement with M-mode TAUS showed means and spreads of 6,2 mm (SD 3,12) during contraction and 6,12 mm (SD 2,96) during relaxation of the PFM. A strong positive association was found between BB displacement during contraction and during relaxation of the PFM.

30 men were included in the study. After measurements were performed we had to exclude four men because a measurement error was observed. These patients strained and expanded their abdomen during their attempt to contract the PFM and the BB descended on the screen. It was uncertain whether the US probe had stayed in the same position on the abdomen and in relation to the bladder. This phenomenon is discussed by Thompson et al.(16) Their study found high reliability for contraction but lower for Valsalva in females, and suggest this could be caused by movement of the probe over the abdomen.

Intra-class Correlation Coefficient BB base elevation in mm was not significant, this may have been partially caused by the small sample in which one of the five cases had a much larger difference between the two measurements. The first measurement was done prior to visiting the urologist while the second was not and some patients may have had more emotional stress during the first measurement. The level of stress could have been different for the five cases for the intra-reliability measurement.

A limitation of this study could be that the measurements were performed by a pelvic floor physiotherapist with limited experience with TAUS. Being an experienced pelvic floor physiotherapist could have been favorable for instruction on how to perform correct pelvic floor movements and could have attributed to the 87% of cases performing a correct upward movement of the BB.

Measuring movement of the BB base by TAUS cannot be done from a fixed point, so a starting point cannot be defined. This means we cannot tell if patients had already an elevated BB because of incomplete relaxation of the pelvic floor resulting in a higher resting position, thus limiting the amount of BB displacement when asked for contraction and relaxation. In a different population, namely men with chronic pelvic pain, Davis et al performed perineal ultrasound and found difference in resting position of the levator plate angle, meaning increased levator ani tone, compared to healthy men.(26) Another finding in the study of Davis et al is that the LPA angle correlated with anxiety. Martin et al described a bilateral association between LUTS, mainly storage, and anxiety.(27) Further studies on the relation between PFMF measured with US and anxiety in men with LUTS could give more clarity on this possible relation.

The advantage of TAUS over perineal US is that the patient doesn't have to get undressed and is not being investigated in a very personal area.

Other studies using TAUS in men used bright-mode US to visualize the bladder base movement. Using the M-mode the start, finish and whole duration of the movement can be seen in total, including the fluency of the movement. The present study did not focus on this

but future studies could measure this and also for feedback for the patient the M-mode can be used.

Association between PFMF and LUTS was not found, this could be because of the multifactorial cause of LUTS in which prostate, bladder, brain, inflammatory markers, pelvic floor muscles all play their role and so far it is not known how much each of these factor contributes to the severity of LUTS.(6)

IPSS is a valid, reliable disease-specific questionnaire, but is does not include urinary incontinence, postmicturition dribble and pain during urinating, which are also common bothersome lower urinary tract symptoms. A study in a large sample with more statistical options could make these things more clear and treatment could possibly be more personalized in the long run.

The present study shows that 87% of men with LUTS perform a correct elevation and a similar size descent of the BB during contraction and relaxation of PFM after a short instruction. This ability may help these men to learn to use their PFM better in activities of daily life in relation to urinary symptoms. For the other 13% more training is expected to be needed.

Pelvic floor muscle function has many characteristics, the characteristics cannot be measured by one method alone. TAUS is able to measure levator ani function because of the vertical cephalid movement. Nahon found moderate positive correlations for TAUS with manual muscle testing.(17) Stafford et al showed that the pelvic floor muscles have different direction of movement and that the levato ani provides the cephalid movement. As levator ani muscle function can be investigated by TAUS this could also provide options for evaluation of this function in patients with complaints in other domains of the pelvic floor, like defecation.

CONCLUSION

TAUS in M-mode is a quick and well-tolerated method in which with short instruction 87% of male patients with moderate LUTS could make an upward movement of the bladder base through contraction of the pelvic floor muscles and a similar size downward movement of the bladder base through relaxation. An association between pelvic floor muscle function and the severity of LUTS was not found in an elderly male population with moderate LUTS.

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APPENDIX

Appendix 1: Dutch and Enlish versions of IPSS

English: http://www.urospec.com/uro/Forms/ipss.pdf on May 29 2018

International Prostate Symptom Score (IPSS)

	IPSS/AUSS	Niet één keer	Minder dan eens in de vijf keer	Minder dan de helft van het aantal keren	Ongeveer de helft van het aantal keren	Meer dan de helft van het aantal keren	Vrijwel iedere keer
1	Hoe vaak heeft u de afgelopen 30 dagen het gevoel gehad dat uw blaas niet helemaal leeg was nadat u klaar was met plassen?	0	1	2	3	4	5
2	Hoe vaak moest u de afgelopen 30 dagen nà het plassen binnen twee uur opnieuw plassen?	0	1	2	3	4	5
3	Hoe vaak kwam het de afgelopen 30 dagen voor dat u tijdens het plassen verschillende keren opnieuw begon, dus 'met schokjes' plaste?	0	1	2	3	4	5
4	Hoe vaak kwam het de afgelopen 30 dagen voor dat u moeilijk uw plas kon ophouden?	0	1	2	3	4	5
5	Hoe vaak produceerde u de afgelopen 30 dagen tijdens het plassen slechts een mager straaltje?	0	1	2	3	4	5
6	Hoe vaak moest u de afgelopen 30 dagen persen of drukken om te kunnen beginnen met plassen?	0	1	2	3	4	5
7	Hoeveel keer moest u de afgelopen 30 dagen gemiddeld per nacht uw bed uit om te plassen?	0	1	2	3	4	5

8. Hoe zou u zich voelen als u voor de rest van uw leven last zou houden van uw huidige plasklachten?

- Uitstekend (0)
- Goed (1)
- Over het algemeen tevreden (2)
- Gemengde gevoelens (ongeveer even tevreden als ontevreden) (3)
- Over het algemeen ontevreden (4)
- Ongelukkig (5)
- Verschrikkelijk (6)

Referentie:

- Badía X, García-Losa M, Dal-Ré R. Ten-language translation and harmonization of the International Prostate Symptom Score: developing a methodology for multinational clinical trials. Eur Urol. 1997;31(2):129-40.

International Prostate Symptom Score (I-PSS)

Patient Name: _____ **Date of birth:** _____ **Date completed** _____

In the past month:	Not at All	Less than 1 in 5 Times	Less than Half the Time	About Half the Time	More than Half the Time	Almost Always	Your score
1. Incomplete Emptying How often have you had the sensation of not emptying your bladder?	0	1	2	3	4	5	
2. Frequency How often have you had to urinate less than every two hours?	0	1	2	3	4	5	
3. Intermittency How often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
4. Urgency How often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5. Weak Stream How often have you had a weak urinary stream?	0	1	2	3	4	5	
6. Straining How often have you had to strain to start urination?	0	1	2	3	4	5	
	None	**1 Time**	**2 Times**	**3 Times**	**4 Times**	**5 Times**	
7. Nocturia How many times did you typically get up at night to urinate?	0	1	2	3	4	5	
Total I-PSS Score							

Score: 1-7: *Mild* 8-19: *Moderate* 20-35: *Severe*

Quality of Life Due to Urinary Symptoms	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	**0**	**1**	**2**	**3**	**4**	**5**	**6**

SAMENVATTING

Doelstelling: De studie beoogt de bekkenbodemspierfunctie te beschrijven bij mannen met Lower Urinary Tract Symptoms (LUTS), gemeten met transabdominale echo. Een associatie wordt gehypothetiseerd tussen de spierfunctie en de ernst van de klachten.

*Methode:*Bekkenbodemspierfunctie is onderzocht met transabdominale echo in Motion-mode in een cross-sectionele studie bij mannen met LUTS, geworven op de polikliniek urologie in een groot perifeer ziekenhuis, de metingen zijn gedaan door één bekkenfysiotherapeut. De ernst van LUTS is gemeten met een vragenlijst, de International Prostate Symptom Score (IPSS).

Resultaten: Data van 26 van 30 mannelijke deelnemers zijn geanalyseerd. Deze 26 mannen konden een bekkenbodemspiercontractie maken waarbij de basis van de blaas in opwaartse richting verplaatste. Vier mannen die deze beweging niet konden maken, zijn vanwege meetfout geexcludeerd voor analyse. Gemiddelde verplaatsing van de basis van de blaas was bij contractie 6,20 (SD 3.12) en bij relaxatie 6,12 mm (SD 2,96). Pearson's r voor de correlatie tussen spannen en ontspannen was 0,936 (P=0,000). Deelnemers scoorden matige LUTS met mediaan 14,5 (Inter Quartile Range 9,5021,0). Er was geen associatie gevonden tussen bekkenbodemspierfunctie en de ernst van LUTS.

Conclusie: TAUS in Motion-mode is een snelle en door patiënten geaccepteerde methode waarbij 87% van mannen met matige LUTS na een korte instructie de basis van de blaas kunnen heffen door het aanspannen van de bekkenbodemspieren en deze even ver kunnen laten dalen door het ontspannen van deze spieren. In de populatie oudere mannen met matig ernstige LUTS is geen associatie gevonden tussen de bekkenbodemspierfunctie en de ernst van de klachten, gemeten met de IPSS.

Klinische relevantie: TAUS is een geschikte methode als onderdeel van het bekkenbodemspier functie onderzoek bij mannen met LUTS en mogelijk ook een geschikte feedbackmethode tijdens bekkenbodemspiertraining. De methode is met name geschikt als inwendige technieken gecontra-indiceerd zijn. Hoewel niet getest in deze studie zou de methode ook gebruikt kunnen worden in populaties met dysfunctie van de levator ani, zoals defecatieproblemen.