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# Validity of clinical assessment tools to evaluate involuntary PFM contractions during coughing

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## Objective:

In clinical practice an involuntary PFMC can be assessed by different tools such as visual inspection (VIP), palpation (PA), and transperineal ultrasound (US). An involuntary PFMC is described as a contraction that precedes an intra-abdominal pressure rise, e.g. during coughing and can be present or absent. Although reliability of PFM strength assessment has been evaluated and clinically established, there is still a lack of consistency in evaluating an involuntary PFMC.

The aim of this study was to compare outcome measures and strength of association between the above described evaluation tools.

## Study design, materials and methods

One hundred forty-nine nulliparous women (mean age 26.3 years), without a history of pelvic floor dysfunction confirmed by a German validated questionnaire, were included.

The participants performed 3 series of three maximal expulsive coughs. During these coughs, different evaluation tools were used. To identify a present involuntary PFMC, we followed the outcome measures defined by the terminology report of IUGA/ICS; during inspection no perineal downward movement should occur, during palpation, a PFMC must be recognized and US was used to assess a cranioventral bladder neck displacement. All measurements were done in the standing and supine position.

Measurement tools were statistically compared using the Pearson chi-square test or the Fisher exact test and the strength of association was reported with the phi coefficient ( $\Phi$ ).

## Results

In the evaluation of an absence of PFMC in the supine and standing position, we found a high (83.2% and 96.4%) agreement between US, PA and VIP, but in the evaluation of a presence of PFMC, the agreement between measurements were very incoherent. In the standing position, the agreement between US and PA was 58.3% and for VIP 16.7%. In supine position 33.3% for PA and 22.2% for VIP. The agreement between PA and VIP was 25% in the standing position and 100% in the supine position (table 1).

Table 1: Cross-tables includes numbers and total sum of absence or presence evaluated involuntary PFMC measured inspection (VIP), palpation (PA) and ultrasound (US) 0=present, 1=absent PFMC

		Cough St			VIP			Cough St						
		Cough Sup	Palpation	total sum	Cough Sup	1	0	total sum	Cough Sup	1	0	total sum		
US	1	7	5	12	US	5	20	25	PA	1	2	10	12	
	0	3	6	9		11	11	22		2	7	9	137	
	0	18	119	137		2	122	124		5	132	140	140	
	0	19	121	140		11	116	127		20	120	140	149	
		total sum	25	124	149	total sum	7	142	149			7	142	149
			22	127	149		22	127	149			22	127	149

The results showed a significant association between ultrasound and palpation during coughing in the standing position and a significant association between palpation and inspection in both the standing and supine position. However, the strength of association was weak due to the large alterations in agreement between measurements (table 2). Remarkable was the unexpectedly low number of identified PFMC in all 3 measurements. The participants were healthy nulliparous subjects, so a higher rate of involuntary PFM response would be expected.

Table 2: P-Values of Pearson chi-square test / Fisher exact test (indicated by \*) and phi coefficients of the VIP, PA and US in supine and standing position.

		Cough supine		Cough standing	
		VIP	Palpation	VIP	Palpation
US	P-Value	0.622*	0.130*	0.100*	0.001*
	$\Phi$ coefficient	0.053	0.133	0.167	0.329
PA	P-Value	<0.000*		0.002*	
	$\Phi$ coefficient	0.413		0.325	

VIP visual inspection of the perineum, no downward movement

PA PFMC palpated with vaginal palpation

US perineal ultrasound for cranioventral bladder neck displacement defined as positive values in both the x- and y-axis (no displacement = positive)

## Conclusion

Although the results showed a significant association between US and palpation and between palpation and visual inspection, there is a lack of consistency in identifying the presence of an involuntary PFMC. There may be a need to re-evaluate outcome measures or tools to identify an involuntary PFMC.

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