

Intravaginal Dynamometry Measures Correlate well with Manual Evaluation of Pelvic Floor Muscle Strength



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Intravaginal Dynamometry

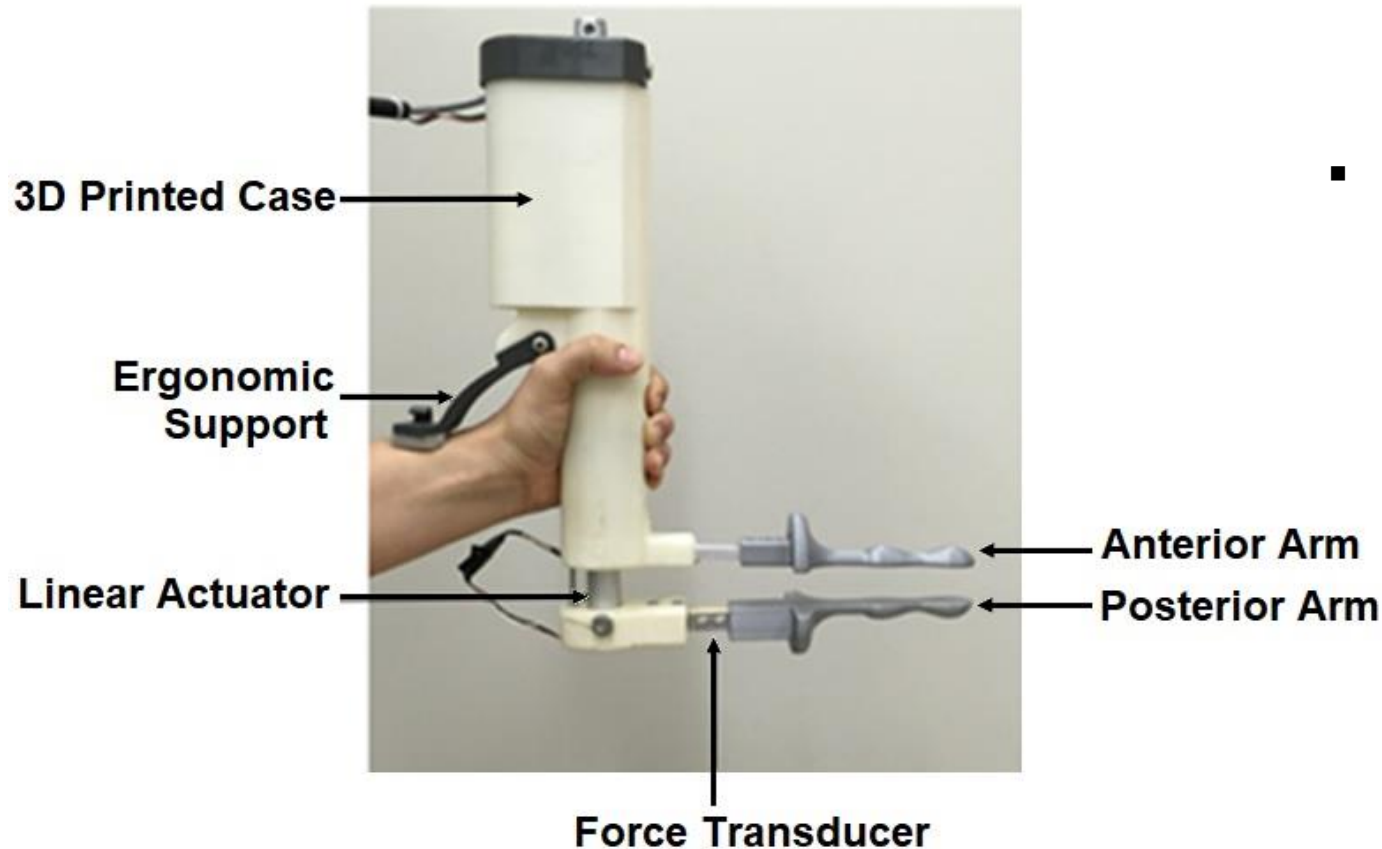


Fig. 1 Automated servo-controlled PFM dynamometer for objective measurement of active and passive pelvic floor tissue properties¹.

- The Current clinical gold standard to evaluate pelvic floor muscle (PFM) strength is the Modified Oxford Scale² (MOS)
- Our custom dynamometer objectively measures PFM properties including maximum voluntary contraction force and tissue resistance to passive opening (Fig. 1). It exhibits excellent reliability¹ but has not yet been validated against MOS or other outcomes

Purpose:

To investigate the association between PFM strength measured by our custom dynamometer and strength measured through palpation using the MOS.

Methods

- Protocol approved by uOttawa Health Sciences and Sciences REB and all women provided written informed consent prior to participating
- Recruitment: Target $n = 30$, through twelve local physiotherapy clinics and word of mouth.
 - Inclusion criteria: Women aged 18+ who had previously undergone physiotherapy treatment for pelvic floor disorders and had performed PFM training for a minimum of 12 weeks such that strength and motor control would be stable
 - Exclusion criteria: women with pelvic organ prolapse greater than POP-Q stage II, women who were pregnant or who had given birth within the previous year, women with known neurological or metabolic disorders that may affect pelvic floor muscle activation, women with dyspareunia
- Assessment: One visit to the MFM lab at the University of Ottawa.
 - PFM strength assessed first manually (MOS) using digital intravaginal palpation (MOS Grade 0 to 5)
 - PFM next evaluated using our custom dynamometer with arms opened to 35mm of anteroposterior diameter. Outcomes were absolute and relative peak forces.
 - Common instruction given: "When I say go, I want you to squeeze and lift with your pelvic floor muscles as quickly and as strongly as possible. Are you ready? Set....GO... squeeze, squeeze, squeeze, squeeze, harder, harder, harder....and relax"

Results

Sample size	Age (years)	Body mass index (kg/N ²)	Parity	PFM strength (MOS)	Absolute peak force (N)	Relative peak force (N)
n=29	42±13	25±4	1±1	4 (2-5)	16.19 ± 4.00	7.21 ± 2.59

Spearman Correlation Results

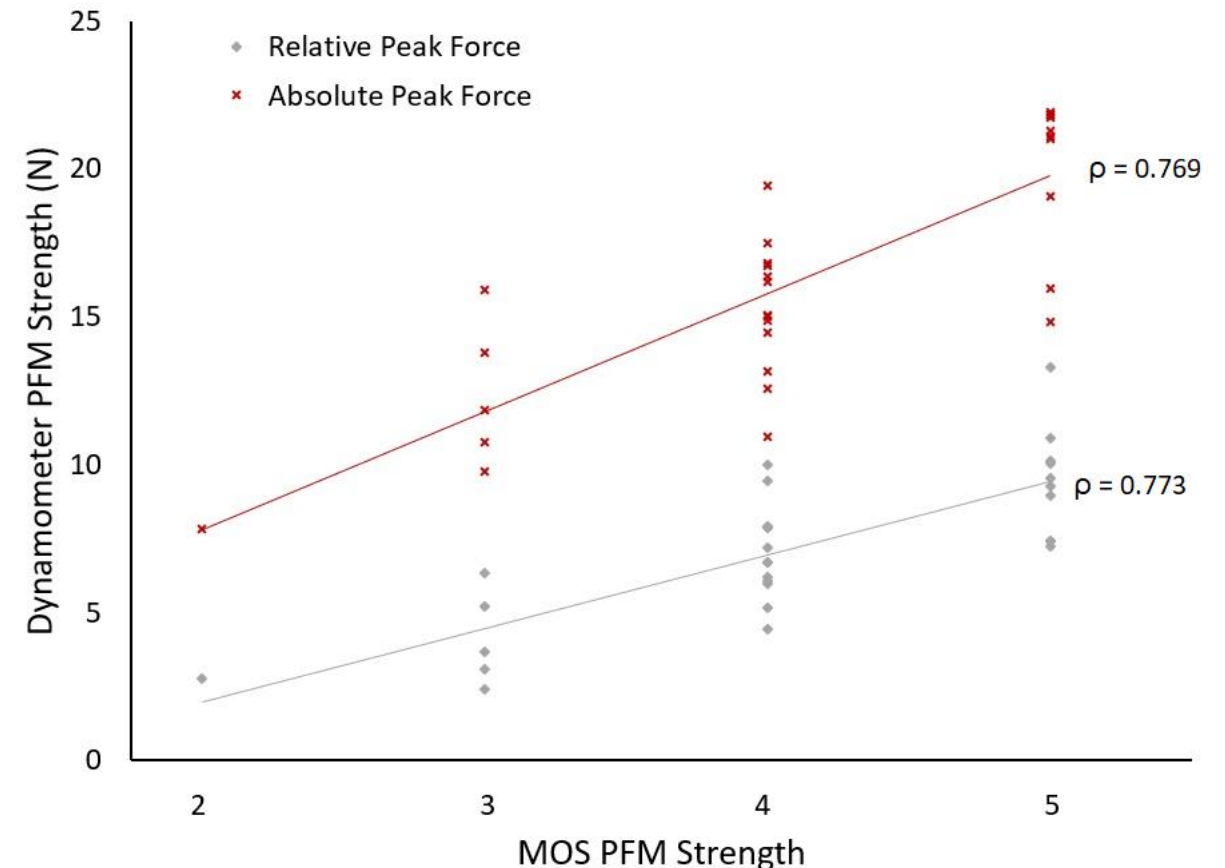
- MOS vs Relative Peak PFM Force

$$\rho \text{ (Rho)} = 0.773, p < 0.001$$

- MOS vs Absolute Peak PFM Force

$$\rho = 0.769, p < 0.001$$

- No significant difference between correlations ($p > 0.05$)



Conclusion

- We found moderate positive correlations between the two methods of assessing PFM force among women with strength grades between 2 and 5 on the MOS
- Our findings are consistent with Morin et al. who found significant correlations between these same two measurements with coefficients of $r = 0.727$, $r = 0.450$, and $r = 0.564$ for continent, incontinent, and all women, respectively ($P < 0.01$)³ and with Navarro Brazales et al who also found that MOS was moderately correlated with dynamometry ($r^2 = 0.524$, $p < 0.05$)
- Despite limitations including:
 - The subjective nature of strength assessment using the MOS
 - The narrow and discrete range of scores on the MOS
 - An inability of the dynamometer to capture the “squeeze” but not the “lift” action associated with PFM contraction

Maximum contraction force values obtained using our dynamometer reflect findings seen using palpation assessment