DYNAMOMETRY TO MEASURE PELVIC FLOOR FUNCTION

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INTRODUCTION

Evaluation of the pelvic floor muscle (PFM) function is an important parameter in clinical and scientific issues regarding PFM training, the first-line treatment of Stress Urinary Incontinence (SUI) [1]. Until recently, clinicians have been relying on digital assessment, a subjective measure that lack sensitivity, or on indirect sources of measurements of the PFM function such as surface EMG and pressure measurements, which do not offer adequate specificity [2]. This research report addresses the development and psychometric evaluation of a new dynamometer for measuring PFM function in women.

METHODS

The new dynamometer comprises a computerized central unit and a peripheral, a dynamometric speculum.

Through *in vitro* calibration studies, the dynamometer was assessed for linearity, repeatability and its capacity to measure a force independently of its point of application on the dynamometer branch. Subsequently, 29 female subjects aged between 27 and 42 and presenting different severity levels of SUI participated in an *in vivo* test-retest reliability study where the PFM evaluation was repeated in three successive sessions. During each session, maximum strength at 19mm and 24mm vaginal aperture, endurance, speed and rapidity of PFM contraction were recorded.

RESULTS AND DISCUSSION

The calibration results suggest that the voltage outputs of the apparatus are linearly related to applied forces. Repeated calibration with dead weights has shown that the force measurements are also repeatable. Furthermore, calibration performed by applying forces at different locations on the moving branch of the dynamometer confirms that the measurement is independent of the site of application of the resultant force.

The reliability coefficients found in the test-retest reliability study (coefficient of dependability and standard error of measurement) indicated good to very good reliability of all PFM measurements (Table 1). Furthermore, the subjects' unanimous appreciation implied that the instrument is acceptable and the measuring procedure comfortable.

CONCLUSIONS

This study demonstrates that the new dynamometer accurately measures forces applied to its instrumented branch, takes reliable measurements of the PFM function and is deemed acceptable by women.

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Table 1: Dependability coefficients and standard error of measurements for the PFM function measurements

Parameters	Maximal strength at 19mm vaginal aperture	Maximal strength at 24mm vaginal aperture	Endurance	Speed of contraction	Number of rapid contraction
Dependability coefficient	0.71	0.88	0.81	0.92	0.79
Standard error of measurement	1.22 N	1.49 N	2.98%	1.39N/s	1.4 contraction