167

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DIGITAL MUSCLE TESTING AND VAGINAL SQUEEZE PRESSURE MEASUREMENTS: CAN THESE BE INTERCHANGEABLE WHEN ASSESSING PELVIC FLOOR MUSCLE FUNCTION OF CONTINENT AND INCONTINENT PRIMIPAROUS WOMEN?

Hypothesis / aims of study

Evidence of positive effects of pelvic floor muscle training (PFMT) to the prevention and treatment of SUI in women after VD is increasing, turning postpartum assessment of pelvic floor muscle function (PFMF) an important goal to the admission of women to physical therapy programs. Digital muscle testing (DMT) and vaginal squeeze pressure (VSP) measurements are recommended by the ICS to assess PFMF. While DMT is largely used in the clinical setting, VSP measurements are often used in scientific studies because of its higher reliability. Although studies have shown good agreement between these two methods [1], there is a lack of information regarding the range of VSP values that corresponds to the DMT grades, which hinders comparability between clinical and scientific data as well as the communication between clinical practice and scientific evidence. The aims of this study were: 1) to investigate the correlation between DMT and VSP; 2) to determine the range of VSP values that corresponds to the grades on a DMT scale; 3) to investigate potential differences in the PFMF in primiparous women with and without SUI symptoms using the two measurement systems; 4) to determine values of VSP that best distinguish women with or without SUI symptoms in a cohort of primiparous women who underwent VD.

Study design, materials and methods

In this prospective observational study, primiparous women who underwent VD in a Brazilian birth centre between May/2007 and January/2010 were evaluated. Inclusion criteria were age between 18 and 35 years old, singleton fetus in cephalic presentation, not being pregnant at the time of assessment, absence of neurological or musculoskeletal diseases affecting the pelvis, absence of menstruation at the day of assessment. PFMF was assessed between 5 and 7 months postpartum by the Modified Oxford Grading System (MOGS) and by the Peritron 9300 perineometer (Cardio-Design, Australia) [2] by one trained experienced physical therapist, with participants in the bent-knee lying position. After PFMF assessments, women were questioned about the presence of SUI symptoms according to the ICS definition. All the procedures were in accordance with the Declaration of Helsink. All participants signed the consent form. Correlation between MOGS and VSP values was tested by the Spearman´s rho; the range of VSP values for each grade of the MOGS were described as means and 95%CI; Mann Whitney U tested differences in VSP values between women with and without SUI and Chi-square tested correlation between MOGS grades and presence of SUI; the k-means clustering algorithm was applied to separate the sample into two groups of greatest possible distinction regarding the VSP measurements; Chi-square was used to test if the VSP value identified by the k-means was correlated to SUI. α was set at 5%.

Results

A total of 184 women were evaluated, at 189.1±12.1 days postpartum. Participants' characteristics are described in Table 1. There was a strong and positive correlation between VSP and MOGS measurements (r=0.887; p=0.000). The distribution of MOGS grades and their correspondent VSP values for the whole sample are displayed in Table 2, and separated by group in Figure 1. There was significant difference (p=0.002) between continent women (median=30.0 cmH_20, IQR=26.3) and women with SUI (median=16.5 cmH_20, IQR=21.0) on VSP (Figure 2), but not on MOGS (p=0.1). The k-means clustered the sample in two groups of participants regarding the VSP values (group 1: n=64, range=34-103cmH_2O; group 2: n=120, range=0-33cmH_2O); there was a negative correlation (Phi=-0.2;p=0.02) between VSP≤33cmH_2O and SUI, indicating that a higher frequency of women with SUI presented values of VSP≤ 33cmH_2O (Figure 2).

Table 1: Participants' characteristics regarding risk factors for SUI

Variables	Incontinent (n=30)	Continent (n=154)	p value
Oxytocin use*	12 (40.0%)	63 (40.9%)	0.9
Episiotomy	2 (6.7%)	19 (12.3%)	0.4
Perineal lacerations with suture	18 (60.0%)	98 (63.6%)	0.8
Newborn weight†	3213.8 (375.0)	3116.7 (372.7)	0.09
Duration of the 2nd stage of labor	35.9 (20.7)	41.0 (28.9)	0.6

History of SUI	10 (33.3%)	6 (3.9%)	0.000
BMI ≥25 kg/m^2	8 (26.7%)	29 (18.8%)	0.3

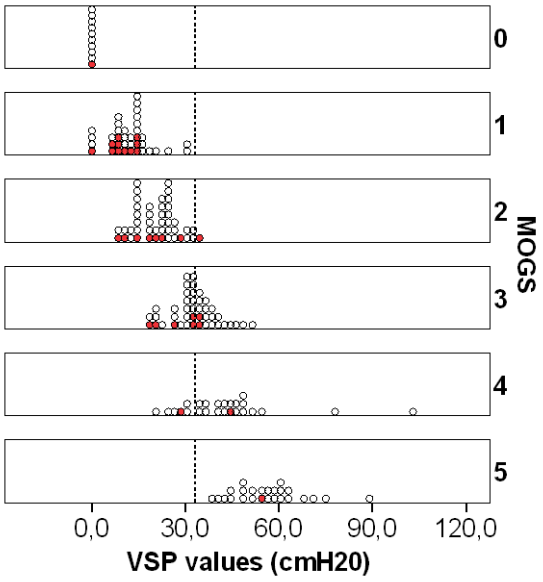
* Frequencies and corresponding percentages in parenthesis . † Means and standard deviations in parenthesis

Table 2: Distribution of MOGS grades and their correspondent VSP values for the whole sample (N=184).

MOGS grades	**VSP mean (95%CI) (cmH_2O)**	**VSP range min-máx (cmH_2O)**
0 (n=10)	NA	NA
1 (n=37)	12.24 (9.85-14.64)	0-31
2 (n=44)	20.79 (18.76-22.83)	8-34
3 (n=43)	33.02 (30.68-35.37)	18-51
4 (n=25)	43.16 (36.09-50.23)	21-103
5 (n=25)	56.28 (51.46-61.10)	38-89

NA=not applied

Figure 1: Distribution of MOGS grades and their correspondent VSP values for continent women (n=154) and women with SUI (n=30).



Interpretation of results

The PFMF in the whole sample ranged from 0 to 5 and from 0 to 103 cmH_2O allowing the description of the VSP values for the whole MOGS. The strong positive correlation between MOGS and VSP measurements is in agreement with previous studies [1] suggesting that it is valid to interchange information between these two measurement tools, therefore favoring the exchange of information between scientific evidence and clinical practice. The description of VSP values that correspond to each MOGS´ grade will offer a reference to this interchange of information. PFMF differences between continent women and women with SUI were identified when using the VSP measurements but not when using MOGS, indicating that the MOGS has low sensitivity to capture score changes, therefore should not be used when investigating the effects of intervention on the PFMF. The majority of women with SUI presented values of VSP lower than continent women therefore indicating recommendation of PFMT to prevent SUI in women during pregnancy and after VD. The value of VSP equal to $33cmH_2O$, which in our sample corresponded to the grade 3 on the MOGS, seems to be a possible cut-off point to the presence of SUI.

Concluding message

The present data offers the VSP values that correspond to the MOGS grades and will improve the communication between clinical practice and scientific evidence. The value of $33cmH_2O$, which corresponded to grade 3 on the MOGS, seem to be a cut-off point to the presence of SUI and should be investigated in future studies as a criterion for the admission of asymptomatic postpartum primiparous women to physical therapy preventive programs.

References

1. 1. Isherwood PJ, Rane A. Comparative assessment of pelvic floor muscle strength using a perineometer and digital examination. British Journal of Obstetrics and Gynaecology 2000; 107:1007-1011
2. 2. Frawley HC, Galea MP, Phillips BA, Sherburn M, Bo K. Reliability of pelvic floor muscle strength assessment using different test positions and tools. Neurourology and Urodynamics 2006;25(3):236-42.
3. 3. Thompson JA, O´Sullivan PB, Briffa NK, Neumann P. Assessment of voluntary pelvic floor muscle contraction in continent and incontinent women using transperineal ultrasound, manual muscle testing and vaginal squeeze pressure measurements. International Urogynecology Journal 2006; 17(6):624-630.

Specify source of funding or grant	**None**
Is this a clinical trial?	**Yes**
Is this study registered in a public clinical trials registry?	**No**
Is this a Randomised Controlled Trial (RCT)?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Sofia Feldman Hospital Ethical Committee. All the participants signed informed consent.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**