#379 Involuntary activity of pelvic floor muscles in healthy women while performing activities of daily living

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Background

- Activities of daily living (ADL) accompanied by increasing intra-abdominal pressure can provoke urine loss in women with stress urinary incontinence (SUI)
- The affected can therefore complain involuntary loss of urine associated with change of body position [1]
- For preventing SUI involuntary pelvic floor muscle (PFM) activity is important

Aim

- The study aim was to investigate whether there is involuntary PFM activity during moderate ADL: using stairs, rising from a chair and lifting of loads (Figure 1a-c), and,
- whether there is a difference in PFM activity between:
  - three different speeds of stair using (slow, medium, fast)
  - two different speeds of chair rising (slow, fast)
  - the lifting of two different loads (10 kg, 15 kg)

Methods

- Exploratory, cross-sectional pilot study
- Electromyogram (EMG) activity of PFM of 16 healthy nulliparous women using vaginal probes
- Root mean square values of the EMG signals were analyzed before and after onset of load
- EMG values: Normalization to peak activity during maximum voluntary contractions (%MVC)
- PFM activity-onset threshold: mean of rest activity plus two standard deviations (SD)
- PFM activities: Analysis by ANOVA for repeated measures between before and after onset of load and the three different speeds followed by adequate post hoc t-test, and,
- t-test between the different speeds and different loads for paired samples was calculated. $\alpha = 0.05$

Figure 1a Rising from a chair

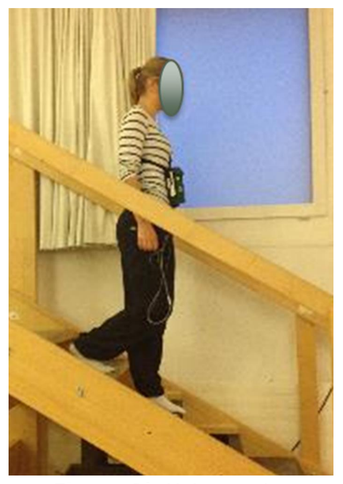

Figure 1b Using stairs

Figure 1c Lifting of load

Results

- 16 participants: mean (± SD) age of 26.8 (± 5.2) years; body mass index of 22.3 (± 2.4) kg/m^2
- Mean threshold of PFM activity onset: 32.4±12.4 %MVC
- PFM activity was higher than during rest in all measured ADL
- Stair up and down: long lasting PFM activity and activity tended to increase with higher speed
- Load lifting and chair rise: higher PFM activity with increasing weight or speed
- Mean PFM activity during load lifting and chair rise: Figure 2 & 3

Conclusions

- Involuntary PFM activity was shown during stair use, lifting loads and rising from a chair
- The increase of involuntary PFM activity with speed and ground reaction force during stair use and chair rise is comparable to findings during other whole-body impact activities i.e. running [2, 3]
- ADL can presumably be applied to provoke involuntary PFM activity in healthy nulliparous women
- Future research is needed in involuntary PFM activity of women suffering from SUI

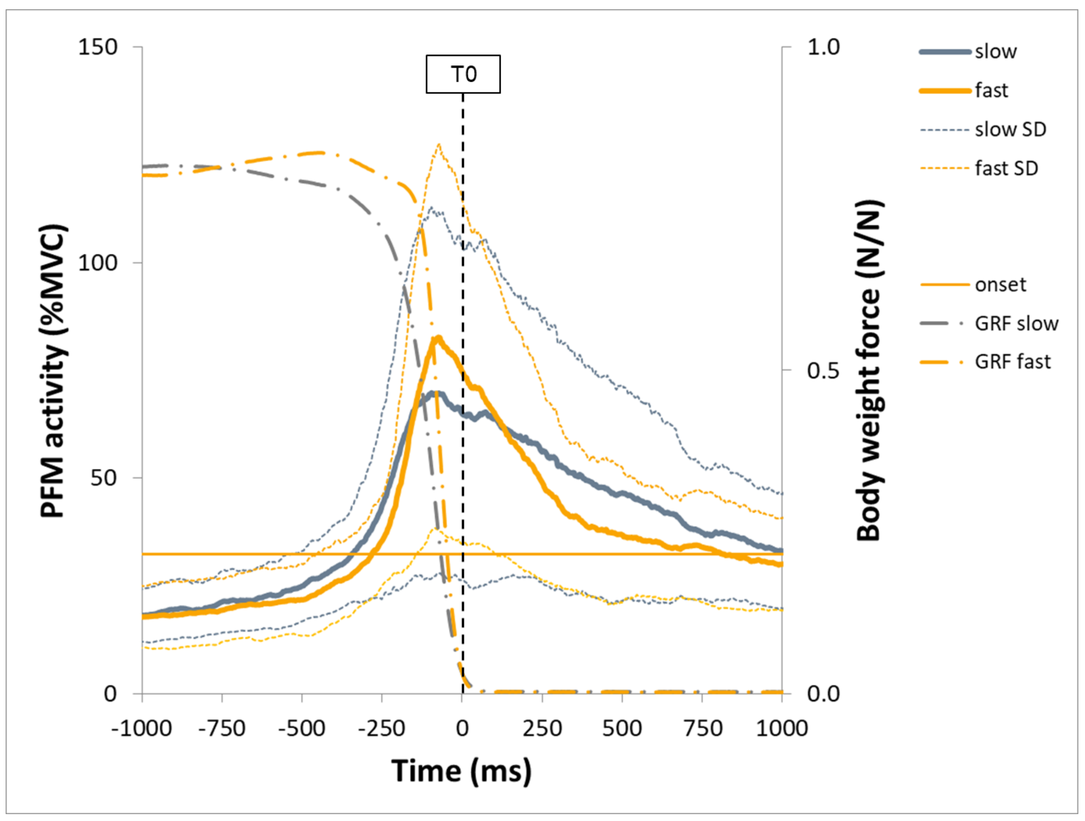

Figure 2 Mean PFM activity (±SD) (%MVC) and body weight force during chair rise with two different speeds (slow, fast)
Abbreviations: T0: Onset of load; SD: Standard Deviation; N: Newton

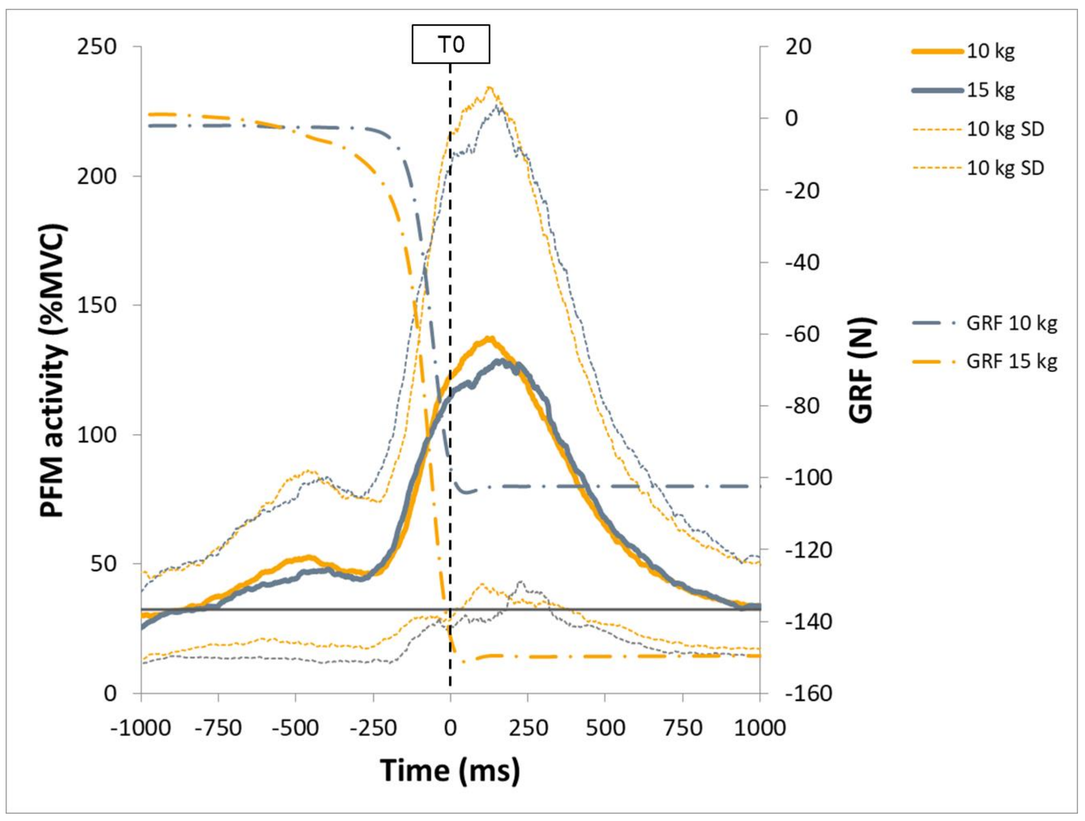

Figure 3 Mean PFM activity (±SD) (%MVC) and ground reaction force (N) during load lifting with two different loads (10, 15 kg)
Abbreviations: T0: Onset of load; SD: Standard Deviation; N: Newton

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Ethics
Study approved by Ethics Committee of the Canton of Bern, Switzerland (2016-00786)

Keywords
Electromyography, muscle contraction, pelvic floor, stress urinary incontinence

References
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