Pelvic floor muscle activity during impact loads in continent and incontinent women: A systematic review

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Purpose

- The aim was to investigate electromyography activity of female pelvic floor muscle (PFM) during impact loads.
- This may help clarify the pathophysiology of stress urinary incontinence (SUI).
- A systematic review (PROSPERO: 2016:CRD42016035624) was conducted to summarise current evidence for PFM activity during impact loads in both continent and incontinent women.

Methods

- PubMed, EMBASE, Cochrane, and SPORTDiscus databases were systematically searched for literature.
- The PICO approach (Patient, Intervention, Comparison, Outcome) was applied in order to construct the search query.
- Original articles were included that investigated PFM activity during impact loads if they included terms related to muscle activity, measurement methods, test positions, activities performed and continence status.
- Two reviewers screened titles and abstracts independently to ascertain if included papers fulfilled the inclusion criteria and extracted data on outcome parameters.

Table 1

<table>
<thead>
<tr>
<th>Methods</th>
<th>Test position</th>
<th>Test activity</th>
<th>EMG activity</th>
<th>Timing</th>
<th>Relationships</th>
<th>Reliability</th>
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<tr>
<td>Vaginal probe</td>
<td>Squeeze</td>
<td>Coughing</td>
<td>Maximal EMG activity in %</td>
<td>EAS - EIC</td>
<td>Bladder pressure</td>
<td>ICC</td>
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<td>Perineum</td>
<td>Standing</td>
<td>Running</td>
<td>Mean EMG activity in %</td>
<td>EAS - Iciadder pressure</td>
<td>Intervertebral pressure</td>
<td>Internal pressure</td>
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<tr>
<td>Perineum</td>
<td>Sitting</td>
<td>Horse walking</td>
<td>Maximal EMG activity in %</td>
<td>EAS - intra-abdominal pressure</td>
<td>Intervertebral pressure</td>
<td>Intervertebral pressure</td>
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<tr>
<td>Perineum</td>
<td>Weight-carrying</td>
<td>Rapid arm movements before heel strike</td>
<td>Mean EMG activity in %</td>
<td>PFM - posterior vaginal wall pressure</td>
<td>Cough link point pressure</td>
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<tr>
<td>Perineum</td>
<td>Standing</td>
<td>Pelvic floor muscle (PFM)</td>
<td>Area under the EMG average curve in %MVE</td>
<td>EAS - 0, 0.2, 0.3 and 0.5</td>
<td>Intensity of coughing</td>
<td></td>
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<tr>
<td>Wire EMG</td>
<td>Horse riding</td>
<td>PFM - hoof strike</td>
<td>MAD in %MVE</td>
<td>Recruitment of motor units</td>
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</table>

Conclusions & Practical implications

- Future research should focus on dynamic PFM activities, due to the fact that continence is also based on reflex activity of the PFM.
- The results suggest that impact activities should furthermore be validated, as we still do not clearly understand how the PFM react during impact loads.
- PFM rehabilitation programs for SUI women should include training control and coordinated abdominal muscle activity.
- Eventually impact loads may be included in a PFM rehabilitation to exercise and activate fast twitch muscle fibres in their involuntary function.

References