Examination of overactive PFM with EMG
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High tone PFM - increased tension in tissue on palpation
- Contractile - Overactive PFM
  - Elevated EMG resting tension - fear, pain, neurogenic
  - Excessive contraction before or on initiation of penetration
- Non-contractile
  - Normal EMG
  - Contracture of connective tissue - radiation, surgical scaring, disease

Palpation versus EMG - contractile and non contractile tissues

<table>
<thead>
<tr>
<th>EMG</th>
<th>Palpation</th>
<th>Possible cause</th>
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<tbody>
<tr>
<td>High uV level</td>
<td>Soft muscle</td>
<td>Artifact</td>
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<tr>
<td>High uV level</td>
<td>Hard muscle that relaxes easily with</td>
<td>Overactive PFM - holding pressure and verbal cues</td>
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<tr>
<td>High uV level</td>
<td>Hard muscle that does not relaxes</td>
<td>Overactive PFM – spasm</td>
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<td>easily with pressure and verbal cues</td>
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<tr>
<td>Normal uV level</td>
<td>Soft muscle</td>
<td>Normal PFM</td>
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<td>Normal uV level</td>
<td>Hard muscle</td>
<td>Short PFM</td>
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<td>Trigger points in muscle</td>
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<td>Connective tissue restriction</td>
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Other factors influencing resting baseline
- Medications which artificially decrease EMG signal:
  - Sedatives
  - Antihypertensive
  - Anticholinergic
  - Anti-angina drugs
  - Anti-spasmodic
  - Proton pump inhibitors
- Skill of the operator - unwanted signals

Unwanted signal
Environmental noise
- Usually elevated steady base line with little variability related to muscle activity
- Changes in tracing not related to patient activity
- Noise related to defective hardware - consult with equipment manufacture:
  - Computer
  - Cables - can fatigue and need to be replaced periodically
  - Electrodes - may need to remove and replace, especially the ground electrode
• Noise related to environmental activity
  o Can come from any electrical device including the computer, EMG device, lights, and electrical plinth
  o Check all connections
  o Unplug all electrical devices
  o Patient 3 ft from computer monitor
  o Computer monitor apart from EMG hard drive
  o Change power strip

<table>
<thead>
<tr>
<th>Artifact</th>
<th>What it Looks Like</th>
<th>What to Do</th>
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<tbody>
<tr>
<td>Heart rate</td>
<td>Regular small spike occurring during rest phase</td>
<td>• Move electrodes or ignore</td>
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</table>
| Cross talk: contraction of other muscles | Increased microvolt levels with contraction of other muscles | • Watch / palpate patient  
• Keep patient relaxed and still  
• Support legs with pillows or wall |
| Skin electrode shear: sliding of electrodes over skin surface | Spikes with skin movement | • Ensure good contact  
• Reapply electrodes |
| Electrical short circuit: Bridging of electrodes from gel or vaginal secretions, sweating getting down between two active electrodes | Flat line rest with little change on movement | • Remove electrodes and re apply |

Evaluation measurements
• Many different protocols, no studies
• Very few hard and fast rules – the art of interpretation
• EMG assessment must be taken in context with other examination findings - patient has symptoms of overactive PFM – obstructed urination, defecation, pain
• 1 to 2 minute resting baseline
• Recheck resting baseline between tests
• Comparing session - it may not be reliable to compare day to day or patient to patient - look for trends and correlation with symptoms

Normal resting tone
• Baseline fairly constant
• Without large spikes
• Between contractions
• Between sessions
• There is no microvolt (uV) level below which normal resting tone occurs
• Past standard has been below 2 uV, this may be too strict and does not take other variables into account
Standard deviation
- Variation size or "jumpiness" of a signal
- No norms established

Overactive PFM
- Baseline between contractions – inconsistent and elevating
- Resting baseline - varies widely from session to session, especially in relation to pain
- Elevated standard deviation
- Return to baseline after startle or frightening – overactive PFM is slow

Biofeedback Relaxation Training
- Contract relax to decrease PFM tension (Naess 2013)
- Small contraction with big relaxation - anti kegel
  - Study with normals and provoked vestibulodynia patients
  - Vaginal pressure measurement and EMG after 3 maximal PFM contractions
  - Results
    - Resting pressure in both patients and controls significantly decreased after contraction.
    - EMG significantly decreased only in patients.
- Gentle bearing down should result in lower EMG activity and descent of the PFM
- Diaphragm breathing (Talasz 2011) - health women, real-time dynamic MRI
  - Diaphragm and PFM move caudally during inspiration and cranially during expiration.
- Levator ani syndrome - biofeedback is superior to Electrical Stimulation and massage (Chiarioni 2010)
- Pelvic muscle exercises with or without biofeedback may improve sexual function in women with pelvic floor disorders or pain. (Rogers 2018)
- Biofeedback combined with vaginal dilators (McGuire 2009)

References


www.bethshelly.com