Considerations of Assessment of Long Term Pain and Function

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Disclosures

■ Consulting
  ■ Pfizer, Tonix, Theravance, Zynerba, Samumed, Aptinyx, Daiichi Sankyo, Intec, Regeneron, Teva, Lundbeck

■ Research support
  ■ Pfizer, Cerephex, Aptinyx

■ Litigation – testified against opioid manufacturers in State of Oklahoma
Potential measures of long term outcomes

*Think of pain as more of a state, function as a behavior*

- **Subjective PROs**
  - Pain intensity
  - Pain interference
  - Functional status (disease specific vs generic)

- **Objective assessment of performance based measures** e.g. a walk, stair, climb or chair-stand test

- **Objective activity measured by actigraphy**

- **TJR**

- **Some combination of above**
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Relationship Between Self-report and Objective Physical Function

- How strong is the relationship between self-report and objective measures of physical function in healthy individuals or in individuals with disease?
- In studies that directly compare self-report and objective measures of physical function or functional status, what are the self-report measures really measuring?
- Should we expect a strong relationship between self-report and objective measures? Lessons from other domains
- Given the differences between self-report and objective measures, which is the “right” measure?
If we use actigraphy as the current gold standard for measuring activity or function in real life settings . . .

There is a consistently poor relationship ($r = 0 - .40$) between average activity levels and measures of functional status or activity.\textsuperscript{1-4}

There is a strong trend towards these relationships being stronger (albeit still rather weak) when the objective measure is compared to \emph{activity} measures vs. \emph{functional status} measures.

\textsuperscript{1} Kashikar-Zuck, et. al. \textit{Arthritis Care and Research} 2013, \textsuperscript{2} Chandonnet et. al. \textit{PLoS One} 2012, \textsuperscript{3} Ferriolli et. al. \textit{J Pain and Symptom Management} 2012. \textsuperscript{4} Evenson et. al. \textit{J Phys Act Health} 2012.
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Relationship between symptoms, self-reported, and objective measures of activity, in fibromyalgia

- Patients with FM have amongst the lowest self-reported functional status of any chronic illness.
- This parameter has been very difficult to improve in interventional studies.
- How is self-reported activity related to:
  - Objective measures of activity
  - Specific symptoms

*Kop et. al. Arthritis Rheum 2005*
Actogram I

Walking

Office work-desk

Running

Preparing dinner

Swimming

In bed; reading

Sleeping

Getting ready

Office work-desk

Got up

Couch sitting; reading

Walking
Results – Objective Activity

- Average daytime and nighttime activity levels were nearly identical in the patient and the control groups (p=ns).

<table>
<thead>
<tr>
<th></th>
<th>Daytime</th>
<th>Nighttime</th>
<th>PCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>1456±429</td>
<td>147±156</td>
<td>36</td>
</tr>
<tr>
<td>Controls</td>
<td>1445±556</td>
<td>152±107</td>
<td>56</td>
</tr>
</tbody>
</table>
Peak Activity

- *Peak* activity was significantly lower in the FM patient group relative to the control group (p=0.008).
  - $7870 \pm 3223$ vs. $12178 \pm 7862$ activity units

- *Variability* of peak activity was also significantly different between groups
  - Levene’s test on SDs, p=0.001
Average and Diurnal Peak Activity Levels of Fibromyalgia Compared to Controls

*p<0.05; Error Bars=SEM
Assessment of Pain and Activity in a Placebo-Controlled Crossover Trial of Celecoxib in Osteoarthritis of the Knee

- RCT in OA (n=47) to examine how to better differentiate active treatment from placebo
- The WOMAC pain subscale was the most responsive of all five pain measures.
- Pain–activity composites resulted in a statistically significant difference between celecoxib and placebo but were not more responsive than pain measures alone. However, a composite responder defined as having 20% improvement in pain or 10% improvement in activity yielded much larger differences

Trudeau et. al. Pain Practice 2014
Assessment of Pain and Activity in a Placebo-Controlled Crossover Trial of Celecoxib in Osteoarthritis of the Knee

- The most responsive actigraphy measure was peak activity, with a between-group difference of 91.9 counts/min ($P = 0.090$); mean activity and total activity did not approach statistical significance.

- Actigraphy was more responsive than the WOMAC function scale, possibly due to lower placebo responsiveness.
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Self-report vs. Objective Measures of Other Domains

- **Sleep**
  - Correlation between multiple PSG measures and multiple self-report measures in sleep apnea patients ranges from $r = .01-.24$, mean $r = .09$.\(^1\)
  - Correlations between self-report and PSG measures in insomnia $r = .05 - .36$.\(^2\)

- **Memory/cognition**
  - Very poor relationship between subjective measures and objective performance based measures in both healthy individuals, and individuals with mild TBI, but there is a modest relationship between subjective measures and mood measures.\(^3,4\)

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Relative difference among 27 functional measures in patients with knee osteoarthritis: an exploratory cross-sectional case-control study

K. Vårbakken¹,²*, H. Lorås³, K. G. Nilsson⁴, M. Engdal⁵ and A. K. Stensdotter¹,²
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