Research Question
- Can portable biosensors detect opioid administration?

Background
- Portable biosensors have been used to monitor physiologic variables in natural environments, and have been shown to be useful in the monitoring of cocaine addiction by identifying craving and relapse
- Biosensor technology may provide critical information in opioid addiction and treatment
- There are currently no data on the changes measured by biosensors after opioid exposure

Methods
- Q sensor
- Flow Diagram for enrollment/participation

Results
- 4 patients recruited
- Individual graphs shown below (figures 3-6)
  - Time on horizontal axis: opioid administration delineated by marker along top
  - Graphs from top to bottom: Electrodermal Activity (EDA), skin temperature and locomotion
- Participant Characteristics

<table>
<thead>
<tr>
<th>Patient</th>
<th>Handedness</th>
<th>Age</th>
<th>Gender</th>
<th>History of Opioid Use</th>
<th>Intervention</th>
<th>Sensor Wrist</th>
<th>EDA Response</th>
<th>Pain Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right</td>
<td>82</td>
<td>M</td>
<td>opioid naive</td>
<td>4 mg morphine</td>
<td>Left</td>
<td>65% Rise</td>
<td>Complete resolution</td>
</tr>
<tr>
<td>2</td>
<td>Left</td>
<td>47</td>
<td>M</td>
<td>recent short-term opioid use</td>
<td>1 mg hydromorphone</td>
<td>Right</td>
<td>200% Rise</td>
<td>Moderate improvement</td>
</tr>
<tr>
<td>3</td>
<td>Left</td>
<td>42</td>
<td>F</td>
<td>chronic opioid use</td>
<td>1 mg hydromorphone</td>
<td>Left</td>
<td>no change</td>
<td>No improvement</td>
</tr>
<tr>
<td>4</td>
<td>Right</td>
<td>72</td>
<td>M</td>
<td>chronic opioid use</td>
<td>4 mg morphine</td>
<td>Right</td>
<td>70% Rise</td>
<td>Minimal improvement</td>
</tr>
</tbody>
</table>

Discussion
- In this pilot study, opioid injection was associated with a rise in EDA
- Previous opioid use seemed to be associated with a blunted response. In one patient, apparent drug seeking behavior correlated with lack of change in EDA
- Laterality seemed to be an important factor
- Biometric changes should be further explored as a marker of opioid use in various clinical scenarios.

Limitation
- Larger application across varying ages, demographics, and range of opioid tolerance will be required to further delineate the expected biometric parameter changes.

Conclusion
- Changes in EDA occur with administration of opioids, may vary depending on opioid use history and hand dominance, and can be easily measured by portable biosensors.

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