Topical capsaicin modulates the 2-point discrimination threshold – modulation depends on stimulation modality and intensity

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INTRODUCTION

• The 2-point discrimination threshold (2PDT) can be used to probe the sensory integration.
• Studies have shown that the 2PDT may be modulated during experimental pain sensitization in acute pain [1] and in chronic pain [2] conditions.
• Normally the 2PDT is tested using innocuous mechanical stimuli, but little is known about how the 2PDT of different intensities and modalities during pain is modulated during sensitization.
• It is likewise unknown which combinations of pain intensities and modality are more suitable to investigate change in 2PDT following e.g. sensitization.

METHODS

• In session 2, one group had the skin in the stimulation area sensitized with topical capsaicin (8% Quercia) for 30mins. The other group received placebo for 30mins.
• To find the 2PDT the data was fitted to a sigmoidal curve [3], for each fit the 95% CI (mm) was extracted as well.
• To analyze differences in the NRS data a 3-way ANOVA was used, factors set as capsaicin/placebo, stimulation noxiousness, and stimulation modality.
• The experiment was approved by the local ethical committee (VN-20190005).

METHODS (CONT.)

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• To analyze differences in the NRS data a 3-way ANOVA was used, factors set as capsaicin/placebo, stimulation noxiousness and stimulation modality.
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AIM

The aim of this study was to investigate how the 2PDT of both noxious and innocuous stimuli of mechanical and thermal stimulation modalities are modulated by hyperalgesia evoked by topical capsaicin.

RESULTS

Baseline results

Table 1. Baseline 2PDT and 95% CI for each combination of stimulation modality and noxiousness.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Noxious</th>
<th>Innoxious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal</td>
<td>80.3</td>
<td>65.5</td>
</tr>
<tr>
<td>Mechanical</td>
<td>66.6</td>
<td>61.7</td>
</tr>
<tr>
<td>Mechanically</td>
<td>34.1</td>
<td>32.6</td>
</tr>
<tr>
<td>Mechanical</td>
<td>46.9</td>
<td>44.6</td>
</tr>
</tbody>
</table>

• Post-capsaicin

• Baseline results

Table 2. 2PDT and 95% CI for each combination of stimulation modality and noxiousness following capsaicin or placebo.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Placebo</th>
<th>Capsaicin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal</td>
<td>91.0</td>
<td>85.5</td>
</tr>
<tr>
<td>Mechanical</td>
<td>55.9</td>
<td>48.1</td>
</tr>
<tr>
<td>Mechanically</td>
<td>50.9</td>
<td>46.9</td>
</tr>
</tbody>
</table>

• NRS was significantly higher after capsaicin compared to placebo (ANOVA, p<0.001). NRS was significantly higher for thermal stimuli (ANOVA, p<0.001). NRS was significantly higher for noxious stimuli (ANOVA, p<0.001).

CONCLUSIONS

• Topical capsaicin modulates the 2PDT across different stimulation modalities and noxiousness – placebo does not modulate the 2PDT.
• For innocuous and noxious mechanical stimuli capsaicin increased the 2PDT.
• For thermal stimuli the 2PDT increases slightly for innocuous stimuli, but the 2PDT decreases for noxious thermal stimuli.

REFERENCES


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