Spine Buddy

An Evaluation of Sitting Application

Alex Cote • Anna Mumford • Celine You • Jason Li • Ric Ren • Tina Lee
Factors to be considered for chair study:
- First impressions
  - Initial opinion of Spine Buddy
  - General attitude towards soft vs. firm side
- Comprehensibility
  - Ease of application (speed)
  - Knowledge of where to place T part
  - Use actively or passively
- Comfort
  - Soft and firm
  - Preferred side (soft vs firm), preferred chair (high vs low)
- Universal design
  - If users' dimensions change interaction with and effectiveness of product

Factors to be considered for car study:
- Comprehensibility
# Measurements

## Participants Measurements

<table>
<thead>
<tr>
<th></th>
<th>Back Length (inches)</th>
<th>Shoulder Width (inches)</th>
<th>Hip Width (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>20.5</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>Minimum</td>
<td>17</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Average</td>
<td>18.7</td>
<td>15.7</td>
<td>13.2</td>
</tr>
</tbody>
</table>

## Spine Buddy Measurements

- Soft: 21" x 6.5"
- Firm: 21.25" x 7.38"
## Test Process

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Type of Chair</th>
<th>Type of Spine Buddy</th>
<th>Time (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Pre-test Survey</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Take pictures</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measure Body Dimensions</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Low back</td>
<td>Firm</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Low back</td>
<td>Comfort Worksheet and Interview</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Low back</td>
<td>Soft</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Low back</td>
<td>Comfort Worksheet and comparison Interview</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Break</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>High back</td>
<td>Firm</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>High back</td>
<td>Comfort Worksheet and Interview</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>High back</td>
<td>Soft</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>High back</td>
<td>Comfort Worksheet and comparison Interview</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Final Interview</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>
The installation time is pretty short, so the design should be quite easy to use.
The reason why subjects did not rest their neck on the T part probably because the limited length of the chair back. The length is too low to let subjects rest their neck when leaning back.
The subject reported that his back felt uncomfortable when speeding up. And this cause some distractions.
Net Discomfort Scores

Most uncomfortable combination:
- Firm on High back chair (7.0)
- Firm on Low back chair (5.5)
- Soft on High back chair (1.0)

Better-off cases
- Soft on Low back chair (-3.0)
- Soft on Car seat (-1.5)

Most uncomfortable body parts:
- Head and neck (3.22) and Upper back (2.6)
Pressure is concentrated on upper back and mid back
The second part of our interview focused on the comparison between firm and soft Spine Buddy. Participants preferred the soft spine buddy because of... However, those participants who preferred the firm spine buddy pointed out...
Final Interview

User Suggestions:
1) shape can be adjusted manually/automatically to mold the spine better, or use memory sponge
2) half cylinder rather than cylinder;
3) support for left and right side of the back;
4) add top buckles so the reversed one would be separable;
5) provide lumbar support, like make it I shape;
6) less firm;
7) customize appearance,
**Suggestions**

**Adjustability:**

- size
- contour
- length

The head/neck rest able to change width and long part able to bend to match contours of spine.
Length should extend when needed.
Sizes decided by anthropometric data to fit the widest range of people.

size: head/neck rest (top of T) was fine for some users but not for others
contour: users disliked when the Spine Buddy pushed hard on some parts of their backs
length: some users unable to use T at the right place
Making Spine Buddy adjustable would allow it to fit more users comfortably.
Suggestions

Usability:

- active or passive
- duration of use
- placement

When to use actively or passively.
Instructions included on how long to use.
Diagrams to explain that T-shape goes on neck.

active or passive: users don't know to use as massage or use as support
duration of use: users don't know options of all day use vs. periodic use
placement: users don't know to place top of T at base of neck
movement: cylinder rolling and loose elastic makes the Spine Buddy move

how to use
whether to actively use or passively
how long to use
put t shape on neck