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THE PLANNING AND USE OF SPACE IN
IRISH HOUSES 1730 to 1830

VOLUME 2 OF TWO VOLUMES

ILLUSTRATIONS

A thesis submitted to the University of Dublin
for the Degree of Doctor of Philosophy

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Results Part I

Descriptive analysis of phantom and residual limb pain experiences

Of the 952 respondents, 870 (91.4%) responded to the question on phantom pain experience and nearly three quarters of those reported that they experience phantom limb pain (n = 646, 74.3%) (67.9% of the total sample). Eight hundred and forty people (88.24%) responded to the question regarding residual limb pain experience and over three quarters (n = 642, 76.4%) indicated that they experience residual limb pain (67.4% of the total sample), a further 5 people (0.60%) reported that the nature of their injuries (i.e. complete disarticulations) meant that the question was not applicable.

The frequencies and durations with which the respondents experienced phantom pain and residual limb pain during the previous week are detailed in Table 6.1. Forty-one per cent of those who reported phantom pain experienced phantom pain five times per week or more and 30.5% of those who affirmed the experience of residual limb pain indicated that they experienced residual limb pain at least five times per week. The duration of the typical phantom pain episode was brief for most respondents – 44.8% of the 462 respondents who rated the duration of pain episodes reported phantom pain lasting between a few seconds to half an hour. However, phantom pain of more extended durations was also reported – hours (31.2%), 24 hours (1.5%), days (2.3%), constant phantom pain (10%). In terms of residual limb pain, of the 510 respondents who reported average duration of residual limb pain episodes experienced in the past week 41.2% reported pain lasting from seconds to half an hour and 33.9% reported pain episodes lasting from hours to days while 11.8% reported constant pain in their residual limbs.
<table>
<thead>
<tr>
<th></th>
<th>Phantom pain (%)</th>
<th>Residual limb pain (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of pain experience during the past week</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>51 (7.9)</td>
<td>60 (9.3)</td>
</tr>
<tr>
<td>Daily or almost daily</td>
<td>71 (11.0)</td>
<td>90 (14.0)</td>
</tr>
<tr>
<td>Five or more times</td>
<td>142 (22.0)</td>
<td>46 (7.2)</td>
</tr>
<tr>
<td>Two or three times</td>
<td>16 (2.5)</td>
<td></td>
</tr>
<tr>
<td>Three or four times</td>
<td>51 (7.9)</td>
<td>66 (10.3)</td>
</tr>
<tr>
<td>One or two occasions</td>
<td>45 (7.0)</td>
<td>147 (22.9)</td>
</tr>
<tr>
<td>Other descriptors</td>
<td>58 (13.4)</td>
<td>65 (13.7)</td>
</tr>
<tr>
<td><strong>Duration of pain experience during the past week</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seconds</td>
<td>48 (10.4)</td>
<td>60 (11.8)</td>
</tr>
<tr>
<td>Minutes</td>
<td>136 (29.4)</td>
<td>117 (22.9)</td>
</tr>
<tr>
<td>Half an hour</td>
<td>23 (5.0)</td>
<td>33 (6.5)</td>
</tr>
<tr>
<td>Hours</td>
<td>144 (31.1)</td>
<td>143 (28.0)</td>
</tr>
<tr>
<td>24 hours</td>
<td>7 (1.5)</td>
<td>18 (3.5)</td>
</tr>
<tr>
<td>Days</td>
<td>11 (2.4)</td>
<td>12 (2.3)</td>
</tr>
<tr>
<td>Constant</td>
<td>46 (10.0)</td>
<td>60 (11.8)</td>
</tr>
<tr>
<td>Varied</td>
<td>35 (7.6)</td>
<td>38 (7.5)</td>
</tr>
<tr>
<td>Other descriptors</td>
<td>8 (1.7)</td>
<td>26 (5.1)</td>
</tr>
</tbody>
</table>

Table 6.1: Frequency and average duration of phantom pain and residual limb pain experiences in the past week.

* The percentages calculated are based on the number of people experiencing the pain condition: phantom pain (n = 646) and residual limb pain (n = 642).

b The percentages are calculated based on the number of people rating the average duration of pain: phantom pain (n = 462) and residual limb pain (n = 510).

The average intensity and extent of lifestyle interference resulting from each of phantom and residual limb pain during the past week are summarised in Table 6.2. ‘Discomforting’ was the most frequently endorsed intensity category for both phantom (47.9%) and residual limb pain (44.5%). However, almost a third of respondents who rated typical phantom pain intensity and nearly a quarter of those who rated residual limb pain intensity reported severe pain – phantom pain rating: horrible (13.8%) and excruciating (17.7%); residual limb pain rating: horrible (0.2%) and excruciating (12.6%). Of those with phantom limb pain, 31.9% indicated that such pain did not cause lifestyle interference during the past week.
Chapter 6  

Results Part I

(“not at all”), almost a quarter indicated they had experienced “a little bit of lifestyle” interference as a consequence of phantom pain, 22.3% reported moderate interference, 12.8% quite a bit of interference, and 8.7% a lot of interference. Comparable figures for those who experienced residual limb pain were: 24.3% not at all, 21.9% a little bit, 26.2% moderate interference, 15.9% quite a bit and 11.5% a lot of lifestyle interference attributable to residual limb pain.

<table>
<thead>
<tr>
<th></th>
<th>Phantom pain (%)</th>
<th>Residual limb pain (%)</th>
</tr>
</thead>
</table>
| **Average pain intensity in the past week**  
  Mild                    | 89 (19.8)        | 44 (8.2)               |
|  Discomforting           | 215 (47.9)       | 240 (44.5)             |
|  Distressing             | 108 (24.1)       | 132 (24.5)             |
|  Horrible                | 62 (13.8)        | 55 (10.2)              |
|  Excruciating            | 75 (17.7)        | 68 (12.6)              |

*The percentages calculated are based on the number of people who responded to the question: phantom pain (n = 549) and residual limb pain (n = 539).*

In order to further investigate the experience of pain in greater detail, the sample was subdivided into four groups according to pain experience. Only the 815 individuals who responded to questions on both PLP and RLP were categorised. Just 90 people (11%) experienced no pain. Ninety-eight people (12%) experienced phantom pain only; whereas 120 people (14.7%) experienced residual limb pain only and 507 people (62.2%) experienced both phantom and residual limb pain. The association between the experience of residual limb pain and phantom limb pain was significant ($\chi^2 (1) = 64.053$, p < .001; OR .252). The relative risk of
experiencing phantom pain when having residual limb pain is about one and a half times as high compared with those not experiencing residual limb pain (RR 1.471). As shown in Figure 6.1, the intensity of respondent’s average pain episodes in the past week did not differ significantly across the two domains measured ($Z = -.056, p = .955$). This result was consistent amongst both the upper and lower extremity amputee groups.

Similarly for both lower extremity ($Z = -2.250, p = .024$) and upper extremity ($Z = - .790, p = .43$) amputation groups respondent’s level of pain-related lifestyle interference did not differ significantly across the two domains measured ($Z = -.790, p = .43$) (see Figure 6.2).

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**Figure 6.1:** Distribution of average intensity ratings for RLP & PLP during the past week.

**Figure 6.2:** Distribution of extent of lifestyle interference resulting from RLP & PLP in the previous week.
**PLP aggravating and relieving factors**

When asked about their abilities to increase or decrease PLP, 358 people (61.8%) indicated they were unable to influence PLP experience, while 221 respondents (38.2%) could influence PLP experience. 195 people described their strategies for decreasing phantom limb pain, detailed in Table 6.3. The most frequently cited strategies involved taking pain medication and manipulation of the residual limb. The intensity of residual limb manipulation ranged from gentle touch and massage (n = 33) to hitting and banging the residual limb (n = 8).

Only 18 respondents detailed techniques for increasing phantom pain. Six people suggested that phantom pain could be increased by moving or attempting to move their phantom, wearing a prosthesis was implicated by five respondents, whereas 2 respondents indicated that “moving around” increased their pain. For two individuals thinking about phantom pain led to deterioration in pain intensity, however, in one of these cases the respondent indicated that concentrating on the pain to bring it to a climax sometimes led its to amelioration i.e. it ‘burnt itself out’. Decreasing weight or pressure on the stump could increase phantom pain for one respondent and finally shaking or knocking the stump, getting it cold or pressing particular areas meant worsening phantom pain for one person.
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking painkillers</td>
<td>50</td>
</tr>
<tr>
<td>Manipulation of the residual limb</td>
<td>41</td>
</tr>
<tr>
<td>Distracting thought or activities</td>
<td>22</td>
</tr>
<tr>
<td>Wearing prosthesis</td>
<td>15</td>
</tr>
<tr>
<td>Apply heat</td>
<td>13</td>
</tr>
<tr>
<td>Adjust position</td>
<td>11</td>
</tr>
<tr>
<td>Remove prosthesis</td>
<td>10</td>
</tr>
<tr>
<td>Use TENS machine</td>
<td>7</td>
</tr>
<tr>
<td>Move or attempt to move the phantom</td>
<td>6</td>
</tr>
<tr>
<td>Wear magnetic bracelet</td>
<td>6</td>
</tr>
<tr>
<td>Take a warm bath</td>
<td>5</td>
</tr>
<tr>
<td>Apply pressure to the stump</td>
<td>5</td>
</tr>
<tr>
<td>Try to relax</td>
<td>4</td>
</tr>
<tr>
<td>Move stump/tighten stump muscles</td>
<td>3</td>
</tr>
<tr>
<td>Implant</td>
<td>3</td>
</tr>
<tr>
<td>Avoid carbonated drinks with sweeteners</td>
<td>2</td>
</tr>
<tr>
<td>Tell oneself it isn’t there</td>
<td>2</td>
</tr>
<tr>
<td>Apply salve or cream to stump</td>
<td>2</td>
</tr>
<tr>
<td>Apply cold compress</td>
<td>1</td>
</tr>
<tr>
<td>Remain very still</td>
<td>1</td>
</tr>
<tr>
<td>Have a drink</td>
<td>1</td>
</tr>
<tr>
<td>Scream and shout</td>
<td>1</td>
</tr>
<tr>
<td>Try to increase pain until it ‘burns out’</td>
<td>1</td>
</tr>
<tr>
<td>Sedatives</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 6.3: Strategies employed to decrease phantom pain

**Impact of prosthesis use on PLP**

Of the 522 respondents who described the influence of prosthesis use on phantom pain, 12 (2.3%) indicated that they were unsure if prosthesis use affected their phantom pain experience, 367 people (70.3%) reported that use of a prosthesis had no impact on their phantom pain and 143 respondents (27.4%) indicated that prosthesis use was an influential factor in phantom pain experience. Of these, 25 people (17.5%) indicated that prosthesis use contributed to worsening phantom pain.
while 32 respondents (22.4%) indicated that phantom pain could be ameliorated by prosthesis use, 86 people (60.1%) did not specify the direction of the relationship.

**Factors associated with phantom pain and residual limb pain**

**Phantom pain**

**Age and time since amputation**

For respondents with phantom pain the time since amputation was significantly shorter ($t_{(454)} = 4.118, p < .001$) when compared with respondents who did not experience phantom pain, see Table 6.4. However, time elapsed since amputation was not related to either intensity of PLP ($F_{(4,529)} = .608, p = 0.657$) or lifestyle interference resulting from PLP ($F_{(4,540)} = 1.049, p = 0.381$).

<table>
<thead>
<tr>
<th>Phantom pain</th>
<th>Yes: mean (SD)</th>
<th>No: mean (SD)</th>
<th>$P$</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>73.80 (12.05)</td>
<td>75.12 (12.65)</td>
<td>0.165</td>
<td>&lt; 0.20</td>
</tr>
<tr>
<td>Time since amputation (months)</td>
<td>506.31 (255.74)</td>
<td>578.77 (210.63)</td>
<td>&lt; 0.001</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Table 6.4: Age at follow-up and time since amputation of respondents who experienced phantom pain and who did not experience phantom pain.

As indicated in Table 6.4, respondents experiencing phantom pain did not differ significantly from those not experiencing phantom pain with respect to age at follow-up. Similarly, age was not associated with either PLP intensity ($F_{(4,539)} = 1.167, p = 0.324$) or interference resulting from phantom pain ($F_{(4,550)} = 1.450, p = 0.216$).

**Amputation aetiology**

The prevalence of phantom pain was significantly higher ($\chi^2_{(1)} = 22.392, p < .01$; OR 4.206) for the disease-related amputation group (91.3%) than for the traumatic amputation group (71.3%), see Table 6.5. Given the association between time since amputation and phantom pain and the substantial and statistically significant difference in time elapsed since amputations between the two aetiology groups time since amputation represents a potential confound. When comparison is arbitrarily limited to those whose amputation occurred within the past 15 years the relationship
between amputation aetiology and phantom pain is still significant. Three quarters
(75.4%; \(n = 61\)) of those with trauma related amputation and 90.5% \((n = 85)\) of those with amputations due to disease occurring in the past 15 years experience
phantom pain \(\chi^2 (1) = 6.165, p = 0.013; \text{OR .391})\). The relative risk of experiencing
phantom pain following amputation necessitated by disease is about twice as high
\((\text{RR 1.8})\) compared with amputation necessitated by trauma.

Neither intensity \((F_{(1,534)} = 2.415, p = 0.121)\) nor lifestyle interference resulting
from phantom pain \((F_{(1,552)} = .008, p = 0.929)\) varied according to amputation
aetiology.

**Site and level of amputation**

Phantom pain was present in 74.3% of those with lower extremity amputations and
72.6% of those with upper limb amputations. This difference is not statistically
significant \(\chi^2 (2) = 1.391 p = .499)\) see Table 6.5. Similarly the incidence of phantom
pain was not higher in respondents who had more than one limb amputated \(\chi^2 (2) =
1.269, p = .530)\). However, both intensity of pain episodes in the previous week \((F
_{(2,546)} = 6.299, p = .002)\) and lifestyle interference resulting from phantom pain \((F
_{(2,558)} = 5.028, p = .007)\) differed in accordance to whether the amputation pertained
to an upper or lower extremity. Post hoc Games-Howell analyses revealed that
lower extremity amputees had more intense phantom pain \((\text{mean 2.75, SD 1.28})\)
that resulted in more extensive lifestyle disturbance \((\text{mean 2.50, SD 1.30})\) than
upper extremity amputees \((\text{mean intensity 2.32, SD 1.10;} \text{mean interference 2.03, SD 1.19})\).
Table 6.5: Association between phantom pain and suggested determinants. The percentages in parentheses represent the percentage of respondents exposed to a factor (or not) experiencing phantom pain. Note that not all the figures add up to a total of 870 (i.e. the number of respondents who answered the question pertaining to phantom pain occurrence) as not all respondents answered every question.

<table>
<thead>
<tr>
<th>Factor</th>
<th>(n)</th>
<th>Phantom pain (%)</th>
<th>(P)</th>
<th>(OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic amputation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (732)</td>
<td>522 (71.3)</td>
<td>(&lt; .001)</td>
<td>(.252)</td>
<td></td>
</tr>
<tr>
<td>No (126)</td>
<td>115 (91.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower extremity amputation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (730)</td>
<td>542 (74.2)</td>
<td>0.733</td>
<td>(.928)</td>
<td></td>
</tr>
<tr>
<td>No (125)</td>
<td>91 (72.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of limbs amputated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One only (786)</td>
<td>579 (73.7)</td>
<td>0.224</td>
<td>(1.409)</td>
<td></td>
</tr>
<tr>
<td>More than one (84)</td>
<td>67 (79.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other medical problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (524)</td>
<td>396 (75.6)</td>
<td>0.070</td>
<td>(.731)</td>
<td></td>
</tr>
<tr>
<td>No (238)</td>
<td>165 (69.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosthesis use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (762)</td>
<td>556 (73.0)</td>
<td>0.021</td>
<td>(1.853)</td>
<td></td>
</tr>
<tr>
<td>No (108)</td>
<td>90 (83.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of prosthesis use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(&lt;8) hours daily (68)</td>
<td>47 (69.1)</td>
<td>0.500</td>
<td>(1.206)</td>
<td></td>
</tr>
<tr>
<td>(&gt;8) hours daily (608)</td>
<td>440 (72.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual limb pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (627)</td>
<td>507 (80.9)</td>
<td>(&lt; .001)</td>
<td>(.252)</td>
<td></td>
</tr>
<tr>
<td>No (186)</td>
<td>96 (51.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amputation level(^a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above elbow (65)</td>
<td>51 (78.5)</td>
<td>0.463</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through elbow (6)</td>
<td>46 (66.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below elbow (47)</td>
<td>31 (78.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above knee (299)</td>
<td>227 (75.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through knee (12)</td>
<td>8 (66.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below knee (353)</td>
<td>255 (72.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of limb amputation was unrelated to PLP occurrence (\(\chi^2\)\((5)\) = 3.818, \(p = .576\)) (see Table 6.5). However, PLP intensity (\(F\)\((7,520)\) = 4.839, \(p < .0001\)) varied according to level of amputation. Post hoc analyses using the Games-Howell test indicated that bilateral lower extremity amputees reported significantly more intense PLP in the previous week (mean 2.86, SD 1.36) than individuals with below elbow amputations (mean 2.61, SD 1.16), in addition, unilateral above knee amputees had
significantly more intense PLP (mean 3.01, SD 1.33) than either below elbow or below knee amputees (mean 2.48, SD 1.17). Comparison of average pain intensity levels reported by individuals with lower extremity amputations only revealed that those with above knee level amputations reported significantly more intense phantom pain than those with below knee amputations ($F_{(3,439)} = 5.867, p = .001$). All other comparisons were not significant. Similarly, comparison of reported pain intensities for the upper extremity amputation group revealed that those with above elbow amputations on average reported significantly more intense phantom pain than those with below elbow amputations ($F_{(1,68)} = 5.786, p = .029$). The mean and standard deviations of pain intensity ratings for those with above or below knee and above or below elbow amputations are illustrated in Table 6.6.

<table>
<thead>
<tr>
<th>Amputation level</th>
<th>Mean intensity rating (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above knee</td>
<td>3.03 (1.32)</td>
</tr>
<tr>
<td>Below knee</td>
<td>2.51 (1.17)</td>
</tr>
<tr>
<td>Above elbow</td>
<td>2.60 (1.18)</td>
</tr>
<tr>
<td>Below elbow</td>
<td>2.00 (0.866)</td>
</tr>
</tbody>
</table>

Table 6.6: Average phantom pain intensity ratings.

Level of amputation was also related to the extent of lifestyle interference resulting from PLP ($F_{(7,531)} = 3.765, p = .001$). Bonferroni post hoc comparisons indicated that through knee amputees reported significantly more interference with lifestyle activities in the past week as a consequence of PLP (mean 3.75, SD 1.75) compared with below knee amputees (mean 2.30, SD 1.22) and both above (mean 2.22, SD 1.30) and below (mean 1.81, SD 1.02) elbow amputees. All other comparisons were not significant. Comparison PLP-related lifestyle interference in the lower extremity amputation group alone revealed that those with above knee amputations reported significantly ($F_{(3,457)} = 5.123, p = .002$) greater PLP-related lifestyle interference than those with below knee amputations (mean (SD) ratings 2.62 (1.27) and 2.30 (1.22), respectively). All other comparisons were not significant. When only cases of upper extremity amputation were included there was no main effect of amputation level ($p = 0.171$).