Needling depth at BL52 in 13 cadavers

BACKGROUND
BL52 is located 3 cun lateral to the lower border of the spinous process of the L2 vertebra. The needling pathway includes the skin, subcutaneous tissue, latissimus dorsi muscle, intrinsic muscles of the back, quadratus lumborum muscle, the dorsal branches of the second lumbar artery and vein, and the lateral branches containing fibres from the second lumbar spinal nerve. Deep perpendicular needle insertion at this location in the lower back risks damage to the kidneys, which are located in the dorsal region of the abdominal cavity within the retroperitoneal space.

ANATOMICAL OBSERVATION
In 2015, we observed the needling depth at BL52 on the right side of 13 cadavers during the eighth week of medical student anatomical dissection teaching at Flinders University of South Australia (table 1). The left sides of the cadavers were not included, because they had already been dissected by the medical students. The cadavers were donated through the Body Donation Program to the school for teaching and research purposes.

Table 1 General characteristics of study cadavers

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Sex</th>
<th>Cause of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>79</td>
<td>M</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>2</td>
<td>67</td>
<td>M</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>M</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>4</td>
<td>95</td>
<td>M</td>
<td>Sepsis due to perforated diverticulum</td>
</tr>
<tr>
<td>5</td>
<td>83</td>
<td>M</td>
<td>Pneumonia and congestive heart failure</td>
</tr>
<tr>
<td>6</td>
<td>57</td>
<td>M</td>
<td>Mesothelioma</td>
</tr>
<tr>
<td>7</td>
<td>77</td>
<td>F</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>8</td>
<td>91</td>
<td>F</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>9</td>
<td>91</td>
<td>F</td>
<td>Breast cancer</td>
</tr>
<tr>
<td>10</td>
<td>88</td>
<td>F</td>
<td>Cerebral atherosclerosis</td>
</tr>
<tr>
<td>11</td>
<td>83</td>
<td>F</td>
<td>Renal failure and ischaemic stroke</td>
</tr>
<tr>
<td>12</td>
<td>79</td>
<td>F</td>
<td>Myocardial infarction</td>
</tr>
<tr>
<td>13</td>
<td>88</td>
<td>F</td>
<td>Ischaemic stroke</td>
</tr>
</tbody>
</table>

None of them were Australian Aboriginal or Torres Strait Islanders. Ethical approval was granted by the Southern Adelaide Clinical Human Research Ethics Committee (reference no. 245.14—HREC/14/SAC/241).

In each cadaver, a caudal-cranial sagittal dissection was performed to expose the lumbar vertebra. The interspace of L2/3 was located by visually counting the vertebra. Then, the cun measurement of each individual cadaver was obtained by measuring the width of its thumb, which was used for localisation of BL52 at the level of L2/3. Next, the depth-measuring blade of a vernier caliper was inserted dorsally and perpendicularly to the surface of the skin at BL52 to mimic acupuncture needle insertion at this location in the lower back.
NEEDLING DEPTH AT BL52

All needles inserted dorsally and perpendicularly at BL52 perforated the quadratus lumborum muscle (figure 1). In general, male subjects had a greater needling depth than female subjects (median 37 (IQR 24–59) mm vs 30 (21–46) mm).

Therefore, the safe depths in males and females were estimated to be 28 (18–44) mm and 23 (16–35) mm, respectively. Overall needling depth was 32 (25–47) mm and the safe depth was 24 (18–35) mm for male and female subjects combined.

CONCLUSION

Our observation showed that the overall needling depth and safe depth at BL52 were 32 (25–47) mm and 24 (18–35) mm, respectively, in Australian cadavers.

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Contributors KLC was responsible for the original idea of this research, study design, ethics application, data collection, statistical analysis, discussion of the research findings, and preparation of the manuscript. RVH was responsible for supervision, provision of expert opinion about the research, and discussion of the research findings. Both authors examined and approved the final manuscript.

Competing interests None declared.

Ethics approval Southern Adelaide Clinical Human Research Ethics Committee.

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