**Ideal Body Position for Epinephrine Auto-Injector Administration**

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**Introduction**

- Intramuscular (IM) is the preferred route of administration of epinephrine.²
- The needle lengths of commercially available epinephrine auto-injectors for adults range from 1.17 cm to 2.5 cm.³
- With increased prevalence of obesity in the United States, there is concern that current needle lengths may not be sufficient for IM injection.⁴
- Studies have showed that more than 30% of adults are at risk for subcutaneous (SC) rather than IM delivery of epinephrine based on ultrasound measurements of the thigh.⁴,⁶
- Delivery into the IM space is dependent on needle length, thigh compression, and propulsion pressure.⁷

- No studies to date have examined the relationship between body position and epinephrine auto-injector delivery.

**Purpose**

Determine whether body position can change subcutaneous tissue depth (SCTD) in the lateral thigh and potentially effect epinephrine auto-injector delivery into the IM space.

**Methods**

- Adults age 18 or older
- Gender, age, height, weight, and BMI
- Subcutaneous tissue depth (SCTD) of lateral thigh measured via ultrasound at various body positions (standing, sitting, and supine)
- Statistical analysis performed using SPSS

**Results**

**Table 1: Demographic Data**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Female</th>
<th>Male</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count (n)</td>
<td>51</td>
<td>18 (35%)</td>
<td>33 (65%)</td>
<td></td>
</tr>
<tr>
<td>Age (yr)</td>
<td>39 ± 16.2</td>
<td>43.7 ± 16.6</td>
<td>36.4 ± 15.6</td>
<td>0.122</td>
</tr>
<tr>
<td>Height (in)</td>
<td>68.8 ± 3.4</td>
<td>65.9 ± 3.2</td>
<td>70.4 ± 2.3</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Weight (lb)</td>
<td>168.9 ± 31.4</td>
<td>151.9 ± 35.7</td>
<td>178.2 ± 24.7</td>
<td>0.003*</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25 ± 3.6</td>
<td>24.5 ± 4.5</td>
<td>25.3 ± 3.1</td>
<td>0.451</td>
</tr>
</tbody>
</table>

**Figure 1:** Epinephrine auto-injector administration resulting in delivery of epinephrine beyond its needle length

**Figure 2:** Ultrasound SCTD measurement of a supine subject

**Figure 3:** Body Position and SCTD

- No statistical significance observed between SCTD and body position

**Figure 4:** Gender and SCTD

- Females had significantly higher SCTD than males at all body positions

**Figure 5:** BMI and SCTD

- No significant correlation found between BMI and SCTD

**Conclusions**

- No ideal body position for administering epinephrine auto-injector
- This stresses the need for prompt epinephrine administration regardless of body position during anaphylaxis
- Gender
  - Females had significantly higher mean SCTD than males (F: 2.72 ± 1.36 cm vs. M: 1.10 ± 0.38 cm), which is similar to the results from Song, et al.⁵
  - Mean SCTD of females is higher than most commercially available epinephrine auto-injector needle lengths (1.17-2.5 cm) BMI
- No significant correlation between SCTD and BMI

**References**


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