

Ideal Body Position for Epinephrine Auto-Injector Administration

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Introduction

- Intramuscular (IM) is the preferred route of administration of epinephrine^{1,2}
- The needle lengths of commercially available epinephrine auto-injectors for adults range from 1.17 cm to 2.5 cm³
- With increased prevalence of obesity in the United States,⁴ there is concern that current needle lengths may not be sufficient for IM injection
- 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^{5,6}
- Delivery into the IM space is dependent on needle length, thigh compression, and propulsion pressure⁷

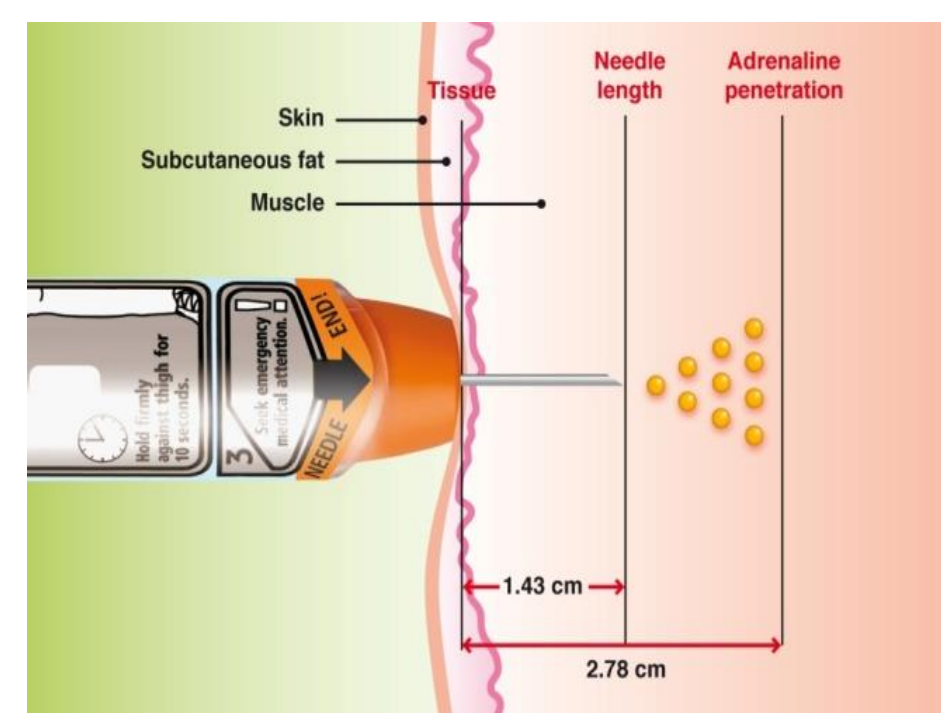


Figure 1: Epinephrine auto-injector administration resulting in delivery of epinephrine beyond its needle length

- 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



Figure 2: Ultrasound SCTD measurement of a supine subject

Results

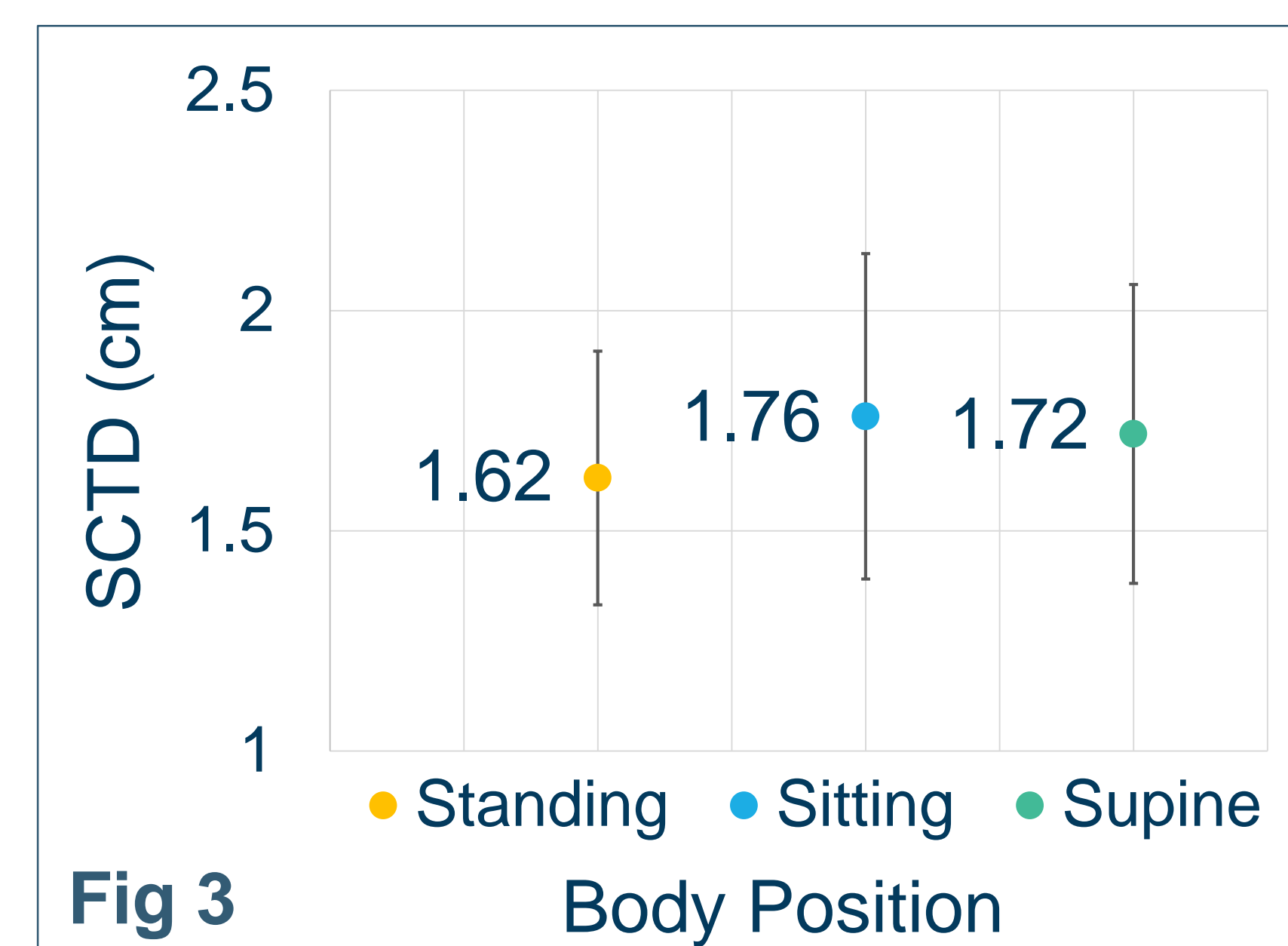


Fig 3

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

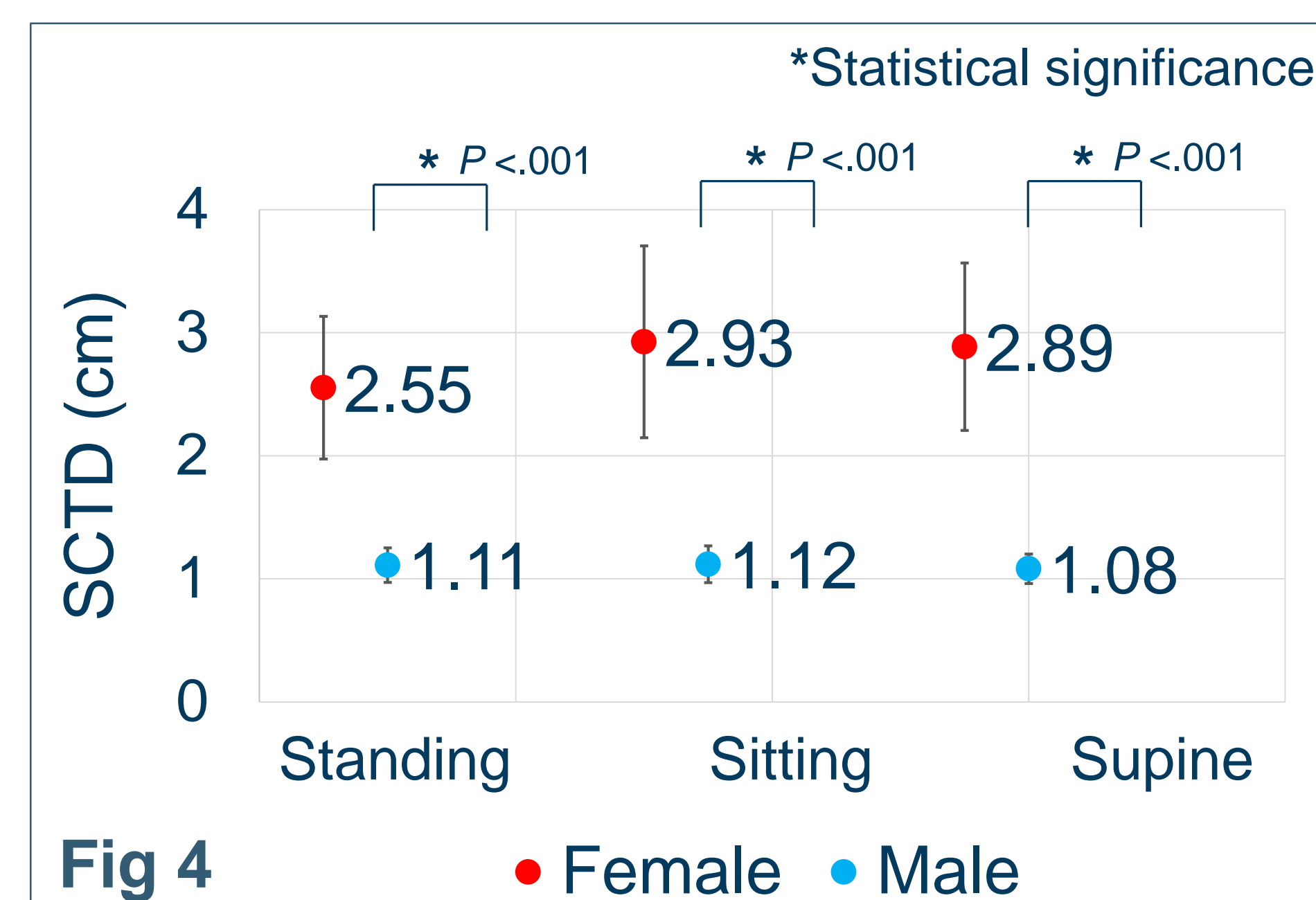


Fig 4

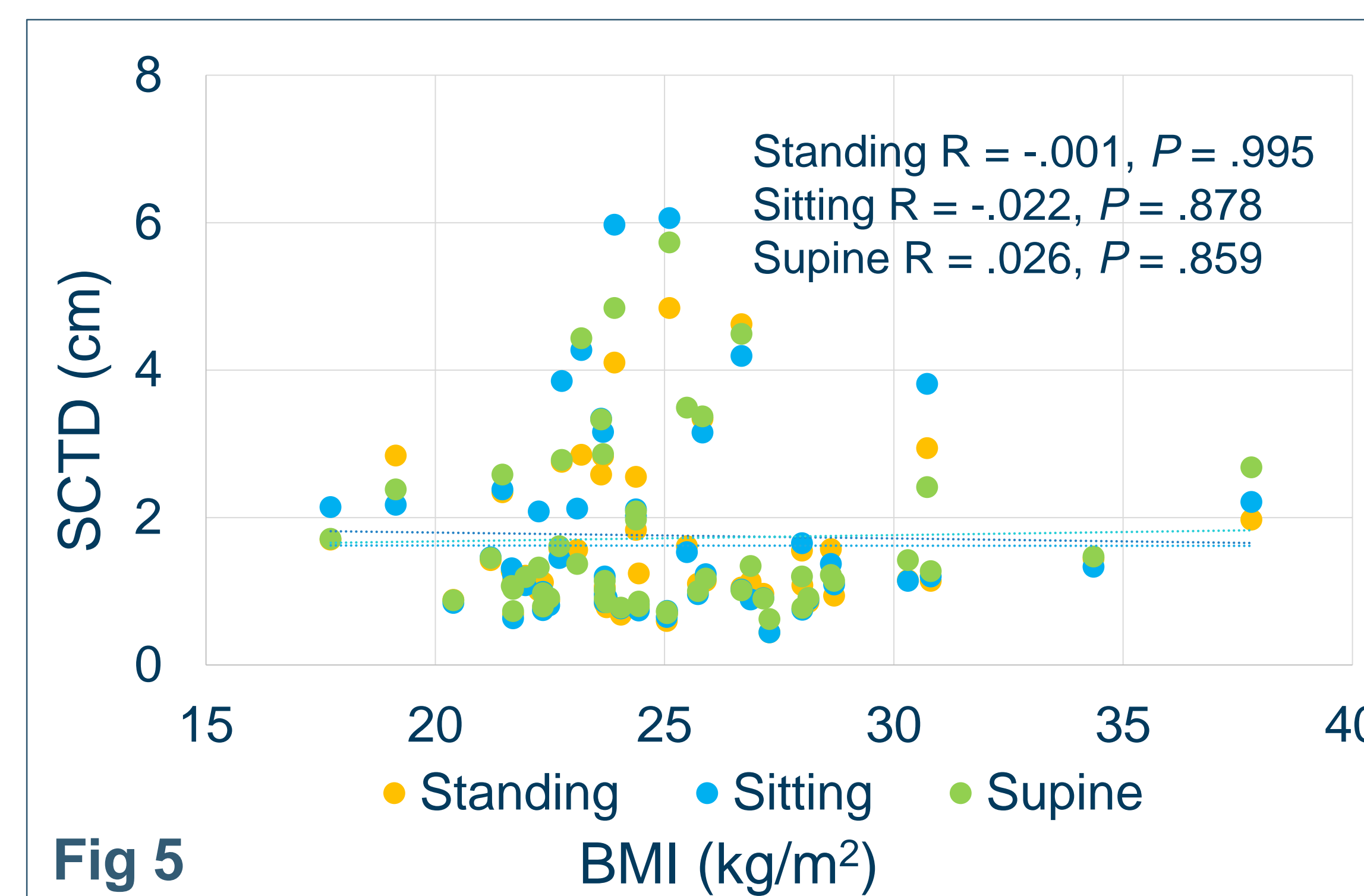


Fig 5

Figure 5: BMI and SCTD

No significant correlation found between BMI and SCTD

Results

Table 1: Demographic Data

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

Conclusions

Body Position

- 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.*⁸
- 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

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