

Supplementary Materials

Title: Optimal Landmark for Chest Compressions During Cardiopulmonary Resuscitation
Derived from a Chest Computed Tomography in Arms-Down Position

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Table S1 Measurement of Rescuer's Hand

Measurement (centimeter)*	Right hand (n = 69)	Left hand (n = 69)	Difference	95% CI	p-value
Width of hand's heel	7.9 ± 0.9	7.9 ± 0.8	0	-0.1 to 0.1	0.431
Width of radial border' heel to point of maximal force	5.4 ± 0.6	5.8 ± 0.6	0.3	0.3 to 0.4	<0.001

Abbreviations: *95% CI*, 95% confidence interval.

* mean ± standard deviation and analyzed with paired t-test.

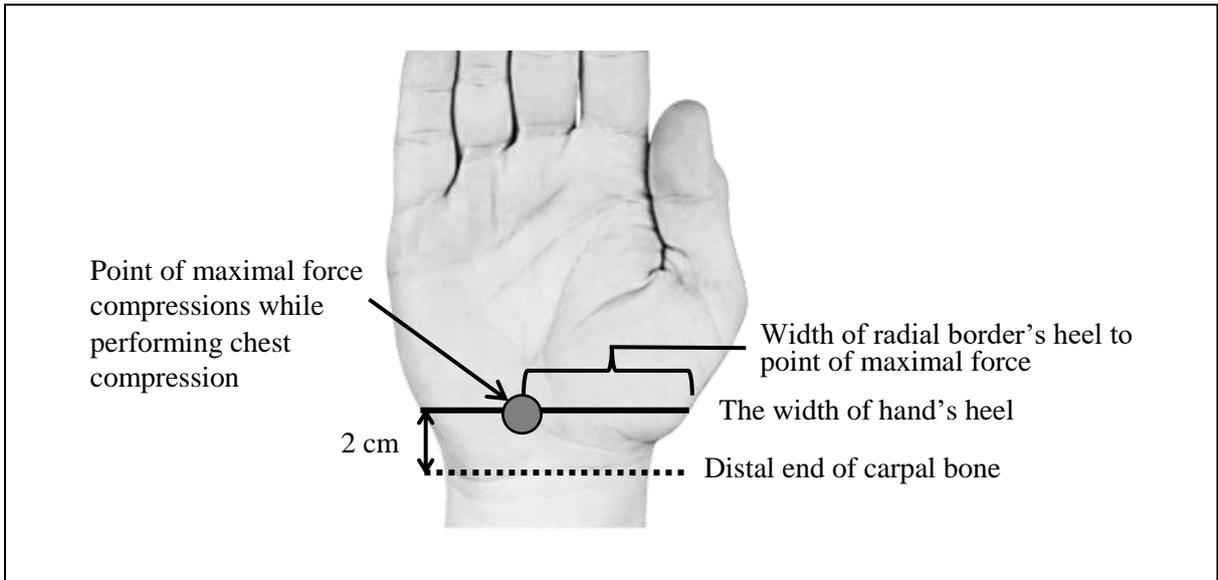
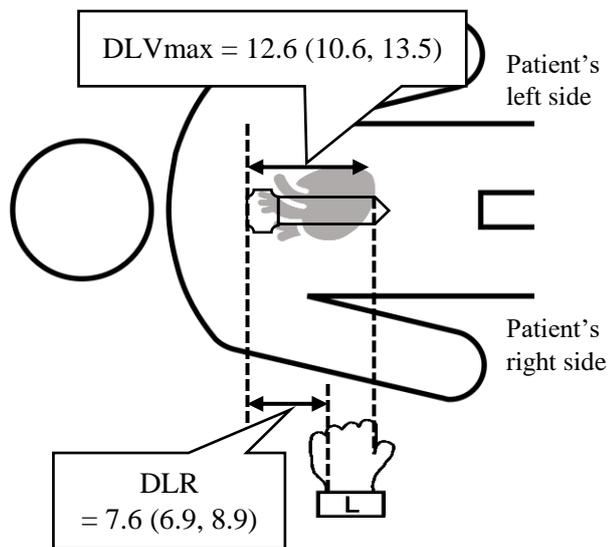


Figure S1 Rescuer's Hand Measurement

Abbreviations: *cm*, centimeter.

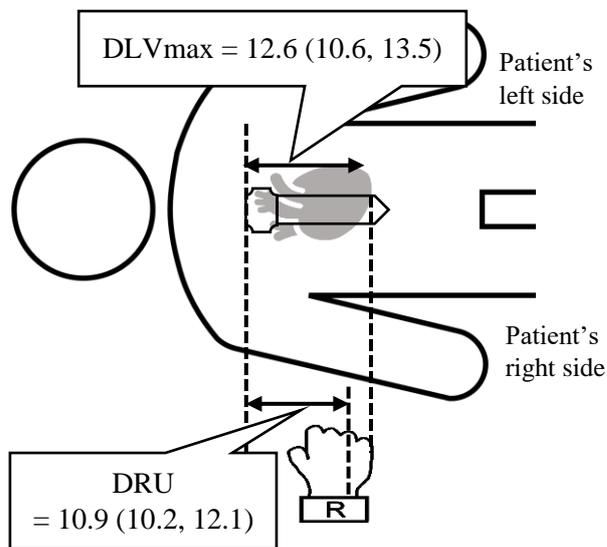
A. Rescuer at right side of patient with left hand down.

$p < 0.001$



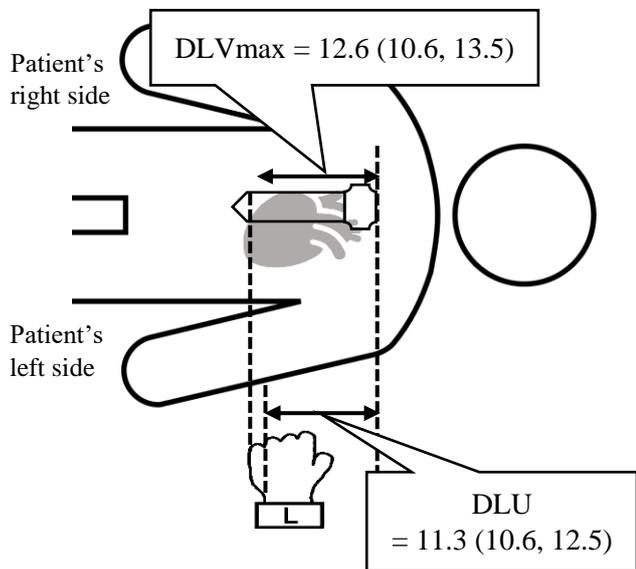
B. Rescuer at right side of patient with right hand down.

$p = 0.012$



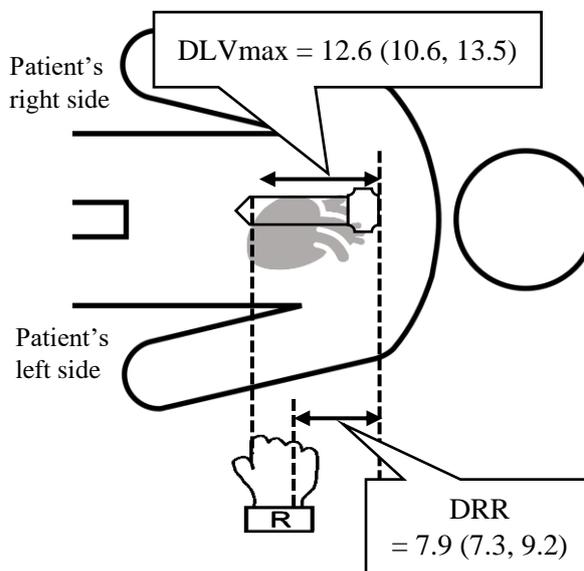
C. Rescuer at left side of patient with left hand down.

$p = 0.076$



D. Rescuer at left side of patient with right hand down.

$p < 0.001$



Legends



Rescuer's right hand down



Rescuer's left hand down

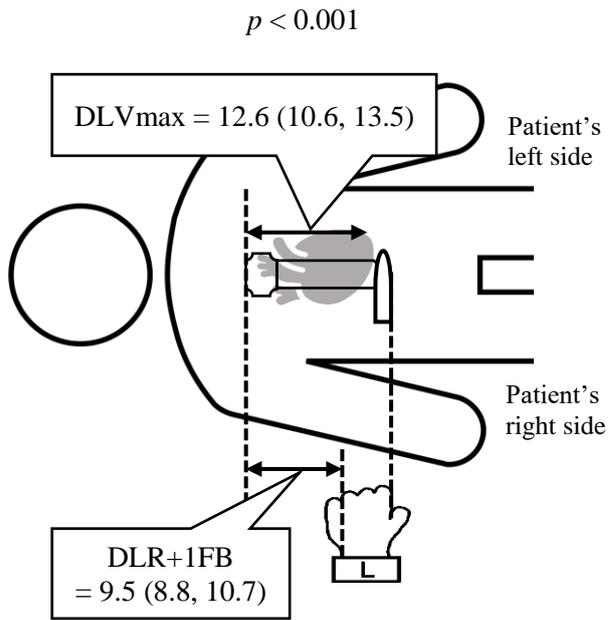


Patient's heart

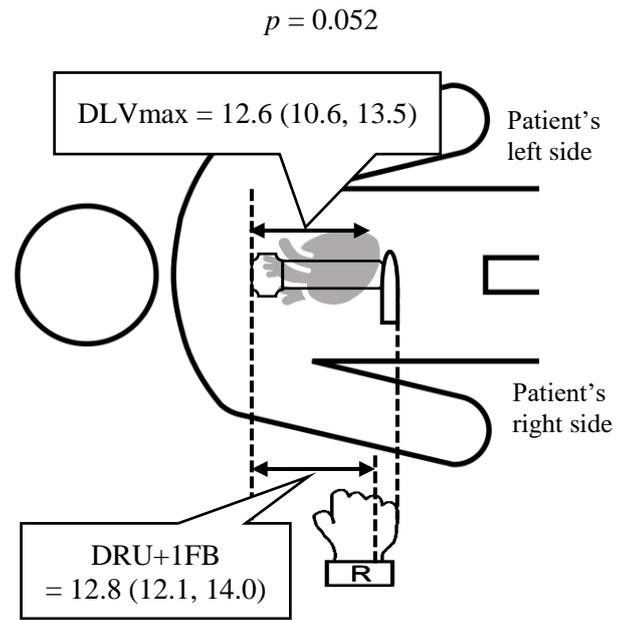
Figure S2 Optimal Landmarks for Chest Compressions. The distances showed as median (interquartile range) in centimeters. Differences were analyzed with Wilcoxon signed-rank test.

Abbreviations: *DLVmax*, distance from the sternal notch to the point of maximal left ventricular diameter on the sternum; *DLR*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the radial border located at the xiphisternal junction; *DLU*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the ulnar border located at the xiphisternal junction; *DRR*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the radial border located at the xiphisternal junction; *DRU*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the ulnar border located at the xiphisternal junction; *95% CI*, 95% confidence interval.

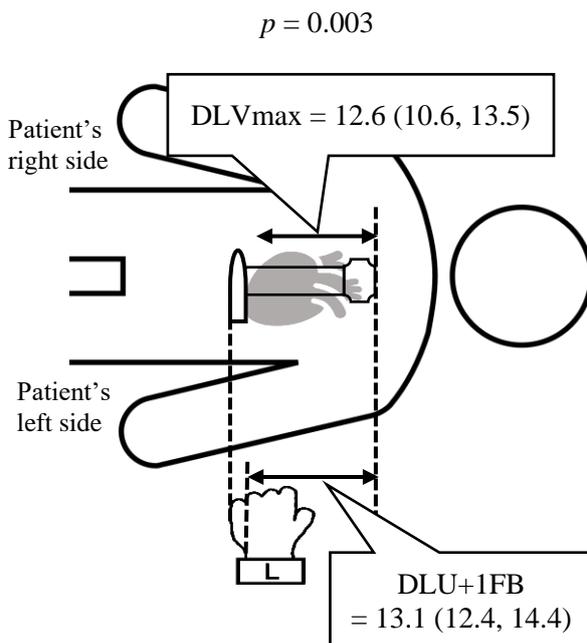
A. Rescuer at right side of patient with left hand down.



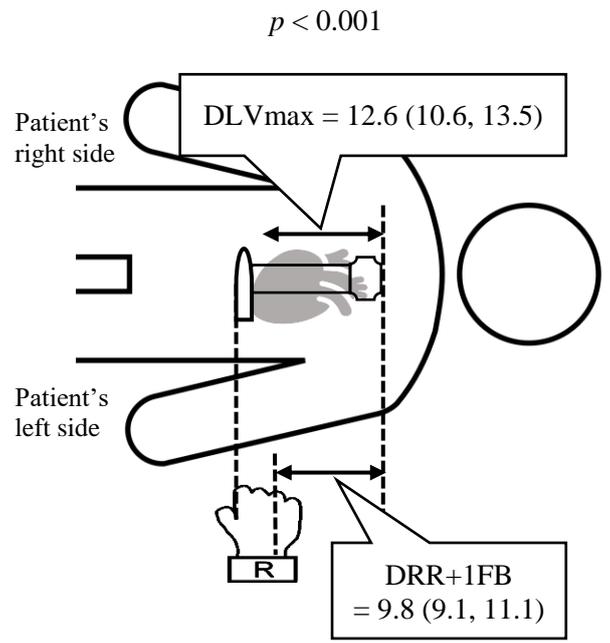
B. Rescuer at right side of patient with right hand down.



C. Rescuer at left side of patient with left hand down.



D. Rescuer at left side of patient with right hand down.



Legends



Rescuer's right hand down



Rescuer's left hand down



Patient's heart

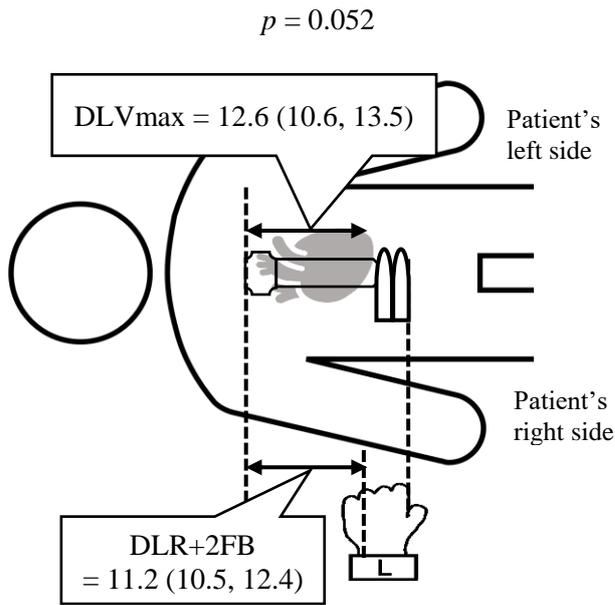


Rescuer's one fingerbreadth

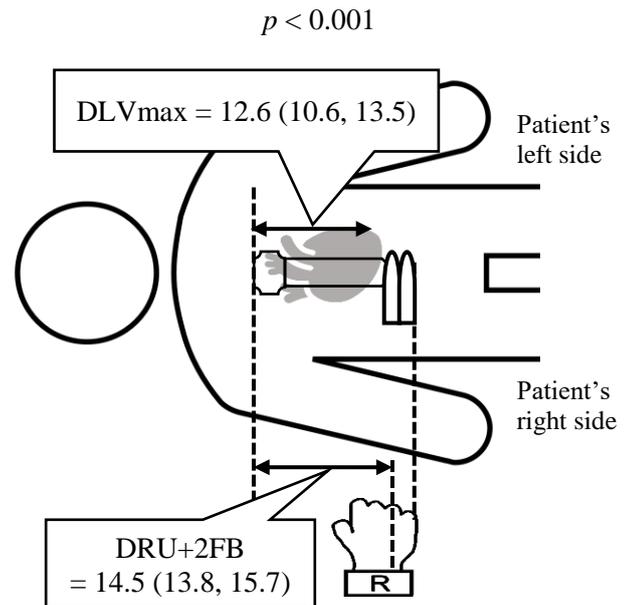
Figure S3 Optimal Landmark for Chest Compressions: Add one fingerbreadth below the xiphisternal junction. The distances showed as median (interquartile range) in centimeter. Differences were analyzed with Wilcoxon signed-rank test.

Abbreviations: *DLVmax*, distance from the sternal notch to the point of maximal left ventricular diameter on the sternum; *DLR + IFB*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the radial border located at below the xiphisternal junction one fingerbreadth; *DLU + IFB*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the ulnar border located at below the xiphisternal junction one fingerbreadth; *DRR + IFB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the radial border located at below the xiphisternal junction one fingerbreadth; *DRU + IFB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the ulnar border located at below the xiphisternal junction one fingerbreadth; *95% CI*, 95% confidence interval.

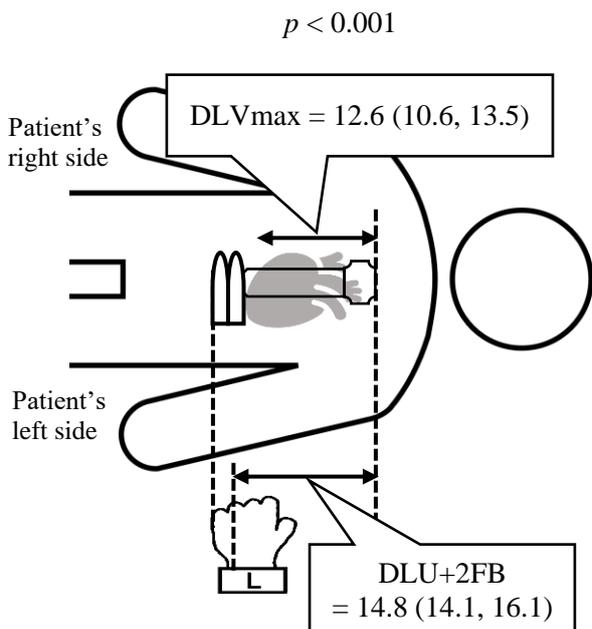
A. Rescuer at right side of patient with left hand down.



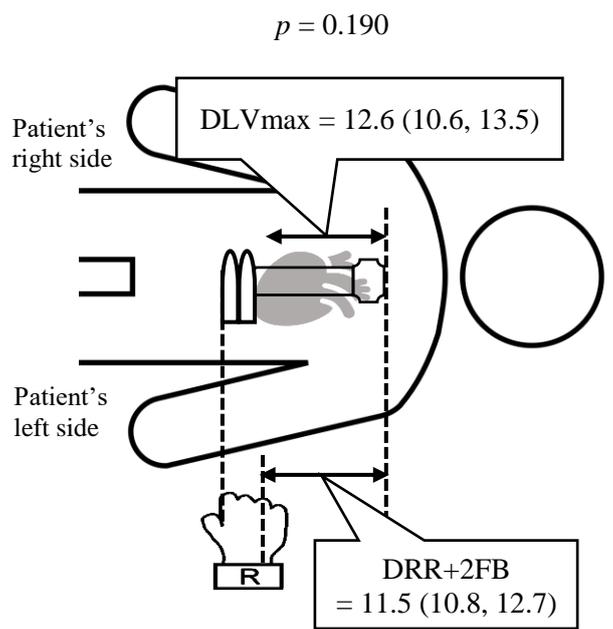
B. Rescuer at right side of patient with right hand down.



C. Rescuer at left side of patient with left hand down.



D. Rescuer at left side of patient with right hand down.



Legends



Rescuer's right hand down



Rescuer's left hand down



Patient's heart



Rescuer's two fingerbreadths

Figure S4 Optimal Landmark for Chest Compressions: Add two fingerbreadths below the xiphisternal junction. The distances showed as median (interquartile range) in centimeter.

Differences were analyzed with Wilcoxon signed-rank test.

Abbreviations: *DLVmax*, distance from the sternal notch to the point of maximal left ventricular diameter on the sternum; *DLR + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the radial border located at below the xiphisternal junction two fingerbreadths; *DLU + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the ulnar border located at below the xiphisternal junction two fingerbreadths; *DRR + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the radial border located at below the xiphisternal junction two fingerbreadths; *DRU + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the ulnar border located at below the xiphisternal junction two fingerbreadths; *95% CI*, 95% confidence interval.

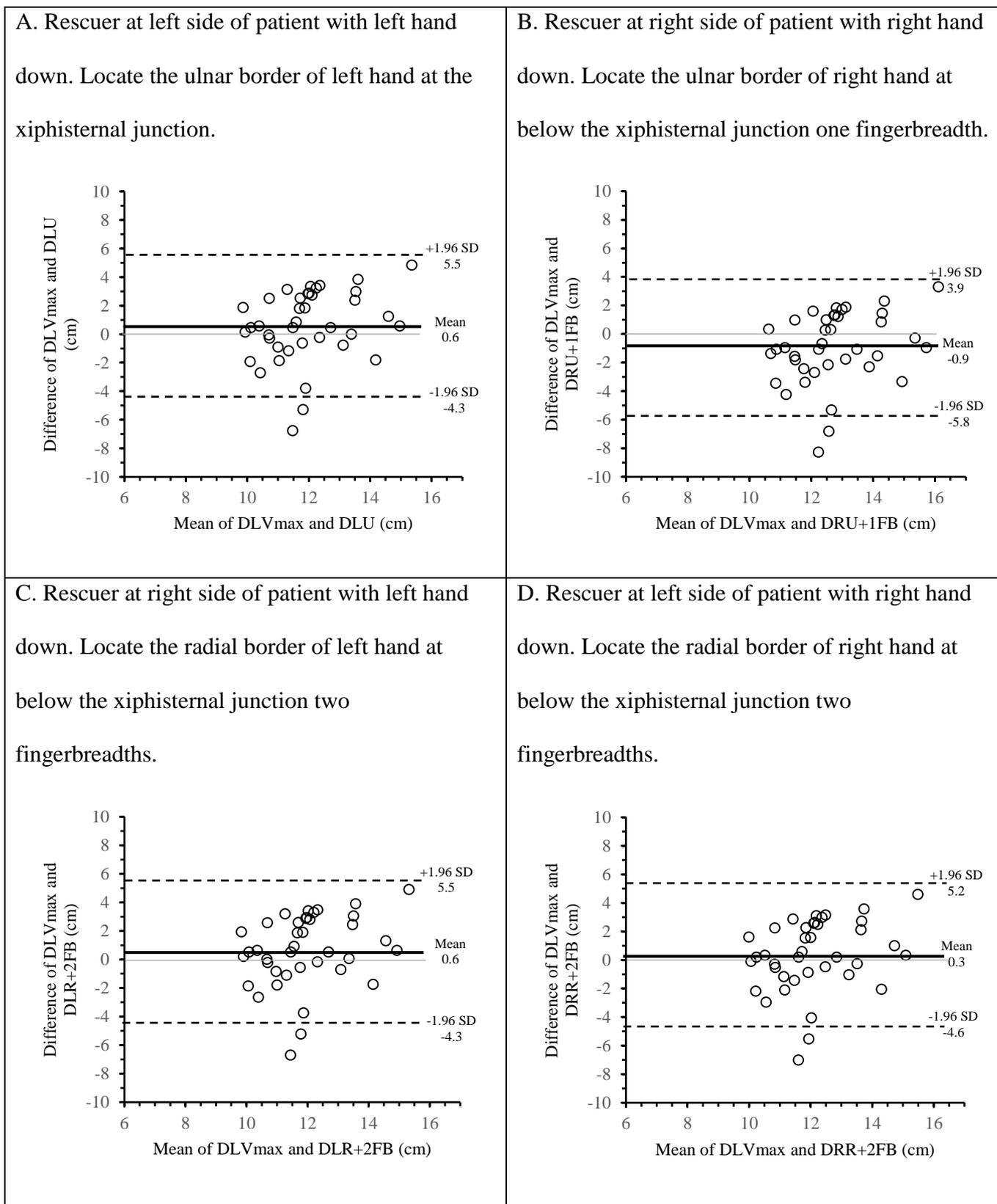


Figure S5 Summary of the Optimal Landmark for Chest Compressions by Modified Bland-Altman Plots. Horizontal axes are mean of DLVmax and DLU, DRU + 1FB, DLR + 2FB or DRR + 2FB. Vertical axes are differences of DLVmax and DLU, DRU + 1FB, DLR + 2FB or DRR + 2FB. Horizontal solid lines are mean of those differences. Two dashed lines are

+1.96 and -1.96 of standard deviations of those differences. Shapiro-Wilk test is checked to ensure normal distribution of those differences and able to use standard deviation to define limits of agreement.

Abbreviations: *DLVmax*, distance from the sternal notch to the point of maximal left ventricular diameter on the sternum; *DLU*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the ulnar border located at the xiphisternal junction; *DRU + 1FB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the ulnar border located at below the xiphisternal junction one fingerbreadth; *DLR + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's left hand with the radial border located at below the xiphisternal junction two fingerbreadths; *DRR + 2FB*, distance from the sternal notch to the point of maximal force of the rescuer's right hand with the radial border located at below the xiphisternal junction two fingerbreadths; *cm*, centimeter; *SD*, standard deviation.