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Letter to the Editor

Heterogeneity of teaching approaches to determine hand position for adult chest compressions among European basic life support instructors

Keywords: Basic life support, Cardiopulmonary resuscitation, Chest compressions, Hand placement site, Teaching

To the Editor,

During cardiac arrest, high-quality chest compression is crucial for organ perfusion and is dependent on the correct hand position. The European Resuscitation Council simplified its basic life support (BLS) guidelines and now recommends that the correct hand position is in the center of the chest and on the lower half of the sternum,[1] with no specific landmark specified on the victim's chest.[2] When teaching BLS to the lay public, specific visual landmarks are relied on upon.[3] This letter presents different BLS lay teaching approaches for teaching the correct position of adult chest compressions to the lay public from BLS-instructors in two European countries.

In May 2022, Slovenian and Dutch BLS-instructors participated in an observational study in which they were asked to demonstrate their teaching approach for determining the chest compression landmark on a low fidelity manikin (Rescue Anne QCPR, Laerdal Medical, Stavanger, Norway). The manikin was lying on the ground with clothes on and arms down.

A total of 43 BLS-instructors, 22 from Slovenia (SLO) and 21 from the Netherlands (NL) were invited to participated in this observational study. Twenty-four (56 %) were registered nurses (10 SLO, 14 NL), 19 (44 %) physicians (12 SLO, 7 NL); 18 (42 %) were women (5 SLO, 13 NL); 41 ± 9.6 years; with 10 ± 7.4 years of experience in BLS-teaching. All Slovenian BLS instructors used a combination of theoretical (e.g., figures/photos in PowerPoint presentation) and practical (e.g., manikin) teaching approaches for demonstrating hand position for adult chest compressions, whereas Dutch BLS instructors relied primarily on practical approaches. Before demonstrating their hand position, 19 (86 %) Slovenian BLS-instructors exposed the manikin's chest, whereas only 8 (38 %) Dutch BLS-instructors did ($p > 0.001$). More than half (n = 25; 58 %) of BLS-instructors were kneeling on the right side of a manikin. Most Slovenian BLS-instructors first determined the chest size from the clavicles to the posterior costal arch aiming to locate the chest's center and the lower half of the sternum (n = 18, 82 %). Three different teaching approaches were demonstrated (Fig. 1A-C). Less than half (n = 6, 42 %) of Dutch BLS-instructors did not use any method and just placed their hand in the middle of the manikin's chest, 4 (24 %) used the "inter-nipple" line. Another 3 (14 %) used the knee to shoulder[4] (Fig. 1D), or arm under armpit approaches (Fig. 1F) to determine the correct hand position for adult chest compressions. All BLS-instructors targeted the center of the chest and the lower half of the sternum; however, Slovenian BLS instructors demonstrated a combined approach of vertical and horizontal chest size measurement to determine the correct compression points.

This observational study highlights the heterogeneity of teaching approaches to determine correct hand position for adult chest compressions used by instructors from Slovenia and the Netherlands. Overall, few Slovenian and Dutch BLS-instructors rely on previous BLS-recommendations (e.g., the internipple line) as an anatomic landmark for hand position in adult chest compressions.[5] Future BLS-guidelines should provide further clarity on the most evidence-based location for chest compressions among adults.[6–8]

Conflict of interest

Nino Fijačko is a member of the ERC BLS Science and Education Committee and mentee of ILCOR Task Force Education Implementation and Team. Sander van Goor is co-chair of the ERC BLS Science and Education Committee. Robert Greif is ERC Director of Guidelines and ILCOR, and ILCOR Task Force chair Education Implementation and Team. Matej Strnad and Ruth Masterson Creber declare that they have no conflict of interest.

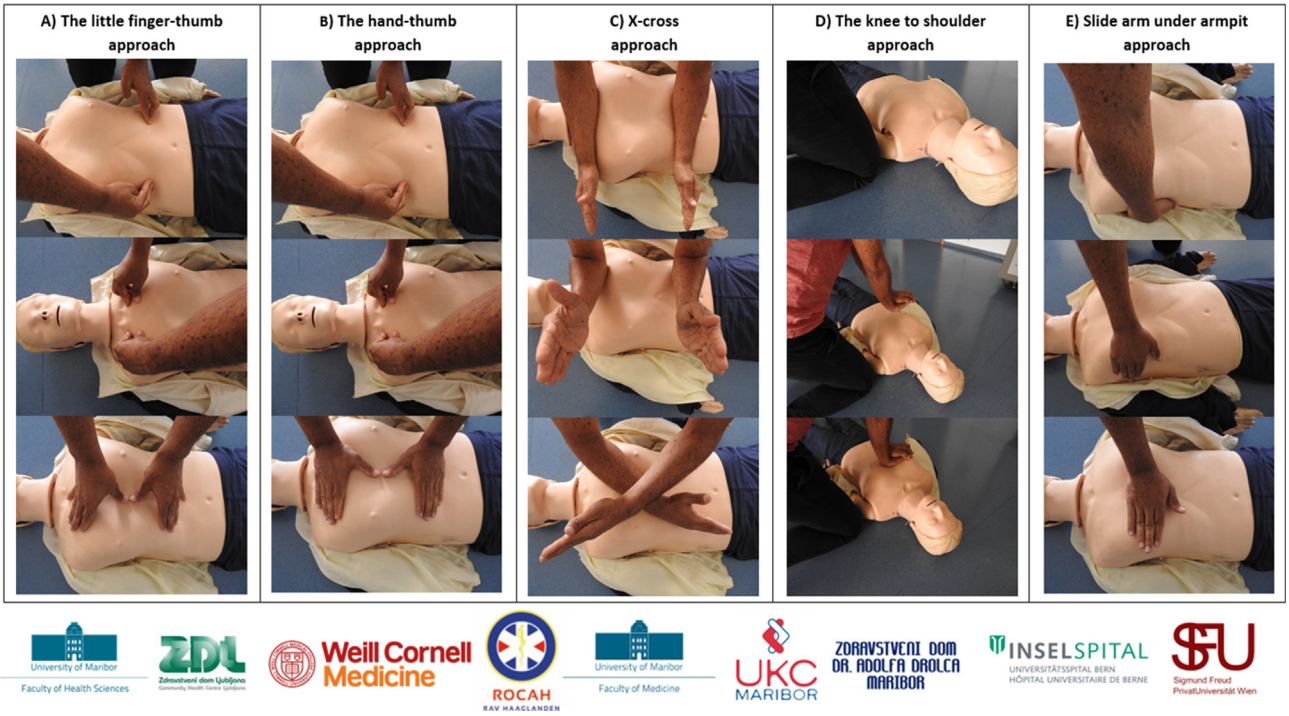

Fig 1 – Figures above present five teaching approaches for determining the center of the chest and the lower half of the sternum for performing adult chest compression: A) The little finger-thumb, B) The hand-thumb, C) The X-cross, D) The knee to shoulder, and E) The arm under armpit approaches. For better visualization of the teaching approaches for determining the center of the chest we prepared the video: https://www.youtube.com/watch?v=MNx60sWjZcg&feature=youtu.be&ab_channel=NinoFija%C4%8Dko.

REFERENCES

1. Olasveengen TM, Semeraro F, Ristagno G, et al. European Resuscitation Council Guidelines 2021: Basic Life Support. Resuscitation 2021;161:98–114.
2. Kang J, Lee KL, Hwang SO, et al. Lay rescuer CPR: Exposing the Chest Facilitates more Accurate and Safer Chest Compression. J Kor Soc Emerg Med 2014:550–6.
3. Secher N, Grove EL, Adelborg K, Løfgren B. Visual-aided directions are superior to verbal instruction only in obtaining hand position for cardiopulmonary resuscitation. Am J Emerg Med 2011;29 (9):1178–81.
4. Birkenes TS, Myklebust H, Kramer-Johansen J. New pre-arrival instructions can avoid abdominal hand placement for chest compressions. Scand J Trauma Resus Emerg Med 2013;21(1):1–6.
5. Koster RW, Baubin MA, Bossaert LL, et al. European Resuscitation Council Guidelines for Resuscitation 2010 Section 2. Adult basic life support and use of automated external defibrillators. Resuscitation 2010;81(10):1277–92.
6. Kim H, Chon SB, Yoo SM, et al. Optimum chest compression point might be located rightwards to the maximum diameter of the right ventricle: A preliminary, retrospective observational study. Acta Anaesthesiol Scand 2020;64(7):1002–13.
7. Olszynski PA, Bryce R, Hussain Q, et al. A novel anatomic landmark to target the left ventricle during chest compressions in cardiac arrest. Cureus 2021;13(3).
8. Usawasuraiin P, Wittayachamnankul B, Chenthanakij B, et al. Optimal Landmark for Chest Compressions during Cardiopulmonary Resuscitation Derived from a Chest Computed Tomography in Arms-Down Position. J Cardiovas Develop Disease 2022;9(4):100.

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