



Does the Simulated Sex of the CPR Training Manikin Affect CPR Quality?

Abigail Schipper, EMT-B,¹ and Sabrina Liu, EMT-B¹
¹Massachusetts Institute of Technology, MIT EMS



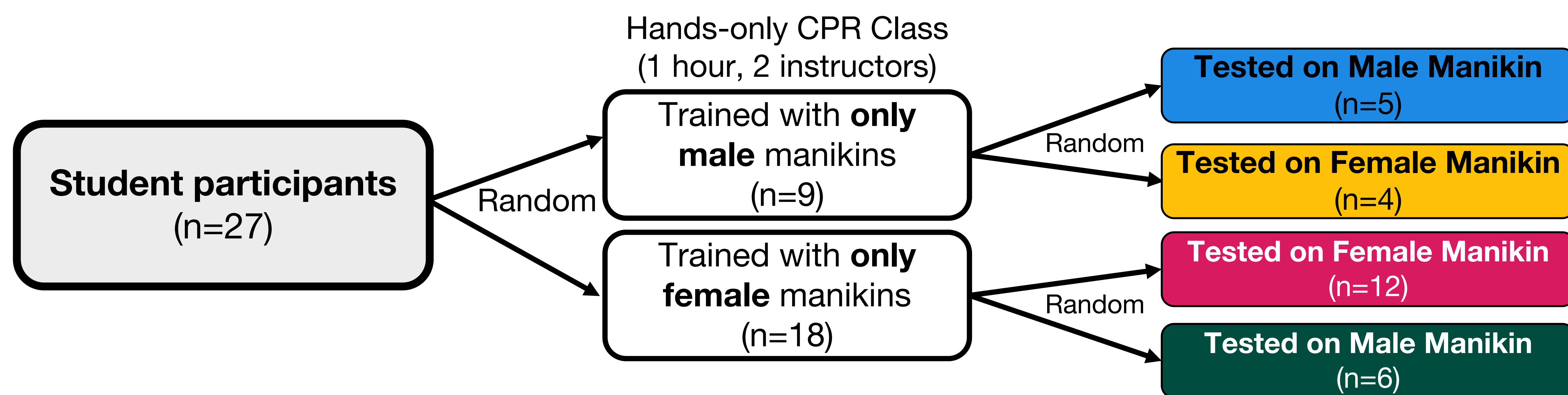
Abstract

There is a sex-linked disparity that reveals women are less likely to survive out-of-hospital cardiac arrest, inspiring investigation into the near exclusive use of male, flat-chested manikins in cardiopulmonary resuscitation (CPR) classes. Trainees were randomly divided into two cohorts (n=9 and n=18), with the first learning hands-only CPR with all male manikins and the second with all female manikins. Then, the trainees were randomly assigned to perform chest compressions and defibrillation on a male or female manikin. We measured the chest compression fraction, compression rate, and hand placement of the trainee through use of computer vision image analysis. We compared the CPR quality of the two cohorts to determine if the sex of the manikin used in training impacts a trainee's ability to perform high-quality CPR to victims of different sex.

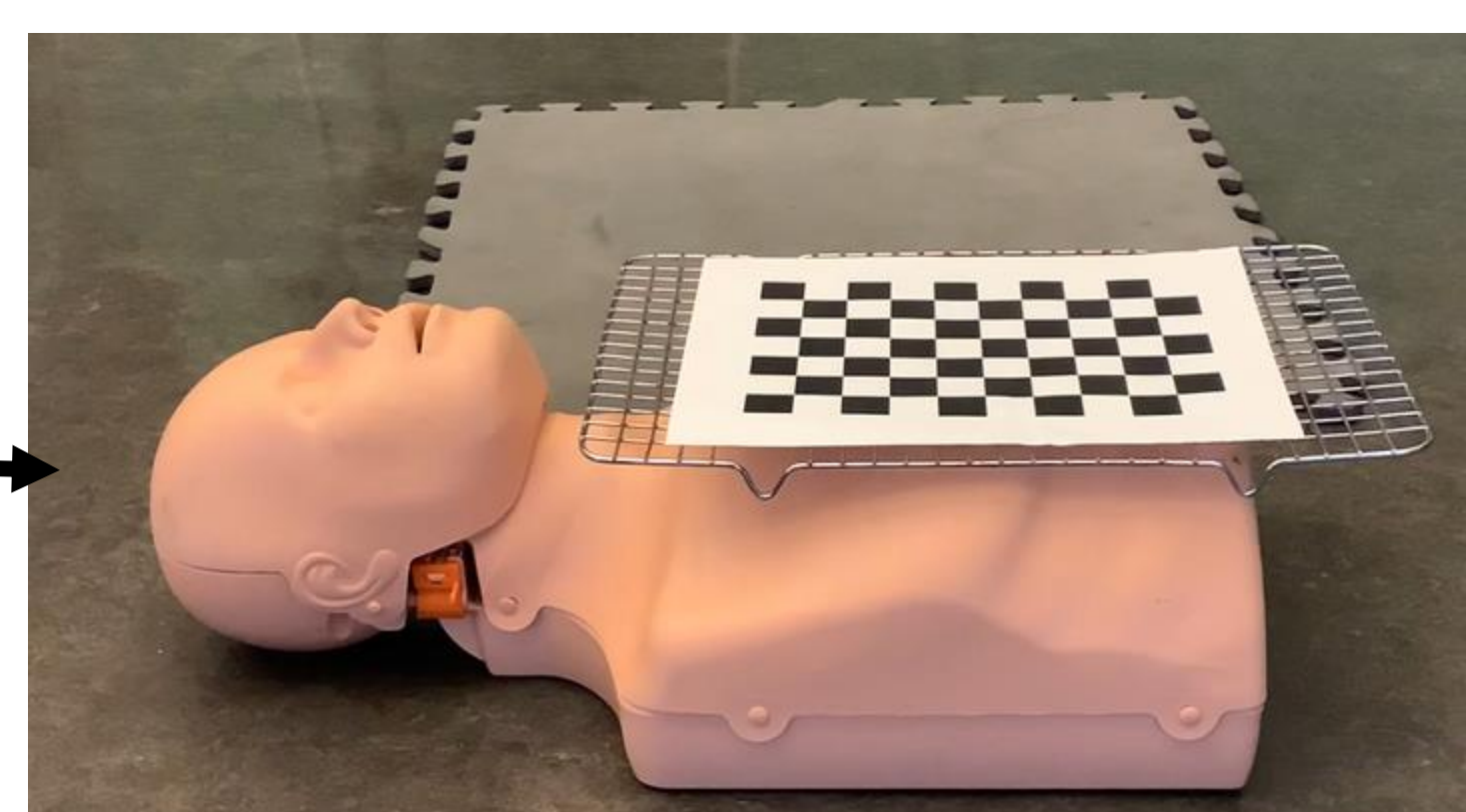
Introduction

Administration of high-quality cardiopulmonary resuscitation (CPR) is a critical intervention for a victim experiencing out-of-hospital cardiac arrest (OHCA). Quick action by bystanders can significantly raise the victim's chances of survival by two- to three-fold.¹ Despite the established benefits of rapid and proper CPR and AED use, numerous studies show that women are less likely than men to receive bystander CPR.² A prior study has shown that female manikins receive lower quality CPR from CPR-trained individuals than male manikins,³ and to our knowledge, no study has been done to see if incorporating female manikins into CPR training would lessen this disparity.

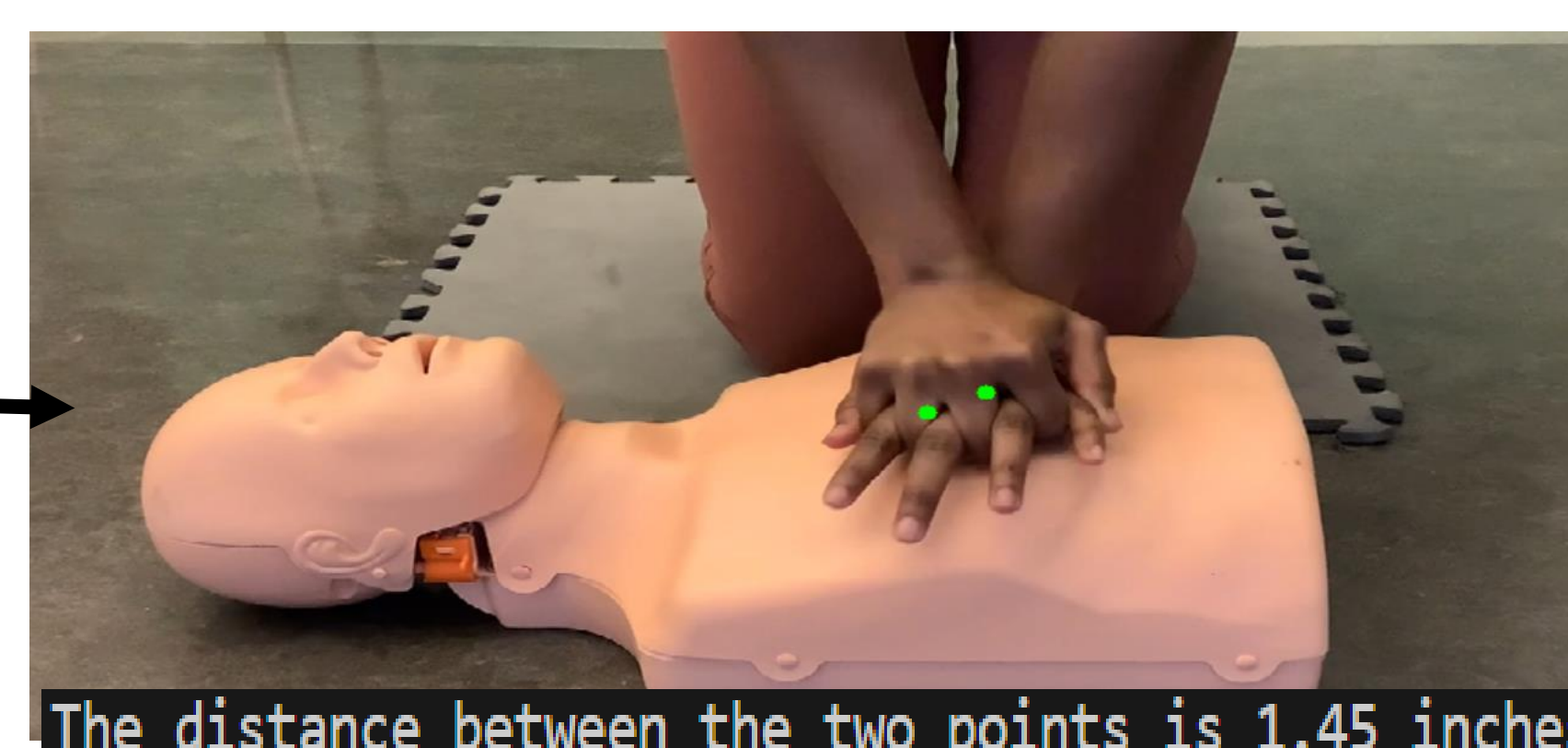
Methodology



Random assignment to male or female manikin for testing



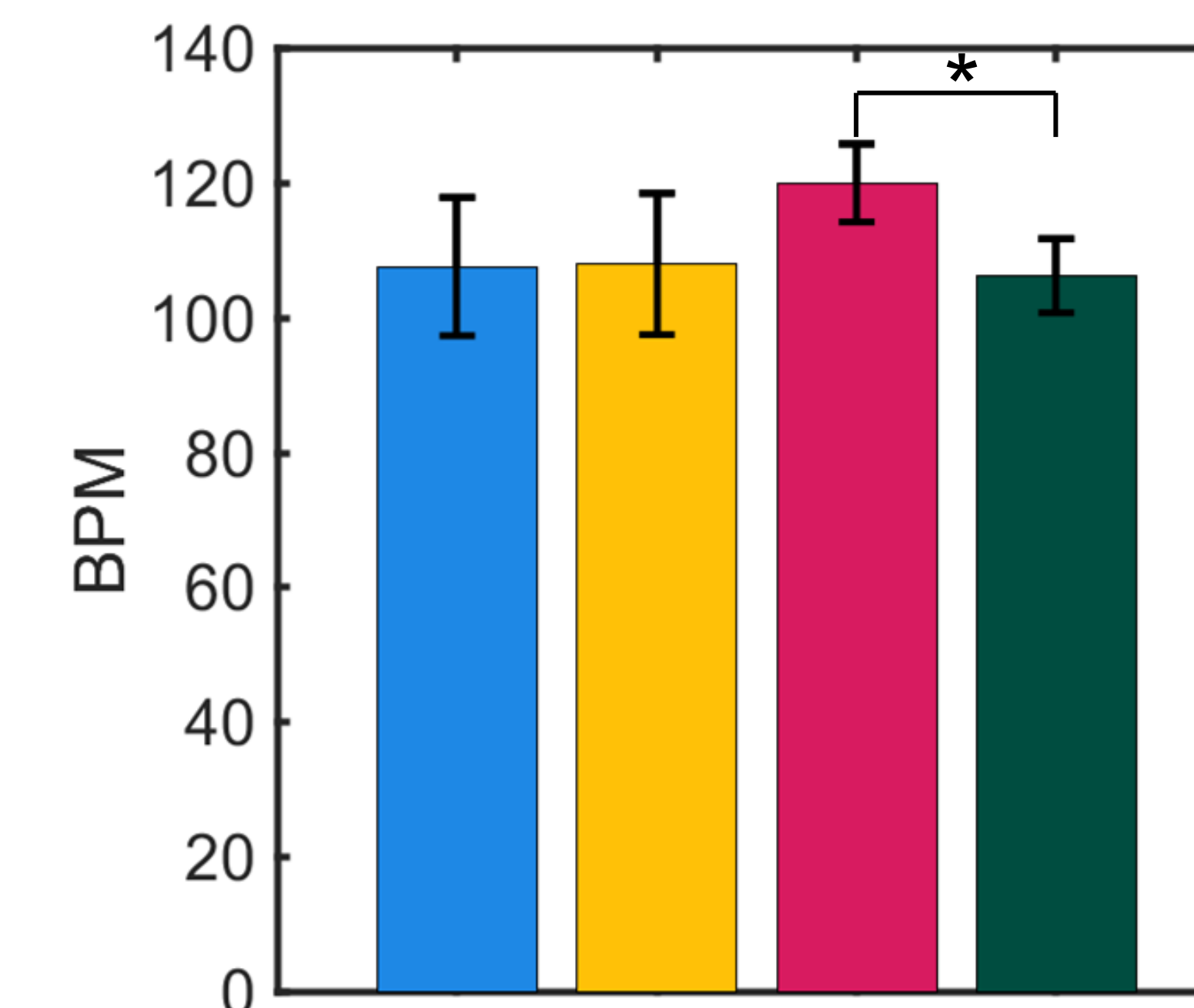
Calibrated using homography estimation to adjust for angle and distance



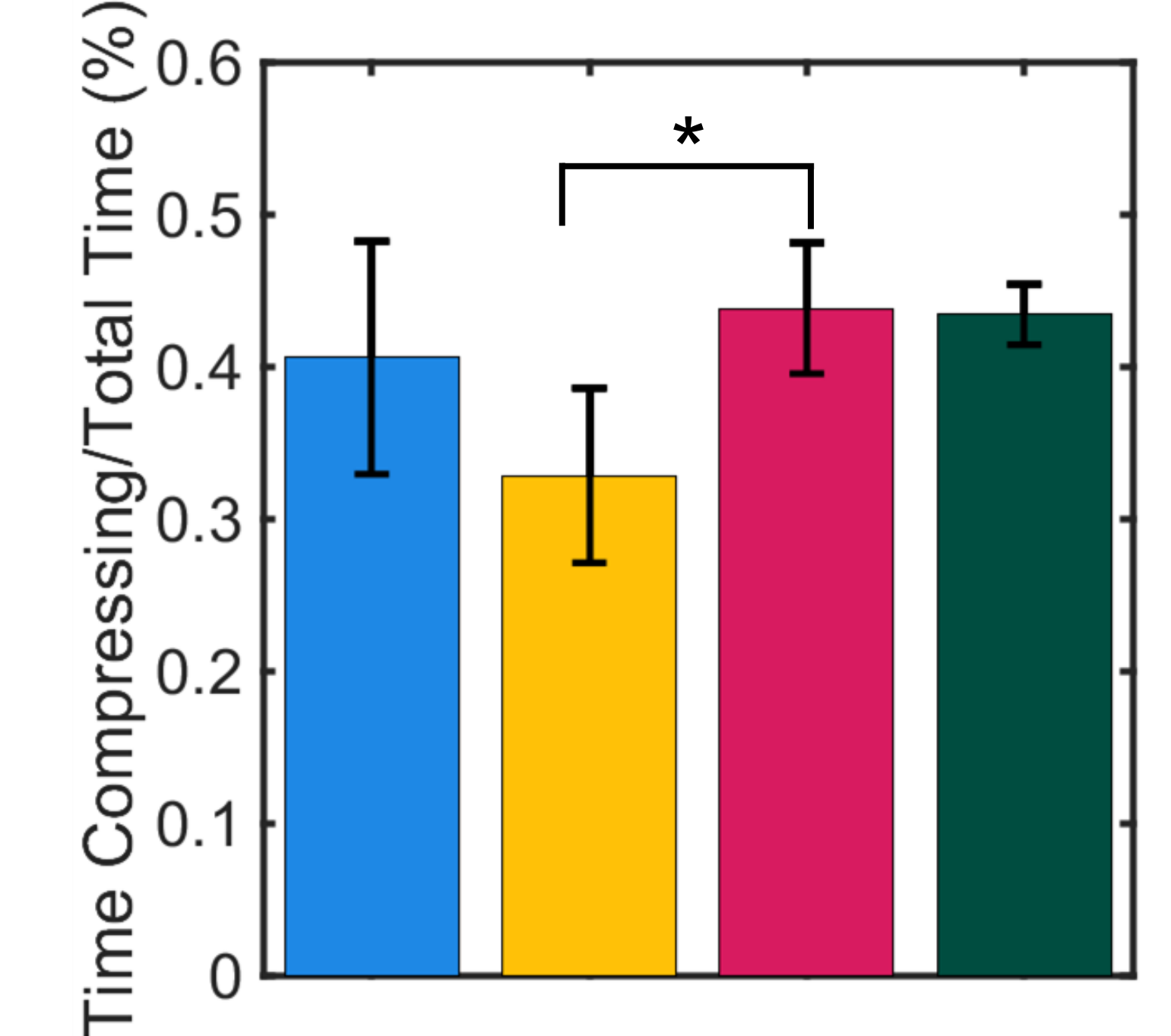
Calculates distance between heel of lower hand and center of chest

Results

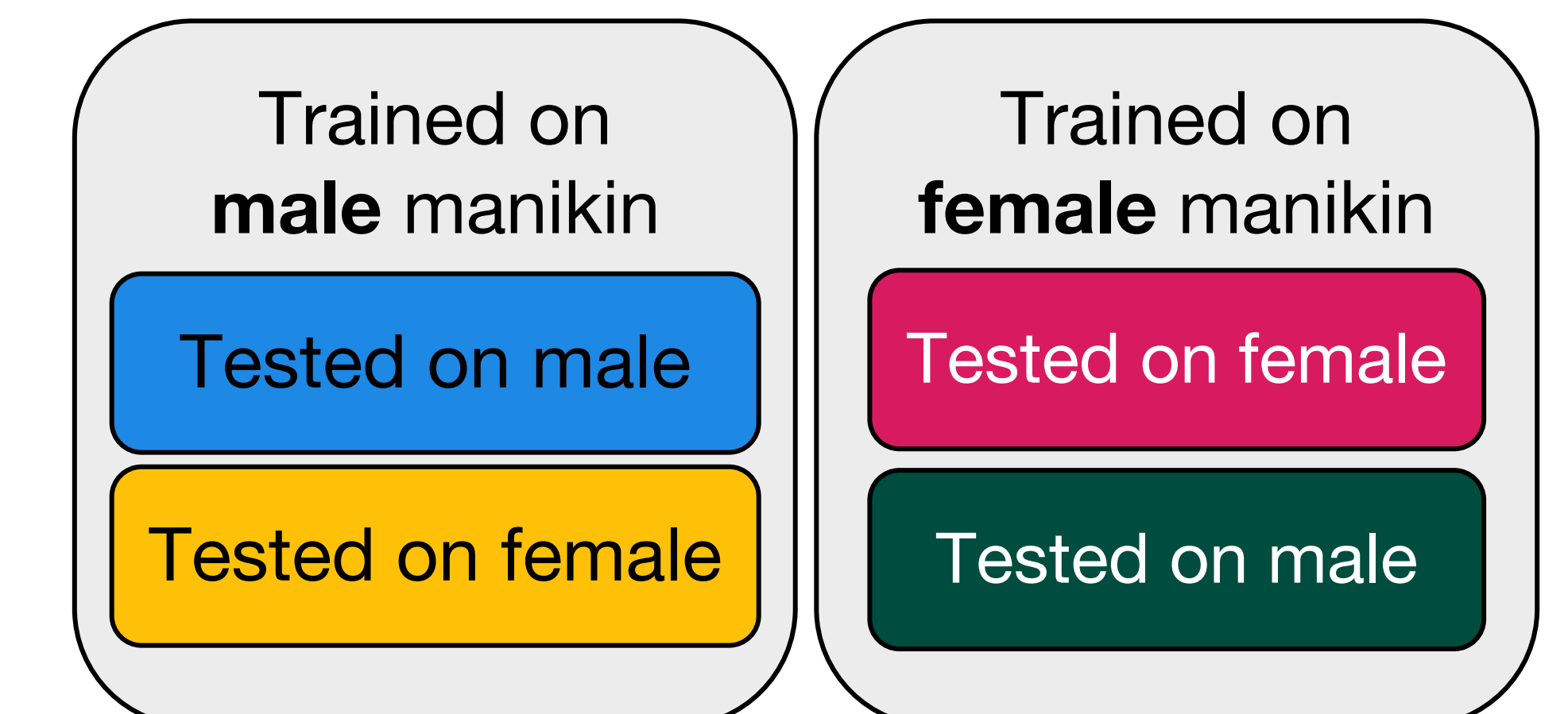
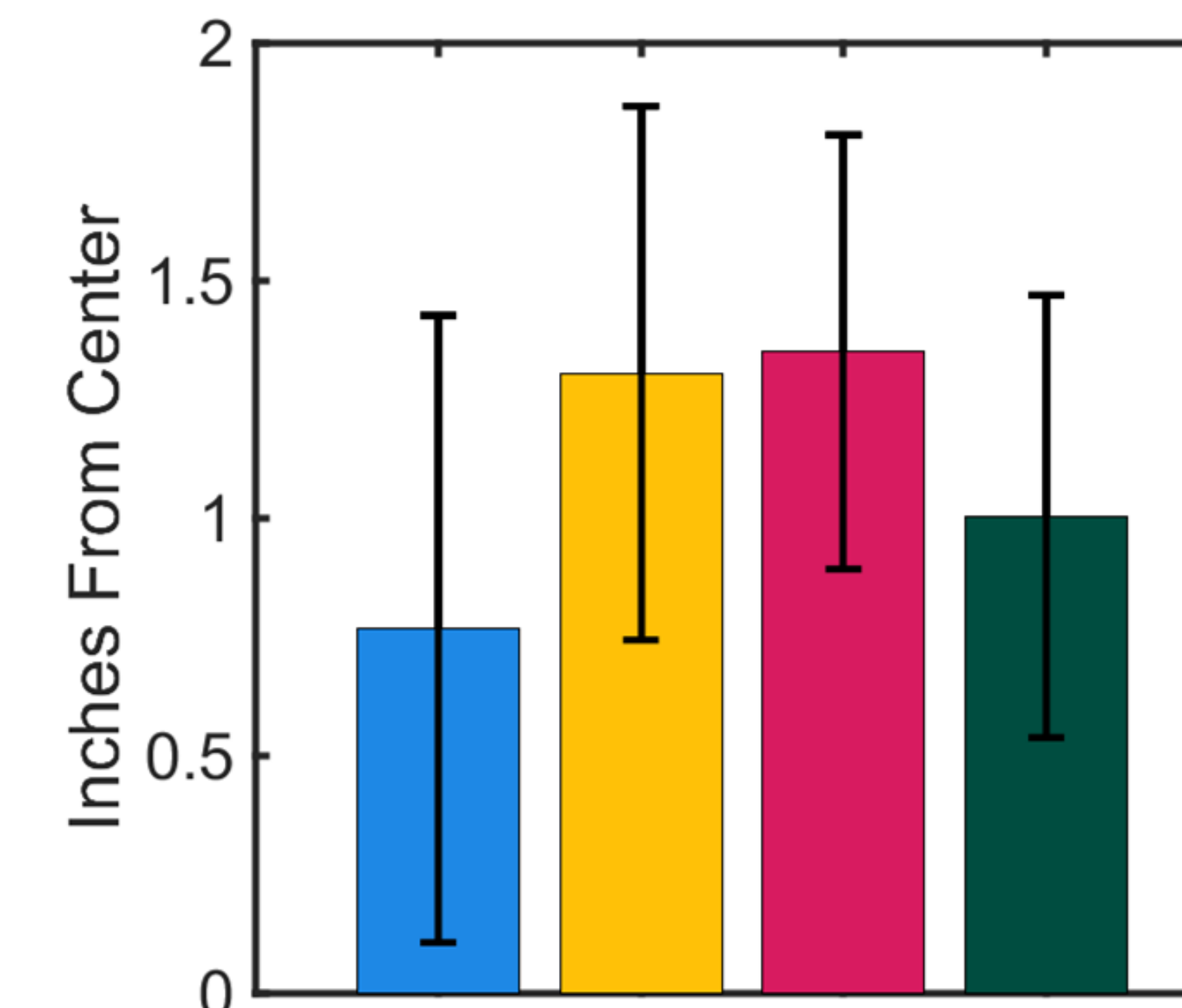
Compression Rate



Chest Compression Fraction



Hand Positioning



Conclusions and Discussion

1. When performing CPR on a female manikin, those who trained on a female manikin had a higher chest compression fraction than those who trained on a male manikin.
2. There was no significant difference in hand positioning between all groups.
3. Given the increase in chest compression fraction, including female manikins into CPR trainings may improve quality of CPR given to female victims.
4. Computer vision can be used to expedite CPR quality analysis.

Acknowledgements

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References

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Introduction

Administration of high-quality cardiopulmonary resuscitation (CPR) is a critical intervention for a victim experiencing out-of-hospital cardiac arrest (OHCA). Quick action by bystanders can significantly raise the victim's chances of survival by two- to three-fold. Despite the established benefits of rapid and proper CPR and AED use, numerous studies show that women are less likely than men to receive bystander CPR.² One survey revealed that the reasons for this disparity include fear of causing further injury to a woman, the belief that women may be overreacting and do not truly need CPR, fear of being accused of inappropriately touching the victim, and a reluctance to unclothe a woman in public.³ While women are less likely to receive bystander CPR than men, the impact of gender on OHCA survival rates still remains unclear. Further, one can postulate that a lack of female anatomical representation in CPR training materials and devices might contribute to this disparity.

Given the gender disparity in bystander CPR, which may affect OHCA survival rates, and the lack of female-anatomy representation in CPR training materials, this study aimed to assess whether the use of a female-anatomy adjunct during CPR training would influence reported comfort levels of trainees in performing CPR on women, and to what extent.

