Skill of Athletic Trainers Performing Two Rescuer CPR

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Context: During acute cardiac emergencies, it is imperative to have trained personnel who are skilled at performing cardiopulmonary resuscitation (CPR) to facilitate a positive patient outcome. CPR skill decay has been documented in numerous healthcare professionals. As part of a pre-test for a broader study we analyzed skill of athletic trainers in performing 2 rescuer CPR. **Objective:** To determine the skill level of athletic trainers performing 2 rescuer CPR on a high fidelity manikin. **Design:** Descriptive Study **Setting:** Simulation Lab **Patients or Other Participants:** Thirty-six (12 males and 24 females) athletic trainers completed this study (Age = Males: 33.3 ± 9.7 years, Females 33.4 ± 9.8 years; AT experience = 10.80 ± 9.01 years). The participants were randomly assigned a partner. **Interventions:** Participant pairs performed two minutes of 2 person CPR on a Q-CPR manikin with SimPad Skill Reporter (Laerdal Medical Corporation, Wappingers Falls, NY) in both the role of the compressor and the ventilator, separately. All ventilations were delivered using a standard pocket mask airway. The SimPad Skill Reporter measured multiple variables related to CPR skill. The CPR score provided by the SimPad is calculated using an algorithm that takes into account incorrect compression depth, incorrect compression rate, incomplete release, inaccurate hand placement, flow time fraction, incorrect ventilation volume and incorrect ventilation rate (based on the American Heart Association 2015 guidelines). Participants were required to achieve an overall score of ≥80% to be deemed proficient or were required to remediate. **Main Outcome Measures:** The dependent variables were overall CPR score (%), compression score (%), ventilation score (%), ventilation volume (mL), ventilation rate (#/min), compression depth (mm), and compression rate (#/min). Descriptive statistics (frequencies, means, standard deviations) were used to describe CPR skill. **Results:** Fourteen of eighteen pairs (77.78%) did not achieve an overall CPR score of 80% on the first attempt. There was a total of 19 trials where participant pairs failed to demonstrate CPR proficiency (≥80%). For the 19 failed trials the overall CPR score was (51.52 ± 19.63%), compression score was (47.58 ± 34.95%), ventilation score was (90.47 ± 13.70%). The 19 failed trials had compression depth (46.32 ± 11.48 mm), compression rate (123.95 ± 12.31/min), ventilation volume (519.42 ± 235.89 mL), and ventilation rate (5.16 ± 1.21/min). **Conclusions:** A large percentage of participant pairs lacked proficiency while performing 2 person CPR indicating that athletic trainers experience skill decay from time of last certification similar to other health care providers. Our data indicates that shallow chest compression depth and faster compression rate were the variables of CPR skill that most attributed to the lack of proficiency in the failed trials. Performing CPR recertification with high fidelity manikins may provide the participant with specific feedback regarding his/her deficiencies so they can make corrections.

The Ability to Provide Quality Chest Compressions Over Lacrosse Shoulder Pads to Initiate CPR

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Context: Early initiation of Cardiopulmonary Resuscitation (CPR) is essential for improving patient outcomes and decreasing mortality during sudden cardiac arrest. Performance of compressions over football shoulder pads inhibits chest compression depth but speeds time of first compression. Lacrosse equipment has not been studied. **Objective:** To assess the impact of lacrosse shoulder pads on the ability to provide quality chest compressions to simulation manikins. **Design:** Crossover study. **Setting:** Simulation laboratory. **Patients or Other Participants:** Thirty-six (12 Males: 33.3 ± 9.7 years old; 24 females: 33.4 ± 9.8 years old) athletic trainers with current professional rescuer level CPR (26 American Heart Association; 10 American Red Cross) participated. **Interventions:** We used the Resusci Anne Q-CPR manikin (Laerdal Medical Corporation, Wappingers Falls, NY) for all trials. Shoulder pad condition (NSP = no shoulder pads, WBH = Warrior Burn Hitman shoulder pads [Warrior Inc., Boston, MA], STX = STX Cell II shoulder pads [STX LLC, Baltimore, MD]) served as the independent variable. Half (18) of participants performed 3 trials each of NSP and WBH, and the other half did 3 trials each of NSP and STX. All sessions were counterbalanced. **Main Outcome Measures:** We performed three separate, 1-way analyses of variance (ANOVA) for chest compression depth (mm), compression rate (compressions/minute), and ratings of perceived exertion (RPE) with Bonferroni post-hoc analyses. Hand placement accuracy, chest wall recoil, and percentage of compressions

reaching adequate depth were variables expressed as percentages and therefore non-parametric analyses (Kruskal-Wallis tests with Mann-Whitney U for post hoc testing) were utilized to determine differences. **Results:** There was a significant difference between shoulder pad conditions on mean compression depth ($F_{2,213} = 3.73$, $P = .026$, $\omega 2 = .03$) with a significantly shallower depth for the WBH (54.1 ± 5.8) when compared to NSP (56.8 ± 5.7; $P = .021$). For mean compression rate, there was not a significant difference between the shoulder pad conditions ($F_{2,213} = 0.87$, $P = .422$, $\omega 2 = .001$, $1\text{-}\beta = .20$). There was a significant difference in RPE scores ($F_{2,213} = 16.41$, $P < .0001$, $\omega 2 = .12$) depending on shoulder pad condition. Compressions were more difficult with the STX in place (4.1 ± 1.3) compared to NSP (2.9 ± 1.2; $P < .0001$) as well as WBH (3.3 ± 1.1; $P = .002$). There was a significant difference in hand placement accuracy ($\chi^2_2 = 11.14$, $P = .004$) between the three different shoulder pad conditions with NSP having higher percentages than STX ($P = .002$) and STX higher than WBH ($P = .001$). There were no significant differences between shoulder pad conditions for chest wall recoil ($\chi^2_2 = 1.11$, $P = .571$) and percentage of compressions reaching adequate depth ($\chi^2_2 = 5.10$, $P = .078$). **Conclusions:** Based on our results, it may not be necessary to remove lacrosse shoulder pads before initiating chest compressions. Our participants were able to provide high quality chest compressions over two different pairs of shoulder pads by obtaining a depth of 50 mm. Delaying chest compressions to remove lacrosse shoulder pads may be detrimental to patient care.