

## Clinical Summary

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### Metronome improves compression and ventilation rates during CPR on a manikin in a randomized trial

Kern KB, Stickney RE, Gallison L, Smith R. *Resuscitation*. 2010; 81:206-210.

#### Purpose:

To study the effects of customized compression/ventilation metronome prompts on over-ventilation by professional rescuers.

#### Methods:

- Prospective, randomized parallel study of a customized CPR metronome with “tock” prompts for compressions and a spoken “ventilate” prompt.
- Two groups of 34 firefighter EMTs performed 2-rescuer CPR on an instrumented manikin. One group used metronome guidance while the other group had no metronome guidance.
- The EMT groups performed 2 minutes of 30:2 CPR with an unsecured airway then 4 min of CPR with a secured airway (continuous chest compressions with 8-10 ventilations per minute) and repeated this sequence after switching roles.
- Endpoints included compression and ventilation rates.

#### Results:

- Significantly less variation of ventilation rate on the metronome group ( $p < 0.001$ ).
- Compression rates were significantly better with the metronome.
  - During 30:2 CPR (unsecured airway) the target compression rate (90-110/min) was achieved in 15% of the CPR sessions in the control group vs. 100% for the metronome group ( $p < 0.001$ ).
  - During CPR with an advanced airway the average target compression rate was achieved in 9% of the CPR sessions for the control group versus 97% for the metronome group ( $p < 0.001$ ).

#### Conclusions:

The combined tone and voice prompt audio guidance was extremely effective at maintaining the target chest compression rate and avoiding the common problem of hyperventilation during CPR by professional rescuers.

#### Physio-Control Discussion Points:

Metronomes have been shown to be highly effective in guiding rescuers to the correct compression rate.<sup>1,2,3</sup> The CPR Metronome used in the study is incorporated in the LIFEPAK® 15 monitor/defibrillator.\*

\*LIFEPAK 15 monitor/defibrillator non-US ventilation prompt is a tone prompt instead of the word “ventilate.”

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#### References:

1. Kern KB, Sanders AB, Raife J, Milander MM, Otto CW, Ewy GA. A study of chest compression rates during cardiopulmonary resuscitation in humans: the importance of rate-directed chest compressions. *Arch Intern Med* 1992;152:145-149.
2. Fletcher D, Galloway R, Chamberlain D, et al. Basics in advanced life support: A role for download audit and metronome. *Resuscitation* 2008;78:127-134.
3. Jost D, Degrange H, Verret C, et al. DEFI 2005. A randomized controlled trial of the effect of automated external defibrillator cardiopulmonary resuscitation protocol on outcome from out-of-hospital cardiac arrest. *Circulation* 2010;121:1614-1622.