THE LYFETYMER 6 SECOND METRONOME

Reviewed by Paul Mathews PhD, RRT

This issue's product review is a divergence from the usual type of equipment we review. It is not a ventilator, ABG analyzer or other large piece of capital equipment. It's not a device that costs thousands or even hundreds of dollars. It is smaller than your cell phone, lighter than a nickel, long lasting and accurate. Additionally, it responds well, and directly to a need that, while evident to some of us as observers, is difficult to meet by many. What is this device you ask? It's all in the name.

The *Lyfetymer 6 Second Metronome* is a small inexpensive device that was recently developed to help meet the new American Heart Association (AHA) CPR guidelines **(American Heart Association 2005 Guidelines for CPR and ECC*)** as those guidelines relate to the rate of ventilation - more specifically, the *number* of manually delivered breathes given by a rescuer during a CPR event.

Compression-Ventilation Ratio – As we all know, once an advanced airway is in place, two rescuers are no longer need to deliver "cycles" of CPR (ie, compressions interrupted by pauses for ventilation). Instead, the *compressing rescuer* should give continuous chest compressions at a rate of 100 per minute without pauses for ventilation. The rescuer delivering *ventilation* is simultaneously supposed to provide 8 to 10 breaths per minute via manual resuscitator (or mouth to mouth if the situation calls for it.) The two rescuers, then, are supposed to change compressor - ventilator roles approximately every 2 minutes to prevent compressor fatigue and deterioration in quality and rate of chest compressions.

The *Lyfetymer 6 second* Metronome device, is about 1 and 7/16 inches in diameter – about the size of the bell on a standard adult stethoscope. It is 3/8 inch (1 cm) thick at its maximum thickness and it is made of a transparent domed plastic covering a mirrored silvered disk with a small bright red light protruding into the space provided by the domed design. This whole assembly is held together by a metallic ring and sits on a 3M adhesive disk which, in turn, covers a chip and small battery. The chip is designed to pulse a light every 6 seconds (10 times a minute) therefore providing a visual signal of that passage of time – perfect for a visual signal to "bag" the patient *exactly* 10 times per minute.

To use the Lyfetymer, one simply removes it from its package, pulls the battery tab and peels back the adhesive covering to stick it to any surface. Of course, sticking it to the surface of a manual resuscitator is the idea here. By doing so, one can constantly look at the patient and the resuscitator while watching the red light blink every six seconds to deliver a manual breath with perfect timing.

The AHA recommendations actually address the issue of "prompts" as an aid to proper CPR, thus, this device is perfect in regard to the part of CPR having to do with ventilation. It's interesting to note how incorrect people actually are when depending on their own sense of time to deliver 10 breaths per minute. In several unpublished studies performed here at the University of Kansas (as part of our senior year research methods course) we found that most people either over or under estimated the passage of time. For example, we used a telegraph key-like device to activate or deactivate an electronic stop watch not visible to the subject. The subjects were instructed to activate the stop watch by pressing the key at their own convenience. They were told to wait 10 seconds and deactivate the watch by pressing the key again. The activity was repeated 5 times. In this study there was a response variance of 1-3 seconds on average growing larger and with more rapid deactivation with repetition. Most people admitted to "counting in their head" but even that was inaccurate.

Another study simulated CPR using a manikin. The individuals performing the simulation were timed for both compression and bagging. At the start of the exercise we kept things "calm" providing timing feedback by means of a metronome. As the exercise progressed, however, we stopped the metronome and raised the tension level by role playing other code participants. All the while we were timing the rescuer's activities. As the metronomic feedback was halted and the "pressure to perform" increased, the rate of both compressions and ventilation increased. What should have been 10 breathes per minute rose to 16 or more breathes while compressions rose from 60 to anywhere up to 90 per minute.

Clearly it is difficult for individuals to accurately judge the passage of time even in the most quiet and controlled of condi-

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tions although everyone thinks they're an expert at it! Add to that problem the effects of stress and expectations to perform, and the time judgment ability deteriorates even more. The AHA Standards cite several studies indicating that the use of CPR "prompts" may be useful in both hospital-based CPR and in pre-hospital CPR attempts. Indeed numerous emergency service and ambulance companies are using the Lyfetymer for this purpose.

CPR Prompts - Evidence from 2 adult studies show that the chest compression rate during unprompted CPR is frequently inadequate in both out-of-hospital and in-hospital settings. Human, animal, and manikin studies showed consistent improvement in end-tidal CO2 and/or quality of CPR in both the out-of-hospital and in-hospital settings when CPR prompt devices were used. A CPR prompt device may be useful in both out-of-hospital and in-hospital settings"

Testing and Evaluation

To evaluate these devices I took several of them and subjected them to tests of accuracy, duration, adhesiveness, durability and comfort.

Accuracy was measured by starting a computer based electronic stopwatch (interval timer). We used the stopwatch from easysurf (http://www.easysurf.cc/stimer.htm) which required mouse clicks to start and stop the timer. There was some variance noted, likely due to eye hand response time but the variance was less than 0.25 seconds.

Duration referred to the length of time the battery would provide power. I randomly selected three Lyfetymers and activated them at approximately 5:00 PM on a Monday. A full week later the device was still flashing. Currently the flash cycle time is 6.03 seconds. Clearly the duration of the power source and the accuracy far exceeds any conceivable code situation.

Adhesiveness was tested by applying the Lyfetymer to several different surfaces removing them and rotating them to other surfaces. I also applied them to several types of bag-valve-mask (BVM) devices with excellent results. They stuck securely (the device uses 3M adhesive) and removed with relative ease, but not so easy as to accidentally be dislodged.

Durability was studied by dropping a Lyfetymer to a tiled floor several times from heights ranging from 2 to 7 feet, hitting it with moderate force several times to simulate possible impacts against a wall or bedside. In all cases the device tested survived without damage or change of function.

Conclusions This is not rocket science by any means. As I stated in the beginning, this is simply a little light that blinks every six seconds. It does, however, actually have a very important role when it comes to CPR, thus I recommend that managers look into purchasing it so that it can be attached to every manual resuscitator used in the hospital, sleep lab or home. Remember, even the most experienced CPR rescuers usually bag much more frequently than they need to, so this easy to use device is actually a God-send in that regard. It's accurate, sturdy, inexpensive and does the job of fulfilling the prompting recommendations of the AHA's new standards. By leaving the battery activation tab in place it could be pre-positioned on any BMV in any setting to be quickly and easily activated by pulling the tab.

The Lyfetymer metronome can be purchased by contacting the company at 631-736-3239 and/or by visiting their web-site located at www.LYFETYMER.com.

Dr. Paul Mathews PhD, RRT, FAARC is a veteran therapist, educator, author, lecturer and past President of the AARC. He is also an Assistant Professor at the University of Kansas Respiratory Care Program.