

Roy Pryer
Senior Resuscitation Officer
Royal Sussex County Hospital
Brighton and Sussex University Hospitals NHS Trust

Roy Nightingale
Community Responder Officer
Sussex Ambulance Service NHS Trust

A New Approach to CPR

A very significant change is on the way emphasising the critical importance of chest compressions during Cardio Pulmonary Resuscitation (CPR). For some years the Automated External Defibrillator (AED) has been the focus, but the scientists are now of the view that without good chest compressions an AED has a significantly reduced chance of working. The challenge facing the employer is to know that his first aiders are competent to deliver the new requirements as opposed to just go through the motions of training courses. In truth, given the problem of skill loss after training, rescuers cannot know that they are delivering good chest compressions unless some feedback is available during the actual rescue.

This article provides an insight into what is being considered, what solutions there may be, as well as considering it in the context of the papers presented at the recent 7th Scientific Congress of the European Resuscitation Council (ERC) in Budapest in September 2004.

In April 2004 a review day was held at Stamford Bridge – the home of Chelsea Football Club, with the working title “Given the increasing importance of Chest Compressions, is there a place for Chest Compression Guidance Devices in Basic Life Support?”. The day was chaired by Dr Peter Baskett, former chair of both the European and UK Resuscitation Councils, and there were presentations by Dr Gavin Perkins, Lecturer in Medicine at University of Birmingham, Ken Spearpoint, Senior Resuscitation Officer at Hammersmith Hospital and Chairman of the Council for Professionals as Resuscitation Officers, David Halliwell, Head of Education & Professional Development at Dorset Ambulance and Paul Reeves, Paramedic Training Officer and Resuscitation Specialist at Dorset Ambulance. Attendees at the day came from a wide range of disciplines including doctors, nurses, paramedics, ALS & BLS trainers, Voluntary Aid Societies and independent first aid trainers.

Some of the key information presented on the day included David Halliwell’s paper on how critical it is to deliver good quality chest compressions, in line with the current guidelines, to build up coronary artery perfusion pressure prior to delivery of a defibrillatory shock. Ken Spearpoint talked about how, at the Hammersmith Hospital, the focus is on training the first responder and how this has led to improvements in outcome although further improvement is needed. Ken shared his experiences and techniques. Paul Reeves informed the audience of a trial that he had undertaken comparing external chest compressions (ECC) with and without the CPREzy and found that by using the device, participants believed that their attempts at CPR would be more effective in resuscitating the arrested patient. It was agreed that this would encourage CPR to be attempted in the first place. Finally Dr Gavin Perkins gave those present a preview of interesting work assessing the value of having real-time

feedback whilst delivering chest compressions on a hospital bed (more on this below).

Readers may be aware of the CPREzy which is a mechanical aid designed to improve the accuracy and consistency of chest compressions during training and real-life CPR. It provides real time feedback to the rescuer on the depth and rate of compression. It was developed primarily for real-life emergency use but also has a role in the training environment. Previous work done by Boyle et al [1] indicates a significant improvement in ECC when using the device.

The overall consensus from the day was that CPR is not being undertaken effectively, not only by lay persons, but also by those who believe they are competent, including in-hospital and pre-hospital care providers. Indeed Dr Perkins had highlighted the problems of being able to provide correct compression levels in a hospital bed environment. An evaluation of the CPREzy was made by the group and it was generally agreed that there seemed to be a place for such a device and that the CPREzy could help to improve the effectiveness of external chest compressions, particularly in relation to correct depth and timing.

When the question was posed “If cost were not the consideration, should the product be widely available” the participants on the day generally concluded that this would have a beneficial impact.

Since that review day, the work that Dr Perkins referred to has been submitted and accepted for publication by the journal Resuscitation[2] and was presented at the ERC Conference in Budapest. The group found “a significant improvement in ECC depth with CPREzy compared to standard CPR” in a simulated hospital bed situation. The paper refers to previous work undertaken by Dr.Perkins; “We have demonstrated previously that external chest compressions (ECC) performed on a hospital bed are inferior to those undertaken with the victim on the floor[3]. Furthermore, performance is not enhanced by emergency deflation of air filled mattresses[4]; by using a back-board; by kneeling on the bed next to the victim or by altering bed height[5]”. Dr Perkins said “It is encouraging that we have identified one device that seems to be able to overcome this common problem of delivering ECC in an in hospital situation. Now we would welcome more work in this area”.

It is noteworthy to relate the overall findings of this review day to one of the main themes emerging from the recent ERC conference in Budapest. Many of the eminent leading resuscitation experts including Prof Douglas Chamberlain (UK), Dr Stig Steen (Sweden), Prof Dr Michael Frenneaux (UK), Lars Wik (Norway), Prof Dr Pierre Carli (France) made presentations all of which seemed to emphasise the increasing importance of chest compressions, and the need to perform them correctly. Various reports cited poorly delivered chest compressions, not only by the lay rescuer but also by trained medical staff – with variable rates and poor compression depth. A panel discussion on the last day of the conference consisting of Prof Chamberlain, Dr Stig Steen and Prof Frenneaux concluded by suggesting that adopting a CAB rather than the ABC (Airway, Breathing, Circulation) model might be a more simple and effective way of increasing the emphasis and effectiveness of compressions.

While no specific conclusions can yet be drawn, and work is currently underway by the International Liaison Committee on Resuscitation (ILCOR) to determine the next resuscitation guidelines, there is a consistent theme of increasing the emphasis on, and importance of, chest compressions. Whilst Automatic External Defibrillators (AED) are recognised as the best way to produce a return of a spontaneous circulation, it is clear that good quality ECC is the only way to achieve the necessary coronary artery perfusion pressure to increase the chance of defibrillation success significantly. Comments made by several speakers indicate that there may be changes in this vein in the new guidelines in 2005.

When one adds to this the current issues of rescuer lack of confidence in performing CPR and the poor retention of CPR skills [up to 90% lost within 6 months according to the Resuscitation Council (UK)], many are concluding that a mechanical device to aid the performance of ECC would be a beneficial addition to any resuscitation kit.

There does seem to be a growing view that we need to do all we can to ensure that rescuers, and particularly lay rescuers, are able to do all they can to perform CPR in an effective manner. It would seem that there is a need for a mechanical device that can give the rescuer confidence by providing feedback on the correct depth and rate of compression. Ideally the device should be available with the defibrillator and the usual first aid equipment in the workplace and community.

1. Boyle AJ, Wilson AM, Cincotta m, McGuigan L, Wilson J & Whitburn R.: Improvement in timing and Efficacy of External Cardiac Compressions With a New Non-invasive Device: The CPREzy. Resuscitation 2002; 54: 63-67
2. Perkins GD, Augré C, Rogers H, Allan M, Thickett DR, CPREzy: An evaluation during simulated cardiac arrest on a hospital bed. Resuscitation 2004; In press
3. Tweed M, Tweed C, Perkins GD. The effect of differing support surfaces on the efficacy of chest compressions using a resuscitation manikin model. Resuscitation 2001; 51: 179-183
4. Perkins GD, Benny R, Giles S, Gao F, Tweed MJ. Do different mattresses affect the quality of cardiopulmonary resuscitation? Intensive Care Med 2003; 29: 2330-2335
5. Smith CM, Stephenson BTF, Gao F, Perkins GD. The effect of a back board on CPR performance. Resuscitation 2004; In press:

September 2004