



Research Studies Assessing the Value of the CPREzy Pad

The following studies have been published. References are given but full details are available at www.CPREzy.com

The Quality of chest compressions by trained personnel: The effect of feedback, via the CPREzy, in a randomized controlled trial using a manikin model.

Noordergraaf et al., *Resuscitation* Vol 69 (2006) 241-252
Dept. of Emergency Medicine, St Elizabeth Hospital, Tilburg, Netherlands

- Investigated the quality of chest compressions by trained personnel and the effect of feedback via CPREzy
- Subjects: 224 Hospital staff: physicians, nurses, caregivers - first responders
- No training on CPREzy given.
- "When the CPREzy is used, the overall percentage of adequate compression during the assessment period was increased significantly, from an average of 9 compressions of sufficient depth in the control group, to at least 14 per 15 compressions in the CPREzy group."
- Performance is improved "regardless of physiognomy of the caregiver."
- "This device deemphasises the interval after training without compromising quality" ie training costs can be reduced while BLS will improve
- **Author's conclusions in his paper:**
"The improvements in efficacy should be an important factor in optimization of the 'Chain of survival'."

CPREzy™: A new adjunct to improve external chest compressions by professionals

Max Skorning, Stefan Beckers et al. A full paper is being prepared for *Resuscitation*.
Anaesthesiology Clinic, University Hospital, Aachen, Germany.

- Investigated the quality of chest compressions by healthcare workers trained in BLS
- Subjects: 81 healthcare professionals – doctors, nurses, paramedics
- Randomly split into 2 groups and asked to perform 3 minutes of continuous ECC with and without CPREzy.
- Primary endpoints were a rate of ECC between 90 and 110/min and a compression depth between 40 and 50 mm.
- Group 1, shown 98 second video on CPREzy and then tested with CPREzy. Achieved good results (Rate: 82.5% correct, Depth: 72.5% correct). When retested without CPREzy, their performance reduced (Rate: 30.0% correct, Depth: 62.5% correct)
- Group 2 was first tested without CPREzy. (Rate: 12.2% correct, Depth: 51.2% correct). This group was then shown the CPREzy video and retested with CPREzy. They showed marked improvement (Rate: 82.9% correct, Depth: 87.8% correct).
- Performance is enhanced by using CPREzy
- Skill retention is improved by being trained on CPREzy.
- **Author's conclusion:**
"CPREzy as a simple portable and re-usable device is able to improve healthcare professionals' performance of ECC in simulated cardiac arrest. In addition the device is a suitable tool for ECC training".

CPREzy: an evaluation during simulated cardiac arrest on a hospital bed

Perkins et al., *Published in Resuscitation* Vol 64 (2005) 103-108
Division of Medical Sciences, University of Birmingham, England

- Investigated chest compressions on a hospital bed
- Subjects: Medical students: trained ERC BLS/AED Instructors
- CPREzy facilitated a "significant improvement" in chest compression depth
- Guidelines maintained throughout the 3 minute trial
- Showed that ONLY with CPREzy can nurses achieve correct depth
- **Author's conclusion in this paper:**
"...this is the first intervention that has been shown to improve the performance of chest compressions when undertaken with the victim on a hospital bed."

Improvement in timing and effectiveness of external cardiac compressions with a new non-invasive device: the CPREzy

Boyle et al., *Published in Resuscitation* Vol 54 (2002) 63-67
Dept. of Cardiology, St. Vincent's Hospital, Melbourne, Australia

- Investigated effect of using CPREzy as part of CPR routines
- Subjects: Non-medical and nursing, hospital staff; all CPR trained
- Improved external cardiac compression by 3 fold - over 500% improvement in the 4th minute
- The effects of rescuer fatigue after 3 mins. was largely overcome
- Improved rescuer hand positioning by 25%
- Improved rescuers ability to maintain the correct rate of compression
- **Author's conclusion in this paper:**
"the CPREzy can improve timing and effectiveness of ECC, and reduce the effects of resuscitator fatigue, in community-trained subjects."

CPREzy™: improves performance of external chest compressions in simulated cardiac arrest.

*S.Beckers, et al., Published in Resuscitation Vol 72 (2007) 100-107
Anaesthesiology Clinic, University Hospital, Aachen, Germany.*

- Investigated the quality of chest compressions by laypeople
- Subjects: 202 Laypeople -
- Randomly split: Group 1 trained in CPR using CPREzy, Group 2 without.
- Both Groups tested after training – Group 1 much more proficient than Group 2.
- A week later, each group randomly split again.
- Group 1a tested again with CPREzy, Group 1b tested without. Group 1a far more proficient
- Group 2a tested again with CPREzy, Group 2b tested without. Group 2a much more proficient.
- Showed that at training, and a week later, students perform better with CPREzy.
- CPREzy requires little training.
- CPREzy helps students retain their skills as the group that was trained in CPREzy performed better, WITHOUT CPREzy, than the group that had never used CPREzy.
- **Author's conclusion:**
“The CPREzy™ is a new device that is easy to use after brief instruction and is able to improve laypersons' performance of ECC in simulated cardiac arrest.”

Actually doing chest compressions: the CPREzy's contribution to BLS

*Noordergraaf et al., A full paper is being prepared for Resuscitation while an abstract poster at the 3rd Mediterranean Emergency Medicine Conference in Nice, France. Sept. 2005 gives an insight.
Dept. of Emergency Medicine, St Elizabeth Hospital, Tilburg, Netherlands*

- Recorded the quality of chest compressions, and the effect of using CPREzy, **on real patients**
- Subjects: 12 (so far) actual cases of in-hospital resuscitation attempts.
- “Chest compressions were deeper and more regular” with CPREzy
- “End-tidal CO₂ monitoring showed higher values when CPREzy was being used correctly indicating better pulmonary circulation”
- “Caregivers recognised the need to rotate faster”
- Their resuscitation committee now recognise CPREzy as a “necessary prerequisite for adequate chest compression”
- **Author's conclusion in his paper:**
*“ The CPREzy can be used during clinical resuscitation”
“ Case oriented data, in terms of ETCO₂ values during CPR, show that using the CPREzy consistently increases this measure of pulmonary circulation”*

The CPREzy and caregiver safety under stringent defibrillation conditions

*Noordergraaf et al., Poster abstract at the Annual Meeting of the Belgian Society of Anesthesiology and Resuscitation, Nov 2005.
Dept. of Emergency Medicine, St Elizabeth Hospital, Tilburg, Netherlands*

- Investigated conductance characteristics of the CPREzy
- Can CPREzy protect the caregiver from accidental contact during shocking?
- Does it enable compressions between shocks in a 3-shock block?
- “With the CPREzy, a caregiver is electrically isolated from the patient even if he is compressing the chest during defibrillation”.
- **Author's conclusion in his paper:**
“ We suggest that the use of the CPREzy makes a contribution to the safety of the caregiver, when using a biphasic defibrillator. This may be particularly important in ad hoc teams or when compressions are performed close to defibrillation”

Feedback during CPR: judging chest compressions

Noordergraaf et al., Poster abstract at the 2nd Science Day, Dutch Society for Anesthesiology, Sept 2005, Amsterdam, Netherlands. Dept. of Emergency Medicine, St Elizabeth Hospital, Tilburg, Netherlands

- The Quick Response Team responds to 100-150 calls per year.
- The resident at the patient's head coaches and needs to assess the nurse performing chest compressions.
- But are advanced life support caregivers, including senior medical staff, able to judge whether compressions are in fact “adequate” – within guidelines?
- Subjects: 15 physicians and 15 nurses in a random/convenience sample, in across-over design, with blinding of the candidate.
- Without feedback estimation was correct in only 20% of assessments
- With CPREzy this figure improved to 89%
- “Recognising the adequacy of compressions is a skill not taught during typical CPR courses.... Persistent poor outcome may, in part, be due to lack of recognition of poor compressions”
- **Author's conclusion in his paper:**
*“ Neither physicians nor nurses consistently recognise impression depths without the help of a feedback device. Ability improves with feedback, eg the CPREzy”
“External factors such as the suggestion of “work being done” by the caregiver directly influences the perception of depth”*

Further work is underway.