Scientific Study References

HeartSine Technologies are a world leader in personal and public access cardiac rhythm management, our mission is to advance the deployment of lifesaving defibrillation therapy in non-traditional areas of care through the development of proprietary technologies and quality products.

Time is critical in the event of Sudden Cardiac Arrest. More than 84% of all incidents occur in non-medical locations (either in the home or in a public place). As a result, our sole purpose is to design and manufacture an affordable defibrillator for the non-medical consumer that is lightweight, portable, and easy to use.

HeartSine® products are a commitment to excellence, designed to deliver:

- outstanding clinical efficacy based on over 40 years of expertise
- unsurpassed reliability
- integrated information management
- ease of use
- a cost effective solution
- solutions specific to public access use

Here you will find a list of studies completed both internally by the Belfast Research Group and externally by others which relate to HeartSine’s life saving technology.
In 2010 HeartSine Technologies introduced the new HeartSine samaritan® PAD 500P with CPR advisor. The HeartSine samaritan® PAD 500P has all the advantages of our well-known samaritan® 300P device with the addition of a CPR advisor which will provide the user with feedback such as ‘Push Harder’, ‘Push Faster’ or ‘Push Slower’ offering the operator a step-by-step guide through the resuscitation process.

For further information and in-depth knowledge of CPR and ICG, the following articles are easily accessible through the web and highly recommended.

CPR Related:


• Influence of Cardiopulmonary Resuscitation Prior to Defibrillation in Patients With Out-of-Hospital Ventricular Fibrillation, L Cobb, C Fahrenbruch, Lt T Walsh, M Copass, M Olsufka, M Breskin, A Hallstrom. JAMA. 281, 1182-1188, 1999


ICG Related:


• Cardiac output measured by transthoracic impedance cardiography at rest, during exercise and at various lung volumes. Edmunds AT, Godfrey S, Tooley M. Clinical Science 63, (107–113), 1982


• Impedance Cardiography, Joseph M. Van De Water, Timothy W. Miller, Robert L. Vogel, Bruce E. Mount, Martin L. Dalton, Chest vol. 123, 2028-2033, 2003

For further reading on topics related to Defibrillation therapy, please see the publications index below
**BIPHASIC DEFIBRILLATION STUDIES**

*HeartSine samaritan® PAD 300P/PAD 500P*

**Belfast Research Group**

1989  Electrode pad size, transthoracic impedance and success of external ventricular defibrillation

1999  Rounded Biphasic Waveform Lowers Threshold for Transthoracic Ventricular Defibrillation


**Others**

1997  Low-Energy Impedance-Compensating Biphasic Waveforms Terminate Ventricular Fibrillation at High Rates in Victims of Out-of-Hospital Cardiac Arrest  J Poole, R White, K-G Kanz, Friederike Hengstenberg, G Truett Jarrard  JCE Vol 8; 12, 1373 - 1385


1999  Comparison of a Novel Rectilinear Biphasic Waveform With a Damped Sine Wave Monophasic Waveform for Transthoracic Ventricular Defibrillation  Suneet Mittal, Shervin Ayati, Kenneth M. Stein  J Am Coll Cardiol. Vol. 34, No. 5


2000 Biphasic shocks are superior to monophasic for human transthoracic defibrillation  S. C. Faddy, J. Powell, J. C. Craig  Heart, Lung and Circulation. 9; 3; A148

2001 Patient outcomes following defibrillation with a low energy biphasic truncated exponential waveform in out-of-hospital cardiac arrest  Roger D. White, Daniel G. Hankins and Elizabeth J. Atkinson  Resuscitation. 49; 9-14


2003 Biphasic and monophasic shocks for transthoracic defibrillation: a meta analysis of randomised controlled trials  Steven C. Faddy, Jane Powell, Jonathan C. Craig  Resuscitation 58 9-16

2003 Do clinically relevant transthoracic defibrillation energies cause myocardial damage and dysfunction?  Charles D. Deakin, Jonathan J.S. Ambler  Resuscitation 59 59-70
LOW ENERGY DEFIBRILLATION

*HeartSine samaritan*® PAD 300P/PAD 500P

**Belfast Research Group**


**Others**


2006  A randomised controlled trial of efficacy and ST change following use of the Welch-Allyn MRL PIC biphasic waveform versus damped sine monophasic waveform for external DC cardioversion Ambler JJS, Deakin CD  Resuscitation. 71: 146-151

2008  Superiority of Biphasic over Monphasic defibrillation shocks is attributable to less intracellular calcium transient heterogeneity;  Gyo-Seung Hawng, Liang Tang, Boyoung JoungJ Am Coll Cardiol. Vol. 52; 828-835.

*HeartSine*® **Personal Defibrillation Unit PDU 400**

**Belfast Research Group**

2007  A novel low-tilt biphasic waveform is efficacious with significantly lower voltage and current than a standard waveform in the defibrillation of VF Darragh KM, Doyle C, Walsh SJ, Allen JD, Adgey AAJ, Anderson J, Manoharan G Journal of Electrocardiology 40; S30–S36

ICG-VT DETECTION ALGORITHM

*HeartSine® Personal Defibrillation Unit PDU 400*

*Belfast Research Group*


2008 The impedance cardiogram recorded through two electrocardiogram/defibrillator pads as a determinant of cardiac arrest during experimental studies. Cromie, Nick Alexander; Allen, John Desmond; Turner, Colin; Anderson, John McCoy; Adgey, A A. Jennifer. Critical Care Medicine. 36(5):1578-1584

2008 The impedance cardiogram recorded through two electrocardiogram/defibrillator pads as a determinant of cardiac arrest during experimental studies. Cromie, NA, Allen, JD; Turner, C; Anderson, JMCC, Adgey, AAJ Critical Care Medicine, 36: 1578-1584
PUBLIC ACCESS DEFIBRILLATION

HeartSine samaritan® PAD 300P/PAD 500P

Belfast Research Group


Others

1998 Public Locations of Cardiac Arrest Implications for Public Access Defibrillation L Becker, M Eisenberg et al Circulation. 97, 2106-2109.


2003 Public access defibrillation in Helsinki: Costs and potential benefits from a community-based pilot study M Kuisma, M Castrén, K Nurminen Resuscitation. Vol. 56, 149-152 PAD 300P/500P


2008 Results from Austria's nationwide public access defibrillation (ANPAD) programme collected over 2 years R Fleischhackl, B Roessler et al Resuscitation. Vol. 77, 195-200


BYSTANDER CPR/COMPRESSIONS/ICG-ANALYSIS

HeartSine samaritan® PAD 500P

1976 Cardiopulmonary Resuscitation by lay people Ivar Lund and Andreas Skulberg Vol. 308, 702-704

1979 Bystander-Initiated Cardiopulmonary Resuscitation in the Management of Ventricular Fibrillation R Thompson, A Hallstrom, L Cobb AIM. 90, 737-740


1994 Quality of bystander cardiopulmonary resuscitation influences outcome after prehospital cardiac arrest L Wik, P Steen, Nicholas Bircher Resuscitation. 28, 195-203


2000 Cardiopulmonary Resuscitation by Chest Compression Alone or with Mouth-to-Mouth Ventilation A Hallstrom, L Cobb, E Johnson, and M Copass NEJM. 342, 1546-1553

2000 Effect of bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrest patients in Sweden Mikael Holmberg, Stig Holmberg, Johan Herlitz Resuscitation. 47, 59–70
2003 Rediscovering the importance of chest compressions to improve the outcome from cardiac arrest. L Wik Resuscitation. 58, 267-9.

2003 Evaluation of a defibrillator-basic cardiopulmonary resuscitation programme for non medical personnel Lars Wik, Elizabeth Dorph, Bjørn Auestad, Petter Andreas Steen Resuscitation 56, 167-172


BYSTANDER CPR STUDIES: CPR-ADVISOR

*HeartSine samaritan® PAD 500P (Studies applying to the samaritan® PAD 300P also are marked*)

*Belfast Research Group*


1995  Improving the Accuracy of an Automated External Defibrillator  P W Johnston, J Anderson, A A J Adgey  Eur Heart J 16 (Suppl) 398, 2246*


2003  The impedance cardiogram recorded through two defibrillator pads is a potential haemodynamic sensor of ventricular fibrillation  Cromie N, Allen JD, McIntyre A, Scott T, Allen J, Anderson JMCC, Adgey AAJ  Cardiac arrhythmias: clinical issues p340


2006  The Impedance Cardiogram recorded through the novel configuration of two defibrillator/electrocardiogram pads provides a powerful determinant of cardiac arrest  Cromie NA., Allen J., Anderson J., Adgey A  Heart, vol. 92(Supplement II):A4–A121

2008  The impedance cardiogram recorded through two electrocardiogram/defibrillator pads as a determinant of cardiac arrest during experimental studies.  Cromie, Nick Alexander; Allen, John Desmond; Turner, Colin; Anderson, John McC; Adgey, A A. Jennifer.  Critical Care Medicine. 36(5):1578-1584
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2009 Transthoracic Impedance Cardiography: A Non invasive Method of Hemodynamic Assessment Melike Bayram, Clyde W. Yancy Heart Failure Clinics, Volume 5, Issue 2, Pages 161-168


2010 Assessment of the impedance cardiogram recorded by an automated external defibrillator during clinical cardiac arrest. Cromie, N A; Allen, J D; Navarro, C; Turner, C; Anderson, J McC; Adgey, AAJ Critical Care Medicine 38(2):510-517


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2003 Improving CPR Performance using an Audible Feedback System Suitable for Incorporation into an Automated External Defibrillator Handley JA et al Resuscitation. Volume 57 Issue 1, Pages 57-62


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