

Ballistocardiography

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The ballistocardiograph is a vital sign in the 1-20 Hz frequency range which is caused by the mechanical movement of the heart and can be recorded by noninvasive methods from the surface of the body. It was shown for the first time, after an extensive research work by Dr. Issac Starr, that the effect of main heart malfunctions can be identified by observing and analyzing the BCG signal.



Recent Publications on Ballistocardiography:

- [Heart rate detection from an electronic weighing scale.](#)
We propose a novel technique for beat-to-beat heart rate detection based... 10th October, 2008
Instrumentation, Sensors and Interfaces Group, EPSC, Universitat- Physiol Meas. 2008
Aug;29(8):979-88. Epub 2008 Jul 18. ([DOI Direct Link](#))
- [The difference between ballistocardiography and stem cells.](#)
The study of Balkan Endemic Nephropathy (BEN) in the affected localities... 2nd October, 2008
University Medical Center Utrecht, Utrecht, PO Box 85500 3508 AG Utrecht,- Neth Heart J. 2008
Sep;16(9):291-2.
- [Improvement of ballistocardiogram processing by inclusion of respiration information.](#)
In this paper a novel methodology for processing of a ballistocardiogram... 17th September, 2008
Computational and Integrative Bio-Engineering Research Laboratory (CIBER),- Physiol Meas. 2008
Jul;29(7):771-81. Epub 2008 Jun 18. ([DOI Direct Link](#))
- [Ballistocardiography in sitting and horizontal positions.](#)
The purpose of this study is to examine the effect of posture in the... 30th August, 2008
Department of Biomedical Engineering, Tampere University of Technology,- Physiol Meas. 2008
Sep;29(9):1071-87. Epub 2008 Aug 28. ([DOI Direct Link](#))
- [Model-based Bayesian filtering of cardiac contaminants from biomedical recordings.](#)
Electrocardiogram (ECG) and magnetocardiogram (MCG) signals are among the... 2nd August, 2008
GIPSA-Lab, Department of Images and Signals, INPG, Grenoble Cedex, France.- Physiol Meas. 2008
May;29(5):595-613. Epub 2008 May 7. ([DOI Direct Link](#))
- [FFT averaging of multichannel BCG signals from bed mattress sensor to improve estimation of heart beat interval.](#)
A multichannel pressure sensing Emfit foil was integrated to a bed... 9th April, 2008
Machine Vision, VTT Technical Research Center of Finland, Tampere,- Conf Proc IEEE Eng Med Biol
Soc. 2007;2007:6686-9. ([DOI Direct Link](#))
- [BSeg++: a modified blind segmentation method for Ballistocardiogram cycle extraction.](#)
This paper presents a method to extract cardiac cycles and H-I-J... 3rd April, 2008
Institute of Signal Processing, Tampere University of Technology, Tampere,- Conf Proc IEEE Eng Med
Biol Soc. 2007;2007:1896-9. ([DOI Direct Link](#))

- [Development of a fully automated network system for long-term health-care monitoring at home.](#)
*Daily monitoring of health condition at home is very important not only as...*3rd April, 2008
Graduate School of Natural Science and Technology, Kanazawa University,- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:1826-9. ([DOI Direct Link](#))
- [Heart rate detection from an electronic weighing scale.](#)
*We propose a novel technique for heart rate detection on a subject that...*29th March, 2008
Instrumentation, Sensors and Interface Group, Universitat Politecnica de- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:6283-6. ([DOI Direct Link](#))
- [Wearable seismocardiography.](#)
*Seismocardiogram (SCG) is the recording of body vibrations induced by the...*26th March, 2008
Polo Tecnologico (Biomedical Technology Department), IRCCS S Maria- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:3954-7. ([DOI Direct Link](#))
- [Noninvasive heart rate variability analysis using loadcell-installed bed during sleep.](#)
*Polysomnography is the standard method to score the sleep stages or to...*19th March, 2008
Interdisciplinary Program in Medical and Biological Engineering, Seoul- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:2357-60. ([DOI Direct Link](#))
- [Study of the ballistocardiogram signal in life detection system based on radar.](#)
*In this article, our study of non-contact method via radar for monitoring...*19th March, 2008
Department of Biomedical Engineering, Fourth Military Medical University,- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:2191-4. ([DOI Direct Link](#))
- [Wireless biomedical signal monitoring device on wheelchair using noncontact electro-mechanical film sensor.](#)
*The present study purposed to measure the BCG (Ballistocardiogram) of...*14th March, 2008
Department of Biomedical Engineering, College of Medicine, Chungbuk- Conf Proc IEEE Eng Med Biol Soc. 2007;2007:574-7. ([DOI Direct Link](#))
- [A wireless ballistocardiographic chair.](#)
*This paper presents a wireless ballistocardiographic chair developed for...*1st March, 2008
Inst. of Signal Process., Tampere Univ. of Technol., Tampere, Finland.- Conf Proc IEEE Eng Med Biol Soc. 2006;1:5932-5. ([DOI Direct Link](#))
- [Force plate monitoring of human hemodynamics.](#)
*ABSTRACT: BACKGROUND: Noninvasive recording of movements caused by the...*26th February, 2008
University of Hradec Kralove, Rokitanskeho 62, CZ - 500 03 Hradec Kralove,- Nonlinear Biomed Phys. 2008 Feb 22;2(1):1. ([DOI Direct Link](#))

Ballistocardiography Patents:



- 7422562- [Real-time measurement of ventricular stroke volume variations by continuous arterial pulse contour analysis](#)
- 4889130- [Method for monitoring a subject's heart and lung sounds](#)
- 4889123- [Method for determining heart rate](#)
- 4848350- [Method for recording an electrocardiogram](#)
- 4836215- [Method for preparing a ballistocardiogram](#)
- 4836214- [Esophageal electrode array for electrical bioimpedance measurement](#)

- 4817610- [Method of determining center of gravity and body weight](#)
- 4803996- [Cardiovascular monitor](#)
- 4738264- [Heart and breathing alarm monitor](#)
- 4681098- [System, apparatus and method for gathering physiological data](#)
- 4679569- [Ballistocardiograph](#)
- 4657025- [Heart and breathing alarm monitor](#)
- 4450527- [Noninvasive continuous cardiac output monitor](#)
- 4301809- [Esophageal monitoring apparatus](#)
- 4195643- [Diagnostic force analysis system](#)
- 4079730- [Apparatus for measuring externally of the human body magnetic susceptibility changes](#)
- 4893633- [Method of temperature measurement](#)
- 4895155- [Method for estimating blood oxygen saturation](#)
- 7396331- [System and process for non-invasive collection and analysis of physiological signals](#)
- 7314451- [Techniques for prediction and monitoring of clinical episodes](#)
- 7220230- [Pressure-based system and method for determining cardiac stroke volume](#)
- 7107095- [Device for and method of rapid noninvasive measurement of parameters of diastolic function of left ventricle and automated evaluation of the measured profile of left ventricular function at rest and with exercise](#)
- 6936016- [Method for analysis of abnormal body tremors](#)
- 6517492- [Method and apparatus for assessment of cardiac function by monitoring movement of the trachea](#)
- 6186956- [Method and system for continuously monitoring cardiac output](#)
- 6024705- [Automated seismic detection of myocardial ischemia and related measurement of cardiac output parameters](#)
- 5445159- [Minimally invasive method to determine the left ventricular pressure waveform](#)
- 5343867- [Method and apparatus for detecting the onset and relative degree of atherosclerosis in humans](#)
- 5297556- [Method of detecting atherosclerosis while excluding motion artifacts](#)
- 5241963- [Method for detecting the onset and relative degree of atherosclerosis in humans](#)
- 5159932- [Myocardial ischemia detection system](#)
- 4926866- [System for gathering physiological data](#)
- 4905706- [Method an apparatus for detection of heart disease](#)
- 4036215- [Apparatus and method for eliminating perturbations of a kinetic origin in the blood flow waveform](#)

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