



International Society of Biomechanics Newsletter

WINTER ISSUE 1985 N° 21

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Editorial

During the 10 th International Congress of Biomechanics in Umeå, Sweden, the new ISB Council was elected. In the Editorial of the Autumn Issue (N°20), the new Council of ISB

was extensively described by Jim Hay, President. In order to visualize who is who for the coming two years, have a look around the table.



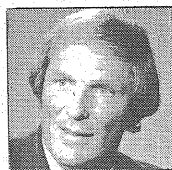
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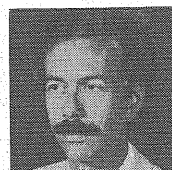
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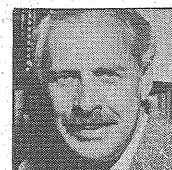
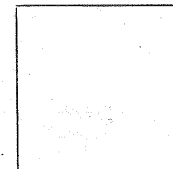
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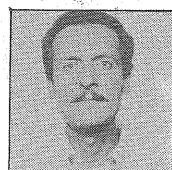
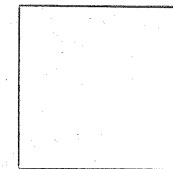
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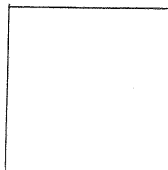
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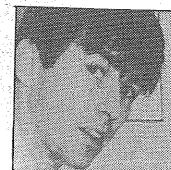
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Workinggroup biomechanics of Sport

W.G.B.S. - I.S.B. - I.C.S.S.P.E.

vo years,

The 2nd annual meeting was held in Umea on Tuesday, June 17, 1985 during the Xth Int. Congress of Biomechanics.

WGBS council members present:

P. Komi (Finland-Chairman) J.P. Clarys (Belgium-Secret. Gen.) B. Gregor (USA) M. Kumamoto (Japan) E. Schneider (Switzerland) H. Ekström (Sweden)

Invited: P. Hollander, R. Rozendal (the Netherlands) D. Nelson (USA) A. Lees (U. Kingdom) G. Wood (Australia) B. Ungerechts (W. Germany) A. Komor (Poland) M. Miyashita (Japan) B. Norman (Canada) D. Morehouse (USA) A. Thorstensson (Sweden) and C. Li (China)

1. The minutes of the annual meeting in Davos (Switzerland) which appeared in the ISB newsletter n° 17 - winter 1984 were approved.

2. Int. J. Sport Biomechanics.

Dick Nelson gives a review of the development of the Int. J. of Sport Biomechanics and discusses contributions, abstract corners, Call for papers and promotion. (See Editorial ISB newsletter 19 Summer 1985 "The Launching of IJSB")

3. WGBS - activities in Athletics (Bob Gregor)

During the 1984 Olympic Games a strong interest was established in the IAAF to support research in athletics. In conjunction with the IOC, research was conducted in athletics in several track and field events during final competition. The results of this research became an official film for the IAAF, will be distributed by the IOC some time during the Fall of 1985 and has been realized in several manuscripts published in Vol. 1, No 2 of the International Journal of Sports Biomechanics (Human Kinetics Pub.). To carry further this work in athletics some of the results will be presented to the IAAF at the World Cup Championships this fall in Australia. Support for this initial effort has come from The Athletics Congress in the United States, the IAAF, The Australian Institute of Sport and The Working Group in Sports Biomechanics. The intent of this effort is 1) to demonstrate the initial success of the IOC Medical Commission's efforts to document high level competition and provide feedback to coaches and athletes, 2) to give feedback to the IAAF as to the results obtained during the Olympic Games and develop with that governing organization strong ties with the International Working Group in Sports Biomechanics, 3) to develop continued plans with the IAAF for continued documentation of high level competition in athletics (at future World Cup, World Championships, European Championships, Pan American Games or Olympic Games) with results of this work presented at future scientific congresses to be held in conjunction with some World Championships. The International Working Group in Sports Biomechanics has made excellent progress in many sports to foster research and distribute results to coaches, athletes and other scientists. This report outlines the progress currently

being made in athletics. Hopefully the meetings this fall in Australia will promote much future work in athletics for the benefit of all interested in this sport.

4. WGBS - Activities in Gymnastics - Rowing and Sailing sports. (Kumatoto - Schneider)

- Prior to the XXIII World Gymnastic Championships a scientific congress on "Analysis of Gymnastic talent" is organised by the McGill, Concordia and UQAM Universities of Montreal. (October 31 - November 3, 1985)

- Attempts to organise scientific Conferences on Rowing- and Sailing, prior to the O.G. in Seoul; and Canoiny prior to the 1e Asian regatta (sept 26-28, will not work out.

5. WGBS - International Congress on Wintersports (Hans Ekström)

In conjunction with the Olympic Wintergames in Calgary, the university of Calgary (Alberta-Canada) has agreed to organise an "International Congress on Wintersports" in oktober 1987. Information can be obtained from Prof. Dr. Benno Nigg (Univ. of Calgary)

6. WGBS - International Symposium of Sport Biomechanics Beijing, China. (C. Li)

Dr. C. Li representing Chinese Sports Biomechanics, reported on the plans to organize the 1ste International Symposium on Sport Biomechanics in China. Dr. Li's report was received with enthusiasm and WGBS agreed unanimously to give its all support and assistance in case WGBS receives a request from the Chinese authorities. Upon the request from Dr. Li it was tentatively agreed to form a three member committee, consisting of Paavo V. Komi, Richard C. Nelson and James G. Hay, to give the Chinese organizers suggestions for the content of the scientific program, including the names of potential international speakers and other participants. Dr. Li will report to his authorities and will keep WGBS informed about the final decision. It was tentatively agreed that the time of the International Sports Biomechanics Congress/Symposium in China will be September 1986.

7. WGBS - 5th Int. Symposium Biomechanics and Medicine in Swimming (Bodo Ungerechts)

Bodo Ungerechts gives a detailed financial and organization report on the 5th Int. Symposium Biomechanics and Medicine in Swimming to be held in Bielefeld (W. Germany, July 27-31, 1986.

The aim of the Symposium is to report research in the area of swimming. Even though biomechanical and medical aspects of swimming are mentioned in the first place, papers of different areas are invited. It is to demonstrate the multidisciplinary and the interdisciplinarity necessary to understand the sport of swimming for the good of "bridging the gap". The Symposium will include invited lectures, oral and poster presentation. The conference participants will have the opportunity to present their work during the Symposium covering the following topics and further aspects:

SWIMMING BIOMECHANICS (gen.)	application of biomechanics/
SWIMMING MEDICINE (gen.)	biofeedback/body composition/
SWIMMING BIOMECHANISMS	computerized analysis/disease of ear,
SWIMMING ENERGETICS	nose and throat/drag/dermatology/
SWIMMING CARDIOLOGY	efficiency/electromyography/
SWIMMING COACHING	experimental psychology/energy
SWIMMING HYDRODYNAMICS	expenditure/learning strategies/
SWIMMING KINESIOLOGY	medical care/mental training/
SWIMMING PHYSIOLOGY	metabolism/methodology and
SWIMMING PSYCHOLOGY	methods/muscular mechanics/
SWIMMING REHABILITATION	neuromuscular control/oxygen
SWIMMING TEACHING	consumption/performance/physio-
SWIMMING TRAINING	logical aspects/physiotherapy/
	propulsion/training effects

For more detailed information on invited speakers, Instructions to authors, deadlines, Registration Fee, the Archimedes Award a.o. please contact Bodo Ungerechts and see the Brochure included in the ISB Newsletter n° 20 autumn issue.

8. WGBS - International Symposium "the Science of Archery" (Jan Pieter Clarys)

Olympic Solidarity Europe appointed Belgium to organise in 1985, 1986 and 1987 an International Archery Seminar. Recently in Umea and Brussels it was agreed that the final 1987 seminar would become a Satellite meeting of the XIth Int. Congress on Biomechanics in Amsterdam.

This 1987 Int. Symposium on Archery will be organised under the auspices of both "Olympic Solidarity" and "WGBS-ISB-ICSSPE" on July 6 to July 10, 1987 after the Amsterdam conference.

The organisers (the Belgian Archery Federation and the Dept. of Experimental Anatomy - Univ. Brussels) will distribute detailed information through the ISB Newsletter and flyers of the Amsterdam Congress. The 1987 Archery Symposium will be held in Brussels.

9. WGBS - International Symposium on Computer Simulation in Sport Biomechanics (Andrej Komor)

This Symposium will be another Satellite meeting of the XIth Int. Congress on Biomechanics in Amsterdam. But will be organised in Poland.

The following is proposed:

- 1) Methodological aspects of modelling in biomechanics
- 2) Modelling of motion techniques
- 3) Modelling of muscular activity and neuromuscular control
- 4) Modeling of sport equipment dynamics

Invited lectures

- 1) Model experiment- methodological advantages and limit
- 2) Perspectives and main trends in computer simulation in biomechanics
- 3) Computer state-of-art - dedicated hardware and software development

Workshop

Organizers should supply the most popular mini-and personal computers for direct presentations of developed models and sim. software (the access to main frame computer should be also available).

Particular stress should be put on:

- Presentation of working models and software with the use of supplied computers (or video presentation)
- Arrangement of panel discussions on:
 - Modelling methodology and models verification
 - Dedicated software development
 - Modelling of particular sport exercises and disciplines.

10. THE VIII COMMONWEALTH AND INTERNATIONAL CONFERENCE ON SPORT, PHYSICAL EDUCATION, DANCE, RECREATION AND HEALTH CONFERENCE, GLASGOW

18-23 July 1986 held in conjunction with The XIII Commonwealth Games Scotland 24 July - 2 August 1986 (Adrian Lees)

The Sports Science theme will include:

- i) The Third International Kinanthropometry meeting;
- ii) Unidisciplinary sections on Sports Biomechanics, Sports Physiology and Sports Psychology to accompany the Kinanthropometry meeting;
- iii) Social programmes and professional meetings (AGM) of the involved bodies.

Third International Kinanthropometry Conference

Kinanthropometry, the quantitative link between human structure and function, can be broadly defined as the multidisciplinary study of the relationship between human dimension and body function.

The methodologies can also be related to ergometry, responses to training, sports equipment design or evaluation, the sports environment, performance prediction, injury predisposition, sport for disabled people, the female athlete, the child athlete and the elite athlete. Also pertinent to the programme will be new instrumentation and methods of measurement and data resolution, auxological phenomena and performance, biostereometrics, iconomorphometrics, genetics and other determinants of structure and function, structural basis of metabolic events.

Sub-themes within the kinanthropometry meeting will be:

1. Exercise in adolescence, growth and aging.
2. Fitness for sport and exercise.
3. Exercise, health and well-being.
4. Exercise and the female.
5. The elite athlete.

Sports Biomechanics

The programme will contain material which applies mechanical principles to investigations pertinent to sport and exercise. Themes will include:

1. Sports actions and techniques.
2. Man and machine systems in sport and exercise.
3. Mechanics of tissues and sports injuries.
4. Instrumentation, methodology and equipment.
5. Open session.

Physiology

Physiological demands in sport at elite and recreational levels.

The enhancement of sports performance.

Adaptations to exercise - acute and chronic responses.

Exercise and the environment.

Exercise for health and preventative medicine.

Open session.

Sports Psychology

Exercise stress and coping mechanisms.

Attitudes to sport and exercise.

Sociopsychology of sports groups.

Psychological monitoring in sport.

Analysis of behaviour.

Open session.

Format

The conference programme for the Kinanthropometry Conference and for each of the multidisciplinary meetings will be comprised of keynote addresses, short oral scientific communications and poster presentations. Combined sessions with the Sports Medicine Section will also be included in the programme.

There will also be a one-week course of kinanthropometric techniques supervised by IWGK personnel during the week prior to Conference '86. This course which will be open only to conference delegates will be held at the Scottish School of Physical Education and places on the course will be restricted in number.

Further details are available from the Conference Director. The Science Section of the Conference is supported by:

1. The Working Group in Biomechanics of Sport of the International Society of Biomechanics;
2. The International Council for Sport Science and Physical Education Research Committee (Status A UNESCO);
3. The British Association of Sports Sciences.

11. WGBS International Symposium of the science of soccer (Adrien Lees)

The "Liverpool Polytechnic Sports Science Department" (Fr. Sonderson, Th. Reilly, A. Lees) are considering the organisation of a soccer symposium in the U.K. Details will be forwarded later.

12. The 3rd annual meeting of the WGBS-ISB-ICSSPE will be held in Bielefeld during the 5th Int. Symp. Biomechanics and Medicine in Swimming.

Jan Pieter Clarys
Secr. Gen. WGBS



Laboratory Feature

Name of Laboratory

Spine Biomechanics Research Lab and the Vermont Rehabilitation Engineering Center for the Study of Low Back Pain (VT REC)

Institution

Department of Orthopaedics & Rehabilitation, University of Vermont

Mailing Address

Burlington, Vermont 05405 USA

Telephone Number

802-656-2250

Purpose and Objectives of Laboratory

Basic research directed toward the study of: (1) Kinematics and kinetics of the human lumbar spine in relation to low back pain, degenerative disease, spine trauma, scoliosis, ergonomics, and human performance; (2) the inter-relationship between surface trunk topography and internal spine structure in relation to the etiology and treatment of scoliosis; (3) the design, fabrication, evaluation and clinical testing of spine fixation devices; (4) the role of trunk cavity pressure (e.g., intra-abdominal, intrathoracic, erector spinae, compartment) on the biomechanics of the spinal column; (5) evaluation of electromyographic changes in trunk muscles in response to fatigue, vibration exposure, low back pain, and the use of various spinal orthoses.

Principal Personnel

Principal investigators and VT REC administrators include the following:

John W. Frymoyer, M.D., Professor and Chairman; Director, VT REC
Malcolm H. Pope, Ph. D., Professor, Dept. of Mechanical Engineering and Dept. of Orthopaedics; Co-Director, VT REC

Raymond L. Milhous, M.D., Professor, Dept. of Orthopaedics; Co-Director, VT REC

Martin H. Krag, M.D. Asst. Professor, Dept. of Orthopaedics

Ian A. F. Stokes, Ph. D., Research Asst. Professor, Dept. of Orthopaedics

Morey S. Moreland, M.D., Assoc. Professor, Dept. of Orthopaedics

The Vermont Rehabilitation Engineering Center comprises nearly thirty individuals including orthopaedic surgeons, biomechanical, electrical and industrial engineers, physical therapists, computer scientists, psychologists and laboratory technicians.

Student Population

The laboratory supports the work of a number of undergraduates, graduate students in bioengineering, mechanical and electrical engineering, medical students and orthopaedic residents. In addition, visiting students from such institutions as Ecole Polytechnique (Montreal) and Wright Patterson Air Force Base (Ohio) are involved in our research programs.

Organizational and Funding Structure

Research funds are obtained from a variety of grants and contracts including U.S. Federal Government (National Ins-

titude of Occupational Safety and Health, Army, Air Force), private research organizations and the Orthopaedic Research and Education Foundation. The VT REC was established in 1983 by a five-year grant from the National Institute for Handicapped Research (U.S. Dpt. of Education).

Historical Development

Research activities have grown substantially over the past 10 years, further accelerated by the merger in 1980 of the Departments of Orthopaedic Surgery and Rehabilitation Medicine into a combined Department. Collaboration has grown in parallel, including anatomy, biochemistry, engineering, physical therapy, psychology and psychiatry. In 1980, our research group, in conjunction with Oxford University, received the Volvo Award, the only international award for low back pain research. We have recently established the Vermont Center for the Study and Surgery of the Lumbar Spine which, in addition to clinical service, has maintained a Back School and several health care educational programs including an annual conference on Industrial Low Back Pain. In 1983, the University was designated the only federally funded low back pain research center in the United States.

Titles and Sources of Funding for Current External Grants and Contracts

Determinants of Occupational Disability in Low Back Pain (PI: Frymoyer)--Social Security Administration

Rehabilitation Engineering Center, Rehabilitation of Low Back Pain (PI: Frymoyer)--National Institute of Handicapped Research

Lumbar Corset-Induced Trunk Muscle Atrophy (PI: Krag)--Camp Brace Company

Cervical Spine Fixation Device, Mechanical Testing (PI: Krag)

Evaluation of Moire Fringe Topography in Scoliosis (Pm: Moreland)--Public Health Service

The effect of Helicopter Vibration on the Spinal System (PI: Pope)--U.S. Army

Mechanics of Thoracic Spinal Fractures (PI: Pope)--U.S. Air Force

Three-Dimensional Shape Measurement in Scoliosis (PI: Stokes & Moreland)--National Institutes of Health

Study of Lumbar Spine Asymmetry (PI: Stokes)--National Institutes of Health

Rib Shape Measurement in Scoliosis (PI: Moreland)--Scoliosis Research Society

Description of Facilities

The Spine Biomechanics Laboratory is a comprehensive facility with capabilities in materials testing, biomechanics (motion segment kinematics, spine segment trauma), biplanar radiography, Moire topography, ejection seat kinematics and assessment of vehicle vibration. Clinical laboratories exist for biomechanical assessment of patients and include stereoradiography and Moire topography, as well as lifting performance testing. Facilities are also available for specialized histological evaluation of pathologic material, micromachining, impedance testing, x-ray and Moire fringe studies, and for prototype machining assembly. A servo-hydraulic vibration simulator is used for simulating vehicle vibrations, assessing their relationship to spine disorders, and for analysis of vehicle seating.

The laboratory maintains several computers (IBM PCs, Hewlett-Packard 150 microcomputer with graphics and touch-screen capability, a mobile DEC MINC 23 with graphics capability and a flatbed plotter, the University's DEC 2060) and high accuracy x-ray photogrammetry with a Summagraphics digitizer is used for measurement of lumbar spine geometry and movement. In addition, laboratory space available to our researchers in the University's department of electrical engineering includes a variety of general purpose test equipment such as storage oscilloscopes, meters, power supplies, signal generators, and electronics assembly equipment. Specialized facilities for performing perfusion and micro-electrode experiments including a perfusion apparatus, micro-electrode puller and micro-manipulators, are also available, as well as a PDP-11/55 computer system. The University maintains a Computer Facility, Instrumentation and Model facility, and Biometry Facility and our research group also has access to laboratory space in the Department of Physical Therapy which is equipped for joint torque measurement (Cybex, etc.), electromyography, and high speed motion cinematography.

Current Projects

1. Prediction of Disability and Assessment of Rehabilitation in Low Back Pain
2. Mechanical Rehabilitation of Back Pain: Optimization of Spinal Orthoses through Biomechanical Analysis
3. Electrical Rehabilitation of Back Pain: Trunk Muscle Performance and Role in Rehabilitation
4. Optimum Seating in Static and Vibration Environments
5. Rehabilitation Engineering for Vocational Rehabilitation of Low Back Pain
6. Pilot Studies:
 - a. Lateral Bending of the Lumbar Spine with Disc Herniation
 - b. Digital Image Processing Techniques of Flexion-Extension Radiographs
 - c. An Internal Fixator for Improved Surgical Management of LBP-Producing Spinal Instability
 - d. Isthmic Spondylolisthesis: Instability at the L4-5 Level
 - e. Thermography: A Blinded Study of Its Efficacy in Diagnosis of Low Back Dysfunction
 - f. Effect of Corset-Wearing on Muscle Atrophy

Recent Publications

Andersson GBJ, Pope MH, Frymoyer JW. Epidemiology. In *Occupational Low Back Pain*, Praeger Press, 1984.

Andersson GBJ, Pope MH, Frymoyer JW. Introduction and Definitions. In *Occupational Low Back Pain*, Praeger Press, 1984.

Andersson GBJ, Chaffin DB, Pope MH. Occupational Biomechanics of the Lumbar Spine. In *Occupational Low Back Pain*, Praeger Press, 1984.

Buterla E, Hawkins C, Seligson D, Pope MH. The use of finite element analysis in the prediction of pathologic fracture in patients with metastatic cancer. Accepted *Automedica*, December 1983.

Byrt W, Seligson D, Hogan M, Pope MH. Fracture gap motion in combined fixation. Accepted *Unfallheilkunde*, July 1984.

Record gait-related force/time data *in situ*.

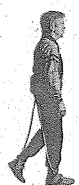


The Langer Electrodynogram™ System 1184.

A vital new tool for bioengineers, biomechanists, electrodiagnostic specialists, kinesiologists, physical therapists, physicians, work safety engineers and students of gait analysis and human locomotion.



The Langer Electrodynogram (EDG) System 1184 is a versatile analog-to-digital force/time data collector used with packaged software for pre-formatted analysis, or without packaged software for custom formatting and analysis of raw data.



The EDG System can be used with a wide range of computer hardware from minimally configured PC's to large mainframes.

The Langer EDG System 1184 is compatible with the IBM® PC and PC/XT, the Compaq® PC, the Apple IIe® and many other personal computers using MS-DOS® or CP/M®. It can also be easily adapted to virtually any mainframe computer.



The EDG System provides an optional Calibration Module to ensure linear test results and a higher degree of accuracy.

The Calibration Module provides the EDG System 1184 with a higher level of inter-test and intra-test accuracy. Each time a test procedure is run, the Calibration Module initiates a sensor "zeroing" or calibration curve for that particular set of sensors and test.



The basic Electrodynogram System is priced as low as \$9500.

For as little as \$9500 you'll get the hardware and software you need to obtain gait-related force/time data *in situ* when used in conjunction with your computer.

This special offer includes:

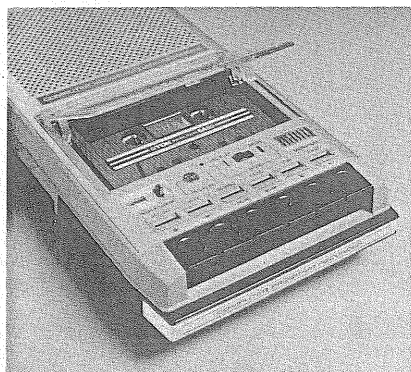
- Your choice of either the General Ambulation (2A) or Sport Activity (2S) software.
- The Model 2A or 2S Force Data Collector and Remote Activator. (If you order them at the same time, you'll get both the 2A and the 2S software and Force Data Collectors for an additional \$2,000. That's a savings of \$2,000 off the \$4,000 price of adding either package at a later date.)
- One set of Ankle-to-Waist Cable Assemblies with Permanent Sensors.
- One box of either 2A or 2S Disposable Sensors (12 subject tests).
- The optional Calibration Module and software are available at an additional cost.
- To support your EDG 1184, Langer has a technical staff available for consultation.

If you don't have access to an EDG-compatible computer, Langer is offering the EDG System plus an IBM PC or PC/XT for a special low price.



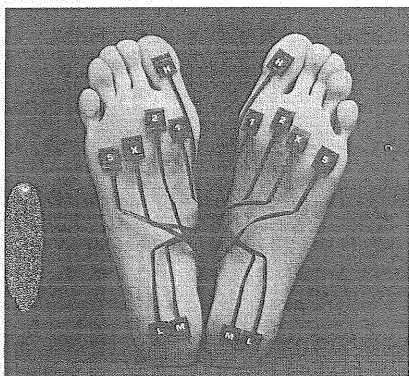
Force Data Collectors:

MODEL 2A—Used for general ambulation testing of cadences between 90 and 120 steps per minute. Acquires individual sensor data at 10 millisecond scan rate.
MODEL 2S—Used for tests during running or other sport activities. Acquires individual sensor data at 5 millisecond scan rate.



Multi-test capacity at satellite locations.

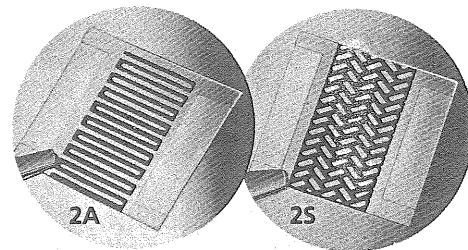
The EDG System 1184 Multi-Test Recorder for recording test data at remote or satellite locations. The stored data can later be transferred to the main computer console for analysis.



Patented Disposable Force Sensors* measure segmental and sequential forces.

Disposable Force Sensors (pressure transducers) are quickly and easily applied to measure forces at predetermined key segmental locations on the plantar aspect of the subject's feet. Additional sensors may be placed on any desired location.

*The Force Sensor is patented. Registered U.S. Pat. No. 4,426,884.



Disposable Sensors for general ambulation and sport activities.

The EDG System 1184 utilizes thin, comfortable, Disposable Sensors that are available in two designs and force range formats: 2A to record ambulatory forces and 2S for the higher forces normally associated with sport activities.

Force data collection—indoors or out.

With the lightweight EDG System 1184 Force Data Collector, the subject is independent of any connections to stationary instruments and can move naturally. Remote radio activation permits testing at the specific desired moment in the subject's activity without influencing the subject's gait.

The Electrodynamogram System 1184

General Specifications:

Disposable Flexible Force Sensors:

- 2A—General ambulation
- 2S—Sport activity

Thickness: .004 inch

Sensor Force Range:

The Disposable Sensors measure forces between .1 kg/cm² and 8 kg/cm².

Permanent Force Sensor Lead:

Thickness: .0114 inch

Force Data Collector:

Scan Rate: 2A— 10 milliseconds
 2S—5 milliseconds

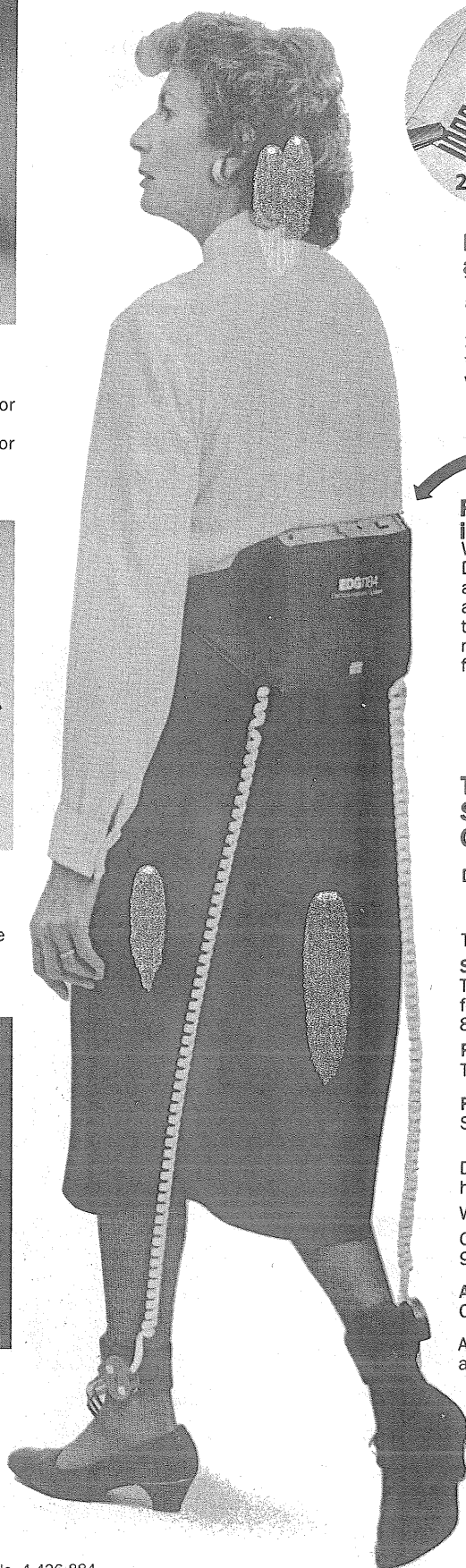
Dimensions: 6½" deep x 1½" high x 7¼" wide

Weight: 13 ounces

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The EDG in use.

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Director of Sports Science Programs
United States Olympic Committee

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Sportmedicine/Coaches Education Director
U.S. Ski Team-Nordic Dept.

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BARRY T. BATES, Ph.D.,
Director, Biomechanics/Sports Medicine
Laboratory, University of Oregon

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USING TWO MEASUREMENT SYSTEMS"

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HUMAN LOCOMOTION III

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CANADIAN SOCIETY FOR BIOMECHANICS
AUGUST, 1984.

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The Hosts of the 1987 ISB congress

As you may have noticed in no.17 of ISB Newsletter or in Umea the XIth I.S.B. Congress in 1987 will be held at Amsterdam. The Interfaculty of Physical Education also known as Interfaculty of Movement Science will invite members of ISB, ESB and other interested people to participate. In this paper we will try to familiarize the readership with our faculty, which was founded in 1971. The faculty consists of two medical departments, two departments in social sciences and one, small department in history, theory and philosophy of physical education. The first mentioned departments are:

Functional Anatomy

Exercise Physiology and Health Sciences

Psychology

Education, Psychomotor Therapy and Sociology

The Interfaculty of Physical Education is a faculty of the Free University in Amsterdam, but also the University of Amsterdam cooperate in the activities of the Interfaculty.

In the Dutch organizational scheme of faculties in a university the Interfaculty is situated between Medicine and Social Sciences. Thus students become a masters degree in Physical Education and can work for a Ph.D. either in Medicine or in Social Sciences, depending on the contents of their thesis. Therefore Professors Rozendal (Functional Anatomy), Sargeant (Exercise Physiology) and Kemper (Health Sciences) are also appointed in the Medical Faculty and Professor Whiting (Psychology) is a member of the Faculty of Social Sciences. Ph.D. studies, in the Dutch system, are organized within the structure of the Interfaculty. The research programs of the Interfaculty depend for a rather large part on this type of work within a number of broader formulated research programs.

- 1) Power balance in cyclic (repetitive) human movement
In this program the factors leading to mechanical efficiency in cyclic movements like speed skating, cycling, swimming and wheelchair driving are studied. One of the factors is the manner in which the movements are optimized. Anthropometric measures, aspects of muscular coordination and muscular contraction, special technical aspects of the (sportive) movement in question, friction forces and their minimalization as well as design of the equipment in use are relevant. Biomechanical modeling of the movements in question and measuring on the interface between the human performer and the environment or equipment are experimentally important items. Overall assessment of energy expenditure with respect to performance in general and to efficiency are made. Gerrit Jan van Ingen Schenau, Gert de Groot and Peter Hollander have daily responsibility for this program. Ruud de Boer, Maarten Bobbert, Luuk van der Woude and Huub Toussaint are Ph.D. students. In the near future coordination of muscles in the movements in question will be studied as well.
- 2) Form, function and innervation of skeletal muscle
Human as well as rat muscles are studied in this program. Muscle architecture as defined by the relationship

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between muscle fibres, aponeuroses and tendons is analyzed and described under various conditions of contraction. A measure of pennation, the index of architecture i.e. length of muscle fibre over length of muscle belly, is determined for each muscle in study. Length-force under isometric conditions as well as force velocity relations are experimentally measured as well as the reaction of the muscle to various modes of repetitive loading. Functional characteristics and morphological data are related to each other e.g. in the case of different capita of triceps surae. Different muscles acting as synergists, and muscles differing in architecture, and/or biochemical and histochemical composition of the muscular components: fibers, are studied.

Passive stiffness of muscular components as well as of other soft tissues crossing a joint are measured in experimental animals and human subjects. The structures which are important for these properties are studied. Daily responsibility is in the hands of Peter Huijing. Reinout Woittiez completed his Ph.D. work in this program in 1984 and expands this work now to dynamic loading of muscles. Yvonne Heerkens and Arnold de Haan are Ph.D. students. Peter Hollander and Gert Jan van Ingen Schenau participate in this program too. In the near future effects of immobilization and growth will be studied.

Programs 1 and 2 are a joint venture of the Vakgroep Functional Anatomy and Exercise Physiology and Health Sciences. The programs are linked together by concepts like muscle contraction and coordination.

3) Growth and health of youth, adolescents and young adults

This longitudinal study of a sample of youth, started in 1976, is directed to determinants of health. The determinants studied are habits of sports, smoking, drinking, eating and other components of behaviour. Han Kemper is leading this program. Robbert Verschuur and Wouter Schouten are Ph.D. students in the Vakgroep Exercise Physiology and Health Sciences.

4) Complex motor actions

This research program is carried out in the department of Psychology. It consists of the following subprograms:

- a) Learning motor skills. This subprogram is directed to research in motor learning and ball sports (e.g. skiing on a ski-simulator) and rehabilitation (in patients with neuro-muscular disorders). Effects of different forms of on-line feedback (e.g. fluency of movement in sports, EMG feedback in rehabilitation) are evaluated.
- b) Training of motor skills. The role of modelling in the training of sport skills is studied in this subprogram.
- c) Individual differences. This subprogram is mainly concerned with the effects of individual differences in anxiety on motor learning and performance.
- d) Movement evaluation. This subprogram, finally, has to do with movement evaluation, ranging from kinematic apprehension to esthetic evaluation. The program is conducted by Professor John Whiting; his coworkers are Frank Bakker, Berrie den Brinker, Bernard Netelenbos, Jacques van Rossum and Piet van Wieringen, while some Ph.D. students are connected to the program as well.

On the Campus of the Free University the Vakgroepen Functional Anatomy and Psychology have about 800 m² laboratory room. A 15m walk way, two Kistler force plates, a motor driven treadmill of 125 x 350 cm with a maximal speed of 18 km/h and inclination of 15 degrees, two cages of Faraday EMG-work, 10 channels of EMG, knee joint resistance registration unit, simulators for skiing and skating movements, a ball thrower, a Selspot system, a high-speed movie camera for movement analyses, and a number of dedicated and general computers form the basic instrumentation. A work shop managed by Wim Rijnburger who is an electronic engineer from Delft Technical University, develops and maintains our instrumentation. We will welcome you to a more detailed lab tour during Congress.

The Free University was founded in 1880 as a private University to be free from governmental interference in the teaching programs especially those of the ministers of the faith in some Dutch churches. In the middle of the fifties all Dutch universities including the Free University, became 100% subsidized from the general taxes. The university has all the classic faculties and is the only Dutch university having an Interfaculty of Physical Education. In this faculty we teach future researchers in the field of Human Movement Science, future teachers of Anatomy, Physiology and Didactics, in schools of Physiotherapy, Physical Education etc. Also some of our students became psychomotor therapists or went into civil service in the field of sports management. So we do not teach teachers of physical education. We hope that in the climate of research and education we contribute to the development of a body of knowledge: Human movement science.

Rients H. Rozendal, Dean,
Professor of Functional Anatomy.

CALL FOR PAPERS

We would appreciate if I.S.B. members could participate more active in this Newsletter. Please send us material: short papers, letters to the editor, laboratory features,... etc.

SCIENTIFIC ADVERTISEMENTS

On request of ISB members and on condition that there is no relation with a commercial circuit, all scientific advertisements will be published free of charge.

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150 US dollar per half page
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All publicity will be advertised in the 4 issues.

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Calendar of scientific events

1986

June 25 - 27, 1986

Kuopio, Finland, "Articular cartilage and other joint structures in relation to loading and movement" - XVth Symposium of ESOA.

July 18 - 23, 1986

Glasgow, Scotland, "Conference '86: The VIIIth Commonwealth and International Conference on Sport, Physical Education, Dance, Recreation and Health" (c/o Mr. B. Wright, Conference '86 Director, Jordanhill College of Education, Southbrae Drive, Glasgow G13 1PP, Scotland)

July 27 - 31, 1986

Bielefeld, FRG, "Vth Int. Symposium on Biomechanics in Swimming" c/o Dr. Bodo Ungerechts, Univ. Bielefeld, Abt. Sportwissenschaft, Postfach 8640, D-4800 Bielefeld 1, FRG)

August 22 - 26, 1986

Heidelberg, FRG, AIESEP World Convention "The Physical Education Teacher and Coach today" (c/o Prof. H. Rieder, Inst. f. Sport und Sportwissenschaft, Im Neuenheimer Feld 710, 69 Heidelberg, FRG)

September 8 - 10, 1986

Berlin (West), Germany, Fifth Meeting of the European Society of Biomechanics.

September 15 - 17, 1986

Istituto Rizzoli - Bologna, Italy, European Conference on Biomaterials.

September 22 - 26, 1986

Brisbane, Australia, XXIIIrd FIMS World Congress of Sports Medicine (c/o Organizing Committee, XXIII FIMS World Congress, P.O. Box 439, Fortitude Valley, Queensland, 4064, Australia)

1987

July 6 - 10, 1987

International Seminar on Archery, Vrije Universiteit Brussel - Experimental Anatomy; Under the auspices of Olympic Solidarity and Workinggroup Biomechanics of Sport (ISB-ICSSPE), Brussels, Information: Prof. Dr. J.P. Clarys, Belgium

June 29 - July 3, 1987

Xth International Congress of Biomechanics, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands.

(Date to be fixed)

Seoul, Korea, Int. Sportscience Conference on the occasion of the Asian Games



INSTRUCTION TO AUTHORS

In order to facilitate the editing of the ISB Newsletter, we would appreciate receiving any material according to the following criteria:

- 1° All material should be typewritten.
- 2° The title should be written in CAPITAL LETTERS.
- 3° Subtitles should be written *in italics* and/or underlined.
- 4° Different paragraphs should be separated by double spacing.
- 5° Try to use the whole text-frame.
There should not be any margins inside the frame.

Thank you in advance for your cooperation.

Jan P. CLARYS

Jan CABRI

Fak. Geneeskunde & Farmacie

Experimentele Anatomie

Laarbeeklaan 103

B-1090 BRUSSELS (Belgium)

P.S. The ISB Newsletter is published quarterly. Material and articles should reach us prior to February 10 for the Spring issue, May 10 for the Summer issue, August 10 for the Autumn issue, and November 10 for the Winter issue.

When individual members have a change in a mailing address, it is important to send the new address to the Treasurer so that you are certain to receive copies of the Newsletter and dues notices.

ISB Treasurer:

C.A. Morehouse

109 Sports Research Bldg.

Penn State University

University Park. PA 16802

U.S.A.

29 June - 3 July 1987

location

The XIth International Congress of Biomechanics will be held in the Main building of the Free University in Amsterdam

topics

Topics to be scheduled will be:

1. Biomechanics of human movement
2. Biomechanics of the musculoskeletal system
3. Biomechanics of tissues and materials
4. Methodology

invited speakers and topics

Dr. R. McNeill Alexander (U.K.)
The spring in your step: the role of elastic mechanisms in human gait

Dr. A. E. Chapman (Canada)
How muscular properties govern technique in sports

Dr. C. Gielen (The Netherlands)
Coordination of movements by the neuro-muscular system

Dr. A. L. Hof (The Netherlands)
Assessment of muscle force in complex movements by EMG

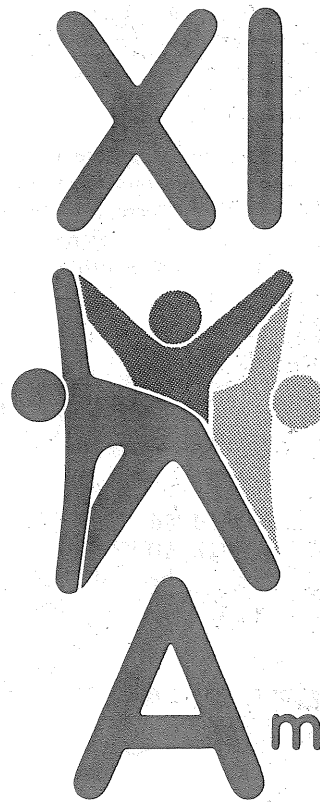
time schedule

- Call for papers and distribution of registration forms
May 1986
- Deadline submission of abstracts
1 December 1986
- Acceptance or rejection of abstracts
15 February 1987
- Deadline for registration of congress participants and submission of complete manuscripts
1 April 1987

secretariat

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XI international congress
of biomechanics



ISB 1987

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