ISB

International Society of Biomechanics Newsletter

SUMMER ISSUE 1985 N° 19

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Editorial

INTERNATIONAL JOURNAL OF SPORT BIOMECHANICS

THE LAUNCHING OF IJSB

The publication of the *International Journal of Sport Biomechanics* is of considerable historical significance. It demonstrates the emergence and development of sport biomechanics throughout the world. Since the first International Seminar on Biomechanics, held in Zurich, Switzerland, in 1967, sport biomechanics has grown at an accelerating rate. In 1973, during the Fourth International Seminar, the International Society of Biomechanics was founded. This Society has been an extremely effective professional organization for biomechanists form many diverse disciplines through its biennial international congresses, sponsorship of specialized meetings, publication of proceedings, and distribution of a regular newsletter.

I was privileged to serve this organization as an officer and council member over a 10-year period, during which time a number of unsuccessful attempts were made to publish a scientific journal. That those earlier attempts did not succeed was due mainly to the diversity of scientific interests among the membership of the society. A journal which included such different topics as orthopaedics, ergnonomics, anatomy, physical therapy, and mechanical engineering would not meet the specific needs of professionals form these various fields. This led me to believe that any future journals would have to be restricted to specific areas within the larger field of biomechanics.

It was against this background that Rainer Martens, publisher of Human Kinetics, asked me to serve as editor of a new journal devoted to sport biomechanics. Such a publication would be consistent with this commitment to develop journals specializing in separate subdisciplines within the sport sciences (sport psychology, sport sociology, sport philosophy, etc.). I accepted his offer under the condition that it would be international in scope and with the hope that is will make a significant contribution to sport biomechanics.

Plans for the new journal were announced in various professional journals, newsletter, and flyers. The first issue was to be available during the Olympic Scientific Congress in Eugene, Oregon, in August 1984. However, the difficulty of obtaining a sufficient number of high quality papers delayed the first issue until 1985. Now that this first issue has been published, it is hoped that many authors will seek to publish their work in the *IJSB*.

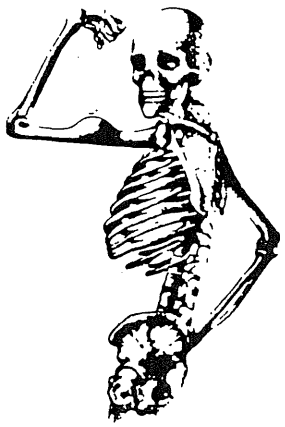
Why another journal? This question can best be answered through an understanding of the dilemma facing the sport biomechanist. This young discipline is considered to be an integral part of the sport sciences (physical education), and in many countries it is included under the banner of sports medicine while also being affiliated with the broad field of biomechanics. The publication channels available to the sport biomechanist parallel these professional groups. Journals such as *Research Quarterly for Exercise and Sport, Medicine and Science in Sports and Exercise, Journal of Biomechanics, International Journal for Sport Science,* and *Canadian Journal of Applied Sport Sciences,* along with many similar journals in foreign languages, are publications in which sport biomechanists have published their research. As a consequence, the research and scholarly information in this specialized field is widely dispersed throughout the literature.

The *ISJB* solves this problem by providing scientists and scholars a unique opportunity to share their work through a publication concerned specifically with their scientific interests. However, it is not intended to compete with existing eclectic type journals but rather to complement them. The *ISJB* will serve as a single international source for research, scholarly work, and professional information through the common bond of the English language.

Through its various subsections, the journal format provides considerable flexibility in presentation. This section, *Professional Perspectives,* will be used for editorial matters and will also serve as an international forum for new and stimulating ideas of interest to scholars in the field. Abstracts presented in the *Research Digest* will contain information that has appeared recently in other publications and will serve as a valuable source of curent research findings. The *Original Investigations* form the core of the journal and will include the most recent, significant research being conducted throughout the world; the section will also allow scientist to share their computer software by describing it and making it available to readers upon request. Significant topics of narrow scope will be contained in the *Technical Notes* section. Recently published books will be reviewed in the *Book Reviews* section as a further means of keeping biomechanists informed. Finally, additional current information can be gleaned from the *Conference Reports and Calendar of Events* section.

The future success of this new journal will depend upon the interest and support of sport biomechanists throughout the world. It has been carefully and systematically planned to meet the needs of these professionals. It is hoped that this publication will become the most important journal in sport biomechanics and will make a significant contribution to the continued international development of this discipline. I'm looking forward to the opportunity and challenge of serving as its editor.

Richard C. Nelson
The Pennsylvania State University



"You should know..."

THE INTERNATIONAL BUDO UNIVERSITY : A NEW UNIVERSITY IN JAPAN

Background

With the rapid expansion of Budo overseas, there is an urgent need, both at home and abroad, to cultivate Budo leaders who are highly accomplished in Budo itself as well as in international cultures.

The idea of establishing an international Budo institute was initiated by Dr. Shigeyoshi Matsumae (the President of both the Nippon Budo Kan and the International Judo Federation) in March, 1980.

Under the initiative of Nippon Budo Kan and with strong support from the public, the idea crystalized into a movement to establish the International Budo University, the result of which is the opening of the University in April, 1984.

University Site

The University is located in Katsuura-shi Chiba Prefecture), 100 km from Tokyo. The address is 841 Aza Monomizuka Shinga Katsuura-shi Chiba. Katsuura-shi, a scenic seaside city, which offers an ideal educational environment, and there is also a training institute of the Nippon Budo Kan.

Purpose of the International Budo University

The purpose of the International Budo University is not limited to the physical training of Budo. This institue is a four-year comprehensive university which aims at the cultivation of international Budo leaders who have both mastered the Budo spirit and have general educations.
To achieve this purpose, it is planned to set up not only Budo courses but also courses in languages and international, political, economic and cultural sciences. The courses are open to students of any nationality. The University offers an opportunity for students from abroad to live, train and study together.

President and Teaching Staff

The President, Dr. Shigeyoshi Matsumae, is currently the President of a major university in Japan, Tokai University. He is a prominent educator. While he has a Ph. D. in Engineering and is the inventor of one of the basic devices of electro-communication, he once was a leading member of the Japanese Diet. With his rich experience and deep love for humanity, Dr. Matsumae acts as the President of the Japan Cultural Association with Foreign Countries and has greatly contributed to the promotion of international exchange in the highest decorations by many countries as well as with the honorary doctorates from many foreign universities.
It is the University's great honor to have Dr. Matsumae as the first president.

The teaching staff consists of prominent instructors of Judo, Kendo and other sports and the leading scholars of Japan's community.

Educational Structure

1. The University will commence with one division, the Gymnatics Division, with phased expansion in vieuw. The Gymnatics Division consists of General Academic courses and Specialized Sub ject courses. The latter is divided into the Budo Course and Gymnatics Course. The Budo Course encompasses the subjects of Judo and kendo and other Budo-related subjects. Since the University's aim is to raise Budo experts who can be trusted and respected members of the international society, the curriculum focusses on the mastering of:
(1) Languages (English, French, Spanish)
(2) The Budo Spirit and Theories
(3) International Cultures

2. Phase I Expansion: it is considered to set up the following nine arts for foreign students as one-year special course in the University-attached training Center;
(1) Judo
(2) Kendo
(3) Karate
(4) Kyudo
(5) Aikido
(6) Shorinji-Kempo
(7) Naginata
(8) Jukendo
(9) Sumo

3. Phase II Expansion: This is the second phase with the objective of establishing a comprehensive international university based on the spirit of Budo. In this phase, it is planned to set op the International Relationschip Division, etc.

Facilities for foreign students

1. The dormitory is reserved to meet the foreign student admission quota.

2. Other academic facilities are arranged in co-operation with the Tokai University.

Admission

1. Number of Students:
   - For each academic year
     Budo Course 200
     Gymnastics Course 200
     Total 400 (of both sexes)
   - University Total 1600

2. Number of Foreign Students:
   Approx. 50 (of both sexes)

3. Foreign student admission requirements:
   1) Students who have completed the 12 year education in one or more foreign countries.
   2) Students who are 18 years of age, who have passed an acceptable national (or the equivalent level) examination and are certified to surpass the 12 year education attainments.

   Students who are 18 years of age and have completed the pre-university Japanese language courses at the education institutes listed below, or who will complete these courses by March, 1984.

The List of the Institutes:

Title of the Institute	Location
• Japanese Language School attached to the Tokyo University of Foreign Studies	Tokyo
• The Japanese Language School of the International Students Institute	Tokyo
• The Japanese Language School of the Kansai International Students Institute	Osaka
• The Preparatory School for the exchange Students to Japan	Jilin-Sheng, China

4. Selection

Students are to be selected on the basis of data such as the University's entrance examination result, the certified transcript of the final education record, and a certificate of good health.

(1) Entrance examination:

Subjects	Date	Location
• Language (English or French or Spanisch or German)	Scheduled for 2nd Feb., 1984	Nippon Budo Kan
•Japanese Composition		Nippon Budo Kan
•Gymnastics		Nippon Budo Kan
•Interview		

(2) Health Check: Carried out on the basis of the health certificate information. If necessary, the applicant will be asked to undertake a detailed health check during the examination period.

5. Application

(1) The applicant should personally present, or send by registered mail, the documents listed below to the following location:

Secretariat
International Budo University
c/o Nippon Budo Kan
2-3, Kitanomaru Koen, Chiyoda-ku
Tokyo 102, Japan

a) Application Form (issued by the University; applicant's photo should be attached)
b) Graduation Certificate and Certified Transcript of Record issued by one's final alma mater
c) Evidence of Diploma, for those who have completed or will complete the above-listed Japanese Language Courses
d) Educational Attainments Certificate, for those applicable
e) Statement prepared by the President of applicant's final alma mater
f) Health Certificate (University's form should be used)
g) Alien Registration Certificate
h) Parents' or Guardian's Agreement for overseas study (University's form should be used)
i) Certificate or guarantor residing in Japan (University's form should be used)
j) Application fee (20,000 Yen)
k) Return Envelope (prepared by the University; Applicant's Name, Address and Mail code should be written, and the necessary stamps should be attached).

Note: Upon request, the forms wil be sent to the a-plicants.

(2) Application Period: from 9th January 1984 (Scheduled for)

6. Admission Announcement:

(1) Each succesful applicant will be notified by mail on 5th February, 1984, with forms for registration.

7. Registration

(1) Students who are admitted should present the required documents and payment between 5th and 13 th February 1984, otherwise the admission shall be annulled.

8. Fees and levies (Yen)

a. Expenses (instalment):

Registration Period	535 000 Yen
Beginning of the second term (September)	335 000 Yen

b. Second academic year and after (instalment):

Registration Period	335 000 Yen
Beginning of the second term (September)	335 000 Yen

9. Inquiry:

For more detailed information, contact the following office:

Secretariat of the Foundation
for the Establishment of the
international Budo University,
c/o Nippon Budo Kan
2-3, Kitanomaru Koen,
Chiyoda-ku, Tokyo 102
Phone: (03) 201-7333 (direct) (03) 216-0781

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 seperated by double spacing.

5° Try to use the whole text-frame.
There should not be any margines 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 Autumm issue, and November 10 for the Winter issue.

"You should know..." (Cont.)

THE VOLVO AWARD FOR LOW BACK PAIN RESEARCH 1986

In order to encourage research in low back pain, the Volvo Company of Göteborg, Sweden, also this year has sponsored three prizes of US $ 6000,00 each. Awards will be made competitively on the basis of scientific merit in the following three areas:

1. Clinical studies
2. Bioengineering studies
3. Studies in other basic science areas

Papers submitted for the contest must contain original material, not previously published or submitted for publication. A multiple authorship is acceptable. The manuscripts should be in the form of a complete report, not exceeding 30 typewritten pages, double-spaced, and in a form suitable for submission to a scientific journal. Five copies of each paper submitted in full should **reach the adress given below not later than January 2, 1986.**

One of the authors should be prepared, at his own expense, to come to Dallas, Texas, USA, at the time of the meeting of the International Society for the Study of the Lumbar Spine, May 29 - June 2, 1986, to present the paper and to receive the award.

A board of referees will be chaired by the undersigned and will contain members from the fields of clinical medicine, bioengineering, and biochemistry.

Please direct all correspondence to:

Professor Alf L. Nachemson
Department of Orthopaedic Surgery I
Sahlgren Hospital
S-413 45 Göteborg
Sweden

Symposium:
"The human spine in research and practice"

This symposium was held in Utrecht, December 7 and 8, 1984 and organized by the Dutch workgroup "Prevention backaches".
The presented 28 papers including the three topics: introduction to back problems and it social relevance, biomechanics of the spine and clinical aspects, can be obtained at a price of Dfl 25,- or U.S. $ 8,-.

Orders should be addressed to:
Peter Scholten
Department of Anatomy and Biomechanics
Vrije Universiteit, Amsterdam
The Netherlands.

Bookreviews

"Sport Shoes and Playing Surfaces : Biomechanical Properties"

Ed. F.C. FREDERICK

This newly released volume contains the current, State-of-the-art information on shoe design, playing surfaces, and their impact on the human body. The 10 review articles discuss, among other effects, that shoes and surfaces, significantly alter the kinematics of running and jumping; have qualities that may allow athletes to run faster or jump higher; can cause or prevent injury, and possibly, speed recovery. The book also reviews many of the test methods used to evaluate shoes and surfaces and discusses the controversial application of the surface - related test to the establishement of standards for sport surfaces.

Chapter 1 is by Benno Nigg and co-workers, and reviews the methods for assessing the load on the human body in various sports movements. It also summarizes the results of recent research on the relationship between surface and sport shoe characteristics and the etiology of various athletic injuries.

Chapters 2 and 3 (P. Cavanagh and K. Misevich) present a model of the interaction of shoe and foot during foot contact in running.

Chapter 4, by O. Mac Lellan, discribes his attempts to reduce the shock to the musculoskeletal system by using visco-elastic shoe inserts. Results of clinical trials using these pads to treat patients with chronic problems, caused or exacerbated by impact shock, are also discussed in this paper.

Chapter 5 describes the work of H. Stucke and collaborators on measuring the traction of various playing surfaces. Traction is a critical characteristic of safe performance sport surfaces; and their work is a key contribution to the develepement of accurate measurements that can be used in the design and selection of proper surface materials.

Chapter 6, by H.J. Kolitzus, discusses his approach to standardization and describes his test methods in detail.

Chapters 7 & 8 contain papers of T. Mc Mahon and P. Greene and suggest that optimal surfaces for running should have surface elastic properties that fall within a range of values defined by empirical data. Their work presents a model describing the spring stiffness of the human body while running of surfaces of variable stippness.
To highlight this, Cuin briefly describes in Chapter 9 the design and construction of a high performance track that applies the principles.

Chapters 10 & 11, by T. Clarke, N. Frederick and C. Hamill review the methodology used to make rearfoot kinematic and cushioning measurements and the application to specially constructed shoes.

The reviews presented in this volume contain more than useful information for the physician, trainer-coach, and off course for the athlete himself.
The author's list is an insurance for the exponential scientific progress that sportshoes have come through for the good sake of sports!

F.C. FREDERICK - **Sport shoes and playing surfaces, Biomechanical properties** - Human Kinetics Inc. Illinois, 1984, 198 pp. Price - U.S.: $24.95
FOREIGN: $29.95

"Free Publicity"

UNIVERSITY OF QUEENSLAND
CATALOGUE
BIOMECHANICS FILMING PROJECT
1982 COMMONWEALTH GAMES

ATHLETICS
FILM AVAILABLE ON:

Sprint lunges (m,f)
100 m (m,f,p,c)
100 m hurdles (f,p,c)
110 m hurdles (m,p,c)
400 m at the 200 m stage (m,f,c)
8OO m two passes back straight (m,f,c)
1500 m three passes back straight (m,f,c)
3000 m six passes back straight (f,c)
3000 m steeplechase six water jumps (m,c)
Marathon film of the leading runners at 4, 9, 21, 29, 36 km. stages
High Jump (m,f,c,a)
Javelin (m,f,c)
Shot put (m,c,a)
Hammer (m,c,a,)

LEGEND:

m - male athletes
f - female athletes
p - panned camera action
c - suitable for coaching purposes
a - two camera filming for possible 3D analysis using DLT technique

AQUATICS

FILM AVAILABLE ON:

FREESTYLE	100 m	(m,f,s,x,t,c)
	200 m	(m,f,s,x,t,c)
	400 m	(m,t,c)
	800 m	(f,c)
	1500 m	(m,t,c)
BACKSTROKE	100 m	(m,f,s,x,t,c)
	200 m	(m,f,s,x,t,c)
BREASTSTROKE	100 m	(m,f,s,x,t,c)
	200 m	(m,f,s,x,t,c)
BUTTERFLY	100 m	(m,f,s,x,t,c)
	200 m	(m,f,s,x,t,c)
INDIVIDUAL MEDLEY	200 m	(m,f,s,t,c)
	400 m	(m,f,s,t,c)
DIVING	3 m Springboard	(m,f,c)
	Tower	(m,f,c)

LEGEND:

m - male swimmers
f - female swiqmmers
s - starts
x - middle of pool
t - turns
c - suitable for coaching purposes

BIOMECHANICS FILMING PROJECT
ORDER FORM

The Commonwealth Games Biomechanics Project involved the high speed (50 and 100 f.p.s.) exposure of film (16 mm colour) during the XIIth Commonwealth Games in Brisbane. Events covered by the project include Track and Field, Swimming and Diving. All film has time and distance references. In selected events the filming technique used will allow three dimensional analysis of performances. Film is appropriate to researchers with an interest in the sport sciences and biomechanics as well as to coaches and others concerned with training.

Sample Film: Covering various events from Athletics to Aquatics 1 x 400 foot film cost $200

Event Films: $50 per 100 feet of film
$7 per order for postage and handling

N.B.: Prices for special events will vary according to the footage available and the editing requested.

(DETACH OR MAKE A COPY AND RETURN)

I am interested in purchasing films on the following events:

.....

.....

.....

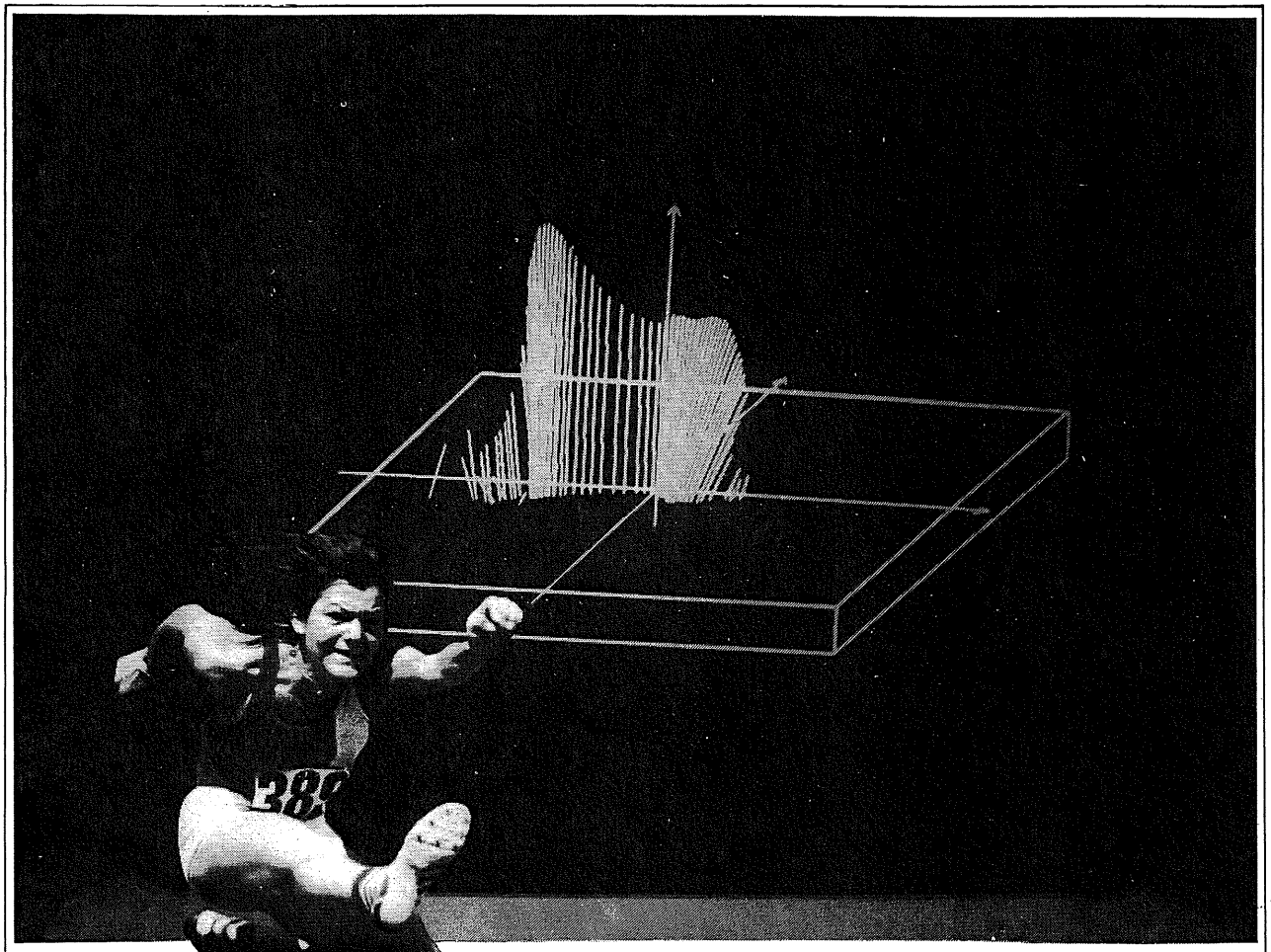
Please forward me additional information and costing:

NAME: ..... Phone: .....

ADRESS: .....

..... Postcode .....

Post to: Dr. B. Wilson
Department of Human Movement Studies
University of Queensland
St. Lucia 4067
Qld. Australia



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Special article

BIOMECHANICS AND WHEELCHAIR SPORT

Catherine M. Walsh
University of Alberta

Since the early 1940's, researchers have been examining and reporting on various dimensions of wheelchair sport. Much of the early literature concerning sport for wheelchair athletes deals with such topics as the value of wheelchair sport, the initiation and growth of wheelchair competition and the development of a medical classification system for athletes competing in wheelchairs. More recently, researchers in the field of excercise physiology have contributed to the development of wheelchair sport. Numerous studies, designed to assess and improve various physical fitness components in wheelchair athletes, have provided results that have led to better performances.

Some of the latest research contributions related to wheelchair sport have come from the area of biomechanics. Steadward (1978) and Byrnes (1983) both used cinematography and electromyography to describe the movement patterns of wheelchair athletes performing various sports skills. Steadward studied athletes representing seven of the eight classes in the International Stoke Mandeville Games Federation (ISMGF) Medical Classification System and described the wheelchair dash. Byrnes described the wheeling pattern utilized by elite male paraplegic athletes in the 1500 metre event and identified the contribution of various muscle groups to this pattern.

A study of the racing wheelchairs used at the 1980 Olympics for the Disabled was conducted by Higgs (1983). Through photographic analysis, he obtained information regarding the characteristics of those chairs that were most successful in competition. In general it was found that the more successful chairs had lower seats, larger seat to base angles, narrower frames and smaller handrims than their less successful counterparts. In addition, it was found that wheelchairs that were used for distance events had lower seats, longer wheel bases, narrower frames and had their seats positioned further back with respect to the rear wheel axle than chairs that were used for sprinting.

Since 1976, researchers at the University of Virginia - Rehabilitation Engineering Departement, have been conducting experiments and disseminating information related to the design of sport wheelchairs. Their efforts have proceeded in three general areas - product design, performance testing and engineering analysis. Product design projects have ranged in scope from single component to complete wheelchairs. Performance testing has included tests to measure the effects of toe-in and camber on rolling resistance, and the effects of different seat positions on stroke frequency, stroke duration, torque application and wheeling efficiency. Engineering analysis has dealt with the structural analysis of wheelchairs and has included work related to the stresses applied to chairs and the effects of variations in chair components (i.e. hubs, rims, spoke patterns) on wheelchair performance. Further details of the work conducted at the University of Virginia can be found in two summary reports (Stamp and McLaurin, 1976-1981, 1982-1983) compiled by the Rehabilitation Engineering Center.

Higger (1984) biomechanically analyzed and compared the stand-up and the wheelchair basketball set shots and found that the wheelchair athletes used in his study projected the ball with a greater speed of release, a higher angle of release and a smaller angle of approach to the basket. He also found that the wheelchair players generated greater overall upper body muscle torques than the stand-up athletes. This information has important implications in terms of setting realistic expectations for success in performing the wheelchair basketball set shot.

It is evident from the research that has been presented above, that the field of biomechanics has contributed significantly to the area of wheelchair sport. The work that has been carried out to date, however, represents only a very small portion of the total impact that biomechanics can make in the area. Because sport for individuals that compete in wheelchairs is still in its early stages, researchers in the field of biomechanics have the potential to play a major role in the analysis of existing techniques and equipment as well as the design of new techniques and equipment. Similarly, the biomechanist can be instrumental in providing coaches with the background necessary to effectively analyze and improve the performances of their wheelchair athletes.

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Thesis Abstract Corner

THE PENNSYVALNIA STATE UNIVERSITY
THE GRADUATE SCHOOL
COLLEGE OF HEALTH, PHYSICAL EDUCATION
AND RECREATION

A DETERMINATION OF THE MECHANICAL CHARACTERSTICS OF THE HUMAN HEEL PAD IN VIVO

A thesis in Physical Education
by
Gordon Arthur Valiant
(Peter R. Cavanagh, Advisor)

Submitted in Partial Fulfillment
of the Requirements
for the Degree of
Doctor of Philosophy
May 1984

A group of 12 male runners and a group of 12 male nonrunners served as subjects in this study. Techniques of pendelum impacting, vibration testing, and three-dimensional stroboscopic photography were employed in order to determine the mechanical characteristics of the peel pad, and to determine if the heel pad charachteristics differed between runners and nonrunners.

The pendelum impacting involved striking the heel pad of each subjects' restrained right leg with a free-swinging ballistic pendulum which was instrumented with a uniaxial accelerometer. Repeated trials were made at three different impact velocities, and trials were also made at all impact velocities with a tightly fitting rigid heel restraining device clamped about the heel region. Force-time characteristics and force-deformation characteristics were determined from the acceleration signal, and measures of peak force, % energy absorptoin, maximum deformation, and stiffness of the soft tissue of the heel pad were made. Double-exposure photographs were made simultaneously from three different directions during the impacting. The first exposure was made at the time the pendulum just touched the heel, and the second exposure occurred at a time approximating the time of peak force. The direct linear transformation technique was applied to determine the three-dimensional displacement of skin markers within the heel region between exposures.

The response of the heel pad to steady state vibrations was also measured using a mechanical shaker. The transfer function relating the acceleration of the shaker table to the acceleration of an instrumented loading plate which was in intimate contact with the heel pad was determined as a function of frequency at fixed excursions. This response was compared to the response of a three component discrete element model.

None of the tests made on the subjects revealed any differences between runners and nonrunners. The impacting revealed a distinct force-deformation relation which rose to force in two linear stages, and which exhibeted hig hysteresis. The peak force during impacting was found to increase from a mean of 223 N to 437 N as impacht velocity increased from 0.8 m/sec tot 1.2 m/sec respectively. The effect of the heel restraint was to increase the peak force by an average amount of 29.8 N. The amount of energy absorbed was high, ranging from 84 % to 99 %. The amount of energy absorption increased about 1 % with each 0.2 increase in impact velocity, and decreased about 1 % due to the presence of the heel restraint. The stiffness estimate made from the second linear portion of the hysteresis curve increased with increasing impact velocity. Both estimates for stiffness, 7910 N/m and 105,646 N/m when averaged over all conditions, were found to be greater than similar measures previously reported in the literature. Maximum deformation increased form 8.5 m, to 9.9 mm with increases from 0.8 to 1.2 m/sec in impact velocity. Maximum deformation decreased by 1 mm due to the presence of the heel restraint. It was found that this decrease was accounted for by the decrease that occurred in the initial portions of the impact as defined bu the force-deformation curve. The photographs showed the skin markers to be displaced in all three dimensions, with the more proximal markers being confined largely to the cranial direction.

The measured frequency response revealed that the system being tested was extremely overdamped. There was no indication of a resonant frequency in the frequency range tested. Comparison of the frequency response with that of the proposed three component discrete element model showed the inappropriateness of the model for the representation of the heel pad.

It was concluded that the heel pad was a nonlinear viscoelastic substance which was capable of absorbing high percentages of energy. The reshaping of the heel pad in medial/lateral and in posterior directions was a mechanism for some of the energy absorption. This mechanism was affected slightly with the application of a thightly fitting heel counter.

ISB Members to Receive Discount on IJSB subscriptions

Beginning in 1986 all ISB members who subscrive to the IJSB will receive a $ 3.00 U.S. discount on the annual subscription rate. The publisher will have a current ISB membership list so that you merely need to indicate on the subscription form that you are an ISB member to receive the discount.

Calender of scientific events

July 09 - 11, 1985
Budapest, Hungary, "Int. Symp. of the European Union for School and University Health and Medicine"
(c/o Congress Bureau MOTESZ, P.O. Box 32, H-1361, Budapest, Hungary)

July 14 - 20, 1985
Brussels, Belgium, "Int. Seminar on Physical Education"
(c/o Prof. Clairette Brack, Vrije Universiteit Brussel, HILOK, Pleinlaan 2, 1050 Brussel, Belgium)

July 20 - 27, 1985
Warwick, England, "Xth Int. Congress of IAPESGW"
(c/o Pat Bowen-West, Bedford College, 37 Lansdowne Road, Bedford MK 40 2BZ)

July 29 - August 2, 1985
London, England, "28th ICHPER World Congress", Theme: "Education For Living: the contribution of Health, Physical Education and Recreation"
(c/o Mr. A.J. Petherick, ICHPER Congress Secretary, The Physical Education Association of GB and NI, Ling House, 162 Kings Cross Road, London WCIX 9BH, England)

August 08 - 10, 1985
Toronto, Canada, "Int. Sports Medicine Symposium on the occasion of the world's 1st Masters Games"
(c/o Dr. R.M. Brock, Co-chair Masters Games Sports Medicine Symposium, P.O. Box 1985, Station "P", Toronta, Ontario, M5S 2Y7 Canada)

August 19 - 23, 1985
Garden City, Long Island, New York, USA, "Int. AIESEP Conference on Research in Physical Education and Sport"
(c/o Dr. R.S. Feingold, Dept. of Physical Education Recreation and Human Performance Science, Adelphi University, Garden City, NY 11530, USA)

August 26 - 30, 1985
Dunedin, New Zealand, VIth World FINA Medical Congress
(c/o Congress Secretariat of the VIth World FINA Medical Congress, P.O. Box 6171, Dunedin, New Zealand)

August 26 - 28, 1985
Kobe, Japan, "FISU/CESU Int. Conference" in conjunction with the Universiade 1985 Kobe;
Conference Theme: University Sport in a Changing Society
(c/o Organizing Committee for CESU Conference Kobe, 1985 International Friendship Building, 6-9-1 Minatojima-nakamachi Chuo-ku, Kobe City, (code 650) Japan)

September 8 - 21, 1985
St. Moritz, Champfèr.
6. Internationalen Sportärtzkongreß

September 19 - 23, 1985
Vienna, Austria, Int. "Sport and Leisure" Seminar on "Sport and Age"
(c/o ASKO - General sekretariat, A-1040 Wien, Margaretenstr. 13-15, Austria)

October 14 - 19, 1985
Dresden, GDR, "8th Int. IASI Congress on Sports information"
(c/o Dr. H. Bachmann, Zentrum f. Wissenschaftsinformation, Körperkultur u. Sport, Friedrich-Ludwig-Jahn-Allee 59, 7010 Leipzig, GDR)

November 09 - 12, 1985
Cologne, FRG, 9th Int. IAKS-Congress on "Sports, Swimming Pool and Leisure Facilities",
(c/o IAKS, Neusserstrasse 26, 5000 Köln 1, FRG)

November 19 - 20, 1985
London, E1 4NS United Kingdom. "Composites in Biomedical Engineering" First International Conference.
Dr. P.J. Hogg, Department of Materials, Queen Mary College, Mile End Road.

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, Soutbrae Drive, Glasgow G13 1PP, Scotland)

August 14 - 16, 1986
Bielefeld, FRG, "Vth Int. Symposium on Biomechanics in Swimming" c/o Dr. Bodo Ungerechts, Univ. Bielefeld, Dept. Biomechanics, 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 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)

September 1986
Berlin, W.-Germany, Fifth Meeting of the Europ. Soc. of Biomechanics.

(Date to be fixed)
Seoul, Korea, Int. Sportscience Conference on the occasion of the Asian Games

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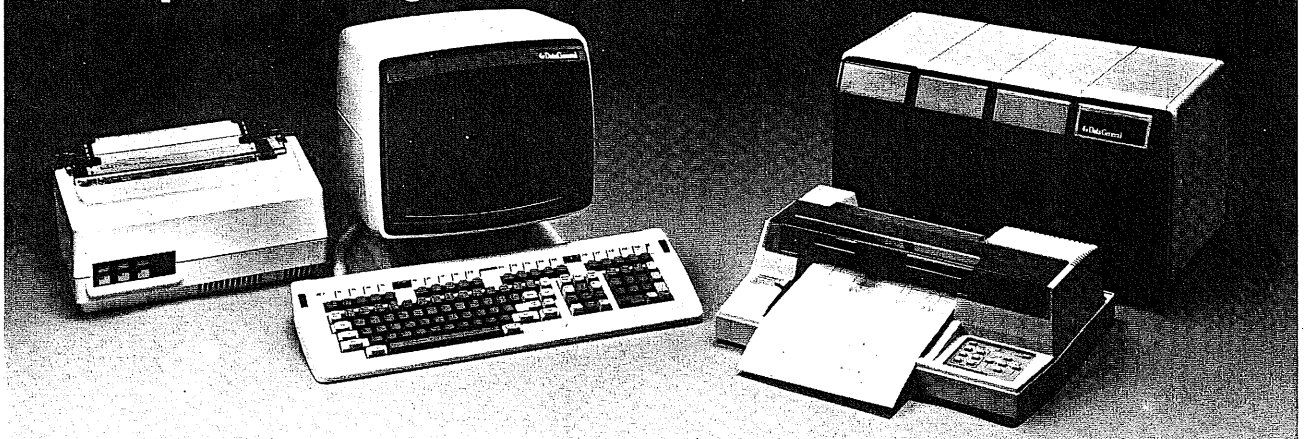

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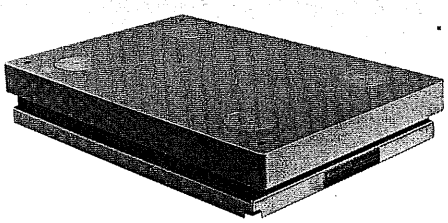

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System will be shown at:
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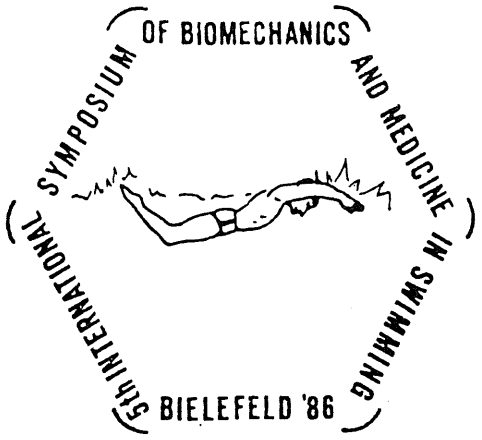
Working Group Biomechanics of Sport
W.G.B.S. - I.S.B. - I.C.S.S.P.E.



In July 1986 West - Germany will host the

5 TH INTERNATIONAL SYMPOSIUM OF BIOMECHANICS AND MEDICINE IN SWIMMING

which will take place in BIELEFELD,
July, 27 - 31, 1986 at University.

The Symposium is organized after the "1986 COMMONWEALTH GAMES CONFERENCE ON SPORT" held in Glasgow, Scotland, July, 18 - 23, 1986. It is agreed, that swimming is only discussed at the Bielefeld Symposium.

TOPICS:

SWIMMING BIOMECHANICS (general)
SWIMMING MEDICINE (general)
SWIMMING BIOCHEMISTRY
SWIMMING ENERGETICS
SWIMMING CARDIOLOGY
SWIMMING COACHING
SWIMMING HYDRODYNAMICS
SWIMMING KINESIOLOGY
SWIMMING PHYSIOLOGY
SWIMMING PSYCHOLOGY
SWIMMING REHABILITATION
SWIMMING TEACHING
SWIMMING TRAINING

FURTHER ASPECTS:

application of biomechanics / biofeedback / body composition / computerized analysis / disease of ear, nose and throat / drag / dermatology / efficiency / electromyography / experimental psychology / energy expenditure / learning strategies / medical care / mental training / metabolism / methodology and methods / muscular mechanics / neuromuscular control / oxygen consumption / performance / physiological aspects / physiotherapy / propulsion / training effects

For further information and the 2 nd announcement, please contact:
5 th International Symposium of Biomechanics and Medicine in Swimming

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Tel.: 0521 / 106 5124