International Society of Biomechanics Newsletter

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Editorial

INTERNATIONAL SOCIETY OF BIOMECHANICS PRESIDENTS NEWSLETTER

It is my pleasure to write to all members again at this time. Your Council has recently met at Bristol just before the meeting of our colleagues of the European Society of Biomechanics and we conveyed to the organisers our compliments over the programme which they had arranged.

I am happy to tell you that there was a full turnout of all 14 members of the Council. Since they are all busy people we are most fortunate that this is possible. The meeting lasted from 11 a.m. on Friday 9th September to 1 p.m. on Saturday 10th September with short breaks for eating and sleeping! A remarkable total of 32 Agenda items were dealt with and working groups of Committee members will communicate with each other to tackle various organisational matters for report at the Council meeting in Los Angeles next year. Extracts from the Minutes of the meeting will be published in the next newsletter but you may wish to know a number of matters that were discussed.

The Society's finances were carefully reviewed and there is, at present, a slight downward trend in the overall resources of the Society which may in a future year require corrective action. As an immediate contribution we hope that all Members will help by recruiting new members and special incentive schemes are planned.

The Council wishes to acquire information about the members for guidance in its arrangement of future events. We will therefore be circulating with the call for subscriptions a questionnaire which we hope you will complete to allow us to determine your first discipline, your current employment and you affiliation to other societies.

The Council asked Dr Rozendal to convey to the other organisers of the X1 Congress in Amsterdam the warmest congratulations on the efficiency of their arrangements. We expect the proceedings to be available this year — a great achievement.

Ron Zernicke, Bob Gregor and William Whiting are making good progress for the XII meeting in Los Angeles. Get your Abstracts in early! Remember the reduction in registration fee for ISB Members and for early registration.

Start saving to attend the XIII meeting — see the announcement elsewhere in this newsletter. For me and for many of you, it will be the opportunity of a lifetime to see the world's most beautiful city in the world's youngest continent. We wish Graeme Wood and his colleagues every success in their endeavours.

The Council noted and approved the formation of the working group on computer simulation being organised by Andrzej Komor and the working group on two joint muscles being organised by Gerrit Jan Van Ingen Schenau. Working groups on specialist topics such as these are a useful and rewarding aspect of ISB's activities and participation is open to any member.

In this newsletter we will see also a report from the World Council on Sports Biomechanics and it is gratifying to note the continuation of the close relationship between this body and ISB. The Council is determined to continue this happy relationship.

Most of us have already started or are urgently facing the onset of a new academic year. There does not seem to be any country at the present time where educational institutions are not suffering from reorganisation which generally involve diminution of available funds for teaching, research and professional activities. I would be interested to have feedback from members on the effects of the present retrenchment in academic support so that the Council can consider whether they would wish to take any action related to particular countries or institutions where the effects of reduction in funds could imply a change in activities and priorities.

With best wishes to you all,

J.P. Paul

PROCEEDINGS OF THE 11th CONGRESS ON BIOMECHANICS

Gert de Groot, A. Peter Hollander, Peter A. Huijing, and Gerrit Jan van Ingen Schenau (editors)

This series represents the official proceedings of the biennial congress sponsored by the *International Society of Biomechanics* and includes the work of many prominent researchers from around the world. The volumes include review-type presentations by the keynote speakers as well as shorter descriptions of original research in the various areas of biomechanics.

Sections:

Muscle - Control of movement - Clinical aspects - Gait - Occupational biomechanics and ergonomics - Wheelchair - Soft tissue - Biomechanics of sports - Running - Shoe, floor and impact - Gymnastics - Ball games - Water, snow and ice - Weightlifting - Cycling - Other sports - General - Methods, instrumentation and modelling.

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Laboratory feature

Part I

CENTER FOR ERGONOMICS
THE UNIVERSITY OF MICHIGAN

Ergonomics, derived from the Greek words 'ergon', work, and 'nomos', law, means the study, or principles, of work. Ergonomists are interested in the design of human-hardware systems that are at once productive, efficient, and safe. They are concerned with improving both the design of machines, vehicles and tools, as well as the design of work methods and work environments in general.

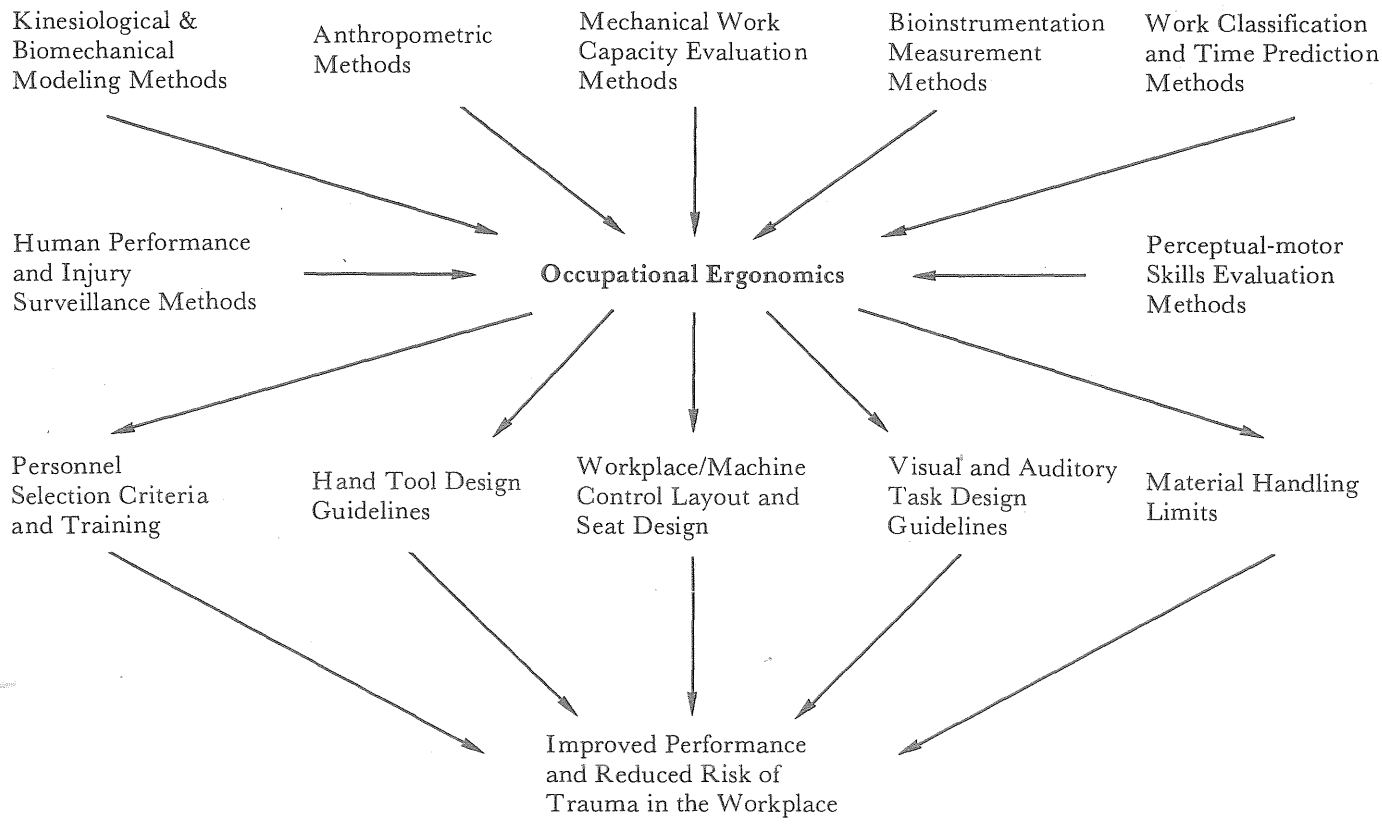
The Center for Ergonomics at The University of Michigan is a multidisciplinary organization devoted to education and research in ergonomics. It was founded in 1959 as the 'Engineering Human Performance Laboratory' of the Department of Industrial Engineering by Professor Walton Hancock. In the 1960s laboratory research provided the basic information needed to predict worker motion times and manual limitations to repetitive physical effort. This role was expanded in 1970 to include worker safety in 1972. Professor Don Chaffin became Director of the newly named Human Performance and Safety Engineering Laboratory. Researchers from other units in the University joined in cooperative activities (see **History of Center Faculty and Staff**). The name 'Center for Ergonomics' was confirmed by the Regents of the University in 1980 in recognition of the multi-disciplined nature of the research.

Though the Center for Ergonomics is first of all a research organization within the College of Engineering, the faculty of the Center are also professors in the departments of industrial and Operations Engineering, Bioengineering, and Environmental and Industrial Health. This faculty currently offers 40 credit hours of instruction in ergonomics annually to over 250 undergraduate and graduate students. Some of the major courses are:

Introduction to Human Performance
Human Performance Laboratory
Occupational Ergonomics
Safety Management
Work Measurement and Prediction
Human Factors in Engineering Systems
Biomechanics and Physiology of Work
Occupational Safety Engineering
Advanced Work Measurement
Man-Machine Systems
Laboratory in Biomechanics and Physiology of Work
Seminar in Human Performance
Seminar in Occupational Health and Safety Engineering
Industrial Hygiene
Occupational Health Controls

In addition to these courses, center faculty lecture in other academic courses, providing an awareness of ergonomics to an additional 200 students at the University each year. This large educational activity is enchanced by the existence of a training grant provided by the National Institute for Occupational Safety and Health, which had designated the University as one of fourteen **Educational Resource Centers** in the Country. This grant annually supports approximately 30 graduate students seeking advanced education in:

Occupational Safety Engineering
Industrial Hygiene
Occupational Medicine



The Center contributes to continuing education courses at Michigan

In addition to the academic programs, the following short courses are offered by the faculty and staff of the Center:
Occupational Ergonomics (5 days)
Ergonomics Workshop (3 days)
Micro-computer Applications in Occupational Health (2 days)
Management Briefing Seminar in Occupational Health and Safety (2 days)
Occupational Cumulative Trauma Disorders Symposium (2 days)
Industrial Low Back Pain Conference (3 days)

Each year over 400 practicing engineers, occupational health and safety specialists, and managers learn about contemporary ergonomics from these courses.

Extended Arm-Reach Motion and Fatigue Analysis

Little is known about the effects of extended reach, or working with hands overhead, upon basic manual assembly motions (e.g. move and reach times and errors) and onset of worker fatigue.

A series of pilot experiments have been completed. The experiments were designed to: (1) provide an estimate of the magnitude of performance limitations, and subject fatigue and discomfort, as the location of the hand was varied within the reach envelop; (2) determine which variables of hand location (i.e. hand height, bearing, range) resulted in meaningful limitations in human manual movement-time capability and reports of muscle fatigue and discomfort, and (3) test experimental hardware and software proposed for data acquisition and processing.

In initial studies, increased hand height and tool loads produced significant increases in move or reach times (20%-30% range), and the levels of muscular fatigue and discomfort. Postures which permitted rapid hand movements were found to produce the least fatigue and discomfort. Studies are continuing under sponsorship of the Ford Motor Company. The principal invesigators are Professors Langolf and Chaffin and Ph.D. candidate Steven Wiker.

Ergonomics of Material-Handling Assist Devices

In many jobs, workers pick up and carry loads that are heavy enough to cause a significant risk of injury. From an ergonomic point of view, the use of a hoist or lifting assist is often the only way to reduce risk of injury. There is a reluctance to use such mechanical aids however, where manual lifting is possible, because it is argued that hoists are awkward to use and require more time than manual handling.

This project is to evaluate physical stress and most importantly, the time required to transfer loads using hoist assist devices. We are developing standard time data for hoist travel times, and will attempt to define hoist design configurations that minimize operator time and effort. The development of such design concepts and data should better delineate the trade-offs among manual/mechanized/automated material handling. The research is continuing under sponsorship of Ford Motor Company in cooperation with Zimmerman Manufacturing Company. The principal investigators are Professor Langolf, Research Engineer James Foulke, and Ph.D. student Jeff Woldstad.

Computer-Aided Manual-Work Design

By surveying engineers in charge of the design of future manufacturing systems involving manual labor, it has been established that contemporary ergonomic principles are not often considered in such designs. It is believed that computer-aided methods of design might provide a means by which such principles can be easily and effectively used.

To date, forty practicing engineers in various organizational groups have been interviewed to determine current workspace-design practices. The results of these interviews have been coded and statistically analyzed to identify design practices, information requirements, and ergonomic concerns. Results have been used to develop a descriptive model of current design procedures, and to identify problems with regard to the use of ergonomic information, and areas for improvement in workspace design.

A prototype CAD system is being developed on an HP-1000 mini-computer at the Center. Practicing engineers are to be recruited to serve as system evaluators. Subsequent work will involve integrating this computerized ergonomic workspace-design technology within their design processes. The work is being sponsored by the Ford Motor Company. Principal investigators are Professor Chaffin and Ph.D. candidate Susan Evans.

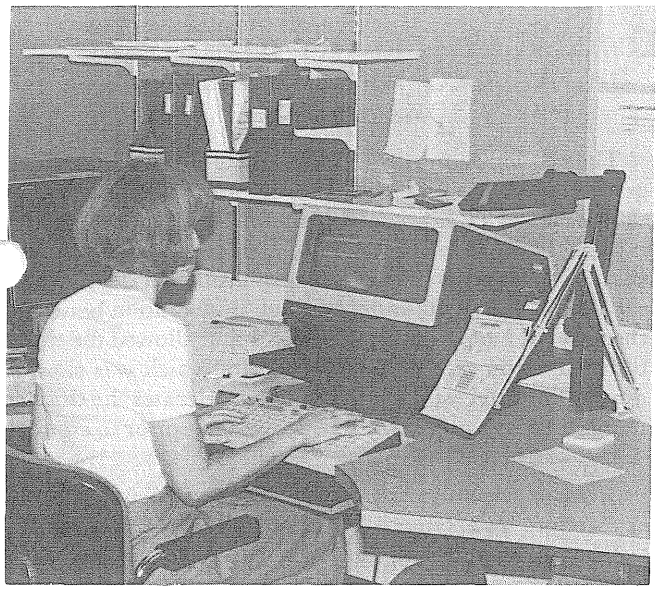
Ergonomics of Flooring

Slip and fall injuries account for approximately 20 per cent of serious injuries in industry. One objective of this research is to develop an understanding of how floors affect the potential for people slipping during work and to test the floors and shoes currently on the market for slip resistance. This information will then be put into a PC data base for use by concerned design and plant engineers.

A second objective is to study the effects of various floors and shoes on 'leg fatigue', which is often the reason older workers must abandon work that requires prolonged periods of standing and walking.

Two sets of preliminary experiments have been performed to compare various shoes and floors and their effects on electromyographic (EMG) signals of the muscles in the leg. The results of these experiments showed that EMG levels were affected by the shoes worn. Flooring also was shown to have an effect. It is believed that an increase in the EMG reflects an increase in the work done by leg muscles. Therefore, certain shoe-floor combinations seem to require more energy output by the legs than others. The next step is to attempt to quantify the work of indidivual muscles. The relative effects of shoes and floorings on workers can then be measured and evaluated. To do this, an analytical model of EMG to force output of the lower leg muscles during gait has been developed. This model will be used to predict the work being done by the individual muscles under various conditions common to industrial standing-and-walking operations.

The principal investigators are Professor Chaffin and Ph.D. student Mark Redfern. The work is continuing under sponsorship of the Ford Motor Company.



little research has been done to systematically analyze the ergonomics of the climbing movement. The primary purpose of this research is to develop a biomechanical model to predict the overexertion hazard during the climbing movement. Inputs to the model are measurable parameters such as hand and foot forces during the climbing activity, body movement patterns, and user anthropometry. Model outputs are estimated of articulation torques at each joint and estimated back compressive forces throughout the climbing cycle.

Validation of this model involved the evaluation of the model in laboratory conditions where the estimated outputs could be measured or calculated and compared to the model results. In this way the accuracy or validity of the model was determined for a number of combinations of task, equipment, and user characteristics.

This biomechanical model may be used to perform ergonomic analyses of existing or proposed climbing systems for general or specific user populations. In addition, the empirical data generated during the validation study will provide the basis for general guidelines in the selection of ladders.

The principal investigators are Professor Chaffin and Ph.D. candidate Donald Bloswick. The research is being sponsored by the Association of American Railroads.

Ergonomics of Hand Tools in Vehicle Assembly Operations

The use of automotive assembly tools such as nutrunners, grinders, and screwdrivers can impart physical stressors to the tool operator. These include vibration, cold exposure and mechanical stresses of forceful exertions and awkward hand posture. They are recognized risk factors in the production of sprains, cumulative trauma disorders and muscle fatigue in the upper extremities, which are a common cause of lost work and workers' compensation. The goal of this effort is to improve jobs by reducing the risk of cumulative trauma disorders in hand-intensive work. Toward this end are the following objectives: (1) enhance the tool-selection process by incorporating ergenomics consideration into the selection criterion, and (2) study physical stress associated with power hand tools.

The effects of power tool handle design on the tactile and reflexive influences of hand grip and motor control, which can contribute to cumulative trauma disorders and localized muscle fatigue, are being studied. Laboratory experiments include studies using a vibrating handle instrumented with a strain gauge dynamometer to measure hand grip exertion, driven by an electromechanical shaker. Field studies include tool vibration amplitude/frequency analysis and postural and grip force analysis of common manual jobs in industry. As part of this, special studies are underway to evaluate the effects of various handles used on spotwelding guns and upholstery staple guns.

Climbing-System Evaluation Methods

While climbing is an inherent part of many activities performed in home, occupational, and recreational environments,

Information Display Ergonomics

Often errors in assembly units that use a variety of parts can result form misreading or misinterpreting assembly instruction. This results from the large amount of information on the instruction sheet, the complexity of coding used, or because of problems in correctly identifying the alphanumeric characters used.

The project is an attempt to determine a better method of presenting assembly information to production workers. It is hypothesized that unambiguous and clearly recognizable information would: (1) lead to greater usage of the instruction sheets and fewer errors, (2) impose less of a requirement or need for memorization of broadcast code, (3) obviate the need for marker highlighting, a practice resorted to by foremen on some assembly lines, (4) make it easier to justify the time allocation to read assembly information, and (5) enable personnel changes between lines and/or departments to be made more easily, since learning time to become familiar with part codes would be reduced significantly.

The efficacy of a CRT based parts system for a select assembly line is being investigated. Progress to date has included the development of a graphics package for parts broadcast, and an alphanumeric format display with reverse video highlighting. Attempts are now being made to perform validation experiments in real production environments.

A second investigation is to develop criteria for the design of human interfaces in automated manufacturing where ease of manual start-up, troubleshooting and of maintenance are significant. Studies are underway to develop computer aided algorithms that use 'human' criteria.

This research is sponsored by the Ford Motor Company. The principal investigator is Professor Dev Kochhar.

Thesis abstract corner

THIGH AND SHANK INTERACTIONS DURING SOCCER PLACE KICKING

by

Martin James Toomey

A thesis submitted in partial fulfillment of the Masters degree in Physical Education, Otago University, Dunedin, New Zealand

Supervisor: Bob Marshall

In order to determine the kinetic and kinematic patterns which characterise soccer place kicks and the mechanics responsible for generating these patterns, two analytical techniques were applied to data collected for six subjects. Three kicking criteria were specified with three trials per criterion being averaged and analysed for each subject. The first criterion was to demonstrate accuracy over 15 metres, the second criterion to demonstrate accuracy over 30 metres, and the third criterion to perform a maximal distance soccer place kick.

An Inverse Dynamics analysis was used to examine the kinematic and kinetic patterns which characterised the kicking movements. The results demonstrated proximal to distal sequencing of the end-point linear and segmental angular velocities, but this pattern was not apparent in the segmental angular acceleration data.

Conclusions could not be drawn regarding the expediency of one kinematic pattern over another, since all subjects satisfied the performance criteria in the 15 and 30 metre kicks. In the maximal distance kicks, the best performers were those who not only attained large segmental angular velocities, but timed the peaking of these velocities so that they were effectively utilised. The importance of a clean foot-ball contact was identified after finding that the magnitudes of the shank angular velocities and ankle linear velocities did not directly correlate to the distance the ball travelled in the maximal distance kicks. After finding consistent organisation in the timing of the peak segmental angular velocities across all three kicks it was suggested that soccer place kicks are controlled by a generalised motor program.

Variability was more common in the kinetics than the kinematics, with the major variations being present during the latter stages of the slower kicks. Kinetic and kinematic variability decreased in the maximal distance kicks as time became a limiting factor. Results suggest that each subject utilises a generalised set of kinetics to produce a kick, and that variations are present to overcome perturbations or make final adjustments in the segmental orientations prior to foot-ball contact.

An Interactive Dynamics analysis solved the Newtonian equations of motion for the thigh and shank (a quasi-rigid shank and foot segment) and partitioned the resultant joint moments (RJM) across the hip and knee joints into terms which were functions of the kinematic, gravitational and inertial parameters of the lower extremity. This procedure allowed the effect of each segments motion on its adjacent link to be studied and vica versa. Results suggested that during the initial stages of the kicks the motion of each segment was primarily controlled by the RJM as its proximal end. Following initiation of the movement, the adjacent link assumes partial responsibility for controlling the segmental kinematics.

The acceleration—deceleration theory proposed by Plagenhoef (1971), was refuted after finding that the deceleration of the thigh was not solely responsible for the subsequent increase in the shanks acceleration, rather the motion of the shank was found to be partially responsible for decelerating the thigh. The shank-induced thigh deceleration benefited the forward motion of the shank in that it allowed the shank to rotate faster relative to a knee joint which was slowing down. This suggests that the shank decelerates the thigh to increase the magnitude of its own velocity prior to contact.

AN ANALYSIS OF SELECTED CINEMATOGRAPHIC AND DESCRIPTIVE VARIABLES IN THE JUMP AND CONVENTIONAL OVERHAND VOLLEYBALL SERVES OF UNITED STATES OLYMPIC ATHLETES

by

H. Scott Strohmeyer

A thesis submitted to the School of Physical and Health Education and the Graduate School of the University of Wyoming in partial fulfillment of the requirements for thee degree of Master of Science

Supervisor: Professor John B. Woods

ABSTRACT

The purpose of this research was to compare and analyze the conventional and jump volleyball serves of eleven selected male and female United States Olympic Volleyball players. Pre-determined mechanical and descriptive measures were obtained and analyzed to ascertain which of these two techniques most effectively met established criteria for a well executed serve. Pertinent literature indicated that the variables considered to be of greatest importance for the succesful execution of this neuromuscular skill are: ball placement accuracy; ball trajectory angle; and ball velocity.

Specifically this study determined each athletes: standing height; vertical jump height; preferred arm standing reach height; ball placement accuracy and analyzed from high speed 16 mm film: pre-impact vertical ball displacement velocity; post-impact resultant ball velocity; and post impact trajectory angle.

The subjects were filmed during two photographic sessions at the U.S. Volleyball Training Center in San Diego, California. Mean values for each of the above variables were compared among groups using an 'a priori t' test comparison to define significant differences between groups at the p 0.05 level. The statistical analysis revealed that the jump serve had pre-impact ball drop velocities, and post-impact resultant ball velocities that were significantly lower trajectory angles than the overhand serve and proved to be just as accurate. The analysis also indicated that for this sample of Olympic athletes there was a significant difference in mean standing heights between the conventional and jump servers with shorter subjects favoring the jump serve.

A BIOMECHANICAL AND PHYSIOLOGICAL EVALUATION OF THE EFFECT OF LOWER EXTREMITY LOADING ON RUNNING PERFORMANCE

A Thesis in
Physical Education
by
Philip E. Martin

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

December 1983

ABSTRACT

This study examined the effect of adding load to either the feet or thighs on biomechanical and physiological measures of running performance. Submaximal oxygen consumption and heart rate, selected temporal and kinematic descriptors of the running cycle, and measures of mechanical work were quantified for five load conditions to determine the effect of both load magnitude and load position on running performance.

Fifteen subjects completed an eight-minute run on a treadmill at 12.0 km/hr for each of the following load conditions: 1) no added load, 2) 0.25 kg added to each thigh, 3) 0.25 kg added to each foot, 4) 0.50 kg added to each thigh, and 5) 0.50 kg added to each foot. Oxygen consumption and heart rate data were collected and high speed films were taken at 100 fps for each load condition. The films were analyzed to yield values for a series of temporal and kinematic descriptors of the running patterns of the subjects including stride length, single leg support time, swing time, and flight time. Also measured from film were the mechanical work done on the foot, shank, thigh, and total leg, and the contributions of the joint reactions forces and joint moments of the lower extremity to these work measures. The work analysis was limited not only to the lower extremity, but also to the swing phase of the running cycle.

The results demonstrated that oxygen consumption increased nearly linearly as load was increased on both the thighs and feet. Foot loading, however, resulted in oxygen consumption increases that were approximately twice as great as those due to thigh loading. The increase in oxygen consumption was about 0.7% for each 100 g of load applied to the feet. The results for heart rate were similar to those for oxygen consumption. Heart rate, however, was a less sensitive measure of the increased demand due to the addition of load rather than oxygen consumption.

The results for the temporal and kinematic descriptors indicated that there was little change in these variables produced by adding load to the feet or thighs. Based on these results, it is believed that the basic movement pattern for running is resistant to change when small amounts of load are applied to the lower extremities. This has interesting implications not only when considered from mechanical and physiological perspectives, but also from a motor control perspective. When the effect of load to the feet or thighs on the mechanical work done on the segments of the leg was evaluated, the results demonstrated that the work values increased as load was increased. While the increases in work were proportional to the magnitude of the load, they were considerably greater for the feet than for the thighs. With respect to the relative contributions of the joint reaction forces and joint moments to the work done on the lower extremity segments, the results indicated that the joint reaction forces played a greater role in doing work during the swing phase than the joint moments. Nevertheless, both the hip and knee moments made important contributions to the work done on the thigh and shank.

The function of the hip moment was primarily one of energy generation to the thigh early in the wing; whereas, the knee moment acted primarily to dissipate energy from the thigh and shank.

When considered in combination, the results of this study indicated that a direct relationship exists between the changes in oxygen consumption and changes in the work done on the lower extremity during the swing phase as load was increased. Because there was little change in the basic pattern of movement, the increases in work were due almost totally to the increases in the inertia of the loaded segment. The increases in oxygen consumption were then attributed to greater involvement of the musculature. This increased joint forces and moments which were needed to overcome the increased inertia due to segment loading.

IMPLEMENTATION OF HISTORY DEPENDENT PROPERTIES IN A MODEL OF HUMAN SKELETAL MUSCLE

by

Anthony J. Leyland

M.Sc. Thesis
School of Kinesiology
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(Supervisor: A.E. Chapman)

ABSTRACT

This thesis was designed to build upon an existing two-component model of muscle. The model has been used to simulate human muscular contraction. It was written in APL and performed on a digital computer using an iterative process.

Some modification of mechanical output is observed in human skeletal muscle which has undergone stretch. This phenomenon, called force enchancement (FE), was not included in the existing model. Consequently FE was investigated using existing data and those collected from additional experiments. The experiments were performed using one subject. Maximally contracting supinator muscles were stretched at various speeds by a free gravitational load.

Mechanical relationships for the contractile component (CC) and the series elastic component (SEC) of a two-element model were derived. These represented mechanical properties of a single equivalent muscle performing forearm supina-

tion for this subject. The phenomenon of FE was then incoporated into the model. Hotelling's t^2 test for matched pairs revealed no significant difference ($p < 0.01$) between experimental and model output.

The analyses performed in investigating human eccentric contraction centred on the role of the CC and SEC in a two-element model. Simulations of muscle stretched showed that no CC stretch occurred in the model despite the presence of FE in the experimental results. Because only SEC stretch occurred and the SEC is considered to be a passive element not subject to FE, a criticism of the two-element model is presented. As most of the elasticity within whole muscle resides in the cross-bridges, they are considered to be central in a 'geometric' theory of FE presented in this thesis.

The model is statistically accurate as a predictor of the mechanical response of human skeletal muscle during and after eccentric contractions but this application is purely practical. Despite begin able to simulate experimental output, it is not possible to explain theoretically the phenomenon of FE within the framework of the two-element model.

STRUCTURAL AND MECHANICAL ADAPTATION OF IMMATURE BONE TO STRENUOUS EXERCISE*

by

J.J. MATSUDA

Master of Science
in
Kinesiology

Los Angeles, California, 1985

Supervisor: Ronald F. Zernicke

ABSTRACT

To investigate the adaptive reponses of immature bone to increased loads, young (3-wk-old) White Leghorn roosters were subjected to moderately-intense treadmill running for 5 or 9 wk. The training program induced significant increases in maximal O_2 consumption and muscle fumarase activity in the 12-wk-old birds, demonstrating that growing chickens have the ability to enhance their aerobic capacity. The structural and mechanical properties of the runners' tarsometatarsus bones were compared with sedentary age-matched controls at 8 and 12 wk of age. Suppression of circumferential growth occurred with exercise in both ages, whereas exercise enhanced mid-diaphysial cortical thickening, especially on the bones' concave surfaces. Although cross-sectional area moments of inertia did not change with exercise, significant decreases in bending stifness, energy to yield, and energy to fracture were observed. It was concluded that strenuous exercise may retard long-bone maturation, resulting in more compliant bones.

* Published as: Matsuda, J.J., Zernicke, R.F., Vailas, A.C., Pedrini, V.A., Pedrini-Mille, A., and Maynard, J.A. Morphological and mechanical adaptation of immature bone to strenuous exercise. *Journal of Applied Physiology: Respiratory, Environmental, and Exercise Physiology* 60: 2028-2034, 1986.

You should know...

THE INTERNATIONAL SOCIETY OF ELECTROPHYSIOLOGICAL KINESIOLOGY - I.S.E.K.

1) ISEK initiated a membership drive aimed to all scientists and persons interested or active in electrophysiological kinesiology. Joining the society requires only filling a form and $ 15 annual fee to the treasurer of the society.'

2) ISEK will meet in the future every two years instead of three years.
The congress year is always in the year when the ISB does not meet.

3) The new ISEK officers are:
Dr. DE LUCA - President
Dr. ZILVOLD - Vice President
Dr. WALLINGA - Council member
Dr. SOLOMONOW - Council member
Dr. MANO - Council member
Dr. JONSON - Council member
Dr. LEHR - Treasurer
Dr. HOBARD - Secretary-General

Society news
Important notice

ISB CONGRESS GUIDELINES

In the summer issue of the ISB newsletter (nr. 31), the ISB Congress Guidelines were published. Unfortunately, the version printed in that issue was a preliminary one, not intended for publication. At that time, it had already been replaced by a more detailed and complete version.

The intent of these guidelines is to provide possible future organizers of ISB congresses with the format needed for their submission and to familiarize the definitive organizers of a congress with the many aspects of this task. These guidelines have been developed by a subcommittee of the Executive Council of ISB, consisting of Erich Schneider (chairman), Bengt Jonson, Paavo Komi and Robert W. Norman. The guidelines contain statistical material and examples of documents from earlier conferences. Anyone interested in obtaining a copy of this material may write to the secretary-general or one of the authors.

Letter to the Editor

Dear Editor,
I am writing to advise you of the contents of a letter I send to Dr. N. Rosselle of the EMG and Clinical Neurophysiology Journal concerning the journal's unauthorised designation as the 'Official Journal of I.S.E.K.'. I would be grateful if you shared this letter with your readers.

« The **EMG and Clinical Neurophysiology Journal,** of which you are the Editor, carries the designation 'Official Journal of I.S.E.K.'.

The Council of I.S.E.K. has often expressed concern about the designation. During the recent meeting of the Council, held on June 23, 1988, the following resolution was passed :

'That the **Electromyography and Clinical Neurophysiology Journal** not continue to designate itself as the Official Journal of I.S.E.K.'

You are hereby requested to terminate all references to the Journal's affiliation with I.S.E.K. The council members are unanimous in their decision and have indicated their intentions to monitor your compliance of their request.

I assume that this request causes no undue hardship to your journal. If you wish to discuss this issue please communicate with me at the above address. If I do not receive any communication from you by September 1, 1988 I will assume that you agree to comply.

Thank you for your attention in this matter.

Sincerely,

Carlo J. De Luca, Ph. D.
President, I.S.E.K. »

MUSCLE PHYSIOLOGIST OR BIOMECHANIST

The Department of Kinesiology at the University of Colorado, Boulder invites applications for a tenure-track position available August, 1989: either a **muscle physiologist** or a **biomechanist**. Preference will be given to candidates at the Assistant Professor rank, but candidates at all levels will be considered. Candidates for the muscle physiologist position should have a Ph.D., postdoctoral training, and a record of strong research accomplishment. Preferred areas of expertise include isolated working heart and skeletal muscle preparations and/or hindlimb perfusions.

Candidates for the biomechanics position should have a Ph.D. with a strong background in biomechanics, demonstrated research experience, and experience in obtaining extramural research funding. Teaching experience at the undergraduate and graduate levels is desired for both positions. To apply, send letter of application, curriculum vitae, and three letters of reference to: Dr. Dale Mood, Chair, Department of Kinesiology, Box 354, University of Colorado, Boulder, CO 80309-0354. The deadline for receipt of applications is 1 March, 1989. The University of Colorado at Boulder has a strong institutional commitment to the principle of diversity. In that spirit, we are particularly interested in receiving applications from a broad spectrum of people, including women, members of ethnic minorities and disabled individuals.

UNIVERSITY OF WISCONSIN-MADISON DEPARTMENT OF PHYSICAL EDUCATION & DANCE

POSITION VACANCY: **Associate/Assistant Professor in Biomechanics**
The Department of Physical Education and Dance is seeking a tenure-track Associate or Assistant Professor in Biomechanics. Applicants must have research and teaching experience in Biomechanics, and the successful candidate will be expected to establish an independent research program in biomechanics.

BEGINNING DATE: August 28, 1989. This is a full-time tenure track position with nine-month academic appointment.

RESPONSIBILITIES:
1. Establish an excellent research program.
2. Teach undergraduate and graduate courses in the biomechanics area.
3. Advise graduate students.
4. Fulfill service expectations.
5. Obtain extramural funding.

QUALIFICATIONS:
1. Ph.D. in biomechanics area.
2. Ability to teach undergraduate and graduate courses.
3. Demonstrated record of refereed publications and extramural funding.
4. Postdoctoral experience desired.

SALARY: Commensurate with qualifications and experience.

APPLICATION PROCEDURE (please submit):
1. Letter of application
2. Current curriculum vita
3. Three reprints of your most recent research
4. Names, address, and phone numbers of three references

SEND TO:
Professor William P. Morgan, Chair
Search Committee-Biomechanics
Department of Physical Education and Dance
University of Wisconsin-Madison
2000 Observatory Drive
Madison, WI 53706

DEADLINE: February 1, 1989 or until position is filled.

The university of Wisconsin-Madison is an equal opportunity and affirmative action employer. Applications are encouraged from women and membres of minority groups.

ANNOUNCEMENT FOR A.S.B. MEMBERS

The 1989 American Society of Biomechanics meeting will be held in Burlington, Vermont, on August 23-25, 1989. For more detailed information, please contact:

David G. Wilder, Ph.D.
University of Vermont
Orthopaedics & Rehabilitation Dept.
C-418 Given Building
Burlington, VT 05405 U.S.A.
Telephone No.: (802) 656-2250 or (802) 656-4253

Calendar of world wide scientific events

April, 14-17, 1989
Formia, Italy, Symposium on Biolocomotion: a century of research using moving pictures, Associazione Italiana di Cinematografia Scientifica, Instituto di Fisiologia Umana - Universita degli Studi di Roma 'La Sapienza'. Information: Prof. Aurelio Cappozzo, Instituto di Fisiologia Umana, Universita degli Studi 'La Sapienza', 00185 Roma, Italy, phone: 6-490 673

April, 26-30, 1989
Vienna, Austria, Advances in Ergometry, 6th International Seminar on Ergometry, ICSSPE, International Council of Sport Science and Physical Education, Working Group on Ergometry, Scientific Secretariat: Doz. Dr. Norbert Bachl, Institut für Sportwissenschaften der Universität Wien Abteilung Sportphysiologie (Institute of Sport Sciences, Department Sport Physiology), Auf der Schmelz 6, A-1150 Wien/Vienna, Austria.

April 27-29, 1989
Leuven, Belgium, "XIVth Meeting of the European group of Pediatric Work Physiology" (c/o Prof. Dr. G. Beunen, K.U.L., I.L.O., Tervuurse Vest 101, 3030 Heverlee, Belgium) Tel.: 016/22.23.10.

May 14-19, 1989
Papendal, The Netherlands, "IXth Congress for Sports Information", Theme: "Effective Sports Information for the Nineties" (c/o: Rob Timmer, Secr. Gen. of IASI, Laan van Meerdervoort 1a, 2517 AA The Hague, The Netherlands) Tel.: (070)632963. Telex: 34379 nsfsp.

June 21-24, 1989
Berlin (West), FRG, "7th Intern. Symposium Adapted Physical Activity - an interdisciplinary approach" (c/o 7th ISAPA BERLIN '89, Secretary, Institut für Sportwissenschaft, Freie Universität Berlin, Rheinbabenallee 14, D-1000 Berlin 33) Tel.: (030)824.37.31.

June 26-30, 1989
Los Angeles, "XII Congress of Biomechanics" (c/o XII Intern. Congress of Biomechanics, UCLA Deptm. of Kinesiology, 2854 Slichter Hall, Los Angeles, CA 90024-1568, USA. Tel.: (213)825-3910 of 825-5376.

June 29-July 3, 1989
Maccabiah-Wingate, International congress on sport sciences & coaching. International Congress Secretariat: Wingate Institute for Physical Education & Sport, Wingate Post 42902, Israel.

July 3-7, 1989
Brussels, Belgium, International Congress 'Dance and Research', Vrije Universiteit Brussel, Auditorium Q, Pleinlaan 2, Prof. Dr. Cl. Brack, International Congress 'Dance and Research', V.U.B.-H.I.L.O.K., Pleinlaan 2, B-1050 Brussel, Belgium

July 3-7, 1989
Albena, Bulgaria, Sixth International Symposium on Motor Control, Union of the Medical Scientific Societies in Bulgaria, Bulgarian Society for Physiological Sciences, Institute of Physiology of the Bulgarian Academy of Sciences

July 14, 1989
Helsinki, 31th International Congress of Physiological Sciences. (Secretariat: Pr. O. Hanninen - Travel Experts Ltd - P.O. Box 722 - SF - 00101 Helsinki - Finland)

July 16-19, 1989
Paris, Symposium 'Head Movement Control'. (Secretariat: A. Berthoz - CNRS - Laboratoire de Physiologie Neurosensorielle - 15 rue de l'Ecole de Médecine - 75270 Paris)

July 18-21, 1989
Birmingham, United Kingdom, 'International Sports Science Conference'. Theme 'Science in the service of sport' (c/o The Sports Council, 16 Upper Woburn Place, London WC1H OQP). Tel.: 01-3881277, Fax: 01-3835740, Telex: 27830 SPORTC G.

July 23-27, 1989
Denpasar, Indonesia, 'IX IAPESGW World Congress'. Theme: 'Better Family Life Through Physical Education and Sport' (c/o XI IAPESGW Congress, Gedung Koni, Jalan Gelora Pintu Satu, Jakarta 10270, Indonesia). Tel. (65021) 587492 - 5481890, Telex: 45214 koni ia.

Aug. 07-12, 1989
Singapore, '7th World Congress on Sport Psychology'. Theme: 'Sport Psychology and Human Performance' (c/o Dr. C. K. Giam, Singapore Sports Council, National Stadium, Kallang 1439, Singapore). Tel: (65) 3457111, Telex: rs 35467 natstad.

Aug. 23-25, 1989
University of Vermont at Burlington, Vermont, 13th Annual Meeting of the American Society of Biomechanics, UVM Conferences, 460 So. Prospect Street, Burlington, VT 05401 USA, (802) 656-2088.

Aug. 28-Sep. 01
Turku, Finland, '2nd Paavo Nurmi Congress and Advanced European Course on Sports Medicine'. (c/o Dr. Martti Kvist, M.D., Sports Medical Research Unit, Kiinamyllynk. 10, SF-20520 Turku, Finland). Tel.: 358-21-513355.

Aug. 29-Sep. 01, 1989
Saarbrücken, FRG, International Symposium on 'Research in Motor Learning and Movement Behavior' (c/o Prof. Dr. Reinhard Daugs, Sportwissenschaftliches Institut der Universität des Saarlandes, Im Stadtwald, 6600 Saarbrücken, FRG). Tel.: (0681)3024170.

Sep. 05-08, 1989
Barcelona, Spain, 'XVI Congreso Grupo Latino y Mediterràneo de Medicina del Deporte' (c/o CEARE, Residència Blume, Av. Paisos Catalans, 12, 08950 Esplugues de Llobregat, Barcelona, Espana). Tel.: 254 07 78.

Sep. 6-8, 1989
Institut Méditerranéen de Technologie, Marseille, XIVème Congrès annuel de la Société de Biomécanique & Journée Protheses, Lasers, Instrumentation vasculaires, information: Mr. Régis Rieu, Institut de Mécanique des Fluides de Marseille, XIVème Congrès de Biomécanique, 1, rue Honnorat, 13003 Marseille, tél.: 91.08.16.90.

Oct. 4-6, 1989
Lyon, XXVe Congrès de la Société d'Ergonomie de Langue Française Self, Evolutions technologiques et ergonomie, Palais des Congrés de Lyon, Quai Achille Lignon, 69006 Lyon, Secrétariat: Congrès Self, Inrets Lesco 109, av. S. Allende, Case 24 - 69675 Bron Cédex-F, Tel.: 78.26.90.93

Sep. 11-15, 1989
At the London Hospital, London, England. VIIIth World fina Medical Congress on Aquatic Sports. Further Information: Conference Service Limited, Aldine House, 9-15 Aldine Street, London W12 8 AW. Tel.: 01-740 8121 (International 2 44-1-740 8121) Telex: 916024 Confer G.

Sep. 22-24, 1989
Saumur, Médecine et Sports Equestres, 7e Congrès des pays francophones, Groupe d'étude de la médecine des sports équestres, secrétariat général: Dr. B. Auvinet, Centre Hospitalier de Laval, F 53024 Laval Cedex, Tél.: 43 66 50 00

Oct. 29-Nov. 3, 1989
Colorado Springs, Colorado, U.S.A., World Congress on Sport Sciences. Promoted by the International Olympic Committee, Medical Commission. Organized by the United States Olympic Committee, c/o M.M. Newsom, U.S. Olympic Committee, 1750 East Boulder Street, Colorado Springs, CO 80909 U.S.A.

Jan. 28-Feb. 02, 1990
Auckland, New Zealand, IXth Commonwealth and International Conference (c/o Conference Convenor 1990, Ms. Rosalie King, Auckland College of Education, Private Bage, Symonds St., Auckland, New Zealand).

May 21-25, 1990
Brussels, Belgium, International Congress on 'Youth, Leisure and Physical Activity'. Vrije Universiteit Brussel, HILOK, P. De Knop, secretary general, Pleinlaan 2, B-1050 Brussels, Belgium.

May 27-June 01, 1990
Amsterdam, The Netherlands, XXIV FIMS World Congress of Sports Medicine (c/o Organisatie Bureau Amsterdam b.v., Europaplein 12, 1078 GZ Amsterdam, The Netherlands, Tel.: 31/2044087. Telex: 13499 raico nl.).

Sep. 02-07, 1990
Brussels, Belgium, International ISAK-congress 'Kinanthropometry IV) incorporated in the international congress on 'Youth, Leisure and Physical Activity' (c/o Dr. P. De Knop, Vrije Universiteit Brussel, HILOK, VTBP, Pleinlaan 2, 1050 Brussel, Belgium). Tel.: (02)641 27 44, Telex: 61.051 VUBCO-B, Fax: (02)641.22.82.

April 8-13, 1991
Maastricht, The Netherlands, 'Second World Congress of Science and Football' (c/o Prof. J.M. Greep, Dept. of Surgery, Academic Hospital St. Annadel, Maastricht, The Netherlands).

Sep. 10-15, 1991
Cologne, FRG, '8th European Congress of Sport Psychology'. Theme: 'Movement and Sport: Psychological Fundamentals and Effects' (c/o Erwin Hahn, Bundesinstitut für Sportwissenschaft, Carl-Diem-Weg, 5000 Köln, 41, FRG). Tel.: (0221)4979-161, Telex: 8881178 bisp d.

Dec. 9-14, 1991
ISB XIII Congress
University of Perth - Western Australia organisation: Dr. Graeme Wood

SYMPOSIUM ON BIOLOCOMOTION

The first of October 1888, Etienne Jules Marey, at the Académie des Sciences of Paris, said: 'Je aix l'honneur de vous présenter aujourd'hui une bande de papier sensible sur la quelle une série d'images a été obtenue, à raison de vingt images par second.' He also said: 'La photocronographie contient la solution de touts les problèmes de physiologie, de physique ou de mécanique dans lesquels il faut déterminer, à des temps égaux, la position d'un corps en différentes points de l'espace.' Optoelectronics is taking over, but Marey's methodological approach has not lost its cultural momentum.

We invite the students of biolocomotion to take a break from their everyday research activity, and review the work of our predecessors with the aim of acknowledging the continuity of the scientific thought, clarifying established concepts, and drawing inspiration for future work.

The Symposium will be opened by S. Cerquiglini, University of Rome 'La Sapienza' with and introductory lecture. M. Marchetti, University of Rome 'La Sapienza', a student of Borelli's work, will tell us what had been achieved in biolocomotion studies, before invention of photography. V. Tosi, A.I.C.S. member, will bring original material from the historical film archives about Marey and Muybridge. The contribution to the analysis of human walking given by C.W. Braune and O. Fisher will be discussed by P. Maquet, from Bruxelles, J.P. Clarys, Vrije Universiteit Brussel, will deal with the origin of electromyographic investigations. The scientific impact of Marey's work will be reviewed by S. Bouisset, University Paris Sud. H. Jansons, from Riga, U.S.S.R., will present the most interesting material belonging to the Russian scientist Bernstein. Everybody is aware of the gigantic work done by the California team at Berkeley. This will be illustrated by J.P. Paul, University of Strathclyde. The development of optoelectronics, its present and future uses in biolocomotion will be presented by A. Capozzo, University of Rome 'La Sapienza', and N. Berme, The Ohio State University. The contribution given by moving picture techniques to orthopedics will be discussed by R. Brand, The University of Iowa. R. McN. Alexander, University of Leeds, will address the state of the art knowledge in animal locomotion. D. Carpitella, University of Rome 'La Sapienza', will talk about ambulation and cultural identity in human gait.

We wish you a lot of health, luck, success, love, good research, productivity... for 1989!!!

Jan Pieter Clarys and Jan Cabri

Due to the mixed colouring of the above cartoon and due to the content of the new years bottle the autumn issue of the Newsletter 1988 n° 32 was erroneously printed in 'purple' instead of 'green'... Guess what the colour will be of the 1989 issues!?