



International Society of Biomechanics Newsletter

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AFFILIATE SOCIETIES OF ISB:

American Society of Biomechanics; British Association of Sport and Exercise Sciences; Bulgarian Society of Biomechanics; Canadian Society of Biomechanics/Société canadienne de biomécanique; Chinese Society of Sports Biomechanics; Comisia de Biomecanica Inginerie si Informatica (Romania); Czech Society of Biomechanics; Formosan Society of Biomechanics, Japanese Society of Biomechanics; Korean Society of Sport Biomechanics; Polish Society of Biomechanics; Russian Society of Biomechanics; Société de biomécanique (France).

From the President
Sandra J. Olney, Ph.D.

Organizations, Culture and Change

Nearly all of us work in organizations: universities, research institutes, hospitals, industries. As an administrator I have acquired great respect for organizations - if they work well their goals can be achieved and the people within them have fulfilling working lives. However, organizations are quite fragile, and it is surprising to me how easily a workplace degenerates into a truly dysfunctional unit. I have seen this happen during periods of change, which, not surprisingly, makes organizations particularly vulnerable. However, change is unlikely to go away. With the advent of globalism, a need for knowledge based organizations and acceleration of the information age, one thing that seems certain about the future of our working places is that they will involve change.

We all know that each organization, and sometimes each department, has what we can refer to as its own culture. Recently analysts have given some attention to culture, as it is clearly an integral part of understanding organizations and in determining their ability to respond to change. Although we use the word often enough, what is culture? Words relating to culture emphasize the idea that certain things in groups are shared or held in common. These "things" include behaviors we can observe such as language and customs, group norms, espoused values, formal mission statements, implicit rules for getting along in the organization, climate (physical layout as well as how people relate to each other), shared meanings, and sometimes physical symbols that characterize the group.

Analysts look at organizational culture at three levels depending upon the degree to which the cultural phenomena are visible to the observer. Artifacts are most obvious and include such things as the physical environment and style of dress and

interacting. Espoused values are less evident. The third level is comprised of basic underlying assumptions, which are hardest for outsiders to discern as they are unspoken and taken for granted by members of the organization. You might like to identify a few features in your own workplace at each level, as a kind of basic analysis.

One thing we know about culture is that it is a stabilizing, conservative force, rather than a force for change. Think about the angst suffered by a unit when they are directed to change even what would be referred to as artifacts. Have you ever been involved in an unpopular shifting of office space? Another thing we know about culture is that it is remarkably difficult to change, especially at the deeper levels of espoused values and basic assumptions.

It appears, then, that we have a dilemma - the working culture provides stability yet we will almost certainly be faced with constant change in the environment that, if it is to be successful, will require the organization to manage. In other words, it seems we need to institutionalize and stabilize learning and innovation itself, or foster what can be termed a "learning organization." One might expect there to be a number of cultural dimensions of organizations that are relevant to the capacity of a culture to learn, and this is indeed the case. I draw from the work of Edgar H. Schein (*Organizational Culture and Leadership*, Jossey Bass, San Francisco, 1997) in identifying some of these dimensions and hypothesizing the ideal location along each of these dimensions for learning to occur on a continuing basis. Although he identifies ten dimensions, I will discuss only a few of these. For each dimension (Table) consider where along the continuum you think that learning is favoured. The hypotheses in the table have yet to be examined empirically, of course. Each dimension is discussed briefly below.

Table. Characteristics of a Learning Culture (indicated by X).

Organization-Environment Relationship		
<i>Environment dominant</i>	<i>Symbiotic</i>	<i>Organization Dominant</i> X
Nature of Human Nature		
<i>Humans basically evil</i>		<i>Humans basically good</i> X
<i>Human nature fixed</i>		<i>Human nature changeable</i> X
Nature of human relationships		
<i>Groupism</i>	X	<i>Individualism</i>
<i>Authoritative/paternalistic</i>	X	<i>Collegial/participative</i>
Task versus Relationship orientation		
<i>Primarily task</i>	<i>Task and Relationship</i> X	<i>Primarily relationship</i>

Organization-Environment Relationship. The learning culture, in a situation of change, must feel that the environmental context in which it exists is manageable, at least to some degree. Think of the despair of workers when they say, "We can't do anything about this - whatever we say won't make any difference." The more turbulent the environment the more important it is that leaders can argue and show that some control is possible. Universities in Canada have suffered devastating financial cutbacks. Still, I have seen extraordinarily creative management result in positive change - examples of control of the organization over the environment.

Nature of Human Nature. Learning implies desire for survival and improvement, so it is thought that if one assumes that people are basically lazy and passive and have no concern for anything beyond themselves, management will develop control-oriented organizations which are the opposite of learning organizations. The resulting organizations will fail as the environment becomes more turbulent and as problem solving becomes increasingly complex. In contrast, as problem solving requires more widely based knowledge and skills, management becomes more and more dependent upon the other people in the organization, trusting that people have positive motives and will do their best for the organization. Similarly, a

learning culture must assume humans are capable of change!

Nature of Human Relationships.

Does groupthink or individualistic thinking favour the learning culture? We might postulate that if creativity and innovation are central to learning, then an individualistic culture would be more favourable. On the other hand, if implementation of complex interdependent activities is required, we might think that a groupist kind of organization would perform better. It appears that neither extreme is favourable, and we should aim for a blend of the two in a learning culture. I believe many university departments show this mix - people work together to develop and implement a new curriculum, but the design of each of its components is dependent upon very creative individual action. Regarding authority, does an authoritative/paternalistic or collegial/participative environment favour learning? The second is more likely to generate creative solutions to problems as it has a wider range of input available, but the choice in implementation is less clear. It would appear that if the solution is easily communicated, an authoritarian system might be more efficient, but if the solution is complex and needs the collaboration of different elements of the organization, then the first would likely work better. In summary, then, one might propose that management style be varied according to the nature of the task at hand.

Task Versus Relationship Orientation.

On the surface this also seems to be difficult as one might expect productive learning to require both. We might expect that the more complex the environment, where interdependence is high, the more one might value relationships in order to achieve a level of trust and communication that would allow joint problem solving and solution implementation. One must be particularly careful not to make one's own cultural assumptions, however, as in some cases it would be assumed that one cannot accomplish the task unless relationships are

built. I wonder if there are also differences with respect to gender. A commonly held opinion is that women tend to foster organizations that stress relationships, but I am also aware of many exceptions.

We must await further research to address this and many other questions. In the meantime, I hope you will look at your own work organization with interest and caring, and consider the implications of your own cultural dimensions in fostering a learning culture that will thrive in future years.

ISB Student Travel Report

Janet Tapper
Biomedical Engineering
University of Calgary

I am currently studying towards a PhD in Mechanical Engineering. My research area is joint injury and arthritis, and my work to date has focused on measurement and analysis of the in vivo kinematics and kinetics of the intact and ligament-deficient stifle joint of the sheep. I intend to use these experimental data, in conjunction with limb geometry obtained via MRI and spatial digitizing, to develop a computational model of load transfer across the joint. I hope to use this model to gain insight into the role of mechanical factors in the development of osteoarthritis.

In April 2001, I was grateful to receive an ISB Student International Travel Award. This award provided the means for me to work at Oxford University for three weeks with Dr Richie Gill and Dr John O'Connor's research group. This group has a long history of research investigating human knee joint function, with a wealth of experience in joint and limb modeling. The focus of my visit was to learn techniques for modeling joint kinematics and kinetics, and assess the potential for adaptation of these techniques to my work with the ovine stifle joint. This experience provided a solid foundation in modeling as well as insight into different modeling approaches. I am

continuing to develop this work for application in my thesis.

I studied at Oxford in July 2001 so that I was able to coordinate the timing of this visit with the XVIIIth ISB Congress in Zurich, as well as the Pre-Conference Symposium on Computer Simulation in Biomechanics in Milan. In addition to the great people, the wonderful ambience and the incredible food, the Computer Simulation Symposium provided an excellent opportunity for interaction between researchers with a wide variety and depth of experience in modelling and simulation. The ISB Congress then provided exposure to a remarkable diversity of biomechanics research. I thoroughly enjoyed both conferences and look forward to the World Congress in Calgary in August.

I would like to thank the International Society of Biomechanics Council for their financial support and would strongly encourage other students to take advantage of this excellent opportunity to enrich their graduate research experience.

IDEAL ATTRIBUTES OF FACULTY MEMBERS AND STUDENTS

Yongmin Kim, Ph.D.

**Chairman of Bioengineering
University of Washington, Seattle WA.**

Note: these characteristics were obtained through student surveys in Dr. Kim's department.

Faculty:

- Outstanding Scholarship
- Personal and Professional Integrity
- Excellent Teacher
- Leadership
- High Energy
- Vision
- Strive for Excellence
- Communications Skills
- Able to Make Difficult Decisions
- Team Builder
- Patience
- Sensitivity
- Humility
- Selflessness

- Confidence
- Open-Minded and Open to Criticism
- Self-Motivated and Tenacious
- Multi-tasking and Multi-level
- Insightful
- Able to see a big picture
- Planning: Strategic, Financial, ...
- Good recruiter
- Cheerleader and Supporter for Former Students
- Grantsmanship
- Business/Industry Relations
- Press Relations

Students:

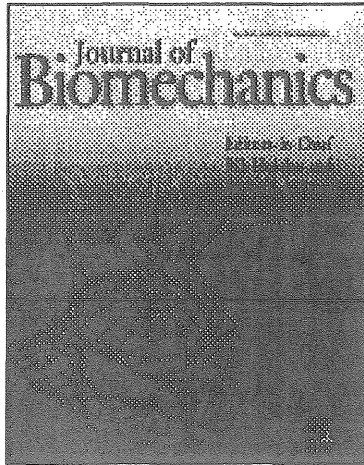
- Honesty & Integrity
- Dedicated
- Self-Motivated
- Hardworking
- Perseverance
- Innovative
- Independent Thinking
- Communication Skills
- Excel under Pressure & Ambiguity
- Confident
- Constructive
- Proactive
- Responsive & Responsible
- Unselfish
- Self-Control
- Open to Criticism
- Learn from Mistakes and Failures
- Team Player
- Interdisciplinary
- Multi-tasking
- Leadership
- Vision

Don't be afraid to celebrate life.

Nike commercial.

Fear of failure, fear of success, fear of losing your health, fear of losing your mind. Fear of being taken too seriously, fear of not being taken seriously enough. Your mother's fear that you will never marry, your father's fear that you will. Fear of the unknown? Forget it. Fear of too many roads and not enough time? Maybe. But go ahead, put one foot in front of the other. And just do it.

Journal of Biomechanics



The **Journal of Biomechanics** is the leading forum for the publication of articles describing the principles of mechanics to explore biological problems. Papers published in the journal cover a wide range of topics in biomechanics including, but not limited to:

- **Fundamental Topics**
- **Cardiovascular & Respiratory Biomechanics**
- **Dental Biomechanics**
- **Injury Biomechanics**
- **Orthopaedic Biomechanics**
- **Rehabilitation Biomechanics**
- **Sports Biomechanics**
- **Cell Biomechanics**

ALSO CURRENTLY FREELY AVAILABLE ONLINE

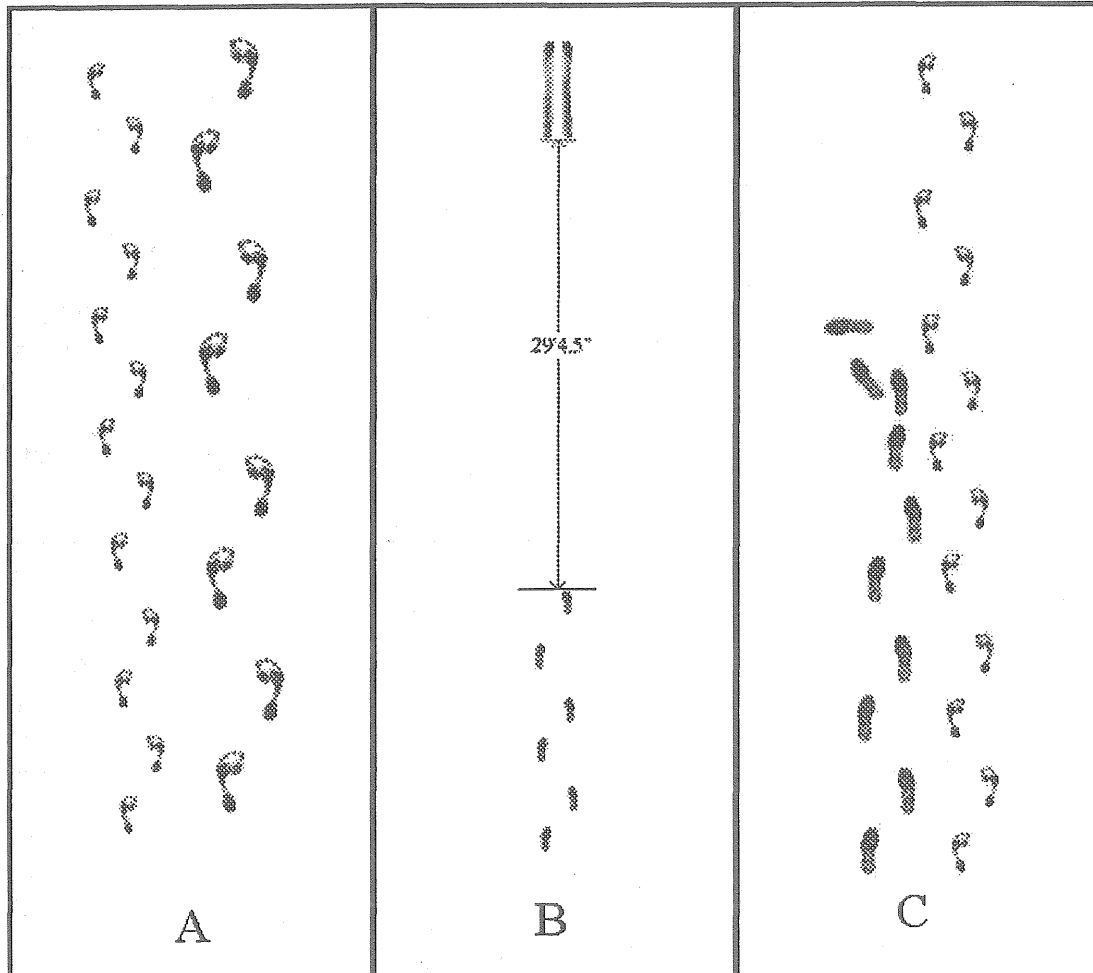
- FREE full-text access to *Journal of Biomechanics* articles
- Supplementary data area for additional material complementing the printed journal
- Further information on the journal and its affiliated societies

Please visit <http://www.jbiomech.com>

- Should you wish to subscribe to the journal at the ISB discounted member rate, please contact the society directly.
- If you would like to discuss informally a submission to the journal, or have an idea for a focused journal issue, please feel free to talk to one of the journal Editors-in-Chief: Professor R. Huiskes (E-mail: Biomechanics.BMT@tue.nl) or Professor R. Brand (E-mail: dick-brand@uiowa.edu).

Footprints in time
Ari Levine
Cleveland Clinic Foundation

This puzzle involves identifying the noteworthy or historical event corresponding to each panel below. The footprint spacing and overall dimensions are not to scale, but this shouldn't affect the interpretation. Clues are given below, but try figure the answer before getting help! If you still cannot identify the event corresponding to these footprints, the answers are given on the next page.



“Footnote” Another one of these puzzles is given at:
<http://www.drfootsie.org/footsie/history/puzzle.html>

Clues:

A: These footprints resulted in the feet getting muddy, but there was no tap water around to wash the feet.

B. This event improved upon a record that had stood for a long time.

C. These footprints were created by two females and resulted in controversy.

**XIIIth Int. Biomechanics Seminar
Prof. Stefan Kornecki (Chairman)**



The XIIIth International Biomechanics Seminar (IBS) was the most important biomechanics event in Poland in the year 2001. It was organised during the days of 5-6 October by the Academy of Physical Education in Wroclaw, Poland, the Centre for Biomechanics, Büdingen, Germany and the Polish Society of Biomechanics under the chairmanship of Prof. Stefan Kornecki. The honorary guest of the XIIIth IBS was Prof. Georges Van der Perre, the President of the European Society of Biomechanics.

The key theme of this two-day-long seminar was: "Origins of biomechanics: factors of regress and progress", and the invited speakers were:

Prof. Peter A. Huijing, Free University in Amsterdam, The Netherlands
Prof. Janusz M. Morawski, Institute of Aviation in Warsaw, Poland;
Prof. Georges Van der Perre, Catholic University in Leuven, Belgium
Prof. Andrzej Wit, Academy of Physical Education in Warsaw, Poland.

It comprised four sessions devoted to various aspects of the seminar's leading theme, each starting with a lecture of a distinguished invited speaker and containing four to five free communications, and a workshop by SIMI Reality Motion Systems GmbH.

A book of proceedings containing full texts of the four invited lectures and free communications by authors representing Belgium, Bulgaria, The Netherlands, Poland, and United Kingdom was published after the seminar.

Answers to the footprint puzzle:

- A. Footprints found by Dr. Mary Leakey in Tanzania, where a child was walking alongside an adult in the mudplains of Laetoli.
- B. Mike Powell's long jump at the 1991 Olympic games. He improved upon Bob Beaman's record set in Mexico City.
- C. Mary Decker Slaney and Zola Budd became entangled at the 1984 Olympic games. Zola Budd, running barefoot, managed to complete the race.

**Professor Bengt Saltin, M.D.,
Receives the IOC Olympic Prize,
The Highest Honor in Movement,
Exercise and Sport Sciences.**

One day before the opening of the Olympic Winter Games in Salt Lake City, UT (February 7, 2002), the International Olympic Committee (IOC) Medical Commission and Pfizer presented Professor Bengt Saltin, M.D., with the 2002 IOC Olympic Prize on Sport Sciences, the highest honor in the field of movement, exercise and sport sciences, at a special ceremony in Salt Lake City's Athletes Village. IOC President Jacques Rogge made the presentation.

The IOC Olympic Prize, which is endowed by Pfizer, carries a \$500,000 award and is accompanied by an Olympic Medal presented as part of the Olympic Games. The IOC Medical Commission noted Dr. Saltin's outstanding contributions in basic cardiovascular and muscle physiology, as well as his exceptional findings in the field of exercise physiology, as reasons for his receiving the honor in 2002.

"Dr. Saltin's work epitomizes what this award is all about - helping people live active lives," said Prince Alexandre de Merode, Chairman, IOC Medical Commission. "The IOC Olympic Prize is a catalyst for scientific discoveries that will benefit athletes and recreational enthusiasts of all ages and abilities. Together, the IOC and Pfizer are committed to improving research and sharing scientific knowledge in Movement Exercise and Sport Sciences."

The impact of Dr. Saltin's research can be felt throughout society - in the medical field and in the everyday lives of people,

from the promotion of basic physical health to the enhancement of elite performance. Through research studying the effects that inactivity has on the body, which was commissioned in part by NASA, Saltin confirmed that exercise should be a part of recovery after experiencing illness/injury instead of bed rest. This marked a major shift in how patients were treated following illness or injury.



IOC President Jacques Rogge presenting the Olympic Medal to Dr. Bengt Saltin

"Years ago, it was thought that rest and relaxation were the best ways to recuperate from an injury or illness, but my research proved that, in fact, it's the opposite," said Saltin. "People should work with their doctor to create an active recuperation plan following any illness or injury."

Dr. Saltin's work has focused on aerobic and anaerobic work capacity, as well as the effects of altitude and anemia on blood and oxygen flow. He has provided new insights and perspective on the limitation and regulations of oxygen transport with the invention of his "knee extensor model." This model gave Dr. Saltin a means to isolate a specific muscle group and opened the door for human study in the field. With that, his experiments have fundamentally changed how we think about the capacity and control of human circulation during exercise, proving that muscles need a steady flow of oxygen as much as they need nutrients in order to function to capacity.

The Olympic Winter Games in Salt Lake City marked the fourth time the coveted IOC Olympic Prize has been awarded. The IOC Medical Commission and Pfizer believe the prize heightens the recognition for research of movement and mobility, and thus attracts brilliant scientific minds to study and further human performance.

"Pfizer is committed to sharing research and inspiring healthy living," said Randall Kaye, M.D., Senior Director of Olympic Affairs for Pfizer. "By supporting scientific advances, we underscore the importance of exercise and physical activity in cardiovascular and other disease treatment. This research is crucial to improving human movement, providing preventive care, and better managing disease states for people who seek healthy lifestyles."

To ensure that the IOC Olympic Prize reflects scientific work of the highest degree, a committee of worldwide renowned scientists and thought leaders evaluates peer nominations of candidates from multiple fields. Rigorous criteria guide the selection of a scientist whose contributions to movement, exercise, and sport sciences have a significant impact on science and/or society.

Although the IOC Olympic Prize on Sports Sciences is the main focus of the Pfizer/IOC Medical Commission partnership, Pfizer also endows three other major IOC Medical Commission initiatives including: IOC Olympic World Congress on Sport Sciences, IOC Olympic Academy on Sport Sciences, and Pfizer/IOC Olympic Research on Sport Sciences.

Dr. Bengt Saltin, the winner of the 4th IOC Olympic Prize and Dr. John Holloszy, the winner of the 3rd IOC Olympic Prize were honored during the joint meeting of the American College of Sports Medicine and the IOC Olympic Congress in St. Louis. Both laureates presented in the afternoon of Tuesday, May 28th, 2002.

Worst biomechanics/business decisions
Information compiled from:
[http://www.business2.com/
articles/mag/print/0,1643,38604,00.html](http://www.business2.com/articles/mag/print/0,1643,38604,00.html)

Foot stress: A dozen Burger King marketing executives suffered first- and second-degree burns while walking over hot coals as part of a team-building retreat in October, 2001. One woman was taken to a hospital emergency room, and Burger King brought in a doctor to treat others whose feet were blistered. Some workers used wheelchairs the next day when they went to the airport to leave for another company retreat.

Body anthropometry: Banana Republic co-founders Mel and Patricia Ziegler start ZoZa, an "athletic formalwear" retailer, in late 2000. The idea was for ZoZa's designers to intentionally make clothing two sizes smaller than labeled. ZoZa's merchandise return rates soared to 80 percent. The company shut down in May 2001.

Material science versus skin shear: With the slogan "Sometimes wetter is better," Kimberly-Clark introduced Cottonelle Fresh Rollwipes pre-moistened toilet paper. The product failed.

Not biomechanics, but deserving of honorable mention: Unilever subsidiary Lipton approved an ad in which a man standing in line for holy communion holds a bowl of onion dip, presumably to improve the taste of the communion wafer he was about to receive. Under protest, Lipton withdrew the ad.

Upcoming Meetings, Workshops 2002

13th Conference of the European Society of Biomechanics.
Wroclaw University of Technology.
1 -4 September 2002
<http://www.esb2002.pwr.wroc.pl>

12th International Conference on Mechanics in Medicine and Biology
Sept 9-13, Lemnos, Greece.
Email: tkaral@civil.duth.gr

37th UK Conference on Human Response to Vibration
Sept 18-20, Loughborough University, England.
<http://humsci.lboro.ac.uk/vibration>

11th Meeting of European Society for Movement Analysis in Adults & Children
Sept 19-21, Leuven, Belgium
Email: ESMAC2002@uz.kuleuven.ac.be

21st Southern Biomedical Engineering Conference
Sept 28 - 29, Washington, DC, USA
Email: vossoughi@transinfo.com or jvossoughi@hotmail.com

"Biomechanics of Man 2002"
Organizers: Czech Society of Biomechanics
Nov 13-15th, 2002, Cejkovice u Hodonina, Czech Republic, Europe
<http://biomech.ftvs.cuni.cz/csb/bmc2002/>

3rd Int. Conference on Strength Training
Nov, 13-17, 2002, Budapest, Hungary
<http://www.detail.hu/>

Australasian Biomechanics Conference
Nov 28 - 30, 2002, Melbourne, Australia
<http://www.anzsb.asn.au/abc4.htm>

International Congress on Biological and Medical Engineering
4th - 7th December 2002
Raffles City Convention, Singapore
<http://www.icbme.org>

2003

2nd International Symposium on Adaptive Motion of Animals and Machines
4-8 March 2003, Kyoto, Japan.
[http://www.kimura.is.uec.ac.jp/amam2003/
index.html](http://www.kimura.is.uec.ac.jp/amam2003/index.html)

International Society for Postural and Gait Research conference,
March 23-27, 2003, Sydney
[http://www.powmri.unsw.edu.au/ispg2003/
ISPG2003/ISPG2003.htm](http://www.powmri.unsw.edu.au/ispg2003/ISPG2003/ISPG2003.htm)

News that shouldn't make the news

1996 -- In Lamar, Mo., a pre-trial hearing took place in February on Joyce Lehr's lawsuit against the county for injuries suffered in a 1993 fall in the icy, unplowed parking lot of the local high school. The Carthage Press reported that Lehr claimed injuries to nearly every single part of her body. According to her petition: *"All the bones, organs, muscles, tendons, tissues, nerves, veins, arteries, ligaments ... discs, cartilages, and the joints of her body were fractured, broken, ruptured, punctured, compressed, dislocated, separated, bruised, contused, narrowed, abraded, lacerated, burned, cut, torn, wrenched, swollen, strained, sprained, inflamed and infected."*
Wow!!!

1992 -- In a 1992 medical journal article on nocturnal overeating, a psychiatrist related the story of a 53-year-old woman who was unable to move upon waking, despite urinary urgency. At first, she assumed she had had a stroke, but then was able to move some muscles although she still could not get up. Finally she wriggled free of her bedclothes to discover that the reason for her temporary immobility was that her nightgown had been stuck to the sheets by several crushed and melted Mars bars.

Isn't it annoying when that happens??

1994 -- Tamara Jo Klemkowsky, 32, of Waldorf, Md., was hospitalized with several broken bones in April after she fell out the window of a chartered party bus traveling 55 mph. Klemkowsky had leaned too hard on an emergency window while mooning a passing car, causing the window to give way.

Poetic justice!

1996 -- Research published in the Journal of Archaeological Science in November suggested a valuable role for an assistant researcher. A research director wanted to learn whether small bones found at a dig were from an animal that died there or

from an animal that had been eaten by the animal that died there. An assistant was fed a boiled shrew and had his bowel movements tracked for three days, then boiled and analyzed. The director concluded that the human stomach basically mashes up the eaten shrew's bones during digestion.

2002 -- The USA federal government announced that three makers of popular electronic abdominal belts were making false claims about how easy it is to use the gizmos to get a rippling six-pack.

"For years, marketers of diet and exercise products have been preying on overweight, out-of-shape consumers by hawking false hope in a pill, false hope in a bottle, and, now, in a belt," said Federal Trade Commission chairman Timothy J. Muris. "Unfortunately, there are no magic pills, potions, or pulsators for losing weight and getting into shape. The only winning combination is changing your diet and exercise."

The USA government is challenging the questionable claims made by AB Energizer, AbTronic, and Fast Abs:

"Now you can get rock hard abs with no sweat"

"Lose 4 Inches in 30 Days Guaranteed"

"30% More Effective Than Normal Exercise"

"10 Minutes = 600 Sit-Ups"

As they say, no pain, no gain.

Editor's Notes and Requests:

1. Usually the Newsletter is published in the spring, summer, fall and winter, although if you are in the Southern Hemisphere, this may be different. There are no deadlines for newsletter material since historically they have never been taken seriously. The content of the Newsletter does not necessarily reflect the philosophy and opinions of the ISB membership.

2. Newsletter items such as Opinions, Affiliate Society News, Thesis Abstracts, Reviews of Biomechanics Meetings are desirable and may be considered for publication. Material may be submitted electronically or on a computer disk as a text-only file, and must be in some form of English. Submission is not a guarantee of a timely or accurate appearance in the Newsletter."

ISB Membership News

New members to ISB

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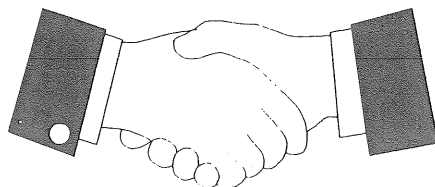
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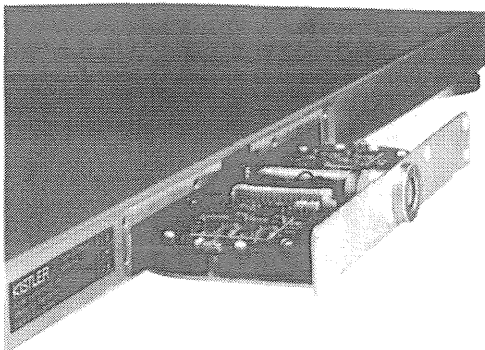
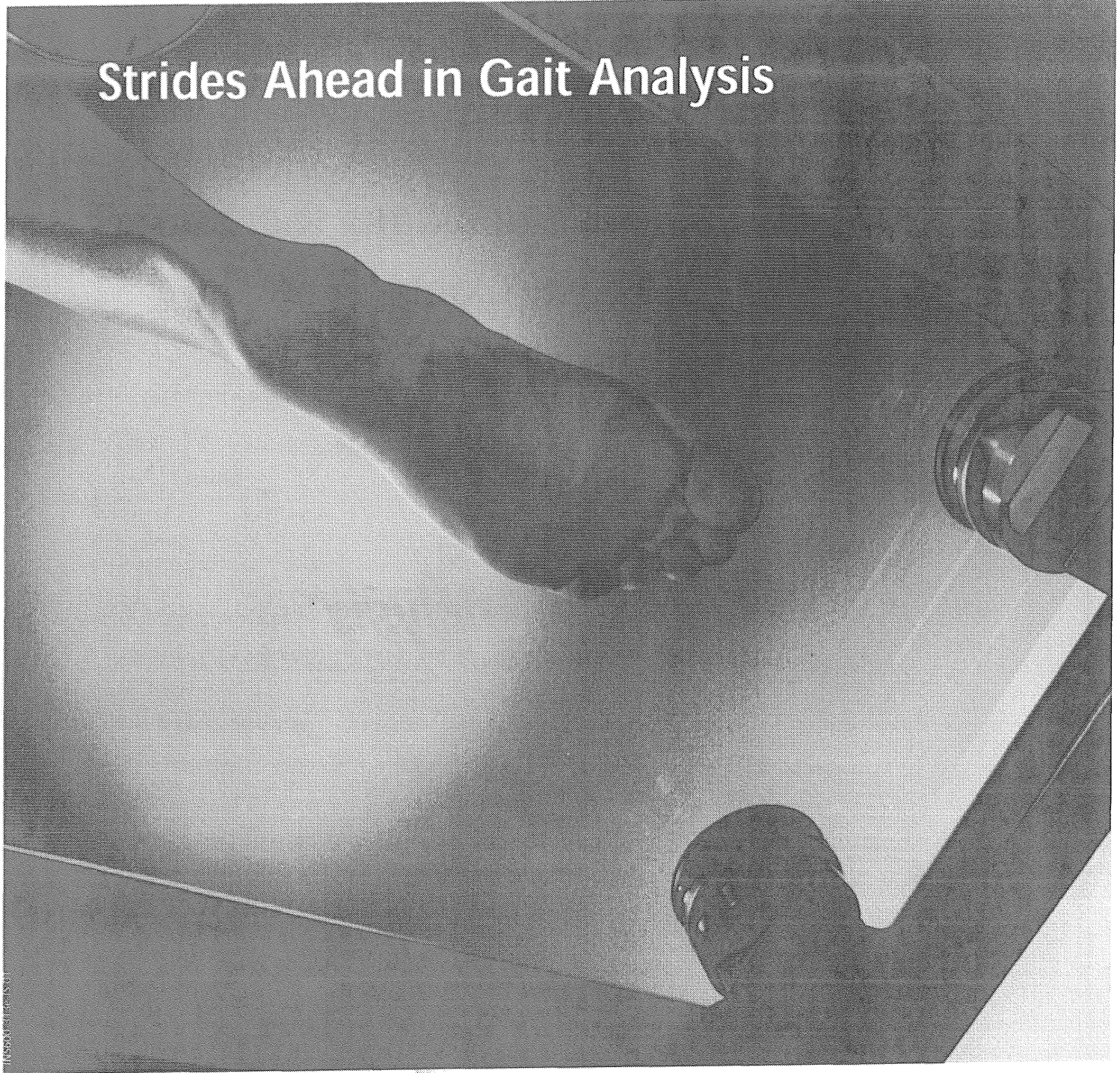
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