NEWSLETTER

EUROPEAN SOCIETY OF BIOMECHANICS 1995

10th Conference of the European Society of Biomechanics Leuven

August 28-31, 1996

It is our pleasure to invite you to Leuven to join us for the Tenth Conference of the European Society of Biomechanics. The conference will be organised by a national committee including representatives from biomechanics groups from Leuven, Brussels and Ghent.

The conference is not only intended to provide a high level forum to exchange the latest findings in biomechanics, but also to indicate directions to guide biomechanics in the next millennium. Multimedia will be used throughout the Conference to enhance the level of knowledge transfer.

Leuven is one of Europe's most ancient university towns, and is ideally located. The town of Leuven itself came into full bloom a few centuries before the University was founded. Straddling the banks of the then navigable Dijle river and the trade route from Bruges to the Rhine territorities, Leuven grew to become a major trade and textile centre. Leuven was, up to the end of the 13th century, also the residence of the Dukes of Brabant. Town and university enjoyed many periods of prosperity. The town hall, the famous 'Begijnhof' the churches, cloisters and colleges stand silent witness to those days and make Leuven the interesting place it is. Leuven is only 25 km away from Brussels, the capital of Belgium and the centre of the European Union. Leuven can be reached easily by car, train or by airoplane into Brussels.

The Katholieke Universiteit Leuven will host this conference. It was founded in 1425 and is the oldest University in Belgium and one of the oldest in Europe.

We look forward to welcoming you in Leuven to celebrate with us the twentieth anniversary of the European Society of Biomechanics in the country where it all started.

Structure of the Conference

The conference program will include precourses on August 28th. From August 29th until August. 31st keynote lectures, parallel sessions, symposia and a special

event to celebrate the twentieth anniversary of the ESB will be presented.
The use of multimedia will be an innovation throughout the conference.
The social program will include a reception by the Lord Mayor of Leuven, a concert, a cheese and beer evening, also a banquet.

List of Topics

- bone research
- orthopaedic and dental implants
- biofluid mechanics
- molecular biomechanics
- prosthetics and orthotics
- rehabilitation engineering
- sports biomechanics
- locomotion
- biomechanics of trauma
- numerical simulations in biomechanics
- soft tissue biomechanics
- EC programmes, actions and projects

Abstracts

The instructions for abstracts will be mailed together with the final announcement in June 1995. A one page abstract will be required by January 1st, 1996. The proceedings book with the selected papers will be made available at the conference.

Georges Van der Perre
Conference Chairman

Address for Correspondence:

10th Conference of the European Society of Biomechanics
Katholieke Universiteit Leuven
Division of Biomechanics and Engineering Design.
Celestijnenlaan 200A
B-3001 Heverlee
Belgium

Dr J Vander Sloten, Executive Secretary
Mrs R Vanroelen, Secretary
Tel (32) 16 32 70 96
Fax (32) 16 29 27 16

INTERNATIONAL SOCIETY OF BIOMECHANICS IN SPORTS
Lakeside University, Thunder Bay,
Ontario, Canada
18-22 JULY 1995

The XIII ISBS will be hosted by the School of Kinesiology at Lakehead University in Thunder Bay, Ontario, Canada.

Thunder Bay is located on the north-western shore of Lake Superior, approximately 800 kilomoters east of Winnipeg, Manitoba and 1,400 kilometers northwest of Toronto. The United States border is approximately 60 kilomoters to the south with the city of Minneapolis, Minnesota roughly a 6-hour drive away. Thunder Bay is a multi-cultural, industrial port city of 110,000 people. The city functions as the major cultural centre for a far-reaching area north of Lake Superior and east of the Manitoba border. The region is part of the Canadian Shield which is primarily a forested rugged wilderness territory with numerous lake systems and rivers banking the Great Lakes network. The area abounds with beautiful scenery, lakes, rivers and forests plus an abundance of natural fauna, wild like and recreational feasibilities.

Lakehead University is the major university institution in the region, small by Canadian standards (6,000 students) with a regional focus including forestry, engineering, business, educational, nursing and kinesiology programs, together with the Arts and Science faculties.

The conference activities will be located on campus, with the major presentations and related scheduled events taking place in and around the University. Conference delegates will be residing in comfortable condominium residences set in an attractive natural area adjacent to the campus.

A variety of recreational and social programs focusing on the local culture and the natural recreational areas is planned. The academic program will be designed to approach the major objectives of the ISBS and bring together researchers and practitioners in a variety of sporting fields including skiing, gymnastics and sports medicine.

The objectives of the Society shall be:
To provide a forum for researchers, teachers, coaches and practitioners in sports biomechanics

For further information:
Contact: Tony Bauer

Tel (807)343-8654
Fax (807)343-8944
EMail TBAUER@CS_ACAD_LAN.LAKEHEADU.CA
or TONY BAUER2@LAKEHEADU.CA

ESB AWARD PAPERS

There were a record number of manuscripts submitted for the ESB Award. The number of reviewers had to increase in order to cope with the extra work. Each paper was marked by at least three reviewers who were considered to be experts in the particular field. The final four papers were considered in great depth, but eventually two papers emerged as being the leaders. It was not possible to select one over the other and so the decision was made to make two awards. This was felt to be appropriate considering that the World Congress in combination with the ESB was a really special event. We are pleased to reproduce the abstracts of these two outstanding papers.

A CASE FOR BONE CANALICULI AS THE ANATOMICAL SITE OF STRAIN GENERATED POTENTIALS

SC Cowan, S Weinbaum and Yu Zeng
Dept of Mechanical Engineering, The School of Engineering of the City College and the Graduate School fo the City University of New York, New York NY 10031, USA

In the past it has been argued, on the basis of experimental data and a reasonable model, that the site of the experimentally observed strain generated potentials in bone is the collagen-hydroxyapatite porosity whose pores are 35 mm or less. In this work, a similar model, but one in which the effects of fluid dynamic drag of the cell surface structures in the bone canaliculi are included, is used to show that it is possible for the generation of strain potentials to be associated with the larger size lacunarcanalicular porosity. The consistency of the strain generated potential data with this model is demonstrated. The model employed is that of Weinbaum et al. (1993) in which Biot's porous medial theory is used to relate the combined axial and bending loads applied to a whole bone into the flow past the osteocytic process in the canaliculi. We show that previously predicted fluid pore pressure relaxation times were a hundred fold too short for the lacunar-canalicular porosity because they neglected the fluid drag associated with proteoglycan matrix on the surface membrane of the osteocyte and its cell processes. The theory for flow through cross-linked fibre filled channels is used to model the flow through this proteoglycan matrix, and the predicted pore relaxation time, 1-2 sec., closely corresponds to the measured times by Salzstein and Pollack (1987).

BIOMECHANICS OF THE HUMAN PATELLA DURING PASSIVE KNEE FLEXION

JH Heegaard[1,2], Leyvraz[1], A Curnier,[2] L Rakotomanana[1,2] & R Huiskes[3].
(1) Hopital Orthopaedique de la Suisse Romande, (2) Ecole Polytechnique Federale, Lausanne, Switzerland, (3) Inst. of Orthopaedics, University of Nijmegen, The Netherlands.

The determination of patellar 3D biomechanics becomes especially relevant when facing the problem of evaluating surgical procedures in terms of standard (ie non pathological) knee functionality. Classical examples of such procedures include Total Knee Replacement (TKR) and elevation of the tibial tubercle (Maquet's procedure). Following this perspective, the current study was oriented toward an accurate and reliable determination of the human patella biomechanics during passive knee flexion. To this end, a comprehensive three-dimensional computer model based on the finite element method, was developed for analysing articular biomechanics. Unlike any previously published study on patello-femoral biomechanics (1,2), this model simultaneously computed the joint's kinematics, associated tendinous and ligamentous forces, articular contact pressures and stresses occurring in the joint during its motion. The components constituting the joint (ie bone, cartilage, tendons) were modelled using objective forms of nonlinear elastic materials. A unilateral contact law allowing for large slip between the patella and the femur was implemented using an augmented Lagrangian formulation.

Patellar kinematics computed for two knee specimens were close to equivalent experimental ones (3) (average deviations below 0.5° for the rotations and below 0.5mm for the translations) and provided validation of the model on a specimen by specimen basis. The ratio between the quadriceps pulling force and the patellar tendon force was less than unity throughout the considered knee flexion range (30°-150°), with a minimal near 90° of flexion for both specimens. The contact patterns evolved for the distal part of the retropatellar articular surface to the proximal pole during progresive flexion. The lateral facet bore more pressure than the medial one, with corresponding higher stresses (hydrostatic) in the lateral compartment of the patella. The forces acting on the patella were part of the problem unknown, thus leading to more realistic loadings for the stress analysis, which was especially important when considering the wide range of variations of the contact pressure acting on the patella during flexion.

ESB NEW MEMBERS - 1995

Forename	Surname	Residence
Jorgen E	Assentoft	Aarhus, DK
Romuald	Basdrivish	Wroclow, PL

Zeevi	Dyir	Tel Aviv, ISR
Thomas	Eilers	Berlin, D
Laurant	Fabeck	Bruselles, B
Rene	Ejachsman	Winterthur, CH
Dirk	Gade	Aachen, D
Patricia	Gaillot	Lachan, F
Trevor N	Gardner	Oxford, GB
Constantijn	Gielen	Nijmegen, NL
Paul	Grimshaw	Middx. GB
David	Guzik	Burlington, VT, USA
Gerhard	Hoch	Bad Aibling, D
Erwin	Haukes	Nijmegen, NL
Shong	Jin	Leeds, GB
Josef	Kollmitzer	Vienna, AU
Vadim	Kananenka	Moscow, Russia
Brendan	McCormack	Dublin, Ireland
Grzegorz	Milewski	Krakow, PL
Danuta	Modelska	Krakow, PL
Mats	Stading	Goteborg, S
Claudio	Orizio	Brescia, I
Jose	Planell	Barcelona, E
Elena-Taina	Rinderu	Craiova, R
Patrick	Salvia	Neubiberg, D
Frank	Sievering	Bad Aibling, D
Athanasios	Spirakis	Cape Town, SA
Vladimir	Voroblev	St Petersburg, Russia
Wen	Wang	London, GB
K.R.	Widmer	Basel, CH
Ming	Zhang	London, UK
Pavel	Zinin	Bremen, D

A full list of Members may be obtained from F Schuind, MD PhD, Treasurer, Department of Orthopaedic Surgery & Traumatology, Hopital Universitaire Erasme, 808 Route de Lennik, B-1070 Brussels, Belgium.

UPCOMING EVENTS - 1995

8-9th May. Florence, Italy . **Joint Meeting EMSOS-AMSTS** and 10-12 May Florence. **8th ISOLS.** Contact: OIC S.R.L., VIA A. LA MARMORA, 24, 50121 Florence, Italy. Tel 39 55-50-00-631 - Fax 39 55 50 01 912.

2-3 July Munich, Germany. **European Orthopaedic Research Society. (EORS)** Contact: W Puhl, K Kranich - Congress & Scientific Secretariat, Orthopadische Universitats-Klinik RKU, Oberer Eselsberg 45, 89081 Ulm. Tel (49) 731-55 27 32 - Fax (49) 731 55 27 22

4-7 July. Munich, Germany. **2nd Congress of the EFORT.** Contact. W Puhl, K Kranich, Orthopadische Universitats-Klinik RKU, Oberer Eselsberg 45, 89081 Ulm. Tel 49 731-55-27-32 - Fax 49 731-55-27-22.

July 18-22. Canada. **The X111 Int. Symposium on Biomechanics in Sports.** Contact Tony Bauer, Dept. of Kinesiology Lakehead University, Thunder Bay, Ontario, Canada. Tel 807 343-8654 - Fax 807 343-8944 E-Mail: Tony.Bauer@LAKEHEADU.CA

27 Sept-1 Oct. Puerto Rico. **ISTAA.** International Society for Technological Advances in Arthroplasty. 8th Anual International Symp. on Custom-Made Prosthesis (ISSCP) Contact: Secretariat, 724 Maiden Choice Lane, Apt;.204, Baltimore, MD 21228, USA Tel (410) 788-1455 - Fax (410) 788-4022.

12-16 Sept. Bulgaria. **Sixth International School on Biomechanics**, South-West University, Blagoevgrad, Bulgaria.

6-8 November **Second Combined Meeting of the Orthopaedic Research Societies of USA, Japan, Canada & Europe.** Contact: Sheril King, ORS, 6300N River Road, Suite 727, Rosemont, IL 60018, USA Tel (708) 6981625 - Fax (708) 823 0536

LETTER FROM THE PRESIDENT

With the 9th Congress of ESB just finished, I first wish to look back on it. I already was on the Council, when the decision was taken to combine the meeting of the World Congress with the Congress of the European Society of Biomechanics. It was feared at that time, that the Society might lose identity or at least visibility in doing so After the World Congress, I am even more convinced that the decision was the right one. In Amsterdam, we Europeans could meet with many more researchers in biomechanics than ever before. The program was immense and tiring, yet inspiring and informative, as every good meeting should be. The European Society of Biomechanics did not lose profile, it was visible through its own booth, it was present in the program through the many sessions organized, it became apparent through the awards sponsored and many members carried the gold-and-green ESB button with the logo. Peter Walker organized and provided the President's Reception just by himself and it became a full success. Not only our own members and their guests came, but many more individuals well known in the field. The Amsterdam experience with this large meeting can teach us that we should indeed concentrate on organising or participating in such large meetings from time to time, with the entire spectrum of biomechanics to allow cross-fertilization through the field. In order to do that, we should not fear to combine meetings. On the other hand, we should promote smaller meetings around very specific topics and allow ample time for discussion. In spite of the attractive possibilities of network bulletin boards, we should continue to meet and make friends to further the research in our field.

How about the future for biomechanics? In Germany, universities suffer from severe cut backs. Existing positions are reduced rather than new ones offered. National funding agencies see more applications and have less money to distribute. Industry is selling less and therefore third party research money is also more difficult to obtain. There is a specific danger due to this development as some researchers have to constantly be applying for funds, whenever funds are being offered. But for the hot topics currently being of interest, these scientists do not have sound experience. Good research obviously needs time and effort in a specific field, which in turn requires long-term positions and well-equipped research centres. There is a significant need for this in Europe. If biomechanics as a discipline is to grow, political decisions in this direction are needed.

In addition, I believe that researchers have an obligation to think about the general purpose of their work exceeding the short-term goal of finishing up a PhD thesis or research assignment. Is there a reasonable group of patients or indi-

viduals profiting from my work at some time or is it my pure curiosity? Am I solving a real (clinical) problem or am I looking for applications for a measuring method available in my lab? Am I defending the design rationale of a specific implant or am I trying to understand the underlying fixation or wear processes? Such general long ranging lines of thinking are important in good and bad economic times.

In general, we should make more progress on diseases than on devices. Maybe, if we first try to better understand the diseases, we might later be in a better position to develop devices. It is unbelievable, how much energy is spent to solve the problems of loosening of prostheses. Maybe we should again start to think about alternatives to solve the problem of osteoarthritis!

When looking at certain funding agencies, one might believe that the weight of the application or the numbers of pages submitted has something to do with the success. We should also write good indepth publications, not a series of publications containing yet another parameter of the work published before And if we are to exchange our results, or even, full papers, more and more through electronic networks, we should publish less often. Fewer but more accurate work will make our progress more visible.

Erich Schneider
President

NEW APPLICATION FOR MEMBERSHIP

At the 2nd World Congress in Amsterdam it was decided to provide an information desk for the ESB. Staff from University of Amsterdam were available to assist members in a general way and also to provide information to new prospective members. They were kept busy much of the time and provided an excellent service. Due to all their efforts, we have had 34 new applications.

It was interesting to note increasing interest from Eastern European countries whilst there was a broad spread of EEC countries and even an application from the USA.

ESB MEETING 1998
Organizer for 1998 Meeting - Applications Requested.

Our Meetings this decade have been most successful and very well organized and

attended. In 1990 the Meeting was held in Aarhus organised by Ivan Hvid. In 1992 we were hosted in Rome where Aurelio Cappuzzo provided the organization. Our 1994 Meeting was of course in combination with the 2nd World Congress with the overall organization being by Rik Huiskes. In 1996 Georgs Van der Perre will be running the meeting in Leuven. To follow-on with this tradition we invite you to submit a proposal for organizing the meeting in 1998. It is an advantage to move to different European locations, and, hence countries other than the above are preferred Another criterion is that the location should be easy to reach by transport. The conference facilities should be suitable for at least four simultaneous sessions with the exhibition and posters very close together. There should be accommodation of different prices including very inexpensive, if possible, all close to the conference location. At this stage it is important to indicate your interest by writing a fairly brief letter with some brochures and other illustrations and send to our President, Professor Erich Schneider, Arbeitsbereich Biomechanik, Technical University, Hamburg-Harburg, Denickestrasse 15, D-2100 Hamburg 90, Germany.

Peter S Walker

BULGARIAN SOCIETY OF BIOMECHANICS 'THANK YOU'

Prof. Yuli Toshev, President of the Bulgarian Society of Biomechanics would like to thank Members of the ESB, in particular, Dr FA Schuind, Dr A Cappozzo, Dr Savio Woo, Dr GE Loeb and Bertec Corporation of USA, who sent books to the Bulgarian Society for the students in the Biomechanics Department of the South West University (Blagoevgrad).

FURTHER LETTER OF REQUEST FROM PROF. YULI TOSHEV BULGARIAN SOCIETY OF BIOMECHANICS

The Bulgarian Society of Biomechanics, taking into account the discussions during the Executive Council Meeting of ISB and the General Assembly of ESB in Amsterdam 1994, addresses a request to all members of ISB and ESB, associated Societies of Biomechanics, Institutes and Departments working on Biomechanics, for material and technical support. This assistance will be very helpful both for education and research in the field of biomechanics in Bulgaria and may consist

of:

1 **Used or new literature for the undergraduate and the post-graduate students at the Deparment of Biomechanics, South-Western University, Blagoevgrad, in the field of:**

- Biomechanics of motion
- Biomechanics of bone-joint-muscular systems
- Prosthetic and orthotic devices
- Biomechanics of sport
- Dynamics and rheology of cardio-vascular system
- Methodology (Experimental methods and devices, simulation)

2. **Used or new basic Courses on:**

- Mathematics, Physics, Mechanics, Anatomy, Physiology, Biology, Computer Sciences (hardware and software).

3. **Used or new Journals (after 1990):**

- Journal of Biomechanics
- Annals of Biomedical Engineering
- Journal of Electromyography and Kinesiology
- Mathematical Biosciences
- Journal of Sport Biomechanics
- Biomechanical Engineering
- Biorheololgy

4. **Used or new Proceedings of the:**

- Congresses of ISSB and ESB
- World Congresses of Biomechanics
- American Society of Biomechanics
- North American Society of Biomechanics
- French Society of Biomechanics
- Biomechanics Seminars
- NATO ISI Series

5 **Used Devices:** computer, peripheral devices, software products, measuring devices in the field of biomechanics of motion, cardio-vascular measuring systems, devices for neuro-muscular dynamics and bioreology investigation.

The printed matter (books, journals, proceedings etc) can be sent to:
Prof. Yuli Toshev, Bulgaria, Sofia 1113, PO Box 89, Bulgaria.

The Bulgarian Society of Biomechanics takes on the responsibility for all custom clearances for the packages including used or new apparatus and devices. An

accompanying letter is necessary to be enclosed however, where the following must occur:

"The donation is granted to the Bulgarian Agency for International Assistance and is destined to the Department of Biomechanics, South-Western University, Blagoevgrad"

The address of the Agency is:

Agency for International Assistance
1, Vrabcha Str. 1000 Sofia, Bulgaria
Tel: 88 19 51 297 80 33 28
Fax: 88 50 39

All, wishing to help can make contact with:

Prof. Yuli Toshev
Sofia 1113, PO Box 89, Bulgaria
E-mail: ytoshev@bgearn.bitnet
Tel: 359.2 72 52 80
Fax: 359.2 70.20.56

Thank you in advance for the help to about 150 students on biomechanics in the South-West University, Blagoevgrad, Bulgaria.

Prof. Yuli Toshev
President of the Bulgarian Society of Biomechanics.

Report from the Meeting of the General Assembly 1994 at the Free University, Amsterdam

On Wednesday July 13th 1994 the members of the European Society of Biomechanics had their regular business meeting during a lunch break of the World Congress of Biomechanics This report is intended to inform those members who were not able to join the general Assembly or to take part in the World Congress at all.

One of the topics to be addressed in every business meeting is the question of increase or decrease, measured in terms of members and funds. The ESB in this respect has good news. The Society is steadily growing since its first meeting in 1978. At present there are 272 ordinary, 25 associate and 10 honorary members. Growth in membership is quite important. It means that new scientists are joining

the society to contribute and share their curiosity, knowledge and vision. The second item, the funds of the society are reasonable, but not extraordinary. The exact numbers have been published in the previous newsletter. The funds should only be large enough to allow the society to function, not more, not less. In order to maintain this state, the membership fee had to be raised from GB £45.00 to GB £50.00. The members present voted in favour.

The European Society of Biomechanics has certain business aspects to it. It provides a service and receives certain remuneration for this. The service of the Society is to maintain the organization of a scientific meeting every other year and to thereby provide a forum of discussion to each member, to provide subscription to the Journal of Biomechanics at an affordable rate, to inform the members through the Newsletter of internal and externl facts relating to biomechanics to encourge and promote biomechanics-related meetings, to raise the quality of research by offering several kinds of awards, etc. Two aspects did not work well in the past. The delivery of the Journal of Biomechanics to a number of members had problems. These problems of communication have been discussed with Pergamon Press and solved. We apologize for the inconvenience and thank all the members concerned for their understanding. At the General Assembly, a considerable number of members was indicated not to have paid their membership fee. For some members, this was not the case and again, we have to apologize to them. There are, however, members who profit from the services of the Society, receive the Journal in advance, yet do not pay. This I know, could be changed, if everyone of us was to check our files. It is never too late...

There is another item to be covered at each General Assembly: Elections. This time, three members retired: Ivan Hvid from Denmark after eight years on the Council (four years in the capacity of Vice-president), Peter Niederer and Michel Jaffrin after four years of service each. These individuals have contributed time and effort during various services to the Society and last but not least, they have - like all the others too - often spent their private money to come to the Council meetings to discuss important topics and take decisions. This is special and we wish to express a sincere thank you to them. Georg Bergmann from Germany and Alain Meunier from France were re-elected to the Council. New members on the Council are Leendert Blankevoort from the Netherlands, Georges Van der Perre from Belgium and Yannis Missirlis from Greece. According to the statutes, a President is on duty a maximum of four years. This is the reason why Peter Walker handed this duty over to me. I would have liked him to stay longer. It was no surprise, that he was proposed and unanimously accepted to honorary membership. Peter is always working 150%, in research and in other duties. There is no doubt that he has made very significant contributions to the field of biomechanics and to the European Society of Biomechanics alike. Thank you,

Peter, very much.

There were more items on the agenda that afternoon but the minutes will be mailed to each member separately. One particular item deserving special attention was brought up by Rik Huiskes, one of our former Presidents. He noticed that more and more young scientists are leaving Europe to work in other parts of the world, particularly the United States. He expressed concern that Europe may be losing some of its best young scientists just because there are practically no new opportunities nor adequate positions. I believe that it is vital for our young researchers to go abroad and learn new ways of thinking and working to make friends in other institutions and to gain experience in other fields. But I agree with Rik that Europe needs more positions, grants, and opportunities. We all should work hard towards establishing new groups or centres where high-quality research in biomechanics may be carried out. And one step to meet these challenges in the future will be our own involvement in the political and scientific decision-making process.

Erich Schneider

SECOND WORLD CONGRESS OF BIOMECHANICS
POSTER AWARDS

The Posters at the Amsterdam Congress were of an exceptionally high standard. Our panel of judges had a most difficult time choosing the winners. The panel were asked to select winners with a spectrum of topics, and they have succeeded in this as you can see.

1st Prizes

Biomechanical Comparison of Ankle Ligament Reconstructions

Flahill CM, Hollis JM, Blasier RD

Univ. of Arkansas for Medical Sciences, Orthopaedic Biomechanics, Little Rock. AR, USA

Geometry of Joint Structures and the Instantaneous Screw Axis

Wilson DR, O'Connor JJ.

Orthopaedic Engineering Centre and Department of Engineering Science,

University of Oxford, UK

In Vitro Measurements of the Loads in an Instrumented Spinal Fixation Device

Rohlmann A, Bergmann G, Graichen F.

Orthopaedic Hospital of the Free University, Oskar-Helene-Heim, Berlin, Germany

2nd Prizes

A Cadaveric Study of Sliding Hip Screw Cut-out Failure Modes

Haynes RC, Miles AW, Poll RG, Weston RB

School of Mechanical Engineering, University of Bath, England. Department of Orthopaedics, University of Leiden, The Netherlands

Mechanical Characteristics of Human Wrist Tendons

Breault-janicki MJ, Small CF, Bryant JT, Pichora DR, Lee JM

Clinical Mechanics Group, Queen's University, Kingston, Canada.

Pulmonary Blood Flow Affected by Gas Pressure in the Lung.

Wada S, Tanaka M, Horikawa T, Nakamura H, Tanaka K.

Faculty of Science and Technology, Ryukoku University, Seta, Otsu 520-21, Japan. Faculty of Engineering Science, Osaka University, Toyonaka, Osaka 560, Japan

3rd Prizes

Metabolic Response of ACL, PCL and PT Fibroblasts Submitted to In-vitro Mechanical Stimulation

DesRosiers EA, Methot S, Rivard CH, Yahia LH

Paediatric Research Centre, Ste-Justine Hospital and Biomedical Engineering Institute, Ecole Polytechnique, Montreal, Canada

Residual Stress in the Human Aorta and Saphenous Vein

Saini A, Kane TPC, Greenwald SE

Institute of Pathology, London Hospital Medical College, Whitechapel Road, London, UK

Mechanics of Motion Transduction by the Semicircular Canals

Damiano ER, Rabbitt RD

Department of Applied Mathematics, Rensselaer Polytechnic Institute Troy, NY, USA. Department of Bioengineering, University of Utah, Salt Lake City, UT, USA