



The International Society for Fractures Repair

The 11th ISFR Conference in Lake Tahoe, Nevada
July 13-16, 2008

President's Address

Peter Augat, MD ISFR President

Every two years the members of the International Society for Fracture Repair (the ISFR) convene for their international conference. Although a rather small society, with about 200 active members, 25 nationalities are represented. But it is not only the international representation that characterizes our society, but more so the interdisciplinary representation. Our membership includes clinicians, biologists, engineers, statisticians, and computer scientists alike. All of us share in our mission as dedicated to the advancement and interchange of the science of fracture repair and its application to the improvement of patient care. As you will see from this report of our most recent conference, held in Lake Tahoe, California, USA, and hosted by David Hak, fracture repair remains an exciting topic. New technologies and new medications solve some concerning issues, but they also present new challenges and can pose new questions. In an aging society in which musculoskeletal conditions are not only a minor burden but easily develop into life-threatening conditions, research on treating patients with bone diseases continues to be a fascinating topic. Our next conference will move to Europe and will take place in London, England, in September 2010. The London conference will be jointly hosted by David Marsh and Allen Goodship.

David Hak, MD Chair of Local Organizing and Programme Committee and **Antonio Moroni, MD** Programme Committee Chair

The 11th Biennial Conference of the International Society for Fracture Repair was held in picturesque

Lake Tahoe July 13th through the 16th, 2008. The 112 participants from 13 different countries were engaged in an invigorating scientific program organized by the program committee under the direction of Professor Antonio Moroni (Bologna, Italy). The program included six symposia, seven plenary sessions, and 52 scientific poster presentations. Subjects presented during the podium presentations included fracture healing, basic science, osteoporosis, biomechanics, and clinical papers. The symposia topics included distal radius fractures, the effect of osteoporotic drugs on fracture healing, publication strategies, complications in fracture healing, clinical use of bone morphogenetic protein, and management of hip fractures in the osteoporotic patient. The meeting immediately followed the International Bone Morphogenetic Protein Meeting. Professor A. Hari Reddi gave the presidential guest lecture on the topic of BMPs and Fractures: From Repair to Regeneration.

Old friendships were renewed, and new friendships made, during the many social functions including an opening reception, a poster session, afternoon excursion activities, and at the gala dinner. Participants enjoyed a sunset view of Lake Tahoe during the gala dinner banquet. Professor Mathias Bostrom (New York City, New York, USA), Outgoing ISFR President reflected on his past two years of tenure and the many successes the organization has enjoyed during that time. We then welcomed the incoming ISFR President, Professor Peter Augat (Murnau, Germany).

Basic Science and Clinical Development

The ISFR has always maintained a high standard at its meetings in its basic science representation and this year was no exception. Sections included: fixation, hip and fracture healing, animal models, imaging and biomechanics. The quality and attendance of these sessions was very high and demonstrated the immense research being conducted in this area. In the fracture healing section, Holstein JH et al (Department of Trauma, Hand & Reconstructive Surgery, Ulm, Germany) conducted a study on deficiencies of folate and vitamin B6 and B12 as well as increased methionine serum concentrations in order to revisit the problem caused by an induction of hyperhomocysteinemia (HCY) disturbing overall bone metabolism. Blood samples evaluating serum concentrations of HCY, folate and vitamin B12 were drawn from 27 mice. There was comparable size and tissue composition of callus in all groups, and no significant bending stiffness differences between bones of the mice with a methionine-enriched diet or B vitamin-deficient diet were found. However, increased serum concentrations of HCY correlated with decreased serum concentrations of folate and vitamin B12 when compared to controls fed with standard diet. Hoang-Kim A et al (St. Michael's Hospital, Toronto, Canada) noted a trend in the increased use of outcome instruments for assessing functional recovery in the aged with hip fracture.

However none of the measures were used consistently which could easily overestimate treatment effects reported in the randomized controlled trials. Out of 86 unique trials, 10 trials at most used the same index: 10 (16.9%) Katz Activities of daily living Index, 9 (15.2%) Harris hip score, and 5 (8.5%) New Mobility Score. Equivalently, poor use of standardized health status and utility measures were found in the systematic review. In the biomechanics section, Antoci V et al (Mimbres Memorial Hospital, Deming, NM, US) compared 4 hybrid systems for external fixation under multiple loading conditions to evaluate differences in motion permitted by the pins and wires together with frame deformation. 15 fiberglass composite tibias with a 2cm proximal metaphyseal gap osteotomy were used. 50% of the motion was achieved from frame deformation and 50% from deformation of the pins and wires.

Awards

Mathias Bostrom, MD Programme Committee

Groups of judges, specialized in either basic science or clinical research from the scientific committee, attended the sessions to listen to each presentation based on the following criteria: style, originality, thoroughness and knowledge. Five awards were presented at the closing of the conference by local chairman, David Hak. There were two awards presented for best posters, one award for Young Investigator and one award for best paper. Yoshinobu Watanabe from the Department of Orthopaedic Surgery, Teikyo University School of Medicine won the best poster award for clinical research entitled: "Mechanism of joint depression fracture in tibial plateau analyzed by the stress wave transmission". Best Poster Award for Basic Science was awarded to Roland Steck from Queensland University of Technology, Australia; University of Queensland, Australia for his work on: "Characterisation of rat ulna compression model using microCT and Finite Element calculations". The Young Investigator Award went to Jasmin Lienau from the Julius Wolff Institut and Center for Musculoskeletal Surgery, Charité - Universitätsmedizin Berlin, Berlin, Germany for the work on: "Downregulation of osteogenic BMP and cartilage matrix degrading MMP gene expression in delayed compared to standard bone healing". The aim of the study was to compare the temporal expression pattern of factors related to cartilage and bone formation and endochondral ossification during standard and delayed bone healing. A tibial osteotomy was performed in two groups of sheep (n=30 per group) and stabilized with either a rigid external fixator leading to standard healing or with a mechanically critical one leading to delayed healing. Hematoma was harvested at 4, 7, 14, 21 and 42 days postoperatively. qPCR was used to determine the expression patterns of BMPs and other molecules. The authors found that downregulation of osteogenic BMPs and cartilage matrix degrading MMPs may account for a considerable delay of bone healing. Best

Paper was awarded to Mo Bhandari and SPRINT Investigators from McMaster University. The study, "A Randomized Trial of Reamed Versus Non-Reamed Intramedullary Nail Insertion on Rates of Re-operation in Patients with Fractures of the Tibia" showed an overall lower incidence of revision surgery than previously reported. Optimizing peri-operative care and avoiding premature re-operation may substantially decrease the need for re-operation in tibial fracture patients. More in depth coverage of these awards can be found in the ISFR newsletters.

Osteoporosis Highlights

Amy Hoang-Kim, MSc ISFR OFC Coordinator

Orthopaedic surgeons have traditionally been involved in the care of fragility fractures. However, there is increasing demand for them to act beyond just fixing the fractures, to providing a more holistic management of patients with respect to future injury prevention. Seven accepted abstracts in this 11th ISFR Biennial conference highlighted pertinent issues dealing with osteoporosis. Fractures cause significant osteopenia at the ipsilateral limb, reports Augat P (Biomechanics Trauma Center Murnau, Germany). 45 Sprague Dawley rats were divided into 3 groups, randomly allocated into ovariectomy (OVX), sham operation (Non-OVx) and OVX with bisphosphonate (ibandronate) treatment (OVX + BIS) groups. All animals received a standard closed mid-diaphyseal fracture of the left femur fixed with an intramedullary pin. After 4 weeks of healing, both femurs were excised and scanned with Micro CT to analyze bone architecture in the femoral head. BV/TV was reduced by 30%. The fracture itself induced a similar osteopenia at the ipsilateral femur. In OVX animals the fracture induced osteopenia was potentiated by ovariectomy and amounted in a total bone deficit of 60% compared to healthy cancellous bone. Bisphosphonate treatment significantly reduced both the OVX and fracture induced osteopenia. A fracture leads to significant localized osteopenia at locations adjacent to the fracture site. The investigators report that it is important to consider prevention measures for osteoporosis during the course of fracture healing in osteoporotic patients. Goemaere S (Unit for Osteoporosis and Metabolic Bone Diseases, Ghent University, Belgium) presented on the initiative FORWARD—a referral program for fracture patients in orthopaedic wards. Data from 7758 fracture patients was collected. Prevalence of osteoporosis was found for in-hospital patients (84%) and females (75%). Using both Dual energy X-ray absorptiometry analysis and specialist consultations resulted in a positive identification of osteoporosis in 2150 (27%) of the patients. Treatment with calcium and vitamin D was initiated in 2510 (32%) of the patients and with bisphosphonates in 1717 (22%) of the patients. No data regarding compliance has been collected thus far.