

5th Annual Meeting
of the International Society
for Computer Assisted
Orthopaedic Surgery

Helsinki, Finland
June 19-22, 2005

Conference Chairman

Dietrich Schlenzka, M.D., Ph.D.
ORTON Hospital, Helsinki, Finland

Program Committee

Brian L. Davies, Ph.D. (Chairman)
London, Great Britain

Florian Gebhard, M.D.
Ulm, Germany

Leo Joskowicz, Ph.D.
Jerusalem, Israel

Frank Langlotz, Ph.D.
Bern, Switzerland

Michael L. Swank, M.D.
Cincinnati, USA

Norberto Confalonieri, M.D.
Milano, Italy

P.S. John, M.D.
Kottayam, India

Martin Krismer, M.D.
Innsbruck, Austria

Lutz-P. Nolte, Ph.D.
Bern, Switzerland

Local Advisory Board

Timo Laine, M.D.
ORTON Hospital, Helsinki, Finland

Teija Lund, M.D.
ORTON Hospital, Helsinki, Finland

Seppo Seitsalo, M.D.
ORTON Hospital, Helsinki, Finland

Jouni Lohikoski, M.Sc.
Helsinki University of Technology, Finland

Seppo Santavirta, M.D.
University of Helsinki, Finland

The Following CME Credits will be Awarded

To be completed...	
--------------------	--

For Information and Registration Please Contact

CAOS 2005 Office
c/o University of Bern
MEM Research Center for Orthopaedic Surgery
Stauffacherstrasse 78
3014 Bern
Switzerland
Phone +41-31-631-5959
Fax +41-31-631-5960
Email CAOS2005@CAOS-International.org
URL <http://www.CAOS-International.org/2005/>

Sunday, June 19, 2005

- 9:00 Registration
13:30 Welcome and introduction to the 5th Annual Meeting
Dietrich Schlenzka

Session I – Soft Tissue Consideration in Total Knee Replacement

Chairmen: James B. Stiehl and Joel M. Bach

- 14:00 Soft tissue balancing for navigated TKA
S. Hakki
- 14:10 Influence of everted and subluxed patella in ligament balancing of TKR
C. Lüring, T. Hüfner, D. Kendoff, L. Perlick, H. Bähis, J. Grifka
- 14:20 Evolution in ligament balancing surgical technique for TKR – from historical gap measurement via today's force controlled gap-balancing to tomorrow's patients individual joint stability
P. Ritschl, R. Fuiko, F. Machacek Jr.
- 14:30 Rotational alignment after navigated TKA
S. Wirth, T. Schneider, N. Biasca
- 14:40 TKR and ligament balance by CAS
C.C. Castelli, F. Barbieri, V. Gotti
- 14:50 In-situ evaluation of a force-measuring device for assistance in ligament balancing during knee arthroplasty
D. Crotzet, J. Kowal, S.A. Saifert, H. Bleuler, L.-P. Nolte, L. Dürselen

Session II – Unicompartamental Knees

Chairmen: S. David Stulberg and Antony J. Hodgson

- 15:00 Mini-invasive implantation of a unicompartamental knee prosthesis – towards a new instruments philosophy?
J.-Y. Jenny, C. Boeri
- 15:10 Hands-on robotic unicompartamental knee replacement – a prospective randomized controlled clinical investigation of the Acrobot® System
J.P. Cobb, J. Henckel, P. Gomes, S.J. Harris, M. Jakopec, B.L. Davies
- 15:20 Mini-invasive implantation of a unicompartamental knee prosthesis might decrease the accuracy despite the use of a navigation system
J.-Y. Jenny, C. Boeri
- 15:30 Accuracy in arthroplasty – a three-dimensional CT based measurement study
J. Henckel, J.P. Cobb, S.J. Harris, M. Jakopec, F.M. Rodriguez y Baena, B.L. Davies

Break

- 15:40 COFFEE BREAK

Session III – Novel Aspects of Surgical Planning

Chairmen: Teija Lund and Klaus Radermacher

- 16:10 An innovative multi-sensorial environment for pre-operative planning of total hip replacement
D. Testi, C. Zannoni, N.G. Tsagarakis, D. Neiberg, G.J. Clapworthy, M. Viceconti
- 16:20 A new orthopedic implant management tool for computer assisted planning, navigation, and simulation – from implant CAD files to a standardized XML-based implant database
S. Sagbo, G. Zheng, B. François, F. Langlotz, C. Vangenot, L.-P. Nolte

- 16:30 3D visualization using fluoroscopic images acquired in virtual fluoroscopy
G. Chami, J.Ward, A. Mohsen, R Phillips
- 16:40 Basic experiments on milling of bone cement in RTHR
M. Hahndorff, W. Lauer, M. Neuss, M. de la Fuente, D.C. Wirtz, K. Radermacher
- 16:50 Software requirements evolution in CAOS applications – a case study
G. Douta, C. Schenkel, D. Schmedes, C. Schaffrath, O. Nierstrasz, F. Langlotz

Session IV – Statistical Shape Modeling

Chairmen: Nubuhiko Sugano and Gábor Székely

- 17:00 Bone morphing vs freehand localization of anatomical landmarks – consequences on the reproducibility of TKA
N. Perrin, E. Stindel, C. Roux
- 17:10 Feasibility of ultrasound-initialized bone morphing – early experiences and evaluation of a computer-assisted surgical technique
H. Talib, K. Rajamani, J. Kowal, M. Styner, M.A. Gonzalez Ballester
- 17:20 A two-level method for building a statistical shape atlas
C. Wu, P.E. Murtha, A.B. Mor, B. Jaramaz
- 17:30 Validation studies of anatomical structure morphing
K. Rajamani, H. Talib, M. Styner, M.A. Gonzalez Ballester
- 17:40 Sex: does it matter (in the construction of a statistical atlas of the hemi-pelvis)?
P.E. Murtha, A.B. Mor, C. Wu, B. Jaramaz
- 17:50 COCKTAIL RECEPTION AT THE POSTER AND INDUSTRIAL EXHIBITIONS
- 20:00 END OF DAY 1

Monday, June 20, 2005

- 8:00 Introduction to the day
Seppo Seitsalo

Session V – Computer Assisted Spinal Surgery

Chairmen: Philippe Merloz and Ramin Shahidi

- 8:15 Osteoid osteoma of the spine treated by combined computer-assisted and gamma probe-guided high-speed intralesional drill excision
B.J. van Royen, H.C. Baayen, R.J. Pijpers, P.I. Wuisman
- 8:25 Computer-assisted navigation is safe and accurate in sacroiliac screw insertion: a report of the technique and first clinical cases
J. Kasurinen, T. Laine, T. Lund, D. Schlenzka
- 8:35 Navigated pedicle instrumentation in the thoracic spine with the Iso-C^{3D} – is the precision satisfactory?
J. Franke, L.-P. Nolte, K. Wendl, J. von Recum, A. Wentzensen, P.A. Grützner
- 8:45 Endoscope based hybrid-navigation system for minimally invasive ventral-spine surgeries
R.U. Thoranaghatte, G. Zheng, F. Langlotz, L.-P. Nolte
- 8:55 CT-fluoro merge using Vectorvision and Stealth Station compared to fluoroscopy for insertion of pedicle screws using minimal invasive percutaneous techniques – is the accuracy adequate?
S. Eiskjær, C. Perlick, S. Nielsen
- 9:05 Image-guided percutaneous vertebroplasty using electromagnetic tracking
V. Watson, N.D. Glossop, A. Kim, D. Lindisch, H. Zhang, K. Cleary

Session VI – Osteotomies of the Hip and Lower Extremity

Chairmen: Martin Krismer and Frank Langlotz

- 9:15 Intraoperative ultrasound navigation to determine the mechanical leg axis
P. Keppler, J. Kozak, H.-P. Tümmler, L. Kinzl
- 9:25 Computer-assisted hip osteotomy surgery with near real-time biomechanical feedback
M. Armand, R. Armiger, G. Chintalapani, X. Liu, R. Szczepanowski, S. Feng, D. Minhas, R. Taylor, J. Lepisto
- 9:35 Computer assisted double osteotomy for severe genu varum – first results about 11 cases
D. Saragaglia
- 9:45 Computer assisted spherical osteotomy with a curved-bladed Tuke Saw
T. Koyama, N. Sugano, T. Nishii, H. Miki, Y. Sato, H. Yoshikawa
- 9:55 Navigated open wedge high tibia osteotomy – advantages and disadvantages in comparison to the conventional technique in a cadaver study
T. Hüfner, S. Hankemeier, D. Kendoff, G. Wang, G. Zheng, C. Krettek
- 10:05 Computer assisted optimization of correction osteotomies on lower extremities
E. Schkommodau, P. Belei, A. Frenkel, B. Recknagel, K. Radermacher
- 10:15 Computer assisted range of motion prediction in normal and impinging hips
M. Kubiak-Langer, M. Tannast, S.B. Murphy, K.A. Siebenrock, F. Langlotz

Poster Session, Part I

- 10:30 COFFEE BREAK AND POSTER PRESENTATIONS
Posters 1-11 were rated “Special Posters” indicating an exceptional quality of this work.
- 1) What can go wrong in CAOS
A.M. DiGioia III, D. Davidson, B. Jaramaz

- 2) Single vs. multi-fiber ligament model – an in vivo kinematics analysis
E. Chen, R.E. Ellis
- 3) Consequences of the femoro-tibial replacement on the femoro-patellar kinematics – an intra-operative in vivo study
E. Stindel, G. Guillard, J.-L. Briard, N. Perrin, J. Savean, C. Roux
- 4) Intra-operative registration of the knee kinematics by a navigation system – a pilot study
J.-Y. Jenny, C. Boeri
- 5) Evaluation of proximal femur bone mineral density using digitalized plain X-ray radiography of the hip
I. Ilisar, A. Hareven, I. Leichter, A.J. Foldes, Y. Mattan, M. Liebergall
- 6) Computer assisted planning for hip resurfacing replacement surgery
S.J. Harris, A.R.W. Barrett, M. Jakopiec, W. Dandachli, J.P. Cobb, B.L. Davies
- 7) Variations in acetabular anatomy – application to a pelvic atlas-based image-free navigation system
P.E. Murtha, M. Hafez, B. Jaramaz, A.M. DiGioia III
- 8) Special demands for pedicle screw insertion in dynamic stabilization of the lumbar spine – clinical accuracy of manual technique, CT based navigation technique, and fluoroscopic navigation technique
T. Mattes, T. Kocak, W. Puhl
- 9) Reliability study of the CT based system for range of motion calculation within the native hip joint
M. Kubiak-Langer, M. Tannast, S.B. Murphy, K.A. Siebenrock, F. Langlotz
- 10) The Accuracy of femoral anteversion determined by navigated ultrasound
S. Klein, A. Otto, J. Kozak, L. Kinzl, P. Keppler
- 11) Accurate calibration method for intraoperative ultrasound
C. Wehrle, J. Kozak, P. Keppler
- 12) Osteochondral lesions of the talus – clinical experience in navigated Iso-C^{3D} based drilling
K. Wendl, J. van Recum, A. Wentzensen, P.A. Grützner
- 13) An alternative method for calculation of femoral rotation using image guided surgery
R.N. de Steiger, A. Leung
- 14) Biomechanical analysis of strength of fixation of tracker devices to bone in computer navigated joint replacement arthroplasty
K. Deep, B. Donnelly, G.A. Tevelan, R. Crawford
- 15) A modified new reference clamp for minimal invasive navigated operations
M. Citak, M. Kfuri Jr., D. Kendoff, J. Geerling, C. Krettek, T. Hüfner
- 16) Fully automated computer algorithm for calculating articular contact points with application to knee biomechanics
A. Wolf, B. Jaramaz, P.E. Murtha
- 17) Mini snake robot for orthopaedic interventions
A. Wolf, H. Choset, A. Degani
- 18) Mini bone-attached robot for joint arthroplasty
A. Wolf, B. Jaramaz
- 19) TSA CT-based navigation protocol – preliminary results
P. Kilian, M.E. Bellemare, L. Carat
- 20) Computer-assisted ankle joint arthroplasty using bioengineered autografts
R. Sidler, M.A. Gonzalez Ballester, M. Styner, L.-P. Nolte, N. Südkamp, W. Köstler
- 21) Knee osteophytes have little influence on the coronal ligamentous balancing during total knee replacement
J.-Y. Jenny, C. Boeri, L. Schneider
- 22) The effect of sequential soft tissue release in TKR – a computer aided model
C. Lüring, T. Hüfner, D. Kendoff, H. Bähis, L. Perlick, J. Grifka
- 23) Gap balancing in robot assisted total knee arthroplasty
J.K. Seon, E.K. Song, T.R. Yoon, J.Y. Lee, Y.S. Lee
- 24) Varus and valgus stress before and after TKR – what is right?
F.J. Picard, A. Gregori, P. Marin

- 25) Influence of navigated soft tissue balancing on the height of the so called joint line
U. Clemens, K. Fujiwara, R.K. Miehle
- 26) Soft tissue tightening in the intact and prosthetic knee – in-vitro analysis with a navigation system
C. Belvedere, A. Ensini, A. Leardini, S. Giannini, F. Catani
- 27) How can the Ceravision system guide to achieve the ligament balance in total knee arthroplasty?
H. Wu, S. van Driessche, D. Blanquaert, D. Goutallier
- 28) Imageless navigation of unicompartmental knee arthroplasty – first impressions
R. Zini, G. Ponzetto, P. Pirani, S. d'Ercole
- 29) One-year clinical results of image-guided and conventional Oxford unicompartmental knee replacement
B. Ma, D. Watson, J. Rudan, R.E. Ellis
- 30) Limitation of preoperative templating of femoral components on plain radiographs – rotational evaluation with synthetic X-rays on ORTHODOC
T. Hananouchi, N. Sugano, N. Nakamura, T. Nishii, H. Miki, H. Yoshikawa
- 31) Three dimensional evaluation of the patello-femoral joint using MRI
T. Kobayashi, D. Kaneko, M. Matsunaga, K. Nemoto, A. Sugihara, Y. Aoki
- 32) Three-dimensional biomechanical analysis of acetabular osteotomy for preoperative planning
R. Armiger, M. Armand, J. Lepistö, X. Liu, K. Tallroth, R. Taylor
- 33) The effect of a laterally elevated wedged insole on the locus of the dynamic loading axis of the knee during gait
H. Kawakami, N. Sugano, K. Yonenobu, H. Yoshikawa, A. Hattori, N. Suzuki
- 34) Computer assisted preoperative planning and cup positioning in total hip arthroplasty
J.-N.A. Argenson, S. Parratte, X. Flecher, S. Lavallée, P.H. Valloton
- 35) Stereoscopic visualization and six-degrees-of-freedom interaction in preoperative planning of total hip replacement
D. Testi, M. Diegoli, M. Petrone, C. Zannoni, M. Viceconti
- 36) 3-dimensional femoral anteversion measurement using the volumetric femoral neck center and the posterior femoral plane in ORTHODOC
Y.S. Lee, T.R. Yoon, S.H. Oh, J.K. Seon, E.K. Song, J.S. Kim
- 37) Load related trabecular architecture variations in the scapular glenoid – modeling and validation
D. Lim, R. Seliktar
- 38) A simple method to determinate the pelvic tilt through a radiographically linear measurement to enhance the navigation
G. Grappiolo, G. Burastero, G. Moraca, L. Spotorno
- 39) Stress distribution visualization on pre- and post-operative virtual hip joint
A. Maciel, S. Sarni, R. Boulic, D. Thalmann
- 40) Mutual information based musculo-skeletal tumor marking – an anatomical based approach
S.A. Safert, A. Kurth, K.A. Siebenrock
- 41) A natural and intuitive 3D planner for orthopaedic surgery
S. Richards, J.A. Stewart, J.F. Rudan, D.R. Pichora
- 42) Automated preoperative 3D planning for multi-component implants based on leg length evaluation in total hip arthroplasty using CT data – pilot study
Y. Kagiya, M. Nakamoto, M. Takao, Y. Sato, N. Sugano, Y. Tada
- 43) Preliminary experiments of full-length planner in CAOS of lower limb fracture therapy
W. Liu, T. Wang, L. Hu, J. Wei, J. Wang, M. Wang
- 44) Advanced arthroscopy training simulator – insightMIST©
C. Illana Alejandro, J. Potti Cuervo, P.F. Navarro, J.M. Fernández Fernández-Arroyo, L. Pastor Pérez
- 45) 3-D planning and virtual X-ray evaluation in hip arthroplasty for instability
M.J. Seel, M. Hafez, K. Eckman, B. Jaramaz, D. Davidson, A.M. DiGioia III

TKA – Soft Tissue

Uni Knees

Computer Assisted Planning and Simulation

- | | |
|---|--|
| <p>46) Computer assisted pedicle screw fixation – clinical experience with a newly developed software
<i>P.S. John</i></p> <p>47) Comparison of two different navigation systems for spinal instrumentation – an experimental study
<i>J. Geerling, M. Citak, D. Kempe, S. Haschemi-Fard, C. Krettek, T. Hüfner</i></p> <p>48) Computer assisted minimal invasive IS joint arthrodesis
<i>F.T. Gebhard, P. Keppler, M. Arand</i></p> <p>49) Open architecture haptics simulator for robot-assisted surgery
<i>J.M^a Sabater, J.M^a Azorín, N. García</i></p> <p>50) Heat generation and temperature distribution in human cortical bone drilling
<i>A. Murariu, J.P. Turiel, J.C. Fraile</i></p> <p>51) Development of robotic model of external fixator for bone deformity correction of mal-united lower extremity
<i>Y.H. Kim, S.M. Joo</i></p> <p>52) Magnetic attachment of optical reference arrays to reduce the incidence of error caused by pin movement
<i>R.L. Thornberry</i></p> <p>53) Possible effects of artifacts on the Iso-C^{3D} navigation
<i>M. Citak, D. Kendoff, J. Geerling, V. Look, C. Krettek, T. Hüfner</i></p> <p>54) The Hiploc – an innovative device to transfer the Lewinneck reference system into the surgical field
<i>E. Stindel, C. Lefevre, B. Faguer, R. Gerard, P. Merloz</i></p> <p>55) Development of a new miniaturized robotic device for the removal of femoral bone cement
<i>M. Hahndorff, M. de la Fuente, D.C. Wirtz, K. Radermacher</i></p> <p>56) Computer assisted high tibial osteotomy in clinical routine – a prospective study
<i>J. von Recum, K. Wendl, L.-P. Nolte, G. Wang, A. Wentzensen, P.A. Grützner</i></p> <p>57) Navigation guided high tibial osteotomy – is it worth the effort?
<i>F. Maurer, G. Wassmer</i></p> <p>58) Does computer-assisted navigation increase the precision of the high tibial osteotomy?
<i>R. Wiehe, U. Becker, G. Bauer</i></p> <p>59) Arthroscopic assisted CT-free navigation guided medial open wedge high tibial osteotomy
<i>K.W. Cheung, S.H. Yung, K.H. Chiu</i></p> <p>60) CT-fluoro based registration for minimally invasive hip surgery
<i>M. Haimerl, F. Grünschläger, A. Oschinski, T. Stahelin, G. Tuma</i></p> <p>61) Taylor spatial frame in limb reconstruction surgery – review of 100 cases
<i>I.S. McFadyen, F.P. Monsell, J.A. Livingstone, M.L. Jackson, M.B. Rogers, R.M. Atkins</i></p> <p>62) Short-term clinical results of image-guided peri acetabular osteotomy
<i>B. Ma, W. Long, J. Yach, J. Rudan, R.E. Ellis</i></p> <p>63) Computer assisted high tibial osteotomy
<i>F.T. Gebhard, P. Keppler, J. Kluzik, G. Maier, L. Kinz</i></p> | <p>Spine</p> <p>Novel Technology for CAOS Systems</p> <p>Osteotomies</p> |
|---|--|

Podium Discussion – CAOS - Its Past, Present, and Possible Future

Moderator: Brian L. Davies

- 12:00 CAOS: To know where it is going we need to know where it has been and where it is now
S.D. Stulberg
- Smart Instruments for Orthopaedic Surgery
L.-P. Nolte
- Further Participants: A. Bauer and T. Laine

Break

- 13:00 LUNCH BREAK AND GENERAL ASSEMBLY OF CAOS-INTERNATIONAL

Session VII – Accuracy of Surgical Navigation

Chairmen: Rolf K. Miehke and Stéphane Lavallée

- 14:30 The impact of fixation type and location on tracker stability in navigated THA – a cadaver study
E. Mayr, J.-L. Moctezuma de la Barrera, M. Krismer, M. Nogler
- 14:40 Accuracy of CT based navigation of tumors in the pelvis
M. Thaler, E. Mayr, A. Prassl, M. Krismer, J.-L. Moctezuma de la Barrera, M. Nogler
- 14:50 Accuracy of the Medtronic Treon Plus CAOS system
J.B. Stiehl, D.A. Heck
- 15:00 The accuracy of (registration of) the trans-epi condylar axis in computer assisted surgery
E. van der Linden-vd Zwaag, E.R. Valstar, R.G.H.H. Nelissen
- 15:10 Ultrasound acquisitions for minimally invasive knee surgery using morphometric models –an accuracy analysis
P. Kilian, M.-E. Bellemare, C. Plaskos

Educational Workshops, Part 1

- 15:20 COFFEE BREAK
- Workshop 1
Sponsored by Biomet Europe
- Workshop 2
Sponsored by DePuy iOrthopaedics
- Workshop 3
Sponsored by Plus Orthopedics AG
- 17:30 END OF DAY 2

Tuesday, June 21, 2005

8:00 Introduction to the day
Seppo Santavirta

Session VIII – Computer Aided Trauma Care

Chairmen: Tobias Hüfner and Randy E. Ellis

- 8:15 Fixing peritrochanteric fracture with Gamma nails with fluoro-navigation – a comparative study of operative procedures of two different designs
K.S. Leung, N. Tang
- 8:25 Surface-matching can predict dislocation parameters of fracture fragments and might improve alignment in fractures of the femoral shaft
T. Gössling, S. Winkelbach, R. Westpfahl, T. Hüfner, F. Wahl, C. Krettek
- 8:35 A new optical system for measuring fracture healing at external fixators
J. Burger, S. Kussmaul, L. Claes
- 8:45 Navigated intraoperative clinical test for kinematic assessment of ACL graft behavior
S. Zaffagnini, S. Martelli, S. Bignozzi, N. Imakiire, M. Marccacci
- 8:55 Ultrasound guided scaphoid pinning
M. Beek, C. Peters, P. Abolmaesumi, T. Chen, R. Sellens, D. Pichora
- 9:05 Anterior cruciate ligament reconstruction using knee joint laxity measurements and a bendable ligament model
P. Colombet, M. Allard, C. Granchi, C. Plaskos, S. Lavallée
- 9:15 Table-mounted vs. bone-mounted reference frame attachment in navigation-assisted orthopedic surgery
I. Ilisar, Y. Weil, R. Mosheiff, L. Joskowicz, A. Peyser, M. Liebergall

Round Table – Computer Assisted Traumatology – More than Prototypes?

Moderator: David M. Kahler

9:25 Participants: P.A. Grützner, C. Krettek, M. Liebergall, K.S. Leung

Computer Assisted Spine Surgery – Live Transmission from the Operating Room at ORTON, Helsinki

Moderator: Dietrich Schlenzka

10:00 Operating Surgeons: T. Lund and T. Laine

Poster Session, Part 2

- 10:30 COFFEE BREAK AND POSTER PRESENTATIONS
Posters 64-74 were rated “Special Posters” indicating an exceptional quality of this work.
- 64) Fluoroscopy-based navigation system for ACL reconstruction using theoretical AP-view and lateral-view images
C.C. Wu, C.S. Tseng, H.M. Lee, S.T. Hung
- 65) Cone beam CT for image guided surgery – pre-clinical investigation in tibial plateau fractures
A. Khoury, J.H. Siewerdsen, C.M. Whyne, D.J. Moseley, H.J. Kreder, D.A. Jaffray
- 66) Fluoroscopy-based rigid registration for image guided spine surgery
X. Zhang, G. Zheng, L.-P. Nolte
- 67) Semi automated and non invasive determination of bone landmarks using a navigated US
J. Kozak, C. Wehrle, M. Wittek, P. Keppler

- 68) Development of a computer-assisted, motorized injection device for high viscous materials
M. Löffel, J. Kowal, S. Band, P. Heini, J. Burger, L.-P. Nolte
- 69) Femoral rotation and balanced flexion gap using navigation system and hydraulic knee analyzer
P.C. Graf, S.-P. Dominati, T. Ledoux
- 70) Standardized evaluation of accuracy of conventional and navigated cup placement
R.G. Haaker
- 71) Imageless navigation in minimally invasive total hip replacement with a posterior approach – excellent clinical results and radiographic alignment
M.L. Swank
- 72) Variation in pelvic position during total hip arthroplasty
M. Tannast, A. Murphy, G. Zheng, K.A. Siebenrock, F. Langlotz
- 73) Zero-dose C-arm navigation reducing intraoperative radiation
M. de la Fuente, P. Belei, F. Portheine, D.C. Wirtz, K. Radermacher
- 74) Minimal access total knee arthroplasty using a miniature robot and a new side milling technique
C. Plaskos, P. Cinquin, S. Lavallée, A.J. Hodgson
- 75) Measuring the tunnel positioning of an ACL replacement with a navigation system – comparison with X-ray measurements
J.-Y. Jenny, L. Schneider, C. Boeri
- 76) ACL reconstruction with OrthoPilot system – correlations between the computer data and the X-rays measurements – a study with 50 cases
J.-C. Panisset, F. Boux de Casson
- 77) Kinematic analysis of two different tunnel orientations in double-bundle ACL reconstruction
S. Zaffagnini, S. Martelli, S. Bignozzi, N. Imakiire, M. Marcacci
- 78) Tunnel placement in computer assisted anterior cruciate ligament surgery
M. Bhattacharyya, B. Gerber
- 79) Navigated measurement of the tibial rotation after ACL reconstruction
R. Meller, D. Kendoff, B. Zelle, T. Hüfner, F. Fu, C. Krettek
- 80) Computer-assisted auto-frame navigation system for distal locking of tibial intramedullary nails – a preliminary report on clinical application
J. Wang, L. Hu, M. Wang, T. Wang, C. Zhao, W. Liu
- 81) A sound-guided 3D navigation system for tibial intramedullary interlocking nail distal locking screws fixations
S.S. Hung, M.Y. Lee, C.H. Kuo
- 82) Correction of posttraumatic ankle and hind foot deformities with computer assisted surgery (CAS)
J. Geerling, D. Kendoff, M. Citak, T. Hüfner, C. Krettek, M. Richter
- 83) Intraoperative use of the Iso-C^{3D} in foot and ankle trauma care – preliminary results of the first 101 cases
J. Geerling, D. Kendoff, M. Citak, M. Richter, T. Hüfner, C. Krettek
- 84) Decreasing of the torsion difference in femur fractures with the use of fluoroscopy based navigation – a preliminary study
J. Geerling, T. Gössling, D. Kendoff, R. Westphal, C. Krettek, T. Hüfner
- 85) Robot assisted fracture reduction – a cadaver study
T. Gössling, R. Westphal, T. Hüfner, P. Martin, F. Wahl, C. Krettek
- 86) Surgical tools in navigation – a new parallel drill guide for femoral neck fractures
D. Kendoff, J. Geerling, M. Citak, T. Gössling, C. Krettek, T. Hüfner
- 87) Intraoperative 3-D imaging of perilunate dislocations – a decision guidance
D. Kendoff, M. Citak, J. Geerling, M. Richter, T. Hüfner, C. Krettek
- 88) Intraoperative 3-D imaging control of tibial plateau fractures
D. Kendoff, J. Geerling, M. Citak, T. Gössling, T. Hüfner, C. Krettek
- 89) Economic value and consequences of intraoperative 3-D imaging at calcaneal fractures
D. Kendoff, M. Citak, J. Geerling, M. Richter, C. Krettek, T. Hüfner

ACL Reconstruction

Fracture Fixation

- 90) Computerized hexapod assisted orthopaedic surgery (CHAOS) in the correction of long bone fracture and deformity
R.M. Atkins, J.A. Livingstone, F.P. Monsell, M.L. Jackson, A.H. McLean
- 91) A novel interface for ultrasound guided percutaneous pinning of fractured scaphoids
C. Peters, P. Abolmaesumi, T. Chen, D. Pichora, R. Sellens
- 92) Measurement of traction load and torque transferred to the lower extremity during simulated fracture reduction
M. Yuki, S. Masanobu, T. Yuichi, Y. Kazuo, W. Shinichi, S. Nobuhiko
- 93) Clinical use of virtual fluoroscopy in trauma surgery
P.F. Merloz, H. Vouaillat, A. Eid, S. Blendea, S. Plaweski, J. Troccaz
- 94) About the benefit of intraoperative 3D-imaging in repairing displaced intraarticular calcaneal fractures – results of a comparative study
A.P. Schmidt, K. Wendl, C.G. Wöfl, P.A. Grützner, A. Wentzensen
- 95) Hip resurfacing with computer navigation – initial experience at The Royal Bournemouth Hospital, UK
H.S. Sandhu, R.G. Middleton
- 96) A practical reference coordinate system for planning hip resurfacing arthroplasty
W. Dandachli, R. Richards, S. Harris, A. Barrett, J.P. Cobb
- 97) Comparison between conventional and navigated inserted cups using the OrthoPilot in standardized evaluation X-rays
R.G. Haaker, A. Ottersbach
- 98) Preliminary report of the navigated THA for dysplastic hip with OrthoPilot
K. Kanesaki, H. Hieda, T. Tamaki, M. Kubo, K. Nagata
- 99) Highlighting of navigation of the pelvic tilt through an “in-vitro study”
G. Grappiolo, S.-P. Dominati, G. Burastero, L. Spotorno
- 100) Accuracy and potential pitfalls of fluoroscopy guided acetabular cup placement
M. Tannast, F. Langlotz, M. Kubiak-Langer, U. Langlotz, K.A. Siebenrock
- 101) Comparison of experience with CT-based and fluoroscopic-based surgical navigation for total hip arthroplasty
S.B. Murphy
- 102) Minimally invasive surgery and navigation total hip prosthesis
H. Judet
- 103) The role of navigation-supported minimally invasive total hip replacement in daily practice by means of the SAL device
J.E. Brandenburg, C. de Simoni
- 104) Non-image based navigation for minimally invasive THR – a feasibility study of cup and stem navigation
T. Mattes, W. Puhl
- 105) Complete hip navigation in THA – technique and first results with OrthoPilot 2.0
H. Kiefer, A. Othman
- 106) A novel approach for biomechanical cup positioning in THR
E. Schkommodau, E. Rydlikowski, D.C. Wirtz, K. Radermacher
- 107) Individual optimization of the individual joint biometry in THR – computer assisted positioning and selection of implant segments in a new modular THR implant system
J.A. Richolt, S. Kammerzell, L. Zichner
- 108) Is computer assisted surgery worthwhile in high demanding knee replacement?
A matched-pairs study
N. Confalonieri, A. Manzotti, K. Motavalli
- 109) Short term clinical follow-up comparing rotating vs. fixed bearing navigated TKR
C. Lüring, H. Bähis, F. Oczipka, C. Trepte, L. Perlick, J. Grifka
- 110) Accuracy measurement of current TKR instrumentation with navigation
E. Andrea, C. Fabio, R. Fulvio, L. Alberto, B. Luca, G. Sandro

Fracture Fixation

Resurfacing

Total Hip Replacement

TKR

- 111) CAOS assessment of tibial rotation in total knee arthroplasty
J.B. Stiehl
- 112) Dynamic long-leg mechanical axes tracking – a prospective study on 25 patients – relationship between mechanical axis and knee rotation
F.J. Picard, A. Gregori, P. Martin
- 113) Image-free navigation system for total knee arthroplasty – determination of accuracy by using preoperative and postoperative CT measurement
D. Tigani, E. Rincari, E. Rimondi, P. Trentani, M. Mastroieni, F. Trentani
- 114) A framework and parameters for quantitative assessment of bone cutting for TKR
H. Haider, O.A. Barrera
- 115) Navigated freehand bone cutting for TKR – more experiments with more detailed 3-d quantitative surface comparison to conventional cuts
O.A. Barrera, T.D. Sekundiak, K.L. Garvin, B. O'Brien, H. Haider
- 116) Ankle torsion would cause varus alignment of the tibia using extramedullary guide in total knee arthroplasty – the necessity of computer navigation system
S. Matsuda, H. Mizu-uchi, H. Miura, H. Higaki, H. Miura, Y. Iwamoto
- 117) Clinical evaluation of CT-based navigation system for total knee arthroplasty
H. Mizu-uchi, S. Matsuda, H. Miura, R. Nabeyama, K. Okazaki, Y. Iwamoto
- 118) Differences in patellar tracking between intact and replaced knee with and without patellar resurfacing – an in-vitro study
C. Belvedere, A. Ensini, A. Leardini, S. Giannini, F. Catani
- 119) A hand-held computer-controlled tool for total knee replacement
T. Devos, P. Martin, F.J.M. Picard, M. Borchers, N. Cabanial, A. Dassier
- 120) A computer assisted surgical technique for total knee arthroplasty revision
M. Marcacci, L. Nofrini, F. Iacono, S. Bignozzi
- 121) Adjustable constraints – a novel method for positioning 8-in-1 cutting guides in computer assisted orthopaedic surgery
A.D. Pearle, A. Leroy, C. Granchi, C. Plaskos, S. Lavallée, P. White
- 122) Computer navigated knee prostheses are too large
E. van der Linden-vd Zwaag, E.R. Valstar, R.G.H.H. Nelissen
- 123) A comparative study of minimally invasive computer assisted total knee replacement (MICA TKR) and conventional open computer assisted total knee replacement (CATKR)
S.K. Chauhan, M. Ather, D. Lucas
- 124) MIS meets CAOS – early experiences and results in MISTKJR
A.C. Gregori, G. Holt
- 125) CAS enabled minimally invasive TKA – better clinical results and better alignment than mechanical instruments
M.L. Swank
- 126) Minimally invasive, computer-assisted TKR – the use of percutaneous 2-pin fixation
S.B. Murphy
- 127) Factors affecting the accuracy of minimally invasive total knee arthroplasty
S.D. Stulberg, L. Koyonas, S. McCusker, M. Granieri

Total Knee Replacement

Minimally Invasive Total Knee

Presidential Guest Lecture

12:00 Pär Slätis

Break

13:00 Lunch Break

Session IX – Registration

Chairmen: Norberto Confalonieri and Leo Joskowicz

- 14:00 A novel 3D ultrasound to bone surface registration technique using the unscented Kalman filter
M. Hedjazi Moghari, P. Abolmaesumi
- 14:10 Robust registration in robotic assisted unicompartmental knee arthroplasty – the region-based point acquisition protocol
F.M. Rodriguez y Baena, A.R.W. Barrett, J.P. Cobb, J. Henckel, M. Jakopec, B.L. Davies
- 14:20 A system for ultrasound-guided computer-assisted orthopaedic surgery
T. Chen, P. Abolmaesumi, R.E. Ellis, D. Pichora
- 14:30 Validation of fluoroscopic registration in surgical navigation of total hip arthroplasty
J.B. Stiehl, D.A. Heck, B. Jaramaz
- 14:40 Using anatomical models and fast rendering algorithms for C-arm pose recovery and cone-beam tomographic reconstruction of bone anatomy
O. Sadowsky, K. Ramamurthi, J.L. Prince, R.H. Taylor

Educational Workshops, Part 2

- 14:50 COFFEE BREAK
- Workshop 4
Sponsored by Zimmer GmbH
- Workshop 5
Sponsored by DePuy iOrthopaedics
- Workshop 6
Sponsored by BrainLAB AG
- 17:00 END OF DAY 3

Conference Banquet

- 18:15 Bus Transfer to Hotel Kalastajatorppa
- 19:00 CAOS Banquet
Presentation of the Maurice E. Müller Award for Excellence in Computer Assisted Surgery
Inauguration of the new CAOS-International President
Invitation to the 6th Annual Meeting of CAOS-International in Montreal, Canada

Wednesday, June 22, 2005

8:00 Introduction to the day
Teija Lund

Session X – Hip Resurfacing

Chairmen: Stephen B. Murphy and Branislav Jaramaz

- 8:15 Computer-assisted pre-operative planning for hip joint-preserving surgery
M.J. Kang, H. Sadri, N. Magnenat-Thalmann
- 8:25 The Tubes™ system for minimally invasive computer assisted hip resurfacing surgery
A.R.W. Barret, J.P. Cobb, M. Jakopec, S.J. Harris, F.M. Rodriguez y Baena, B.L. Davies
- 8:35 Automatic detection of femoral neck axis for hip resurfacing surgeries
H. Müller, B. Bracke, R. Dick
- 8:45 Biomechanical and geometrical consequences of femoral resurfacing component placement
C. Anglin, J. Tonetti, K. Beadon, A.J. Hodgson, N.V. Greidanus, C.P. Duncan
- 8:55 Computer aided hip resurfacing arthroplasty
W.J. Long, J. Rudan, R.E. Ellis

Session XI – General Aspects of Computer Assisted Total Hip Replacement

Chairmen: P.S. John and Yoshinobu Sato

- 9:05 Tissue-preserving computer-assisted total hip arthroplasty – faster recovery and lower complication rate without compromising accuracy of cup orientation
S.B. Murphy, M. Tannast
- 9:15 Comparison between robotic-assisted system and manual implantation of primary cementless total hip arthroplasty – a short-term result
N. Nakamura, N. Sugano, T. Nishii, H. Miki, A. Kakimoto, M. Yamamura
- 9:25 Computer-assisted femoral head resurfacing
K.B. Inkpen, M. Shekman, C. Anglin, N.V. Greidanus, J. Tonetti, B.A. Masri, A.J. Hodgson, C.P. Duncan, D.S. Garbuz
- 9:35 Computer-assisted navigation in the acetabular component positioning in total hip joint replacement – a randomized controlled clinical study
J. Kasurinen, S. Varjonen, M. Ylikoski, J. Lepistö
- 9:45 Higher accuracy of cup positioning by using an image-free navigation system
T. Kalteis, L. Perlick, H. Bähis, M. Handel, J. Grifka
- 9:55 Prediction of individual hip joint motion and impingement – a validation study using surgical navigation
M. Tannast, M. Kubiak-Langer, F. Langlotz, R. Ganz, K.A. Siebenrock, S.B. Murphy

Break

10:05 Coffee Break

Session XII – General Aspects of Computer Assisted Total Knee Replacement

Chairmen: Justin P. Cobb and Sandra Martelli

- 10:30 Navigated versus hand-guided total knee arthroplasty
R. Rosiek, B. Stöckl, E. Mayr, M. Nogler, M. Krismer
- 10:40 Functional impact of navigation assisted minimally invasive total knee arthroplasty
E.K. Song, J.K. Seon, T.R. Yoon, J.Y. Lee, S. M. Rowe, C.I. Hur

- 10:50 Process optimization for shorter operation times in navigated TKA – a comparison between navigated and manual procedures
H.-J. Walde, T.A. Walde, D. Burgdorf
- 11:00 Computer-assisted arthroplasty versus conventional jig-based/hand-guided techniques – a systemic review
L.S.S. Foo, M. Samuel
- 11:10 Rotational alignment in total knee replacement using CT-less navigation
M. Pleser, O Wörsdörfer
- 11:20 Very low dose computer tomography (CT) based planning and outcome measurement in knee arthroplasty
J. Henckel, J.P. Cobb, S.J. Harris, F.M. Rodriguez y Baena, A.R. Barrett, B.L. Davies
- 11:30 Preoperative versus intraoperative assessment of landmarks in navigated TKA – a regression and correlation analysis
M. Oberst, C. Bertsch, S. Würstlin, U. Holz

Scientific Awards Ceremony

- 11:40 Best clinical podium presentation award
Sponsored by Aesculap
- Best technical podium presentation award
Sponsored by NCCR CO-ME
- Best clinical poster presentation award
Sponsored by ORTON Invalid Foundation
- Best technical poster presentation award
Sponsored by Aesculap

Closing

- 12:00 Closing remarks
D. Schlenzka
- 12:15 ADJOURN

Meeting of the ASTM International Subcommittee F04.05

Computer Assisted Orthopaedic Surgical Systems

The subcommittee is working on a draft standard practice for the Measurement of Positional Accuracy of Computer Assisted Orthopaedic Surgical Systems. This first, and fundamental, baseline document will provide a protocol for measuring accuracy across all image and non-image based systems. The group decided to standardize accuracy measurements first since defining a way to compare the accuracy of various systems using a common protocol will provide a fundamental basis for the review of different technologies and their application to various tasks, and open the way to system comparison. Joel Bach, Ph.D., an assistant professor at the University of Colorado Health Sciences Center and Colorado School of Mines, is chairing the task group that will develop this standard.

Interested parties are welcome to join this meeting and participate in the ASTM International standards development activity on CAOS.

Room "Baltic", 2nd Floor, Wednesday, June 22; 12:30 – 17:30

To carry out an event such as CAOS would not be possible without the support and contributions by the following companies and organizations. Their help is highly appreciated.



Grand Benefactor
BrainLAB AG
<http://www.brainlab.de/>



Name Tag Benefactor
Zimmer
<http://www.zimmer.com/>



Proceedings Benefactor
Northern Digital Inc.
<http://www.ndigital.com/>



Lunch Break Benefactor
CAS Innovations
<http://www.cas-innovations.de/>



Award Benefactors
Aesculap AG & Co. KG
<http://www.aesculap.de/>

Best Clinical Podium Presentation
Best Technical Poster Presentation



NCCR CO-ME
<http://co-me.ch/>

Best Technical Podium Presentation



ORTON Invalid Foundation
<http://www.invalidisaatio.fi/>

Best Clinical Poster Presentation



MEM Foundation
<http://www.fmem.unibe.ch/>

*M.E. Müller Award for Excellence
in Computer Assisted Surgery*

Exhibitors (in alphabetic order)



Workshop Sponsors (in alphabetic order)



Other Sponsors (in alphabetic order)



Computer Aided Surgery

Formerly Journal of Image Guided Surgery

EDITOR:

Professor Richard D. Bucholz, *St. Louis University Health Sciences Center, USA*

ASSISTANT EDITOR:

Keith A. Laycock, *St. Louis University Health Sciences Center, USA*

The aims of *Computer Aided Surgery* are to improve patient care by advancing the utilization of computers during treatment; to evaluate the benefits and risks associated with the integration of advanced digital technologies into surgical practice; to disseminate clinical and basic research relevant to stereotactic surgery, minimal access surgery, endoscopy, and surgical robotics; to encourage interdisciplinary collaboration between engineers and physicians in developing new concepts and applications; to educate clinicians about the principles and techniques of computer assisted surgery and therapeutics; and to serve the international scientific community as a medium for the transfer of new information relating to theory, research, and practice in biomedical imaging and the surgical specialties.

The scope of *Computer Aided Surgery* encompasses all fields within surgery, as well as biomedical imaging and instrumentation, and digital technology employed as an adjunct to imaging in diagnosis, therapeutics, and surgery. Topics featured include frameless as well as conventional stereotactic procedures, surgery guided by intraoperative ultrasound or magnetic resonance imaging, image guided focused irradiation, robotic surgery, and any therapeutic interventions performed with the use of digital imaging technology.

This journal is also available online.

Please connect to www.tandf.co.uk/journals for further information.

To view an online sample copy please visit: www.tandf.co.uk/journals/onlinesamples.asp



SUBSCRIPTION RATES

2005 – Volume 10 (6 issues)

Print ISSN 1092-9088; Online ISSN 1097-0150

Institutional rate: US\$501; £303

Personal rate: US\$171; £104

Special CAOS Rate: US\$70; £42



Taylor & Francis
Taylor & Francis Group

ORDER FORM

tcas

PLEASE COMPLETE IN BLOCK CAPITALS AND RETURN TO THE ADDRESS BELOW

Please invoice me at the institutional rate personal rate CAOS special rate

Name _____

Address _____

CAOS Membership Number _____

Email _____

Please contact Customer Services at either:

Taylor and Francis Group, 4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Email: enquiry@tandf.co.uk Website: www.tandf.co.uk

Taylor & Francis Inc, 325 Chestnut Street, 8th Floor, Philadelphia, PA 19106, USA

Tel: +1 800 354 1420 (toll-free calls from within the US) or +1 215 625 8900 (calls from overseas) Fax: +1 215 625 8914

Email: info@taylorandfrancis.com Website: www.taylorandfrancis.com