Boston, MA, USA, June 17-20, 2009

Computer Assisted Orthopaedic Surgery

9th Annual Meeting of
CAOS-International
Final Program

CAOS International

Conference Chairman

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Center for Computer Assisted & Reconstructive Surgery, New England Baptist Hospital, Boston, USA

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Wednesday, June 17, 2009

Pre-Congress Educational Workshops

As a novelty in 2009 CAOS will feature educational pre-congress workshops. A faculty of renown experts will comprehensively introduce workshop participants to selected topics related to computer assisted orthopaedic surgery.

Workshop I – Statistical Shape Modeling

Organizers: Mauricio Reyes and Philippe Büchler

Statistical shape analysis enjoys a remarkable popularity within the medical image analysis community, and has been widely used to study human anatomy. These techniques hold potential for novel approaches in image guided surgery planning, simulation and execution. Among possible applications, the need for pre- and/or intraoperative CT data sets to gather bone surface information may be removed, pathologies could be detected automatically or structural biomechanical behavior of human structures incorporated during planning.

The aim of the workshop is to introduce and present statistical shape modeling to researchers working in Orthopedics and related topics. The workshop will focus on three main aspects: building statistical shape models, applications to orthopedic research and related topics, and current challenges and advancements to improve the accuracy, robustness and usability of statistical shape and intensity models.

The workshop introduces a varied list of international renowned speakers working actively on the topic of statistical shape and intensity modeling. The workshop aims at emphasizing not only on the methodologies but also on the practical aspects of statistical shape modeling.

Workshop II – The 3DSlicer Platform for Image Analysis and 3D Visualization

Organizers: Ron Kikinis, Randy Gollub, and Sonia Pujol

3DSlicer is an application for visualization, image analysis and an environment for plug-ins. The 3DSlicer software platform has been developed with support primarily from the National Institutes of Health and is distributed without restrictions on use. The overall goal aims at improving the availability and deployment of cutting-edge biomedical computing algorithms to the medical imaging community. This technology delivery platform has been designed as a modular software tool that is both easy to use for scientists and clinicians, and easy to extend for software developers and engineers.

The goal of this workshop is to provide the orthopaedic research community with a comprehensive introduction to the 3D visualization and image analysis tools which are available in the Slicer platform, and a practical experience with the open-source software. The tutorial will consist of a series of lectures and corresponding instructor-lead hands-on sessions with the participants working on their own laptops. After completion of the workshop, participants will be able to visualize and analyze their own datasets within the 3DSlicer platform.

Thursday, June 18, 2009

7:00 REGISTRATION

7:45 Welcome and introduction
SB Murphy, BL Davies

Session I – Unicondylar Knee Replacement – Part 1: Navigation

Chairmen: Jean-Yves Jenny and Michael Conditt

8:00 Comparison of minimally invasive unicondylar knee arthroplasty with or without a navigation system
Song EK, Seon JK, Park SJ, Lee DS

8:07 Computer-assisted uni knee arthroplasty for genu varum deformity. Results of axial correction in a case-control study of 40 cases
Ayach A, Plaweski S, Saragaglia D

8:14 The influence of posterior tibial slope on antero-posterior stability in the ACL insufficient medial unicompartmental knee replacement
Sussmann PS, Preiss S, Pearle AD, Kendoff D

8:21 DISCUSSION

8:30 Tibial undercutting in a navigation system designed for unicompartmental knee arthroplasty
Cullis PS, Gregori A

8:37 Computer assisted revision of failed UKR
Manzotti A, Confalonieri N, Motavalli K

8:44 DISCUSSION

Session II – Osteotomy & Trauma

Chairmen: Christian Krettek and Lutz-Peter Nolte

8:50 Computer-assisted navigation vs. customized jigs for distal radius osteotomy
Ma B, Kunz M, Fedorak G, Rudan J, Alsanawi H, Smith B, Ellis R, Pichora D

8:57 Individualized instrument guides for distal radius osteotomy
Kunz M, Ma B, Rudan JF, Ellis RE, Pichora DR

9:04 Navigated open wedge high tibial osteotomy for gonarthrosis
Song EK, Seon JK, Park SJ, Lee DS

9:11 Navigated double level osteotomy for the correction of severe varus deformity
Bartl C, Gebhard F, Keppler P

9:18 DISCUSSION

9:30 Evaluation of biomechanical analysis for periacetabular osteotomy
Murphy R, Armiger R, Tallroth K, Lepisto J, Mears S, Armand M

9:37 Computer assisted tibial derotation osteotomy. Cases report
Grimaldi M, Courvoisier A, Merloz PF

9:44 Use of two intraoperative 3D fluoroscopic devices for the assessment of articular reduction – an accuracy study
Weil YA, Singer SB, Mosheiff R, Liebergall M, Khoury A

9:51 DISCUSSION

Coffee Break and Poster Session – Part 1

10:00 POSTERS WILL BE PRESENTED IN FOUR SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION'S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.

1) Double-bundle anterior cruciate ligament reconstruction
Ferretti A, Monaco E, Labianca L, Maestri B, de Carli A, Speranza A, Conteduca F

2) Morphometric measurements (tibial and femoral footprints, anisometric envelope) in navigation assisted double bundle anterior cruciate ligament reconstruction
Plaweski S, Petek D, Saragaglia D

3) The optimal femoral head size
Jenabzadeh AR, Cobb J

4) Measurement of cup angles of metal on metal hip resurfacing: Plain radiographs versus low radiation dose, metal artifact reduction CT
Hart AJ, Henckel J, Dandachli W, Schlueter-Brust K, Cobb J

5) Transforming standard fluoroscopy to three-dimensional renditions and axial slices for orthopedic surgery
St. Clair S., Shoham M.

6) One-year experience with 3D-navigation in posterior instrumentation of the upper thoracic spine – application, reliability, and benefit
Blattert TR, Jarvers JS, Katscher S, Siekmann H, Glasmacher S, Franck A, Stockmar C, Josten C

7) Image-based guidance for pedicle screw instrumentation of the scoliotic spine
Devito DP, Gaskil T

8) Prosthetic femoral anteversion in THR and its lack of relationship to native acetabular anteversion
Bargar WL, Jamali A

9) Leg length discrepancy, dislocation rate and off-set in total hip replacement using a short modular stem: Navigation versus conventional free-hand
Confalonieri N, Manzotti A, Montironi F

10) The methods of measuring leg length discrepancy – are conventional methods accurate for severe orthoarthritis patients?
Hirasawa N, Matsubara M, Okuda N

11) Improving the accuracy of acetabular component orientation: Avoiding malposition
Moskal JT, Capps SG

12) Frames of reference following total hip arthroplasty
Dandachli W, Henckel J, Lloyd G, Hart A, Cobb J

13) A comprehensive formula for compliant orientation of both components in total hip arthroplasty in the safe zone
Widmer KH

14) MRI guided applications of signal inducing bone cements on a spine phantom
Wichlas F, Schilling R, Seebauer C, Teichgräber U, Bail HJ

15) Assessment of optical localizer accuracy
Elfring R, de la Fuente M, Radermacher K

16) Combining the best: Feasibility of zero dose electro-magnetically tracked facet joint puncture with closed bore magnetic resonance scanners
Penzkofer T, Bruners P, Elfring R, Isfort P, Günther RW, Schmitz-Rode T, Mahnken AH

17) Signal inducing bone cements for MRI
Wichlas F, Schilling R, Teichgräber O, Bail HJ

18) Surface reconstruction of cartilage defects for partial joint resurfacing surgery
Tseng CS, Su W, Wu CC, Chen TH

19) Prediction of impingement-free range of motion in Legg-Calvè-Perthes disease – an experimental pilot study
Puls M, Ecker TM, Steppacher SD, Murphy SB, Kowal JH, Siebenrock KA, Tannast M

20) Automated detection of the acetabular rim – a novel and accurate method
Ecker TM, Puls M, Steppacher SD, Weber S, Tannast M, Siebenrock KA, Kowal JH

21) In-vivo evaluation of vibrotactile feed-back in knee arthroscopy surgery: Measurement and impact on training
Tenzer Y, Henckel J, Hart AJ, Davies B, Rodriguez y Baena F

22) Optimizing cement injection in osteoporotic femur augmentation
Basafa E, Armiger R, Kutzer DM, Sutter E, Mears S, Armand M

23) Introducing computer-assisted surgery into combined PET/CT image based biopsy
Santos TO, Weitzel T, Klaeser B, Reyes M, Weber S

24) The effect of kinematic navigation system for TKA of the unstable or destructed RA knee
Kanesaki K, Yokosuka K, Mitsui Y, Kaieda T, Nagata K

25) Does navigated total knee replacement really improve radiological findings compared to the conventional one?
Pach M, Holibka R, Spacil A

26) Influence of obesity on accuracy of CT-based navigation system for total knee arthroplasty
Fukagawa S, Matsuda S, Mizu-Uchi H, Miura H, Okazaki K, Moro-Oka T, Mitsuyasu H, Iwamoto Y

27) Internal rotation of femoral components using computer navigation
Siliski JM, Cooper AJ, Franklin JH, Josephs L

28) Navigated revision total knee replacement
Jenny JY, Diesinger Y, Ciobanu E

29) Accuracy of image-free navigation for severely deformed knees
Matsuda S, Takasaki M, Fukagawa S, Mitsuyasu H, Miura H, Okazaki K, Morooka T, Iwamoto Y

30) Navigation prediction for balancing of soft tissue and flexion-extension gap in primary total knee arthroplasty and its midterm clinical results
Song EK, Seon JK, Park SJ, Lee DS

31) Mechanical accuracy of navigated minimally invasive total knee arthroplasty
Biasca N

32) Varus and valgus stress assessment in total knee replacement: A comparison of two independent series of 450 knees
Clarke JV, Daubresse F, Mebara T, Deakin AH, Claasen C, Baines J, Deep K, Picard F

33) Profile of distal femoral cortex – a computer aided, cadaveric study
Hulse N, Page S, Pinzuti JB, Payne AP, Picard F

34) MRI-based patient matched technology for total knee arthroplasty
Agnihotri A, Wald A, Rumery MP, Nadzadi ME, Mehl DT, Salehi A

35) Comparing results of minimally invasive total knee arthroplasty performed with and without computer-assisted navigation
Tanavalee A, Khumrak S, Rojpornpradit T, Ngarmukos S

36) Computer navigated orthopaedic training system for fracture fixation
Rambani R, Phillips R, Verma R, Bielby M, Mohsen AMMA

37) The effects of 3D-navigation on intra-operative management and on post-operative results during ORIF of dis-placed acetabular fractures
Oberst M, Schmal H, Hauschild O, Konstantinidis L, Suedkamp NP

38) Computerized navigation for the internal fixation of proximal femoral fractures on the basis of zero-dose C-arm navigation. An experimental study
Mueller MC, Belei P, Strake M, Kabir K, Burger C, Radermacher K, Wirtz DC

39) 3-D measurement of femoral antetorsion compared to a conventional radiological method
Citak M, Oszwald M, O'Loughlin PF, Kendoff D, Pearle AD, Krettek C, Hüfner T, Citak M

40) Heterotopic ossification post navigated high tibial osteotomy
Citak M, O'Loughlin PF, Citak M, Kendoff D, Pearle AD

Session III – Total Hip Replacement – Part 1: Kinematics

Chairmen: William L. Bargar and Guoyan Zheng

11:00 Evaluation of intraoperative pelvic positioning using software-based computed tomography/radiography matching
Chow JC, Eckman K, Jaramaz B, Ecker T, Murphy S

11:07 Pelvic tilt remains consistent after total hip arthroplasty
Klingenstein GG, Murphy SB, Jaramaz, B, Eckman, K

11:14 Analysis of dynamic pelvic flexion angle after total hip arthroplasty among patients with pelvic reclination using a 4D motion analysis system
Tsuda K, Miki H, Kitada M, Nakamura N, Hattori A, Suzuki N, Yonenobu K, Sugano N

11:21 A New THR procedure based on hip ROM and patient's dynamic behaviour of the pelvis
Stindel E, Dardenne G, Hamitouche C, Roux C, Lefèvre C

11:28 DISCUSSION

Session IV – Novel Technology – Accuracy Issues

Chairmen: Paul A. Grützner and Ferdinando Rodriguez y Baena

11:40 Comparison of two CT-based intra-operative navigation systems for mosaic arthroplasty
Kunz M, Devlin S, Hurtig M, Waldman SD, Stewart J

11:47 Computer-assisted navigation vs. conventional mosaicplasty of the knee joint: A cadaveric study
Koulalis D, Kendoff D, O'Loughlin PF, Citak M, Di Benedetto P, Cranchi C, Plaskos C, Pearle AD

11:54 Point registration accuracy of infrared optical tracking systems
Clarke JV, Deakin AH, Picard F, Nicol AC

12:01 DISCUSSION

Presidential Guest Lecture 1

12:10 Open source software as an enabler of research
Ron Kikinis, M.D. (Brigham & Women's Hospital; Boston, USA)

Lunch Break

12:40 LUNCH BREAK AT THE INDUSTRIAL EXHIBITION

Industrial Workshop I

13:40 Image Based Orthopaedic Solutions
Stryker

Session V – Total Knee Replacement – Part 1: Alignment

Chairmen: Eun Kyoo Song and Antony Hodgson

14:10 The reliability of different frames of reference involved in the rotation of the tibial component in total knee arthroplasty
Page S, Deakin AH, Clarke JV, Pinzuti JB, Payne AP, Picard F

14:17 The relationship of pre-implant and post-implant alignment and range of motion in computer assisted total knee arthroplasty
Dean FKM, Deakin A, Picard FJM, Baines J, Deep K, Gregori ACP

14:24 Femoral component rotation: Assessment of two methods to determine the flexion axis of the femoral component
Page S, Deakin AH, Pinzuti JB, Payne AP, Baines J, Dean F, Picard F, Leitner F

14:31 DISCUSSION

14:40 Long leg radiographs as a measurement tool for biomechanical axis in total knee replacement: Comparison of radiographic and navigation measurements
Deep K, Willcox N, Smith B

14:47 A comparison of posterior condylar axis with transepicondylar axis as the reference for rotational orientation of femoral component in total knee replacement – conventional vs. computer navigation
Deep K, Smith B, Nunag P, Willcox N

14:54 A radiological and navigated study of the anatomical and mechanical femur axes in the lateral plane
Jenny JY, Barbe B

15:01 Automated guide positioning in computer-assisted total knee arthroplasty with the iBlock – a comparative study with conventional blocks
Koulalis D, O'Loughlin PF, Plaskos C, Kendoff D, Pearle AD

15:08 DISCUSSION

Session VI – Hip Resurfacing

Chairmen: Justin Cobb and Antony Hodgson

15:20 The accuracy and reliability of image-less computer navigation output in hip resurfacing arthroplasty
Olsen M, Gamble P, Chiu M, Tumia N, Boyle RA, Schemitsch EH

15:27 Accuracy of femoral component placement for hip resurfacing using individualized templates: A clinical trial
Kunz M, Rudan JF, Xenoyannis GL, Ellis RE

15:34 DISCUSSION

Coffee Break and Poster Session – Part 2

15:40 POSTERS WILL BE PRESENTED IN FOUR SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION'S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.

41) Measurement of the anteroposterior and rotational knee laxity by a navigation system during ACL replacement
Jenny JY, Diesinger Y

42) In-vivo comparison of isometricity between navigational and conventional technique in an ACL reconstruction
Song EK, Seon JK, Park SJ, Lee DS

43) Current concept on computer assisted techniques in anterior cruciate ligament reconstruction
Klos TVS, Zaffagnini S, Bignozzi S, Lopomo N

44) What is the variation in angular orientation of CT measured non-navigated hip resurfacing cups?
Hart AJ, Henckel J, Skinner JA, Richards R, Cobb JP

45) Orientation of the femoral component in resurfacing arthroplasty of the hip: In-vitro comparison of accuracy of computer navigation and mechanical jigs
Bansal R, Verma R, Gambhir AK

46) Computer aided percutaneous vertebroplasty and kyphoplasty using Efilm workstation software
Yu W, Cody B, Chunde L, Xiaodong Y

47) Build spine atlas from sparse data
Wu C, Murtha PE, Jaramaz B

48) The effects of the CT-fluoro matching procedure on the registration in CT-based navigation total hip arthroplasties for Japanese patients
Tokunaga K, Watanabe K, Imai K, Muraoka M

49) Adjustment of leg length discrepancy in THA using CT-free navigation system without the use of a femoral tracker
Nishio S, Fukunishi S, Imamura F, Fukui T, Yoshiya S

50) Comparison between landmark (point) acquisition during navigated hip replacement using an ultrasound probe and a percutaneous digitizer probe: A cadaver study
Mathew MO, Frame MC, Periasamy K, Picard F, Leitner B, Mollard B

51) Reliability of cup position in navigated THR in lateral decubitus using the "flip technique"
Speranza A, Monaco E, Carcangiu A, Alonzo R, D'Arrigo C, Ferretti A

52) Validation of a new method for determination of cup orientation using 2D/3D matching
Steppacher SD, Tannast M, Zheng G, Zhang X, Kowal J, Anderson SE, Siebenrock KA, Murphy SB

53) Comparison of two novel fluoroscopy-based stereotactic techniques for subaxial cervical spine pedicle screw placement
Reinhold M, Bach C, Audigé L, Blauth M, Magerl F

54) Computer-aided osteotomy planning
Fuernstahl P, Schweizer A, Nagy L, Szekely G, Harders M

55) A swarm intelligence approach to ultrasound segmentation of bone surfaces
Hefny M, Ellis RE

56) Optimal fixation of acute scaphoid fractures – a finite element analysis
Luria S, Hoch S, Liebergall M, Mosheiff R, Peleg E

57) Optimized A-mode ultrasound based 3D-detection of bone cement in RTHR:
Towards a miniaturized ultrasound geometry scanner
Heger S, Fieten L, Mumme T, Wirtz DC, Radermacher K

58) Enhancing dental planning with the automatic prediction of primary implant stability:
First validation in sheep bone
Bardyn T, Gédet P, Hallermann W, Büchler P

59) Experimental accuracy evaluation of a navigated robotic assistance system
Wahrburg J, Sahm S

60) Diagnosis of femoro-acetabular impingement based on the equidistant hip joint simulation strategy
Ecker TM, Puls M, Tannast M, Steppacher SD, Weber S, Siebenrock KA, Kowal JH

61) Soft tissue artifacts when using navigation systems to measure lower limb coronal alignment with external (non-invasive) trackers
Clarke JV, Deakin AH, Nicol AC, Picard F

62) Does navigation tell the truth? Deviations between navigation data and post-op X-rays in total knee arthroplasty
Livshetz I, Brin YS, Holcroft C, Antoniou J, Zukor DJ

63) Application of the CT-based navigation system to the pre-operative simulation of setting a femoral component in minimally invasive total knee arthroplasty
Enomoto H, Tsuji S, Kawasaki T, Niki Y, Matsumoto H, Toyama Y, Suda Y

64) Predictive autonomous orthopaedic device
Gouriou M, Almouahed S, Hamitouche C, Roux C, Stindel E

65) Evaluation of intra-articular, articular-surface-mounted navigation in the setting of limited incision total knee arthroplasty
Williams N, Seino D, Mai K, Rosen A, Walker R

66) Sagittal plane alignment of the femoral component in total knee arthroplasty – CAOS vs. manual
Song EK, Seon JK, Park SJ, Lee DS

67) Tibial implant alignment in total knee arthroplasty: A radiographic evaluation of three techniques
Dayton MR, Mallette PR, Newman J, Resende G, Morgan SJ

68) The limb alignment in conventional total knee arthroplasty – evaluation with optical tracking system
Chang CW, Yang CY, Chang CH, Tai TW, Wu PT, Lin CL

69) Characterization of three-dimensional pathological patterns in frontal plane alignment during computer navigated total knee arthroplasty
Dunbar MJ, Ganapathy V, Kjar R, Hennigar A, Richardson G

70) Computer navigation decreases the frequency of medial and lateral soft tissue release in total knee arthroplasty
Deep K

71) Pre- vs. post-operative alignment using an alternative navigation method
Deboer DK, Barnes CL, Blaha JD, Penenberg BL, Obert RM, Stemniski PM

72) Comparing a disposable non-invasive surgical orientation system with an established navigation system requiring intraosseous markers
O'Loughlin PF, Koulalis D, Pearle AD

73) Gender differences in the rotational reference axes of the distal femur – a CT based analysis
Ball S, Windley J, Akhbari P, Gopal R, Nathwani D

74) Relevance of computer-assisted recording of femoral mechanical axis to give rotation to femoral implant
Saragaglia D, Ayach A, Mercier N, Plaweski S

Total Knee Replacement

75) Quantitative comparative patient-specific evaluation of femoral fracture fixations: A clinical study
Peleg E, Joskowicz L, Gefen A, Liebergall M, Moshieff R

76) Integration of multi-body-system analysis in a fluoroscopic planning and navigation system for oblique osteotomies
Belei P, Mumme T, Radermacher K

77) Treatment of complex tibial fractures with computer assisted hybrid external fixator
Rampurada A, Tadross T

78) Navigation of proximal femur nails
König B, Schäffler A, Freude T, Döbele S, Stöckle U

79) Computer navigation and fixator-assisted femoral osteotomy for correction of malunion after peri-prosthetic femur fracture
Kendoff D, Fragomen AT, O'Loughlin PF, Pearle AD, Citak M, Rozbruch SR

Trauma

80) Improvements in implant accuracy in unicompartmental knee replacement by the use of navigation
Quirbach S, Fink C, Hoser C, Attal R, Rosenberger RE

UKR

Panel Discussion – Computer assisted double bundle ACL reconstruction

Moderator: Stephane Plaweski

16:40 Panelists: Kamal Deep, Jason Koh, Burt Klos, Philippe Colombet

Session VII – Spine

Chairmen: Philippe Merloz and Moshe Shoham

17:10 Effective dose and organ doses of intra-operative 2D- and 3D-imaging in dorsal spondylodesis and percutaneous transsacral screw stabilization comparing standard and computer-navigated procedures
Kraus MD, Keppler P, Krischak G, Banckwitz R, Gebhard FT, Schuetz UHW

17:17 Minimally invasive posterior lumbar interbody fusion with isocentric C-arm fluoroscopic navigation in elderly patients 80 years of age or older
Kishida S, Sato K, Ando T, Katayama Y

17:24 Miniature robotic spine surgery – a surgical toy or a break-through?
Barzilay Y, Liebergall M, Schroeder JE, Kaplan L

17:31 Spine instrumentation simulator for virtual prototyping and optimization of spinal deformity surgeries
Aubin CE, Majdouline Y, Sangole A, Labelle H

17:38 DISCUSSION

17:50 Accuracy of lower cervical pedicle screw placement assisted by navi-gation system in the human cadaveric spine
Liu YJ, Tian W

17:57 Computer-assisted intra-operative stiffness measurement of spinal motion segments
Reutlinger C, Gédet P, Kowal J, Rudolph T, Burger J, Hasler C, Büchler P

18:04 In-vivo investigation of the biomechanical properties of the human lumbar spinal segment using an instrumented spinal distractor
Ambrosetti-Giudici S, Pfenniger A, Nolte LP, Krenn MH, Piotrowski W, Burger J

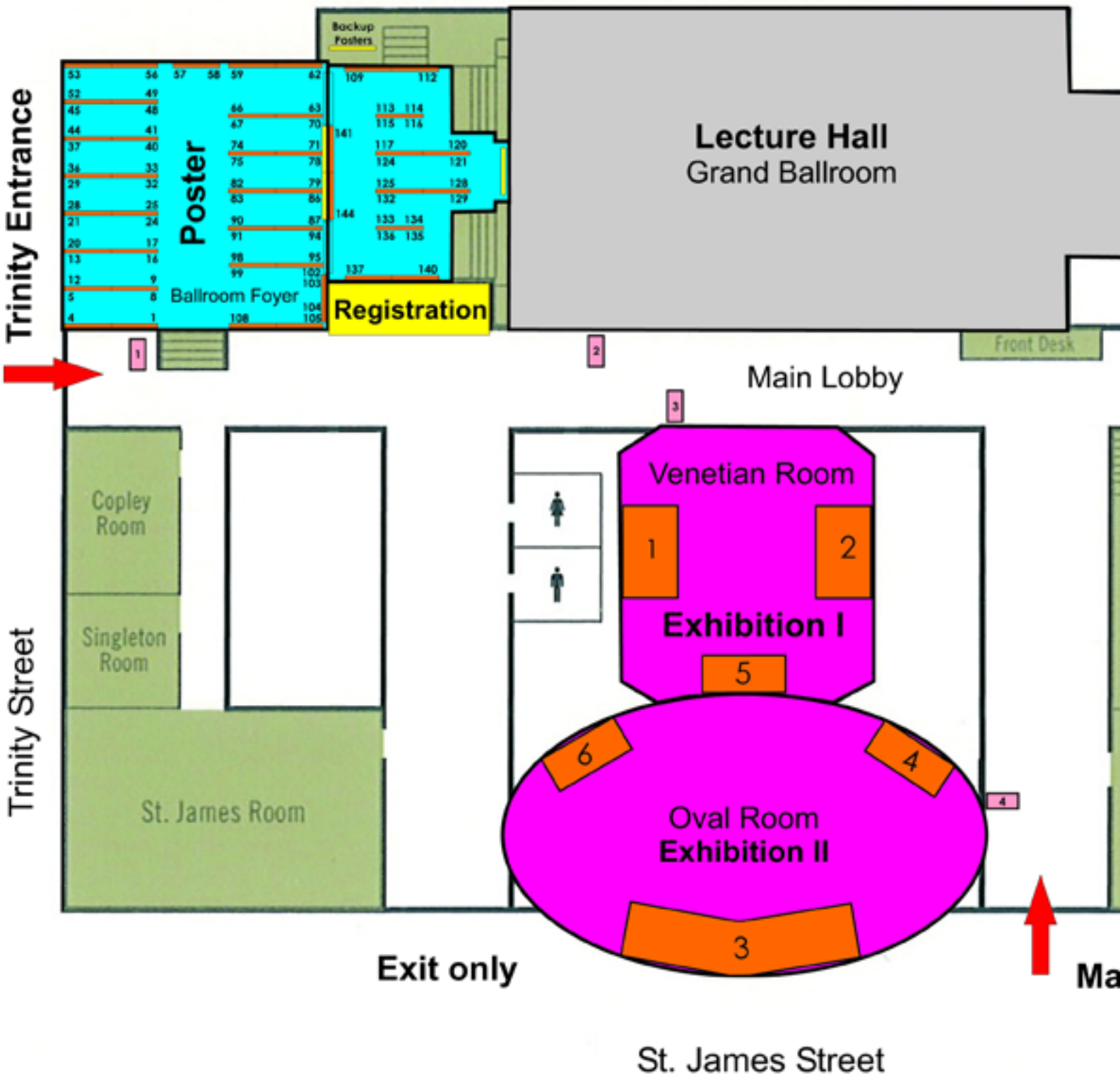
18:11 Guided oblique lumbar interbody fusion (GO‑LIF): A biomechanical study in human spines to compare GO‑LIF fixation against pedicle screws fixation
St. Clair S., Tan JS, Lieberman IH

18:18 DISCUSSION

18:30 END OF THE DAY

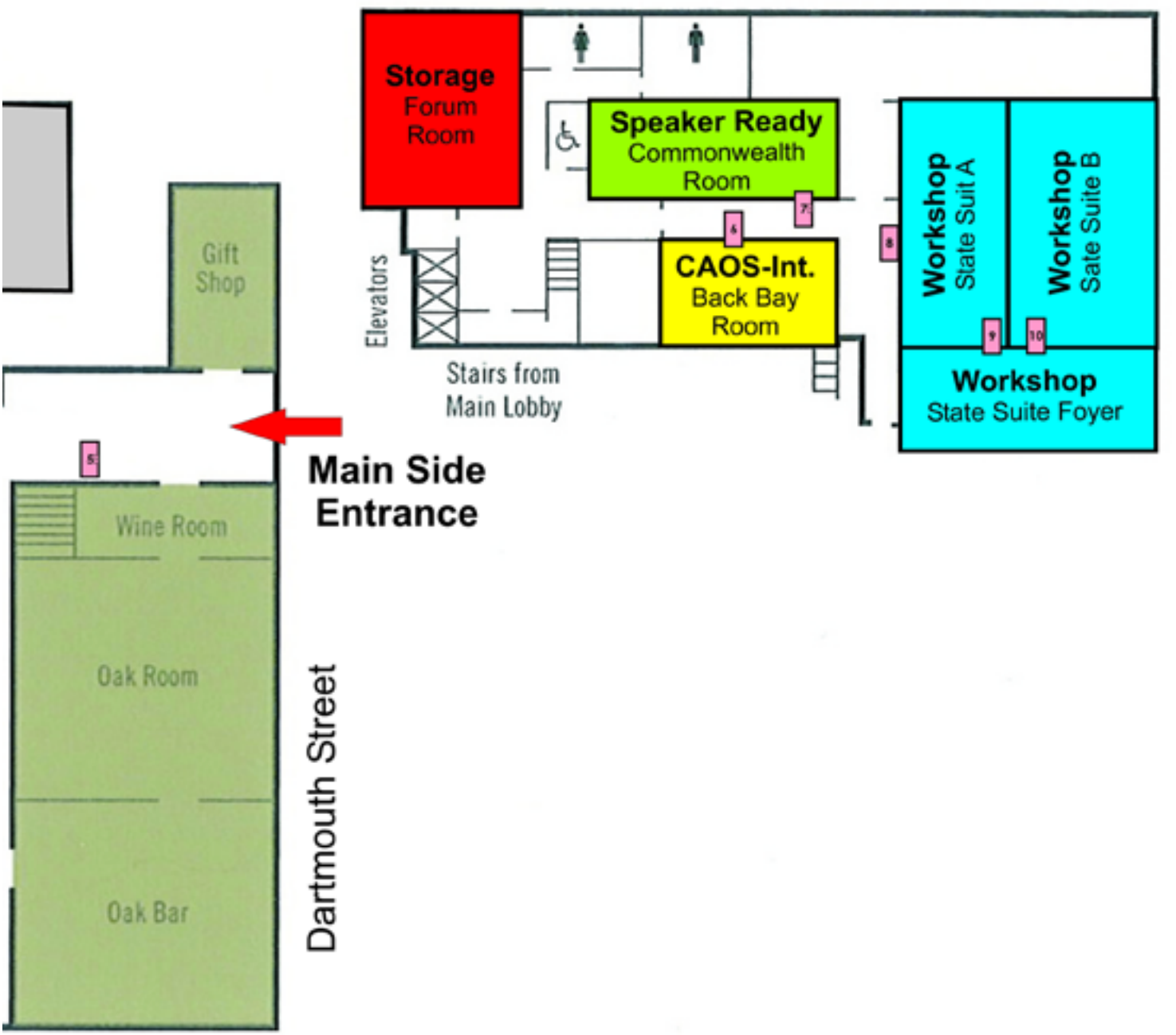
CAOS 2009 -

Main Lobby Level



- Floorplan

Lower Lobby Level



ain Entrance

Friday, June 19, 2009

7:00 REGISTRATION

Session VIII – Total Knee Replacement – Part 2: Clinical Outcomes

Chairmen: S. David Stulberg and Randy Ellis

8:00 One-year follow-up of 214 total knee arthroplasties with navigated implants
Katipalli G, Deakin AH, Greaves J, Reynolds T, Picard F

8:07 Computer navigated vs. conventional knee arthroplasty in the morbidly obese patient
Millar NL, Deakin AH, Millar LL, Kinninmonth AW, Picard F

8:14 Tracker related problems in navigated TKR: How to avoid conversion to manual TKR
Baines J, Deep K, Sarungi M, Kinninmonth AWG, Picard F

8:21 Blood loss after total knee replacement in the morbidly obese patient: Effects of computer navigation
Millar NL, Deakin AH, Millar LL, Picard F

8:28 DISCUSSION

8:40 Imageless computer assisted vs. conventional total knee replacement. A Bayesian meta-analysis of twenty-three comparative studies
Brin YS, Nikolaou V, Joseph L, Zukor DJ, Antoniou J

8:47 4-9 years midterm results in navigated TKA
Mattes T, Ostertag O, Oefele J, Reichel H, Decking R

8:54 Computer-assisted internal rotation of the femoral implant for TKA does not modify clinical Outcome. Results of a case-control study of 38 cases
Saragaglia D, Ayach A, Mercier N, Plaweski S

9:01 DISCUSSION

9:10 Multifactorial analysis of time efficiency in total knee arthroplasty
Stiehl JB

9:17 Does an experienced knee surgeon benefit from the use of a navigation system?
Miehlke RK, Bause L, Klimek K

9:21 Posterior cruciate ligament sparing, cruciate substituting, cruciate sacrificing and bicruciate implants in computer navigated knees: Does technique or implant design determine patient outcome?
Alkire, MR, Swank ML

9:29 DISCUSSION

Session IX – Novel Technology – Part 1: Imaging

Chairmen: S. David Stulberg and Randy Ellis

9:40 Assessing surface localization accuracy in 3D local phase ultrasound images using CT reference images
Hacihaliloglu I, Hodgson AJ, Abugharbieh R, Rohling RN

9:47 Real-time and automatic segmentation of bone in US image
Dardenne G, Hamitouche C, Chaoui J, Roux C, Stindel E

9:54 DISCUSSION

Coffee Break and Poster Session – Part 3

10:00 POSTERS WILL BE PRESENTED IN FOUR SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION'S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.

81) Navigated knee kinematics after injury to the ACL and its secondary restraints
Musahl V, Choi D, O'Loughlin PF, Dodson CC, Bedi A, Pearle AD

82) An evaluation of accuracy and learning curve in computer navigated hip resurfacing
Olsen M, Davis ET, Waddell JP, Schemitsch EH

83) Minimally invasive fluoroscopic 3D-navigated cartilage removal of the tibio-talar and subtalar joint with a diamond coated bone cutting device
Ruebberdt A, Hofbauer VR, Koesters C, Raschke MJ

84) Higher precision by use of electro-magnetic navigation in trans-pedicular punctures?
Buschmann C, Kowalski KF, Maus U, Penzkofer T, Bruners P, Ohnsorge JAK

85) Image guided computer assisted surgery for fixation of upper cervical spine fractures
Schroeder JE, Barzilay Y, Kaplan L, Soroka A, Hasharoni A

86) Navigated total hip arthroplasty using a 3D-freehand ultrasound system – pre-liminary results and feasibility study
Hirschmann MT, Helfrich C, Schwägli T, Friederich NF

87) Differences in acetabular orientation in navigated THR with different pelvic registration landmarks
Mihalko WM, Saleh KJ, Kammerzell S

88) A model based approach for optimized A-mode ultrasound based geometry scanning of bone cement in RTHR
Heger S, Fieten L, Wirtz, DC, Radermacher K.

89) Comparison of the clinical accuracy of a CT-based navigation for femoral stem orientation and leg length discrepancy with or without distal femoral reference points
Kitada M, Nakamura N, Iwana D, Kakimoto A, Miki H, Nshii T, Sugano N

90) Detection of acetabular osteophytes using flipped CT images
Hananouchi T, Fieten L, Radermacher K

91) ODUNU – the optical 2D-3D-matching CT-based navigation system for total hip arthroplasty
Ikebuchi M, Iwaki H, Minoda Y, Takaoka K, Nakajima S

92) Usability evaluation of a non-active remote pointing device for computer-assisted orthopaedic surgery
Janss A, Ibach B, Lauer W, Radermacher K

93) Patient-specific morphological modeling of gleno-humeral joint deformities for functional surgical planning
Al Hares G, Bahm J, Wein B, Belei P, Eschweiler J, Fieten L, Radermacher K

94) Integration of a C-arm and a navigated assistance robot: Concept and first results
Schlimbach M, Sahm S, Wahrburg J

95) Angle error analysis of navigation transmitter
Pfeifer T, Göggelmann A

96) Dislocation-error evaluation of an integrated minirobot based A-mode ultrasound module for bone cement detection during RTHR
Niggemeyer M, Heger S, de la Fuente M, Korff A, Radermacher K

97) MRI-Iso-C^{3D} image fusion for optimal navigated treatment of medial femoral condyle osteonecrosis
O'Loughlin PF, Kendoff D, Citak M, Stubig T, Pearle AD, Krettek C, Hüfner T, Citak M

98) Virtopsy – the Virtopsy robot
Ebert LC, Näther S, Buck U, Thali M

99) Use of computer-assisted TKR among ESSKA/SGO-SSO members – what is the daily practice?
Hirschmann MT, Kohlhaas U, Verdonk R, Friederich NF

100) Don't just point anywhere! Precise landmarking in computer assisted total knee arthroplasty is critical to final alignment
Brin YS, Livshetz I, Grinberg-Dotan S, Antoniou J, Zukor DJ

101) Tibial shaft stress fracture after computer assisted navigation in TKA
Jafari SM, Parvizi J, Hoke D, Ong A

102) Computer-assisted total-knee arthroplasty. Comparison of two successive systems. Learning curve
Bové JC

103) Preliminary experience with electro-magnetic navigation system in TKA
Tigani D, Busacca M, Rimondi E, Moio A, Del Piccolo N, Sabbioni G

104) Lighter patients present with worse valgus deformities than heavier patients
Sampath SAC, Voon SH, Davies H

105) Computer navigated knee replacement: Use of passive knee movement graphs
Kamat YD, Adhikari AR

106) All knees are the same! The femoro-mechanical intersection point (FMIP)
Goldberg TD, Bush JD

107) Is the gender specific knee necessary in Korean women
Song EK, Seon JK, Park SJ, Lee DS

108) How accurate are the machines? Assessment of coronal plane alignment after TKA
Goldberg TD, Bush JD

Total Knee Replacement

109) Minimally invasive screw-fixation of acetabular fractures using a 2D-fluoroscopic navigation system
Gras F, Marintschev I, Klos K, Wilharm A, Mueckley T, Hofmann GO

110) In-vitro evaluation of navigated optimal oblique osteotomy vs. conventional closed wedge osteotomy for multiplanar long-bone geometry corrections
Belei P, Barbe AG, de la Fuente M, Mumme T, Radermacher K

111) Intraoperative cone-beam CT-based measurement of femoral shaft fracture malalignment in six degrees of freedom
Crookshank MC, Schemitsch EH, Whyne CM

112) Estimation of pretraumatic femoral anteversion in bilateral femoral shaft fractures after virtual reduction
Citak M, Citak M, Kendoff D, Stubig T, O'Loughlin PF, Pearle AD, Krettek C, Hüfner T

Trauma

113) Arthroscopic robotic arm-assisted uni-compartmental knee arthroplasty
O'Loughlin PF, Kendoff D, Citak M, Citak M, Pearle AD

UKR

Session X – Total Hip Replacement – Part 2: New Devices

Chairmen: Nobuhiko Sugano and Branislav Jaramaz

11:00 A novel patient-specific, gravity-assisted navigation system for acetabular cup placement
Zheng G, Echeverri S, Dong X, Vallotton J, Nolte LP, Weber S

11:07 The Hip Sextant: Navigation of acetabular component orientation using a mechanical instrument
Murphy SB, Steppacher SD, Kowal J

11:14 Tailor-made surgical guide reduces the learning curve for cup insertion
Hananouchi T, Saito M, Koyama T, Hagio K, Nishii T, Murase T, Yoshikawa H, Sugano N

11:21 Femoro acetabular surgery – feasibility of a navigated registration technique
Kendoff D, Stueber V, Nelson L, Citak M, Böttner F, O'Loughlin P, Pearle A

11:28 DISCUSSION

Session XI – Novel Technology – Part 2: Robotics & Augmented Reality

Chairmen: Eric Stindel and Klaus Radermacher

11:40 Experimental testing of precision free-hand sculptor – speed control
Jaramaz B, Nikou C, Giurgi M, Moody J, McCandless B, Plakseychuk A

11:47 Monte-Carlo simulation of a semiactive robotic bone shaping tool
Jaramaz B

11:54 Development of an augmented reality training environment for orthopaedic surgery procedures
Ockert B, Bichlmeier C, Kutter O, Navab N, Euler E, Heining SM

12:01 DISCUSSION

Presidential Guest Lecture 2

12:10 Topic and speaker to be announced
Frank Moss (MIT Media Lab; Massachusetts Institute of Technology; Cambridge, USA)

Lunch Break and General Assembly of CAOS-International

12:40 LUNCH WILL BE SERVED IN THE INDUSTRIAL EXHIBITION. ALL MEMBERS OF THE INTERNATIONAL SOCIETY FOR COMPUTER ASSISTED ORTHOPAEDIC SURGERY ARE KINDLY INVITED TO JOIN THE CAOS-INTERNATIONAL GENERAL ASSEMBLY IN THE LECTURE HALL.

Session XII – Novel Technology – Part 3: Modeling

Chairmen: Rolf Miehlke and Leo Joskowicz

13:40 Acetabular fracture reduction planning using statistical shape models
Turner AW, Nahkla AI, Cobb JP, Davies BL, Rodriguez y Baena FM

13:47 Fast 3D reconstruction of the lower limb using a parametric and statistical model and clinical parameters calculation from biplanar X-rays
Chaibi Y, Cresson T, Humbert L, de Guise JA, Skalli W

13:54 Development of a navigation system for femoral augmentation using an intraoperative C-arm reconstruction
Otake Y, Armand M, Sadowsky O, Kutzer M, Armiger RS, Basafa E, Kazanzides P, Taylor RH

14:01 DISCUSSION

14:10 Statistical shape model based anterior pelvic plane determination: A feasibility study
Schumann S, Weber S, Nolte LP, Zheng G

14:17 CT-based automated preoperative planning of acetabular cup size and position using pelvis cup integrated statistical shape model
Otomaru I, Kobayashi K, Okada T, Nakamoto M, Takao M, Sugano N, Tada Y, Sato Y

14:24 3D reconstruction of the rib cage from biplanar X-rays using a parametric model
Jolivet E, Sandoz B, Laporte S, Mitton D, Skalli W

14:31 DISCUSSION

14:40 Symmetry-based determination of the pelvic coordinate system with the patient in the lateral position
Fieten L, Eschweiler J, Hananouchi T, Kabir K, Gravius S, Heger S, Wirtz DC, Radermacher K

14:47 Automatic landmark propagation for left and right symmetry assessment of tibia and femur: A computational anatomy based approach
Seiler C, Weber S, Schmidt W, Fischer F, Reimers N, Reyes M

14:54 Accuracy and reliability of computer-assisted osteochondroplasty of the femoral head-neck junction
Puls M, Ecker TM, Steppacher SD, Weber S, Siebenrock KA, Kowal JH, Tannast M

15:01 DISCUSSION

Coffee Break and Poster Session – Part 4

15:10 POSTERS WILL BE PRESENTED IN FOUR SESSIONS, DURING WHICH THE AUTHORS OF THE RESPECTIVE SESSION'S POSTERS WILL BE PRESENT AT THE POSTER BOOTHS. HOWEVER, ALL POSTERS OF ALL SESSIONS WILL BE ON DISPLAY DURING THE ENTIRE TIME OF THE MEETING.

ACL

114) Development of navigated manual vs. mechanized pivot shift
Musahl V, Voos JE, Kendoff D, O'Loughlin PF, Stueber V, Pearle AD

Resurf.

115) A comparison of conventional guide-wire alignment jigs with imageless computer navigation in hip resurfacing
Olsen M, Chiu M, Gamble P, Boyle RA, Tumia N, Schemitsch EH

Ankle

116) The dynamic behaviour study through finite element method of an implant used in human ankle joint arthroplasty
Copilusi PC, Dumitru N, Mazilu MT

Spine

117) Treatment of type II odontoid fractures with anterior screw fixation based on Iso-C^{3D} navigation system
Zhou Dongsheng, Hao Wei, Wang Yanjing, Wang Bomin

118) Guided oblique lumbar interbody fusion (GO-LIF): A surgical anatomic study of fixation
Lieberman IH, St. Clair S

119) One-year experience with 3D-navigation in posterior instrumentation of the cervical spine – application, reliability, and benefit
Blattert TR, Jarvers JS, Katscher S, Siekmann H, Glasmacher S, Franck A, Stockmar C, Josten C

Total Hip Replacement

120) Imageless computer assisted total hip replacement – early to mid-term results of 150 cases
Drinkwater CJ, Brown M, Kermanshahi A

121) Clinical and radiological outcomes of short stem in mini invasive navigated THR
Hakki, S

122) Intra-operative control of the leg length changes during total hip replacement by a navigation system
Jenny JY, Robial N

123) Trial head navigation: A simple method to position total hip components in the safe-zone for optimal range of movement using a special trial head
Widmer KH

Novel Technology

124) Construction of multi-component statistical shape models of bone anatomy
Chintalapani G, Taylor RH

125) Best-matching – experimental comparison of different matching procedures to use in computer navigation
Schaeffler A, Koenig B, Haas NP, Stoeckle U

126) A software for comprehensive assessment of procedures for determining anatomical parameters
König C, Sharenkov A, Duda GN, Heller MO

127) Ultrasound to CT registration of vertebral bones
Yan CXB, Goulet B, Pelletier J, Tampieri D, Collins DL

128) Osteomark: A tool for transferring computer-based treatment plans to bone during minimally-invasive orthognathic surgery
Magill JM, Nikonovskiy VM, Bouchard C, Murphy B, Hata N, Byl MF, Troulis MJ, Kaban LB

129) Virtual osteotomy on real bone shape registered by universal free-hand ultrasonic system
Krowicki P, Świątek Najwer E, Keppler P, Kozak J, Krysztoforski K, Będziński R

130) A three-dimensional pre-operating software (ATHENA) analysis of tibial coverage in total knee arthroplasty
Matsuda YM, Tatsumi IT, Hirakawa KH, Tsuji KT, Tsukamoto RT, Nakiura NN

131) Validation tests of accuracy for universal free-hand ultrasonic system
Świątek Najwer E, Keppler P, Krowicki P, Będziński R, Krysztoforski K, Kozak J

132) Automatic bone density evaluation from CT images
Bonaretti S, Büchler P, Reimers N, Schmidt W, Seiler C, Weber S, Reyes M

133) Computer assisted total knee arthroplasty for significant tibial deformity
Puri L, Shah RR, Kinder JR

134) The posterior cruciate ligament in computer-assisted in total knee arthroplasty: Retain or release?
Alkire, MR, Swank ML

135) Reliability of adductor tubercle landmark to identify joint line in navigated revision knee arthroplasty – complementary radiologic and computer-based studies
Hakki S

136) The effect of femoral component rotation on alignment and laxities in total knee arthroplasty using the balanced gap technique
Song EK, Seon JK, Park SJ, Lee DS

137) Limb alignment and position of the components in bilateral total knee replacement with robotic and conventional manual support – a prospective, randomized study
Song EK, Seon JK, Park SJ, Lee DS

138) The effect of posterior cruciate ligament on flexion-extension gaps and femoral component decision in total knee arthroplasty
Song EK, Seon JK, Park SJ, Lee DS

139) 3D reconstruction software ATHENA navigated to achieve precise rotational alignment of the femoral prosthesis in MIS-TKA
Ichiroh T, Yoshikazu M, Kazuo H, Kouji T, Reichiro T

140) Knee range of motion depending on the different femoral component design – in-vivo evaluation using navigation
Song EK, Seon JK, Park SJ, Lee DS

141) Cadaver validation and first clinical use of a novel adjustable cutting guide for computer-assisted total knee arthroplasty
Koulalis D, O'Loughlin PF, Plaskos C, Kendoff D, Pearle AD

142) A new force-based approach for prosthesis alignment and ligament balancing in TKA
Schmidt F, Elfring R, Nolten U, Mokwa W, Radermacher K

143) Experiences with a TKA-revision software
Clemens, U, Leitner F

144) Surface-based analysis of pelvic ring's symmetry
Kabir K, Fieten L, Müller M, Gravius S, Eschweiler J, Burger C, Radermacher K, Wirtz DC

145) 3D navigated placement of screws in the SI-joint – precision of screw placement and clinical experiences
Hofbauer VR, Loehrer L, Surke C, Fuchs T, Raschke MJ, Ruebberdt A

146) Navigated reconstruction of a tibial plateau compression fracture post-virtual reconstruction
Citak M, O'Loughlin PF, Citak M, Pearle AD, Kendoff D, Oszwald M, Hüfner T, Krettek C

147) Navigation of vertebro-pelvic fixations based on CT-fluoro matching
Marintschev I, Gras MF, Klos K, Wilharm A, Mückley T, Hofmann GO

148) Accuracy of implantation in computer-assisted minimally invasive Oxford unicompartmental knee arthroplasty – comparison with conventional instrumented technique
Kwang Am Jung, Su Chan Lee, Moon Bok Song, Seung Hyun Hwang

Industrial Workshop II

16:10 Image Based Orthopaedic Solutions
Stryker

Session XIII – Ankle & Shoulder Procedures

Chairmen: André Bauer and Vineet Sarin

16:40 CT-guided robot-assisted retrograde drilling of osteochondral lesions of the ankle joint
Wiewiorski M, Jacob AL, Büttner O, Kretzschmar M, Leumann A, Rasch H, Bilecen D, Valderrabano V

16:47 Navigated retrograde drilling of osteochondral lesions at the talus
Grützner PA, Gronwald U, Ohly T, V. Recum J

16:54 The novel use of a computer assisted personalized intra-operative guidance tool in total ankle arthroplasty
Mayich DJ, Harrison MM, Daniels TR, Kunz M, Quinn A, Rudan J

17:01 Genetic algorithms-based registration method for shoulder navigated surgery
Chaoui J, Dardenne G, Hamitouche C, Roux C, Stindel E

17:08 DISCUSSION

Session XIV – Anterior Cruciate Ligament Reconstruction

Chairmen: Andrea Ferretti and Manuela Kunz

17:27 The intraoperative improvement in rotational stability with navigated single bundle ACL reconstruction
Sampath SAC, Voon SH, Davies H

17:34 Navigated knee kinematics after single bundle vs. double bundle ACL reconstruction in a severely injured knee
Musahl V, Choi D, O'Loughlin PF, Dodson CC, Bedi A, Pearle AD

17:41 Selective bundle augmentation for isolated bundle injury of ACL using navigation
Song EK, Seon JK, Park SJ, Lee DS

17:48 DISCUSSION

CAOS-International Banquet

20:00 The 2009 CAOS-International Banquet will take place in the festively decorated Grand Ballroom of Fairmont Copley Plaza.

- Presentation of the Maurice E. Müller Award for Excellence in Computer Assisted Surgery
- Introduction of the new CAOS-International President
- Invitation to the 10th Annual Meeting of CAOS-International in Paris

23:30 END OF THE DAY

Saturday, June 20, 2009

8:00 REGISTRATION

Session XV – Unicondylar Knee Replacement – Part 2: Robotics

Chairmen: Norberto Confalonieri and Brian L. Davies

8:30 Robotically assisted UKA is more accurate than manually instrumented UKA
Coon TM, Driscoll MD, Conditt MA

8:37 The learning curve of robotic-assisted UKA
Jinnah R, Horowitz S, Lippincott CJ, Conditt MA

8:44 Robotic arm-assisted unicompart-men-tal knee arthroplasty
Lonner JH, John TK, Conditt MA

8:51 Robotically guided UKA: Outcomes of initial series
Roche M, Augustin D, Conditt MA

8:58 DISCUSSION

9:10 Navigation and the low volume uni-compartmental knee replacement surgeon
George Malal JJ, Deshpande S

9:17 Robot assisted arthroplasty: Cost-utility analysis shows the benefit
Cobb J, Willis-Owen C, Ahmad M

9:24 Accuracy matters: 5 year follow-up of a PRCT of robot assisted knee arthroplasty confirms the significance of accuracy in arthroplasty
Cobb J, Henckel J, Rodriguez F, Jacopec M, Harris S, Gomes P, Davies B

9:31 Preliminary evaluation of UKA using surgical robot
Lee CT, Trabish M, Yoon SH, Kwon OM, Lee HJ, Kang M

9:38 DISCUSSION

Session XVI – Total Knee Replacement – Part 3: Kinematics

Chairmen: James B. Stiehl and Wafa Skalli

9:50 Gap balancing vs. measured resect-ion technique in computer assisted surgery
Tigani D, Sabbioni G, Ben Ayad R, Filanti M, Rani N, Del Piccolo N

9:57 Do the arthritic knees behave in a true varus or valgus fashion – an ana-lysis of knee kinematics with com-puter navigation: A challenge to the existing concept and a classification of kinematics
Deep K, Picard F, Bains J, Deakin AH, Kinninmonth A, Sarungi M, Willcox N, Smith B

10:04 Effect of patellar resurfacing in total knee arthroplasty on patello-femoral joint kinematics. An in-vitro study
Belvedere C, Ensini A, Bianchi L, Feliciangeli A, Leardini A, Catani F, Giannini S

10:11 Effect of preoperative kinematics on postoperative kinematics in knee after total knee arthroplasty using cruciate retaining designs
Song EK, Seon JK, Park SJ, Lee DS

10:18 DISCUSSION

Break

10:40 COFFEE BREAK AT THE INDUSTRIAL EXHIBITION

Session XVII– Total Hip Replacement – Part 3: Alignment

Chairmen: Robert L. Thornberry and Russel H. Taylor

11:10 Accuracy of CT-based computer-assisted total hip arthroplasty
Steppacher SD, Tannast M, Kowal J, Zheng G, Siebenrock KA, Murphy SB

11:17 What is a normal acetabulum? A computer-assisted radiographic study
Tannast M, Kakaty DK, Zheng G, Siebenrock KA

11:24 Computer-assisted analysis to deter-mine acetabular retroversion and Implications for the management of Femoro-acetabular impingement
Dandachli W, Ulislam S, Liu M, Richards R, Witt JD

11:31 DISCUSSION

11:40 Cup implant alignement to transverse acetabular ligament and leg length control with computer assisted surgery in total hip arthroplasty
Bassini F, Pozzi-Mucelli M, Colombo E

11:47 Optimal acebtacular component orientation is difficult to learn
Davda K, Cobb JP, Hart AJ

11:54 Cup orientation with and without CT-based navigation
Maeda Y, Miki H, Nishihara S, Takao M, Sakai T, Nishii T, Sugano N

12:01 DISCUSSION

CAOS-International Travel Fellowships – Reports by the 2007 Fellows

12:10 Influence of leg axis correction on lengthening of the ACL
Daniel O. Kendoff

12:25 Computer assisted surgical planning
Hong Lin

Scientific Awards Ceremony

12:40 Best clinical podium presentation award
Sponsored by B. Braun Aesculap

Best technical podium presentation award
Sponsored by Ziehm Imaging

Best clinical poster presentation award
Sponsored by B. Braun Aesculap

Best technical poster presentation award
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Closing

12:55 Closing remarks
Stephen B. Murphy

Venue Information

Venue

The Fairmont Copley Plaza
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During the Meeting CAOS2009@CAOS-International.org

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