"Quantitative accuracy assessment of pedicle screw insertion in spine surgery: initial study using Artis Zeego II intraoperative imaging robotic system"

Boutchichi, Ali ; Boulanger, Jean-Christophe ; Banse, Xavier ; Cartiaux, Olivier

ABSTRACT

Introduction In spine surgery, intraoperative computed tomography (CT) and fluoroscopy-based navigation systems have demonstrated significant improvements in accuracy and safety of pedicle screw placement when compared to freehand technique [1]. Evaluation of pedicle screw placement is assessed in terms of pedicle breaches typically detected through visual inspection of the CT and fluoroscopic images [2,3]. However, it is not yet possible to use intraoperative images to quantitatively assess the accuracy of pedicle screw insertion by comparing with a predefined insertion planning. This study aims to demonstrate the feasibility to quantitatively assess the accuracy of pedicle screw insertion using intraoperative fluoroscopic images and compare the achieved screw placement with a predefined insertion planning. Materials and methods The study was conducted using a synthetic model of a lumbar spine. The testbed consisted of a clamping device and a reference block (Figure 1a). The clampin...

CITE THIS VERSION

Computer Assisted Orthopaedic Surgery

14th Annual Meeting of CAOS – International
Preliminary Program

Honorary President: Paolo Cherubino
President: Norberto Confalonieri
Welcome to our 14th C.A.O.S. Meeting
Milan Italy, June 2014

Dear Friends,

The 14th Annual Meeting of the International Society for Computer Aided Orthopaedic Surgery (CAOS) will be held in Milan, Italy, from 18 to 21 of June, 2014.
It is a great honour and pleasure that the Executive Board and the Assembly of our Association have decided to hold the 14th annual meeting in Milan.
I am proud to invite you to attend this gathering of surgeons, biomechanics engineers, companies and researchers, who are the world’s leading experts in the fields of computer and robotic assistance in orthopaedic and traumatology surgery.

A special feature of this event will be the combined sessions with the most important Italian and European scientific associations: S.I.O.T. (Italian Society Orthopaedic and Traumatology), E.H.S. (European Hip Society) and S.I.G.A.S.C.O.T. (Italian Society Knee, Arthroscopy, Sport, Cartilage and Orthopaedic Technology partner of E.S.S.K.A. and E.K.A.).
A special pre-congress event will be held on Wednesday 18th June, with a lot of Educational Re-live surgeries and mini-debates about the most controversial aspects of these surgical procedures with computer and robotic tools.
There will be an Exhibition and Presentations of the most important Companies involved in this field with workshops, talks and video-surgeries about the new products and technologies.

Milan is the financial capital of Italy, the power engine of the Italian economy, a great combination of culture, art, fashion, unforgettable Italian food & wine, nightlife and unique way of life. Milan moves at a fast pace but also offers relaxing breaks, with mountains, lakes and golf courses nearby. Just outside the city the beautiful Lake Como is waiting for you. We are organizing special events for the social programme with many cultural, gastronomic and fashion Italian surprises.

I hope that this CAOS meeting will be a great occasion for fruitful collaboration and the development of long-lasting relationships between clinical and basic research and a most memorable stay for you and your families in Milan.

I am very glad to welcome you all in Milan, Italy!

Norberto Confalonieri M.D.
Orthopaedic Surgeon
President of CAOS – International 2014
President of CAOS - ITALY & Conference Chairman

Norberto Confalonieri
Milan, Italy

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Lutz-Peter Nolte, Switzerland
Frédéric Picard, UK
Klaus Radermacher, Germany
David Stulberg, USA
Nobuhiko Sugano, Japan
Russell Taylor, USA
08.20 Welcome and Introduction

N. Conflonieri

SOME OTHER ASPECTS (8’+2’ discussion)

Chairmen: G. M. Calori, S. Bignozzi

08.30 MIS in the Hip Surgery: The Brexis Short-Stem

C. Cucciniello, F. Lonati, D. Ducì, F. Curtì, C. Borsotti

08.40 Potentialities of wearable augmented reality in orthopaedics

P. Parchi, N. Piolanti, L. Andreani, F. Cutolo, C. Freschi, S. Mascioli, M. Ferrari, M. Lisanti

08.50 Management of long bone complex deformities with the computer-assisted ortho-suv frame® hexapod external fixation system

B. Bertani, L. Pedrotti, G. Tuvo, S. Lucanto, F. De Rosa, R. Mora

09.00 Computer-assisted navigation systems in oncological spine surgery

S. Bandiera, S. Colangeli, A. Gasbarrini, G. Barbanti Brodano, S. Terzi, R. Ghermandi, M. Girolami, S. Boriani

09.10 Computer-assisted surgery: a teacher of TKAs

F. Conteduca, R. Iorio, D. Mazza, G. Bolle, A. Redler, L. Valeo, A. Ferretti

ACL AND HIP (8’+2’ discussion)

Chairmen: F. Benazzo, A. Piccioli

09.20 Reliability of a smartphone app in diagnosis of ACL rupture

L. Valeo, R. Iorio, D. Mazza, A. Ferretti

09.30 The influence of tunnel tibial slope on postoperative knee laxity after ACL reconstructions

C. Signorelli, T. Bonanzinga, N. Lopomo, A. Grassi, F. Raggi, G.M. Marcheggiani Muccioli, M. Maracci, S. Zaffagnini

09.40 Risultati clinicì e radiografici a breve termine, dell’impianto della protesi monocompartmentale mediale con tecniìa robotizzata MAKO RIO System

P.G. Perazzini, P. Sembenini, A. Marangon, F. Alberton

09.50 Intraoperative validation of the accuracy of limb length and offset measure with BrainLab Navigation system compared to standard radiology and clinical measurements. A prospective comparative study

L. Orlandini, V. Meroni, O. Consonni, M. Ulivi, V. Sansone
UKR (8’+2 di discussion)

Chairmen: F. Catani, R. d’Anchise

10.00 Artroprotesi totale di anca con metodica MAKO-RIO (MAKOplastica): la nostra esperienza
   P.G. Perazzini, A. Marangon, P. Sembenini, F. Alberton

10.10 MAKO robotic arm system (MAKOplasty) Unicompartmental Lateral Knee Arthroplasty using the MAKO robotic arm system (MAKOplasty)
   G. Franceschi, D. Bertolini, C. Khabbazè, A. Rovini, R. Nardacchione

10.20 Is there any benefit in varus-valgus stability using navigation in unicompartmental knee arthroplasty? A kinematic assessment
   N. Confalonieri, S. Bignozzi, A. Manzotti

10.30 Early experience with prenavigation and with a new system of navigation in unicompartmental and total knee replacement: pros and cons
   M. Denti, C. Bait, A. Quaglia, E. Prospero, P. Volpi

BIOMECHANICS – KINEMATICS (8’+2 discussion)

Chairmen: C. Frigo, S. Giannini

10.40 Automatic landmark processing from bone surface in knee surgery based on resection guides specific to patient anatomy
   P. Cerveri, M. Marchente, N. Confalonieri, A. Manzotti, G. Baroni

10.50 Patello-femoral joint tracking in navigated total knee arthroplasty
   C. Belvedere, A. Ensini, A. Leardini, A. Feliciangeli, S. Giannini

11.00 Post-operative assessment of the efficacy of Modern surgical technologies for total knee replacement
   A. Leardini, C. Belvedere, A. Ensini, S. Tamarri, M. d’Amato, S. Giannini

11.10 Patient-specific instrumentation in total knee arthroplasty
   A. Ensini, C. Belvedere, A. Leardini, S. Tamarri, P. Barbadoro, S. Giannini

TKA (8’+2 discussion)

Chairman: V. Calvisi, G.V. Mineo

11.20 Patient Specific Instruments is realy usefull? Prospective study of 50 prenavigated total knee replacement
   C. Chemello, G. Costacurta
11.30 Three different cruciate sacrificing TKA designs: no intraoperative kinematic differences and no clinical differences at 2 years follow up
*S. Bignozzi, S. Zaffagnini, I. Akkawi, T. Marko, D. Bruni, F. Colle, M. Marcacci*

11.40 Comparative study on pre intra and post-operative assessment of the mechanical axis in knee arthroplasty performed with a computerised navigation system
*A.M. Molinar Min, F. Amberti, D. Agosta, W. Vogel*

11.50 CT evaluations in 15 TKAs using Patient Specific Instruments. Our experience
*V. De Santis, A. Burrofato, R. D’Apolito, C. De Ieso, D. A Santagada, A. Cipriani, F. Ferrara, N. Magarelli*

12.00 Outcomes of computer navigated SCORE® highly congruent mobile-bearing TKA at minimum 5 years follow-up
*A. Todesca, L. Garro, M. Penna, H.J. Bejui*

12.10 Computer Assisted Total Knee Arthroplasty: A Medium 2.5 Years Follow-up of 200 Cases
*D. Notarfrancesco, A. Lamberti, F. Aquino, A. Zara, L. Russo*

12.20 Validazione del software pinless Alignment Verification Workflow Knee 25 Brainlab e del sistema DASH in protesi totale ginocchio eseguita con tecnica computer assistita
*M. Ulivi, V. Sansone*

12.30 Navigazione computerizzata, mini invasivita’ e design delle protesi nella chirurgia sostitutiva articolare del ginocchio
*S. Santamaria*

12.40 – 13.50 **Light Lunch and Assembly of CAOS ITALY**
Chairmen: B.L. Davies, F. Picard

14.00 Introduction to CAOS - N. Sugano

14.20 - 18.00 Educational Re-live surgery

**MINI-DEBATES**

*Videosurgery+ Personal experience (12’) + Discussion [6’]*

14.20 **TKR:**
   Robot - E.K. Song
   Navigation - D. Saragaglia
   Discussion

14.50 **TKR:**
   E-libra - F. Bernetti
   Orthopilot – S. Hakki
   Discussion

15.20 **PSI:**
   TAC – R. Harvey
   RMN – E. Thienpont
   Discussion

15.50 **Knee Prosthesis:**
   PSI – A. Tom
   Navigation – J.Y. Jenny
   Discussion

16.20 **UKR Robots:**
   Mako – M. Conditt
   Blue Belt Technologies, Inc - B. Jaramaz
   Discussion

16.50 **THR:**
   Hip Sextant – S. Murphy
   Computer – J. Lazovic
   Discussion

17.20 **THR:**
   Robot – D. Padget
   Navigation – K. Deep
   Discussion

17.50 Close Remarks - A. Ferretti
07.00 Registration and Coffee Breakfast (Exhibition Area)

07.45 Introduction to the 14th Annual Meeting - N. Confalonieri, B. Davies

**SESSION 1: UNI**

**Chairmen:** P.J. Ajeya, S. Bignozzi

08.00 The accuracy of a robotically-controlled freehand sculpting tool for unicondylar knee arthroplasty  
*F. Picard, J. Lonner, B. Hamlin, J. Smith, P. Rowe, P. Riches, A. Deakin*

08.10 The learning curve of a novel handheld robotic system for unicondylar knee arthroplasty  
*A. Gregori, F. Picard, J. Bellemans, J. Lonner, R. Marquez, J. Smith, A. Simone, B. Jaramaz*

08.20 Short-term outcomes of robotic-arm assisted bicompartamental knee arthroplasty  

08.30 Handheld Robot-Assisted Unicondylar Knee Arthroplasty: A Clinical Review  
*F. Picard, A. Gregori, J. Bellemans, J. Lonner, J. Smith, D. Gonzales, A. Simone, B. Jaramaz*

**SESSION 2: Osteotomy And Femoral Acetabular Impingement**

**Chairmen:** D. Saragaglia, E. De Momi

08.40 Results of Navigational Open Wedge High Tibial Osteotomy Compared with Conventional Cable Technique  
*H. Park, E. Song, J. Seon, K. Lee, C. Park, H. Kim, G. Kim*

08.50 Determinants of Femoral Head Displacement after Rotational Acetabular Osteotomy for Hip Dysplasia  
*M. Takao, T. Nishii, T. Sakai, H. Yoshikawa, N. Sugano*

09.00 Effect of medial opening wedge high tibial osteotomy on intraarticular knee and ankle contact surface pressures  
*E. Suero, Y. Sabbagh, R. Westphal, N. Hawi, M. Citak, F. M. Wahl, C. Krettek, E. Liodakis*

09.10 The effect of tibial rotation during high tibial osteotomy on the contact pressures in the knee and ankle joints  
*N. Hawi, E. Suero, Y. Sabbagh, R. Westphal, M. Citak, F. Wahl, C. Krettek, E. Liodakis*
09.20  Navigated acetabular reorientation during periacetabular osteotomy
        a computer-assisted Cadaver Study
        T. M. Ecker, M. Puls, J. D. Bastian, M. J. B. Keel, M. Tannast, L. Liu, G. Zheng, K. A. Siebenrock

09.30  In vitro evaluation of functional hip center method detection using only tibial tracker for
        computer assisted tibial osteotomy surgery
        Z. Dib, G. Dardenne, N. Poirier, P. Huet, C. Lefevre, E. Stindel

09.40  3D Ultrasound-Guided Femoroacetabular Impingement Surgery: A Cadaver Study
        L.L. Buchan, J.C. Doucette, I. Hacihaliloglu, R.E. Ellis, M.K. Gilbart, D.R. Wilson

09.50  A comprehensive computational framework to diagnosis and plan Femoroacetabular
        impingement
        L. Liu, P. Haefeli, T. Ecker, K. Siebenrock, L.P. Nolte, G. Zheng

Coffee Break and POSTERS SESSION Part 1

10:00  S1-S5 Were rated “SPECIAL POSTERS” indicating an exceptional quality of this work.
        Posters will be presented in five sessions, during which the authors of the respective
        session’s posters will be present at the poster booths.
        However, all posters and special posters of all sessions will be on display during the entire
        time of the meeting.

S1)  Is there any benefit in varus-valgus stability using navigation in unicompartamental knee
        arthroplasty? A kinematic assessment
        N. Confalonieri, S. Bignozzi, A. Manzotti

S2)  Unicompartmental knee arthroplasty versus total knee arthroplasty. Are we able to
        create the forgotten joint?
        H.A. Zuiderbaan, C. Ismael, S. Khamaisy, R. Thein, S. Paul, A. Pearle

S3)  Validation of patient specific surgical guide for pelvic osteotomy

S4)  Tool bracing for performance improvement in simulated femoral neck osteoplasty
        J. Kooymen, Y. Po Liu, M. Gilbart, A.J. Hodgson

S5)  Potentialities of wearable augmented reality in orthopaedics
        P. Parchi, N. Piolanti, L. Andreani, F. Cutolo, V. Ferrari , M. Ferrari, M. Lisanti

S6)  Repeatability analysis of manual segmentation for high resolution and low resolution MRI
        images of hip joints
        X. Kang, D. R. Wilson, A. J. Hodgson

S7)  The stress distribution between prosthesis and bone interface in 10 total knee
        replacement models during squatting position: a finite element study
        P. Srithirom, C. Siramanakul

S8)  Short-term results of patient-specific total knee arthroplasty compared with conventional
        technique
        E. Song, J. Seon, H. Park, K. Lee, C. Park, H. Kim, B. Na
1) Mid-term results of 29 computer-assisted osteotomies for genu valgum deformity. 
   D. Saragaglia, B. Chedal-Borru

2) Patient Specific instrumentation for Complex Orthopaedic Surgery – A report of 2 cases 
   K.S. Leung, N. Tang, K.L. Liu, L.H. Hung, C.S. Chui

3) Fragment mobility of the acetabulum in periacetabular osteotomy performed through 
   the pararectus approach – a navigated cadaver feasibility study 
   T.M. Ecker, J.D. Bastian, L. Liu, G. Zheng, M. Tannast, P. Haefeli, M.J.B. Keel, K.A. 
   Siebenrock

4) Investigation of acetabular sector angle by three-dimensional computed tomography in 
   curved periacetabular osteotomy (CPO) 
   S. Nakasone, T. Yamauchi, H. Horizono, F. Kanaya

5) Unicompartmental lateral knee arthroplasty using the MAKO robotic arm system 
   (MAKOplasty) 
   G. Franceschi, D. Bertolini, C. Khabbazè, A. Rovini, R. Nardacchione

6) Change of unaffected limb gait pattern after unilateral total knee arthroplasty 

7) Primary mechanical stability of unicondylar knee replacement implants 
   H.G. Wells, A. Thomson, P.E. Riches

8) Two year survivorship of robotically guided unicompartmental knee arthroplasty 
   T. Coon, M. Roche, A. Pearle, J. Dounchis, T. Borus, F. Buechel

9) Quantifying the soft tissue envelope during varus/valgus test in cadaveric specimens 
   A.A. Adewumi, P.J. Rowe

10) 500 consecutive robotic arm assisted medial UKA: an outpatient procedure that 
     consistently increases ROM 
     F. F. Buechel

11) Robotic arm assisted UKA: the Makoplasty Experience 
    A. Ranalletta, C. Ranalletta

12) Early experience with prenavigation and with a new system of navigation in 
    unicompartmental and total knee replacement: pros and cons 
    M. Denti, C. Bait, A. Quaglia, E. Prospero, P. Volpi

13) Effect of navigation on posterior slope of Oxford unicompartmental knee replacements in 
    low volume surgeons 
    G.K.M. Pemmaraju, A. Thomas, J.J. Malal, S. Deshpande

**ROOM 2:**

10.00/10.50 - NATIONAL CAOS CHAPTERS MEETING
SESSION 3: Technical Innovation

Chairmen: E. Stindel, L. Nolte

11.00 The Aspherical Hip: An In-Vitro Study  
S. Zakani, J. Rudan, R. E. Ellis

11.10 The influence of the native, ruptured and reconstructed Medial Patellofemoral Ligament (MPFL) to 3D-Patella-Tracking. Development of a dynamic knee-simulator using an industrial robot and an optical tracking system  
V.R. Hofbauer, J. Glasbrenner, T. Bittrich, C. Kosters, D. Rosenbaum, M.J. Raschke

11.20 Ultrasound-based automatic registration for minimally invasive orthopedic surgery  
H.E. Fakhfakh, G. Llort-Pujol, C. Hamitouche, E. Stindel

11.30 Design and validation of a smart knee brace to measure varus-valgus stability  
C.P. Bell, P. A Meere, I. Borukhov, P.S. Walker

11.40 Automated laser registration for computer assisted orthopaedic surgery  
S. V. Joshi, P. Rowe

11.50 Accuracy of a visible spectrum single camera drill mounted tracking system for knee arthroplasty  
N. Smith, V. Stankovic, P.E. Riches

LUNCH BREAK and Combined Session CAOS and SIGASCOT-ESSKA

(Italian Society of Knee Surgery, Arthroscopy, Cartilage, Sport Trauma and Orthopaedic Technologies-European Society Sport traumatology Knee and Arthroscopy)

Chairman: S. Zaffagnini, N. Confalonieri  
Discussants: M. Denti, P. Randelli

12.00 CAOS and research - F. Rodriguez Y. Baena

12.12 Navigation in kinematic assessment - S. Zaffagnini

12.24 Navigation and TKR - J. Y. Jenny

12.36 Navigation and osteotomies - D. Saragaglia  
Orthopaedic Surgery

12.48 Robot and TKR: lights and shadows – J.A. Koenig

13.00 New Trends in knee reconstruction – F. Picard

13.12 Discussion
SESSION 4: TKR1: PSI and Kinematic

Chairmen: A. Amis, W. Bargar

13.30 Preoperative kinematic navigation for surgical approach choice in TKR
   R. Hart

13.40 Patient specific instruments for Total Knee Arthroplasty: A Novel Technique with an Open Platform
   M.A. Hafez

13.50 Does Implant Design Influence the Accuracy of Patient Specific Instrumentation in Total Knee Arthroplasty?
   N. Goyal, A. Patel, M. Yaffe, M. Luo, S. D. Stulberg

14.00 Intra-operative analysis of the kinematic behavior of a total knee replacement by a navigation system. Initial experience and further development
   J. Y. Jenny, Y. Diesinger, F. Firmbach

14.10 Do different PSI Software programs produce similar preoperative plans when applied to a single implant system?
   N. Goyal, S. D. Stulberg

14.20 On the unreliability of collateral stability assessment in knee arthroplasty with the knee locked in screw home position. A kinetic – kinematic mechanical study
   P.A. Meere, C.P. Bell, I. Borukhov, P. Rathod, P.S. Walker

14.30 Improvement of semi-automated 3D kinematic measurement of total knee arthroplasty from X-ray fluoroscopic images
   T. Yamazaki, R. Kamei, T. Tomita, Y. Sato, H. Yoshikawa, K. Sugamoto

14.40 Accuracy of CT-based custom-made surgical templating instrumentation for patella resection in total knee arthroplasty – in vitro study

14.50 Comparison of the kinematic behaviour of a total knee replacement with either floating platform with posterior cruciate retaining or rotating platform with posterior cruciate substitution with an intra-operative navigation system
   J.Y. Jenny
Coffee Break and POSTERS SESSION Part. 2

15:00 S6-S10 Were rated “SPECIAL POSTERS” indicating an exceptional quality of this work. Posters will be presented in five sessions, during which the authors of the respective session’s posters will be present at the poster booths. However, all posters and special posters of all sessions will be on display during the entire time of the meeting.

S9) Accuracy of three-dimensional preoperative templating in total hip arthroplasty using navigation  
*T. Fujishiro, S. Hayashi, N. Kanzaki, S. Hashimoto, M. Kurosaka*

S10) The Learning Curve Associated with Robotic-Assisted Total Hip Arthroplasty  
*J.M. Redmond, A. Gupta, J.E. Hammarstedt, A. Petrakos, C. E. Stake, B.G. Domb*

*J.M. Redmond, A. Gupta, J.E. Hammarstedt, A. Petrakos, C.E. Stake, B.G. Domb*

S12) The effect of femoral neck anteversion on foot progression angle  

S13) Accuracy of combined anteversion in THA with the stem first technique using image-free navigation  
*S. Fukunishi, S. Nishio, T. Fukui, Y. Fujihara, S. Okahisa, S. Yoshiya*

S14) Revision total hip arthroplasty using imageless navigation with the concept of combines anteversion  
*J. Chang, I. Kim, A. Bajaj, J. Yoo*

14) Reduction of the dose of ionising radiation in navigated transpedicular screw placement  
*R. Hart*

15) Sensitivity analysis of geometric and dynamic variables of the scoliotic spine on the computation of intervertebral efforts  
*G. Abedrabbo, O. Cartiaux, P. Fisette, M. Raison, P. Mahaudens, C. Detrembleur, M. Mousny*

16) Clinical Comparison of Navigation Assisted  
*T. Wei, L. Yajun, J. Peihao*

17) Intraoperative 3D Navigation  
*L. Yajun, T. Wei, L. Bo, L. Qin, Z. Guilin, S. Yuzhen*

18) The New concept of Clinical Application  
*T. Wei, L. Yajun, L. Bo, H. Lin, L. Zhiyu, Y. Qiang, S. Yaqing, H. Da, X. Yonggang, S. Yuzhen*
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<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>19)</td>
<td>Three-dimensional assessment of the mechanical axis crossing point of the knee joint line in the weight-bearing standing position in healthy elderly subjects</td>
<td>A. Arumi, T. Sato, S. Watanabe, O. Tanifuji</td>
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<td>20)</td>
<td>Three-dimensional analysis revealed that a tapered wedge cementless Accolade TMZF stems contacted femoral canals at medial and distal zones</td>
<td>K. Tokunaga</td>
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<td>21)</td>
<td>Three-dimensional analysis of forearm deformity in congenital radioulnar synostosis</td>
<td>M. Nakasone, S. Nakasone, C. Futenma, M. Kinjo, K. Horikiri, T. Kinjo, F. Kanaya</td>
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<td>22)</td>
<td>Development of a smart tool based on human intention estimation for accurate and fast operation</td>
<td>P. Yen, S. Hung</td>
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<td>23)</td>
<td>Assessment of skin markers in the lower limb for navigation surgery - A fresh-frozen cadaver study</td>
<td>S. Hung, P. Yen, G.F. Tseng</td>
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<td>25)</td>
<td>Semi-automatic 3D quantifications of vertebral fracture restoration based on CT data</td>
<td>J.A. Richolt, G. Le Pennec, X. Barreau</td>
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<td>26)</td>
<td>Insertion accuracy of acetabular cup placement using a smartphone in a cadaveric study</td>
<td>H. Kurosaka, S. Fukunishi, S. Nishio, T. Fukui, Y. Fujihara, S. Okahisa, S. Yoshiya</td>
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<td>27)</td>
<td>Mater-slave robot-assisted fracture reduction: a preliminary study in long bone shaft</td>
<td>H. Wei, L. Hong, W.J. Qiang</td>
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<td>28)</td>
<td>TLEMsafe: a European project to improve predictability and success of severe musculoskeletal surgery</td>
<td>P. Jutte, V. Carbone, L. Vieresteyn, L. Vigneron, M. Damsgaard, R. Sitnik, T. Feilkas, N. Verdonschot</td>
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<td>29)</td>
<td>Applying bracing to orthopaedic surgery: reducing drill plunge depth with a damper-based bracing device</td>
<td>J. McIvor, A.J. Hodgson</td>
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<td>30)</td>
<td>Design of a less-obtrusive flexible optical tracker for computer assisted orthopaedic surgery</td>
<td>M. Semple, A. Hodgson</td>
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<td>31)</td>
<td>Fluoroscopic radiographic markers for measuring tibial torsion based on computed tomography reconstructed radiographs – an accuracy and feasibility study</td>
<td>Y.A. Weil, D. Hakimian, A. Khoury, M. Liebergall</td>
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33) A development of coded infrared LED pattern technology for real-time instrument localization  
   *P. Yuan Lee, S. Yang, M. Hu, H. Lin, M. Wang*

34) An approach for minimal invasive insertion of pedicle screws using a navigated robotic assistance system  
   *S. Sahm, H. Roth, D. Scale, A. Von Schilling, G. Winkler, U. Spetzger, J. Wahrburg*

35) Practical Guide to plan and evaluate  
   *O. Cartiaux, B.G. Francq*

36) Evaluation of bone deformity on accuracy of a computer-assisted guidance system for total knee arthroplasty  
   *L.D. Angibaud, R.A. Liebelt, B. Gao, X. Silver, S. Gulbransen*

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**Combined Session CAOS and SIOT** (*Italian Society of Orthopaedic and Traumatology*)  
*“WHY COMPUTER ASSISTANCE IS NOT SO POPULAR?”*

**Chairman:** *P. Cherubino, N. Confalonieri*  
**Moderators and discussants:** *F. Falez, A. Masini*

15.40 **G. Rivkin and M. Liebergall**

15.55 **P. Regazzoni**

16.10 **N. Ehrke, M. Immerz**

16.25 Discussion

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**SESSION 5: THR (planning and outcomes) and SPINE**

**Chairmen:** *Tian Wei, E. Anglin*

16.50 Is leg traction test reliable as a measure of leg length and offset in total hip arthroplasty?  
   *M. Takao, T. Nishii, T. Sakai, H. Yoshikawa, N. Sugano*

16.55 The incidence of noise in computer assisted total hip replacement with ceramic on ceramic bearing and risk factors analysis  
   *K. Deep, C. Siramanakul, V. Mahajan*

17.00 Factors related to disagreement in implant size between preoperative CT-based planning and implants used in total hip arthroplasty  
   *T. Ogawa, M. Takao, T. Sakai, T. Nishii, N. Sugano*
17.05 Radiographic Parameters Correlate with Change in Sagittal Pelvic Tilt after Hip replacement
   
   *J.D. Maratt, C. Esposito, K. M. Carroll, S.A. Jerabek, D.J. Mayman*

17.10 Preliminary validation study of the accuracy of cup orientation using the EOS imaging system as Measured by CT
   
   *A. Thomas, W.S. Murphy, J.H. Kowal, S.B. Murphy*

17.15 Robot-assisted spine surgery for improved safety: a prospective case-matched analysis
   
   *N. Lonjon, E. Chan-Seng, V. Costalat, B. Bonnafoux, M. Vassal, J. Boetto, F. Segnarbieux*

17.20 A Robot Assisted Surgical System
   
   *T. Wei, H. Xiaoguang, L. Yajun, F. Mingxing, L. Bo, S. Yuqing, H. Da, X. Yonggang*

17.25 Comparison between robotic-assisted and manual implantation of primary cementless total hip arthroplasty; minimum ten years follow-up results
   
   *N. Nakamura, N. Sugano, T. Sakai, I. Nakahara*

17.30 End of the day
   
   *N. Confalonieri*
07.45 Registration and Coffee Breakfast (Exhibition Area)

SESSION 6: TKR Outcomes

Chairmen: M. Hafez, S. Lavallée

08.00 The mobile bearing insert can reduce the patello-femoral contact pressure in total knee arthroplasty with CT-based navigation system

K. Takayama, T. Matsumoto, N. Shibanuma, H. Muratsu, T. Matsuzaki

08.10 How does laxity after single radius total knee arthroplasty compare with the native knee?


08.20 CAS vs Patient matched total knee replacement: X-ray and CT-scan evaluation

F. Mancuso, P. Di Benedetto, V. Cainero, R. Gisonni, A. Beltrame, A. Causero

08.30 Three different cruciate sacrificing TKA designs: no intraoperative kinematic differences and no clinical differences at 2 years follow up

S. Bignozzi, S. Zaffagnini, I. Akkawi, T. Marko, D. Bruni, F. Colle, M. Marcacci

08.40 Where does all the time go in computer assisted surgery?

D.R. Lionberger, P.P. Talati

08.50 Which tibial tray design achieves maximum coverage and ideal rotation: anatomic, symmetric, or asymmetric? An MRI-based study

S.D. Stulberg, N. Goyal

09.00 Complications resulting from tracker pin-sites in computer navigated total knee replacement

A. Thomas, G. Pemmaraju, S. Deshpande

SESSION 7: THR (navigation) Trauma

Chairmen: N. Sugano, G. Zheng

09.10 Evaluation of Ultrasound-based Navigation System with CT in total hip artroplasty


09.20 Accuracy and precision of acetabular component placement with imageless navigation in obese patients

A.S. Mclawhorn, K. Durham Weeks, D. Nam, P.K. Sculco, D.J. Mayman

09.30 Reproduction of femoral offset in Navigated Hip arthroplasty – How accurate are we?

P. Ellaparadja, V. Mahajan, K. Deep
09.40  The safe zone for acetabular component orientation in hip arthroplasty
   \textit{W.S. Murphy, J.H. Kowal, S.B. Murphy}

09.50  Does computer navigation in total hip arthroplasty better restore native combined anteversion?
   \textit{G. Li, T. Tsai, D. Dimitriou, Y. Kwon}

10.00  Targeting a new safe zone – a step in the development of patient-specific component positioning in hip arthroplasty
   \textit{A.S. McLawhorn, P.K. Sculco, K. Durham Weeks, D. Nam, D.J. Mayman}

10.10  Three dimension fluoroscopy-based navigation for dorsal percutaneous instrumentation in traumatic vertebral fractures
   \textit{P. Merloz, S. Ruatti, A. Moreau Gaudry, E. Chipon, C. Dubois, J. Tonetti, M. Milaire, G. Kerschbaumer}

10.20  Haptic interface for computer-assisted patient specific preoperative planning in orthopedic fractures surgery
   \textit{I. Kovler, L. Joskowicz, Y. Weil, J. Salavarrieta}

10.30  Accuracy of image-guided iliosacral screw placement using a hybrid operating theater
   \textit{P.H. Richter, A. Schicho, F. Gebhard}

\textbf{COFFEE Break and POSTERS SESSION Part 3}

10:40  \textit{S11-S14 Were rated “SPECIAL POSTERS” indicating an exceptional quality of this work. Posters will be presented in five sessions, during which the authors of the respective session’s posters will be present at the poster booths. However, all posters and special posters of all sessions will be on display during the entire time of the meeting.}

S15) Automatic landmark processing from bone surface in knee surgery based on resection guides specific to patient anatomy
   \textit{P. Cerveri, M. Marchente, N. Confalonieri, A. Manzotti, G. Baroni}

S16) Accuracy of stem alignment is affected by stem design and surgical approach
   \textit{S. Hayashi, T. Fujishiro, S. Hashimoto, N. Kanzaki, M. Kurosaka}

S17) EOS Imaging is Accurate for Preoperative Total Hip Arthroplasty Templating
   \textit{A.S. McLawhorn, J.D. Maratt, K.M. Carroll, D.J. Mayman}

S18) Accuracy of cup positioning, COR Restoration and achieving desired hip length and offset following robotic THA
   \textit{S.A. Jerabek, K. Carroll, J.D. Maratt, D.J. Mayman, D.E. Padgett}

S19) Influence of computer-assisted leg length and offset measurements on implant features in total hip arthroplasty
   \textit{M.M. Schneider, P. Koenen, T. Brockamp, M. Frohlich, A. Wafaisade, M. Balke, B. Bouillon, H. Bathis}
S20) How consistent is the 3D orientation of orthopods – a study of tal targeting and given orientation most commonly practiced
K. Deep, M.S. Khan, A.H. Deaking, R. Abboud

37) A simulation study of Burch-Schneider cage 3D templating for acetabular bone defects

38) A 40 mm head significantly improves range of motion compared to a 28 mm head in total hip arthroplasty using CT-based Navigation system
K. Tsuda, K. Haraguchi, J. Koyanagi, S. Takahashi, R. Sugama, K. Fujiwara

39) The Effect of anterior capsule on stability and range of motion in computer assisted total hip replacement with posterior approach: a cadaveric study
P. Sriphirom, A. Vejjaijiva

40) Adjustment of leg length discrepancy using two different types of imageless navigation software in THA
F. Higuchi, S. Fukunishi, S. Nishio, Y. Fujihara, Y. Takeda, T. Fukui, S. Yoshiya

41) Intraoperative validation of the accuracy of limb length and offset measure with BrainLab Navigation system compared to standard radiology and clinical measurements. A prospective comparative study
L. Orlandini, V. Meroni, O. Consonni, M. Ulivi

42) Variation in Cup Orientation using Conventional Cup Alignment Techniques as Measured by CT
W.S. Murphy, J.H. Kowal, S.B. Murphy

43) EBRA is more accurate than crosstable lateral radiographs when compared to intraoperative measurement of acetabular version
P.K. Sculco, A.S. McLawhorn, D.J. Mayman

44) Do patients with unilateral Crowe 4 developmental dysplasia of the hip have femurs of equal length?

45) Does obesity affect cup position in computer navigated total hip arthroplasty
K. Deep, M. S. Khan, A.H. Deakin, V. Mahajan

46) A semiactive retractor holder for minimally invasive hip arthroplasty: a concept study
D. Putzer, S. Klug, M. Haselbacher, E. Mayr, M. Nogler

47) Is navigation in THR the way forward to avoid limb length discrepancy
P. Ellaparradj, V. Mahajan, K. Deep
48) Computer-assisted total hip arthroplasty: from pre-operative planning to post-operative assessment

J. Schmid, C. Chenes, S. Chagué, P. Hoffmeyer, P. Christofilopoulos, M. Bernardoni, C. Charbonnier

49) Sensitivity analysis of biomechanical models for total hip arthroplasty

J. Eschweiler, M. Asseln, P. Damm, G. Bergmann, V. Quack, B. Rath, M. Tingart, K. Radermacher

50) Anatomical head ceramic on ceramic total hip arthroplasty – a short term follow-up study

R. K. Sharma

51) The differences between combined anteversion of anterior and posterior approach in total hip replacement

ROOM 2:

10.40/11.20 FIRST BOARD EXECUTIVE MEETING

Combined Sessions: CAOS and EHS (European Hip Society)

Chairman: L. Zagra, N. Confalonieri
Discussants: F. Bassini, J.A. Epinette

11.20 Computer aided surgery for Bernese and other difficult osteotomies

R. Trebse

11.30 Navigation in congenital hip dysplasia

H. Ohashi

11.40 Computer navigation reduces the complications and enhances function as compared to conventional techniques

K. Deep

11.50 Results & Technique for THR using the Mako robot hip system

M. Conditt

12.00 Robotic hip replacement – Robodoc results – Are complications and time an issue?

B. Bargar

12.10 The use of the transverse acetabular ligament for cup positioning. A randomised controlled trial

G. Meermans, J. Kats, J. Van Doorn

12.20 The results of navigation, computer aided and robotic surgery in registries and Interpretation of Register data”

G. Labek

12.30 Discussion

12.50 Close Remarks L. Zagra
14.30 S15-S19 Were rated “SPECIAL POSTERS” indicating an exceptional quality of this work. Posters will be presented in five sessions, during which the authors of the respective session’s posters will be present at the poster booths. However, all posters and special posters of all sessions will be on display during the entire time of the meeting.

S21) Mid-high flexion instability in the replaced knee after iatrogenic popliteus tendon injury

S22) Patient specific guides for total knee arthroplasty. A cadaveric study
   S. Dao-Lena, P. Merloz

S23) Clinical and radiological outcome of CT-based patient-specific cutting-blocks compared to conventional instrumentation in primary total knee arthroplasty: a single center cohort study with a minimum follow-up of 2 years
   W. Anderl, L. Pauzenberger, R. Kolblinger, G. Kiesselbach, G. Brandl, B. Kriegleder, B. Laky, E. Scwameis

S24) Analysis of coronal Prosthetic Alignment in TKA using three different Computer assisted Navigation Systems

   C. Belvedere, S. Giannini, A. Ensini, A. Feliciangeli, A. Leardini

S26) Computer-aided patellar resurfacing in navigated total knee arthroplasty
   C. Belvedere, A. Ensini, A. Leardini, S. Tamarri, A. Feliciangeli, S. Giannini

S27) MRI Analysis of anatomical variation of distal femoral rotational axis and its effect on flexion gap
   S. Thati, A. Kaminskas, M. Ganapathi

S28) Thigh pull test in TKR: equivalent or different than heel push
   P.A. Meere, C.P. Bell, I. Borukhov, P. Rathod, P.S. Walker

52) The effect of malrotation of tibial component of total knee arthroplasty on tibial insert during squatting. A finite element analysis
   K. Osano, R. Nagamine, M. Todo, M. Kawasaki
53) Placement of a Femoral Posterior Condylar Trial Component Changes Extension Gap in Navigated Total Knee Arthroplasty Using the Pre-cut Technique
K. Yamada, K. Hoshino, K. Tawada

54) Does patient specific guide improve clinical results on TKA?
T. Kawamoto

55) Accuracy of digital templating for total knee arthroplasty: a step towards template-directed "patient-specific" instrumentation
S. Jerabek, K.M. Carroll, A.S. McLawhorn, D.J. Mayman

56) Preoperative planning using computed tomography for total knee arthroplasty with stem and augment
T. Osamu, Y. Hiroshi, S. Takashi, W. Satoshi, O. Go, E. Naoto

57) The effect of posterior tibia slope on the joint gap in posterior cruciate retained knee and posterior cruciate sacrificed knee: an experimental gap analysis on cadaveric study
P. Sriphirom, K. Srisom, K. Pithankaukul, A. Vejchaicheva, N. Wanthaphisut

58) What is happening to our Knee Alignment?
M. Bayers-Thering, M.J. Phillips, L. Ryan, K.A. Krackow

59) CT evaluations in 15 TKAs using Patient Specific Intruments. Our experience
V. De Santis, A. Burrofato, R. D'Apolito, C. De Ieso, D.A. Santagada, A. Cipriani, F. Ferrara, N. Magarelli

60) Early outcomes utilizing a first-generation patient-specific TKA implant: a retrospective study
W. Kurtz, R. Sinha, G. Martin, K. Kimball

61) Does the use off navigation systems influence our operative procedure in knee arthroplasty?
P. Koenen, M.M. Schneider, M. Strohe, T. Brockamp, M. Frohlich, B. Bouillon, H. Bathis

62) Computer-assisted surgery: a teacher of TKAs
F. Conteduca, R. Iorio, D. Mazza, G. Bolle, A. Redler, L. Valeo, A. Ferretti

63) Measurement of the knee flexion angle with Smartphone-applications is precise and accurate
J. Y. Jenny, Y. Diesinger

64) In vivo kinematics of the mobile-bearing cruciate retaining total knee arthroplasty

65) Measurement of the posterior femoral offset: navigation is more precise than standard X-rays
J. Y. Jenny, Y. Diesinger

66) Balancing a total knee replacement with a navigation system
J. Y. Jenny, Y. Diesinger

67) Patient-specific templates for total knee replacement. Analysis of the learning curve in an academic department
J. Y. Jenny, Y. Diesinger

68) Postoperative 3D analysis based on X-ray images
L. Vigneron, H. Delport, P. Peeters, S. De Boodt
69) Outcomes of computer navigated SCORE highly congruent mobile-bearing TKA at minimum 5 years follow up
A. Todesca, L. Garro, M. Penna, J. Bejui Hugues

70) Comparisons of kinematics during stair motion in single radius total knee arthroplasty: cruciate retaining vs. substituting designs
Y. Kii, T. Tomita, Y. Yamazaki, K. Iwamoto, K. Futai, T. Yamashita, H. Yoshikawa, K. Sugamoto

71) The lateral flexion gap narrow than medial flexion gap in valgus knee is it true?
A retrospective study reviews 81 cases in computer assisted total knee replacement
P. Sriphirom, N. Wanthaphisut

72) The first result of a clinical rehearsal for robotic assisted fracture surgery
S. Joung, C.W. Park, C.W. Oh, I.L. Park

73) Computer assisted orthopaedic surgery guided by damage control for pelvic fractures in polytrauma patients: preliminary results of 39 patients

74) Management of long bone complex deformities with the computer-assisted ortho-suv frame hexapod external fixation system
B. Bertani, L. Pedrotti, G. Tuvo, S. Lucanto, F. De Rosa, R. Mora

SESSION 8: Others Joint And Oncology

Chairmen: E. Thienpont, G. Ferrigno

15.30 Pre-designed corrective osteotomy guide in total ankle arthroplasty for adjusting loading axis of whole lower-extremities: in rheumatoid arthritis cases
M. Hirao, H. Tsuboi, S. Akita, M. Matsushita, S. Ohshima, Y. Saeki, T. Murase, J. Hashimoto

15.40 Comparing a novel 3D-CT reconstruction method to conventional 2D approaches for evaluating glenoid implant and screw position for reverse shoulder arthroplasty
G. Venne, M. Pickell, D.R. Pichora, R. Bicknell, R.E. Ellis

15.50 A patient-specific measurement technique to model the kinematics of the Shoulder in tennis players
C. Charbonnier, S. Chagué, F.C. Kolo, A. Laderman

16.00 Validation of a virtual implant planning system (VIPS) in distal radius fractures
S.Y. Vetter, I. Muhlhauser, J. Von Recum, P.A. Grutzner, J. Franke

16.10 Use of patient specific instrument for tarsal coalition resection in adolescents
S. De Wouters, S. Traore, K.T. Duy, P. Docquier

16.20 A reproducible technique for 3D kinematics analysis of the scapulo-thoracic motion during elevation of the arm in the scapular plane
X. Ohl, P.Y. Lagacé, F. Billuart, N. Hagemeister, O. Gagey, W. Skalli
16.30 Accuracy of patient-specific instrumentation for bone tumor resection within pelvis: 1st study of 11 patients  
L. Paul, O. Cartiaux, G.A. Odri, F. Gouin

16.40 Pelvis Tumor Resection: 3D preoperative planning and navigation validation using a virtual specimen  
L.E. Ritacco, F. Milano, G.L. Farfalli, L.A. Aponte-Tinb

16.50 Curettage of grade one chondrosarcoma in the long bones; a retrospective analysis of treatment assisted with fluoroscopy versus computer assisted surgery  
J.G. Gerbers, P.C. Jutte

SESSION 9: TKR clinical outcomes / ACL

Chairmen: M. Marcacci, P. Meere

17.00 Ligament-specific Navigation-assisted Gap Balance Technique with Minimum Follow-up Eight Years  
K. Lee, E. Song, J. Seon, H. park, C. Park, H. Kim, Y. Seol

17.10 Lower post-operative D-dimer level in navigation-assisted TKA than conventional TKA - a prospective randomized control study  
K. Siu, J. Ko, F. Wang, C. Wang, W. Chou

17.20 Total knee replacement at 10-year follow-up: computer-assisted system versus conventional instrumentation  
A. Ensini, M. d'Amato, A. Feliciangeli, P. Barbadoro, C. Belvedere, A. Timoncini, A. Leardini, S. Giannini

17.30 An RCT to compare component placement in navigated TKA using original and streamlined registration processes  

17.40 Evaluation of a new computer guidance system – new sites  
G. Giordano, J. Ginther, B. Stulberg, S. Polakovic, N. Hohl

17.50 “A la carte” ACL reconstruction. Pre-operative laxity evaluation or intra-operative navigated measurements?  
J. Y. Jenny, Y. Diesinger

18.00 End of the day  
N. Confalonieri
PARALLEL SESSION 15.30/16.20 : Technical Innovation 2

Chairmen: C. Frigo, T. Hodgson

15.30 Hybrid closed-loop control of laser osteotomy based on optical coherence tomography and ablation induced acoustic emission: a preliminary study
Y. Zhang, H. Woern

15.40 Fully automatic hip CT segmentation by combining random forest regression based landmark detection with atlas-based segmentation
C. Chu, C. Chen, L. P. Nolte, G. Zheng

15.50 2D/3D SSM reconstruction method based on Robust Point Matching
M. Valenti, E. de Momi, W. Yu, G. Ferrigno, G. Zheng

16.00 Towards perforation pattern analysis of drilling femur bone using vibration signal
H. Ren, K. Wong, C. Feng, Z. Yang

16.10 Development of a patient-specific musculoskeletal model of the knee for clinical application and kinematic validation based on in-vivo measurements
M. Asseln, G. Al Hares, J. Eschweiler, K. Radermacher

16.20 Accuracy of an adjustable patient specific guide for acetabular alignment
M. Akbari Shandiz, J. R. Mackenzie, S. Hunt, C. Anglin

16.30 Hip osteoarthritis vs. healthy subjects: a comparison of hip, pelvis and lower limb
S. Bendaya, J.Y. Lazennec, C. Anglin, R. Allena, N. Sellam, P. Thoumie, W. Skalli

16.40 Robust measurement of natural Acetabular orientation from AP radiographics
C. Anglin

19.00 CAOS International Banquet........

Attendance to the banquet requires booking in advance. Seats can be booked and paid online at www.caos-international.org/2014/. A limited number of seats may still be available at the registration desk on-site.

The Banquet will feature the following highlights:

- President’s greetings, thanks and introduction
  N. Confalonieri

- Presentation of the M. Muller Award for Excellence in Computer Assisted Surgery
  Kamal Deep

- Introduction of the new CAOS International President
  A. Hodgson

- Invitation to the 15th Annual Meeting
  A. Hodgson

Special Italian Events and Performances
08.00 Registration and Coffee Breakfast (Exhibition Area)

SESSION 10: THR psi and robotics

Chairmen: J.D. Chang, B. Davies

08.30 Comparison between robotic-assisted and manual implantation of primary cementless total hip arthroplasty; minimum ten years follow-up results
N. Nakamura, N. Sugano, T. Sakai, I. Nakahara

08.40 Robot-assisted short stem total hip arthroplasty: a prospective randomized controlled trial
Y. Park, Y. Moon, S. Lim, D. Kim, I. Yeo

08.50 Robotic assisted total hip replacement: improved radiographic and clinical outcomes compared with manual techniques at minimum 1 year follow-up
R. Illgen, M. Conditt

09.00 Patient-specific instrument for acetabular cup orientation: accuracy analysis in a pre-clinical study
T. Hananouchi, E. Giets, J. Ex, H. Delport

09.10 Clinical accuracy of the Hip-Sextant Navigation System as Measured by Post-operative CT
W.S. Murphy, J.H. Kowal, S.B. Murphy

SESSION 11: UNI

Chairmen: C.C. Castelli, B. Jamaraz

09.20 Does Navigation System Have Any Advantages in Uni-Knee Arthroplasty Compared with Conventional Technique in Long Term Results?
J. Seon, E. Song, H. Park, K. Lee, C. Park, H. Kim, Y. An

09.30 Clinical results from a RCT Comparing Robotic Surgical Assistance and Manual Unicompartmental Knee Arthroplasty
M. Blyth, A. MacLean, I. Anthony, P. Rowe, B. Jones

09.40 Kinematic walking assessment comparing robotic-assisted and conventional unicompartmental knee arthroplasty
A. Motesharei, P. Rowe, M. Blyth, B. Jones, A. MacLean, I. Anthony

09.50 Improving outcomes of lateral unicompartmental knee arthroplasty with robotic-assisted surgery
10:00 S20-S23 Were rated “SPECIAL POSTERS” indicating an exceptional quality of this work. Posters will be presented in five sessions, during which the authors of the respective session’s posters will be present at the poster booths. However, all posters and special posters of all sessions will be on display during the entire time of the meeting.

S29) Navigation system for arthroscopic anterior cruciate ligament reconstruction - New 2D-3D Image registration method using arthroscopic images
   S. Watanabe, T. Sato, G. Omori, R. Nakamura, Y. Shiga

S30) Three-dimensional analysis of acute scaphoid fracture displacement
   Y. Schwarcz, Y. Schwarcz, E. Peleg, L. Joscokicz, R. Wollstein, S. Luria

S31) Making a diagnosis system of scoliotic by respirometry
   H. Murayama, K. Kato, A. Yuji

S32) The importance of 2mm and 2 degrees in Total Knee Balancing
   P.S. Walker, P.A. Meere, C.P. Bell

S33) Robot-assisted versus conventional total knee replacement: a systematic review
   A. Mahmood, M. A. Bashir, G. Kumar

S34) Complications resulting from trackers
   A. Thomas, G. Pemmaraju, S. Deshpande

S35) Fast Accurate Procedure for accurate identifying the Current pose of an IntramedullaryNail
   H. Esfandiari, S. Amiri, D. Lichti, C. Anglin

75) Kinematic navigation for the evaluation of the stability of the knee at least 2 years after the ACL reconstruction
   R. Hart

76) A prototype of surgical robotic system for anterior cruciate ligament reconstruction
   M. Kim, S. Lee, K. Kim, S. H. Park, J. Kim, S. Jung

77) Reliability of a smartphone app in diagnosis of ACL rupture
   L. Valeo, R. Iorio, D. Mazza, A. Ferretti

78) The influence of tunnel tibial slope on postoperative knee laxity after ACL reconstruction
   C. Signorelli, T. Bonanzinga, N. Lopomo, A. Grassi, F. Raggi, G.M. Marcheggiani Muccioli, M. Maracci, S. Zaffagnini

79) Towards Asian-specific statistical humerus implants
   H. Ren, K. Wong, S. Sim, K. Wu

80) Computer Assisted Navigation system oncological Spine Surgery
   S. Bandiera, S. Colangeli, A. Gasbarrini, G. Barbanti Brodano, S. Terzi, R. Ghermandi, M. Girolami, S. Boriani
81) Computer assisted total knee arthroplasty: a medium 2.5 years follow-up of 200 cases
   D. Notarfrancesco, A. Lamberti, F. Aquino, A. Zara, L. Russo

82) Clinical outcome of patient specific instrumentation total knee arthroplasty
   S. Thati, G. Kainth, M. Ganapathi

83) TKA strategy based on trochlea groove invariance
   Y. Vanderschelden, F. Leitner

84) Deep Dished highly congruent tibial insert in CR-TKA
   D. Bruni, I. Akkawi, F. Colle, G.F. Raspagli, S. Bignozzi, S. Zaffagnini, F. Iacono, M. Marcacci

85) Evaluation of bone deformity on alignment discrepancies during total knee arthroplasty
   using an image-free computer-assisted guidance system
   L. D. Angibaud, R. A. Liebelt, B. Gao, X. Silver

86) Effect of repetitive training practices using an image-free computer-assisted guidance system
   on cognitive and technical skills
   L.D. Angibaud, R.A. Liebelt, B. Gao, X. Silver

87) Introducing Monitored Real-Time Patient-Specific Technique for Total Knee Arthroplasty
   B.N. Stulberg, L.D. Angibaud, J.D Zadzilka

88) Quantitative accuracy assessment of pedicle screw insertion in spine surgery: initial study
    using Artis Zeego II intraoperative imaging robotic system
   A. Boutchichi, J. Boulanger, X. Banse, O. Cartiaux

89) Local differences in the alignment of knees in the Northwest of England.
   S. Sampath, B. Tigar

90) Three dimensional Virtual Surgery and Customised smart guides for open wedge HTO
   K. Oh, M. Trabish

91) Remote Rehabilitation after TKR using visualisation and monitoring techniques
   M. Ayoade, A. H. Deakin, K. Deep, T. E. Howe, L. Baillie

92) Risk Analysis and Usability evaluation of the zero-dose-c arm navigationsystem for
    application in Lumbar Interventions
   A. Janss, M. Fuente, A. Ladenburger, M. Strake, K. Radermacher

ROOM 2:

10.00/11.00 SECOND BOARD EXECUTIVE MEETING
SESSION 12: TKR miscellaneous

Chairmen: D. Stulberg, A. Leardini

11.00 Computer navigated ligament balancing assessment in total knee replacement
    J.B. Stiehl

11.10 Robot-assisted Total Knee Arthroplasty with Minimum Follow-up Nine years Compared with Conventional Total Knee Arthroplasty

11.20 Comparative Study of Robotic Total Knee Arthroplasty: Measured Resection vs Gap Prediction Technique
    H. Kim, E. Song, J. Seon, H. Park, K. Lee, C. Park, S. Na

11.30 Functional comparisons between conventional mechanical alignment and shapematch kinematic alignment in TKA via video-fluoroscopy and EMG
    A. Leardini, A. Ensini, C. Belvedere, S. Tamarri, P. Barbadoro, M. D'Amato, S. Giannini

11.40 A Novel Method for Accurate Determination of Knee Prosthesis sizing in TKA Navigation
    A. Boyer, C. Hamad, F. Bertrand, S. Polakovic, S. Lavallée

12.00 SCIENTIFIC AWARDS CEREMONY
    B. Davies

12:15 INVITATION TO THE 15° ANNUAL MEETING
    A. Hodgson

12.25 CLOSING REMARKS
    N. Confalonieri
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* At April 22, 2014
**Venue**

*Marrriott Convention Center*
Via Washington, 66
Milan, Italy

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**REGISTRATIONS**

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</thead>
<tbody>
<tr>
<td>Caos Member – congress + precongress</td>
<td>€ 400,00</td>
<td>€ 480,00</td>
<td>€ 600,00</td>
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<tr>
<td>Non Member – congress + precongress</td>
<td>€ 500,00</td>
<td>€ 580,00</td>
<td>€ 700,00</td>
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<tr>
<td>Fellows/Residents/Students – congress + precongress</td>
<td>€ 200,00</td>
<td>€ 250,00</td>
<td>€ 350,00</td>
</tr>
<tr>
<td>Pre-Congress Educational Workshops</td>
<td>€ 65,00</td>
<td>€ 65,00</td>
<td>€ 65,00</td>
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<tr>
<td>Accompanying Persons</td>
<td>€ 100,00</td>
<td>€ 120,00</td>
<td>€ 150,00</td>
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<tr>
<td>Gala Dinner</td>
<td>€ 100,00</td>
<td>€ 110,00</td>
<td>€ 125,00</td>
</tr>
</tbody>
</table>

*Please go to [www.caos-international.org/2014/](http://www.caos-international.org/2014/) to register and book accommodation in our pre-selected hotels. Alternatively contact us at caos2014@keywordeuropa.com*