

MARKUS C. MICHEL, MD

Dr. med. Markus C. Michel
International Consultant for Orthopedic Surgery

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CURRICULUM VITAE

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1. OVERVIEW

Visitation Centre

International Visitation Centre for:

- Hip arthroscopy (Labrum refixation techniques and treatment of the FAI, femoral acetabular impingement)
- MicroHip (THR by a direct anterior approach without traction table)
- Tissue sparing total joint replacement
- Computer assessed surgery

Consultancies

- International consultant for Hip Surgery and Tissue Sparing Joint replacement.
- Specialty: Direct Anterior Approach

Memberships

- International development group for DAA (direct anterior approach to the hip)
- AAOS: American Association of Orthopedic Surgeons; International Affiliate Member
- EHS: European Hip Society
- DVOST: German Association for Orthopedic Sports Traumatology
- SGO: Swiss Orthopedic Association
- FMH: Swiss Medical Association
- SAOA: South African Orthopedic Association
- SASHA: Society for Hip Arthroscopy
- SAC: Swiss Alpine Club

Education

- | | |
|---------|--|
| 1979-85 | Medical Degree at the University of Berne / Switzerland, Graduation in 1985 |
| 1986 | Institute of Pathology, University of Bern, Switzerland |
| 1987 | Postgraduate study in experimental Medicine, University of Zürich, Switzerland (Grant: Swiss National Foundation) |
| 1988 | Biomechanics: Maurice E. Müller Institute of Biomechanics, University of Bern, Switzerland
AO-Institute Davos, Switzerland |
| 1989 | Visceral Surgery: Prof. L.H. Blumgart, University of Bern, Switzerland |
| 1990 | Orthopedic Department, Beth Israel Hospital, Prof. Wilson C. Hayes, Harvard Medical School, Boston, USA |
| 1990 | Research Fellowship in Biomechanical Engineering, Harvard Medical School, Boston and Massachusetts Institute of Technology (MIT), Prof. Lona Gibson, Boston, USA |
| 1991 | Orthopedic Surgery: Hip Department, Prof. Reinhold Ganz, University of Bern, Switzerland |
| 1991 | Thesis: In vivo Measurements on the Loads acting in an intramedullary Nail. Prof. Stefan Perren, Basel, Switzerland |
| 1992 | Orthopedic Surgery: Shoulder Department, Prof. Christian Gerber, University of Bern, Switzerland |
| 1993 | Orthopedic Surgery: Knee Department, Prof. Roland Jakob, |

1993	University of Bern, Switzerland MANRHYE FOUNDATION AWARD, 3.9.93 Société Internationale de Chirurgie Orthopédique et de Traumatologie 19th World Congress SICOT93, Seoul, 28.8.-3.9.1993
1994	Orthopedic Surgery: Spine Department, Prof. Max Aebi, University of Bern, Switzerland
1994	Hand and plastic Surgery: Prof. Ueli Büchler, University of Bern, Switzerland
1996	Orthopedic Surgery and Traumatology, Ziegler Hospital, Bern, Switzerland

Orthopedic Consultant / Positions

1996-1997	Consultant in Orthopedic Surgery, Ziegler Hospital, Bern, Switzerland
1998- 2013	Director at the Orthopedic Centre in Münsingen, Bern
1999	Appointed Consultant at the Hirslanden Hospitals in Berne, Switzerland
2002- 2013	Head of the Orthopedic Department, Spital Netz Bern, Münsingen, Switzerland
2005- now	International Consultant for Orthopedic Surgery, Tissue Sparing Hip Surgery
2007	Appointed Consultant at the Sonnenhof Hospital in Berne, Switzerland
2008- 2013	Head of the Board Orthohealth AG
2008	Founding of the Swiss Joint Foundation
2009	Opening of the Orthopedic Centre Brig, Switzerland
2010	Opening of the Orthopedic Centre Muri, Switzerland
2011	Opening of OSZM Orthopedic Sport Centre Münsingen, Switzerland
2011	Founding of the Swiss Sport Clinic Berne, Switzerland
2014	Consultant at Tygerberg-University, Stellenbosch, South Africa
2014	Consultant at Privatspital Bethanien and Alphaclinic Zürich, Switzerland
2015	Founder and member of the board alphaclinic Zurich, Switzerland
2017	Founder and member of the board Adus Hospital, Zürich Switzerland
2018	Head of the Hip Department Adus Klinik, Zürich Switzerland

2. PRIVATE ACTIVITIES

1959	Born in Interlaken/ Switzerland
Family:	married to Christine Arregger Michel, Attorney-at-Law/ Executive MBA
Children	Kayla 2011 / Keanou 2009 / Oliver 1994 / Manuel 1991
Sports:	Marathon Running, Triathlon, Snowboarding, Biking, 18x Grand-Prix of Berne, 5x Jungfraumarathon, 3x New York Marathon, 2x Two Ocean Marathon Mountaineering; Everest-Expedition 2003 Ironman Zurich Finisher 2009 Cape Argus, Namib Quest 2014, W2W
Travelling:	all over the World
Music:	Saxophone, Classical Jazz
History:	Antique and prehistoric History

3. LATEST PUBLICATIONS

Direct Anterior Total Hip Arthroplasty in the Lateral Decubitus Position

Markus C. Michel, Wietse P.R. Melmann, Cees C.P.M. Verheyen

Chapter 9, The Direct Anterior Approach to Hip Reconstruction 2016, SLACK Incorporated, ISBN 978-1-63091-027-3

Wear patterns of failed taper connections in large diameter metal-on-metal bearings

¹N.Bishop, ¹F Witt, ²R Pourzal, ²A Fischer, ³M Rütschi, ⁴M Michel, ¹M.Morlock

J.of Orthopaedic Research, 2013, published in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/jor.22326

Selection Criteria: Prêt-à-Porter

Markus C. Michel, p. 54

The Corail Hip System

A Practical Approach Based on 25 Years of Experience

1st Edition, 2011, XXVII, 338 p. 299 illus., 162 in color. ISBN 978-3-642-18395-9

Direct Anterior Without Traction Table: Lateral Position

Markus C. Michel, p 200

The Corail Hip System

A Practical Approach Based on 25 Years of Experience

1st Edition, 2011, XXVII, 338 p. 299 illus., 162 in color. ISBN 978-3-642-18395-9

Total Hip Arthroplasty (THA) After Proximal Femoral Osteotomy

Markus C. Michel, p 297

The Corail Hip System

A Practical Approach Based on 25 Years of Experience

1st Edition, 2011, XXVII, 338 p. 299 illus., 162 in color. ISBN 978-3-642-18395-9

MicroHip Total Hip Arthroplasty Technique by Direct Anterior Approach Without the Use of a Traction Table: 5-year results

Markus C. Michel

Adv. Venous Arterial Thrombos 2011; 1(2): 52–5.

Tissue Sparing Solutions

MicroHip: Minimal-invasive Hüftendoprothetik

Orthopedic Dimensions, Austria 1/2009

Schonung für Gewebe und Kasse

Die Vorteile der minimal invasiven Endoprothetik

FutureDimensions i/2009

**MicroHip: Une technique mini-invasive pour une arthroplastie total de hanche.
La voie de Smith-Peterson modifiée**

Markus C. Michel, Pierre Witschger
Maîtrise Orthopédique (2007) No: 160 1: 10-14

**MicroHip: A minimal invasive procedure for total hip replacement surgery.
A modified Smith-Peterson approach**

M.C. Michel, P. Witschger
Interact Surg (2006) I: 16-20

MIS Total hip Arthroplasties

T. Ait Si-Selmi, M. C. Michel, L. Jaquot, S. Lustig
Medico-Surgical Encyclopedia (EMC), Elsevier Editor, (December 2006)

**MicroHip: A minimally invasive procedure for total hip replacement surgery
A modified Smith-Peterson approach**

M.C. Michel, P. Witschger
Hip International (2006) 16. (suppl. 3) 40-47

MicroHip: Minimal-invasive Hüftendoprothetik

M.C. Michel, P. Witschger
Orthopedic Dimensions: (2006) 2: 6-9

MicroHip: Minimal Invasive Hip Endoprosthesis

Markus C. Michel, Pierre Witschger
Charnley Chronicle (2005) 8: 3-8

4. ACTUAL ACTIVITIES

26. 11.2018	Surgical training: PAO with modified Stoppa approach Durban, South Africa
14. 11.2018	DAA THR training supine without traction table Cape Town, South Africa
24.10.2018	Patienten Vortrag: Moderne Endoprothetik und Sport Dielsdorf, Switzerland
3.9.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Paarl, South Africa
22.8.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Millerton, South Africa
20.8.2018	Live surgery PAO, Durban, South Africa
16.8.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Millerton, South Africa
15.8.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Millerton, South Africa
30.5.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Millerton, South Africa
25.5.2018	Cadaver Workshop, Direct anterior approach in supine Johannesburg, South Africa
23.5.2018	VSP, Direct anterior approach for THR, lateral decubitus surgical demonstration/teaching Pretoria, South Africa
10/11.5.2018	It's not about the Size of the Incision – Rather the Approach Croosfire: Direct Anterior Approach / Haridng-/ Posterior-Approach Current Concepts & Controversies in Hips; Johannesburg, South Africa
8.5.2018	DAA THR training supine without traction table

Paarl, South Africa

- 19.4.2018 Live Surgery: DAA in lateral decubitus position
Presentations: Rationales for a tissue sparing total joint replacements /
Techniques used in DAA / My approach: DAA in lateral decubitus / Overcoming
the learning curve: My 5 top tips
Nanchang Hongdu Hospital, China
- 18.4.2018 Live Surgery: DAA in lateral decubitus position
Presentations: DAA, Stairways to Heaven? / Short and Long Term results with
DAA: Is DAA really better?
Jingzhou 1st Hospital, China
- 17.4.2018 Surgical Video demonstration: DAA in lateral decubitus
Presentation: DAA, Stairways to Heaven?
Foshan Chancheng; China
- 16.4.2018 Presentations: As a Corail stem user, why I still need a POLARSTEM? / THR by
a DAA without traction table / Tissue sparing total joint replacement /
Overcoming the learning curve: My 5 top tips
Guangzhou 1st Hospital, China
- 16.4.2018 Live Surgery: DAA in lateral decubitus position
Presentations: Rationales for a tissue sparing total joint replacements /
Techniques used in DAA / My approach: DAA in lateral decubitus / Overcoming
the learning curve: My 5 top tips
Guangzhou Orthopedics Hospital, China
- 15.4.2018 Live Surgery: DAA in lateral decubitus position

Presentations: Techniques used in DAA / DAA in lateral decubitus / Overcoming
the learning curve: My 5 top tip / Verilast: The perfect equation in THA ?
Chengdu, China
- 16.3.2018 Presentations: Techniques used in Direct Anterior Approaches / How to shorten
my learning curve : my 5 top giveaways / Common pitfalls in DAA : What should
I do?
Cadaveric Hands on Session: DAA in lateral decubitus and supine
Chair: APAC & Emerging Markets Hip Solutions; Total Hip Arthroplasty
Approaches, Singapore,
- 13.3.2018 Live Surgery: DAA in lateral decubitus position
Mediclinic Paarl, South Africa
- 10.3.2018 Direct Anterior Approach, table free in supine

	DAA Worshop, Durban, South Africa
5.3.2018	Cadaver workshop on DAA THR Cape Town, South Africa
26.2.2018	Live Surgery Demonstration: Peri-Acetabular Osteotomy (PAO) Gateway Hospital, Durban, South Africa
31.11.2017-	Chairman, High Performance Hip Master Class Live Specimen Demo: My Anterior Approach ^[L] _[SEP]
1.12.2017	Presentations: DAA with Touch Surgery / Overcoming the learning curve: My 5 top tips / How important is the ITB? / The importance of the perfect reconstruction of the Offset in THA Singapore
7.12.2017	Live Surgery Desarthrodeses of the Hip with a direct anterior approach in lateral decubitus. Durbanville, South Africa
17.11.2017	DAA training supine without traction table Johannesburg, South Africa
15.11.2017	DAA lateral decubitus training Mediclinic Middletown
2017	Development of DAA in supine learning program with TouchSurgery International
19.8.2017	Cadaver Workshop on DAA in lateral decubitus Durban, South Africa
1./2.6.2017	High Performance Hip Masterclass Chairman Course Overview and Objectives ^[L] _[SEP] The millennium patient: what are challenges in THR today? Techniques used in DAA Live Specimen Demonstration: My Anterior Approach DAA – a pathway to heaven? VERILAST: The perfect equation in THA ^[L] _[SEP] How to close the wound and feeling good ^[L] _[SEP] National University Hospital, Singapore

- 26/27.5.2017 DAA Cadaver Workshop
Red Cross Hospital, Cape Town, South Africa
- 23.5.2017 Live Surgery: The Arthroscopic technique for the release of the piriformis tendon
Durbanville, South Africa
- 22.5.2017 PAO (Periacetabular Osteotomy) Live Surgery, Durban South Africa
- 18.5.2017 DAA THR Surgeon Training
Johannesburg, South Africa
- 17.5.2017 DAA Surgeon Training
Cape Town, South Africa
- 3.5.2017 DAA THR Surgeon Training
Johannesburg, South Africa
- 13.2.2017 Live Surgery: THR Revision with DAA in lateral decubitus
Cape Town, South Africa
- 2.2.2017 Moderne Methoden zur Behandlung der Hüftarthrose
Bethanienhospital, Zürich, Switzerland
- 30.12.2016 DAA Surgeon Training
Millnerton, Cape Town, South Africa
- 31.11.2016 Live Surgery: Arthroscopical Capsular Repair of the Hip,
Durbanville, South Africa
- 6./7.10.2016 High Performance Hip Masterclass
Chairman
Course Overview and Objectives<sup>[L]
[SEP]</sup>
The millennium patient: what are challenges in THR today?
Techniques used in DAA
My Anterior Approach in lateral decubitus
DAA – a pathway to heaven?
Soft Tissue Sparing Approaches versus Minimal Invasive Approaches, is there a difference?
The way to shorten the learning curve for DAA –My Experience
How to close the wound and feeling good<sup>[L]
[SEP]</sup>
National University Hospital, Singapore

- 23.8.2016 DAA THR Surgeon Training
Durbanville, South Africa
- 26./27.5.2016 The Direct Anterior Approach for Total Hip Replacement
Chair, CORAIL Hip 30 Year Symposium, Lyon France: 25 - 27 May 2016
- 19.5.2016 Lecture: Femoral Acetabular Impingement (FAI) - State of the Art Treatment
Sport Science Institute Stellenbosch, South Africa
- 2.2.2016 Moderne Hüftchirurgie, Zürich, Switzerland
- 24.-27.11.2015 Australian International Visitation Center for DAA (MicroHip) Surgery,
Durbanville, South Africa
- 17./18.10.2015 Orthotrends 2015, Ahmedabad, Gujarat, India
Chair: Primary TKR
Key Note Lecture: Does the approach influence the out come of THR surgery
FAI (Femero Acetabular Impingement) – State of the art treatment
Corail: Has stood the test
Managing bone deficiency in revision THR
Constrained Implants – its use in TKR
- 12.10.2015 PAO (Periacetabular Osteotomy) Live Surgery, Durban South Africa
- 3./4.10.2015 Corail Learning Center, Durban, South Africa
Need for Conservative Revision
Long HAC Stem in Revision (Corail Revision)
Total Hip Replacement: A solution fort he young and active
- 1.10.2015 Hip Arthroscopy: Live Surgery, Durban, South Africa
- 23.6.2015 MicroHip™: Direct Anterior Approach - Decubitus Lateral, Pretoria, South Africa
- 18.6.2015 Hüftchirurgie im 3. Jahrtausend, Utzwil, Switzerland
- 18.19.5.2015 Live Surgery/Teaching: Direct Anterior Approach, Johannesburg, South Africa
- 22.4.2015 CORAIL International Faculty, Annecy, France
- 23./24.3.2015 Live Surgery/Teaching: Direct Anterior Approach - Decubitus Lateral (no table),
Pretoria, South Africa
- 16.3.2015 DAA Teaching, Johannesburg , South Africa

- 4./5.3.2015 Corail Learning Center Dubai, AUE
Need for Conservative Revision
Long HAC Stem in Revision (Corail Revision)
Approachs to the Hip: Anatomical Considerations
MicroHip™: Direct Anterior Approach - Decubitus Lateral (no table)
My Experience: Problems and Lessons Learnt
- 16.2.2015 Pariacetabular Osteotomy PAO, Live Surgery, Balito, South Africa
- 4.2.2015 DAA (MicroHip) reversed visitation, Johannesburg, South Africa
- 27.-29.1.2015 Live surgeries and Teaching in DAA (MicroHip), Bruxell, Belgium
- 15.1.2015 DAA Teaching, Durbanville, South Africa
- 19.11.2014 Workshop in DAA THR, Live Surgery MicroHip, Pretoria, South Africa
- 13/14. 11.2104 Workshop in Periacetabular Osteotomies (PAO) and DAA THR
Blumefontaine, South Africa
- 6./7.11.2014 Current Concepts in Hip Arthroplasty, Santon South Africa
Evolution of Uncemented Stems
Restoring Biomechanics in THR
Minimal Invasive THR
Revision of the Femoral Component
- 1./2.10.2014 DAA Live Teaching Pretoria, South Africa
- 11.9.2014 DAA (MicroHip) Live Teaching, Durbanville, South Africa
- 9.9.2014 Hip Arthroscopy Course (Faculty) Durbanville, South Africa
- 6./7.08.2014 Live Surgery: DAA, MicroHip
Pretoria/Johannesburg, South Africa
- 26.06.2014 Need for Conservative Revisions
Chair: Conservative Revisions, 20-Y Experience
Workshop: Revision. Clinical case study
International Corail Learning Center, Annecy, France
- 17.06.2014 Live Surgery: DAA, MicroHip
Durbanville, South Africa
- 9/10.6.2014 Live Surgery: DAA, MicroHip
Pretoria/Johannesburg, South Africa

- 08.05.2015 Live Surgery: DAA, MicroHip
Johannesburg, South Africa
- 17.04.2014 Live Surgery: DAA, MicroHip
Pretoria, South Africa
- 13.04.2014 Total Hip Replacement: My Experience: Problems and Lessons Learnt
The Corail Learning, Dubai, UA
- 12.04.2014 Long & interlocked HAC Stem in Revision (Corail Reconstruction)
Surgical approaches to the hip: Anatomical considerations
MicroHip™: Direct Anterior Approach - Decubitus Lateral (no table)
The Corail Learning, Dubai, UA
- 11.04.2014 Femoro-acetabular impingement following SCFE
Hip Arthroscopy: Can it prevent major surgeries in young patients?
South African Paediatric Orthopaedic Society, Johannesburg, South Africa
- 03.04.2014 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 02.04.2014 International Corail Faculty
Annecy, France
- 27/28.3.2014 Minimal invasive approach to the hip
The painful hip impingement
The cup design
Hip arthroscopy a non replacement option
Leraning Center, Somerset West, South Africa
- 22/23.11.2013 Direct Anterior, no Traction Required
Bearings, not all Created Equal (chair)
The Future: Where will we be in 10 Years? (chair)
Future, Trends, Challenges in Total Hip Replacement, Amsterdam, Netherlands
- 14.11.2013 Live Surgery: DAA, MicroHip
Durbanville, South Africa
- 7/8.11.2013 Long HAC Stem in Revision (Corail Revision)
Anatomical Considerations about Hip Approches
MicroHip: Direct Anterior Approach - Decubitus Lateral (no table)
My Experience: Problems and Lessons learnt
International Learning Center, Sharjah University, Dubai

- 17/18.10.2013 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
Chair: Conservative Revision Surgery
International Corail Learning Center, Annecy, France
- 28.09.2013 Economics, outcomes while using MIS in a routine practice
St. Petersburg, Russia
- 27.09.2013 Symposium on DAA / MicroHip : Anatomy, Technique, Tips and Tricks, Outcome
St. Petersburg, Russia
- 26.09.2013 TriLock Workshop
Ceramic on Ceramic, Best Practice
St. Petersburg, Russia
- 16.09.2013 Live Surgery: DAA, MicroHip
Johannebourg, South Africa
- 12.09.2013 Live Surgery: DAA, MicroHip
Durbanville, South Africa
- 30/31.8.2013 The direct anterior approaches for total hip arthroplasty-exploring the options:
Instructional Cadaver Course
Chair, DAA MicroHip, TriLock: Options with DAA
Cape Town, South Africa
- 22.07.2013 Live Surgery: DAA, MicroHip
Northampton, England
- 28.06.2013 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
Chair: Conservative Revision Surgery
International Corail Learning Center, Annecy, France
- 21.06.2013 Rationale for using MicroHip, Surgical Technique, Clinical Results
- 21.06.2013 Balancing Excellence in Total Knee Arthroplasty
- 21.06.2013 Workshop: Navigation in TKA

Cheboksary, Ukraine
- 31.05.2013 Direkt anteriorer Zugang ohne Extensionstisch mit Standardschaft
Hüftendoprothetik kontrovers, Vienna, Austria
- 02.05.2013 The Swiss Experience: Long term results on Hip Arthroscopy: 10 years +

- First International SASHA Meeting, Cape Town, South Africa
- 20.04.2013 THR by Direct Anterior Approach (MicroHip): Five Years Results including gate analyse
SAAS, Drakensberg, Kwazulu-Natal, South Africa
- 14.03.2013 The anatomy of approaches
- MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 4./5. 3. 2013 Live surgery's in Durban, South Africa: 2 MicroHip, 4 Periacetabular Osteotomies using a single incision Stoppa approach
- 22.01.2013 "Arthrose" ein Volkskrankheit
Public presentation, Thun, Switzerland
- 19.01.2013 The TriLock BPN experience of Switzerland
International user group meeting, Zug, Switzerland
- 21.12.2012 PAO and DAA Surgery, Pellenberg, Belgium
- 30.11.2012 MicroHip: Soft tissue sparing approach to the hip, technique and results
Live surgery: MicroHip & Corail
Saratov, Ukraine, Russia
- 29.11.2012 MicroHip: Soft tissue sparing approach to the hip, technique and results
Two live surgeries: MicroHip & TriLock
Samara, Ukraine, Russia
- 09.11.2012 Minimal Invasive Surgery
International Corail Learning Center, Annecy, France
- 17.10.2012 DAA in lateral decubitus: 5-years results with the MicroHip technique
Oslo, Norway
- 17.10.2012 Live surgery: THR with MicroHip technique
PAO
Oslo, Norway
- 13.09.2012 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France

- 12.09.2012 Differences between high-offset and standard Corail implants:
Radiologic findings
International Corail Faculty, Annecy, France
- 22.06.2012 The athletic hip: What fit's best? (1)
What is your ultimate hip design? (2)
Patient Specific Management in Modern Hip Arthroplastic
Treviso, Italy
- 14.06.2012 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 24.05.2012 Teaching session: Direct anterior approach with live surgery and presentations
Vienna, Austria
- 14.05.2012 Tissue Sparing Solutions, THR by Direct Anterior Approach (DAA):
Corail and MicroHip
17th SICOT Trainees Meeting
- 15.05.2012 Teaching session: Direct anterior approach with live surgery and presentations.
Moscow, Russia
- 30.04.2012 Aeschbacher Talk: Gesundheitsschiff - Mittelmeer
- 18.04.2012 The Swiss Experience
International TriLock user group meeting
Amsterdam, Holland
- 6.-7.04.2012 Teaching session: Direct anterior approach with live surgery and presentations.
Nizhny Novgorod, Russia
- 29.03.2012 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 12.03.2012 MicroHip Surgery
Cape Town, South Africa
- 03.03.2012 TriLock BPS well matched for a DAA
TriLock user group meeting
Dublin, Ireland
- 8.-11.02.2012 DAA in lateral decubitus, International DAA Conference
American Academy of Orthopedic Surgeons

San Francisco, USA

- 24.11.2011 TriLock, Evolution and Technique, Hand's on Workshop
Sanatorium Hera, Wien, Austria
- 05.11.2011 The Direct anterior approach for Total Hip Replacement
Corail on Tour, Italy
- 03.11.2011 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 27.10.2011 Teaching session: Direct anterior approach with live surgery and presentations.
Cheboskary, Russia
- 30.09.2011 Does the approach matter?
TriLock BPS Preservation Stem Learning Center Dublin, Ireland
- 22.09.2011 The anatomy of approaches
MicroHip: Direct Anterior Approach - Decubitus Lateral
International Corail Learning Center, Annecy, France
- 23.06.2011 Live Surgery: Tissue sparing Total Hip Replacement
Hip Symposium - 25 Years of Hydroxyapatite in Total Hip Arthroplasty
Geneva, Switzerland
- 17.06.2011 TriLock BPS well matched for a DAA
Short Stem Symposium, Norddeutscher Orthopädenkongress, Hamburg,
Germany
- 15.06.2011 TriLock, Evolution and Technique, Hand's on Workshop
Sanatorium Hera, Wien, Austria
- 27.05.2011 MIS: Side position
AVOR Hip-Symposium, Lucerne, Switzerland
- 28.4.2011 Bone Preserving and Soft Tissue Sparing - TriLock BPS and MicroHip, the
perfect Match
Delta-Motion, the Advantages of Big Heads, Ceramic on Ceramic
The Future of THR, Helsinki, Finland
- 01.04.2011 MicroHip: Direct Anterior Approach - Decubitus Lateral
Corail Learning Center, Annecy, France
- 21.01.2011 The Great Debate: Controversies in Hip and Knee Surgery:

- Cement less is the new gold standard
London, UK
- 21.01.2011 The Great Debate: Controversies in Hip and Knee Surgery:
Mini anterior can be low-tech and muscle sparing
London, UK
- 03.11.2010 Chair/ Wet Lab Session
Tissue Sparing Solutions, Instructional Course, 2nd & 3rd November 2010
Kiel, Germany
- 02.11.2010 Chair
Tissue Sparing Solutions, Instructional Course, 2nd & 3rd November 2010
Kiel, Germany
- Presentations:
Anatomic Consideration and Patient Selection for the Anterior Approach
How to Achieve Correct Acetabular Cup Positioning
Using a Bone-preserving 'Blade' Stem
Results from The Anterior Approach
- 27.10.2010 Individuelle Versorgungskonzepte der Hüfte: Zwischen Tradition und Innovation
DGOT Berlin, Germany
- 23.10.2010 Kniearthrose – vom Knorpelschutz bis zur Knieprothese
Schmerzkongress, Nottwil, Switzerland
- 20.10.2010 Early Intervention Scientific Advisory Board
Rome, Italy
- 19.10.2010 Alternative Tissue Dissection Technology in TKA
25 Years of High Function and Low Wear TKA Symposium, 18.-20. October
Rome, Italy
- 09.10.2010 Minimally Invasive hip replacement surgery
Latin-American Symposium, Rio, Brasil
- 08.10.2010 Clinical experience with Rivaroxaban - Perspectives from Switzerland
Latin-American Symposium, Rio, Brasil
- 24.09.2010 Tri-Lock BPS Workshop,
Konzept und Design des Tri-Lock® Hüftschafts
Der Micro Hip Zugang mit Tri-Lock® mit operativen Tips und Tricks
Klinische Resultate/ Templating/ Workshop am frischen Präparat
Vienna, Austria

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SWITZERLAND

- 20.09.2010 International Corail Faculty
Lyon, France
- 21.09.2010 Chair: Does the approach matter?
Applied Anatomy of the Hip
International Learning Center, Lyon, France
- MicroHip: Direct Anterior Approach - Decubitus Lateral
International Learning Center, Lyon, France
- 22.09.2010 Hip Core Faculty Meeting
Lyon, France
- 15.09.2010 Live Surgery: THR by DAA in lateral decubitus
Durban, Pietermaritzburg, South Africa
- 16.09.2010 Live Surgery: THR by DAA in lateral decubitus
Richard's Bay, Durban, South Africa
- 17.09.2010 Live Surgery: THR by DAA in lateral decubitus
Pretoria, South Africa
- 9/10.8.2010 Evaluation & Design of an orthopedic ultrasonic device
Cincinnati, USA
- 01.07.2010 Chair / Wet Lab Session
Tissue Sparing Solutions, Instructional Course
Kiel, Germany
- 30.06.2010 Chair
Tissue Sparing Solutions, Instructional Course
Kiel, Germany
- Presentations:
Anatomic Consideration and Patient Selection for the Anterior Approach
How to Achieve Correct Acetabular Cup Positioning
Using a Bone-preserving 'Blade' Stem
Results from The Anterior Approach
- 17.06.2010 Austrian Sales Training
Vienna, Austria
- 21.05.2010 International Corail Faculty
Annecy, France

- 26.05.2010 The MicroHip Approach - Well Matched to the Blade Stem
Hip Symposium: Tri-Lock® BPS
Learning Center, Rome, Italy
- 20.05.2010 Chair: Does the approach matter?
Applied Anatomy of the Hip
International Learning Center, Annecy, France
- MicroHip: Direct Anterior Approach - Decubitus Lateral
International Learning Center, Annecy, France
- 21.05.2010 International Corail Faculty
Annecy, France
- 27.03.2010 Soft-Tissue sparing: Approaches and Technologies in Total Joint Arthroplasty to
effectively protect and preserve soft tissues
Brussels, Belgium
- 20.03.2010 Das Künstliche Kniegelenk: Was macht das Gelenk erst richtig gut?
1. Berner Patientenkongress, Bern, Switzerland
- 20.03.2010 MicroHip: Hüftoperation im Schongang
1. Berner Patientenkongress, Bern, Switzerland
- 05.03.2010 Indication for a fully coated hydroxiapethite stem
Hip Core Faculty, Annecy, France
- 04.03.2010 Chair: Does the approach matter?
- Applied Anatomy of the Hip
International Learning Center, Annecy, France
- MicroHip: Direct Anterior Approach - Decubitus Lateral
International Learning Center, Annecy, France
- 03.03.2010 International Corail Faculty, Annecy France
- 25.02.2010 Medical Talk: Hüfte im Schongang; von der Hüftarthroskopie bis zum
Gelenkersatz
Swiss TV Production, Switzerland
- 22.01.2010 Options for a short stem design in DAA
Venice, Italy
- 11.12.2009 Direct Anterior Approach without traction Table
The Annecy Hip Meeting, Annecy France

- 04.12.2009 Bisturi nuova generazione Harmonic
Congresso Nazionale della Societa Italiana dell'Anca
Rome, Italy
- 09.11.2009 Evaluation of a proximally coated tapered-wedge short stem
Phoenix, USA
- 06.11.2009 Direct Anterior Approach without traction Table
The Annecy Hip Meeting, Annecy, France
- 23.10.2009 Soft Tissue sparing Procedures: DAA
Oslo, Norway
- 14.10.2009 New Techniques and Technologies in Total Joint Replacement
The importance of Soft-Tissue Management in Joint Replacement Surgery,
The Tourniquet free TKR, My technique to perform a TKA?
The subcapsular release in a subvastus approach
Lausanne, Switzerland
- 13.10.2009 New Techniques and Technologies in Total Joint Replacement
The importance of Soft-Tissue Management in Joint Replacement Surgery
Lisbon, Portugal
- 12.10.2009 New Techniques and Technologies in Total Joint Replacement
The importance of Soft-Tissue Management in Joint Replacement Surgery
Manchester, England
- 08.07.2009 Soft Tissue Preserving Techniques for Total Hip Replacement
Subcapsular Release in TKR by the use of the Harmonic Scalpel
Innovative approaches & Techniques in total Joint Replacement
Anatomical demonstrations
London, United Kingdom
- 10.07.2009 Subcapsular Release in TKR by the use of the Harmonic Scalpel
Soft Tissue Preserving Techniques for Total Hip Replacement
Hands-on workshop
Innovative approaches & Techniques in total Joint Replacement
Belfast, Ireland
- 08.07.2009 Subcapsular Release in TKR by the use of the Harmonic Scalpel
Soft Tissue Preserving Techniques for Total Hip Replacement
Innovative approaches & Techniques in total Joint Replacement
Anatomical demonstrations
Zürich, Switzerland
- 04.06.2009 Expert Meeting EFCOT: The direct anterior approach

Vienna, Austria

- 28.05.2009 Introduction to Anatomic Approaches
Surgical Demonstration – MicroHip
Practical Session
Tissue Sparing Solution Instructional Corse, Kiel, Germany
- 27.05.2009 Using Harmonic in MicroHip Surgery
Tissue Sparing Solution Instructional Corse, Kiel, Germany
- 28.05.2009 The Use of a Hydroxyapatite Stem with a Fully Modular Acetabular System
Tissue Sparing Solution Instructional Corse, Kiel, Germany
- 27.05.2009 The MicroHip Approach
Tissue Sparing Solution Instructional Corse, Kiel, Germany
- 22.04.2009 Teaching Approaches
Corail Faculty Meeting, Annecy, France
- 19.03.2009 Total Hip Arthroplasty using minimally invasive Approaches
South African Arthroplasty Meeting, Sun City, South Africa
- 19.03.2009 The Subcapsular Release in TKR by the use of the Harmonic® Scalpel
South African Arthroplasty Meeting, Sun City, South Africa
- 17.03.2009 Silent Evaluator Instructional Corse
Hamburg, Germany
- 13.02.2009 Instructional Corse on Minimal invasive Hip Surgery: Part 2
Paris, France
- 12.02.2009 Instructional Corse on Minimal invasive Hip Surgery: Part 1
Paris, France
- 23.01.2009 Developer presentation on new technologies in orthopedic surgery
Hamburg, Germany
- 10.12.2008 Table Sessions on soft tissue sparing THR
Current Concepts, Orlando, Florida, USA
- 1/2.12.2008 Development of ultrasonic scalpels for orthopedic surgery
Cincinnati, USA
- 13.11.2008 Le vie chirurgiche: Via anteriore: esperienze a confronto
La Mini-invasivita: Mito O Realta'? In Ortopedia Ed In Traumatologia

Centro Congressi Marina Di Carrara, Italia

- 30.10.2008 MicroHip surgical approach: experience and results
Use of Hydroxyapatite in primary and revision surgery
Annecy, France
- 29.10.2008 Live Surgery, MicroHip with Corail and Pinnacle,
St. Etienne, France
- 17.10.2008 Design Developments of The Corail Stem: Clinical Results and Long Term Bone
Remodeling
Tissue Preserving Anterior Approach Hip Replacement
Ottawa, Canada
- 17.10.2008 Moderation Live Surgery Direct Anterior Approach with an Orthopedic Table
Tissue Preserving Anterior Approach Hip Replacement
Ottawa, Canada
- 17.10.2008 MicroHip Surgical Approach without an Orthopedic Traction Table
Tissue Preserving Anterior Approach Hip Replacement
Ottawa, Canada
- 19.09.2009 Developer presentation on new technologies in orthopedic surgery
Hamburg, Germany
- 04.09.2008 Arthrose – Mit minimalem Aufwand zum maximalen Resultat. Die optimale
Behandlung von Knie- und Hüftarthrosen. Vom vorbeugenden Training bis
zum neuen Gelenk.
Schmerzkongress Nottwil, Switzerland
- 13.06.2008 Midterm Results on MicroHip: An Extension Table free anterior Procedure
without Restrictions
57. Jahrestagung der Norddeutsche Orthopädenvereinigung
Hamburg, Germany
- 12.06.2008 Live Surgery: Fully HA Coated Stem with a Ceramic on Metal Bearing
Through a Direct Anterior Approach (Surgery and Moderation)
European Hip Society, Madrid, Spain
- 12.06.2008 Satellite Presentation: The minimal invasive Hip Replacement
NOF (Nordic Orthopedic Federation) Congress, Amsterdam, Netherlands
- 13.05.2008 Live Surgery: Fully HA Coated Stem with a Ceramic on Metal Bearing
Through a Direct Anterior Approach, Moderation
High Performance Hip Symposium, Munich, Germany

- 13.05.2008 The MicroHip Approach
High Performance Hip Symposium, Munich, Germany
- 25.04.2008 Case study: How to deal with difficult situations in THR
Turkish Orthopedic Surgeons Meeting, Antalya, Turkey
- 25.04.2008 The direct anterior approach for THR, MicroHip
Turkish Orthopedic Surgeons Meeting, Antalya, Turkey
- 20.04.2008 Swiss Television: SF2; Minimal Invasive Hip Procedures in high demand patients
- 18.04.2008 The role of TAL in Hip Navigation
Corail: 20 años en España, Barcelona, Spain
- 18.04.2008 Ceramic on Ceramic: the perfect Bearing Option?
Corail: 20 años en España, Barcelona, Spain
- 18.04.2008 Anterior approach MICROHIP
Corail: 20 años en España, Barcelona, Spain
- 13.04.2008 Chair: Current Topics in Surface Replacing
Restoring the Joy of Motion Symposium, Shanghai, China
- 13.04.2008 HA - The Science behind the Fixation
Restoring the Joy of Motion Symposium, Shanghai, China
- 13.04.2008 MicroHip, a minimal invasive procedure for THR
Restoring the Joy of Motion Symposium, Shanghai, China
- 18.02.2008 Video-Demonstration des MicoHip Zugangs.
Surgery Week, MUW Medizinische Universität Wien, Austria
- 18.02.2008 Präparate Workshop: Anatomie des anterioren Zugangs.
Surgery Week, MUW Medizinische Universität Wien, Austria
- 18.02.2008 Hüftnavigation mit TAL –Zukunft der Hüftchirurgie.
Surgery Week, MUW Medizinische Universität Wien, Austria
- 18.02.2008 MicroHip Zugang modifiziert nach Smith Peterson.
Surgery Week, MUW Medizinische Universität Wien, Austria
- 14.02.2008 The direct anterior approach for THR
Corail Learning Center, Annecy, France
- 14.02.2008 Chair: Hip revision with HA coated Implants, HA Coated Implants
Annecy, France

- 24/25.1.2008 Developer meeting on new cup implants
Hamburg, Germany
- 08.11.2007 Cadaver workshop on Proxima and direct anterior approach
Hamburg, Germany
- 07.11.2007 Maximizing Bone and Soft Tissue Preservation /Presentation
Proxima: Technical workshop
Hamburg, Germany
- 26.10.2007 Teaching Operation: THR with MicroHip
Luxemburg
- 25.10.2007 Presentations on Anatomy/Planning/Direct Anterior approach for THR/ Tips and
Tricks
Cadaver workshop on MicroHip
MicroHip Learning Center in Luxemburg
- 20/23.09.07 Validation of the Russian Visitation Center for MicroHip
Prof. Victor Kuzin, Moscow
- 14.09.2007 TV-Presentation: Hip Arthroscopy
Medical Talk; Swiss TV
- 06.09.2007 Evolution in MIS for Hip replacement: MicroHip the only MIS approach in an
internerveous plane
Marbella, Spain
- 05.07.2007 International Meeting on Tissue Sparing Cups: Presentation
Leeds, England
- 06.06.2007 Live transmission from Münsingen to Paris:
Surgery: The MicroHip approach with Ceramic on Metal
International Hip Learning Center, Paris, France
- 05.05.2007 The direct anterior approach: MicroHip; Technique and Results
Learning Center, Paris, France
- 05.06.2007 Surgery at the Hospital in Paris (Prof. Hutten)
2 MicroHips with Corail
- 25.05.2007 Metal on Metal: An objective assessment
International Learning Center, Chennai, India
- 25.05.2007 MIS: Results and technical tips and tricks

	International Learning Center, Chennai, India
25.05.2007	The Minimal invasive approaches to the Hip: The MicroHip technique International Learning Center, Chennai, India
18.05.2007	Instructional course on the direct anterior approach Proxima, around the corner technique, Workshop Learning Center Graz, Austria
17.05.2007	A direct anterior approach: MicroHip, Technique and Results Learning Center Graz, Austria
13.05.2007	MircroHip: a modified Smith-Peterson approach: Results and technique; Symposium 25: Why a short stem? 8 th EFFORT Congress, Florence, Italy
13.05.2007	Minimal invasive hip replacement: the MicroHip technique Advances in the surgical and clinical management of orthopedic patients; Satellite Symposium; 8 th EFFORT Congress, Florence, Italy
10.05.2007	Advisor Meeting on Rivaroxaban, Florence, Italy
03.05.2007	Workshop: The technique of the Corail stem. International Congress on Hydroxiapatite in primary and Revisions Lyon, France
03.05.2007	Radiographic long term follow up on a fully hydroxiapatie coated stem International Congress on Hydroxiapatite in primary and Revisions Lyon, France
03.05.2007	Clinical Results of the direct anterior approach: MicroHip International Congress on Hydroxiapatite in primary and Revisions Lyon, France
17.04.2007	MicroHip: Technique and Preliminary Results Learning Center Graz, Austria
18.04.2007	Direct anterior Approach and Proxima: Is it the perfect marriage? Presentation, Learning Center Graz, Austria
19.04.2007	Cadaverworkshop on MicroHip/ Proxima Learning Center Graz, Austria
27.03.2007	Live Surgery: Direct Anterior Presentation: Independent long term Radiological Review of fully Hydroxiapatite Coated Stem Intelligent Surgery Hip Course, Cannes, France

- 26.03.2007 Direct Anterior Approach: Surgical Overview
Intelligent Surgery Hip Course, Cannes, France
- 16.03.2007 Direct Anterior Video Technique – Without a Fracture Table, Transforming
Orthopedics
Park City, USA
- 15.03.2007 MicroHip Technique and Results
Park City, USA
- 14.03.2007 The MicroHip Technique, Presentation
New York, USA
- 03.03.2007 Modération: Les nouveaux implants
26ème Journée Orthopédique, Brussels, Belgium
- 03.03.2007 La voie mini-invasive antérieure: MicroHip
26ème Journée Orthopédique, Brussels, Belgium
- 26.01.2007 Presentation of the preliminary results in Proxima THR, Early user meeting
Alst, Belgium
- 25.01.2007 Presentation: Risk factors for the implantation of the Proxima stem. Developer
meeting.
Alst, Belgium
- 22/23.1.2007 Evaluation of Ci-Hip.
Hamburg, Germany
- 18.01.2007 International Learning Center: Core Faculty meeting.
Leeds, GB
- 15.01.2007 Video Interview for the JnJ shareholder conference, USA
The development of the MicroHip technique
- 12.12.2006 Presentation: MicroHip and Proxima: Is it the perfect marriage?
Zermatt, Switzerland
- 01.12.2006 Presentation on: The use of the Harmonic scalpel in minimal invasive hip
surgery, Hamburg, Germany
- 05.10.2006 Live Surgery: MicroHip with Corail
International Learning Centre; Geneva Switzerland
- 04.10.2006 The future of minimal invasive hip surgery: MicroHip

International Learning Centre; Geneva Switzerland

- 29.09.2006 Presentation and Workshop on MicroHip
94. Jahrestagung der Vereinigung Mittelrheinischer Chirurgen
Bonn, Germany
- 25.09.2006 Presentation and Surgery: Technique of MicroHip
Nantes, France
- 22.09.2006 MicroHip-Technik und erste Resultate
Schweizerische Gesellschaft für Orthopädie, Luzern, Switzerland
- 21.09.2006 Live Surgery: MicroHip and Corail/Pinnacle
Brussels, Belgium
- 20.09.2006 Presentation: MicroHip technique and first results
Brussels, Belgium
- 15.09.2006 Schweizerischer Schmerzkongress:
Die Behandlung der Kniegelenksarthrose
Nottwil, Switzerland
- 12.09.2006 Presentation: MicroHip and Proxima: The perfect Marriage?
Valencia, Spain
- 13.09.2006 Live Surgery: MicroHip and Proxima XL/ASR
Valencia, Spain
- 11.09.2006 Cadaverworkshop on MicroHip Proxima
Geneva, Switzerland
- 10.09.2006 Swiss Television: Modern Techniques in TKR
Zurich, Switzerland
- 03.09.2006 The Future of Total Hip Arthroplasty
Japanese Learning Center, Bangkok, Thailand
- 02.09.2006 MicroHip Cadaverworkshop
Japanese Learning Center, Bangkok, Thailand
- 02.09.2006 Latest Development in MI Surgery MicroHip
Japanese Learning Center, Bangkok, Thailand
- 01.09.2006 MicroHip Cadaverworkshop (high potential)
Japanese Learning Center, Bangkok
- 24.08.2006 Minimal Invasive Hüftchirurgie: MicroHip

Langenthal, Switzerland

- 11.08.2006 A direct anterior approach for Total Hip Replacement: MicroHip
Brisbane, Australia
- 09.08.2006 A direct anterior approach for Total Hip Replacement: MicroHip
Melbourne, Australia
- 08.08.2006 A direct anterior approach for Total Hip Replacement: MicroHip
Sidney, Australia
- 08.08.2006 Live Surgery: Total Hip Replacement with the MicroHip Approach
Wagga Wagga, Australia
- 22.07.2006 My experience with computer assisted surgery in total knee replacement
Intelligent Hip and Knee Surgery Course (Incorporating tissue spearing
techniques)
Midrand, South Africa
- 22.07.2006 Corail: The Clinical Results
Intelligent Hip and Knee Surgery Course (Incorporating tissue spearing
techniques) Midrand, South Africa
- 21.07.2006 MicroHip Surgery; Mini Anterior Approach
Intelligent Hip and Knee Surgery Course (Incorporating tissue spearing
techniques) Midrand, South Africa
- 03.07.2006 A direct anterior approach for Total Hip Replacement: MicroHip
Aarau, Switzerland
- 30.06.2006 The MicroHip approach: Technique and clinical results
20years anniversary meeting of Corail; Lyon, France
- 23.06.2006 A direct anterior approach for Total Hip Replacement: MicroHip
European Hip Society, Antalya, Turkey
- 22.06.2006 Live Surgery: Total Hip Replacement with the MicroHip Approach
Garmisch, Germany
- 30.05.2006 A direct anterior approach for Total Hip Replacement: MicroHip.
International Learning Center, Graz, Austria
- 30.05.2006 Presentation of a live transmission from Switzerland on the MicroHip approach
International Learning Center, Graz, Austria

- 30.05.2006 Workshop on the Anatomy and Technique for Anterior MI THR: MicroHip
International Learning Center, Graz, Austria
- 24.05.2005 A direct anterior approach for Total Hip Replacement: MicroHip
International Learning Center, Adelaide, Australia
- 22.05.2006 MicroHip: A new anterior minimal invasive approach to the hip joint
(Presentation)
Shoushu, China
- 22.05.2006 MicroHip: A new anterior minimal invasive approach to the hip joint (Live
Surgery)
Shoushu, China
- 21.05.2006 MicroHip: A Minimally Invasive Procedure for Total Hip Replacement Surgery. A
Modified Smith-Peterson Approach
Shanghai, China
- 16.05.2006 A direct anterior approach for Total Hip Replacement: MicroHip
Bangkok, International Asian Learning Center
- 16.05.2006 Presentation of a live transmission from Switzerland on the MicroHip approach
Bangkok, International Asian Learning Center
- 16.05.2006 Workshop on the Anatomy and Technique for Anterior MI THR: MicroHip
International Asian Learning Center, Bangkok
- 12.05.2006 MicroHip: A Minimally Invasive Procedure for Total Hip Replacement Surgery. A
Modified Smith-Peterson Approach
International Symposium, Katowice, Poland
- 11.05.2006 MicroHip: The anterior minimal invasive approach to the Hip (Presentation)
Current Topics in Total Hip Replacement
London, England
- 11.05.2006 Rapid Rehabilitation Hip Programs (Chair)
Current Topics in Total Hip Replacement
London, England
- 04.05.2006 Most Recent Development in MI Hip Surgery: MicroHip
Corail Learning Centre, Annecy, France
- 27.04.2006 Workshop on the Anatomy and Technique for Anterior MI THR: MicroHip
Paris, France
- 20.04.2006 The Future of Navigation in Orthopedic Surgery

Jacksonville, USA

- 10.04.2006 Presentation on a minimal invasive approach to the Hip
Testing of new Ultrasonic operation tools
Cincinnati, USA
- 06.04.2006 MicroHip: A new anterior minimal invasive approach to the hip joint
(Presentation) Manhattan/NY, USA
- 20.03.2006 Workshop on MicroHip for international surgeons
Anatomic Institute of Prof. Fasel, Geneva, Switzerland
- 03.03.2006 Proxima and MicroHip: Is it the perfect marriage?
Presentation, Proxima lounge meeting
Hamburg, Germany
- 02.03.2006 Workshop on MicroHip at the International Learning Center
Hamburg, Germany
- 01.03.2006 Live Operation: THR with MicroHip
International Learning Center, Hamburg, Germany
- 01.03.2006 MicroHip: latest development in Total Hip Replacement (Presentation)
International Learning Center, Hamburg, Germany
- 18.02.2006 MicroHip: A new anterior minimal invasive approach to the hip joint. Presentation
at the national orthopedic congress of Greece
Thessaloniky, Greece
- 02.02.2006 Workshop on MicroHip
International Learning Center, Brussels, Belgium
- 01.02.2006 MicroHip: latest development in Total Hip Replacement (Presentation)
International Learning Center, Brussels, Belgium
- 29.01.2006 EMAT Navigation in THR (Video production)
Hamburg, Germany
- 26.01.2006 The Future of Hip Surgery
ISM06, Lisbon, Portugal
- 08.12.2006 Most Recent Development in MI Hip Surgery: MicroHip
Corail Learning Center, Annecy, France
- 17.11.2006 Workshop on MicroHip at the International Learning Center
Hamburg, Germany
- 16.11.2006 Live Operation: THR with MicroHip

	International Learning Center, Hamburg, Germany
16.11.2006	MicroHip: Latest development in Total Hip Replacement (Presentation) International Learning Center, Hamburg, Germany
27.10.2005	Most Recent Development in MI Hip Surgery: MicroHip. Corail Learning Center, Annecy, France
28.09.2005	Workshop on MicroHip at the International Learning Center Brussels, Belgium
27.09.2005	Live Operation: THR with MicroHip International Learning Centre, Brussels, Belgium
27.09.2005	MicroHip: Latest development in Total Hip Replacement (Presentation) International Learning Center, Brussels, Belgium
17.09.2005	A new anterior approach to the Hip: MicroHip (Presentation) Current Topics in Hip Surgery Brussels, Belgium
01.08.2005	Live Surgery: Total Hip Replacement with the MicroHip approach Pretoria, South Africa
31.07.2005	State of the art in Navigated Knee Surgery (Presentation) The Minimal Invasive Approaches to the Hip Joint; an Overview (Presentation) Pretoria, South Africa
30.07.2005	MicroHip: Latest development in Total Hip Replacement (Campsite Presentation), South Africa
29.07.2005	Navigation in TNR (Campsite Presentation), South Africa
27.07.2005	Latest Developments in THR: MicroHip Meeting on MI approaches to the Hip, Los Angeles, USA
07.07.2005	A new anterior approach to the Hip: MicroHip (Presentation) International Learning Center, Brussels, Belgium
07.07.2005	Workshop on MicroHip at the International Learning Center Brussels, Belgium
02.06.2005	A new minimal invasive anterior approach to the Hip: MicroHip (Presentation) International Learning Center, Lisbon, Portugal
12.05.2005	A new minimal invasive anterior approach to the Hip: MicroHip (Presentation)

International Learning Centre, Hamburg, Germany

- 18.03.2005 Live Surgery: Total Hip Replacement with the MicroHip approach
Interlaken, Switzerland
- 17.03.2005 Minimal invasive anterior Hip Surgery (Presentation)
Interlaken, Switzerland
- 17.03.2005 The Minimal Invasive Approach to the Hip Joint; an Overview (Presentation)
Interlaken, Switzerland

5. CURRICULUM 1977-2012

A) AWARDS

MANRHYE FOUNDATION AWARD, 3.9.93

Société Internationale de Chirurgie Orthopédique et de Traumatologie
19th World Congress SICOT93, Seoul, 28.8.-3.9.1993

B) PUBLICATIONS

1. Genge M., Schneider E., Michel M.C., Genge H. and Perren S.M.
Hochauflösende Telemetrie-Anlage für statische Belastungsmessungen.
Proceedings European Telemetry Conference, Döring-Druck,
Braunschweig, 288-296, (1988)
2. Thurnheer U., Novak A., Michel M.C., Ruchti Ch., Jutzi H., Weiss M
Septische Melioidose nach Aufenthalt im indischen Subkontinent
Schweizerische Medizinische Wochenschrift, 118, 558-564 (1988)
3. Marchesi D., Michel M.C., Schneider E. Aebi M.
Fixation transpediculaire ventrale de la colonne lombaire: Verification experimental d'un
nouveau system de vissage.
Revue de Chirurgie Orthopédique (1988)
4. Marchesi D., Michel M.C., Schneider E., Aebi M.
Experimental verification of direction finder for anterior transpedicular fixation of the lower
thoracic and lumbar spine.
Orthopedic Transactions J Bone Joint Surg. 12 (2), 476 (1988)
5. Schneider E., Genge M., Michel M.C., Bräm W., and Perren S.M.
Instrumented interlocking nail for telemetrized load determination in the human femur.
Orthopedic Transactions, J Bone Joint Surg. (1989)
6. Genge M., Schneider E., Michel M.C., Genge H., Perren S.M.
Multi-channel telemetry system for load measurements in intramedullary nails.
In: Bergmann et al (etds.) Implantable telemetry in orthopedics. Free University Berlin, pp.
133-136 (1990)
7. Schneider E., Michel M.C., Genge M., Perren S.M.
Loads acting on a telemetrized interlocking nail.
In: Bergmann et al (etds.) Implantable telemetry in orthopedics. Free University Berlin, pp.
221-227 (1990)
8. Schneider E., Michel M.C., Genge M., Wyder D.
In vivo load measurements by means of an instrumented interlocking nail.

Proceedings 7th Meeting European Society of Biomechanics
J.of Biomechanics 24(6),463, (1991)

9. Marchesi D., Michel M.C., Lowery G., Aebi M.
Direction finder for anterior transpedicular fixation of the lower thoracic and lumbar spine.
Spine (in press)
10. Michel M.C., Zysset P.K., Hayes W.C.
Fatigue behavior of trabecular bone.
J.B.J.S. Proceedings of the 37th Annual Meeting Orthopedic Research Society (1991)
11. Michel M.C., Genge M., Schneider E., Perren S.M.
Loading history of an interlocking nail subsequent to fracture treatment.
J.B.J.S. Proceedings of the 37th Annual Meeting Orthopedic Research Society, 141, (1991)
12. Michel M.C., Genge M., Witschger P.M.
Biotelemetry Anlage für statische und dynamische Messungen am Menschen.
Proceedings European Telemetry Conference, Döring-Druck, Braunschweig, 425-434
(1992)
13. Michel M.C., Genge M., Zuber K., Witschger P.M., Schneider E., Perren S.M.
Monitoring of fracture healing in vivo on a human femur.
Proceedings IIX Meeting of the European Society of Biomechanics, J. of Biomechanics (in press)
14. Michel M.C., Guo X.E., Gibson L.J., McMahon T.A., Hayes W.C.
Fatigue behavior of trabecular bone
Proceedings IIX Meeting of the European Society of Biomechanics
J. of Biomechanics (in press)
15. Michel M.C., Genge M., Witschger P.M.
Fast 15-channel micro-telemetry for implantation in man: Report and results of the first implantation in a human femur.
Proceedings XII International Symposium on Biotelemetry,
Ancona, Italy, August 31 to September 5, 1992
Editrice Universitaria Litographia felici, Pisa: 420-425
16. Genge M., Witschger P.M., Michel M.C.
Fast 15-channel micro-telemetry for implantation in man:
Philosophy and Technology
Proceedings XII International Symposium on Biotelemetry,
Ancona, Italy, August 31 to September 5, 1992
Editrice Universitaria Litographia felici, Pisa: 425-426
17. Michel M.C., Genge M., Witschger P.M., Perren S.M.
The effect of dynamisation to an interlocked intramedullary nail: In vivo measurements of

load during consolidation of a femoral fracture.

Orthopedic Transactions of the 39th Annual Meeting of the Orthopedic Research Society,
San Francisco, California, 15.-20.2.1993

18. Michel M.C., Guo X.E., Gibson L.J., McMahon T.A., Hayes W.C.
Compressive fatigue behavior of bovine trabecular bone
J. of Biomechanics 26 (4/5) 453-63 (1993)
19. Michel M.C., Zysset P.K., Angst M.P.
Compressive creep behavior of trabecular bone
Proceedings 3rd conference of the EORS, Paris, 19.4.-20.4.93
J. of Biomechanics (proceedings)
20. Schneider E., Michel M.C., Genge M., Zuber K., Ganz R., Perren S.M.
Loads acting in an intramedullary nail during fracture healing in the human femur
J. of Biomechanics 34 (2001) 849-857

C) ABSTRACTS

1. Marchesi D., Michel M.C., Schneider E., Aebi M.
Experimental verification of direction finder for anterior transpedicular fixation of the lower thoracic and lumbar spine.
34th Orthopedic Research Society, Las Vegas, 1988
2. Schneider E., Genge M., Michel M.C., Wyder D., Perren S.M., Bräm W
Instrumented interlocking nail for in vivo implant load measurements.
6th Meeting European Society of Biomechanics, 16 (1988)
3. Marchesi D., Michel M.C., Schneider E., Aebi M.
Experimental verification of direction finder for anterior transpedicular fixation of the lower thoracic and lumbar spine.
Orthopedic Transactions J Bone Joint Surg. 12 (2), 476 (1988)
4. Marchesi D., Michel M.C., Schneider E., Aebi M.
Experimentelle Nachprüfung eines Zielgeräts für die ventrale transpediculäre Fixation der thorako-lumbalen Wirbelsäule.
8. Kongress der Schweizerischen Gesellschaft für Orthopädie,
Crans-Montana, 8. - 11. Juni (1988)
5. Schneider E., Genge M., Michel M.C.
Invitro Messung der Implantatbelastung beim Verriegelungsmarknagel für das Femur.
Osteosynthese International, Gerhard Küntscher-Kreis, Wien (1989)
6. Schneider E., Genge M., Michel M.C., Bräm W., and Perren S.M.
Instrumented interlocking nail for telemetrized load determination in the human femur.
35th Orthopedic Research Society , New Orleans (1989)
7. Zuber K., Genge M., Michel M.C., Wespe R.
In vivo Implantation eines Telemetrie-Verriegelungsmarknagels
Unfallchirurgie, Frankfurt am Main, 28.-30.9. (1990)
8. Michel M.C., Schneider E., Genge M.
The effect of posture and physiotherapy on the loads acting on an interlocking femoral nail.
XVIII World Congress SICOT 90, 185, (1990)
9. Schneider E., Michel M.C., Genge M., Perren S.M.
Determination of the in vivo load by means of an instrumented interlocking femoral nail.
Proceedings First World Congress of Biomechanics, 220, (1990)
10. Schneider E., Michel M.C., Genge M., Wyder D.
Invivo load measurement by means of an instrumented interlocking nail.
7th Meeting European Society of Biomechanics, A 44, (1990)

11. Michel M.C., Genge M., Schneider E., Perren S.M.
Loading history of an interlocking nail subsequent to fracture treatment.
37th Annual Meeting Orthopedic Research Society, 141, (1991)
12. Michel M.C., Zysset P.K., Hayes W.C.
Fatigue behavior of trabecular bone.
37th Annual Meeting Orthopedic Research Society, 156, (1991)
13. Michel M.C., Genge M., Witschger P.M.
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In vivo Monitorisierung der Belastung am Femur; Verriegelungsmarknagel.
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15. Steffen T.B., Michel M.C., Jakob R.P.
Bestimmung der korrekten Kreuzbandinsertionspunkte im Röntgenbild - Ein individueller
Test am Computer.
50. Jahreskongress der Schweizerischen Gesellschaft für Orthopädie, Lausanne,
p.72, 17.-20.6.92
16. Michel M.C., Genge M., Zuber K., Witschger P.M., Schneider E., Perren S.M.
Monitoring of fracture healing in vivo on a human femur.
Proceedings IIX Meeting of the European Society of Biomechanics, p.134
Rome, Italy, 21-24.6.1992
17. Michel M.C., Guo X.E., Gibson L.J., McMahon T.A., Hayes W.C.
Fatigue behavior of trabecular bone
Proceedings IIX Meeting of the European Society of Biomechanics, p.43
Rome, Italy, 21-24.6.1992
18. Michel M.C., Genge M., Witschger P.M.
Fast 15-channel micro-telemetry for implantation in man: Report and results of the first
implantation in a human femur.
XII International Symposium on Biotelemetry, Ancona, Italy, 31.8-5.9.92 (on invitation)
19. Genge M., Witschger P.M., Michel M.C.
Fast 15-channel micro-telemetry for implantation in man: Philosophy and Technology
XII International Symposium on Biotelemetry, Ancona, Italy, 31.8-5.9.92 (on invitation)
20. Steffen T.B., Michel M.C., Jakob R.P.
Bestimmung der korrekten Kreuzbandinsertionspunkte im Röntgenbild - Ein individueller
Test am Computer.

21. Michel M.C., Genge M., Witschger P.M., Perren S.M.
The effect of dynamisation to an interlocked intramedullary nail: In vivo measurements of load during consolidation of a femoral fracture.
39th Annual Meeting of the Orthopedic Research Society,
San Francisco, California, 15.-20.2.1993
22. Zysset P.K., Angst M.P., Michel M.C., A.Curnier
Compressive creep behavior of trabecular bone
3rd conference of the EORS, Paris, 19.4.-20.4.93
23. Michel M.C., Zysset P.K., Angst M.P.
Creep behavior of trabecular bone
XIVth International Society of Biomechanics, Paris, 4.7.-8.7.93
24. Michel M.C., Genge M., Witschger P.M., Perren S.M.
In vivo longterm measurements of the dynamisation-effect in an interlocking femoral nail by a 8-channel biotelemetry system; p. 216
19th World Congress SICOT93, Seoul, 28.8.-3.9.1993
25. Michel M.C., Genge M., Witschger P.M., Perren S.
MAHNRYE FOUNDATION AWARD
In vivo longterm measurements of the dynamisation-effect in an interlocking femoral nail by a 8-channel biotelemetry system; p. 307
19th World Congress SICOT93, Seoul, 28.8.-3.9.1993
26. Schneider E., Michel M.C., Genge M., Zuber K., Ganz R., Perren S.M.
Loads acting in an intramedullary nail during fracture healing in the human femur
J. of Biomechanics 34 (2001) 849-857

D) PRESENTATIONS

- 08.10.88 Experimentelle Nachprüfung eines Zielgeräts für die ventrale transpediculäre Fixation der thorako-lumbalen Wirbelsäule.
Weiterbildungskurs Verband Schweizerischer Anatomie-Pathologie Präoperatoren,
Bern, Schweiz
- 13.09.90 The Effect of Posture and Physiotherapy on the Loads
Acting on an Interlocking Nail.
SICOT 90, Montreal, Canada
- 21.09.90 The telemetrized interlocking femoral nail
Beth Israel Hospital, Harvard University, Boston, USA
- 05.05.91 Loading History of an Interlocking Femoral Nail

Subsequent to Fracture Treatment;
37th Annual Meeting Orthopedic Research Society, Anaheim, California.

- 05.05.91 Fatigue Behavior of Trabecular Bone
37th Annual Meeting Orthopedic Research Society, Anaheim, California.
- 14.02.92 In vivo Telemetrie-Anlagen am Menschen: Entwicklung, Applikation, Resultate.
Fortbildungsveranstaltung: Labor für Experimentelle Chirurgie, Davos
- 13.05.92 Biotelemetrie Anlage für statische und dynamische Messungen am Menschen.
European Telemetry Conference, Garmisch-Partenkirchen, Germany, 12. - 14. 5. 92
- 19.06.92 In vivo Monitorisierung der Belastung am Femur; Verriegelungsmarknagel.
50. Jahreskongress der Schweizerischen Gesellschaft für Orthopädie, Lausanne, 17.-
20.6.92
- 22.06.92 Monitoring of fracture healing in vivo on a human femur.
IIX Meeting of the European Society of Biomechanics
Rome, Italy, 21-24.6.1992
- 24.06.92 Fatigue behavior of trabecular bone
IIX Meeting of the European Society of Biomechanics
Rome, Italy, 21-24.6.1992
- 04.09.92 Fast 15-channel micro-telemetry for implantation in man:
Report and results of the first implantation in a human femur.
XII International Symposium on Biotelemetry, Ancona, Italy, 31.8-5.9.92
- 16.02.93 The Effect of Dynamisation to An Interlocked Intramedullary Nail:
In Vivo Measurements of Load During Consolidation of a Femoral
Fracture
39th Annual Meeting of the Orthopedic Research Society,
San Francisco, California, 15.-20.2.1993
- 05.07.93 Creep behavior of trabecular bone
XIVth International Society of Biomechanics,
Paris, 4.7.-8.7.93
- 31.8.93 In vivo long term measurements of the dynamisation-effect in an
interlocking femoral nail by a 8-channel biotelemetry system.
19th World Congress SICOT93, Seoul, 28.8.-3.9.1993
- 31.8.93 MANRYE FOUNDATION AWARD
In vivo long term measurements of the dynamisation-effect in an
interlocking femoral nail by a 8-channel biotelemetry system.
19th World Congress SICOT93, Seoul, 28.8.-3.9.1993

- 16.11.93 Kompressionsneuropathien der oberen Extremität
Fortbildungsprogramm Handchirurgie Inselspital Bern
- 12.03.94 Traumatische Läsionen des Karpus I
Fortbildungsprogramm Handchirurgie Inselspital Bern
- 10.05.94 Traumatische Läsionen des Karpus II
Fortbildungsprogramm Handchirurgie Inselspital Bern
- 04.06.94 Scaphoidfrakturen: Diagnose und Therapie
Fortbildungsprogramm Zieglerspital Bern
- Multiple presentations in Europe and USA to the following topics:
Hip- and Knee Replacements, primary TKR and THR, Hip Arthroscopy
from 1995 to 2002
- 01.10.97 München: Knieendoprothetik: Mobile Bearing
- 01.10.97 München: Soft Tissue Balancing in TKR
- 30.10.98 Visana Bern: Simultane Knieendoprothetik
- 26.08.99 Sulzer Medical: Von der Arthrose zur Hüftarthroskopie. Die Orthopädie an der
Schwelle zum 3. Jahrtausend
- 03.12.00 Methacarpalefrakturen: Konservative und operative Therapie
Schloss-Symposium: Leistenschmerz
Limbusläsion und Hüftarthroskopie
- 07.06.02 Pressekonferenz Hirslanden: Orthopädische Chirurgie auf höchstem Niveau:
Kosteneinsparung durch Hightech und Teambildung
- 22.08.03 Centerpuls: Von der minimal invasiven Hüftchirurgie bis zum Endoprothetischen
Ersatz.
Hands-on Demonstration der CLS Hüftprothese
- 08.09.03 RSZ Top aktuell: Sportverletzungen

E) POSTERS

1. Marchesi D., Michel M.C., Schneider E., Aebi M.
Experimental verification of direction finder for anterior transpedicular fixation of the lower
thoracic and lumbar spine.
Orthopedic Research Society, 34th Annual Meeting, Atlanta, 1.-4.2. (1988)

2. Schneider E., Genge M., Michel M.C., Bräm W., and Perren S.M.
Instrumented interlocking nail for telemetrized load determination in the human femur.
35th Orthopedic Research Society, Las Vegas (1989)
3. Zysset P.K., Angst M.P., Michel M.C., A. Curnier
Compressive creep behavior of trabecular bone
3rd Conference of the EORS, Paris, 19.4. - 20.4.93
4. Midterm results on MicroHip:
An extension table free anterior procedure without restrictions
EFCOT, Vienna 2009
5. Abnutzungsmuster bei Kopf-Konus-Verbindungen von Hüftendoprothesen Florian Witt¹,
Nicholas E. Bishop¹, Marcel Rütschi², Markus Michel³, Michael M. Morlock¹
3. Workshop „Neue Horizonte für metallische Biomaterialien“, 2013

F) VIDEO

1. The telemetrized nail (1990), Author: M.C. Michel,
Maurice E. Müller Foundation Bern
2. Hip Arthroskopie (2001): Technique, Clinics, Indications
Authors: M.C. Michel, P. Witschger
Maurice E. Müller Foundation Bern
3. Minimal invasive Hip-Resurfacing using the MicroHip technique
EFCOT 2008

G) CHAIRS

- | actual | recent chairs are listed under „Actual activities“ |
|------------|---|
| 13.04.2009 | Tissue Sparing Solution Instructional Course
Kiel, Germany |
| 17.10.2008 | Tissue Preserving Anterior Approach Hip Replacement
Ottawa, Canada |
| 13.04.2008 | Current Topics in Surface Replacing
Restoring the Joy of Motion Symposium
Shanghai, China |
| 14.02.2008 | Hip revision with HA coated Implants, HA Coated Implants
Annecy, France |
| 25.10.2007 | Learning Center on Anterior Approaches: Cadaver workshop on MicroHip |

MARKUS C. MICHEL, MD

SWITZERLAND

Luxembourg

25.05.2007 International Learning Center on advanced Hip Surgery
Chennai, India

1.05.2006 Rapid Rehabilitation Hip Programs
Current Topics in Total Hip Replacement
London, England

31.08.1993 Femur Fractures
19th World Congress SICOT 93, Seoul, 28.8. - 3.9.1993

H) PUBMED RESULTS

1 J Biomech. 1993 Apr-May; 26(4-5):453-63.

• **Compressive fatigue behavior of bovine trabecular bone.**

Michel MC, Guo XD, Gibson LJ, McMahon TA, Hayes WC.

Source

M.E. Mueller Laboratory of Biomechanics, University of Bern, Switzerland.

Erratum in

• J Biomech 1993 Sep;26(9):1144.

Abstract

We studied the fatigue behavior of bovine trabecular bone specimens under stress control using a sinusoidal uniaxial compressive load profile with a frequency of 2 Hz. The stress range was determined from the corresponding initial global platen-to-platen strain range, where the maximum initial strain was between 0.8 and 2.1% and the minimum strain was 0.6%. The local strain distribution was measured on the same type of specimen by affixing glass spheres and photographing them in the unloaded and loaded positions using multiple exposures. The number of cycles to failure (defined as a 5% decrease in secant modulus) was strongly correlated with the initial global maximum strain ($r^2 = 0.78$) and ranged from 20 cycles at 2.1% strain to 400,000 cycles at 0.8% strain. All of the fatigue specimens showed a region of transverse failure approximately 1 mm from the end of the specimen. Microscopic examination of the failure zones revealed two failure modes: a straight transverse brittle-like fracture through the trabeculae, most often found in trabeculae transverse to the loading direction, and buckling-like failure, common in oblique trabeculae, involving bending and splitting. The local strain increased towards the ends of the specimens to a value 2-4 times that in the middle. Modulus degradation with the number of cycles was distinctively different for high-cycle and low-cycle fatigue, suggesting the possibility that both creep and damage accumulation contribute to fatigue failure of trabecular bone.

PMID: 8478349 [PubMed - indexed for MEDLINE]

1 Hip Int. 2006;16 Suppl 3:40-7.

• **MicroHip: A minimally invasive procedure for total hip replacement surgery A modified Smith**

Michel MC, Witschger P.

Source

Münsingen Orthopedic Centre, Münsingen - Switzerland.

Abstract

In this article we present the surgical technique of our anterior minimally invasive approach to the hip along an interneural plane and makes the approach truly minimally invasive. This technique is performed in the decubitus position on a normal operating table; there is no need for a specific orthopedic or fracture table. It is not necessary, this enables the approach to be used routinely. Most of the instruments used are standard instruments; only the acetabular reamers and positioners are angulated and specifically designed instruments (MI minimally invasive) are especially useful when performing hip replacement in obese patients. A view of both the acetabulum and the proximal femur can be obtained through an incision of only

approach. The approach follows the interval between the tensor fascia lata muscle and the rectus femoris muscle of the anterior iliofemoral approach described by Smith-Petersen. No tendon or muscle is cut or sutured. The capsule is split and left in place. The hip joint is not dislocated and we perform the osteotomy of the femur. To date we have performed over 500 MicroHip operations. We have not observed any nerve lesions or damage to the greater trochanter. Our experience to date shows that the method we have developed allows us to operate on almost any patient. Preliminary results also show that important factors like length of stay, pain, blood loss and hospital charges can be reduced significantly. The MicroHip technique is being used by more and more different clinics and can be applied with success after suitable training.

PMID: 19219819 [PubMed – in process]

- 1 J Biomech. 2001 Jul;34(7):849-57.

Loads acting in an intramedullary nail during fracture healing in the human femur.

Schneider E, Michel MC, Genge M, Zuber K, Ganz R, Perren SM.

Source

M.E. Mueller-Institute for Biomechanics, University of Bern, Murtenstrasse 30, CH-3010, Bern, Switzerland. erich.schneider@ao-asif.ch

Abstract

The form and function of the musculo-skeletal system is closely related to the forces acting in its components. Significant forces are present in the long bones, but their magnitudes have so far only been estimated from mathematical models. Fracture fixation by means of metal implants provides an opportunity to measure the implant-borne forces and to estimate the long bone forces before healing occurs. The load changes during fracture healing may provide additional information. Therefore, a telemetrized, interlocking femoral nail for wireless transmission of forces and moments acting across the fracture site was developed. The design was based on the geometry and material of a 16 mm AO nail with a circular, closed cross-section allowing full protection of the electronic circuits from the body fluids. After careful testing, it was implanted in a 33-year-old patient who had sustained a multifragmentary fracture of the left femur. Measurements at a rate of approx. 0.4 Hz were performed in different patient postures between the 2nd and 26th postoperative week. Significant axial forces and bending moments were measured during several activities such as sitting, unsupported leg elevation and partial weight bearing in a standing position. Forces orthogonal to the nail axis remained small. The reductions of the implant loads due to fracture consolidation were in the order of 50%. Dynamization of the nail did not change the forces. Even though the telemetry system did not allow for dynamic measurements and the results presented here provide data from one subject only, the new information will be useful with respect to implant design, biomechanics of fracture fixation and evaluation of healing progression.

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PMID: 11410169 [PubMed – indexed for MEDLINE]