

## Orthopaedic Research Knee-Team

**Clinical and experimental research and development at the  
Department of Orthopaedic Surgery and Traumatology, Kantonsspital  
Baselland**



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The Department of Orthopaedic Surgery and Traumatology at Kantonsspital Baselland-Bruderholz, in Basel, Switzerland is recognized worldwide for its many orthopaedic contributions. In particular, it is known for having positively impacted the field of sports medicine and furthered the understanding of knee function. The Orthopaedic Department is affiliated to the University of Basel. An active research department ensures that we can offer newest and well investigated treatment options to our patients. In addition, latest developments of implants, techniques and surgical procedures are critically analysed. Today, orthopaedic registrars can participate in a number of studies into orthobiologics, cartilage repair, orthopaedic imaging, hydrogel technology and more. The research focuses on the knee joint, in particular new imaging in orthopaedics, orthobiologics, ACL, PCL, multi-ligament injuries and the painful arthroplasty. We currently hold research grants from several national and international grant authorities. We have [collaborations](#) with many other institutes in Switzerland and abroad.

### **Team:**

PD Dr. med. Michael T. Hirschmann  
Head Knee Section and Head of the Research Department  
[Michael.Hirschmann@unibas.ch](mailto:Michael.Hirschmann@unibas.ch), [Michael.Hirschmann@ksbl.ch](mailto:Michael.Hirschmann@ksbl.ch)

Dr. med. Helmut Rasch  
Senior Consultant Nuclear Medicine  
[Helmut.Rasch@unibas.ch](mailto:Helmut.Rasch@unibas.ch), [Helmut.Rasch@ksbl.ch](mailto:Helmut.Rasch@ksbl.ch)

Dr. med. Enrique Testa  
Resident Orthopedics and Team Leader Research  
[Enrique.Testa@unibas.ch](mailto:Enrique.Testa@unibas.ch), [Enrique.Testa@ksbl.ch](mailto:Enrique.Testa@ksbl.ch)

Study Nurse, Silvia Reichl  
[Silvia.Reichl@ksbh.ch](mailto:Silvia.Reichl@ksbh.ch)

Study Nurse, Anita Matt  
[Anita.Matt@ksbl.ch](mailto:Anita.Matt@ksbl.ch)

Felix Amsler, MSc  
Statistical Consulting, Amsler Consulting  
[www.amslerconsulting.ch](http://www.amslerconsulting.ch)

Adrian Bernard  
IT-Specialist

2 Scientific Research Fellows (12 months period)

15-20 doctoral or master thesis students

#### Website:

[www.ksbl.ch](http://www.ksbl.ch), [www.kniedoktor.ch](http://www.kniedoktor.ch), [www.kneesurgeon.ch](http://www.kneesurgeon.ch), [www.kneedoctor.ch](http://www.kneedoctor.ch)

#### Major Research Focus:

e.g.

- Retrospective and prospective clinical studies investigating factors which influence outcome after partial or total knee arthroplasty
- „The painful arthroplasty“
- Cartilage repair procedures
- High tibial osteotomy
- Outcome and treatment of ACL, PCL, posterolateral corner injuries, multi-ligament injuries
- Multimodality Imaging in orthopaedics
- Clinical testing of novel Imaging and Analysing methods
- Influence of psychological factors on outcome after total knee arthroplasty

#### Awards:

- September 2013 AGA SFA 2. Poster-Preis "Das Patellofemoralgelenk im SPECT/CT: Biologie folgt der Mechanik!", **Schön S**, Arnold MP, Afifi F, Rasch H, Amsler F, Hirschmann MT; AGA 2013, Wiesbaden, Deutschland
- July 2013 Young Investigator Award der European Association of Nuclear Medicine "4D-SPECT/CT including assessment of TKA component position, alignment and tracer uptake distribution in patients with painful total knee arthroplasty", **Testa EA**, Rasch H, Forrer F, Hirschmann MT

- June 2013 1. Preisträger Technology Sektion, 5th Swiss Quality Award, Basel, Schweiz; **Hirschmann MT**, Rasch H, Bernard A, Wagner C, Henckel J
- April 2013 3<sup>rd</sup> Young Investigator Award, “Clinical value of 4D-SPECT/CT including assessment of TKA component position, alignment and tracer uptake distribution in patients with painful total knee arthroplasty”, **Testa EA**, Rasch H, Forrer F, Hirschmann MT; 3<sup>rd</sup> ECOSEP Congress Frankfurt, Germany
- November 2012 Certificate of Merit „Multimodality assessment of metal-on-metal hip arthroplasties: never miss a diagnosis again on plain radiographs, MARS MRI and SPECT/CT”, Sabah S, Henckel J, Salchithanada K, Khan S, Barwick T, **Hirschmann MT** et al.
- June 2012 3<sup>rd</sup> neurotech® GOTS Young Investigator Award 2012, **Keller Leonie**
- May 2012 ESSKA Basic Science 1st Poster Award, 2012, Genf, Schweiz
- European Arthroscopy Fellowship der AGA- Gesellschaft für Arthroskopie und Gelenkchirurgie, **Hirschmann MT**
- Juni 2011 2<sup>nd</sup> neurotech® GOTS Young Investigator Award 2011, **Mathis D**
- Mai 2011 2<sup>nd</sup> International Basel Knee Congress, **Mathis D**
- 4. Platz Wissenschaftsmodul, Universität Basel, **Schön S**
- ESSKA-APOSSM Fellowship Asien 2012, **Hirschmann MT**
- April 2010 Spezialprogramm Nachwuchsförderung Klinische Forschung Universität Basel, 50.000CHF, **Hirschmann MT**
- EFORT Visiting Fellowship Tampere, Finnland 2010, **Hirschmann MT**
- 01.01.2009-31.12.2009 Research Stipendium PROMOTIO Stiftung für Biomechanische Forschung Basel, **Hirschmann MT**

#### **Scientific Cooperation:**

- Institut für Radiologie und Nuklearmedizin, Kantonsspital Bruderholz (PD Dr. med. Rolf Hügli, Dr. med. Helmut Rasch)
- Anatomisches Institut, Universität Basel (Prof. Dr. Magdalena Müller-Gerbl)
- Universitätsspital Basel, Orthopädie (Prof. Dr. med. Victor Valderrabano, Dr. med. Thomas Hügler)
- Universitätsspital Basel, Radiologie (Dr. med. Anna Hirschmann)
- Universitäts-Kinderspital beider Basel UKBB (Dr. med. Carlo Camathias)
- Universität Basel, Departement Biomedizin (Prof. Ivan Martin)
- Sportmedizinisches Institut e.V., Frankfurt am Main, Deutschland (Prof. Dr. med. Heinz Lohrer)
- LOB2 – Labor für Orthopädische Biomechanik und Biokalorimetrie, Universität Basel (Prof. Dr. med. Niklaus Friederich)
- Medical Image Analysis Center, CMBE Universität Basel (Prof. Phillipe Cattin)
- Imperial College, Mechanical Engineering Department, London, UK (Prof. Andrew Amis)
- Fachhochschule Nordwestschweiz, Hochschule für Life Sciences (Prof. Erik Schkommodau)
- Charing Cross Hospital, Dept. of Muskuloskeletal Surgery (Prof. Justin Cobb, Prof. Roger Emery)

- Orthorun Ltd., London, UK
- Naviswiss, Laufen
- Orthopaedic Department, Tampere University Hospital, Finland (Dr. Petri Silanpää)
- Orthopaedic Department, Mehilainen Hospital, Finland (Dr. Timo Järvelä)
- Sonnenhof Spital, Bern (Dr. med. Phillip Henle)
- Stanmore Institute and The Stanmore Imaging Hub (Prof. Dr. Alister Hart, Dr. Johann Henckel)

## Publications in 2010 till 2013:

2013

“Meniscus repair and regeneration: review on current methods and research potential.” Scotti C, **Hirschmann MT**, Antinolfi P, Martin I, Peretti GM. Eur Cell Mater. **2013** Sep 23;26:150-70.

“Letter to the editor concerning the Editorial "Innovation in orthopaedic surgery as it relates to evidence-based practice" by M. Hofbauer, B. Muller, C. D. Murawski, J. Karlsson and Freddie H. Fu. Arnold MP, **Hirschmann MT**. Knee Surg Sports Traumatol Arthrosc. **2013** Sep 8. [Epub ahead of print] No abstract available.

“Nondislocated osteoprotic insufficiency fracture of the medial femoral neck : SPECT/CT makes the diagnostic difference.” Rieger B, Friederich NF, Rasch H, **Hirschmann MT**. Unfallchirurg. **2013** Aug 16. [Epub ahead of print] German.

“SPECT/CT in patients with painful knee arthroplasty-what is the evidence?” **Hirschmann MT**, Henckel J, Rasch H. Skeletal Radiol. **2013** Sep;42(9):1201-7. doi: 10.1007/s00256-013-1657-9. Epub **2013** Jun 11.

“4D-SPECT/CT in orthopaedics: a new method of combined quantitative volumetric 3D analysis of SPECT/CT tracer uptake and component position measurements in patients after total knee arthroplasty.” Rasch H, Falkowski AL, Forrer F, Henckel J, **Hirschmann MT**. Skeletal Radiol. **2013** Sep;42(9):1215-23. doi: 10.1007/s00256-013-1643-2. Epub **2013** May 22.

“The unhappy total knee arthroplasty (TKA) patient: higher WOMAC and lower KSS in depressed patients prior and after TKA.” **Hirschmann MT**, Testa E, Amsler F, Friederich NF. Knee Surg Sports Traumatol Arthrosc. **2013** Oct;21(10):2405-11. doi: 10.1007/s00167-013-2409-z. Epub **2013** Jan 29.

“SPECT/CT tracer uptake is influenced by tunnel orientation and position of the femoral and tibial ACL graft insertion site.” **Hirschmann MT**, Mathis D, Rasch H, Amsler F, Friederich NF, Arnold MP. Int Orthop. 2013 Feb;37(2):301-9. doi: 10.1007/s00264-012-1704-5. Epub 2012 Nov 11.

„One-year clinical and MR imaging outcome after partial meniscal replacement in stabilized knees using a collagen meniscus implant.“ **Hirschmann MT**, Keller L, Hirschmann A, Schenk L, Berbig R, Lüthi U, Amsler F, Friederich NF, Arnold MP. Knee Surg Sports Traumatol Arthrosc. 2013 Mar;21(3):740-7. doi: 10.1007/s00167-012-2259-0. Epub 2012 Oct 30.

„Double incision iso-anatomical ACL reconstruction: the freedom to place the femoral tunnel within the anatomical attachment site without exception.“ Arnold MP, Duthon V, Neyret P, **Hirschmann MT**. Int Orthop. 2013 Feb;37(2):247-51. doi: 10.1007/s00264-012-1681-8. Epub 2012 Oct 24.

“One-year clinical and MR imaging outcome after partial meniscal replacement in stabilized knees using a collagen meniscus implant.” **Hirschmann MT**, Keller L, Hirschmann A, Schenk L, Berbig R, Lüthi U, Amsler F, Friederich NF, Arnold MP. Knee Surg Sports Traumatol Arthrosc. 2013 Mar;21(3):740-7. doi: 10.1007/s00167-012-2259-0. Epub 2012 Oct 30.

„Single photon emission computerized tomography and conventional computerized tomography (SPECT/CT) for evaluation of patients after anterior cruciate ligament reconstruction: a novel standardized algorithm combining mechanical and metabolic information.“ **Hirschmann MT**, Mathis D, Afifi FK, Rasch H, Henckel J, Amsler F, Wagner CR, Friederich NF, Arnold MP. Knee Surg Sports Traumatol Arthrosc. 2013 Apr;21(4):965-74. doi: 10.1007/s00167-012-2083-6. Epub 2012 Jun 13.

„From open to arthroscopic anatomical ACL-reconstructions: the long way round. A statement paper.“ Arnold MP, Friederich NF, Müller W, **Hirschmann MT**. Knee Surg Sports Traumatol Arthrosc. 2013 Jul;21(7):1478-81. doi: 10.1007/s00167-012-2029-z. Epub 2012 May 9.

„Long-term results of arthroscopically assisted anatomical single-bundle anterior cruciate ligament reconstruction using patellar tendon autograft: are there any predictors for the development of osteoarthritis?“ Gerhard P, Bolt R, Dück K, Mayer R, Friederich NF, **Hirschmann MT**. Knee Surg Sports Traumatol Arthrosc. 2013 Apr;21(4):957-64. doi: 10.1007/s00167-012-2001-y. Epub 2012 Apr 10.

## 2012

„Anterolateral approach using tibial tubercle osteotomy for total knee arthroplasty: can we predict failure?“ Wishart M, Arnold MP, Huegeli RW, Amsler F, Friederich NF, **Hirschmann MT**. Int Orthop. 2012 Dec;36(12):2485-90. doi: 10.1007/s00264-012-1693-4. Epub 2012 Nov 6.

„Assessment of loading history of compartments in the knee using bone SPECT/CT: a study combining alignment and 99mTc-HDP tracer uptake/distribution patterns.“ **Hirschmann MT**, Schön S, Afifi FK, Amsler F, Rasch H, Friederich NF, Arnold MP. J Orthop Res. 2013 Feb;31(2):268-74. doi: 10.1002/jor.22206. Epub 2012 Aug 8.

„Standardized volumetric 3D-analysis of SPECT/CT imaging in orthopaedics: overcoming the limitations of qualitative 2D analysis.“ **Hirschmann MT**, Wagner CR, Rasch H, Henckel J. BMC Med Imaging. 2012 Mar 29;12:5. doi: 10.1186/1471-2342-12-5.

„See the whole picture: knee preserving therapy needs more than surface repair.“ Arnold MP, **Hirschmann MT**, Verdonk PC. Knee Surg Sports Traumatol Arthrosc. 2012 Feb;20(2):195-6. doi: 10.1007/s00167-011-1733-4. Epub 2011 Nov 3. No abstract available.

2011

“Verbesserte diagnostische Möglichkeiten für Patienten mit Problemen nach Ersatz des vorderen Kreuzbandes – SPECT/CT als neue Chance in der Diagnostik!“, Rieger B, Friederich NF, Rasch H, **Hirschmann MT** (Orthopädische Praxis 47, 11, 2011)

“Anatomic reconstruction of a chronic anterior-superior sternoclavicular joint dislocation using gracilis tendon autograft- a technical note“, Friedrich L, Afifi FK, Skarvan J, Friederich NF, **Hirschmann MT** (accepted Knee Surg Sports Traumatol Arthrosc)

“Navigated total hip replacement using a 3D-freehand ultrasound system- technical note and preliminary results“, **Hirschmann MT**, Afifi FK, Helfrich C, Wirz D, Schwägli T, Overhoff HM, Moser W, Friederich NF (accepted Orthopedics)

“Can clinical examination cause a Stener lesion in patients with skier`s thumb?: A cadaveric study.“, Adler T, Eisenbarth I, **Hirschmann MT**, Müller-Gerbl M, Fricker R; Clin Anat 2011 Nov 22. doi: 10.1002/ca.22005

“See the whole picture: knee preserving therapy needs more than surface repair.“, Arnold MP, **Hirschmann MT**, Verdonk PC (Knee Surg Sports Traumatol Arthrosc 2011 Nov. 3)

“Combined single photon emission computerized tomography and conventional computerized tomography (SPECT/CT): Clinical value for the shoulder surgeons?“, **Hirschmann MT**, Schmid RB, Rasch H, Skarvan J, Dhawan R, Emery R, Friederich NF Int J Shoulder Surg. 2011 Jul;5(3):72-6.

„Clinical value of combined single photon emission computerized tomography and conventional computer tomography (SPECT/CT) in sports medicine?“, **Hirschmann MT**, Davda K, Arnold MP, Friederich NF (Sports Med Arthrosc Rev 2011 Jun;19(2):174-81)

“Comparison of inter-and intra-observer reliability of component position measurements in total knee arthroplasty on conventional radiographs, transverse 2D-CT slices and 3D-CT“, **Hirschmann MT**, Konala P, Amsler F, Iranpour F, Friederich NF, Cobb JP (JBJS Br 93-B (5), may)

“Biomechanical Comparisons between 4-strand and Modified Larson 2-strand Procedures for Reconstruction of the Posterolateral Corner of the Knee“, Miyatake S, Kondo E, Tsung-Yuan T, **Hirschmann MT**, Halewood C, Jakobsen BW, Yasuda K, Amis AA (Am J Sports Med Apr 20)

“Isoanatomical bone patellar-tendon bone single bundle ACL reconstruction: the wedge that gives the edge!“ Arnold MP, Biedert RM, van Loon C, **Hirschmann MT** (EJOST, DOI 10.1007/s00590-011-0793-y)

“Seltene Ursachen für Schmerzen nach VKB-Ersatz!“, Wirries A, Arnold MP, Afifi FK, Friederich NF, **Hirschmann MT** (Arthroskopie, (23 December 2010, pp. 1-4, DOI: 10.1007/s00142-010-0632-x)

“Anterior cruciate ligament reconstruction using quadriceps tendon autograft for adolescents with open physes“, Mauch C, Arnold MP, Wirries A, Mayer RR, Friederich NF, **Hirschmann MT** (Sports Med Arthrosc Rehabil Ther Techno 3:7)

“An unusual case of persistent groin pain after total hip arthroplasty: a case report“, Konala P, Schaefer T, Iranpour F, Friederich NF, **Hirschmann MT** (J Med Case Reports 15; 5(1):67)

„Clinical value of SPECT-CT for evaluation of patients with painful knees after total knee arthroplasty- a new dimension of diagnostics“, **Hirschmann MT**, Konala P, Iranpour F, Kerner A, Rasch H, Friederich NF (BMC Musculoskeletal Dis, 12:36)

“Medium term evaluation following internal fixation of proximal humerus fractures with an interlocking plate (PHILOS)“, **Hirschmann MT**, Fallegger B, Amsler F, Regazzoni P, Gross T (J Orthop Trauma, Apr 1)

“Intra-operative femoral condylar stress during arthroscopy: an in-vivo biomechanical assessment“, Schmid R, Wirz D, Göpfert B, Arnold M, Friederich NF, **Hirschmann MT** (Knee Surg Sports Traumatol Arthrosc 19 (5): Page 747)

„Comparison of a novel ACL graft fixation device with a conventional interference screw system: a human in-vitro study“, Halewood C, **Hirschmann MT**, Newman S, Chaimski G, Amis AA (Knee Surg Sports Traumatol Arthrosc 19(4):559-67)

“Combined single photon emission computerized tomography and conventional computerized tomography (SPECT/CT) in patellofemoral disorders - a clinical review“, **Hirschmann MT**, Davda K, Rasch H, Friederich NF (Int Orthop 2011, 35(5):675-80.)

2010

“Die Knieluxation - was tun? Eine Therapiestrategie“, **Hirschmann MT**(Orthopädie & Rheuma, Ausgabe 10, Oktober 2010)

“Painful knee joint after ACL reconstruction using biodegradable interference screws– SPECT/CT a valuable diagnostic tool? A case report“, **Hirschmann MT**, Adler T, Rasch H, Huegli RW, Friederich NF, Arnold P (Sports Medicine, Arthroscopy, Rehabilitation, Therapy & Technology 2010, 2:24)

“Anterolateral approach with tibial tubercle osteotomy versus standard medial approach for primary total knee arthroplasty: does it matter?“, **Hirschmann MT**, Hoffmann M, Krause R, Jenabzadeh AR, Arnold MP, Friederich NF NF (BMC Musculoskeletal Dis 2010 Jul 22;11(1):167)

“Long-term Outcome of Patients Treated Surgically for Traumatic Knee Dislocation - Does the Injury Pattern Matter?“, **Hirschmann MT**, Meier D, Amsler F, Friederich NF (The Physician and Sportsmedicine, ISSN – 0091-3847, June 2010, No. 2, Volume 38)

“SPECT/CT - Neue Chancen in der diagnostischen Abklärung von Patienten mit schmerzhaftem Kniegelenk nach endoprothetischer Versorgung“, **Hirschmann MT**; Leading Opinions, 2010

„Combined single photon emission and conventional computerized tomography (SPECT/CT) for follow-up of osteochondritis dissecans- a case report“, Konala P, Rasch H, Kerner A, Friederich NF, **Hirschmann MT** (Ann Nucl Med 2010, 24(8):621)

“Long-term outcome of patients after complete single stage reconstruction of patients after traumatic knee dislocation“, **Hirschmann MT**, Zimmermann N, Rycken T, Candrian C, Hudetz D, Lorez LG, Friederich NF (BMC Musculoskeletal Dis 2010 May 27; 11(1):102)

„A novel standardized method for evaluating patients after total knee arthroplasty using combined single photon emission tomography and conventional computerized

tomography (SPECT/CT)", **Hirschmann MT**, Iranpour F, Konala P, Kerner A, Rasch H, Cobb JP, Friederich NF (Knee Surg Sports Traumatol Arthrosc 2010 ,18(7):939

"Open single stage complete reconstruction of traumatic knee dislocation in elite athletes - what can we expect?", **Hirschmann MT**, Iranpour F, Müller W, Friederich NF (AJSM Epub Mar 9)

"Critical evaluation of the strength measurement of the Constant Murley Score", **Hirschmann MT**, Wind B, Amsler F, Gross T (Clin Orthop Relat Res. 2010, 468(6):1565

### **Funding:**

Project grants with private and public foundations and institutions:

- PROMOTIO, Stiftung für Biomechanische Forschung, Basel Switzerland
- Deutsche Arthroshilfe e.V., Germany
- Bangerter-Rhyner-Stiftung, Switzerland
- University of Basel, Switzerland
- Alwin-Jäger-Stiftung, Aschaffenburg, Germany
- Schweizerische Gesellschaft für Orthopädie (SGO), Switzerland
- ENDO Klinik, Hamburg, Germany
- Schweizerische Unfallversicherungsanstalt (SUVA), Luzern, Switzerland
- Diverse KTI-Projects

Project grants in cooperation with the industry:

- Synthes, Oberdorf, Switzerland
- ReGen Biologics AG, Appenzell, Switzerland
- Mathys Medical, Bettlach, Switzerland
- Smith&Nephew, Aarau, Switzerland
- Corin, Corinchester, UK
- BIOMET, UK
- Tornier, Switzerland
- Naviswiss, Laufen, Switzerland

### **Fellowships?:**

We regularly offer research fellowships to national and international students as well as physiotherapists and orthopaedic surgeons. The funding of the fellowship has to be organized in advance, either via a research grant or personal funds. Applications including a CV and an application letter should be sent via email to

[Michael.Hirschmann@unibas.ch](mailto:Michael.Hirschmann@unibas.ch)

### **Contact:**

PD Dr. med. Michael Hirschmann  
Head Knee Section and Head of Research, Dept. of Orthopaedic Surgery and Traumatology, Kantonsspital Baselland-Bruderholz, CH-4101 Bruderholz, Switzerland

[Michael.Hirschmann@ksbl.ch](mailto:Michael.Hirschmann@ksbl.ch), [Michael.Hirschmann@unibas.ch](mailto:Michael.Hirschmann@unibas.ch)  
[www.kneesurgeon.ch](http://www.kneesurgeon.ch)