

OTC Foundation



OTCF RESEARCH PROGRAM

2015 - 2020



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5 Years OTC Foundation Research

2015-2020

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Trauma & Extremities



Preface

10 plus 5 Years of OTC Foundation



The Osteosynthesis and Trauma Care Foundation (OTCF) is an educational and scientific professional organization dedicated to the advancement of musculoskeletal trauma treatment. The OTCF recognizes the importance of scientific discovery and has committed funding to promising research projects since its inception. In particular, the foundation has supported the work of early career investigators, as well as scientific studies of established researchers and their teams through research grants awarded annually.

The present publication highlights basic, biomechanical, preclinical and clinical research activities supported by OTCF over the last five years. Many of these research projects have garnered additional funding from other private and public agencies generating multiple publications. Annual workshops on “hot topics” and resulting presentation in annual Injury

supplements are reaching a wide audience of interested scientists and surgeons. The OTCF Research Committee (RECO) was established in 2005 and ever since oversees this program.

The first ten years research at OTCF were celebrated at the 25th session of RECO in Athens in June 2015, and summarized in a comprehensive publication. The subsequent five years are the subject of the present publication, presented at the 34th session of RECO, held in November 2020 via internet due to the Corona pandemic.

Both publications are available as flipbooks on our website www.otcfoundation.org. RECO and all its members are determined to overcome this unfortunate virus-induced interruption, and to guide OTCF research through a successful future through the next decade.




ESTHER VAN LIESHOUT
Scientific Coordinator




THEODORE MICLAU
President

Introduction

OTC Foundation Framework

THE OTC FOUNDATION UMBRELLA 

OTC-CHAPTERS
(18 CHAPTERS AND 1 REGIONAL GROUP)

3 PRESIDENTS

6 REGIONAL COORDINATORS

EXECUTIVE BOARD (EB)

EXECUTIVE SECRETARIAT IMPLEMENTS EB ACTIVITIES

EDUCATION TASK FORCE

- Leadership Forum
- Regional Events
- Chapter Course faculty exchange
- Harmonized Course Evaluation

COMMUNICATION WITH CHAPTERS

- Website
- Newsletter
- General Assembly
- Chapter Cooperation
- New Chapters

RESEARCH COMMITTEE

- Research Grant
- Hot Topic Symposia
- Regional Courses
- Journal Publications
- Methodology Textbooks

BOARD OF TRUSTEES (BOT)



Introduction

OTC Foundation Framework

THE OTC FOUNDATION (OTCF) is a non-profit Swiss Foundation incorporated in the Canton of Solothurn, Switzerland. In 2007 Stryker Trauma SA founded OTCF and has been its main sponsor ever since. With funding based primarily on grants and related donations and as a legally independent entity, OTCF complies with all restrictions and/or financial limitations. Such funding may contain very specific allocations or restrictions regarding how the funding may be spent or allocated. All funding is tied to specific annual work plans and budgets that were independently generated by the Health Care Professionals who participate in OTC Foundation activities.

Today the OTC is an interactive global network of surgeons and scientists, dedicated to the advancement of osteosynthesis and trauma care through education, research and professional networking. The common goal is to attract both early career and experienced professionals, that strive to be competent in fields such as fragility fractures, osteoporosis and related surgical interventions.

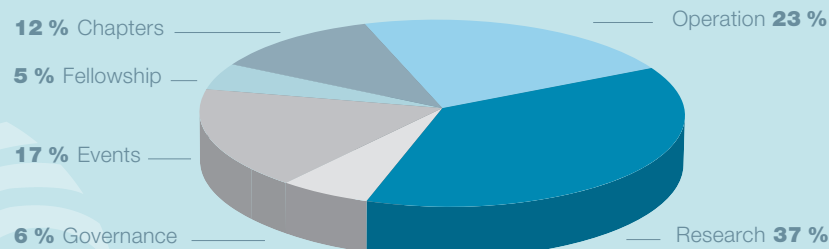
THE OTCF RESEARCH PROGRAM supports current trends in development of trauma care technology which are governed by the increase in the aging population, particularly in industrialized countries. The OTC Research Program aims at mobilizing more resources being allocated to pre-clinical and clinical musculoskeletal research.

The translational research program developed around selected “Hot Topics” and consists of five key activity components:

- Reviews and analysis of the scientific literature on the selected “hot topic”
- Symposia convened on an annual basis as multi-disciplinary workshops focusing on the selected “hot topic” and bringing together surgeons and scientists
- Training courses embedded in international conferences
- Provision of research grants for funding scientific studies related to that topic
- Stimulation of publications, individual books or in form of supplements to scientific journals

In addition, the OTC Foundation promotes development of methodology on experimental research, published in a reference textbook in 2015. This continued the series of textbooks on clinical research methodology which has been amended in 2020 with another textbook on coordination of clinical research. Courses on clinical research were resumed by national OTC Chapters, and expanded by OTC Foundation courses on experimental research, all based on the methodology compiled in these textbooks. The main purpose of the present publication is to report on the activities of this program during 2015 to 2020, but also to document fifteen years of achievement in orthopaedic and trauma research. Events and results are highlighted which demonstrate the wide array of scientific and clinical subjects covered, and the large community of surgeons and scientists which had been reached out to over these years. This would have not been possible without the guidance and dedicated engagement of the members of the Research Committee (RECO) who had been faithful to the program over all these years.

ANNUAL OTC FOUNDATION BUDGET DURING 2015 TO 2019



15 Years

History

Research Committee Members 2005 to 2020

VOLKER ALT, MD PHD, GERMANY SINCE 2005

Professor, Director and Chairman, Department of Trauma Surgery, University of Regensburg, Germany

PETER AUGAT, PHD, GERMANY SINCE 2008

Professor of Biomechanics, Institute of Biomechanics, Murnau, Germany

MOHIT BHANDARI, MD MSC, CANADA FROM 2008 TO 2010

Professor and Chairman, Department of Orthopedic Surgery, McMaster University, Hamilton, Canada

LOUIS WING-HOI CHEUNG, BSC PHD, CHINA FROM 2005 TO 2012

Research Associate Professor, Deputy Director of Musculoskeletal Research Laboratory
Department of Orthopaedics & Traumatology, The Chinese University of Hong Kong, Hong Kong, China

SUNE B.A. LARSSON, MD, PHD, SWEDEN FROM 2014 TO 2017

Professor and Consultant in Orthopedic Surgery, Uppsala University Hospital, Sweden

THEODORE MICLAU, III, MD, USA SINCE 2005; CHAIRMAN SINCE 2011

Professor and Vice Chairman, Department of Orthopaedic Surgery, Director, Orthopedic Trauma Institute,
Department of Orthopaedic Surgery, University of California San Francisco, San Francisco, USA

PETER PATKA, MD PHD, THE NETHERLANDS CHAIRMAN FROM 2005 TO 2011

Professor, University Chair in Trauma Surgery, Trauma Research Unit, Dept. of Surgery, Erasmus MC,
University Medical Center Rotterdam, Rotterdam, The Netherlands

EMIL SCHEMITSCH, MD PHD, CANADA FROM 2005 TO 2010

Professor and Chairman, Department of Surgery, Western University, Ontario, Canada

HAMISH A.R.W. SIMPSON, MD PHD, UK SINCE 2006

Professor of Orthopaedics and Trauma, Dept. of Orthopaedic Surgery, Royal Infirmary, Edinburgh, Scotland

ESTHER M.M. VAN LIESHOUT, PHD MSC, ASSOCIATE PROFESSOR, THE NETHERLANDS SINCE 2006 SCIENTIFIC

COORDINATOR Research Coordinator in Trauma Surgery, Trauma Research Unit, Dept. of Surgery, Erasmus MC,
University Medical Center Rotterdam, Rotterdam, The Netherlands.



History

OTC Foundation Research Program



THE OTCF RESEARCH COMMITTEE

The mission of OTC is to foster evidence-based research that increases knowledge to solve clinical problems and improve orthopaedic trauma care. Through the OTC Research Grant Program, funding support is provided on topics that include:

- Promotion of fracture healing, including treatment and enhancement of fracture repair
- Treatment of fractures in osteoporotic bone
- New technologies in fracture fixation, including computer-assisted surgery
- Prophylaxis and treatment of infections in fracture
- Prospective clinical trials in fracture care
- Numerical methods in trauma surgery
- Translational, pre-clinical and experimental research
- Biomechanical studies

The focus of program activities is reviewed and updated at the annual RECO meetings, and the area of research grants adjusted accordingly. The work of RECO was recognized and appreciated by the General Assembly of all OTC Chapter Presidents by providing Prof. Peter Patka in 2014 and Prof. Theodore Miclau in 2020 with an honorary award for their long and dedicated service and leadership of the committee.

OTCF RESEARCH COMMITTEE MEMBERS 2020



Esther van Lieshout

Peter Augat

Theodore Miclau

Hamish Simpson

Volker Alt

History

OTC Foundation Research Program

OTC RESEARCH COMMITTEE (ReCo) SESSIONS 2005-2020

ReCo 1:	Washington DC	February	2005	ReCo 19:	Barcelona	November	2011
ReCo 2:	Nice	June	2005	ReCo 20:	Berlin	June	2012
ReCo 3:	Rotterdam	November	2005	ReCo 21:	Boston	December	2012
ReCo 4:	Chicago	March	2006	ReCo 22:	Copenhagen	June	2013
ReCo 5:	Nice	June	2006	ReCo 23:	London	November	2013
ReCo 6:	Amsterdam	November	2006	ReCo 24:	Lisbon	June	2014
ReCo 7:	San Diego	February	2007	ReCo 25:	Athens	June	2015
ReCo 8:	Nice	June	2007	ReCo 26:	Zurich	November	2015
ReCo 9:	Amsterdam	November	2007	ReCo 27:	Verona	June	2016
ReCo 10:	San Francisco	March	2008	ReCo 28:	Amsterdam	June	2017
ReCo 11:	Nice	June	2008	ReCo 29:	Amsterdam	June	2018
ReCo 12:	Amsterdam	November	2008	ReCo 30:	Toronto	November	2018
ReCo 13:	Las Vegas	February	2009	ReCo 31:	Amsterdam	June	2019
ReCo 14:	Nice	June	2009	ReCo 32:	Prague	November	2019
ReCo 15:	Amsterdam	November	2009	ReCo 33:	Internet-based	June	2020 *)
ReCo 16:	Amsterdam	June	2010	ReCo 34:	Internet-based	November	2020 *)
ReCo 17:	Munich	November	2010				
ReCo 18:	Zurich	March	2011				

*) Due to Corona crisis physical meetings in 2020 not possible



OTC Foundation Research Grants Program

STRATEGY

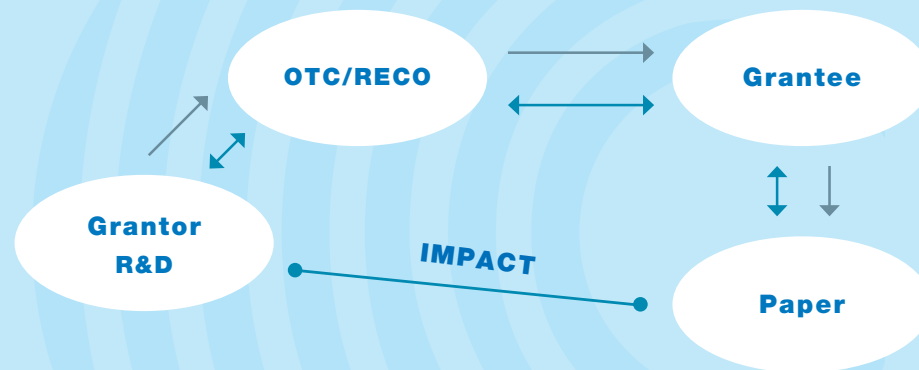
The objective of Research Grants is to encourage orthopaedic trauma surgeons and basic scientists by providing seed and start-up funding for promising research projects in the field of orthopedic trauma surgery through grants of up to US\$ 50,000 for a research project extending over a maximum of two years. Both laboratory and clinical projects are suitable, but in either

case clinical relevance is needed. The aim is to make the results of these grant projects available to a wider audience of surgeons with manifest research interests and of active scientific involvement. Thus, a feedback loop between all involved, from Research & Development (R&D) at Stryker to open literature and back is achieved.

OUTCOMES OF RESEARCH GRANTS 2005 TO 2019



GENERAL STRATEGY



OTC Foundation Research Grants Process

PRE-PROPOSAL APPLICATIONS (2005 to 2011 grant cycles):

Preliminary screening of an application were based on a pre-proposal application, containing a brief description of the research idea. Pre-proposals were reviewed in a blinded fashion by all research committee members, and were rated and ranked based on scientific merit and orthopaedic trauma impact. Proposals receiving an average rate of three or higher (on a scale of 1 to 5) were then invited to submit a full-length proposal. Full-length proposals were judged as follows.

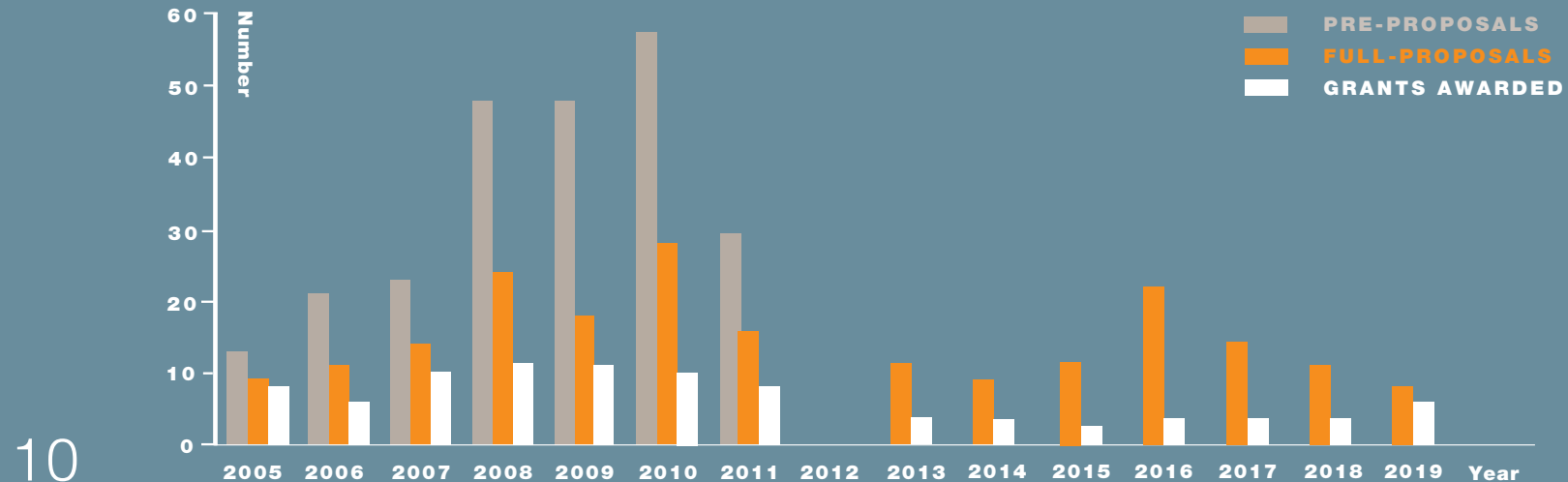
FULL-LENGTH PROPOSALS (direct submission as of 2013 grant cycle):

Full-length proposals are evaluated in a non-blinded fashion for their scientific merit, orthopaedic trauma impact, methodology, feasibility, experience of the research team, and the budget requirements. For each application, three appointed RECO reviewers provide an in-depth review, which is discussed with all research committee members. The best-rated applications are offered a grant contract.

RESULTS OF THE RESEARCH GRANTS

Details on all grants awarded during the first ten years are summarized in the brochure OTC Research Program 2005 - 2015. Also, the publications and presentations that resulted out of the investigators work are listed in this brochure. This brochure can be read as an eBook on the OTCF website www.otcfoundation.org. The next five years are summarized in the present brochure. A full account of the period 2005 to 2019 is given in the graph and in the statistical records table.

Notably, no research grant proposals were accepted in 2020 as the research program was suspended due to the coronavirus crisis. Due to the variable duration of the grant projects, the recent presentations and publications produced by the grants, particularly over the past three years, has been delayed. The annual figures reflect the research outcome of previous years.



OTC Foundation Research Grants Program

STATISTICAL OVERVIEW OF RESEARCH GRANTS 2005 TO 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Sub-Total 2005-2014
Preproposals	13	21	23	48	48	55	29		0	0	237
Full proposals	11	10	14	28	18	27	16		13	10	147
Grants	8	6	10	11	11	10	8		3	3	70
%granted of pre	62	29	43	23	23	18	28				30
%granted of full	73	60	71	39	61	37	50		23	30	48
Grants amount USD	145.000	300.000	364.200	386.965	421.089	331.733	270.722	0	150.000	150.000	2.519.709
Presentations	16	18	43	38	42	54	19	17	20	10	277
Publications	5	11	14	12	14	14	14	5	10	7	106

STATISTICAL OVERVIEW OF RESEARCH GRANTS 2015 TO 2019

	2015	2016	2017	2018	2019	Sub-Total 2015-2019	Total 2005-2019
Full proposals	11	21	14	11	8	65	212
Grants Awarded	2	3	3	3	3	14	84
% Grant proposals awarded	18	14	21	27	38	22	40
Grants amount USD	99.560	149.900	109.300	147.124	150.000	655.884	3.175.593
Presentations	5	2	1	0	1	9	286
Publications	14	8	0	0	0	22	128

OTC Foundation Research Grants Program



The activities and results of the work of the OTC Research

Committee were summarized and published grouping several years together. The three brochures followed about a common presentation:

- Research Program History
- Research Committee Members
- Supporting Researchers Worldwide
- Research Grant Application and Review Process
- Young Investigator Grants Awarded
- Research Grants Awarded



- Research Symposia
- Research Fellowships
- Research Courses
- Research Workshops
- Textbooks published
- Publications on Grant Projects
- Presentations of Grant Projects
- Announcement of Research Grants

OTC Foundation Research Grants Program



The four brochures can be read and downloaded as eBooks on the OTC website www.otcfoundation.org

Further information on the Research Grants Process can be obtained from research.grants@otcfoundation.org

This summary booklet highlights all basic, biomechanical, and clinical research activities supported by the OTC Foundation over the last ten years. Many of these research projects have gone on to garner additional funding from other private and public agencies and have resulted in multiple presentations and publications. It is expected that the results of this research will stimulate future discoveries. Its purpose is the further dissemination of this interesting work. The OTC Research Committee (RECO) was established in 2005 and since then oversees this program. Ten Years Research at OTC Foundation were celebrated at the 25th session of RECO in Athens, June 10th 2015.

Translational Research Program From Science to Practice

Experimental Research Methods in Orthopedics and Trauma

Hamish Simpson
Peter Augat



EXPERIMENTAL RESEARCH METHODS IN ORTHOPEDICS AND TRAUMA

Editors: Hamish Simpson, Peter Augat
© 2015 Georg Thieme Verlag

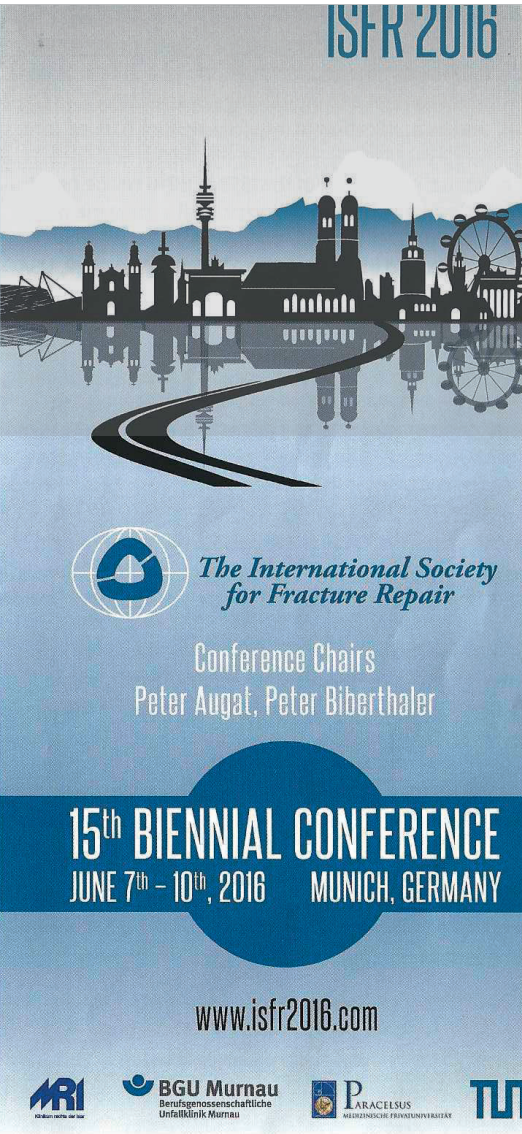
THE BOOK'S PURPOSE:

- Utilizes the principles and methodology of modern, evidence-based medicine in pre-clinical musculoskeletal research
- Offers a comprehensive analysis of in vivo models for studying different components of the musculoskeletal system
- Demonstrates how principles of structural, functional, and numerical biomechanics can be utilized in well-defined experimental research studies – spanning topics from fracture fixation to gait analysis to bone remodeling
- Covers the role of new macroscopic CT and ultrasound imaging techniques for assessing bone and cartilage functions
- Explores cutting-edge developments in cell culture research, molecular testing, and tissue engineering
- Provides practical advice, a glossary of key terminology, and hundreds of illustrations to familiarize clinicians with every aspect of designing and interpreting an effective research study



With 54 chapters by orthopedic surgeons, physicians, biologists, bioengineers, physicists, and mathematicians, Experimental Research Methods in Orthopedics and Trauma became an authoritative reference on this topic. The OTC Foundation, the OTC Research Committee, and OTC Chapters with research interests use this textbook as the basis for workshops, training courses, and other educational events. This program was started at the Congress of the German Society for Biomechanics, Bonn, 6-8 May 2015, where chapter authors presented material from biomechanics chapters of the book to a workshop of 90 participants.

Translational Research Program OTCF Course at ISFR 2016




ISFR 2016

The International Society
for Fracture Repair

Conference Chairs
Peter Augat, Peter Biberthaler

15th BIENNIAL CONFERENCE
JUNE 7th – 10th, 2016 MUNICH, GERMANY

www.isfr2016.com



**Tuesday June 7, 2016:
INTRODUCTORY COURSE**

EXPERIMENTAL RESEARCH METHODS IN FRACTURE REPAIR

The course is aimed at young researchers and clinicians who are interested in:

- basic principles of fracture healing
- update on newest methodologies available in the fracture research

Well known experts in their field gave in-depth introduction into their topics. Each participant received a complimentary textbook: „Experimental Research Methods in Orthopedics and Traumatology“ by Simpson/Augat

PROGRAM:

- 13:00 Welcome & introduction**
(Peter Augat, Murnau)
- 13:10 Basic principles of fracture repair**
(Georg Duda, Berlin)
- 13:40 Mechanobiology of fracture healing**
(Allen Goodship, London)
- 14:10 Coffee break**
- 14:30 In-vivo models of fracture repair**
(Hamish Simpson, Edinburgh)
- 15:00 In-vivo models of bone infection**
(Volker Alt, Giessen)
- 15:30 Biomechanics of fracture fixation**
(Michael Bottlang, Portland)
- 16:00 Coffee break**
- 16:20 Computational biomechanics for fracture fixation**
(Ulrich Simon, Ulm)
- 16:50 Molecular biological techniques**
(Esther van Lieshout, Rotterdam)
- 17:20 Tissue engineering in bone repair**
(Matthias Schieker, Munich)

Translational Research Program OTCF Course Amsterdam 2017

THURSDAY, 15 JUNE 2017

RESEARCH COURSE IN ORTHOPEDICS AND TRAUMA CARE

AMSTERDAM

Course Director:

Esther van Lieshout, Erasmus MC, Rotterdam

Course Book:

Experimental Research Methods in Orthopedics and Trauma Editors:
Hamish Simpson & Peter Augat

Publisher: © 2015 by Georg Thieme Verlag, Stuttgart, Germany

Course Content:

- Evidence Based Science for Basic and Translational Studies: Hamish Simpson, Edinburgh, UK
- Basic Principles of Fracture Repair: Sune Larsson, Uppsala, Sweden
- Device Safety Testing in Industry: Geert von Oldenburg, Kiel, Germany
- In vivo Models of Fracture Repair: Hamish Simpson, UK
- In vivo Models of Bone Infection: Volker Alt, Giessen, Germany
- Biomechanical Models for Fracture Fixation: Pankaj Pankaj, Edinburgh
- Molecular Biological Techniques for Clinical Studies: Celine Colnot, Paris, France
- Imaging of Fracture Repair: Theodore Miclau, San Francisco, USA
- Laser Scanning and Microdissection: Louis Cheung, Hong Kong
- Gait Analysis: Peter Augat, Murnau, Germany
- Data Analysis: Do's and Don'ts: Taco Blokhuis, Maastricht, Netherlands

Course Venue: DoubleTree Hilton Amsterdam Centraal Station



Translational Research Program

OTCF Courses at DKOU 2017 and DKOU 2019

DKOU2017

Deutscher Kongress für Orthopädie und Unfallchirurgie
Berlin 24. – 27. Oktober

OTC Foundation:
Wissenschaftliche Methoden in
Orthopädie und Unfallchirurgie

Sitzungstitel: Wissenschaftliche Methoden in Orthopädie und Unfallchirurgie
Sitzungsleitung: Peter Augat (Murnau) & Volker Alt (Giessen)
Sitzungstag: Dienstag, 24.10.2017
Sitzungszeit: 14:30 - 16:00 Uhr & 16:30 - 18:00 Uhr
Sitzungsort: Lindau 6

„Wissenschaftliche Methoden in Orthopädie und Unfallchirurgie I“
Vorsitz: Peter Augat & Markus Huber-Lang

14:30	Wozu brauchen wir experimentelle Forschung?	Ted Miclau, UCSF San Francisco
14:45	Planung und Auswertung experimenteller Studien	Peter Augat, BGU Murnau
15:00	Strukturelle Biomechanik	Lutz Dürselen, Uni Ulm
15:15	Funktionelle Biomechanik	Dieter Rosenbaum, Uni Münster
15:30	Numerische Biomechanik	Daniel Kluess, Uni Rostock
15:45	Biomechanische Analyse von Endoprothesen	Jan Philippe Kretzer, Uni Heidelberg
16:00	PAUSE MIT OTC CATERING	

„Wissenschaftliche Methoden in Orthopädie und Unfallchirurgie II“
Vorsitz: Volker Alt & Frank Hildebrand

16:30	In vivo Modelle am Knochen	Volker Alt, Uni Giessen
16:45	In vivo und in vitro Modelle am Knorpel	Susanne Grässel, Uni Regensburg
17:00	Organ- und Inflamationsprofil beim Polytrauma (Tipps & Tricks)	Makus Huber-Lang, Uni Ulm
17:15	Methodische Grundlagen der Zellbiologie	Brit Wildemann, Uni Berlin
17:30	Methodische Grundlagen der Zell-Biomaterial-Interaktion	Torsten Blunk, Uni Würzburg
17:45	Methodische Grundlagen des Tissue Engineering	Martijn van Griensven, TU München

Der Kurs basiert auf dem Lehrbuch: „Experimental Research Methods in Orthopedics and Trauma“, Editors: Hamish Simpson & Peter Augat. Thieme Verlag Stuttgart
Jeder Teilnehmer erhält hiervon ein Freie Exemplar.
 Die Teilnehmerzahl ist begrenzt.

Finanzielle Unterstützung durch:
OTC FOUNDATION
 Emmenholzweg, CH-4528 Zuchwil
www.otcfoundation.org
info@otcfoundation.org

DKOU2019

Deutscher Kongress für
Orthopädie und Unfallchirurgie
Berlin, 22. – 25. Oktober

OTC Foundation:
Wissenschaftliche Methoden in
Orthopädie und Unfallchirurgie

Sitzungstitel: Wissenschaftliche Methoden in O&U -
Was muss der Clinical Scientist alles wissen?
Sitzungsleitung: Peter Augat (Murnau) & Volker Alt (Regensburg)
Sitzungstag: Dienstag, 22.10.2019
Sitzungszeit: 14:30 - 16:00 Uhr & 16:30 - 18:00 Uhr
Sitzungsort: Lindau 6

„Wissenschaftliche Methoden in Orthopädie und Unfallchirurgie I“
Vorsitz: Volker Alt & Brit Wildemann

14:30	In vivo Modelle in der muskuloskeletalen Forschung	Volker Alt, Uni Regensburg
14:45	Methodische Grundlagen der Zellbiologie	Brit Wildemann, Uni Jena
15:00	Strukturelle Biomechanik	Andreas Seitz, Uni Ulm
15:15	Methodische Grundlagen des Tissue Engineering	Martijn van Griensven, Uni München
15:30	Methoden der Numerischen Biomechanik	Daniel Kluess, Uni Rostock
15:45	Planung und Auswertung experimenteller Studien	Peter Augat, BGU Murnau
16:00	PAUSE MIT OTC CATERING	

„Wissenschaftliche Methoden in Orthopädie und Unfallchirurgie II“
Vorsitz: Peter Augat & Dirk Stengel

16:30	Der Weg zum Clinical Scientist an der deutschen Uni	Georg Duda, Charite Berlin
16:45	Methodische Grundlagen Klinischer Studien	Peter Augat, BGU Murnau
17:00	Grundlagen interventioneller Studien und RCTs	Dirk Stengel, BG Kliniken Berlin
17:15	Register- und Versorgungsforschung	Peter Angele, Uni Regensburg
17:30	Besonderheiten klinischer Studien in O&U	Stephan Kirschner, St. Vincentius Karlsruhe
17:45	Koordination einer klinischen Studie: Do's and Don't's	Esther v. Lieshout, Uni Rotterdam

Der Kurs basiert auf dem Lehrbuch: „Experimental Research Methods in Orthopedics and Trauma“, Editors: Hamish Simpson & Peter Augat. Thieme Verlag Stuttgart
Jeder Teilnehmer erhält hiervon ein Freie Exemplar.

Finanzielle Unterstützung durch:
OTC FOUNDATION
 Emmenholzweg, CH-4528 Zuchwil
www.otcfoundation.org
info@otcfoundation.org

Hot Topic Workshop 2015

Complications of intramedullary Nailing: Evolution and Treatment

ZURICH, 1-3 November 2015

The OTCF Research Committee convened this “hot topic” workshop with 25 participants attending. The discussions covered a variety of issues, which are reflected in the 2016 research grant invitations.

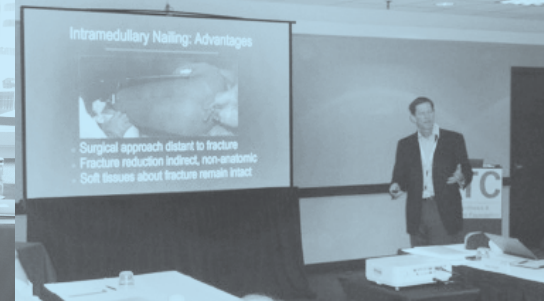
Presentations were made in four thematic areas:

- Response to Injury Related to IM Nailing
- Clinical Decision-Making with IM Nailing
- Compartment Syndrome Diagnosis and Treatment Related to IM Nail Treatment
- Treatment of Acute vs. Chronic Infection following IM Nailing

The papers presented were subsequently published in the *Injury Supplement 2017*.



WORKSHOP ZURICH Chairmen Hamish Simpson, Ted Miclau, Volker Alt



Ted Miclau reporting on his experiences with IM nailing at UCSF

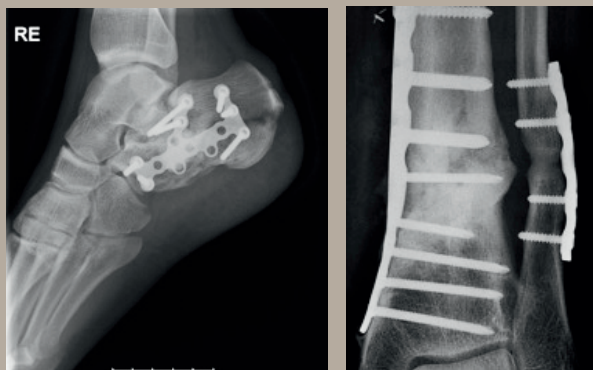


Hot Topic Workshop 2016

Complications of Plating: Evolution of Treatment



Mel Rosenwasser reporting on experiences at Columbia University



Discussion of Locking versus Non-locking of Plates

BOSTON, 3-5 November 2016

The OTCF Research Committee (RECO) organized this annual “hot topic” workshop with 24 participants from Europe and North America. Themes covered treatment, techniques, and complications in upper and lower extremities.

Chairpersons were Peter Augat and Sune Larsson. Presentations were made in the following thematic areas:

- Operative vs. non-operative management of commonly plated fractures
- Outcomes of post-operative treatment regimens, including rehabilitation and hardware management
- Detection of early vs. delayed healing, and related complications, including infection, hardware failure, and other implant-related issues
- Evaluation of plating techniques, including single vs. dual plating, locked vs. unlocked plating, near cortical vs. far cortical cortex screw placement, and static vs. dynamic screw placement

The papers presented were then published in the [Injury Supplement 2017](#).



BOSTON 2016 research workshop

Hot Topic Workshop 2017

External Fixation and Percutaneous Pinning Treatment

MALAGA, 19-21 October 2017

The OTCF Research Committee convened this „hot topic“ workshop with 34 participants. The workshop was hosted by Enrique Guerado, OTC Spain.

Chairpersons were Volker Alt and Hamish Simpson.

The discussions centered around the following thematic areas:

- Implant-Bone Interface: Coatings, fixation, minimizing infection
- Prevention and Treatment of Infection: type and length of antibiotic treatment, stability of fractures
- Post-traumatic Deformity: angular deformities and consequences, pediatric fracture deformities
- Role of External Fixation in Acute Trauma: staged protocols, span and scan – timing of internal fixation, timing of fixation (systemic)
- External Fixation and Fracture Repair: optimal stiffness, external fixation in osteoporotic bone, assessment of healing after external fixation

The papers presented were then published in the [Injury Supplement 2019](#).



External fixation alternatives



Ted Miclau explaining the research grant process.



Presentation of external fixation study



20 MALAGA WORKSHOP 2017 Participants

Hot Topic Workshop 2018

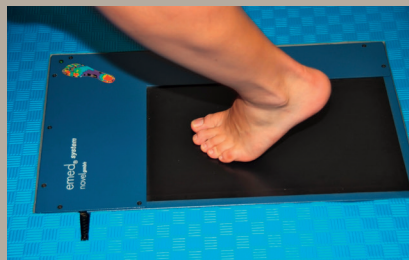
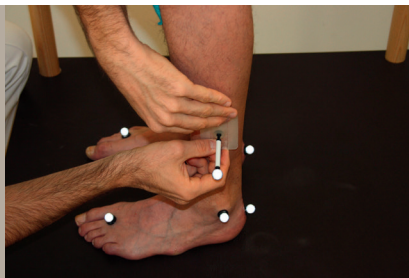
Optimizing Patient's Function after Musculoskeletal



Toronto Workshop in progress



12 Canadian scientists joined the workshop



Gait analysis

TORONTO, 15-17 November 2018

The OTCF Research Committee convened this annual “hot topic” workshop in collaboration with OTC Canada.

Chairpersons were Theodore Miclau and Esther van Lieshout. 38 Participants were in attendance.

Papers were presented in the following thematic areas:

- Pre-operative decisions
- Intra-operative decisions
- Post-operative management: fracture patients
- Post-operative management: geriatric patients
- Measuring outcomes

The papers presented were then published in the [Injury Supplement 2020](#).



Hot Topic Workshop 2019

Enhancement of Fracture Healing

PRAGUE, 14-16 November 2019

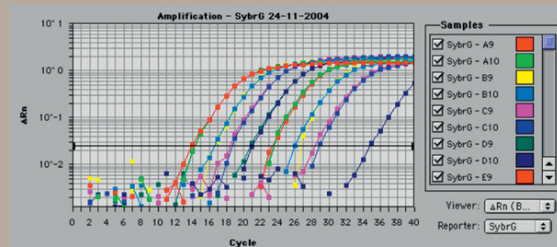
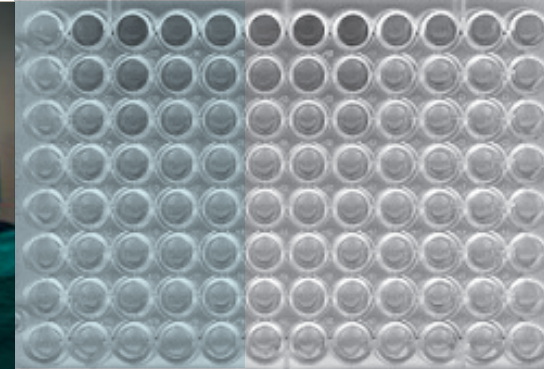
The OTCF Research Committee convened this “hot topic” workshop with 22 participants, including OTCF Executive Board members.

Chairpersons were Peter Augat and Hamish Simpson.

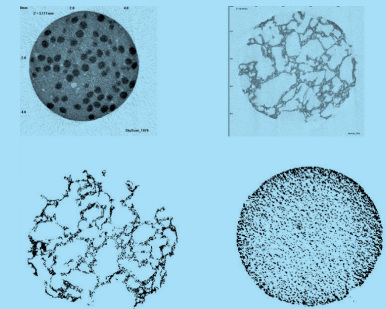
Presentations were made in the following thematic areas:

- Generic
- Bone grafts and graft substitutes
- Cell-based therapy and molecular enhancement for fracture healing
- Surgical enhancement of fracture healing
- Physical enhancement of fracture healing

The papers presented will be published in the Injury Supplement 2021.



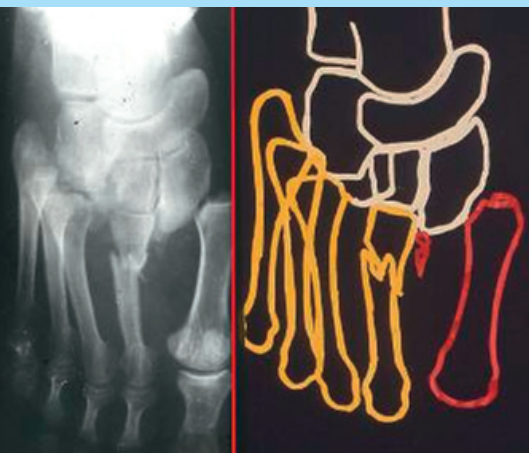
Cell-based therapy



Molecular enhancement studies



Virtual Reality demonstration to OTCF audience



Imaging of a lisfranc dislocation



Robotic



3D printing of bone implants



Fluoroscopic examination with C-arm

LYON, 12-14 November 2020 (postponed to 2021)

The OTCF Research Committee plans this “hot topic” workshop on the theme of “New Technologies”, chaired collectively by all RECO members.

The OTCF Research Committee foresees the following areas for the presentation of papers:

- Imaging
- Implant technologies
- Digital technologies
- 3D printing
- Robotics

Further details to be announced in early 2021.

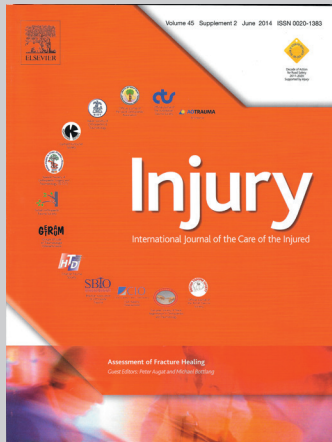
NOTE: Due to the coronavirus pandemic this international workshop could not be held in 2020 and was deferred to November 2021.



Surgical Robot MAKO

INJURY Supplements 2014 to 2021

OTCF Research Workshop Publications

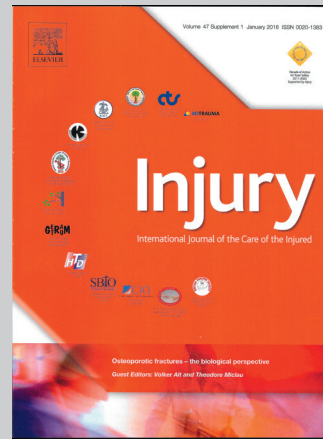


ASSESSMENT OF FRACTURE HEALING

Guest editors: Peter Augat and Michael Bottlang

INJURY Supplement 2, June 2014, 57 pages

The need for collaboration between clinicians and scientists to translate the latest diagnostic technology into a clinically relevant strategy for the timely assessment of unions and non-unions was the challenge for the OTC Foundation to convene two consecutive workshops, one in Barcelona in October 2011 and one in Cambridge MA in December 2012. This supplement summarizes key workshop presentations on fracture healing assessment, including: (1) clinical aspects of fracture healing; (2) technologies for fracture healing assessment; and (3) outcome assessment for clinical trials.



OSTEOPOROTIC FRACTURES – THE BIOLOGICAL PERSPECTIVE

Guest editors: Volker Alt and Theodore Miclau

INJURY Supplement 1, January 2016, 68 pages

On the biological front, systemic anti-osteoporotic treatment is the cornerstone for avoiding secondary fractures, and better strategies for enhancing fracture healing in elderly patients by local or systemic therapies continue to be developed. This supplement summarizes the outcome of a workshop held in London in November 2013. Topics include (1) experimental approaches – animal models; (2) systemic osteoporotic treatment; (3) local treatment for fracture healing; and (4) the surgeon's role and fragility fracture programs.



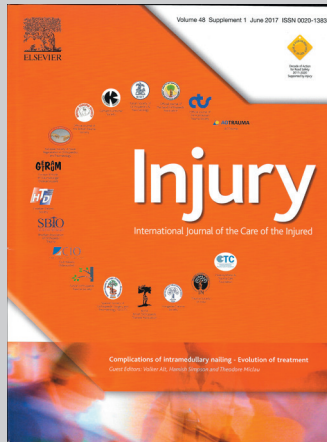
OSTEOPOROTIC FRACTURE FIXATION – A BIOMECHANICAL PERSPECTIVE

Guest editors: Peter Augat and Jörg Goldhahn

INJURY Supplement 2, June 2016, 65 pages

Fragility fractures are more challenging to treat compared to fractures in otherwise healthy bone. However, the available evidence how fragility fractures are effectively treated is sparse and relies mostly on basic and pre-clinical research. The biomechanical perspective was subject of a workshop held in Boston, MA in November 2014. Three series of manuscripts are presented, on (1) biomechanical properties of aged and osteoporotic bone; (2) development of improved strategies for the management of fragility fractures; and (3) methods for the fixation of fractures around prostheses.

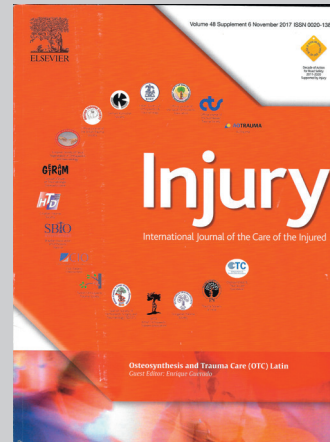
INJURY Supplements 2014 to 2021 OTCF Research Workshop Publications



OSTEOSYNTHESIS AND TRAUMA CARE (OTC) LATIN

Guest editor: Enrique Guerado
INJURY Supplement 6, November 2017, 95 pages

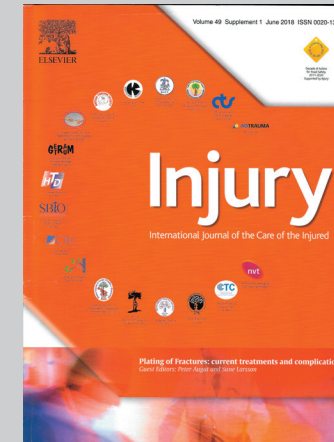
This supplement is the outcome of a new form of collaboration among OTC Chapters in Latin countries. Led by Spain, Portugal, Chile, and Brazil, a life webinar course, sponsored by OTCF, was held in Spanish language – broadcast from Spain with the collaboration of surgeons from these countries. More than 600 surgeons from eight countries participated. This was followed by a cybernetic cooperation project to edit this supplement in English language. This knowledge broadcasting project was followed up by local workshops distributed via internet.



COMPLICATIONS OF INTRAMEDULLARY NAILING – EVOLUTION OF TREATMENT

Guest editors: Volker Alt, Hamish Simpson and Theodore Mclau
INJURY Supplement 1, June 2017, 93 pages

In spite of achievements reached, surgeons and researchers are still faced with open questions on how to further improve clinical outcome after nailing. Inclusion of relevant technologies and a deeper understanding of biological and mechanical aspects were the focus of a workshop held in Zurich in November 2015. The supplement provides 18 “mini reviews” on (1) the systemic response after trauma and nailing; (2) reduction techniques; (3) technique-related complications; and (4) recent developments on locking solutions and intramedullary lengthening techniques.



PLATING OF FRACTURES: CURRENT TREATMENTS AND COMPLICATIONS

Guest editors: Peter Augat and Sune Larsson
INJURY Supplement 1, June 2018, 104 pages

Plating techniques have rapidly evolved and became the customary treatment of fractures. Optimization of plate designs, plate materials and plating techniques led to the perfection of conventional plating. Currently anatomically locked plates are available for almost each location of the human body with various locking options. As there are still many open questions remaining on how to treat some fractures by bone plating, the OTCF held a workshop in Boston, MA in November 2016. The resulting supplement reviews current treatment techniques and identifies complications associated with current plating techniques.

Injury Supplements 2014 to 2021

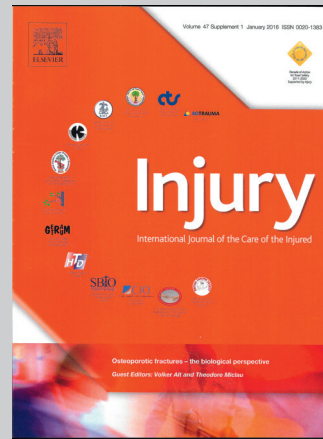
OTCF Research Workshop Publications



EXTERNAL FIXATION AND PERCUTANEOUS PINNING

Guest editors: Volker Alt and Hamish Simpson
INJURY Supplement 1, June 2019, 94 pages

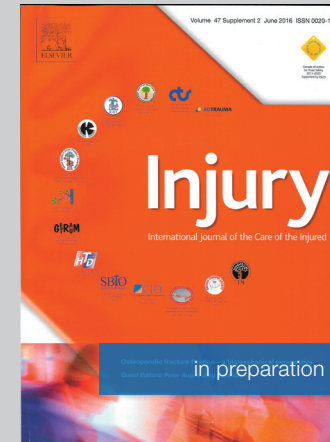
Percutaneous pinning and external fixation remain a vital method of choice for all orthopaedic surgeons due to their versatility in the management of paediatric injuries, open fractures, polytrauma, and treatment of post fracture fixation complications. An OTCF workshop was held in Malaga in October 2017 leading to this supplement which provides 12 “mini reviews” on topics linked to percutaneous pinning and external fixation, biomechanical aspects and surgical options in the management of acute injuries in the paediatric and adult patient, and posttraumatic sequelae such as infections, non-unions, and limb lengthening.



OPTIMIZING PATIENT CARE FOLLOWING MUSCULOSKELETAL TRAUMA

Guest editors: Theodore Miclau and Esther van Lieshout
INJURY Supplement 2, May 2020, 132 pages

Identifying and addressing elements that influence patient outcomes are critical to maximize patient recovery. While many factors are non-modifiable patient- and injury-related conditions, others can be significantly influenced by pre-operative, intra-operative, and post-operative management. This supplement provides a review of topical issues related to optimizing patient function following musculoskeletal trauma as presented at the OTCF workshop held in Toronto in November 2018.



ENHANCEMENT OF FRACTURE HEALING

Guest editors: Peter Augat and Hamish Simpson
INJURY Supplement 1, June 2021, in preparation

Generic approaches include clinical conditions, including monitoring healing while various bone grafts and bone substitutes have become available. Cell-based therapy and molecular enhancement of fracture healing are biologically and/or chemically based approaches in development. Various surgical methods are available and new implants are emerging. Physical enhancement includes ultrasound treatment, electric stimulation, shockwaves and vibration devices. The papers given at an OTCF workshop in Prague in November 2019 will be summarized in the 2021 supplement, which is currently in the process of paper submissions and editorial review.

Clinical Research Program Evidence Basis

PROGRAM STRATEGY

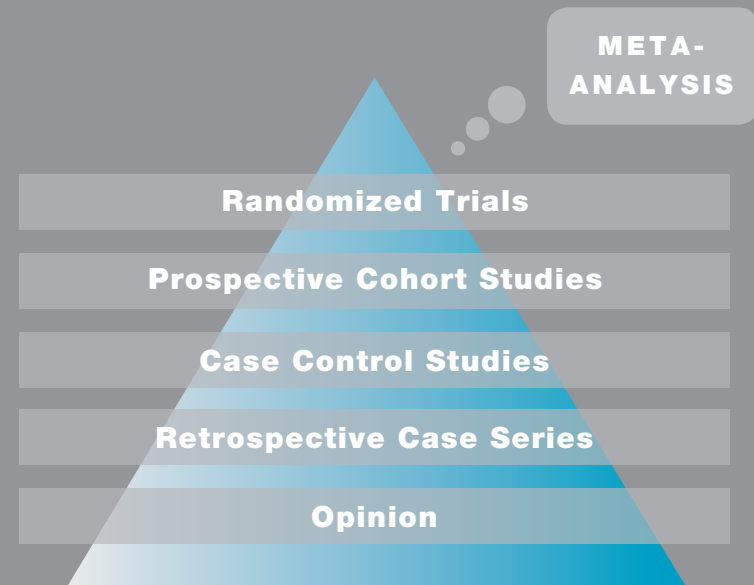
While Evidence Based Medicine (EBM) is sometimes perceived as a blind adherence to randomized trials, it more accurately involves informed and effective use of all types of evidence, particularly evidence from the medical literature in patient care. With the ever-increasing amount of available information, surgeons must consider a shift in paradigm from traditional practice to one which involves question formulation, validity assessment of available studies and appropriate application of research evidence to individual patients. For orthopaedic surgeons, the integration of research evidence in their practice requires an understanding of what constitutes high-quality and low-quality evidence. A case report describing a surgical intervention makes one less certain when compared with evidence summarized in a meta-analysis from a systematic review of multiple large, high-quality randomized controlled trials. Consequently, evidence-based medicine emphasizes a hierarchy of evidence to help with clinical decision making.

The paucity of practical resources for surgeons led to the OTC Foundation's development and ongoing leadership in research education. Systematic methodology was developed to present options for clinical studies. This was described in detail in a series of three methodology books which emanated from the work of Mohit Bhandari and others. They provided the basis for a series of clinical research courses across North American, Latin American, and European OTC chapters

With the methodology at hand and feedback from the courses, it became clear that practical problems with the planning and execution of clinical research studies remained. This led to the need for a further workbook published in 2020 to provide guidance on the coordination of such studies.

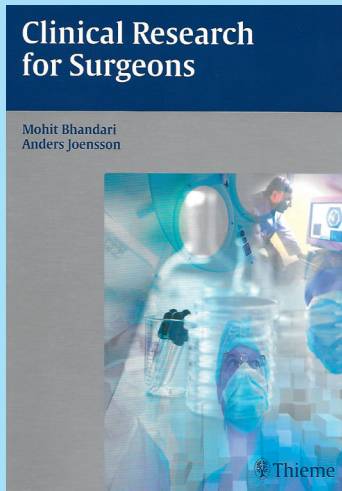
The complete set of all four books is presented in the following pages.

HIERARCHY OF EVIDENCE



Strategic approach to clinical research studies

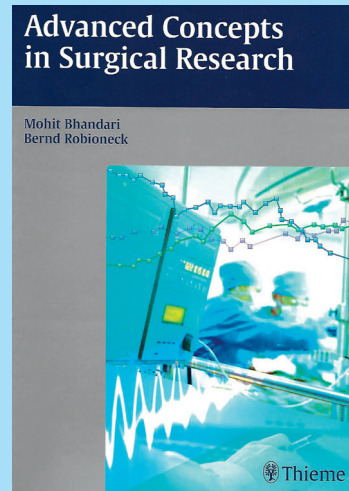
Clinical Research Program Methodology Textbooks



CLINICAL RESEARCH FOR SURGEONS

Editors: Mohit Bhandari and Anders Joensson
© 2009 Georg Thieme Verlag

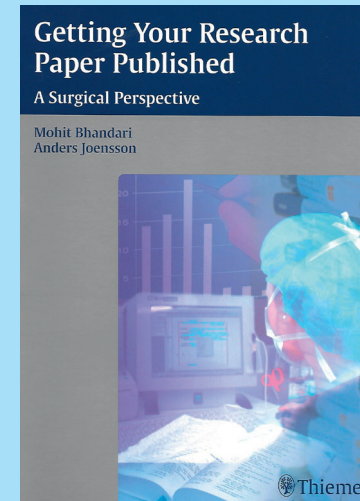
Clinical Research for Surgeons is a practical guide for understanding, planning, conducting, and evaluating surgical research. It covers the principles of evidence-based surgery, the standard benchmark guiding clinical practice, and applies these principles to the design of suitable research studies. The reader will come to fully understand important concepts such as case-control studies, prospective cohort studies, randomized trials, and reliability studies.



ADVANCED CONCEPTS IN SURGICAL RESEARCH

Editors: Mohit Bhandari and Bernd Robioneck
© 2012 Georg Thieme Verlag

Advanced Concepts in Surgical Research is a practical, reader-friendly guide to planning, conducting, and evaluating solid, evidence-based research that leads to high-quality results. Geared to the investigator who has already mastered basic principles, this book focuses on more advanced topics such as randomized controlled trials, survey design, observational studies, meta-analysis, statistical concepts, reporting of data, and more.



GETTING YOUR RESEARCH PAPER PUBLISHED - A SURGICAL PERSPECTIVE

Editors: Mohit Bhandari and Anders Joensson
© 2011 Georg Thieme Verlag

Getting Your Research Paper Published is written from the perspective of experienced surgeons and veteran researchers. This succinct, how-to manual provides readers with everything they need to prepare, publish, and present a scientific research paper. The expert authors address every aspect of the publication process, including quality and ethics in academic writing, the rules of authorship, grammar, formatting, style, and more.

Clinical Research Program Methodology Textbooks

COORDINATION OF CLINICAL RESEARCH

Editors:

Mohit Bhandari, MD, PhD, Professor, Evidence-Based Orthopaedic Surgery, McMaster University, Hamilton, Canada
 Esther M.M. van Lieshout, MSc, PhD, Associate Professor, Trauma Research Coordinator, Erasmus Medical Center, Rotterdam, The Netherlands

Given the rise and popularity of evidence-based practice, surgeons and institutions are increasingly engaging in research. The number of research coordinators has steadily increased worldwide, but resources directed specifically for this specialty area is lacking.

To cope with that demand, this textbook aims to bring together a global network of experienced coordinators, surgeons, and researchers towards creating the benchmark, “must have” resource for anybody considering engaging in research. The textbook provides a roadmap for conducting research with pearls from research coordinators—with over 10 years of experience. It will cover the breadth of knowledge required to begin research and execute successful programs. While a small portion of the book covers the topic of research design, the goal of this text is to complement the other books on clinical research in the OTC series. This book will focus on the day to day checklists and activities required to execute research from the ‘coordinators’ perspective.

This fourth volume in the series of OTCF-sponsored methodology textbooks on clinical research is conceived as a transformational guide in executing research for those who coordinate it on a daily basis. The book focuses not on the design of research projects, but rather on the actual execution of such projects.

Key features are:

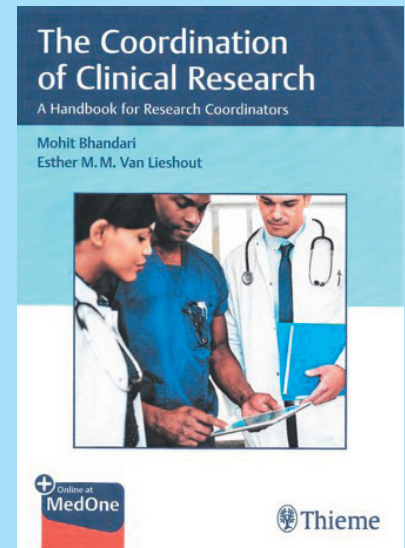
- International group of authors and practicing research coordinators with decades of collective hands-on experience
- Includes many crucial but often neglected topics such as principles of successful grant writing, working with study budgets, ethics and consent forms, regulatory versus standard trials, coordinating and conducting observational research and randomized clinical trials, and much more
- Many helpful templates and sample forms with checklists, consent forms, budget outlines, and more

The target readership includes scientists, physicians, surgeons, epidemiologists and statisticians. Industry research and development directors will welcome this unique and highly useful book.

Publication of this book was made possible through a research grant from Stryker to OTCF without which this would have not been possible.

By purchasing this book, the buyer will also receive access to a free e-book version.

In the coming years, the book will provide a basic working tool for training courses on coordination of clinical research. Course participants will be provided with a complimentary copy.



Clinical Research Program Methodology Textbooks

THE COORDINATION OF CLINICAL RESEARCH: A Handbook for Research Coordinators

SECTION 1: Getting Started		SECTION 4: Study Execution and Close-Out	
1	Leadership and management: The Principal Investigator and Research Coordinator	17	Screening and recruiting participants
2	Roles: Why a research coordinator is critical	18	Obtaining informed consent
3	Hiring: Characteristics of a highly qualified research coordinator	19	Collecting data: paper and electronic data capture systems
4	Growth: From 0 to 100, real quick!	20	Follow-up: Why it's important and how to minimize loss to follow-up
SECTION 2: What Every Research Coordinator Needs To Know		21	How to close out a study
5	What is Evidence-Based Medicine?	22	Knowledge dissemination: getting the word out!
6	Randomized controlled trials	SECTION 5: Advanced Principles of Research Coordination	
7	Observational studies	23	Regulatory trials: Key differences from standard trials
8	Surveys	24	How to survive a site audit
9	Qualitative studies	25	Monitoring in a clinical study: Why and how?
10	Principles of Good Clinical Practice (GCP) and research conduct	26	Managing large studies: Organization and committees
SECTION 3: From Idea to Study Start-up		27	International research: Challenges and successes
11	Principles of grant writing: Tips for a successful experience	SECTION 6: A Coordinator's Toolbox	
12	Dollars and "sense": A guide to research finances	A	Toolbox A: Sample budget template
13	Maintaining records and the trial master file	B	Toolbox B: Sample trial master file table of contents
14	Ethics submissions	C	Toolbox C: Sample ethics checklist
15	The basics of research contracts	D	Toolbox D: Sample checklist for study startup
16	How to start up a study	E	Toolbox E: Sample informed consent form
		F	Toolbox F: Sample case report forms
		G	Toolbox G: Sample study close-out checklist



OTC Foundation Research Program Outlook into the Future

OTC FOUNDATION

Emmenholzweg 1
CH-4528 Zuchwil
Switzerland
www.otcfoundation.org

HISTORY AND FUTURE OF THE OTCF RESEARCH PROGRAM

Publication of the textbook on experimental research methods in 2015 and the textbook on coordination of clinical research in 2020 constitute remarkable cornerstones of the research committee (RECO) during the five-year period covered by the present report. They cover the entire sphere of orthopaedic research ranging from basic science and biomechanical experimentation to pre-clinical and clinical studies. Stimulating exchange between scientists and surgeons took place annually at the “hot topic” workshops in which topic-related research specialists and interested clinical practitioners were brought together to evaluate the state-of-the-art and to explore new avenues carrying potential promises. Awarding research grants annually in these “hot” areas allowed for sponsoring related research projects direct yielding a large array of scientific outcomes and publications. A wider audience was reached by synthesizing the workshop results in annual supplements to INJURY which became the official house journal of the OTC Foundation.

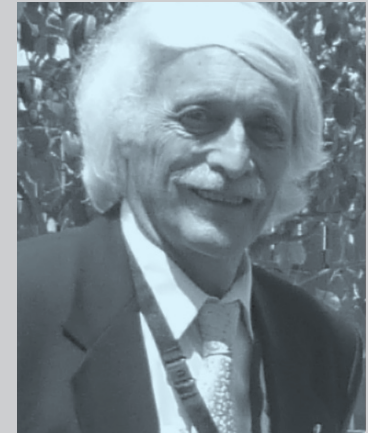
Although the year 2020 with its pandemic interrupted most program activities, the OTC Foundation and its research arm RECO, together with R&D colleagues of the grantor, are determined to carry on jointly identifying and sponsoring scientific advances in orthopaedic and trauma research.

Congratulations on the achievements of the first ten plus five years, and best wishes for successful continuation into the 2020'ies!
Zuchwil, November 12th, 2020



RICHARD HELMER

General Manager
OTC Foundation



RICHARD HELMER
OTCF Secretariat
2007 to 2020



www.otcfoundation.org

