



**E.S.T.R.O.T.**

*European Society of Tissue Regeneration in Orthopaedics and Traumatology*

26-27-28 September 2022

MECC Maastricht



## 6<sup>th</sup> E.S.T.R.O.T. CONGRESS

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Visser Rick - Malaga, ES  
Wong Jason - Manchester, UK  
Zimmermann Gerald - Mannheim, DE



## FREE PAPERS

Abdulaziz Dina - Leeds, UK  
Are Alessandro - Roma, IT  
Blokhuis J.T. - Maastricht, NL  
di Sarno Laura - Siena, IT  
Grimm Andreas - Heidelberg, DE  
Groven Rald V.M. - Maastricht, NL  
Hendricks Floris - Maastricht, NL  
Lodewijks Anna - Maastricht, NL  
Muller Nele - Berlin, DE  
Rutjes E.P. - Nijmegen, NL  
Schiefer Anna - Berlin, DE  
Söhling Nicolas - Frankfurt, D  
Vandenrijt Jasper - Edegem, BE  
Vahabi Arman - Izmir, TR  
Verboket René - Frankfurt, DE  
Vun J.S.H. - Leeds, UK  
Yildizbakan Lemhia - Leeds, UK

## POSTERS

Ackermans Leanne - Maastricht, NL  
Azikhanova Irina - Almaty, KA  
Groven Rald V.M. - Maastricht, NL  
Haartmans M.J.J. - Maastricht, NL  
Haversath Marcel - Essen, DE  
Kalmet Pishtiwan - Maastricht, NL  
Labarre Klaus Werner - Mannheim, DE  
Onorato Francesco - Turin, IT  
Oseneegg Sophie - Mannheim, DE  
Vandenberghie Florence - Maastricht, NL  
Verboket René - Frankfurt DE  
Wagner Robert - Amsterdam, NL



10:00 PARTICIPANTS REGISTRATION

10:30 **OPENING AND WELCOME:**

Taco J. Blokhuis, Chairman ESTROT 2022 Congress  
Peter Giannoudis, President of ESTROT

**SESSION I: THE DIAMOND CONCEPT: CELLS**

**Chairs: Peter Giannoudis (UK) & Gerald Zimmermann (DE)**

10:40 **Keynote: Bone Marrow Mesenchymal Stromal Cells (BM-MS) for bone regeneration**  
Martijn van Griensven (NL)

11:00 **BMAC: Added value?**  
Gerald Zimmermann (DE)

11:15 **Mesenchymal stem cells of adipose tissue in regenerative/reconstructive problems in orthopaedics**  
Riccardo Ferracini (IT)

11:30 **Discussion**

12:00 **BONALIVE LUNCH SYMPOSIUM - (PLENARY ROOM)**  
**S53P4 BIOACTIVE GLASS FOR LONG BONE SEGMENTAL DEFECT REPAIR - EXPERIENCES FROM TWO MEDICAL CENTERS**

**Chair: Fredrik Ollila:** Introduction to the symposium  
Relevance of the future of segmental defect reconstruction

The use of S53P4 bioactive glass in segmental defect reconstruction  
Gerhard Schmidmaier (DE)

Reconstruction of segmental bone defects of septic origin  
Thierry Bégué (FR)

**Discussion**

SESSION II: FREE PAPERS

Chairs: Dzihan Abazovic (MO) & Gerhard Schmidmaier(DE)

- 13:00 In vitro Evaluation of a 20% Bioglass-Containing 3D printable PLA Composite for Bone Tissue Engineering  
N. Söhling\*, S. Al Zoghool, E. Schätzlein, J. Neijhoft, K. M.C. Oliveira, L. Leppik, U. Ritz, E. Dörsam, J. Frank, I. Marzi, A. Blaeser, D. Henrich (DE)
- 13:07 Discord in non-union surgery - Surveys of current practice  
A. Grimm\*, M. Miska\*, S. Findeisen, P. Haubruck, G. Schmidmaier, M. Tanner (DE)
- 13:14 The treatment of very large traumatic bone defects with a polycaprolactone - Tricalcium phosphate 3d-printed cage in combination with bone marrow aspirate concentrate. a review of three cases  
A.J.L. Lodewijks, T.J. Blokhuis, M. van Griensven, M. Poeze (NL)
- 13:21 Physiologically Engineered Bone: Quantifying the Mechanical Properties and Investigating Cellular Response of Novel Porous Composite Scaffolds  
Dina Abdulaziz, Jehan J El-Jawhari, Antonios Anastasiou, Vasiliki Panagiotopoulou, Elena Jones, Peter Giannoudis, Animes Jha (UK)
- 13:28 Articular environment modification after joint injury - Can regenerative medicine restore articular homeostasis?  
Alessandro Are (IT)
- 13:35 Characterization and optimization of SmartBone® (SBN) matrix for hMSCs engraftment and differentiation  
Laura Di Sarno (IT)
- 13:42 Discussion

**SESSION III: THE DIAMOND CONCEPT: GROWTH FACTORS AND BIOACTIVE PEPTIDES**

**Chairs: Jan Verbruggen (NL) & Thierry Bégué (FR)**

- 14:00 Keynote: Bioactive peptides; formulations and indications  
Rick Visser (ES)
- 14:20 Bioactive peptides mode of action - a systematic review analysis  
Chris Arts (NL)
- 14:28 Second generation bioactive peptides  
Scott Johnson (UK)
- 14:36 BMP-2 coated nails  
Gerhard Schmidmaier (DE)
- 14:44 Clinical application of BMPs  
Peter Giannoudis (UK)
- 14:52 The biological chamber and importance of BMP's  
Giorgio Calori (IT)
- 15:00 Discussion
- 15:20 **COFFEE BREAK**

**SESSION IV: THE DIAMOND CONCEPT: BIOMECHANICS**

**Chairs: Martijn van Griensven (NL), Peter Giannoudis (UK)**

- 15:55 Keynote: Mechanotransduction: does it help?  
Jenneke Klein-Nulend (NL)
- 16:15 Permissive weight-bearing in trauma patients with tibial plateau fractures in safe and effective: a prospective multicenter comparative cohort study  
Pishtiwan Kalmet (NL)

## Monday September 26th

16:25 Biomaterials revisited: new insights  
Chris Arts (NL)

16:47 Discussion

18:00 *Welcome reception city hall, Maastricht and free night*

19:00

08:00 PARTICIPANTS REGISTRATION AND COFFEE

**SESSION V: SCAFFOLDS**

**Chairs: Chris Arts (NL) & Peter Giannoudis (UK)**

08:30 Keynote: Bioglass based devices for bone regeneration  
Julian Jones (UK)

08:45 Keynote: Bioactive glass scaffolds for treating critical-sized bone defects with a single-staged induced membrane technique  
Robert Björkenheim (FI)

08:55 Management of bone defects using a Collagen-B-TCP bone scaffold carrier for different antibiotics application  
Damiano Papadia (IT)

09:10 Translational analysis of the immune response to submicron topography of calcium phosphates and its relevance to bone healing  
Charlie Campion (NL)

09:30 Discussion

**SESSION VI: SOFT TISSUES**

**Chairs: Giorgio Calori (IT) & Martijn Poeze (NL)**

09:45 Keynote: The role of the plastic surgeon in the extremity reconstruction Free flaps in limb reconstruction  
Shanshan QiuShao (NL)

10:05 Understanding the basic science of injury to better tissue engineer for trauma  
Jason K. Wong (UK)

10:17 Soft tissue management in fracture related infections  
Tim De Jong (NL)



10:29 New horizons in the soft tissue reconstruction  
Mario Scaglioni (CH)

10:41 Discussion

11:00 COFFEE BREAK

**SESSION VII: FREE PAPERS**

**Chairs: P. V. Giannoudis (UK) & Gerhard Schmidmaier (DE)**

11:30 Accelerated induced membrane (Masquelet) technique -  
Reduction to a one stage procedure in a critical size bone  
defect in rats  
RD. Verboket, M. Leiblein, M. Janko, J.C. Brune,  
K. Schroeder, I. Marzi, C. Nau, D. Henrich (DE)

11:36 Short exposure of bone marrow to platelet rich plasma  
induces a priming effect on the physiological potency  
mesenchymal stem cells for bone repair: a donor matched  
in vitro study in humans  
J.S.H. Vun, J. El-Jawhari, E. Jones, P.J. Harwood,  
P.V. Giannoudis (UK)

11:42 Infection of the intramedullary nail: a retrospective cohort  
A.M. Schiefer, N. Renz, S. Meller, A. Trampuz (DE)

11:48 MicroRNA expression in polytrauma treatment: profiling  
local and systemic expression levels  
Rald VM Groven, Ümit Mert, Johannes Greven, Martijn  
Poeze, Taco Blokhuis, Markus Huber-Lang,  
Frank Hildebrand, Martijn van Griensven (NL)

11:54 Postponing knee prosthesis in relatively young patients  
with knee joint distraction  
J. Vandenrijt, J. Michielsen, F. Van Glabbeek, C. Heusdens  
(BE)

- 12:00 Evaluation of bilayered osteochondral scaffold in treatment of osteochondral defects - experimental study in rabbits  
E. Er, A. Vahabi, EK. Biçer, Ö. Yilmaz, S. Aydoğdu (TR)
- 12:06 Comparative analysis of the antibiofilm effect of different BAG- S53P4 formulations alone and in combination with vancomycin  
Nele Müller (DE)
- 12:12 Fabrication and Characterisation of Synthetic Double Layered Bone Scaffold  
L. Yildizbakan, D. Abdulaziz, N. Iqbal, E. Jones, N. T. Do, P. V. Giannoudis, A. Jha (UK)
- 12:18 Discussion

12:45 LUNCH

SESSION VIII: CLINICAL STUDIES: AN UPDATE

Chairs: Thierry Bégué (FR) & Dzihan Abazovic (MO)

13:40 Keynote: Clinical studies to assess enhancement in fracture healing  
Gerhard Schmidmaier (DE)

14:00 Keynote: BMPs and other GFs in the treatment of NU: the lesson we have learned  
G.M. Calori, G. Basile, F. Biggi (IT)

14:10 Concomittant injuries and timing of fixation of major fractures: is there an impact on fracture healing  
Frank Hildebrand (DE)

14:20 3D printed cages in large bone defects; preliminary results and study design  
Martijn Poeze (NL)

14:30 Results of the clinical phase IIa trial  
BMC2012: Transplanted autologous bone marrow mononuclear cells lead to normal bone healing of subcapital humerus fractures after a 12 week observation period  
Ingo Marzi (DE)

14:40 Discussion

15:00 **COFFEE BREAK / BONALIVE WORKSHOP**  
(Singapore Room)

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Introduction - Fredrik Ollila

Try out Bonalive® bioactive glass applicators with  
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15:15 Hands-on workshop - Fredrik Ollila

*Coffee and tea available at the room*

**SESSION IX: INFECTION**

**Chairs: Jan Geurts (NL) & Michael Edwards (NL)**

16:00 **MINI BATTLE - ANTIBIOTICS AFTER SURGERY:  
YES OR NO?**  
Jan Geurts (NL) & Gerhard Schmidmaier (DE)

16:30 **Keynote: Management of fracture-associated infections:  
modern concepts and algorithmic approach**  
Andrej Trampuz (DE)

16:40 **Local application of antibiotics in allograft**  
Guy Putzeys (BE)

16:50 **Masquelet and S53P4 bioactive glass; first clinical results**  
Thierry Bégué (FR)

17:00 **ROUNDTABLE DISCUSSION - ALL**

17:30 **E.S.T.R.O.T. CO-FOUNDERS MEETING**

19:30 **SOCIAL DINNER - MUSEUM AAN HET VRIJTHOF**  
(REGISTRATION IS REQUIRED)

08:00 PARTICIPANTS REGISTRATION AND COFFEE

**08:30-09:00 SESSION X: POSTER PRESENTATION**

1- Compliance of weight bearing recommendations in surgically treated trauma patients with peri- and intra-articular fractures of the lower extremities: prospective multicenter comparative longitudinal cohort study

P.H.S. Kalmet, C.V. Maduro, G. Meys, H.A.M. Seelen, Y.Y. V. Horn, P. Ustinx, R. v. Vught, H. Janzing, A. vd. Veen, C. Jaspars, J.B. Sintenie, T.J. Blokhuis, M. Poeze (NL)

2- The three years follow-up of cell-based PRP interventions for children with legg-calvet-perthes disease

I. Azikhanova (KA)

3- Application of stromal vascular fraction for treatment of knee osteoarthritis (OA)

G. Zimmermann, K.W. Labarre (DE)

4- Biologization of bone substitute materials in orthopedics surgery: the BoneFlo+ concept

E. Papaeleftheriou, A. Busch, A. Sowislok, M. Haversath, M. Jaeger (DE)

5- Ciprofloxacin versus cotrimoxazol as an oral treatment for post-traumatic osteomyelitis caused by Enterobacterales

F. Vandenberghe, T. J.Blokhuis, L. Brandts, J. Geurts, S.P. van Mens (NL)

6- From two stages to one: accelerated induced membrane (Masquelet) technique using human acellular dermis

R. Verboket, J.C. Brune, I. Marzi, C. Nau, D. Henrich (DE)

7- Multiple trauma treatment influences extracellular vesicles' microRNA cargo: a multiple trauma animal model

R. VM Groven, J. Greven, Ü. Mert, S. Majoor, M. Poeze, T.J.Blokhuis, M. Huber-Lang, F. Hildebrand, M. van Griensven (NL)

8- Citrulline supplementation enhances osteogenic capacities of hBMSCs from non-union patients

R. VM Groven, M.AJ Sangen, T. J Blokhuis, M. van Griensven, M. Poeze (NL)

9- Autologous minced cartilage repair technique for single -step treatment procedure of chondral lesions of the knee joint

S. Osenegg\*, A. Chakraborty, Y. Wiart, G. Zimmermann (DE)

10- Prevalence of "Surprise" Positive Intraoperative Cultures in the Treatment of Long-Bone Nonunion: A Systematic Review with Meta-analysis

R. K. Wagner, C.van Trikt, S. J. Janssen, P. Kloen (NL)

11- Rapid Evaporative Ionization Mass Spectrometry (REIMS) with diathermic knife as a potential diagnostic tool in cartilage defect and osteoarthritis patients

M.J.J. Haartmans, K.S. Emanuel, S. Nauta, G.J.M. Tuijthof, R.M.A. Heeren, P.J. Emans, B. Cillero-Pastor (NL)

12- Clinical evaluation of automated segmentation for body composition analysis on abdominal L3 CT slices in polytrauma patients

L. L.G.C. Ackermans, L. Volmer, Q. M.M.A. Timmermans, R. Brecheisen, S. M. W. Olde Damink, A. Dekker, D. Loeffen, M. Poeze, T. J. Blokhuis, L. Wee and J. A. Ten Bosch (NL)

13- Microfragmented autologous adipose tissue injection: new perspectives for the treatment of early knee osteoarthritis at medium -term follow-up

F. Onorato, S. Furlan, T. Fabbri, R. Ferracini (IT)

**SESSION XI: CARTILAGE REGENERATION**

**Chairs: Pieter Emans(NL) & Marinus de Kleuver (NL)**

- 09:00 Keynote: Boosting natural mechanisms for cartilage regeneration, clinical expertise  
Dzihan Abazovic (MO)
- 09:20 Cartilage repair: new insights and clinical relevance  
Pieter Emans (NL)
- 09:28 Knee-distraction  
Roel Custers (NL)
- 09:36 Advanced MR Imaging for noninvasive monitoring of cartilage repair techniques  
Siegfried Trattnig (AT)
- 09:44 Cartilage repair at different stages of our life; autologous tissue as the ideal graft versus tissue engineering and biomaterials  
Ralph Jeuken (NL)
- 09:52 Discussion
- 10:10 **COFFEE BREAK**

**SESSION XII: FREE PAPERS**

**Chairs: Martijn Poeze (NL) & Tobias Grossner (DE)**

- 10:45 Keynote: Regenerative stem cell therapy in orthopedics: exosomes, last frontiers of research and practical and experimental clinical applications  
F. Colao (IT)
- 11:00 Surgical vacuum filter derived bone grafting material displays an osteogenic microRNA profile  
J.T. Blokhuis, R.V.M. Groven, M. Poeze, M. van Griensven, T.J. Blokhuis (NL)

- 11:07 Trabecular, but not cortical, bone tissue protein synthesis rates in the femoral head are reduced following an intracapsular hip fracture  
F K. Hendriks\*, M.E.G. Weijzen\*, J.P.B. Goessens, A.H.G. Zorenc, A.P. Gijzen, I.F.Kramer,M. Poeze, T.J. Blokhuis, L.J.C. van Loon (NL)
- 11:14 MR measured muscle volume and fat fraction adaptation in patients with transfemoral bone-anchored prosthesis- Preliminary baseline analysis and results  
E.P. Rutjes, D. Reetz, M. Bakker, N. Verdonschot, M. Ploegmakers, J.P.M. Frölke, R.A. Leijendekkers (NL)
- 11:21 Discussion
- SESSION XIII: PERI-OPERATIVE OPTIMALISATION**  
Chairs: Jan Ten Bosch (NL) & Thierry Bégué (FR)
- 11:45 Keynote lecture: Muscle metabolism and regeneration  
Luc van Loon (NL)
- 12:05 Preventing falls: muscle strength vs reactive balance training  
Kenneth Meijer (NL)
- 12:13 Screening Diagnosis and Monitoring of Muscle Mass when to use which tool?  
Leanne Ackermans (NL)
- 12:21 Discussion
- 12:45 **AWARD BEST POSTER AND BEST ABSTRACT**
- 13.00 **End of the Congress**



## AWARDS

### FREE PAPERS

GOLD € 1.000,00

SILVER € 500,00

BRONZE € 250,00

POSTER € 250,00

## REGISTRATION FEES

REGISTRATION FEES (VAT included)	UNTIL 31/07/2022	FROM 01/08/2022
Medical Doctors Member	€ 300,00	€ 400,00
Medical Doctors - Non Member	€ 350,00	€ 450,00
Scientist and Researchers - Member	free	free
Students, Residents and Nurses* - Non Member	free	free
Young Investigators*	free	free
Exhibitors	€150,00	€ 200,00
One day registration Member	€ 100,00	€ 150,00
One day registration Non Member	€ 150,00	€ 200,00
Accompanying /family /per day	€ 50,00	€ 50,00
SOCIAL DINNER	€ 75,00	€ 75,00

\* WRITTEN AND SIGNED PROOF OF STATUS BY EMPLOYER

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References: 1. Heckman JD, Ryaby JP, McCabe J, Frey JJ, Kiooyne RF. Acceleration of tibial fracture-healing by non-invasive, low-intensity pulsed ultrasound. *J Bone Joint Surg Am.* 1994;76(1):26-34. 2. Kristiansen TK, Ryaby JP, McCabe J, Frey JJ, Rose LR. Accelerated healing of distal radial fractures with the use of specific, low-intensity ultrasound. A multicenter, prospective, randomized, double-blind, placebo-controlled study. *J Bone Joint Surg Am.* 1997;79(7):961-73. 3. Nolte PA, van der Kraak A, Patka P, Janssen IM, Ryaby JP, Albers GH. Low-intensity pulsed ultrasound in the treatment of nonunions. *J Trauma.* 2001;51(4):693-703.

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<sup>1</sup>A nonunion is considered to be established when the fracture site shows no visibly progressive signs of healing.

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## Spine

### 1 ACDF

319 patients (IDE RCT)

*"i-FACTOR subjects demonstrated higher overall success rate than control (autograft) subjects (68.75% and 56.95% respectively,  $p = 0.0382$ )"*

### 2 PLF

98 patients (RCT)

*"This RCT indicates i-FACTOR being significantly superior to allografted bone in enhancing intertransverse fusion ( $p = 0.000$ )"*

### 3 ALIF

110 patients

*"...high fusion rate and clinical improvements comparable to the published results for ALIF using autograft or BMP"*

### 4 PLIF

40 patients

*"i-FACTOR is associated with faster formation of bridging bone when compared to autologous bone in patients undergoing PLIF"*

## Orthopedics

### 5 Long bone non-union and delayed union 22 patients – 90% bone consolidation

*"P-15 appears to offer a safe, economical, and clinically useful alternative to autograft in the repair of ununited fractures"*

### 6 Foot and ankle 170 patients

*i-FACTOR yields 92% fusion at 12 months post-op across fore-, mid- and hindfoot joints*

### 7 Foot and ankle 16 patients

*100% fusion at 12 months in hindfoot and ankle fusion revision procedures*

### 8 Peri-acetabular osteotomy 51 patients

*Patients treated with i-FACTOR were 3x more likely to attain a partial or complete fusion at 6 months post-op, compared to allograft*



The Dutch Orthopedic Society and the Dutch Surgical Society have recently granted  
the patronage to the 6th E.S.T.R.O.T. Congress

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