



OSORA

AI-powered digital twins
for orthopedics





Orthopedics remained unchanged for the last 40 years: an analogous, eminence-based discipline

10%

of patients are affected by complications and require further treatment

71.431 €

Average cost of pseudarthrosis of lower extremities

15 years

and hundreds of patients treated are necessary to become a good orthopaedic surgeon

Expensive

Clinical studies for the go-to-market of new implant products

No existing product on the market targets these problems from a holistic patient journey perspective covering diagnosis, treatment and rehabilitation

Our solution: Closing the data loop for AI-based decision support – for better treatment outcomes and fast orthopedic innovation

OSORA



DU

Patient-at-risk identification

for prevention of healing complications

Faster mobilization

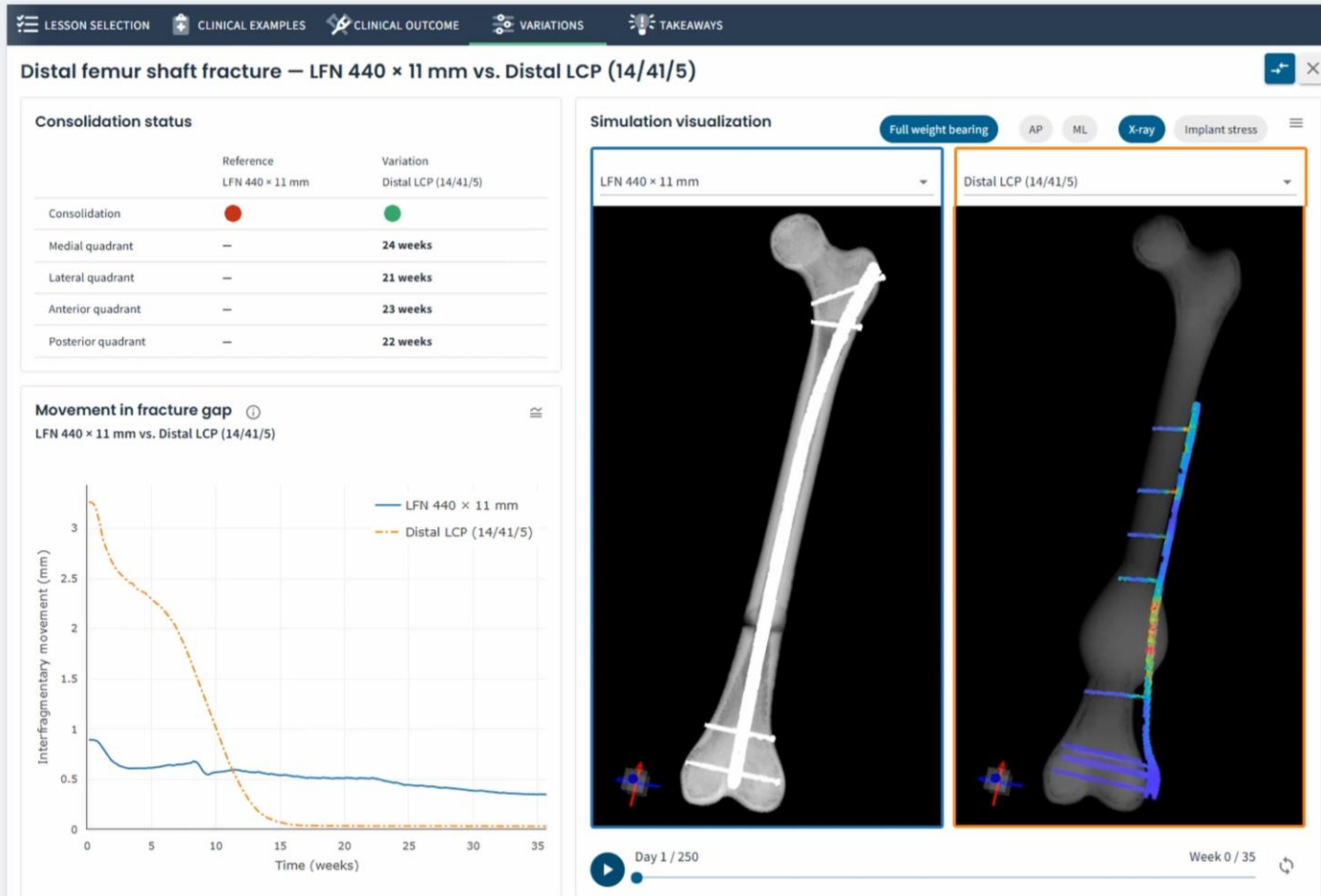
for minimized treatment costs

Training off-the-patient

in VR/AR-environments

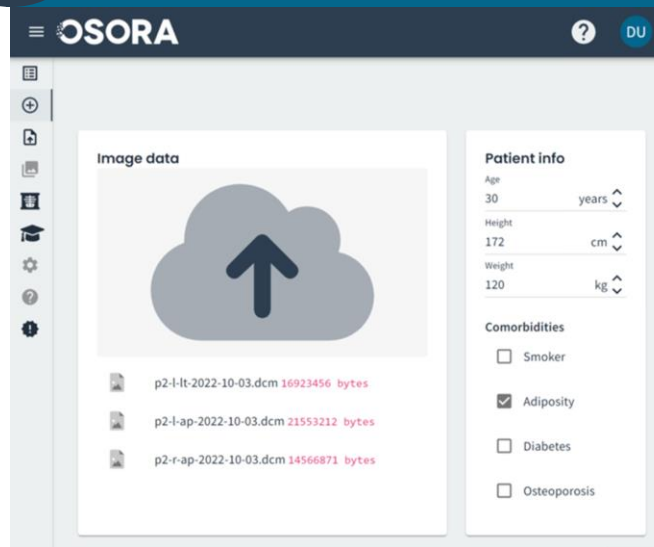
Speed up go-to-market

with in silico implant testing



We are building the first orthopedic management software that clinicians use to make sure patients are safe on their healing path

1 Upload patient data



Tap every available data source: medical imaging, patient data, etc.

2 Optimize the treatment



Build what works for surgeon and patient: Harmonizing osteosynthesis and rehab regime

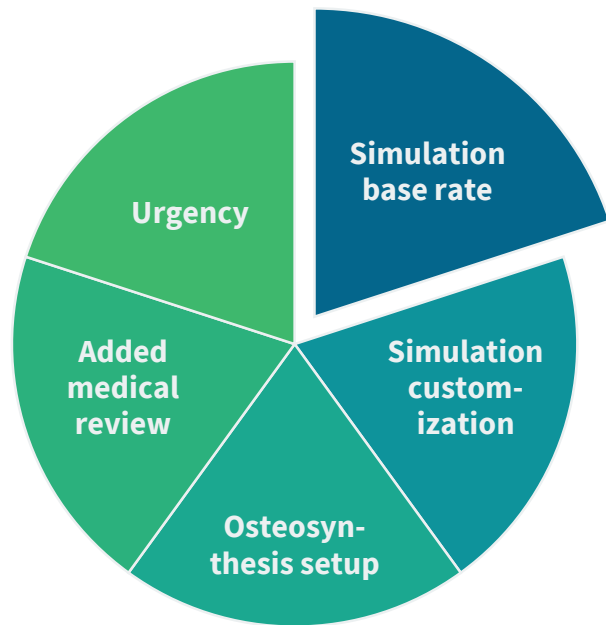
3 Initiate treatment & rehabilitation



Reduce friction: Structured reporting for admin & patient monitoring

Cloud-based Simulation-as-a-Service: Convenient in clinical practice, ready for future reimbursement

Feature-based pricing factors

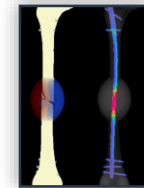


Our customers



Medical societies

Educational software in a train-the-trainer model



Medical manufacturers

Accelerated technology development

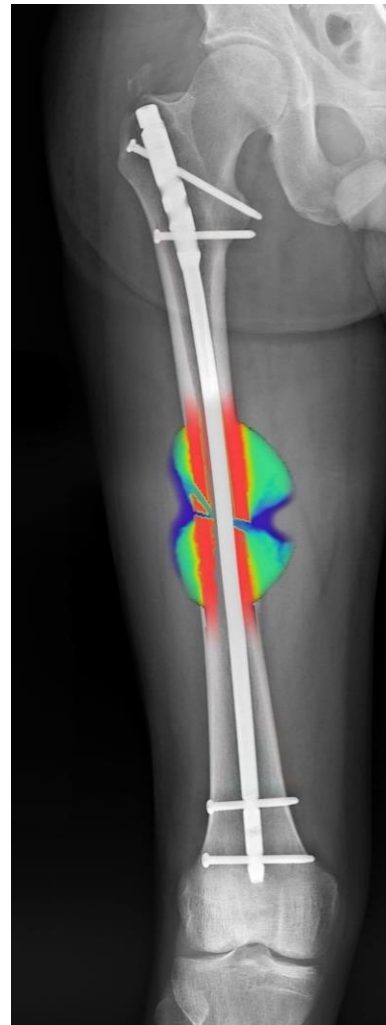
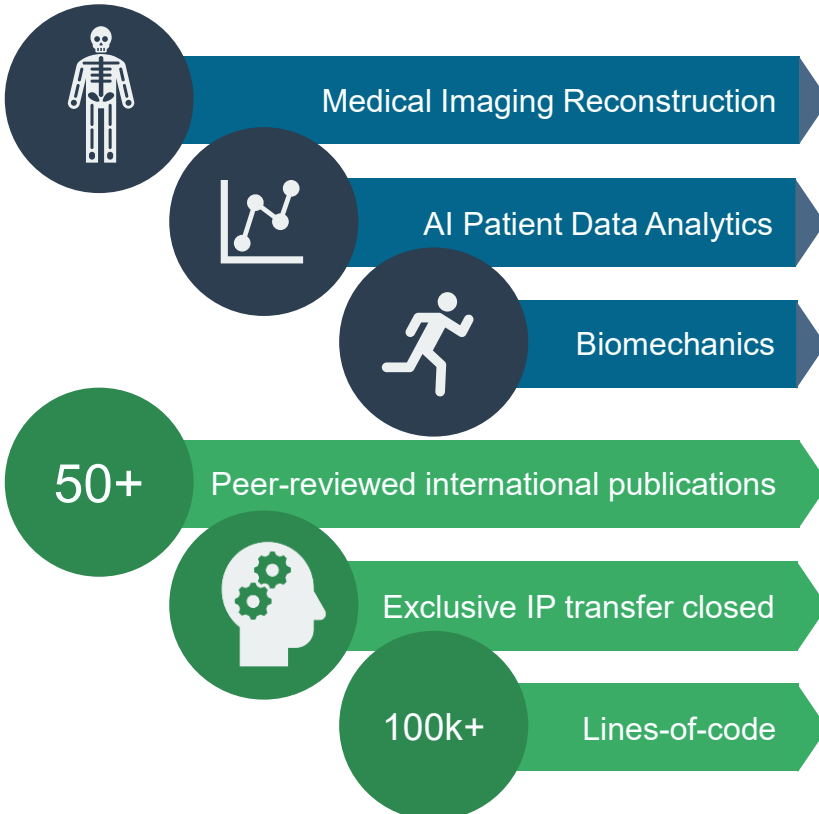


Healthcare Institutions

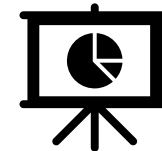
Clinical Decision Support in Fracture Management

Our business model challenges currently available planning tools, which are sold as licenses with additional maintenance contracts

AI-augmented digital twins and bone healing simulation, based on 25 years of research, validated with real-life patient data



Proof-of-Concept study results



Prediction of fracture treatment outcome

Degenhart C, Engelhardt L, Niemeyer F, et al. Computer-Based MechanoBiological Fracture Healing Model Predicts Non-Union of Surgically Treated Diaphyseal Femur Fracture, J. Clin. Med. 2023, 12(10), 346



Impact of stability on bone healing progress

Steiner M, Claes L, Ignatius A, et al. Numerical Simulation of Callus Healing for Optimization of Fracture Fixation Stiffness. Costa-Rodrigues J, ed. PLoS ONE. 2014;9(7):e101370



AI-assisted identification of patients-at-risk for bone healing complications

Armbruster J et al. Predicting non-unions in tibial shaft fractures: Can digital twins contribute to a reliable prognosis? DKOU 2024
 Visuals: <https://osora.eu/2024/05/08/five-reasons-why-osora-boosts-mechano-biological-bone-healing-simulation-with-ai/>

The market for medical AI is gaining traction, with an estimated market size of 188 billion USD by 2030

TAM: \$11 billion

General medical AI (2021)

SAM: \$251.2 million

AI in Orthopedics (2023)

SOM: \$100 million

Simulations by OSORA in 2027

<https://www.statista.com/topics/10011/ai-in-healthcare/#topicOverview>

<https://www.marketsanddata.com/industry-reports/ai-in-orthopedic-surgery-market>

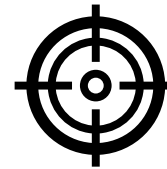
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4919810/>

Every year 660 million patients require treatment of musculoskeletal defects

37 % CAGR factors: increasing geriatric population, number of surgeries & adoption of AI-support



Target markets: Germany, then EU, US, Asia



Indication: Surgical treatment of fractures of the lower extremities

Surgical planning is changing from being a mandatory task to a real workload reduction for surgeons

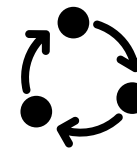
Direct competitors

	SYNOPSIS®	mediCAD® The Orthopedic Solution	BRAINLAB	PeekMed	OSORA
Business Model	Licenses	Licenses	Licenses	Licenses	Simulation-as-a-Service
Deployment	On premise	On premise	Cloud	Cloud	Cloud
Image processing	✓	✓	✓	✓	✓
Measurements	✓	✓	✓	✓	✗
3D printing	✓	✗	✗	✓	✗
Rehab loadings	✗	✗	✗	✗	✓
Outcome prediction	✗	✗	✗	✗	✓

Indirect competitors



Specialist principle fallback
“Facharztprinzip” – strain on the workforce in tight timeframes



Trail-and-error approach
Training on the patient – all risks involved

The OSORA USP: a patient-specific prediction of the healing process in bones based on individualized load bearing scenarios

Our mission is the digitization of the treatment of musculo-skeletal defects by using AI-powered simulation technology

Founding team



Dr. rer. nat. Lucas Engelhardt
Ph.D. in Modeling & Simulation of Bone Healing
Ulm University
Image processing & Biomechanics



Dr. biol. hum. Frank Niemeyer
Ph.D. in Simulation of Bone Healing
Ulm University
Software development, ML & AI



Dr. oec. Andreas Arnegger
Ph.D. in Business Development
University of Hohenheim
Business Development, Managing Director

Clinical partners



General trauma application
partner since 1999



Pseudarthrosis & rehabilitation planning
development partner

Mentors & Advisors



Prof. Dr. Florian Gebhard
Medical director
University Hospital Ulm
Clinical application



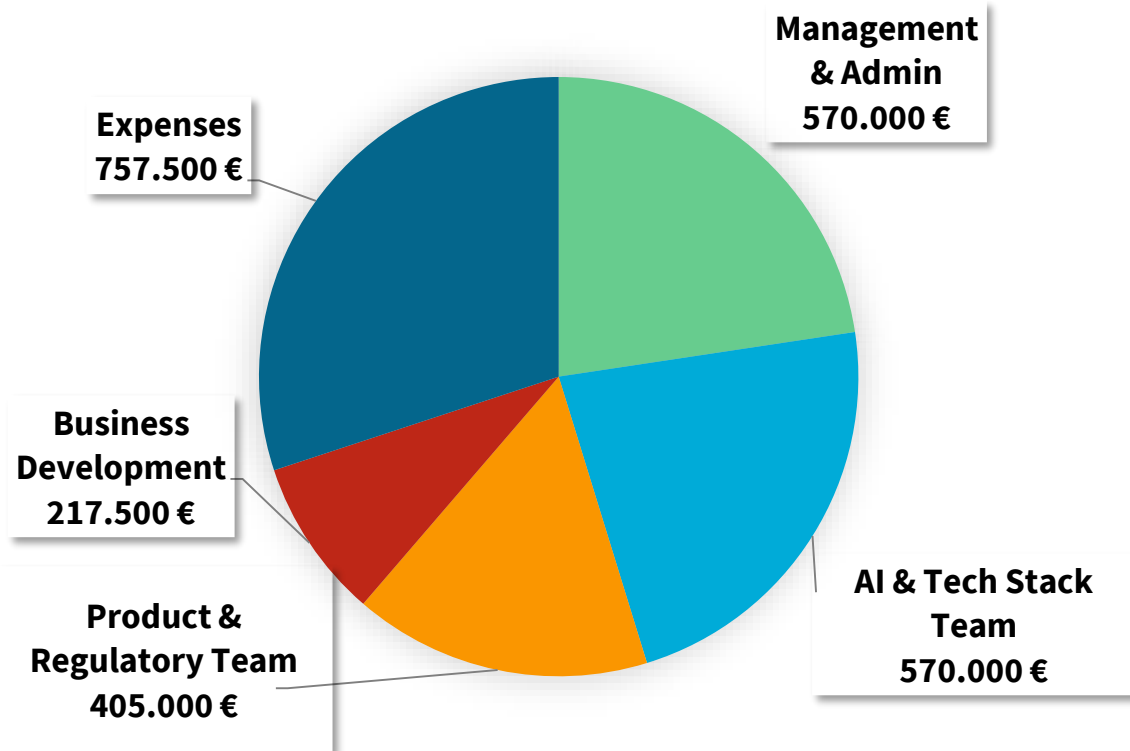
Prof. Dr. Lutz Claes
Former director Institute for
Biomechanics Ulm
Scientific network



Prof. Dr. Endric Schubert
Co-founder & CTO
Missing Link Electronics
Startup acceleration

We aim to raise 2,5 m € pre-seed funding until the end of 2024 for building sales & regulatory and scaling the tech stack

Use of funds – 18 months cash runway



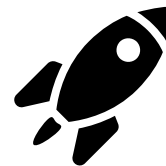
Why now?



Treating patients is getting more complicated due to age and comorbidities

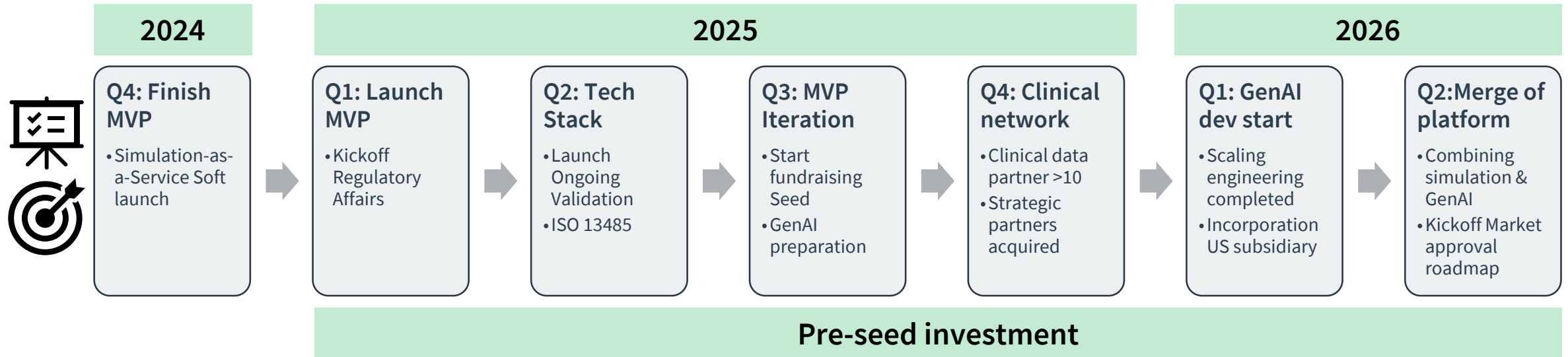


Shortage of healthcare professionals opens window for technology push



Regulatory frameworks open the avenue for AI-based decision support

Our goal: the go-to-platform for orthopedic treatment within the regulatory requirements of clinical safety, efficacy and usability



AI-powered digital twins for orthopedics – We invite you to join our initiative for better, smarter and efficient bone fracture healing!



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