

STATEMENT

By Assoc.prof. dr. Martin Bernev, MD, Ph.D.,
Department of Orthopaedics and Traumatology
MU - Varna.

By the order of the Rector of MU - Varna № R- 109-511 / 29.11.2021 I have been appointed as the chairman of the Scientific Jury and I have been appointed to present an opinion on the dissertation of Dr. Biser Aleksandrov Makelov, PhD candidate in the independent form of study at the Department of Orthopedics and Traumatology of the MF at MU - Varna, in the field of higher education 7. "Health and Sport" in the professional field 7.1 "Medicine" and doctoral program "Orthopedics and Traumatology".

Subject: defense of the dissertation of Dr. Biser Aleksandrov Makelov, entitled: “ONE - STAGED LOCKED EXTERNALIZED PLATING FOR THE TREATMENT OF UNSTABLE PROXIMAL METADIAPHYSEAL TIBIAL FRACTURES” for the award of the educational and scientific degree "Doctor".

Relevance of the topic: This paper presents a prospective clinical study with a practical orientation based on a generated experimental three-dimensional biomechanical simulation model (FEA-model) as a method of treatment of unstable tibial fractures with metadiaphyseal localization based on the principles of biological fixation. There is limited objectivity determined by the small number of patients included in the study. The level of science in our country is such that it does not suggest opportunities for further development, so even the attempt to apply experimental models is itself sufficiently acute and deserves admiration for maintaining the level of scientific knowledge. Indirect techniques with an externally placed locking plate have been applied. The indications and contraindications for choosing between external and internal fixation with locking plates, intramedullary nails, and staged treatment are presented. The target of the methodology comprises patients in polytrauma conditions injured in traffic accidents, which determines the serious social relevance of the work. A universal solution adequate to the huge anatomical diversity of trauma cases as well as the prediction of postoperative outcomes has not yet been achieved. In this sense, the work of Dr. Makelov represents a valuable and significant study in the search for the so-called "philosopher's stone" - the construction of a unified trauma system in its entirety.

The structure of the dissertation includes 178 pages, 20 tables and 83 figures and graphs, literature review (from 46 pages - 8 titles in Cyrillic and 171 in Latin). Surgical anatomy, biomechanics and

mechanism of trauma, biology of bone fusion, clinical and imaging diagnosis, classification systems and known treatment modalities and complications are consistently presented.

The **aim** was formulated as "To investigate the feasibility and evaluate the results of the application of single-stage external stabilization with locking plates in the treatment of unstable metadiaphyseal tibial fractures".

Four, well-defined objectives relevant to the achievement of the aim were derived. A (AO Research Institute Davos) biomechanical virtual finite element method computational model was created. The conclusion of the experimental model is: "creates favourable biomechanical conditions for callus formation at well-defined values of longitudinal strain in the fracture zone".

Methodology and clinical material. Includes a series of surgically treated patients with unstable tibial fractures in the period 2013 - 2021 at the University Hospital "Prof. Dr. Stoyan Kirkovich AD", Stara Zagora. The operation was applied in 26 patients. 18 patients were followed up for a period of up to 60 months. The average age of the study participants was 51y. The injuries were from road traffic accident and altitude trauma. According to the location of fractures, the most common fracture was proximal metadiaphysis fracture - 12 cases. In 11 of them the fracture was open.

Functional outcome was assessed using HSS for knee joint and AOFAS for ankle joint. Complications presented were refracture without osteosynthesis breakdown, septic arthritis and subsequent extension contracture of the knee.

The discussion concludes with an assessment of three major shortcomings of the study - the small number of patients indicated for inclusion, the relatively short follow-up period, and the lack of a control group of patients treated by standard methods needed to compare and evaluate outcomes.

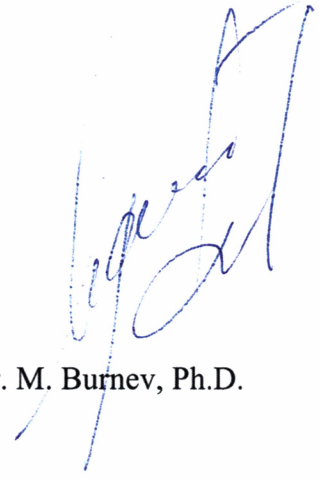
More important contributions:

1. Dissertation is based on an experimental FEA model.
2. Clinical follow-up of the bone healing process during treatment with locking single-stage external plate stabilization.
3. Provides an opportunity to derive a practical, low-risk operative technique that is easily implemented in multiple trauma settings.

In conclusion, I believe that Dr. Makelov's work is devoted to a topical subject, is structured correctly in a classical version, and has serious scientific and practical value. I give it a positive assessment because it has all the necessary qualities and meets the requirements for the degree of Doctor of Science and Education in Orthopaedics and Traumatology.

10.01.2022

Assoc.prof. dr. M. Burnev, Ph.D.

A handwritten signature in blue ink, appearing to read 'M. Burnev', is written over a faint, dotted grid pattern.