

## OPINION

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Subject: Dissertation of Dr. Dimitar Stefanov Todorov on topic  
***"Analysis of the results after minimally invasive fixation with angularly stable plates in distal femur fractures AO 33A / 33C"*** for awarding an educational and scientific Doctorate degree.

I have been assigned to provide an opinion by order **No. RD26 -1181 / 19.06.2019.**

FDF and their treatment remain problematic, despite the progress and new methods of treatment that have become a doctrine in the last 7 years.

Although that MIPO fixation with lateral peri-articular plate in FDF preserves fractured hematoma and biological response to bone, it does not produce the set in vivo results. In a series of studies, the incidence of debricolage and bone loss reaches up to 20%.

This contemporary topic is devoted to the official scientific work presented by Dr. Dimitar Todorov, entitled "Analysis of the results after minimally invasive fixation with angularly stable plates in distal femur fractures AO 33A / 33C".

The thesis is in volume of 134 pages and is presented a little atypically, as a biomechanical study is a part of it.

The purpose is clearly stated. To achieve this, the author sets himself up for solution of 4 scientific tasks. They are logically justified and actually feasible.

The author has been surveying 97 patients with 100 distal femur fractures for a period of 5 years (January 2013 - December 2017).

The cohort meets set criteria and are a contingent of Orthopedic and traumatology clinics of UMHATEM "N.I. Pirogov". 54 patients (57 fractures) are tracked to full fracture healing.

The dissertation also presents the experimental study performed by the author at AO Research Institute – Davos, Switzerland. There was a non-destructive testing of distal models of femur with simulated fracture with lateral fixation locking plate. The models are divided into three groups - fixed only by lateral plate, lateral plate + medial plate augmentation, lateral plate + augmentation with intramedullary graft.

The author finds a statistically significant relationship between osteosynthesis and delayed healing and trauma energy as they are relative to the incidence of accompanying injuries as well. Scores on the Schatzker rating scale are: excellent results in 12 patients (21%), good - 15 (26%), satisfactory - 8 (14%) and poor - 22 (39%) patients.

The most significant conclusion from the biomechanical test is that longitudinal axial loading of fragments is considerably varies between the three fixing techniques for the two working lengths. The largest deformation is detected in treatment with locking angular stability plate followed by LCP + IM graft and fixation with 2 LCPs. This conclusion could lead to practical benefits.

Dr. Todorov makes 3 conclusions, in which he critically and accurately demonstrates the clear logic and the rational of his scientific work.

### **CONTRIBUTIONS TO THE DISSERTATION WORK**

1. The method of minimally invasive fixation with angularly stable plates in the case of the FDF was applied to a large enough contingent of patients.
2. Opportunities and disadvantages of the specific method are retrospectively sought and proven.
3. A detailed statistical analysis has been carried out to account for the various factors leading to poor treatment outcomes as well as problems with fracture healing.
4. Advantages of the FDF fixation augmentation technique are offered and proved experimentally
5. The performed biomechanical tests are carried out in a reliable laboratory, along with an international team of experts in the specialty which provides clear directions for future scientific developments on the topic.
6. Modern indications for modification of osteosynthesis with angular plates in

FDF have been refined based on the gained experience.

## **CONCLUSION**

The dissertation deals with an important topic, contains innovations, covers a statistically sufficient contingent, is objective and ends with useful conclusions. It absolutely covers the criteria for acquiring educational and scientific degree "DOCTOR".

Based on the above, I propose that the Scientific Jury vote positively and award Dr. Dimitar Stefanov Todorov the educational and scientific degree "DOCTOR" in the scientific specialty "Orthopedics and Traumatology".

29 October 2019  
Sofia

Respectfully,  
Prof. Dr. Asen Georgiev Baltov, Ph.D.