

Numerical Solution of External Fixator for the Treatment of Fractures of Pelvis and its Acetabulum

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This extended abstract reports about the designing of external fixators applied in traumatology. These fixators can be applied in the treatment of open and unstable (i.e. complicated) fractures of pelvis and its acetabulum, see Fig. 1.

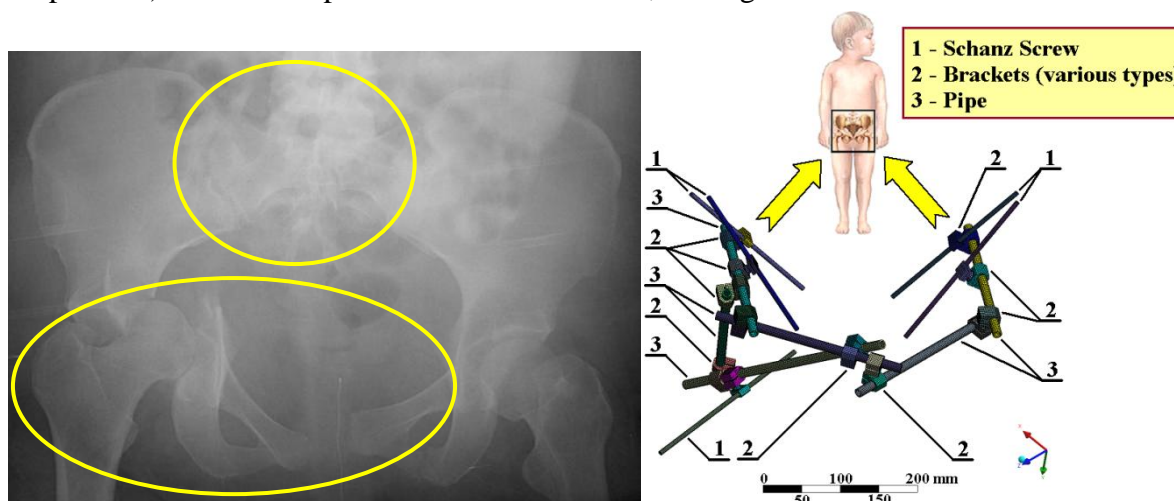


Fig. 1 Fracture of pelvis and acetabulum and its treatment (anteroposterior radiograph - transverse with posterior wall acetabular fracture; numerical modelling of external fixator).

According to the current research, performed at VŠB – Technical University of Ostrava, Traumatology Centre of the University Hospital of Ostrava, MEDIN a.s. and ProSpon s.r.o., the current design of external fixators must be modified.

There are real needs to make a modern design of fixators which satisfy new trends and demands in medicine (i.e.: applications of new smart materials - composites, x-ray invisibility, antibacterial nanotechnology protection, weight and shape optimization, patient's comfort, reducing the time of the operation, reducing the overall cost, "friendly-looking design").

The new types of external fixators for treatment of fractures of pelvis and acetabulum were designed in the CAD system (Inventor software), tested in the

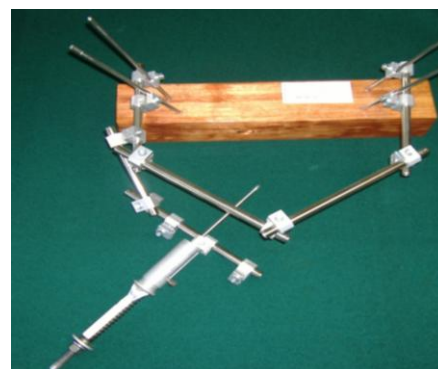


Fig. 2 Prototype of the external fixator for pelvis and acetabulum and its measurement.

laboratory, see Fig. 2, and modeled by the FEM (Ansys Workbench software), see Fig. 3 and 4. The new proposed designs cannot be more specifically described here, for confidentiality reasons.

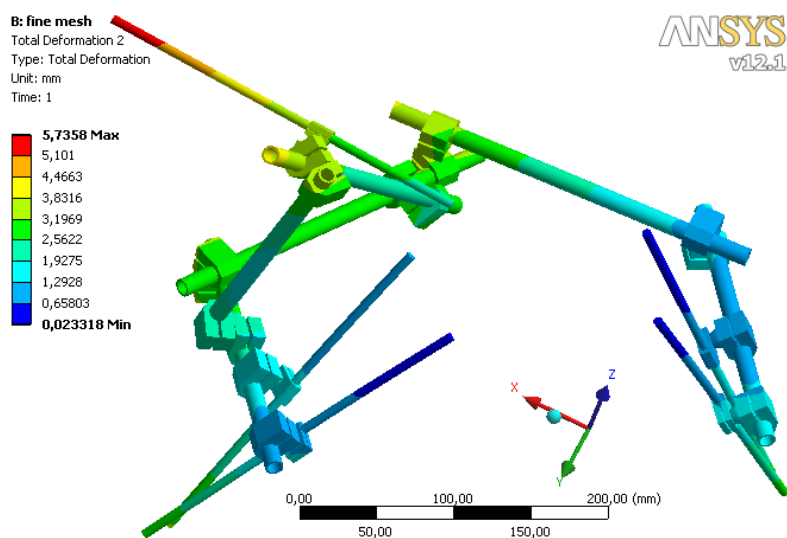


Fig. 3 FE modelling of external fixator for pelvis and acetabulum (total displacement).

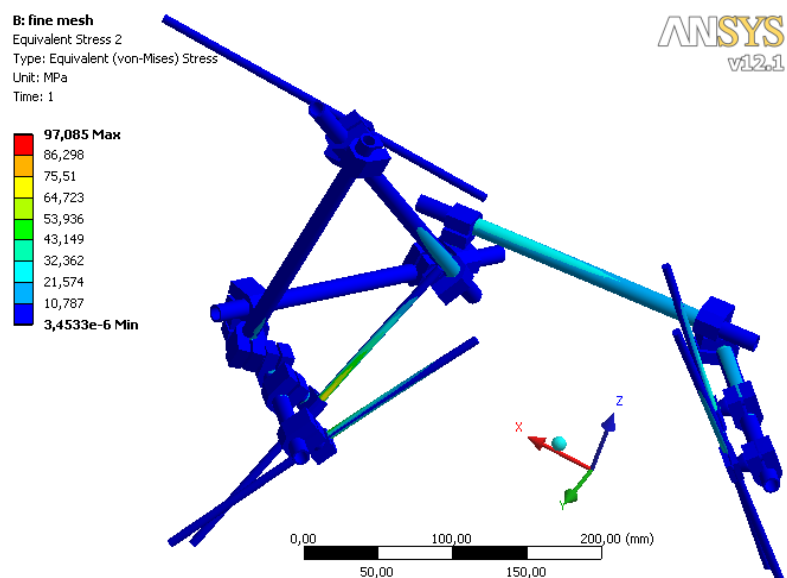


Fig. 4 FE modelling of external fixator for pelvis and acetabulum (equivalent stresses).

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