

Title: Biomechanical aspects of the dynamics of intracranial pressure in traumatic brain injury

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This PhD thesis "Biomechanical aspects of the dynamics of intracranial pressure in traumatic brain injury" is about the dynamics of intracranial pressure, particularly in relation to the external mechanical action of the patient. Severe head injury is the leading cause of death in patients under 35 years of age. Despite constantly-improving medical and nursing care only one third of patients, after recovery, regained the ability to live independently in the long term. Two-thirds of patients were severely disabled or died. The lifetime cost of such a patient who was not completely cured has been calculated to be \$4,000,000.

A significant consequence of craniocerebral injuries are secondary brain lesions, which among other means the rise in intracranial pressure (ICP), which can further exacerbate due to intracerebral or extracerebral causes.

Therefore, the objective of the treatment is minimizing secondary injury, optimally at the phase of the primary lesion.

However, realization of this requirement, about which we can say that is a *conditio sine qua non*, sometimes leads to situations that have a negative impact on the treatment, and in particular could cause problems with the ratio in the intracranium. This statement is illustrated by reports describing changes in vital signs of patients treated for severe craniocerebral injury in department of Anesthesiology and Resuscitation at Na Homolce Hospital.

These clinical evidences were compared with the variations of data obtained from animal models in the First Faculty of Medicine Laboratory and Biomechanical Laboratory at Faculty of Physical Education and Sport, Charles University in Prague.

The results from both laboratories are being used back in compare to data obtained from critically ill patients treated for craniocerebral injury at the Anesthesiology and Resuscitation department of Na Homolce Hospital.