

The dissertation is dealing with the option of using biodegradable metal alloys such as osteosynthetic material in maxillofacial surgery, The hypothesis presupposes that Zn-1,6Mg and WE43 alloys are from the viewpoint of the degradation period and biological interactions suitable for fixation of facial skeleton.

The theoretical part of the work evaluates current trends in the use of biodegradable metal alloys. It monitors the development of material for osteosynthesis in maxillofacial surgery emphasizing the biological reactions of material and undesirable qualities including their clinical impact.

The experiment part of the work is divided in two successive stages. The first stage used the rat biomodel to implant Zn-1,6Mg and WE43 alloys. The aim was to compare the duration of degradation and to receive the reaction of the ambient tissue. The animals were euthanized in regular intervals. They were scanned *ex vivo* by means of cone-beam tomography to find the degradation period of each alloy. Histopathological examination was performed to receive the reaction of the ambient bone tissue. The conclusion evaluates WE43 alloy is more suitable for osteosynthesis in the facial skeleton according to the results of the first stage.

The second stage used the rabbit biomodel for implantation of WE43 and titanium as a standard osteosynthetic material. The aim was to compare the used material and WE43 alloy as regards their impact on the healing of the bone defect and the suitability for implantation in the skeleton. The animals were euthanized in regular intervals, microtomography was used *ex vivo* to reveal the condition of the ambient bone, and to find out the speed of degradation of WE43 implants. Using the measuring of bone-interface-contact and changes in the volume and surface of implants degradation period of the alloy were monitored. Histopathological examination was used to find out the reaction of the ambient bone tissue. Secondary methods in both stages of the experiment were electron microscopy and energetic dispersion spectrometry.