1. SUMMARY

Introduction: During the period of the last 25 years remarkable changes occurred in the treatment of traumas of thoracolumbar spine. The surgical treatment was extended in cases where instability and impairment of its physiological shape are expected. This development is based on the progress in imaging technologies, more detailed understanding of spine biomechanics and a pathophysiology of its impairment. The situation was also influenced by the progression in surgical instruments and implants and also in the technology of bone substitutes.

Aim of the study: The aim of the study is to analyze the long term morphological and clinical results after the surgical treatment of thoracolumbar fractures, in which the bioactive glass-ceramics in the form of granules was used as a bone substitute.

Material and method: A series of 140 patients treated surgically for unstable thoracolumbar fracture (LSC points 4 – 6) during the period from 1997 to 2003 was studied. The average age of patients was 44 years (14 – 78). The patient collection consists of 83 males in the average age of 43,7 years (14-73) and 57 females in the average age of 44.9 years (15-78). The minimum follow-up was 24 months, the average follow-up period was 29 months. Patient series includes a group of 91 cases, in which the implant was removed after 78 weeks in the average and a group of 49 cases, in which implant was left. Pedicles of the injured vertebra were used for intracorporeal application of bioactive glass-ceramics. The application method was standardized to ten consecutive steps. Neither transpedicular nor posterior intervertebral fusion was performed. Morphological changes of the treated vertebral body were evaluated by the computerized measuring of the kyphosis on lateral X-rays. Clinical results were assessed using parameters of Activities of Daily Living as well as evaluation of functional and economical status according to Prolo. ANOVA tests and paired t-test of variance of inequality were performed for each value. All tests were executed on significance level $p>0,05$.

Results: Kyphosis (body angle and endplate angle) at the end of the first postoperative year is lower by 8,84 degrees (7,50 degrees respectively) in comparison with the moment of injury. Same parameters increased during the second postoperative year by 1,74 degrees (5,62 degrees respectively). Loss of correction is formed by progression of vertebral body kyphosis (31%) and posttraumatic disc degeneration (69%). The group of patients with implants left shows significantly lower kyphosis (body angle and endplate angle) at the end of the follow-up period then that with implant removed. Clinical results are better in the patients with implant left as compared to the patients with implant removed. The relation between morphological and clinical results was proved.

Conclusion: Bioactive glass-ceramics granules give good long-term morphological and clinical results when used as a bone substitute in the surgical treatment of the thoracolumbar fractures classified in the range from 4 to 6 points according to the Load Sharing Classification (LSC). The indication border between posterior and anterior surgery in the frame of LSC remains unchanged with a tendency to shift to the lower values.