

Abstract

The dissertation is focused on lumbar spinal stenosis (LSS), because it is a serious disease, that primarily affects elderly patients and which often leads to disability. Because the pathophysiology or feasible prophylaxy is not yet fully understood, the first part of the thesis is devoted to the ligamentum flavum (LF), whose changes (hypertrophy and degeneration) are one of the main factors leading to LSS. We focused in this experimental part on changes in the LF properties that could cause its degeneration and hypertrophy - changes in vascularization (investigated as vascular density - L_v), the presence of inflammatory changes and the occurrence of chondroid metaplasia, and then to clarify changes in the LF mechanical properties (stiffness). Vascular density analysis of degenerated and healthy human LF combined with measurement of micromechanical properties was performed. It was found that L_v changes were not dependent on the degree of LSS but were age dependent, that is, LF vascular density declines up until 50 years of age and thereafter changes very little. A significant increased incidence of chondroid metaplasia and clear signs of inflammation in LSS patients were found out. LF samples from LSS patients showed significantly lower stiffness in comparison to samples of healthy patients. The clinical part of the thesis was a prospective study with the evaluation of pain, difficulties and complications in patients after surgery for symptomatic LSS within a five-year follow-up in correlation with other factors (age, sex, BMI, number of affected segments, complications). As part of the short-term results (1/2 year and 1 year after the surgery), there was an improvement in all monitored parameters. During the long-term follow-up (5 years after the surgery), there was a similar course in all parameters - in two years a slight and in five years a significant worsening of the difficulties. But a significant improvement still remains in five years follow-up compared to the pre-operative state in all parameters. Regarding the monitored factors, only age had an effect on the degree of this deterioration – it increases with increasing age. Neither complications nor the development of degenerative changes in adjacent segments had any effect on the development of the patients state during the five-year follow-up.

Key words

ligamentum flavum vascularisation, chondroid metaplasia, inflammatory, mechanical properties, structure of ligamentum flavum, vascular denzity, lumbar spinal stenosis, quality of life, post-operative outcomes, complications