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## Relationship between BDNF-positive number of nerve fibers and pain in intervertebral disc degeneration

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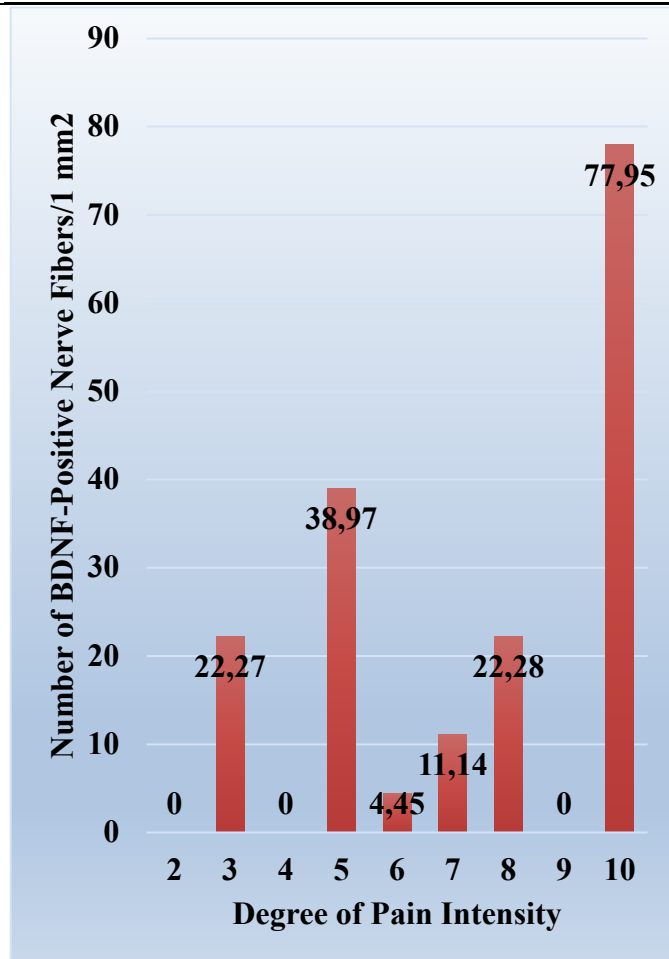
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### Graphical Abstract

### Abstract.

In the etiology of pain of discogenic origin, attention is paid to the role of neurotrophic factors, such as brain-derived neurotrophic factor (BDNF). Considering the potential role of BDNF in the etiology of pain during IVDD, this study aimed to assess changes in the



number of BDNF-positive nerve fibers and levels of BDNF in the IVDD of the lumbosacral spine in comparison to IVDs of the control group (cadavers).

The study group comprised 113 patients with IVDD of the lumbosacral spine. The control group consisted of 81 people (cadavers). We performed hematoxylin-eosin staining to assess IVD structures (degeneration), and immunohistochemistry to determine the number of BDNF-positive nerve fibers.

In immunofluorescent staining, we used a primary rabbit anti-BDNF antibody (Novus Biologicals, Centennial, CO, USA; catalog number NB100-98682; dilution 1:200). H&E staining of IVDs obtained from the control group was carried out to assess whether features of IVD degeneration were present in the present samples, which allowed them to be classified as controls. On the other hand, degenerated IVDs show changes in the AP and NF structures and features of reduced IVD height. Based on the analysis, no statistically significant differences were found between the number of BDNF-positive fibers in the study and control groups. We did not find that the number of BDNF-positive nerves differed significantly according to the degree of perceived pain ( $p = 0.359$ ; one-way ANOVA test). The lowest number of nerve fibers was found in the group of patients reporting a perceived pain level of 6, and the highest at a level of 10. The results indicate an increasing trend in both the number of nerve fibers and the concentration of BDNF with the progress of the degeneration process in IVDD, but only to a certain stage, at which it seems that the intercellular matrix still allows biochemical processes to take place.

### Introduction (optional)

In the etiology of pain of discogenic origin, attention is paid to the role of neurotrophic factors, such as brain-derived neurotrophic factor (BDNF). Considering the potential role of BDNF in the etiology of pain during IVDD, this study aimed to assess changes in the number of BDNF-positive nerve fibers and levels of BDNF in the IVDD of the lumbosacral spine in comparison to IVDs of the control group (cadavers).

### Materials and Methods (optional)

The study group comprised 113 patients with IVDD of the lumbosacral spine. The control group consisted of 81 people (cadavers). We performed hematoxylin-eosin staining to assess IVD structures (degeneration), and immunohistochemistry to determine the number of BDNF-positive nerve fibers. In immunofluorescent staining, we used a primary rabbit anti-BDNF antibody (Novus Biologicals, Centennial, CO, USA; catalog number NB100-98682; dilution 1:200). H&E staining of IVDs obtained from the control group was carried out to assess whether features of IVD degeneration were present in the present samples, which allowed them to be classified as controls.

**Results and Discussion** (optional)

On the other hand, degenerated IVDs show changes in the AP and NF structures and features of reduced IVD height. Based on the analysis, no statistically significant differences were found between the number of BDNF-positive fibers in the study and control groups. We did not find that the number of BDNF-positive nerves differed significantly according to the degree of perceived pain ( $p = 0.359$ ; one-way ANOVA test). The lowest number of nerve fibers was found in the group of patients reporting a perceived pain level of 6, and the highest at a level of 10.

**Conclusions** (optional)

The results indicate an increasing trend in both the number of nerve fibers and the concentration of BDNF with the progress of the degeneration process in IVDD, but only to a certain stage, at which it seems that the intercellular matrix still allows biochemical processes to take place.

**References** (mandatory)

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