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# IDENTIFICATION OF C-TERMINAL TELOPEPTIDES AS MARKERS OF CONNECTIVE TISSUE DYSPLASIA IN BIOCHEMICAL BLOOD TESTS IN ADOLSCENTS WITH A HERNIATED DISC

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**ABSTRACT** — Juvenile osteochondrosis, which can be complicated by a herniated disc, is a common disease in the pediatric population. Currently, this nosology is considered as one of the forms of manifestation of connective tissue dysplasia syndrome. A clinical study was conducted to identify dysplastic processes among 34 adolescents operated on for a herniated disc. Based on the characteristic phenotypic features, it was revealed that 15.36 % of the subjects had grade 1 connective tissue dysplasia, 74.47% — grade 2, and 10.17% — grade 3. The diagnosis was supplemented by a biochemical blood test for C-terminal telopeptides of type I collagen Beta-Cross Laps. In 18 patients (52,94%), the biochemical blood test exceeded the reference values, indicating consistency in the ongoing systemic catabolic reactions associated with the prevalent destruction of the collagen fibers of the tissues of the body.

**KEYWORDS** — osteochondrosis, herniation of the intervertebral disc, C-terminal telopeptides Beta-Cross Laps.

## INTRODUCTION

In the structure of morbidity in children and adolescents, nosologies associated with the pathology of the musculoskeletal system occupy the 3rd place. One of these diseases is juvenile osteochondrosis, which can be complicated by a herniated disc [3, 5, 9]. According to modern concepts, juvenile osteochondrosis is considered as a manifestation of the syndrome of connective tissue dysplasia (mesenchymal insufficiency) [2, 4, 7]. A study was conducted to identify dysplastic processes in adolescents with a herniated disc on the background of juvenile osteochondrosis.

*Objective:*
to assess the state of connective tissue structures based on the study of venous blood markers (C-terminal telopeptides) in children with a herniated disc.

## MATERIALS AND METHODS

From 2013 to 2020, 34 children with juvenile osteochondrosis complicated by IVD hernia underwent surgical treatment at the Neurosurgical Department of the Children's Regional Clinical Hospital in Tver. The study group consisted of adolescents aged 12 to 17 years (13 boys and 21 girls). All adolescents underwent microdiscectomy with video endoscopic assistance. The postoperative period was smooth. All children were examined for phenotypic signs of connective tissue dysplasia using a specially developed table by T. Milkovskaya-Dimitrova [1]. The degree of mesenchymal insufficiency was determined by the number of signs evaluated in this table. The following phenotypic signs of connective tissue dysplasia were more common in the studied patients: scoliosis (32.35%), joint hypermobility (29.41%), nasal septum asymmetry (23.52%), visual pathology (23.52%). (Fig. 1)

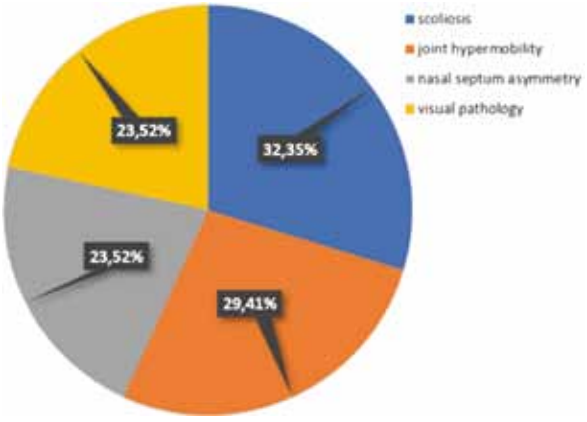


***Fig. 1.*** *Distribution of phenotypic signs of connective tissue dysplasia in the group of treated patients*

According to the diagnostic criteria developed by Abbakova L.N. [1 ] we detected:

I degree of connective tissue dysplasia in 15.36%, II degree — 74.47%, III degree — 10.17%. To identify the systemic nature of mesenchymal immaturity of the body's tissues, the examination was supplemented by

a study of biochemical blood analysis for C-terminal telopeptides of type I collagen Beta-Cross laps. The reference values were: 0.276–1.546 ng/ml for males, 0.167–0.933 ng/ml for females [1, 5, 6, 11].

## RESULTS

Excess rates of beta-Cross Laps of telopeptides from the norm was seen as the presence of systemic catabolic processes from the connective tissue in the body [7, 10]. In 18 patients (52,94%), the biochemical blood test exceeded the reference values, indicating consistency in the ongoing systemic catabolic reactions associated with the prevalent destruction of the collagen fibers of the tissues of the body.

This group of children was prescribed vitamins, chondroprotectors, antioxidants as well as observation of an endocrinologist, orthopedist [3, 6, 8, 9, 11].

## CONCLUSIONS

1. In the treatment of juvenile osteochondrosis complicated by IVD hernia, it is necessary to take into account the features of the clinical picture associated with the manifestation of connective tissue dysplasia syndrome for better and more complete treatment and rehabilitation events.
2. Biochemical blood parameters, such as Beta-Cross Laps, can be markers of hidden catabolic processes associated with the breakdown of collagen fibers, which then manifest themselves in clinical practice in the form of mesenchymal insufficiency syndrome.
3. To compensate for dysplastic processes, it is important to follow up such children by specialist doctors, to determine the intake of vitamins, antioxidants, chondroprotectors, to monitor their nutrition and physical activity.

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