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Investigation of the Relationship Between Dental Occlusion Disorders and Axial Deformities of the Spine

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Abstract: Disorders of dental occlusion develop during different stages of formation and functioning of the dentofacial system and are considered a significant cause of musculoskeletal dysfunctions. Recent studies suggest a close relationship between occlusal disturbances and postural abnormalities, particularly axial deformities of the spine; however, this association remains insufficiently explored in pediatric patients. This study aimed to evaluate the relationship between dental occlusion disorders and axial spinal deformities in children.

A total of 36 children aged 6–15 years were examined to assess the possible association between occlusal abnormalities and spinal deformities. All patients received outpatient orthopedic treatment at the Training Center of Tashkent State Medical University and were under regular pediatric supervision. Anamnestic data collection and comprehensive clinical examinations of body posture, spinal alignment, and the dentofacial system were performed.

Dental and jaw system disorders were identified in 77.9% of patients with spinal deformities. A direct relationship was observed between the severity of axial spinal deformities and the frequency of occlusal discrepancies, dental arch abnormalities, and pathological bite patterns. The results confirm a significant interrelationship between dental occlusion disorders and axial spinal deformities in children, emphasizing the importance of early interdisciplinary diagnosis and integrated preventive and therapeutic strategies.

Keywords: *Dental occlusion disorders, spinal deformities, scoliosis, posture abnormalities, pediatric dentistry*.

Introduction

It is well known that malocclusion of the dental arches occurs at various stages of the development and function of the stomatognathic system and is considered one of the main causes of the development of myofascial disorders [3].

Moreover, it is important to note that occlusal disturbances can occur even in cases with intact dentition and physiological biting types. In complete edentulism, successful prosthodontic treatment of patients is impossible without considering the occlusal factor in designing the artificial dentition, as it ensures stability during all stages of the masticatory cycle. Effective treatment of periodontal diseases also depends on occlusal correction using selected splinting techniques. The research findings of several authors prove that the occlusal factor affects not only the function of the stomatognathic system but also the entire organism. Viktor Stoll identified the connection between occlusion, the neck, breathing, neuralgia, and general health issues.

In children with dental-jaw anomalies, obstructive pathology of the nose and throat is three times more common than in children with normal bites [1], [2]. The high incidence of dental and jaw disorders is due to genetic factors, general health status, lack of sufficient chewing stimulation, consumption of mainly

soft and homogenized foods, early loss of primary teeth, The high incidence of dental and jaw disorders is associated with genetic factors, general health status, lack of sufficient chewing stimulation, consumption of mainly soft and homogenized foods, early loss of primary teeth. Therefore, the occlusion and articulation of the dental arches remains a pressing issue that requires the improvement of methods for examination, treatment, and the prevention of complications [5], [6]. Normalizing the occlusal relationships of the dental arches is considered one of the key measures for preventing complications not only in the stomatognathic system but throughout the entire organism. Treatment of stomatognathic disorders should begin as early as possible [7], [8].

Method

To study the possible relationship between occlusion and the spine, 36 patients aged 6–15 years were observed. They received outpatient orthopedic treatment at the training center of the Tashkent State Medical University and were under pediatric follow-up care at the university's clinic. A medical history was taken and a clinical examination was performed on all patients.

Results and Discussion

The patients' body composition was assessed. During conversations with the parents, it was determined that in childhood 6 patients (16.7%) had suffered from rickets, and 7 patients (19.4%) were noted to breathe through the mouth. In 13 patients (36.1%), early loss of temporary or permanent teeth was identified as a result of caries and its complications. In 10 patients (27.8%), other factors were present.
During the clinical (dental) examination, the patients' constitutional features, oral cavity condition, dental and dental arch anomalies, occlusion, as well as the condition of the ENT organs (free or obstructed breathing) were assessed. Based on the results of the dental examination, the patients were conditionally divided into 2 groups. Group 1 included 16 patients (44.4%) with postural disturbances. Group 2 included 20 patients (55.6%) with scoliosis.

Clinical Description. Patients in Group 1 had no complaints. On examination, a mild spinal deformity (Chaklin Grade I) and slight body asymmetry were identified.

Patients in group 2 complained of low back pain and fatigue. On orthopedic examination, there was a marked asymmetry of the trunk, a severe scoliosis (Chaklin grades II–III–IV), rib hump or rib notch, lateral curvature of the spine, and asymmetry of the pelvic bones, etc. As a result of the clinical examination, dental and jaw anomalies and deformities (or pathological bite conditions) were identified in 28 patients (77.9%).

Table 1

Comparative Characteristics of Patients in the Two Groups

Clinical signs	Group 1, n = 16	Group 2, n = 20
Shoulder level asymmetry	+	+++
Scapular angle asymmetry	+	+++
Mammary gland asymmetry	+	+++
Rib prominence or rib hump	–	++
Pelvic (iliac crest) asymmetry	–	++

*As shown in **Table 1**, patients in Group 2 demonstrated more pronounced postural asymmetry compared to Group 1, including shoulder, scapular, and pelvic asymmetry, as well as rib prominence.*

Table 2

Distribution of Patients According to Types of Anomalies and Deformities

Type of occlusion	Group 1, n = 16	Group 2, n = 20
Orthognathic (normal variant)	3	1
Dental protrusion (crowding)	3	5
Prognathic bite	5	7
Progenia	1	1
Deep bite	3	5
Crossbite	1	1
Total	**16**	**20**

***Table 2** illustrates the distribution of occlusal anomalies in both groups, with prognathic bite, deep bite, and dental crowding being the most frequently observed conditions, particularly in patients with more severe spinal deformities.*

The examination revealed that prognathic bite was detected in 13 patients (36.1%), deep bite in 9 patients (25%), and dental crowding in 8 patients (22.2%).

These findings indicate that the above-mentioned occlusal disorders are the most characteristic for children with impaired spinal morphology. It is also noteworthy that occlusal disturbances of the dentofacial system were more frequently detected in children aged 6–9 years in Group 1, whereas in Group 2 they were predominantly observed in children aged 9–12 years.

It is well known that the period between 6 and 9 years of age is characterized by active formation, restructuring, and maturation of the dentofacial system. From the perspective of spinal development, postural deformities observed in early childhood are not always permanent and tend to stabilize by the age of 6–7 years (according to Goff) as the vertical posture becomes established.

Conclusion

1. Various disorders of the dentofacial system were identified in 77.9% of patients with spinal deformities, with a higher frequency observed in patients of the second group.

2. The more pronounced the clinical manifestations of spinal deformities, the more frequently discrepancies in occlusal tooth contacts, dental arch relationships, and pathological bite patterns were detected. Therefore, disorders of the dentofacial system and the spine are closely interrelated and exert a mutual influence on each other.

3. Proper nutrition, adherence to a rational daily regimen, maintenance of oral hygiene, timely dispensary follow-up of children by pediatricians and specialized healthcare professionals, early diagnosis of initial signs of occlusal disturbances, as well as monitoring of nasopharyngeal pathology and postural status are essential prerequisites for the correct formation and physiological development of children as a whole.

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