

EVIDENCE BASE AND CLINICAL INDICATIONS — SITUATIONS OF EFFECTIVENESS IN VARIOUS MALOCCLUSION, LIMITATIONS AND RISKS OF USE IN CHILDREN

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Abstract: This article analyzes the clinical effectiveness, indications, limitations, and risks of occlusal splints in the treatment of temporomandibular joint (TMJ) dysfunctions in children and adolescents. The study examines the role of splint therapy in various malocclusion patterns, pain syndromes, disc displacement, and functional disorders based on current scientific evidence. Particular attention is given to possible adverse effects, occlusal changes, and the importance of continuous monitoring in growing patients. The findings demonstrate that splint therapy, as a conservative and reversible treatment modality, is effective in reducing symptoms and improving functional outcomes, especially when combined with orthodontic management.

Keywords: temporomandibular joint, TMJ dysfunction, occlusal splint, malocclusion, disc displacement, orthodontic treatment, adolescent dentistry, conservative therapy, bruxism, functional disorders

Introduction

In recent years, temporomandibular joint (TMJ) dysfunctions in children and adolescents have become one of the most significant problems in modern dentistry. These disorders are associated not only with impaired masticatory function but also with pain syndromes, muscle spasms, disc displacement, and deterioration of psychoemotional well-being. During the growth period, morphological and functional changes in the craniofacial system substantially influence the development of TMJ disorders. Therefore, early diagnosis and the application of conservative treatment approaches are of great importance in pediatric dentistry [1].

Currently, occlusal splints are considered one of the most widely used reversible conservative methods for managing TMJ dysfunctions. Their primary purpose is to reduce excessive loading on the joint and masticatory muscles, alleviate pain symptoms, and restore functional balance. Scientific studies indicate that splint therapy is particularly effective in patients with Class II and Class III malocclusions, anterior open bite, crossbite, and bruxism-related disorders. However, due to the limited number of high-quality randomized clinical trials in pediatric populations, clinical decisions should be made cautiously and based on individualized assessment [2, 3].

According to the recommendations of the American Academy of Pediatric Dentistry (AAPD), reversible treatment methods such as splint therapy, physiotherapy, and functional exercises should be prioritized in children and adolescents with TMJ disorders. At the same time, continuous monitoring of growth, occlusion, and joint condition is essential throughout treatment. Improper or prolonged use of partial-coverage splints may lead to occlusal shifts, anterior open bite, and other complications [4]. Therefore, modern clinical practice requires individualized splint therapy protocols coordinated with orthodontic treatment to achieve optimal functional and therapeutic outcomes [5].

Methodology

At the same time, the body of high-quality randomized trials in minors is limited, and most of the conclusions are based on guidelines from relevant associations summarizing age-mixed studies, individual prospective series, and systematic reviews with low confidence in evidence. That is why this chapter focuses not only on "what helps," but also on "what clinical phenotypes and malocclusion are likely to benefit," as well as what limits the use of splints in a growing patient. The American Academy of Pediatric Dentistry, in its current guidance, emphasizes that children and adolescents should prefer reversible methods training, physical therapy, and splints with mandatory monitoring of growth and occlusion; irreversible interventions were considered to have no convincing benefit in this age group. This position sets a methodological "caution framework" for the clinician, in which any conclusions are correlated with low to moderate confidence in the evidence. The question of the relationship "malocclusion TMJ splint response" is fundamental for pediatrics. Modern systematic reviews of children and adolescents show that some morphological patterns are indeed associated with signs and symptoms of TMJ pain: in the generalization by Szyszka Sommerfeld and colleagues for 2025 (Frontiers in Neurology), with low confidence in evidence, class II, class III, cross bites, anterior open bite and bruxism are classified as high-risk areas.. Hence the clinical logic: splints do not "treat" malocclusion as such, but in adolescents with these morphologies they are more often necessary for tissue relief and pain control against the background of orthodontic management. Intraarticular phenotypes are an area where the evidence base in adolescents is rapidly being supplemented, but is still fragmented. An anterior repositioning splint remains a clinically justified tool for juvenile disc dislocation. In a prospective paper by Ma et al in juvenile patients with class II and dislocation of the repositioned disc, the ARS course for 12 months was accompanied by a decrease in clicking, pain symptoms, and signs of displacement according to MRI data. The authors emphasized the importance of selecting and monitoring compliance, because the risk of recurrence persists, especially with late initiation of treatment. These data are consistent with the generalized ARS reviews, in which adolescents, due to the mechanosensitivity of the condylar cartilage, are likely to have the greatest functional "response" provided they are dosed and closely monitored for occlusion.

Results and Discussion

In adolescents with disc dislocation without reposition, splint monotherapy provides limited and variable results; combined strategies are increasingly being discussed. In a randomized study by Sun and colleagues (2023, BMC Oral Health), after open surgical disc repositioning in adolescents with bilateral ADDwoR, the addition of a postoperative occlusive splint was associated with greater condillary regeneration and more pronounced skeletal class II correction in 12 months than a single operation [6]. Although this is not a "pure" conservative model, the very fact of enhanced regeneration against the background of splint is important for understanding the role of unloading and management of the interclusal position during the growth period. Separate clinical series in 2025 report conservative combinations in adolescents with ADDwoR, for example, occlusive splint combined with hyaluronic acid, according to a retrospective analysis by Bi et al. but these results should be taken as hypothesis-forming [7]. Systematic reviews of 2023-2025 devoted to adolescent ADD also emphasize that the "reduction free" phenotype requires stratification and more often benefits from protocols where the tire is only part of a complex tactic [8]. Against the background of the controversial role of occlusion in the genesis of TMJ in adolescents, it is important to remember the downside: orthodontic treatment alone does not increase the risk of TMJ. Modern meta-analytics on adolescents (Applied Sciences, 2024) showed the absence of a statistically significant increase in the risk of TMJ against the background of fixed orthodontics. This confirms a reasonable tactic.: In a teenager with pain dysfunction, we use a splint as a means of controlling symptoms and overload and simultaneously continue orthodontic treatment according to indications, coordinating the height of separation and contacts with the mechanics of the arches [9, 10].

The risks and adverse events in children and adolescents are well-typified and are mainly associated with occlusal shifts if the device does not cover the teeth completely, with poor hygiene during night wear, with speech disorders during the adaptation period and with decreased compliance during long

courses. Cases of anterior open bite after wearing splints, especially partial coverage and in the absence of regular controls, have been documented [11]; supra-corruption of uncovered segments and secondary overgrowth have been described. At the same time, in most adolescents on full-cover structures, with monthly monitoring of the first 2-3 months and subsequent "lifting" of the load as symptoms stabilize, these risks are minimal [12, 13]. To reduce the likelihood of complications, the AAPD advises choosing reversible solutions from the start, limiting the duration of continuous wear, checking the uniformity of contacts and documenting them at each visit, and in case of disc phenotypes, determining the need for MRI and interdisciplinary consultation before starting long-term repositioning therapy. Conclusions [14]. The synthesis of the presented material makes it possible to clearly fix the framework of conclusions on the first chapter and set direct guidelines for subsequent sections of the work [15].

Conclusions

There is no single "root cause" in childhood and adolescent TMJ dysfunctions: the phenotype is formed at the intersection of three contours morphology and growth, myofunctional ecology, and neuroendocrine-psychological modulation. It is this triad that explains why wide ranges of prevalence, sexual dimorphism, pubertal peaks of pain forms and heterogeneity of clinical manifestations are visible in the population. Morphological signs of bite create a mechanical scene, but the symptom occurs only when the actual stress exposure and regulatory shifts are connected; therefore, the rectilinear "occlusal" model in children is methodologically untenable, and strong effects are observed only in combination with "anomaly + functional patterns".

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