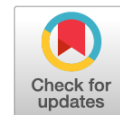


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Sociologic and Psychologic Factors Influencing Orthodontic Treatment of Dentofacial Anomalies in Students of General Education Institutions Under the Russian Ministry of Defense

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ABSTRACT

The issue of motivating students of general education institutions under the Russian Ministry of Defense who require orthodontic care is examined from the perspective of creating conditions that foster their interest in engaging with dental specialists to achieve favorable treatment outcomes. A key aspect involves the development of individualized programs that align medical objectives with the personal interests of the students. For example, the use of digital technologies such as 3D bite modeling visually illustrates the stages of treatment, thereby enhancing student engagement. The role of caregivers and dental professionals extends beyond supervision; they are also responsible for fostering a trust-based environment that takes into account the age-related and sociopsychological characteristics of adolescents. For students aged 10 to 18 years, motivation is fostered by emphasizing improvements in appearance, which directly influence social adaptation, self-confidence, status within the peer group, and the development of leadership qualities. Incorporating elements of gamification into the motivational framework—such as awarding points or certificates for adherence to medical recommendations—helps reinforce discipline and responsibility throughout the course of treatment. In addition, joint meetings with parents or guardians and educational seminars on the significance of orthodontic health enhance external support. For students under continuous supervision, psychologic comfort is essential: peer group discussions of treatment success and open communication with healthcare professionals help reduce anxiety. This comprehensive approach not only improves treatment efficiency but also promotes goal-directed behavior in adolescents, which is particularly relevant to their future selection of a military occupational specialty. The integration of medical, educational, and social support thus establishes a solid foundation for developing motivated, disciplined, and healthy personnel for the Ministry of Defense of the Russian Federation.

Keywords: braces; cadets; dentofacial anomalies; Ministry of Defense of the Russian Federation; motivation for treatment; orthodontic treatment; Suvorov School students; aligners.

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Социолого-психологические предпосылки лечения зубочелюстных аномалий среди воспитанников общеобразовательных организаций Минобороны России

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АННОТАЦИЯ

Вопросы по созданию мотивации обучающихся общеобразовательных организаций Минобороны России, нуждающихся в медицинской помощи по профилю «ортодонтия», рассматриваются с точки зрения формирования условий для их заинтересованности во взаимодействии с врачом-специалистом для достижения хорошего результата лечения. Ключевым аспектом является разработка индивидуальных программ, сочетающих медицинские цели с личными интересами воспитанников. Например, использование цифровых технологий (3D-моделирование прикуса) позволяет наглядно продемонстрировать этапы лечения, усиливая вовлеченность воспитанников. Роль воспитателей и врачей-стоматологов заключается не только в контроле, но и в создании доверительной среды, где учитываются возрастные и социально-психологические особенности подростков. Для учащихся 10–18 лет мотивация формируется через акцент на улучшение внешности, что напрямую влияет на их социальную адаптацию, уверенность в себе и статус в коллективе и развитие лидерских качеств. Важно интегрировать элементы геймификации в систему мотивации: элементы поощрений (баллы, сертификаты) за соблюдение рекомендаций врача укрепляют дисциплину и ответственность подростков в процессе лечения. Кроме того, совместные встречи с родителями и опекунами, образовательные семинары о важности ортодонтического здоровья усиливают поддержку на внешнем уровне. Для воспитанников, находящихся под круглосуточным наблюдением, критически важен психологический комфорт: групповые обсуждения успехов сверстников и открытые диалоги с медиками снижают тревожность. Реализация такого подхода не только обеспечивает эффективность лечения, но и формирует у молодежи установку на достижение целей, что особенно значимо для будущего выбора военно-учетной специальности. Таким образом, синтез медицинской, педагогической и социальной поддержки создает устойчивую основу для воспитания целеустремленных, дисциплинированных и здоровых кадров для системы Минобороны России.

Ключевые слова: брекетсы; кадеты; зубочелюстные аномалии; Минобороны России; мотивация к лечению; ортодонтическое лечение; суворовцы; элайнеры.

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BACKGROUND

Orthodontic treatment of students in general education institutions under the Russian Ministry of Defense is challenging. These students are state-supported, live under continuous supervision for 7 years, and receive funding from the Ministry of Defense and Ministry of Health of the Russian Federation. However, orthodontic care is not covered by the Ministry of Defense healthcare system and is available only through state or private healthcare facilities affiliated with the Ministry of Health, based on territorial jurisdiction. These students live under a strict regimen with limited personal time. Therefore, orthodontic treatment should be feasible within these constraints and should avoid complex appliances that could disrupt daily life or require special care and accessories. Considering orthodontic treatment is inherently prolonged, sociological and psychological preconditions should be established to ensure successful outcomes.

This study explores motivational factors influencing cadets aged 10–18 years who require orthodontic care, recognizing the role of parents, guardians, educators, and healthcare providers in shaping these factors.

Cadets at this developmental stage are capable of independent decision-making and demonstrate a strong desire for autonomy. They are aware of their appearance and are sensitive to feedback from classmates and others. Cadets know that malocclusion may hinder future academic or career opportunities, especially during medical evaluations for eligibility for military and other specialized occupational roles.

Dental professionals, together with educational staff, should recognize that building or enhancing motivation in this group can improve the efficiency and quality of orthodontic treatment. The treatment plan and appliance selection should promote autonomy, allowing cadets to follow medical recommendations with minimal effort and without interference in academic responsibilities. Treatment conditions should minimize the need for off-site orthodontic visits, and the appliances should be securely fixed to reduce the risk of breakage and associated physical and psychological discomfort.

For this age group, fixed appliances (braces) and aligners are indicated. During the planning stage, cadets should be involved in selecting treatments and discussing the appliance design. This fosters a sense of personal responsibility and accounts for their social status and logistical constraints.

The study aimed to analyze the sociological and psychological factors that shape treatment motivation among cadets aged 10–18 years in general education institutions under the Russian Ministry of Defense, based on a review of Russian and international scientific sources.

MATERIALS AND METHODS

This study was conducted as part of a dissertation project. The use of human participants and medical records was approved by the independent ethics committee of the S.M. Kirov Military Medical Academy (protocol No. 260; dated February 22, 2022).

A selective sources review was performed using *eLIBRARY.RU* and *PubMed* with the search queries *мотивация к ортодонтическому лечению (motivation for orthodontic treatment)* and *ортодонтическое лечение кадетов (orthodontic treatment of cadets)*. Studies on motivational strategies for adolescents aged 10–18 years undergoing orthodontic treatment and published within the past 10 years were included.

Overall, 64 sources were identified. Among these, 41 were relevant to the research topic, and 20 were selected as the primary sources for analysis. Systemic and scientific approaches were used in the study to systematize obtained information.

RESULTS AND DISCUSSION

Influence of psychological characteristics on orthodontic treatment outcomes. Adolescents aged 10–18 years are in the formative stage of self-awareness and are highly responsive to external opinions. Anxiety or stress about treatments is common, as many students do not fully understand the nature of these interventions. Minimizing such emotional states results in greater readiness for treatment [1]. Dental professionals may observe resistance or anxiety in students, particularly when malocclusion affects facial aesthetics. Depending on the individual's perception, this can be a barrier or motivator for treatment. Explaining the long-term benefits and anticipated outcomes can establish trust and enhance motivation [2].

Social context influences perceptions of orthodontic treatment at this age. Peer support and belonging to a group where others are also undergoing treatment can reinforce the decision to seek care. Cadets strive to meet group standards of appearance. In closed educational settings with limited external contact, motivational strategies can be more effectively implemented. If most peers wear orthodontic appliances, others would likely follow. Positive reinforcement from peers and educators increases motivation. Notably, adherence to all treatment rules and recommendations induces positive outcomes, such as a beautiful smile or improved health, which motivates the individual to actively participate in the process [3–5]. Moreover, visualization of results, such as showing “before-and-after” photos, can boost adolescents' interest in treatment. Social media, which cadets often access, also influences treatment perception.

Dentists and educators should adopt a personalized approach to each cadet undergoing orthodontic treatment. It is the adolescent's attitudes that shape their approach to health. If they have already adopted health-related behaviors modeled within their families, they are more likely to perceive orthodontic treatment as a natural step toward maintaining and improving their health.

Motivation as a key factor in successful orthodontic treatment. Parents, guardians, educators, and orthodontists play critical roles in building and sustaining motivation throughout the treatment process. Ongoing support contributes to positive outcomes and goal attainment [6–8].

Parents, guardians, and educators are encouraged to hold regular discussions about the importance of treatment and thus create a supportive atmosphere. However, their involvement should be subtle yet confident for adolescents resistant to treatment. It is important to allow cadets to express and discuss their doubts, as this helps prevent the development of negative attitudes toward treatment.

The orthodontists can put themselves in the child's position to understand their emotions and concerns. The use of empathy helps build trust and reduce anxiety that children may experience before treatment. The orthodontist should consider each patient's individual characteristics, such as the level of fear, temperament, and personal preferences. These can be provided by parents, guardians, or an educator who maintains close daily contact with the cadet.

During visits, the orthodontist can praise the child for his/her efforts and should demonstrate patience in all situations. A friendly and supportive environment helps the student perceive the orthodontist as an ally rather than a stressor.

Using clear, plain language and visual aids (e.g., animations) helps the cadet understand the purpose of treatment better and how it will be performed. The more adolescents comprehend the rationale behind treatment, the less fearful and resistant they become. Additionally, the orthodontist may offer the cadet a choice of colors for elastic ties or interarch ligatures, enriching a sense of personal involvement in decision-making. Recognizing even minor achievements and reinforcing how they contribute to the overall goal can boost motivation. It is critical to provide more information about the treatment and its benefits and show before-and-after photos, which help motivate the cadet and illustrate the goal to be achieved.

An oral hygiene calendar may be an effective tool, allowing tracking of their hygiene practices while undergoing orthodontic treatment. The orthodontist can acknowledge the cadet's progress and adherence to recommendations through rewards, such as an orthodontic

hygiene kit for oral and appliance care. Referencing public figures admired by adolescents who have undergone orthodontic treatment can be an additional motivational strategy.

Use of additive technologies to enhance motivation. The application of additive and digital technologies undeniably boosts patient motivation [9]. Cadets are integrated into comprehensive digital infrastructures, including automated workstations and personal mobile devices. These devices can support installation of software that further enhances motivation, ultimately improving treatment adherence. Thus, the process becomes more engaging and informative, and the levels of stress, anxiety, and uncertainty are decreased.

Mobile applications such as Dental Monitoring and BraceMate allow for monitoring of oral condition and maintaining proper care of braces and aligners [10]. The Russian application ORTHO 3D facilitates treatment tracking by visualizing each stage [11]. These tools promote responsibility by informing users of their current status and upcoming tasks.

Gamified features such as progress calendars and virtual rewards for following medical advice keep cadets motivated and engaged. Applications enhance interest in treatment through interactive engagement, distract patients from the clinical environment, promote a positive treatment experience, help establish oral hygiene habits, and foster a sense of responsibility for one's own health [12].

Furthermore, digital tools aid in treatment planning. The clinician can record the initial clinical situation and outline treatment goals. If cadets or their parents and guardians have questions, the orthodontist can use visualizations of tooth movement to explain mechanisms and potential challenges.

Animated educational videos can be used to explain the importance and benefits of orthodontic treatment and oral hygiene during the course of care. During self-study hours or educational sessions, educators can organize group viewings of video containing detailed, playfully framed discussions of specific scenarios.

Online communities are additional motivational resources, enabling cadets to share progress, seek advice, and receive support.

Using these tools to communicate information in an accessible format reduces feelings of isolation or embarrassment among cadets and increases motivation through peer and professional support. Collaboration among parents, guardians, educators, and clinicians, combined with the use of validated domestic digital tools, improves orthodontic outcomes and cultivates a proactive attitude toward health.

Some digital programs enable adolescents to create virtual avatars that evolve in appearance as they adhere to medical instructions. This makes routine tasks

more engaging and establishes positive behavioral habits.

Augmented reality (AR) technologies provide treatment visualization. For example, the application OrthoVision allows adolescents to see how their teeth will look after treatment, which increases their interest in the final outcome [13]. Using AR allows adolescents to visualize their posttreatment smile, which is a powerful motivator. Adolescents like to see the end goal and understand the purpose behind their efforts.

Moreover, social media communities where they can share progress, participate in challenges, and receive support contribute to increased motivation. Cadets can find likeminded peers in these communities, which helps reduce feelings of isolation and anxiety before and during treatment. Dentists can contribute by sharing brief educational videos, treatment updates, and care tips and engaging in discussions about diagnostics and therapy via these platforms [14–16]. Such videos show adolescents positive examples and make them feel a sense of belonging to a community of peers undergoing treatment.

Video content featuring care instructions for braces and aligners and tips for reducing discomfort helps patients better understand what actions to take in specific situations. These videos can be created by orthodontists and made freely available on platforms such as *RuTube*. Online consultations arranged by parents, guardians, or educators help adolescents stay connected with their orthodontist and receive prompt answers to questions. This enriches a sense of support and safety and further motivates them to follow dentists' recommendations.

Considering adolescents' tendency toward independent decision-making, it is advisable to incorporate self-monitoring, visual progress tracking, and readily available support — from parents, guardians, educators, and orthodontists — delivered through digital communication channels as part of the motivational strategy. An effective motivational strategy is clearly demonstrating how orthodontic treatment can enhance quality of life [17–20]. This topic is extensively covered in current scientific sources. Several studies have shown that malocclusion affects oral health and overall health condition, highlighting the need to establish sociological and psychological prerequisites for orthodontic treatment [21–24].

CONCLUSION

Motivating students in general education institutions under the Russian Ministry of Defense who require orthodontic treatment requires a comprehensive approach involving parents, guardians, educators, and dental specialists.

Cadets should receive clear information about the treatment process and its benefits and be involved in decision-making throughout orthodontic correction. The treating orthodontist should consider each cadet's age-related and psychological characteristics and implement a system of positive reinforcement to recognize progress. This approach fosters responsibility and goal-oriented behavior in cadets. The use of gamification and additive technologies through digital platforms among cadets aged 10–18 years strengthen interest in the outcomes of orthodontic treatment and enhances motivation in a modern, accessible format tailored to their age group.

ADDITIONAL INFO

Authors' contribution. All authors made a substantial contribution to the conception of the work, acquisition, analysis, interpretation of data for the work, drafting and revising the work, final approval of the version to be published and agree to be accountable for all aspects of the work. The contribution of each author: N.P. Petrova, data collection and processing, analysis of results, and writing of the article; N.A. Sokolovich, development of the overall concept, study design; S.J. Aleskerova, work with foreign sources, translation; I.K. Soldatov, research methodology, development of the overall concept, writing, and editing of the final version of the article.

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