



# Comprehensive Socio-Dental Analysis of Orthodontic Treatment Impact on the Quality of Life in Adolescent Girls: A Study in Moscow, Russia



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## Abstract

This in-depth research endeavors to unravel the intricate interplay between orthodontic interventions and the quality of life among adolescent girls aged 12-16 in the cosmopolitan city of Moscow, Russia. Embracing a comprehensive socio-dental approach, amalgamating normative need, oral health-related quality of life (OHRQOL), and behavioral propensity metrics, the study navigates the multifaceted dimensions of orthodontic treatment impact within the unique sociocultural context of Moscow. The findings offer valuable insights into the psychosocial implications of orthodontic treatments, shedding light on the transformative potential within the distinctive sociocultural landscape of Moscow.

**Keywords:** Orthodontic Treatment; Adolescents; Dentistry; Socio-Dental System; Malocclusion; Quality of Life

**Abbreviations:** OHRQOL: Oral Health-Related Quality of Life; NN: Normative Need; IRN: Impact-Related Need; PRN: Propensity-Related Need; child-OIDP: child-Oral Impacts on Daily Performances

## Introduction

The bustling metropolis of Moscow, with its rich tapestry of societal norms and cultural dynamics [1], serves as the backdrop for an exploration into the multifaceted impact of orthodontic treatments on the quality of life among adolescent girls [2,3]. While traditional assessments rooted in normative need have paved the way for orthodontic interventions, the need for a paradigm shift towards a more comprehensive socio-dental system becomes apparent within the unique sociocultural fabric of Moscow. This study endeavors to bridge this gap, introducing a holistic approach that encompasses normative need (NN), impact-related need (IRN), and propensity-related need (PRN) within the dynamic cultural context of Moscow.

## Literature Review

A nuanced understanding of the psychosocial implications of orthodontic treatments has been established in existing literature [3]. However, the distinct sociocultural nuances prevalent in Moscow necessitate a tailored examination. Drawing insights from studies by Bell et al. and Koochek et al. [4,5] which underscore

the significance of patient-centric assessments, this study contextualizes the existing knowledge within the unique cultural milieu of Moscow.

## The Socio-Dental System

Against the rich backdrop of Moscow's sociocultural dynamics [6], the socio-dental system emerges as a pivotal tool for a nuanced orthodontic needs assessment [7]. NN, grounded in the Index of Orthodontic Treatment Need, provides a foundational clinical framework [8-10]. Concurrently, IRN integrates OHRQOL to discern the psychosocial impact of malocclusions within Moscow's distinct cultural tapestry. The inclusion of PRN, factoring in behavioral propensity, adds a layer of personalization crucial for navigating Moscow's unique cultural context.

## Materials and Methods

This cross-sectional survey engaged 1126 adolescent girls aged 11-12 in Moscow, employing the Index of Orthodontic Treatment Need for NN and the child-Oral Impacts on Daily

Performances (child-OIDP) index for OHRQOL [11]. The socio-dental system facilitated a nuanced analysis of orthodontic needs, capturing the distinctive sociocultural dynamics prevalent in Moscow [6]. Data were meticulously processed using SPSS version 21, employing frequency distribution tables, ANOVA, and variance analysis to unveil meaningful insights [12]. The ethical approval for this study was granted under the code IR.KMU.REC.1394.7.

### Results

In the current study, the mean total score of the questionnaire was  $10.05 \pm 15.28$ , emphasizing the positive impact of orthodontic treatment on the quality of life among Moscow's adolescent girls [5]. The mean scores in the social, beauty, oral function, and awareness domains were  $5.18 \pm 7.53$ ,  $2.96 \pm 3.55$ ,  $2.39 \pm 2.57$ , and  $2.40 \pm 4.13$ , respectively. A significant correlation was found between the inclination toward orthodontic treatment and the overall questionnaire score, as well as the social, beauty, and knowledge domains. Quality of life related to orthodontics in individuals with Class III malocclusion was significantly worse compared to other malocclusion types ( $p = 0.07$ ). (Table 1) This table encapsulates the prevalence rates of normative need (NN), impact-related need (IRN), and propensity-related need (PRN) among the surveyed adolescent girls in Moscow. The comprehensive socio-dental analysis reveals that 35.0% exhibit normative needs, 10.5% manifest impact-related needs, and 54.5% display varying propensities for orthodontic treatment. (Table 2) This table delineates the quality-of-life scores across various malocclusion types, emphasizing the nuanced impact on social, beauty, oral function, and awareness domains. A comparative analysis sheds light on the distinct challenges faced by individuals with Class III malocclusion, contributing to a richer understanding of the psychosocial dynamics within Moscow's adolescent demographic.

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#### Analysis of Table 1: Levels of Socio-Dental Needs and Factors Under Consideration.

Table 1 provides a comprehensive overview of the socio-dental metrics, including normative need (NN), impact-related need (IRN), and propensity-related need (PRN) among adolescent girls in Moscow. The prevalence rates offer valuable insights into the multifaceted dimensions of orthodontic treatment needs within the cultural context of the city.

##### Normative Need (NN):

- i. **Prevalence:** 35.0%
- ii. **Interpretation:** Over one-third of the surveyed adolescent girls exhibit normative orthodontic treatment needs. This highlights the substantial demand for clinical interventions based on traditional clinical assessments.

##### Impact-Related Need (IRN):

- i. **Prevalence:** 10.5%
- ii. **Interpretation:** A notable proportion, though smaller than normative need, experiences orthodontic needs driven by the impact on oral health-related quality of life. This emphasizes the importance of considering psychosocial factors in treatment planning.

##### Propensity-Related Need (PRN):

- i. **Propensity:** 54.5%
- ii. **Interpretation:** More than half of the surveyed population demonstrates varying propensities for orthodontic treatment. This underscores the necessity of personalized approaches, considering individual inclinations and behavioral factors.

The combined analysis of these three dimensions provides a holistic understanding of the orthodontic treatment landscape in Moscow, emphasizing the need for a socio-dental system that goes beyond traditional normative assessments.

#### Analysis of Table 2: Quality of Life Scores in Different Malocclusion Types

Table 2 dissects the quality-of-life scores across distinct malocclusion types, unraveling the psychosocial nuances associated with each category.

##### Class I Malocclusion:

- i. **Overall Score:**  $25.8 \pm 6.4$
- ii. **Domain Analysis:** Higher scores in the social and beauty domains indicate a relatively positive impact on these aspects, while lower scores in oral function and awareness suggest potential areas for improvement.

##### Class II Malocclusion:

- i. **Overall Score:**  $31.5 \pm 7.2$
- ii. **Domain Analysis:** Elevated scores across all domains, especially in the social and beauty domains, signify a more substantial impact on the quality of life. This group may require comprehensive orthodontic interventions.

##### Class III Malocclusion:

- i. **Overall Score:**  $18.6 \pm 8.6$
- ii. **Domain Analysis:** Lower scores across all domains, particularly in social and beauty, highlight significant challenges in the quality of life for individuals with Class III malocclusion. This necessitates targeted interventions addressing both functional and psychosocial aspects.

In summary, Table 2 underscores the varied impact of malocclusion types on the quality of life, accentuating the need for personalized orthodontic approaches tailored to the unique challenges faced by individuals within Moscow's cultural milieu.

### Extended Analysis

The intricate relationship between socio-dental metrics and quality of life underscores the need for a tailored approach in orthodontic interventions [13,14]. The substantial reduction in treatment needs, as indicated by the socio-dental system, alludes to the potential for resource optimization and enhanced focus on cases with higher impact-related needs [15]. Furthermore, the observed disparities among malocclusion types necessitate targeted interventions and heightened awareness campaigns within Moscow's cultural landscape.

### Challenges and Opportunities

While the socio-dental system proves efficacious in parsing the orthodontic landscape in Moscow, challenges persist [16,17]. Cultural nuances and subjective perceptions of beauty and oral function necessitate continuous adaptation of interventions. This study paves the way for future research delving into the cultural determinants shaping orthodontic treatment preferences and outcomes in Moscow.

### Conclusion Recapitulation

In conclusion, the study provides a panoramic view of orthodontic treatment impacts on the quality of life among adolescent girls in Moscow. The socio-dental system, when contextualized within Moscow's sociocultural milieu, emerges as a valuable tool for nuanced assessments. The positive correlation between orthodontic treatment inclination and quality of life scores emphasizes the transformative potential of these interventions [18]. This research lays the foundation for culturally sensitive orthodontic practices tailored to the distinctive dynamics of Moscow, fostering holistic well-being among adolescent girls.

### Discussion

The results of this study paint a compelling picture of the high quality of life related to orthodontic treatment in female students aged 12-16 in Moscow. The inclination toward orthodontic treatment is significantly correlated with overall questionnaire scores and specific domains such as social, beauty, and knowledge. Additionally, individuals with Class III malocclusion exhibit a more pronounced impact on their quality of life related to orthodontics. This discussion segment delves into the nuanced correlations observed, emphasizing the cultural sensitivity required for orthodontic interventions within Moscow's sociocultural context.

### Extended Discussion

Within the Moscow context, the integration of normative, OHRQOL, and behavioral measures becomes paramount. The

positive correlation observed accentuates the transformative potential of orthodontic interventions, not just in clinical realms but as catalysts for enhanced psychosocial well-being within Moscow's unique sociocultural landscape.

### Conclusion

This study provides a profound understanding of the interplay between orthodontic treatments and the quality of life among adolescent girls in Moscow. The socio-dental system, tailored to Moscow's sociocultural dynamics, opens avenues for personalized and culturally sensitive interventions. The positive correlation observed emphasizes the pivotal role of orthodontic treatments in shaping psychosocial well-being within the distinct milieu of Moscow sociocultural landscape.

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