

Malocclusion and Quality of Life: Functional, Psychosocial, and Socioeconomic Dimensions, with Implications for Underserved and Special-Needs Populations in the United States

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Abstract:

Malocclusion is among the most prevalent conditions in dentistry, yet its consequences extend well beyond occlusal alignment. This narrative review synthesizes literature published from 2020 to 2026 on the functional, psychosocial, and socioeconomic impact of malocclusion, with attention to mastication and nutrition, speech, and self-esteem. Evidence consistently associates malocclusion with reduced masticatory efficiency, compromised ingestion, and diminished oral health-related quality of life (OHRQoL), particularly among adolescents. Psychosocial consequences include lowered self-esteem, greater vulnerability to bullying, and impaired social confidence linked to dentofacial appearance. This review then situates these findings within the reality of the United States, where access to orthodontic correction is stratified by income, insurance status, and race, and where dental appearance measurably influences hiring perceptions and employment prospects. Individuals with autism spectrum disorder, Down syndrome, and cerebral palsy present malocclusion prevalence far above the general population while facing compounded barriers to care. The review argues that untreated malocclusion in the United States functions not merely as a clinical finding but as a mechanism through which existing

socioeconomic and disability-related disparities are reinforced, and proposes directions for policy and research attention.

Key Words: *malocclusion; oral health-related quality of life; orthodontic access; special needs; socioeconomic disparities*

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I. Introduction

Malocclusion, defined broadly as any deviation from ideal alignment between the dental arches, is among the most common conditions addressed in dentistry, ranking after dental caries and periodontal disease in global prevalence. For decades, its clinical significance was framed almost exclusively in mechanical and esthetic terms. A growing body of evidence published since 2020, however, situates malocclusion within a broader determinants-of-health framework, one in which occlusal deviation intersects with nutrition, communication, mental health, and — critically for the present review — income, insurance access, and disability status.

This narrative review addresses three interrelated aims. First, it synthesizes recent evidence on how malocclusion affects everyday function, specifically mastication and nutrient intake, and speech production. Second, it examines the psychosocial pathway through which malocclusion affects self-esteem and social participation. Third, and central to this review's contribution, it situates these functional and psychosocial findings within the specific reality of the United States, where access to orthodontic correction is neither universal nor evenly distributed, and where the social perception of a malocclusion carries direct economic consequences. Particular attention is given to individuals with autism spectrum disorder (ASD), Down syndrome, and cerebral palsy (CP), populations documented to carry a disproportionate burden of malocclusion alongside disproportionate barriers to treatment.

II. Malocclusion and the Domains of Everyday Function: Mastication, Nutrition, and Speech

The relationship between malocclusion and masticatory function is the most physiologically direct of the domains reviewed here. A systematic review registered in PROSPERO and covering 29 studies published between 2007 and 2023 concluded that malocclusion negatively affects ingestion function, and recommended that orthodontic consultations give particular attention to chewing, biting, and swallowing disorders capable of affecting nutritional status.¹ This conclusion is consistent with the broader literature on masticatory function and diet, which links impaired chewing capacity to reduced consumption of fruits, vegetables, and fiber-rich foods, and consequently to lower intake of key micronutrients.

Speech is similarly affected, particularly in malocclusions involving increased overjet, anterior open bite, or significant crowding, which can alter the positioning of the tongue and lips during articulation. Reviews addressing the psychosocial burden of malocclusion consistently list speech disturbance alongside snoring, sleep-disordered breathing, and temporomandibular dysfunction as part of the broader symptom cluster associated with untreated occlusal deviation.²

III. Psychosocial Impact: Self-Esteem, Social Perception, and Quality of Life

The psychosocial literature on malocclusion has matured considerably since 2020, moving from simple association studies toward models that specify the pathway between occlusal deviation and quality of life. A 2023 systematic review and meta-analysis registered on PROSPERO, covering five databases and controlling explicitly for confounders such as age, gender, caries, and socioeconomic status, found moderate-quality evidence that malocclusion negatively affects OHRQoL among adolescents.³ This finding is significant because it resolved conflicting conclusions from two earlier reviews that had not required confounder control.^{4,5}

Beyond the aggregate association, structural models have begun to specify mechanism. A school-based cohort study of socially deprived adolescents found that malocclusion was not directly associated with poorer quality of life, but was indirectly associated with it through functional limitations, diminished social well-being, and self-perceived health — a mediation pathway consistent with the Wilson and Cleary framework. Self-esteem emerges repeatedly as the central psychosocial casualty: reviews describe malocclusion as capable of shaping self-perceived attractiveness, peer relationships, and willingness to smile openly, with severe cases associated with heightened vulnerability to bullying.^{6,2}

IV. The Unexplored Intersection: Financial Barriers, Disability, and the American Oral Health Divide

While the functional and psychosocial consequences of malocclusion are increasingly well documented internationally, the literature has been comparatively slow to connect these consequences to the specific structural conditions under which American patients seek — or fail to seek — orthodontic correction. This section addresses that gap along three lines: the financial architecture of orthodontic access, the measurable economic cost of untreated or unaddressed dental appearance, and the compounded vulnerability of individuals with special healthcare needs.

IV.1 Cost and Insurance Fragmentation

Orthodontic treatment in the United States is expensive and inconsistently covered. Using two decades of Medical Expenditure Panel Survey data, Hung et al.⁷ documented that total national orthodontic expenditures nearly doubled, from 11.5 billion dollars in 1996 to 19.9 billion dollars in 2016, while Black patients recorded the lowest per-capita orthodontic expenditure of any racial group studied. Public coverage does little to close this gap: Medicaid and the Children's Health Insurance Program leave the determination of “medically necessary” orthodontic care to individual states, producing wide variation in which malocclusions qualify for funding and how reimbursement is structured.⁷ A national comparison of state Medicaid orthodontic programs found that barriers to Medicaid-funded orthodontic treatment increased between 2006 and 2015, driven by tightened case-complexity thresholds adopted amid state budget pressure. Utilization data compound this picture: American Dental Association Health Policy Institute figures for 2023 show that 65% of children with private dental insurance had at least one dental visit that year, compared with 42% of those with public coverage and only 23% of those without any dental coverage.⁸ Racial disparity persists even within Medicaid itself, as documented in a Washington State evaluation of Medicaid-enrolled children's orthodontic service utilization.⁹

IV.2 Dental Appearance and Economic Consequence

A distinct and less frequently cited body of evidence connects dentofacial appearance directly to employment outcomes, offering an economic mechanism by which the self-esteem consequences described in Section III translate into material disadvantage. A controlled experimental study using digitally altered smile photographs found that human-resources evaluators rated images with idealized dental esthetics as more intelligent and more likely to be hired than the same individuals shown with their original, non-ideal smiles.¹⁰ A related United Kingdom-based cross-sectional experiment using curriculum vitae vignettes with attached photographs reached a comparable conclusion regarding hiring judgments tied to dental appearance.¹¹ Most directly relevant to the American context, a study published in the *Journal of Public Health Dentistry* and authored by researchers affiliated with the DentaQuest Partnership for Oral Health Advancement and Brandeis University quantified the impact of untreated dental caries and missing anterior teeth on employment outcomes among United States adults, establishing untreated dental appearance as a measurable, quantifiable barrier to securing work rather than a purely subjective concern.¹²

Taken together with the access data in Section IV.1, this literature suggests a self-reinforcing cycle specific to the American system: lower-income and racially minoritized patients face the greatest structural barriers to correcting malocclusion, and are simultaneously the population most exposed to the economic penalty that untreated dental appearance imposes in hiring contexts. This cycle has not, to the authors' knowledge, been explicitly named or modeled in the orthodontic literature, and constitutes this review's central unexplored intersection.

IV.3 Special Needs Populations and Compounded Vulnerability

Individuals with intellectual and developmental disabilities present a markedly higher burden of malocclusion than the general population, while simultaneously facing additional, disability-specific barriers to orthodontic and dental care. A cross-sectional study of children with Down syndrome and cerebral palsy conducted in two special-needs institutions in Rio de Janeiro, Brazil — a setting comparable in resource constraints to underserved American communities — found anterior crossbite in 20.4%, posterior crossbite in 21.5%, and anterior open bite in 29.8% of the sample, with disability type, prolonged bottle feeding, and non-nutritive sucking habits identified as determinant factors.¹³ A separate cross-sectional study comparing individuals with Down syndrome to non-syndromic controls across childhood, adolescence, and adulthood found consistently higher prevalence of Class III malocclusion, concave facial profile, and anterior crossbite in the Down syndrome group across all age groups.¹⁴

Autism spectrum disorder carries a similarly disproportionate burden. A cross-sectional study comparing 48 children with ASD to 49 non-ASD controls referred for orthodontic treatment found significantly higher malocclusion complexity, measured by the Discrepancy Index, and significantly higher orthodontic treatment need on both the Dental Health and Aesthetic Components of the Index of Orthodontic Treatment Need.¹⁵ A more

recent study extended this comparison to 74 children with ASD matched against 74 neurotypical controls and again found significantly elevated malocclusion complexity and treatment need, including higher prevalence of increased overjet and overbite.¹⁶ These findings are clinically important because ASD is independently associated with elevated risk of speech impairment, meaning that a population already vulnerable to communication difficulty is simultaneously more likely to carry an occlusal condition capable of worsening that difficulty.

For these populations, the financial and access barriers described in Section IV.1 are compounded by behavioral, communicative, and provider-training barriers specific to disability, meaning that individuals with special healthcare needs face not a single obstacle to correcting malocclusion but a stacked set of obstacles — clinical complexity, cooperation and sedation requirements, workforce shortages of clinicians trained in special-needs dentistry, and the same insurance fragmentation affecting the general Medicaid-eligible population.

A recent narrative review focused specifically on children with autism spectrum disorder (ASD) argues that this population's elevated malocclusion burden may be mechanistically linked to a second, largely separate body of evidence: markedly elevated rates of food selectivity rooted in oral sensory hypersensitivity and oral motor difficulty.¹⁷ The review identifies oral motor function, encompassing mastication, deglutition, and parafunctional habits, as a plausible shared pathway connecting sensory processing atypicalities to both occlusal development and restricted dietary repertoire, and it notes that no published study has yet tested whether orthodontic treatment itself influences food selectivity patterns in children with ASD, or conversely, whether pre-existing food selectivity acts as a barrier to adapting to fixed appliances.¹⁷ This intersection is directly relevant to the access barriers discussed above: an orthodontic protocol for a child with ASD that does not account for food selectivity risks either clinical failure, through poor adaptation to appliances, or unintended nutritional harm, through further restriction of an already narrow diet during treatment.

V. National Interest and Significance

The evidence assembled in this review carries direct relevance to United States oral health policy for three reasons. First, it reframes malocclusion from a purely esthetic or elective concern into a condition with documented downstream consequences for nutrition, communication, psychosocial development, and — through the employment-related evidence reviewed in Section IV.2 — economic participation. This reframing bears on ongoing debates about whether orthodontic care should be treated as medically necessary for Medicaid and CHIP reimbursement purposes, a determination currently left to inconsistent state-level discretion.⁷

Second, the documented racial and income-based disparities in orthodontic expenditure and Medicaid utilization^{7,9} indicate that the burden of untreated malocclusion, and its downstream psychosocial and economic consequences, falls disproportionately on populations already facing broader social and economic disadvantage. Given the employment-related findings reviewed above,^{10,11,12} this is not merely a health equity concern but a workforce-participation concern with implications for state and federal economic policy.

Third, the compounded burden documented among individuals with ASD, Down syndrome, and cerebral palsy^{13,14,15,16} intersects with existing federal disability policy, including the Individuals with Disabilities Education Act and Medicaid Home and Community-Based Services waivers, neither of which currently mandates or incentivizes specialized orthodontic access. Expanding dental workforce training in special-needs care, and explicitly incorporating disability status into state Medicaid orthodontic eligibility criteria, represent concrete, evidence-supported policy directions arising from this review.

VI. Conclusion

Malocclusion is not confined to the occlusal plane. Recent literature demonstrates measurable effects on mastication and nutrient intake, on speech, and — mediated through functional limitation and diminished social well-being — on self-esteem and oral health-related quality of life. In the United States, these consequences do not fall evenly: fragmented Medicaid coverage, documented racial disparity in orthodontic expenditure, and a labor market shown to reward idealized dental esthetics combine to convert a clinical finding into a socioeconomic one. Individuals with autism spectrum disorder, Down syndrome, and cerebral palsy bear a disproportionate share of this burden while facing the least consistent access to correction. Future research should prioritize longitudinal designs capable of tracing the pathway from untreated malocclusion in childhood to adult economic outcomes, and policy attention should extend explicitly to special-needs populations currently underserved within existing orthodontic access frameworks.

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