

THE PERCEPTION OF AESTHETIC ASPECTS IN PAEDIATRIC PATIENTS – A SCOPING REVIEW

Laura Zaharia¹, Alexandru Grațian Grecu², Anca Ștefania Mesaroș³, Alexandra Iulia Aghiorghiesei⁴, Raul Sorin Ghiurca⁵, Diana Dudea⁶

¹"Iuliu Hațieganu" University of Medicine and Pharmacy, Faculty of Dental Medicine, Department of Propedeutics and Dental Aesthetics, 32 Clinicilor, 400006, Cluj Napoca, Romania

²"Iuliu Hațieganu" University of Medicine and Pharmacy, Faculty of Dental Medicine, Department of Propedeutics and Dental Aesthetics, 32 Clinicilor, 400006, Cluj Napoca, Romania

³"Iuliu Hațieganu" University of Medicine and Pharmacy, Faculty of Dental Medicine, Department of Propedeutics and Dental Aesthetics, 32 Clinicilor, 400006, Cluj Napoca, Romania

⁴"Iuliu Hațieganu" University of Medicine and Pharmacy, Faculty of Dental Medicine, Department of Propedeutics and Dental Aesthetics, 32 Clinicilor, 400006, Cluj Napoca, Romania

⁵ Rotar Dental Clinic, 80 Bd. 21 Decembrie 1989, Cluj-Napoca, România

⁶"Iuliu Hațieganu" University of Medicine and Pharmacy, Faculty of Dental Medicine, Department of Propedeutics and Dental Aesthetics, 32 Clinicilor, 400006, Cluj Napoca, Romania

Corresponding author: Alexandru Gratian Grecu; e-mail: ag.grecu@yahoo.com

ABSTRACT

Aim of the study To review the characteristics of aesthetic perception in pediatric patients regarding different dental medicine fields. **Material and methods** A literature search on PubMed and ScienceDirect has been performed using the following key terms: "pediatric", "aesthetics", "dental," and "perception". The inclusion criteria were represented by: recent studies between 2015 and 2023, published in the English language, studies regarding pediatric aesthetic aspects, and 6 to 18 years the subjects' age (childhood through adolescence). Studies that did not meet inclusion criteria were excluded from this review. As a result, a number of 51 articles were selected. **Results** The selected articles (N=51) were grouped into five categories, as follows: the perception of aesthetic aspects regarding dental issues: colour, number, shape, size, and structure in pediatric dentistry (N=17); dentofacial aesthetics (N=7); the impact of dentofacial aesthetics on health-related quality of life in children (N=13); aesthetics of dental prosthetics and restorations in pediatric dentistry (N=5); and aesthetic aspects of orthodontic treatment and malocclusion (N=9). **Conclusions** Pediatric patients are aware of many aspects of dentofacial aesthetics; behavioral and psychosocial changes were demonstrated among children and adolescents dissatisfied with the shape of the face, the appearance of the smile, facial symmetry, and the aspects of the lips, chin, nose, or cheeks. Further research is still necessary regarding the perception and self-perception of the aesthetic expectations of dental treatments for children of 3-6 years old age group.

Key words: paediatric patients, dental aesthetics, quality of life, perception

INTRODUCTION

The perception and the self-perception of aesthetic aspects of dentofacial structures are extensively researched in dentistry. Over the years, aesthetic demands have increased, mainly concerning the smile's appearance (1).

Dentofacial aesthetics refers to aspects

related to the shape of the face, the facial segment proportions and symmetry, the dental arches and teeth shape and proportions, as well as their colour and gingival contours. The high impact of factors such as facial height, midfacial projection, chin and nose prominence, lip thickness, lower facial height, mandibular

plane inclination, and labio-mental fold depth was advocated within scientific literature (2).

Recent studies claim that dental aesthetics is an essential chapter among children and adolescents (3), with influences on self-perception (4), social integration, and self-esteem (5), sense of coherence, and treatment outcome expectations (4, 6). Thus, by the age of eight years, children start to self-perceive the appearance of their teeth and begin to worry about the surrounding persons' opinions regarding their teeth and dentofacial aspects, which ultimately affects their self-esteem (7).

The awareness of these personal aesthetic characteristics is based on two essential factors: perception and self-perception. Perception is defined as the capacity to use the senses for seeing, hearing, or becoming conscious of something or the way something is being viewed, comprehended, or interpreted (8). Self-perception is a person's view of their self or any mental or physical attributes that constitute the self. Such a view may involve genuine self-knowledge or varying degrees of distortion and subjectivity (9).

Also, a social judgment theory applies to analyzing interpersonal variations, which emerge from cognitive differences and judgments between individuals, dentofacial aesthetics being included. Physical appearance can also influence how people feel about themselves and how others consider them, especially in adolescents experiencing psychological and biological changes (1).

The psychosocial aspects of dentistry, such as dental fear, treatment satisfaction, and OHRQoL, have been widely studied in dentistry. Still, the association of these aspects with pediatric dentistry started to develop only in recent years. (10).

The children's ability to perceive issues related to all the fields of dentofacial aesthetics in the context of the OHRQoL is an under-researched topic but is progressively being studied in pediatric dentistry (11).

Oral health-related quality of life (OHRQoL) refers to the impact of oral health or pathological conditions on daily life activities and general well-being, including physical, psychological, and social aspects. Assessment of OHRQoL is a dynamic phenomenon in which individuals modify their perceptions, which leads to changes that influence their physical and emotional development. More recently, these aspects have also been directed toward pediatric dentistry (6, 12).

The role of the dental care provider, in addition to the one of the child's family, tutors, or instructors, is essential in raising the awareness of paediatric patients regarding the perception of oral health and dental aesthetics as components of the OHRQoL. Thus, children might raise their awareness on these issues, later growing into adolescents and adults more concerned about their health and oral aesthetics.

The current study aimed to conduct a scoping review of the literature to identify the main directions in evaluating the paediatric dental aesthetics self-perception and in managing pediatric patient treatment outcome expectations. Thus, the children's perception related to different aesthetic aspects and implications of paediatric dentistry was extensively reviewed in this study.

The review will focus on the following:
1. The perception of dental aesthetic (dental color, number, shape, size, and structure) in pediatric dentistry; 2. The perception of dentofacial aesthetics; 3. The impact of dentofacial aesthetics on OHRQoL in

children; 4. Aesthetics of dental restorations in paediatric dentistry and 5. Aesthetic

implications of orthodontic treatment and malocclusion.

MATERIAL AND METHODS

A literature search on PubMed and ScienceDirect has been performed using the following key terms: "paediatric", "aesthetics", "dental," and "perception".

Using PubMed, 78 articles matched the search. Title and abstract screening were performed to select articles for full-text retrieval and relevance. The inclusion criteria were represented by: recent studies between 2015 and 2023, published in English language, studies regarding paediatric aesthetic aspects, 6 to 18 years of

age (childhood through adolescence). Studies that did not meet inclusion criteria were excluded from this review. As a result, a number of 41 articles were selected.

Using ScienceDirect, 35 articles matched the search, respecting the criteria. Studies that did not meet inclusion criteria were also excluded from this review. A number of 10 scientific papers matched the inclusion criteria. As a result, a total of 51 articles were considered. The flowchart of the research is presented in Fig 1.

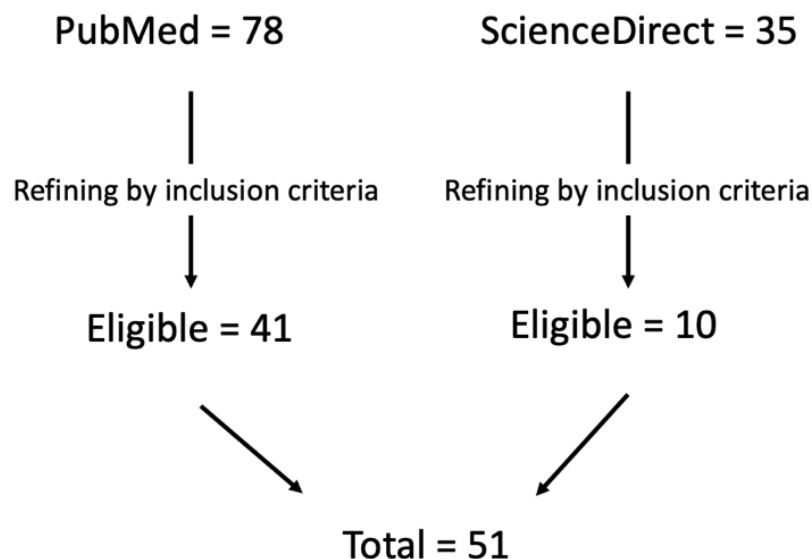


Figure 1 The flowchart of the research

RESULTS AND DISCUSSIONS

The selected articles were grouped into the five abovementioned categories in Tables 1 and 2.

The perception of aesthetic aspects related to dental colour, number, alignment, shape, size, and structure in paediatric dentistry

A strong connection between physical appearance and social interaction has been

identified. The dentofacial region mainly contributes to the general facial appearance. A smile with harmonious and aesthetic characteristics is essential in establishing facial beauty criteria (2, 13).

Many studies have concluded that schoolchildren and pre-schoolers can be aware of certain self-perceived aspects of dental aesthetics, such as dental color, which generates the desire to have whiter and

correctly aligned teeth (14-16).

Social judgments based on tooth color were reported in the context of the overall appearance and concerning factors with dental color altering effect: superficial enamel extrinsic discoloration, exposed dentin or cementum, accumulation of pigments from food and beverages, deposits, and calculus. Discoloration can also be generated by intrinsic factors affecting the teeth' hard tissues, such as enamel hypomineralization, enamel mottling, etc. Increased fluoride intake during enamel formation results in enamel staining, also known as dental fluorosis (17). Dental color and facial appearance improvement are associated with increased pediatric OHRQoL (7).

Dental fluorosis, one of the most widespread pediatric dental conditions, negatively impacts children's perception. In these cases, even young people might make negative judgments about other children with dental fluorosis (17).

Amelogenesis imperfecta (AI) represents another dental aesthetic-altering pathology with genetic determinism, which affects enamel mineralization, encompassing two main types: hypoplastic and hypomineralized. The negative aesthetic effects often experienced by AI patients are caused by these changes in tooth color, reduced tooth size, and the characteristic appearance of tooth structures. The patients report significantly higher social avoidance and distress levels than subjects without this condition (18).

Molar Incisor Hypomineralization (MIH) negatively correlates with tooth health perception. An essential factor in children's perception was the number of teeth affected by MIH, which was also associated with higher rates of discolored perceived teeth. Negative perceptions regarding tooth health, alignment, and dental discoloration were

recorded in a significantly higher number of children with MIH than those without this condition (14).

MIH profoundly impacts pediatric OHRQoL due to its effects on tooth structure, aesthetics, and behaviour. The often-difficult treatment represents a challenge for the pediatric practitioner (19). Still, studies suggest a significant improvement in OHRQoL and aesthetic satisfaction in patients with MIH who received treatment that addresses the demarcated opacities of frontal teeth, especially incisors (14, 19). Also, limitations in daily activities and severe dental pain were found in patients with dental hypersensitivity associated with MIH. In these cases, laser therapy can be indicated in managing hypersensitivity in adolescents with severe MIH to control pain and discomfort and improve their OHRQoL (20).

Ectodermal dysplasia (ED) represents a genetic disorder affecting ectodermal tissues, including skin, hair, nails, sweat glands, and teeth. Dental agenesis frequently occurs in patients with ED, associated with alveolar bone loss, abnormal eruption patterns, widely spaced teeth, abnormal teeth shapes, frequently with reduced width, and salivary dysfunctions. As a result, patients diagnosed with ED, especially those with severe hypodontia or even anodontia, have difficulties accepting their dentofacial appearance and speech problems. Appearance, self-esteem, and each patient's expectation regarding the treatment options should be carefully considered. Early treatment is a requirement to avoid speech, chewing, and swallowing negative outcomes and to simultaneously allow for a harmonious facial development (21).

Dental caries is the most frequently associated dental pathology that substantially impacts the OHRQoL of children (22). A therapeutic variant includes silver diamine

fluoride (SDF); however, this procedure causes dental black staining after application (23-29). This outcome was reported as aesthetically unacceptable by parents and children in a study investigating the level of acceptability of dental caries treatment procedures using silver diamine fluoride (SDF) (23).

Regarding dental traumas and accidents, studies have shown their negative impact on the OHRQoL of preschool children. These findings indicate the need for prevention and early treatment of traumatic dental injuries during childhood (30).

Dento-facial aesthetics

Although self-perceived dento-facial aesthetics is becoming of great interest and concern in the younger generation (among different ages), the self-perception of desirable and undesirable dental aesthetic aspects increases and differs from the younger to the older age groups, including parents (6).

An additional congenital pathology, significantly and negatively impacting the OHRQoL of both children between 2 and 6 years and their parents, is cleft lip and palate (CLP). Facial appearance is essential in the psychological development of patients with CLP. They are usually shy and quiet, attitudes negatively impacting their OHRQoL. In these circumstances, parents of children surgically treated for this condition express satisfaction and gratitude with the surgical outcomes. Early surgical correction regarding orthognathic surgery may benefit some patients regarding functional, aesthetics, and, most importantly, psychosocial reasons (31).

Under possible media pressure, which presents high aesthetic smile standards, minor dental irregularities, rotations, or diastemas represent reasons for seeking orthodontic treatment. Because parents usually play a significant role in negotiating such situations,

it is essential for pediatric dental practitioners to consider the influence of social media when working with parents seeking health information regarding their decisions for their children (32).

Studies have shown that in 10-year-old children, dentofacial appearance influences interpersonal attractiveness within the dimensions of friendship, aesthetics, aggressiveness, and intelligence (16). Characteristics regarding the lips, mouth, teeth, and gums highly influence the general facial appearance and the perceptions of one's about a person's physical and social attractiveness (33).

Most children perceive dental appearance as an essential factor in facial appearance, contributing to psychosocial well-being and correlating with self-esteem in children and adolescents (5). Events such as bullying at school and its psychological impact on children, or access to dental care providers with trained and well-equipped clinics, are essential for the aesthetic perspective of children (14).

The impact of aesthetic dentofacial aspects on OHRQoL in children

The World health organization (WHO) defines quality of life (QoL) as one's perception of their value systems and culture, connected to their standards, concerns, goals, and expectations about life. Dental conditions influence the QoL, and these consequences are encompassed in the more complex concept of OHRQoL. OHRQoL is a multidimensional construct that includes one person's comfort during eating, sleeping, or social interaction and self-esteem contentment with one's oral health. OHRQoL is usually associated with social, psychological, and functional aspects and social integration (34).

Numerous instruments can measure OHRQoL. The most regularly used ones are

the Oral Health Impact Profile (OHIP-14), the Oral Impact of Daily Performances (OIDP), and the Child Perception Questionnaire (CPQ11-14) (34).

The Child Oral Health Impact Profile Questionnaire (COHIP) is one of the literature's most used and cited questionnaires. The instrument presents forms with 34, 38, and 19 questions. The field of application of the questionnaire ranges from evaluating the impacts of different categories of malocclusion or facial malformations to assessing the perception of oral health. Also, this questionnaire presents forms for both children between 8 and 15 years and parents and includes positive and negative aspects of OHRQoL. The 19-question-based version (COHIP-SF19) is the most used one. The questions are arranged accordingly to three main subscales: Oral Health, Functional Well-Being, and Socio-Emotional Well-Being. High scores of COHIP indicate a positive OHRQoL, while low scores define a poor OHRQoL (34).

Consciousness about self can start at 3-5 years old when children start expressing their feelings about their dental appearance. These aspects were discovered in recent studies within the field of psychology. Children have adult-similar and -comparable criteria regarding self-perceived body image at the age of 8 years (11).

The ability to self-perceive diverse aspects of dental aesthetics has massive psychological importance because aversions and negative feelings correlated to the facial and oro-dental characteristics tremendously impact the psychosocial aspects of children's and adolescents' lives (11).

A vital role in social interaction is played by physical attractiveness, as many authors have reported. Thus, it influences the perception of the person in society. The presence of malocclusion, enamel defects,

dental caries, dental trauma, and congenital defects, such as CLP, can have a negative effect on the QoL, social interaction, and psychological well-being and can also generate feelings of weakness and inferiority (35)

Aesthetic aspects of dental prosthetics and restorations in paediatric dentistry

One of the biggest challenges for a pediatric dentist is to restore severely affected primary teeth aesthetically. Thus, a key role in pediatric dentistry is the early use of aesthetic restorations, such as crown therapy, addressing both permanent and deciduous teeth affected by dental caries, dental trauma, or other defects of hard dental tissues (18).

Due to a high degree of child-related concern, the parental demands for aesthetic restorations have increased. Parents positively assessed Zirconia crowns regarding color, size, and shape and viewed them as responsible for enhancing their children's appearance and oral health (36).

In managing some pathological conditions in children, such as ED, AI, dentinogenesis imperfecta, anodontia, and even early childhood caries, prosthetic restorations are of essential importance. They not only solve the morphology and function of the affected teeth but also improve the patient's psychological profile and QoL (18, 21). In these cases, prosthetic therapy is mandatory, striving to provide a solution that will grant the child a normal and healthy life without negative impacts on self-esteem and a harmonious psychological development (18).

Regarding aesthetic restorations in anterior teeth, the prosthetic treatment addresses both function and aesthetics while generating a positive psychological impact, enhancing, thus, the perceived QoL. Even children between 4 and 5 years old have negative social perceptions and self-perceptions about altered dental aesthetics. Studies have shown

that children have negative social perceptions because a significant association was found between altered dental aesthetics and their negative feelings, using pictures of children with pathological dental conditions. The central incisor was the most indicated tooth as the main reason for their negative emotions (15).

The parent's point of view also influences the aesthetic aspects of prosthodontic restorations. In cases where children suffered from oligodontia, parents reported that their children became aware of it since kindergarten and received a prosthetic solution before starting school. That way, after the aesthetic dentures had been applied, parents suggested that dentures enhanced the aesthetics, self-image, and self-esteem of their children, as well as functional abilities, such as mastication (37).

Researchers state that immediate therapeutical action is advisable in cases of AI-related dental discoloration. To sustain this statement, a patient that received crown therapy at the age of 14 years old, affirmed that without early crown therapy, she couldn't imagine how she would have managed highschool life because she previously felt shame and negative feelings related to her teeth and the dentofacial aspects (18).

In children, it is also possible to re-establish self-esteem and self-confidence by assuring a satisfactory aesthetical treatment, significantly improving socializing capacity in school. It reduces the chances for these children to be the victims of bullying and its consequences (18).

Aesthetic aspects of orthodontic treatment and malocclusion

In seeking orthodontic treatment, both parents and children report reasons related to dental aesthetics (4). People not suffering from dental and facial problems are considered more socially competent and

better adapted from an intellectual and psychological perspective than those with such issues (35).

The negative impact of malocclusion occurs even at a young age, during childhood and adolescence, and it is essential to understand that these patients want to improve their emotional and social aspects. For example, the self-perceived need to seek orthodontic treatment among Brazilian schoolchildren was highlighted due to dissatisfaction with the alignment of the teeth, their appearance, and the existence of edentulous spaces. The effects of dental malocclusion negatively influence dentofacial appearance perception. Schoolchildren between 8 and 10 years old are sensitive to negative anterior region aesthetic impacts of dental malocclusion. Early orthodontic treatment improves dental function and aesthetics, positively influencing OHRQoL (11).

The orthodontic treatment need is differently perceived related to gender and age, being higher in female subjects and adolescents (3).

Parents or caregivers also report the negative impact of malocclusion on adolescents' OHRQoL. The greater the severity disabling effect of the malocclusion, the more it significantly influences OHRQoL and its domains (38), like the socio-emotional well-being domain in patients aged between 11-14 years (39). OHRQoL ameliorates after orthodontic treatment, but there are situations when it worsens during therapy because of the discomfort generated by orthodontic appliances. Even with these inconveniences, an improvement in occlusion and the perceived need for orthodontic treatment were observed after undergoing orthodontic treatment, as well as a significant improvement in OHRQoL (34).

Malocclusion negatively affects self-

esteem, bullying, levels of aggression, and psychosocial judgments (7). Previous studies have shown that children presenting visible pathology are more susceptible to these

negative aspects (18). By contrast, children without this occlusal pathology are perceived as likable, intelligent, less aggressive, and considered better friends (7).

Table 1. The perception of aesthetic aspects regarding dental colour, number, shape, size, and structure in paediatric dentistry, Dentofacial aesthetics

Object of interest	Author/Year	Article title	Study type	Conclusions
The perception of aesthetic aspects of dental color, number, shape, size and structure in paediatric dentistry	C. Fragelli et al/2020	Aesthetic perception in children with molar incisor hypomineralization	Cross-sectional study	The tooth health perceptions were negatively affected by MIH; The tooth alignment and discoloration perceptions were negatively affected by MIH in incisors; The tooth discoloration perception was negatively affected by the number of MIH-affected teeth.
	Marcela Baraúna Magno et al/2019	Aesthetic perception, acceptability and satisfaction in the treatment of caries lesions with silver diamine fluoride: A scoping review	Review	The pigmentation caused by SDF influence the parent's acceptance according to paediatric dentistry, residency programme's directors and associate programme's directors
	Fernanda Mafei et al/2019	Aesthetic perceptions and social judgments about different enamel opacities	Questionnaire validation study	Summary defects in tooth enamel may negatively affect an individual's social life. In this study, even opacities without any structural loss were found to negatively affect an individual's perception. Yellowish opacities with loss of tooth structure had a very negative influence on an individual's perception and social judgment.
	Hanan Siddiq et al/2020	Children's perception of other children with dental fluorosis – A cross- T sectional study	Cross-sectional study	Children in our study perceived that fluorosis could have a negative impact on their appearance and children make negative judgments about other children with dental fluorosis.
	A.M. Curtis et al/2020	Decline in Dental Fluorosis Severity during Adolescence: A Cohort Study	A Cohort Study	Overall, there is growing clinical evidence for a decline in fluorosis severity during adolescence for all permanent teeth and into young adulthood to a lesser extent. These changes probably affect esthetic perceptions of fluorosis over time, decreasing fluorosis-related esthetic concerns for older adolescents and adults.
	Arheiam Arheiam et al/2022	Dental Fluorosis and Its Associated Factors Amongst Libyan Schoolchildren	Cross-sectional study	The results indicated a relatively low level of DF associated with social inequalities and higher caries rates, and negative impacts on the socioemotional wellbeing of the affected children.
	Marcela Baraúna Magno et al/2019	Does dental trauma influence the social judgment and motivation to seek dental treatment by children and adolescents? Development, validation, and application of an instrument for the evaluation of traumatic dental injuries and their consequences	Cross-sectional study	In conclusion, the questionnaire used proved to be a valid and reliable instrument for evaluating the perceptions and social judgment of children and adolescents in view of different traumatic dental injuries. 10- to 15-year-old children and adolescents attributed bad social judgment to other children and adolescents with different TDI-C in relation to visible incisor trauma, with tooth loss being the type of trauma consequence that most negatively influenced their social judgments. Following dental trauma, adolescents believed it is necessary to seek dental treatment.
	Ana Lúcia Volli et al/2019	Efficacy of 30% silver diamine fluoride compared to atraumatic restorative treatment on dentine caries arrestment in primary molars of preschool children: A 12-months parallel randomized controlled clinical trial	Clinical trial	SDF requires much less chair-time and have similar results as ART in arresting caries lesion, anxiety, adverse effects, aesthetic perception and quality of life.
	Raquel Goni Calves Viciu- Andrade et al/2015	Impact of traumatic dental injury on the quality of life of young children: a case-control study	Case-control study	Four studies found that children with TDI experienced a negative impact on OHRQoL.
	Floreance Gabriela da Silva et al/2022	Low-Level Laser Therapy for Management of Hypersensitivity in Molar-Incisor Hypomineralization and Oral Health-Related Quality of Life: Case Report	Case report	Patients with MIH and associated hypersensitivity experience severe pain, often with limitations in performing day-to-day activities. It can be concluded that LLLT is a therapy that can be indicated in the management of hypersensitivity in an adolescent with severe MIH to control pain and discomfort and to improve his OHRQoL.
	Rana Yawary et al/2022	Silver Diamine Fluoride Protocol for Reducing Preventable Dental Hospitalisations in Victorian Children	Randomised clinical trial	There are several studies that have explored parental perception and acceptance of SDF staining. These studies have found that staining on anterior teeth was perceived as undesirable.
	Crystal YO et al/2019	Parental Expressed Concerns about Silver Diamine Fluoride (SDF) Treatment	Survey study	Although parents are concerned about the esthetic impact of SDF, they understand the risks of alternative treatments and welcome information that will allow them to make an informed decision. Location of the cavities and visibility of the staining appear to heavily influence the decision to accept or reject this therapy.
	Heba Sabbagh et al/2020	Parental acceptance of silver Diamine fluoride application on primary dentition: a systematic review and meta-analysis	Systematic review and meta-analysis	Parental acceptance for SDF treatment was significantly related to tooth location, child cooperation and pre-operative instruction.
	Mehreen Wajhat et al/2022	Parental perception of silver diamine fluoride for the management of dental caries	Cross-sectional study	Parental acceptance of SDF in comparison to other dental caries treatment options in children was found to be higher when more invasive treatment choices were provided. Aesthetic appearance and cost of treatment were significant concerns for the parents.
	Hollis Haotian Chai et al/2022	Parental perspectives on the use of silver diamine fluoride therapy to arrest early childhood caries in kindergarten outreach dental services: A qualitative study	Qualitative study	This qualitative study found that the outreach dental service using SDF to treat early childhood caries in kindergarten is an acceptable strategy from their parents' point of view. The parents preferred caries arrest over aesthetics and accepted SDF therapy. However, some parents worried about SDF toxicity.
Clara Serna-Muñoz et al/2020	Perception, knowledge, and attitudes towards molar incisor hypomineralization among Spanish dentists: a cross-sectional study	Cross-sectional study	Spanish dentists perceived an increase in the incidence of MIH. The material of choice was RMGIC for non-aesthetic sectors and composite for incisors.	
Fernanda Cunha Soares et al/2015	Altered Esthetics in Primary Central Incisors: The Child's Perception	Cross-sectional study	Four- to five-year-olds have negative social perceptions and self-perceptions regarding altered dental esthetics.	
Object of interest	Author/Year	Article title	Study type	Conclusions
Dento-facial aesthetics	S. Kluba et al/2016	Parental perception of treatment and medical care in children with craniosynostosis	Retrospective review	As well as the major objective of protecting the child from functional disturbances, the aesthetic results are undoubtedly very important. The head and face receive the most attention in social interactions. Therefore enduring impairments in appearance in this sensitive region may cause disturbances in social competence and in the development of personality. This analysis revealed a principally high rate of satisfaction with the aesthetic results of surgery.
	Alisa Tiro et al/2021	Perception of Dentofacial Aesthetics in School Children and Their Parents	Cross-sectional study	Awareness about dentofacial aesthetics was found in all three age groups in the present study. Younger and older children, as well as adults, have clear perception of desirable and undesirable dental aesthetic appearance. The level of perception increases from the younger to the older age group. Attitudes about desirable and acceptable dental aesthetics differ in younger children compared with older children and parents.
	M.F. Perazzo et al/2019	Self-Perceptions of the Impact of Oral Problems on the Social Behavior of Preschoolers	Cross-sectional study	Socioeconomic, symptomatic, and/or oral esthetic problems exerted an impact on the social behavior of the preschoolers analyzed, such as playing, sleeping, and smiling.
	Tulsi Roy, MD et al/2020	Skin Deep: Perception of Scars After Cranial Vault Reconstruction	Qualitative study	Results underscore the value of scar aesthetics in reconstructive goals. Advanced age and complications are important determinants of satisfaction. However, the lack of association between parent-reported patient self-consciousness and parental scar satisfaction suggests differences in aesthetic priorities between parents and children.
	Cory D. Hatch et al/2017	The Effects of Objective 3D Measures of Facial Shape and Symmetry on Perceptions of Facial Attractiveness	Qualitative study	Aspects of symmetric shape variation have the most impact and include facial height, midfacial projection, chin and nose prominence, lip thickness, lower facial height, mandibular plane inclination and labio-mental fold depth. Components of asymmetric variation such as cants of the lip commissures and the base of the nose have the most impact along with higher levels of fluctuating asymmetry and overall facial size.
	R. Bucci et al/2017	Translation and validation of the Italian version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) among adolescents	Questionnaire validation study	The psychometric properties of this version of the questionnaire support its use for the assessment of the psychosocial impact of dental aesthetics among Italian adolescents.
	Wan Nurazreena Wan Hassan et al/2017	Validation and reliability of the Malaysian English version of the psychosocial impact of dental aesthetics questionnaire for adolescents	Questionnaire validation study	The adapted Malaysian English PIDAQ demonstrated adequate psychometric properties that are valid and reliable for assessment of psychological impacts of dental aesthetics among Malaysian adolescents.

Table 2. The impact of aesthetic dentofacial aspects on health-related quality of life in children, Aesthetic aspects of dental prosthetics and restorations in paediatric dentistry, Aesthetic implications of orthodontic treatment and malocclusion

Object of interest	Author/Year	Article title	Study type	Conclusions
The impact of aesthetic dentofacial aspects on health related quality of life in children	M.T. Martins et al/2018	Dental caries are more likely to impact on children's quality of life than malocclusion or traumatic dental injuries	Cross-sectional study.	Dental caries seems to be the oral condition most commonly associated with a higher impact on the OHRQoL of Brazilian 8-to-10-year-olds
	Ling Sun et al/2020	A cohort study of factors that influence oral health-related quality of life from age 12 to 18 in Hong Kong	Cohort study	Age, periodontal status, and malocclusion had an influence on OHRQoL from age 12 to 18. When clinicians attempt to improve subjects' OHRQoL, it is necessary to consider these factors.
	M. Marcus et al/2018	Child and Parent Demographic Characteristics and Oral Health Perceptions Associated with Clinically Measured Oral Health	Cross-sectional survey	These child and parent survey items have potential to be used to assess oral health status for groups of children in programs and practices in lieu of dental screenings.
	Caroline Sørensen et al/2021	Comparing oral health-related quality of life, oral function and orofacial aesthetics among a group of adolescents with and without malocclusions	Cross-sectional survey	Malocclusions clearly affects the adolescents with need for orthodontic treatment in this study. It influences their OHRQoL in the psychosocial impact dimension. Aesthetically they perceive their oral and facial appearance as worse compared to controls. Although embarrassed and displeased with their oral appearance they still rate themselves as having a good oral health with low jaw function limitations.
	Katherine B. Bevans et al/2020	Development of patient-reported outcome measures of children's oral health aesthetics	Systematic review	The oral health aesthetic item banks and short forms provide precise and valid assessments of children's satisfaction with their oral appearance. They may be useful for targeting and evaluating paediatric dental and orthodontic care in clinical practice and research settings.
	Youbai Chen et al/2022	Oral health-related quality of life between Chinese and American orthodontic patients: A two-center cross-sectional study	Cross-sectional study.	Chinese orthodontic patients had lower OHRQoL-14 scores, indicating a higher OHRQoL than American patients. In addition to the younger age, this difference may be attributed to the different ethical, cultural, educational, and socioeconomic background of Chinese and American orthodontic patients.
	Gabriela Mendonça RANDO et al/2017	Oral health-related quality of life of children with oral clefts and their families	Cross-sectional study.	The group comparison revealed that the cleft lip and palate negatively impacted on OHRQoL of 2 to 6-year-old children and their parents.
	Matheus Melo Pithon et al/2019	Oral health-related quality of life of children before, during, and after anterior open bite correction: A single-blinded randomized controlled trial	Randomized controlled trial	Correction of AOB had a positive impact and failure to correct it had a negative impact on the OHRQoL of children.
	Carlos Alberto Feldens et al/2019	The effect of enamel fractures on oral health-related quality of life in adolescents	Cross-sectional study.	Enamel fractures exert a negative impact on the OHRQoL of adolescents, suggesting that subjective measures should be incorporated in the evaluation of patients with this traumatic injury.
	Katrien Jaeken et al/2019	Reported changes in oral health-related quality of life in children and adolescents before, during, and after orthodontic treatment: a longitudinal study	Longitudinal study	OHRQoL ameliorates after orthodontic treatment. High baseline self-esteem works as a protective factor for OHRQoL
Aesthetic aspects of dental prosthetics and restorations in paediatric dentistry	Abeer Al-Namankany et al/2018	Effects of cleft lip and palate on children's psychological health: A systematic review	Systematic review	CLP is not only connected to psychological effects which distress children's self-esteem and psychological functions, it also extends to their parents, particularly their mothers. However, parental and social support seem to have positive influences by reducing these psychological effects.
	Lea Kragt et al/2017	Influence of self-esteem on perceived orthodontic treatment need and oral health-related quality of life in children: the Generation R Study	Cross-sectional study	The relationship between subjective orthodontic need and OHRQoL is not based on the SE of children. However, SE modifies the relationship between subjective orthodontic need and OHRQoL. Work still needs to be done to find an explanation for the effect modification by SE in the relationship between subjective health perceptions and OHRQoL.
	Erika Frey et al/2021	Parents' Use of Social Media as a Health Information Source for Their Children: A Scoping Review	Review	This scoping review reveals parents' motivation to use social media for health information, and how that can interact with, and impose on, clinical practice. It is important for those who provide pediatric health care to both understand and accommodate this permanent shift facilitated by social media, when working with parents who are seeking health information when making health decisions for their children.
	Gumilla Pousette Lundgren et	Amelogenesis Imperfecta and Early Restorative Crown Therapy: An Interview	Interview Study	The results of this study showed that adolescents and young adults described a profound effect of AI on several aspects of their daily life. Experiences included severe pain and sensitivity problems, feelings of embarrassment, and
Aesthetic aspects of orthodontic treatment and malocclusion	Holsinger, Daniel M et al/2016	Clinical Evaluation and Parental Satisfaction with Pediatric Zirconia Anterior Crowns	Retrospective study	Zirconia crowns are clinically acceptable restorations in the primary maxillary anterior dentition. Parental satisfaction with zirconia crowns is high.
	Blumer, Sigalit et al/2018	Parental Perceptions of Prosthetic Treatment for and Coping Abilities of Children with Ectodermal Dysplasia: A Pilot Study	Pilot Study	According to the parents, dentures contribute to the esthetics, self-image, self-esteem, and mastication abilities of children with ectodermal dysplasia. Their appearance generally did not affect their ability to socialize with their peers.
	Mariela Machado et al/2018	Rehabilitation of ectodermal dysplasia patients presenting with hypodontia: outcomes of implant rehabilitation part 1	Cross-sectional study	Patients with ED treated with dental implants reported encouraging outcomes post treatment after prostheses were fitted. Follow-up from 1.6 to 6.8 years has confirmed these improvements.
	M. M. Uhlen et al/2021	Stainless-steel crowns in children: Norwegian and Finnish dentists' knowledge, practice and challenges	Cross-sectional study	Although the value of SSCs for restoring young molars is recognized by Norwegian and Finnish dentists, SSCs are rarely used by general dentists. The majority of the respondents reported lack of training and materials and was interested in receiving more information and education
Aesthetic aspects of orthodontic treatment and malocclusion	Gabriela Chinchilla Soto/2017	Considerations when referring patients with disabilities to orthodontic treatment	Cross-sectional study	Aesthetic requirements and egalitarian inclusion into society cause a greater search for orthodontic services on behalf of patients with special needs and their families.
	Lucas DUARTE-RODRIGUES et al/2017	Correlation and comparative analysis of the CPQ8-10 and child-OIDP indexes for dental caries and malocclusion	Cross-sectional study	The CPQ8-10 and the child-OIDP indexes revealed a moderate correlation between their total scores. Concerning the discriminative validity, both instruments were incapable of distinguishing children with and without dental caries and/or malocclusion by their total scores. However, the instruments discriminated children with and without those oral disorders in different dimensions. Thus, both instruments demonstrated a different capacity to assess the impact on OHRQoL among schoolchildren.
	Bárbara Hope et al/2020	Cross-cultural adaptation and validation in Spanish of the malocclusion impact questionnaire (MIQ)	Cross-sectional study	The results support the applicability, reliability and validity of the Spanish version of MIQ for assessing OHRQoL in Chilean children with malocclusions.
	Soraia Pimenta de Araújo GUIMARÃES et al/2018	Impact of malocclusion on oral health-related quality of life among schoolchildren	Cross-sectional study	The prevalence of malocclusion in the present study was high and was associated with a negative impact on OHRQoL among schoolchildren aged 8 to 10 years.
	Jéssica Madeira Bittencourt et al/2017	Negative effect of malocclusion on the emotional and social well-being of Brazilian adolescents: a population-based study	Cross-sectional study	Adolescents with handicapping malocclusion, where the need for treatment was mandatory, suffered from a greater negative impact on quality of life, with emotional and social aspects most affected.
	Emerson Tavares de Sousa et al/2016	Perception of children and mothers regarding dental aesthetics and orthodontic treatment need: a cross-sectional study	Cross-sectional study	Children and parents realize the need for orthodontic treatment according to the different types of malocclusion, as noted in the association between orthodontic treatment need and dental appearance perceived by children and their mothers, which was also observed—with low correlation—with regard to DAJ.
	Firas Nafi Salih et al/2017	Perception of orthodontic treatment need among Swedish children, adolescents and young adults	Cross-sectional study	The lower limit for orthodontic treatment need among subjects, age 10, was higher – compared to subjects, ages 15 and 19 – and closer to literature-based standards. Subjects with self-perceived orthodontic treatment need, subjects with previous orthodontic treatment, and subjects age 19 of foreign origin, have higher aesthetic demands.
	Lucas Guimarães Abreu et al/2016	Perception of parents and caregivers regarding the impact of malocclusion on adolescents' quality of life: a cross-sectional study	Cross-sectional study	Parents/caregivers reported a negative impact of malocclusion on adolescents' OHRQoL. Increased severity of malocclusion is associated with higher adverse impact on OHRQoL.
	Iagan K. Baskaradoss et al/2022	The impact of malocclusion on the oral health related quality of life of 11-14-year-old children	Cross-sectional study	Handicapping malocclusion had a significant negative impact on the social well-being domain of OHRQoL among 11-14-year-old children in this population.

CONCLUSIONS

1. Dento-facial self-perception, with its physical, psychological, and behavioral personal characteristics, is widely studied in dental medicine, with increased interest in recent years in paediatric dentistry. Studies reviewed in the present article suggest specific correlations between the psychosocial behavior of the paediatric patient and his oral health condition. Paediatric patients are aware of many aspects of dentofacial aesthetics; behavioural and psychosocial changes were demonstrated among children and adolescents dissatisfied with the shape of the face, the appearance of the smile, facial symmetry, and the aspects of the lips, chin, nose, or cheeks. Malocclusions and the need for orthodontic treatment correlate with emotional and social changes, negatively impacting paediatric and parental OHRQoL. Also, MIH, traumatic dental injuries, fluorosis, structural enamel defects, periodontal

status, malocclusions, CLP, dental caries, and incorporation of SDF in some treatment strategies negatively influence self-perception and OHRQoL.

2. On the other hand, dental restorations and paediatric dental prosthetics (zirconia, ceramics) correlate with high satisfaction among paediatric patients and their parents. These are considered the best treatment options for patients with AI and ED.
3. Dental practitioners should be aware that, due to the positive impact of paediatric dental treatments on children's OHRQoL (including the appearance of prosthetic restorations, direct restorations, or orthodontic dental treatments), aesthetic expectations among children and adolescents remain high.
4. Further research is still necessary regarding the perception and self-perception of the aesthetic expectations of dental treatments for 3-6-years-old children.

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