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Original Research Article

Using the Smile Index to comparatively analyze the self-perceived esthetics, orthodontic awareness and treatment need amongst dental students

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Abstract

Introduction: Esthetic cognition is an interactive heuristic process molded by numerous personal and social influencing factors. The self-perceived need of orthodontic treatment and acceptance of a clinician's judgement although related to orthodontic awareness is influenced by factors directly or indirectly related to self-perceived esthetics.
This study aimed to emphasize the importance of obtaining candid responses regarding orthodontic awareness, self-perceived esthetics, and the overall desire for treatment. Utilizing the SMILE Index, a verbally assigned assessment tool, the research seeks to provide clinicians with valuable treatment safety scores, ensuring a more personalized and effective approach to patient care.
Objectives: The main objective of this study was to elicit unbiased opinions from the adolescents without any form of coercion to ascertain the true willingness or reluctance towards orthodontic treatment using an index to categorize the safety score of handling such patients based on their responses.
Materials and Methods: A purposive sample of 122 dental students with normal growth and development were enrolled in this clinical screening study after obtaining their consent and with the clearance of the ethical clearance committee. During the assessment of malocclusion-related factors, students were also evaluated using the verbally assigned Simplified Malocclusion Index for Layperson Evaluation (SMILE Index, Digumarthi & Prakash, 2022), providing an accessible and structured approach to understanding orthodontic concerns to elicit candid responses related to the three evaluation parameters of orthodontic awareness, self-perceived esthetics and orthodontic treatment need. Details related to malocclusion and the responses to the SMILE Index were tabulated in Microsoft Excel and subsequently subjected to statistical analysis.
Results: A SMILE Index based analysis of those dental students with clinically ascertained malocclusion revealed that 66.66 % boys and 74.03 % displayed orthodontic awareness and 55.55% boys and 69.23% girls displayed self-perceived esthetics. 27.77% of the boys and 31.73% of the girls screened felt a need for orthodontic treatment Based on the SMILE index scores it was seen that the highest was with score V as in patients who are difficult to treat unless extensively counselled (47.54%) followed by Score III (20.49%) as in patients who are moderately safe and easy to handle.
Conclusion: The informed consent of an adolescent in reality requires appropriate information to be provided to condition the conviction of a decision made by the young patient. The SMILE Index helps analyze the patient's willingness for treatment without any form of coercion or bias from either the parent/guardian or the clinician by eliciting appropriate only candid responses and analyzing these responses. The SMILE Index also highlights the degree of safety in taking up a case for treatment based on the score.

Keywords: SMILE Index, Index of Orthodontic Treatment Need (IOTN), Visual Analogue Scale (VAS)

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1. Introduction

A patient's perceived need for orthodontic treatment is usually based on a heuristic reasoning process as has been highlighted in literature. The preconceived notions of esthetics in an adolescent are largely influenced by the immediate circle of friends and family and also by the community in what has been referred to as the psychosomatic norm. There is a strong influence of the opinion of either a parent or guardian or even the clinician in the decision-making process. There exists a complex interplay between the degree of decision-making independence of the adolescent as modified by the degree of conformity to opinions of family and friends and the final motivation to pursue a perceived need. In some instances, derangements in occlusion precipitate what has been termed in literature as a

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condition specific impact on specific daily performance parameters of perceived quality of life as in the impact of malocclusion on activities like smiling, or eating. Literature also highlights the impact of a person's SMILE during interaction and communication.[1-6]

There has been an emphasis on the need to communicate clinically ascertained information of importance towards the decision-making process keeping in mind bioethical and informed consent issues whilst aiming towards the improvement and maintenance of the oral health related quality of life. It is also important that the adolescent be given a balanced opinion of all the pros and cons so that there is conformity and independence in the motivation towards a final decision and the informed assent and consent. If there is any resistance towards clinically ascertained treatment, appropriate counselling may be instituted comprising to a large extent of clinical examples showcasing prior treatment performed on similar individuals and patient testimonials highlighting the final benefits felt and the overall levels of treatment comfort. A clinician must be able to help reinforce this decision-making process, sometimes against a certain degree of resistance from the adolescent. This is done with an evidence-based approach stressing on clinically ascertained needs rather than being influenced by patient or parent perceived psychosocial needs thus being able to implement a process of informed consent of the parent or guardian and informed unbiased assent of the adolescent. Of importance is an adolescent who seeks orthodontic treatment purely our of psychosocial insecurity not substantiated by any professionally ascertained clinical findings indicative of a treatment need. On the flip side there would be individuals not keen on treatment due to a multitude of reasons. Shaw proposed that the decision for orthodontic treatment by an individual is based on a varying weightage of perceived psychological or functional benefits.[7-15]

There is a scarcity of evidence that orthodontic treatment need indexes actually take into account an unbiased opinion of the minor being treated. In most situations the opinion or consent of the parent or guardian is taken and this may at times be in conflict with the desires of the adolescent. The SMILE Index (Digumarthi & Prakash, 2022) by comparison and contrast elicits unbiased responses from the adolescent.[16] To prevent operator bias these responses are entered in a grid to arrive at the final score that is indicative of how receptive or unreceptive the patient may be if treatment is required or in other words how difficult a patient to handle would the adolescent be if there is a clinically ascertained need for treatment. The SMILE Index also helps indicate the degree of informed consent that exists along with a self-perceived need for treatment.[17-18]

2. Materials and Methods

A purposive sample of 122 dental students with normal growth and development and good orthodontic awareness were enrolled in this clinical screening study after obtaining their consent and with the clearance of the institutional ethical clearance committee. The clinical screening was performed in the department of orthodontics with strict adherence to infection control and prevention norms, with an objective to categorize the observed occlusion of participants into either an ideal occlusion or Angle's Class I, II & III malocclusions. During the screening, while interacting with the participants, the 'Simplified Malocclusion Index for Layperson Evaluation' (SMILE) index, The authors introduced an assessment method delivered verbally in the native Telugu language, designed to gather responses on three key evaluation factors: self-perceived esthetics, orthodontic awareness, and perceived need for orthodontic treatment.

2.1. Smile index

The Simplified Malocclusion Index for Layperson Evaluation index elicits responses from adolescents that are not coerced or biased. Operator bias is also effectively curtailed by use of a scoring grid and subsequently an interpretation made based on the score (**Table 1** &

Figure 2). All responses received from those adolescents were listed in Microsoft Excel and the percentages of distribution of responses calculated (**Figure 3 & Figure 4**).

3. Results

A summary of the clinical findings of the screening process is detailed in **Table 1**. A SMILE Index based analysis of those dental students with clinically ascertained malocclusion revealed that 66.66 % boys and 74.03 % displayed orthodontic awareness and 55.55% boys and 69.23% girls displayed self-perceived esthetics. Of the boys 27.77% and of the girls screened 31.73% felt a need for orthodontic treatment Based on the SMILE index scores it was seen that the highest was with score V (47.54%) followed by Score III (20.49%) (**Table 2** & **Table 3**)

Simplified Malocclusion Index for Layperson Evaluation (S.M.I.L.E.) of self-perceived treatment need

Question	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Orthodontic awareness	Y	N	Y	N	Y	N	Y	N
Self-Perceived Esthetics	N	N	N	N	Y	Y	Y	Y
Self-Perceived Treatment Need	Y	Y	N	N	Y	Y	N	N
Score	1	2	3	3	4	4	5	5

Figure 1: SMILE index scoring grid

SCORE	Interpretation of SMILE index score
1	Has orthodontic awareness coupled with poor self-esteem and a desire for treatment. Very safe patient to handle
2	Lacks orthodontic awareness .Has poor self-esteem with a desire for treatment. Patient safe to handle only after audio visual demonstrations of proposed treatment and counselling.
3	Is aware/unaware of orthodontic treatment. Has poor self-esteem yet is reluctant to accept treatment. Moderately safe patient to handle if the cause for reluctance is a simple cause
4	Good self-esteem as far as esthetics is considered irrespective of orthodontic awareness. Requires clinical correlation for justifiable treatment to rule out insecurity based psychological/socio-psychological causes. Patient to be firmly discouraged unless clinically justifiable need for orthodontic treatment. Proceed with caution. Difficult case to handle
5	Good self-esteem as far as esthetics is considered irrespective of orthodontic awareness with NO desire for treatment. Clinically ascertained need for orthodontic treatment requires extensive counseling required. Proceed with extreme caution. Very difficult case to handle

Figure 2: Interpretation of SMILE index scores

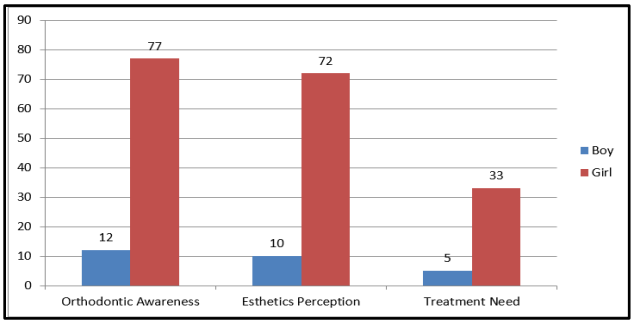

Figure 3: Distribution of smile index evaluation parameters

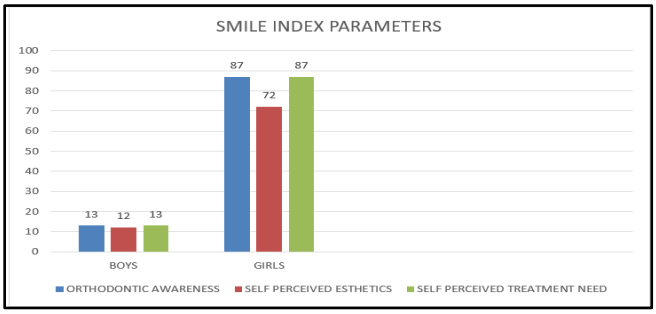

Figure 4: A gender based comparison of the distribution of Smile Index parameters

Table 1: Clinical findings in the screened population

Gender	Number Screened	Angle's Cl I	Angle's Cl II	Angle's Cl III	Midline Diastema	Crowding	Excessive Overjet	Excessive Overbite	Bimaxillary Protrusion
Male	18	14	2	2	2/18	4/18	3/18	1/18	4/18
Female	104	86	13	5	9/104	70/104	26/104	23/104	19/104
Total	122	100	15	7	11/122	74/122	29/122	24/122	23/122

Table 2: Smile index distribution

Gender	Number screened	Orthodontic awareness		Self-perceived aestitics		Self-perceived treatment need	
		Present	Absent	Present	Absent	Present	Absent
Male	18	12 (66.66%)	06 (33.33%)	10 (55.55%)	8 (44.44%)	05 (27.77%)	13 (72.22%)
Female	104	77 (74.03%)	27 (25.96%)	72 (69.23%)	32 (30.76%)	33 (31.73%)	71(68.26%)
Total	122	89	33	82	40	38	84

Table 3: SMILE index scores

Gender	Smile Index Scores				
	1	2	3	4	5
Male (18)	1 (5.55%)	2 (11.11%)	5 (27.77%)	2 (11.11%)	7 (38.88%)
Female (104)	19 (18.26%)	0 (0%)	20 (19.23%)	15 (14.42%)	51(49.03%)
Total (122)	20(16.93%)	2 (1.63%)	25 (20.49%)	17 (13.93)	58 (47.54%)
Percentage distribution					

4. Discussion

Orthodontic treatment during childhood is generally associated with esthetic problems normally related to considerable diversity in patient's perception process. Conventional approaches to assessing orthodontic needs and treatment outcomes primarily rely on normative evaluations, utilizing occlusal indexes and cephalometric analyses to determine necessity or predict treatment success. These clinical metrics, however, predominantly represent the perspective of professionals rather than that of the patients themselves. Notably, there exists a significant disparity between expert assessments and patient perceptions of dental aesthetics and orthodontic requirements. Since patient viewpoints play a crucial role in determining treatment needs, their perspectives may align with or diverge from traditional clinical evaluations based on individual circumstances.[19-23]

A well-structured evaluation protocol ensures that individuals with minor or borderline malocclusion are protected from unnecessary orthodontic interventions. Current evidence suggests that for minor dental irregularities, orthodontic treatment may not significantly improve dental health or function. Instead, its primary justification often lies in enhancing social confidence and psychological well-being through improved aesthetics.[24-25]

The study's findings reveal that despite strong orthodontic awareness, only 28% of boys and 32% of girls with clinically diagnosed malocclusion felt the need for treatment. This lower self-perceived need likely stems from high self-esteem regarding their dental aesthetics. The SMILE Index results further emphasize good orthodontic awareness and positive self-perceived esthetics, suggesting

that societal norms significantly influence the perception of treatment necessity.

The SMILE Index values indicated a higher distribution of Score V followed by Score III. The attributes of Score V are of high self-esteem as related to self-perceived esthetics irrespective of having orthodontic awareness or not with a strong reluctance towards treatment on account of no self - perceived need. Such cases require careful counselling and the clinician can only proceed when sure that the adolescent is convinced based on clinical examples and data shown to the adolescent. Such cases can thus be considered to be difficult to handle as the parent or guardian and the clinician perceive a need for treatment but the adolescent does not. This has been documented in literature from two angles. One is Abdul Kader's reference to the psychosomatic norm that would mean that the adolescent is comfortable to just fit into the esthetic requirement of the immediate surrounding circle of friends, family and community and does not feel any need for further corrections especially if the malalignments are mild and non-handicapping.[26-34]

Russelo has also indicated how media exposure has an impact on what is perceived as esthetic. From an esthetic standpoint this has been documented in literature from a viewpoint of how there is a difference in perceptions between laypersons and the clinically trained.[35-38] De Sousa et al. highlighted a gap between clinical assessments and patients' self-perceived orthodontic needs, emphasizing the importance of considering both perspectives for a well-rounded treatment approach. A deviation from what is considered acceptable may only be perceived as requiring treatment if the adolescent perceives a sufficient benefit outcome. Shaw has highlighted upon this uncertainty as related to the expected psychological or functional benefits.[39] Tung and Kiyak highlight that adolescents and parents expect a betterment of their self-image and also of oral function. This raises questions regarding the need of orthodontic treatment in borderline cases of malocclusion which invariably depend on the outcome of the interaction between the orthodontist and the patient's parent or guardian.[40-41]

The next category of SMILE Index scores was Score III with attributes of poor self-esteem as pertaining to self-perceived esthetics irrespective of having orthodontic awareness or not treatment. The reluctance towards treatment is the main obstacle towards treatment and once this is addressed the patient is easy to handle. Reluctance towards treatment is multifactorial and has been extensively documented by authors like Sayers, Kazanci and Freeman with a stress upon treatment anxiety, fear of ridicule, apprehension related to discomfort or pain, the duration of treatment and sometimes even treatment expense.[42]

Historically, the need for orthodontic treatment was assessed solely from a clinical standpoint, focusing on normative criteria. However, recent studies emphasize the significance of self-perception in determining the desire for orthodontic care. An individual's satisfaction with their dental appearance plays a crucial role in their motivation to seek treatment, highlighting the importance of incorporating both professional evaluations and personal esthetic concerns in treatment planning.[18,21-23] On the basis of this, different scales such as the Index of Orthodontic Treatment Need (IOTN), the Dental Aesthetic Index, and the Index of Complexity Outcome and Need were developed taking into consideration the perceived dental appearance from the patient's perspective in addition to the normative need determined by professional evaluations. Independent self-evaluation tools, using different approaches, have also been used to evaluate the self-perceived dental appearance such as the Standardized Continuum of Aesthetic Need (SCAN), the Oral Aesthetic Subjective Impact Scale (OASIS), or Visual Analogue Scale (VAS). There are only a few studies in the literature comparing self-perceived dental appearance between young adults with and without previous orthodontic treatment. A problem with impact scales is that they usually involve questions that are difficult for children.[43-53]

The SMILE Index functions as a straightforward tool, prompting individuals with simple yes-or-no questions regarding their awareness, perceived esthetics, and treatment needs while also capturing any hesitation they may express. Additionally, it serves as a predictive measure for assessing the safety of undergoing orthodontic treatment. Research suggests that parents may not always have an accurate understanding of their children's true orthodontic concerns, reinforcing the importance of directly obtaining unbiased patient perspectives through the SMILE Index.[54-55]

5. Conclusion

The consumer segment addressed by orthodontic treatment as a service is comprised predominantly by adolescents who have been hitherto guided almost completely by a regulated professional opinion in a operator influenced normative approach of counselling. And most often than not due to the psychosocial pressures of peer acceptance or pressure from parents or guardians. Thus, the treatment may be rendered more in favor of the demand than the need while seemingly taking adult consent and adolescent assent into account. An understanding of this has led to the desire for a practitioner to ascertain the true needs of the adolescent along with an insight into the perception of how the adolescent feels orthodontic treatment will influence the quality of life. The SMILE Index helps with this analysis by way of eliciting candid responses to very simple ineteractive questions in the child's vernacular thus proving to be a valuable tool.

6. Source of Funding

None.

7. Conflict of Interest

None.

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