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RESEARCH ARTICLE

Impact of malocclusion traits on the oral health related quality of life and self esteem in a school going population of Marathwada region- A Cross-sectional study.

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ABSTRACT

Introduction: Malocclusion is regarded as any deviation from the normal occlusion and has an adverse impact on psychological, social and physical wellbeing of an individual. There are different malocclusion traits that include anterior crowding, spacing, increased overjet, anterior open bite and increased overbite. These traits invariably result in bullying, mocking and sometimes leads to great torment to the individual. The aim of this study was to determine the impact of three malocclusion traits on the quality of life and self esteem of the patients in Marathwada population.

Methodology: This was a cross-sectional study involving 165 patients between 10 and 20 years of age, with crowding, spacing and increased overjet. The quality of life was determined using the Oral Health Impact Profile and self esteem was estimated by Rosenberg self esteem scale.

Results: The results showed that out of the three malocclusion traits increased overjet and crowding showed a highly statistically significant negative impact on oral health related quality of life and self esteem invariably leading to psychological, social and physical discomfort to the patients.

Conclusion: Malocclusion traits has reported to have negative impact on oral health related quality of life and self esteem of people pertaining to the Marathwada population.

INTRODUCTION

“Patient-centered care” is a concept introduced in healthcare systems that emphasizes on understanding the patient’s treatment needs, their experiences, satisfaction and the perceived overall quality of healthcare system.¹ There is increasing recognition in the oral disorders that affect the orofacial skeletal structure, that eventually have a significant impact on psychological, physical and social well-being of an individual²⁻⁶. This results in greater focus on improving quality of life as one of its major objective.⁵⁻⁷

Malocclusion is regarded as any deviation from the normal occlusion, and has an adverse impact on psychological, social and physical wellbeing of an individual. Malocclusion traits often lead to adverse social reactions that results in a deficient self-concept and self-worth. Those affected with malocclusion develop feelings of self-consciousness, self-doubt and shame/shy as their facial appearances are negatively impacted which hampers the social confidence of an individual. Malocclusion being a subjective component depends on individual variation and a person’s self-awareness of the malocclusion may not be related to its severity in its truest sense. There are different malocclusion traits that include crowding, spacing, increased overjet, anterior open bite and increased overbite, these traits invariably result in bullying, mocking and sometimes leads to great torment to the individual.

Correction of the malocclusion improves body image of dental and facial features and

in turn boosts the overall confidence of an individual in its functional and aesthetic dimension⁸. When evaluating the impact of a malocclusive trait, different domains that can be affected should be considered and their relationships to one’s personality traits and psychosocial factors should be evaluated as well⁹⁻¹⁰. As seeking orthodontic treatment is mostly due to altered psychological and social performance of an individual therefore oral health related quality of life (OHRQoL) can be considered a useful supplemental measurement tool for orthodontic treatment need and outcome¹¹

Several methods have been designed to measure dental outcomes in terms of the impact on quality-of life in oral health. Among all the different measures, the oral health impact profile (OHIP) is widely accepted and followed. The original 49-item OHIP developed by Slade and Spencer,¹² and was derived from the World Health Organization’s International Classification of Impairments, Disabilities and Handicaps. OHRQoL is considered to be reliable and sensitive to changes and to have adequate cross-cultural consistency¹³⁻¹⁵ The items in the original 49-item version and in the short form, OHIP-14, are grouped into 7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.^{12,16}

Malocclusion as it affects the functional and physical well-being of an individual it also influences the self esteem of an individual in a negative direction. Self esteem describes a person’s overall sense of self-worth or

personal value. The term self esteem may have three different definitions:

- (I) the golden concept of self esteem, which refers to how a person feels about himself,
- (II) individual assessment of one's capabilities,
- (III) momentary feelings of an individual about himself¹⁷

There is a positive relationship between improvement in aesthetics and psychological and functional profile which can enhance the self esteem of an individual. Amongst the various scales that have been used for estimating self esteem, one of the most commonly used scale is Rosenberg self esteem scale (RSES) which is extensively used.

This study incorporates two important domains i.e quality of life and self esteem of an individual and its impact on various malocclusion traits and its effect on day to day behaviour of an individual.

AIM

The aim of the study is to evaluate the Impact of malocclusion traits on the oral health related quality of life and self esteem in a school population of Marathwada region

OBJECTIVE

1. To evaluate the impact of three malocclusion traits on oral health related quality of life
2. To study the impact of different malocclusion traits on self esteem in school going population.
3. To correlate both of the above.

MATERIALS AND METHODS

A Cross-sectional, comparative study, was conducted among 165 patients from school going population in Marathwada population. The inclusion criteria included the patients aged between 10 and 18 years with malocclusion traits that consisted crowding, spacing and increased overjet. Individuals with a history of long-term medication because nonsteroidal anti-inflammatory drug and hormone supplements are known to interfere with bone metabolism, individuals with unilateral chewing or parafunctional habit, skeletal crossbite, and occlusal interferences, periodontally compromised patient, missing of any of the anterior teeth were excluded from this study.

In this cross-sectional study, carried out among school going population, the study group was further sub-divided into 3 groups: group I – patients with anterior crowding, group II -anterior spacing, group III -anterior increased overjet, For the purpose of the study, patients with the following occlusal traits were recruited using a modification of Johal's criteria¹⁸

- anterior crowding in which the space required to align the teeth in the upper labial segment 3 mm with a normal overjet of 2–3 mm (group I);
- anterior spacing in which total spacing in the upper labial segment 3 mm with an overjet < 6 mm (group II);
- increased overjet with an overjet 6 mm, spacing 1 mm between adjacent contact points and crowding 1 mm to align the teeth (group III).

The study participants were assessed via clinical examination. The Oral Health Impact Profile (OHIP-14) was used to measure the impact of oral problems in the subject. The items in the OHIP-14 were grouped into 7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Each patient was asked about the frequency with which he or she had experienced impact on 14 daily activities in the past 12 months. Responses was made on a 5-point Likert scale coded: never (score 0),

hardly ever (score 1), occasionally (score 2), fairly often (score 3), very often (score 4).

The Rosenberg self esteem scale as shown in Table 1¹⁷ was used to assess the self esteem of sample. This scale had 10 four-point Likert scale questions. Five questions were positive and the remaining five were negative. Positive questions were scored 4 (strongly agree) to 1 (strongly disagree). Negative questions were scored 1 (strongly agree) to 4 (strongly disagree)

Table 1: Rosenberg self-esteem scale			
1. On the whole, I am satisfied with myself.			
Strongly agree	Agree	Disagree	Strongly disagree
2. At times, I think I am no good at all.			
Strongly agree	Agree	Disagree	Strongly disagree
3. I feel that I have a number of good qualities.			
Strongly agree	Agree	Disagree	Strongly disagree
4. I am able to do things as well as most other people.			
Strongly agree	Agree	Disagree	Strongly disagree
5. I feel I do not have much to be proud of.			
Strongly agree	Agree	Disagree	Strongly disagree
6. I certainly feel useless at times.			
Strongly agree	Agree	Disagree	Strongly disagree
7. I feel that I'm a person of worth, at least on an equal plane with others.			
Strongly agree	Agree	Disagree	Strongly disagree
8. I wish I could have more respect for myself.			
Strongly agree	Agree	Disagree	Strongly disagree
9. All in all, I am inclined to feel that I am a failure.			
Strongly agree	Agree	Disagree	Strongly disagree
10. I take a positive attitude toward myself.			
Strongly agree	Agree	Disagree	Strongly disagree
Q 1,3,4,7,10: SA=4 A=3 D=2 SD=1. Q 2,5,6,8,9: SA=1 A=2 D=3 SD=4			

STATISTICAL ANALYSIS

Following data collection, data was coded and expressed in MS Excel worksheet (Microsoft, USA). Estimated values was expressed along with 95% confidence intervals. Data analysis was done using IBM Statistical Package for Social Sciences (Statistics for Windows, Version 21.0. Armonk,

NY: IBM Corp.) Categorical data was described in terms of frequencies and percentages. Continuous data was presented by mean and standard deviation (SD). Comparison of means was done using repeated measures ANOVA followed by Tukey's post hoc analysis. For categorical data, chi square test was used to compare the

proportions. For analysis, p-value less than 0.05 was considered statistically significant.

RESULTS

There were a total of 165 participants in the study. The malocclusion trait group (I to III) predominantly comprised children aged 10 to 18 years with a mean age of 12.1 \pm 2.2 years

and 17.2 \pm 2.2 years, respectively. The OHIP-14 profile was grouped into 7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap and the effect was analysed individually as follows.

Table 1: Impact on quality of life of malocclusion groups relative to each other based on various domain:

Domain	Impact		Crowding	Increased over-jet	Spacing	χ^2 value p value
Functional limitation	No impact	n	40	9	43	$\chi^2=59.198,$ $p<0.001^{**}$
		%	72.7%	16.4%	78.2%	
	Mild impact	n	14	33	12	
		%	25.5%	60.0%	21.8%	
	Severe impact	n	1	13	0	
		%	1.8%	23.6%	0.0%	
Physical pain	No impact	n	30	6	37	$\chi^2=39.351$ $p<0.001^{**}$
		%	54.5%	10.9%	67.3%	
	Mild impact	n	16	28	11	
		%	29.1%	50.9%	20.0%	
	Severe impact	n	9	21	7	
		%	16.4%	38.2%	12.7%	
Psychological discomfort	No impact	n	29	11	41	$\chi^2=41.317$ $p<0.001^{**}$
		%	52.7%	20.0%	74.5%	
	Mild impact	n	17	21	13	
		%	30.9%	38.2%	23.6%	
	Severe impact	n	9	23	1	
		%	16.4%	41.8%	1.8%	
Physical disability	No impact	n	33	8	46	$\chi^2=57.653$ $p<0.001^{**}$
		%	60.0%	14.5%	83.6%	
	Mild impact	n	12	22	8	
		%	21.8%	40.0%	14.5%	
	Severe impact	n	10	25	1	
		%	18.2%	45.5%	1.8%	

Domain	Impact		Crowding	Increased over-jet	Spacing	χ^2 value p value
Psychological disability	No impact	n	30	12	43	$\chi^2=36.268$ $p<0.001^{**}$
		%	54.5%	21.8%	78.2%	
	Mild impact	n	12	25	8	
		%	21.8%	45.5%	14.5%	
	Severe impact	n	13	18	4	
		%	23.6%	32.7%	7.3%	
Social disability	No impact	n	55	2	53	$\chi^2=147.655$ $p<0.001^{**}$
		%	100.0%	3.6%	96.4%	
	Mild impact	n	0	53	2	
		%	0.0%	96.4%	3.6%	
	Severe impact	n	0	0	0	
		%	0%	0%	0%	
Handicap	No impact	n	55	54	55	$\chi^2=2.012,$ $p=0.366$ NS
		%	100.0%	98.2%	100.0%	
	Mild impact	n	0	1	0	
		%	0.0%	1.8%	0.0%	
	Severe impact	n	0	0	0	
		%	0%	0%	0%	
Total	n	55	55	55		
	%	100.0%	100.0%	100.0%		

Table2: Sum of oral health impact profile-14 (OHIP-14) scores of the respondents in each group:

OHIP-14 score	Crowding	Increased over-jet	Spacing
Highest total score	14	19	14
Lowest total score	0	5	2
Mean	7.47	12.96	5.52
Standard Deviation	4.38	2.91	2.94
Range	14	14	12
Number of respondents with impact on OHRQoL	0	18	0
Percentage of respondents with impact on OHRQoL	0%	32.7%	0%
Percentage of respondents with no impact on OHRQoL	100%	67.3%	100%

Table 2 shows sum of oral health impact profile-14 (OHIP-14) scores of the respondents in each group. The highest score was 14 in participants with crowding and spacing while participants with increased over-jet had 19 as highest score. The lowest score was 0, 2 and 5 respectively among the participants with crowding, spacing and increased over-jet respectively. The mean

scores of OHIP-14 were 7.47 ± 4.38 , 12.96 ± 2.91 and 5.52 ± 2.94 respectively among the participants with crowding, increased over-jet and spacing respectively. None of the participants with crowding and spacing had impact on OHRQoL while 32.7% participants with increased over-jet had impact on OHRQoL.

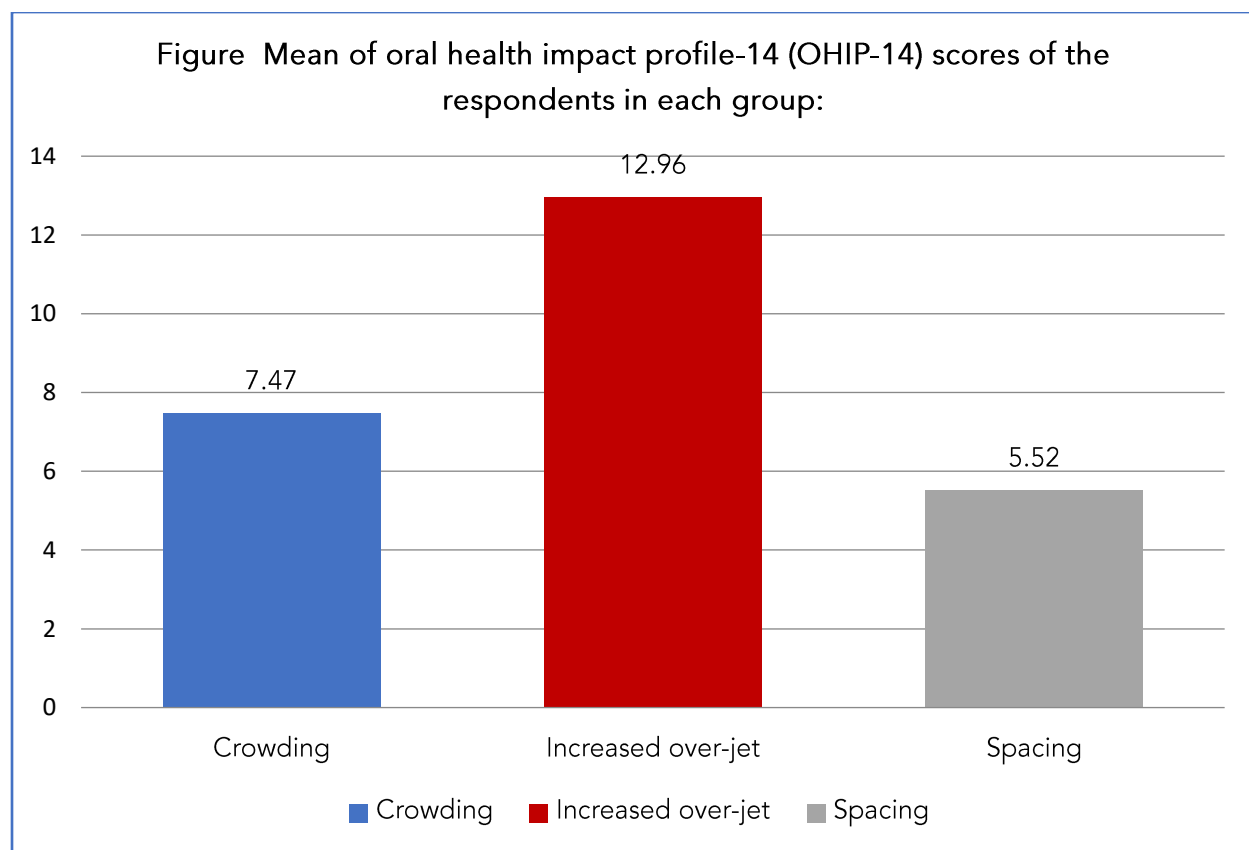


Table 3: Mean and standard deviation of Rosenberg self-esteem scale score among respondents in each group:

Group	Mean	Standard Deviation	95% confidence interval		F value	p-value
			Lower Bound	Upper Bound		
Crowding	3.44	0.11	3.41	3.47	111.344	<0.001**
Increased over-jet	3.05	0.17	3.00	3.09		
Spacing	3.04	0.19	2.99	3.09		
Post-hoc analysis by Tukey's test						
Group	Mean difference		p-value			
	Mean	SD				
Crowding vs Increased over-jet		0.39	0.03	<0.001**		
Crowding vs Spacing		0.40	0.03	<0.001**		
Increased over-jet vs Spacing		0.39	0.03	0.983 NS		

Table 3 shows mean and standard deviation of Rosenberg self-esteem scale score among respondents in each group. The mean scores were 3.44 ± 0.11 , 3.05 ± 0.17 and 3.04 ± 0.19 respectively with statistically significant difference between the groups ($F=111.344$, $p<0.001$). The difference between the crowding vs increased over-jet and crowding vs spacing was statistically highly significant ($p<0.001$) while increased over-jet vs spacing did not show any significant difference ($p=0.983$).

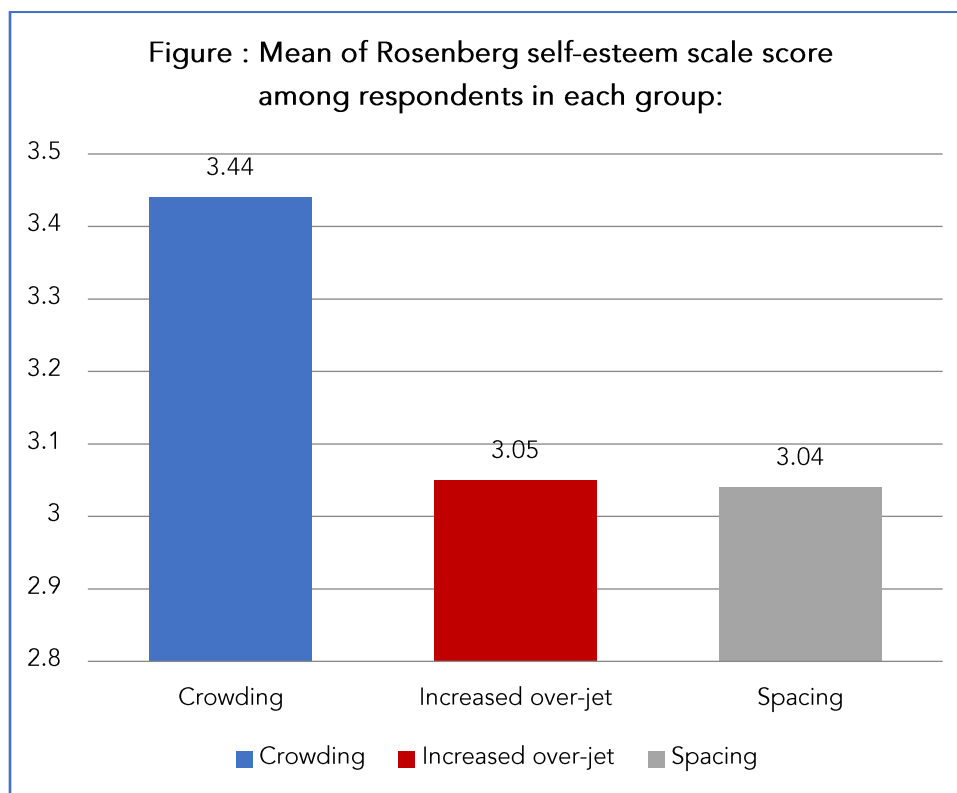


Table 4: Correlation between Rosenberg self-esteem scale and OHIP-14:

Question	Correlation	OHIP-14
Question 1	Spearman's correlation	-.170*
	<i>p</i>	0.029
Question 2	Spearman's correlation	0.077
	<i>p</i>	0.327
Question 3	Spearman's correlation	-0.077
	<i>p</i>	0.327
Question 4	Spearman's correlation	-.333**
	<i>p</i>	0.000
Question 5	Spearman's correlation	-.337**
	<i>p</i>	0.000
Question 6	Spearman's correlation	0.121
	<i>p</i>	0.122
Question 7	Spearman's correlation	-0.076
	<i>p</i>	0.334
Question 8	Spearman's correlation	0.314**
	<i>p</i>	0.000
Question 9	Spearman's correlation	-.220**
	<i>p</i>	0.004
Question 10	Spearman's correlation	0.065
	<i>p</i>	0.410

Table 4 shows correlation between Rosenberg self-esteem scale and OHIP-14. A statistically significant negative correlation was observed between question number 1, 4, 5 and 9 while a statistically significant positive correlation was observed with question 8. No statistically significant correlation was seen between question number 2, 3, 6, 7 and 10 and OHIP-14.

DISCUSSION

Malocclusion is regarded as any deviation from the normal occlusion, and has an adverse impact on psychological, social and physical

wellbeing of an individual.¹⁹ Malocclusion is considered as one of the irrevocable factor that affects the overall well-being of an individual that invariably affects the quality of

life and self esteem of an individual. In this study, three different malocclusion traits that is increased overjet, crowding and spacing were assessed to comprehend its effect on oral health related quality of life and self esteem of an individual. The age group targeted in our study was 10-18years school going population of the Marathwada region. The study participants were assessed via clinical examination. The Oral Health Impact Profile (OHIP-14) was used to measure the impact of oral problems in the subjects and self esteem was evaluated via Rosenberg self esteem scale¹⁷.

Of the three malocclusion traits, increased overjet had the highest impact while spacing had the least impact on Oral Health Related Quality of Life and self esteem respectfully. Similar results were found in a study conducted by Johal et al.¹⁸ who concluded that increased overjet and spaced dentition significantly affects the quality of life compared to control subjects. Their findings revealed that different malocclusion traits can have negative impact on the quality of life which affects the overall self esteem of an individual.

In a study conducted by Obilade et al¹⁹ in 2016 they had compared the malocclusion traits with oral health quality of life of 120 patients pertaining to the age group of 10 to 20 years. In the study they had concluded that the functional limitation and psychological discomfort are affected more in patients with increased overjet and crowding as compared to other malocclusion traits respectively. OHQoL(oral health related quality of life) was

poorer in patients with malocclusion and patients with increased overjet recorded the highest level of impact on their quality of life. Concurrent findings were reported by Mohd. Masood et al²⁰ in 2017 who examined the association of increased overjet, cross-bite/scissor-bite and increased overbite/open bite with oral health-related quality of life (OHRQoL) among Finnish adults using nationally representative data.

A systematic review done by Dimberg et al²¹ in 2015 found a high level of evidence that malocclusion in the aesthetic zone affects negatively on the quality of life. Similarly, in our study, one malocclusion trait that is increased overjet, demonstrated a highly significant association with OHRQoL. Within the seven OHRQoL domains, there is evidence that malocclusion can limit function by reducing chewing and speech capability and thus lowering the overall self esteem of an individual. Concurrent results were reported by Naseri et al¹⁷ in 2020 who assessed the effect of malocclusion on the self esteem of adolescents and concluded that lower self esteem was seen in patients with malocclusion traits that invariably results in more peer pressure and bullying of students in school which affect the overall growth of an individual having a negative impact on the quality of life.

Esthetics is the basic reason for seeking an orthodontic treatment and malocclusion traits invariably affect the quality of life which was stated in a study done by Sardenberg et al²² in 2013 involving 8- to 10-year-old Brazilian school. The study showed that individuals with

malocclusion experienced a greater negative impact on OHRQoL than those without malocclusion. Malocclusion, especially in the anterior teeth, can compromise a child's psychosocial well-being thereby affecting the self esteem of an individual.

Agou et al²³ in 2006 conducted a longitudinal study to find the relationship between self esteem of an individual to that of quality of life and concluded that compared with normative measures of malocclusion, self esteem is a more salient determinant of OHRQoL in children seeking orthodontic treatment which is in accordance to the results of our study. Peer victimization among school children is described as a situation when children are repeatedly exposed to negative actions based on their appearances leading to teasing, hitting, name calling and threatening. Seehra et al²⁴ conducted a study to measure the self-reported frequency and severity of bullying amongst patients referred for orthodontic treatment and investigated if there was a relationship between levels of self-reported bullying, malocclusion and need for orthodontic treatment, self esteem and oral health-related quality of life concluding significant relationships exist between bullying and certain occlusal traits, self esteem and OHRQoL.

Santos et al²⁵ assessed the relationship between normative and perceived orthodontic treatment need associated with quality of life, self esteem, and self-perception and concluded that the normative need for orthodontics treatment was not overestimated by the perceived need, and the perceived need was

not influenced by sex and the impact on quality of life which is not in accordance with our study as as per our study perceived orthodontic treatment is influenced by quality of life. A similar study was conducted by Taylor et al²⁶ who concluded that malocclusion and orthodontic treatment do not appear to affect general or oral health QoL to a measurable degree, despite subjective and objective evidence for improved appearance, oral function, health, and social well-being.

Several studies by Sardenberg²², Griffiths²⁷, Dalle²⁸, Jung²⁹, Rusanen³⁰ demonstrate that malocclusion traits have negative impact on oral health related quality of life and also on self esteem of an individual that leads to altered social behavior and questionable self-worth. This leads to long term damage to self esteem which may lead to bullying and anxiety in the future. Bullied children and teens are more likely to experience depression and sometimes long-term damage to self esteem. Children feel lack of confidence and avoid to mix up their other peers ending up being lonely. These children have the highest rates of anxiety, depression and substance abuse, compared to children who are victims or bullies. They are also more likely to feel less positive about the future and develop antisocial personality disorder as adults. If treated in time, reversal of the self-damage and positive outlook towards life can be expected.

CONCLUSION

There exists a highly statistically significant relationship between malocclusion traits and quality of life and self esteem of an individual. Traits that are commonly encountered are

increased overjet, crowding and spacing in an individual.

People with malocclusive traits have higher need for orthodontic treatment that

should be carried out as early as possible to avoid the damage to self esteem and quality of life.

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Conflict of Interests

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