

# Psychological factors influencing motivation, cooperation, participation, satisfaction, self appraisal, and individual quality of life in adolescents and adults undergoing Orthodontic treatment

Dr. Oshin Pawar<sup>1</sup>, Dr. Purva Joneja<sup>2</sup>, Dr. Deepak Singh Choudhary<sup>3</sup>

<sup>1</sup>PG Student, <sup>2</sup>Professor and HOD, <sup>3</sup>Senior Lecturer,  
Department of Orthodontics and Dentofacial Orthopedics, Bhabha college of Dental Sciences, Bhopal (M.P.)

Corresponding author: Dr. Oshin Pawar; Email: droshinpawar@gamil.com

## ABSTRACT

**Introduction:** To bring the best outcome from both the sides i.e. the orthodontist and the patient, it is of prime importance to understand certain psychological factors, and to treat every patient with an individualistic approach. The need was to study all such psychological factors and to find a method to deal with the same; to evaluate the psychological factors that influence the self appraisal and individual Quality of life. To compare psychological factors affecting the self appraisal and individual quality of life before treatment and after treatment, to study psychological factors of patients which influence the treatment outcome and to find a method to manage them.

**Materials and Method:** This In-vivo study, includes case study and survey. Two separate sets of questionnaires (before and after undergoing orthodontic treatment) were given to patients. The study also included psychological test scales like OHIP-14 and 12-CSES. The sample size of patient was 150.

**Result:** The study revealed that esthetics (95%) is the main concern for getting treatment especially for female (56%). There is improvement in OHIP and CSES (interval of 12.63, 14.66) score of patients before and after treatment. Patients' satisfaction (94.7%) increases on having healthy orthodontist-patient relationship.

**Conclusion:** Esthetics is the main concern. Most patients want improvement in smile. Lack of awareness and lack of financial supports is the main reason for delay in getting treatment. The main discomfort about the treatment reported by participants was pain after activation appointments, ulcers and change in food eating habit. The orthodontic therapy improves confidence, satisfaction, individuals' appraisal and quality of life. There were no variations in response for patients' satisfaction by gender, age, education or by treatment duration.

**KEYWORDS:** Expectations; Orthodontic treatment; Psychology; Quality of life; Satisfaction, Self appraisal

## INTRODUCTION

The concept of being a healthy person is incomplete without psychosocial well being, and esthetics plays a major role in it. The face, especially mouth is a key element in personal attractiveness, self-esteem. The mouth enables nutrition, establishes relation to environment via speech.<sup>1,2</sup> The unesthetic perception of face by self or by other, implies negative social and psychological reflexes and affects one's self-confidence, self appraisal, professional success and quality of life.<sup>3</sup> There is a quote "A good patient makes a good

orthodontics". To have a good result of orthodontic treatment, the patient should be self-motivated, cooperative, true participative, punctual for appointments, and should be interactive enough to tell their needs and expectations from the treatment.<sup>4,6</sup> As the orthodontic treatment is long, the patient develops a long term relationship with the orthodontist. So to bring the best outcome from both the sides, it is of prime importance to understand certain psychological factors individual to adolescent<sup>7,8</sup> and adults<sup>9-10</sup>, and to treat every patient with an individualistic approach. The

need was to study all such psychological factors and to find a method to deal with the same, so as to get a highly satisfactory<sup>11</sup> outcome; to evaluate the psychological factors<sup>12</sup> that influences the self appraisal<sup>13</sup> and individual Quality of life<sup>10,14</sup>.

The correlation between patient satisfaction regarding Orthodontic treatment and the numbers of factors like age, sex, treatment duration, esthetic improvement has been found<sup>15-17</sup> but the study of overall correlation of the psychological factors: expectation, motivation, cooperation, participation which successively effects the individual appraisal and Quality of life have not been found yet. Also how an orthodontist can overcome these factors has not been explored. So, this study also provides an insight to the orthodontist on, how to manage patient with undesirable psychological factors, and how to shape them towards being motivated and cooperative to get desirable treatment outcome.

**OBJECTIVES**

- To compare psychological factors affecting self appraisal and individual quality of life before treatment and during treatment.
- To know the variation in psychological factor in male and female, adolescent and adults
- To study psychological factors of patients which influences the treatment outcome and to find methods to manage them.

**MATERIALS AND METHOD**

The Sample consisted of local-central India population reported to the department of Orthodontics. Adolescent patients age ranging from 13-19 years and adult patients age ranging from 20-55 years age, including both male and female. The sample size of patients was 150. Inclusion criteria were: Patients who will commence orthodontic treatment, age ranging from 13- 55 years, who are at least able to read and write and, those children who can answer on their own without the help of guardians. Exclusion Criteria: Illiterate individual, relapsed Orthodontic cases, patient with history of orthognathic surgery or in need, major facial trauma, cleft lip and cleft palate, craniofacial syndromes, neurological or psychiatric disorders.

In this In-vivo study, the instrument of data collection is survey which is composed of close-ended, separate sets of Online Questionnaire (multiple choice types) for the Patients. A set questionnaire (FORM-A) comprised of 11 questions, which were filled before the start of the treatment (Figure 1). And another set of questionnaire (FORM-B) were filled by the same patients at end of treatment comprised of 12 multiple choice questions (Figure 2). Both of the questionnaire sets also included

psychological test scales: Core Self-Evaluation Scale – 12 (12-CSES) (Figure 3) & Oral Health Impact Profile – 14 (OHIP-14) (Figure 4); the score of both psychological test scales were then compared. The questionnaire was made in Google forms. The forms were circulated among the patients through different social media platforms such as Whatsapp and Email.

Data was analyzed through Python programming. Descriptive statistical analysis was used to describe variables included in the study. Mean scores and standard deviations were calculated and were used to describe the continuous variables. Percentages were used to describe the categorical data. T-test was used to find significance within the sample. The confidence interval was set at 95%.

Figure 1: Questionnaire FORM-A (before treatment)

Name:	Age:	Sex: M/F	Education:
1. What is the Chief complaint related to your teeth? <input type="radio"/> Bad facial appearance <input type="radio"/> Difficulty in chewing <input type="radio"/> Gums related problems <input type="radio"/> Difficulty in speaking <input type="radio"/> Problem related to jaw joint <input type="radio"/> Any other (specify)_____		6. Does the position, size and/ or thickness of your lips bothers you? <input type="radio"/> No <input type="radio"/> Yes, i feel my lips are short <input type="radio"/> Yes, i feel my lips are thick or thin than normal	
2. What are your myths and doubts about Orthodontic treatment? <input type="radio"/> Treatment is very painful <input type="radio"/> Treatment duration is very long <input type="radio"/> Only children are right candidate for orthodontic treatment <input type="radio"/> Extraction of teeth can lead to blindness <input type="radio"/> There will be drastic improvement in facial appearance <input type="radio"/> Any other (specify)_____		7. What bothered you the most about your smile? <input type="radio"/> Gummy smile <input type="radio"/> Toothy smile <input type="radio"/> Size and shape of teeth <input type="radio"/> Mis-alignment of teeth <input type="radio"/> Position of lips	
3. Who motivated you to get the orthodontic treatment? <input type="radio"/> Self motivated <input type="radio"/> Motivated after been explained by the Orthodontist <input type="radio"/> On general dentist suggestion <input type="radio"/> Under influence of family or friends		8. If you think your smile is "crooked", then what do you mean by it? <input type="radio"/> Uneven lip line while smiling <input type="radio"/> Slanting of teeth one side <input type="radio"/> Wide spaces in between teeth <input type="radio"/> Overcrowding of teeth <input type="radio"/> Other, plz mention_____	
4. Do you like your smile? <input type="radio"/> Yes <input type="radio"/> No		9. Which smile is more pleasant? <input type="radio"/> Consonant <input type="radio"/> Straight <input type="radio"/> Non-Consonant	
5. When do you feel that your facial appearance is bad? <input type="radio"/> Lips closed <input type="radio"/> On smiling		10. While smiling, how much amount of gum display is acceptable? <input type="radio"/> No display of gum <input type="radio"/> 1-2 mm of gum <input type="radio"/> 3mm or more	
		11. While smiling, Buccal corridor(refer image) should be present or not? <input type="radio"/> Yes, it look good <input type="radio"/> No, they are unesthetic <input type="radio"/> Does not matter	

Figure 2: Questionnaire FORM-B (after treatment)

Name:																																	
1) What is the main distress/discomfort caused during treatment? <input type="radio"/> No discomfort <input type="radio"/> Pain after appointments <input type="radio"/> Ulcers <input type="radio"/> Change in food eating habit <input type="radio"/> Long treatment plan <input type="radio"/> Social embarrassment <input type="radio"/> Problem in maintaining oral hygiene <input type="radio"/> Any other (specify)_____	2) Is or was there any social embarrassment in day to day life during orthodontic treatment? <input type="radio"/> No interference <input type="radio"/> Yes, but only to small extent <input type="radio"/> Yes, to complete extent																																
3) Describe your orthodontist under following points (check on the suitable box)																																	
<table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>YES</th> <th>MAY BE</th> <th>NO</th> </tr> </thead> <tbody> <tr> <td>Orthodontist explained the treatment plan to me before start of the treatment.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>He/ she cleared all my doubts promptly</td> <td></td> <td></td> <td></td> </tr> <tr> <td>He/ she was gentle while treating me</td> <td></td> <td></td> <td></td> </tr> <tr> <td>He/ she was concerned about my health</td> <td></td> <td></td> <td></td> </tr> <tr> <td>He/ she was punctual about appointment timing</td> <td></td> <td></td> <td></td> </tr> <tr> <td>He/ she was honest with me regarding treatment duration and cost</td> <td></td> <td></td> <td></td> </tr> <tr> <td>I will recommend my orthodontist to other people</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		DESCRIPTION	YES	MAY BE	NO	Orthodontist explained the treatment plan to me before start of the treatment.				He/ she cleared all my doubts promptly				He/ she was gentle while treating me				He/ she was concerned about my health				He/ she was punctual about appointment timing				He/ she was honest with me regarding treatment duration and cost				I will recommend my orthodontist to other people			
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4) Did the duration of your treatment bothered you? <input type="radio"/> No <input type="radio"/> Yes, a little <input type="radio"/> Yes, very much	5) Are you satisfied with the treatment? <input type="radio"/> Very satisfied <input type="radio"/> Satisfied <input type="radio"/> Neutral <input type="radio"/> Unsatisfied <input type="radio"/> Strongly unsatisfied																																

Figure 3: CSES-12

S.No.	Questions	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
01	I am confident I get the success I deserve in life.					
02	Sometimes I feel depressed					
03	When I try, I generally succeed.					
04	Sometimes when I fail I feel worthless					
05	I complete tasks successfully					
06	Sometimes, I do not feel in control of my work					
07	Overall, I am satisfied with myself.					
08	I am filled with doubts about my competence.					
09	I determine what will happen in my life					
10	I do not feel in control of my success in my career					
11	I am capable of coping with most of my problems					
12	There are times when things look pretty bleak and hopeless to me					
Total Score						

Figure 4: OHIP-14

Dimensions	Questions	0 Never	1 Hardly ever	2 Occasionally	3 Fairly Often	4 Very Often
Functional limitation	Have you had trouble pronouncing any words because of problems with your teeth or mouth?					
	Have you felt that your sense of taste has worsened because of problems with your teeth or mouth?					
Physical pain	Have you had painful aching in your mouth?					
	Have you found it uncomfortable to eat any food because of problems with your teeth or mouth?					
Psychological discomfort	Have you been self-conscious because of your teeth or mouth?					
	Have you felt tense because of problems with your teeth or mouth?					
Physical disability	Has your diet been unsatisfactory because of problems with your teeth or mouth?					
	Have you had interrupted meals because of problems with your teeth or mouth?					
Psychological disability	Have you found it difficult to relax because of problems with your teeth or mouth?					
	Have you been a bit embarrassed because of problems with your teeth or mouth?					
Social disability	Have you been a bit irritable with other people because of problems with your teeth or mouth?					
	Have you had difficulty doing your usual jobs because of problems with your teeth or mouth?					
Handicap	Have you felt that life in general was less satisfying because of problems with your teeth or mouth?					
	Have you been totally unable to function because of problems with your teeth or mouth?					

## RESULT

The mean age was 21.68 (SD +1.11). Out of the 150 subjects, 84 were females and 66 were males. More than half of study population were undergraduate students. The most common reason for seeking Orthodontic treatment was Bad facial appearance (63.3%).

Most of the subjects felt that prolonged duration of treatment (32.6%) was the main reason. Hence, the duration of orthodontic treatment should be explained to patients at the beginning of treatment in order to prevent losing their motivation. Second most common myth they had was that there will be drastic facial improvement. Hence, patient should be explained prior, the limit of orthodontic treatment and up to what level their expectation can be fulfilled.

The patients were asked who motivated you to get the orthodontic treatment. It can be seen that, a

high percentage (54.7%) of patients are self motivated followed by suggestions from their family or friends, by Orthodontists, on general dentist suggestion.. This is important because internally motivated patients are more likely to be cooperative during their orthodontic treatment.

On asking if they like their present smile, 70% answered "No". 62% felt their facial appearance is bad on smiling. 27.3% thought that their lips are thick or thin than normal, 19.3% said that their lips are short. On asking "what bothers you the most about your smile", 40% answered misalignment of teeth; 26% toothy smile; 16% size and shape of teeth. By the term Crooked, 37.3% meant overcrowding of teeth, 22.7% meant wide spaces in between teeth. 79.3% patients agreed that consonant smile is more pleasant. Most of the patients (77.3%) said that 1-2mm of Gum display on smiling is acceptable. For Buccal corridor, answer was not significant, 42.7% said that they are unesthetic, 36.7% found it looks good and to 20.7% it didn't matter.

Difference between Female and Male CSES score lies in the interval (-0.24, 3.18) with 95% of confidence interval. (Table.1) Difference between the mean score of male and female is insignificant. Difference between mean score of adolescent and adults is insignificant.

Table 1: Form-A CSES score according to sex and age (T-distribution table)

Population	Observation	Mean score	Standard deviation	Pooled standard deviation	P value
Male	66	33.47	4.99	5.27	0.78
Female	84	34.94	5.42		
Adolescent	55	34.54	5.22		0.98
Adults	95	34.41	5.41		

Difference between Male and Female OHIP score lies in the interval (-1.98, 3.76) with 95% of confidence interval. (Table.2) Difference between the mean score of male and female is insignificant. Difference between the mean score of adolescent and adult is insignificant.

Table 2: Form-A OHIP score according to sex and age (T-distribution table)

Gender	Observation	Mean score	Standard deviation	Pooled standard deviation	P value
Male	66	27.94	8.907	8.824	0.9
Female	84	27.05	8.652		
Adolescents	55	25.67	8.88		0.72
Adults	95	28.13	8.67		



Regarding the discomforts experienced throughout treatment, 28% patients complained of pain after activation appointments; 18.7% complained about ulcers, 14.7% patients pointed to change in food eating habit; 7.3% patients had no discomfort. Most of patients (64%) had no social interference or embarrassment in doing routine work with orthodontic appliance in mouth. 8% of subjects were “very much” bothered or unsatisfied and 38.7% were “a little” bothered with the total treatment duration.

When the patients were asked about the reason to delay Orthodontic treatment, the answers were: 20.7% didn't know problem can be treated orthodontically; 16% couldn't afford treatment till now; 16% said their guardians didn't agree before; 14% said teeth got more crooked with time. Responses to questionnaire regarding orthodontic treatment and services. A high rate of satisfaction with the treatment (94.7%) was found.

On the question “Orthodontist explained the treatment plan to me before start of the treatment” revealed that (15 %) of the subjects answered “maybe” or “No”. Whereas, (82.7%) of the subjects stated that their orthodontist were gentle while treating them. A significant percentage of the subjects (85.3%) stated that the doubts they had during the appointments were answered promptly. While a total of (82.7%) of Individuals stated that the dentist was gentle while treating them. Questions concerning orthodontist honesty, (10%) of the respondents stated that their orthodontist weren't completely honest about total treatment duration and treatment cost.” Also, (84%) of the subject answered “Yes” to the question “I will recommend my orthodontist to others” while (2%) answered “No” and (14%) answered “maybe”

Difference between Post and Pre CSES scores lies in the interval (12.63, 14.66) with 95% of confidence interval. The differences between the pre and post CSES scores are significant. (Table 3)

Difference between Pre and Post OHIP scores lies in the interval (13.60,16.81) with 95% of confidence interval. The differences between the pre and post OHIP scores are significant. (Table 4)

Table 3. Comparison of Form-A & Form-B results of CSES

CSES score	Observation	Mean	Standard Deviation	P value
Pre (Form A)	150	34.29	5.27	< 0.05
Post (Form B)	150	47.94	3.50	

Table 4. Comparison of Form-A & Form-B results of OHIP

OHIP score	Observation	Mean	Standard Deviation	P value
Pre (Form A)	150	27.44	8.74	< 0.05
Post (Form B)	150	12.23	4.82	

**DISCUSSION**

The successful treatment in orthodontics is mainly dependent on a good interaction between the orthodontist and the patient. The relationships in between patient –orthodontist and the treatment provided is influenced by number of variables such as issues relating to compliance; maintenance of oral hygiene<sup>18</sup>; pain perception, discomfort, and psychological adjustment to treatment<sup>19</sup> ; habits<sup>20</sup> and patient satisfaction.

The orthodontist has to encompass more of a psychologist/counselor role at times, rather than a mechanical practitioner treating malocclusions. With the help of this study, we were able to identify the psychological aspects which are relevant to clinical orthodontics.

The mean age group of patients for seeking orthodontic treatment was 21±1.11 years.

The predominance of female patients (56%) suggests that women have a greater motivation to undergo orthodontic treatment when compared to men. It means greater tendency of women seeking orthodontic treatment, corroborating with the studies by other authors.<sup>21</sup> This proportion shows that women are more demanding about appearance, and more uninhibited in showing their dissatisfaction about themselves.<sup>22</sup>

The fact that the study sample is mostly composed of individuals with high level of Education (58% undergraduates) suggests that education lead to awareness toward oral health as they can better recognize the impact of a malocclusion on their health. When assessing the chief complaint of patients, it is clear that most of the patients had esthetic reasons (63.3%). This data corroborates with previous studies that show that the great majority of patients seek treatment to improve their smile esthetics and their facial esthetics.<sup>23</sup>

In the present study, 54.7% of the subjects said that it was their own decision to seek treatment. This is in

agreement with the study of Fazwan et al<sup>24</sup> and Pabari et al,<sup>25</sup> who found that about half of their sample sought treatment on their own accord. In contrast, according to the findings of Daniels et al<sup>26</sup> and Fleming et al,<sup>27</sup> the highest percentages of patients were motivated by their general dentist, the second highest percentage being of self motivated patients. Therefore, it can be said that a high percentage of patients are self motivated. This is important because internally motivated patients are more likely to be cooperative during their orthodontic treatment.

On asking about their smile, most of patients didn't like their smile and felt the facial appearance is bad on smiling. Half of patients were unsatisfied with either position of lips or with thickness of lips. Misalignment bothered them the most about their smile.

In general, high levels of satisfaction following orthodontic treatment have been reported in the current study, which is similar to the results of previous studies<sup>28</sup>. The present study found that 94.7% of subjects were satisfied with the treatment. The results are similar to Larsson and Bergsröm study<sup>29</sup> where they reported a satisfaction rate of 74%. These findings are not surprising given that another study showed that the face is a crucial characteristic in the development of a person's self-esteem and self-image.

In addition, the current study results showed that gender, age, and duration of treatment were not related to patients' satisfaction after orthodontic treatment. These results are consistent with earlier studies.<sup>30</sup>

In addition, the findings of the present study, as well as earlier studies<sup>31</sup> supported that orthodontic treatment not only results in improvement in oral health (OHIP interval of 13.60, 16.81) but also has a significant impact on the self-appraisal (CSES interval of 12.63, 14.66) of the patient.

Regarding experience of discomfort during treatment, the majority had pain after activation appointments. Moreover, Kouguchi et al (1990)<sup>32</sup> observed that (49%) of patients had thought of giving up treatment due to discomfort of appliances. Concerning gender, the present results demonstrated no difference in pain perception between both males and females. Earlier studies<sup>33</sup> are in agreement with the present study. On the other hand, findings of previous studies showed that females had more pain and discomfort during fixed appliance treatment than males<sup>34</sup>.

In this study, the most common reason given by the patients for the delay in treatment till presently was the unawareness that the problem can be treated orthodontically. Next answer was inability to afford the treatment. This is dissimilar to the study done by Pabari et al<sup>27</sup> who found the most common reason was failure to recommend orthodontic treatment to them. Inability to afford treatment was the second most common reason for delay found in their study too.

A critical role in a patient's mental satisfaction, in addition to professional performance is the patient-orthodontist relationship. The results of the current study showed that the factors that affected the patients' satisfaction with their orthodontist were orthodontists' punctuality for appointments, answering to patients' doubts by the orthodontists, gentleness of the orthodontists while treating patients and honesty about treatment duration.

When the pre orthodontic treatment psychology and post orthodontic psychology were compared of patients, there was drastic improvement in patients' oral health, oral health related quality of life and self appraisal.

## CONCLUSION

It was determined from this study that the orthodontic therapy did improve individuals' self appraisal and quality of life. There were no variations in response for patients satisfaction by gender, age, education or by treatment duration.

The main reason for seeking orthodontic therapy is bad facial appearance. There is predominance of female patients for seeking orthodontic treatment, meaning female are more concerned with esthetics. Most of the patients in this study believed that their orthodontic treatment was successfully completed, resulting in esthetical, social, and psychological improvement. For most participants orthodontic appliance do not interfere in their social-relations, but brings some degree of difficulty in maintaining oral hygiene. The main discomfort about the treatment reported by participants was pain after activation appointment, ulcers and change in food eating habit.

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