

# Effect of Malocclusion on Quality of Life among Persons Aged 7 - 25 Years: A Cross-Sectional Study

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## Abstract

**Background:** The theory of Oral Health Related Quality Of Life (OHRQOL) has manifold qualities. It endeavors to address social and/or emotional concerns as well as any symptoms or functional problems related to the teeth and jaws from the patients view point. The difficulty of utilizing any one standard evaluation tool to determine how the patient feels about problems with malocclusions or arising from them, led to the development of this construct/theory. **Aim:** To evaluate the impact of malocclusion on the socio-functional and psychological wellbeing of persons 7 - 25 years old. **Method:** 100 patients within the ages of 7 - 25 years who visited the Orthodontics Unit of the Oral Health Directorate of Komfo Anokye Teaching Hospital (KATH), Kumasi, were conveniently sampled and surveyed. Participants were given questionnaires to assess the effects of malocclusion on their Oral Health Related Quality of Life and also to determine if their educational status had any influence on the impact of malocclusion on their oral health related quality of life. **Results:** The modal age of the participants was 10 - 15 years with 40% as it frequency followed by 7 - 9 years while the age with least frequency was 16 - 25 years which stood at 22.0%. 28 respondents reported negative effects on their functional domain. 71 of the participants reported negative effects on psychological well-being and 49 of them reported negative effects on social well-being. **Conclusion:** Malocclusion has an overall negative impact on Oral Health Related Quality of Life and its related purviews. It was observed to be highest for the psychological discomfort domain and the lowest in the functional well-being domain.

## Keywords

Oral Health Related Quality of Life (OHRQOL), Malocclusion

## 1. Introduction

Occlusion describes the relationship between the maxillary and mandibular teeth when they come into maximum intercuspation. A normal dental occlusion was defined by Angle as a situation where “the sizes, forms, interdigitating surfaces, and positions of the teeth in the arches are such as to give to one another, singly and collectively, the greatest possible support in all directions” [1]. Angle’s definition of normal occlusion has afterwards been considered to be more properly a picture of ideal occlusion, which is very rare in nature, whereas normal occlusion may contain minor deviations from the ideal.

Malocclusion is a widespread oral condition that occurs worldwide. It differs from a majority of dental and medical conditions in that it is a “set of dental deviations” rather than a disease, and that orthodontic treatment does not cure the condition but rather corrects variations from an arbitrary norm [2].

Malocclusion can be defined as appreciable deviation from the normal or ideal occlusion [3]. Malocclusions are classified into two major groups: dental and skeletal malocclusions, depending on skeletal relationships. Severe malocclusions are frequently skeletal and often referred to as “dentofacial deformities”. Malocclusion, as defined by the Index of Orthodontic Treatment Need (IOTN) 4 occurs in 20% - 60% of adolescents in Europe, in 20% - 50% in Asia, 7 - 9 in 20% - 40% in Africa, and in 20% - 30% in South America, although it is not generally a life threatening.

The concept of Oral Health Related Quality of Life has multiple qualities and can be defined as the absence of negative impacts of oral conditions on social life and positive sense of dento-facial self-confidence [4]. The concept attempts to address social and/or emotional concerns as well as any symptoms or functional problems from the patients view point. It is difficult to utilize any one standard evaluation tool to determine how the patient feels about themselves [5]. However, this concept of a patient’s view means that the idea of a “good oral health” should include the patient’s self-esteem, psychological and social well-being, as well as the absence of hard and soft tissue oral diseases [4].

Like other adverse oral conditions, malocclusions are highly prevalent and wide-reaching [2]. Globally, malocclusion has been increasing with industrialization in many populations and has become so widespread that it is ranked as the third most prevalent oral health problem after dental caries and periodontal disease [6]. A longitudinal and cross sectional study on impact of orthodontic treatment on OHRQOL, disclosed a successful orthodontic treatment included the individual’s emotional well-being and their quality of life. However, this was observed to be on short term evaluations [7].

Another study on effect of malocclusion severity on oral health related quality of life and food in-take ability in the Korean population done showed that as the severity of the malocclusion and the age of the patient increased, oral health related quality of life and masticatory factors greatly deteriorated. This finding provided evidence that, severe malocclusions are associated [8]. A cross sectional

study conducted on the impact of malocclusions on oral health related quality of life in children in the Netherlands, showed an inverse association of malocclusion with oral health related quality of life [9]. It also showed that, the strength of the association differed depending on the age of the children and their cultural environment [9].

## 2. Methodology

This is a descriptive cross sectional study.

### 2.1. Background of Study Area

Kumasi is the capital city of Ashanti Region of Ghana. Its location makes it readily accessible to people from all over Ghana. It is the second largest city in the country. It has an estimated population of more than two million people and an annual growth rate of about 5.4% [10]. The Komfo Anokye Teaching Hospital is a 1200 bed capacity teaching hospital located in Kumasi. It takes referrals from 12 of the 16 administrative regions, as well as some West African neighbours. It is also involved in the training of various health personnel [10].

### 2.2. Eligibility Criteria

#### Inclusion criteria

Patients between 7 - 25 years, who were in good general health, who came to the clinic for purely orthodontic purpose and consented to take part in this study, were included.

#### Exclusion criteria

Patients below 7 years and above 25 years, patients with a medical condition such as psychiatric condition and those who were not willing to take part in the study were excluded.

## 3. Sampling

#### Sample size

A calculated sample size of 100 was used

Sample size was calculated using the formula:

$$n = \frac{(Z^2 \times P(1-P))}{e^2}$$
$$\frac{(z^2 \times P(1-P))}{e^2 N}$$

$Z$  = value from standard normal distribution corresponding to desired confidence level ( $Z = 1.96$  for 95% CI),

$P$  is expected true proportion,

$e$  is desired precision (half desired CI width),

$N$  is population.

## 4. Data Collection Tools

A structured questionnaire which was self-administered and researcher assisted,

were used on the patients after they had been seen by the doctor. The questions comprised both close ended and open ended questions.

## 5. Ethical Consideration

Ethical approval has been obtained from the Committee on Human Research, Publications and Ethics of Kwame Nkrumah University of Science And Technology, School of Medical Sciences, and Komfo Anokye Teaching Hospital. Approval was also be obtained from the respondents.

**Table 1** showing age, gender and educational status of respondents.

**Figure 1** showing the perception of arrangement of teeth and how it affected the speech of respondents.

**Figure 2** showing the perception of arrangement teeth and its effect on chewing and biting.

Response to psychological effects of malocclusion by respondents, **Table 2**.

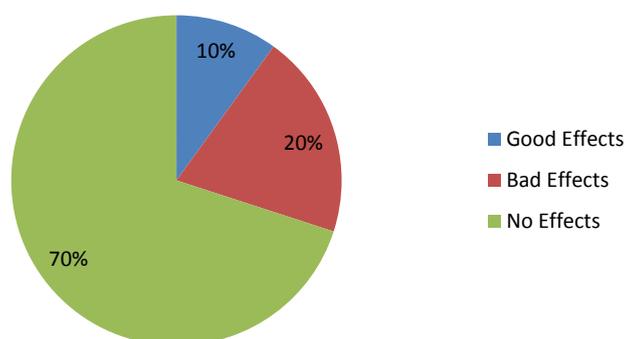
**Figure 3** showing the perception of arrangement teeth and its effects on relationship at work/school.

Proportion of functional, psychological and social domain on the life's of respondents, **Table 3**.

**Table 1.** Demographics.

Factors	Variables	Frequency
Gender	Male	33
	Female	67
Age group	7 - 9	38
	10 - 15	40
	16 - 25	22
Educational Status	Never	1
	Primary	44
	Junior	43
	Senior	10
	Tertiary	2

**ARRANGEMENT OF TEETH ON SPEAKING**

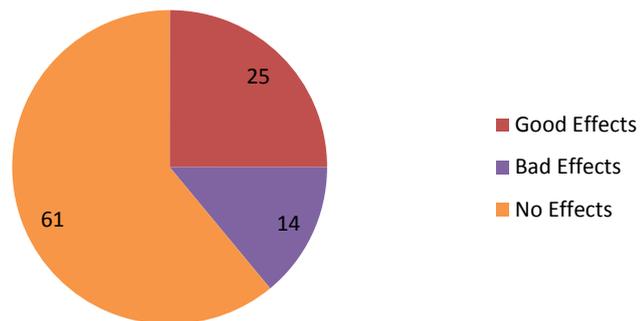


**Figure 1.** Functional effect of arrangements of teeth on speaking.

**Table 2.** Psychological effects of malocclusion.

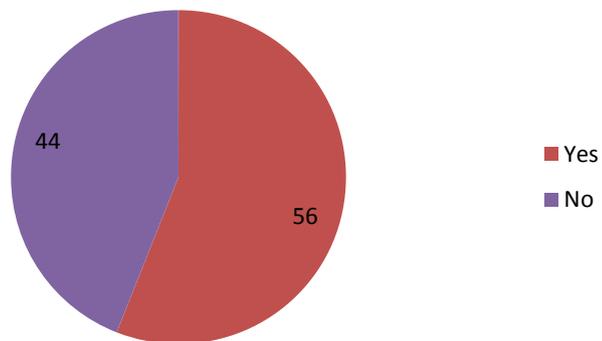
CONFIDENCE AROUND PEOPLE		
RESPONSE	FREQUENCY	PERCENTAGE (%)
YES	63	63.0
NO	37	37.0
TEETH APPEARANCE ON LOOKING TO PEOPLE EFFECTS		
RESPONSE	FREQUENCY	PERCENTAGE (%)
YES	73	73.0
NO	27	27.0
GOOD/BAD EFFECTS ON TEETH		
RESPONSE	FREQUENCY	PERCENTAGE (%)
GOOD EFFECTS	29	39.8
BAD EFFECTS	44	60.2
HAPPY ABOUT APPEARANCE OF TEETH		
RESPONSE	FREQUENCY	PERCENTAGE (%)
YES	9	9.0
NO	91	91.0

**ARRANGEMENT OF TEETH ON CHEWING AND BITING**



**Figure 2.** Effects of arrangement of teeth on chewing and biting.

**TEETH EFFECT ON RELATIONSHIP AT WORK**



**Figure 3.** Effect of malocclusion on relationship status.

**Table 3.** Overall effects of malocclusion.

	Functional domain	Psychological domain	Social
Negative Effects (%)	28.1	71.4	49.5
Non-significant (%)	33.7	25.4	28.5

## 6. Discussion

The study sampled 100 respondents, out of which most 67 (67.0%) were found out to be females and 33 (33.0%) were males which indicated female dominance in the course of our studies as illustrated in **Table 1**. This posits that, nearly twice as many girls as boys sought orthodontic treatment at the Komfo Anokye Teaching Hospital's orthodontic clinic during the recruitment period for this study, and corroborates previous studies which show higher utilization of orthodontic treatment services by females. This may suggest that women are more likely to and are responding to social expectations of the importance of aesthetics rather than an objectively greater orthodontic treatment need in comparison to their male counterparts.

Alternatively parents may be more prone to seek orthodontic treatment for their female children than their male children. It was expected that the impact of malocclusion on quality of life would be significantly greater in girls as compared to boys, since boys may be less self-conscious about their appearance.

The age range was between 7 - 9 years, 10 - 15 years and 16 - 25 years. The modal age of the participants was 10 - 15 years with 40 as its frequency, followed by 7 - 9 years while the age with least frequency was 16 - 25 years which stands at 22, shown in **Table 1**. A negative association was observed between age and impact on quality of life due to malocclusion, the impact of malocclusion decreases as age increases. This may be the result of "response shift" with age. The longer an individual lives with a malocclusion, the greater the likelihood that they will adjust to the limitations it places upon their activities thereby reducing its impact on their lives and socialization [2]. In order to explore this, future studies should look at treatment need changes with age.

### Functional, Psychological and Social Effects

Generally, the effects of malocclusion on the above domains were negative as presented in **Table 2** & **Table 3**. This agrees with previous studies that state that malocclusions stand out among the main problems that affect OHRQOL due to impact on function, appearance, interpersonal relationship, socialization, self-esteem, and psychological well-being [2] [11]. Also, Bhatia, Winnier and Mehta stated that, "The appearance and the position of teeth are factors that have greater psychological and social impact on children and young adults, since the appearance of the face has a vital role in building a good human life and stable relationships [12].

The results revealed a significant impact on the emotional well-being and social well-being of the patients. Thus, it can be derived that the impact of malocclusion is less on functional limitations as compared to emotional and social

impact. Psychological well-being reported the most negatively affected with a score of 71.4% followed by social well-being with a score of 49.5% and functional wellbeing reporting the least reported negative effect with 28.1%. This finding agreed with previous studies that the arrangement and appearance of a person's teeth have a great influence on attractive appearance and social success [13].

#### Education and Effect of Malocclusion

More than ninety 90% of the respondents in the study have been to school while only 1% of the respondents had not been to school. 44% were in the primary school, 43 (43%) were in the Junior High School, 10 was in the Senior High school and 2% were Tertiary students (Table 1).

Majority of the respondents had little educational qualification. This is because, majority of the respondents were aged between 7 - 9 and 10 - 15 years and are thus expected to be in primary and junior high school respectively. This agrees with Mtaya *et al.*, when they stated that, malocclusion was more prevalent in primary school children [14].

Education level had a positive impact on the effect of malocclusion on oral health related quality of life which may be due to increased self-awareness and self-esteem with increasing education. It may also be due to the opportunity formal education gives to people to meet and interact with one another. Young people have the opportunity to interact with other young people both with similar and cultural backgrounds and the differences in the appearance of the teeth make them question their malocclusion and subsequently seek treatment.

Figure 1 & Figure 2 show the functional effect of arrangements of teeth on speaking, chewing and biting and these are classified as good effects, bad effects and no effects with the latter (no effects) having the greater percentage for all functional domains.

Exploring each component of the questionnaire, individual perceptions were most closely correlated with impact on the psychological discomfort and social limitation domains of oral health. Similar results have been reported in children aged 11 - 14 years and in young adults. This is logical when we consider that the most common reason for seeking orthodontic treatment is to correct dental aesthetics and improve self-esteem. Considering the effects of malocclusion on work relationships, Figure 3 demonstrates that 56 clients of the sample population responded in the affirmative of malocclusion interfering with the relationship at work. 44 however did not experience any affectation of their malocclusion with work colleagues their teeth. Orthodontists should therefore be aware that young patients might expect orthodontic treatment to provide not only improved oral functioning and health but enhancement of aesthetics, self-esteem and a positive acceptance in their social life. When these expectations are not met this may lead to dissatisfaction with treatment outcomes. The use of the Oral Health Related Quality of Life measures a part of this diagnostic procedure and can provide information on priorities for treatment in order to maximize patient satisfaction.

Some have suggested that malocclusion might become handicapping not be-

cause of the functional disability, but because it can adversely affect social relationships and self-perception [1].

## 7. Conclusion

Malocclusion has an overall negative impact on oral health related quality of life and its domains, this is observed to be the highest for the psychological discomfort domain and the lowest in the functional wellbeing domain. The impact is the greatest in primary school children and the lowest in those with no education. Whereas this study did not find any significant difference in the impact on oral health related quality of life in male and females. Education level had a positive impact on the effect of malocclusion on oral health related quality of life.

## Recommendations

### Education

The importance of education in the improvement on the effects of malocclusion OHRQOL cannot be over emphasized. This calls for active participation and collaboration on the part of health workers, the mass media, The Ministry of Health, community leaders, family members and interested NGOs.

Education must include the causes, types, symptoms and effects of malocclusion on oral health as well as benefits of orthodontic treatment. Mothers should also be made aware of the scientific basis of malocclusion and the need to seek early dental intervention to help reduce the impact on the quality of life of their children.

### The mass media

The mass media should collaborate with health workers to provide them with slots on radio programs, television shows and new paper columns in order to educate and create public awareness on malocclusion and its effects on Oral Health Related Quality of Life. The public should also be encouraged to seek early and prompt orthodontic intervention.

## Limitations

The findings of this study must be tempered by a consideration of its limitations.

The participants in this study were 7 - 25 year-old patients, seeking orthodontic treatment at a teaching hospital in a large urban city in Ghana. Therefore, the results from this study cannot be extrapolated to the entire youth population who may have differing levels of malocclusion and orthodontic treatment needs and, therefore, different impacts on their daily activities. Although many studies have assessed the impact of oral conditions on children's quality of life using convenience samples in hospitals or universities, it is recommended that future studies should be based on a representative sample with or without normative need.

The results of this study is non-conclusive and restricted to this study because the psychological state of the patient at the time of the study can modify the va-

lidity of the report. Also, the implications on one domain may affect the impact on another such as a negative impact on the social domain may affect the psychological effect on the individual.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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