

# PERCEPTION OF OCCLUSAL APPEARANCE AMONG SCHOOLCHILDREN IN LIMPOPO PROVINCE



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**PERCEPTION OF OCCLUSAL APPEARANCE AMONG SCHOOLCHILDREN IN**

**LIMPOPO PROVINCE**

**BY**

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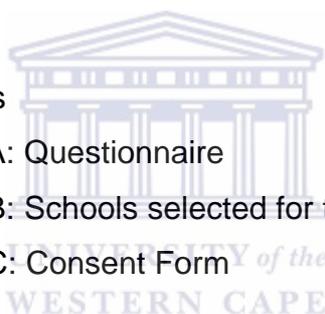
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## CONTENTS

		Page
	Declaration	iii
	Acknowledgements	iv
	Dedication	vi
	Abstract	vii
	List of figures and tables	ix
Chapter One	Introduction	1
Chapter Two	Literature Review	5
Chapter Three	Aim and Objectives	16
Chapter Four	Research Methodology	17
Chapter Five	Results	20
Chapter Six	Discussion	28
Chapter Seven	Conclusion	33
	References	34
	Appendix A: Questionnaire	43
	Appendix B: Schools selected for the study	46
	Appendix C: Consent Form	47



## **DECLARATION**

I Nelly Mokgadi Sehowa declare that this thesis titled:

“Perception of occlusal appearance among schoolchildren in Limpopo Province”

is my own work and that all sources quoted have been indicated and acknowledged by means of references.

Signature: \_\_\_\_\_

N.M. Sehowa



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## **DEDICATION**

This thesis is dedicated to my late parents Hamilton Njasana and Selokela Dorcas Sehowa for their constant support and encouragement with my studies.



## **ABSTRACT**

**Introduction:** Dental appearance among children, adolescents and young adults has been of great concern due to various factors. These factors include genetic composition among people in a community, dietary, environmental factors, oral health and developmental position of the teeth, anomalies in number and form (Shivakumar *et al*, 2010). Improvement of Oral Health and enhancement of psychosocial well-being are the perceived benefits of orthodontic treatment among any given population or community. This study focused on the perception of occlusal appearance among schoolchildren of the rural and urban community in Limpopo Province of South Africa.

**Aim and Objectives:** The aim of this study is to determine the perceptions of different occlusal appearance observed by schoolchildren aged 13 -16yrs in the Capricorn District of Limpopo Province in South Africa. The study determined schoolchildren's perceptions of different occlusal appearances, by assessing the self-perception of schoolchildren toward their occlusal appearance using the Aesthetic Component (AC) of the Index of Orthodontic Need (IOTN). These were compared with the perceptions held by schoolchildren across age, gender and place of residence in Limpopo Province.

**Methodology:** A cross-sectional analytical study was conducted in Capricorn District of Limpopo Province. The sample was selected from schoolchildren in Public High Schools between the ages of 13-16 years. A multiple stage sampling technique was used to select the participants for the study. A questionnaire was used for data collection. The collected data was analyzed using SAS version 9. The study was approved by the Research Ethics Committee of the University of the Western Cape and Provincial Department of Education in Limpopo Province. Those children, whose parents consented, participated in the study.

**Results and Discussion:** Ten schools were selected; all except one were in a rural area. Four hundred and three schoolchildren sampled from the selected schools participated in this study (Table 4). Their ages ranged from 13 to 16 years old and they were found to be in grades between 8 and 11. Majority of participants, 213 (53%) were females and 190 (47%) were male.

There was no statistical significant difference with regard to the importance of healthy teeth and gender, age or place of residence. Regarding the importance of well-arranged teeth for appearance, there was a highly significant difference in terms of gender ( $p = 0.0016$ ). However, there was no significant difference with regard to age and place of residence. When participants assessed their own teeth using the randomised and relabelled IOTN images, 22 (5.5%) identified one of the three pictures (I, D, G) which indicate a definite need for orthodontic treatment. Participants also ranked Picture J (IOTN 1) as the most attractive with a rank score of 1.61, while picture G (IOTN 10) was ranked the least attractive picture with a score of 8.69.

**Conclusion:** Teenagers, especially females attach great importance to a healthy and attractive dental appearance. There were older children who were dissatisfied with the arrangement of their teeth. A greater percentage of the participants associated their occlusion with IOTN image one that does not require treatment. The schoolchildren were able to rank the randomised and relabelled IOTN images in order, from the most attractive to the least attractive. Their perception matched exactly with that of the IOTN. The Aesthetic Component of the IOTN was found to be a valid tool in the aesthetic evaluation and assessment of the self-perceived need for orthodontic treatment.

## LIST OF FIGURES

		<b>Page</b>
Figure 1	The Aesthetic Component (AC) of the Index of Orthodontic Treatment Need	14
Figure 2	The Randomised and Relabelled Aesthetic Component (AC) of the Index of Orthodontic Treatment Need	15
Figure 3	Self-assessment of which picture resembles their teeth	25

## LIST OF TABLES

Table 1	Distribution of the need for orthodontic treatment in South African studies	11
Table 2	Dental health component grades of the IOTN and treatment need	13
Table 3	Aesthetic component of the IOTN photographs and treatment need	13
Table 4	Total number of participants in the study	21
Table 5	Gender and age distribution of the school children	21
Table 6	Association between gender, age, place of residence and the importance of healthy teeth	22
Table 7	Association between gender, age, place of residence and appearance of well arranged teeth	23
Table 8	Self assessment of which picture resemble their teeth	23
Table 9	The relabelled IOTN self assessment and treatment need	24
Table 10	Association between gender, age, place of residence and satisfaction with own teeth	25
Table 11	Rating given by schoolchildren and IOTN rating	26

## **CHAPTER ONE**

### **INTRODUCTION**

Good dental appearance among patients without dental related infections has been considered to have an aesthetic value, which directly relates to success and promotes self-image. The self-image perception can be a reflection of well-aligned teeth and a pleasing smile, which boost personality and status in society (Mugonzibwa *et al.*, 2004). In such a society, a balance of facial features and dental arrangement is viewed based on ethnic and cultural orientations. This variance in cultural and ethnic dental perception often leads to biases as some cultural beliefs become relevant by associating dental arrangement with beauty depending on the society (Mugonzibwa *et al.*, 2004). The behavioural tendencies and mental alertness of children were mentioned as other traits associated with dental appearance according to Prah Andersen (1978).

From the media (print and electronic) and societal norms, the strong desire for physical attractiveness can be attributed to the various beauty competitions which, continue to increase the consciousness and awareness of physical appearance among adolescents (Newton and Minhas, 2005). Some recent studies have shown the overall influence of the media on body approval and physical attractiveness. Media stereotypes play an important role in influencing body satisfaction among adolescent viewers by showcasing prevailing trends with systematic emphasis on conformity with idolized media celebrities. Although there is a strong relationship between dental appearance and facial attractiveness, there is a divergence of opinions on the level of consciousness among the genders irrespective of the society (Baldwin, 1980; Durkin and Paxton, 2002). In recent times, studies have suggested that aesthetic reasons are a major drive for orthodontic treatment, more prominent than health or function. The prevalence of patients with orthodontic treatment need is about 65% (Newton and Minhas, 2005).

Orthodontics is a speciality in dentistry, which focuses on dental aesthetics. The “Orthodontic treatment need” is an ambiguous concept in dentistry because of the overlapping perceptions of “when” and “how” the treatment is needed by the patients (Shaw, 1981). According to the British Dental Association, “orthodontic treatment was

aimed to produce improve function by correction of irregularities and create not only greater resistance to disease, but also to improve personal appearance, which later will contribute to the mental as well as to the physical well-being of the individual". The variance of orthodontic treatment priority has been defined in terms of three concepts, improvement in function, oral health and personal appearance (Foster *et al.*, 1973). Among these reasons, aesthetic perception by patients has been identified as a major factor compared with the malocclusion functional disability and oral health treatment needs (Prahl-Andersen, 1978). Shaw (1975) identified several different parties that determine the need for orthodontic treatment at any point in time. These include the child or patient, the child's parents, the dentist, the orthodontist and, where applicable, the payment agency. From a more general perspective, self-esteem and social acceptance of the patient are two critical factors that determine the treatment demand. In considering orthodontic treatment needs, parental perception also seems to play a significant role (Prahl-Andersen, 1978).

Dental appearance among children, adolescents and young adults has been of great concern due to various factors. These include the genetic composition among people in a given community, dietary factors, environmental factors, oral health and developmental position of the teeth, anomalies in number and form (Shivakumar *et al.*, 2010). Improvement of Oral Health and enhancement of psychosocial well-being are the perceived benefits of orthodontic treatment among any given population or community. These treatments are considered to improve a person's appearance, self-image and social functioning. The positive self-perception approach by individuals has been identified to influence the overall body image of patients with malocclusion (Cunningham and Hunt, 2001; Kiyak, 2002; Klages *et al.*, 2005).

In addition, the influence of the Quality of Life (QOL) and its importance in orthodontics cannot be overemphasized (Becker *et al.*, 1993; Cunningham and Hunt, 2001). QOL is defined as a person's sense of well-being that stems from satisfaction or dissatisfaction with the areas of life that are important to them. Health-related quality of life (HRQL) is the true impact of health and disease on quality of life and this is also relevant to orthodontics. HRQL domains such as physical status, psychological status and well-being, social interactions, economic and vocational status and religion have been identified to be relevant to an individual's self-perception in the treatment of malocclusion.

To try and make sense of these competing influences on the determination of orthodontic treatment need and demand, the orthodontic profession has developed a range of clinical indices. Indices play a major role in resource allocation and planning, promoting treatment standards, identifying prospective patients and informed consent (Shaw *et al*, 1995). There are many orthodontic indices for assessing and grading malocclusion. These orthodontic indices can be classified under five headings i.e. diagnostic, epidemiological, treatment need, and treatment success and treatment complexity. The Index of Orthodontic Need (IOTN) is a relatively recent index that is used in the grading of malocclusion according to the significance of various occlusal traits for individual dental health and perceived aesthetic impairment.

Of the various indices available, the IOTN has the potential to be the most useful in this study because it was developed in an attempt to categorize the treatment of malocclusion according to urgency and treatment need (Shaw *et al*, 1995; Otuyemi and Jones, 1995; Bernabe and Flores-Mir 2006). The IOTN has two discrete components, a clinical component called the dental health component and a separate aesthetic component. The Aesthetic Component (AC) of the IOTN consists of a visual 10-point scale, which represents a wide range of dental attractiveness, illustrated by a series of 10 frontal view photographs arranged from number 1, most attractive, to number 10, least attractive. No profile views were included (Brook and Shaw, 1989). The Aesthetic Component of the IOTN is used to assess attractiveness and orthodontic treatment need.

This study focused on the perception of occlusal appearance among schoolchildren of the rural and urban community in Limpopo province of South Africa. The participants for this study were school pupils aged 13-18 years old. This age group has been identified as having a high degree of consciousness with respect to dental appearance and facial features, especially among the adolescent girls. In this age the degree of concern reaches a peak by 16 years of age and declines at 17 years (Baldwin, 1980). The different occlusal appearances among the rural community in the Capricorn district recorded in this study will be compared with the findings of studies reported in the literature review.

Limpopo province is a developing community made up of approximately 99% rural community dwellers. It has a population of about 5.4 million inhabitants. It shares

international borders with Botswana, Zimbabwe and Mozambique. The province is subdivided into five municipal districts namely, Sekhukhune, Mopani, Vhembe, Waterberg, and Capricorn Districts. These five municipal districts are further subdivided into twenty-four local municipalities. Capricorn is the largest among the Limpopo districts with a population of approximately 1.2 million people. Capricorn District is further subdivided into 32 circuits, which has 378 schools (Statistics South Africa Population Census, 2001). The distribution of the schools in Limpopo Province as a whole is such that 2.3% of the schools are urban and 97.7% rural.

This study draws a representative sample of schools from these 32 districts to determine the perceptions of dental aesthetics and malocclusion held by adolescent school pupils in this region.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. Introduction**

The face is a key feature in physical appearance as it symbolises self-esteem, societal acceptance and beauty. Although it is often said that beauty is in the eye of the beholder, the human face still, largely, represents a strong inter-personal relationship, which may vary between people, communities and age groups. The way people perceive the face's attractiveness, changes over time. It is influenced by age, gender, culture and socio-environmental factors (Newton and Minhas, 2005). Within the face, the mouth and eyes are important and account for 31% and 34% respectively. In the opinion of Flores-Mir *et al.* (2004), aesthetic judgement of the face can be assessed using the patient's frontal face view, during conversation, their facial expressions and smiling.

Children's perception of their own appearance is influenced by the media such as looking at idealized models or presenters with beautiful smiles on the television. This increases the awareness of certain forms of beauty in general as well as dentofacial attractiveness. There is a growing demand among people for orthodontic treatment in order to enhance their dentofacial attractiveness. Several studies have shown that 75%-98% of patients seek orthodontic treatment for aesthetic purposes (Al-Hamlan and Al-Shraim, 2008).

Malocclusion is a form of dental variation with limited influence on oral health. The demand for orthodontic services in several countries generally exceeds supply, which then presents difficult choices in the distribution of public health resources. The treatment needs for more prominent oral health problems such as dental caries, periodontal disease and other oral conditions compete for resources with apparently less important oral treatments such as those provided by orthodontists. In the planning of the orthodontic treatment within a public health system, there is need for information on the orthodontic treatment requirements of the population (Pine, 1997). It is therefore important to state that malocclusion is not a disease, rather it emphasis the dental arrangement of individuals.

The development of a homogeneous method of epidemiological assessment and grading of malocclusion has continued to be of interest for several years. Baume (1970) expressed concern about the lack of appropriate methods for assessing malocclusion. The inability to establish a universal occlusal index has led to the development of several indices for the assessment and grading of malocclusion. These indices are classified into diagnostic, epidemiological, treatment need, treatment success and treatment complexity (Otuyemi and Jones 1995).

Different researchers have various terms that define numerous permutations of occlusal types such as occlusion, ideal occlusion, normal occlusion and malocclusion and perception. These terms will be discussed in the following section.

## **2.2. Definition of Terms**

### **2.2.1 Occlusion**

Ash and Ramfjord (1982) define occlusion as the manner in which the upper and lower teeth intercusate between each other in all mandibular positions and movements. This is said to be a result of neuromuscular control of the components of the masticatory systems namely the teeth, periodontal structures, maxilla, mandible, the temporomandibular joints and their associated muscles and ligaments that share a functional role (Draker, 1960; Salzman, 1968; Ramfjord and Ash, 1963). The static connotation of occlusion is a morphological one and only involves the contact of the dentition (Jacobson, 1967; Lundeen and Gibbs, 1982).

### **2.2.2 Ideal Occlusion**

An ideal occlusion is a concept applied to a condition when the skeletal bases of maxilla and mandible are of the correct size relative to each other and the teeth are in a correct relationship in all three planes of space at rest (McDonald and Ireland, 1998).

### **2.2.3 Normal Occlusion**

Many researchers have tried to define the normal occlusion (Angle, 1899; Hellman, 1921; Stoller, 1954; Begg, 1954; Ackerman and Proffit, 1969; Andrews, 1972). Angle, (1899) provided the first clear definition of a normal occlusion. His classification was

and is still widely used in the dental profession. With the normal occlusion, the mesiobuccal cusp of the upper molar occludes in the buccal groove of the lower first molar and the teeth are arranged in a smooth curving line of occlusion. The normal occlusion and Class I malocclusion share the same molar relationship but differ in the arrangement of the teeth relative to the line of occlusion (Hassan and Rahimah, 2007). Angle's major shortcoming was that it assumed the position of the maxillary first molar to be fixed (Proffit, 2007). A Class I molar relationship with good alignment of all the teeth is considered to be a normal occlusion. This is seen in about 30-40% of the population (Mossey, 1999).

Stoller, (1954) expanded on Angle's classification by relating the upper first molar to both the lower first and second lower molars. Andrews, (1972) contributed to the ideal occlusion by defining six keys to normal occlusion.

#### 2.2.4 Malocclusion

Houston *et al* (1992) define malocclusion as a condition of imbalance in the relative sizes and position of teeth, facial bones and soft tissues (lips, cheek and tongue). It is an appreciable deviation from the ideal occlusion that may be considered aesthetically unsatisfactory. Malocclusion occurs in the majority of the population and it is neither an abnormal nor unhealthy condition (Proffit and Fields, 2000).

#### 2.2.5 Perception

Perception has been defined as a process of attaining awareness or understanding of sensory information. The concept of perception is individualistic in nature, as it is determined by the sense of touch, sight, feeling, smell, and hearing. The term perception is derived from the Latin word 'perceptio' which is used to describe the act of "receiving, collecting, an action of taking possession, apprehension with the mind or senses" (Flanagan and Lederman, 2001).

### 2.3. Perception of Occlusal Appearance

Physical appearance, including the human dentition, is an important feature of human activity, as one aims to be liked, respected or accepted by those around him/her. The uptake of orthodontic treatment is influenced by the desire to look attractive. This is influenced by self-perception of dental appearance, self-esteem, gender, age and peer group norms (Shaw *et al.*, 1991; Burden. 1995). Gender, socio-economic background, cultural perception and age (peer pressure) have been suggested as factors affecting the self-perception of dental appearance. High social class individuals are considered to be more critical and younger children less aware of their dental appearance (Horowitz *et al.*, 1971; Jenkins *et al.*, 1984). In contrast, Burden and Pine (1995) found that adolescents, with identical dental aesthetics, had similar perceptions of malocclusion irrespective of gender or social background.

Gender sensitivity was more pronounced in females than males and in the work of Petersen and Dahlstrom (1998) and Abu Alhaija *et al.*, (2005) gender rating among the selected participants was considered more significant in females than male recipients. Social acceptance in society is important and directly related to occlusion perception among people of higher status in a community. People from a wealthy background are more conscious of their appearance and tend to care more about their looks in the society than the less wealthy ones. The cultural perception theory is based on the composition of the society and how each race responds to health issues, according to their cultural backgrounds, norms or traditions.

Beauty and physical attractiveness are of great importance for human beings. Some of the important factors such as social acceptance, popularity, mate selection and careers are affected by an individual's physical attractiveness (Cross and Cross, 1971). Consequently, professional orthodontists and patients view appearance differently. For professionals, aesthetics is about looking at the teeth and the surrounding structures such as the 'gingiva' with clinical norms in mind, whereas patients attribute their smiles in relation to facial beauty. According to the literature, the majority of orthodontic patients are children aged 11-15 years, and this was attributed to patient concern over appearance. The parents feel that their children will look more attractive and socially acceptable after orthodontic treatment (Dorsey and Korabick, 1977; Shaw *et al.*, 1979).

Professionals and patients tend to describe occlusal appearance in a similar manner but using different terminologies. Some of the terminologies associated with the description of occlusal appearance by patients include 'disgusting', 'fangs', 'dracula' while professionals classify occlusal appearances in terms of crowding, spacing, size of teeth, overjet and deep bite among others terms (Abdulla and Rock, 2002).

Abu Alhaija *et al*, (2005) assessed the factors affecting self-perception and the demand for orthodontic treatment among north Jordanian school children. Their study showed that gender and age influence the self-perception of malocclusion, that rural children perceive their dentition similar to urban children, that the self-perception of students with no aesthetic need, borderline need and definite need was different and that females and urban children are more willing to have orthodontic treatment. Other studies support the relationship between dental attractiveness, facial attractiveness and psychosocial measures such as popularity and self-esteem (Shaw *et al.*, 1985; Howells and Shaw, 1985).

#### **2.4 Orthodontic Treatment Need**

The primary reason for patients to seek orthodontic treatment is for aesthetic purposes though functional disability may also be the reason. In orthodontic treatment need, lack of manpower or skilled-personnel and cost has limited service delivery to patients. The orthodontic treatment of patients is based on three types of information, including objective signs, subjective symptoms and social sufficiency. The observed conditions that deviate from the generally accepted norm in diagnosis are referred to as objective signs. In the case of subjective symptoms, the patient's judgemental perception is reflected in the fact that occlusion has caused a problem while the recognition of the society that a patient has a problem is referred to as the social sufficiency (Prah Andersen, 1978).

Foster and Walpole Day, (1973) assessed malocclusion and the need for orthodontic treatment among 11 to 12 year old pupils. They concluded that 37.9% of the children required active tooth movement with appliances. Shaw, (1981) conducted a study and found that 48% of children with moderate to severe irregularities were comfortable with their occlusal appearance while 30% of the children failed to recognize their own dental photographs.

Holmes (1992) looked at the subjective need and demand for orthodontic treatment amongst 12-year-old children using the Index of Orthodontic Treatment Need (IOTN). Their studies showed that females, who accounted for 51.7%, perceived themselves as having unattractive occlusal appearance and greater need for orthodontic treatment than their male (44%) counterparts have. About 85% of the children that were on the attractive side of the aesthetic component (AC) scale were prepared to accept orthodontic treatment of an unspecified nature. Just 3% of the children in the unattractive half of the AC of the IOTN liked their occlusal appearance and did not indicate any concern or need for treatment.

Diagne *et al*, (1993) investigated the prevalence of malocclusion and the need for orthodontic treatment among Senegalese schoolchildren aged 13 to 15 years. The study concluded that 18.33% required treatment compared to about 7.61% that required urgent treatment.

Abdullah and Rock, (2001) assessed the prevalence and severity of malocclusion in Malaysian children aged 12 to 13 years. The children were examined using the Index of Orthodontic Treatment Need (IOTN) and Dental Aesthetic Index (DAI). They found that the children in need of Orthodontic treatment were 47.9% in grades 4 and 5 of the DHC of IOTN and 22.8% in grade 8 to 10 of the AC.

Ucuncu and Ertugay, (2001) used the IOTN to assess the need for orthodontic treatment in Turkish schoolchildren aged 11 to 14 years. It was concluded that 36.8%, 17.6% and 45.2% of the schoolchildren required great, moderate or no orthodontic treatment need respectively.

Flores-Mir *et al*, (2004) evaluated the self-perceived orthodontic treatment need in University population through three scales which included the aesthetic component of the IOTN, the Oral Aesthetics Subjective Index scale (OASIS) and a visual analogue scale (VAS) that used different approaches. It was found that 87.5% had no treatment need, 10.6% borderline need and 1.8% had a substantial treatment need using the AC of the IOTN. The mean OASIS score was 11.81 and the VAS score was 40.16.

Manzanera et al, (2009) conducted a study to determine the orthodontic treatment need in Spanish schoolchildren aged 12 to 16 years using the IOTN. They concluded that 21.8% of the 12 year olds and 17.1% of the 15 to 16 year olds need orthodontic treatment using the dental health component (DHC) and using the aesthetic component (AC) 4.4% and 2.4% respectively.

The distribution of the orthodontic treatment need in South African studies is summarised in Table 1, according to the investigator, population, age of the participants and treatment need. Most of these studies were conducted in the Black populations and their ages range between 11 and 14 years. The orthodontic treatment need as determined by Kotze *et al*, (1982) in the White population was 78%. This was found to be the highest as compared to 49% in the Indian population, 47% Coloured (Zietsman, 1979) and 47% Blacks (Hlongwa and du Plessis, 2005). Hirschowitz *et al*, 1981 found the lowest treatment need to be 11% amongst Blacks.

Table 1: Distribution of the need for orthodontic treatment in South African studies

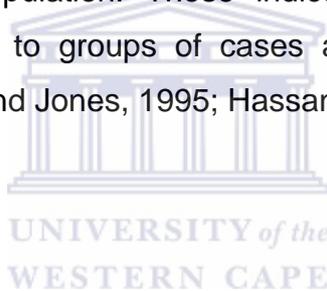
Investigator	Population	Age (yrs)	Treatment need (%)	Index
Zietsman, 1979	Whites	14	63	Angle classification & various other traits
	Black	12-14	25	
	Coloured	14	47	
	Indian	14	49	
Hirschowitz <i>et al</i> , 1981	Blacks	12	11	Malocclusion scored as present or absent
Kotze <i>et al</i> 1982	Whites	11-12	78	Occlusal Index of Summers
Swanepoel, 1985	Blacks	14	30	Modified FDI method
Van Wyk <i>et al</i> , 1985	Coloureds (urban)	12-13	44	Occlusal Index of Summers
De Muelenaere, Viljoen 1987	Blacks (rural)		17	Occlusal Index of Summers
De Muelenaere <i>et al</i> , 1992	Blacks	14	28	Occlusal Index of Summers
Volschenk <i>et al</i> , 1993	Blacks	12	17	Occlusal Index of Summers
Hlongwa, du Plessis, 2005	Blacks	12	47	Dental Aesthetic Index
Van Wyk and Drummond, 2005	Asian	12	21	Dental Aesthetic Index
	Black		14.8	
	Coloured		23	
	White		19.5	

## 2.5. METHODS FOR ASSESSING AND GRADING MALOCCLUSION

There are different methods used for classification of malocclusion called occlusal indices. The requirements for clinical categorization differ from those of epidemiology (Houston et al, 1992). Although many indices are used to categorize malocclusion, it is imperative to classify these indices into types such as diagnostic or occlusal (Angle, 1899), epidemiological (Bjork *et al.*, 1964) and treatment need or priority indices (Otuyemi and Jones, 1995; Hassan and Rahimah, 2007). Other indices measure treatment success, treatment complexity (Otuyemi and Jones, 1995) and dental arch relationships (Hassan and Rahimah, 2007). These indices have various limitations, but this work will utilise the Index of Orthodontic Treatment Need (IOTN), which is an index that reflects treatment need or priority.

The indices of treatment need were developed to assess and categorize the need for orthodontic treatment in a population. These indices are important when limited resources are to be allocated to groups of cases according to the priority of the proposed treatment (Otuyemi and Jones, 1995; Hassan and Rahimah, 2007).

### 2.5.1 The Concept of IOTN



The challenge to address some dental treatment needs has led to the conceptualization and modification of IOTN to identify individuals who are most likely to benefit from the proposed treatment. This led to the subsequent adoption of the IOTN as a tool to determine the various treatment needs. The Index of orthodontic treatment need (IOTN) method was introduced as a combination of Standardized Continuum of Aesthetic Need (SCAN) and the Swedish Dental Health Board (SDHB). IOTN has been modified by Richmond *et al*, 1992; Lunn *et al*, 1993 (cited in Grzywacz, 2003) and classified into two parts, the Aesthetic Component (AC) and Dental Health Component (DHC).

#### 2.5.1.1 Dental Health Component

DHC assesses 10 traits of malocclusion: overjet, reverse overjet, overbite, open bite, crossbite, crowding, impeded eruption, defects of cleft lip and palate as well as any craniofacial anomaly, Class I and Class II buccal occlusions, and hypodontia. The DHC

identifies the worst occlusal trait that is potentially detrimental to dental health and each given grade is a reflection of the level of orthodontic treatment need and can then provide the basis for treatment prioritization (Shaw *et al*, 1991; Brook and Shaw, 1989; So and Tang, 1993). DHC is grouped into five grades with distinct points between each grade.

Table 2: Dental health component grades and treatment need

<b>Grade</b>	<b>Treatment need</b>
1	No need
2	Little need
3	Borderline need
4	Need
5	Great need

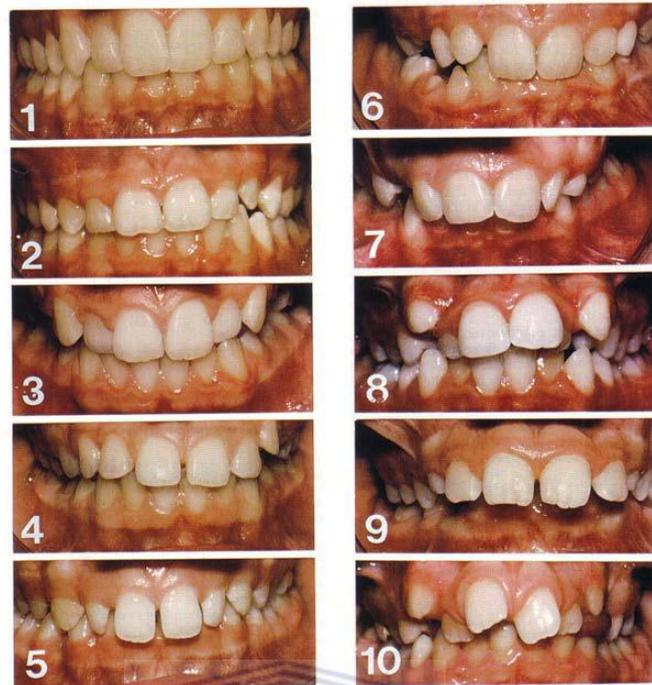
2.5.1.2. The Aesthetic Component

The AC assesses the perception of an individual on the attractiveness of dentition through a 10-point colour intra-oral photographical scale showing different levels of dental attractiveness. The table below shows the classification of the treatment need from photographs (Figure 1). Based on aesthetic components, photograph 1 represents the most attractive and photograph 10 the least attractive (Brook and Shaw, 1989; Evans and Shaw, 1987).

Table 3: Aesthetic component photographs and treatment need

<b>Standard IOTN</b>	<b>Treatment Need</b>
1	No need
2	
3	
4	
5	Borderline need
6	
7	
8	Need
9	
10	

Figure 1: The Aesthetic Component (AC) of Index of Orthodontic Treatment Need.



### 2.5.2. Reliability and validity of IOTN

The IOTN has a relatively high degree of intra- and inter-examiner reliability, better known as reproducibility, when used to study the orthodontists' ability to assess the need for treatment (Brook and Shaw, 1989; Grewe and Hagan, 1972; Howells and Shaw, 1985). Validity is found by studying whether the index actually measures what it purports to measure. According to Turbill *et al* (1996) the IOTN has shortcomings in assessing individual cases. Cooper *et al*, (2000) looked at the reliability of the IOTN over time between the ages of 11-19 years. They concluded that the DHC of the IOTN is reliable over time despite the changes that occur in the occlusal traits that make up the index as well as the age. The AC of the IOTN also tends to improve over time.

### 2.5.3 Limitations of the IOTN

The IOTN was aimed at identifying individuals who would most likely benefit from orthodontic treatment (Shaw *et al*, 1991). Orthodontic treatment outcome depends on malocclusion type and severity, the type of appliance used in the treatment, patient cooperation, as well as the orthodontist's qualifications and experience in practice (Fox *et al.*, 1997; Bergstrom *et al.*, 1998; Shaw *et al.*, 1980). The aesthetic scale poorly

represents dentofacial imbalance in the anteroposterior plane (Otuyemi and Jones, 1995). According to Carter and Slattery (1998) the IOTN does not take into account the occlusal traits common in Black patients such as bimaxillary protrusion, anterior open bite, anterior diastemas and reverse overjet.

#### 2.5.4 Ideal Index

Indices play a major role in diagnostic assessment, epidemiological studies and the assessment of treatment need, outcome and complexity. According to Draker, (1960) the ideal index should be quick, simple, accurate, reliable and reproducible; should be objective and yield quantitative data for analysis; should be able to distinguish between handicapping malocclusions; and it should be able to measure degrees of handicap. To date there is no index that has all the above-mentioned requirements. Modification of the indices is at times required for surveys.

The AC was modified by arranging the photographs randomly to form the Randomised and Relabeled Aesthetic Component (RRAC) of the IOTN (Figure 2). The RRAC was used in this study.

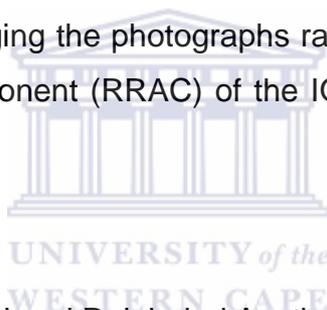
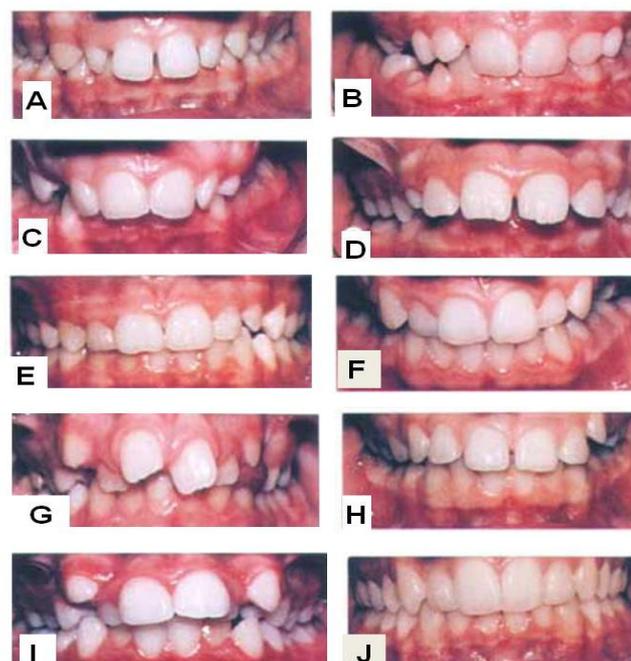


Figure 2: The Randomised and Relabeled Aesthetic Component (RRAC) of the IOTN



## **CHAPTER THREE**

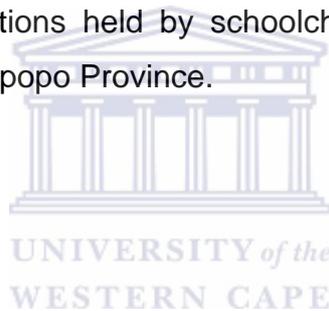
### **3.1. Aim**

The aim of this study was to determine the perceptions of different occlusal appearances observed by schoolchildren aged 14 -16 years in the Capricorn District of Limpopo Province in South Africa.

### **3.2. Objectives**

**The objectives of the study were:**

1. To determine schoolchildren's perceptions of different occlusal appearances.
2. To determine the self-perception of schoolchildren toward their occlusal appearance using the Aesthetic Component (AC) of the Index of Orthodontic Need (IOTN).
3. To compare the perceptions held by schoolchildren across age, gender and place of residence in Limpopo Province.



## **CHAPTER FOUR**

### **3. RESEARCH METHODOLOGY**

#### **4.1. Study Design**

A cross-sectional analytic study was conducted in Capricorn District of Limpopo Province.

#### **4.2 Study population**

The sample was selected from Limpopo Public High Schools in the Capricorn District between the ages of 13-16 years. This age group was expected to be in grades 8 to 10.

#### **4.3. Sampling Technique**

A multiple stage sampling technique was used to select the participants for the study. The primary sampling unit was the circuit, and then schools were randomly selected within the selected circuits. Within selected schools, classes were randomly selected and all children within the selected classes aged 13 to 16 years were invited to participate in the study. Those children whose parents consented participated in the study.

#### **4.5 Sample Size**

In sampling for this study, ten circuits were randomly selected. Within the selected circuits, one school was randomly selected, providing ten schools for the study. The minimum number of children needed for the study was calculated based on the following formula by Levy and Lemeshow, (1991):

$$n = \frac{Z^2 p(1-p)}{e^2}$$

Where Z is the percentile needed to give 95% confidence, p = proportion of children who need treatment of malocclusion (p was taken to be 32.3% based on Van Wyk and Van Wyk, 2004) and e is sampling error which is 5%. Therefore, the minimum number of children required for this study is 336.

#### **4.6. Inclusion Criteria**

4.6.1. High school children aged 13-16 years were included in the study.

4.6.2. A signed letter of consent from parents or guardians was also required (Appendix C).

#### **4.7. Exclusion Criteria**

Children with a history of previous orthodontic treatment or having family members that had orthodontic treatment, and schoolchildren without anterior teeth, were excluded.

#### **4.8. Data Collection**

The data collection process from the selected schools was done in January 2010. The schools were visited twice with the visits a week apart. The first visit was for distribution of the consent forms to the principals of the schools. These consent forms were given to schoolchildren to take home for signature by parents and/or guardians. The second visit to the school was for the data collection using questionnaires (Appendix A). The questionnaires were handed out to schoolchildren in classrooms and they were asked to complete the questionnaires using a pencil. Participants were invited to ask questions if they did not understand any of the questions. The questionnaires were collected from the schoolchildren at the end of the session. The data collected were captured on Microsoft excel spreadsheet for analysis.

#### **4.9. Data Analysis**

The collected data was analyzed using SAS version 9. The frequency distribution of all the variables was calculated. The mean and standard deviation for continuous data (i.e. age, scores on 10 photographs) were used to interpret the data. The Chi square test was used to determine the association between participants' gender and perception/treatment need as well as age and perception/treatment need. The schoolchildren were asked to rate each photograph by means of a five point Likert scale: 1. very dissatisfied, 2. dissatisfied, 3. unsure, 4. satisfied, 5. very satisfied. The average rating given to pictures by the schoolchildren was calculated. The schoolchildren were then asked to rank the pictures from the most attractive to the least attractive. The average rank for each picture was calculated. The average rank was correlated with the IOTN rating. The statistical tests were always two sided and p

values  $< 0.05$  were considered statistically significant and p values  $> 0.05$  were considered insignificant.

#### **4.10. Study Limitations**

Only the children, who obtained parental consent and gave their own assent, participated in the study. The study was restricted to one urban school and nine rural schools. The IOTN does not represent all forms of malocclusion in the population.

#### **4.11. Legal and Ethical Considerations**

Permission to conduct the study was obtained from the Research Ethics Committee of the University of the Western Cape and Provincial Department of Education in Limpopo Province.

Participation in this study was voluntary. The participants were also informed that they had a right to withdraw at any moment. All the personal details and information obtained for the study will remain confidential. The aim and objectives of the study were explained to each class verbally before completion of the questionnaires. The consent forms were given to the participants so that they could be signed by the parents a week before conducting the study (Appendix C). Participants requiring treatment were referred to the Dental Specialist Facility at Polokwane-Mankweng Hospital Complex.

## **CHAPTER FIVE**

### **RESULTS**

This chapter presents the results of the study. The results include demographic characteristics, perceptions of schoolchildren on the importance of healthy and well-arranged teeth for appearance, assessment of their own teeth and a ranking of pictures in terms of attractiveness. The presence of an association between the importance of healthy and well-arranged teeth, with gender, age and place of residence, was investigated.

#### **5.1 Demographic characteristics of the sample**

The demographic characteristics of children in the selected schools are presented below. They include the total number of participants, percentage distribution of schoolchildren by age, grade and gender sampled.

Ten schools (Bataung, Chita-Kekaka, Klaas-Mothapo, Letswalela, M.E. Makgato, Dr A.M.S. Makunyane, Mathabatha, Mmaphuti, Mokgorokgoro and Radikgomo) were randomly selected from the Capricorn District of Limpopo Province for this study. M.E. Makgato was the only school that was situated in the urban area whilst the rest of the schools were in the rural area of the Province. Four hundred and three schoolchildren sampled from the selected schools participated in this study (See Table 4). Their ages ranged from 13 to 16 years old and they were found to be in grades between 8 and 11. A breakdown of the participant's grades collected for this study indicated that 229 were in grade 9 and 114 were in grade 8. Grades 10 and 11 accounted for 55 and 5 schoolchildren respectively.

Table 4: Total number (n) of participants in the study

Name of School	Number of participants(n)	Percentage (%)
Bataung	40	10
Chita-Kekaka	37	9
Klass-Mothapo	44	11
Letswalela	44	11
M.E. Makgato	54	13
Dr. Makunyane	40	10
Mathabatha	40	10
Mmaphuti	37	9
Mokgorokgoro	25	6
Radikgomo	42	11
<b>Total</b>	<b>403</b>	<b>100</b>

Of the 403 schoolchildren who participated in the study 213 (53%) were females and 190(47%) were males. The mean age of the study participants was 15 years, ranging from 13 to 16 years of age. The majority (45%) of the schoolchildren in the study were 15 years old, followed by 27% aged 14 years, and 1% aged 13 years (Table 5). One school was selected from each of the ten circuits (Appendix B).

Table 5: Gender and age distribution of the schoolchildren

	No	%
<b>Gender</b>		
Female	213	53
Male	190	47
<b>Age (years)</b>		
13	4	1
14	109	27
15	181	45
16	109	27

## 5.2. Perception of schoolchildren on the importance of healthy teeth for appearance

The association between children's perception of the importance of healthy teeth in relation to age, gender and place of residence was determined. Five participants indicated that they did not know whether healthy teeth are important for appearance or not. The table below is based on 398 schoolchildren who gave response. There was no

statistical significant difference with regard to importance of healthy teeth and gender, age and place of residence (see Table 6).

Table 6: The association between gender, age, place of residence and the importance of healthy teeth.

		Healthy teeth are important for appearance		p-value
		Yes	No	
<b>Gender</b>				
	Female	203(97%)	7(3%)	0.4610
	Male	179(95%)	9(5%)	
<b>Age</b>				
	<15	107(96%)	6(4%)	0.4042
	15	170(95%)	9(5%)	
	>15	105(98%)	2(3%)	
<b>Place of residence</b>				
	Rural	331(96%)	13(4%)	0.5367
	Urban	51(94%)	3(6%)	

### 5.3. Perception of schoolchildren on the importance of well-arranged teeth for appearance

Of the 403 participants, 13% said that they did not know that well-arranged teeth are important for appearance. Eighty five percent (85%) of the females reported that well arranged teeth are important for appearance compared to 71% of the males. This was a highly significant difference in terms of gender ( $p=0.0016$ ). with a p-value of 0.0016. However, there was no significant difference with regard to age and place of residence with 13% of participants indicating that they did not know (see Table 7). The table below is based on 349 schoolchildren who responded.

Table 7: Association between gender, age, place of residence and appearance of well-arranged teeth

		Well arranged teeth are important for appearance		p-value
		Yes	No	
<b>Gender</b>				
	Female	155(85%)	27(15%)	0.0016
	Male	119(71%)	48(29%)	
<b>Age</b>				
	<15	73(75%)	25(26%)	0.3443
	15	127(82%)	28(18%)	
	>15	74(77%)	22(23%)	
<b>Place of residence</b>				
	Rural	233(78%)	66(22%)	0.5163
	Urban	41(82%)	9(18%)	

## 5.4. Assessment of own teeth

### 5.4.1 Using the relabelled IOTN

The participants were asked to identify the picture that best resembles own their teeth. Of the 403 children in the study, most identified J (63%) as similar to their own teeth. Only one participant (0.3%) selected G, which is the worst occlusion. Fourteen of the children (3.5%) could not identify the occlusion similar to theirs (Table 8).

Table 8: Self assessment of which picture resemble their teeth

	Teeth resembles	Frequency	Percent	IOTN
1	None	14	3.47	
2	J	255	63.28	1
3	E	42	10.42	2
4	F	37	9.18	3
5	H	19	4.71	4
6	A	8	1.99	5
7	B	4	0.99	6
8	C	2	0.50	7
9	I	10	2.48	8
10	D	11	2.73	9
11	G	1	0.25	10

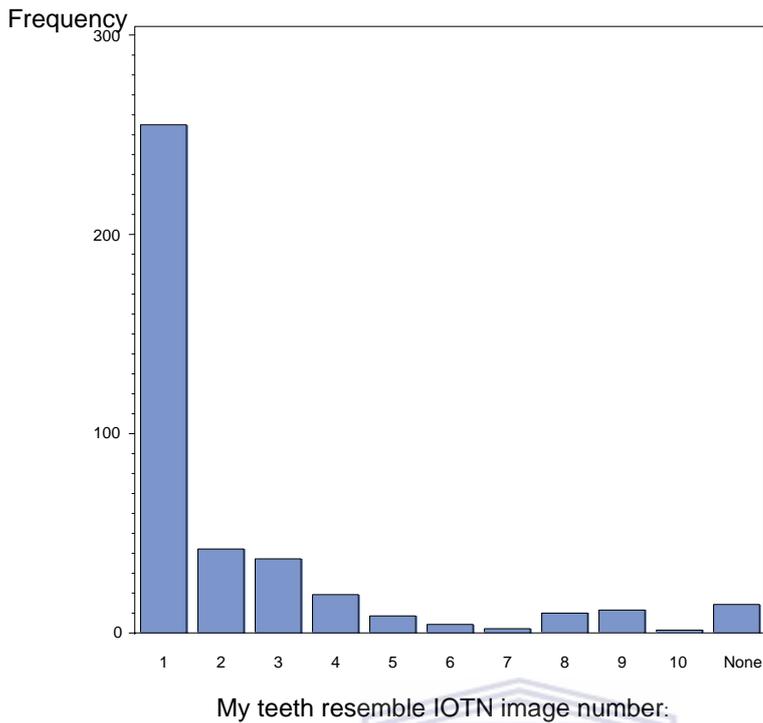
Of the 403 schoolchildren in the study, 22 (5.5%) identified one of the three pictures (I, D, G), 353 (91%) identified one of the four pictures (J, E, F, H) and 14 (3.5%) identified one of the three pictures (A, B, C,) which indicate definite need, no need and borderline need for orthodontic treatment respectively (Table 9). Fourteen of the 403 said none of the pictures resemble their own teeth (Table 8).

Table 9: The relabelled IOTN self assessment and treatment need

Relabelled IOTN	IOTN	Frequency	Treatment Need	%
J	1	255	<b>No need 91%</b>	63.28
E	2	42		10.42
F	3	37		9.18
H	4	19		4.71
A	5	8	<b>Borderline need 3.5%</b>	1.99
B	6	4		0.99
C	7	2		0.50
I	8	10	<b>Need 5.5%</b>	2.48
D	9	11		2.73
G	10	1		0.25

The most commonly chosen picture was IOTN number one, followed by two, three, and four. The picture labelled 10, was the least chosen picture. Some of the children did not select any of the occlusions (Figure 3).

Figure 3: Self-assessment of which picture best resembles their teeth



#### 5.4.2 Satisfaction with own teeth

Participants were asked if they were satisfied with their teeth and 233 were satisfied and 131 were dissatisfied. Thirty-nine children responded with the answer “do not know”. Colour, size and shape of teeth were the main factors mentioned by those that were not satisfied (Table 10).

Table 10: Association between gender, age, place of residence and satisfaction with own teeth

	I'm satisfied with my own teeth		p-value
	Yes	No	
<b>Gender</b>			
Female	125(63%)	73(37%)	0.7025
Male	108(65%)	58(35%)	
<b>Age</b>			
<15	76(70%)	32(30%)	0.0254
15	92(56%)	71(44%)	
>15	65(70%)	28(30%)	
<b>Place of residence</b>			
Rural	214(68%)	100(32%)	0.0001
Urban	19(38%)	31(62%)	

## 5.5. Ranking of pictures in terms of attractiveness

The participants were asked to rank the pictures in order from the most attractive to the least attractive. For each picture, the average rank was calculated to yield a rank score with one indicating the best ranking. Picture J was rated the most attractive with a rank score of 1.61, while picture G was rated the least attractive picture with a score of 8.69. The ranking of the randomised pictures matched the order based on the IOTN rating almost perfectly (except for the ratings of seven and nine being reversed). The agreement is clearly very good as reflected by the fact that the Spearman Rank correlation between the orders of the schoolchildren's rank scores and the IOTN rating was 0.95. The ranking of pictures by the schoolchildren are shown in Table 11. A second way of eliciting this information from children was to rate each picture from 1-5.

Table 11: Rating given by schoolchildren and IOTN rating

Relabelled IOTN	Rating score	IOTN
G	8.87	10
C	7.83	7
I	7.80	8
D	6.86	9
B	5.78	6
A	5.51	5
H	3.90	4
F	3.85	3
E	3.06	2
J	1.61	1

## 5.6. Summary of the results

In summary the association between gender and the importance of healthy teeth was significant ( $p = 0.0016$ ; Table 7). Similarly, there is highly significant difference between place of residence and the schoolchildren's satisfaction with their own teeth ( $p = 0.0001$ ; Table 10), however age is also marginally significant ( $p = 0.0254$ ; Table 10). The rating given by schoolchildren and the IOTN rating are in agreement with each other.

The schoolchildren were asked to identify the picture that resembles their teeth. Of the 403 children in the study, the majority identified J (63%) whilst only one selected G

(0.3%). Fourteen of the children (3.5%) could not identify the occlusion similar to theirs (Table 8).

Twenty two (5.5%) schoolchildren identified one of the three pictures (I, D, G), 353 (91%) identified one of the four pictures (J, E, F, H) and 14(3.5%) identified one of the three pictures (A, B, C,) which indicate definite need, no need and borderline need for orthodontic treatment respectively (Table 9). The most commonly chosen picture was one followed by two, three, and four. The picture labelled 10 was the least favoured picture. Some of the children did not select any of the occlusions (Figure 3).



## **CHAPTER SIX**

### **6. DISCUSSION**

#### **6.1. Description of the participants' demographic features**

In this cross-sectional analytical study, perception of different occlusal appearances among schoolchildren in the Capricorn District of Limpopo Province was evaluated. The sample was randomly selected from schoolchildren aged 13 to 16 years. Of the 403 schoolchildren that participated in the study, 213 were female and 190 as indicated in Table 5. The study was conducted in one urban and nine rural Limpopo Public High Schools (Table 4). Only the children whose parents consented participated in the study. The sample does not represent the whole of Limpopo Province population of this age group but it gives an overview of orthodontic concern and treatment need of schoolchildren in the Capricorn District in both the urban and rural areas of the Limpopo Province. The participants used relabelled intraoral photographs of the IOTN to judge their dental attractiveness.

This study showed a high proportion of female participants which was similar to some studies in the literature. However, other studies reported a higher number of male participants. The age group chosen is appropriate because this is more or less the age at which Orthodontic treatment usually begin. The children should be able to interpret and answer the questions by themselves at this level of cognitive development (Birkeland *et al*, 1996). Only one urban and nine rural schools participated in the study, because there are more rural than urban schools in the Province.

At Mankweng Township, which forms part of the Capricorn District of the Limpopo Province, Hlongwa and du Plessis, (2005), looked at children aged 12 years. More females participated in their study. Bernabe *and Flores-Mir* (2006) evaluated children aged 17 to 19 years consisting of more females in their study. In India, a study was conducted with the aim to assess orthodontic treatment need in school children aged 12-15 years (Shivakumar, 2010), while in United Kingdom, assessment was made on children aged 10 to 12 years old (Kok, 2004). The age and gender of children in this study was similar to those in the studies by Hlongwa and du Plessis, Shivakumar and Kok, allowing comparison with these studies.

## **6.2. Perception**

### **6.2.1. Importance of healthy teeth**

The majority of the schoolchildren in this study (95%) perceive healthy teeth as important for appearance, sixteen (4%) perceive healthy teeth as unimportant for appearance whilst five (1%) said they did not know whether healthy teeth are important for appearance or not (Table 6). The results confirm that these teenagers attach great importance to an attractive dental appearance, affirming the findings of Shaw et al, (1980) who found that facial attractiveness was the most important feature for overall appearance before weight, complexion etc. These results are slightly higher than those of Theunissen, (1993) who found satisfaction levels of 84% to 89%, and slightly lower than the 100% reported by Grzywacz, (2003). The results of this study showed no significant difference between age, gender, place of residence and the importance of healthy teeth. Other researchers such as Shaw, (1981) and Holmes, (1992) found contrasting results in which more females reported that healthy teeth are important. Although in this study, a higher proportion of girls (97%) and children aged 15 years and older said healthy teeth are important, the difference was not significant.

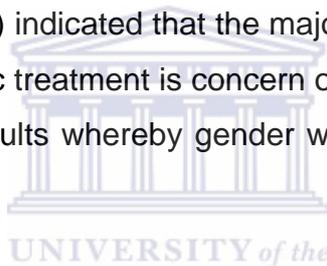
### **6.2.2. Importance of well-arranged teeth**

The results of this study further indicate that 68% of the schoolchildren perceive well-arranged teeth as important for appearance, 19% perceive well-arranged teeth as unimportant for appearance and 13% said they did not know. The results are lower than the 100% reported by Grzywacz, (2003). In this study, no significant difference was observed in relation to place of residence and the importance of well-arranged teeth. Regarding gender and the importance of well arranged teeth, the majority (85%) of females compared to 71% males believe that well arranged teeth are important for appearance ( $p = 0.0016$ ). The gender difference was found to be highly statistically significant suggesting that females perceive well-arranged teeth as important for appearance. According to Tung and Kiyak (1998), of peer acceptance for adolescents particularly girls, is significantly associated with their facial features, especially when they are different from those of peers.

### **6.3. Self- assessment and Treatment need**

#### **6.3.1. Satisfaction with their own teeth**

A significant difference was observed with regard to the question “are you satisfied with the arrangement of your teeth” and age. Thirty four percent of the children aged 15 years and above, were not satisfied with the arrangement of their teeth compared to 29% of children aged 15 years and younger. There was no significant difference between males and females regarding their satisfaction with the arrangement of their own teeth and their desire to change anything about their teeth. Nevertheless, a small percentage of participants indicated that they were not happy about the colour, shape, size and arrangement of their teeth. In Kenya, Psiwa, (2004) investigated the perception of occlusion and found that three-quarters of the children were satisfied with their occlusion. Psiwa also found significant difference in satisfaction with occlusion by gender. Cross and Cross (1971) indicated that the major reason that leads patients and their parents to seek orthodontic treatment is concern over appearance. Mugonzibwa *et al* (2004) also found similar results whereby gender was unrelated to satisfaction with dental appearance.



#### **6.3.2. The picture that most resemble their own teeth**

In this study, participants were asked to assess themselves by choosing the picture that most resembles their own teeth. The results of this exercise indicated the most chosen photograph to be J (63%) and only one child selected G (0.3%) out of 403 school children selected G. Five and a half percent (5.5%) of the children identified one of the three pictures (I, D, G) which indicate a definite need for orthodontic treatment. Another 3.5% had a borderline need for treatment, whilst 91% did not need any orthodontic treatment (Table 9). Kerusuo *et al*, 2004 looked at the association between normative and self-perceived orthodontic treatment need among Arab High School Students aged 14 to 18 years. There was 77% agreement between the AC and the self-perceived need. Seventy six percent (76%) of the students did not require treatment, 22% had borderline need whilst 2% had great need for treatment.

These results are different from those obtained by Hlongwa and Du Plessis, (2005) which indicated that 47% of the schoolchildren required orthodontic treatment. Although

their study was carried out in Capricorn district of Limpopo province, it should be noted that a different instrument i.e. Dental Aesthetic Index (DAI) was used to carry out their study. This is a normative orthodontic treatment need assessment. This contrasts with the perceived orthodontic treatment need used in this study. Other studies, which compared normative and perceived orthodontic treatment need, reported diverse results with some showing significant differences and some showing similar results between the two.

A study conducted in Italy showed a significant difference in which 3.2% of children reported a definite need for orthodontic treatment, whereas the dentist and parents indicated that 8.6% and 5.4% of these children needed orthodontic treatment, respectively (Nobile *et al*, 2007). Hamdan (2004) has showed a significant difference between the parents and the clinician, the highest score being that of parent (6.6%) followed by patient (6.1%) and clinician (5.4%). Psiwa (2004) found that there was a moderate agreement between the researcher's determination and the perception of treatment need by participants.

Furthermore, different authors have found very diverse results regardless of the instrument used. Van Wyk and van Wyk (2004) reported that 32% of the 12-year old children in their study had a definitive need for treatment. A study conducted in Jordan University Hospital showed that 71% of patients who participated in the study had a definite need for orthodontic treatment (Hamdan, 2004). A cross-sectional study in India indicated that 20% of children had a definite need for orthodontic treatment (Shivakumar *et al*, 2010). Souames *et al* (2006), indicated that 7% of the children they surveyed were considered to have a definite treatment need.

#### **6.4. Ranking of relabelled IOTN photographs in terms of attractiveness**

In this study, the schoolchildren were asked to arrange the photographs in order from the most attractive to the least attractive. Picture J was ranked the most attractive with a rank score of 1.61, while picture G was ranked the least attractive picture with a score of 8.69. The ranking of the randomised and relabelled pictures matched the order of the IOTN ranking perfectly except for the ranking of seven and nine, which were reversed. The schoolchildren's ranking was almost identical to the professionally determined IOTN ranking. The schoolchildren are good judges. They could easily identify which

occlusion needed treatment and their assessments were the same as those of professionals (Table 10).

According to Howells and Shaw, (1985) the visual stimuli such as those provided by the IOTN photographs are more useful than verbal descriptions in communicating with children. This then makes the use of the AC photographs for self-assessment more appropriate.

The children in this study had a tendency to select the low IOTN ranked photographs. The children were asked to score each photograph from one to five. The mean scores for photographs B, C, D, G, and I (high IOTN ranked images) were less than two whereas, the mean scores for photographs A, E, F, H, (low IOTN ranked images) were between two to three and only photograph J (Image number 1 on the IOTN ranking) had a mean score of more than three.

Several studies have reported on a similar tendency for both researcher and respondents to select photographs toward the attractive (low) end of the scale (Holmes, 1992; Burden and Pine, 1995).

Seventy four percent (74%) of the children who were willing to have orthodontic treatment were from a rural area, which is substantially higher than reported by Elham *et al.*, (2005) but reflects the high proportion of rural children in this study. Elham *et al.*, (2005) reported that 45% of the children who were more willing to have orthodontic treatment were from the urban schools.

## **6.5. Study limitations**

Only the schoolchildren who gave their consent participated in the study. This might have led to the exclusion of other children who might have different occlusions. The study was restricted to one urban school and nine rural schools since there are more rural than urban schools in the Province.

The occlusal appearance is only one assessment of the alignment of the anterior teeth and this alone cannot be the only way to qualify a patient for treatment. The IOTN does not identify all malocclusions that may exist in a given population. The treatment need assessment therefore may omit to address some functional aspects of occlusion.

## **CHAPTER SEVEN**

### **CONCLUSION**

This study confirms that teenagers attach great importance to a healthy and attractive dental appearance. There was no association between gender, age and place of residence and the importance of healthy teeth. Females were more likely to think that the arrangement of their teeth was important for appearance. More of the older children i.e. 15 years and above were not satisfied with the arrangement of their teeth. There was a significant difference between males and females. The majority of the participants indicated that their teeth resemble the occlusion represented by IOTN image one (most attractive), that does not require treatment.

The participants were asked to rank the relabelled IOTN in order from the most attractive to the least attractive. The perception of schoolchildren matched exactly with that of the IOTN which is the professional ranking established by orthodontic specialists. This confirms that the children are good judges as far as occlusion is concerned. The results also suggest that normative and self-perceived orthodontic treatment needs are associated. Compared with other studies there is a small number of patients who need substantial orthodontic treatment and a large majority of participants who do not indicate a need for treatment. A few schoolchildren indicated that none of the occlusions they were shown resemble their own teeth. This may be because the IOTN does not include occlusions common in this particular population such as anterior open bite, bimaxillary protrusion and anterior diastema.

This study found the Aesthetic Component of the IOTN to be a valid tool in the aesthetic evaluation and assessment of the self-perceived need for orthodontic treatment. It can also be concluded that schoolchildren compare favourably with orthodontic professionals in their perception of what occlusions are acceptable and require no treatment, compared to those that are unacceptable and require borderline or intensive orthodontic treatment.

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## APPENDIX A: QUESTIONNAIRE

### PERCEPTION OF OCCLUSAL APPEARANCES AMONG SCHOOL CHILDREN IN LIMPOPO PROVINCE

Circuit:

School Name:

Class:

Date:

Name:

Age:

Yrs

Gender:

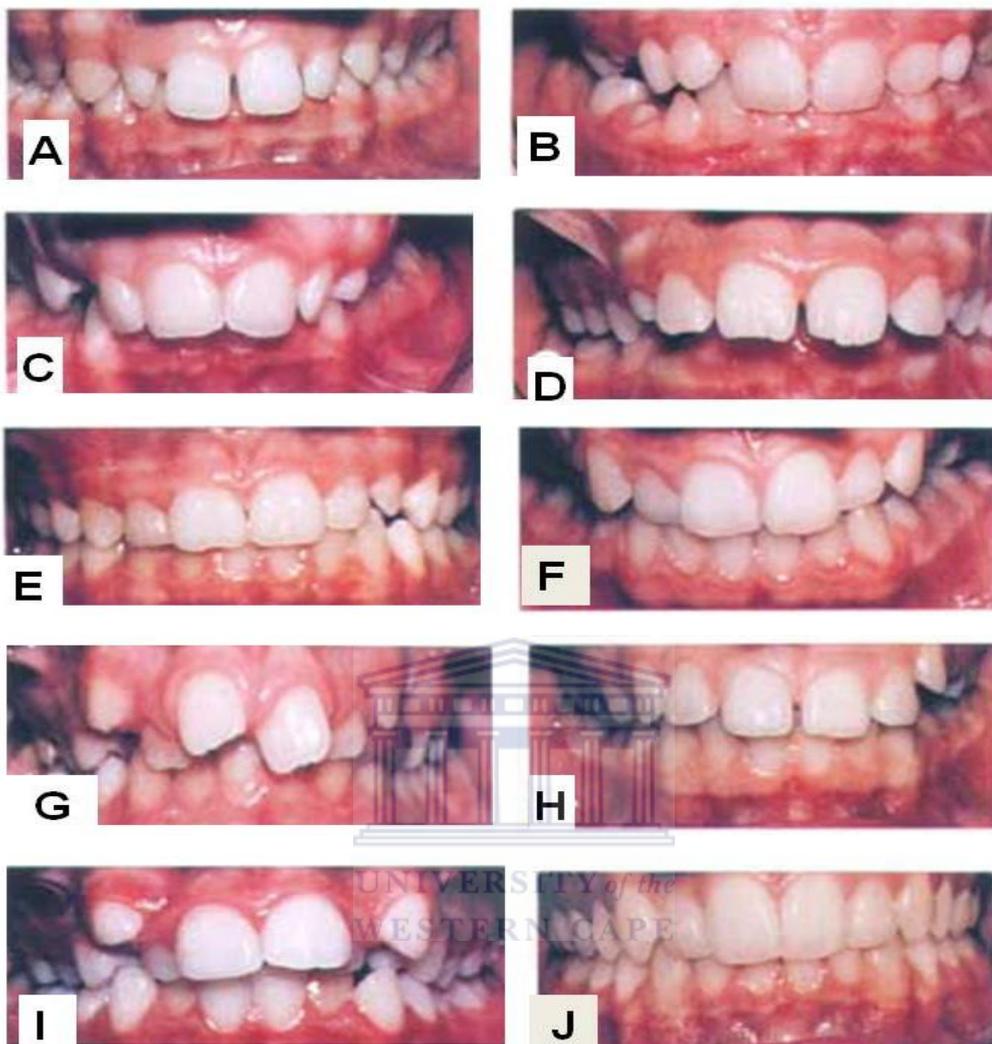
Male

Female

Record No:

- 
- 1 Do you think healthy teeth are important?  Yes  
 No  
 Don't know
- 2 Do you think well arranged teeth are important for your appearance?  Yes  
 No  
 Don't know
- 3 Are you satisfied with the arrangement of your teeth?  Yes  
 No  
 Don't know
- 4 Is there anything you would like to change about your teeth?  Yes  
 No  
 Don't know
- 5 If yes, what would you like to change?  Arrangement  
 Size  
 Colour  
 Other (specify)

**2. RANDOMISED AND RELABELLED AESTHETIC COMPONENT OF THE IOTN(RRAC)**



The above photographs are labelled randomly from A to J. Please rate each photograph from 1-5

2. If these photographs above were your teeth would you be:

	Very Dissatisfied	Dissatisfied	Unsure	Satisfied	Very Satisfied
Photograph A					
Photograph B					
Photograph C					
Photograph D					
Photograph E					
Photograph F					
Photograph G					
Photograph H					
Photograph I					
Photograph J					

3. Identify which teeth most resemble yours. (**Please select one picture**).

Picture A	Picture B	Picture C	Picture D	Picture E
Picture F	Picture G	Picture H	Picture I	Picture J

4. Arrange the pictures in order from the most attractive to the least attractive, one being the most attractive and ten being the least attractive).

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.



## APPENDIX B: SCHOOLS SELECTED FOR THE STUDY

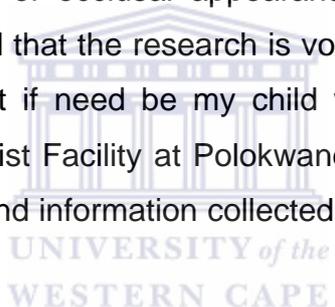
Circuit		School selected
1	Bohlaloga	Mathabatha
2	Bochum East	Bataung
3	Bochum West	Mokgorokgoro
4	Kgakotlou	Klaas Mothapo
5	Maraba	Mmaphuti
6	Mogodumo	Radikgomo
7	Mogoshi	Letswalela
8	Moletlane	Chita Kekaka
9	Polokwane	M.E. Makgato
10	Seshego	Dr AMS Makunyane



## **APPENDIX C: CONSENT FORM**

**Department of Orthodontics**  
**Faculty of Dentistry**  
**University of the Western Cape**

I Mr/Ms/Mrs .....grant my son/daughter permission to participate in the research on perception of occlusal appearances among schools children in Limpopo Province. I understand that the research is voluntary and that there will be no provision for any treatment but if need be my child will be referred for appropriate treatment to the Dental Specialist Facility at Polokwane/Mankweng Hospital Complex. All my child's personal details and information collected during the research will be kept confidential.



Parent's name..... Signature.....

Witness' name..... Signature.....

Date.....

Signature of the researcher.....

Dr N.M. Sehowa