UNIVERSITI TEKNOLOGI MARA

COMPARISON OF TREATMENT OUTCOMES OF ORTHODONTICALLY TREATED CLASS I MALOCCLUSION AND BIMAXILLARY PROTRUSIVE PATIENTS IN THE MALAY POPULATION

SITI BALQISH BINTI OON

Dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Clinical Dentistry
(Orthodontics)

Faculty of Dentistry

September 2022

ABSTRACT

The aims of this study were to compare the treatment outcomes of orthodontically treated Class I malocclusion and bimaxillary protrusion in Malay population using orthodontics records and questionnaires respectively. 128 Malay patients who met the inclusion criteria were recruited; of which 64 patients were in Class I malocclusion and another 64 patients in bimaxillary protrusion groups. This quantitative cohort study involved plotting of 29 landmarks on two-dimensional lateral cephalometric pre- and post-treatment radiographs using geometric morphometric analysis (GMA). Generalized Procrustes Analysis, Principal Component Analysis, Discriminant Function Analysis, followed by Procrustes ANOVA were performed using MorphoJ and SPSS softwares. Peer Assessment Rating (PAR) Index assessments were carried out using study casts of pre-treatment and post-treatment in both groups. A validated questionnaire was used to determine patients' satisfaction post orthodontic treatment outcomes. Paired and unpaired t-test and correlation test were applied using SPSS software. Results showed that, with the application of GMA, bimaxillary protrusion group presented more protruded shape of incisor inclination compared to Class I malocclusion group. Both groups had similar skeletal and dental outcomes after treatment completed. In terms of soft tissue, bimaxillary protrusion group exhibited significant improvement in nasiolabial angles, while there was no significant difference in labiomental fold angles in both groups. Regardless of the incisor inclination, the PAR scores were similar for both before and after orthodontic treatment with significant improvement in 99% of the patients. Almost all patients were satisfied with their facial and dental aesthetics after treatment was carried out for both groups. Within the limitations of this study, it can be concluded that the treatment outcomes for both Class I and bimaxillary protrusion cases were satisfactory in terms of clinical improvement and patient satisfaction.

ACKNOWLEDGEMENT

In the Name of Allah, Most Gracious, Most Merciful. Praise be to Allah for His Mercy for giving me this opportunity to complete my PhD Thesis. I can never be here without His Grace and Blessings. After an intensive journey, writing this note of thanks is the finishing touch on my thesis. It has been a period of intense learning for me, not only in the scientific arena, but also at personal level. Writing this thesis has had a big impact on me. I would like to reflect on the people who have supported and helped me so much throughout this period.

After years of an intensive period, today is the day:

I would like first of all to express my sincere gratitude and thank to my supervisor, Associate Professor Dr Noraina Hafizan Norman for her valuable guidance and for all of the opportunities I was given to conduct my research. She definitely provided me with the tools that I needed to choose the right direction and successfully complete my thesis. I would particularly like to single out my co-supervisors, Dr Sarah Haniza Ab. Ghani, Associate Professor Dr Budi Aslinie Md Sabri and Associate Professor Dr Aspalilah Alias for their excellent cooperation and supporting me greatly and were always willing to help me. In addition, my sincere gratitude is also extends to Madam Izyan Hazwani, statistician at Faculty of Dentistry, Universiti Teknologi MARA (UiTM) for helping with the statistic and research work.

Of course, there are no words to describe my gratitude and appreciation to my family. I would also like to thank my beloved mother for her prayers and support to instil in me the root and virtue of seeking knowledge. To my siblings, thank you so much for their wise counsel, support and sympathetic ear. They are always there for me. Finally, to all my batch mate, thank you for your prayer, time and support all this while. We were not only able to support each other by deliberating over our problems and findings, but also happily by talking about things other than just our papers.

Thank you very much, everyone!

TABLE OF CONTENTS

<div align="right">**Page**</div>

CHAPTER ONE
INTRODUCTION

1.1   Research Background

Malocclusion was classified as a Handicapping Dento-Facial Abnormality by the World Health Organization in 1987. Malocclusion was then defined as an anomaly that causes disfigurement or impedes function, needing treatment "where the deformity or functional defect was likely to be a hindrance to the patient's physical or emotional well-being.". Malocclusion was further defined as significant variation from optimal occlusion, a condition aesthetically unacceptable (Houston, et al., 1992), signifying an imbalance in the relative sizes and positions of teeth, facial bones, and soft tissues (lips, cheek, and tongue). Malocclusion could be considered as a multifactorial problem; therefore, a multitude of aetiological factors have been incriminated, of which the genetic, environmental, and ethnic factors contribute the most in the emergence of malocclusions (Alhammadi et al., 2018).

The most common qualitative assessment of malocclusion is Angle's classification (Angle, 1899) which classifies occlusion into 3 groups which are Class I (neutrocclusion), Class II (distocclusion) and Class III (mesiocclusion). However, it only examines molar relationships and does not take into account the relationship of the anterior teeth, which are aesthetically important (Gravely & Johnson, 1974). Hence, to supplement the occlusal assessment with the relationship of the anterior teeth, British Standard Institute (B.S.I.) developed an incisor relationship classification which categorises different types of malocclusion for more accurate diagnosis, quick and easy documentation as well as comprehensible form of communication between dentists and clinicians (British Standard Institute, 1983). In this classification, B.S.I defined Class I when the lower incisor edges occlude with or lie immediately below the cingulum plateau of the upper central incisors. Meanwhile, for Class II, the lower incisor edges lie posteriorly to the cingulum plateau of the upper incisors. There are two subdivisions for Class II which are Division 1, where the upper central incisors are proclined or of average inclination with an increase in overjet while for Division 2, the upper central incisors are retroclined, minimal or slightly increased in overjet. For Class III, it is defined when the lower incisor edges lie anterior to the cingulum plateau of the upper