

**UNIVERSITI TEKNOLOGI MARA**

**BIMAXILLARY PROTRUSION  
IN MALAY POPULATION: A  
SYSTEMATIC CLASSIFICATION OF  
SKELETAL, DENTAL AND ITS  
SOFT TISSUE FEATURES**

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## ABSTRACT

The aim of this study is to analyze, classify and calibrate its cephalometric classification of skeletal and dental components and to describe its related soft tissue features of bimaxillary protrusion in Malay patients attending Orthodontic Clinic at UiTM. This cross-sectional study involved tracings and analysis of 116 lateral cephalometric radiographs using Dolphin Imaging software. This study was conducted in four phases which are first: preliminary, second: sample selection, third: quantitative and fourth qualitative analysis. Thirty radiographs were randomly selected, traced, digitized, calibrated and repeated within 2 weeks interval to assess measurement error. Eight angular and eight linear parameters were measured. Skeletal and dental values were analyzed and classified into mild, moderate and severe to grade the severity of protrusion. Tracings were matched to the profile photos and numerically arranged for further grading by four assessors on two occasions of 2 weeks interval. Calibration were tested among 18 assessors including subjective scoring without cephalometric values. Descriptive statistics were used to assess the dentoskeletal characteristics and Kappa coefficient to measure the assessors' agreement. Inter-rater and intra-rater reliability were analyzed for 30 radiographs and showed excellent correlation coefficient (ICC: 0.831). Agreement on classification between 4 assessors were found to be good in skeletal (0.8007) and very good in dental components (0.853). Further calibration similarly showed good agreement in skeletal (0.8490) and dental (0.7693), whereas subjective scoring displayed poor agreement in both variables (0.2506, 0.2079). With regards its severity, 61% of the subjects exhibited moderate, 24% of mild and 15% of severe protrusion. Significant bidental proclination of incisors were also observed (UIA: 125.48°; LIA: 102.56°) with acute interincisal angle (102.73°). Majority of subjects had moderate (71%) and 26% with severe proclination. Soft tissue assessments showed that the average lip thickness of the subjects was  $11 \pm 2$ mm. Bimaxillary protrusion mainly presented in wide range of protrusion from mild, moderate to severe protrusion and in occurrence of soft tissue procumbence. Subjective perception was shown to be inaccurate and unreliable. Thus, this systematic categorization aids easy identification, guided evaluation and proper treatment delivery.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of Study

Being indifferent is not stringently different when one is seeing in a group who share those similarity too, unless compared to its counterpart, which may be described as not normal or with abnormality. Thus, it is difficult to decide which one is the best model for a population due to this indifferent as normal in general is hard to define (Purmal et al., 2013). In similar condition, a Caucasoid face will never fit a Mongolian face or vice versa, because of their distinct facial features that differs them. This recognition strongly supports the idea to study people who share common features for establishment of a baseline norm.

Many studies have shown that Asians, including Malaysians are commonly seen with bimaxillary protrusion features, which is characterized by protrusive and proclined upper and lower incisors and an increased in procumbency of the upper and lower lips (Chen, 2009; Mohamad et al., 2011; Solem et al., 2013) and sometimes may or may not accompanied with incompetent lips (Proffit et al., 2007).

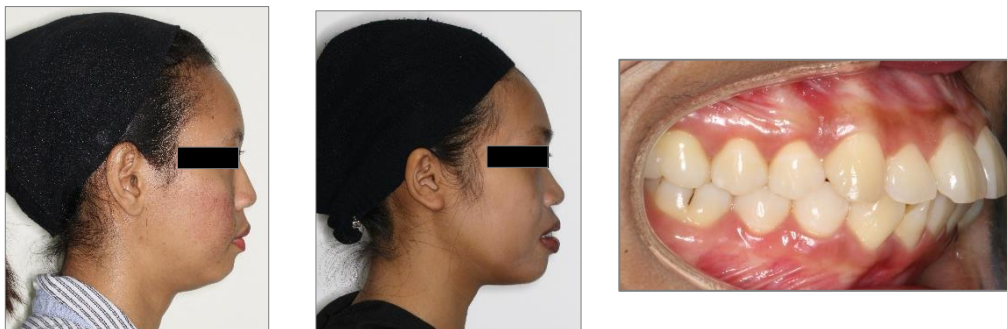


Plate 1.1 Facial Profile of Subject with Bimaxillary Protrusion with Competent and Incompetent Lips, and Proclination of Upper and Lower Teeth

However, Bimaxillary protrusion presentations may differ from one ethnic group to one another. The features and degree of a protrusion may vary with one's culture, ethnicity, age, gender (Yesmin et al., 2014) as well as their subjective perception (Sivakumar et al, 2014). A bimaxillary protrusion subject of a Caucasian may not have the same severity as in the other group (Keating, 1985) because of their