

CHAPTER I

INTRODUCTION

1.1 Rationale and background

Most cleft lip and palate patients have many dento-skeletal problems such as anterior or posterior crossbite, congenital missing teeth at cleft site, and skeletal Class III relationship.¹ The dentofacial deformity can affect speech, swallowing pattern, mastication and dentofacial esthetics. One of the most common associated skeletal problems in cleft lip and palate patients is maxillary deficiency in which dental development is also impaired.² Maxillary hypoplasia may occur not only in the sagittal plane but also in the transverse and vertical planes of cleft lip and palate patients who received cleft surgery during infancy.³

The nasomaxillary complex deficiency in cleft lip and palate patients is variously attributed to early reconstructive surgery, tissue deficiency, and inherent growth retardation.^{4,5} The effect of primary surgery such as surgical technique, timing, and the expertise of surgeon has been considered to have greater impact on the growth and development of the craniofacial complex in children with clefts.⁶⁻⁸ Other factors, such as presurgical orthopedics and orthodontic treatment, are also considered to influence the final growth outcome.⁹

Cleft lip and palate patients need orthodontic treatment alone (camouflage treatment) or orthodontics combined with orthognathic surgery to correct the malocclusions. In the final phase of treatment, orthognathic surgery is usually performed due to the maxillary hypoplasia. Maxillary osteotomy is most commonly required for cleft lip and palate patients.¹⁰ The purpose of orthognathic surgery is to facilitate normal jaw function, acceptable facial esthetics, and long-term stability.¹¹

Good treatment outcome is the objective of treatment that cleft lip and palate patients should receive. For this reason, treatment outcome evaluation is essential to identify and implement the highest possible standards of care. However, the quality of treatment outcomes can vary widely in cleft lip and palate patients. The differences in treatment results may be related to variation in the sequence, timing, and technique of

treatment, the organization and delivery of oral care, as well as the skills and experience of individual surgeons.¹²

The assessment of treatment outcome and degree of improvement are essential to evaluate the final orthodontic treatment outcome. Many previous studies have examined positional and soft- and hard-tissue changes after orthognathic surgery, by comparing cephalometric radiographs or photographs or both, before treatment.¹³⁻¹⁶ By contrast, the occlusal outcome after orthognathic surgery has been overlooked, mainly.¹⁷

There are many kinds of quantitative indices that have been reported to assess orthodontic treatment need or treatment outcome, and showed the improvement or post-treatment changes.¹⁸⁻²¹ For example, the Index of Orthodontic Treatment Need (IOTN) was developed to evaluate need of orthodontic treatment and measure the quality of treatment outcomes.²² Furthermore, the Peer Assessment Rating (PAR) Index was developed to assess the severity of malocclusion.²³ This Index can use to evaluate the orthodontic outcome by comparing pre- and post-treatment casts.²⁴ The difference between the pre- and post-treatment scores reflects the degree of improvement and the success of treatment.

At the Khon Kaen University Cleft Lip and Palate Center, the final treatment outcomes have not so far been evaluated, nor has any report from other Centers in Thailand so far been found for objective evaluation of final phase treatment outcomes. Since PAR has been widely used for assessing both pre-treatment and post-treatment orthodontic outcomes, it was decided to apply this Index to assessing outcomes for treatment of patients with oral clefts.

1.2 Research questions

1.2.1 What is the outcome of the final phase of treatment in complete cleft lip and palate patients with orthodontic treatment alone (OTA) and with combined orthognathic surgery (COS)?

1.2.2 What is the amount of change (improvement) in the occlusion in the final phase of these two alternatives of treatment?

1.3 Objectives of the study

1.3.1 To assess the malocclusions among patients with complete cleft lip and palate in Khon Kaen University Cleft Lip and Palate Center immediately before and after the final phase of correction of their malocclusions

1.3.2 To assess the degree of improvement for malocclusions of patients with repaired complete clefts of lip and palate at the Khon Kaen University Cleft Lip and Palate Center

1.4 Research hypothesis

H_0 = There is no difference in the outcome of the final phase of treatment in complete cleft lip and palate patients with orthodontic treatment alone and with combined orthognathic surgery.

H_A = There is difference in the outcome of the final phase of treatment in complete cleft lip and palate patients with orthodontic treatment alone and with combined orthognathic surgery.

1.5 The scope of the study

This study evaluated and compared the quality of treatment outcomes of Khon Kaen University Cleft Lip and Palate Center. All subjects were the complete cleft lip and palate patients in their final phase of treatment by orthodontic treatment alone and orthodontic combined with orthognathic surgery. The PAR Index was performed for the subjects' pre-treatment and post-treatment study models to interpret the study's objectives. Mann-Whitney U Test was used to compare pre-treatment, post-treatment, and improvement in PAR scores between OTA and COS groups whereas comparison of PAR Index score improvement categories of both groups were made using Fisher's exact test.

1.6 Expected benefits of the study

For Khon Kaen University Cleft Lip and Palate Center, the final outcome of correction of malocclusion has never been assessed. This study will determine the outcome of treatment in completed cleft lip and palate patients who received OTA or COS. Furthermore, the study will show the degree of improvement in cleft lip and palate patients. The expected benefit of this study is to help the Cleft Lip and Palate Center improve treatment outcomes and guide improvement in orthodontic diagnosis and treatment planning in the future.