

# Effect of a fixed (pin-retained) Lateral Maxillary Plate on Maxillary Arch Dimension in Complete Bilateral Cleft Lip and Palate

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## Introduction

For a Cleft Palate Team, one of the greatest challenges is the treatment of a child born with a complete bilateral cleft of the lip and palate. To improve the surgical outcome in these children, placement of a pin-retained lateral maxillary prosthesis is performed, on average, at six months of age and worn until twelve months of age. The prosthesis is placed prior to surgical closure of the palate, which is when it is removed. Alternatively, the maxilla may be allowed to develop without the fixed prosthesis. Pin-retained plate has been shown to reduce the collapse of the lateral maxillary palatal segments. This study evaluates the difference in palatal width of children who had the pin-retained lateral maxillary plate placed at six months of age and the children that had no prosthesis used (The usual treatment). This study only evaluated children who reached five to six years of age.

## Purpose

The purpose of the study is to determine if the fixed pin-retained lateral maxillary prosthesis will maintain the maxillary arch or reduce the maxillary lateral collapse.

## Methods

Twenty-three patients from Cardinal Glennon Children's Hospital were identified using the following criteria: complete bilateral cleft lip and palate, a patient of the craniofacial team, and ability to obtain intraoral photographs at the age of six. Nearly half of the patients wore the fixed plate, and the remainder did not. Intraoral photographs were evaluated for the presence of cross bite or edge to edge in the occlusion of primary molars and anterior canines. A permutation test for equality of proportions with 2,000 replications was ran on the data for statistical analysis with an Alpha of 0.05.

## Results

- Statistically significant decrease in the presence of cross bite for patients treated with fixed plate was seen when evaluating canines and/or molars ( $p < 0.05$ ).
- The difference was not significant ( $p = 0.22$ ) if sensitivity was expanded with inclusion or the presence of edge to edge.
- When including edge to edge for evaluating malocclusion there was no significant difference in canine relationship. ( $p = 0.69$ ).
- Molar alignment outcome was most evident with significant difference seen in the presence of molar cross bite with ( $p < 0.001$ ) or without ( $p < 0.005$ ) the inclusion of edge to edge.
- The presence of cross bite either of molars or canines was seen in 9 of the 11 patients without fixed prosthesis and 4 of the 12 patients with fixed prosthesis.
- Molar cross bite was seen in 9 of the 11 patients without fixed prosthesis and 2 of the 12 with the fixed prosthesis.
- All 11 without the fixed prosthesis, demonstrated molar cross bite and/or edge to edge occlusion. And 2 of the 12 fixed prosthesis showed cross bite and/or edge to edge occlusion.

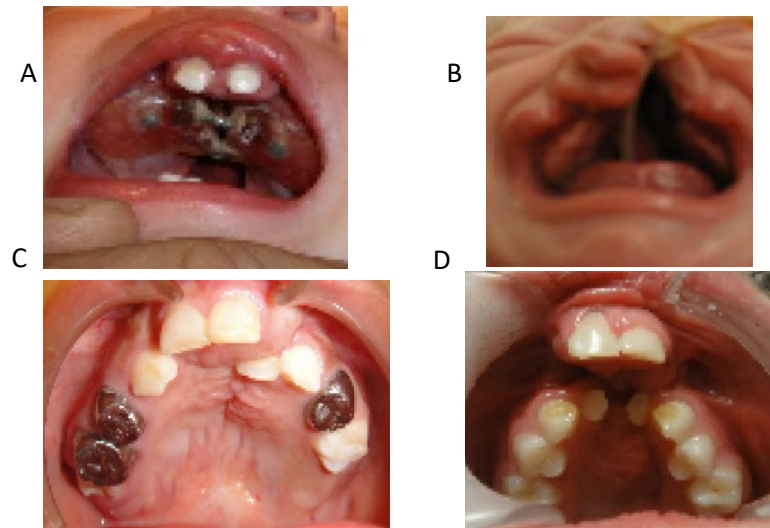
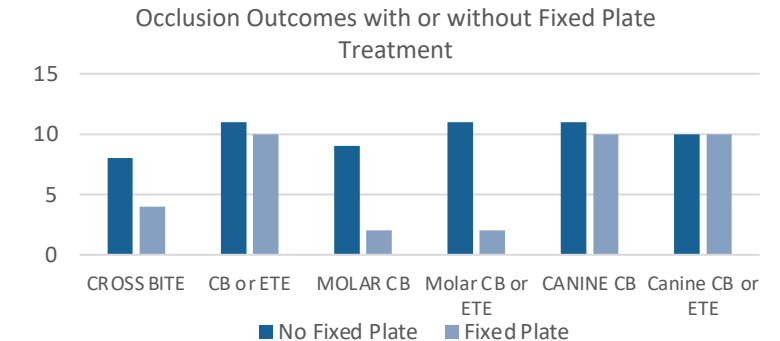


Fig. 1: A) Fixed plate treatment at time of placement at age 1y 5month . B) No fixed plate treatment subject at 1 month old. C) Outcome of fixed plate treatment at age 6yo D)Outcome without fixed plate treatment at age 5yo,



Permutation test for equality of proportions with 2000 replications

statistic	p.value	estimate_no_fp	estimate_yes_fp	variable
3.694	0.012	0.818	0.333	cross_bite
0.457	0.222	1.000	0.833	cb_or_ete
7.326	0.004	0.818	0.167	molar_cb
13.004	0.000	1.000	0.167	m_cb_or_ete
0.457	0.221	1.000	0.833	canine_cb
0.000	0.687	0.909	0.833	c_cb_or_ete

## Conclusion

Fixed plate prosthesis for complete bilateral cleft lip and palate, results in an improved occlusion outcome. Implications include better esthetics due to improved positioning of the premaxilla and improved speech development due to wider palate throughout the treatment process. It was also implied a decreased need for palatal expansion and improved patient's morale. Further investigation and studies should be completed to evaluate these aspects of the benefits of the fixed plate prosthesis.

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