



COMPARISON OF THE MANDIBULAR ARCH WIDTHS IN CLEFT PALATE PATIENTS

Suja Ani G

Department of Orthodontics, Government Dental College, Thiruvananthapuram

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Abstract: Mandibular arch widths and ratios are computed for unilateral cleft patients. The mandibular dental arch dimensions in unilateral cleft are different from that of the normals. Studies were made on the arch widths of normals of our population, but the arch dimensions of the cleft patients are not that widely studied. The mandibular dental arch dimensions in unilateral cleft are not different from that of the normals. The average MD33/MD44 and MD33/MD66 ratios among males and the normals showed a statistically significant difference ($p < .05$). The average MD33/MD44 ratio among females of the cleft and the normals also showed a statistically significant difference ($p < .05$). The parameters in the study did not show any statistically significant difference between the males and females among the cleft. There was significant difference between males of the cleft and the normal populations in (MD66). The long term stability of treatment results in cleft palate patients is to be taken up for further research.

Keywords: Arch, Cleft, Comparison, Mandible, Mandibular, Palate, Unilateral, Width

INTRODUCTION

Cleft palate is the most common genetic defect seen in the orofacial region, for treatment of which the patients report to the department of orthodontics also. There are different types of clefts, and different classifications. The cleft may be unilateral or bilateral. The patients who reported to the dept: of orthodontics were divided into the different groups of classifications, and an attempt is made here to determine the mandibular arch width in unilateral cleft palate patients.

Background/Rationale:

Studies were made to measure the arch widths in the normals of our population, in our state, in our country and in the world; but the mandibular arch dimensions of the cleft patients are not that widely studied. Hence this study is undertaken on the mandibular arch dimensions of the cleft patients, in the Government Dental College, Thiruvananthapuram.

MATERIALS AND METHODS

This study was carried out in the Department of Orthodontics, Government Dental College, Thiruvananthapuram, during the period from January 2012 to March 2012.

Twenty plaster study models, of unilateral cleft patients who reported for treatment in the department of Orthodontics, Dental College, Thiruvananthapuram, were taken up for analysis. The criteria for selection of the study casts included unilateral cleft palate with presence of most of the permanent teeth except 3rd molar. These were the study casts of patients who had

undergone surgical repair of the cleft palate at the specified required age and who belonged to Kerala by birth and domicile. The mandibular arch dimensions were taken using digital vernier callipers. The dimensions taken for this study were inter canine width; inter premolar width, and inter molar widths. Mandibular inter canine width (MD33) was measured at the cervical margin, on the labial surface of mandibular canines; mandibular inter premolar width (MD44) was measured at the cervical margin, on the buccal surface of mandibular first premolars; and mandibular inter molar width (MD66) was measured at the cervical margin at the buccal surfaces of mandibular molars. No reading was taken when a tooth was missing or unerupted. No substitution was made for missing and/ or unerupted tooth as it may give false reading. The mean ages of the cleft patients were 16.5 years. There were 7 males and 13 females.

The data was analyzed statistically using the SPSS software. The mean and the standard deviations for the mandibular arch dimensions were calculated. Whether there is any statistically significant difference between the mean values observed for males and females were also analyzed. Comparison of the arch width values of the cleft sample with that of the normals was done; Normals refer to normal population values obtained from an earlier study¹ conducted in the department of orthodontics, Government Dental College, Thiruvananthapuram, the mean age of the normal sample being 19.4 for the sample designated as T1 sample and 34.4 for the sample designated as T2 sample in that study; and the sample number being 15. Intra oral photographs of a patient with unilateral cleft

*Corresponding Author:

Dr. Suja Ani G MDS, PhD (orthodontics),
Professor and Head, Department of Orthodontics,
Government Dental College,
Thiruvananthapuram, India



are presented in fig 1 and 2.



Fig.1: Intra oral photograph of a unilateral cleft patient Frontal View



Fig.2: Intra oral photograph of a unilateral cleft patient Right lateral view

RESULTS

Table.1: Mean and SD of arch dimensions for the cleft and the normals

parameter	Category	N	mean	sd	t	p
mandibular inter canine width (MD33)	Cleft	20	30.28	2.02	1.536	0.134
	Normal	15	29.28	1.71		
mandibular inter premolar width (MD44)	Cleft	20	38.62	2.83	-0.826	0.415
	Normal	15	39.31	1.75		
mandibular inter molar width (MD66)	Cleft	18	51.73	2.79	-1.249	0.221
	Normal	15	52.82	2.10		
MD33/MD44	Cleft	20	0.79	0.03	3.510	0.001
	Normal	15	0.75	0.03		
MD33/MD66	Cleft	18	0.58	0.03	2.686	0.012
	Normal	15	0.55	0.02		
MD44/MD66	Cleft	18	0.74	0.04	0.310	0.759
	Normal	15	0.74	0.02		

Mean and SD of arch dimensions for the cleft and the normals are presented in Table.1. The average mandibular intercanine width (MD33) among cleft was 30.28±2.02 and that among the normals was 29.28±1.71. The observed difference was statistically not significant (p>.05). The average mandibular inter premolar width (MD44) among cleft was 38.62± 2.83, and that among the normals was 39.31±1.75. The observed difference was statistically not significant

(p>.05). The average mandibular inter molar width (MD66) among cleft was 51.73± 2.79, and that among the normals was 52.82±2.10. The observed difference was statistically not significant (p>.05). The average MD33/MD44 ratios among cleft was 0.79± 0.03, and that among the normals was 0.75±0.03. The observed difference was statistically significant (p<.05). The average MD33/MD66 ratios among cleft was 0.58± 0.03, and that among the normals was 0.55±0.02. The observed difference was statistically significant (p<.05). The average MD44/MD66 ratios among cleft was 0.74± 0.04, and that among the normals was 0.74±0.02. The observed difference was statistically not significant (p>.05).

Table.2: Gender wise comparison among the cleft

parameter	Category	N	mean	sd	t	p
mandibular inter canine width (MD33)	Male	7	29.23	2.02	-1.788	0.091
	Female	13	30.84	1.86		
mandibular inter premolar width (MD44)	Male	7	37.40	3.36	-1.452	0.164
	Female	13	39.28	2.40		
mandibular inter molar width (MD66)	Male	7	50.50	3.18	-1.542	0.143
	Female	11	52.51	2.34		
MD33/MD44	Male	7	0.78	0.05	0.095	0.926
	Female	13	0.79	0.03		
MD33/MD66	Male	7	0.58	0.03	0.202	0.843
	Female	11	0.58	0.04		
MD44/MD66	Male	7	0.74	0.05	0.001	0.999
	Female	11	0.74	0.03		

Table.2 presents the Gender wise comparison among the cleft. The average mandibular inter canine width (MD33) among the males in the cleft sample was 29.23±2.02, and that among the females was 30.84±1.86. The observed difference was statistically not significant (p>.05). The average mandibular inter premolar width (MD44) among the males in the cleft sample was 37.40± 3.36, and that among the females was 39.28±2.40. The observed difference was statistically not significant (p>.05). The average mandibular inter molar width (MD66) among the males in the cleft sample was 50.50± 3.18, and that among the females was 52.51±2.34. The observed difference was statistically not significant (p>.05). The average MD33/MD44, MD33/MD66 and MD44/MD66 ratios did not show statistically significant difference between the males and females in the cleft sample (p>.05).

A comparison between cleft and normal among males is given in Table 3. The average mandibular inter canine width (MD33) among males of the cleft was 29.23±2.02, and that among the males of the normals was 29.46± 1.94. The observed difference was statistically not significant (p>.05). The average mandibular inter premolar width (MD44) among males of the cleft was 37.40± 3.36, and that among the males of the normals was 39.54±1.95.

Table.3: Comparison between cleft and normal among males

parameter	Category	N	mean	sd	t	p
mandibular inter canine width (MD33)	Cleft	7	29.23	2.02	-0.235	0.817
	Normal	10	29.46	1.94		
mandibular inter premolar width (MD44)	Cleft	7	37.40	3.36	-1.662	0.117
	Normal	10	39.54	1.95		
mandibular inter molar width (MD66)	Cleft	7	50.50	3.18	-2.545	0.022
	Normal	10	53.60	1.84		
MD33/MD44	Cleft	7	0.78	0.05	2.333	0.034
	Normal	10	0.74	0.02		
MD33/MD66	Cleft	7	0.58	0.03	2.627	0.019
	Normal	10	0.55	0.02		
MD44/MD66	Cleft	7	0.74	0.05	0.172	0.866
	Normal	10	0.74	0.02		

The observed difference was statistically not significant ($p > .05$). The average mandibular inter molar width (MD66) among males of the cleft was 50.50 ± 3.18 , and that among the males of the normals was 53.60 ± 1.84 . The observed difference was statistically significant ($p < .05$). The average MD33/MD44 ratio among males of the cleft was 0.78 ± 0.05 , and that among the males of the normals was 0.74 ± 0.02 . The observed difference was statistically significant ($p < .05$). The average MD44/MD66 ratio among males of the cleft was 0.74 ± 0.05 , and that among the males of the normals was 0.74 ± 0.02 . The observed difference was statistically not significant ($p > .05$). The average MD33/MD66 ratio among males of the cleft was 0.58 ± 0.03 , and among the males of the normals was 0.55 ± 0.02 . The observed difference was statistically significant ($p < .05$).

Table.4: Comparison between cleft and normals among Females

parameter	Category	N	mean	sd	t	p
mandibular inter canine width (MD33)	Cleft	13	30.84	1.86	2.114	0.051
	Normal	5	28.92	1.21		
mandibular inter premolar width (MD44)	Cleft	13	39.28	2.40	0.379	0.710
	Normal	5	38.84	1.30		
mandibular inter molar width (MD66)	Cleft	11	52.51	2.34	1.041	0.316
	Normal	5	51.27	1.82		
MD33/MD44	Cleft	13	0.79	0.03	2.193	0.043
	Normal	5	0.75	0.05		
MD33/MD66	Cleft	11	0.58	0.04	0.961	0.353
	Normal	5	0.56	0.03		
MD44/MD66	Cleft	11	0.74	0.03	1.161	0.265
	Normal	5	0.76	0.02		

A comparison between cleft and normals among Females is given in Table 4. The average mandibular inter canine width (MD33) among females of the cleft was 30.84 ± 1.86 , and that among the females of the normals was 28.92 ± 1.21 . The observed difference was statistically not significant ($p > .05$). The average mandibular inter premolar width (MD44) among females of the cleft was 39.28 ± 2.40 , and that among the females of the normals was 38.84 ± 1.30 . The observed difference was statistically not significant ($p > .05$). The average mandibular inter molar width

(MD66) among females of the cleft was 52.51 ± 2.34 , and that among the females of the normals was 51.27 ± 1.82 . The observed difference was statistically not significant ($p > .05$). The average MD33/MD44 ratio among females of the cleft was 0.79 ± 0.03 , and that among the females of the normals was 0.75 ± 0.05 . The observed difference was statistically significant ($p < .05$). The average MD33/MD66 ratio among females of the cleft was 0.58 ± 0.04 , and among the females of the normals was 0.56 ± 0.03 . The observed difference was statistically not significant ($p > .05$). The average MD44/MD66 ratio among females of the cleft was 0.74 ± 0.03 , and that among the females of the normals was 0.76 ± 0.02 . The observed difference was statistically not significant ($p > .05$).

DISCUSSION

Management of the cleft patients requires a multidisciplinary approach, and the treatment is a prolonged to, over years; study on the arch dimensions would be appreciated in this context.

The study sample included patients who had undergone surgical intervention. Analysis of the mandibular arch widths showed that the arch widths in the inter canine, inter premolar and the inter molar regions (MD33, MD44 and MD66) showed no significant changes between the cleft and the normals.

Literature² has shown that, even with the conservative non traumatic surgical techniques, early repairing surgeries induce changes in the upper dental arch morphological characteristics in patients with cleft lip and palate.

MD33/MD44 and MD33/MD66 ratios showed statistically significant difference between the cleft and the normals (Table 1). Gender wise comparison among the cleft showed no significant changes in MD33, MD44 and MD66 in males and females (Table 2). Comparison between cleft and normal among males showed significant differences in (MD66), MD33/MD44 and MD33/MD66 ratios (Table 3).

Comparison between cleft and normal among females showed significant difference in MD33/MD44 ratio (Table 4).

Comparison between cleft and normal among males and also comparison between cleft and normal among females showed significant difference in the MD33/MD44 ratio. Of the parameters taken up for this study on cleft, MD33/MD66 ratio alone showed statistically significant difference in the T1 and T2 groups in the early adulthood in the study on normals, (0.013mm in 15 years, averaging to 0.001mm/year). Comparison between cleft and normal among males showed significant differences in MD33/MD66 ratio.

CONCLUSION

- The mandibular dental arch dimensions in unilateral cleft are not different from that of the normals (Table 1).
- In the cleft sample, the mean inter canine width, inter premolar width and the intermolar widths for the males was 29.23 ± 2.02 , 37.40 ± 3.36 and 50.50 ± 3.18 respectively; for the females was 30.84 ± 1.86 , 39.28 ± 2.40 and 52.51 ± 2.34 respectively; and for the total population was 30.28 ± 2.02 , 38.62 ± 2.83 and 51.73 ± 2.79 respectively (Table 3, 4, 1).
- The average md33/md44 ratios among males of the cleft were 0.78 ± 0.05 , and that among the normals was 0.74 ± 0.02 (Table.3). The observed difference was statistically significant ($p < .05$). The average md33/md66 ratio among males of the cleft was 0.58 ± 0.03 , and that among the normals was 0.55 ± 0.02 . The observed difference was statistically significant ($p < .05$) (Table.3). The average MD33/MD44 ratio among females of the cleft was 0.79 ± 0.03 , and that among the females of the normals was 0.75 ± 0.05 (Table.4). The observed difference was statistically significant ($p < .05$).
- In the cleft sample, the mean inter canine width/inter molar width; and inter premolar width/inter molar width and inter canine/inter premolar width ratios for the males was 0.58 ± 0.03 , 0.74 ± 0.05 and 0.78 ± 0.05 (Table 3); for the females was 0.58 ± 0.04 , 0.74 ± 0.03 , and 0.79 ± 0.03 (Table 4); and for the total population was 0.58 ± 0.03 , 0.74 ± 0.04 and 0.79 ± 0.03 respectively (Table 1).
- The parameters in the study did not show any statistically significant difference between the males and females among the cleft (Table 2).
- On comparison between cleft and normal among males, there was significant difference between males of the cleft and the normal populations in (MD66), MD33/MD44 ratio and MD33/MD66 ratio (Table 3). MD33, MD44, the MD44/MD66 ratio showed no significant difference.
- On comparison between cleft and normals among females, there was statistically significant difference between females of the cleft and the normal populations in MD33/MD44 ratio.

The average MD33/MD44 ratio among females of the cleft was 0.79 ± 0.03 , and that among the females of the normals was 0.75 ± 0.05 (Table.4).

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