A Comparative Study of Male and Female Arch form

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Abstract:
Introduction: Dental arch form is one of the most essential aspects of dentition, and understanding its descriptive characteristic important is for orthodontists. Dental arches are dynamic, and they undergo changes due to treatment intervention as well as growth, therefore the purpose of this study is to investigate the maxillary and mandibular arch width in untreated male and female subjects. This will help in utilizing particular arch wires for each patient's pre- treatment arch width for this population type.
Materials and methods: This study includes study models of untreated 75 males and 75 females (between age group 18-30 years) from the regional population. Study model analysis- inter- molar, inter- premolar, and inter- canine width.
Result: showed tendency of wider arch in males than females.
Conclusion: Females have narrow arch forms than males. The study suggests that the Orthodontist should consider gender difference in arch width while deciding orthodontic treatment plan for this population type.
Keywords: Arch form, arch width, Dental arch, dentition, Orthodontics

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INTRODUCTION:

Dental arch form is one of the most essential aspects of dentition, and understanding its descriptive characteristic is important for orthodontists. Dental arches are dynamic, and they undergo changes due to treatment intervention as well as growth and development. [1, 2] Adequate knowledge of the factors affecting the shape and dimension of the dental arch helps in planning the treatment of malocclusion to achieve more successful results concerning to esthetics, function and stability .[3]

In terms of the difference in arch width between males and females, there are gender differences in maxillary, and mandibular inter-canine widths.[4] In children, males have significantly larger inter-molar widths when compared with females.[5]

AIMS AND OBJECTIVES

To Compare the Dental arch width and form in males and females.

INCLUSION CRITERIA

- Skeletal and dental class I relationship bilaterally.
- Minor spacing or crowding.

- Permanent dentition with or without third molars.
- Pleasant profile.

EXCLUSION CRITERIA

- History of previous orthodontic treatment.
- History of extractions.
- Edentulous spaces.
- History of trauma.
- Extensive restorations and prosthetics.
- Significant cuspal wear.
- Anterior and posterior cross bite.
- Gingival inflammation.

MATERIALS AND METHOD

Upper and lower arch alginate impressions were recorded for study models of each subject, and the following measurements were taken using a digital caliper accurate to 0.01 mm.

1. Inter-canine width [(buccal cusp tip and widest labial aspect) (fig.1a &1b)].
2. First and second inter-premolar widths [(buccal cusp tip and widest labial aspect) (fig.1a & 1b)].

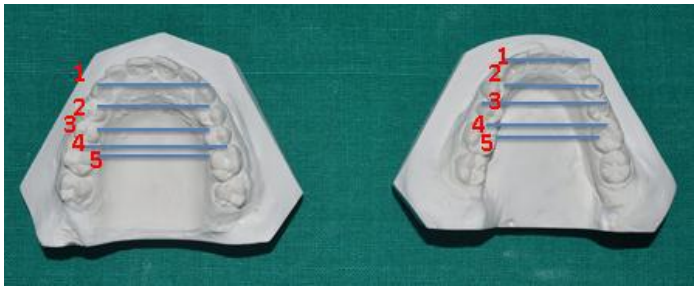

Fig 1(a) 1-Maxillary and mandibular cast measurements 1- inter-canine width from canine tip. 2- Inter first premolar width from central groove .3- Inter second premolar width from central fossa.4- Inter first molar width central fossa. 5 - Most lingual

3. First inter-molar widths [(mesiobuccal cusp, central fossa, widest buccal, and narrowest lingual aspect) (fig.1a & 1b)].

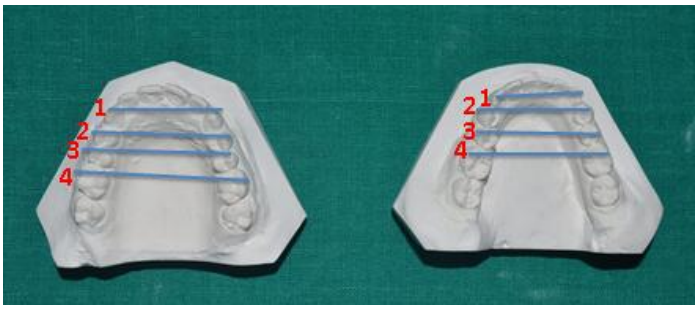

Fig 1(b) -1.Maxillary and mandibular cast measurements, 1- Most buccal inter- canine width. 2- Most buccal inter first premolar width. 3- Most buccal inter second premolar width. 4- Most

Results:

Table 1 shows significant difference between male, and females with maxillary and mandibular inter-canine width measured from most buccal, and from the canine tip, maxillary, and mandibular inter first pre-molar width from most buccal and cusp tips, maxillary and mandibular inter-second molar width from most buccal and cusp tips, and maxillary and mandibular inter- first molar width measured from most lingual, from the central fossa and the most buccal surface of males and females. The maxillary inter canine width (P-value.0001) was highly significant in both males and females.

DISCUSSION

The size and shape of the arches do have considerable effects on orthodontic diagnosis and treatment planning, affecting the space available, dental aesthetics, and stability of the dentition. These considerations in association with anteroposterior movements of the dentition determines the requirements for extraction or otherwise[3]

Table No. 1: Difference between male and female arch width

	Groups	N	Mean	Std. Deviation	T	df	P	Inference
maxillary archInter canine width	Males	75	42.00mm	2.68	5.980	148	.0001	Highly significant
	Females	75	39.36mm	2.73			(<0.001)	
Inter canine mandibular arch width	Males	75	34.03mm	3.49	4.598	148	.002	Significant
	Females	75	31.35mm	3.64			(<0.05)	
maxillary archFirst premolar width	Males	75	44.78mm	3.79	2.404	148	0.048	significant
	Females	75	44.00mm	2.56			(>0.05)	
mandibular arch interFirst premolar width	Males	75	38.91mm	2.68	2.217	148	.02	Significant
	Females	75	37.72mm	3.82			(<0.05)	
maxillary arch inter Second premolar width	Males	75	49.21mm	3.03	2.619	148	.036	significant
	Females	75	48.06mm	3.42			(>0.05)	
mandibular arch inter Secind premolar width	Males	75	43.18mm	3.76	2.933	148	.048	significant
	Females	75	41.10mm	2.51			(>0.05)	
maxillary arch inter First molar width	Males	75	54.29mm	3.48	2.307	148	0.019	significant
	Females	75	52.20mm	3.15			(>0.05)	
mandibular arch inter First molar width	Males	75	48.52mm	3.07	.2.41	148	.0.041	significant
	Females	75	47.52mm	3.74			(>0.05)	

The age group of 18-30 years were selected for this study since most of the growth would have been completed by the time, and skeletal pattern is established and become constant.[6,7] Bishra [8] in his longitudinal study in 1985 concluded that the difference among facial types were more pronounced at adulthood. Studies have shown that the growth change of the facial tissues even if not completed, occur predominantly before the age of 18 years .[9]

Few studies are done to measure the dental arch and most of these studies were concerned with the effects of craniofacial anomalies and surgical procedures on dental arch measurements.[10, 11] Some studies described only the racial and hereditary influences on these measurements.[12,13]

Since this study included adults of the regional population, matured with no dental abnormalities, the parameters obtained may represent ethnic, regional population who share the same geographical environment . In this present study dental cast of 150 samples divided in to two groups, 75 males and 75 females & were analyzed on the bases of gender difference in arch width.

This present study has confirmed the view that male's dental arches are larger than that of females. Since according to the present studies results all of the mean values of arch width are larger in male subjects than that of the females and this finding agrees with Samir Bishara 1996, [14] who has stated that males have wider arches and tendency of longer arches, C Matthew foster 2008, [15] found that the dental arch widths in males were significantly greater than the females, Robert T. Lee 1999, [3]has noted that male arches grow wider than female arches. Sultan Olmez 2011, [16] concluded that arch widths and depths were more in boys as compared with girls. Vishnu Patel et al. 2012,[17] concluded that females showed a greater tendency for constricted arch form in comparison males showed greater tendency for wider arch form, and this may be due to the smaller and smoother bony ridge and alveolar process in females & the average weakness of musculature that plays an vital role in facial breadth measurements, width and height of the dental arch.[11] The mechanical stress created by occlusal bite forces and the volume of certain masticatory muscles might influence the size of adjacent craniofacial skeletal regions, this might be another reason for variation in arch widths according to facial pattern.[18] Helkimo et al,[19] have found that mean bite force values were significantly higher in males than in females. The increased bite force might be a reason for the increased arch width in males as compared to females.

CONCLUSION

The dental arch widths in males are significantly greater than those in females.

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