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Prevalence of Bilateral Maxillary Arch Width Deficiency in an Algerian Population Aged Between 6-10 Years and Orthodontic Factors

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Abstract: *The bilateral maxillary arch width deficiency is defined as an orientation or position too within one or two maxillary alveolar processes compared to the mandible causing occlusion. This cross-sectional study was conducted on a population of school children aged from 6 to 10 years attending to the number of 1091 children, whose 568 male and 523 female on the basis of a clinical examination on terrain in addition to a review Radiation of the target population. A prevalence of 11.5%, Prevalence of arch width deficiency is more important to 9 years (32.8%) There is no difference in gender distribution. The prevalence of bilateral arch width deficiency is 11.5%; 3.9% right asymmetric; 4.4% asymmetric left, the prevalence of maxillary deficiency is 19.8%. Class III presents a greater risk of developing arch width deficiency with significant p= 0.005 and OR 3.6 (1.5-8.9).Deforming habits arch width deficiency expresses very significantly with a p<0.001. Thumb sucking is still the dominant element of the deforming habits with p = 0.001 odds ratio OR 6.2 (1.8-20.9). Among which 16.8 % have a3-4 teeth decayed with one p very significant (p=0.02) and particularly at the girls. It is a specificity of our population.*

Keywords: *prevalence- arch width deficiency – orthodontic factor*

I. Introduction

The bilateral maxillary arch width deficiency is defined as an orientation or position too inside in one or two maxillary alveolar processes compared to the mandible causing posterior cross bite responsible of occlusal dysfunction and various disorders (1). The arch width deficiency maxilla is the most common cross anomalies (2) type endomorphic particularly in its bilateral form. These abnormalities are frequently 2 to 10% of patients (2). A Finnish study of 489 children (from 4 to 8 years) showed a prevalence of 7.5%. The same study of population of German children (about 1975 children) aged from 6 to 8 years found a prevalence of 8.2%(3). Thereof was evaluated using the index need. The prevalence in France is 8.9% (4). Its importance in other populations shows interest to define it in our population. This is the primary objective of this study. Heredity, non-nutritive sucking and mouth breathing have been described by Svedmyr 1979(5), Larsson 1983(6) and Waerren(7) Bishara(8) in 2002 as main causes of onset of posterior cross bite; hence the importance of early detection with the aim of preventing the onset of this pathology .The prevalence and clinical data to assess in order to achieve an efficient and planned management (9). Given that access to care is increasingly possible, the care and treatment of this disease is essential.

II. Materials and methods

This descriptive study was done on the basis of a survey sheet established in the dento facial orthopedics unit of Sidi Bel Abbes north western city of Algeria, for diagnosis of various malocclusions and especially pathologies transverse direction it is a study achieved in the city of Sidi Bel Abbes, over a period of 06 months from January to June 2012, a town with more than 605,000 people in western Algeria whose 27.2% is a primary school population. The study involved children aged between 6 to 9 years. Simple random sampling stratified two-stage draw 1: primary schools in the town of Sidi Bel Abbes on the register of Education presented by the draw area has been in increments of 5 on a list of 73 schools; 15 schools were of interest in this study or about 20% of schools in the city. 2nd draw: the classes in which students match the age group. All the students in a class was investigated. The sample size was calculated to an accuracy of 2% and 95% confidence interval; 724 is the sample size calculated by averaging the different prevalences found in our references **(2,3.4)** .The study has involved 1091 pupils aged between 6 to 9, whose 568 male and 523 female. Dropoff window The children were examined in Units From Health (UDS), which are the number of 13. The survey was conducted in 7 UDS in the city of Sidi Bel Abbes during periodic visits of classes involved in the draw .dropoff window. A complete physical examination was conducted on all students in the class. The inclusion criteria for

the calculation of prevalence is the bilateral posterior crossbite defined by the French Society of Orthopedic Dento Facial (SFODF) as a guidance in the alveolar process occlusion in the static state in the three planes of space. Data entry was recorded on statistical software Statistical Package for Social Sciences (SPSS) 20, chicago illinois Inc., USA.

III. Results

All statistical analyzes were performed with SPSS (Statistical Package for Social Sciences) chicago illinois Inc., USA. The prevalence of symmetric arch width deficiency is 11.5%; 3.9% for right asymmetric; 4.4% for asymmetric left, the prevalence of maxillary deficiency is 19.8% (Table I) The prevalence of arch width deficiency is more important to 9 years (32.8%). There is no difference in gender distribution (Table II). About 4.8% of cases have arch width deficiency due to poor hygiene 4% of cases of arch width deficiency have a habit deforming primarily thumb sucking. (Table III). 78,4% of cases of arch width deficiency are class I Ballard. (Table IV) 65,6% have abnormalities associated with arch width deficiency. The most common abnormality is associated anterior open bite 11,2%. 21,6% have a facial typology deep bite 11,2% of cases of arch width deficiency have a concave profile (Table V) .

67,2% of cases have at least one decayed tooth(Table VI), Among which 16.8 % have a3-4 teeth decayed with one p very significant (p=0.02) and particularly at the girls.

Swallowing is atypical in 38.4% of cases. Chewing is unilateral right into 33.6%. Ventilation is oral in 14.4% of cases of arch width deficiency. Phonation is disturbed in 23.2% (Table VII). In case of presence of the deforming habits arch width deficiency expresses very significantly with a p□0.001 and α = 2% and CI Confidence interval ED95% OR of 6.4 (3.8-10.8)

Thumb sucking is still the dominant element of the deforming habits with p = 0.001 odds ratio OR 6.2 (1.8-20.9). The presence of caries present a significant difference p = 0.0003: the presence of three teeth decayed and is a proven risk factor with significant p = 0.001 OR 3.8 (1.7-8.6). Cl III presents a greater risk of developing endo with significant p= 0.005 and OR 3.6 (1.5-8.9). A typology deep bite is also a significant factor with p = 0.011 and OR of 4.8 (1.4-15.8). The convex profile is a significant factor with p = 0.016 and OR 0.3 (0.1-0.8). Atypical swallowing is a risk factor with a significant difference p = 0.31 and odds ratio of 1.79 (1.21-2.63) (Table VIII).

IV. Discussion

The prevalence of bilateral arch width deficiency is 11.5%; 3.9% right asymmetric; 4.4% asymmetric left, the prevalence of maxillary deficiency is 19.8%. This is in line with other Brazilian studies (Chevitarese et al, 2002;. Katz et al., 2004). [9] As well as that of bandeira who finds 10.4%.[10]The prevalence of posterior crossbite in mixed dentition was reported to be between 8 and 22% (Lindner and Modéer[11], 1989; Katz et al.[9], 2004).Germany [3] includes a reversal of the occlusion in 8.2%. In France Mourad Souames [2] of unilateral osterior cross occlusions were recorded for 4% and bilateral posterior cross bite was found in 4%.In Morocco 11.5% [12] consultant's patients have bilateral arch width deficiency.The genus p = 0.783 there is no significant difference; or a later articulated Cross was more common among girls (52%), which is consistent with the results of Ogaard et al. (1994)[13] and Chevitarese et al. (2002), early establishment of occlusion in females compared to males is criminalized. Age is not a risk factor for onset of arch width deficiency (p = 0.67). Age is an interesting element in the timing of onset of arch width deficiency peaking at 9 years .The prevalence of arch width deficiency is more important to 9 years (32.8%). We were able to establish a higher prevalence in 9 years might be explained by the functional establishment of permanent molars. The strong corrrelation between arch width deficiency and presence of decayed tooth is very important; this is a specificity of our population, we could explain it by the loss of substance important of enamel due to the decay it is an element to develop.

This significant increase with age was also observed in another Brazilian study (Katz et al., 2004) and can be explained by the development of occlusion of the 200 patients examined, abnormalities are transversely present in 57.7% of our sample of which 41.2% had an isolated deviation, 2.5% have arch width deficiency , 28.9 have an inverted bilateral articulated. According Raberin, maxillary transverse deficiency represents 8-18% of malocclusions encountered in mixed dentition. There is a correlation of results between the Moroccan study and our study any time this prevalence is much higher than in Europe. Multivariate analysis of PULLINGER et al [14] showed that except for some signs of malocclusion, there is little DDM / malocclusion correlation. Drevensek [15] has been noted that among the 45 children examined, 82.22% do not present malocclusions in the transverse direction, while 17.78% of these children have an arch width deficiency at a tooth, unilateral or bilateral. The difference is not statistically significant between the type of ventilation and malocclusion in the transverse direction.

Oulis et al., 1994[16] establish an association of impaired driving nasal breathing caused by enlargement of the tonsils and adenoids, and the appearance of pathologies transverse direction. In Morocco 67.5% [17] Consultants patients have abnormal transverse direction, which 58.3% had mouth breathing and 64.9% had allergies. The group of children with distorting habits is 5 times more likely to develop arch width deficiency.

The knowledge of the etiology of malocclusion is essential to a successful orthodontic treatment. In view of the growing interest in early diagnosis research factors involved in the etiology of cross bites include deforming habits is undeniable.

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Table I : Distribution of maxillary deficiency

	n	%
Maxillary bilateral arch width deficiency	125	11,5
Right maxillary arch width deficiency	43	3,9
Left maxillary arch width deficiency	48	4,4
Maxillary deficit	216	19,8
Total	1091	100

Table II : Distribution according to age, sex in case of bilateral arch width deficiency

Gender	**n**	**%**
Male	59	47,2
Female	66	52,8
Age	**n**	**%**
7	26	20,8
8	25	22,6
9	41	35,8
10	26	20,8
Total	125	100

Table III : Distribution according to the presence of deforming habit of case of bilateral arch width deficiency

Deforming habit	**n**	**%**
No	20	16
Yes	105	84
Total	125	100

Table IV: Distribution according to cases of bilateral arch width deficiency

Skeleton rank	**n**	**%**
Class I	98	78,4
Class II	16	12,8
Class III	11	8,8
Total	125	100

Table V :Distribution according to the profile, typology of cases of bilateral arch width deficiency

Profile	n	%
Concave	14	11,2
Rectilinear	92	73,6
Convex	19	15,2
Facial typology	**n**	**%**
Open	4	3,2
Normo	94	75,2
Deep	27	21.6
Total	125	100

Table VI : Distribution according to the decayed teeth of cases of bilateral arch width deficiency

The decayed teeth	male n	%	Female n	%	Total n	%
Aucune	22	37.2	19	28	41	32.8
1-2 decayed teeth	26	44.0	37	56.0	63	50.4
3-4 decayed teeth	6	10.1	6	9.0	12	9.6
≥ 5 decayed teeth	5	8.4	4	6.0	9	7.2
p- value	**0.06**		**0.01**		**0.02**	

Table VII : Distribution according to oro facial fonctions associated to cases of bilateral arch width deficience

Oro facials Fonctions	Male n	%	Female n	%	Total n	%
Ventilation						
Buccal	11	18.6	7	10.6	18	14.4
Nasal	44	74.6	55	83.3	99	79.2
Mixte	4	6.8	4	6.1	8	6.4
p value	**0.02**		**0.4**		**0.02**	
Mastication						
Bilateral	26	44.1	39	59.1	65	52,0
lateral right	23	39,0	19	28.8	42	33.6
lateral left	10	16.9	8	12.1	18	14.4
p value	**0.4**		**0.02**		**0.05**	
Deglutition	33	55.9	44	66.7	77	61.6
Typical	26	44.1	22	33.3	48	38.4
Atypique						
p value	**0.006**		**0.09**		**0.003**	
Phonation						
Normal	44	74.6	52	78.8	96	76.8
Perturbée	15	25.4	29	23.2	29	23.2
p value	**0.01**		**0.01**		**0.001**	

Table VIII : OR values adjusted downward by logistic regression in the study of the relationship between the factors and orthodontic endoalvéolie

	ORa [IC 95%]	P
Deforming habit	6,4 [3.8-10.8]	**<0.001***
Decayed teeth +3	3,3 [2.1-4.9]	**0,001***
Phonation	3,8 [1.7-8.6]	**0,003***
Skeleton rank (classe III)	2,2 [1.3-3.8]	**0,005***
Deep face typology	3,6 [1.5-8.9]	**0,01***
Ricketts convex profil	4,6 [1.4-14.9]	**0,01***

*p<0.05