

A National Iraqi Survey on Anterior Crossbite

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Abstract: About seven thousand 13 year olds with no history of orthodontic treatment were selected from six governorates (Baghdad the capital, Ninevah, Basrah, Diyala, Anbar and Najaf). An intra-oral clinical examination was used to assess the presence of crossbites.

Of the sample, 5.5% had anterior crossbite (4.4% had one to three inverted incisors and 1.1% had a mandibular overjet involving all four incisors). This was non-significantly related to gender and residency.

Keywords: Anterior crossbite, survey (Iraqi Orthod J 2005; 1(2): 1-3).

S alzmann¹ defined anterior crossbite as the lingual placement of the maxillary incisors to their opposing mandibular, when both arches are in centric occlusion.

Mandibular overjet is characterized by all 'four' maxillary incisors occluding lingual to the mandibular incisors.^{2,3} In some studies this feature was called lower overjet⁴ or frontal inversion.⁵

Instanding or inverted incisors usually refers to the involvement of one, two or three incisors,^{2,6} while Foster and Day⁷ confined this condition to one or two incisors.

Anterior crossbite may lead to tooth attrition, gum recession and periodontal pockets, and most dangerously mandibular displacement, mostly the forward postural type which may mask the increase in overjet in the central incisor area.⁸

Because this condition necessitates rapid and urgent treatment registration of this condition was recommended by many investigators.^{1,2,6,7,9,10} The results of some of the studies on these features are listed in table 1.

MATERIALS AND METHODS

The sample included a total of 7176 intermediate school students 13 years of age. These students were taken from 6 governorates (cities and environs) in Iraq selected to cover the whole country geographically (Baghdad the capital, Ninevah, Basrah, Diyala, Anbar and Najaf) according to a multi-stage stratified sampling technique. Details of the geographic distribution and sampling technique are given in Al-Huwaizi.¹⁸

After excluding the invalid casesheets and isolating the students with some sort of orthodontic treatment, the number of casesheets which entered the statistical analysis dropped to 6957.^{19,20}

Before examination the students must achieve centric occlusion. Then any maxillary incisor occluding lingually to mandibular incisors was regarded as an

inverted incisor. Not more than three incisors were entered as inverted. In case of four incisors in crossbite this was considered as mandibular overjet.²¹

Statistical analysis

Chi square test was used to assess the association between anterior crossbite and gender, urban and rural, and governorates on the other side.

P levels of more than 5% were regarded as statistically insignificant.

RESULTS AND DISCUSSION

Of the sample, 5.5% were presented with anterior crossbite, of whom 4.4% had one, two or three inverted incisors while 1.1% had a mandibular overjet involving all four incisors (Table 2). This percentage is comparable to that found by previous epidemiological studies (Table 1) but was remarkably lower than that in the English population.^{11,14}

Anbar showed the highest prevalence of inverted incisors (5.0%) followed by Najaf (4.6%) and Basrah (4.6%). This difference was statistically insignificant ($X^2=1.843$, d.f.=5, NS). Basrah, Anbar and Najaf showed the highest prevalences of mandibular overjet (1.3%) and this difference was also statistically insignificant ($X^2=8.187$, d.f.=5, NS) as shown in table 2. This was in agreement with the finding of Al-Alousi et al.²² who also found an insignificant difference between Mosul, Baghdad and Basrah.

Considering gender differences, males showed more inverted incisors (4.9%) than females (3.9%), however this was statistically significant only for the urbans ($X^2=4.322$, d.f.=1, $p<0.05$) and was statistically insignificant for the rurals ($X^2=0.166$, d.f.=1, NS) and total sample ($X^2=3.313$, d.f.=1, NS). Males and females showed comparable prevalences of mandibular overjet which were statistically insignificant for the urbans ($X^2=0.025$, d.f.=1, NS), rurals ($X^2=1.230$, d.f.=1, NS) and total sample ($X^2=0.346$, d.f.=1, NS) as shown in table 3.

Considering residency, an insignificant difference was found between the prevalence of inverted incisors between urbans and rurals for males ($X^2=0.616$, d.f.=1, NS), females ($X^2=0.525$, d.f.=1, NS) and total sample ($X^2=0.001$, d.f.=1, NS). Also, an insignificant difference was found between the prevalence of mandibular

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overjet between urbans and rurals for males ($X^2=0.635$, d.f.=1, NS), females ($X^2=0.254$, d.f.=1, NS) and total sample ($X^2=0.016$, d.f.=1, NS) as shown in table 3.

Of the inverted incisors, the majority involved a single tooth (64.7%) and two involved teeth were found in 27.1%, while only 8.2% of inverted incisors involved three incisors (Figure 1). This was also found by previous researchers.¹⁵⁻¹⁷

Lateral incisors were more commonly affected by anterior crossbite (1.95% on the right side and 2.22% on the left side) than central incisors (1.01% on the right side and 1.07% on the left side) as shown in figure 2. This was also found by Cons et al.²⁴ and may be due to their palatal developmental position.²⁴

Table 1: Reported prevalences (%) of inverted incisors.

Author	Sample			Total %	No. of teeth		
	Country	Size	Age		1	2	3
Foster & Day ⁷	England	1000	11-12	4.9			
Kinaan ¹¹	Iraq	250	11-12	4.3			
	England	236		8			
Farah ¹²	Iraq	101	9-10	10.9			
Hill ¹³	Scotland	765	9	7.5			
			12	5.9			
			15	5.4			
Office of Population Censuses and Surveys ¹⁴	Britain		12	8			
Abdulla ¹⁵	Iraq	200	13	5	3.2	1.8	0.2
		200	15	4.5			
		200	17	6			
Batayine ¹⁶	Jordan	200	13	6	2.7	1.7	0.3
		200	15	3.5			
		200	17	4.5			
Al-Dailami ¹⁷	Yemen	400	10-12	4	3.25	0.75	0.0
		400	13-15	4.5	2.25	1.75	0.5

Table 2: Distribution of the anterior crossbite according to the number of incisors involved by governorate.

No. of incisors		Baghdad N=1995	Ninevah N=991	Basrah N=989	Diyala N=994	Anbar N=995	Najaf N=993	Total N=6957
Inverted incisors	1	2.9	2.4	2.8	2.6	3.1	3.1	2.8
	2	1.1	1.1	1.4	0.9	1.5	1.3	1.2
	3	0.3	0.5	0.3	0.5	0.4	0.2	0.4
	Total	4.3	4.0	4.6	4.0	5.0	4.6	4.4
Mand. overjet	4	1.2	0.8	1.3	0.3	1.3	1.3	1.1
Grand total		5.5	4.8	5.9	4.3	6.3	5.9	5.5

Table 3: Distribution of the anterior crossbite according to the number of incisors involved by residency and gender.

No. of incisors	Urban			Rural			Total			
	Male N=1739	Female N=1744	Total N=3483	Male N=1738	Female N=1736	Total N=3474	Male N=3477	Female N=3480	Total N=6957	
Inverted incisors	1	2.9	2.4	2.7	3.3	2.8	3.0	3.1	2.6	2.8
	2	1.4	1.0	1.2	1.3	1.0	1.2	1.4	1.0	1.2
	3	0.5	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4
	Total	5.2	3.7	4.4	4.5	4.2	4.4	4.9	3.9	4.4
Mand. overjet	4	1.0	1.1	1.0	1.3	0.9	1.1	1.2	1.0	1.1
Grand total		6.2	4.8	5.3	6.2	5.1	5.6	6.0	4.9	5.5

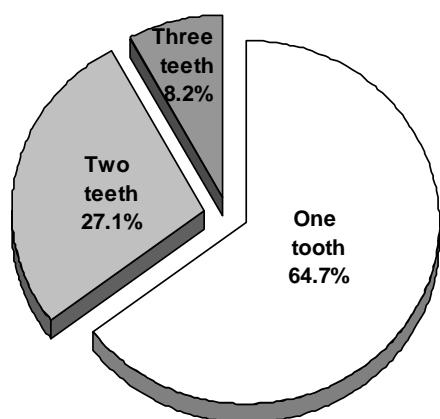


Figure 1: Percentage of the number of inverted incisors.

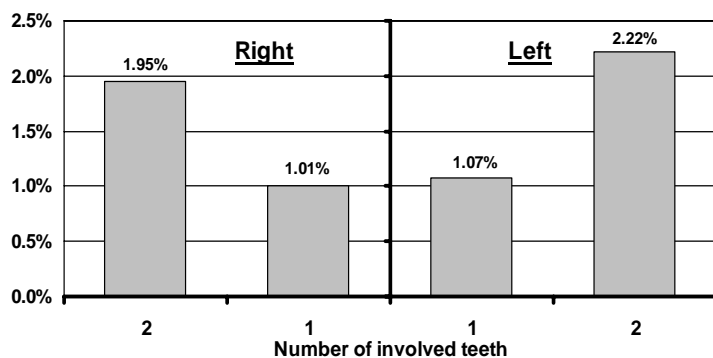


Figure 2: Distribution of the anterior crossbite according to the number of incisors involved by location.

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