Prevalence of Malocclusion among Children and Adolescents in Various School of Leh Region

Satinder Pal Singh[1],
Vinay Kumar[1],
Phunchok Narboo[2]

1   Unit of Orthodontics, Oral health Sciences Centre, Post graduate institute of medical Education and Research, Chandigarh - 160012, India
2   Unit of Pedodontic and Preventive Dentistry, Oral Health Sciences Centre, Post Graduate Institution of Medical Education and Research, Chandigarh-160012, India

Corresponding author:
Dr. Satinder Pal Singh

✉   drspsingh_chd@yahoo.com

MDS, Professor and Head, Unit of Orthodontics, Oral Health Sciences Centre, Post Graduate Institute of Medical Education And Research, Chandigarh - 160012, INDIA

Tel: 9815933748

Abstract

Background: The aim of the present study was to determine the prevalence of malocclusion among children and adolescents population in various school of Leh.

Methods: Final sample comprised of 691school children and adolescents (310 males and 380 females) with age range of 10-18 years. Prevalence of malocclusion was assessed by determining the percentage of children affected.

Results: Angle's Class I, Class II/1, Class II/2 and Class III malocclusion were observed in 87.4%, 8.7%, 1.4% and 2.5% respectively. Highest prevalence of 49% prevailed for bite depth of 26-50%. The prevalence of open bite (1.6%), overjet (52.2%), anterior crossbite (8.7%) and posterior crossbite (6.9%) was also determined.

Conclusion: Prevalence of Angle's Class I malocclusion was maximum, followed by Angle's Class II/1 and Class III. Angle's Class II/2 malocclusion was found to be the least among Leh school children.

Key Words: Prevalence; Malocclusion; Children; Leh; India

Introduction

The knowledge of epidemiological status of various traits of malocclusion among particular population is important for planning the need and provision for orthodontic service to enhance quality of life. Dental malocclusions exhibit the third highest prevalence among oral pathologies, second only to tooth decay and periodontal disease and therefore rank third among world-wide dental public health priorities [1]. Although dental malocclusion not a life-threatening condition [2], the psychosocial distress [3, 4], impaired mastication [5] and poor periodontal conditions [4] associated with it, need to explore the prevalence of malocclusion in different ethnic groups. In addition, the prevalence of malocclusion or an accurate measurement of occlusal variation in different population group is important because it could be used to:

1. Determine the priority and need of orthodontic treatment modalities according to the severity of malocclusion and resources available.

2. Estimate the need of treatment in particular population and gain a view for training adequate man power to meet the demands.

There are several epidemiological study in literature [1, 6-14] that give an insight on the prevalence of different traits of dental malocclusion in different ethnic groups. The prevalence of malocclusion among Indian children has been reported as high as 90% in Delhi and as low as 19.6 % in Madras [7]. For any health set up which provides orthodontic care to affected people, data regarding the prevalence of malocclusion and hence, need for orthodontic treatment is a must. With this purpose, the present study was aimed to assess the prevalence of malocclusion among children and adolescents in a population of Leh region, Jammu and Kashmir, India.

Materials and Method

This cross-sectional descriptive study was carried out at various

schools in Leh region of Jammu and Kashmir, India. Oral examination of 691 school children (male 311 and female 380) were conducted by one of the author (N.P) with the use of mouth mirror and explorer under natural light and different types of malocclusion were measured as described by Singh et al. [14] and recorded on a standard proforma. After an interval of 2 weeks, same investigator (N.P) re-examined the 10 % of sample selected randomly and data were entered on proforma. A very good intra-observer agreement was found between two different time interval observations. Age range of total sample was 10-18 years, recorded as numbers of years completed according to date of birth. Children with mixed dentition, craniofacial anomalies and who were undergoing or prior history of orthodontic treatment were excluded. Distribution of sample based on age and gender is given in **Table 1.**

Statistical Analysis

The recorded data was compiled and entered in excel 2007(Microsoft, Redmond, WA, USA) and elaborated using the Statistical Package for Social Sciences window, version 16.0 (SPSS Inc., Chicago, Illinois, USA). Appropriate statistical tests of significance were used wherever indicated. Prevalence of malocclusion was assessed by determining the percentage of children affected.

Results

Among total of 691subjects, 311 male (45%) and 380 female (55%) were examined and assessed for prevalence of different types of malocclusion. Out of 691 schoolchildren, 604 (87.4%) exhibited Class I malocclusion according to Angle's classification **(Table 2),** whereas Class II Div. 1, Class II Div. 2 and Class III malocclusion was present in 60 (8.7%), 10 (1.4%) and 17 (2.5%) subjects respectively.

Three hundred and thirty nine subjects (49.1%) were found to have bite depth of 26-50 percent, whereas 172 (24.9%) had bite depth of 0-25 percent, 137 (19.8%) and 43 (6.2%) had 51-75

percent and 76-100 percent respectively **(Table 3).** Six hundreds and eighty schoolchildren i.e. 98.4% were found to have normal bite depth. The prevalence of open bite malocclusion was minimum i.e. only 11 schoolchildren had open bite malocclusion **(Table 4).** Three hundred and thirty subjects (47.8%) of total sample had normal/optimal overjet, whereas 321 (46.5%) had overjet of 3-5 mm. Increased overjet of more than 6 mm was present in 5.8% of the total sample **(Table 5).** Six hundred and thirty one i.e. 91.3% of the sample had no anterior crossbite. Only 42 (6.1%) and 18 (2.6%) schoolchildren had single and multiple anterior teeth crossbite respectively **(Table 6).** Six hundred and forty three subjects (93.1%) had not posterior crossbite. Twenty one subjects (3%) had single tooth crossbite and 14 (2%) had multiple teeth crossbite affecting single side. A small percentage of the sample (0.30% to 1.6%) also had single and multiple teeth crossbite affecting both sides of arches **(Table 7).**

Six hundred and nine subjects (88.1%) had no spacing in maxillary teeth. Whereas, 32 subjects (4.6%) had mild spacing, 49 (7.1%) and 1 (0.1%) had moderate and severe spacing respectively in maxilla. In mandibular teeth, 634 subjects (91.8%) had no spacing and 33, 22 and 2 subjects exhibited mild, moderate and severe spacing **(Table 8).** Five hundred and twenty one (75.4%) had no crowding mesial to first premolar in maxillary arch and 554 (80.2%) in mandibular arch. In maxillary arch 57 (8.2%), 94 (13.6%) and 19 (2.7%) had mild, moderate and severe crowding respectively. Similarly in mandibular arch, 68 (9.8%), 64(9.3%) and 5 (0.7%) had mild, moderate and severe crowding respectively **(Table 9).**

Discussion

According to the distribution of sample, 380 (55%) were female and 311 (45%) were males. The general observation made during the clinical examination of school going children and adolescents was confirmed from the finding of present study, i.e., Class I malocclusion were more common (87.4%) than Class II/1(8.7%). The prevalence of Class II/2 and Class III malocclusion was low, i.e., 1.4 % and 2.5% respectively.

Table 1 Distribution of sample based on age and gender.

AGE (IN YEARS)	MALE		FEMALE		TOTAL	
	N	*%age*	*N*	*%age*	*N*	*%age*
≤ 14	147	47.2	183	48.2	330	47.7
> 14	164	52.8	197	51.8	361	52.3
TOTAL	311	100	380	100	691	100

Table 2 Distribution of sample based on angle's classification.

	TOTAL	CLASS I		CLASS II/1		CLASS II/2		CLASS III	
	N	*N*	*%age*	*N*	*%age*	*N*	*%age*	*N*	*%age*
MALE	311	270	86.8	30	9.6	3	1	8	2.6
FEMALE	380	334	87.9	30	7.9	7	1.8	9	2.4
COMBINED	691	604	87.4	60	8.7	10	1.4	17	2.5

Table 3 Distribution of sample based on bite depth in percentage.

	TOTAL	0-25 PERCENT		26-50 PERCENT		51-75 PEERCENT		76-100 PERCENT	
	N	*N*	*%age*	*N*	*%age*	*N*	*%age*	*N*	*%age*
MALE	311	78	25.1	147	47.3	68	21.9	18	5.8
FEMALE	380	94	24.7	192	50.5	69	18.2	25	6.6
COMBINED	691	172	24.9	339	49.1	137	19.8	43	6.2

Table 4 Distribution of sample based on open bite.

	TOTAL	00mm		00-06mm	
	N	N	%age	N	%age
MALE	311	306	98.4	5	1.6
FEMALE	380	374	98.4	6	1.6
COMBINED	691	680	98.4	11	1.6

Table 5 Distribution of sample based on overjet.

	TOTAL	0-2 mm		3-5 mm		≥ 6mm	
	N	N	%age	N	%age	N	%age
MALE	311	153	49.2	140	45.0	18	5.8
FEMALE	380	177	46.6	182	47.6	22	5.8
COMBINED	691	330	47.8	321	46.5	40	5.8

Table 6 Distribution of sample based on cross bite in anterior teeth.

	TOTAL	NO CROSSBITE		CROSSBITE OF ANTERIOR SINGLE TOOTH		CROSSBITE OF ANTERIOR MULTIPLE TEETH	
	N	N	%age	N	%age	N	%age
MALE	311	281	90.4	19	6.1	11	3.5
FEMALE	380	350	92.1	23	6.1	7	1.8
COMBINED	691	631	91.3	42	6.1	18	2.6

Table 7 Distribution of sample based on cross bite in posterior teeth.

	TOTAL	NO CROSSBITE		UNILATERAL SINGLE		UNILATERAL MULTIPLE		BILATERAL SINGLE		BILATERAL MULTIPLE	
	N	N	%age	N	%age	N	%age	N	%age	N	%age
MALE	311	292	93.9	8	2.6	5	1.6	0	0.00	6	1.9
FEMALE	380	351	92.4	13	3.4	9	2.4	2	0.50	5	1.3
COMBINED	691	643	93.1	21	3.0	14	2.0	2	0.30	11	1.6

Table 8 Distribution of sample based on spacing in maxillary and mandibular anterior teeth.

		TOTAL	NO SPACING		0-2mm (MILD)		2-5mm (MODERATE)		> 5mm (SEVERE)	
		N	N	%age	N	%age	N	%age	N	%age
MAXILLA	MALE	311	265	85.2	20	6.4	25	8.0	1	0.30
	FEMALE	380	344	90.5	12	3.2	24	6.3	0	0.00
	COMBINED	**691**	**609**	**88.1**	**32**	**4.6**	**49**	**7.1**	**1**	**0.1**
MANDIBLE	MALE	311	278	89.4	18	5.8	13	4.2	2	0.60
	FEMALE	380	356	93.7	15	3.9	9	2.4	0	0.00
	COMBINED	**691**	**634**	**91.8**	**33**	**4.8**	**22**	**3.2**	**2**	**0.30**

Table 9 Distribution of sample based on crowding in maxillary and mandibular teeth.

		TOTAL	NO CROWDING		0-2mm (MILD)		2-5mm (MODERATE)		> 5mm (SEVERE)	
		N	N	%age	N	%age	N	%age	N	%age
MAXILLA	MALE	311	227	73.0	24	7.7	50	16.1	10	3.2
	FEMALE	380	294	77.4	33	8.7	44	11.6	9	2.4
	COMBINED	**691**	**521**	**75.4**	**57**	**8.2**	**94**	**13.6**	**19**	**2.7**
MANDIBLE	MALE	311	241	77.5	31	10.0	36	11.6	3	1.0
	FEMALE	380	313	82.4	37	9.7	28	7.4	2	0.5
	COMBINED	**691**	**554**	**80.2**	**68**	**9.8**	**64**	**9.3**	**5**	**0.7**

The study conducted by Jacob and Mathew [10] had also reported prevalence of 88.8 % Class I malocclusion in Trivandrum school children, result similar to present study. Various authors have reported prevalence of 68% [12], 50.97% [14], 36% [13], 23% [11] and 40.4% [9] Class I malocclusion, which were low from present study. Silva and Kang [15] reported the prevalence of Class I malocclusion upto 62.9% among Latino adolescents. Another recent longitudinal study by Dimberg et al [15, 16] had reported

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92% prevalence of Class I malocclusion, which was high from present investigation. Lew et al [17] also found the prevalence of 58.8%, which was again less than our study.

The distribution of Class II/1 malocclusion in this study was 8.7%, comparable with study conducted by Jacob and Mathew [10] i.e. 10.5%. Singh et al. [14], Shaikh and Desai [12] and Tiwari A [13] have reported prevalence of 40 %, 31.2 % and 37.9% respectively for Class II/1 malocclusion, which were very high as compared to this investigation. However, Nagraja et al. [11], Lagana G et al. [9] and Lew et al. [17] have reported 4.5%, 29.2% and 21.5% of Class II malocclusion respectively. They did not divide the Class II sample into Class II/1 and Class II/2. In contrast, the study conducted by Silva and Kang [15] had diagnosed 94.5% individuals with Class II/1 and 5.7 % by Dimberg et al [16].

A higher occurrence of Class III malocclusion i.e. 2.5% was found in present investigation as compared to Jacob and Mathew [10] (0.7%), Shaikh and Desai [12] (0.8%), Dimberg et al. [16] 0.4% and Nagraja et al. [11] (1.3%). When compared with Singh et al [14] (3.17%) and Lagana G et al. [9] (3.2%), prevalence was similar in results with our investigation. In contrast to the investigations conducted by Tiwari A [13], Silva and kang [15] and Lew et al.[17] who reported high prevalence of 26.1%, 9% and 12.6% respectively.

Prevalence of normal bite depth i.e. 0-25% was found to be 24.9% in present investigtion. Singh et al. [14] (1993) had also reported 28.78% prevalence of 0-30% bite depth in their sample. In the same study, they reported 27% and 30% of prevalence of 40-70% and more than 75% bite depth, much higher than the values that we found in our investigation i.e. 19.8% and 6.2% respectively. Kapoor (1968) reported that in Class II/1 cases, 24% has medium overbite and 76% had excessive overbite [18]. Thilander et al. [8] had reported prevalence of 21.6 % overbite more than 4 mm in Bogotanian population. Recent longitudinal study by Dimberg et al [16] had also reported 20.5% of deep overbite in 275 children (11.5 years of age).

The prevalence of 1.6% i.e. 11 out of 691 sample reported with open bite malocclusion, whereas 98.4 % of the sample was without open bite malocclusion. Singh et al [14] had reported 14.88% openbite malocclusion in their sample, much higher than present investigation. Possible explanation for increased prevalence of open bite malocclusion could be that, the sample selected were those who reported for orthodontic treatment. Corruccini et al. [19], Corruccini et al. [20] had reported only 0.37% openbite malocclusion which was very low. Tak M et al. [6] and Tiwari A [21] had reported the prevalence of 2.5% and 4.98% openbite malocclusion among school children of Udaipur (Rajsthan) and Chandigarh, India respectively, whereas Thilander et al. [8] had reported prevalence of 9% openbite malocclusion in Bogotanian population.

Results of the present study revealed that, 47.8% of school children were reported with normal overjet i.e. 0 – 2 mm, much higher when compared with study conducted by Singh et al. [14] (11.5%). The study by Singh et al. (1993) reported the prevalence of 29% and 43.9% for overjet of 3-5 mm and more than equal to 6 mm respectively [14], whereas prevalence of 46.5% for overjet of

3-5 mm and 5.8% for overjet more than equal to 6 mm was found in present study. Corruccini et al. [19] found that 8% had more than 5 mm of overjet, 57.45% had 2-4 mm of overjet in north Indian population. Thilander et al. [8] and Tak M et al. [6] found prevalence of 25.8% and 12.7% with maxillary overjet more than 4 mm respectively.

Prevalence of anterior crossbite was found to be 6% involving single tooth and 2.6% involving multiple teeth, whereas large sample (91%) reported without any anterior crossbite malocclusion in present study. Gul-e-Erum et al (2008) found prevalence of 4.5% anterior crossbite among 156 orthodontic patients in Pakistan [22]. Borzabadi- Farahani et al. (2009) had reported prevalence of 8.4% in a sample of 502 children with age range of 11-14years [23].

Prevalence of crossbite of posterior teeth was 6.9%, whereas, 93.1% of individual had no posterior crossbite malocclusion. Some studies had reported more prevalence i.e. 27.07% [14], 14.75% [16] and 12.4% [20] of posterior crossbite.

Distribution of spacing in maxillary and mandibular anterior teeth of mild severity (0-2 mm) was 4.6% and 4.8% respectively, 7.1% and low in mandible 3.2% as moderate (2-5 mm) found to be very low (8.05%, 7.56%, 15.6% and 8.29%) as compared to study conducted by Singh et al [14]. From the present study it can be concluded that, prevalence of moderate spacing was more in maxilla than mandible, which was found in accordance with the study by Singh et al [14].

No crowding was observed in 75.4% in maxillary arch and 80.2% in mandibular arch. In maxillary arch, 8.2%, 13.6% and 2.7% showed mild, moderate and severe crowding respectively, whereas prevalence of 9.8%, 9.3% and 0.7% respectively was found in mandibular arch. Singh et al. [14] reported prevalence of 7.8%, 21.46%, and 7.07% and 16.59%, 25.37% and 9.7% as mild, moderate and severe crowding in maxillary and mandibular teeth respectively. Thilander et al. [8] had reported 52.1% prevalence of crowding in one or more segment in a sample of 4724 children. Tak et al. [6] reported 39% (1-2 mm) and 6.4% (more than equal to 3 mm) crowding in maxillary arch, whereas it was 27.4% (1-2 mm) and 0.9% (more than equal to 3 mm) in mandibular arch.

Conclusion

Data collected from the present investigation revealed that 87.4% individual had Angle's Class I malocclusion, 8.7% Class II/1, 1.4% Class II/2 and 2.5 % Class III. Forty nine percent schoolchildren had 26-50% bite depth, whereas 19.8% and 6.2% had 51-75% and 76-100% bites depth respectively. Openbite was present in small population (1.6%). Forty six percent had overjet of 3-5 mm and 5.8% showed more than equal to 6 mm. Single tooth anterior crossbite was found to be maximum which was 6.1% as compared to crossbite involving multiple teeth (2.6%). Unilateral single tooth posterior crossbite was also found to be maximum which was 3%, followed by unilateral multiple teeth (2%), bilateral multiple (1.6%) and bilateral single posterior teeth crossbite (0.30%). Mild spacing of 4.6% and 4.8% was present in maxillary and mandibular arch, but moderate spacing (2-5 mm) was more

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in maxillary arch (7.1%) than mandibular arch (3.2%). Crowding was found to be more in maxillary arch than mandibular arch with 13.6% revealed moderate crowding of 2-5 mm in maxillary arch than 9.3% in mandibular arch. This data deserves the attention from dental health care professional for early orthodontic referral. So also results of the present investigation warrants the future planning to meet need of orthodontic treatment among the population.

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