World Journal of Environmental Biosciences

Available Online at: **www.environmentaljournals.org**

Volume 6, Supplementary: 48-52

ISSN 2277- 8047

Evaluation of Orthodontic Indices in 6 to 17 Years Old Male and Female Group Using Template Method in The Iranian Race

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ABSTRACT

Introductions: Successful orthodontic treatment requires availability of normal values. The normal values vary in different populations, so defining these values seems to be necessary in each geographic region. Accordingly, this study was designed and conducted to measure normal values of orthodontic indices in central population of Iran.
Material and Methods: Out of 911 students selected, 235 students aged 6-17 years were included in the study. After preparing radiography of lateral cephalometry, 44 orthodontic indices were studied. The present study was conducted to collect data in order to develop template and to update the historical data.
Results: Findings indicated that there is a difference between males and females in terms of oral indices. In addition, 34 indices varied based on age group.
Conclusion: based on the results, it is possible to define specific template for the central population of Iran.

Key words: *Lateral cephalometry, craniofacial evaluation, Template*

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INTRODUCTION

People have shown their interest in beauty by any means over the years. Paintings, sculptures, and works of past generations are evidence in this regard. After several years, studies focused on measuring the living human face known as anthropometry. These measurements and other types of these indicators have been led inachieving an appropriate index for comparing different types of growth and evolution in humans.By investigating different communities, we conclude thathard and soft characteristics vary in different races (Jeelani and et al, 2016). Perception of occlusion failure and orthodontic treatment differ compared with the dentist(Athira and et al, 2016). Therefore, it seems to be rational to define separate template for each population.
Accordingly, unique growth and development templates could be considered for different age groups, for example, separate template could be developed for post-puberty period (Gupta and et al, 2016).
It is a for long time that patients, referring for dentofacial abnormalities, are examined and analyzed before starting treatment through certain tools and procedures. Accordingly, type and severity of their abnormalities are diagnosed (Song and et al, 2016). One of the factors used nowadays to diagnose treatment before orthodontic is lateral cephalogram that different analyses have been conducted on it depending on patient's need (Silva and et al, 2008).
Therefore, we always need an algorithm to compare various abnormalities and the simplest method used in this regard is template method. Template in fact a model determining the size and placement of each complex dentofacial set (Franco and et al, 2016). Template is not a new method. Buamdeveloped four transparent templates in 1952 used directly on x-ray films (Akhoundi and et al, 2012). This method is used in many studies. For example, it was used in study conducted by Yunfeng Li et al in which they examined dentofacial abnormalities (Li and et al, 2016). A template can respond quickly and carefully to all of our questions (Schnutenhaus and et al, 2016) In general, template is a type of analysis determining the problem without any measurement.
Construction and development of these templates are based on normal values of population. The present study was conducted to collect data in order to develop template and to update past data.

MATERIALS AND METHODS

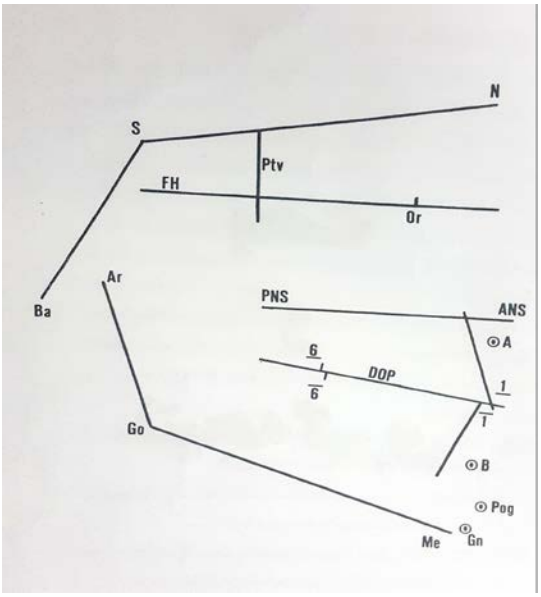
The sample of study included 6151 students studying at three primary, secondary and high school levels in Isfahan schools. They were divided into five age groups of 6-8,8-10,10-12,12-14,14-17, and significant difference was not found between two populations in terms of mean age. Among the students examined, 3686 of them had malocclusion class 1, 1226 had malocclusion div 1 class 2, 47 of them had div 2 class 2, 271 of them had malocclusion class 3, and 911 of them met the occlusion criteria.

Among these 911 subjects, 235 referred for lateral cephalogram that 95 of them were male and 140 of them were female. Dr. SaeedSadeghian performed the examination and developed the cephalogram. Type of study was observational, descriptive, cross-sectional, and unbiased. Sampling was conducted after obtaining the required licenses directly and randomly by referring to examinational and educational center of all students.

After preparing radiography, cephalometry was drawn on paper (dentaurum, Germany) and 43 indicates listed in Table 1 were measured (Figure 1). It represents the central tendency of lower incisor to mandibular plane.

Indicates
1. SNA
2. SNB
3. FACIAL ANGLE
4. SN TO FH
5. S-N
6. MANDIBULAR PLAN ANGLE
7. Y AXIS
8. UPPER FACE HEIGHT
9. IMPA(It Represents the central tendency of lower incisor to mandibular plane)
10. 1 TO FH
11. OR TO SN
12. OR TO S
13. SELLA ANGLE
14. S TO AR
15. ARTICULATOR ANGLE
16. AR TO GO
17. GONIAL ANGLE
18. GO-ME
19. S TO GN
20. N TO POGONION
21. DOWNS OCCLUSAL PLANE
22. CANT OF OCCLUSAL PLANE
23. N TO OCC PLANE
24. ANS TO NPREPENDICULAR
25. ANS TO PNS
26. PNS TO FH
27. PTERYGOID VERTICAL (PTV)
28. TO PTV
29. MAXILLARY FIRST MOLLAR(6th) TO PTV
30. MANDIBULAR FIRST MOLLAR(6th) TO PTV
31. MAXILLARY E TO PTV
32. E TO PTV MANDIBULAR
33. MAXILLARY 1th TO PTV
34. MANDIBULAR 1th TO PTV
35. Basicranium angel (N-SNBA)
36. SELLA_ BASION
37. SELLA _BASION
38. P.P TO FH
39. CONVEXITY ANGLE
40. ANB
41.POG TO N_PREPENDICULAR
42. LOWER FACE HEIGHT
43. INTER INCISAL ANGEL

1 Figure



(BA:BASION)),S:SELLA,(N:NASION)),(PTV:pterygoid vertical),(FH:frankfort line),(or:orbital line),((pns:posterior nasal spine),ans: anterior nasal spine),(6th underline :maxillary first mollar),(6th overline:mandibular first mollar),(dop: down occlusal plane),(1th underline:first maxillary incisor),(1th over line:first mandibular incisor), (pog:pogonion), (gn:gnation), (me:menton), (go:gonion), (ar:articular)

RESULTS

In this study conducted on females and males in the age range of 6 to 17 years, it was observed that Group A factors increase as age goes up and Group B factors remained almost unchanged. In addition, Group C factors reduced as age goes up.

A	B	C
SN.	SNA	SN to FH
SNB	U1 to FH	Mandibular Plane angle
Facial angle	IMPA	Gonial angle
Y-axis	ANS to N-vertical	Cant of occ.
ANS-PNS	Articular angle	Angle of convexity
Ar- Go	Sella angle	ANB
Ar- Ptv	Basicranium angle	
Ba to Ptv	Palatal Plane angle	
Go- Me	A to NP	
L1 to Ptv		
L6 to Ptv		
N to occ Plane		
N to Pog		
Orbit to SN		
PNS to FH		
S-Art icular		
S-Basion		
S-Gn		
S-orbit		
U 1 to Ptv		
U 6 to Ptv		
Upper face height		
Na- A		
Na- B		
Lower face height		
Pog to NR		

Figure 2

Complex dentofacial dimensions are larger in males compared to females.
According to results, it is better to use separate templates for males and females.
P-Value and correlation coefficient in correlation coefficient test between age and each of cephalometric measurementsBy sex.
* means insignificance. Positive correlation coefficient indicates direct correlation with age, and negative correlation coefficient indicates reverse correlation with age.

variable / sex	ANB	Ato NP	ANS to NP	ANS-PNS
Male	-0/26 P=0/010	-0/17 P=0/101*	-0/02 P=0/868*	-0/72 P=0/000
Female	-0/36 P=0/000	-0/05 P=0/556*	0/2 P=0/015	0/73 P=0/000
	Ar-Go	AR-Ptv	Ba-Ptv	Convexity
Male	0/76 P=0/000	0/7 P=0/000	0/65 P=0/000	-0/32 P=0/000
Female	0/71 P=0/000	0/6 P=0/000	0/55 P=0/000	-0/41 P=0/000
	Fecial-A	Go-Me	Gonial angle	IMPA
Male	0/15 P=0/138*	0/86 P=0/000	-0/53 P=0/000	0/3 P=0/004
Female	0/3 P=0/000	0/79 P=0/000	-0/34 P=0/000	-0/3 P=0/701*
	1 tpPtv	6 to Ptv	Lower.f.H	Mandibular.P
Male	0/69 P=0/000	0/83 P=0/000	0/66 P=0/000	-0/24 P=0/020
Female	0/56 P=0/000	0/74 P=0/000	0/66 P=0/000	-0/13 P=0/117*
	N-A	N-B	N-Occ.P	N-Pog
Male	0/74 P=0/000	0/77 P=0/000	0/80 P=0/000	0/81 P=0/000
Female	0/66 P=0/000	0/71 P=0/000	0/73 P=0/000	0/77 P=0/000
	Occlusal.P	Or-SN	PNS-FH	Pog to NP
Male	-0/2 P=0/058*	0/43 P=0/000	0/68 P=0/000	0/07 P=0/509*
Female	-0/29 P=0/001	0/35 P=0/000	0/69 P=0/000	0/29 P=0/000
variable / Sex	**S-Ar**	**Articular angle**	**S-Ba**	**S-Gn**
Male	0/75 P=0/000	0/05 P=0/621*	-0/82 P=0/000	0/82 P=0/000
Female	0/54 P=0/000	-0/03 P=0/729*	0/67 P=0/000	0/83 P=0/000
	S-N	SNA	SNB	SN/FH
Male	0/6 P=0/000	0/03 P=0/754*	0/23 P=0/024	-0/23 P=0/026
Female	0/42 P=0/000	0/13 P=0/121*	0/34 P=0/000	-0/18 P=0/036
	Sella.A	Basicranium	S-Or	1 to FH
Male	0/18 P=0/072*	0/08 P=0/428*	-0/6 P=0/000	0/13 P=0/232*
Female	0/015 P=0/860*	-0/002 P=0/976*	0/58 P=0/000	0/08 P=0/365*
	to$\bar{1}$1	1 to Ptv	6 to Ptv	N-ANS
Male	-0/003 P=0/980*	0/67 P=0/000	0/78 P=0/000	0/74 P=0/000
Female	0/067 P=0/448*	0/56 P=0/000	0/69 P=0/000	0/6 P=0/000
	Y-axis	Palatal Plane		
Male	0/25 P=0/014	0/77 P=0/000		
Female	0/13 P=0/134*	0/912 P=0/291*		

3 Figure

* means insignificance. Positive correlation coefficient indicates direct correlation with age, and negative correlation coefficient indicates reverse correlation with age.

The results of comparing the mean of cephalometric sizes in both genders in each of the age groups.

variable / sex	1	2	3	4	5
ANS-NP	0/004*	0/656	0/412	0/006*	0/004*
ANS-PNS	0/046*	0/024*	0/080	0/553	0/000*
Ar-Go	0/927	0/396	0/639	0/460	0/012*
Ar-Ptv	0/406	0/402	0/530	0/023*	0/003*
Ba-Ptv	0/887	0/353	0/412	0/107	0/006*
Facial.A.	0/039*	0/816	0/263	0/013*	0/007*
Go.Me	0/825	0/557	0/712	0/354	0/000*
Gonial.A.	0/535	0/974	0/933	0/646	0/003*
IMPA	0/617	0/202	0/161	0/482	0/008*
1 to Ptv	0/764	0/614	0/998	0/211	0/025*
6 to Ptv	0/406	0/971	0/604	0/118	0/049*
Mandibular.P.	0/328	0/649	0/916	0/020*	0/231
N-A	0/000*	0/367	0/286	0/201	0/000*
N-B	0/085	0/234	0/603	0/136	0/000*
N-OCC.P	0/001*	0/541	0/041	0/208	0/000*
N-Pog	0/090	0/343	0/262	0/152	0/000*

Occlusal.P	0/421	0/981	0/127	0/001*	0/764
Or-SN	0/001*	0/010*	0/017*	0/018*	0/000*
PNS-FH	0/278	0/865	0/087	0/552	0/083
S-Ar	0/001*	0/071	0/075	0/000*	0/000*
Articular A.	0/987	0/090	0/691	0/914	0/200
S-Ba	0/000*	0/000*	0/208	0/000*	0/000*
S-Gn	0/011*	0/157	0/557	0/018*	0/000*

Figure 4

variable / sex	1	2	3	4	5
S-N	0/016*	0/910	0/025*	0/073	0/000*
SNA	0/113	0/656	0/490	0/873	0/009*
SNB	0/475	0/369	0/590	0/677	0/029*
SN/FH	0/125	0/276	0/888	0/000*	0/916
Sella.A	0/588	0/016*	0/425	0/314	0/389
Basicranium	0/380	0/002*	0/250	0/073	0/837
S-or	0/062	0/030*	0/002*	0/464	0/001*
1 to FH	0/149	0/475	0/675	0/043*	0/716
1 to Ptv	0/796	0/843	0/873	0/169	0/014*
6 to Ptv	0/879	0/939	0/601	0/146	0/069
N-ANS	0/010*	0/274	0/061	0/048*	0/000*
Y-Axis	0/074	0/290	0/351	0/004*	0/032*
Palatal.P	0/721	0/293	0/573	0/426	0/591
ANB	0/122	0/753	0/719	0/692	0/992
A to NP	0/019*	0/331	0/211	0/006*	0/014*
Convexity	0/134	0/586	0/654	0/853	0/967
Lower.F.H	0/116	0/034*	0/662	0/929	0/002*
Pog to NP	0/026*	0/780	0/220	0/003*	0/003*
1 to 1	0/814	0/111	0/246	0/308	0/527

5 Figure

* means p-value is significant.Discussion

DISCUSSION

In recent years,comparing patients suffering from orthodontic development has been analyzed using template method in various studies as a reliable method (Proffit and et al, 2014). This study was conducted based on 44 indices on 6151 females and males at age range of 6 to 17 years. Alter direct examination and exclusion of non-relevant samples, their number reduced to 235 people.

In a systematic review, they concluded that the lateral cephalogramis one of the appropriate methods for measuring anatomical positions before orthodontic treatment (Durão and et al, 2013).

In this study, we divided age groups to five categories due to puberty at age of approximately 16 years so that growth developmental changes during puberty to have no effect on other groups. Due to non-relevance of immigration and racial patterns in the studies population, we considered whole sample of study homogeneous in terms of race.

Nowadays, the main focus of diagnosis and treatment is not only on coordination and balance of teeth, but also general anatomy of face and tooth and lip tissues and indices causing coordination and balance in general (Bejoy and et al, 2016), and this was considered as the objective of this study.

In a study examined on cranial landmarks tomography, it was concluded that cranial landmarksdecrease as age increases. For this reason, they can be appropriate reference to increase lengths of other landmarks in terms of comparison level (Lemieux and et al, 2016). In this study, we also concluded that SNA and SELLA ANGE increased slightly, and change in BASICRANIUM SIZE is not significantly correlated with age and this factor indicates lack of major change in cranial landmarks as age goes up.

In 1984, SN.BAHITA et al concluded that as age goes up, the lengths of SNA and ANB landmarks increase and point A moves forward, indicating increased growth of upper jaw by increasing age (Bhatia and et al ,1948). However, results of the current study indicated that the length of indices such as GO-ME increases not only in upper jaw but also in lower jaw, indicating increased length of the mandible.

The study was conducted on people who had no abnormality and using them as reference in treatment of these abnormalities requires further investigation.

CONCLUSION

According to results, indices of current study are different from indices of other studies, indicating use of these values to define template separately for central regions of the Iran. Therefore, complementary studies are recommended for this purpose.

REFERENCES

1. Akhoundi MSA, Chalipa J, Hashemi R, Nik TH, Sodagar A, Afzalifar R. A comparison between craniofacial templates of Iranian and western populations. Acta Medica Iranica. 2012;50(2):127.
2. Athira S, Jayakumar H, Chandra M, Gupta T, Anand PS, Dithi C. Dental esthetic perceptionsand orthodontic treatment needs among school children aged 9–18 years of South Bengaluru: A cross-sectional study. Journal of Indian Association of Public Health Dentistry. 2016;14(1):50.
3. Bejoy P, Eerali SM, Eerali SM, Varghese J, Narayanan M, Laju S. Evaluation of Lip Position on various Nasal Dorsum in South Indian Population. population. 2016;8(2):1-5.
4. Bhatia S, Sowray J. A computer-aided design for orthognathic surgery. British Journal of Oral and Maxillofacial Surgery. 1984;22(4):237-53
5. Durão AR, Pittayapat P, Rockenbach M, Olszewski R, Ng S, Ferreira AP, et al. Validity of 2D lateral cephalometry in orthodontics: a systematic review. Prog Orthod. 2013;14(1):31-42.

6. Franco PB, Farrell BB. Inverted L osteotomy: a new approach via intraoral access through the advances of virtual surgical planning and custom fixation. Oraland Maxillofacial Surgery Cases. 2016;2(1):1-9.
7. Gupta M, Makhija P. Quantitative evaluation of masseter muscle volume in different growth patterns and its correlation with facial morphology: Cone beam computed tomography study. Journal of Indian Orthodontic Society. 2016;50(2):106.
8. Jeelani W, Fida M, Shaikh A. FACIAL SOFT TISSUE ANALYSIS AMONG VARIOUS VERTICAL FACIAL PATTERNS. Journal of Ayub Medical College Abbottabad. 2016;28(1):29-34.
9. Lemieux G, Carey JP, Flores-Mir C, Secanell M, Hart A, Lagravère MO. Precision and accuracy of suggested maxillary and mandibular landmarks with cone-beam computed tomography for regional superimpositions: An in vitro study. American Journal of Orthodontics and Dentofacial Orthopedics. 2016;149(1):67-7.
10. Li Y, Jiang Y, Ye B, Hu J, Chen Q, Zhu S. Treatment of Dentofacial Deformities Secondary to Osteochondroma of the Mandibular Condyle Using Virtual Surgical Planning and 3-Dimensional Printed Surgical Templates. Journal of oral and maxillofacial surgery. 2016;74(2):349-68.
11. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics: Elsevier Health Sciences; 2014.
12. Schnutenhaus S, Edelmann C, Rudolph H, Luthardt RG. Retrospective study to determine the accuracy of template-guided implant placement using a novel non-X-ray evaluation method. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2016.
13. Silva MAG, Wolf U, Heinicke F, Bumann A, Visser H, Hirsch E. Cone-beam computed tomography for routine orthodontic treatment planning: a radiation dose evaluation. American Journal of Orthodontics and Dentofacial Orthopedics. 2008;133(5):640. e1-. e5.
14. Song YL, Yap AUJ. Orthognathic treatment of dentofacial disharmonies: its impacton temporomandibular disorders, quality of life, and psychosocial wellness. CRANIO®. 2016:1-6.