

## Specific features of location of the anterior teeth in patients with class III malocclusion

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### ABSTRACT

Medial occlusion - it is an anomaly of occlusion, when lateral group of teeth close up in class III malocclusion and it may be also accompanied with back coverage of incisors or direct closing of cutting surfaces of the incisors. Location of the incisors of upper and lower jaws is widely variable. It would be just to regard that the angle between the incisors and jaw basis is one of differential diagnostic criteria. Anterior teeth are of great esthetic, physiologic and functional significance. We have studied locations and positions of incisors of upper and lower jaws in patients with medial occlusion against generally accepted anatomic indicators (reference lines); there is conducted comparative analysis of obtained results, with average normal figures. There were studied 60 patients with medial occlusion of the dentition, aged from 7 to 25. The patients were divided into two age groups. 25 patients were observed in the period of replacement of milk-teeth with permanent ones; in 35 patients the process of replacement was already completed. There were studied 60 head cephalograms of the patients with medial occlusion of dentition, 30 side cephalograms of the head of individuals with physiological occlusion of dentition. Analyzing the upper and lower incisors in the patients with medial occlusion of dentition in the period of teeth replacement and period of permanent bite, we concluded that in the patients with medial occlusion of dentition, protrusion of upper incisors and retrusion of lower ones increase with the age. Consequently, in the process of orthodontic treatment of medial occlusion of dentition it is possible to eliminate back sagittal fissures (or minimize them) through change of the angulation of the incisors and canines within the limits of permissible deviation (5°).

**KEYWORDS:** *medial occlusion, cephalometrics*

**M**edial occlusion - it is an anomaly of occlusion, when lateral group of teeth close up in class III malocclusion, what may be accompanied with back coverage with incisor or direct closing of cutting surfaces of the incisors. Medial occlusion of dentition is essentially complex and poly-etiological disorder and with regard of the frequency, it occupies non-significant place among other teeth and jaw anomalies, though it is the most complex anomaly of the structures of morphological and functional changes of dentofacial area (Basilevskaya Z.F. and Mukhina A.D., 1975. Jacobson A., 1980, Kalamkarov Kh.A. et al., 1981, Manetti V. 1984, Miller J.P. 1990, Latii A.A. 1998, Hunter W.S., Snigler P., Mamandras A.H. 1987, Bacetti T. 1999.).

Teeth, as it is well known, play major role in formation of occlusion plane. Anomalous position of the teeth affects not only esthetics, but also the function of entire teeth and jaw complex. It is impossible to study position of occlusive plane in the area of cranium, without analysis of positions both, of separate teeth groups and entire dentition (Lulla P, Gianelli A, 1976; Rakosi T, Schilli W 1981; Segner D. 1989; Gyeva Ju. A., et al., 1998; Popova I.V., 1998; Bedniakov A.A., 2001; Persin L.S., et al., 2002);

Anterior teeth are of great esthetic, physiologic and functional significance. The incisors have specific function in articulation. Contact between upper and lower anterior teeth "edge to edge", with prominent lower jaw ensures biting and separating of the food.

Positions of the incisors on upper and lower jaws are characterized with wide variability. It is valid proposition that the angle between the incisors tilt and base of the jaw is one of differential diagnostic criteria.

### MATERIALS AND METHODS

There were studied 60 patients with medial occlusion of the dentition, aged from 7 to 25. The patients were divided into two age groups. 25 patients were observed in the period of replacement of milk-teeth with permanent ones, in 35 patients the process of replacement was already completed. There were studied 60 head cephalograms of the patients with medial occlusion of dentition and 30 side cephalograms of the head of

individuals with physiological occlusion of dentition. Cephalograms of the head were provided by means of apparatus Milwaukee/Wisconsin, manufactured by the company General Electric. Distance from the tube was 150 cm, voltage - 80 KV, exposition time - 1,6 - 2,0 sec, current strength - 7 mA, with adjustments, for age and constitution.

We have studied location (direction) and position of the incisors of upper and lower jaws in patients with medial occlusion against generally accepted anatomic indicators. There is conducted comparative analysis of the obtained results and average normal parameters

There were studied following parameters:

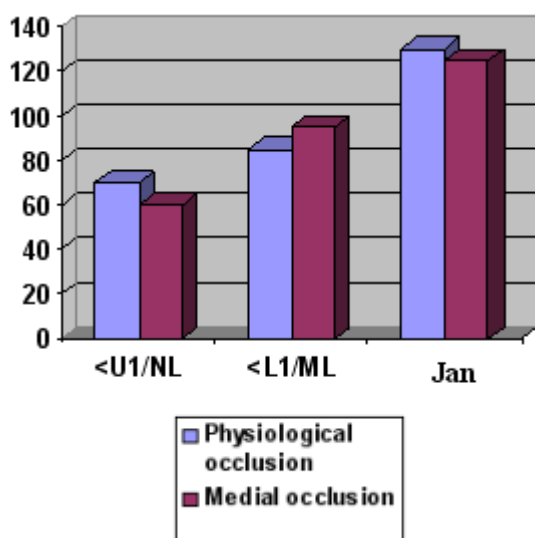
- 1) <U1/NL - Angulation, characteristic inter-location of the 1st incisor and plane of the basis of upper jaw.
- 2) <U1/NS - Angulation between the 1st upper incisor and the plane of the skull basis.
- 3) <L1/ML - Angle, characterizing location of the 1st lower incisor and the plane of lower jaw basis.
- 4) <I/1 alfa-angulation between incisors.
- 5) <U1 Vsp - angulation, characterizing mutual position of the 1st upper incisor and Vsp.
- 6) <L1 Vsp - angulation, characterizing mutual position of the 1st lower incisor and Vsp.
- 7) U-NA - position of the 1st upper incisor against N-A line.
- 8) L1-NB - position of the 1st lower incisor against N-A line.
- 9) U1-NL - upper frontal teeth alveolar height.
- 10) L1-ML - lower frontal teeth alveolar height.
- 11) U1- "K"- Distance from the K point to central upper incisor.
- 12) L1- "K"- Distance from the K point to central lower incisor.
- 13) iu - Quadratic deviation of upper incisors.
- 14) il- Quadratic deviation of lower incisors.

**RESULTS**

Results of the conducted researches are represented in the tables.

Tab.1 shows that in the patients with medial occlusion there is observed statistically reliable average distant angulation of 5,8P1,66+(p<0,001) of the incisor crowns of lower jaw, with vestibular plane and -8,2P1,07 of the plane of lower jaw plane in comparison with the average normal data, what point to the retrusive angulation of the lower jaw incisors and it is logically fall into a pattern of medial occlusion.

Quadrilateral analysis of location of the incisors of lower jaws (il) in patients with medial occlusion is 1,13P0,2 mm greater than similar parameters in individuals with physiological occlusion. This deviation is statistically reliable (p<0,001).

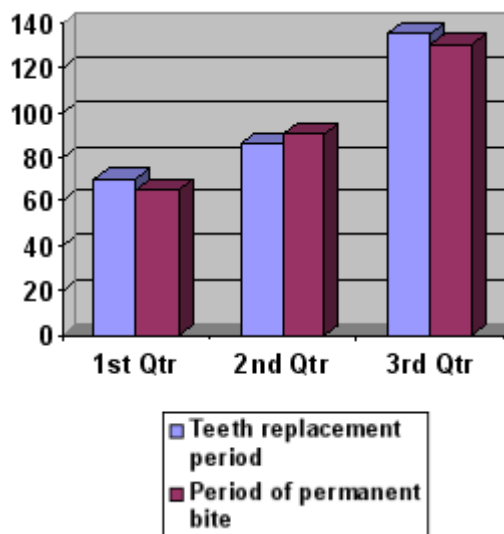


**Fig.1** Diagram of Comparison of location of the incisors in patients with medial occlusion with normal data.

Statistical processing of the data on angulation of the incisors of upper dentition showed protrusive location - reliable magnification <U1/NL, what is proved by decrease of angulation to the plane of frontal section of the skull basis by <U1/NS (5,69P 2,38) (p<0,001) (Fig.1).

As for location of the cutting edges of incisors of upper and lower jaws, though there are observed changes in the parameters (<l/1 alfa; U1-NA; L1-NB; U1-NL; L1-ML; U1-"K"; L1-"k"; <U1Vsp), these are not statistically reliable (p<0,005), what points to the compensatory character of protrusion of upper incisors and retrusion of the lower ones.

Based on analysis of locations of upper and lower incisors of the patients with medial occlusion of dentitions, in the period of teeth replacement and in the period of permanent bite (Tab.2), we concluded that in case of medial occlusion of dentitions protrusion of upper incisors and retrusion of lower ones increase with the age, what is consistent with data, reported by Giova Ju, A. (1988), (Fig.2).



**Fig.2** Diagram of comparison of location of incisors in patients with medial occlusion in the period of teeth replacement and after this.

It means that in the process of orthodontic treatment of medial occlusion of dentitions it is possible to eliminate back sagittal fissure (or its minimization) through change of angulation of the incisors within allowable deviation (5°).

	Parameter Deg. (+)	Physiological Occlusion M1Pm1	Medial Occlusion M2Pm2	dPmd	P
1	<U1/NL	70P1,3	62,9P1,6	7,0P1,5	<0,001
2	<U1/NS	78,8P1,5	73,2P1,5	5,6P2,3	>0,05
3	<L1/ML	87P0,4	95,2P0,9	-8,2P1,0	<0,001
4	<l/1 alfa	135,4P5,8	131,5P1,8	3,8P6,0	>0,05
5	<U1 Vsp	93,6P1,3	94,4P1,6	0,7P2,0	>0,05
6	<L1 Vsp	44,1P1,2	50,5P1,1	-5,8P1,6	<0,001

**Tab.1** Comparison of the location of central incisors of the patients with medial occlusion and normal data.

	Parameter Deg.. (+)	Period of Teeth Replacement 1Pm1	Period of Permanent Bite M2Pm2	dPmd	P
1	<U1/NL	70,1P1,8	65,72P7,19	4,44P7,42	<0,05
2	<L1/ML	91,61P1,9	93,21P2,08	-1,6P2,87	<0,05
3	<I/1 alfa	134P2,59	130,52P2,02	3,48P3,28	>0,05

**Tab.2** Comparison of the patients with teeth replacement and period of permanent bite.

#### REFERENCES:

1. Бедняков А. А. Оценка положения различных сегментов зубных дуг при медиальном прикусе // Достижения в стоматологии. Сборник тезисов. - М. - 2001. - с. 178-180;
2. Василевская З. Ф. и Мухина А. Д. Деформации зубочелюстной системы у детей. // Киев: Здоровье, с. 1975-184;
3. Гиева Ю. А., Персин Л. С., Польша Л. В., Михайлова А. Д., Леонова Е. Л. // Применение метода Di Paolo для определения уровня окклюзионной плоскости на ТРГ головы в боковой проекции // Новое в стоматологии. – 1998 - №2 - с. 57-59;
4. Каламкаргов Х. А., Рабухина Н. А., Безруков В. М. Деформация лицевого черепа – М: Медицина, 1981-233 с.;
5. Латий А. А. Изменение в височно-нижнечелюстном суставе при действии на нижнюю челюсть дистально направленной внеротовой тяги. // Стоматология, - 1988, №2 – с. 19-21;
6. Персин Л. С., Попова И. В., Кузнецова Г. В., Влияние уровня и направления окклюзионной плоскости на состояние зубочелюстной системы. // Ортодонт-Инфо – 2002 - №2, - с. 8-13;
7. Попова И. В. Влияние размеров и положения челюстных костей на формирование окклюзионной плоскости у детей с дистальной окклюзией. Автор. дис. кан. мед. наук. – М, 1998 – с. 19;
8. Vaccetti T. Planning of surgical orthodontic corection in a case of Bone Class III. // Minerva Stomat. – 1999. V. 33 – P. 134-140.
9. Demetris J. Halozonis V. Effect of chinap force on the timing and amaunt of mandibular growth associated with anterior revesed occlusion. (class III malocclusion) during puberty // Am. J. Orthodont – 1998, V. 90 – p. 454-469.
10. Hunter W. S., Singler C. P., Mamandras A. H. The depth of the mandibular, anterogonial notch as an indicator of mandibular anterogonial growth potential. // Amer. J. Orthodont – 1997, V. 91 – P. 117-124.
11. Jacobson A. Orthognatic diagnosis using the proportionate template. // J. Oral Surgery – 1980. V. 38 – p. 820-833.
12. Miller J. P. A. Dental Class III malocclusion on treated to a full casp Class II molar relationship. // Am J. Orthodont – 1990, V. 97. – p. 10-19.
13. Manetti V. Presentanzione del trattamento ortodondco-chirurgico di casi di Class III. // Mondo Orthodontico – 1984. – vol. 9, p. 63-84 mal.
14. Lulla P., Gianelli A. The mandibular plane and mandibular rotation. // Amer. J. Orthodont – 1976 – Vol 70, №5 – p. 567-571

## Особенности положения передних зубов у пациентов с мезиальной окклюзией зубных рядов

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### РЕЗЮМЕ

Мезиальная окклюзия - вид аномальной окклюзии, при которой боковая группа зубов смыкается по III классу Энгля и может сопровождаться обратным резцовым перекрытием, либо прямым смыканием режущих поверхностей резцов; при этом положение резцов верхней и нижней челюсти весьма вариабельно. Справедливо принято считать, что величина угла наклона резцов к основаниям челюсти весьма вариабельно. Справедливо принято считать, что величина угла наклона резцов к основаниям челюсти является одним из дифференциально-диагностических критериев. Передние зубы несут большую эстетическую, физиологическую и функциональную нагрузку. Нами изучено положение и позиция резцов верхней и нижней челюсти у пациентов с мезиальной окклюзией относительно общепринятых анатомических ориентиров - референтных линий и проведен сравнительный анализ полученных данных со значениями средней нормы. Обследовано 60 пациентов зубных рядов с мезиальной окклюзией в возрасте от 7 до 25 лет. Пациенты были подразделены на две возрастные группы: 1) у 25 пациентов наблюдался период смены молочных зубов на постоянные, 2) у 35 - смена закончилась. Изучено 60 боковых телерентгенограмм головы у пациентов с мезиальной окклюзией зубных рядов и 30 боковых телерентгенограмм головы лиц с физиологической окклюзией зубных рядов (контрольная группа). Путём сопоставления положения верхних и нижних резцов у пациентов с мезиальной окклюзией зубных рядов в период смены зубов и в период постоянного прикуса удалось установить, что с возрастом у пациентов с мезиальной окклюзией зубных рядов увеличивается протрузия верхних и ретрузия нижних резцов. Следовательно в процессе ортодонтического лечения мезиальной окклюзии зубных рядов возможно устранение (или уменьшение) обратной сагитальной щели за счёт изменения наклона резцов и клыков в пределах допустимого отклонения (5°).

**Ключевые слова:** мезиальная окклюзия, цефалометрия