PROTRUSION OCCURRENCE RATE IN THE MAXILIARY-DENTAL ANOMALIES

Cuc Albinita*, Cuc Octavian**

* Faculty of Dental Medicine, Oradea ,
** Faculty of Medicine and Pharmacy,
P-ta 1 Decembrie, 5, Oradea, cucalbinita@yahoo.com

Abstract

In case of maxillary-dental anomalies, the protrusion or the proalveolodentition may be relatively frequently met in case of some complex clinic disorders and rarely as a single anomaly. There are two forms of protrusion: bimaxillary and dental crowding. According to Angle, the protrusion is included in the 2nd Class, subdivision 1 for the bimaxillary protrusion, and subdivision 2 for dental crowding. From the analysis of existing data, one noticed the occurrence of protrusion at 83 patients, representing 19.96% out of the total lot surveyed. In early mixed dentition, 36.36% of patients showed bimaxillary dental protrusion and 63.64% dental crowding. In the second stage of mixed dentition only 27.08% of patients had bimaxillary dental protrusion and 72.91% dental crowding, following that in permanent dentition, the dental crowding increase to 76.92% and to the bimaxillary dental protrusion to decrease down to 23.07%.

Key words: Maxillary-dental anomaly, protrusion, mixed dentition

INTRODUCTION

Literature indicate an increase in the occurrence of dental-maxillary anomalies (mallocusions) among nowadays population, most authors indicating a rate varying between 50-60%, (Boboc, Campeanu, Cocarla, Stanley, Serbanescu). The Class II/1st grade anomalies are frequently encountered in orthodontic practice and count for 12% up to 49% of all orthodontic problems. (Ingerval, Kym). Other values varying between 43.3 and 68.1% were reported for Finland children (Keski-Nisula K et all). Bishara et al. report that Class II anomalies in temporary dentition are not corrected spontaneously in case of breeding children.Children aged between 7 and 14 years old (Dorobat et all) showed malocclusions cases requiring treatment (53.58%). In this paper we aim to study statistically and clinically the protrusion. This symptom is quite commonly met in the dento-maxillary anomalies, both in temporary dentition and in the final dentition. Therefore protrusion occurs as such or associated within some more complex symptoms. According to Angle it is included in 2nd Class, subdivision 1 of maxillary-dental anomalies (maloclusions) for the bimaxillary dental protrusion and subdivision 2 for protrusion associated with crowding.

MATERIAL AND METHOD

In order to include in all their complexity all the clinical and etiopathogenic aspects related to the study of protrusion, we have investigated a group of 520 patients selected from Dacia Primary School, Oradea, structured into threes age groups of 6-9 years, 9-12 years and over 12 years old, respectively. Patients who were diagnosed with different clinical forms of protrusion as such or associated within complex dento-maxillary anomalies were included into in-depth survey on aetiology, clinical form of protrusion and the other abnormalities present. We have also taken into consideration the therapy prescribed.

RESULTS AND DISSCUSIONS

Out of the total 520 patients enrolled in the survey group we have found out that 83 (15.96%) had been applied the morphologic diagnosis of different clinical types of protrusion. The 83 cases were thus divided into three groups as follows: 6-9 years, 9-12 years, and > 12 years. So we tried to include various features of the abnormality surveyed in the first stage and in the second stage of mixed dentition, and in the permanent dentition. We have obtained the following data: 22 cases were in the first age group, 48 cases in the second age group and 13 cases in the third group (*Chart no. 1*).

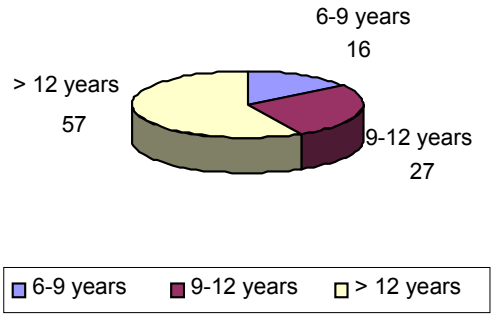

CHART NO. 1. Distribution of protrusion cases by patients age groups

Analyzing the frequency of the two clinical forms (bimaxillary dental protrusion and crowded), we found a total of 83 cases of which 24 cases of bimaxillary dental protrusion, representing a percentage of 28.91% and a total of 59 cases of dental crowding, representing a percentage of 71.09%, respectively.

Analyzing the situation by age groups we have noticed the following distribution:

- for the 6-9 years old age group = 8 cases (36.36%) protrusion of tremor and 14 cases representing 63.64% protrusion of crowding;
- for the 2nd group aged 9-12 years old = 13 cases (27.08%) had protrusion with tremor and 35 cases representing 72.98% were crammed protrusion with;
- as for the third age group > 12 years old = 3 cases (23.07%) had bimaxillary dental protrusion and 10 cases, representing 76.93% of total, had dental crowding.(*See Chart no. 2*)

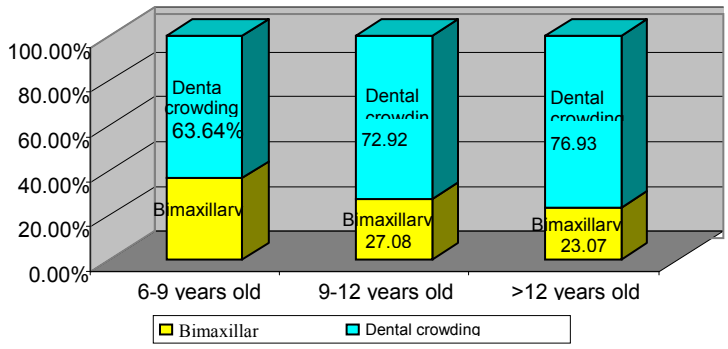

CHART NO. 2. Distrubution by age grups of patients with bimaxillary protrusion and dental crowding, respectively

We have further analyzed the association protrusion with other maxillary-dental anomalies. In case of dental crowding we associated in the target group the following diagnoses: dental crowding, DM protrusion, narrow jaw protrusion, considering that they are actually represent the lack of space for retrusion and alignment.
Clinical situations encountered are listed in the following table.

Table no. 1

Distribution by age group associated of different ADM associated with protrusion

Age		Open bite	Deep bite	Side deviation	Deep distal bite	Open distal bite	Total
6-9 years old	Bimaxillary dental protrusion		4		3	1	8
	Dental crowding	1	8		4	1	14
9-12 years old	Bimaxillary dental protrusion	2	4		6	1	13
	Dental crowding	4	21		8	2	35
Over 12 years old	Bimaxillary dental protrusion		2			1	3
	Dental crowding		6	2	1	1	10
TOTAL		7	45	2	22	7	83

Taking into consideration the oral parafunctions or vicious habits detected by age groups, our findings are as follows:

- for the 6-9 years old age group = 3 patients, representing 13.63% did not show any oral parafunction; 9 patients representing 40.90% showed only one oral para-function and 10 patients, namely 45.74%, showed associated oral parafunctions;
- for the 2nd group aged 9-12 years old = 6 patients representing 12.50% did not show any oral parafunction; 19 patients representing 35.58% % showed only one oral parafunction and 23 patients, namely 47.92 showed associated oral parafunctions;
- as for the third age group > 12 years old = 3 patients representing 23.07% had n oral parafunction, 4 patients, representing 30.76% showed only one oral parafunction, and 46.17 showed associated oral parafunctions (*see Chart no. 3*);

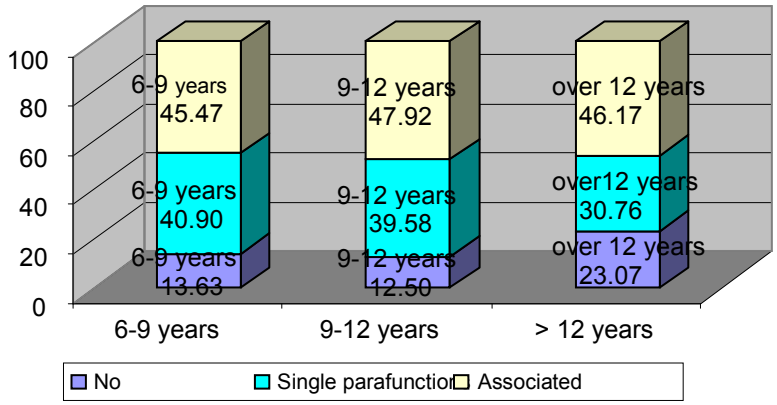

CHART NO. 3. Distribution by age groups of patients of protrusions cases associated with oral parafunctions

Analyzing various forms of oral parafunctions and single vicious habits associated to lips and tongue, mouth breathing and thumb sucking, we have found out the following individual cases (*see Table no 2 bellow*)

Table no. 2

The association method of oral parafunctions by age groups.

	Singel oral parafunctions			Associated oral parafunctions			Triple oral parafunctions		
Age	RO	B	L	B+L	B+RO	B+D	B+L+D	B+L+RO	Total
6-9 years old	2	7		3	2		1	4	19
9-12 years old	5	13	1	3	11	1	2	6	42
Over 12 years old	3	1		1	1			4	10

Legend: B – Lips parafunctions, L – Tongue parafunctions, RO - Oral breathing, D - Thumb sucking

Correlating the clinical maxillary-dental abnormality with oral parafunction or parafunctions associations detected parafunctions one may illustrate the relationship between etiopathogenetic mechanism and dento-

maxillary anomaly installed according to the following table (*see Table no. 3 bellow).*

Table no. 3

Correlation between anomalies diagnosed and associated oral parafunctions

Age			No.oral para-Funct.	Single oral parafunctions			Double oral parafunctions			Triple Oral Parafunctions		Total
				RO	B	L	B+L	B+ RO	B+ D	B+ L+D	B+L +RO	
6-9 years old	Protrusion with deep bite	Bimaxillary					2				2	4
		Crowding						1				8
	Protrusion with open bite	Bimaxillary			7							
		Crowding									1	1
	Deep protrusion with distal bite	Bimaxillary	1								2	3
		Crowding		2			1	1				4
	Open protrusion with distal bite	Bimaxillary								1		1
		Crowding	1									1
	Total		2	2	7		3	2		1	5	22
9-12 tears old	Protrusion with deep bite	Bimaxillary						1			3	4
		Crowding	6	4	9			2				21
	Protrusion with open bite	Bimaxillary					1			1		2
		Crowding					1				3	4
	Deep protrusion with distal bite	Bimaxillary			4			2				6
		Crowding		1				6	1			8
	Open protrusion with distal bite	Bimaxillary								1		1
		Crowding				1	1					2
	Total		6	5	13	1	3	11	1	2	6	48
Over 12 years old	Protrusion with deep bite	Bimaxillary									2	2
		Crowding	2	2	1							6
	Protrusion with open bite	Bimaxillary										
		Crowding									2	2
	Deep protrusion with distal bite	Bimaxillary										
		Crowding		1								1
	Open protrusion with distal bite	Bimaxillary	1									1
		Crowding						1				1
	Total		3	3	1			1			4	13

Discussing the occurrence rate of oral parafunctions at patients by age groups one founds that the share of subjects without parafunctions is very small. In early mixed dentition, and in the second stage of mixed dentition, the share of those patients with associated parafunctions is more than double as against the share of patients with single oral parafunctions.

We have further have looked at the treatment applied to the 83 patients contained in the group we surveyed by age groups:

- For the 6-9 years age group, 11 patients - 50% received treatment single block treatment, 5 patients, namely 22.72%, were applied palatal plate and arch treatment. In case of 4 patients, namely 18.18%, the device application i.e. in 3 palatal plate cases and one single block device case were accompanied by one or more extractions in order to obtain the space needed for protrusion and alignment. 2 patients, namely 9.09%, abandoned treatment before the manufacture and application of the device;

- In the 9-12 years age groups, 19 patients, namely 39.58%, received treatment with single block, 3 patients, namely 6.25% with Balters devices. 13 patients, namely 27.08%, received biomechanical devices such as palatal plate with vestibular arch. In case of 10 patients, namely 20.83%, extractions were made followed, in 7 cases, by application of a palatal plate, and in 3 cases by application of a single block. 3 patients, namely 6.25%, had dropped out before treatment;
- As for the age group over 12 years, 2 patients, namely 15.38%, received treatment with single block, 2 patients, namely 15.38%, received treatment with palatal plate, at 5 patients, namely 38.46%, extractions were made followed in two cases by mounting of a palatal plate and in 3 cases by mounting single blocks. In case of one patient, namely 7.69%, extractions were followed by application of a palatal plate then a single block. 3 patients, namely 23.07%, dropped out the treatment before treatment (*see Table 4 bellow*).

Table no. 4

Treatment applied by age groups

Device type	6-9 years old		9-12 years old		over 12 years old	
Single block	11	50%	19	39,58%	2	15,38%
Balters device			3	6,25%		
Palatal plate	5	22,72%	13	27,08%	2	15,38%
Extractions + Palatal plate	3	13,63%	7	14,58%	2	15,38%
Extractions + Single block	1	4,54%	3	6,25%	3	23,07%
Extractions + Palatal plate+ Single Block					1	7,69%
Fix device	2	4,34%				
Drop-outs	2	9,09%	3	6,25%	3	23,07%

Discussing the data obtained from the analysis of patients lot obtained enrolled in the School "Dacia" (1-8 grades) consisting of 520 patients, we applied the protrusion diagnosis a number of 83 patients protrusion, namely 15.96% of total. In early mixed dentition, 36.36% of patients showed bimaxillary dental protrusion, and 63.64% showed dental crowding. In the second stage of mixed dentition only 27.08% of patients had bimaxillary dental protrusion, and 72.91% dental crowding, following that in the permanent dentition, the dental crowding protrusion increase to 76.92% and the bimaxillary dental protrusion decreases to 23.07% (*see Chart no. 4).*

In early mixed dentition, eruption of permanent front teeth with larger sizes show the lack of preexisting space by occurrence of the dental crowding more frequently. In the second period of mixed dentition when to prolonged action of oral parafunctions one may add the consequences of

premature extraction in the supporting area, the occurrence rate of dental crowding raises more to reach 81.41% in permanent dentition.

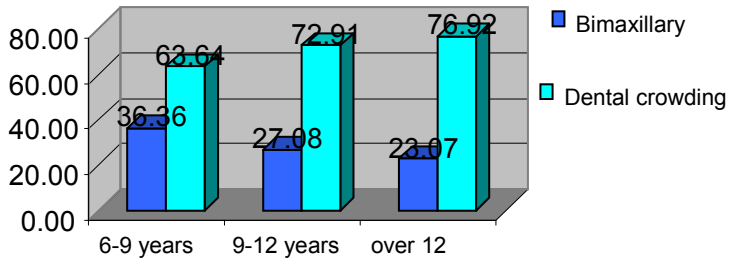

CHART NO. 4. Occurence rate for bimaxillary protrusion and dental crowding by age groups

Studying the occurrence rate of other maxillary-dental anomalies associated with protrusion, we note as significant the deep distal bite and the open distal bite (*see Chart no. 5*).

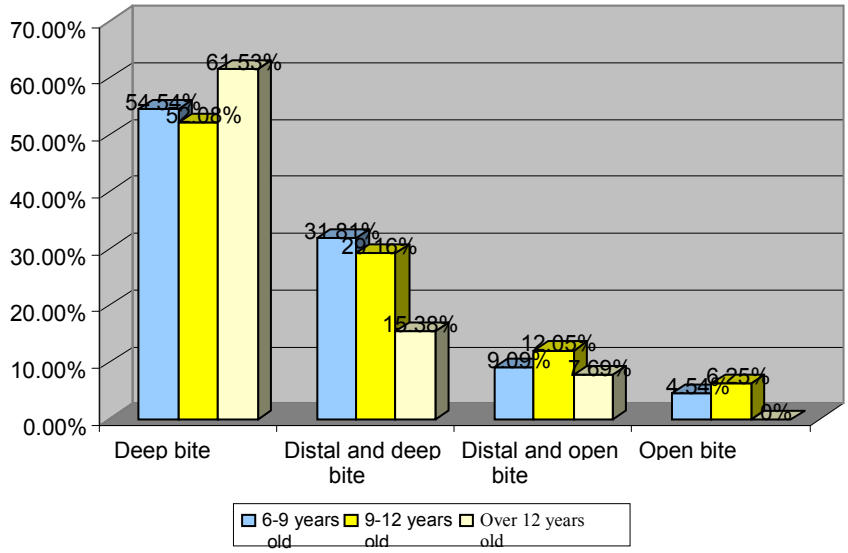

CHART NO. 5. Rate associating protrusion with other maxilliary-dental anomalies, by age

As one may notice, in all age groups the predominant protrusion form is the protrusion with deep bite. The following protrusion type in the hierarchy is the distal and deep bite.

Considering the predominantly functional etiology of protrusion one appreciate that the attitude of oral parafunctions and vicious habits is predominantly made at the upper frontal teeth. By means of its protrusion

the egression of the lower front group of teeth is allowed and thus the protrusion with deep bite is in place.

Next in the occurrence rate is the protrusion associated with distal and deep bite. In this anomaly oral parafunctions acts on the jaw too, which remains in a more secluded position as against the maxillary. The incidence rate of this abnormality is higher in mixed dentition where the action of functional factors is present more actively at the level of the upper jaw causing transversal narrowing and blocking the Mandible in a more distal position.

Open protrusion with distal bite decreases in the second stage of mixed dentition as against the early mixed dentition probably by means of self-educated deglutition. Protrusion with open bite is most common in the second stage of mixed dentition.

We have most often met oral parafunctions of the lower lip. Thus in the first period of dentition 86.60% of cases showed oral parafunctions of the lower lip. This share remains high also both in the second stage of mixed dentition - 79.26%, and in permanent dentition - 86.05%.

Next in order of incidence rate is the oral breathing present in 48.83% of cases in permanent dentition, in 60.91% of cases in the second stage of mixed dentition, and dropping to 47.82% of the cases in the first stage of mixed dentition.

Analyzing associated oral parafunctions in both two stages of mixed dentition and permanent dentition, we found out that the most common associations were as follows: oral breathing and oral parafunctions of the lower lip, and oral parafunctions of the lower lip and lower tongue, respectively, and triple oral parafunction of breathing, lower lip and tongue. One has found out that that most common is the lower lip parafunction (interposition or aspiration). This is explained by the fact that the lower lip is drawn in the negative pressure sagittal step existing most of the time in the mouth.

One may note an increase frequency of oral breathing both as single oral parafunction, and as oral parafunction associated in mixed or permanent dentition by the fact that while the obstruction ways to block pipes partially or totally increase especially by adenoids or hypertrophic tonsils caused by repeated inflammatory Processes.

While correlating existing oral parafunctions with the anomaly diagnosed we have noticed that in early mixed dentition the most frequent correlation was between dental crowding and the oral parafunctions of the lower lip, followed by bimaxillary dental protrusion accompanied by oral parafunctions of the lower lip and tongue. It is also noticeable the correlation between distal bite with protrusion and mouth breathing associated with oral parafunctions of the lower lip.

In the second stage of mixed dentition, the most common correlation identified is the one between dental crowding and the oral parafunction of the lower lip followed by the dental crowding correlated with oral breathing and the oral parafunction of the lower lip, and the protrusion associated with distal bite correlated with oral breathing and oral parafunctions of lower lip and tongue.

In permanent dentition the most common correlation is, as in other cases, the one between dental crowding and the oral parafunction of the lower lip.

Taking in our survey the applied therapy, one noticed that in early mixed dentition the method most used was the single block -50%, followed by palatal plate with arch - 22.72%. In 4 Cases, namely 18.17%, extractions were made followed by the mounting of a device.

In the second stage of mixed dentition the single block device was applied in 19 cases, namely 39, 58%, followed in order of occurrence rate by the extraction and mounting of a medical device - 10 Cases, representing 20.83% and palatal plate in case of 13 patients - 27.09%.

In permanent dentition extractions were applied most frequently followed by the mounting of a medical device – i.e. 5 cases (38.45%). They were followed in order of occurrence by the single block in case of 2 patients t-15, 38%, and the palatal plate in case of other 2 Patients - 15.38%.

Taking into the issue of the treatment applied by age one may notice that in early mixed dentition the functional treatment predominates by mio-gymnastics one associating functional bi-maxillary devices such as single blocks. This is explained by the small magnitude of morphological changes caused by oral parafunctions.

In the second stage of mixed dentition and in permanent dentition, due to the increased length of time the oral parafunctions have acted combined with the association of new oral parafunctions (oral breathing), as well as through the amplification of morphological changes (jaw narrowing, post-extraction displacements), the anomaly is getting worse requiring a more frequent application of extraction in order to obtain the required space for protrusion and alignment.

CONCLUSIONS

1. Protrusion is a symptom often encountered as such or in other dental-maxillary anomalies (malocclusions). In mixed dentition we found a 52% rate of patients presenting malocclusions. In the permanent dentition we have identified protrusion cases at 48% of patients. The difference is explained by the self-treatment possibilities by means of suppressing vicious habits or spontaneous rehabilitation of oral parafunctions amid minimal morphological changes.
2. Among of protrusion clinical forms, crowding dentition is more commonly met in early dentition (63.63%). In the 2nd phase of mixed dentition, this rate increases to 72.91%, to reach maximum value of 76.92% in permanent dentition cases. Dental crowding increasing rate in time is caused, on one hand, by enhancing morphological changes caused by functional factors and, on the other hand, by replacing the palm (which is usually made in unfavorable conditions) and second molars eruption (mesialisation occurring forces occur).
3. Bimaxillary dental protrusion rate decreases in time: starting from a 36.36% rate at 6-9 years old cases, to 27.08% at children between 9-12 years old and going down to 23.07% for children aged over 12 years. This decreasing occurrence rate is explained by the fact that in case of younger patients vicious habits and oral parafunctions are more often and these are the main causes of the bimaxillary dental protrusion.
4, Protrusion is usually associated with deep bite or deep and distal occlusion. Oral para-functions, vicious habits most are frequently incriminated in the etiology of protrusion act predominantly in the upper jaw,in the frontal area,often influencing mandible's position.
5. Protrusion is frequently associated with various oral parafunctions and vicious habits: in the early mixed dentition at 86.36% of cases, in the second stage of mixed dentition in 87.50% of cases, and in permanent dentition in 76.92% of cases.
6. Most frequently we have encountered oral parafunctions associated to the lower lip. Thus, in early mixed dentition, 77.27% of cases showed oral parafunctions of the lower lip, 77.08% of cases showed oral parafunctions in the second stage of mixed dentition and 53.84% in permanent dentition because the lower lip is drawn in sagittal trap by the negative pressure existing in the mouth in its most operating moments
7. By correlating existing oral parafunctions with the anomaly identified in mixed and permanent dentition we have diagnosed most frequently the association between dental crowding and deep bite and oral parafunctions of the lower lip. The fact that etiopathogenic factors acting predominantly in the frontal region and generating protrusion, cause the occurrence of lower lip's oral parafunction in the sagittal cant – even if other factors had been previously eliminated - maintain this anomaly.
8. Protrusion treatment was conducted mostly in mixed dentition by means of single-block – i.e. 50% cases in the first stage, and 39.8% in the second stage. In permanent dentition the top treatment was the teeth extraction, followed by the application of an orthodontic device.
9. The main treatment applied in the first stage of mixed dentition addresses functional etiopathogenic factors amid minimal morphological abnormalities caused by its relatively short time of action. In the second stage of mixed dentition and in permanent dentition morphological changes become apparent requiring besides oral parafunctions, teeth extractions in order to obtain space for the retrusion and alignment of the upper front teeth group.

REFERENCES

1. Bishara Se, Bj Hoppens, Jr Jakobsen, Fj Kohout, 1988, Changes in the molar relationship between the deciduos and permanent dentitios: a longitudinal study. A.J.of Orthod Dentofacial Orthop.; 93:19-28

2.Boboc Gh. ,1971,Anomalii dento-maxilar, , Ed. Med. Bucuresti

3.Cocarla E. ,1995,Ortodontie, Curs litografiat, Cluj Napoca

4.Campeanu Mihaela, 1981, Curs de ortodontie, Litografia IMF Cluj Napoca

5.Dorobat V., Stanciu D., 2003, Ortodontie si ortopedie faciala, Ed.Medicala

6. Ingerval B., 1974, Prevalence of dental and occlusal anomalies in Swedish conscripts. Acta Odontol.Scand.;32: 83-92

7.Keski-Nisula K., R Lehto., V. Lusa, J. Varrela, 2003, Occurrence of malocclusion and need of orthodontic treatment in early mixed dentition; A.J.of Orthod Dentofacial Orthop.

8 Kim Yh., 1979, A comparative cephalometric study of Class II Div.I non extraction and extraction cases; Br.J.Orthod. 49:77-84

9.Serbanescu A., 2001, Posibilitati de apreciere a deficitului de spatiu in ADM, Risoprint, Cluj

10.Staley R., Kerber Pe,1980, A revision of the Hixon oldfather mixed dentition prediction method, Am.J.of Orthod.;78,pag.296-302