

Using of Mathematical Module "MOLARI" (Custom Made) for Determining the Position of the Upper and Lower Molars

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Abstract: Mathematics module "MOLARI" is made to simplify and avoid measuring all parameters examined to determine the location of the upper and lower molars. With its help, it is sufficient to measure only one parameter and from that measured value, based on the correlative relationship of that parameter to calculate the values of other parameters. On the screen it has seen if the received reflected values are within the confidence interval. Mathematics module "MOLARI" could find application in orthodontics, but when applying the value of some of the parameters, it can be seen change that will occur in other work settings.

Keywords: first molar, location, computer program-"MOLARI"

1. Introduction

With the development of technology and the use of computers in everyday life, and for practical and accurate calculation of all tested parameters for determining the position of the upper and lower molars, we have prepared a program in VISUAL BASIC 5.0 named "MOLARI",

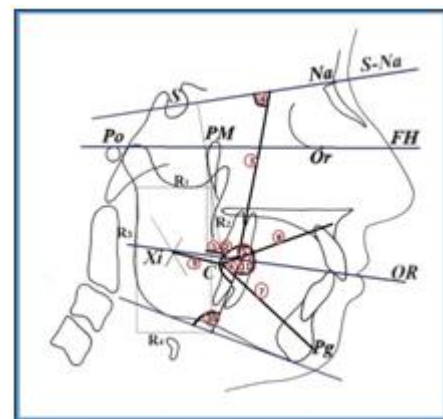
2. Material and Method

Mathematics module we used in the preparation of total dentures in a group of 40 subjects (20 of each gender) and accurately marking the location of the upper first molar.

Pic. 1. Interface of program "Molari" for upper molars

Legend:	pol = gender maski = men zenski = women GorniMolari = Upper molars DolniMolari = Lower molars rastojanie = distance molari = molars agol = angle vrednost - value presmetaj - calculate
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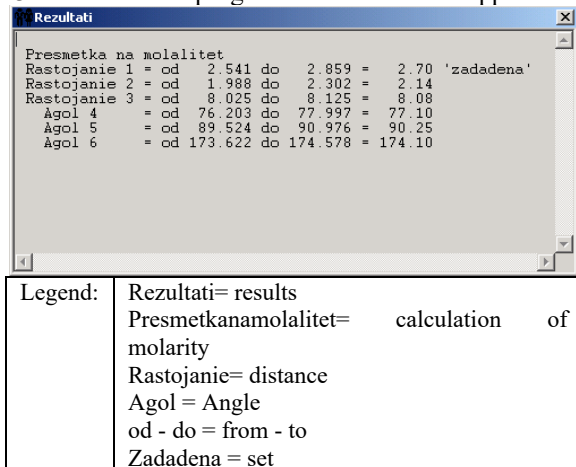
Aim of the paper is using a mathematical module "MOLARI" to avoid measurement of all tested parameters for determining the position of the upper and lower molars and getting their values only if it measures and knows the value of one of the parameters tested as a consequence of their correlative connection.



Picture 2: Craniogram with parameters

First we made craniometrics recording of the respondent under standard conditions and in the final craniometrics we entered all necessary craniometrical points, lines and planes [5]. With that points we determined the position of the first upper [1], [3], [4] and a lower molar [2] [3]. Parameters that we have used to are three linear and three angular measurements for determination the position of the first upper molar [1], [3], [4], while for the lower molar they are three linear and two angular measurements [2],[3]. To avoid measurement of all tested parameters and their analysis, we made a mathematical module "MOLARI" which is enough to specify only one parameter which will be read from the craniometrics. From the resulting value, based on the correlation relationship between the read parameter with other parameters examined using a module, we get the values of the remaining parameters. After conducting factor analysis of readings from the craniometrics, we have used distance 1 or distance 2 or distance 7 and the same we have marked in the program and enter its value. The results for all the parameters we have got in the screen (Picture 3), where exactly is indicated which parameter is set and which is calculated.

Pic. 3. Results of the program "MOLARI" for upper molars

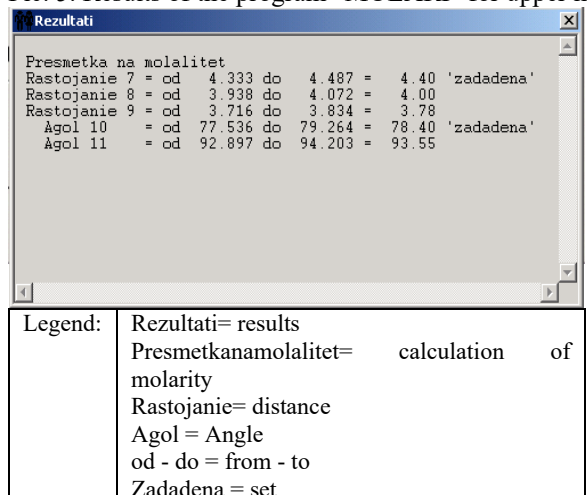


It should be noted that for calculating the position of the upper first molar in respondents of both sexes need to be read and set a parameter value for distance 1 or distance 2, and others are calculating. To calculate the position of lower first molar among respondents of both sexes need to be read and set a parameter value for distance 7, and others are calculating.

Pic 4.interface of program "Molari" for upper molars

Legend:
 pol = gender
 maski = men
 zenski = women
 GorniMolari = Upper molars
 DolniMolari = Lower molars
 rastojanje = distance
 molari = molars
 agol = angle
 vrednost= value
 presmetaj= calculate

Pic. 5. Results of the program "MOLARI" for upper molars



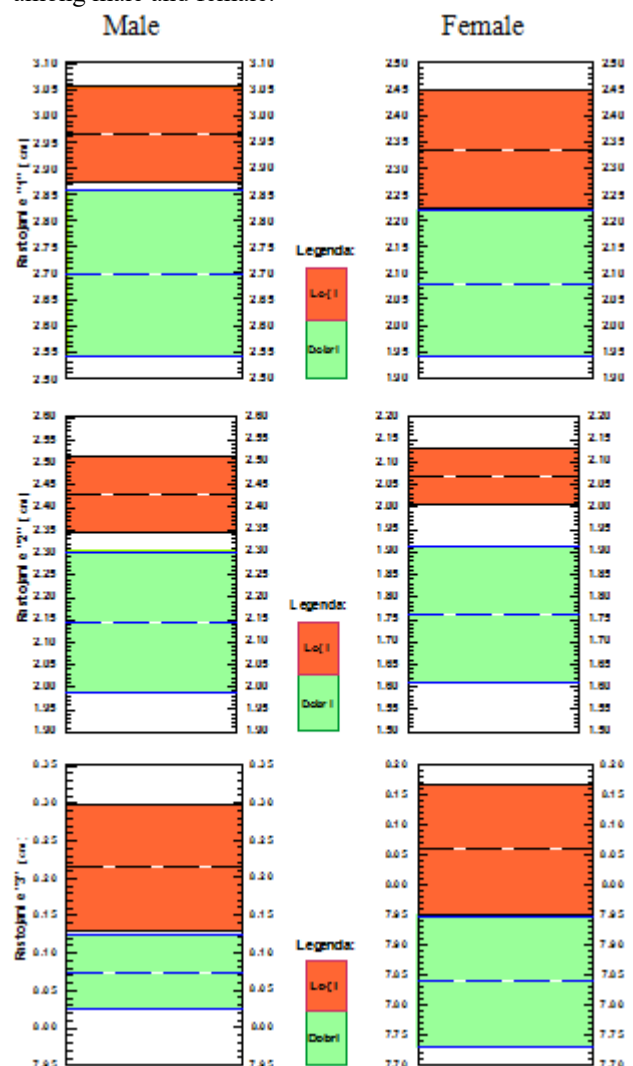
Pictures 2 and 3 is showing an example of determination of position of the first upper molar, and images 4 and 5 is showing an example of determination of position for first lower molar in males.

3. Results and Discussion

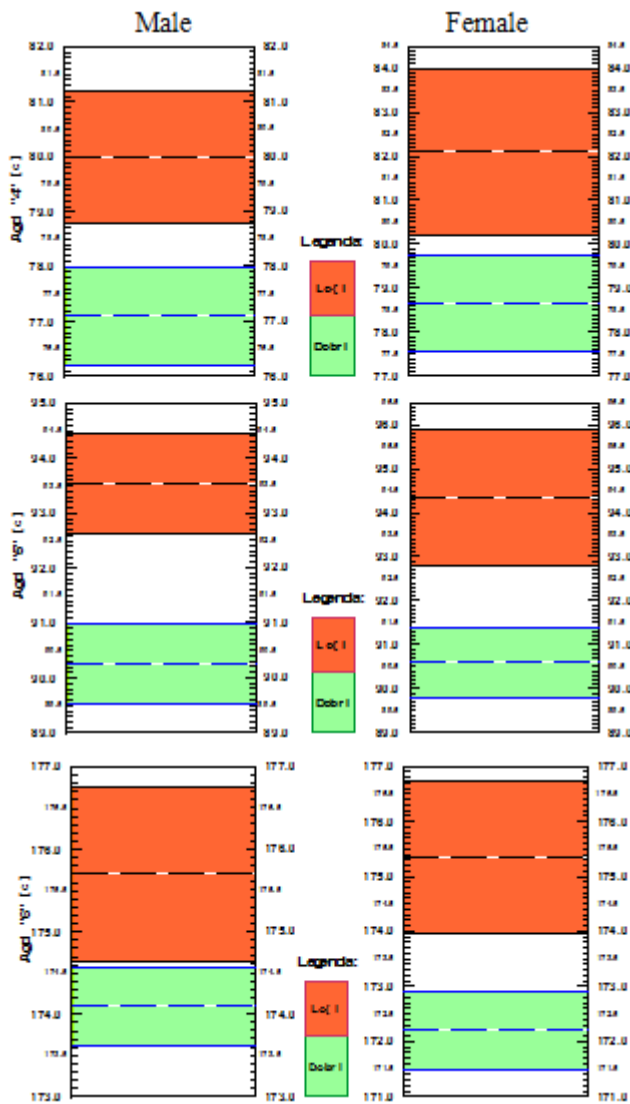
Picture 6, 7, 8 and 9 shows the mean values for each parameter (dashed line) and + - 95% confidence interval (solid line). With a lighter color shows the interval between defined upper and lower limit in patients who had satisfactory effects of dentures and a darker color on the same is shown in patients who had dissatisfaction and difficulty using dentures.

The resulting values we have checked picture 6 and 7 for upper molars. The calculated values for all parameters must be located within the range that is displayed with a brighter color. If the value deviates from a selected range, we should expect unsatisfactory effects of dentures.

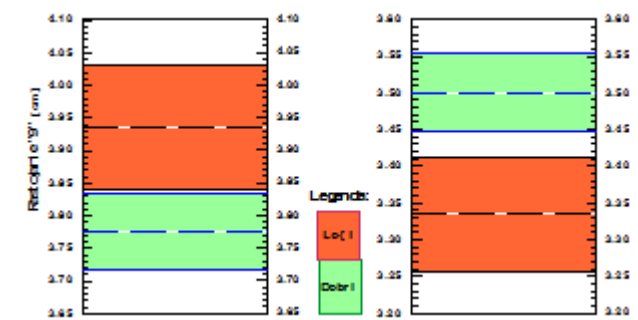
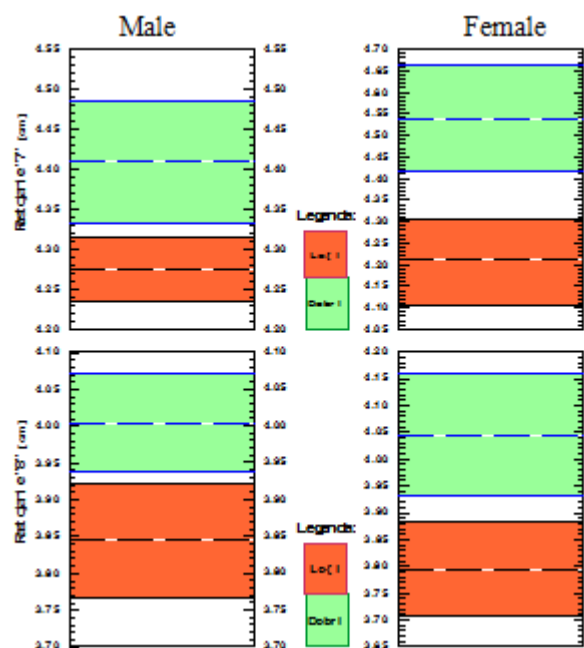
The examined parameters for determining the position of the first lower molars and their derived values are graphically shown in picture 8 and 9 with their upper and lower limits among male and female.



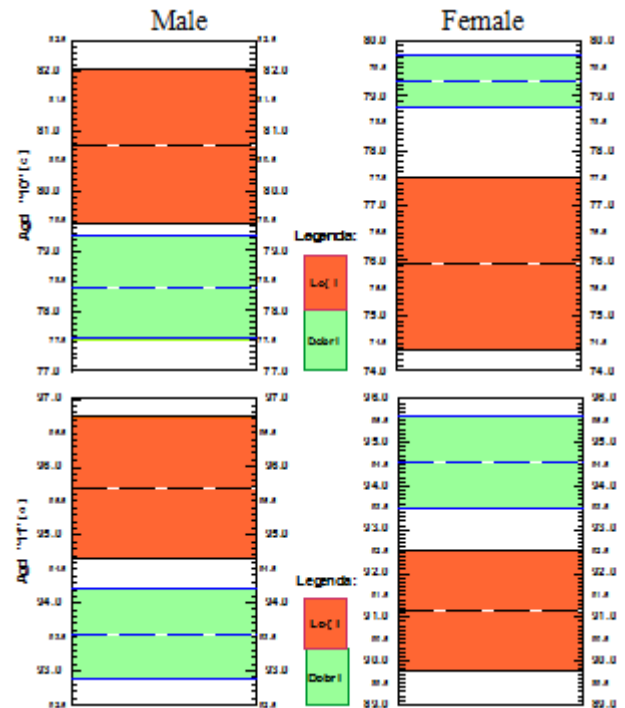
Pic. 6. Graphic display of distances 1,2,3 of upper and lower limits of the parameters of the upper molars in subjects of male and female



Pic. 7. Graphic display of angles 4,5,6 of upper and lower limits of the parameters of the upper molars in subjects of male and female



Pic. 8. Graphic display of distances 7,8,9 of upper and lower limits of the parameters of the lower molars in subjects of male and female



Pic.9. Graphic display of angles of upper and lower limits of the parameters of the lower 10 and 11 molars in subjects of male and female

4. Conclusion

By applying mathematical module "MOLARI" it simplifies the mathematical preparation, shortens time and receives accurate and precise results for all tested parameters for determining the location of the first upper and lower molars. It may find application in orthodontics with changing the value of some of the parameters, that will resulting with the change that will occur on other parameters.

References

- [1] Бундевска Ј. Местоположбата на првите горни молари – рентгенокраниметричка анализа (магистерски труд) Скопје, Стоматолошки факултет, 1991.
- [2] Бундевска Ј. Краниметриски параметри за определување на позицијата на првиот мандибуларен молар. III конгрес на стоматолозите од Македонија, Охрид, 2002; 189.
- [3] Бундевска Ј. Влијание на поставеноста на првите молари врз стабилноста на тоталните протези

- (докторска дисертација) Скопје, Стоматолошки факултет, 2003.
- [4] Matysiak M. Methode de determination de la position de la 6 Maxillarie en vue des rehabilitations par Prothese Complete amovibile. Les Cahiers de Prothese 1984; 48: 65-76
- [5] Ozerovik B. Rengenokranimetrija I rendgenokefalometrija, Beograd 1984.
- [6] Farina, R., Pramstraller.M., Franceschetti. G., Pramstraller. C.&Trombelli, L. (2011). Alveolar ridge dimensions in maxillary posterior sextants: a retrospective comparative study of dentate and edentulous sites using computerized tomography data. Clinical Oral Implants Research.;22:1138-44