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Mesio-distal width of primary second molars in relation to nutritional status

A Project
Submitted to the College of Dentistry, University of Baghdad, Department of Pedodontic and Preventive Dentistry in partial fulfillment for the award of the degree of Bachelor of Science in Dentistry (B.D.S)

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Supervisor Declaration

This is to certify that the organization and preparation of this project have been made by the under graduated (**Sarmed Ahmed Abdulhussein**) under my supervision at College of Dentistry), University of Baghdad in partial fulfillment of requirements of the degree of B.D.S in Pediatric Dentistry.

Signature:

Name:

Date: / / 2018

Dedication

To My family and My fiancé Reem
I dedicate this whole project as a gratitude to their support and help.

Abstract

Background: Tooth development begins as the placode formation with the thickening and invaginating of the oral ectoderm into the dental mesenchyme. A series of reciprocal interactions between these two cell types give rise to differentiation into various cell types including epithelial-derived enamel-secreting ameloblasts and neural crest-derived dentin-secreting odontoblasts. A number of transcription factors control tooth development in order to form unique structures specialized for tooth function with optimized shapes and sizes. There are many factors that affecting the development of the tooth such as genetics, envierment, nutrition and others. Mesio-distal crown diameter, also called tooth size, provides significant information on human evolution and biological problems as well as in forensic and clinical dentistry. There are many factors that affecting the tooth size such as sex and ethnicity, gender, nutrition. Nutrition is the science of food and its relationship to health. It’s the adequate provision of materials like vitamins, minerals, fibers, water and other food component to cells, to support life. Body mass index is an index which its use as growth indicator is also controversial but it has been widely used in the field of dentistry, especially in studies about obesity and dental caries. It's used to classify children into healthy, underweight and overweight.

Aim of the study: The aims of the study to Measure the mesio-distal width of the primary second molars at the form 6-8 regardless of the side and the quadrant and observe The effect of the BMI on mesio-distal width of the primary second molars.

Materials and Methods: The total sample consisted of 30 children of age 6 to 8 years during March 2018 from Department of Pedodontics and Preventive Clinic at the College of Dentistry, University of Baghdad between boys and girls. The measurement of the mesio-distal width of primary second molars was

recorded by using the digital caliper. Nutritional status of each child was assessed by measuring height and weight to calculate body mass index according to formula recorded by Worlds Health organization, 2000.

Results: The highest nutritional status value was seen in the girls at the age of 8. The lowest nutritional status value was seen in the boys at the ages of 6 and 7. The highest Mesio-distal width diameter was seen in the girls at the age of 7. The lowest Mesio-distal width diameter was seen in the boys at the age of 6. An anova test was carried out to examine the difference of mesio-distal width of primary second molar between groups of different nutritional status. No significant was observed between the group at level 0.05.

Conclusion: The girls at the age of 8 years old showd the highest nutritional status value. Nutritional status did not affect the mesio-distal width of second primary molar in children aged 6-8 years in both gender.

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Introduction

The Development and morphology of the primary teeth is of clinical significance to the dentist. It is often necessary to explain to parents the time sequence of calcification in utero and during infancy. The common observations of tetracycline pigmentation, developmental enamel defects, and generalized hereditary anomalies can be explained if the calcification schedule is known. A brief discussion of the morphology of the primary teeth is also appropriate before restorative procedures are considered for children (McDonald and Avery’s, 2016).

The deciduous teeth erupt until about 30 month of age and their replacement begins around 6 years of age, being completed by around 12 years of age (Hagg and Taranger,1985; Liversidge Molleson, 1999).

Mesio-distal crown diameter, also called tooth size, provides significant information on human evolution and biological problems as well as in forensic and clinical dentistry. Anthropologists use mesio-distal diameter to draw the evolution of tooth size. Tooth size provides a perception of connection between populations and environmental adaptation. The relationship between tooth size and dental crowding is reported by authors as being an important factor in clinical practice (Hattab et al,1996; Warren et al, 2003).

Nutrition is substances that are obtained from food and are used by the body to promote growth, maintenance, and repair. assessment of nutritional status using a various anthropometric measurement provides information on growth and body composition. Obtaining such data is important for evaluating underweight, stunting, wasting or overweight associated with increased risk for adverse health outcomes (WHO, 2003) Body mass index is an index which it's use as growth indicator is also controversial but it has been widely used in the field of dentistry, especially in studies about obesity and dental caries (Azizi et al, 2004; Willerhausen et al, 2007).It is the ratio of an individual's weight to height squared (Kgm and it's used to estimate a person's risk of weight related health problems (Nihiser et al 2007).It's commonly used to classify underweight, normal weight and overweight WHO, 2000, 2004).

Aims of study

This project was carried out to :

1. Measure the mesio-distal width of the primary second molars at the age form 6-8 years.
2. The effect of the BMI on mesio-distal width of the primary second molars.

Review of literature

1.1 Development and Morphology of the Primary Teeth:

An accurate chronology of primary tooth calcification is of clinical significance to the dentist. It is often necessary to explain to parents the time sequence of calcification in utero and during infancy. The common observations of tetracycline pigmentation, developmental enamel defects, and generalized hereditary anomalies can be explained if the calcification schedule is known. A brief discussion of the morphology of the primary teeth is also appropriate before restorative procedures are considered for children (McDonald and Avery’s 2016).

1.1.1 Life cycle of the tooth (McDonald and Avery’s 2016):

1. Initiation (bud stage)
2. Proliferation (cap stage)
3. Histodifferentiation and morphologic differentiation (bell stage)
4. Apposition
5. calcification

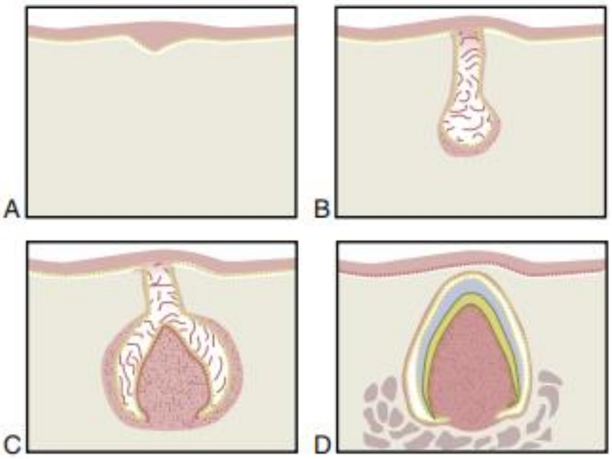

Figure 1.1 Life cycle of the tooth. **A**, Initiation (bud stage). **B**, Proliferation (cap stage). **C**, Histodifferentiation and morphologic differentiation (bell stage). **D**, Apposition and calcification**.** (Bath-Balogh M, and Fehrenbach).

1-Initiation (Bud stage):

Evidence of development of the human tooth can be observed as early as the sixth week of embryonic life. Cells in the basal layer of the oral epithelium proliferate at a more rapid rate than do the adjacent cells. The result is an epithelial thickening in the region of the future dental arch that extends along the entire free margin of the jaws. This thickening is called the primordium of the ectodermal portion of the teeth and what results is called the dental lamina. At the same time, 10 round or ovoid swellings occur in each jaw in the position to be occupied by the primary teeth. Certain cells of the basal layer begin to proliferate at a more rapid rate than do the adjacent cells (Fig. 1.1, A). These proliferating cells contain the entire growth potential of the teeth. The permanent molars, like the primary teeth, arise from the dental lamina. The permanent incisors, canines, and premolars develop from the buds of their primary predecessors. The congenital absence of a tooth is the result of a lack of initiation or an arrest in the proliferation of cells. The presence of supernumerary teeth is the result of continued budding of the enamel organ (McDonald and Avery’s, 2016).

2-Proliferation (Cap stage):

Proliferation of the cells continues during the cap stage. As a result of unequal growth in the different parts of the bud, a cap is formed (Fig. 1.1, B). A shallow invagination appears on the deep surface of the bud. The peripheral cells of the cap later form the outer and inner enamel epithelium. As with a deficiency in initiation, a deficiency in proliferation results in failure of the tooth germ to develop and in fewer than the normal numbers of teeth. Excessive proliferation of cells may result in epithelial rests. These rests may remain inactive or become activated due to an irritation or stimulus. If the cells become partially differentiated or detached from the enamel organ in their partially differentiated state, they assume the secretory functions common to all epithelial cells, and a cyst develops. If the cells become more fully differentiated or detached from the enamel organ, they produce enamel and dentin, which results in an odontoma or a supernumerary tooth. The degree of differentiation of the cells determines whether a cyst, an odontoma, or a supernumerary tooth develops (McDonald and Avery's, 2016).

3-Histodiffrentiation and Morphdifferentiation (Bell stage):

The epithelium continues to invaginate and deepen until the enamel organ takes on the shape of a bell (Fig 1.1, C). It is during this stage that the cells of the dental papilla differentiate into odontoblasts and those of the inner enamel epithelium differentiate into ameloblasts. Histodifferentiation marks the end of the proliferative stage as the cells lose their capacity to multiply. This stage is the forerunner of appositional activity. Disturbances in the differentiation of the formative cells of the tooth germ result in abnormal structure of the dentin or enamel. One clinical example of the failure of ameloblasts to differentiate properly is amelogenesis imperfecta. The failure of the odontoblasts to differentiate properly, with the resultant abnormal dentin structure, results in dentinogenesis imperfecta in the morphodifferentiation stage, the formative cells are arranged to outline the form and size of the tooth. This process occurs before matrix deposition. The morphologic pattern of the tooth becomes established when the inner enamel epithelium is arranged so that the boundary between it and the odontoblasts outlines the future dentino-enamel junction. Disturbances and aberrations in morphodifferentiation lead to abnormal forms and sizes of teeth, resulting in conditions such as peg teeth, other types of microdontia, and macrodontia (McDonald and Avery's, 2016).

4-Apposition:

Appositional growth is the result of a layer-like deposition of a nonvital extracellular secretion in the form of a tissue matrix. This matrix is deposited by the formative cells, ameloblasts, and odontoblasts, which line up along the future dentino-enamel and dentinocemental junction at the stage of morphodifferentiation. These cells deposit the enamel and dentin matrix in a definite pattern and at a definite rate. The formative cells begin their work at specific sites that are referred to as growth centers as soon as the blueprint, the dentino-enamel junction, is completed (Fig. 1.1, D). Any systemic disturbance or local trauma that injures the ameloblasts during enamel formation can cause an interruption or an arrest in matrix apposition, which results in enamel hypoplasia Hypoplasia of the dentin is less common than enamel hypoplasia and occurs only after severe systemic disturbances (McDonald and Avery's, 2016).

5-Calcification:

Calcification (mineralization) takes place following matrix deposition and involves the precipitation of inorganic calcium salts within the deposited matrix. The process begins with the precipitation of a small nidus, and further precipitation occurs around it. The original nidus increases in size by the addition of concentric laminations. There is an eventual approximation and fusion of these individual calcospherites into a homogeneously mineralized layer of tissue matrix. If the calcification process is disturbed, there is a lack of fusion of the calcospherites. These deficiencies are not readily identified in the enamel, but in the dentin they are evident microscopically and are referred to as interglobular dentin (McDonald and Avery's, 2016).

1.2 Early development and calcification of the primary second molars

1.2.1 Morphology of maxillary second molar:

There is a considerable resemblance between the maxillary second primary molar and the maxillary first permanent molar. There are two well-defined buccal cusps, with a developmental groove between them. The crown of the second molar is considerably larger than that of the first molar. The bifurcation between the buccal roots is close to the cervical region. The roots are longer and heavier than those of the first primary molar, and the lingual root is large and thick compared with the other roots (Figs. 1-2). The lingual surface has three cusps: a mesiolingual cusp that is large and well developed, a distolingual cusp, and a third and smaller supplemental cusp (the cusp of Carabelli). A well-defined groove separates the mesiolingual cusp from the distolingual cusp. On the occlusal surface a prominent oblique ridge connects the mesiolingual cusp with the distobuccal cusp (Fig. 1.3) (McDonald and Avery's, 2016).

1.2.2 Mandibular second molar:

The mandibular second molar resembles the mandibular first permanent molar, except that the primary tooth is smaller in all its dimensions. The buccal surface is divided into three cusps that are separated by mesiobuccal and distobuccal developmental grooves. The cusps are almost equal in size. Two cusps of almost equal size are evident on the lingual surface and are divided by a short lingual groove. The primary second molar, when viewed from the occlusal surface, appears rectangular with a slight distal convergence of the crown. The mesial marginal ridge is developed to a greater extent than the distal marginal ridge. One difference between the crown of the primary molar and that of the first permanent molar is in the distobuccal cusp; the distal cusp of the permanent molar is smaller than the other two buccal cusps. The roots of the primary second molar are long and slender, with a characteristic flare mesiodistally in the middle and apical thirds (McDonald and Avery's, 2016).

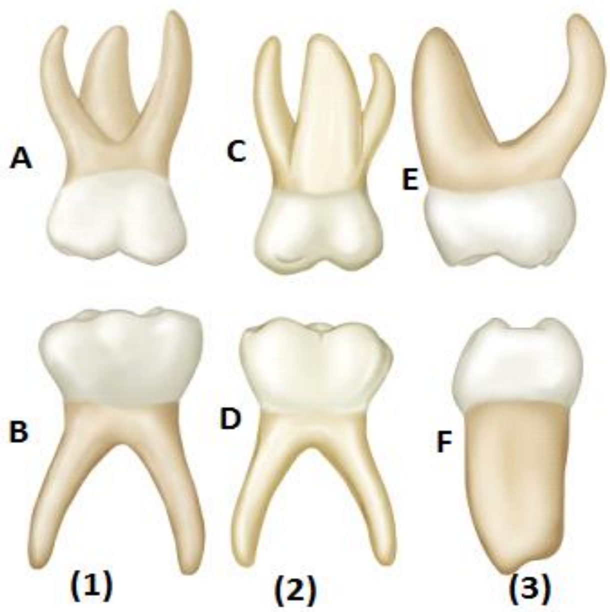

Figure 1.2 Primary right molars, buccal aspect. **A**, Maxillary second molar **B**, Mandibular second molar.**2,** Primary right molars, lingual aspect. **C**, Maxillary second molar. **D**, Mandibular second molar.**3,** Primary right molars, mesial aspect. **E,** Maxillary second molar. **F,** Mandibular second molar.

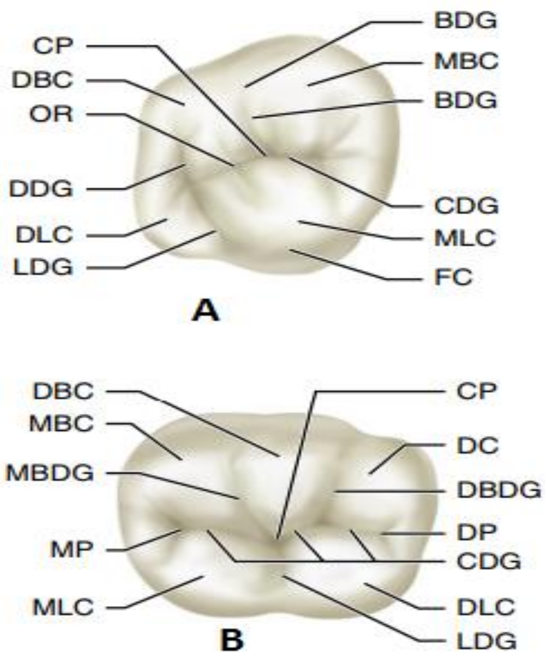

Figure 1.3 Primary right molars, occlusal aspect. **A**, Maxillary second molar.**B,** Mandibular second molar. **BDG**, Buccal developmental. **CP**, central pit; **DBC**, distobuccal cusp; **DBDG**, distobuccal developmental groove; **DC**, distal cusp; **DDG**, distal developmental groove; **DLC**, distolingual cusp; **DP**, distal pit; **FC**, fifth cusp; **LDG**, lingual developmental groove; **MBC**, mesiobuccal cusp; **MBDG**, mesiobuccal developmental groove; **MLC**, mesiolingual cusp; **MP**, mesial pit; **OR**, oblique ridge.

1.3 Tooth size:

Deciduous teeth erupt until about 30 month of age and their replacement begins around 6 years of age, being completed by around 12 years of age (Hagg and Taranger,1985; Liversidge Molleson, 1999;).

Mesio-distal crown diameter, also called tooth size, provides significant information on human evolution and biological problems as well as in forensic and clinical dentistry. Anthropologists use mesio-distal diameter to draw the evolution of tooth size. Tooth size provides a perception of connection between populations and environmental adaptation. The relationship between tooth size and dental crowding is reported by authors as being an important factor in clinical practice (Hattab et al,1996; Warren et al, 2003).

Information about morphologic characteristics of deciduous teeth can be useful for pediatric operative dentistry (Tsai, 2001).

Tooth size is dependent upon race and sex (Moorrees and Reed, 1964).

The differences in tooth eruption, shape and size can reflect the process of evolution and provide a method of studying evolutionary mechanisms (Yuen et al, 1997).

One aspect that demonstrates the importance of the studies on the size of deciduous tooth is that some dental anomalies have been associated with some diseases, such as Down syndrome (Peretz et al, 1999), where tooth crown can be larger, especially on the mesio-distal aspect (Barden, 1980).

Studies on the primary dentition size are scarcer but the mesio-distal diameter and the molar teeth have been mostly analyzed and reported; however, many of them either analyzed only mesio-distal diameters or only molars (Jensen et al, 1957; Yuen et al, 1997; Peretz et al, 1999; Warren et al, 2003; Anderson, 2005).

1.3.1 Factors Effecting tooth size:

1.3.1.1sex and ethnicity:

Tooth size has been shown to have a strong association with both sex and ethnicity. Males have consistently larger teeth than females, whereas people of African descent have larger mesio-distal tooth dimensions than those of European descent (Keene, 1979; Macko et al, 1979; Doris et al, 1981).

Mesio-distal crown widths in Dominican-American sample were similar to black American values, and the mean ratios for both groups were larger than the Bolton standard ratio (Santoro et al, 2000).

Variation in tooth size has been related to genetics (eg, sex and ethnicity) and environment (Guagliando, 1982; Bishara et al, 1986; Yuen et al, 1995; Dechkunakorn et al, 1990; Smith et al, 2000).

Tooth sizes in both dentitions (primary and permanent) in Southern Chinese, in general, larger than those of the Caucasians, comparable with Northern Chinese, but smaller than those of Australian Aboriginals (Yuen et al, 1997).

1.3.1.2 Gender:

Measurements of primary molars showed that average sizes of boys' molars were significantly larger than those of girls. Relationship between the three measurements studied was variable but second molars showed less variability than first molars. The relationship between height and width was found significant in most of the molars (Barbería et al, 2009).

1.3.1.3 Nutrition:

Among students aged 15 years, the findings revealed that all means of mesi-odistal and bucco-lingual diameters values of maxillary and mandibular teeth were lower among malnourished than well-nourished groups with statistically significant, except for mesio-distal diameters of both second molar, second and first premolar of maxillary teeth, second premolar, first premolar and lateral incisor of mandibular teeth and for bucco-palatal diameters of second and first premolar of maxillary teeth, second molar and lateral incisor of mandibular teeth (J Bagh, 2016).

1.4 Nutrition:

Nutrition is the science of food and its relationship to health. It's the adequate provision of materials like vitamins, minerals, fibers, water and other food component to cells, to support life (Russelet la, 2012).

Many common health problems can be prevented with good nutrition. Children need food of appropriate quality and quantity for their growth and development. If their nutritional intake is inadequate, this will lead to fail to gain or lose weight and fail to grow in height. Prolonged or sever nutritional deficiency will result in malnutrition (Lissaure and Clayden, 2017; Ehizele et la, 2009).

An assessment of nutritional status using various anthropometric measurements provides information on growth and body composition. Obtaining such data is important for evaluating underweight, stunning, wasting or wasting or overweighting associated with increased risk for adverse health outcomes (WHO, 2003).

Body mass index is an index which it's use as growth indicator is also controversial but it has been widely used in the field of dentistry, especially in studies about obesity and dental caries ((Aziz et la, 2004; Willerhausen et la, 2007).

1.5 Nutritional Status:

Defined as the extent to which nutrients are available to meet metabolic. This status helps in growth and development, maintains support activities of daily living and protects the diseases (Mahan 2008; Nursing body from Classification, 2009).

1.6 Assessment of nutritional status of children:

There are many methods used for evaluation the nutritional status in children these are (kliegman et al, 2007):

1- Medical and social history

2- Clinical examination

3- Dietary analysis

4- Biochemical test performed on sample of blood or urine collection under standardized condition

5- Physical measurement through anthropometric means

1.7 Anthropometry:

It is the key component of nutritional status assessment in children and adults (Rwenyony et al, 2012). It remains the most practical and useful role for measuring the nutritional status of population, especially among preschool children (Kliegman et al, 2007)

Malnutrition can be diagnosed by anthropometrics measurement using specific criteria of physical growth and development especially in the absence of clinical and subclinical signs. It can be defined as the measurement of the body mass and/or dimension; it is simple to perform, safe cheap and portable.

Nutritional anthropometry can defect an imbalance of energy and nutrition in relation to need (Lissaure and Clyden, 2007; Kliegman et la, 2007).

1.8 Anthropometric Indicators:

Weight, height skin fold thickness, triceps upper arm muscles circumferences and head circumference are considered valuable indicators in the evaluation malnutrition among children. Weight and height are more frequently used to assess nutritional status though using height for age , weight for age and weight for height indicators (Lissaure and Clyden, 2007; Gill and O'brien, 2011;Mahan and Escott-Stump,2008).

1. Height for age
2. Weight for age
3. Weight for height
4. Body for index
5. Waterlow's indicator

1.9 Body mass index:

It is the ratio of an individual's weight to height squared (kg/m2), and it's used to estimate a person's risk of weight related problems (Nihiser et la, 2007) it’s commonly used to classify underweight, normal weight and over weight (Who,2000,2004). It's also the most commonly used way of estimating wheter and individual person is overweight or obese. It is relatively easy, cheap and non-invasive method for establishing weight status (NOO,2009).

Because of unavailability of Iraqi standard for comparison, the value of indicator was compared with the international reference values, for this purpose, it is recommended to use the reference population that defined by the National Center for Health Statistics in collaboration with National Center Chronic Disease Prevention and Health Promotion and using CDC growth charts. Body mass index is used differently for children. The body mass index percentile allows comparison with children of same gender and age. Children with body mass index that is less than the 5th percentile were considered malnourished while children with body mass index that is between the 5th and 85th percentile were considered well-nourished (CDC,2000).

Weight status in children is measured by assessment of mass body index (BMI) corresponding to gender and age-ranked percentage. Children are considered to overweight if they are between the 85th and 95th percentile of age and gender-related body mass index and are considered to be obese if they are at or beyond the 95th percentile of age and gender related body mass index according to Center for Disease Control and Prevention (CDC guidelines (Cyntia and Ogden,2010).

Material and Method

2.1 Study of population

This study was conducted on 30 children of age (6-8) years old attended to Department of Pedodontics and Preventive Clinic at the College of Dentistry, University of Baghdad. The study period was during March 2018.

2.2 Materials and Instruments Used:

1. disposable dental mirror (made in china)
2. Measuring strip taped on a wall in the clinic (made in china)
3. weighting device (made in china)
4. gloves and masks (made in china)
5. digital caliper (made in Japan)

2.3 Anthropometries measurements:

2.3.1 Measurement of weight:

The weight measurement was done using the weighting device while the child stood up in upright position and was looking forward without touching anything (figure 1). The data was tabulated in Microsoft Office Word 2010.

Figure 2.1: weighting device

2.3.2 Measurement of height:

The height measurement was done by using the self-retracting tape while the child stood up in upright position and was looking straight forward (figure 2,3). The data was tabulated in Microsoft Office Word 2010.

Figure 2.2 Measuring strip taped on a wall in the clinic

2.3.3 Body mass index:

This index is a number calculated from child’s Weight and height, according to this formula:

$$\boldsymbol{BMI} = \frac{Weight\ \ (Kg\,)}{Height\ ^{2}(m)^{2}}\ (\boldsymbol{WHO}, \mathbf{2000})$$

2.4 Criteria of the teeth selected for measurement of primary second molar:

1. sound tooth
2. no presence of tooth abnormalities
3. no presence of proximal fillings
4. teeth that should emerged sufficiently to be able to measure
5. children without long-standing systemic illness
6. children without any physical or mental disability

2.5 Oral examination

The total sample consisted of 30 of primary school of age during March 2018 from Department of Pedodontics and Preventive Clinic at the College of Dentistry, University of Baghdad. The second primary measurements was made with a digital caliper (Mitutoyo, Japan) with 0.1 mm precision. Only unworn, undamaged teeth were measured. All measurements was made by one author.

Figure 2.3: digital caliper

2.6 The criteria for each measurement:

• Mesio-distal diameter: measurements to the distance between the contact points, measured with the caliper placed perpendicular to the occlusal surface (figure 1). The data was tabulated in Microsoft Office Word 2010.

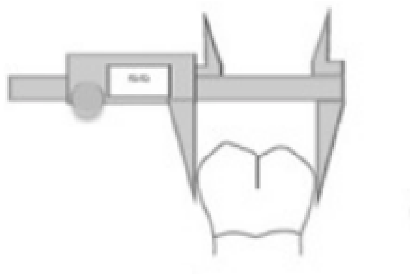

Figure 2.4: Measurement of: mesio-distal diameter between contact points.

2.7 Statistical Analysis

The data was analyzed using INM SPSSversion 2o. The analysis in duded descriptive and anova

Results

3.1 The sample

Table 1 describes the sample according to the age of the children, their gander, BMI (mean of each ganger) and Mesio-distal width of the primary second molars. The highest BMI value was seen in the females at the age of 8 (BMI = 16.4). The lowest BMI value was seen in the male at the ages of 6 and 7 (BMI= 14.1). The highest Mesio-distal width diameter was seen in the females at the age of 7 (Mesio-distal diameter = 9.4). The lowest Mesio-distal width diameter was seen in the males at the age of 6 ((Mesio-distal diameter = 7.8).

Table (3.1): description of the sample

Age	Gender (no.)		BMI(mean)	Mesiodistal of E width(mean)
6	Male	5	14.1	**7.8**
	Female	4	15.0	**8.7**
7	Male	5	14.1	**8.3**
	Female	5	14.7	**9.4**
8	Male	5	15.6	**8.5**
	Female	6	16.4	**8.3**

3.2 The effect of nutritional status on the mesio-distal width of the primary second molars

An anova test was carried out to examine the difference of mesio-distal width of primary second molar between groups of different nutritional status. No significant was observed between the group at level 0.05.

Table (3.2) different of mesio-distal between different nutritional status groups

BMI	Mesio-Distal width of primary second molar	Statistical difference	
Under weight No.(8)	7.5625	F	sig
Normal weight No.(20)	8.8700	2.640	.090
Over weight No.(2)	8.8000		

DISCUSSION

4.1 Description of the sample

This study was conducted to assess the nutritional status in relation to the mesio-distal width of the primary second molars of 30 children between 6 and 8 years of age of both the genders attended to Department of Pedodontics and Preventive Clinic at the College of Dentistry, University of Baghdad. We selected this age group because all second primary molar erupted in the oral cavity and which should not get cerise.

The females at 8 the age show highest BMI value. This finding disagreed with (Talwar and Airi, 2015) who concluded in their study that girls more undernourished than boys. Their study was conducted in areas none for malnutrition children. The female tends to enter adolescent growth spurt at around 10 and boys at around 12. Growth spurt is accompanied by increase in mass of muscles, redistribution of body fat, and increase in rate of skeletal growth (Gaethofs et al, 1999). These changes, obviously affect the BMI. While it agreed with (Basterfield et al, 2014). Who found that boys showed higher MVPA (moderate to vigorous intensity physical activity) per day.

The highest mesio-distal width diameter was seen in the females at the age of 7 this finding came in agreement with that of (Islam et al, 2015) and disagreement with, (Judica, 2004), Saudi Arabia study (Hashim and Al-Ghamdim, 2005), Jordanian studies (Hattab et al, 1996), (Al-Khateeb and Abu Alhaija) and study on the Iraqi group (Ghose and Baghdady, 1979) All these studies have found that the male had significantly larger teeth than females.

4.2 The effect of nutritional status on the mesio-distal width of the primary second molars

The results of anova test revealed that the effect of nutritional status on the mesio-distal width of primary second molar was no significant at level 0.05. this finding came in agreement with (Zameer et al, 2016) was found the nutritional status does not significantly influence the determination of tooth size in humans.

Conclusion

- The females at the age of 8 years old show the highest nutritional status value.
- nutritional status did not affect the mesio-distal width of second primary molar in children of 6-8 years of age in both gender

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