

THE RELATIONSHIP BETWEEN THE WIDTH AND THAT OF DENTAL ARCH OF THE UPPER JAW IN PATIENTS WITH DOWN'S SYNDROME WHICH IS MEASURED BY ANTHROPOMETRIC METHODS

Susy Kristiani, Wajan Tirthaningsih

Department of Oral Biology Airlangga University School of Dentistry

Department of Anatomy & Histology Airlangga University School of Medicine

ABSTRACT

Down's syndrome is a genetic disorder caused by chromosomal aberration. The characteristic features of patient with Down's syndrome are abnormal growth of dentocraniofacial, hypotonia, and mental retardation. The aim of this study is to know the relationship between the width of the face and that of dental arch of the upper jaw in patients with Down's syndrome, which is measured by anthropometric methods. There were 30 patients with Down's syndrome from Special school of Bhakti Luhur, Malang, at period of January till May 2007 and did not differentiated by sex. The samples included in this research are Down's syndrome patients with age distribution of 12 – 15 years old (because the molar tooth had been perfectly erupted) and with intelligence quotient of 25 – 50 and 50 – 75. The width of the face (ZY – ZY) and the width of the teeth on the maxillary arch were measured by tortous caliper (scale in mm). The result of the correlation measurement (by Pearson) revealed that, there is a positive correlation and there is no significant relationship between the width of the face and that of dental arch of the upper jaw in patients with Down's syndrome, which is measured by anthropometric methods.

Keywords: Down's syndrome, the width of the face, the width of dental arch of the upper jaw, anthropometric methods

Correspondence: Susy Kristiani, Department of Oral Biology, Airlangga University School of Dentistry

INTRODUCTION

Approximately 4000 children in America suffer from Down's syndrome are born with each year or about one child than the birth of 800 -1000. All mothers have the opportunity this gave birth to children with the disorder, but pregnant women with age above 35 years have higher opportunities (Brannan 2001). According Downsed.org., There is a case of Down's syndrome than 700-900 birth. In the UK around 30 thousand children, in Western Europe 200 thousand children. Unity Foundation Parents Children with Down's syndrome (POTADS) reported approximately 300 thousand cases, which is about 15% of people with Down's syndrome in Indonesia (Sonjaya 2005).

Some problems are often overlooked in children Down's syndrome usually are physical problems such as respiratory problems, digestive. Another problem is the problem of communication and intelligence are different from normal children. Like normal children, people with Down's syndrome also need an education that includes the way we communicate, how to care for oneself, how to brush your teeth, how to socialize with the surrounding environment as well as requiring the exercise that is useful for fine motor development. Only the application and maintenance procedures in patients with Down's syndrome because they have different

mental abilities, behavior and development of a lower than normal children (there are mental retardation) (McDonald 1994, Smith 2004, Suharsini 1999).

In patients with Down's syndrome, other than mental retardation, the thing that stands out is the abnormality dentocraniofacial growth. Mikrodonsi typical circumstances, protruded tongue in macroglossia, open mouth, delayed tooth eruption, open bite, anterior cross bites and oligodontics. Craniofacial Size Down's syndrome group was shorter or smaller than the normal children group, forms a wide and short head (brachycephaly), narrow face. Dentocraniofacial growth abnormalities caused by general growth retardation and hypotonia muscle as a result of genetic abnormalities. Conditions will be exacerbated by the lack of attention to dental and oral health (Suharsini 1999). Based on the research, the most prominent characteristics of patients with Down's syndrome is on their faces. Approximately 59-78% of patients with Down's syndrome indicated a low nasal bridge (pug), 54% had ear malformations, 78% no epicanthus eye folds (Anonymous 2004). Research Mokhtar (1982) cit Meliawati (2000) suggested a link between the face and curved teeth due to the growth and advance development of a balanced and curved teeth. Added also that there is a narrow curved teeth on the type faces are narrow and curved

teeth on the contrary that there is a wide wide on the type faces.

This study aims to determine the relationship between the width of the face with a wide curved teeth in patients with Down syndrome by using anthropometry. The benefit of the study was to determine the existence to the diversity/dentocraniofacial characteristics of Down's syndrome patients and can be used as input for the readers about the growth and development dentocraniofacial patients with Down's syndrome. So that if an interruption occurs, it can motivate parents/caregivers provide patients with Down's syndrome physiotherapy and exercise more intensive speech therapy to improve muscle tone and development of their brains.

Down's syndrome is a genetic disorder of chromosome abnormalities. Based on cytogenetic examination, distinguished three types of free trisomy Down's syndrome (free trisomy), translocation and mosaic. The most common case is free trisomy Down's syndrome (trisomy 21), followed by Down's syndrome, mosaic translocation Down's syndrome, while very rarely found (Brannan 2001)., four, six, eight, nine Down's syndrome has a close relationship with mental retardation, in general, patients experiencing intelligence disorders of mild to moderate (Pilcher 1998). In accordance with the development of intelligence level of children, it can be classified to determine how severe degree of mental disorder suffered by

Son of Down's syndrome generally have a narrow palate shape, close to the palate with a dental ridge is flat, but at the dorsoventral midline shape in the majors. The situation is so named after the steeple palate that is not in and not flat or have a combination of both. Palate shape so influenced by the direction of the normal palate growth occurred at weeks 6 to 12 in the womb. Impaired growth during this period affect the palatal growth (Handoll 1998, Salentijn 2004). Things palate can also be caused by the habit of breathing through the mouth because in general Down's syndrome children have interference in respiratory tract (Rosenfeld 1997).

Orofacial structural abnormalities seen in the lack of growth or hypoplasia in the face of the center. Facial bones of the middle and relatively short maxilla, in some circumstances, this causes the malocclusion Angle Class III open bite related. Generally, muscle tone weakened Down's syndrome in children. The resulting decrease in muscle tone lip and cheek muscle imbalances in strength to hold the tongue and mastication, and open bite occurs. Weak muscle tone also affect the function of mastication and self-cleansing. (Smith 2004),

Table 1. Classification of facial width according Lebzelter/Saller (Salzmann 1994)

Face Width Criteria	Male	Female
Very Narrow	X – 127	x – 120
Narroq	128 – 135	121 – 127
Moderate	136 – 143	128 – 135
Wide	144 – 151	136 – 142
Very Wide	152 – x	143 – x

Basically, the size and shape of teeth is determined by the curvature of the maxilla and cartilage during fetal mandibulae. Then the developing ties between the teeth and jawbone seed that grows. Only during the post natal period, the environmental forces acting on tooth crown size and shape affect dental arch (Enlow 1990, Moyers 1993).

Dental focal point used to measure the transverse distance between the molar has a wide variation in different studies. These variations can be grouped into three, namely Landmarks buccal surface is the distance between the buccal surface of right and left M2; Landmarks lingual surface is the minimum distance between the lingual surface of the right and left M2; and Intermediate Landmarks is the midpoint of teeth obtained from the middle of the line connecting point central mesial and distal to the M2 center permanently (Meliawati 2000).

MATERIALS AND METHODS

The study was observational and descriptive research as the research conducted at Bhakti Luhur Extraordinary School located at Jalan Raya Dieng No. 40. Extraordinary schools include administrative region Pisangcandi, Sukun District, Municipality of Malang. Samples were 30 people, taken from Down's syndrome children Extraordinary School Bhakti Luhur Malang month period from January to May 2007 and not distinguished by sex. By the criteria of age 12-15 years, because at 12-15 year olds second permanent molar teeth had erupted completely and suffer from Down's syndrome with mental retardation is an IQ of 25-50 and mild mental retardation IQ 50-75

The width of the face is the most lateral distance from the right and left arcus zygomaticus (Zy - Zy). Width curved upper jaw teeth is the maximum distance between the buccal surfaces of permanent second molar on the right and left upper jaw (M2 - M2). Son of Down's syndrome are those based on clinical diagnoses shows characteristics of Down's syndrome that has an

ability below average intelligence who accompanied by abnormalities in behavior and lack of development during the period of growth and cytogenetic examination expressed as Down's syndrome, classified as IQ 25-50, including Down's syndrome and mental retardation is an IQ of 50-75, including Down's syndrome, mild mental retardation.

Equipment and materials were: arched calipers (GPM Swiss Made), with characteristic blunt tip and between the two bars there is a chip-scale ruler up to 30 cm; tool to print the upper jaw, such as print spoon, bowl, spatula; Material for upper jaw model, namely the commercial alginate, gypsum; Tool to record the results of measurement, such as writing paper, pencils.

Maxilla printing done on samples with a spoon that has been adapted to print jaw size, using the alginate material. After the recovery time (according to manufacturer instructions), print a spoon filled with gypsum, to get the upper jaw model. Then the facial width measurements (Zy - Zy) with a caliper tool arch, arcus zygomaticus placed in and withdrawn from the rear toward the front, while the maximum scale reading (in mm) (Meliawati 2000, Glinka 1990). The width measurement of curved teeth (M2 - M2) using curved calipers placed on the buccal area of M2-M2 model of the upper jaw and then reads the maximum scale (in mm) (Meliawati 2000, Glinka 1990).

RESULT

From the measurement of 30 samples, correlation and statistical analysis conducted in this study was chosen Pearson correlation.

Table 2. Relationships wide face and wide curved teeth Down's syndrome patients with anthropometric methods

		Width of Dental Arch (M2 – M2)
Face Width	Correlation	0.355
(ZY – ZY)	Significance	0.054
	N	30

From Table 2 there is a positive correlation between the width of the face with a width of curved teeth in patients with Down's syndrome, that is equal to 0.355, indicating that increased facial width is proportional to the increase in width curved teeth. Significance values in Table 5.1 ($p = 0.05$) showed that there was no significant relationship between the width of the face with a width of curved teeth in patients with Down's syndrome.

DISCUSSION

From the measurement of 30 samples, and after being carried out statistical analysis of correlation (Pearson correlation), it appears there is a positive correlation between facial width and the width of curved teeth. In other words, the increasing width of the face accompanied by increasing the width of curved teeth. According to Sears (1949) cit Suparwitri (1994), width of curved teeth had a direct impact on the face because it is a face-forming elements. Facial width is measured from the point of right and left Zygion anthropometry (Zy - Zy), is part of the middle face (Face Middle) consisting of os temporale, os sphenoidale, os nasale, os os zygomaticus and maxilla. The measured width of curved teeth on the upper jaw (maxilla) is also part of the middle face. Growth of the face is the center have the same velocity, and therefore the growth of facial width and arch width teeth have the same speed. (Salentijn 2004, Moyers 1993).

The results showed no significant relationship between the width of the face and teeth arch width in patients with Down syndrome, anthropometric methods. This is due to the wide face shape in patients with Down's syndrome, does not necessarily have a wide Curvature teeth. Based on the classification of facial width according Lebzelter/Saller (Salzmann 1994), wide face Down's syndrome patients in this study pertained to the average of the narrow categories. In this study, curved teeth varying sizes, although the average width of the face of Down's syndrome patients in the sample falls within the narrow category, but not necessarily have a narrow curved teeth too, because every patient has a variety of sizes. In general, the center of the face is underdeveloped because of the deficiency of craniofacial growth. The possibility of growth and development of the face and curved teeth, is more determined by genetic factors because of the disparity in chromosome amount (Suparwitri 1994). Genetic abnormalities in patients with Down's syndrome causes reduced growth in orofacial structures or hypoplasia of the middle face. Narrow curved teeth possibly due to the growth of the middle face is deficient and therefore contributes to growth and os nasale palate (Suparwitri 1994). Factors affecting the dimensions of curved teeth are the size and shape of the jaw and mouth muscles that affect the position of teeth (Enlow 1990, Moyers 1993). Growth and development of a person depends on several factors, including genetic factors, environment, gender, nutritional and metabolic factors (Meliawati 2000).

Narrow curved teeth may also be influenced by environmental factors such as the mouth is often open, may cause more pressure on the cheek muscle region in

the maxilla, so that a narrow maxilla (Suharsini 2000). In addition to environmental factors, genetic factors also play an important role in determining the size and shape of curved teeth (Enlow 1990, Moyers 1993). In general, muscle tone in people with Down syndrome, weakened, which causes muscular imbalances in the lips and cheeks withstand mastication forces, so that the functional strength to decrease (Smith 2004, Rosenfeld 1997). In this study, not differentiated by sex, for Down's syndrome is a purely genetic disorder. So the physical characteristics, especially facial characteristics did not differ between men and women (Smith 2004, Rosenfeld 1997).

Of the 30 Down's syndrome children in the school's incredible Bhakti Luhur Malang investigated, as many as 40% live in dormitories provided by the special and the rest live in their own homes. Each Down's syndrome patients who live in dormitories have a caregiver with a special education that provides intensive guidance ranging from how to wear/remove their clothes, bathe teach, how to brush your teeth, communicate actively to the development of therapy in a special room. Down's syndrome patients who live in dormitories have an exercise physiotherapist, one of the more intensive speech therapy compared with patients with Down syndrome who live at home alone, who only get exercise during the lesson time only. Besides Down's syndrome patients who live in dormitories also get food with nutrients that have been adjusted. According Suharsini (2000) such events have a positive impact in stimulating muscle tone, especially muscle cheeks and lips so that the jaw Down's syndrome patients may develop due to the function of mastication and speaking functions improved. It is possible that cause teeth arch width in patients with Down's syndrome at the School of Bhakti Luhur Malang varied or in other words there was no significant correlation between facial width and arch width of teeth in patients with Down's syndrome with anthropometric methods

From this research may motivate parents/caregivers provide patients with Down's syndrome physiotherapy and exercise more intensive speech therapy for improving muscle tone and development of their brains. And needs further research in patients with Down's syndrome associated with muscle tone.

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