OCCURRENCE AND PERCEPTIONS OF MIDLINE DIASTEMA AMONGST ADULT PATIENTS VISITING UNIVERSITY OF NAIROBI DENTAL HOSPITAL

A Community Dentistry Research Proposal submitted in partial fulfilment of the requirements for the degree of Bachelor of Dental Surgery University of Nairobi.

2005.

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Faculty of dental sciences
UNIVERSITY OF NAIROBI
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ABBREVIATIONS

W.H.O.-----------------------------World Health Organization
K.N.H.-------------------------------Kenyatta National Hospital
BDS-------------------------------Bachelor of Dental Surgery
UoN-------------------------------University of Nairobi
NBI-------------------------------Nairobi
BDS-------------------------------Bachelor of Dental Surgery
MDS-------------------------------Masters of Dental Surgery
MPH-------------------------------Masters of Public Health
PGD-------------------------------Post Graduate Diploma
STI-------------------------------Sexually Transmitted Infections
SUMMARY

Objective: The aim of this study is to determine the prevalence and perceptions of midline diastema amongst adult patients visiting University of Nairobi Dental Hospital.

Design: This will be a descriptive cross sectional study.

Setting: University of Nairobi Dental Hospital

Subjects and Methods: A sample of 350 patients aged 18 years and above will be studied over a period of three months between August and October. The patients will be examined using a mouth mirror and a probe under artificial light. Spaces between the upper and lower central incisors which are unusually bigger than other interdental spaces will be noted. Subjects who do not have a midline diastema will be interviewed on whether they would like to have one and why. Those who have a midline diastema will be interviewed on whether they want it removed and the reasons why. Subjects who have a midline diastema which have currently been removed will be interviewed on the methods of removal used and why they had the midline diastema removed. All the subjects will be interviewed on whether they know if a dentist can close a midline diastema and the methods employed in the closure.

Data analysis: Data will be analysed manually and using SPSS 12. And Microsoft Excel 2003.

Expected Benefits: From these results, recommendations will be made to address respective treatment needs. The study will also be useful in prevention, intervention and in health education. Sex distribution, geographical distribution and ethical distribution of the midline diastema will be noted. Patients perceptions on the value of the midline diastema will also be analysed.
Spacing of upper or lower central incisors is commonly known as midline diastema. It has been defined as a natural spacing between the central incisors occurring more frequently on the upper teeth. It may be caused by persistent high labial frenum, hypodontia especially missing upper lateral incisors, proclination of incisors, microdontia, macrognathia, peg laterals, midline cysts, lip biting, general spacing of the dentition or presence of conical supernumerary teeth. It might also be due to inheritance, tongue thrusting, periodontal disease or posterior bite collapse or physically placed by some tribes for esthetics reasons. Where the cause of midline diastema is due to a thick frenum attached to the attached gingivae, papilla or is papillary penetrating, frenectomy or frenetomy are indicated. Failure to remove high frenums under some of these circumstances might lead to distention of gingival sulcus that in turn encourages plaque accumulation or increase the severity of periodontal pockets. Other problems associated with high frenum attachments include: prevention of mesial drift of central incisors making orthodontic treatment difficult, interference with effective toothbrushing, difficulties in controlling gingival recession and prejudicing denture fit or retention.

Occasionally midline diastema that appears early in life disappears or becomes smaller as one grows older. For this reason, several clinicians argue that there is no need to do frenotomy or frenectomy in instance where the diastema is due to a high frenum. They recommend that one should wait until the eruption of permanent canines to give the patients a maximum chance of spontaneous closure of the diastema.

Many Kenyans seem to admire those individuals whose teeth have a midline diastema to the extent that some tribes like the AKAMBA, artificially create it by selective grinding of the upper central incisors. Indeed, some individuals insist upon having it created in their partial dentures or complete dentures even though they may not have had a midline diastema prior to the prosthetic treatment.

As to whether this liking of midline diastema is traceable to the fact that many
Kenyans have it and therefore not considered as an abnormality if one does not have it, is difficult to tell. This is precisely so because there have been few prevalence and perception studies done in Kenya. Other countries especially in Europe seem to have concentrated their studies on the prevalence of midline diastema and ignored perception studies.

Therefore the purpose of this study is to describe the occurrence and perceptions of midline diastema amongst adult patients visiting University of Nairobi Dental Hospital.

In determining the occurrence, the gender predilection, the frequency of adults having a midline diastema and those who have had it closed, the method of correction, the rate of appearance on each arch (Mandibular or Maxillary), the width of the diastema on each arch, the ethnic and geographical distribution of the midline diastema, the Familial correlations and heritability of midline diastema, the change in size of the diastema and the aetiology of the diastema will also be assessed.

In determining the perception, the frequency of the study subjects with the diastema and those who want it removed and the reasons of wanting it removed will also be assessed.

The benefits of the study will include determining the population awareness on the correction modalities employed in the closure of the diastema. The prevalence of the diastema in our region and aetiological factors causing midline diastemas will be determined and therefore formulate preventive measures.
Very little is indeed known on midline diastemas and this is due to the fact that limited research has been carried out in the area of midline diastema. Furthermore, studies on the aetiology of midline diastema are mainly concentrated in the industrialized nations. These studies have been concentrated mainly on the management and treatment modalities of midline diastemas. One such study, according to yen le carried out in 1999, has shown evidence that males have a high incidence of diastema compared to their female counterparts. It has also shown that the incidence is twice as high in the black population as compared to white population. As many as 1:5 black men have diastema. Some black men can have 10mm wide diastema, but the incidence of this is much smaller.

In a cross-sectional study of midline diastema done in 1989 by Nainar SM and Gnanasundaram, a South Indian (Madras) population, of 9,774 patients aged 13-35 years were screened. True midline diastema was defined as one without periodontal/periapical involvement and with the presence of all anterior teeth in the arch. Sample purification resulted in a research sample of 166 patients with true midline diastemas. The incidence of true maxillary midline diastema (160/9774-1.6%) was greater than that of true mandibular midline diastemas (31/9774-0.3%). No direct etiologic factor for the midline diastemas was noted. Spacing in the anterior region was the most significant factor associated with the midline diastema.

A study was done to estimate familial correlations and heritability to evaluate familial aggregation patterns of maxillary midline diastemas, by Gass JR, Valiathan M, Tiwari HK, Hans MG, and Elston RC in 2003 at Cleveland, USA. The sample consisted of 30 extended families: 15 black, 14 white, and 1 mixed race. A single ascertainment scheme was adopted to collect the sample. Family data were collected with a 7-question survey. In all, the sample of 430 subjects consisted of 220 females, 210 males, 99 nuclear families, 534 sibling pairs, 422 avuncular pairs, 318 grandparent pairs, and 27 cousin pairs. Heritability was found to be 0.32 +/- 0.14 in the white sample and 0.04 +/- 0.16 in the black sample. The results suggested a possible genetic
basis for maxillary midline diastema and a greater role of environmental factors in the black sample than in the white sample.

Closer home a study done by Prof. Jacob T. Kaimenyi (1998) in Nairobi Kenya was done to determine the prevalence of midline diastema, tongue tie and frenum attachments amongst school children in Nairobi. A total of 1802 children aged between 4 and 16 years were selected randomly using multistage sampling technique. Results showed that 35% had upper and lower midline diastema. 55% were females and 45% were males. Their mean age was 7.6 years. 0.2% had a high lingual frenum. The commonest location of frenum attachment amongst children with lower midline diastema was the mucogingival junction (86%) whereas amongst those with upper midline diastema it was attached gingiva (50%). None of the children had frenum attachment on the interdental papilla. It was concluded that the maxilla had a higher prevalence of midline diastema than the mandible and that papillary penetrating frenum attachments amongst these patients were higher in the maxilla than the mandible.

A study conducted by I. Marini, F. Vecchiet, P. Morselli in Canada (2001) done to evaluate spontaneous closure of the inter-incisive diastema in a group of patients, using a new surgical technique for the treatment of upper lip frenulum hypertrophy. 65 patients aged between 8-11 years, presenting with a wide upper labial frenum inserted in the palatine papilla and with a diastema of 4.5 mm or more, were divided into three groups: A) 33 patients underwent an upper labial frenoplasty using the new triangular flap technique, with no other treatment. B) 22 patients received orthodontic treatment for the closure of their diastema; C) 10 patients, whose parents refused both surgery and orthodontic treatment, were used as a control group. None of the patients in group A presented with complications after surgery. In 32 patients spontaneous closure of the midline incisor diastema was obtained without any orthodontic treatment. In all patients in group B, closure of the diastema was obtained, but retention had to be applied to avoid relapse. Eruption of lateral incisors was observed in only two patients in the control group C within one year, and both were in ectopic position (buccally), while in the other groups lateral incisors erupted correctly. This shows that there are many advantages in using the
triangular flap technique. It avoids orthodontic treatment of the diastema, which can be closed within 2-4 months, but oral hygiene is difficult because of the large frenum and the presence of brackets. Therefore, this new surgical approach allows a reduced healing time while preventing tissue contractions. From the above study it can be Concluded that the triangular flap is a safe, easy, reliable and well accepted procedure that provides positive aesthetic results and allows spontaneous closure of the diastema.

Therefore the purpose of this study is to describe the occurrence and perceptions of midline diastema amongst adult patients visiting University of Nairobi Dental Hospital.
There are various factors that contribute to midline diastema in the Kenyan population. But whatever the cause and aetiology, ignorance, lack of knowledge of orthodontic treatment and financial constraints contribute mostly to having patients retaining those spaces between their teeth.

While trying to evaluate level of aesthetics according to one's dentition it will be needless to say that the Negroid are the most affected population by midline diastema and yet the same population is said not to be conscious of their aesthetics. However there has been a lot of clamour on appearance, beauty and fashion and having the westernized models been flashed on our screens with a dentition which is "perfect" (that is one which lacks spaces between teeth among other things). It is necessary to find out the perceptions our patients have regarding midline diastema especially now that there is an emergence of Aesthetic Dentistry. It is important to define what aesthetic is and establish whether a midline diastema is considered as an acceptable finding in our setup. With the little prevalence studies done on the subject it would then be an important study establishing whether this liking of midline diastema is traceable to the fact that many Kenyans have it and therefore considered as abnormal if one does not have it. This study is precisely important more because there has been very few if any prevalence and perception studies done in Kenya.

This study is set to determine the occurrence and perceptions of midline diastema as well as associated aetiological factors amongst adult patients visiting university of Nairobi Dental Hospital. This will enable formulation of preventive measures.
OBJECTIVES

Broad Objectives
To determine occurrence and perceptions of midline diastema amongst adult patients visiting University of Nairobi Dental Hospital.

Specific Objectives
• To determine proportions of adult patients having midline diastema.
• To determine the aetiological factors associated with midline diastemas.
• To describe patients perception (whether they mind it or not) and knowledge on modalities of treatment.
HYPOTHESIS

• 35% of adult patients have a midline diastema.
• Congenitally missing teeth, undersized or malformed teeth, interarch tooth size discrepancies, hereditary or habits such as tongue thrusting, periodontal disease or posterior bite collapse are associated with the development of midline diastemas.
• Patients prefer having a midline diastema.

STUDY VARIABLES

**Dependent:**
• Presence of midline diastema.
• Location of midline diastema (maxilla or Mandible).
• Patients perception regarding midline diastema.

**Independent:**
• Age.
• Sex.
• Geographical place of birth
• Ethnicity
• Occupation
• Aetiological factors associated with midline diastema.
  • High labial frenum.
  • Microdontia.
  • Congenitally missing incisors.
  • Macrognathia.
Study area
The study will be conducted at a dental hospital in Nairobi. Nairobi is the Capital city of the republic of Kenya. It lies in East Africa south of the Sahara along the Equator. It is a metropolitan city with a population of approximately 5 million (1999, Kenya National Census).

The hospital chosen is The University of Nairobi Dental Hospital. The hospital lies approximately 2Km from the city center, North West of Nairobi along Argwings Kodhek Road. It is the only dental teaching hospital in Kenya. Patients come from within Nairobi city, the surrounding districts as well as other regions of Kenya. Patients are usually self-referred, although some are referred by other dental and medical practitioners. The services offered are heavily subsidized especially those provided by the students. It therefore serves people from the low and middle social-economic levels.

Study Population
The study population will consist of adults (18 year old and above) attending the University of Nairobi Dental Hospital for dental treatment.

In the view of the fact that the above mentioned hospital is the only one of its kind in the country, it was decided to examine all the adult patients who will visited the institution in the months of August, September and October.

Study Design
This will be a descriptive cross-sectional study among adults patients visiting the University of Nairobi Dental Hospital.
Sample Size
Prevalence of upper and lower midline diastema amongst school children in Nairobi is 35% (Jacob T. Kaimenyi, 1998).

- Confidence level chosen is 95%
- Lets assign C to be the confidence interval
  \[ C = 1 - 95\% = 5\% \]
- Lets assign Z to be the corresponding value to the confidence level in the z table.
- Assign P to be the prevalence.
- Assign N to be the sample size.

Hence:

\[ N = \frac{Z^2 \cdot P(1 - P)}{C^2} \]

\[ = \frac{1.96^2 \times 0.35 (1.0 - 0.35)}{0.05^2} \]

=349.5856.

=350(0 decimal places).

A sample size of 350 adults will be involved in the study.

Sampling Procedures
The patients will be over 18 years and will be selected randomly using multistage sampling technique. To avoid over sampling in either sex, a proportionate sampling procedure will be used.
**Inclusion and Exclusion criteria**

**Inclusions:**
- Adults aged 18 years old and above.
- The subjects must consent to participate in the study.

**Exclusions:**
- Non-Kenyans visiting the UoN Dental Hospital.
- Subjects not willing to consent to examination.
- Subjects below the age of 18 years.

**Data Collection, Instruments And Procedures.**

Prior to Intra oral examination, study subjects particulars on age, occupation, ethnicity and sex and their perceptions will be entered into a prepared interviewer-administered questionnaire. (Appendix 1).

Intra-oral examination will then be carried out using a mouth mirror under artificial light with the subjects lying on a supine position.

Presence or absence of midline interdental spaces unusually bigger than other interdental spaces will be noted and recorded on a prepared clinical examination form. (Appendix 2).

No attempts, such as x-rays will be made to rule out possibilities of midline cyst or the presence of unerupted conical supernumerary teeth being responsible for some of the midline diastema unless clinical evidence suggest this to be the case.

Trained assistants will be assisting the investigator in data collection and clinical examination.
ANTICIPATED PROBLEMS

- Inadequate finances
- Limitation of time due to the tight academic schedule of the investigator
- Disappointment on the part of the subject due to failure to obtain instant treatment.
- Study subjects not filling the required information.

MINIMISING BIAS AND ERROR

To minimise errors, the clinical examination forms will be pre-tested by the investigator.

The assistants will be trained in clinical examination.

The examination will be done by dental students with clinical experience who will also be trained on the criteria for diagnosis of a diastema according to WHO basic methods.

ETHICAL CONSIDERATION

Permission to carry out subject examination will be obtained from the director and hospital ethical committee of KNH.

Only study subjects who consent to the study will be involved.

All information obtained from the study subjects will be treated as confidential.

Sterile instruments (mirrors and periodontal probes) and gloves will be used for the clinical examination.

Study subjects found to have any oral pathology will be advised on the treatment required and referred for management.

DATA ANALYSIS AND PRESENTATION:

The data will thereafter be analysed manually by tally method and using Microsoft Excel and SPSS 12 will be presented in the form of tables, pie charts and graphs. Patients file numbers will be taken to avoid repetition of data. All the other variables will be used in the analyses.

Occurrence will then be calculated from individual groups (female and males) and from the total population examined. Etiological factors shall also be considered and their frequencies assessed.

Perceptions and treatment awareness and modalities shall also be analysed.
The results will then be discussed and recommendations and conclusions made.

**Benefits of study**

- Results obtained from the study can be used as baseline data by the policy makers in the oral health planning.
- Information obtained would add to the present knowledge on the occurrences and perceptions of midline diastema among the adult population.
- The study would be for partial fulfilment of the award of Bachelor of Dental Surgery degree for the investigator.
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**Total** 5185.00
REFERENCES.

QUESTIONNAIRE:

Information you herein remit shall be used for the sole purpose of research and shall be fully confidential. It is within your right to object to the answering of any question(s) that you are uncomfortable with.

For the purpose of this study a midline diastema will be defined as: A natural spacing between the central incisors (A tooth for cutting or gnawing; located in the front of the mouth) in either upper, lower or both jaws. Locally it is referred to as a “Mwanya”. In Kikuyu

Tick the correct answer or fill in the correct answer in the spaces provided.

Patients File Number: ____________________ Date: ____________________

AGE: (yrs)__________________ SEX: ☐ a) Male ☐ b) Female Occupation: ____________________

Ethnicity ____________________ Place of birth ____________________

1. Have you ever had a midline diastema?
   ☐ a) No ☐ b) Yes and it is still present ☐ c) Yes but it has been closed

   If No please go to section A below. If Yes and you currently have one go to section B below and if yes but it has been closed go to section C below

SECTION A

2. Would you like to have a midline diastema?
   ☐ a) No ☐ b) Yes
   Please give the reason for your answer. ____________________

3. Which of your parents have a Midline Diastema?
   ☐ a) Mother ☐ b) Father ☐ c) None

4. Specify the total number of siblings who have a midline diastema.
   Siblings with diastema______________  Siblings without diastema_____________

5. Can a Midline Diastema be closed by a dentist?
   ☐ a) Yes ☐ b) No ☐ c) I don’t know
   If yes please specify the method of closing ____________________

SECTION B

2. Would you like to have your midline diastema closed?
   ☐ a) No ☐ b) Yes
   Please give a reason for the above answer. ____________________

3. Do you think the Midline Diastema has been increasing or decreasing with age?
   ☐ a) Increasing ☐ b) Decreasing ☐ c) There is no change

4. Which of your parents have a Midline Diastema?
   ☐ a) Mother ☐ b) Father ☐ c) None

5. Specify the total number of siblings who have a midline diastema.
   Siblings with diastema______________  Siblings without diastema_____________

6. Can a Midline Diastema be closed by a dentist?
   ☐ a) Yes ☐ b) No ☐ c) I don’t know
   If yes please specify the method of closing ____________________

SECTION C

2. How was your midline diastema closed?
   ☐ a) Naturally ☐ b) Artificially

3. If the answer is b, why was your midline diastema removed ____________________
4. Which of your parents have a Midline Diastema?
   □ a) Mother  □ b) Father  □ c) None

5. Specify the total number of siblings who have a midline diastema.
   Siblings with diastema_________  Siblings without diastema_________

6. Can a Midline Diastema be corrected by a dentist?
   □ a) Yes  □ b) No  □ c) I don’t know
   If yes please specify the method of closing ____________________________
APPENDIX II:

CLINICAL EXAMINATION FORM:

This form should only be filled by the examining clinician.

ORAL FINDINGS
Tick or fill in the correct answer in the provided spaces.

1. Presence of a midline diastema? □ a) Yes □ b) No If No go to Question 4 below. If Yes go to question 2 below.

2. Location of the midline diastema?
   □ a) Mandibular arch □ b) Maxillary arch □ c) Both mandibular and maxillary

3. As measured using a Periodontal probe, the width of the midline diastema is—— Mm to 0 decimal places.

4. Tick when present
   □ a) Posterior bite collapse
   □ b) High labial frenum
   □ c) Lip biting
   □ d) General spacing of dentition
   □ e) Microdontia
   □ f) Macrognathia
   □ g) Conical supernumerary teeth
   □ h) Tongue thrusting
   □ i) Periodontal disease
   □ j) Midline Cysts
   □ k) Proclination of incisors
   □ l) Physically placed diastema
   □ m) Congenitally missing incisors
   □ n) Peg laterals

5. Other relevant observations (please specify) a) ____________________________ b) ____________________________

Thank you for your participation