A 5 YEAR AUDIT OF DENTAL IMPLANT TREATMENT AT THE UNIVERSITY OF NAIROBI DENTAL HOSPITAL

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V28/40067/2011

A research proposal submitted to the School of Dental Sciences, University of Nairobi in partial fulfillment of the degree of Bachelor of Dental Surgery (BDS)
DECLARATION

I, Michugu Caroline Watiri, declare that this research proposal is my own original work and has never been submitted before for any degree or examination in this or any other university.

Signature..................................... Date........................................

19/05/2014
SUPERVISORS APPROVAL

We certify that this project has been submitted with our approval as supervisors:

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TABLE OF CONTENT

DECLARATION.................................................................................................................. i
TABLE OF CONTENT...................................................................................................... iii
ABBREVIATIONS ........................................................................................................... v
ABSTRACT..................................................................................................................... 1
CHAPTER 1: INTRODUCTION......................................................................................... 3
CHAPTER 2: LITERATURE REVIEW............................................................................... 4
  2.1 Surveys on implant therapy ................................................................................... 4
  2.2 Implantology as a multidisciplinary approach ..................................................... 4
  2.3 Site preparation ................................................................................................... 4
  2.4 Placement protocol followed ............................................................................. 4
  2.5 Causes of treatment failure ............................................................................... 5
  2.6 Possible complications ....................................................................................... 5
  2.7 Causes of tooth loss and commonly lost teeth .................................................... 5
3.1 Statement of research problem ............................................................................. 6
3.2 Justification ......................................................................................................... 6
3.3 Objectives ............................................................................................................ 6
  3.3.1 Main objective ............................................................................................... 6
      To audit dental implant treatment at the UoNDH ................................................ 6
  3.3.2 Specific objectives ....................................................................................... 6
4. RESEARCH METHODOLOGY................................................................................. 7
  4.1 Study Area ......................................................................................................... 7
  4.2 Study Population ................................................................................................ 7
  4.3 Study Design ...................................................................................................... 7
  4.4 Variables ............................................................................................................ 7
      4.4.1 Socio-demographic variables ................................................................... 7
ABBREVIATIONS

BDS – Bachelor of Dental Surgery

KNH – Kenyatta National Hospital

UoNDH – University of Nairobi Dental Hospital

CBCT – Cone Beam Computed Tomography

GBR – Guided Bone Regeneration

MS EXCEL – Microsoft Excel

SPSS – Statistical Package for Social Sciences
DEFINITION OF TERMS

**Implant survival**- An implant is said to have survived if it is still present in the mouth irrespective of its status (Clinically or radiographically).

**Treatment protocol**- This is the timing of implant placement following extraction of a tooth. It can either be immediate, early or delayed.
ABSTRACT

Introduction

Dental implant therapy is now a popular procedure for replacement of lost teeth due to the highly predictable outcomes with high survival and success rates. This form of treatment requires comprehensive planning and precise surgical execution to be successful. Most of the information available has been on implants done by experienced clinicians. Little data have been published on the survival rates of implants placed in dental residency programs.

Aim

To audit dental implant treatment outcomes at the UoNDH between 2009 and 2013

Material and Methods

Study area: The study will be conducted in The University of Nairobi Dental School in Nairobi. This is an institution located in the city of Nairobi

Study population: Patient records from the conservative, prosthetic and periodontology clinics will be used as the primary source of data.

Study design: The study will be of a descriptive cross-sectional design.

Data management: A data collection checklist coupled with a phone interview shall be used. The data will be analyzed using SPSS and MS EXCEL. Descriptive statistics will be generated to summarize the data collected and the results shall be presented in form of charts, tables and texts.

Ethical consideration

This study will be carried out after approval from Kenyatta National Hospital/ University of Nairobi ethics, research and standard committee. Information collected will be treated confidentially and will only be used for the purpose of the study.

Perceived benefits

The findings of this study will provide useful information in the teaching and policy formulation on implant therapy at the UoNDH. Future studies will also be based on these findings regarding the practice of implant therapy in the country.
Limitations

Some data may be unavailable due to inadequate documentation of some findings in the patient's records.
CHAPTER 1: INTRODUCTION

Implant dentistry is the art, science, and discipline concerned with the diagnosis, insertion of titanium implants, and restoration of oral structures to restore the loss of contour, comfort, function, esthetics, speech, and/or health of the partially or completely edentulous patient. It has become such a popular procedure for replacement of lost teeth that it is now regarded as the standard of care for partial or full edentulous patients. It is now well documented that insertion of dental implants into edentulous jaw bones to replace missing teeth, yields highly predictable outcomes with high survival and success rates.

Success of dental implant therapy depends on both local factors at the site of implantation and the patient's systemic condition. In a recent systematic review of literature, uncontrolled diabetes, recent head and neck radiotherapy, smoking and biphosphonate use were found to be some of the systemic patient risk related factors for implant therapy. In the same review, local factors that may influence implant therapy were found to be: periodontitis related tooth loss and limiting local anatomical structures. These factors are however not absolute contra-indications for placement of dental implants.

In some cases pre-prosthetic procedures such as guided bone regeneration, onlay and inlay bone grafts, bone splinting for ridge expansion, destruction osteogenesis and revascularized flaps are done to augment a deficient alveolar ridge and also to correct soft tissue discrepancies. There are several regenerative biomaterials available (autografts, allograft, xenografts, alloplasts and most recently growth factors) all with differing degrees of success in maintaining ridge dimensions.

Several risks and complications have been associated with dental implant therapy. Excessive bleeding or nerve injury could occur during the surgical placement of the implant if proper evaluation is not done before the procedure starts. Implant loss, peri-implant bone loss, peri implant soft tissue complications, esthetic/phonetic complications and mechanical failures including crown fracture, implant fracture and screw or abutment loosening are some of the other reported complications.
CHAPTER 2: LITERATURE REVIEW

For a long time implant dentistry has been a fairly unexplored area but over the past few years its gained popularity due to its predictability in producing excellent functional and aesthetic outcomes. However, the full potential of implant dentistry is yet to be unveiled especially in developing countries.

2.1 Survival rate surveys

Overall, the 5-year survival rate of implants is 95% and the 10-year survival rate is greater than 89%\(^9\). Little information has been published on the survival rates of implants placed in dental residency programs. In a study done at the University of Florida College of Dentistry, cumulative implant survival was reported to be 98.2%. The implants were placed in dental residency program and had follow-up varied from 6 months to 4 years after placement\(^{11}\).

2.2 Implantology as a multidisciplinary approach

A systematic review publication in the New Zealand Dental Journal found that for a successful implant therapy, a multidisciplinary approach should be adopted. This enables the general dentist to come up with a plan of treatment that makes good use of the surgical, periodontal, orthodontic and implant prosthetic techniques necessary to ensure a predictable implant outcome. In fact, the literature showed that multidisciplinary approach is needed at implant placement stage to determine the ideal placement site for the surgical, restorative and aesthetic needs of the patient\(^{12}\).

2.3 Site preparation

To ensure optimal aesthetic implant rehabilitation, the following prerequisites are considered essential: adequate bone volume (horizontal, vertical, and, contour), optimal implant position (mesiodistal, apicocoronal, buccolingual, and angulation), stable and healthy periimplant soft tissues, aesthetic soft tissues contours, and ideal emergence profile\(^{13}\). Following tooth loss, the alveolar ridge undergoes resorption in both horizontal and vertical dimensions and can lead to less than optimal residual ridges for implant placement\(^{14}\). Numerous ridge therapies to compensate for the loss in height and width of the resultant ridge have been done and shown to ameliorate this undesired yet unavoidable process\(^{15}\).

2.4 Implant treatment protocol

A healed ridge provides the clinician with a more predictable site for placement of endosseous implants. However, advances in contemporary implant therapy have led to development of
improved implant surfaces for quicker healing after placement and also to an immediate placement protocol. Systematic reviews show that early placement preserves bone height and width of the ridge when compared with delayed protocol.

2.5 Causes of treatment failure

It has been shown that proper treatment planning and prosthetically driven placement of implants leads to superior results in terms of function and aesthetics. When implants are placed in non-ideal positions, several biomechanical complications can follow as a result of non-axial loading which leads to occlusal overload. In a review of literature from January 1950 to July 2011, biomechanical implant complications were shown to include peri-implant bone loss implant fixture fracture, overdenture attachment fracture, abutment screw loosening, prosthetic framework fracture and abutment screw loosening.

2.6 Possible complications

Implant therapy involves technique sensitive procedures and thus is prone to the complications like any other surgical procedure. Treatment planning for dental implants involves the assessment of patient-related risk factors prior to formulation of a treatment plan to prevent avoidable complications. Radiological investigations of the jaw bones during dental implant therapy is a vital step in treatment planning as it aids in determining the quantity, quality and angulations of bone, selection of the potential implant sites, and in verification of absence of pathology. Conventional radiographs (panoramic and periapical radiographs) only provide a two dimensional view of a 3-dimensional object, and thus can lead to erroneous diagnosis. Diagnostic cone beam computed tomography (CBCT) provides more accurate and precise views and also are helpful in guided surgery and fabrication of accurate surgical stents.

2.7 Teeth loss and causes

Dental caries is the commonest cause of tooth loss, followed by periodontal disease with upper and lower posteriors being the commonest teeth to be lost due to dental caries and periodontal disease. Extractions as a form of traditional practice, orthodontic treatment and trauma accounted for smaller percentages of total tooth loss.
3. STATEMENT OF THE RESEARCH PROBLEM, JUSTIFICATION OF STUDY AND OBJECTIVES

3.1 Statement of research problem
Dental implants have become the most popular and reliable treatment option for restoring missing teeth. At the university of Nairobi dental hospital, dental implants are done at the prosthodontic and periodontology clinics. To evaluate the success and suitability of a treatment modality, it is a common practice to go back to patient records and systematically review the procedures, outcomes and clinical findings after some time at recall visits.

3.2 Justification
There is no known study at the UoNDH on the assessment of dental implant treatment, known to the author. This study will thus form a baseline for future studies and help in policy formulation regarding implant therapy in the school.

3.3 Objectives

3.3.1 Main objective
To audit dental implant treatment from June 2010 to June 2014 at the UoNDH

3.3.2 Specific objectives

a). To establish socio-economic demographics of patients treated with dental implants.

b). To establish a 5-year survival rate of the implant treatment.

c). To determine the sites for implant placement.

d). To establish the ridge preparation procedures done before implant treatment.

e). To establish the timing of implant placement post-extraction.

f). To establish patient satisfaction.
4. RESEARCH METHODOLOGY

4.1 Study Area
The study will be conducted in The University of Nairobi Dental School in Nairobi. This is an institution located in the city of Nairobi. It is situated along Ralph Bunche road in Upper hill. It serves as a learning institution and offers dental services to the public as the main referral for dental cases. It also offers private dental services in the Dental Plaza.

4.2 Study Population
Treatment notes of patients who have received implant treatment from the conservative, prosthetic and periodontology clinics will be used as the primary source of data.

4.3 Study Design
The study will be of a descriptive cross-sectional design.

4.4 Variables

4.4.1 Socio-demographic variables
- Sex
- Age
- Occupation
- Level of education
- Area of residence
4.4.2 Independent Variables

- Timing of implant placement post extraction.
- Investigation done
- Type of ridge therapy done
- Site of implant placement

4.4.3 Dependent variables

- Status of the implant
- Patient satisfaction

4.5 Data

4.5.1 Data collection tools

- Review of patient records using a data collection checklist.
- Phone interview to find out patient satisfaction with the implant therapy.

4.5.2 Data analysis and presentation

The data will be analyzed using SPSS and MS EXCEL. Descriptive statistics will be generated to summarize the data collected and the results shall be presented in form of charts, tables and texts.

4.5.3 Inclusion criteria and exclusion criteria

4.5.3.1 Inclusion Criteria

1) Records of patients who have had dental implant treatment at the University of Nairobi Dental Hospital.
2) Patients who have been followed up for not less than one year at the UoNDH.

4.5.3.2 Exclusion Criteria

1. Records of patients who have had oral implants placed in other clinics other than in the University of Nairobi Dental Hospital.
2. Patients who haven’t had a one year follow up
4.6 Sampling

4.6.1 Sampling unit
Treatment record of a patient who has received dental implant treatment at the UoNDH between 2009 and 2013.

4.6.2 Sampling method
All records of patients who have received dental implant treatment at the UoNDH between 2009 and 2013.

4.6.3 Sample size determination
All available treatment records patients who have received dental implant treatment at the UoNDH between 2009 and 2013 shall be used.

4.7 Ethical Considerations
This study will be carried out after approval from Kenyatta National Hospital/ University of Nairobi ethics, research and standard committee. Information collected will be treated confidentially and will only be used for the purpose of the study.

4.8 Control Of Errors And Bias
The data will be collected uniformly. Thereafter, the data will analyzed accurately thereby providing accurate results.

4.9 Perceived Benefits
The findings of this study will provide useful information in the teaching and policy formulation on implant therapy at the UoNDH. Future studies will also be based on these findings regarding the practice of implant therapy in the country.

4.10 Limitations of the Study
Some data may be unavailable due to inadequate documentation of some findings in the patient's records.
5. PROPOSED BUDGET

5.1 Proposal Development Phase

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5.2 Data Collection Phase

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5.3 Report Writing Phase

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### 5.4 Schedule Of Activities

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<td>Data collection and Analysis</td>
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<td>Report writing</td>
<td>September – October 2014</td>
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<td>Presentation</td>
<td>October 2014</td>
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REFERENCES


2. Pjetursson, B. E., Bragger, U., Lang, N. P. & Zwahlen, M. Comparison of survival and complication rates of tooth-supported fixed dental prostheses (FDPs) and implant-supported FDPs and single crowns (SCs). *Clin. Oral Imp Res* 2007 18(Suppl. 3): 97–113


APPENDICES

APPENDIX 1: Data collection checklist

AN AUDIT OF DENTAL IMPLANT TREATMENT AT THE UNIVERSITY OF NAIROBI DENTAL HOSPITAL

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<th>Patient no.</th>
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<th>Residence</th>
<th>Site of placement</th>
<th>Health status at insertion</th>
<th>Preoperative investigation(s)</th>
<th>Anything done before placement?</th>
<th>complications</th>
<th>Current status of the implant</th>
<th>Patient satisfied?</th>
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<td>Surgical phase</td>
<td>Post insertion</td>
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</table>

14
APPENDIX 2: Phone interview questionnaire

The following questions shall be asked during the phone interview:

1. Is the implant(s) still present in the mouth?

2. Do you have any problems regarding the implant(s)?

3. If YES, what is the problem?

4. Have you had any dental reviews done after the implant placement?

5. If YES, how many?
Dear Caroline

Research Proposal – clearance – A 5 year audit of Dental implant treatment at the University of Nairobi Dental Hospital (UP520/07/2014)

Your above proposal refers.

This is to inform you that permission has been granted by the KNH/UON-Ethics & Research Committee to carry out research on study titled – A 5 year audit of Dental implant treatment at the University of Nairobi Dental Hospital.

By a copy of this letter, I am requesting the relevant persons to accord you the professional support and other materials that may be useful to your research.

**NB:** Use non-identifiable codes for the records accessed and **NOT** the actual file numbers.

Yours faithfully,

[Signature]

PROF. M. L. CHINDIA
SECRETARY, KNH/UON-ERC

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