

**PREVENTION OF THE ABUTMENT TOOTH DAMAGE IN PATIENTS
USING OVERDENTURE BARE ROOT REMOVABLE DENTURES
A LITERATURE REVIEW**



By:

YIZRIELSA TAPPI

J011191040

Supervisor

Dr.drg.Ike Damayanti Habar, Sp. Pros(K)

PROSTHODONTICS DEPARTEMEN

FACULTY OF DENTISTRY

HASANUDDIN UNIVERSITY

2022

**PREVENTION OF ABUTMENT TOOTH DAMAGE IN PATIENTS
USING OVERDENTURE BARE ROOT REMOVABLE DENTURES
A LITERATURE REVIEW**

THESIS

**Submitted to Hasanuddin University as one of the requirements
Obtaining a Bachelor's Degree in Dentistry**

BY:

YIZRIELSA TAPPI

J011191040

**DEPARTMENT OF PROSTODONSIA
FACULTY OF DENTISTRY
HASANUDDIN UNIVERSITY**

2022

APPROVAL SHEET

Title : Prevention of Abutment Tooth Damage in Patients Using Overdenture

Bare Root Removable Dentures.

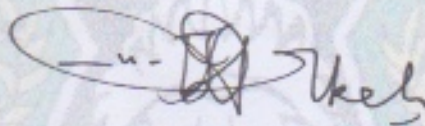
By : Yizrielsa Tappi / J011191040

Has been reviewed and approved

on July 25th, 2022

by:

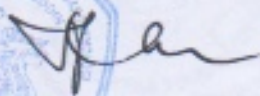
Supervisor



Dr. drg. Ike Damayanti Habar, Sp. Pros(K)
NIP. 19750729 200501 2 002

Acknowledged,

★ Dean of the Faculty of Dentistry
Hasanuddin University



Prof. Dr. Edy Machmud, drg., Sp. Pros(K)
NIP. 196311041994011001

DECLARATION OF ORIGINALITY RATIFICATION

I hereby certify that the student listed below:

Name : Yizrielsa Tappi

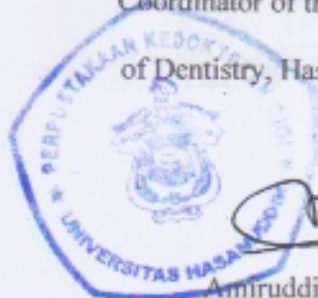
NIM : J011191040

Title : Prevention of Abutment Tooth Damage in Patients Using
Overdenture Bare Root Removable Dentures

States that the title of the thesis submitted is a new title and is not found in the library of the Faculty of Dentistry, Hasanuddin University.

Makassar, July 25th 2022

Coordinator of the Library of the Faculty
of Dentistry, Hasanuddin University



Amruddin, S. Sos

NIP. 19661121 199201 1 003

DECLARATION OF AUTHENTICITY

I, the undersigned:

Name : Yizrielsa Tappi

NIM : J011191040

Hereby declare that the thesis titled "Prevention of Abutment Tooth Damage in Patients Using Overdenture Bare Root Removable Dentures" is my own original work, and no plagiarism has been done in its writing. Any citations in this thesis have been given due acknowledgements and have their sources quoted and listed. I am willing to carry out the proper process in accordance with the applicable laws and regulations if it turns out that this thesis is partly or entirely plagiarized from other works.

Thus, this statement is made to be used as necessary.

Makassar, July 25th 2022



Yizrielsa Tappi
NIM. J011191040

PREFACE

Praise and gratitude, we pray to the presence of God Almighty for His blessings and gifts so that the author can complete this Final Project entitled. "Prevention of Abutment Tooth Damage in Patients Using Overdenture Bare Root Removable Dentures" The writing of this thesis is one of the requirements for completing studies to achieve a bachelor's degree in dentistry at the Faculty of Dentistry, Hasanuddin University.


The author realizes that there are many obstacles faced in preparing this literature review, but thanks to prayers, support, and guidance from various parties, this literature review can be completed. Therefore, with all sincerity, the author would like to express his gratitude to:

1. **God Almighty** who always gives His participation during completion of this thesis
2. My beloved parents, **papa and mama** for the prayers, love, and all the support so far, both spiritual and material, as well as the entire extended family for the contribution and encouragement that has been given
3. **Prof. Dr. drg. Edy Machmud, Sp.Pros (K)** as the dean of Dentistry at Hasanuddin University for the moral support during the author's education
4. **Dr. drg. Ike Damayanti Habar, Sp.Pros(K)** as the supervising lecturer who has provided both academic and non-academic guidance, direction, time and energy in completing this thesis report.
5. **drg. Acing Habibie Mude, Ph.D, Sp.Pros** and **drg. Irfan Dammar, Sp.Pros(K)** as the examiner who has provided suggestions and constructive criticism to the author
6. **drg. Israyani, Sp.PM** as the academic supervisor for the guidance, advice, and support given to the author during the lecture.

7. All lecturers, academic staff, and library staff of **hasanuddin university** who have helped the writer during the lecture process
8. For **William Bagita Samuel**, who also always provides support and motivation to the author in completing his thesis
9. The writer's brother, **Navrianta Tappi**, who has always provided support during his education and the completion of this thesis
10. For **Agung Abe**, who always accompanied him during the writing of this thesis
11. For my friends, **Dias, Ilda, Quran, Indah, Rifqah, Teysha**, who always support the author in completing this thesis.
12. To my seba, **Joe, Roland, Misacl, Josh, Nilan, Frisci, Lia, Fiona**, who always entertain and support me during lectures and during the process of completing this thesis.
13. **Alveolar 2019** friends who always provide beautiful colors during lectures from the beginning until now.

The author realizes that in writing this thesis, there are shortcomings, and it is far from perfect. Therefore, the authors expect any criticism, suggestions, and suggestions for improvement in the future. Finally, hopefully, this literature review can provide benefits for all of us.

Makassar, July 25th 2022



Yizrielsa Tappi

ABSTRAK

Pencegahan Kerusakan Gigi Penyangga Pada Pasien Pengguna Gigi Tiruan
Lepasan Overdenture Bare Root
(Literature Review)

Yizrielsa Tappi

Mahasiswa Fakultas Kedokteran Gigi Universitas Hasanuddin

Latar Belakang : Kehilangan gigi menyebabkan migrasi patologis gigi geligi yang tersisa, penurunan tulang alveolar pada daerah edentulous, penurunan fungsi pengunyahan hingga gangguan berbicara. Untuk menangani masalah kehilangan gigi dapat menggunakan gigi tiruan *overdenture*. *Overdenture* adalah gigi tiruan sebagian atau lengkap lepasan yang menutupi dan bersandar pada satu atau lebih gigi alami, akar gigi, dan/atau dental implant. Keuntungan *overdenture* adalah meningkatkan retensi dan stabilitas dan mencegah resorpsi tulang alveolar. *Overdenture* terbagi atas 3 yaitu, *overdenture* bare root, *overdenture* coping, dan *overdenture* dengan attachment. *Overdenture* bare root merupakan pilihan desain dengan metode yang paling sederhana dan murah namun memiliki kekurangan seperti kemungkinan terjadi karies servikal yang dapat mengakibatkan kerusakan pada gigi penyangga, oleh karena itu perlu dilakukan penanganan dengan penggunaan stannous fluoride. **Tujuan :** untuk mengetahui kerusakan gigi penyangga pada pasien pengguna gigi tiruan lepasan *overdenture* bare root. **Metode :** Metode pengumpulan data yang digunakan dalam penelitian ini adalah metode dokumentasi. Metode dokumentasi adalah mencari metode dengan mencari literatur berupa jurnal artikel terkait dengan napa yang dimaksudkan dengan rumusan masalah. **Hasil :** berdasarkan hasil analisis beberapa literature didapatkan kerusakan yang terjadi pada gigi penyangga yaitu karies, gingivitis, dan periodontitis pada gigi penyangga yang diakibatkan oleh keausan gigi penyangga atau hilangnya restorasi akibat plak. **Kesimpulan :** Kerusakan yang terjadi pada gigi penyangga *overdenture* bare root yaitu Karies, gingivitis, dan periodontitis. Untuk mencegah terjadinya kerusakan pada gigi penyangga dapat dilakukan intruksi kepada pasien tentang bagaimana untuk merawat gigi tiruan dan melakukan kontrol rutin 6 bulan sekali **Kata Kunci :** *Overdenture*, *Overdenture* bare root, Gigi penyangga

ABSTRAK

*Prevention of Abutment Tooth Damage in Patient Using Overdenture Bare Root
Removable Dentures
(Literature Review)*

Yizrielsa Tappi

Student of the Faculty of Dentistry, Hasanuddin University

Background: *Loss of teeth causes pathological migration of the remaining teeth, decreased alveolar bone in the edentulous area, decreased masticatory function and speech disorder. To overcome the problem of tooth loss, overdenture dentures can be used. An overdenture is a removable partial or complete denture that covers and rests on one or more remaining natural teeth, roots, and/or dental implants. The advantage of overdenture is that it increases retention and gain and prevents alveolar bone resorption. Overdenture is divided into 3, namely, bare root overdenture, overdenture coping, and overdenture with attachments. Bare root overdenture is a design option with the simplest and cheapest method but has drawbacks such as the possibility of cervical caries which can cause damage to the abutment teeth, therefore it needs to be treated with the use of stannous fluoride.*

Objective: *To determine the damage to abutment teeth in users of overdenture bare root removable denture users. **Method:** The data collection method used in this research is the documentation method. The documentation method is looking for method by searching for literature in the form of journal articles related to NAPA related to the formulation of the problem. **Results:** Based on the results of the literature analysis, it was found that the damage that occurred to the abutment teeth, namely caries, gingivitis, and periodontitis in the abutment teeth caused by wear of the abutment teeth or restoration due to plaque. **Conclusion:** The damage that occurs to the bare root overdenture abutments are caries, gingivitis, and periodontitis. To prevent damage to the abutment teeth, instructions can be given to patients on how to care for dentures*

and perform routine check-ups every 6 months

Keywords: *Overdenture, Bare root overdenture, Abutment teeth*

TABLE OF CONTENTS

COVER	i
TITLE PAGE	ii
APPROVAL SHEET	iii
RATIFICATION	iv
DECLARATION OF AUTHENTICITY	v
PREFACE	vi
ABSTRAK	viii
ABSTRACT	ix
TABLE OF CONTENTS	x
TABLE OF FIGURES	xiii
TABLE OF TABLE	xiv
CHAPTER 1 INTRODUCTION	1
1.1 Background	1
1.2 Formulation of the Problem	2
1.3 Purpose of Thesis	3
1.3.1 General Purpose	3
1.3.2 Special Purpose	3
1.4 Benefits of Thesis	3
1.4.1 Theoretical Benefits	3
1.4.2 Practical Benefits	3
CHAPTER II LITERATURE REVIEW	4
2.1 Overdenture	4
2.1.1 Indications and Contraindications Overdenture	5
2.1.1.1 Overdenture Indication.....	5
2.1.1.2 Overdenture Contraindication	6
2.1.2 Advantages and Disadvantages of Overdenture	6
2.1.2.1 Advantage.of Overdenture	6

2.1.2.2 Disadvantages of Overdenture	8
2.2 Overdenture Bare Root	9
2.2.1 Indications and Contraindications Bare Root Overdenture	10
2.2.1.1 Indication for Bare Root Overdenture.....	10
2.2.1.2 Contraindications for Bare Root Overdenture	11
2.2.2 Advantages and Disadvantages of Bare Root Overdenture.....	11
2.2.2.1 Advantages of Bare Root Overdenture	11
2.2.2.2 Disadvantages of Bare Root Overdenture	11
2.2.3 Maintenance of Bare Root Overdenture Abutment Teeth.....	12
2.3 Damage to the abutment teeth of Overdenture Bare Root	13
2.3.1 Damage to Natural Gear Elements	13
2.3.2 Periodontal Tissue Damage	14
2.3.3 Damage Due to Improper Denture Design	15
2.4 Treatment of damage to bare root overdenture abutments	15
2.5 Theoretical Framework	17
CHAPTER III WRITING METHOD.....	18
3.1 Approach and Type of Writing	18
3.2 Data Source	18
3.3 Data Collection Method	18
3.4 Writing Procedure	19
CHAPTER IV DISCUSSION	20
4.1 Synthesis Table	20
4.2 Journal Analysis	29
4.3 Journal Equation	40
4.4 Journal Differences	41
CHAPTER V CLOSING	43
5.1 Conclusion	43
5.2 Suggestions	43
REFERENCES	44

APPENDIX47

TABLE OF FIGURES

Figure 1. Coping Overdenture.....4
Figure 2. Noncoping Overdenture.....4
Figure 3. Overdenture with attachment5
Figure 4. Fracture of the Denture Base.....8
Figure 5. Denture Wear..... 8
Figure 6. Perforation of the Denture Over the Abutment Teeth..... 9
Figure 7. Bare Root Overdenture10

TABLE OF TABLE

Table 1. Comparing the mean and standard deviation between attachment loss for the first group of vital abutments and the second group of nonvital abutments at different times.....	29
Table 2. Comparing the mean and standard deviation of tooth mobility between the first group of vital abutments and the second group of nonvital abutments at different times	30
Table 3. Measurement of pocket depth of the two groups	31
Table 4. Colony-forming units of the two groups	32
Table 5. The average depth of the occlusive cavity from the experimental group	34
Table 6. The average depth of remineralization bands of occlusal lesions by the experimental group	34
Table 7. Average total lesion depth on the occlusal surface by the experimental group	35
Table 8. Mean cavity depth of root lesions by the experimental group	35
Table 9. Mean depth of remineralization band of root lesions by the experimental group	36
Table 10. Average total lesion depth by the experimental group	37
Table 11. Denture care needs by gender, age group, and interest variables (N = 91)	38
Table 12. Denture care needs by gender, age group, and interest variables (N = 35)	39
Table 13. The three follow-up examinations revealed average attachment loss (mm) by tooth surface and dental arch.....	40

CHAPTER 1

INTRODUCTION

1.1 Background

Tooth loss is a condition where the teeth are not there or is missing from the socket or place or the condition of the teeth causing the opposing tooth to lose contact. Tooth loss causes pathological migration of the remaining teeth, decreased alveolar bone in the edentulous area, decreased masticatory function to speech disorders. The cause of tooth loss is often caused by disease factors such as caries and periodontal disease. Other factors such as trauma, attitudes and characteristics towards dental health services, socio-demographic factors and lifestyle also influence tooth loss.¹

Indonesia has a prevalence of 57.6% of dental and oral problems, a 19.0% prevalence of tooth loss in Indonesia, and a 10.13% prevalence of tooth loss in the 55-64 age group. Based on the 2018 RISKESDAS data, 57.6% of dental and oral problems are tooth loss, an increase from the previous RISKESDAS data.²

Tooth loss problems are usually corrected using conventional dentures that use wire or cast metal clasps to retain the abutment teeth. However, over time, the abutment teeth will experience damage, causing an unaesthetic appearance, periodontal tissue abnormalities due to a large amount of chewing pressure, and alveolar bone resorption around the abutment teeth, which can affect the retention and stability of conventional dentures. Therefore, to maintain the retention and stability of the denture as much as possible, avoid extraction and retain one or more natural teeth that are still strong to be used as abutments from an overdenture denture design.³

An *overdenture* is a removable partial or complete denture that covers and rests on one or more natural teeth, tooth roots, and dental implants. The advantages of overdenture include increasing retention and stability, preventing alveolar bone resorption, and maximizing masticatory function. Overdenture is indicated in patients with conditions such as still having one or several remaining teeth, teeth with severe attrition, and poor tongue position.⁴

Overdenture design based on the shape of the restoration is divided into three categories: non-coping overdenture or bare root overdenture, coping overdenture, and overdenture with attachments, such as magnetic hooks, stud hooks, and bar hooks.⁵

Non-coping or bare root overdenture is a design choice with the simplest and cheapest method, namely using natural teeth that have been treated endodontically and then root canal preparation, filled with a root canal filling material after which filling with amalgam or glass ionomer filling materials, then made a denture on it.^{6,7}

The advantages of using bare root abutments are low cost, can be retreated or modified if needed, and make it easier for the operator to make a treatment plan. However, bare root abutments also have disadvantages, such as the possibility of cervical caries, which can cause damage to the abutment teeth, therefore need to protect the root surface in addition to oral hygiene instructions such as the use of stannous fluoride and advice on diet.^{8,9}

Another drawback is the susceptibility to periodontal disease. In a study of the use of overdentures, it was reported that gingival bleeding around the abutments developed after four years, and inflammation was evident in 12% of abutments after three years. To prevent this risk, plaque control is needed.⁹

Based on the above background, the author is interested in conducting an in-depth theoretical study regarding the prevention of abutment tooth decay in patients using bare root overdenture removable dentures.

1.2 Formulation of the Problem

Based on the description of the background, the formulation of the problem in this literature review is:

1. What are the damages that can occur in bare root overdenture?
2. What are the factors that can cause damage to the bare root overdenture abutment teeth?
3. How to prevent damage to the bare root overdenture abutment teeth?
4. How to deal with the damage to the bare root overdenture abutment teeth?

1.3 Purpose of Thesis

1.3.1 General Purpose

Based on the formulation of the problem described above, this study aimed to determine the damage to abutment teeth in patients using bare root overdenture removable dentures.

1.3.2 Special Purpose

The specific objectives of this literature review are:

1. To find out the damage that can occur to the bare root overdenture
2. To find out the factors that can cause damage to the bare root overdenture abutment teeth
3. To find out how to prevent damage to the bare root overdenture abutment teeth
4. To know the treatment for bare root overdenture abutment tooth decay?

1.4 Benefits of Thesis

1.4.1 Theoretical Benefits

This writing can provide information about the treatment of abutment teeth in patients using removable dentures with bare root overdenture

1.4.2 Practical Benefits

This writing is expected to be used as a reference to pay more attention to the condition of the oral cavity to prevent damage to the abutment teeth in users of bare root overdenture dentures.

CHAPTER II

LITERATURE REVIEW

2.1 Overdenture

In 1789, John Greenwood made the first ivory mandibular denture for George Washington, using the left premolar as support. Then as early as 1916, Prothero had also proposed using the root of the tooth as a denture abutment and said that often two or three tooth roots that were far apart could be used to support the denture. In 1969 Lord and Teel published an article describing the simple treatment and a combination of endodontic-periodontic-prosthetic combined treatment techniques for fabricating dentures supported by tooth roots.¹⁰

An overdenture is a removable complete or partial denture supported by one or more remaining natural teeth, natural tooth roots, and dental implants. Implants or modified natural teeth provide additional support, stability, and retention of the overdenture compared to an edentulous ridge alone.⁴

Based on the abutment tooth preparation, overdenture is classified into noncoping overdenture, coping overdenture, and overdenture with attachment.⁷

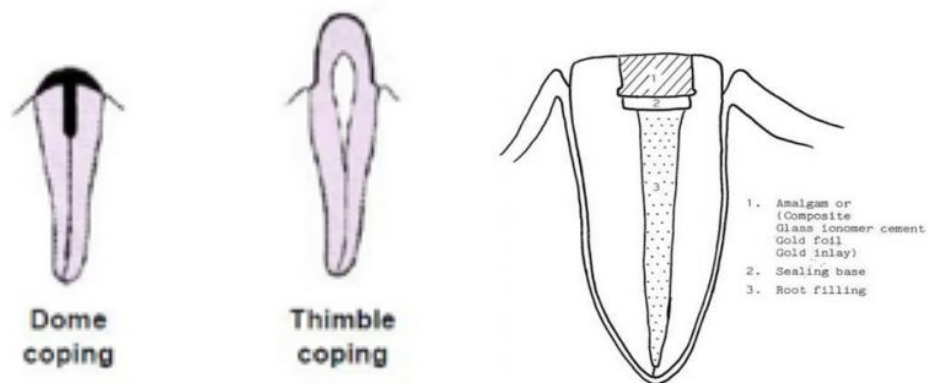


Figure 1. Coping Overdenture

Figure 2. Noncoping Overdenture

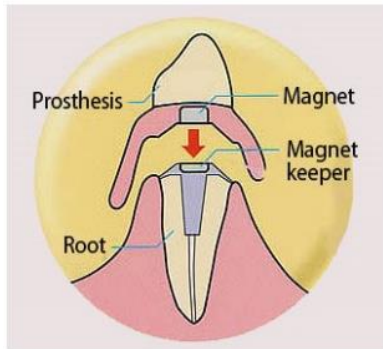


Figure 3. Overdenture with Attachment

(Source: Gunawan GRN, Ismiyati T, Dipoyono HM, Kusuma HA. Perawatan Gigi Tiruan Lengkap Menggunakan Overdenture Magnet, Coping, dan Bare Root Sebagai retensi. *Clinical Dental J* 2019; 5(1) : 17-21)

Overdentures have many advantages over conventional complete dentures. The most important benefit is the preservation of the remaining alveolar supporting bone along with increased stability and retention of the prosthesis.¹¹

Overdenture has a long history of development. In Europe, the development of overdenture is influenced by precision attachment tools/units/devices. The success or failure of overdenture treatment depends on the condition of the periodontium. The results of 70 years of clinical research show long-term success. One thing that must be considered in the treatment of overdentures is the shape of the denture base, and the material that covers the remaining roots of the teeth must be acceptable to the periodontium.¹²

2.1.1 Indications and Contraindications Overdenture

2.1.1.1 Overdenture Indication.

The use of overdenture has the following indications:

1. Jaw curvature requires a prosthesis with only a few teeth that can be preserved. Overdentures can be made for patients with only one or two teeth
2. Patients with poor prognosis for complete dentures, such as patients with poor tongue position, or muscle attachments.

3. Normal reconstruction of teeth cannot be supported financially.
4. Cases of cleft palate and cases of congenital anomalies such as microdontia, amelogenesis imperfecta, dentinogenesis imperfecta, and partial anodontia.
5. Sharp mylohyoid projection.
6. Patients with abnormal jaw size and position where orthognathic surgery is contraindicated.
7. Unilateral overdenture can give good results support, function, and aesthetics.
8. Dentures of patients with maxillofacial trauma.^{5,13}

2.1.1.2. Contraindications Overdenture.

Contraindications of overdenture are as follows:

1. Mobility of class III abutments due to uncorrectable bone loss.
2. Soft tissue and bone defects that cannot be repaired surgically.
3. Uncooperative patient who cannot maintain oral hygiene.
4. Failure to establish a sufficient zone of attached gingiva by mucogingival or grafting procedures.
5. Excessive reduction of the alveolar remnant adjacent to the ridge as a result of elimination of the normal architecture.
6. When the patient cannot accept anything other than a complete denture psychologically.
7. Where other methods give better results-such as removable partial dentures or, in some cases, fixed bridges.
8. Debating medical or psychiatric disorder overrides essential clinical procedures and maintenance.⁵

2.1.2 Advantages and Disadvantages of Overdenture

2.1.2.1 Overdenture Advantage.

The use of overdenture has the following advantages:

1. Overdenture treatment has a better treatment method than other alternative treatment methods. This is found in congenital cases such as hypodontia, oligodontia, and microdontia.

2. Provides a good defense of the alveolar bone. Overdenture utilizes retained teeth or natural teeth that are included to protect the ridge from stress and help maintain the height of the alveolar bone
3. Provides good retention and stability because the height of the alveolar bone is still maintained because natural teeth support the retention and stability of the denture. The overdenture treatment causes loading on m. The mucosal lining is reduced by the vertical support of the supporting elements, thereby reducing mucosal irritation.
4. Due to good retention and stability to provide good occlusion and esthetics as a result of accurate conditions on the overdenture, it is easier to prepare and achieve so that the open face construction of the overdenture is easy to apply.
5. The difference in dimensions and consistency of food will be felt more quickly. The proprioception response will support the ability to chew because psychologically, the patient feels that there are still natural teeth and helps the adaptation process from the use of overdenture
6. The advantages of overdenture treatment that require root canal treatment will provide extraordinary happiness, especially for elderly patients, because extraction of all sides of the tooth will cause mental trauma.
7. The distribution of masticatory forces on the abutment teeth reduces trauma to soft tissues and alveolar bone resorption.
8. Overdentures are easily modified into conventional dentures by rebasing or relining
9. Because overdenture treatment preserves existing natural teeth, it gives dentures advantages such as directional sensitivity, touch sensitivity to load, dimensional discrimination, proprioception, and more.
10. Proprioceptive sensors on the overdenture provide precise information about the magnitude of the load and the direction of the occlusal load. This increases the patient's coordination and ability when using dentures.
11. Reduction of crown height can improve the crown-to-root ratio, reducing abutment teeth' mobility. 50% of the roots that became the overdenture abutment

teeth did not experience the mobility, and 25% at the beginning of treatment-experienced mobility and then experienced reduced mobility.^{4,14}

2.1.2.2 Disadvantages of overdenture.

The disadvantage of overdenture treatment is that it can cause cervical caries in the abutment teeth, and cause periodontal disease due to the appearance of bacterial colonies under the denture base if the dentist does not consider oral hygiene. The prevalence of caries in the patient, the risk is reduced if the patient has frequent appointments for treatment. , meticulous with hygiene and daily use of high concentration topical fluoride gel.⁵

Potential problems are also associated with denture fabrication, namely denture fracture. Overdenture dentures tend to be convex, causing high labial fullness. The anatomical shape of the bone that forms the undercut sometimes complicates the process of inserting an overdenture denture.¹⁶

Greater cost. The drawbacks are directly related to the extent of care before prosthesis fabrication, retention hooks, and effort after insertion.¹⁶

Retention in mandibular overdenture treatment and low resistance to horizontal movements can cause stability during mastication to decrease, resulting in a decrease in masticatory efficiency. Still, suppose the abutment teeth are given mechanical retention aids. In that case, it can increase overdenture retention, and patient adaptation will be faster.¹⁷



Figure 4. Fracture of the denture base.



Figure 5. Denture wear.



Figure 6. Perforation of the denture over the abutment teeth.

(Source: Ettinger RL, Qian F. Longitudinal assessment of denture maintenance needs in an overdenture population. *J of Pros* 2019)

2.2 Overdenture Bare Root

Non-coping or bare root overdenture is an overdenture design option with the simplest and cheapest method: covering endodontically treated roots with amalgam, composite, or glass ionomer cement. The purpose of using bare root overdenture is to prevent alveolar bone resorption.^{6,7}

Bare root overdenture uses natural teeth that have been endodontically treated. The bare root overdenture is made in a convex or dome-like shape by reducing the crown by 2-3 mm and then restored with an amalgam or glass ionomer filling material; then, a denture is made on top of it.⁷

Preparation for treatment of bare root overdenture abutments can be started with plaque control, and oral cleaning actions are performed on patients who will be made overdenture dentures. This is important because the denture will cover the entire surface of the abutment teeth so that the abutment teeth remain healthy. Patients were also instructed to maintain regular dental, oral hygiene, and remove plaque regularly. Patients also need to be informed about the relationship between plaque and caries in the abutment teeth, which will support the overdenture denture.^{4,17}

Periodontal treatment also needs to be considered so that this tissue is healthy. The condition of the attached gingiva that must be treated Note is that the size is more than 1 mm; if there is inflammation, it must be treated first before

preparing the abutment teeth. Endodontic treatment was carried out before preparing the abutment teeth. The root canal was filled with root canal filling material and placed 3 mm in the apex area. After a radiological examination, the abutment teeth were cut at 2-3 mm height above the gingiva to speed up endodontic treatment.^{18,19}



Figure 7. Bare Root Overdenture.

(Source: Mekawy NE, Ibrahim CRM, Hegazy S. Tooth Overdenture Denture Base Materials. 2021)

2.2.1 Indications and Contraindications Bare Root Overdenture

2.2.1.1 Indication for Bare Root Overdenture.

Indications for bare root overdenture treatment are:

- Elderly patients with general health who do not allow tooth extraction.
- The poor prognosis for abutments to be used as conventional denture supports.
- Small interocclusal distances often cause locked occlusion.

Bare root overdenture dentures are more economical than overdenture dentures with other designs. Bare root overdenture has a simple design and does not take up space. Bare root overdentures are an ideal solution during the maturation of edentulous ridges after immediate technique insertion or when the gingival margin is formed after mucogingival surgery. The bare root design can also be used when time is needed to evaluate a questionable tooth or in a cooperative patient.^{8,12}

2.2.1.2 Contraindications for Bare Root Overdenture

Contraindications to bare root overdenture treatment are:

1. If the antagonist's tooth is natural, there will likely be wear and tear on the dentin and prone to fracture of the bare root that supports the denture.
2. Patients with poor OH condition.
3. It should not be used in the long term where the natural teeth are in direct opposition. The incidence of longitudinal root fracture has increased significantly in these circumstances
4. The opposite bare root surface must not be left. Dentin-to-dentin contact can result in very high wear rates.
5. Bare root surfaces should not be used in the long term unless a very smooth surface can be produced.⁸

2.2.2 Advantages and Disadvantages of Bare Root Overdenture

2.2.2.1 Advantages of Bare Root Overdenture

The advantages of using bare root overdenture include:

1. The maintenance process is relatively easy and inexpensive
2. It Can be used as an immediate overdenture denture because it can protect the extraction or surgical wound. If the abutment teeth are further damaged, the tooth can be extracted or re-treated.
3. Retreats can be made if needed, making it easier for operators to make treatment plans.
4. Can avoid uncomfortable chewing and will not be embarrassed because it does not have to go through the edentulous phase, and the centric relation is easily obtained and recorded.^{8,21}

2.2.2.2 Disadvantages of Bare Root Overdenture

Bare root supports have drawbacks, such as a high risk of root caries, so it is necessary to maintain oral hygiene, administer mouthwash containing fluoride and have regular check-ups with the attending dentist. Another drawback of bare

root overdentures is that they provide little retention for the denture due to the grinding of the roots to the gingival margin.²¹

2.2.3 Maintenance of Bare Root Overdenture Abutment Teeth.

Based on clinical observations and research reports, good oral hygiene is a significant factor in the success of overdentures. Maintaining the cleanliness of the abutment teeth can be done by brushing the abutment teeth using brush bristles using the toothbrush forming an angle of approximately 45 degrees from the abutment teeth and endeavoring to ensure that the tips of the bristles enter the crevices of the abutment teeth or by another method using dental floss. Roller bandage, woven four layers of fine nylon thread. For patients who do not have the agility to use this method, there is a simple routine that takes less time and maybe just as effective: the patient is given a child's toothbrush with soft bristles; The small head and short bristles make it easy to gain access to all abutments. This method is excellent for natural or restored teeth but may be difficult to use with short abutments.²²

For users of overdenture dentures whose abutment teeth are short, it is recommended to use a toothpaste containing fluoride, brushing for a relatively long time, and the bristles of the brush parallel to the abutment teeth. Brushing teeth is attempted repeatedly in different directions. After brushing, the patient rinsed his mouth and then polished the abutment teeth with a rubber cup with a small quantity of toothpaste in a circular motion. After the abutment teeth are polished and rinsed, the abutments and gaps around the teeth must be clean. This method instructs the patient to do so that it will become a patient habit.²²

In optimizing this prosthodontic treatment, the patient is given instructions for periodic check-ups every three months. Control intervals can be modified when indicated; for example, patients with excellent motivation and home care can be seen at 6-month intervals, whereas patients with poor track records can be scheduled more frequently. During this visit, examination of the tissues around the retained teeth should be routine, such as examination of abutments and

overdentures. Any developing pockets are removed to avoid possible loss of abutment teeth.²²

2.3 Damage to the abutment teeth of Overdenture Bare Root

The abutment teeth are part of the denture as a support for the denture, which can be in the form of natural teeth or implants.

Requirements for abutment teeth:

1. The abutment teeth must be surrounded by healthy periodontal tissue
2. The abutment teeth used can be treated with endodontic treatment.
3. Slanted teeth cannot be used as abutments because of the large enough undercut that can cause food waste to accumulate.
4. Having the number and position of teeth in the arch of the jaw, namely two teeth in each quadrant of one arch.^{8,13}

Damage to the abutment teeth is divided into three, namely damage to the natural tooth elements that are used as supports in the form of caries, damage to the supporting tissues of the teeth in the form of gingivitis and periodontitis, and damage due to improper denture design, causing the load received by the abutment teeth to be too large, resulting in fracture of the abutment teeth.^{14,15}

2.3.1 Damage to Natural teeth Elements

Dental caries is a prevalent chronic infectious disease resulting from tooth-adherent cariogenic bacteria that metabolize sugars to produce acid, which over time demineralizes tooth structure.²³ Caries represents one the main conditions that could result in the extraction of abutment teeth. Therefore effective caries prevention measures will increase the prognosis of both the abutment teeth and the prostheses^{24,25}

Regular monitoring of oral hygiene procedures that include the use of assistive devices such as cleaning solutions, dental floss, and topical application of fluoride solutions has significantly reduced the incidence of caries in overdenture patients.⁸

2.3.2 Periodontal Tissue Damage

The use of dentures can cause damage to the periodontal tissue. Periodontal tissue is the supporting tissue of the teeth consisting of the gingiva, periodontal ligament, cementum, and alveolar bone attached to the tooth roots. Periodontal damage is the second most common dental and oral disease after dental caries, experienced by many people worldwide and is also experienced by almost 90% of people in Indonesia. Periodontal disease occurs when the periodontal tissue is unhealthy, commonly found in patients with poor oral hygiene. Periodontal damage is part of several inflammatory conditions of the supporting tissues of the teeth caused by bacteria. Damage to the periodontal tissues of the abutment teeth in the form of gingivitis and periodontitis.^{17,26}

Damage in the form of gingivitis can occur in the tissue around the abutment teeth due to poor denture design so that the base surface cannot rest well on the surface of the natural teeth that are used as abutments. This condition can cause food scraps to snag and buildup of plaque that can easily cause gingivitis. When plaque remains attached to the teeth for more than 72 hours, it will harden and form calculus which impacts the occurrence of gingivitis.^{17,27}

Gingivitis is often found in patients who use dentures and ignore the hygiene factors of their dentures and oral cavity. Gingivitis left untreated and not immediately treated will cause damage to the periodontal tissue. The continuation of gingivitis is the inflammation of the periodontal tissue called periodontitis.¹⁴

The periodontitis begins with an increase in plaque on natural teeth and dentures, then causes inflammation of the gingiva to the deeper tissues towards the bone under the teeth, causing more extensive damage known as periodontitis. The occurrence of periodontitis will result in the mobility of the abutment teeth.^{5,14}

Mobility of the abutment teeth can occur due to poor oral hygiene. It can lead to the forces acting on the denture and affecting the abutment teeth. These working forces will make the abutment tooth tissue susceptible to damage. Over time, the possibility of disease in the periodontal tissues of the abutment teeth will increase.^{5,14}

2.3.3 Damage Due to Improper Denture Design

The basis of denture design is to reduce the load, divide the load between the teeth and the ridge, and share the load as widely as possible. Design principles for removable partial dentures include such things as:

- Have to pay attention to the teeth that are still there
- Tissue preservation
- Oral hygiene
- Resistance to various forces (retention and stabilization)
- Base adaptation must be good so that the stress distribution is also good

Denture design that does not pay attention to design principles can cause damage to the oral cavity which includes damage to mucous membranes, alveolar bone, and damage to teeth. Damage to the mucous membranes occurs because of too much mucosal area covered by the prosthesis, the pressure of an open bite, and the anatomical shape of a denture with a cusp that is too large. A load of chewing pressure will be transmitted from the denture to the oral mucosa, if the bite is open, the oral mucosa will experience chronic mechanical irritation during the function of the prosthesis. This pressure will damage the mucosa that directly receives the chewing load. The anatomical shape of dentures with cusps that are too large will cause interference during the articulation movement which over time will cause jaw joint disorders.

Improper denture design can also cause a load received by the abutment teeth is too large so that there can be damage to the alveolar bone and fracture of the abutment teeth.¹⁵

2.4 Treatment of damage to bare root overdenture abutments

Treatment for damage to bare root overdenture abutment teeth, including:

1. One of the problems with bare root overdenture damage is the loss of restoration on abutment teeth undergoing root canal treatment. To deal with the damage to the overdenture, it can replace the lost restoration on the root of the abutment tooth.

2. Another problem is the mobility of the denture base due to residual bone resorption in the posterior edentulous area. To treat the damage to the overdenture, the overdenture can be relined or remade.
3. Another damage is denture wear which can result in loss of occlusal vertical dimension. The overdenture must be remade with the appropriate freeway space to overcome an overdenture problem.^{17,30}

2.5 Theoretical Framework

