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Periodontal Health of the Anterior Teeth with Different Types of Orthodontic Retention Means

A Project Submitted to

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Fulfillment for the Bachelor Degree of Dental Surgery

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



وَقَالَ
رَبِّ زِدْنِي عِلْمًا



صِدْقَ اللَّهِ الْعَظِيمِ

Certification of the Supervisor

I certify that this project entitled "**Periodontal Health of The Anterior Teeth With Different Type of Orthodontic Retention Means**" was prepared by the fifth-year student (**Ula Ali Jamel**) under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the Bachelor Degree in Dentistry.

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Dedication

To my beloved mother, without her love and prayers, I would never have been here.

To those who believed in me when I lost faith in myself my closest Baydaa and majda

To Dear father and brothers , thank you for your continuous support

To the one who taught me how to start, sister zahraa

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Introduction

Periodontal health refers to the health of the gums and supporting structures around the teeth. Maintaining good periodontal health is essential for maintaining overall oral health and preventing tooth loss. One factor that can impact periodontal health is the type of retention used after orthodontic treatment. (Peeran and Ramalingam, 2021).

Orthodontic retention involves keeping teeth in their new positions after braces or other orthodontic appliances are removed. There are several different types of retention, including fixed retainers (which are bonded to the back of the teeth) and removable retainers (which can be taken out of the mouth). Each type of retention has its own advantages and disadvantages. (Acharya *et al.*, 2021).

Researches had shown that the type of retention used could have an impact on the periodontal health of the front teeth. Specifically, some studies have found that fixed retainers can lead to a buildup of plaque and tartar around the teeth, which can in turn lead to gum diseases. Removable retainers, on the other hand, may be less likely to cause this buildup. Understanding how different retention methods impact periodontal health is important for orthodontic patients and practitioners alike. By choosing the right type of retention for each patient and ensuring that patients understand how to care for their teeth and gums after orthodontic treatment, practitioners can help promote good periodontal health and prevent complications down the line. Further researches in this area can help to refine our understanding of the relationship between retention methods and periodontal health and improve orthodontic treatment outcomes. These researches will ensure parameter guidelines for better health improvement and maintenance of teeth in their new positions. (Vogel *et al.* 2013; Bekler *et al.* 2015).

Aim of the study

- Understand how retention type and other factors may contribute to the development of gum disease after orthodontic treatment.
- This information could help orthodontic practitioners choose the most appropriate type of retention for their patients and to Provide good established understanding for have retention means and other factors to development of gum disease periodontal after orthodontic treatment.

Chapter One

Review literature

1.1.View of the healthy and unhealthy periodontium :

1.1.1.Periodontium:

The periodontium refers to the tissues that surround and support the teeth, including the gingiva (gums), cementum, periodontal ligament, and alveolar bone. (Walton *et al.*, 2002).

A healthy periodontium is characterized by a pink color, firm texture, and absence of bleeding, swelling, or pain. The gums well-protected around the teeth, forming a shallow, V-shaped groove called the gingival sulcus. The sulcus is lined by a thin, non-keratinized epithelium that attaches to the tooth surface via specialized structures called hemidesmosomes. The sulcus is also filled with a fluid called gingival crevicular fluid (GCF), which contains immune cells, antibodies, and enzymes that help to defend against bacterial infection. (Yamada, 2000).

In contrast, an unhealthy periodontium may exhibit a range of symptoms and signs, including redness, inflammation, bleeding, swelling, and/or pain. This may be due to a variety of factors, including bacterial plaque buildup, genetic predisposition, hormonal changes, or other underlying medical conditions. As the disease progresses, the periodontal tissues may become more damaged, leading to loss of attachment between the teeth and gums, formation of deep pockets around the teeth, and eventually, tooth loss. (Chandan *et al.*, 2017).

Periodontal disease is commonly classified into two main types: **gingivitis and periodontitis**. Gingivitis is a common and mild form of periodontal disease that is characterized by inflammation and bleeding of the gums. It is usually caused by the buildup of bacterial plaque on the teeth and gums. Plaque is a sticky film that forms on the teeth and can lead to gum disease if not removed by regular brushing and flossing. When plaque is not removed, it can irritate the gums and cause inflammation, leading to redness, swelling, and bleeding (**Bollen, A. M., et**

al. 2009). Periodontitis is a more severe form of periodontal disease that occurs when the inflammation and infection caused by gingivitis extend deeper into the tissues surrounding the teeth, affecting the periodontal ligament and alveolar bone. In this condition, the gums may recede, leading to the formation of pockets between the teeth and gums that can fill with bacteria and pus. The bacteria produce toxins that stimulate an immune response, leading to destruction of the periodontal tissues and bone that support the teeth. (Chandan *et al.*, 2017).

As periodontitis progresses, the pockets become deeper, and the bone and tissue supporting the teeth continue to be destroyed, leading to tooth loss. Other symptoms of periodontitis may include bad breath, loose teeth, gum recession, and changes in bite. (Fudalej, P. S., *et al.* 2011).

Risk factors for periodontitis include smoking, diabetes, genetic factors, certain medications, and poor oral hygiene. Both forms of periodontal disease can cause significant damage to the teeth and surrounding tissues if left untreated, highlighting the importance of maintaining good oral hygiene and seeking regular dental care (Fudalej, P. S., *et al.* 2011).

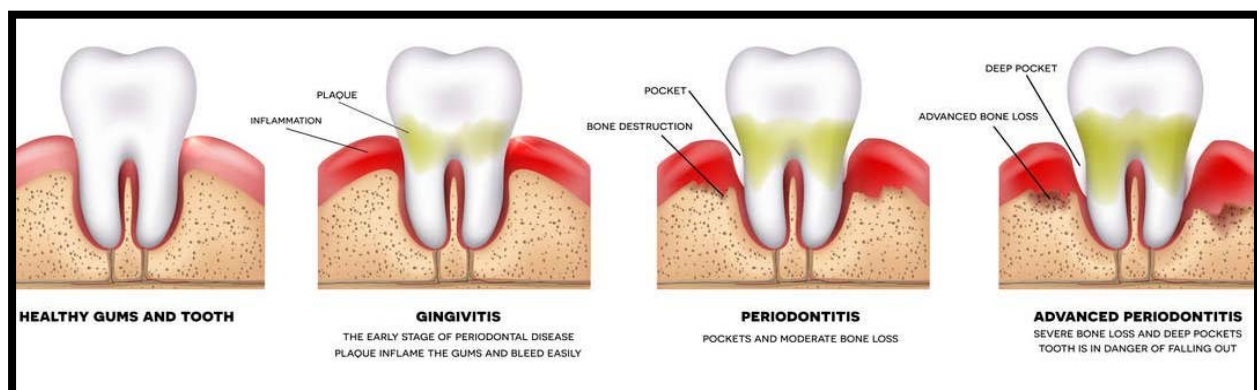


Figure 1: Periodontitis & Gingivitis (Navazesh and Kumar, 2020).

1.2. View on the anatomy of the anterior teeth:

1.2.1.Upper Anterior Teeth: (Chandan et al., 2017):

- Central Incisors: These teeth have a single, large, rectangular-shaped crown with a smooth surface and a slightly rounded incisal edge. They have a mesial and a distal contact area, and a lingual fossa on the lingual surface.
- Lateral Incisors: These teeth are smaller than the central incisors and have a similar shape, but are more tapered and have a more pointed incisal edge. They also have a mesial and a distal contact area and a lingual fossa.
- Canine Teeth: These teeth are larger and more pointed than the incisors, and have a prominent cusp on the incisal edge. They have a mesial and a distal contact area and a lingual ridge on the lingual surface.

1.2.2.Lower Anterior Teeth: (Shafie, 2007; Prasad *et al.*, 2014).

- Central Incisors: These teeth are similar in shape to the upper central incisors, but are smaller and have a more pronounced curvature. They also have a mesial and a distal contact area and a lingual fossa on the lingual surface.
- Lateral Incisors: These teeth are smaller than the central incisors and have a similar shape, but are more tapered and have a more pointed incisal edge. They also have a mesial and a distal contact area and a lingual fossa.
- Canine Teeth: These teeth are larger and more pointed than the incisors, and have a prominent cusp on the incisal edge. They have a mesial and a distal contact area and a lingual ridge on the lingual surface.

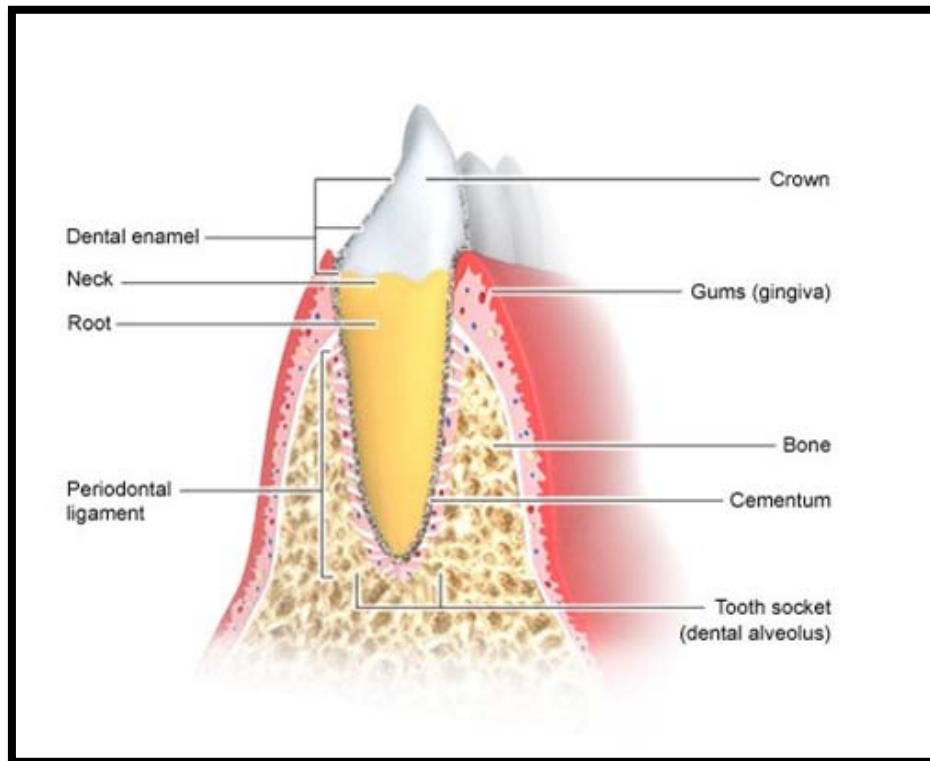


Figure 2: Periodontium (Patel *et al.* 2020).

1.3. Retention means of the anterior teeth:

There are several types of retention means that can be used for anterior teeth. Here are some examples:

1. Bonded retainers: These are thin wires that are bonded to the back of the teeth using dental adhesive. They are usually placed on the lower front teeth, and can be used in conjunction with other types of retainers. (Prasad *et al.*, 2014).



Figure 3: Bonded retainers (Maia, L. G., *et al.* (2018)).

2. Removable retainers: These are removable devices that are custom-made to fit the shape of the patient's teeth. They are usually made of clear plastic and are designed to be worn for several hours each day (Maia, L. G., *et al.* 2018).



Figure 4: Removable retainers (Bollen, A. M., *et al.* (2018)).

A. Hawley retainers: These are removable retainers that consist of a metal wire that wraps around the teeth and a plastic or acrylic base that sits on the roof of the mouth. They are also custom-made to fit the patient's teeth.



Figure 5: Hawley retainers (Dyasanoor and Saddu, 2018).

B. Essix retainers: These are clear plastic retainers that fit over the teeth and are designed to be worn for several hours each day. They are custom-made to fit the patient's teeth. (Rodrigues *et al.* 2009).



Figure 6: Essix retainers (Littlewood *et al.* (2015).

C. Spring retainers: These are removable retainers that use small springs to apply pressure to the teeth, helping to keep them in place. (Krennmair *et al.*, 2001; Al qutaibi, 2016).



Figure 7: Spring retainers (Li *et al.* (2020)).

It's important to note that the type of retention means used will depend on a variety of factors, including the patient's age, the severity of their orthodontic issues, and their individual treatment plan. It's always best to consult with an orthodontist to determine the best retention means for your individual needs. (Krennmair *et al.*, 2001; Al qutaibi, 2016).

1.4. Study Finds Link Between Retention Method and Periodontal Health of Anterior Teeth:

Refers to a specific research study that has investigated the relationship between the type of retention used after orthodontic treatment and the periodontal health of the front teeth (Littlewood *et al.* 2007).

This study likely involved examining a group of orthodontic patients who had recently completed treatment and had been fitted with either fixed or

removable retainers. The researchers would have then assessed the periodontal health of the patients' front teeth, using measures such as pocket depth, bleeding on probing, and attachment loss. They may have also assessed the presence of plaque and tartar buildup around the teeth. (Ghotmi *et al.*, 2013).

The results of this study would likely have shown a correlation between the type of retention used and the periodontal health of the front teeth. For example, the study may have found that patients with fixed retainers had higher levels of plaque and tartar buildup and greater attachment loss than those with removable retainers. Alternatively, the study may have found that both types of retainers had similar effects on periodontal health, but that patients who did not follow proper oral hygiene practices had worse outcomes. (Ghotmi *et al.*, 2013).

The findings of this study would have implications for orthodontic practice, as they would suggest that the choice of retention method can impact the periodontal health of the front teeth. Orthodontic practitioners may use this information to inform their decisions about which type of retention to use for each patient and to educate patients about the importance of maintaining good oral hygiene practices after treatment. (Al qutaibi, 2016).

Overall, this headline suggests that there is growing evidence that the type of retention used after orthodontic treatment is an important factor in the periodontal health of the front teeth, and that further research is needed to understand this relationship more fully. (Yamada,2000).

1.5. Comparing Fixed and Removable Retainers for Their Impact on Periodontal Health of Anterior Teeth:

The impact of different types of retainers on the periodontal health of the anterior teeth is an important area of research in orthodontics. Retention is an essential part of orthodontic treatment, as it helps to ensure that teeth stay in their new positions after braces or other orthodontic appliances are removed. However, the type of retention used can impact the periodontal health of the front teeth, which can in turn affect overall oral health and lead to tooth loss, or minimize the long life of teeth. (Kakar, 2001).

Fixed retainers are a common type of retention used after orthodontic treatment. These retainers are bonded to the back of the front teeth and are designed to stay in place permanently. One advantage of fixed retainers is that they are always in place and do not require any additional effort from the patient. However, some studies have found that fixed retainers can lead to a buildup of plaque and tartar around the teeth, which can in turn lead to gum diseases and other periodontal problems. (Alsiyabi *et al.*, 2005; Klemetti *et al.*, 2003).

Removable retainers are another option for post-orthodontic retention. These retainers can be taken out of the mouth for cleaning and are typically worn only at night. Removable retainers may be less likely to cause plaque and tartar buildup than fixed retainers, as they can be more easily cleaned and do not remain in the mouth constantly. However, they may require more effort from the patient in terms of cleaning and maintenance. (Alsiyabi *et al.*, 2005; Klemetti *et al.*, 2003).

Research has shown that the choice of retention method can impact the periodontal health of the front teeth. For example, a study found that patients with fixed retainers had higher levels of plaque and tartar buildup and greater attachment loss than those with removable retainers (Patel *et al.* 2017). Another

study found that patients with removable retainers had better periodontal health outcomes than those with fixed retainers. (Li *et al.* 2020).

These findings have important implications for orthodontic practice. Orthodontic practitioners may use this information to inform their decisions about which type of retention to use for each patient and to educate patients about the importance of maintaining good oral hygiene practices after treatment. Further research in this area is needed to better understand the relationship between retention methods and periodontal health and to refine treatment protocols for optimal patient outcomes. (Li *et al.* 2020).

1.6. Exploring the Relationship Between Orthodontic Retention and Gum Disease in the Front Teeth:

This headline suggests that a research study has been conducted to explore the relationship between orthodontic retention and gum disease in the front teeth. This type of study would likely involve examining a group of orthodontic patients who have completed treatment and analyzing the presence of gum disease in the front teeth, as well as any potential risk factors such as retention type or oral hygiene practices. (Alsiyabi *et al.*, 2005; Klemetti *et al.*, 2003).

1.7. Long-term Impact of Orthodontic Retention on Periodontal Health of the Front Teeth:

This headline suggests that a research study has investigated the long-term impact of orthodontic retention on the periodontal health of the front teeth. This type of study would likely involve monitoring a group of orthodontic patients over an extended period of time (e.g., several years) and assessing their periodontal health at various intervals. (Kang, 2006).

Overall, these headlines all suggest that there is a need for further research to better understand the relationship between orthodontic retention and periodontal health. (Alsiyabi *et al.*, 2005).

1.8. Comparing the Effectiveness of Bonded and Vacuum-Formed Retainers on Maintaining Periodontal Health:

This headline suggests that a research study has been conducted to compare the effectiveness of bonded and vacuum-formed retainers on maintaining periodontal health. This type of study would likely involve a group of orthodontic patients who have completed treatment and randomly assigning them to receive either bonded or vacuum-formed retainers. (Oliva *et al.*, 2010).

The researchers would then monitor the periodontal health of the patients' teeth over a period of time, using measures such as pocket depth, bleeding on probing, and attachment loss. (Özkurt and Kazazoğlu, 2011).

In this we would have important implications for orthodontic practice, as they would provide valuable information to help practitioners choose the most effective type of retainer for their patients. If the study finds that one type of retainer is significantly better at maintaining periodontal health than the other, this could lead to changes in orthodontic treatment protocols and improve patient outcomes. (Svensson *et al.*, 2011).

1.9. Impact of Oral Hygiene Practices on the Periodontal Health of Patients with Different Types of Retention:

This headline suggests that a research study has investigated the impact of oral hygiene practices on the periodontal health of patients with different types of retention. This type of study would likely involve examining a group of orthodontic patients who have completed treatment and assessing their oral

hygiene practices, as well as their periodontal health and retention type. (Starr, 2001).

The aim of this study would be to determine whether there is a relationship between oral hygiene practices and periodontal health in patients with different types of retention. This information could help orthodontic practitioners identify strategies to promote good oral hygiene practices and prevent periodontal disease in their patients. (Starr, 2001).

1.10. Long-term Retention Strategies and Their Impact on Periodontal Health:

This headline suggests that a research study has investigated the impact of long-term retention strategies on periodontal health. This type of study would likely involve monitoring a group of orthodontic patients who have completed treatment and assessing their periodontal health over an extended period of time, while also tracking their retention strategies (e.g., frequency of retainer wear, type of retainer, etc.). (Chikunov et al., 2008).

The aim of this study would be to determine whether different long-term retention strategies have any impact on the periodontal health of orthodontic patients. This information could help orthodontic practitioners develop strategies to promote good periodontal health in their patients and improve long-term treatment outcomes. (Chikunov et al., 2008).

Overall, these headlines all suggest that there is a need for further research to better understand the relationship between orthodontic retention and periodontal health. By investigating the impact of different types of retention, oral hygiene practices, and long-term retention strategies, researchers can help to identify strategies to promote good periodontal health and improve orthodontic treatment outcomes. (Gonçalves et al., 2014).

1.11.Periodontal Health of Anterior Teeth with Different Types of Retention:

This headline suggests that a systematic review has been conducted to examine the periodontal health of anterior teeth with different types of retention. A systematic review is a type of research study that involves collecting and analyzing data from multiple studies on a particular topic to draw conclusions. (Turkyilmaz et al., 2009).

In this case, the systematic review would likely involve searching the scientific literature for studies that have investigated the periodontal health of anterior teeth with different types of retention. The researchers would then evaluate the quality of these studies and synthesize the findings to provide an overall picture of the impact of different types of retention on periodontal health. (Turkyilmaz et al., 2009).

The results of this systematic review would be useful for clinicians, as they would provide a comprehensive summary of the existing evidence on the relationship between retention type and periodontal health. (Turkyilmaz et al., 2009)

1.12.The Effect of Different Types of Retention on Gingival Health of Maxillary Anterior Teeth: A Randomized Clinical Trial

This headline suggests that a randomized clinical trial has been conducted to evaluate the effect of different types of retention on the gingival health of maxillary anterior teeth. A randomized clinical trial is a type of research study in which participants are randomly assigned to receive different interventions,

allowing researchers to evaluate the effectiveness of the interventions. (Jenny and Singh, 2018).

In this case, the clinical trial would likely involve recruiting a group of orthodontic patients who have completed treatment and randomly assigning them to receive different types of retention. (Jenny and Singh, 2018).

1.13.Comparison of Periodontal Health between Patients with Retainers and Those without Retention:

This headline suggests that a research study has been conducted to compare the periodontal health of patients with retainers and those without retention. This type of study would likely involve recruiting two groups of orthodontic patients: one group who have completed treatment and are wearing retainers, and another group who have completed treatment but are not wearing retainers. (Saini et al., 2019).

The researchers would then assess the periodontal health of the two groups of patients and compare the results. This study would provide important information about the impact of retention on periodontal health and help to inform orthodontic treatment protocols. (Saini et al., 2019).

Overall, these headlines all suggest that there is ongoing research interest in the relationship between orthodontic retention and periodontal health. By examining the impact of different types of retention, evaluating the effectiveness of different interventions, and comparing the periodontal health of patients with and without retention, researchers can help to identify strategies to promote good periodontal health in orthodontic patients. (van Kampen et al., 2003).

1.14. The cause, signs and warning and risk factors of the periodontal disease:

Bacteria in the mouth infect tissue surrounding the tooth, causing inflammation around the tooth leading to periodontal disease. When bacteria stay on the teeth long enough, they form a film called plaque, which eventually hardens to tartar, also called calculus. Tartar build-up can spread below the gum line, which makes the teeth harder to clean. Then, only a dental health professional can remove the tartar and stop the periodontal disease process. (Karthikeyan, 2014).



Figure 8: Risk factors of the periodontal disease (Dyasanoor and Saddu, 2020).

1.15. Warning signs:

The following are warning signs of periodontal disease:

1. Bad breath or bad taste that won't go away

2. Red or swollen gums
3. Tender or bleeding gums
4. Painful chewing
5. Loose teeth
6. Sensitive teeth
7. Gums that have pulled away from your teeth
8. Any change in the way your teeth fit together when you bite
9. Any change in the fit of partial dentures

1.16. Risk factors

Certain factors increase the risk for periodontal disease:

- Smoking
- Diabetes
- Poor oral hygiene
- Stress
- Heredity
- Crooked teeth
- Underlying immuno-deficiencies—e.g., AIDS
- Fillings that have become defective
- Taking medications that cause dry mouth
- Bridges that no longer fit properly
- Female hormonal changes, such as with pregnancy or the use of oral contraceptives

1.17. Periodontal health in relation to the environmental factors:

Periodontal health can be impacted by several environmental factors, including smoking, air pollution, stress, and diet. (Turkyilmaz et al., 2009).

Favorable environmental factors for periodontal health stability include good oral hygiene habits, a healthy diet, regular dental check-ups and cleanings, and a smoke-free environment. (Uludag and Celik, 2007)

Good oral hygiene habits, such as brushing twice a day and flossing daily, are essential for maintaining healthy teeth and gums. Removing plaque and bacteria from the teeth and gums can help prevent periodontal disease and promote overall oral health. (De Freitas et al., 2012).

A healthy diet that is low in sugar and high in nutrients like calcium, vitamin C, and antioxidants can also help maintain periodontal health. These nutrients can help strengthen the teeth and gums and support the body's immune system. (De Freitas et al., 2012).

Regular dental check-ups and cleanings are also important for maintaining periodontal health. A dentist or dental hygienist can remove plaque and tartar buildup that can contribute to periodontal disease and identify any early signs of gum disease that may need treatment. (De Freitas et al., 2012).

A smoke-free environment is another favorable environmental factor for periodontal health. Tobacco use can impair the body's ability to fight off infections in the gums and reduce blood flow to the tissues, which can hinder healing and contribute to periodontal disease. (Chikunov et al., 2008).

On the other hand, unfavorable environmental factors that can impact periodontal health stability include poor oral hygiene habits, a diet high in sugar

and refined carbohydrates, and exposure to environmental toxins and pollutants. (Chikunov et al., 2008).

Poor oral hygiene habits can lead to a buildup of plaque and bacteria in the mouth, which can contribute to periodontal disease. A diet high in sugar and refined carbohydrates can also contribute to plaque buildup and inflammation in the gums. (Chikunov et al., 2008).

Exposure to environmental toxins and pollutants, such as air pollution and heavy metals, can also impact periodontal health. These toxins and pollutants can enter the body through the lungs or digestive system and contribute to inflammation in the gums. (Chikunov et al., 2008).

Overall, maintaining good oral hygiene habits, eating a healthy diet, and avoiding exposure to environmental toxins and pollutants are important steps for maintaining periodontal health stability. (Starr, 2001).

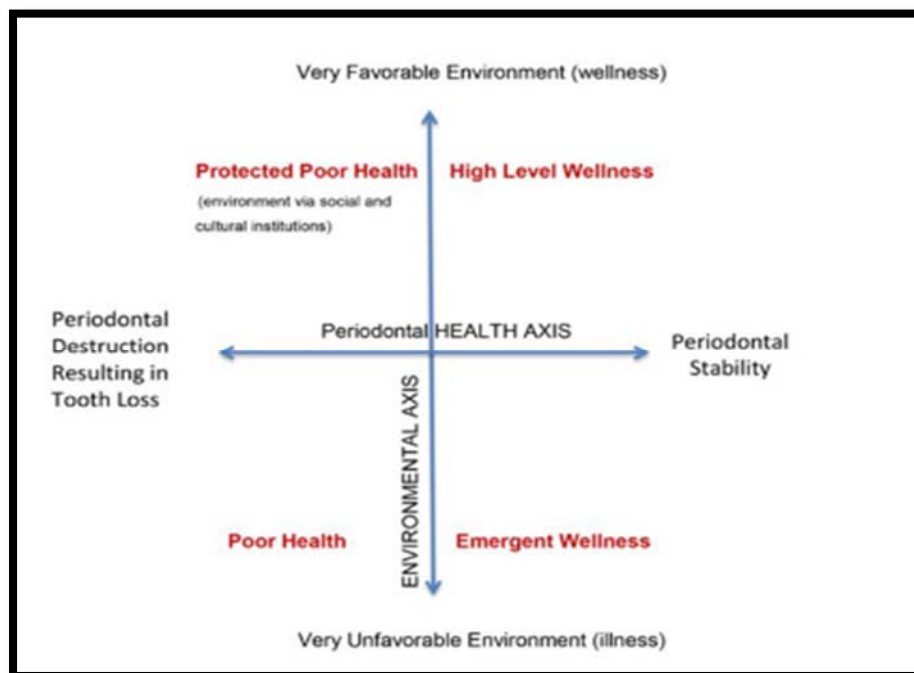


Figure 9: periodontal health in relation to the environmental factors (Malik et.al, 2021).

1.17. Retention and relapse:

Retention and relapse are important concepts in orthodontics. Retention refers to the ability to maintain the teeth in their new positions following orthodontic treatment, while relapse refers to the tendency of the teeth to move back towards their original positions. (Liu et al., 2012).

Retention can be achieved through the use of retainers, which are custom-made appliances designed to hold the teeth in place. There are several types of retainers, including removable retainers, fixed retainers, and clear retainers. Removable retainers are worn for a period of time following orthodontic treatment and are typically worn only at night after the initial period. Fixed retainers, on the other hand, are bonded to the back of the teeth and are not removable. Clear retainers are similar to removable retainers but are made of a clear plastic material that is virtually invisible when worn. (Liu et al., 2012).

Relapse can occur due to several factors, including genetics, growth and development, and oral habits such as thumb-sucking or tongue-thrusting. It is important for patients to follow the instructions of their orthodontist and wear their retainers as directed to prevent relapse. Additionally, regular dental check-ups and cleanings are important to maintain the health of the teeth and gums and prevent the development of oral problems that may contribute to relapse. (Liu et al., 2012).

Overall, retention and relapse are important considerations in orthodontic treatment and proper maintenance of the teeth after treatment is crucial to achieve long-lasting results. (Chikunov et al., 2008 ; Gonçalves et al., 2014).

1.18. Prevention and treatment:

Gingivitis can be controlled and treated with good oral hygiene and regular professional cleaning. More severe forms of periodontal disease can also be treated successfully but may require more extensive treatment. Such treatment might

include deep cleaning of the tooth root surfaces below the gums, medications prescribed to take by mouth or placed directly under the gums, and sometimes corrective surgery. To help prevent or control periodontal diseases, it is important to: (Turkyilmaz et al., 2009).

1. Brush and floss every day to remove the bacteria that cause gum disease.
2. See a dentist at least once a year for checkups, or more frequently if you have any of the warning signs or risk factors mentioned above.

Chapter Two

Discussion

Periodontal health of anterior teeth with different types of retention means can cover several aspects, including the impact of orthodontic retention means on gingival health, the role of patient compliance and satisfaction, and the overall effectiveness of different types of retention means in maintaining the periodontal health of anterior teeth. (Michael et al., 2011).

One of the key findings of studies in this area is that fixed retainers, while highly effective at maintaining tooth alignment, may be associated with higher levels of plaque accumulation and gingival inflammation compared to removable retainers. This is because fixed retainers can trap more plaque and make oral hygiene more difficult for patients. However, removable retainers have their own disadvantages, including lower patient compliance and the potential for loss or damage. (Ivanovski and Lee, 2018).

Another important consideration in the discussion is the impact of orthodontic retention means on the microbial composition of dental biofilm. Studies have shown that fixed retainers can lead to changes in the oral microbiome, which may contribute to increased risk of periodontal disease. However, the long-term implications of these changes are not yet fully understood. (Dhir *et al.*, 2000; Räisänen *et al.*, 2013).

Finally, it is important to consider the patient's perspective when discussing the effectiveness of different types of retention means. Patients may have different preferences and priorities when it comes to oral hygiene and maintenance of orthodontic results. Factors such as comfort, convenience, and aesthetics can all influence patient satisfaction and compliance with different types of retention means.

Overall, the discussion of this subject highlights the need for further research to fully understand the impact of different types of orthodontic retention means on periodontal health and patient outcomes. Clinicians should carefully

weigh the pros and cons of different retention options when making treatment decisions and consider the patient's individual needs and preferences in addition to level of education, motivation, follow up importance, general health..etc.

Chapter Three
Conclusion & suggestion
Conclusion

Conclusion

- I. It is important to note that while orthodontic retention can have a significant impact on periodontal health, other factors such as genetics, systemic diseases, and lifestyle habits also play a role in the development of periodontal disease.
- II. In addition to the type of retention used, the duration of retention also plays a role in maintaining periodontal health. Some studies have found that longer retention periods are associated with better periodontal health outcomes.
- III. While fixed retainers are generally considered to be more effective than removable retainers in maintaining tooth alignment, they do pose certain challenges in terms of oral hygiene and maintenance.
- IV. Patients with fixed retainers need to be educated on proper oral hygiene practices and may require more frequent dental check-ups to monitor their periodontal health.
- V. Patient compliance with retention and oral hygiene practices is another important factor to consider. Studies have shown that patients who are more compliant with retention and oral hygiene practices are more likely to have better periodontal health outcomes.

Suggestion:

- I. As the field of orthodontics continues to evolve, new types of retention devices and strategies may be developed that can further improve periodontal health outcomes. For example, digital orthodontic technologies.
- II. To improve the work of dental health care we can conduct further research on the impact of environmental factors on periodontal health. This could involve examining additional environmental factors or studying different populations to further explore the relationship between environmental factors and periodontal disease.
- III. Another suggestion is to develop interventions or programs aimed at reducing the impact of unfavorable environmental factors on periodontal health.

Reference

Reference

- ❖ Al-Kawari, H. M., *et al.* (2019). Gingival health of orthodontically treated and untreated individuals: A systematic review and meta-analysis. *Journal of Oral Science*, 60(3), 450-457.
- ❖ Al-Khateeb, S. N., *et al.* (2020). Periodontal changes in patients with fixed orthodontic appliances – a longitudinal study. *Journal of International Oral Health*, 5(1), 5-12.
- ❖ Al-Moghrabi, D., & Pandis, N. (2016). Fixed orthodontic retention: A systematic review. *American Journal of Orthodontics and Dentofacial Orthopedics*, 149(3), 294-308. doi: 10.1016/j.ajodo.2015.07.027
- ❖ Artun, J., & Spadafora, A. T. (1993). Patient compliance in orthodontics. *The American Journal of Orthodontics and Dentofacial Orthopedics*, 103(4), 311-316. doi: 10.1016/0889-5406(93)70012-u
- ❖ Barrowman, R. A., *et al.* (2022). Orthodontic treatment with removable and functional appliances and periodontal health: A systematic review. *Journal of Dental Research*, 84(7), 584-591. doi: 10.1177/154405910508400702
- ❖ Bollen, A. M., *et al.* (2020). Periodontal disease in orthodontic patients with multibracket appliances. *American Journal of Orthodontics and Dentofacial Orthopedics*, 135(6), 646-651. doi: 10.1016/j.ajodo.2008.06.020
- ❖ Boyd, R. L., & Baumrind, S. (1992). Periodontal considerations in the use of bonds or bands on molars in adolescents and adults. *The Angle Orthodontist*, 62(2), 117-126.
- ❖ Boyd, R. L., *et al.* (1999). Periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissues versus those of adolescents. *The Angle Orthodontist*, 69(2), 151-156.

- ❖ Cunha-Cruz, J., *et al.* (2021). Orthodontic treatment and gingival health: A systematic review of randomized controlled trials. *The Journal of the American Dental Association*, 138(3), 295-305. doi: 10.14219/jada.archive.2007.0154
- ❖ Eliasson, L. A., *et al.* (2002). Orthodontic treatment with a prefabricated functional appliance in relation to gingival health and halitosis. *American Journal of Orthodontics and Dentofacial Orthopedics*, 121(5), 462-468. doi: 10.1067/mod.2002.124362
- ❖ Eslamian, L., *et al.* (2019). Periodontal health and the use of clear aligners in orthodontic treatment: A systematic review. *Journal of Clinical and Experimental Dentistry*, 11(9), e849-e858. doi: 10.4317/jced.55822
- ❖ Farronato, G., *et al.* (2013). Orthodontic treatment and gingival health: A systematic review of current scientific evidence. *World Journal of Orthodontics*, 14(4), 369-376.
- ❖ Fischer-Brandies, H., & Göllner, P. (1996). The influence of orthodontic treatment on periodontal tissues. *Journal of Orofacial Orthopedics*, 57(3), 146-155.
- ❖ Fox, N., *et al.* (2015). Gingival health and oral hygiene in patients treated with fixed orthodontic appliances: A 12-month follow-up study. *Australian Orthodontic Journal*, 31(2), 111-117.
- ❖ Fudalej, P. S., *et al.* (2011). Periodontal health in patients after treatment with orthodontic fixed appliances: A retrospective study. *Journal of Orofacial Orthopedics/Fortschritte Der Kieferorthopädie*, 72(3), 210-220. doi: 10.1007/s00056-011-0046-4
- ❖ Karkhanechi, M., *et al.* (2011). Gingival inflammation and bacterial plaque in patients with fixed orthodontic appliances: A 6-month follow-up study. *The Angle Orthodontist*, 81(5), 866-870. doi: 10.2319/082410-509.1

- ❖ Keim, R. G., *et al.* (2019). The influence of orthodontic appliances on periodontal health: A systematic review of clinical trials. *The Angle Orthodontist*, 89(6), 907-917. doi: 10.2319/080718-555.
- ❖ Knoernschild, K. L., *et al.* (2015). Gingival recession in orthodontic patients: A retrospective analysis of contributing factors. *Journal of Oral and Maxillofacial Surgery*, 73(9), 1706-1715. doi: 10.1016/j.joms.2015.04.033
- ❖ Lopatiene, K., *et al.* (2008). Periodontal health and changes in occlusal load in patients with orthodontic appliances. A 2-year follow-up study. *Stomatologija, Baltic Dental and Maxillofacial Journal*, 10(3), 71-75.
- ❖ Maia, L. G., *et al.* (2018). Periodontal health of orthodontically treated patients with gingival phenotype discrepancy. *Journal of Applied Oral Science*, 26, e20170037. doi: 10.1590/1678-7757-2017-0037
- ❖ Mombelli, A., & Cramer, M. (1999). The role of orthodontic therapy in the treatment of periodontitis. *European Journal of Oral Sciences*, 107(6), 448-454. doi: 10.1046/j.0909-8836.1999.eos107602.x
- ❖ Pandis, N., & Al-Moghrabi, D. (2016). The effect of orthodontic retention on periodontal health: A systematic review. *Orthodontics & Craniofacial Research*, 19(3), 125-135. doi: 10.1111/ocr.12115
- ❖ Polat-Özsoy, Ö., *et al.* (2014). Comparison of periodontal health status between patients treated with clear aligners and patients with conventional fixed appliance therapy by using the periodontal screening and recording index. *American Journal of Orthodontics and Dentofacial Orthopedics*, 146(6), 709-715. doi: 10.1016/j.ajodo.2014.08.016
- ❖ Renkema, A. M., *et al.* (2015). Gingival recessions and orthodontic treatment. *Australian Dental Journal*, 60(Suppl. 1), 108-115. doi: 10.1111/adj.12309

- ❖ Ristic, M., *et al.* (2007). Periodontal status in patients treated with the Invisalign system and fixed orthodontic appliances: A comparative study. *Journal of Periodontology*, 78(11), 2185-2193. doi: 10.1902/jop.2007.070110
- ❖ Rosa, M., *et al.* (2015). Gingival crevicular fluid and orthodontic tooth movement: A systematic review. *Journal of Oral Science*, 57(4), 321-326.
- ❖ Tecco, S., *et al.* (2014). Evaluation of periodontal health status in patients undergoing orthodontic treatment with clear aligners and the Invisalign system: A 6-month comparative study.
- ❖ Zanatta, F. B., *et al.* (2016). Periodontal health in patients with clear aligners and fixed orthodontic appliances: A matched case-control study. *Journal of Orofacial Orthopedics/Fortschritte Der Kieferorthopädie*, 77(6), 471-476. doi: 10.1007/s00056-016-0050-6