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"Treatment Risks: Unveiling The Challenges And Enhancing Patient Orthodontic Outcomes"

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ABSTRACT :

Orthodontic treatment guarantees legitimate arrangement of the teeth and works on the occlusal and jaw relationship. This works on the nature of life, adding to oral and general wellbeing. Orthodontic treatment has benefits, yet in addition dangers and complexities. Oral cleanliness guidance and periodontal treatment are likewise demonstrated for youngster and juvenile orthodontic patients. This survey features the intricacies of the orthodontic treatment.

Keywords: orthodontic treatment risks, root resorption, TMD, decalcification, trauma, malocclusion

INTRODUCTION:

Untreated malocclusion has been shown to have awkward mental, social, and genuine effects that can cut down private fulfillment concerning oral prosperity. The goals of orthodontic treatment integrate redesigning the ability and presence of the teeth; enhancing psychosocial thriving; and cutting down the chance of long stretch issues invited on by malocclusion, for instance, tooth wear, gingival issues, and pathologies related with affected teeth[1].However, orthodontic treatment isn't without risk. Orthodontic treatment could cause facade demineralization, polish injury, finish wear, pulpal reactions, mischief to periodontal tissue, root resorption, horribly vulnerable reaction, and injury. Understanding the benefits and risks of orthodontic treatment includes high importance. (2) Patients that anticipate to seek orthodontic treatment in like manner needs to know the benefits and risks of the treatment. These perception and data are critical with the objective that both the dental subject matter expert and patient can act cautiously during the range of the treatment. (3)The point of this

review is to look at and assess the articles that had contemplated the entanglements that had happened during or after the orthodontic treatment.

METHODOLOGY:

This study is a review on studies done to identify the challenges faced during orthodontic treatment. A search for relevant articles was made in web-based databases: PubMed, Research gate, Google Scholar, and preprint databases including Research square and Medrxiv. The keywords were used in multiple combinations which include 'orthodontic treatment', 'dental side effects', 'root resorption', 'pain', 'periodontal disease', 'temporomandibular joint disease (TMD)', 'risks', 'oral traumatic ulcer', 'tooth decalcification. The articles were read and those that fulfilled the requirements of the study are included in this review.

DISCUSSION:

1. PERIODONTAL DISEASE -

Orthodontic appliances are known to significantly hinder control of plaque, potentially causing gingivitis (4) In the context of orthodontics, gingivitis can escalate to periodontal breakdown among adults already grappling with active periodontal disease [5]. Oral hygiene becomes challenging, especially for highly motivated patients, due to the use of fixed appliances. Almost all patients encounter gingival inflammation during this period. (6)

The reaction of oral soft tissue to metallic orthodontic appliances may stem from various factors, including the patient's immune response, the existence of systemic diseases, and the calculus's presence and composition. It's worth noting that general health aspects, like smoking, can adversely affect periodontal health. Moreover, uncontrolled diabetic patients undergoing orthodontic treatment may exhibit certain potential side effects on periodontal tissues. (7) Research indicates that gingival enlargement typically happens during orthodontic therapy. However, in most cases, about 3 months after the appliance's removal, the gingiva usually returns to its pre-treatment appearance. It is crucial to provide oral hygiene instructions in all orthodontic treatment instances, emphasizing the use of adjuncts like electric toothbrushes, interproximal brushes, chlorhexidine mouthwashes, fluoride mouthwashes, and regular professional cleaning. Nevertheless, the success of maintaining hygiene heavily relies on patient motivation and dexterity.(6)

ROOT RESORPTION:

According to current understanding, apical root resorption is an inevitable complication of orthodontic treatment. Resorption can manifest on both the apical and lateral surfaces of the roots. Typically, signs and symptoms of root resorption are absent, with mobility rarely exceeding the first degree on the Miller scale. At the conclusion of treatment, if root resorption is mild or moderate in severity, it does not significantly impact the tooth's prognosis. However, the mechanism behind tooth resorption remains unclear. (8) During orthodontic treatment, a condition termed external apical root resorption (EARR) may manifest in a small subset of patients. This occurrence is often attributed to the application of excessive forces or the loss of torque, leading to pressure on the roots from the cortical bone. Consequently, the roots undergo a reduction in length. Monitoring EARR is crucial, and regular radiographs should be taken throughout the treatment to assess its progression and make informed adjustments, ensuring the overall success of the orthodontic procedure. (9) Upon clinical recognition of resorption during the course of treatment, it becomes imperative to take specific actions:

- Utilize light forces in the orthodontic approach to mitigate further damage to the roots.

- Implement a regimen of monitoring the root length every six months through radiographic assessment.

- Reevaluate the treatment objectives to ensure they are aligned with a focus on optimizing the longevity of the dentition, considering the implications of the resorption on overall oral health and stability. (8)

ENAMEL DECALCIFICATION

In orthodontics, an unfortunate and prevalent issue is enamel demineralization, often observed on smooth surfaces. Studies indicate a wide range, spanning from 2% to 96% of orthodontic patients experiencing this particular complication. Understanding and addressing this concern is crucial in orthodontic practice to ensure optimal oral health and prevent potential long-term consequences associated with demineralization. (10) Furthermore, it's important to note that these side effects can become apparent within the typical timeframe of orthodontic visits, often within the span of a month. The presence of orthodontic brackets tends to promote the accumulation of dental plaque, emphasizing the need for regular monitoring and timely intervention during orthodontic treatment to address potential complications promptly. (11)

Upon identifying decalcified areas on the enamel subsequent to the debonding procedure, the orthodontist ought to refrain from opting for invasive measures such as intensive fluoride application or enamel micro abrasion. Instead, it is advisable for the orthodontic patient to attend regular follow-up visits, allowing these areas to undergo the process of re-mineralization. In this scenario, the orthodontist should provide guidance to the patient, emphasizing the importance of maintaining optimal oral hygiene. A prescribed daily fluoride-containing mouthwash can be recommended to aid in this endeavor. Notably, it's essential to avoid fluoride varnish application on these lesions during the debonding visit, as high fluoride concentration might hinder the mineralization process. (11)

ALLERGY :

Allergy to intra-oral orthodontic components is exceptionally rare. Nevertheless, studies have explored nickel release and metal corrosion in association with fixed appliances. Gjerdet et al.(12) discovered a notable initial release of nickel and iron into patients' saliva right after the placement of fixed appliances. Yet, there was no noteworthy disparity in nickel or iron concentrations between subjects and controls, even after several weeks of appliance placement. The clinical implications of nickel release remain uncertain but warrant consideration, especially for patients sensitive to nickel. (13) When conducting orthodontic treatment, another allergen to consider is latex, which can be found in various materials like medical gloves, elastomeric ligatures, elastic chains, rubber dams, and more. While latex-related allergies are less than 1% prevalent in the general population, dental professionals have a higher incidence, exceeding 5% [18]. These allergies can give rise to types I and IV hypersensitivity reactions, with type I being the most severe and potentially life-threatening. (14)

TRAUMA :

The oral mucosal membrane, covering the oral cavity, is delicate and thin, making it susceptible to ulcers and damage. Traumatic ulcerations can quickly form due to sharp tooth edges, traumatic biting, or the consumption of hard food particles. (15)

During treatment or in between treatment sections, it's not uncommon to observe lacerations on the gingivae and mucosa, presenting as areas of ulceration or hyperplasia. This occurrence is particularly prevalent around the arch wire and bonds, especially in areas where long stretches of wire lack adequate support and rest against the lips. A useful strategy to mitigate trauma and discomfort is applying dental wax over the bracket. Additionally, using rubber bumper sleeving on the unsupported arch wire can also be effective in alleviating any potential issues. (16)

TEMPROMANDIBULAR DISEASE (TMD):

Temporomandibular disorder (TMD) is a complex condition influenced by various factors, making it challenging to establish an immediate link with a singular cause such as occlusion. Prior to attributing the condition to teeth-related factors, it is crucial to thoroughly rule out other potential sources of facial pain. According to the principles of evidence-based dentistry, dentists should base their treatment decisions for each patient on the most up-to-date and reliable evidence, aligning their clinical expertise with the best available clinical evidence at hand.(17)

In certain cases, researchers have noted that specific dental malocclusions can be regarded as potential causative factors, although they are not the sole etiological elements. Dentofacial vertical deformities, presenting as anterior dental open bite, deep overbite, or sagittal discrepancies with increased overjet, may be linked to osteoarthritic TMD disorders.(18) However, it's important to highlight that no research grounded in evidence has definitively identified increased overbite or overjet as the primary factor in the pathological mechanism of these diseases. (15)

PULPAL DEATH:

During orthodontic tooth movement, a certain degree of pulpitis is anticipated. This is typically temporary and reversible. Although infrequently, it can progress to vitality loss. In cases where teeth were previously traumatized and have fixed appliances, there might be an elevated risk of pulpitis. Utilizing gentle forces is recommended for traumatized teeth, coupled with regular baseline vitality assessments, ideally performed every three months. (19) When orthodontic apical movement remains uncontrolled, it has the potential to diminish apical blood perfusion, consequently posing a risk of pulp damage. Remarkably, dental pulp exhibits minimal reactivity to orthodontic force. Typically, any reactions observed are transient, often characterized by a temporary inflammatory response, and seldom result in permanent damage. As of now, the evidence regarding the loss of pulp vitality during orthodontic therapy remains notably weak. (20)

Clinical or experimental correlation between orthodontic intervention and non-bacterial pulp death is elusive. In the event of unexpected pulp necrosis during orthodontic treatment, it's essential for the orthodontist to investigate any history of trauma and promptly halt the orthodontic movement.(20)

CONCLUSION:

Orthodontic treatment enhances a patient's quality of life by improving aesthetics, functionality, reducing concerns about appearance, and boosting self-confidence. Additionally, it lowers the risk of dental injuries and incidents of muscle tenderness, alleviating myofascial pain. Orthodontic treatment, akin to other medical or dental procedures, carries the potential for negative side effects. The clinician's understanding of these potential repercussions and their adeptness in managing them is paramount. Prior to initiating treatment, securing informed consent is a highly critical step, particularly in cases where a history of trauma or allergic reaction

REFERENCE :

1. European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 7, Issue 4, 2020 1732, ORTHODONTICS AND TEMPOROMANDIBULAR DISORDERS,K.C. SUBHIKSHA 1, DR. GNANASHANMUGAM2, DR. KANNAN3
2. Travess H, Roberts-Harry D, Sandy J. Orthodontics. Part 6: Risks in Orthodontic Treatment. British Dental Journal. 2004; 196(2): 71–7.
3. Thalca Hamid, Ari Triwardhani, Louis KrisnaIndonesian Journal of Dental Medicine, Benefits and Risks of Orthodontic Treatment: A Scooping Review Volume 5 Issue 1 2022; 18-26 IJDM (eISSN: 2722-1253) is open access under CC-BY license.
4. Naranjo AA, Triviño ML, Jaramillo A, Betancourth M, Botero JE. Changes in the subgingival microbiota and periodontal parameters before and 3 months after bracket placement. Am J Orthod Dentofacial Orthop 2006;130:275.e17-275.e22.
5. Boyd RL, Leggott PJ, Quinn RS, Eakle WS, Chambers D. Periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissues versus those of adolescents. Am J Orthod Dentofacial Orthop 1989;96:191-198.
6. Eleni Kouraki 1, Nabil F Bissada, J Martin Palomo, Anthony J Ficara. N Y State Dent J. Jun- Jul 2005 Gingival enlargement and resolution during and after orthodontic treatment. ;71(4):34-7.
7. .Safkan-Seppälä B, Ainamo J. Periodontal conditions in insulin- dependent diabetes mellitus. J Clin Periodontol 1992; 19(1): 24-9. [http://dx.doi.org/10.1111/j.1600-051.1992.tb01144.x] [PMID: 1732306]
8. Brezniak N, Wasserstein A. 1993. Root resorption after orthodontic treatment Part I Literature review. Am J Orthod., 103: 62–66.
9. Ketcham A. A preliminary report of an investigation of apical root resorption of permanent teeth. Int. J Orthod. Oral Surg 1927;13:97-115.
10. Chang HS, Walsh LJ, Freer TJ. Enamel demineralisation during orthodontic treatment. Aetiology and prevention. Aus Dent J 1997;42:322-327.
11. .Øgaard B, Alm AA, Larsson E, Adolfsson U. A prospective, randomized clinical study on the effects of an amine fluoride/stannous fluoride toothpaste/mouthrinse on plaque, gingivitis and initial caries lesion development in orthodontic patients. Eur J Orthod 2006; 28(1): 8-12.
12. Gjerdet N, Erichsen ES, Remlo HE, Evjen G. Nickel and iron in saliva of patients with fixed orthodontic appliances
13. 1lVishal S Kudagi , Shruti Shivakumar, Bhagyalakshmi A, Adverse effects of orthodontic treatment: A review, International Journal of Applied Dental Sciences 2021; 7(4): 304-305
14. 14.Rahilly G, Price N. 2003. Nickel allergy and orthodontics. JOrthod., 30:171–4.
15. 15.Saud Alotaibi, Potential Side Effects of Comprehensive Fixed Orthodontic Treatment: A Narrative Review, The Open Dentistry Journal 2023; 17:1-5
16. 16.Dental trauma: an overview of its influence on the management of orthodontic treatment. Susan A, Kindelan 1, Peter F Day, Jay D Kindelan, James Spencer, Monty S Duggal. J Orthod. 2008 Jun;35(2):68-78.
17. K.C. SUBHIKSHA , DR.GNANASHANMUGAM, DR. KANNAN, ORTHODONTICS AND TEMPOROMANDIBULAR DISORDERS, European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 7, Issue 4, 2020
18. 18.llSeligman DA, Pullinger AG. The role of intercuspal occlusal relationships in temporomandibular disorders: A review. J Craniomandib Disord 1991; 5(2): 96-106.[PMID: 1812142]
19. Atack NE. The orthodontic implications of traumatised upper anterior teeth. Dent Update 1999;26:432-437.
20. Alberto . Orthodontic treatment does not cause pulpal necrosis. Dental Press Endodontics 2011; 1(1): 14-20.