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PERIODONTAL SPLINTING: A PROSTHODONTIC PERSPECTIVE

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ABSTRACT

Periodontal disease is a multi factorial condition that negatively affects function, aesthetics, and patient comfort. Splinting therapy offers a way to manage and control tooth mobility, thereby extending the lifespan of mobile teeth, promoting periodontal reattachment, and enhancing comfort, function, and appearance. Although splinting has been practiced since ancient times, it remains controversial due to its potential drawbacks, such as compromised oral hygiene and strain on supporting teeth. However, advancements in splinting materials have significantly reduced these adverse effects. When applied to carefully selected cases-where stronger teeth are available to support mobile ones and oral hygiene can be maintained-periodontal splints serve as a valuable adjunctive treatment. This article presents a case report demonstrating a different splinting technique for teeth with grade II mobility. In this case,the approach involves trimming and bonding a prefabricated metal mesh between the compromised and healthy teeth, offering a simple, painless, and effective splinting method with promising outcomes.

INTRODUCTION

Periodontal disease is a multifactorial condition resulting from subgingival plaque accumulation, gingival inflammation, loss of connective tissue attachment, and alveolar bone resorption. One of its key consequences is tooth mobility, which arises due to acute inflammation of the periodontal apparatus, occlusal trauma, and the apical displacement of the tooth's center of rotation as bone loss advances.[1]

Progressive loss of attachment around affected teeth leads to increased mobility, often impairing normal oral function. In such cases, it becomes essential to reinforce the supporting structures, restrict excessive movement, and restore functionality.[1] Increased tooth mobility negatively impacts function, aesthetics, and patient comfort.[2]

It is crucial to remember that periodontal splinting is an adjuvant to full periodontal therapy and does not, by itself, address tooth movement.When cases are carefully selected, splinting can significantly enhance the longevity of mobile teeth.[5][6]

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SPLINTING

Splinting is defined as the joining of two or more teeth into a rigid unit by means of a fixed or removable restorations/ devices.

DEFINITION

According to the Glossary of Prosthodontic Term splint is "as a rigid or flexible device that maintains in position a displaced or movable part; also used to keep in place & protect the injured part".

A periodontal splint is a device that keeps moving teeth in their physiological and functional positions by stabilizing or immobilizing them.[8]

TOOTH MOBILITY

The motion of a tooth in its socket brought on by an external force.

OBJECTIVES OF SPLINTING: [1][8]

1. Provides rest.
2. For redirection of forces.
3. For redistribution of forces
4. To preserve arch integrity.
5. Restoration of functional stability
6. Psychological well-being
7. for surgical stabilization of moving teeth, particularly

in regenerative therapy.

8. In the absence of an adversary, to stop teeth from emerging.

PRINCIPLES OF SPLINTING:[2][4][8]

1. Including a healthy enough number of teeth
2. Splint around the arch:
3. Coronoplasty may be performed to relieve traumatic occlusion.
4. The splint should be fabricated in such a way as to facilitate proper plaque control.
5. Splints should not obstruct occlusion and should be cosmetically pleasing.
6. To reduce tooth movement in three dimensions.
7. No inflammation should be present.
8. Minimum one third of bone support remaining.
9. Splinting should allow for oral hygiene methods.
10. Splinting should not irritate soft tissues
11. Should be stable and efficient, easily repaired

CLINICAL RATIONALE FOR SPLINTING: (Pollack, 1999; Serio, 1999; Siegel et al., 1999; Ramfjord and Ash, 1981; Lemmerman, 1976):[2]

1. To provide rest.
2. To control parafunctional or bruxing forces.
3. Stabilization of mobile teeth during surgical procedures, especially regenerative treatments. According to Friedman, teeth with mobility may not respond effectively to reattachment procedures unless they are properly splinted.(Friedman, 1953; Ferencz, 1987).
4. When more conclusive therapy is not feasible, stabilization of a tooth with weakened periodontal tissue is conceivable.
5. Prevention of the supra-eruption of an unopposed tooth to eliminate the potential for the development of periodontal problems (Hirsch field, 1937).
6. Stabilization of loose teeth to restore the patient's psychological and physical well-being.
7. Splinting proves beneficial in managing the effects of secondary occlusal trauma, both during and after periodontal therapy. Additionally, it enhances the patient's functionality and comfort (Ferencz, 1987)
8. The main objective and rationale of splinting and occlusal adjustments are to control the progressive tooth mobility (Lindhe and Nyman, 1977).

INDICATIONS:[1][2][7][8]

1. It provides stabilization for teeth with moderate to advanced mobility that have not responded to periodontal treatment or occlusal adjustment and where no other intervention is effective.
2. Restore patients' masticatory function and comfort
3. Facilitates scaling and surgical procedures.
4. Stabilizes teeth after orthodontic movement.
5. Stabilizes teeth after acute dental trauma, e.g. subluxation, avulsion, etc.
6. Prevent tipping or drifting of teeth
7. Prevent extrusion of unopposed teeth.

CONTRAINDICATIONS:[1][2][7][8]

1. Moderate to severe tooth mobility when there is original occlusal trauma and/or periodontal disease.
2. The number of solid or suitably robust teeth to secure moveable teeth is insufficient.
3. Teeth with occlusal damage or interference have not had any occlusal correction done.
4. Poor oral hygiene
5. High caries activity
6. Crowding and mal-aligned teeth that may com promise the utility of splint.

ADVANTAGES:[8]

- Remodeling of the alveolar bone and periodontal ligament to accommodate orthodontically shifted teeth.
- Promotes healing of supporting structures.
- The patient will be supplied with optimal stability and comfort.
- Makes surgery easier by keeping the tooth motionless
- Distributes occlusal pressures across a large region.

DISADVANTAGES:[1][7][8]

- All splints impede the patient's ability to care for themselves. In a patient with already weakened periodontal support, plaque accumulation near the splinted edges can lead to additional periodontal deterioration
- Caries development is an inherent risk. It necessitates the patient's scrupulous monitoring
- Both permanent and removable splints have the potential to cause serious harm if they are not manufactured correctly.

REQUIREMENTS OF SPLINTS: [1][4]

1. It should incorporate an adequate number of additional teeth to reduce the extra load on target tooth/teeth to a minimum-At least two firm teeth for every mobile teeth.
2. It should rigidly hold the teeth and should not impose torsional stresses on any incorporated teeth.
3. In order to offset the faciolingual and anteroposterior stresses, it should wrap around the arch.
4. It must not obstruct the occlusion. Before applying the splint, any severe dental disharmonies should be fixed if at all possible.
5. It should be aesthetically acceptable.
6. It should not irritate the pulp.
7. It should not irritate the soft tissues, gingivae, cheeks, lips or tongue.
8. It should be easy to clean and should permit periodontal instrumentation.
9. It should not block the interdental embrasure spaces.
10. It should not impinge on the interdental papilla.

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Biomechanics: [7][8]

1. A loose tooth will be stabilized if it is splinted to nearby firm teeth.
2. Adjacent quadrants should be splinted when it has a large number of teeth.
3. Teeth tend to stay hard mesio-distally while loosening buccolingually.
4. Mobility is reduced to the "least common denominator" via "cross-arch stabilization."
5. At least two groups should be splinted such that one group's "point of firmness" can stabilize the other's "mobility."
6. Occlusal force is dispersed across a larger area and teeth become immobile.
7. The splint can act as a "orthopedic brace," allowing loose teeth to be retained for practical purposes.

Fig.1. Pre-Operative Intraoral View

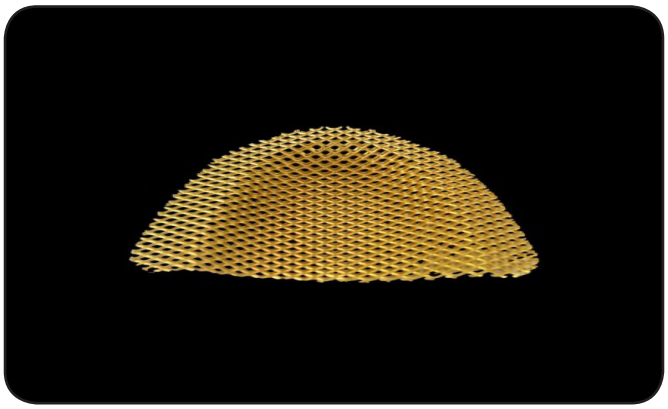

Fig. 2. (A)Prefabricated Mesh

Fig. 2. (B) Metal Mesh Try-In On Cast

Fig.3. Post Operative Intraoral View

Fig. 4. Follow-Up After 3 Months

DISCUSSION

Periodontitis and trauma from occlusion often result in tooth movement. Tooth mobility is a common sequel to periodontitis and trauma from occlusion. Mobility, bone loss and attachment loss associated with trauma from occlusion can be reduced by eliminating trauma. Periodontally compromised teeth with poor prognosis can also be retained for a longer time by using splints, until a more definitive treatment is planned for the patient. When all factors are duly considered and adequate maintenance therapy is advised, splints are increasingly becoming an essential part of periodontal treatment and ongoing care.The metal mesh has the better strength and has the highly favourable mechanical properties and is comfortable to the patient and is aesthetically pleasing. It has better bonding property.

CONCLUSION

As periodontal infection advances, tooth mobility becomes an inevitable consequence of attachment loss. This mobility can significantly impact the patient's ability to speak, chew, and articulate properly. In such cases, periodontal splints are employed to alleviate these symptoms by promoting periodontal stability, preventing further bone loss, aiding in attachment gain, and restoring functional efficiency. However, it is important to note that splinting does not address the underlying cause of mobility. It serves only as a supportive measure to stabilize mobile teeth, and mobility may return once the splint is removed. Therefore, splinting should be regarded as an essential adjunct to cause-related periodontal therapy in the comprehensive management of mobile teeth.

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