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ORTHODONTIC SCARS- A REVIEW

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ABSTRACT:
If orthodontic treatment is going to help a patient, the benefits should outweigh any potential harm. Before selecting to treat malocclusion, it is critical to evaluate the risks of treatment against the potential benefits. In order to return soft and hard tissues to their normal state of health, all preventive measures should be taken into account both during and after orthodontic treatment. To ensure a safe and effective outcome, the orthodontist must therefore use caution and diligence in evaluating and tracking every element of these tissues at every step and moment.

INTRODUCTION:

Orthodontic scars are side effects that occur following orthodontic treatment. Aside from treatment, they can include modest decalcifications, white spot lesions, root resorption, lacerations, and temporomandibular joint abnormalities in previously healthy hard and soft tissues.[1] For a very long time, crowding, proclination, spacing, and malalignment have been persistent aesthetic issues.

Orthodontic treatment has thus become a vital element of esthetic dentistry in the search for a perfect smile. In addition to its aesthetic benefits, it also assists certain patients with speech, mastication, looks, comfort, general oral health, and self-esteem. But if the orthodontist is not careful, orthodontic equipment can occasionally injure the associated hard and soft tissues both during and after treatment.[2] Such damage caused intra or extra-orally by an orthodontic treatment need to be identified at an earlier stage to avoid adverse problems.

On soft tissues, the majority of orthodontic scars are temporary and reversible. Depending on how severe the damage is, hard tissue damage may not heal and may require additional care after orthodontic treatments are finished, as in the case of enamel decalcification.

CLASSIFICATION:

Orthodontic scars fall into the following general categories:

DENTAL PROBLEMS
- Enamel decalcification
- Pulp degeneration
- Root resorption

PERIODONTAL PROBLEMS
- Gingival recession
- Periodontal pockets
- Loss of lower anteriors due to periodontal disease

Alveolar bone loss

MISCELLANEOUS
- TMJ problems
- Allergy
- Injuries
- Cross infection

AESTHETIC PROBLEMS
- White spot lesions
- Enamel stains and fractures
- Effect of extraction-

Orthodontic look, dished-in profile

STABILITY PROBLEMS

- Intercanine width can return to original or less
- The severity of post-Rx relapse is related to pre-Rx crowding

OCCLUSION PROBLEMS

- End-end occlusion of molars
- Altered occlusion of molars~
- Tipping of bicuspids, cuspids & Molars
- Associated open contacts
- Deep overbite
- Loss of Vertical dimension
- Retroclined lower incisors
- Arch length will decrease
- Roots of adjacent teeth in contact

DENTAL PROBLEMS

A)Enamel Decalcification/White Spot Lesions

Accumulation of plaque around the orthodontic appliance can cause dissolution of the organic component and destruction of the inorganic part of the teeth which in turn leads to a modified surface of enamel.

Early lesions appear as opaque white spots caused by mineral loss on the enamel's surface and beneath. If the mineral loss continues, cavitations will result. Younger patients are more vulnerable due to a lack of enamel maturation and a predisposition to practice poor oral hygiene routines. Some evidence suggests that male orthodontic patients are more affected than females.[3]

To prevent these lesions, the patient must maintain exemplary oral hygiene. Topical fluoride applications such as 0.05% sodium fluoride, 1.2% acidulated phosphate fluoride mouth rinse (monthly), 0.4% stannous fluoride gel, and fluoride varnish can help maintain these high standards. Noncompliant patients can be treated with fluoride-containing cement/bonding agents or fluoride-releasing elastomeric ligatures [4].

Fig 1: Enamel Demineralisation

B) Pulp degeneration:

Orthodontic forces on teeth can induce discomfort by squeezing the vasculature in the periodontal ligament (PDL), which causes inflammation of both the pulp and periodontal tissues[5]. Orthodontic tooth movement is likely to cause some pulpitis, which is usually reversible. It rarely causes loss of vitality, although it can aggravate pulpitis in previously traumatized teeth with fixed appliances. Light forces are recommended for injured teeth, as well as baseline vitality monitoring, which should be done every three months. Transient pulpitis can also occur with electrothermal debonding of ceramic brackets and composite removal during debonding.

C)Root Resorption:

Ketcham (1927) was the first to discuss root resorption caused by orthodontic treatment.

Root resorption can be divided into at least three categories:
1. Surface resorption.
2. Inflammatory Resorption and
3. Replacement resorption.

Surface resorption occurs regularly as micro-defects on all roots, which usually heal themselves without notice. It can occur anywhere on the root; however, it is more frequent in the periapical area. It stops after the inciting agent (pressure) is removed and the cementum is repaired. Inflammatory resorption occurs when root resorption proceeds into the dentinal tubules, exposing infected or necrotic pulpal tissue or an infected leukocyte zone. Replacement resorption causes ankylosis of the tooth because bone replaces the resorbed tooth substance [1]. Heavy forces (RME, headgear traction) enhanced the duration of treatment and the kind of tooth movement (intrusion, torquing). Hereditary factors, Systemic causes (such as diabetes, allergic responses, or other systemic disorders), and local factors (such as nail biting and other oral habits) may contribute to root resorption.


Fig 2: Intra oral periapical radiograph of Root resorption

PERIODONTAL PROBLEMS

Periodontal disease consists of gingivitis, alveolar bone loss (periodontitis), and loss of attached gingiva. The periodontal reaction to orthodontic appliances is determined by a variety of factors, including host resistance, the existence of systemic diseases, and the amount and composition of dental plaque. Lifestyle issues, such as smoking, can also undermine periodontal support. Furthermore, the deleterious consequences of uncontrolled diabetes on periodontal support have been extensively documented. Orthodontic therapy is not recommended for uncontrolled diabetics [6].At each appointment, the patient should be reminded to practice good dental hygiene to avoid plaque accumulation.


Fig 3: Gingivitis

AESTHETIC PROBLEMS

A) Enamel fractures

Ceramic orthodontic brackets frequently cause enamel injury during debonding. Damage occurs most frequently on the incisal margins of upper anterior teeth, buccal cusps of upper posterior teeth, and upper canine points during debonding. Careless use of band seaters, band removers, and debonding pliers causes enamel fracture.

Peeling off at the bracket-resin contact is the recommended approach for removing brackets and leftover bonding agents to reduce the risk of enamel fracture. To prevent tooth material loss, appropriate dietary guidance should be offered. The most common causes of erosion are carbonated beverages and pure citrus fruit juices, which should be avoided in patients with fixed appliances [7].

MISCELLANEOUS

A)TMJ problems

TMJ issues have been linked to the inability to achieve occlusal harmony following orthodontic treatment, particularly the inability to remove nonworking contacts and centric prematurities on mandibular excursions. Following orthodontic treatment, the functional occlusion and long-term state of the temporomandibular joint function showed that the prevalence of TMJ symptoms and signs was comparable to that of an adult control group with untreated malocclusions (Sadowsky 1980). General TMD indications and symptoms are either not affected at all by class II elastics and extractions. Joint difficulties can arise after any dental procedure that disrupts the balance between the musculoskeletal system and the occlusion. This includes prosthodontics, orthodontics, and surgery. (Rinchuse, Close, and O'Reilly, 1993).
Trauma to the TMJ can be minimized by preserving musculoskeletal deprogramming, maintaining proper mandibular posture, avoiding eccentric changes of the jaw, stopping parafunctional habits, and avoiding TMJ overload using elastics.

B) Allergy:

In the general population, three out of ten people are nickel-sensitive. Braces, bands, headgear, and orthodontic wires all contain nickel [8]. Nonetheless, nickel allergy-related intraoral hypersensitivity lesions are less frequent. Nickel-titanium wires coated with epoxy can be utilized if a person is hypersensitive to nickel. As a result, there would be less chance of corrosion and consequent nickel release. Rematitan, a pure titanium bracket, has also been released into the market.

Fig 4: Nickel Allergy

Systemic, pulmonary, and dermatological signs are examples of latex allergy reactions. Orthodontic elastics that come into touch with the mucosa or parenterally can cause anaphylactic shock, a severe systemic reaction. The antigen has been determined to be the remaining rubber protein. Use substitutes such as plastic or synthetic rubber items. Alternatives such as nitrile, neoprene, vinyl, polyurethane, and styrene-based rubbers, or mixtures of these synthetic materials, should be used in place of natural rubber latex gloves. The quantity of aerosolized allergens will decrease when powder-free gloves are worn.

Injuries from orthodontic appliances

Ulceration of the palatal mucosa in faulty insertion of TPA, Nance buttons. The distal end of wires extending too much or long stretches of unsupported wires can cause ulcerations.

Facebow can result in head injuries because it may cause dislocations as you sleep or play games. The facebow recoils as a result of the elastic traction, striking the patient in the face, head, or neck. It works like a catapult. Due to the increased risk of infection caused by oral bacteria on the face-bow at the time of damage, trauma related to eye injuries may provide extra challenges. Retainers, sectional wires, bands, brackets, expansion appliance keys, and appliances have all been known to be inadvertently consumed.

Symptoms of tracheobronchial obstruction may include dyspnoea, coughing, or choking. If major problems arise, quick removal is required. Symptoms of oesophageal obstruction include difficulty swallowing, muscle weakness, swallowing pain, vomiting, and hematemesis. Anteroposterior and lateral radiographs will show if the object is trapped in the trachea or the oesophagus. If the appliance is in the gastrointestinal tract, it is more than 90% likely to pass normally. Impaction of heavy or sharp items can cause ulcers and perforations, necessitating prompt surgical excision.

Cross infection

The spread of infection between patients, between operator and patient, and by a third party should be avoided by wearing gloves, masks, sanitized devices, and working in 'clean' environments. Every patient must have a medical history obtained in order to assess risk factors. Patients at risk for endocarditis should be treated in collaboration with their cardiologist.

The patient must maintain excellent dental hygiene, and antibiotics will be required for invasive treatments such as extractions, separation, band insertion, and removal. Bonded attachments are indicated for all teeth to reduce the requirement for antibiotic protection during separator and band application and removal. This also lowers the likelihood of undesirable plaque stagnation locations. Chlorhexidine mouthwash has been recommended before any treatment, and in certain circumstances daily, to reduce bacterial load.

CONCLUSION:

During orthodontic treatment, the patient may suffer from a variety of iatrogenic complications. However, major harm is uncommon. Severe malocclusions are more likely to benefit from therapy than less severe malocclusions, and motivation between these groups may differ. Individuals should be evaluated for risk factors throughout every phase of care. Good clinical practice, careful patient selection, and detailed medical information about a patient are needed to reduce tissue injury.

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