

VARIOUS METHODS OF EXTRUSION OF TOOTH

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1. Abstract

1.1 Aim:*To assess the various methods of extrusion of tooth*

1.2 Objective:*To assess different applications of extrusion in every aspect of operative treatment. Extrusion is widely used in orthodontic therapy, This article focuses on the use of extrusion in other aspects as well.*

1.3 Background:*Introduction For many years, the removal of bone or gingival tissues has been the most common method used for crown-lengthening surgery. This surgical procedure usually causes an uneven contour of the gingival margin in the anterior region. In addition, as fear of pain is one of the major problems in dentistry, patients often reject this traumatic surgery. In recent years, as an alternative to such a highly invasive technique, mini screws have been used as temporary anchorage devices (TAD) for several orthodontic tooth movements including forced eruption. However, there are other methods developed in recent years.*

1.4 Reason:*Hence, this comprehensive literature review aims at understanding the various methods of extrusion of teeth.*

Keywords:*Extrusion; Orthodontic; Tooth movement.*

2. Introduction

The usage of external force on teeth to convey orthodontic tooth advancement passes on some discovered risks. One of the adverse effects is irreversible root resorption. Such orthodontic advancement that have been represented to extend the peril of root resorption intrusion incorporate and tipping, and with some potential growth into the lingual cortical plate of the maxilla [1-3]. Different kinds of orthodontic tooth advancement may make particular mechanical pressure at various regions inside the root [4]. In vivo assessment of stress is irksome, most ideal situation; in like manner, improvement of an incredible model for this system is an estimable goal. The

restricted segment procedure (FEM) is a precise technique used to research essential tension. Used as a piece of working for an extensive timeframe, this method uses the PC to handle generous amounts of conditions to figure weight on the reason of the actual properties of structures being examined [5]. FEM has numerous positive conditions over various procedures, (for instance, the photo-elastic methodology), featured by the ability to fuse heterogeneity of tooth material and anomaly of the tooth structure in the model arrangement and the general effortless with which weights can be associated at different headings and degrees for a more complete examination. Limited component examination has been utilized in dentistry to research a wide scope of points, for example, the structure of teeth, [5-8] biomaterials and reclamations, [9-11] dental implants, and root canals. In orthodontics, FEM has been utilized effectively to show the use of powers to single-tooth frameworks. Alveolar bone depletion was seen to bring down the focal point of obstruction of the tooth and modify the pressure designs on the root. Similar changes were seen in adjusting root length [12-15].

3. Rapid Extrusion

In the traditional course of events, bone and gingival tissue movements are created underneath low-intensity eruptive forces. once stronger traction forces are exerted, as in fast extrusion, wreath migration of the tissues supporting the tooth is a smaller amount pronounced as a result of the fast movement exceeds their capability for physical adaptation [1].As well, rapid extrusion should be followed by Associate in Nursing extended retention period to permit remodelling and adaptation of the periodontium with the new tooth position. Rapid extrusion is related to a risk that the periodontal ligament is going to be torn which tooth ankylosis might occur. Intense force can even result in root biological processes. However, this latter development remains terribly restricted if the forces, though intense, are fittingly controlled [16-19].

Indications for orthodontic extrusion

- For treatment of a subgingival or infra-osseous lesion of the tooth between the cemento-enamel junction and therefore the coronal third of the foundation, particularly once there are esthetic issues.
- For treatment of a restoration striking on the biological width.
- For reduction of angular bone defects and isolated periodontal pockets.
- For preimplant extraction to keep up or re-establish the integrity of alveolar ridge.
- For orthodontic extraction wherever surgical extraction is contraindicated.
- For treatment of trauma or impacted teeth (canines). [20-22]

Contraindications

- Vertical root fracture.
- Short roots, which don't permit satisfactory support to restoration (that is, when the crown-root proportion is less than 1:1).

- Insufficient prosthetic space.
- Exposure of the furcation.

Forces exerted

The maximum force for a slow movement shouldn't exceed 30g. After a latency stage of a number of days to a number of weeks, as well as a amount of condition, slow extrusion happens at a rate of roughly 1mm or less per week. [23-25]

It is imperative that constant force be maintained between the extrusion and hyalinization phases; otherwise, the specified orthodontic movement won't manifest itself.

The force should be applied on the tooth axis to stop any undesirable tilting. The period of treatment (4 to 6 weeks of extrusion and 4 weeks to 6 months of retention). At the top of the procedure, conservative periodontic surgery is also necessary to correct any discrepancy that has developed between adjacent periodontic levels [24-25].

Before beginning treatment, the dental practitioner should assess the following:

- Assessment of periodontal health.
- Quality and quantity of attached gingiva.
- Depth of periodontic (or gingival) pockets for the targeted teeth.
- Esthetic appearance of the specific site.
- Gingival clearance while smiling.
- Gingival contour line.
- Occlusion.
- Overjet and overbite.
- Interference with movement (occlusal excursion).
- Post extrusion prosthetic space.
- General condition of the dentition.[25]

Techniques

The bracket on the target tooth is positioned more towards the apical end than the brackets on the adjacent teeth; the distinction in distance represents the required extrusion. A 0.016-in. nickel–nickel–titanium number 22 arch wire is connected to the brackets.

A metal wire, 0.7 millimetre in diameter, hooked at one extreme, is cemented into the canal of the tooth that's to endure extrusion. An elastic connects the hook to the rigid anchor wire to activate the mechanism. The elastic is modified for every couple of weeks. This methodology will be tedious to use on posterior teeth as a result of occlusion will interfere with the mechanism.

If the anchor teeth haven't been fixed, a rectangular stainless-steel arch wire (0.018 or 0.019 in. x 0.025 in.) will be folded-up and adhered with composite to the buccal aspect of every tooth. An extrusion device also can be ready from a band and a soldered spring; but this method requires more labour. A removable Hawley device & an anchoring tip cemented to the buccal aspect may be a sensible mechanical

alternative. This methodology is beneficial once the adjacent teeth square measure mobile or supply inadequate anchorage due to trauma or once mild force is needed [26-29].

Extrusion of endodontically treated teeth

There is a scarcity of documented data regarding the prognosis of the endodontically treated tooth under-going orthodontic movement. Though teeth are often moved once root canal therapy, several orthodontists contemplate them to experience root resorption process, ankylosis, or fracture underneath appliance fabrication and removal. Alternative dental practitioner feels that endodontically treated teeth are often directed through a massive vary of orthodontic movement and may not expertise larger root resorption process or problem than their vital antimeres.

In some cases, the tooth to be extruded should be treated endodontically to forestall sensitivity and exposure of the pulp throughout the occlusal reduction needed throughout the extrusion. A canal that can't be adequately treated (because of subgingival fracture associate degree lack of an adequate operative field) are often filled with calcium hydroxide before extrusion and subsequent treatment [28] However, once the tooth should be extracted and also the purpose of extrusion is to get obtain optimal ridge (e.g., in cases of preimplant extraction), pulpectomy could also be sufficient [29]. what is more, if the tooth is to be saved and its pulp remains intact, orthodontic extrusion, over a period of 3 to 6 months, is that the most popular methodology of reducing the danger of pulpal necrosis; rapid extrusion may be traumatic to the pulpal tissue [30].

A histological study shows that odontoblastic degeneration once one week of activation and pulpal fibrosis once 4 weeks in a very tooth subject to an extrusion force of 50grams [31]. The authors assumed that the pulpal reaction would dissent looking on the diameter of the apical foramen. Pulp prolapse would result in ischaemia secondary to rapid movement. Throughout rapid extrusion, a pseudo-apical lesion (an apical radiolucency) seems to be differentiated from a real lesion of endodontic origin. However, a tooth that has undergone incomplete root-canal treatment, asymptomatic, might eventually develop a true apical lesion as a result of inflammatory mediators concerned within the root apex throughout an orthodontic movement [32].

Extrusion of tooth associated with implant

The three-dimensional morphology of the alveolar bone in potential implant locales is usually not the maximum amount as ideal, significantly within the anterior region. The deficient amount of cortical bone within the buccolingual measuring frequently needs invasive or non-invasive procedure bone enlargement to ensure good implant situating and satisfactory string coverage [26]. In instances of immediate implant position taking when tooth extraction, the extraction attachment abandoned instantly when tooth extraction is too huge to firmly rough the embed surface, particularly in the coronal 66%. The funnel formed state of the attachment likewise blocks a good

if it round the by and cylindrical implant , a difficulty that's intense that happens by unavoidable coronal socket extension amid extraction manoeuvres [33].

Augmentative surgical procedures are usually to improve the hard and soft tissue profiles of implant recipient sites [13]. Allogeneous graft and autogenic bone graft from intraoral or extra oral donor sites is presently the foremost wide used and best studied technique of skyrocketing the quantity of alveolar bone obtainable for primary implant anchorage, stability, and thread coverage. For correction of gingival tissue deficiencies at potential implant [14] recipient sites, standard mucogingival surgical procedures, like animal tissue grafts, free animal tissue grafts, and coronally positioned flaps, square measure the largely unremarkably used treatment modalities [34]. In 1993, orthodontic extrusion of non-restorable “hopeless” teeth before extraction and later implant placement was introduced as a viable option.

Orthodontic extrusion is an efficient medical procedure technique of up the hard and soft tissue profiles of implant recipient sites supported by a scientific review of this proof. Orthodontic extrusion of non-restorable teeth before implant placement seems to be a viable variety to standard surgical augmentative procedures in implant site development [15].

Extrusion associated with Prosthodontics

The mesiodistal diameter of the root, that is of course “strangled” at the cementoenamel junction of single-rooted teeth, is reduced with progression of the extrusion (especially within the case of cone-shaped roots), that involves enlargement of interproximal gingival embrasures. The contour form of the crowns should not be exaggerated to make amends for this reduction in diameter [16]. Similarly, embrasures mustn't be filled to prevent an over contour, that might adversely have an effect on the marginal periodontium.

Several extrusion ways are accessible, counting on the clinical conditions encountered. a spread of mechanical methods often tend to control the forces applied. One technique involves inserting orthodontic brackets on the buccal facet of the teeth adjacent to the tooth which is to endure extrusion in an exceedingly passive position which will not cause any orthodontic movement of the anchor teeth. The bracket on the target tooth is positioned a lot more apically than the brackets on the adjacent teeth; the distinction in distance represents the specified extrusion [18]. A 0.016-in. nickel titanium archwire is connected to the brackets. If greater movement is desired, a second, more rigid wire, connected solely to the brackets of the adjacent teeth, is employed to stabilize everything. Following extrusion, a more rigid 0.018-in. stainless-steel arch wire is inserted and set by suggests that of a coronal migration of the gum within the buccal side of the extruded tooth [39]. Active extrusion is meted out over a 1-month time. Metal ligature for a minimum retention amount of 12 weeks. The dental tissues are inadequate for cementing a bracket, a composite reconstruction of the crown is often done or another consolidation strategy is often used. It is feasible to avoid positioning the bracket apically by shaping a stainless-steel wire into

a horizontal loop [40-42]. This activated extrusion system can manufacture movement of one millimetre per month. A wire in the form of a spiral can even be accustomed to give the mandatory traction force [20].

Surgical Extrusion

When stronger traction forces are exerted, as in surgical extrusion, coronal migration of the tissues. Supporting the tooth is a smaller amount pronounced as a result of the rapid movement exceeds their capability for physiological adaptation, surgical extrusion is related to a risk that the periodontal ligament are torn which tooth ankylosis might occur. Intense force also can result in root resorption. After extrusion, splinting is given to stabilize the tooth in new position for 4-6 weeks Later, then supra crestal fibrotomy need to be done to forestall relapse [30].

4. Conclusion

It is imperative to maintain an appropriate crown–root ratio (at least 1:1 after extrusion) and to ensure adequate width of the pulpal canal (a wide pulpal canal may indicate root fracture) so as to provide a favourable prognosis for the restored tooth. In spite of the relative difficulties, orthodontic extrusion remains an accessible technique for general practitioners and a beneficial technique for the patient who wishes to keep a tooth.

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