Planas Direct Tracks- For Correction of Class III Malocclusion In Deciduous Dentition : A Case Report

Dr. Shubhangi Amit Mani*, Dr. Krutika M Gaitonde**, Dr. Ankita A Sawant**

Abstract

Planas Direct Tracks are prism shaped blocks incorporating inclined planes made up of composite resin directly built or cemented on the occlusal surfaces of deciduous molars. The PDT is designed such that the distal incline of upper block occludes with mesial incline of lower block so that mandible will have posterior path of closure and condyles in centric relation.

Indications:

1. Useful for early correction of anterior crossbite and skeletal Class II malocclusion.
2. Useful in patient with horizontal growth pattern

Contraindications:

1. Patient with vertical growth pattern
2. Patient with absence or grossly carious deciduous molars

Review of Literature:

According to Pedro Planas[1], Crossbites are very easy to correct, whenever diagnosed early. If not treated, they can produce severe difficulties in the future, due to skeletal modifications that may occur and might be irreversible." He introduced the öism shaped blocks in 1971 to guide the mandible in favorable position. As this was his idea the prism shaped blocks are named as Planas Direct Tracks.

Simoes[2] later adapted Planas Direct Tracks (PDT) for early prevention of anterior and posterior crossbite.

Marcos Nadler Grlbel[3] studied Planas Direct Tracks in the early treatment of unilateral crossbite with mandibular postural deviation and concluded it as excellent treatment modality for anterior and posterior crossbite correction m deciduous and early mixed dentition.

Mode of Action:

The main objective of PDT is to change the mandibular posture and seat the condyles in centric relation with glenoid fossa. The tracks act as interferences in normal closing path. Crossbite does not permit settlement of condyles in glenoid fossa forcing posterior temporalis muscle to become more active resulting muscle imbalance mandible becomes significantly longer due to condylar growth. This transforms functional or pseudo component into skeletal component.

Planas Direct Tracks work by repositioning the mandiblethus prevents the establishment of morphological and positional asymmetries in young children and allowing more symmetrical craniofacial development.

Method of fabrication of Planas Direct Tracks:

Direct method: Planas Direct Tracks can be built directly in oral cavity on deciduous molars with high strength posterior composite material, but this requires highly skilled and experienced operator, as well as a high degree of patient co-operation. Although this method saves the extra laboratory procedures (to be followed in the indirect technique) there are other disadvantages that could be encountered.

Indirect method:Bite Registration - All the necessary precautions for the registration of the construction bite were followed during this procedure. Construction bite was recorded in the most retruded position possible. The

*Professor, **PG student

Corresponding Author:
Dr Shubhangi Amit Mani,
Professor Dept Of Orthodontics & Dentofacial Orthopedics,
RDC, PIMS(DU), Loni.
Email: kushaagraamani02gmail.com

bite was slightly opened creating 2 mm of interincisal space.

Advantages of Planas Direct Tracks

1) Eliminates the factor of patient compliance.

2) Ease long term retention.

3) Guided eruption of first permanent molar

4) Better hygiene maintenance

5) Cost effective

Disadvantages of Planas Direct Tracks

1) Development of posterior open bite.

2) Not suitable in vertical growing individuals.

3) Require a healthy set of deciduous teeth.

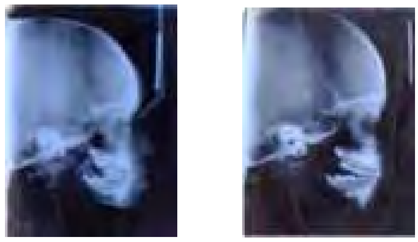
Case Report

8 yrs old female patient with skeletal class III due to prognathic mandible with anterior crossbite treated with Planas Direct Tract appliance.

Pre-treatment photographs

With Planas Direct Tract appliance

Post-treatment photographs



Pre & Post-treatment Cephalogram

Discussion

The functional correction of class III malocclusion is achieved by harnessing occlusal forces as the functional mechanism to correct arch relationship by maxillary advancement, while using the lower arch as means of anchorage and at same time restricting the forward mandibular development. No damaging force is exerted on the condyles because the bite is hinged open with the condyles down and forward in the fossae and the inclined planes are directed downwards and backwards on the mandibular teeth. The force vector in the mandible passes from the lower molars towards gonial angle. This is the area of mandible best able to absorb occlusal forces[4].

References

1. Planas P.: Rehabilitation Neuro occlusal (RNO), Masson- SalvatOdontologia Barcelona, Spain, 1994.
2. Simoes, W.A.: Selective grinding and Planas Direct Tracks as a source of prevention. J.Pedod 5; 298-314 1981
3. Marcos Nadler Gribel: Planas Direct Tracks in the Early treatment of Unilateral Crossbite with Mandibular Postural Deviation. Why Worry So Soon? World J Orthod 2002; 3:239—249
4. Omar Ramirez Yanez (Planas Direct Tracks for early crossbite correction. Journal of Clinical Orthodontics. 2003 June ,294-29

Apexification in open apices with mineral trioxide aggregate (MTA)

Mahavir S. Sarnot*, Nilanjana Zende*, Amruta mahajani* , Nishant Sarda** , Dr. R.B. Vora***, Dr. Sai Kalyan****

Abstract

Endodontic treatment of the pulpless tooth with an immature root apex poses a special challenge for the clinician. The main difficulty encountered is the lack of an apical stop against which to compact an interim dressing of calcium hydroxide (Ca(OH)$_2$, or the final obturation material. In these situations the unpredictability of the result, the difficulty in creating a leak-proof temporary restoration for the duration of treatment, and the difficulty in protecting the thin root from fracture may lead to complications when using traditional (Ca(OH)$_2$-based) apexification technique. This may lead to ultimate failure of the case. The introduction of Mineral Trioxide Aggregate (MTA) in 1993 has revolutionized the field of endodontics and has created the new dimension for the success of complicated clinical procedures. Mineral trioxide aggregate (MTA) was introduced as an alternative to traditional materials for the repair of root perforations and pulp capping and as a retrograde root filling owing to its superior biocompatibility and ability to seal the root canal system. Traditionally, calcium hydroxide (Ca(OH)$_2$ has been the material of choice for the apexification of immature permanent teeth but MTA holds significant promise as an alternative to multiple treatments with Ca(OH)$_2$. This paper discusses the application of MTA with emphasis on its use in the apexification of immature permanent teeth. A case report is presented to demonstrate its use.

Key word: *Mineral Trioxide Aggregate, Apexification*

Introduction

Apexification is defined as 'a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp' (American Association of Endodontists 2003).[1] The goal of this treatment was to obtain an apical barrier to prevent the passage of toxins and bacteria into the periapical tissues from the root canal. Technically, this barrier is also necessary to allow the compaction of the root filling material. Calcium hydroxide pastes have been considered as the material of choice to induce the formation of a hard tissue apical barrier. Its efficiency has been demonstrated by many authors, even in the presence of an apical lesion[2,3]. This chemical has several disadvantages, such as variability of treatment time (average 12.9 months) [4], difficulty of the patient's recall management, delay in the treatment and increase in the risk of tooth fracture after dressing with calcium hydroxide for extended periods.[5,6,7] Alternatives to calcium hydroxide have been proposed; the most promising being mineral trioxide aggregate (MTA) [8,9] The advantages of this material are multiple: (i) reduction in treatment time, (ii) possibility to restore the tooth with a minimal delay, and thus to prevent the fracture of the root and (iii) it also avoids changes in the mechanical properties of dentine because of the prolonged use of calcium hydroxide. In addition, because of its non-cytotoxicity, MTA has good biological propertiesand stimulates repair. When used in dogs' teeth with incomplete root formation and contaminated canals, MTA induced the formation of an apical barrier with hard tissue.[8] The inadequacy of Ca(OH)$_2$ apexification owing to the need for multiple visits for refreshment and reinfection because of its temporary seal, led to the use of MTA, which forms a barrier and prevents microleakage. It is

*PG student, **Consultant, Latur, ***Professor and Head of department, ****Reader

Corresponding author :
Dr. Mahavir Sarnot,
PG student, Dept. of Conservative Dentistry and Endodontics Rural dental college,Loni bk, 413736,Mahavirsarnot3339@gmail.com

biocompatible and facilitates the formation of dentinal bridges and cementum, and regeneration of the periodontal ligament. It has the ability to stimulate cytokine release from the bone cells, indicating that it actively promotes hard tissue formation.

Case report

A 15-year-old female patient suffering from painful symptoms caused by her maxillary first premolar was examined in the Department of Conservative Dentistry and Endodontics of Rural Dental college in Loni for evaluation and treatment. Patient revealed a history of trauma Two years before associated with an enamel–dentine fracture. No treatment had been performed at that time. She denied any history of pain or swelling associated with the tooth. Clinical evaluation indicated that the maxillary first premolar had gray discoloration. The periodontal assessment was normal. The tooth was not responsive to thermal pulp testing. A radiograph showed a blunderbuss open apex with thin dentinal walls(Fig.1). Symptoms also included tenderness to vertical percussion. Cleaning and shaping of the root canal system was achieved under rubber dam isolation. The irrigation was carried out under standard irrigation protocol using 3% sodium hypochlorite (vishal dentocare pvt ltd, india) , 17% EDTA (Dent Wash, Prime Dental, Mumbai), and normal saline. Root canal length was determined using an apex locator and confirmed radiographically. $Ca(OH)_2$ paste was placed in the canals for one week for disinfection. During the second appointment, $Ca(OH)_2$ was removed by mechanical instrumentation and flushed from the root canals by means of sterile water irrigation. The canals were dried using sterile paper points. MTA(MTA; Dentsply Tulsa Dental, Tulsa, OK) was prepared immediately before use, placed into the canals with an MTA carrier and compacted with a hand plugger to create an apical plug of 3 to 4 mm in accordance with the manufacturer's instructions. A radiograph was taken to check whether any apical extrusion had occurred (Fig.2). Moist paper points were placed in the canals and the access cavities were closed with a temporary restorative material, IRM (DENTSPLY). Two days later, the coronal and middle thirds of the canals were filled with gutta-percha by a vertical warm compaction technique and the access cavities were sealed in conjunction with the final restoration(Fig.3). Periradicular healing was assessed clinically and radiographically at six & nine months(Fig.4). The use of MTA followed by conventional endodontic treatment resulted in apical formation in the maxillary first premolar.

Fig: 1 Maxillary first premolar showing wide open apex

Fig:2 Single step apexification using MTA

Fig:3 Obturation done with thermoplastisized GP system

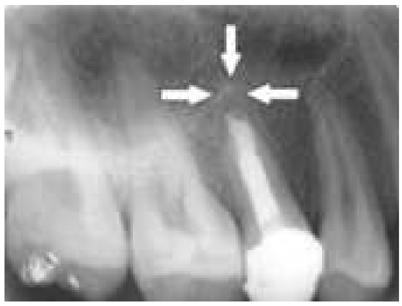


Fig:4 Nine month follow up radiograph

Discussion

Calcium hydroxide has been the first material of choice for apexification, with repeated changes over the course of 5-20 months to induce the formation of a calcific barrier. The unpredictable and often lengthy course of this treatment modality presents challenges, including the vulnerability of the temporary coronal restoration to reinfection. Moreover, the treatment requires a high level of patient compliance. For these reasons, one visit apexification has been suggested MTA introduced by Torabinejad and colleagues at Loma Linda University has shown promising results. MTA has demonstrated minimal leakage of dye and bacteria in comparison with other restorative materials. MTA, a bio-compatible material, can be used to create a physical barrier that also helps in formation of bone and periodontium around its interface. With the use of MTA, the potential for fractures of immature teeth with thin roots is reduced, because a bonded core can be placed immediately within the root canal. One-visit apexification has been defined as the non-surgical condensation of a biocompatible material into the apical end of a root canal. The rationale is to establish an apical stop that would enable the root canal to be filled immediately. Torneck et al. found that when apical closure takes place clinically with $Ca(OH)_2$, there is incomplete bridging of the apex histologically. Periapical inflammation persists around the apices of many teeth because necrotic tissue exists in the corners and crevices of the bridge. There is increasing popularity of the one-visit apexification technique using MTA as an osteoconductive apical barrier. MTA is relatively non-cytotoxic and stimulates cementogenesis. This material generates a highly alkaline aqueous environment by leaching of calcium and hydroxyl ions, rendering it bioactive by forming hydroxyapatite in the presence of phosphate containing fluids. Unlike the extended use of $Ca(OH)_2$ in immature roots, prolonged filling of these roots with MTA did not reduce their fracture resistance. Torabinejad reported the ingredients in MTA as tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicate oxide with some other mineral oxides that were responsible for the chemical and physical properties of aggregate. The powder consists of fine hydrophilic particles that set in the presence of moisture. The hydration of the powder results in a colloidal gel with a pH of 12.5 that will set in approximately 3 hours. MTA has the ability to induce cementum-like hard tissue when used adjacent to the periradicular tissue. MTA is a promising material as a result of its superior sealing property, its ability to set in the presence of blood and its biocompatibility. Moisture contamination at the apex of tooth before barrier formation is often a problem with other materials used in apexification. As a result of its hydrophilic property, the presence of moisture does not affect its sealing ability. Biocompatibility , antibacterial ability, sealing ability, and hydrophilic behavior of MTA makes it the material of choice for single step apexification.

Conclusions

Apexification in one step using an apical plug of MTA can be considered to be valid option to induce apical closure in necrotic immature permanent teeth, and may be an alternative to the use of calcium hydroxide.

References

1. AAE. Glossary of endodontic terms. Chicago: American. 2003.
2. Chosack A, Sela J, Cleaton-Jones P. A histological and quantitative histomorphometric study of apexification of nonvital permanent incisors of vervet monkeys after repeated root filling with a calcium hydroxide paste. Endodontics and Dental Traumatology. 1997; 13: p. 211-7.
3. Felippe WT, Felippe MC, Rocha MJ. The effect of mineral trioxide aggregate on the apexification and periapical healing of teeth with incomplete root formation. International Endodontic Journal. 2006; 39: p. 2-9.
4. Dominguez Reyes A, Munoz Munoz L, Aznar Martin T. Study of calcium hydroxide apexification in 26 young permanent incisor. Dental Traumatology. 2005; 21: p. 141-5.
5. Andreasen JO, Farik B, Munksgaard EC. Long-term calcium hydroxide as a root canal dressing may increase risk of root fracture. Dental Traumatology. 2002; 18: p. 134-7.
6. Felippe MC, Felippe WT, Marques MM, Antoniazzi JH. The effect of the renewal of calcium hydroxide paste on the apexification and periapical healing of teeth with incomplete root formation. International Endodontic Journal. 2005; 38: p. 436-42.
7. Andreasen JO, Munksgaard EC, Bakland LK. Comparison of fracture resistance in root canals of immature sheep teeth after filling with calcium hydroxide or MTA. Dental traumatology. 2006; 22: p. 154-6.
8. Shabahang S, Torabinejad M, Boyne PP, Abedi H, McMillan p. A comparative study of root-end induction using osteogenic protein-1, calcium hydroxide, and mineral trioxide aggregate in dogs. Journal of Endodontics. 1999; 25: p. 1-5.
9. Shabahang S, Torabinejad M. Treatment of teeth with open apices using mineral trioxide aggregate. Practical Periodontics and Aesthetic Dentistry. 2000; 12: p. 315-20.

x