

Early Surgical intervention can eliminate future heavy orthodontic mechano therapy

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ABSTRACT:

Surgical derotation is placing a rotated tooth in normal alignment in a dental arch surgically with out much hampering the PDL to avoid future cumbersome orthodontic treatment. It is very easy and less time consuming treatment modality and proper case selection is very important for clinical success.

The case presented in this article depicts the management of a rotated 21 with immature apex by surgical derotation followed by splinting with a semi rigid light cure splint- *Interlig, Angelus* (Braided glass fiber impregnated with light-cured composite resin) so as to permit physiological tooth movement to avoid ankylosis and follow up was done for long two year to confirm the vitality and continued physiological root formation of the affected tooth.

Key words: surgical derotation, splinting, open apex.

Introduction:

A rotated central incisor creates a massive aesthetic and psychological problem for a patient. Tooth rotation is defined as observable mesio-lingual or disto-lingual intra-alveolar displacement of the tooth around its longitudinal axis. When a tooth erupts in rotated situation in a dental arch, it should be treated either by surgical or orthodontic derotation depending on different parameters associated with the tooth. Rotation of teeth can be caused by number of factors like space availability for tooth alignment, tooth eruption sequence, and resultant force exerted by the tongue and lips in associate with other factors of malocclusion.¹⁻⁴ Presence of supernumerary tooth especially the mesiodens is the commonest cause of rotation of central incisors.

According to the data available, mesiodens can delay or prevent eruption of central incisors in 26-52% of cases, cause ectopic eruption, displacement or rotation of a central incisor in 28-63% of cases, and labial displacement of incisors in 82% of cases.⁵ The obstructed incisor often erupts spontaneously after removal of the obstruction from its path of eruption, if sufficient space is available in the dental arch.

Complications involving the late treatment of a rotated permanent incisors includes dilacerations of the developing roots, root resorption, loss of tooth vitality, compromised oral hygiene.^{2,3} Thus, a significant delay in treatment can create the need for more complex surgical and orthodontic management.

The case presented in this article depicts the management of a rotated left upper central incisor with immature apex with surgical derotation followed by splinting with a semi rigid light cure splint (Interlig), so as to permit physiological tooth movement to avoid ankylosis and follow up done for long two years to look for vitality and continued physiological root formation.

Case report:

A seven years old girl was referred to the OPD of the Dept. of Pedodontics and Preventive Dentistry of Dr. R. Ahmed Dental College and Hospital with a problem of severely rotated ($>90^\circ$) 21 (Fig. 1).

History:

No such significant history of trauma or medical problem revealed.

Radiograph:

Upper standard occlusal and IOPA radiograph revealed the presence of a mesiodens in upper jaw. The rotated 21 showed immature root with a very large apical foramen (Fig. 2 & 3).

After performing necessary pre-surgical investigation and considering all parameters, (in mind) a decision was made for surgical removal of

the mesiodens, derotation of 21 followed by a semirigid splinting for to fix the tooth.

Treatment:

After raising the labial flap from 12-22 region extraction of the mesiodens was done. The rotated incisor was derotated very gently without removing it from its socket and was seated it in normal alignment in the dental arch with the help of a upper anterior tooth extraction forcep. Suturing of the flap was done and at the end a semirigid light cure (*Interlig-Angelus*) splinting (Fig. 4) was done for ten days for to fix the tooth. Periodic checkup was carried out for next two years. The tooth responded to the treatment ie. the tooth remain vital, root completed (Fig. 5 to 7) and restored its aesthetic value (Fig. 8 & 9).

Discussion:

A rotated permanent incisor generally treated either by fixed or removable orthodontic approach which are very time consuming and may not provide a satisfactory result at the end. But it can be very easily obtained by surgical mean. If a fixed appliance had to be given in this case, we would have to wait for root completion of the affected tooth and all permanent teeth to erupt and a removable appliance may not give the desired result if the patient is uncooperative.

As the apex of the tooth is incomplete, so surgical derotation had given a higher opportunity to the pulp to maintain its vitality in the presented case.

Disadvantages and potential risks of orthodontic treatment

- 1) **Decalcification**- As tooth cleaning around the components of the appliance is more difficult so the presence of a fixed appliance predisposes to plaque accumulation. Decalcification during treatment with fixed appliances is a real risk, with a reported prevalence between 2 and 96 per cent.⁵

- 2) **Loss of periodontal support**- an increase in gingival inflammation is commonly seen following the placement of fixed appliances because of reduced access for cleaning in the area of the appliance. Removable appliances may also be associated with gingival inflammation, particularly of the palatal tissues, in the presence of poor oral hygiene.
- 3) **Root resorption**-It is now accepted that some root resorption is inevitable as a consequence of tooth movement. On an average, during the course of a conventional 2-year fixed-appliance treatment around 1 mm of root length is lost.
- 4) **Relapse** - Rotations are easy to treat, but very difficult to retain. They have a very high risk of relapse due to stretching of the supra-alveolar and transeptal gingival fibers which readapt very slowly to the new position. Thus long term retention is required to achieve stability of treatment.

Advantages of “surgical derotation”:

- a) Duration of treatment is short
- b) Retention is not required
- c) Patient cooperation is less critical

Reasons for selecting surgical approach in this case →

- 1) Age of the patient
- 2) Tooth was in erupting stage
- 3) Root was with wide open apex
- 4) Enough space was present for accommodation of derotated tooth
- 5) Shape of the root of central incisor was round.

Advantages of Light Cure splint- Interlig →

- (1) Pre-impregnated (ready to use) - saves time and material

- (2) Glass fiber - High flexural strength
- (3) Easy to cut - special scissors are not required
- (4) Malleable fiber - easy to adapt
- (5) Packed in sachets - easy handling; protects fibers from light and heat
- (6) Aesthetic,
- (7) Maximum patient comfort
- (8) Allows minor tooth movement
- (9) Good occlusion and mastication,
- (10) Easy readjustment, if needed.

During derotation damage to periodontal ligament is inevitable, according to *American Academy of Endodontics*, if tooth is reimplanted within the first 5 min, root surface fibroblasts and precursor cells from the root and alveolar periodontal ligament can live, reproduce, and become functional fibroblasts, capable of producing a united periodontal ligament to protect the root from resorption.^{6,7}

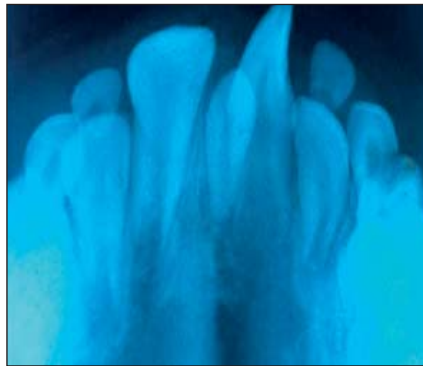
The justification for this early surgical intervention is that it can reduce the severity and complexity of future fixed appliances therapy. The goal of early treatment is to establish normalcy for further growth and development with less psychological trauma to the child. This, in turn, allows us to maximize positive growth patterns and to eliminate future cumbersome treatments.

Conclusion:

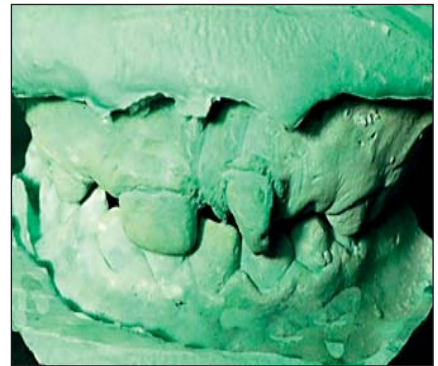
Surgical derotation can be used for treatment of rotated anterior tooth at the early stage of tooth eruption to avoid psychological trauma and future extensive orthodontic treatment. Not only the ideal case selection and judicious surgical approach is mandatory for desired results but also the careful post surgical evaluation upto 3 years is very crucial for long running of the success.



Picture-1-pre-operative view



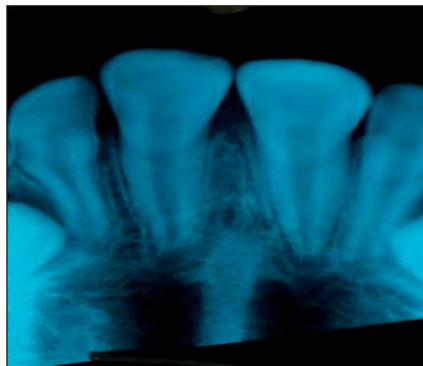
Picture-2- pre-operative radiograph



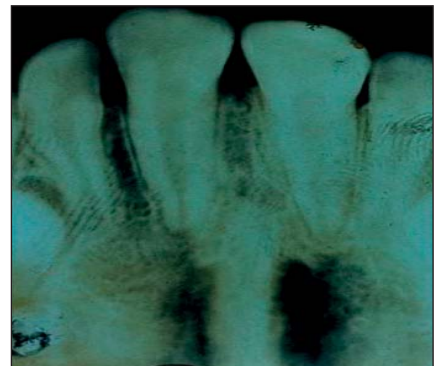
picture-3- pre-operative study model



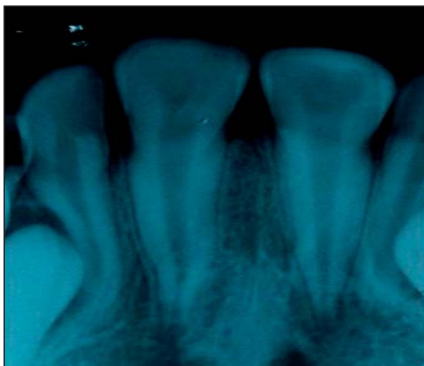
picture-4- interlig



Picture-5- 6months postoperative



Picture-6-12months postoperative



Picture-7--24months postoperative



Picture-8- post operative view



Picture-9-post operative profile view

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