Original Research Paper

Volume - 15 | Issue - 11 | November - 2025 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Endodontics

ESTHETIC REHABILITATION OF ROTATED TEETH USING NANOHYBRID COMPOSITE: MINIMAL INVASIVE APPROACH

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ABSTRACT Advances in dentistry and technologies as well as patient's awareness to maintain their dentition have led an easier path for survival of the tooth in the dental arch. Composite resins are boon as they represents state of the art in the field of restorative dentistry, with satisfactory aesthetic capability, durability and cost-effective than ceramic restorations. The trends towards nanohybrid direct composite regained for its exceptional handling properties and superior aesthetics. This case report illustrate the minimal invasive approach for esthetic rehabilitation of a rotated teeth using nanohybrid composite.

KEYWORDS : Nanohybrid composite, Aesthetic, Minimally invasive, Rotated teeth

INTRODUCTION:

Newer advances in technologies and modern dentistry have increased the possibilities of preservation of tooth and healthy dentition for life. In addition there is a rapid development of awareness and patient's prospectives regarding various treatment options for the survival of dentition rather than have them extracted whenever feasible.[1]

Restorative dentistry is a continuously enhancing field with tremendous progression from silicate cements till composites.[2] Composite restorations are contemporary biomaterials which substitute biological tissue in both appearance and function which lead to application for direct restorations in anterior and posterior teeth.[3] Composite resins require minimally invasive techniques thus preserving tooth structure and esthetics.[4]

Composite has indisputably attained a distinctive position in restorative dentistry. Their significant aesthetic potentials provide diverse therapeutic indications, which continue to develop as a result of the great versatility of the presentations offered. However, the technique-sensitivity is one chief consideration represented by proper case selection, adequate isolation, type of composite to be used, suitable technique, and sufficient curing for expecting successful clinical results.[5]

Nanohybrid is a hybrid resin composite with nano- filler in a prepolymerized filler form, which combines high initial polishing and supreme polish and gloss retention.[6] The adhesion in nanohybrid composite occurs through chemomechanical interlocking by the diffusion of resins around demineralized enamel and partially demineralized dentin.[7] The aim of this case report is to emphasize the application of direct nano-hybrid composite restoration for esthetic rehabilitation of a rotated teeth.

CASE PRESENTATION:

A 32 year old female patient reported to our dental clinic with a chief complaint of spacing in the upper front tooth region since many years. The patient was asymptomatic with major esthetic concerns. Intra-Oral examination revealed the presence of rotated teeth in relation to 21 which lead to midline diastema. There were no signs of pain on percussion and swelling, sinus opening irt 21. Electric pulp testing revealed a positive response suggestive of Vital tooth. The final diagnosis was midline diastema secondary to rotated teeth with respect to 21.

The Potential Treatment Plans Proposed Were:

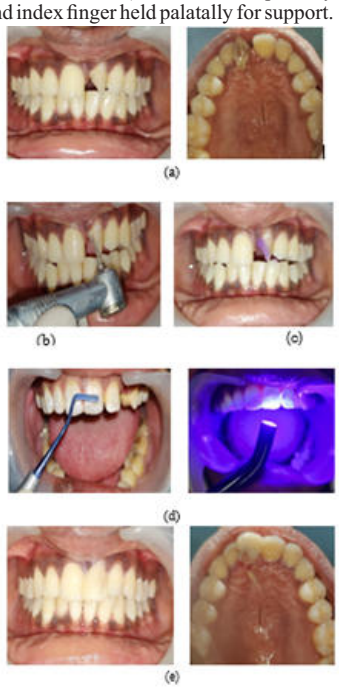
1. Conventional Orthodontic re-correction of tooth to reduce the spacing
2. Extraction of tooth in relation to 21 followed by implant placement
3. Extraction of tooth in relation to 21 followed by fixed prothesis irt 11, 21, 22
4. Conservative esthetic rehabilitation of 21 using Nanocomposite

Patient opted for last treatment plan, as he was more concerned about the natural essence and minimal invasive technique.

Clinical Procedure:

A visual assess ment was performed, and shade matching was done with A2 shade of Nanohybrid Universal Composite (GC-Solare Sculpt, Tokyo, Japan) being selected for the case. After achieving proper isolation, teeth were thoroughly cleaned with pumice. A 2 mm wide bevel was created with a diamond point and finished with discs involving the enamel and dentin on the facial and mesial surface of 21. The palatal portion was smoothened to remove any overhanging enamel.

The adjacent teeth were covered with a Teflon tape and then the surface was etched with 37% phosphoric acid for 15 s then rinsed and dried, followed by the application of two coats of the bonding agent onto the prepared surface, air-thinned and light-cured for 20 s. The palatal shelf was created with A2 enamel (GC-Solare Sculpt, Tokyo, Japan) using a Mylar strip and index finger held palatally for support.



(a) Pre operative images irt 21(b) Beveling irt 21(c) Etching irt 21(d) Composite restoration irt 21 (e) Post operative images.

The shelf extended to the incisal edge and finished just short of the interproximal areas, after which the dentin A2 shade was placed in an accurate and precise position and sculpted with a composite instrument followed by curing each increment for 40 s. Lastly, A2 enamel (GC-Solare Sculpt, Tokyo, Japan) was placed onto the labial surface and sculpted accordingly. Finally the excess was removed and sequential grit abrasive disks (Sof-Lex Pop-on, 3M, Minnesota, USA) were used, followed by rubber points and, finally, composite polishing paste (Prisma-Gloss DENTSPLY Sirona) and the disk to achieve the final gloss. The post operative image presented with satisfactory

esthetic results.

DISCUSSION:

Over the last two decades, the popularity of resin composites for aesthetic restorative procedures has enhanced owing to advances in adhesive systems and composite resin materials. The introduction of nanometer-sized particles has been one of the latest developments in the field which is thought to offer superior aesthetics and polishability requi- red for anterior restorations in addition to excellent wear resistance and strength needed in the posterior teeth Nonetheless, while nanofilled composites use nanosized particles in the resin matrix, nanohybrids take the approach of conjoining nanomeric and conventional fillers.[7]

The presence of clusters formed by small particles seems to reduce the surface roughness of the materials and possibly increase the retention of smoothness after abrasion.[8] The inherent filler properties of nanocomposites are maximized while retaining excellent clinical handling properties and simultaneously reducing the amount of organic resin matrix, thus producing composites with significantly improved mechanical properties as well. These exhibit high translucency comparable to microfilled composites and physical properties similar to hybrid composite.

Hence, these materials exhibit the potential to be used in all the diverse cases and conditions. Durability of a restorative material in the oral environment is directly associated with its resistance to degradation. As far as nanocomposites are concerned, Kumar and Sangi in 2014 reported significantly higher water sorption and solubility for one nanocomposite in contrast with the other and a hybrid after 13-weeks water storage.

Furthermore, lower strength values were reported for the nanocomposite that showed the highest sorption and solubility values.[9] However, Lopes et al. and Shin et al. reported no effect on sorption values of the tested composites when varying polymerization mode.[10,11] The clinical performance of nano- composites has been evaluated in a number of studies in terms of retention, color match, marginal discoloration, surface roughness, marginal adaptation, postoperative sensitivity, gross fracture, tooth integrity, and according to a review done in 2018, clinical performance of nanohybrids was shown to be comparable to microhybrids.[12] There are different techniques for placement of composite resin restorations which include direct and indirect techniques. The selection between direct and indirect techniques is a challenging decision-making process.

In all the aforementioned case, the direct restorative technique was used taking into consideration the patient concerns, the financial constraints and the type of case. However, indirect resin composites (IRCs) cover nowadays a wide range of indications, including inlays, onlays, and over lays. Nevertheless, there are some cases which come inter mediately between direct and indirect where there is no clear demarcation for the technique to be used.[14]

Hence, in such cases it is completely a clinician's call to take into account the amalgamation of all the factors and then decide in the best interest of the patient. [14] The cost and the time factor are two of the major reasons why patients are inclined more toward the direct technique. However, the other merits include minimal tooth preparation, reversibility of treatment, and no need for an additional adhesive cementing system. Moreover, intraoral polishing is easy and has high potential for repair, immediately as well as intraorally.

According to various studies done by Fennis et al., Cetin et al., and several others in the past, no significant difference was found between the performance of direct and indirect restoration.[14,15] The placement of a cavosurface margin bevel on the enamel margins of anterior composite preparations traditionally has been recommended for retention and aesthe- tics. In the present case, 2 mm beveled margins were given to increase the surface area for the retention of the material as well as to obtain a better transition between composite resin and dental substrate inducing higher aesthetic pattern.[16]

CONCLUSION:

Direct placement of resin composite to rehabilitate the anterior teeth offers minimally invasive approach for a rotated teeth. The usage of nanohybrids presented with acceptable color match and cost effective approach.

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