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### RESEARCH ARTICLE

#### COMPREHENSIVE ORTHODONTIC TREATMENT WITH PREMOLAR EXTRACTION OF AN ADULT MALE- A CASE REPORT

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#### Abstract

Adult orthodontics is not new. The first case of such treatment was recorded in the year 1901<sup>[1]</sup>, however, since then the number of adult cases has increased significantly. There are more and more people seeking out braces just to look presentable and have a wonderful smile. Though there are definite advantages and conveniences in treating patients in their childhood, regarding faster tooth movement, earlier completion, and long-term stability and there are definite limitations of orthodontic treatment for adults, orthodontists must adopt skills to face challenges to treat adults successfully as well. The present article will discuss the basic differences between adolescents and adults and showcase the aesthetic improvement of an adult male patient via comprehensive orthodontic treatment.

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#### Introduction:-

With gradual but consistent technological advancements and an increase in awareness, there had been a noticeable increase in the number of adult patients seeking orthodontic treatment in the recent past. The ideal age group for orthodontic treatment is adolescents of age 13-16 years. It has been found that the several different biomechanics to correct different sorts of malocclusions are much more predictable for adolescents with a high bone turnover rate or bone remodeling, simultaneous compensatory condylar growth while correcting the deep bite, and more post-operative stable results. But due to lack of awareness of the parents, unavailability of an orthodontist nearby or due to affordability issues, a good number of individuals with severe dental or skeletal malocclusions fail to be treated in childhood. In most situations, the majority of these patients while being in higher studies or jobs seek orthodontic treatment with some doubts in mind regarding the feasibility and nature of prognosis of their treatment. Fortunately, the present-day armory of orthodontics is studded with several latest technology and appliance systems, which along with the knowledge about the biological and physical limitations of adult patients, possible options and modifications of treatment planning, orthodontics is now well set to face the challenges to successfully treat adult patients with confidence.

#### Case Report

Mr. A. Alam(A.A), age 25 years reported at the Department of Orthodontics, North Bengal Dental College and Hospital complaining about his proclined upper incisors with a very unaesthetic smile characteristics. He had increased lower face height, short upper lip with 100% upper incisor display and moderate crowding in lower anterior teeth. He had retained roots of the lower right first molar.

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**Pre-treatment photographs**

**Fig 1:-** Extraoral and Intraoral photographs.



**Fig 2:** Lateral Cephalogram and Panoramic view



After thorough clinical examination, study model, OPG, and lateral cephalogram analysis, it was found that correction of proclination required 11mm of space in the upper arch. Though retraction of the upper incisors of an adult male is difficult, it was decided to treat A.A with preadjusted edgewise appliance (MBT) mechanotherapy since the Aligner treatment facility was out of the scope of the hospital. Following extraction of three premolars and retained roots of the lower right 1<sup>st</sup> molar, alignment and leveling of teeth was done by a .016 round nitiwire. Considering the high anchorage demand of the case, and the vertical growth pattern, two orthodontic mini-screw implants were placed in between the upper 1<sup>st</sup> and 2<sup>nd</sup> molars. Maxillary canines were retracted, availing anchorage from 1<sup>st</sup> molars (indirect anchorage) tied with the mini implants using 0.020” round stainless steel (S.S) wire. In 2<sup>nd</sup> stage, torque-controlled retraction of upper incisors was done on 19x25 S.S posted arch wire, with an intrusive force component via a midline screw between upper central incisors, about 8mm above the gingival margin, to control the upper incisor-lips relationship and to achieve desirable smile characteristics. The lower right 2<sup>nd</sup> molar was banded, and lower incisors were retracted en-masse on 18x25 S.S wire.

**In-Treatment Photographs**

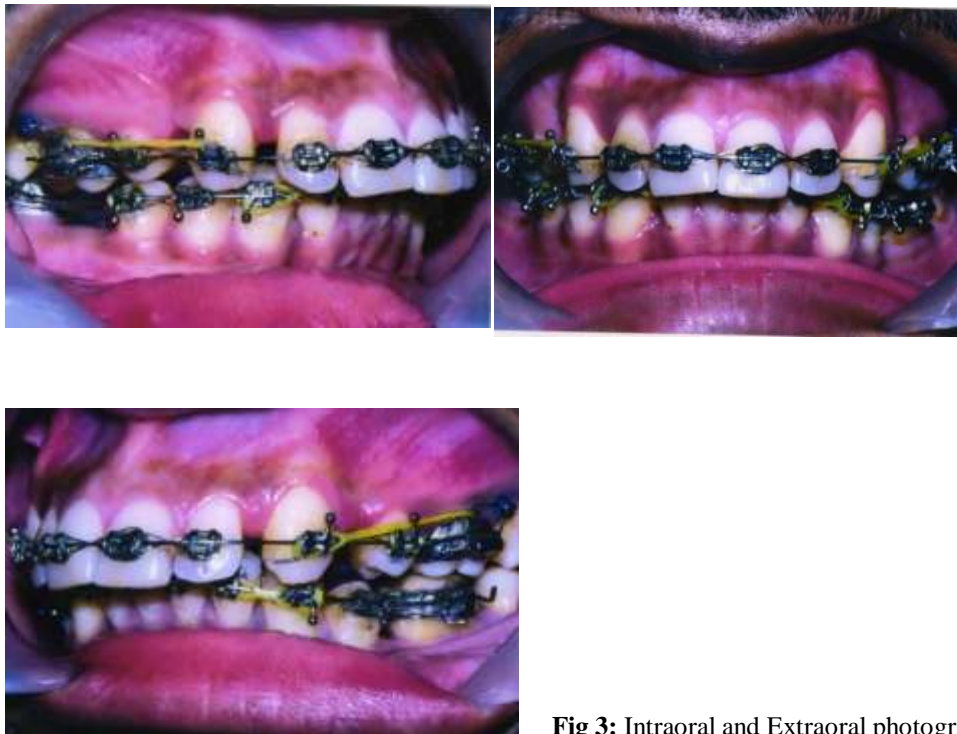


Fig 3: Intraoral and Extraoral photographs





After completion of all extraction space closure, the occlusion was settled with vertical elastics on 0.014” NITI wires. The upper and lower midline was completely matched despite asymmetric extractions in the lower arch. To ensure retention, after debonding of braces, permanent flexible retainers were bonded over palatal and lingual surfaces of upper and lower incisors respectively. Hawley’s retainer was delivered to the upper arch.

**Post-treatment Photographs**

**Fig: 4-** Extraoral and intraoral photographs

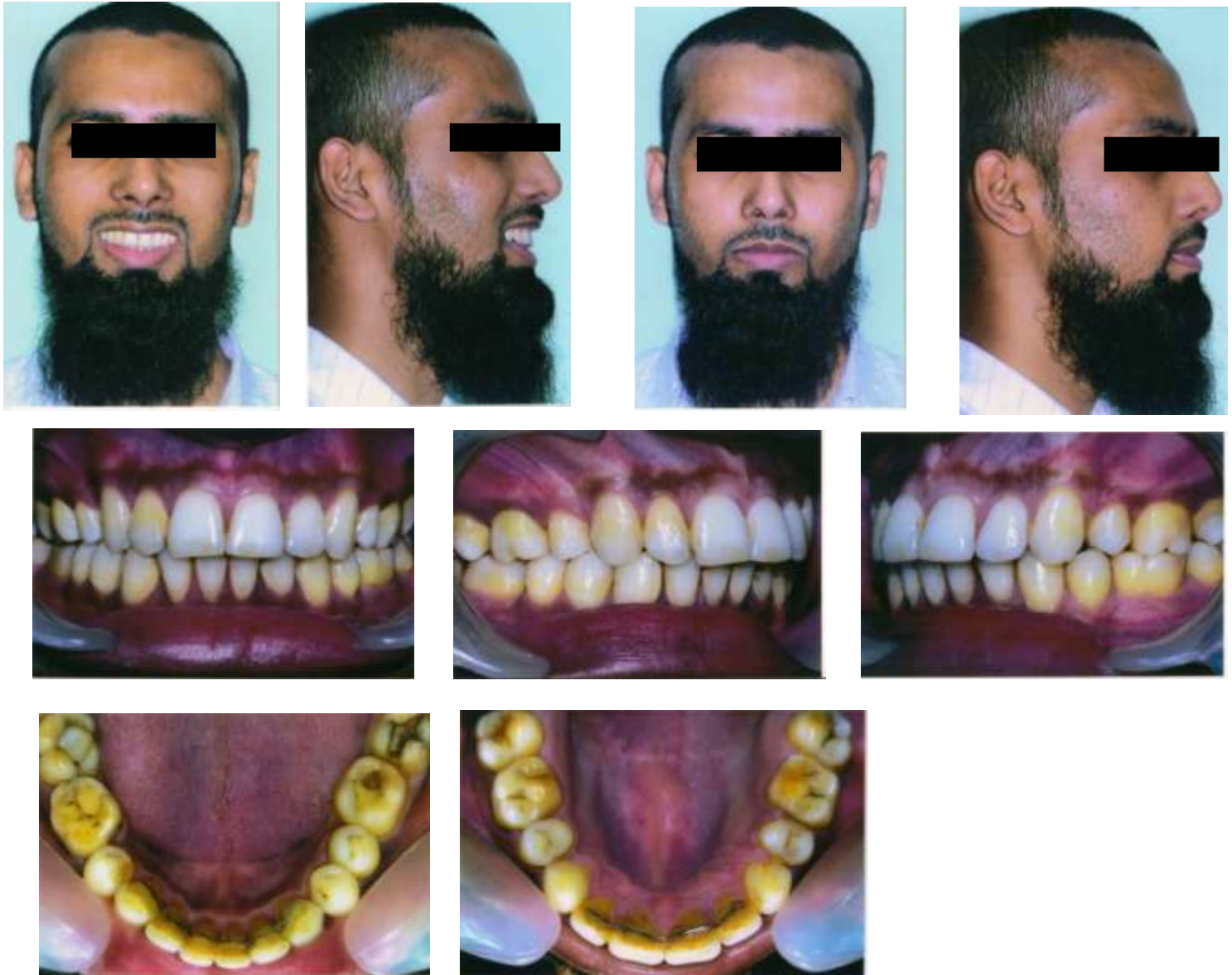
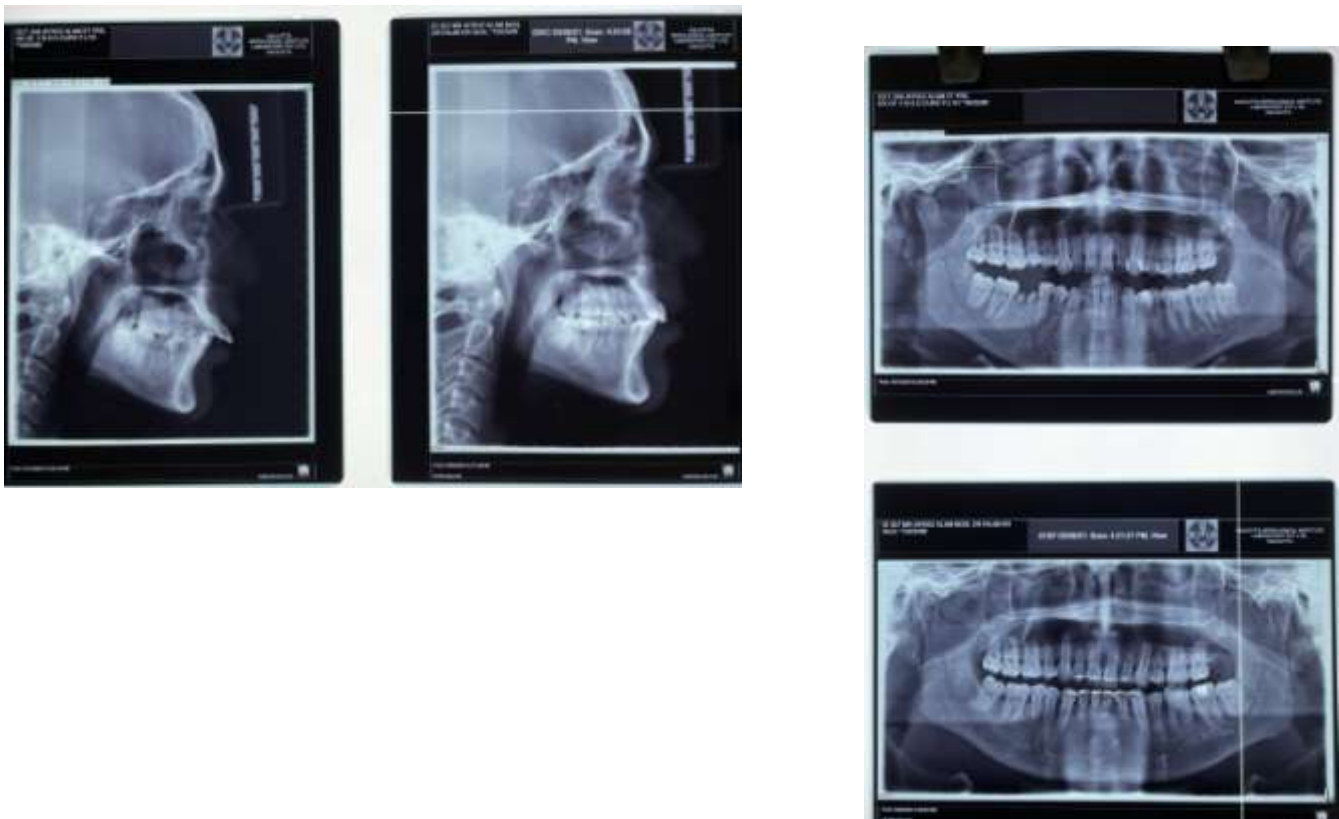


Fig 5: Lateral Cephalogram and panoramic view



Fig 6: Radiographic comparison of the treatment outcome



**Discussion:-**

Adults seeking treatment can be excellent patients with motivation and cooperation, but owing to the higher expectations of adult patients, the orthodontist should duly inform and explain the limitations of the treatment outcomes [2]. The frequency of malocclusion in adults is equal to or more than that observed in children and can be broadly classified into two groups- younger adults usually under 35 years who generally require comprehensive orthodontic treatment and older adults in their 40s or 50s who seek orthodontic treatment as part of their interdisciplinary approach for their full mouth rehabilitation programs.

The difference between adults and adolescents should be discussed in certain aspects-

For adolescents, orthodontic tooth movement (OTM) is simultaneous with growth but for adults, OTM occurs without growth. While in adolescents, correction of deep bite occurs with compensatory condylar growth, in adults deep bite will have to be corrected with intrusive forces on incisors using miniscrew implants. In children, skeletal problems can be managed by functional or orthopedic appliances but in adults, mini-screw or bone-screw-assisted orthodontics or orthognathic surgery is necessary. Also, biomechanical options are limited due to a lack of neuromuscular adaptations.

Diagnosis for an adult patient should be done on a multidisciplinary basis- IOPA, occlusal and TMJ radiographs are mandatory along with primary diagnostic aids like OPG, Lateral Cephalogram, study models, and photographs. The problem-oriented diagnostic approach as described by Profitt and Ackerman is strongly recommended. Factors to be checked thoroughly include recurrent tooth decay, attrition, missing and tilted teeth, and horizontal bone loss and hence increase in clinical crown height, TMJ symptoms etc which will have to be addressed first before the commencement of orthodontic treatment.

A big difficulty in adult orthodontics is that there is a significant delay in the initiation of OTM [4]. Initiation of tooth movement takes a longer time. The delayed response to mechanical stimuli is suggested to be caused by an insufficient source of pre-osteoblasts as a result of reduced vascularity owing to age [3]. Tissue remodeling associated with tooth movement is slow and hence the duration of orthodontic treatment is long. Robb et al [5] however found no significant difference in duration between adult and adolescents after treating 72 adult patients.

Since treatment planning in adults varies from that of adolescents, the goal as per Jackson's triad is neither realistic nor always necessary for all patients. Though non-extraction treatment modality is much more acceptable for adults with crowding and proclination, atypical extraction [6,7] and camouflage orthodontic treatment approach is very common for such patients.

Due to apical shifting of the center of resistance in adult patients due to horizontal bone loss, bodily movement requires more counterbalancing moments for proper torque-controlled retraction of incisors. Comprehensive orthodontic treatment following premolar extraction for Mr. A.A. required special anchorage arrangements. Retraction of canines required heavier forces and we had to keep the posterior anchorage unit stable through indirect anchorage from two mini-screw implants placed distal to the upper 1<sup>st</sup> molars.

Root resorption is another big concern in the case of OTM during retraction, due to a lack of cellular activity. The use of light and intermittent forces should be preferred. Periodic radiographs should be taken to rule out any root resorption. When noted, all forces should be withdrawn for 8 weeks. Treatment can be resumed after cessation of root resorption. Comparing pre and post-treatment OPG, Mr. A.A was found to be treated successfully without any evidence of root resorption.

**Conclusion:-**

The number of reported adult patients has increased gradually in orthodontic practice recently. There are challenges in treating adult patients due to some definitive biological limitations. Certain factors are to be given special importance while diagnosis and treatment planning. Limitations in treatment outcome can be overcome by introducing different approach and biomechanics to reproduce acceptable occlusion, facial appearance and smile characteristics. Because adult patients are proved to be more motivated and co-operative towards orthodontic treatment, comprehensive treatment does not demand more duration of time; also post treatment occlusion can be retained successfully following standardized retentive protocols.

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