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INTRODUCTION The comprehensivefixed orthodontic treatment is the key part of the branch of Orthodontics andDentofacial Orthopedics to correct the malocclusion and its associatedproblems.

Fixed orthodontic treatment isassociated with a very lengthy treatment time, which remains one of the major apprehensionsamong the patients seeking orthodontic treatment. The prolonged treatment timehas been a constant deterrent for the patients as they feel that it would beinconvenient to have orthodontic appliances in the oral cavity for such a longduration of time. The prolonged duration of the orthodontic treatment at manytimes prompts the patients to either avoid treatment or to seek shorteralternative treatment plans with which the patient may land up with compromisedresults. 1 The duration of comprehensivefixed orthodontic therapy, on an average, is about 20-30 months. 2This time period of the treatment depends on large number of factors such asthe type of malocclusion, extraction vs.

non-extraction treatment plan, mechanics involved in the treatment and various simple factors as timelyreporting of the patients for the appointments and maintaining a good oralhygiene. Debra Fink et al (1992)3 in their study to evaluate themean treatment duration of fixed orthodontic therapy in six orthodontic officesreported that on average its takes around 23. 1 months for the fixed orthodontictreatment to finish.

In the study it was further reported that on averagenon-extraction cases take 21. 95 months, two premolar cases take 25. 0 months, and four premolar extraction cases need around 26.

18 months of treatment timeto be completed. Beckwith et al (1999)4 in their study on 144patients undergoing orthodontic treatment from five different orthodonticoffices, found that the average treatment time for comprehensive fixed appliancetherapy is 28. 6 months and it may range from a period of 23. 4 to 33. 4 monthsdepending upon various factors such as patient cooperation, treatment modalityand oral hygiene.

The prolonged treatmenttime associated with comprehensive fixed orthodontic treatment is of concernfrom both patient and practitioner view point because of the increased risk ofwhite spot lesions, dental caries and periodontal problems, external rootresorption and decreased patient compliance. 5 Tufekci et al (2011)6 reported that at least one whitespot lesion was found in 38% of patients undergoing orthodontic treatment after6 months of treatment and in 46% of patients after 12 months of treatment onvisual examination. This augmented occurrence of white spot lesions leads topoor esthetics and increased restorative needs in the patients.

Segal et al(2004)7 in their meta analysis, comprising of 9 studies on externalapical root resorption (EARR) found that treatment time is one of the majorfactor leading to EARR and the duration of the orthodontic treatment isdirectly proportional to the extent of root resorption observed in orthodonticpatients. The lengthy orthodontic treatment thus may leave various flaws, whichare commonly known as orthodontic scars. 8 The lengthytreatment time associated with orthodontic therapy is more so problematic inthe adult patients in whom the esthetics during the treatment is of much moreconcern due the social obligations. Adult orthodontics has been the quickestgrowing type of orthodontic treatment in the recent years,

going from arelative rarity to a common practice. It is a major component of the modern dayorthodontic practice. In United States around 30% of the patients seekingorthodontic treatment are adults and these numbers have been steadilyincreasing with each passing year.

9 The reduction in the treatmenttime is more so a necessity to encourage the adults to take up orthodontictreatment. The attempts toreduce the treatment time associated with fixed orthodontic treatment arebasically based on increasing the rate of orthodontic tooth movement andclinicians have been striving towards development of such strategies. Thefundamental principles and the variables, which effect the duration oforthodontic treatment, need to be first understood to reduce the orthodontictreatment time. The first principle to minimize the length of orthodontictreatment is a proper diagnosis and a personalized treatment plan that suitsthe needs of the case. This plan should include clear treatment objectives andshould provide optimal occlusion without encroaching on the anatomic limitations, while avoiding any harm to the contiguous tissues. The second principle is todevelop a comprehensive mechanical plan with clear understanding ofbiomechanics and using suitable appliance to achieve the treatment goals. 10In addition to these two basic principles, there are three types of variables, which affect the length of orthodontic treatment.

These include patientdependent, practitioner dependent and biological variables. Thepatient-dependent variables include factors such as attending their appointmentson time, acquiescence with the practitioners' directives, maintaining a goodoral hygiene, and preserving the integrity of the appliances. Practitioner-dependentvariables basically include providing best

of the treatment with accuratediagnosis and treatment planning based on their ability and experience.

The biologicalinfluences include the cellular mechanisms involved in the tooth movement afterthe application of orthodontic force. These are tightly synchronized bydifferent molecular and cellular pathways and vary in magnitude for eachindividual. The complicated pathways of biological changes, determine the rateof tooth movement, which in turn determines the duration of the orthodontictreatment. In scenarios where both the treatment rendered by the orthodontist andpatient cooperation is immaculate, biology becomes the only factor that commandsthe rate of tooth movement in a reaction to orthodontic forces. 1