REVIEW ARTICLE

Archwire Sequencing for Different Bracket Systems: A Clinical Guide for Fixed Orthodontic Treatment

Dr. Pravinkumar Maroore[1], Dr. Payal Bhutada[2], Dr. Suresh Kangane[3], Dr. Trupti Nakhate[4], Dr. Swatilekshmi Nair [5], Dr. Manjusha Patil [6]
[1]Professor & HOD, [2]PG Student, [3]Principal & Professor, [4, 5,6]PG Student
Dept of Orthodontics, MIDSR Dental College, Latur.

Abstract:
Successful orthodontic therapy is dependent on a variety of factors, including material selection and understanding in addition to manual skills and treatment processes. The selection of wires is a crucial aspect of fixed orthodontic therapy. Orthodontic wires are devices made of wire that fit to the alveolar or dental arch and are used as anchors to straighten out teeth that are positioned irregularly. Practitioners that possess adequate general knowledge can distinguish between different wires and apply the appropriate wire sequence for each patient. This may improve the standard of care. In order to simplify wire selection during fixed orthodontic mechanotherapy, this article aims to analyse the relevant literature regarding the wide variety of orthodontic archwires that are currently available and to collect the information about which wire can be used at various stages of treatment in different bracket systems. The article has received a copyright. The copyright registration number is – L-147877/2024.
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Corresponding Author: Dr. Payal Bhutada, PG Student, Dept of Orthodontics, MIDSR Dental College, Latur. Email id.: payalbhutada99@gmail.com

INTRODUCTION

The primary goal of orthodontics is to correct malocclusion and produce post-treatment outcomes that are both aesthetically pleasing and functionally stable. In order to attain the greatest outcomes, the movement of the teeth must be optimally controlled. This can be accomplished by employing fixed orthodontic appliances, which include brackets, orthodontic archwires, and other attachments, to provide an ideal amount of orthodontic force.[1]

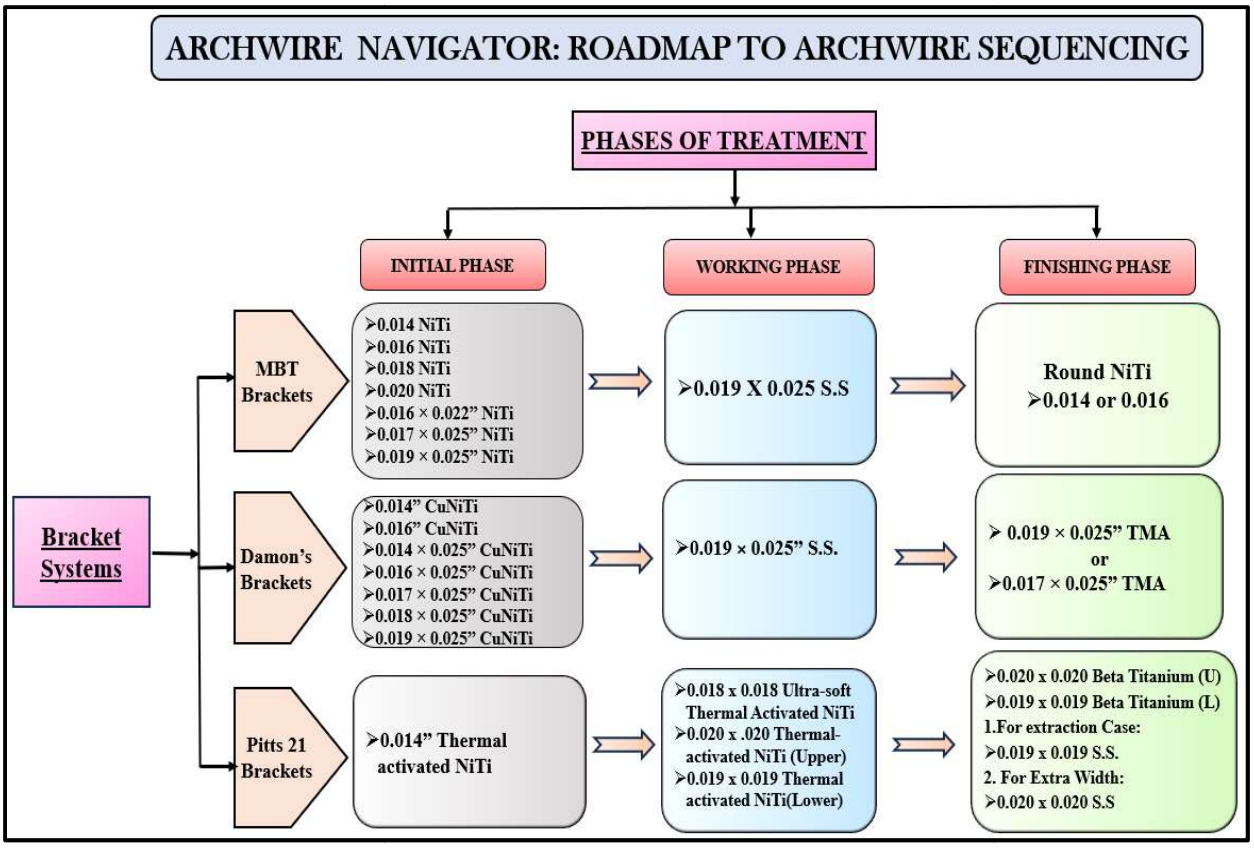
With novel biomaterials being developed on a regular basis, orthodontics is a science that is always changing. In order to apply the forces required to cause biological tooth movement, orthodontic brackets and archwires are essential components of orthodontic fixed equipment. There are a lot of new generation brackets available on the market. These brackets' popularity has grown quickly.[2] Orthodontic bracket technology has improved greatly over the years, starting with the McLaughlin, Bennett, and Trevisi (MBT) bracket system and continuing with lingual bracket systems, self-ligating brackets like Damon's, and Pitts 21 bracket system. These braces have made life much easier for orthodontists.[3,4,5]

The goal of orthodontic therapy is to apply forces on teeth in order to move them into desired positions. A force that moves teeth quickly without harming periodontal or dental tissues is excellent. A variety of biological and non-biological elements, such as tooth size and movement type, should be considered when applying force. Lower force applications yield the best effects, while higher force applications that are

greater than vascular blood pressure decrease periodontal tissue cellular activity and slow down or stop tooth movement, at least temporarily. Orthodontic wires are fixed equipment that are used to apply forces to teeth during orthodontic treatment. By exerting force and torque on teeth via the appliances bonded to them, they release the energy that was stored during installation.[6]

Archwires come in a variety of alloy combinations, including titanium molybdenum alloy, copper nickel-titanium cobalt-chromium, nickel-titanium, and stainless steel. Better and more recent biocompatible alloys are being created by the ongoing advancement of metallurgy. To move teeth more effectively without harming the tooth or the tissues that support it and to design the treatment plan, orthodontists should possess a thorough knowledge of the many types of orthodontic archwires.[7]

In past decades archwires have been classified (1) based on material constituents and (2) based on cross sections.[8]However, there is no classification based on phases of treatment and based on different bracket systems. This sequencing of archwire includes the three commonly used bracket systems, (1)McLaughlin, Bennett, and Trevisi (MBT)brackets, (2) Damon's bracket, and (3) Pitts 21 brackets, which is divided into three phases, (1) Initial phase, (2) Working phase, (3) Finishing phase.In order to simplify wire selection during fixed orthodontic mechanotherapy, this articleaims to analyze the relevant literature regarding the wide variety of orthodontic archwires that are currently available and to collect the information about which wire can be used at various stages of treatment in different bracket systems.



CONCLUSION

This archwire sequencing will guide an orthodontist to select archwire appropriately for different bracket systems at different phases of treatment. It will help orthodontists in limiting the inventory of archwires for various bracket systems. Ultimately it will assist an orthodontist, in having a thorough understanding of the various biomaterials available to make maximum use of these and achieve clinical success.

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