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ORTHODONTICS; TYPES, PROPERTIES, AND THEIR APPLICATIONS

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ABSTRACT

The purpose of this article, which consists of several elements, their characteristics, type, and applications, as well as what these important titles are related to, is a detailed clarification of each of these mentioned elements, which makes there a clear picture of the mechanism that should be used in the use of orthodontics, which is considered One of the means of treatment for a specific condition that the teeth to be treated are exposed to. The difference in orthodontic cases in the teeth is the result of a number of reasons that require the type of orthodontic to be in a specific format and in which metal, ceramic or other materials that determine the type of orthodontic must be used. The article reviewed pictures or figures according to the type of evaluation, according to what was discussed and used in previous studies at the experimental level.

KEYWORDS: *Orthodontic*

INTRODUCTION

Orthodontics is one of the branches of dentistry concerned with the face and jaws, developing teeth, eliminating occlusal abnormalities, and trying to correct them. Among the most important indications for orthodontic treatment are improving oral functions, as well as maintaining the beauty and general health of the teeth. It is necessary for many cases related to teeth that are not organized in their arrangement or arrangement in the jaws, and its use requires a high skill that the orthodontist must possess. If the use of orthodontics is uncontrolled, it will lead to unacceptable results, as well as the need to find alternative solutions in the event of a defect during and after work. Therefore, intensive attempts have been made to find a way to reduce the occurrence of metal or ceramic removal from the jaws of orthodontic patients. A number of studies (1) indicated the need to use mouthwash containing fluoride daily in order to reduce the occurrence of stain lesions on the teeth that lead to dental problems during orthodontic treatment, but by continuing to use mouthwash it can be achieved by 13 to Only 20% of patients (2). Another way to prevent metal or ceramic demineralization is to use products containing absolute fluoride, which can be obtained from composite resins or other compounds that are suitable for attaching orthodontic accessories. There are some risks in orthodontic treatment, including plaque removal, root resorption, and other additional problems in the gums, and thus there will be a failure to achieve the primary goal of treatment.

PROPERTIES

Since materials are actually composed of molecules and atoms, the space between the particles and the connective force are determined and thus the hardness of the materials is recognized. The distance between atoms changes, depending on the nature of the force when the layers are applied, and this is called stress. The material is stressed by the movement of

force and pressure, and thus it will change in size and deform. Flexibility has a significant and effective impact on orthodontics because it is the most important source of strength in the systems for the devices used. The orthodontic apparatus consists of active and passive units. Important items that constitute sources of strength such as wires, rubber materials and other items necessary for this purpose. One of the most important characteristics of orthodontics is related to the constant monitoring of work within a program and fixed times after being linked and fixed by the orthodontist. When the wire is bent to a certain point and released, it will return to its original position. And if the force increases too much, and the wire is bent to a certain position, and this will not be able to return to the previous position as it was. Therefore, with the increase of pressure or force, the deflection of the wire will increase appropriately. In **figure 1** the diagram showing the stress-response relationship for super elastic wires. When the wire is energized the force will increase, and when the force is removed, the wire will take a different path downward. The difference between the activating force and the force applied by the wire during deactivation, also indicates the true level of force that the wire applies to the tooth.3D laser scanners are widely used in orthodontics to create databases of standardized cohorts (3) and segmental growth changes (4), as well as for the real evaluation of clinical outcomes in surgical orthodontics (5, 6, 7, 8, 9) and non-surgical treatments (10,11, 12).

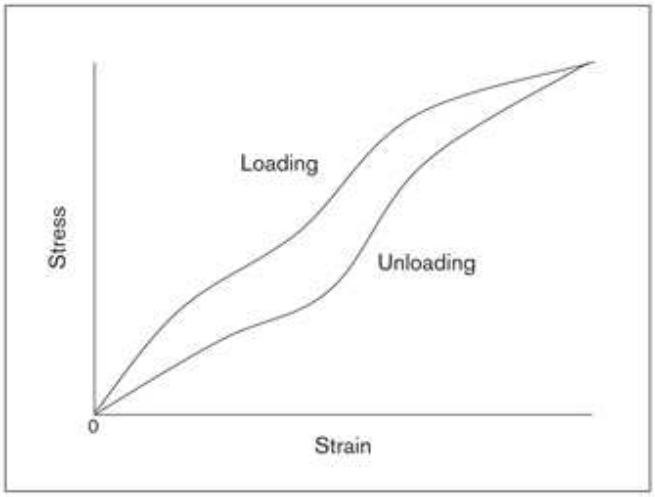

Figure 1: (Shows the Tolerance of a Superelastic Wire, Tracing a Different Path during Inactivation in Two Curves, The Difference between these Two Curves, and Observing the Deceleration during the Clinical Efficacy of that Wire.)

TYPES OF ORTHODONTICS

The choice of orthodontic type from the doctor depends on a set of reasons that the orthodontist discusses with the patient, which may be physiological, histological, technical, or other reasons that depend on the patient's age or financial condition. On the other hand, some studies (13, 14) reported that the amount of movement teeth are subject to the amount of force shed by the orthodontic that happened to the teeth. But other studies (15, 16) confirmed that there was no relationship between the amount of force that orthodontics applied to tooth movement. For this reason, it has not yet been proven how to move the teeth with a high efficiency to the extent of complete moderation, as it was previously.

Metal Braces

Also called traditional arches, it is considered among the most common types of arches in countries of the world and has been available for nearly 100 years until the present time. Previously, this type of braces were very bulky and noticeable,

unlike today's braces. Metal braces are most common among young patients (children and teenagers). Elastic laces are used when attaching wire to brackets. In order for the orthodontist to move the teeth, he makes some adjustments to the wire in the appointments that are scheduled between 4-8 weeks. Which is a removable, so it's not the same as for clear orthodontics, most parents and patients prefer metal braces because they do not need to remind to wear it, as shown in **fig. 2.**

Figure 2: (to show Metal Braces).

Ceramic Braces

It is made of a transparent material that can be tinted according to the color of the teeth, and it works in the same way that is used with metal clips, but with less clarity. It is considered more common among most patients, especially those who think it is suitable for them. The age group of these patients is among those who tend to be teenagers and adults as they prefer them out of aesthetics and good looks. When comparing ceramic braces with metal braces, we find that ceramic braces are less visible and less expensive than metal braces, are slightly larger than metal braces and are in line with the patient's diet and brushing program. It's not for everyone, but it is valuable in the field of orthodontics, as shown in **fig. 3.**

Figure 3: (to show Ceramic Braces).

Self-Ligating Bracket

Self-ligating braces are much the same as in metal and ceramic braces, and are available as in a metal or ceramic material. During orthodontics, the orthodontist attaches wires in a way that leads to orthodontic movement of the teeth. The difference between these self-ligating brackets and metal or ceramic brackets is that they use clips to hold the wire in place, rather than elastic flexible bands, as shown in **fig. 4.** The dates of this type of braces are a little shorter and the reason for this is due to the ease of adjusting them.

Figure 4: (to show Self-Ligating Bracket).

Lingual Braces

It is the most specialized orthodontic system, but it is the least common in the commercial market, as it requires the skill set in orthodontics that orthodontists work. The braces are located behind the teeth and this work takes place with all patients who want to provide advantages that cannot be provided by any other type of orthodontics, so that its complete disappearance. This type of braces is particularly suitable for adults whose braces are complex. We've also seen an increase in the popularity of behind-the-dental braces among beauty-conscious teens. Many patients experience noticeable changes in their speech and slurred speech, as shown in **fig. 5.** These symptoms usually appear shortly after placing the braces, and disappear after a few weeks when the mouth becomes accustomed to it being a new and foreign body.

Figure 5: (to show Lingual Braces).

Clear Aligners

It is the one that has seen a clear increase in its popularity in the past decade. Known as Invisalign in the first period of the twenty-first century, it was considered as the largest brand of aligners. Invisalign is very great for patients who had orthodontics when they were younger, as well as for patients with dental problems that have misalignment, overgrowth, and those with gaps in the front teeth. For more complex problems, braces behind the teeth or by a combination of lingual braces and lingual braces can provide cosmetic relief, as shown in **fig. 6.**

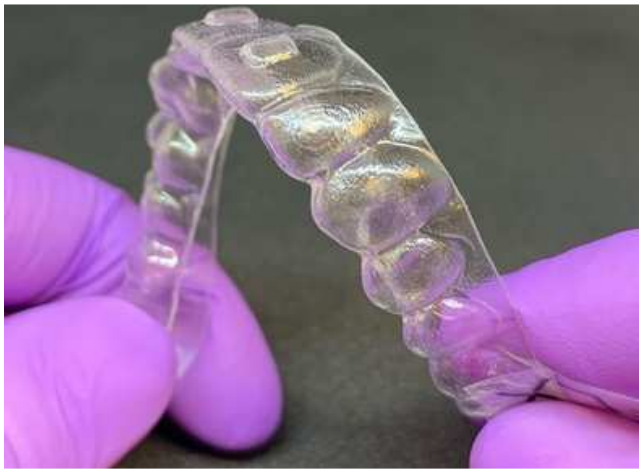

Figure 6: (to show Clear Aligners)

APPLICATIONS

Nowadays, many people have increased their desire to treat their health problems related to the irregularity and consistency of their teeth to resort to the use of orthodontics by going to the orthodontist who works to address this problem through a regular and accurate program that the patient must adhere to, and many are applied Among the applications that gave positive results, including the use of the laser and other methods through which the patient's safety is maintained within a specific time, for example, the temperature increases significantly with the use of the laser, but the duration of the laser is six seconds, which is optimal in terms of safety and effectiveness at the same time (17, 18)which necessitates adding a water coolant to reduce the thermal effects, if any, for one reason and another. One of the most important applications of orthodontics is the treatment of dental malocclusion, so dental braces are manufactured with systems that make them strong in order to perform the desired purpose, which is to modify the phenomenon of dental occlusion. Various elements are used in the formation of the device used in orthodontics, the most important of which are the brackets that are attached to the teeth in order to modify them from the distorted or not beautiful condition to the acceptable condition desired by the patient. One of the most important applications of orthodontics is that it is considered a treatment for tooth deformities, whether acquired or natural, in addition to being a way to get rid of dental malocclusion. Braces are among the most important components of orthodontics, and they are attached and fixed to the teeth, and force is applied by arched wires, and the rest of the other units, including flexible ones. There are a number of variables that are structural characteristics of each component. The sources used in the orthodontic process are the forces arising from the elasticity of wire and rubber. The force must be light for optimal orthodontic mobility. Thus, the movement of the teeth resulting from direct bone resorption will be formed, and the defect will be repaired, and unwanted side effects will be avoided, and the periodontal tissues are preserved, and by this One of the basic applications of orthodontics is the cosmetic function. Orthodontics gives a high satisfaction to the person, because if the position of the teeth is modified and the warping and distortion that was in it is eliminated, the rest of the devices will work with a very high efficiency, such as the digestive system, which will work properly and what is related to it will also work correctly, as well as arranging the structural aspect that is related to the teeth, such as bones and muscles as well, and there is flexibility on the physiological aspect.

CONCLUSION

We can conclude from this article identifying the correct outlines and steps of the orthodontic evaluation process, determining the appropriate treatment, and clarifying the possible treatment methods to correct the problems that most patients suffer from. We can consider it the model that the orthodontist relies on to work in the field of orthodontics, according to what the researchers discussed in previous studies and experiences on the technical level in a truly real way. Thus, we are aware of the benefit in order to seek it, and the lack of benefit in order to avoid it.

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