CLINICAL PROTOCOL FOR ATTACHMENT INSTALLATION IN CASES TREATED WITH ORTHODONTIC ALIGNERS - TECHNIQUE DESCRIPTION

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ABSTRACT

Orthodontic treatment with aligners is something increasingly desired by patients. It is known that these devices carry with them advantages and disadvantages when compared to conventional fixed device. In an attempt to potentiate planned movements virtually, in the vast majority of cases attachments are required. So, it is paramount a safe protocol of attachments installation, thus giving a greater stability and aesthetics for them. The aim of this article is to describe the moment of attachment installation in a patient, highlighting the materials used.

Descriptors: Orthodontics, corrective orthodontics, removable orthodontic appliances.

RESUMO

O tratamento ortodôntico com alinhadores é algo desejado cada vez mais pelos pacientes. Sabe-se que esses dispositivos carregam consigo vantagem e desvantagens quando comparados ao aparelho fixo convencional. Em uma tentativa de potencializar os movimentos planejados virtualmente, na grande maioria dos casos *attachments* são necessários. Nesse sentido, é de suma importância um protocolo seguro de instalação dos *attachments*, conferindo assim uma maior estabilidade e estética desses. O objetivo desse artigo é descrever o momento de instalação dos *attachments* em uma paciente, destacando os materiais utilizados.

Descritores: Ortodontia, Ortodontia corretiva, aparelhos ortodônticos removíveis.

INTRODUCTION

The demand for aesthetic orthodontic treatments is increasing. That is a fact. It is clear that the greatest demand for dental treatment is not the one caused by caries. Today, what most motivates patients to seek dental services is the desire for the "perfect" smile. Thus, the demand usually lies in aligning, leveling, and relating, improving proportions, shapes and dental bleaching.

It seems reasonable to understand that Orthodontics is one of the leading specialties within the aesthetic rehabilitation treatment. However, many patients no longer see themselves as candidates for the use of the conventional fixed metallic aesthetic devices. It is clear that patients seek more comfortable and aesthetic treatments, and in this context, orthodontic aligners are gaining increasing importance, especially for treating mild and moderate malocclusions. It is evident that when comparing orthodontic aligners with fixed aesthetic devices – whether conventional or self-ligating – in terms of aesthetics and comfort the difference is noticeably perceived.

Treatment with orthodontic aligners has evolved a lot in recent years. This evolution can be attributed basically to science, experience of professionals with such devices and continuous improvement of softwares and quality of the "plastic" from which aligners are manufactured. Despite great developments, lack of friction between aligners and teeth makes some movements require extra support. This support and friction come from attachments. The use of attachments with specific drawings increases the correction power of malocclusion by aligners. In other words, in the vast majority of cases, attachments are essential.

When considering the importance of attachments in treatments with orthodontic aligners, the aim of this article is to describe a safe clinical protocol for the installation of these resources, in order to provide good aesthetics and stability.

CASE REPORT

In a treatment with orthodontic aligners, after diagnosis is made and treatment intentions are defined, a virtual planning is carried out. In virtual planning, in addition to a simulation of the desired movements, specific attachments are planned according to the type and magnitude of movement of each tooth. After the virtual planning, usually in consensus with the patient, the aligners are manufactured (Figure 1).

The first step of treatment with orthodontic aligners usually involves the attachments installation. These are manufactured from a 0.3-0.5mm acetate plate (depending on the manufacturer) stamped on the initial model of the patient (Figure 2). For better understanding of the clinical protocol for the attachments installation, follows the step-by-step procedure.

Step 1: *template isolation*

First, the template (acetate plate) is isolated with Cel-Ac insulator for at least 40 minutes before the procedure to facilitate guide removal and decrease the chance of loosening attachments after photoactivation.

Step 2: prophylaxis + acid conditioning + adhesive

After the isolation of the template, prophylaxis was performed with pumice stone and Robinson brush. After washing and drying all teeth, an expandex lip retractor was installed and the conditioning was performed with phosphoric acid 35% (Ultra-Each, Ultradent), restricted to the place where attachments were planned in the respective teeth (Figure 3). After 30 seconds, the acid was removed and washed with air and water consistently. Then, the teeth were properly dried (Figure 4) and the Single Bond Universal Adhesive (3M) was applied with the aid of an adhesive applicator (Microbrush), rubbing for 20 seconds on each tooth. A light jet of air for solvent evaporation was performed and, subsequently, photoactivation with the Valo light curing (Ultradent, Sandy, Utah, USA) for 3 seconds of exposure (Figure 5).


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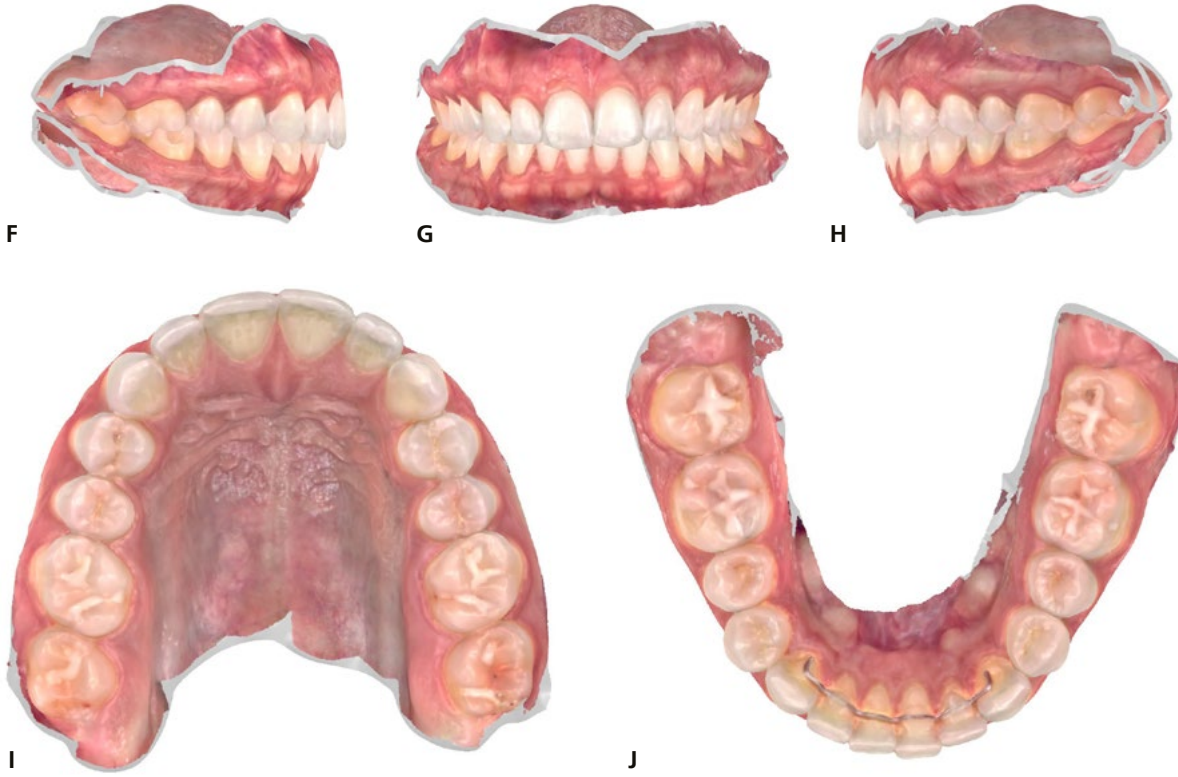
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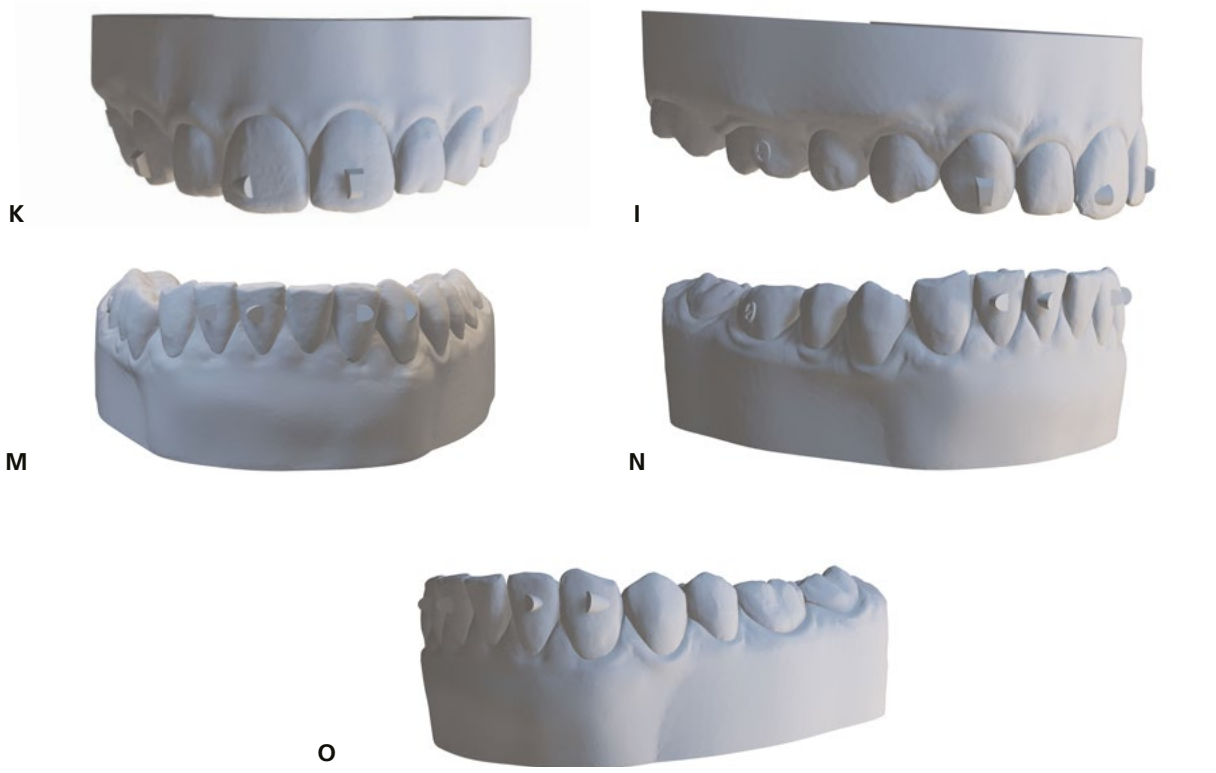


Figure 1 (A-O) – Once the therapeutic goals were defined, the virtual planning was carried out from the intraoral scan of the patient. Then, attachments were planned according to the teeth individual movement.

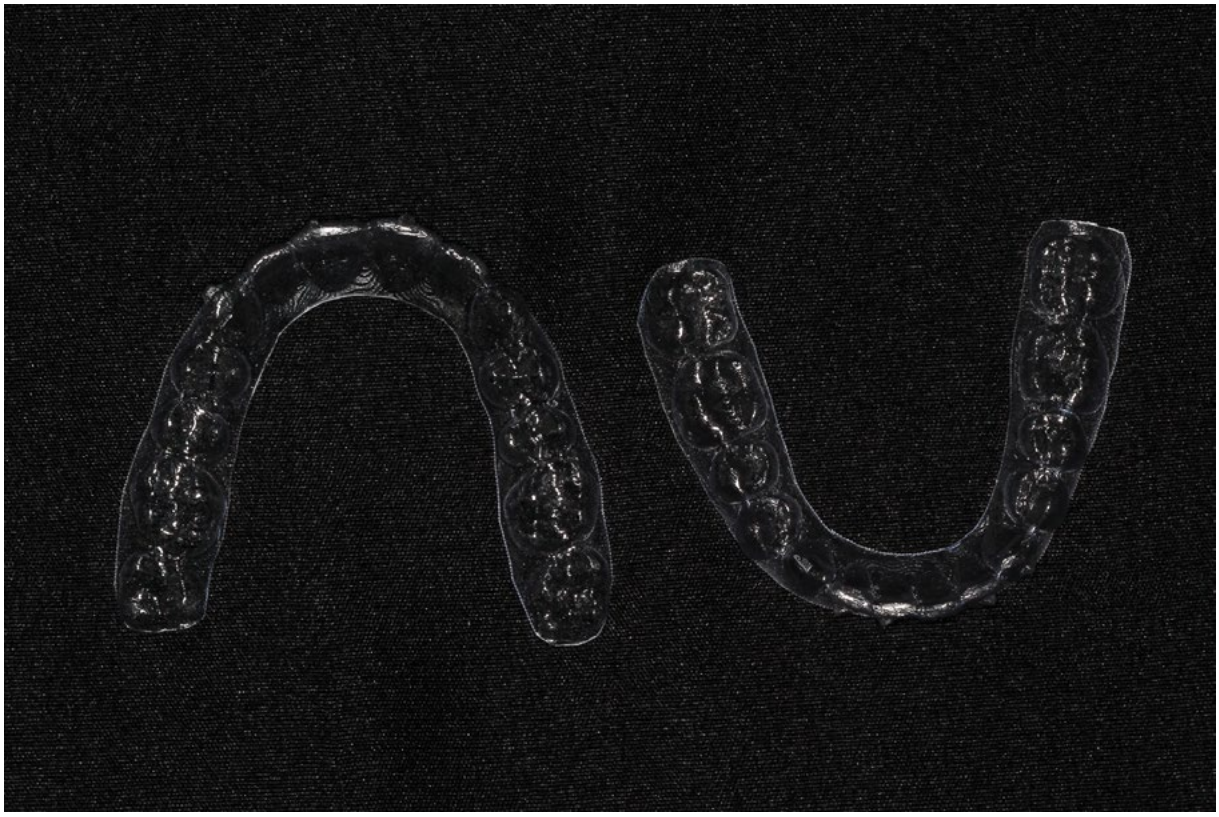


Figure 2 - Top and bottom templates stamped from the original printed templates

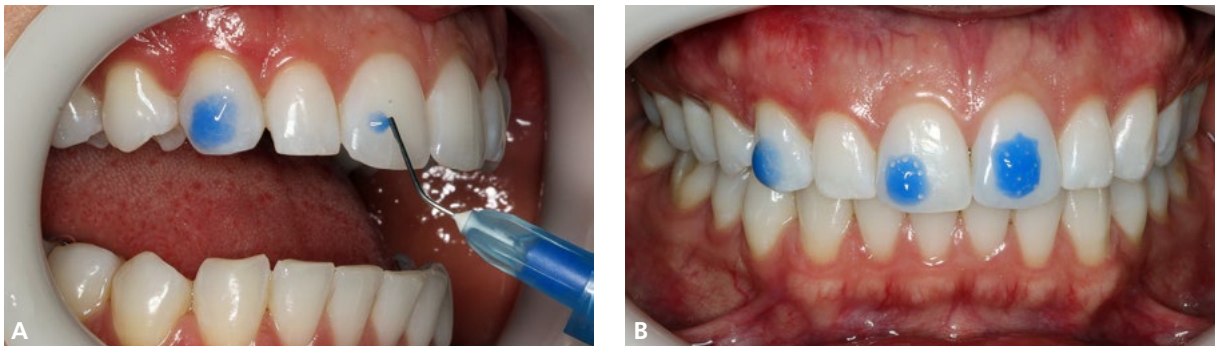


Figure 3 (A-B) – Note that 35% Ultra-etch phosphoric acid (Ultradent) was applied only in the region where the attachment was planned. It is worth saying that this acid, due to its good viscosity allows greater safety and less biological damage, because it does not flow easily, which allows protection to areas that are not of interest.

Figure 4 - After good washing of the acid in order to remove all excess of the phosphoric acid, the teeth were dried. At that moment, an opaque aspect of enamel could be observed.

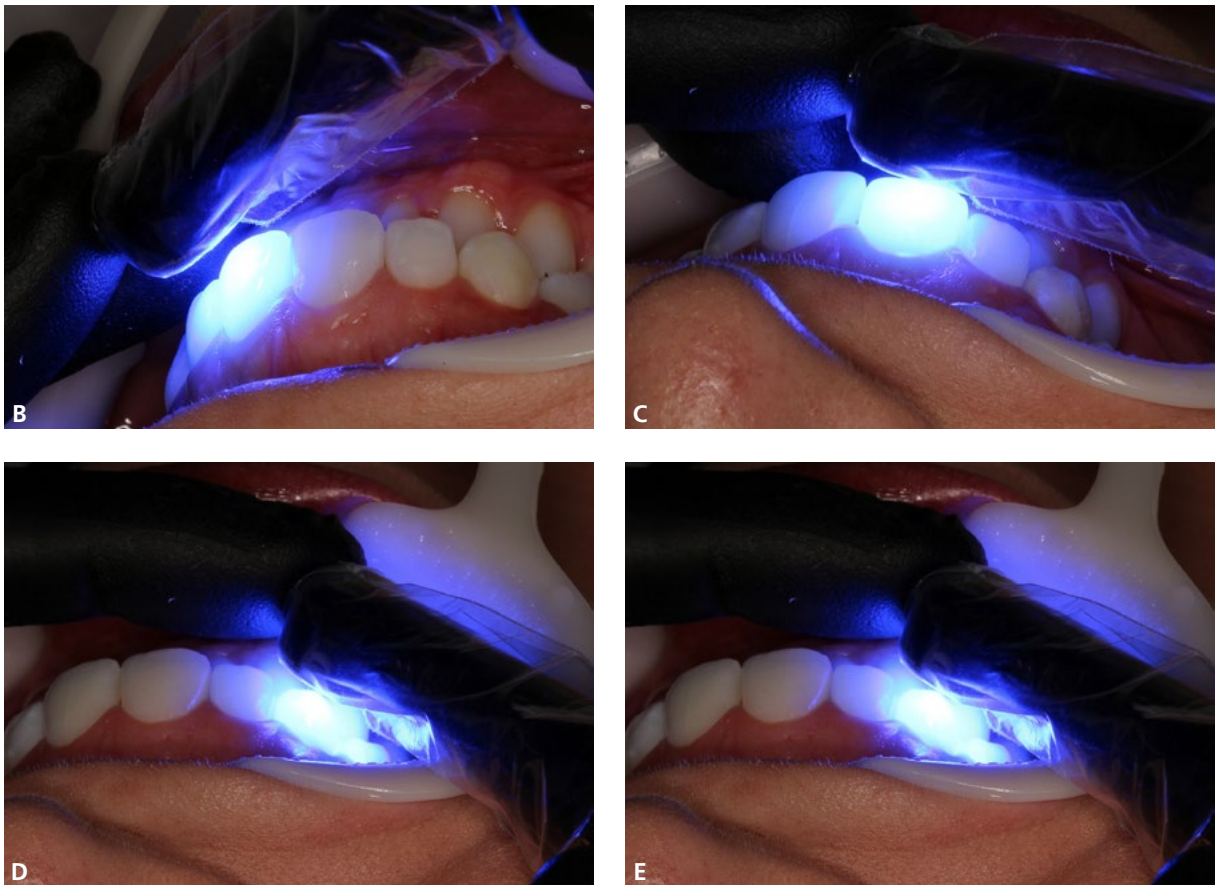
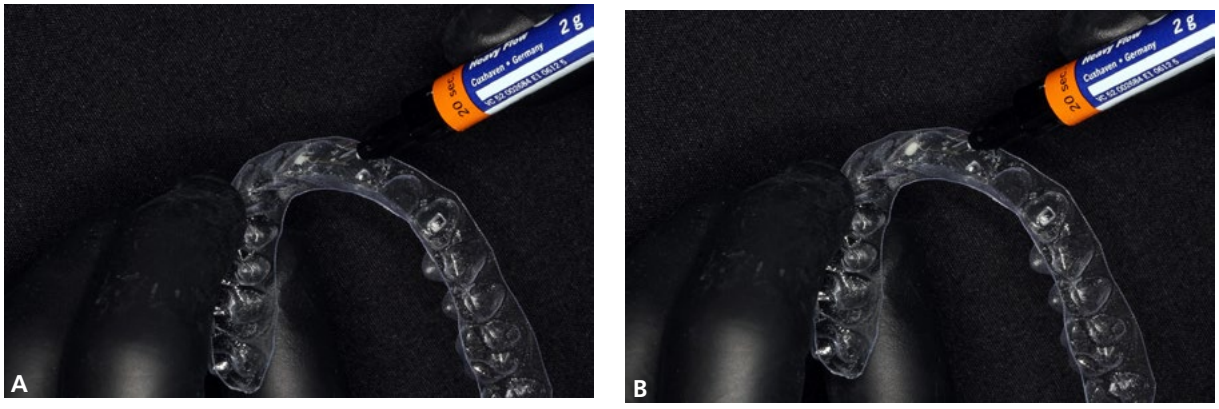


Figure 5 (A-D) – Application of Single Bond Universal Adhesive (3M) in the areas conditioned by phosphoric acid. It is worth saying that this adhesive has a catalyst for several types of surfaces, such as metal, zirconia, and alumina. After applying the adhesive, photoactivation was performed.

3rd Step: composite resin application

At that moment, the compound resin Grande Heavy Flow (Voco) - for facilitating the insertion of the material, having the possibility of choosing ideal color according to the patient's tooth and having very high load content, greater than 83% w/w - was inserted in the respective niches of the template attachments. This insertion was performed slowly, with the applicator tip touching the bottom of the attachment niche, being removed gradually, so that the resin was filling the same, thus reducing the chance of having bubbles (Figure 6).



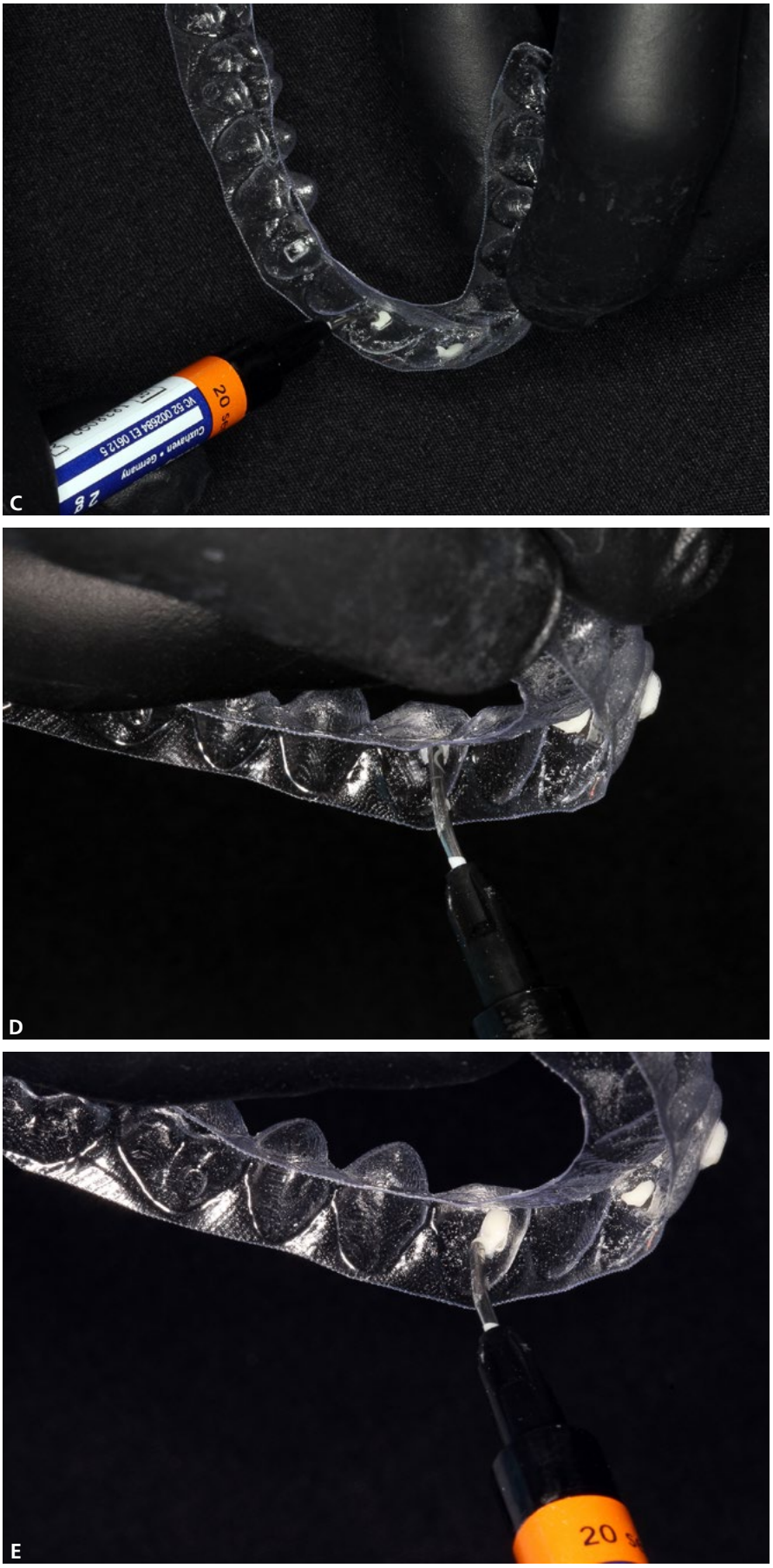


Figure 6 (A-E) – Insertion of Flow resin in attachments niches.

Step 4: photoactivation of attachments through the template

After inserting the resin into the respective attachment niches, the template was transferred to the patient's oral cavity, making sure that the resin was fully in contact with the teeth (Figure 7). When well adapted with a slight apical pressure, attachments were photoactivated with the Valo light curing for 3 seconds (Figure 8). High-power photopolymerizers are recommended for this purpose, such as Valo itself or the Led-X 2400 or 3200 (Orthometric, Marilia, São Paulo)

Then, the template was removed in the direction of the palatine/lingual for the vestibular. Once this was done, the same process was repeated for the lower arc (Figure 9).

Figure 7 - Template adaptation in the patient's mouth. At this point it is paramount to note that the resin is in contact with the vestibular face of the teeth that will receive the attachments.

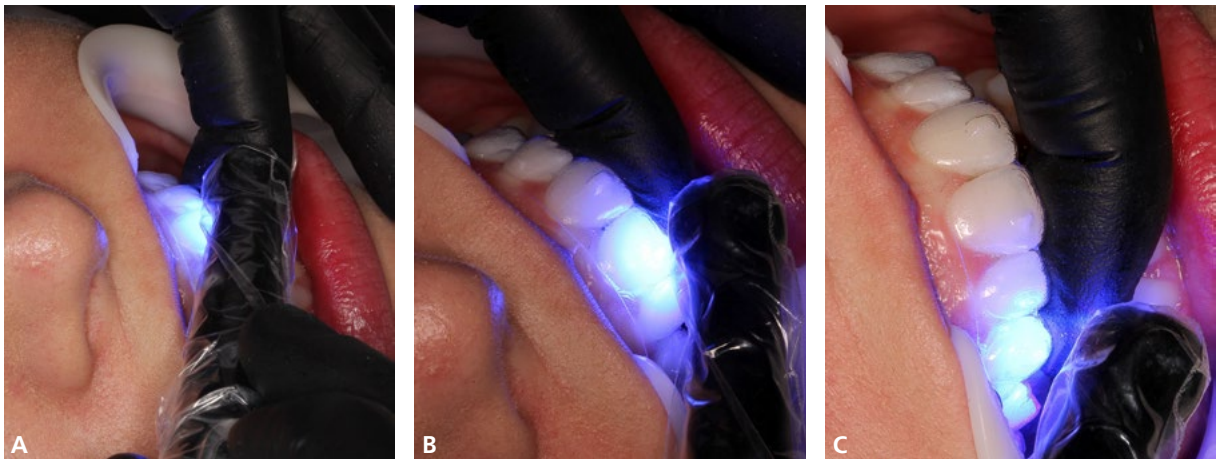
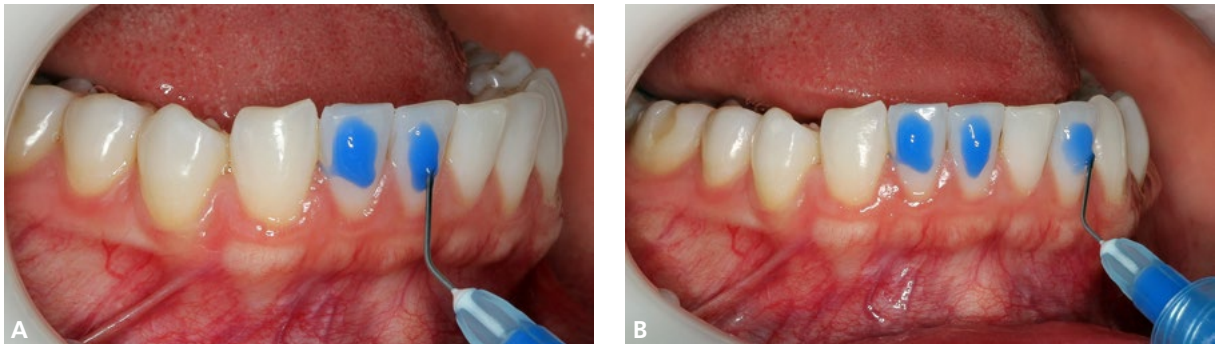


Figure 8 (A-C) – Photo-activation of resins with Valo light curing (Ultradent) for 3 seconds for each tooth.

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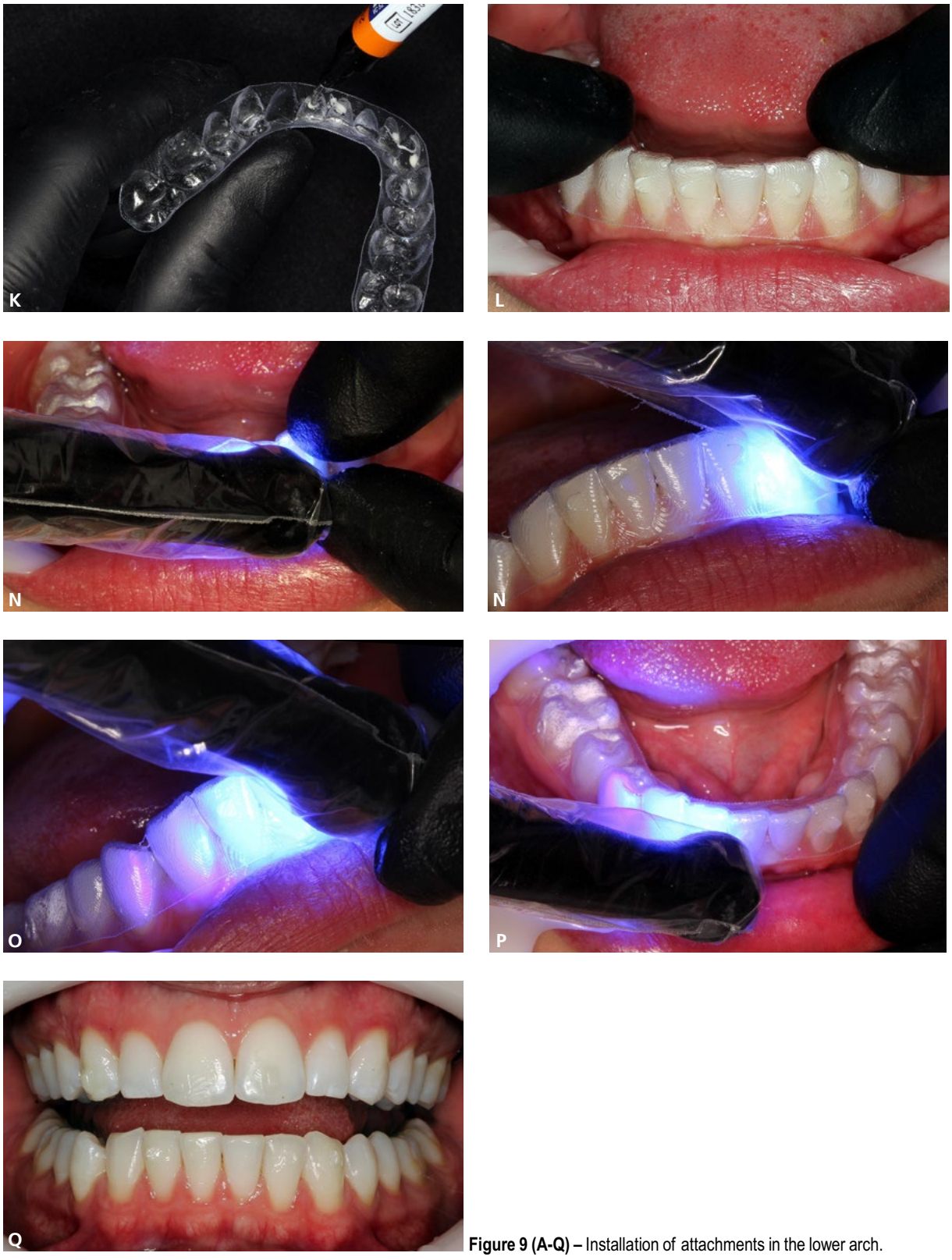

Figure 9 (A-Q) – Installation of attachments in the lower arch.

Step 5: excesses removal

As much as sufficient amount of resin is placed to manufacture the attachment, a minimum excess can be expected. Therefore, at that moment, these excesses were removed with the aid of a handle and a scalpel blade number 15, which confers a lower risk of damage to the enamel surface (Figure 10).

Figure 10 (A-B) – Cautious removal of excesses with the aid of a handle and a scalpel blade n 15.

6th Step: aligners proof

Finally, the aligners for movement are installed and their adaptation is checked, as well as the stability of attachments after their removal (Figure 11).

Figure 11 (A-E) – First aligners adaptation.

FINAL CONSIDERATIONS

Attachments are devices commonly used in cases treated with orthodontic aligners. In order to ensure their good stability and aesthetics from the beginning to the end of treatment, a safe installation protocol must be adhered to. In the protocol described, it is clear that when all possible care is taken, it is possible to guarantee a desirable outcome.