METHOD AND APPARATUS FOR APPLYING ORTHODONTIC BRACKETS AND THE LIKE

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ABSTRACT
An orthodontic method and apparatus wherein a dental cast of a patient has detachably applied thereto at locations selected by the orthodontist a plurality of brackets, and the like, and a positioner is provided which captures the brackets in their proper position and transfers the brackets so positioned to the patient's teeth for securement thereto.

10 Claims, 6 Drawing Figures
METHOD AND APPARATUS FOR APPLYING ORTHODONTIC BRACKETS AND THE LIKE

BACKGROUND OF THE INVENTION

As is well known to those versed in orthodontics, initial positioning and application of the brackets, molar tubes, and the like, (all of which will hereinafter be referred to comprehensively as brackets), is a tedious and time-consuming procedure, and especially difficult as the patient's are usually youngsters. While there is presently an increase in the use of chemical adhesives for securing brackets to patient's teeth, which procedure is considerably advantageous to the patient over the more conventional use of bands about the teeth, the positioning and effective securement of adhesively fastened brackets also presents considerable problems in delicate positioning and retention in position during the curing of the adhesive.

SUMMARY OF THE INVENTION

It is an important object of the present invention to provide an orthodontic method and apparatus which considerably simplifies the application of orthodontic brackets to patient's teeth, substantially reducing the time required for the complete operation, and locates the brackets with enhanced precision and accuracy over previous methods.

It is another object of the present invention to provide an orthodontic method and apparatus of the type described which is usable in conjunction with tooth bands or direct adhesive securement of brackets to the teeth.

It is still another object of the present invention to provide an orthodontic method and apparatus having the advantageous characteristics mentioned in the preceding paragraph, which is more comfortable to the patient, quicker and easier for the orthodontist, and which requires only inexpensive materials for its practice.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations and arrangements of parts and method steps, and which will be exemplified in the following description, and of which the scope will be indicated by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view showing a dental cast having orthodontic brackets temporarily applied thereto for use in practice of the present invention.

FIG. 2 is an elevational view similar to FIG. 1 showing the dental cast and a positioner or mold having been applied to the dental cast, the positioner being shown in phantom withdrawn from the dental cast.

FIG. 3 is an elevational view similar to FIG. 2, showing the dental cast and positioner, the latter being shown partially in section and as having been removed from the dental cast.

FIG. 4 is a top perspective view showing the positioner or mold apart from the dental cast.

FIG. 5 is a partial side elevational view showing the positioner of FIGS. 3 and 4 as applied to the patient's teeth.

FIG. 6 is an elevational view similar to FIG. 5, but illustrating the positioner having been removed from the patient's teeth while the orthodontic brackets remain positioned on the teeth.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, and specifically to FIG. 1 thereof, a dental cast is there generally designated 10, which, of itself, may be conventional, being formed of plaster to accurately simulate the gums and teeth of a patient. Thus, the dental cast 10 includes a base part 11, a gum simulating region 12 extending from the base, and simulated teeth 13 projecting from the gum simulating region 12. Thus, the simulated teeth 13 and gum region 12 are an accurate model of the patient.

With the dental cast 10, the orthodontist may determine the optimum locations and arrangements of dental brackets. That is, the orthodontist may choose the proper type of bracket and select an optimal location and arrangement on the teeth. Thus, it will be seen that certain of the teeth 13 carry brackets 14, as selectively positioned on the teeth. The brackets 14 on the teeth 13 of the dental cast 12 are detachably or removably positioned, as by wax, a tacky adhesive, or other suitable means.

With the brackets 14 selectively positioned and detachably secured to the dental cast teeth 13, a quantity of molding material in a plastic condition is conformably applied to the teeth 13, brackets 14, and adjacent portions of the gum simulating region 12. The molding material may be of any suitable type, and it has been found satisfactory to employ thermoplastic material in a heated or plastic condition for convenient moldability into conforming engagement with the cast teeth 13, brackets 14 and adjacent portions of gum region 12. The molded material is shown in solid lines in FIG. 2 as a mold 15, having been applied into the above-described conforming engagement while in a plastic state. Upon curing or hardening, the mold 15 is of a flexible, self-sustaining, resilient character and has been molded into positive, capturing engagement with the brackets 14. For example, the material of mold 15 extends into undercuts of the brackets 14 so as to capture and releasably retain the latter.

Hence, upon withdrawal of the mold 15 from the dental cast 10, as to the phantom position shown in FIG. 2, the brackets 14 are removed from the dental cast teeth 13 by the positive action of the mold. That is, the brackets 14 are retained by the mold 15 upon its removal from the dental cast 10, the temporary retaining means employed to position the brackets being insufficient to retain the brackets against the positive withdrawing force of the mold 15. The mold 15 is shown in detail in FIG. 3, partly in section, after removal from the dental cast 10. It will there be observed that the mold 15 has captured interiorly thereof the brackets 14, the latter being releasably but positively retained in position within the mold by engagement of the mold material in undercuts of the brackets.

A top perspective view of the mold 15 is shown in FIG. 4, and the mold, containing the captive brackets 14, is safely retained, apart from the dental cast 10 for actual use in the patient's mouth. That is, as will appear more fully hereinafter, the mold 15 serves as a transfer device for positioning or transferring the positioning of
the brackets 14 from the dental cast teeth 13 to the teeth of the patient. The mold 15 is therefore also called a positioner.

Referring now to FIG. 5, the mold or positioner 15 is shown located in conforming engagement with the patient's teeth 20 and the adjacent gum portion 21.

Prior to the actual positioning shown in FIG. 5, the patient's teeth 20 are dried, or otherwise prepared to receive a chemical adhesive, and the adhesive is placed on either or both of the brackets 14 or patient's teeth 20. The positioner or mold 15 and the captive brackets 14 are then positioned as shown in FIG. 5, with the brackets 14 properly located in facing relation with respective teeth, and the positioner held in place until the secured adhesive has cured.

After curing or setting of the adhesive to firmly fasten the brackets 14 to the patient's teeth 20, the positioner or mold 15 is withdrawn from the conforming engagement of FIG. 5, as in the direction of the arrows in FIG. 6. The positioner or mold 15 may be suitably flexed, as required, to release the brackets, which are now fixedly secured in their precise selected positions on the respective teeth, as shown in FIG. 6. Necessary wiring and other orthodontic procedures may now be performed.

While the method and apparatus of the present invention have been illustrated and described hereinbefore in conjunction with direct adhesive securing of brackets to teeth, it is appreciated that the teeth may be provided with circumposed bands, in the conventional manner, and the brackets subsequently secured to the bands in accordance with the teachings of the instant invention, if desired. Thus, that is, the instant method and apparatus may be employed to accurately position and secure orthodontic brackets either directly to the patient's teeth or to bands provided on the teeth.

From the foregoing, it is seen that the present invention provides a highly improved method and apparatus for applying orthodontic brackets, and the like, to a patient's teeth, in accurately positioned relation, for use in conjunction with other orthodontic procedures, and which otherwise fully accomplishes its intended objects.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention.

What is claimed is:

1. An orthodontic method, the steps which comprise: making a dental cast of the patient, selectively positioning and detachably applying brackets to the dental cast positioned as desired on the patient's teeth, applying a molding material into conforming engagement with the dental cast and brackets to define a mold which assumes the configuration of the dental cast and captures the brackets, removing the mold and captured brackets from the dental cast, applying said mold and brackets to the patient's teeth to properly position the brackets relative to the teeth, securing the positioned brackets to the teeth, and removing the mold from the teeth while leaving the brackets secured.

2. The orthodontic method according to claim 1, further characterized in effecting said detachable application by interposing a tacky material between said brackets and cast.

3. The orthodontic method according to claim 1, further characterized in drying said teeth before applying said mold and brackets.

4. An orthodontic method according to claim 1, wherein said molding material is thermoplastic, and further characterized in heating said thermoplastic molding material before said applying step.

5. An orthodontic method according to claim 1, further characterized in chemically securing said brackets to the teeth.

6. An orthodontic method according to claim 1, further characterized in mechanically securing said brackets to the teeth.

7. An orthodontic method according to claim 6, further characterized in applying bands to the teeth before applying said mold and brackets, and securing said brackets to the bands for securement to the teeth.

8. Orthodontic apparatus comprising, in combination, a dental cast of a patient, a plurality of brackets removably applied to the teeth of said dental cast at selected locations thereon, a positioner of resiliently flexible material in conforming engagement with said dental cast teeth and applied brackets for removal together with said brackets from said teeth, said positioner with said brackets being conformably engageable with the patient's teeth to selectively locate the brackets in facing relation with the patient's teeth, and adhesive interposed between the brackets and patient's teeth for effecting securement therewith, whereby said positioner is removable from the patient's teeth while leaving the brackets selectively located on the patient's teeth.

9. Orthodontic apparatus according to claim 8, said positioner engaging in undercut regions of said brackets to capture the brackets for removal from the dental cast and enabling separation of the positioner from the brackets on the patient's teeth.

10. Orthodontic apparatus according to claim 8, in combination with bands circumposed about the patient's teeth and secured to the brackets by said adhesive.

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