This invention relates in general to an orthodontic appliance, and more particularly to a buccal tube insert for a flat oval buccal tube to convert the tube opening from a substantially oval shape to a substantially circular or rectangular shape.

Hereinafter, in the treatment of an orthodontic patient, it is quite often necessary in the early stages of treatment to employ a flat oval buccal tube on one or more of the molars to apply a torquing force to such a tooth. In such an instance, the arch wire is shaped for reception into the oval tooth to cause a torque force on the tooth. Following the torquing of the tooth, it is quite often necessary to remove the oval tube and substitute therefor a circular, cylindrical or rectangular tube for further treatment. In order to make this change, the band and tube are removed from the tooth so that the oval tube may be ground off the band and thereafter replaced with a round or rectangular tube. A newly formed arch wire is then provided, having a simple straight-back end which engages in the opening in the round tube.

The buccal tube insert of the present invention eliminates the necessity of removing the oval tube in that the insert may be applied to the oval tube to thereby substantially convert it to a round or rectangular tube. This substantially reduces the time and problems of an orthodontist. Further, the insertion of the invention also serves to increase the original length of the oval tube.

The buccal tube insert includes a substantially cylindrical or rectangular head having a circular or rectangular opening therethrough, and a pair of legs extending from the head that are sized to be snugly received within the opening of an oval tube. As can be appreciated, the legs will take up space in the oval tube, and where properly shaped, will substantially convert the opening in the oval tube from an oval shape to one of substantially circular or rectangular shape. One of the legs is made of a length substantially equal to the length of the oval tube, while the other leg is made of a length substantially longer than the oval tube to define a tail that may be bent over the end of the tube and thereby lock the insert in place in the tube.

Accordingly, it is an object of the present invention to provide a buccal tube insert for use with an oval buccal tube to convert the substantially oval opening in the tube to one that is substantially circular or rectangular, thereby eliminating the necessity to remove the oval tube where it is next desired to have a round or rectangular tube for further treatment.

Another object of this invention is in the provision of a buccal tube insert for converting the oval shaped opening in an oval buccal tube to a circular or rectangular shaped opening and to lengthen the opening of the tube to allow for a greater length of wire to be in the tube.

Other objects, features and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheet of drawing, wherein like reference numerals refer to like parts, in which:

FIG. 1 is a perspective view of a tooth band having an oval buccal tube mounted thereon;
FIG. 2 is a perspective view of an oval tube mounted on a fragmentary tooth band and illustrating the buccal tube insert of the present invention in position in the oval tube;
FIG. 3 is a buccal view of the oval tube and insert of FIG. 2;
FIG. 4 is a mesial end view of the buccal tube insert taken substantially along line 4--4 of FIG. 3;
FIG. 5 is an exploded view of the oval tube and the buccal tube insert;
FIG. 6 is a mesial-distal sectional view taken through the buccal tube and insert and substantially along line 6--6 of FIG. 4;
FIG. 7 is a buccal-lingual sectional view taken through the oval tube and insert and substantially along line 7--7 of FIG. 3; and
FIG. 8 is a perspective view of a buccal tube insert for converting an oval tube to one having a substantially rectangular shaped opening.

Referring now to the drawings, and particularly to FIG. 1, a flat-oval buccal tube 10 is shown mounted on a tooth band 11. The oval buccal tube 10 is provided with a substantially oval in cross section arch wire receiving opening 12. While the tube is illustrated as being mounted on a band that in turn would be suitably cemented to a molar tooth in a patient's mouth, it can be appreciated that the tube may be mounted directly on the tooth by a suitable adhesive if so desired.

Use of an oval buccal tube is usually made in the initial stages of treatment where it is desired to torque a molar tooth. The arch wire would be formed in a loop at the end to be received in the opening of the oval tube and otherwise bent to provide the necessary torquing forces. Generally, this type of an appliance is employed in the light wire technique and where the wire would be cylindrical in cross section and relatively small.

Following the completion of the desired torquing of a molar tooth with an oval buccal tube, the use of the oval tube is no longer needed for subsequent treatment. It is then generally found that a round or circular in cross section buccal tube is needed in place of the oval tube. Thus, it becomes necessary to remove the oval tube and replace it with a round tube, which in the past has required removal of the tooth band. The oval tube may then be ground from the tooth band and a round tube may be applied thereto so that the round tube and tooth band may be again cemented in place on the tooth of the patient. A round tube is necessary in order to properly coordinate it with the bending of the arch wire to accomplish the desired results. Further, a round tube is normally longer than an oval tube for the purpose of facilitating the use of wire received therein.

The buccal tube insert of the present invention is generally indicated by the numeral 13, and functions to be received by an oval buccal tube to essentially convert the oval buccal tube to a round tube, which reduces greatly the time needed by the orthodontist and the inconvenience to the patient. The buccal tube insert includes a head 14 and legs 15 and 16 extending therefrom.

The head 14 is circular in shape and provided with a circular opening 17 arranged relative to the legs 15 and 16, so that when the insert is received in an oval tube, the opening 17 will align with the opening 12 of the oval tube. The oval opening 12 extends relative to its long axis substantially occlusal-lingually from top to bottom as seen in FIG. 1, and along the short axis buccal-lingually as moving toward the tooth band 11. The longitudinal axis of the opening extends substantially mesial-distally.
As seen in FIG. 4, the buccal-lingual dimension of the insert opening 17 is substantially equal to the buccal-lingual dimension of the opening 12, while the occlusal-gingival dimension of the opening is substantially smaller than the oval tube opening 12. Thus, the effect of the insert is to substantially reduce the occlusal-gingival dimension of the oval tube. Additionally, the longitudinal dimension of the oval tube is increased by the mesial-distal dimension of the insert head 14. As seen in FIG. 6, the legs 15 and 16 extend through the oval opening of the oval tube and thereby decrease the occlusal-gingival dimension entirely along the oval tube. The cross section of the legs 15 and 16 is preferably arcuate as seen in FIG. 7 to essentially define the resulting opening as a circular opening. However, it should be appreciated that the cross-sectional shapes of the legs 15 and 16 may take any desired form.

To facilitate securing of the insert on the oval tube, one of the legs is made longer than the other so that it will extend entirely through the oval tube opening and define a tail 18 that may be bent over the distal end of the tube and lock the insert in place. Preferably, the tail 18 will be on the gingival side of the tube to avoid the wear possibilities that may occur on the occlusal side.

Since a simple straight-back wire is normally proper for a round tube, it can also be employed in an oval tube converted to a round tube by the buccal tube insert of the present invention. This then essentially facilitates the arch wire bending that would normally be done. As seen in FIGS. 2, 3 and 6, when inserting the insert in an oval tube, the head 14 is placed in abutting relation to the mesial end of the oval tube, and thereafter the tail 18 may be bent over the distal end of the tube to lock it in place.

The buccal tube insert 13A of FIG. 8 differs from the embodiment 13 primarily in that the head 14A is rectangularly shaped and provided with a rectangularly shaped opening 17A that is particularly adapted to receive rectangular in cross section arch wire that would be restrained from relative rotation therewith by the fit between the wire and insert opening.

From the foregoing, it can be appreciated that the insert of the present invention is capable of converting an oval buccal tube to a round or rectangular buccal tube and thereby greatly reducing the time and cost of removing a band with an oval buccal tube and replacing the oval tube with a round or rectangular tube and thereafter replace the band on a tooth.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

The invention is hereby claimed as follows:

1. In combination with a buccal tube adapted to be mounted buccally of an anchor tooth and having an oval, mesial-distal opening, the long axis of which extends occlusal-gingivally, a buccal tube insert for substantially decreasing the occlusal-gingival dimension of the oval opening, said insert including a head adapted to abut against one of the tube ends and having an opening aligning with the tube opening, the occlusal-gingival dimension of said insert being less than that of said tube, and a leg integral with and extending from the insert head and into the oval opening decreasing its occlusal-gingival depth.

2. The combination as defined in claim 1, and a second leg extending from the insert head and into the oval opening.

3. The combination as defined in claim 1, wherein said insert head opening is substantially round.

4. The combination as defined in claim 1, wherein said insert head opening is substantially rectangular.

5. The combination as defined in claim 2, wherein said insert is formed to convert the oval opening of said tube to a substantially round opening having a substantially smaller occlusal-gingival dimension and a longer mesial-distal dimension.

6. The combination as defined in claim 2, wherein said insert is adapted to convert the oval opening of said tube to a substantially rectangular opening having a substantially smaller occlusal-gingival dimension and a longer mesial-distal dimension.

7. The combination as defined in claim 1, wherein said leg has a length sufficient to define a tail to be bent over the end of the tube opposite the end against which the insert head abuts.

8. A buccal tube insert for use with a tooth-mounted buccal tube having an oval in cross section opening through the long axis of which would normally extend occlusal-gingivally and the longitudinal axis of the opening extending normally mesial-distally, said insert reducing the occlusal-gingival dimension of said tube opening and extending the dimension along the longitudinal axis thereof, said insert including a head adapted to abut against one end of said tube and having an opening aligning with the tube, the opening of the insert head having an occlusal-gingival dimension substantially less than that of the tube opening, and a pair of opposed legs integral with and extending from said head into said tube opening at the occlusal and gingival sides thereof substantially decreasing the occlusal-gingival dimension of the tube opening throughout its longitudinal axis, said legs being smaller than said head and one leg being longer than the tube to permit bending over one end of the tube for anchoring the insert to the tube.

9. A buccal tube insert as defined in claim 8, wherein the head opening is round and the opening defined by said legs coacting with said tube opening is substantially round and of the same size as the head opening.

10. A buccal tube insert as defined in claim 8, wherein the head opening is rectangular and the opening defined by said legs coacting with said tube opening is substantially rectangular and of the same size as the head opening.

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