COMBINATION DENTAL INSTRUMENT

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Application November 21, 1955, Serial No. 547,897
11 Claims. (Cl. 32—63)

The present invention relates to improvements in a combination dental instrument, including a matrix retainer, cotton-roll holder and saliva-ejector. It consists of the combinations, constructions, and arrangement of parts, as hereinafter described and claimed.

In my United States Letters Patent No. 2,714,252, dated August 2, 1955, there is disclosed a combination matrix retainer and cotton-roll, and saliva-ejector holder. The structural features of the roll and saliva-ejector holder, in the foregoing patent, required the provision of a special head on the matrix retainer, in order that the holder could be attached thereto.

As the cardinal object of the present invention, I provide a dental instrument attachment which may be readily applied to my matrix band retainers, without requiring any change in the latter. For instance, the universal matrix retainer, and the contra-angle retainer, disclosed in my United States Patents Nos. 2,502,903 and 2,591,745, respectively, both of which have gone into wide commercial use in the dental profession, armed services and universities, are adapted to have my improved attachment secured thereto, without the necessity of any structural change being made therein.

Another object is to provide an attachment of the character described, which presents a somewhat more compact unit than that disclosed in my Patent No. 2,714,252 of August 2, 1955. It will be appreciated, of course, that the space in a patient’s mouth is restricted; and it must not be over-encumbered, in order to allow free access to the operative field.

Other objects and advantages will appear as the specification proceeds. The novel features will be set forth in the claims hereunto appended.

For a better understanding of the invention, reference should be had to the accompanying drawing, forming part of this application, in which:

Figure 1 is an occlusal view of the lower teeth of a patient, illustrating my improved cotton-roll holder and saliva-ejector attachment as being secured to a retainer, the latter having a looped matrix band thereon which is anchored to a tooth; Figure 2 is an elevational view of the retainer and attachment, as observed from plane I—I of Figure 1; Figure 3 is a buccal-lingual sectional view taken along the plane III—III of Figure 1; Figure 4 is an enlarged sectional view taken along the vertical plane IV—IV of Figure 3; and Figure 5 is a perspective view of the dental instrument attachment, with the cotton-roll holder omitted.

While I have shown only the preferred form of my invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claims without departing from the spirit thereof.

Detailed description

Referring to the drawing, I have shown a dental ma-
trix retainer which is designated generally at A. For the purpose of illustration only, the contra-angle retainer covered by my United States Patent No. 2,591,745 has been selected, with my cotton-roll and saliva-ejector attachment B as being secured thereto. Of course, this same attachment may be applied to the universal retainer disclosed in my United States Patent No. 2,592,503. The retainer A has a looped dental matrix band C fastened thereto, which has been disclosed as being clamped around the axial contour of a posterior tooth D.

With respect to the structural details of the retainer A, it includes a bar-like frame 10 on which a matrix-clamping block 11 is slidably mounted. This frame has a substantially U-shaped head E at its forward end (see Figure 4), which defines four parallel and spaced-apart fingers 12. As shown in Figure 1, the matrix band C has been looped back upon itself, and the arms 14 of the band have been introduced between a selected pair of the fingers 12. The terminal ends of these arms extend into a diagonal slot 15, which is formed in the block 11, and are clamped thereto by a spindle 16 that is threaded into this block.

Moreover, the retainer A is provided with a rotatable internally threaded sleeve 17, which is held against endwise movement relative to the frame 10. The threaded spindle 16 extends through this sleeve. When the sleeve 17 is turned, the spindle 16 and the clamping block 11 are advanced or retracted relative to the head E of the retainer. It will be quite apparent that when the block 11 is moved away from the head E, the loop of the matrix band C will be drawn around the axial contour of the banded tooth D, with the band anchoring the retainer A to the tooth.

As shown in Figures 2 and 4, the length of the fingers 12 are inclined with respect to the length of the bar 10. This angular arrangement will permit the fingers to remain parallel with the long axis of the banded tooth D, while the retainer A itself extends upwardly to clear the incisal edges of the anterior teeth F. The details of an appropriate matrix band are disclosed in my United States Patent No. 2,720,911, dated October 18, 1955.

The cotton-roll holder and saliva-ejector attachment B may be broadly referred to as being a "dental instrument attachment." As shown in Figures 2, 3 and 5, it defines a detachable anchor member G having a saddle 18 projecting from its top. This saddle is positioned to slide over the exterior surface of the curved end 19 of the U-shaped head E of the retainer A, when the anchor member is moved against the head from a lateral direction. Moreover, the anchor member has a pin or projection 20 fixed thereto to extend therefrom. This pin is adapted for sliding into the interior of the retainer head E, between the flanged edges of the saddle 18, and is held in the curved end 19 of the head (see Figure 4). The saddle 18 and pin 20 frictionally engage the retainer head E to thereby removably attach the anchor member G to the retainer A.

In order to retain a roll 21 of absorbent material on the buccal (check-side) of the posterior teeth, a rollholder H has been provided. This holder defines a pair of spaced-apart arms 22, the inner ends 23 which are journaled in a bore 24, the latter being fashioned in the upper part of the anchor member G (see Figure 5). These arms are adapted to extend trans-occlusally in a buccal-lingual direction relative to the banded tooth D, and are separated from one another sufficiently to give access to the entire occlusal surface of this tooth.

It will be noted that the arms 22 of the roll-holder are swingable up and down relative to the anchor member G, as suggested in Figure 3. Hooks 25 are provided on the outer ends of the arms 22 for engaging with and retain-
ing the roll in a position adjacent to the buccal surfaces of the posterior teeth. The saddle 18 is fashioned with inclined grooves 26 in the opposite lateral sides thereof, which are disposed to receive the arms 22, when the latter are swung in one direction into an inactive position (see full lines in Figure 5). These arms are made from resilient material so as to snap into grooves 26 to thereby releasably retain the arms in an inactive position. The opposite lateral edges 27 of the saddle 18 are positioned to engage above the arms 22 (see Figure 4), when they are swung into an active roll-holding position, with these edges releasably retaining the arms in an active position (see dot-dash lines in Figure 3).

As illustrated in Figure 1, the roll-holder H further includes a bar 28, which interconnects the outer ends of the arms 22. This bar is engageable with the roll 21, and is bendable so as to vary the resiliency of the arms. The bar 28 is curved slightly so as to extend generally parallel to the arch of the teeth.

For the purpose of removing excess saliva from the operative field, I have provided a saliva-ejector J on the anchor member G. This ejector defines an apertured suction tube 29, which communicates with a tubular elbow or section 30, the latter forming part of the detachable anchor member G. The elbow is adapted to have a suction hose 31 coupled thereto, whereby saliva will be drawn through apertures 32 in the tube 29 for discharge through the hose. As shown in Figure 2; one row of apertures are provided on the underneath part of the suction tube, while a second row is fashioned on the lingual aspect thereof.

It will be apparent from Figures 2 and 5 that the suction tube 29 is curved occlusally between its opposite ends. Thus this tube defines a rocker that will rest on the floor 33 of the patient's mouth, when the anchor member G is swung in either direction about the pin 20. The curved tube 29 of the attachment is so designed that it may be used with equal ease and efficiency on either the right or the left side of the patient's mouth, thereby obviating the necessity of a plurality of instruments in order to permit bilateral use. This tube is so designed as to rest gently on the soft-tissues which make up the floor of the mouth in the sublingual area. The yielding nature of these tissues in this area readily and comfortably adapt themselves to the contour of the rocker tube (regardless of the varying depths and shapes of mouths) without the need of complicated and bulky mechanical adjustment features which might be necessary in the unfavored anatomical disposition.

As illustrated, the tube 29 has caps 34 secured to opposing ends thereof. The suction tube defines a bore 35 through which a cleaning element may be telescoped, after at least one of the caps 34 has been removed. An ordinary pipe cleaner will serve the purpose of removing foreign matter from the bore of the suction tube.

Particular attention is called to the fact that the suction tube 29 is mounted on the anchor member G so as to be spaced from the lingual (tongue-side) surfaces of the patient's teeth, when the retainer A is anchored to a patient's tooth by the matrix band C. Thus a roll 37 of absorbent material may be interposed between the suction tube and the patient's teeth on the lingual aspect.

The apertures 32 on the curved rocker tube 29 are so placed that they are below the "water-line" of the saliva, when the instrument is in use; and not extending into space when air, instead of saliva, would be withdrawn from the mouth. Moreover, these apertures are on soft tissue sides of the curved tube, thereby obviating the drawing in of air on either the upper border of the tube 29, or the suction of cotton fibers, lint, etc., from the cotton roll 37.

With further regard to the caps 34, they serve a dual purpose on the ends of the suction tube 29. Inasmuch as they are impervious, these caps prevent suction of air in case either, or both, ends of the curved tube should extend above the "water-line" of the saliva at any time. As previously mentioned, the caps may be removed to permit the bore 35 to be cleaned out. Such a clean-out operation may be accomplished by the pipe cleaner 36, as described earlier, or a small jet of water or air may be used for this purpose. The knurled surfaces on the caps 34 serve a dual purpose, i.e., aiding in holding the cotton roll 37 in place and facilitating removal of the caps.

The curved rocker tube 29 occupies a pivotal relationship with the saddle 18 and the pin 20, when attached to the contra-angle retainer A, thereby maintaining a functioning adaptation with respect to the retainer, regardless of whether it is being used on a distally-remote third molar D1 or on a mesially forward bicusp$D2$.

The suction tube 29 is somewhat smaller than the tubular elbow 30, and is designed to take up the least amount of space under and alongside the patient's tongue. Accumulated saliva is withdrawn from both the mesial and distal curved portions of the tube, and the saliva is discharged into the larger elbow 30. The latter may be connected by the hose 31 or rubber tubing to a dental unit aspirator, or a surgical vacuum pump, or to a central suction system, as the operator elects. The lingually-arched elbow 30 serves to hold the patient's tongue away from the operator.

The roll-holder H, which retains the cotton roll 21 on the buccal side of the teeth, permits the operator to place the contra-angle retainer A in place on the prepared tooth, such as D, of the patient; apply mesial and distal separating wedges (not shown) from the buccal aspect; contour and festoon the band C independently, and in advance of placing the attachment B on the retainer A. The cotton rolls 21 and 37 may be inserted into position, prior to lowering the arms 22. These rolls serve as retractors, and actually drape or isolate the field of operation, similar to the procedures used in general surgery.

The elbow 30 is on the opposite side of the anchor member G from that of the slide 18 and pin 20; and it may be used very effectively as a handle, when attaching the anchor member to the retainer head E, or removing the former from the latter.

As shown in Figure 1, the retainer A and my attachment B have been applied to the lower left quadrant K of the patient's teeth. It will be obvious then when teeth are to be restored in the lower right quadrant L, the anchor member G may be attached to the opposite side of the retainer head E from that shown in the drawing, thereby permitting the retainer A to remain on the lingual (tongue-side) of the patient's teeth.

I claim:

1. In a combination—dental instrument: a matrix retainer, including means operable for clamping a looped matrix band around a tooth; the retainer having a substantially U-shaped head, which defines a curved end having an exterior surface; the retainer further having spaced-apart guide fingers which define spaces through which the band is adapted to extend; an anchor member having a saddle projecting therefrom, and being positioned to detachably slide over the exterior surface of the curved end of the U-shaped head of the retainer, when the anchor member is moved against the head from a lateral direction; the anchor member having a projection fixed thereto so as to extend therefrom, with the projection being disposed for sliding into the interior of the retainer head between the fingers of the latter; the saddle and with projection coextensive with another to frictionally engage with the retainer head to thereby sufficiently secure the anchor member to the retainer; and a roll-holder supported by the anchor member, and having means engageable with a roll of absorbent material for holding the roll in position adjacent to the tooth around which the matrix band has been clamped by the retainer.

2. In a combination dental instrument: a matrix retainer, including means operable for clamping a looped matrix band around a tooth; the retainer having a sub-
stantially U-shaped head, which defines a curved end having an exterior surface; the retainer further having spaced-apart guide fingers which define spaces through which the band is adapted to extend; an anchor member having a saddle projecting therefrom, and being positioned to detachably slide over the exterior surface of the curved end of the U-shaped head of the retainer, when the anchor member is moved against the head from a lateral direction; the anchor member having a projection fixed thereto so as to extend therefrom, with the projection being disposed for sliding into the interior of the retainer head between the fingers of the latter; the saddle and projection coacting with one another to frictionally engage with the retainer head to thereby removably secure the anchor member to the retainer; and a roll-holder defining a pair of resilient spaced-apart arms, each having an inner end thereof journalled to the anchor member, with the arms being swingable up and down relative to the anchor member; these arms being positioned to extend trans-occlusally with respect to the banded tooth, and having hooks engageable with a roll of absorbent material, which is disposed on the buccal aspect of the patient’s teeth, for holding the roll in position adjacent to the tooth around which the matrix band has been clamped by the retainer.

3. The combination dental instrument, as defined in claim 2; and in which the saddle is fashioned with grooves, which are disposed to receive the arms, when the latter are swung upwardly into an inactive position; these arms being swingable so as to snap into the grooves to thereby releasably retain the arms in inactive position.

4. The combination dental instrument, as defined in claim 2; and in which the saddle is provided with opposite lateral edges, which are positioned to engage with the arms when they are swung downwardly into an active roll-holding position, with these edges releasably retaining the arms in active position.

5. The combination dental instrument, as defined in claim 2; and in which the roll-holder is further provided with a bar interconnecting outer ends of the arms; this bar being engageable with the roll, and being bendable so as to vary the resiliency of the arms.

6. In a combination dental instrument: a matrix retainer, including means operable for clamping a looped matrix band around a tooth; the retainer having a substantially U-shaped head, which defines a curved end having an exterior surface; the retainer further having spaced-apart guide fingers, which define spaces through which the band is adapted to extend; an anchor member having a saddle projecting therefrom, and being positioned to detachably slide over the exterior surface of the curved end of the U-shaped head of the retainer, when the anchor member is moved against the head from a lateral direction; the anchor member having a projection fixed thereto so as to extend therefrom, with the projection being disposed for sliding into the interior of the retainer head between the fingers of the latter; the saddle and projection coacting with one another to frictionally engage with the retainer head to thereby removably secure the anchor member to the retainer; and a saliva-ejector carried by the anchor member, and including an apertured suction tube adapted to be disposed in a patient’s mouth to aspirate secretions therefrom; the suction tube being supported by the anchor member.

7. The combination dental instrument, as defined in claim 6; and in which the suction tube is curved occlusally; the tube defining a rocker that will rest gently on the floor of the patient’s mouth.

8. The combination dental instrument, as defined in claim 6; and in which the suction tube has caps removably secured to opposite ends thereof; this tube defining a bore which may be exposed for cleaning when at least one of the caps is removed.

9. The combination dental instrument, as defined in claim 6; and in which the suction tube is mounted on the anchor member so as to be spaced from the lingual surfaces of the patient’s teeth, when the matrix band is anchored to a patient’s tooth by the retainer, whereby a roll of absorbent material may be interposed between the suction tube and the patient’s teeth.

10. The combination dental instrument, as defined in claim 6; and in which the saliva-ejector includes a tubular section which is disposed on the opposite side of the anchor member from that of the saddle and projection, whereby this tubular section may be utilized as a handle when attaching the anchor member to the retainer head, or removing the anchor member from the retainer head; the tubular section being curved to extend linguually over the patient’s tongue.

11. The combination dental instrument, as defined in claim 6; and in which the apertures in the suction tube are fashioned on the lingual and underneath surfaces of this tube.

No references cited.