Jan. 27, 1970 R. L. NEWMAN 3,491,447

DENTAL MATRIX CLAMP

Filed Sept. 3, 1968

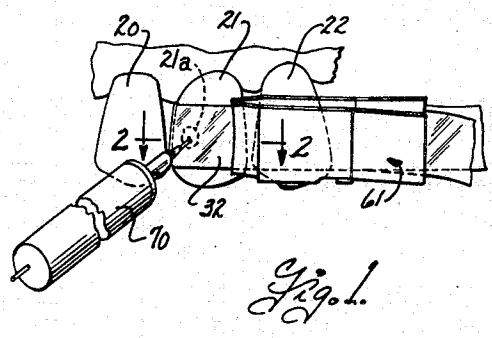


Fig. 1.

Fig. 2.

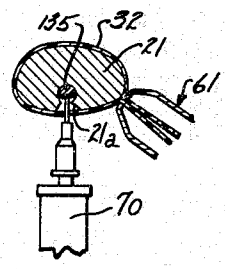
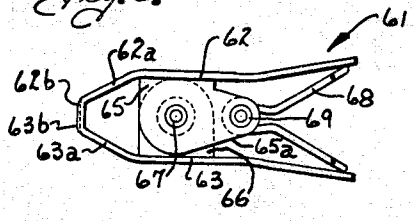


Fig. 3.



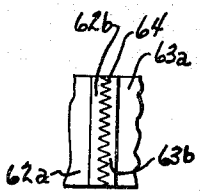


Fig. 5.

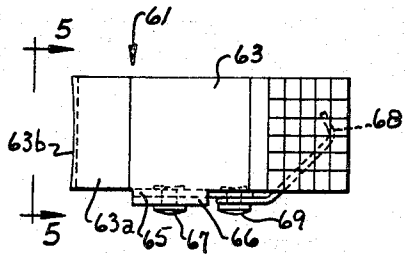


Fig. 4.

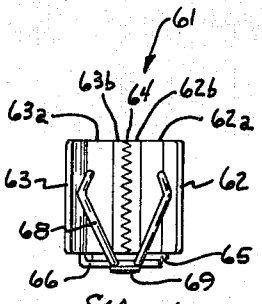


Fig. 6.

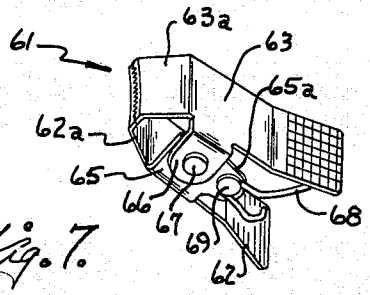


Fig. 7.

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DENTAL MATRIX CLAMP

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Continuation-in-part of application Ser. No. 538,459, Mar. 23, 1966. This application Sept. 3, 1968, Ser. No. 757,013

Int. Cl. A61c 5/12

U.S. Cl. 32—63 2 Claims

ABSTRACT OF THE DISCLOSURE

The clamp has a laterally disposed pivot so a matrix strip can be passed through its central portion. The nose of the clamp is concave in shape to hold the matrix strip closely adjacent the tooth surface.

CROSS-REFERENCE

This is a continuation-in-part application of application Ser. No. 538,459, filed Mar. 23, 1966 and now Patent No. 3,421,222.

BACKGROUND

The invention pertains to the field of dentistry; particularly to a dental instrument for clamping a matrix strip.

Many types of dental matrix clamps have been used by dentists. In some however, the matrix strip is not easily inserted. In others, the clamp does not hold the lateral edges of the matrix strip closely adjacent the tooth. This latter deficiency is particularly critical when the matrix strip is being used in the method disclosed and claimed in the aforementioned parent application. Looseness at the edges of the strip allows oozing of the filling material. In the past, this excess material was removed by chipping or grinding. As harder and more adhesive materials have developed, removal of excess filling material has become more difficult. It is preferable, therefore, to hold the lateral edges of the matrix strip closely adjacent the tooth to minimize such problems.

SUMMARY

The present invention relates to a dental matrix clamp for use in securing a matrix strip.

It is a general object of this invention to provide a unique clamping device for holding a dental matrix strip generally contiguous to a tooth.

Another object is to provide a dental matrix clamp which aids in procuring substantially perfect marginal adaption of the filling material on all portions of the cavity margins.

Still another object of the present invention is to provide a dental matrix clamp which holds the lateral edges of the matrix strip closely adjacent the tooth.

Yet another object is to provide a dental matrix clamp which is so arranged that a looped matrix strip is easily inserted into the clamp .

These, and other objects and advantages of the invention, will become apparent as the apparatus becomes better understood by reference to the following description taken in conjunction with the drawings.

FIGURE 1 is a view, in part perspective and in part diagrammatic, showing the dental matrix clamp of the present invention in use for clamping a dental matrix strip;

FIG. 2 is a partial sectional view taken generally along line 2—2 of FIG. 1;

FIG. 3 is a large-scale top plan view of a dental matrix clamp constructed in accordance with the present invention;

FIG. 4 is a front view of the matrix clamp of FIG. 3;

FIG. 5 is a partial end view taken along line 5—5 of FIG. 4;

FIG. 6 is an end view as seen from the right of FIG. 4; and

FIG. 7 is a perspective view of the dental matrix clamp.

The aforementioned parent application, now Patent No. 3,421,222, disclosed a method and apparatus for filling dental cavities. FIGURE 1 illustrates that method being performed. A plurality of anterior teeth **20–22** are illustrated, with a cavity **21***a* shown in tooth **21**. The cavity **21***a* may be prepared for filling in the usual manner as, for example, undercutting the sides in a generally key-shape (FIG. 2). The cavity preparation may include lining the cavity with a cement, a primer, or a pulp-clapping composition. The preparation may also include moisture exclusion by physical or chemical means to exclude moisture from the cavity during placement of the filling material. In accordance with the method of the parent application, following the preparation of the cavity, a matrix strip is secured in position over the cavity. The cavity is then filled through an opening in the matrix strip, as by inserting a tubular barrel of a filling material dispenser **70** through the opening, and dispensing a flowable filling material **135** through the barrel.

Prior to positioning, the strip may be pulled over the rim of a dentist's mirror or any round edge to concave the surface and avoid cupping the filling. This is particularly applicable to large cavities. The opening in matrix **32** is positioned over the cavity **21***a* and the strip is doubled upon itself to provide a loop extending around the tooth **21** with the end portions of the matrix strip in juxtaposition. The dentist then pulls on the end portions to tighten the central portion of the strip against the tooth and clamps the end portions in an area adjacent the tooth to hold the central position tightly against the tooth. The clamping is advantageously performed by the dental matrix clamp of the present invention, generally designated **61**. It is to be understood that the dental matrix clamp may be utilized with a conventional matrix strip in the conventional manner, in addition to the above described use.

A preferred matrix clamp **61** is illustrated in detail in FIGS. 3–7. Preferably, clamp **61** has a height slightly greater than the width of the matrix strip **32**, and a length less than the length of the looped matrix strip so that the strip extends through the clamp (see FIG. 1). The clamp comprises elongate body elements or members **62, 63** having inwardly tapered portions **62***a*, **63***a* and opposed nose portions **62***b*, **63***b*. Each nose portion is provided with a plurality of sharp teeth **64** arranged to interfit with teeth of the opposite nose portion. The outer surface of nose portions **62***b*, **63***b*, is preferably concave, as shown in FIG. 13, to generally conform to the labial surface of a typical anterior tooth. Because of the shape of a typical tooth, its circumference at one or both lateral edges of the matrix strip **32** is usually less than at the middle. This may cause a gap at the edge and allow the filling material to ooze. The concave nose portion, when opened, allows the teeth to engage the strip so that the midportion has a greater loop circumference than the lateral edges. When allowed to close, this pulls the lateral edges into tight engagement with the tooth. The sharp teeth **64** in the clamp also assure that this tightness is accomplished. In this manner, when clamped on a matrix strip, the strip is gripped closely adjacent the tooth over its entire width.

Adjacent one longitudinal side of the clamp are arms **65, 66** mounted on members **62, 63**, respectively. The arms are pivotally connected by means of a fastener **67** and arm **65** conveniently has a rearward extension for mounting a spring **68**, as by fastener **69**. The rearward extension of arm **65** has an edge **65***a* defining a shoulder

which engages the inner surface of the lower extremity of member **63**. This engagement limits the opening of the clamp in such a manner that both the teeth **64** and the rear end of members **62** and **63** are spaced from each other. This provides an open area into which the matrix strip can be easily inserted as hereafter discussed. The spring **68** is advantageously U-shaped and has its legs extending sidewardly and upwardly into engagement with the inner surface of members **62, 63**. It will be noted that this arrangement of arms **65, 66**, and spring **68** is disposed generally at a side of the members **62, 63** thereby leaving the area therebetween substantially open for reception of a matrix strip. After the matrix is looped around a tooth and its end portions placed in juxtaposition, the clamp is easily opened and slipped over the matrix strip from the side opposite arms **65, 66**. With this arrangement there is no interference with the insertion of the matrix strip.

It is now deemed obvious that the present invention provides a dental matrix clamp into which a matrix strip can be easily inserted and which holds the strip closely adjacent the labial surface of an anterior tooth across the entire width of the strip.

What is claimed is:

1. A dental matrix clamp for securing an elongate matrix strip around an anterior tooth wherein the matrix strip has a central portion wrapped around the tooth and end portions in juxtaposition and extending outwardly from the tooth in a longitudinal direction, the dental matrix clamp comprising:

first and second longitudinal body elements spaced for receiving the end portions of the matrix strip in the area therebetween; each body element having front and rear ends, a width not more than slightly greater than the width of the matrix strip, and a length less than the length of the looped matrix strip;

a gripping portion at the front end of each body element extending toward the other gripping portion for gripping the matrix strip therebetween;

means attached to the body elements intermediate the ends thereof and at only one lateral side thereof for pivotally connecting the body elements and leaving the matrix strip area and the other lateral side open for entry of the matrix strip from the other lateral side into the matrix strip area and including a first arm attached to the first body element, a second arm attached to the second body element, and a fastener pivotally connecting the arms; one of said arms having a shoulder for engaging the other body element when the clamp is in an open position with all portions of the body elements and the gripping portions spaced from each other for reception of the matrix strip therebetween; and

a spring having an intermediate portion disposed laterally of said matrix strip area and mounted on one of the arms, and the spring having end portions each operatively connected to a respective body element for resiliently urging the gripping portions toward each other;

whereby the rear ends of the body elements may be squeezed to separate the gripping portions, the matrix strip inserted between the gripping portions and between the body elements from said other lateral side with the ends of the matrix strip disposed rearwardly of the rear ends of the body elements, the ends of the matrix strip may be pulled to tighten the matrix strip around the tooth, and the rear ends of the body elements released to clamp the matrix strip in place.

2. A dental matrix clamp as set forth in claim **1** wherein the gripping portions have a plurality of interfitting teeth and a concave surface at the front end approximately complementary to an anterior surface of the anterior tooth, whereby the matrix strip may be gripped closely adjacent said anterior surface.

References Cited

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