APPARATUS FOR TOOTH RESTORATION

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ABSTRACT OF THE DISCLOSURE

A stabilizing device for a loose tooth and a restoration for a tooth having a cavity left in the tooth by the breaking away of a relatively large portion of the tooth from the incisal and side wall surfaces thereof comprising a side wall forming plate inset in the cavity adjacent the base thereof and conforming to the normal side wall contour of the tooth portion that has broken away, a reinforcing mesh secured to the bottom of the side wall forming plate and extending inwardly forming a lining over at least a portion of the cavity, a load distributing anchoring mesh fastened to the tooth, and a dental filling of hardening plastic material filling the remainder of said cavity and shaped to conform to the normal contour of the natural tooth portion which it occupies.

This invention relates to a stabilizing device for a loose tooth and a restoration for a broken-down tooth, and to the method and apparatus for securing same to the tooth.

This invention is particularly adapted for use in stabilizing a loose tooth and in the restoration of broken teeth where the cavity formed by the vacated broken tooth portion is too large to be satisfactorily filled with the usual dental filling materials without some additional means for physically securing the filling to the tooth. Where cavities are very large as is the case when a large portion of a tooth, such as a quarter or half section is broken away, the adhesiveness of dental filling materials is normally not sufficient to withstand the shearing forces on the tooth resulting from the chewing of foods. If the cavity is to be filled some additional means for physically attaching the filling to the tooth besides the adhesiveness of the filling must be resorted to.

It is therefore an object of this invention to provide improved mechanical means for firmly securing the filling material to the remainder of the broken tooth left in the gum and to stabilize a loose tooth. Such mechanical means includes a filling retaining device comprising a wall forming portion, of a non-corrosive metal plate or plastic sheet material which is cut in size and bent to conform to the outline of the side wall surface of the tooth portion which has been broken from the natural tooth, a reinforcing mesh attached to the wall forming portion to line the wall of the cavity, and a spool with a fastener therethrough for anchoring the filling retaining device to the natural tooth. Once the filling retaining device is in place, plastic filling material can be placed in the cavity and molded to the shape of the broken tooth portion, thus restoring the tooth to its natural shape. The mechanical means of my invention provide sufficient physical support for the filling material so that it will withstand the shearing forces of normal chewing.

Suitable filling materials which can be used with my invention are porcelain, silver amalgam, gold, and other dental filling materials known in the art.

The spool used in conjunction with the fastener for securing the filling retaining device in position also serves as an anchorage for the dental filling material. The spool is of a shape and size such that it distributes forces resulting from chewing and transmitted through the filling material to the spool, over a wide area of the natural tooth portion on which the spool rests when properly placed.

The stabilizing device on the root end of the tooth provides a root elongation device that bone will adhere to and will prevent resorption of the tooth by sealing off the root canal openings to the organisms which biologically bring this about.

This root end device also increases the root to crown ratio so that a stabilizing effect is achieved by its placement.

With the foregoing more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference are used to designate like parts, and wherein:

Fig. 1 is an enlarged perspective view of a filling retaining device constructed in accordance with the invention;

Fig. 2 is a vertical section taken therefrom;

Fig. 3 is a vertical section of a spool and threaded fastener used as an anchorage in accordance with this invention;

Fig. 4 is a vertical section of a modified form of the filling retaining device constructed in accordance with the invention;

Fig. 5 is an elevational view of a broken tooth showing in dotted line the contour of the tooth portion which has broken away.

Fig. 6 is an elevational view of a tooth shown partly in section to reveal a prepared cavity in which the filling retaining device of Figs. 1—2 is set;

Fig. 7 is an elevational view similar to Fig. 5 but showing the filling retaining device in place and the cavity filled with a dental filling material;

Fig. 8 is a horizontal sectional view taken on lines 8—8 of Fig. 6;

Fig. 9 is a partial vertical sectional view of a broken tooth with a modified form of the invention mounted therein.

Fig. 10 is a top plan view of the extension device at the base of the tooth shown in Fig. 9.

Fig. 11 is a side elevational view of the extension device shown in Fig. 10.

Fig. 12 is a vertical sectional view of a modified anchor device to be used in lieu of the spool shown in Fig. 3.

Fig. 13 is a top plan view of the modified anchor device shown in Fig. 12.

Fig. 14 is an elevational view of still another form of the invention.

Fig. 15 is a top plan view of the device shown in Fig. 14.

In Fig. 6 of the drawing there is shown in elevation a tooth 1 from which a relatively large cusp portion 2 has broken away leaving a cavity defined by the outline 3. The cavity is too large to be filled with the usual filling materials by normal filling processes because the adhesiveness of such materials is insufficient to withstand the shearing forces resulting from normal chewing processes of an individual. However, I have found that by providing a filling retaining device 4 comprising a veneer plate 5 shaped to conform to the contour of the side wall surface of the tooth portion which has broken away, and a reinforcing mesh 6 soldered or otherwise connected to the bottom edge of the veneer plate 5, and by anchoring the filling retaining device in place to the natural tooth, with spool 7, and threaded fastener 8 that sufficient physical support can be given to the usual filling materials such as porcelain, silver amalgam, gold, etc. so that they can be used satisfactorily to fill the cavity.
The veneer plate 5 is a thin, narrow strip of metallic or synthetic resinous material, preferably corrosion resistant, which can be bent to conform to the contour of the filling material. The portion of the veneer plate 5 which is bent will retain the shape to which it has been bent. The veneer strip is cut to the desired size so that it will fill the gap in the side wall of the tooth left by the broken tooth portion.

As shown in FIG. 1, the bottom edge 10 of the veneer plate 5 is provided to provide a narrow ledge 11 on which the reinforcing mesh can be soldered or otherwise suitably connected to the veneer plate as shown at 12. A portion 6 of the reinforcing mesh preferably extends parallel to the main body of the veneer plate while another portion 6 extends at right angles thereto so that it will lie approximate the surface of the natural tooth over which filling material is to be applied. The bottom edge 10 of the veneer plate may be curved or bevelled to provide a smooth edge as shown in FIGS. 1 and 2.

In FIG. 4 a modified veneer plate 5 is shown which has a straight vertical section and the reinforcing mesh 6 is attached to the bottom edge 10 of the veneer plate by means of threaded fasteners 13.

The reinforcing mesh 6 may also be of metal or synthetic resinous material which is corrosion resistant. The holes in the mesh are of sufficient gauge so that plastic filling materials can flow readily therethrough during the tooth restoration process prior to the solidification of the filling materials.

The spool 7 is preferably hour-glass shaped being of greater diameter at the top and bottom than at the middle. A hole 9 is provided through the axis of the spool which receives a threaded fastener 8 for the purpose of securing the spool to the natural tooth. The hour glass shape of the spool provides a good mechanical connection between the spool and filling material molded around it once the filling material has solidified. The wide base of the spool provides for the distribution of forces transmitted through the filling over a wide area of the natural tooth on which the spool rests when the tooth has been repaired.

In preparing for the restoration the dentist grinds off the ragged edges of the broken tooth shown in FIG. 5 so that no mechanically weak portions remain. The base 14 of the cavity is preferably ground flat so that the base of the spool 17 will have a flat surface of the natural tooth to rest against when it is secured in place.

After the broken tooth has been prepared to receive the restoration the dentist takes the filling retaining device 4 and places the veneer strip 5 in the space of the tooth and presses the strip 5 against the inner surface 6 of the tooth. The edges of the veneer strip 5 and reinforcing mesh 6 are trimmed by suitable cutting means to the appropriate size and the veneer strip is bent until it conforms to the shape of the side wall surface of the evacuated tooth portion. In trimming the veneer strip the height of the strip is as shown in FIG. 7 is preferably made to be considerably less than the top of the tooth so that the filling material can be moulded over the upper edge of the veneer strip.

When the veneer strip and reinforcing mesh have been trimmed to the appropriate size for the cavity the filling retaining device 4 is placed in position in the cavity with the bottom edge 10 of the veneer strip resting on the outer edge 15 of the cavity and with the reinforcing mesh 6 extending over the base 14 of the cavity as shown in FIG. 1. The dentist then drills a hole through the mesh and into the base 14 of the natural tooth to receive the threaded fastener 8. The threaded fastener extending through the spool is threaded into the hole formed in the mesh 6 and the natural tooth and tightened to draw the base of the spool up firmly against the base 14 of the tooth. The filling is then placed and shaped in the cavity by the dentist to exactly fill the space between the veneer plate 5 and the inner surface 6 of the tooth.

He then moulds the filling material to conform to the shape of the original tooth with a portion of the filling overlying the top of the veneer plate 5. Once the filling material has been moulded it is allowed to harden in place. The hardened filling 17 can be subsequently ground to obtain the proper bite if necessary.

Instead of the spool shaped anchor device shown in FIG. 5, a mushroom shaped anchor device 18 may be used within the scope of this invention. The anchor device 18 has a cylindrical stem 19 and a top 20 having a downwardly curved outer margin secured to the top of the stem. A bore 21 extends axially through the disk 20 and stem 19 which is adapted to receive a headed screw fastener in the same manner as does the bore through the spool 7 shown in FIG. 3. In use the mushroom shaped anchor device 18 is secured to a broken tooth in the same manner as in the spool 7 shown in FIGS. 6 and 7. Filling material is then packed around the anchor device 18 and is allowed to harden. Once hardened the filling material is securely held in place in the broken tooth by the anchor device 18.

A modified form of the invention is shown in FIG. 9 where an elongated threaded fastener 22 is substituted for the threaded fastener 8 shown in FIGS. 3, 6 and 7. In some cases in the art of dentistry where a mobile tooth is involved, a device which increases the root to crown ratio of the tooth is attached through an opening in the tooth to elongate the root. Such an extension device 24 shown in FIG. 9 serves as a stabilizing device and anchor which becomes embedded in the jaw bone to which the elongated threaded fastener 22 can be attached.

Preferably the extension device 24 has a cylindrical stem 28 to which is secured a cup-shaped upper portion 25 having a concave upper surface 26 which is complementary to the root surface of the tooth 1. The cup shaped portion 25 is shaped to fit closely to the root surface of the tooth 1 and acts as a shield to prevent biological organisms that bring about resorption of root surfaces from their attack on the root surface. An internally threaded bore 27 extends through the extension device 24. In use the extension device 24 is implanted in the jaw to fit closely against the root of a mobile tooth and a threaded fastener 22 is passed down through a bore 23 in the tooth and is screwed into the threaded bore 27 of the extension device.

In still another form of the invention an elongated fastener 29 with circular disk 30 affixed to the fastener near one end 31 can be substituted for the elongated fastener 22 shown in FIG. 9. The threaded fastener 29 would be extended through a bore in a tooth until the disk 30 rests against the floor of a cavity in the tooth which has been prepared to receive the fastener. The fastener 29 is selected of such a length that its threaded end 32 extends beyond the root of the tooth and can be secured into an extension device 24 in the same manner as the fastener 22 shown in FIG. 9. The end 31 extending above the disk 30 provides reinforcement to which filling material packed into the cavity surrounding the end can be firmly attached when it has hardened.

What is claimed is new is:

1. In the art of dentistry, a restoration for a tooth having a cavity left in the tooth by the breaking away of a relatively large portion of the tooth from the incisive and side wall surfaces thereof, comprising a side wall forming plate insert in the cavity conforming to the normal side wall contour of the tooth portion that has broken away and resting on the natural tooth adjacent the base of said cavity, a reinforcing mesh secured to the base of the side wall forming plate and extending inwardly forming a lining over at least a portion of the cavity, a load distributing anchoring means extending through said mesh and fastened to the tooth, and a dental filling of hardened plastic material filling the remainder of said
cavity and shaped to conform to the normal contour of the natural tooth portion which it occupies, wherein said load distributing anchoring means comprises a spool having a bore through the axis thereof and a fastener extending through said bore and fastened to said tooth, and wherein said fastener is an elongated fastener of a length sufficient to extend through the tooth from the cavity to the root end of the tooth with an end projecting beyond said root end and an extension device having a cup member shaped complementary to the root end adapted to be implanted in the jaw bone beneath said tooth for closely receiving the end of said root in said cup member, said extension device having means to rigidly engage the projecting end of said fastener.

2. The restoration set forth in claim 1 wherein said projecting end of said elongated fastener has an external thread, and said extension device has a cylindrical stem with an internally threaded bore extending longitudinally through said stem, said projecting end of said fastener extending into said cylindrical stem and threadedly secured therein.

3. In the art of dentistry, a restoration for a tooth having a cavity left in the tooth by the breaking away of a relatively large portion of the tooth from the incisive and side wall surfaces thereof, comprising a side wall forming plate inset in the cavity conforming to the normal side wall contour of the tooth portion that has broken away and resting on the natural tooth adjacent the base of said cavity, a reinforcing mesh secured to the bottom of the side wall forming plate and extending inwardly forming a lining over at least a portion of the cavity, a load distributing anchoring means extending through said mesh and fastened to the tooth, and a dental filling of hardened plastic material filling the remainder of said cavity and shaped to conform to the normal contour of the natural tooth portion which it occupies, wherein said load distributing anchorage means includes an elongated fastener having a disk shaped head near one end adapted to seat in said cavity, said fastener being of a length sufficient to extend through the tooth from the cavity to the root end of the tooth with its other end projecting beyond said root end, and an extension device having a cup member shaped complementary to the tooth end adapted to be implanted in the jaw bone beneath said tooth and to closely receive the end of said root in said cup member, said extension device having means to rigidly engage the projecting end of said fastener.

4. The restoration set forth in claim 3 wherein said one end of said elongated fastener projects beyond said head in a direction opposite said other end.

References Cited

FOREIGN PATENTS


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