

Sept. 9, 1969

L. I. LINKOW

3,465,441

RING-TYPE IMPLANT FOR ARTIFICIAL TEETH

Filed March 20, 1968

FIG. 1

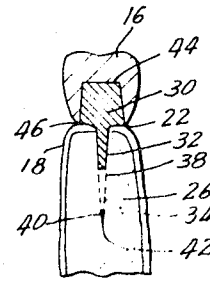
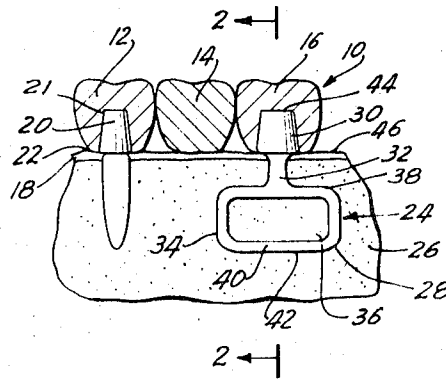


FIG. 2

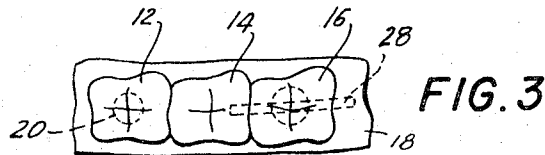


FIG. 3

FIG. 4

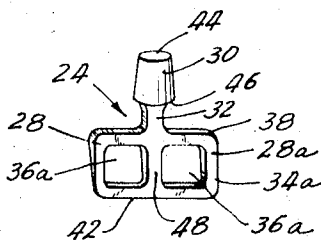


FIG. 5

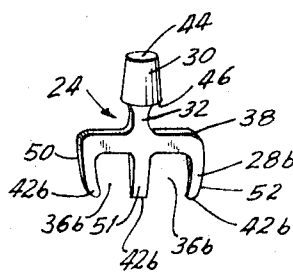


FIG. 6

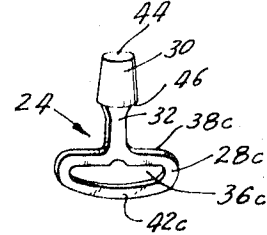


FIG. 7

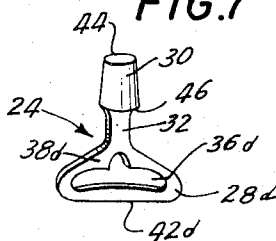
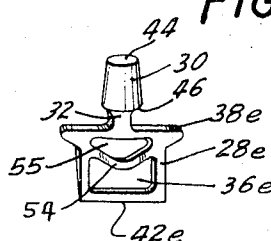


FIG. 8



INVENTOR
LEONARD I. LINKOW
BY *James and Franklin*
ATTORNEYS

1

2

3,465,441
RING-TYPE IMPLANT FOR ARTIFICIAL TEETH
Leonard I. Linkow, 30 Central Park S.,
New York, N.Y. 10026
Filed Mar. 20, 1968, Ser. No. 714,550
Int. Cl. A61c 13/00
U.S. Cl. 32—10 12 Claims

ABSTRACT OF THE DISCLOSURE

A device for implanting an artificial tooth comprises a blade with an opening therein and a free end defining a sharp edge. A support portion extends up from the blade, to which support portion a force may be applied which is distributed over the blade so as to facilitate the implantation of the blade in the jawbone of the patient. Once the blade is implanted, the artificial tooth structure is secured to the support portion which extends up from the gum region.

The present invention relates to a non-removable artificial tooth mounting structure.

To replace lost teeth, the dentist or oral surgeon conventionally utilizes either of two basic techniques, depending on the condition of the remaining natural tooth structure. In the case in which natural teeth remain on both sides of the lost tooth or teeth, a permanent or fixed bridge may be utilized. Typically, in a construction of a fixed bridge, the adjacent natural teeth are ground down to form stubs. The superstructure, formed of artificial teeth, includes, at either end, teeth hollowed out to snugly receive the natural tooth stubs, these teeth being cemented permanently to those stubs, thereby fixedly securing the entire superstructure in position.

If, however, there are insufficient natural teeth remaining upon which to construct a fixed bridge, or the remaining teeth are not sturdy enough for the task, the dentist must then resort to what is generally described as a removable bridge. In such a denture, a resilient metallic clasp is provided which is sprung onto the adjacent natural tooth. A major difficulty in the use of these removable bridges is that food particles tend to accumulate in the areas between the removable bridge and the gum, thus requiring the frequent removal of the bridge from the patient's mouth to properly cleanse both the bridge and the surrounding area. This operation is cumbersome, unpleasant and unsanitary. For these reasons, a dentist, wherever possible, will attempt to utilize a fixed bridge, rather than a removable bridge.

It has been proposed in the past to provide a support for a fixed bridge by implanting a bridge-supporting structure in the jawbone of the patient. This is done by drilling an aperture in the bone structure into which a tooth implant structure is inserted. This procedure has found little, if any, acceptance, for the requirement of drilling into the jawbone to form the aperture is an undesirable procedure at best. Thus, the use of removable bridges is still followed whenever the natural tooth structure deemed necessary for a fixed bridge is unavailable.

It is a major object of the present invention to provide an artificial tooth implant device by means of which it is possible to form a fixed bridge in situations where that was not previously feasible.

It is a further object of the present invention to provide a denture bridge or tooth support which may be readily implanted into the mouth of the patient and which provides secure and long-lasting retention.

It is another object of the present invention to provide an artificial tooth implant which is economical and easily manufactured and utilized.

It is yet a further object of the present invention to provide an artificial tooth implant device which may be embedded in the jawbone without the necessity of drilling into the bone structure.

It is also an object of the present invention to provide an artificial tooth implant which is readily adapted for use in substantially all regions of the patient's mouth.

To these ends, the present invention provides a device for permanently implanting an artificial tooth into the mouth of a patient, the device comprising a thin, razor-sharp implanting blade portion which is adapted to be securely embedded into the patient's jawbone. The device further includes a relatively massive support portion which extends up from the blade beyond the patient's gum and which is adapted to receive the artificial tooth structure. The support structure is further utilized as the means for transmitting a force to the blade so that it may pierce the gum and easily enter into the jawbone structure.

The blade portion will be retained in place in the bone, at least in the first instance, by the pressure of the bone tissue against the side surfaces of the blade. However, the blade is preferably in the form of a complete or partial ring, thus defining an open space through which the bone structure will subsequently grow so as to positively secure the device within the patient's mouth. The support structure is preferably joined to the upper edge and is in essentially the same plane as the blade. In this manner, by simply applying a force to the upper surface of the support portion, the blade, sharp edge foremost, may be readily driven into the patient's jawbone, with the driving force being evenly distributed over the length of the device. Only the support portion remains above the gum line once the blade is embedded into the jawbone, and the artificial tooth structure is then secured to the support portion in any appropriate manner.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the construction and manner of use of an artificial tooth implant device, as defined in the appended claims and as described in this specification, taken together with the accompanying drawings in which:

FIG. 1 is a cross-sectional view, on an enlarged scale, illustrating a way in which the present invention can be utilized to secure an artificial tooth bridge into a patient's mouth;

FIG. 2 is a cross-sectional view as viewed from the right side of FIG. 1;

FIG. 3 is a top plan view of the tooth structure of FIG. 1; and

FIGS. 4-8 illustrate alternative embodiments, drawn to different scales, of the artificial tooth implant device of the present invention.

FIGS. 1-3 illustrate a fixed bridge generally designated 10 which, in the embodiment shown, is formed of three artificial teeth 12, 14 and 16, secured to one another in a known manner. A natural tooth 18 is shown after having been ground down so that only a stub 20 remains above the gum line 22. A recess 21 is formed in artificial tooth 12 to snugly receive the stub 20, the tooth 12 being securely cemented thereon. The artificial tooth implant device of the present invention, generally designated 24, is partially embedded within the jawbone 26 of the patient to the right of natural tooth 18.

Implant device 24 is preferably in the form of a unitary metallic structure and comprises an implant portion 28, a support portion 30 and a linking portion 32 integral with and connecting implant portion 28 and support portion 30. The implant portion 28 is in the form of a thin blade, preferably with tapering ends, and the linking portion 32 preferably is similarly narrow. The implant portion 28 of

FIGS. 1-3 has the shape of a ring 34 having a rectangular central opening 36. The upper section 38 of ring 34 is horizontal, integral with, and extending substantially equally to each side of linking portion 32, and its lower section 40 is downwardly tapered (FIG. 2) to define a razor-sharp surface at 42. The support portion 30 is relatively massive, and is here shown as having a frusto-conical side surface and a flat upper surface 44.

In securing the bridge 10 in place, the implant portion 28 is first embedded into the patient's jawbone 26. To this end, the razor-sharp edge 42 is forced through the gum and the periosteum layer between the gum and the jawbone. A force is applied onto the flat upper surface 44 of support portion 30, by means such as a mallet, to force or hammer the sharp edge 42 into the jawbone. The force applied to surface 44 is transmitted by means of linking portion 32, and is distributed by the structure substantially equally over the entire edge 42, so that the implant portion 28 easily moves into the jawbone 26 in an accurately defined direction. The razor-sharp edge 42 is readily able to cut into the jawbone structure and spread it apart until the lower surface 46 of support portion 30 comes to rest on the gum layer 22. It is at this time that the artificial tooth structure 10 can be cemented onto both stub 20 and support portion 30.

Initially, the implant device will be held in place by the pressure of the bone tissue on the side surfaces of the implant portion 28. Hence, that portion 28 must have sufficient such surface area to produce effective retention when it is first driven into the bone. The designs disclosed here have that characteristic. After a time, the bone structure grows through the opening 36 provided in the implant portion 28 of the device, thereby securely retaining the implant portion 28 within the jawbone.

While the embodiment of this invention illustrated in FIGS. 1-3 is suitable for implanting a denture or single tooth in most portions of the mouth, special configurations of the implant portion may be required in special circumstances, such as where only weak or limited bone structure is present. Several exemplary configurations are illustrated in FIGS. 4-8 in which the implant devices are drawn to different scales, it being understood that the dentist will preferably have at his disposal most or all of these configurations.

In the embodiment of FIG. 4, the ring 34a is larger than ring 34 in FIG. 1 to provide greater surface-to-surface contact between the implant portion 28a and the jawbone, which is desirable in patients having relatively weak bone structure. A vertical cross bar 48, in line with linking portion 32, connects the upper and lower edges of ring 34a to provide increased rigidity and to better transmit the insertion force to the lower sharp edge 42. Openings 36a are thereby defined, through which the bone structure will eventually grow. The larger openings 36a permit a greater amount of bone structure to grow through, thereby to provide sufficient retention of the implant portion 28a even where the patient has relatively soft and weak bone structure.

The embodiment of FIG. 5 is particularly suitable for use in areas of the jawbone in which the sinus cavities are present, it being desired not to cut the sinus cavities with any part of the implant portion 28b. To this end, the implant portion 28b comprises three downwardly extending fingers 50-52, each being downwardly tapered to define sharp edges at their lower ends 42b. As shown, the outer fingers 50 and 52 are curved inwardly and central finger 51 is in alignment with linking portion 32. Open spaces 36b are defined between fingers 50-52. The inward curve of fingers 50 and 52 provide some positive retention effect when the bone grows into those open spaces 36b by producing partial ring sections cooperating with the new bone tissue.

The embodiment of FIG. 6 is particularly useful in applications where the available bone area is relatively shallow. Implant portion 28c is correspondingly shallow-

er than in the previously described embodiments. The lower sharp edge 42c is slightly bowed as shown and defines, along with upper surface 38c, an opening 36c.

The device illustrated in FIG. 7 is also particularly useful in areas in which only a shallow portion of jawbone structure is available, but with the additional factor that only a narrow area is available for work at the gum line. Accordingly, the implant portion 28d, whose depth may correspond to that of the implant portion 28c of FIG. 6, comprises sloping shoulders 38d extending downwardly and outwardly from linking portion 32 to sharp edge 42d, thereby to define a space 36d therebetween.

In applications in which a wide area of contact is desired at the bone region directly adjacent the periosteum, and in which the amount of available jawbone structure is limited, the embodiment of FIG. 8 may be advantageously employed. As illustrated, the upper wings 38e of implant portion 28e extend to a greater width than the lower edge 42e. An integral transverse rib 54 extends between shoulders 38e and defines therewith a first space 55, and defines a second space 36e with lower sharp edge 42e.

Thus, it will be appreciated that by the relatively simple expedient of embedding the implant device of the present invention into the patient's jawbone, a fixed bridge structure may be formed thereon in practically any portion of the patient's mouth, even in situations where the lack of sufficient natural teeth in the past would otherwise make such a fixed bridge structure impractical. It will be further appreciated that in the event that a natural tooth such as 18 is not available, a second device 24 of the present invention may be inserted into the patient's jawbone to provide a second anchor for the fixed bridge. If desired, a separate implant device 24 may be used for each tooth of a denture. When only one artificial tooth is called for, an implant device 24 may hold it in position without any modification of adjacent natural teeth. The entire operation of embedding the implant device of this invention is relatively simple and accurate, requiring only the application of a suitable force to one portion of the device, an operation of this type being readily within the skill of a dentist.

While a limited number of embodiments of the invention have been described, it will be appreciated that many variations may be made thereto without departing from the spirit and scope of the present invention.

I claim:

1. A device for permanently implanting an artificial tooth into the mouth of a patient, said device comprising an implanting portion in the form of a comparatively thin blade having an opening provided therein and having its lower free end formed into a sharp edge capable of being directly forced into the bone structure of the patient, and a comparatively massive support portion extending upwardly from and operatively joined to the upper end of said implanting portion and adapted to have an artificial tooth structure secured thereon, said support portion constituting means adapted to have a force applied thereto and effective to transmit said force to said implanting portion, thereby to drive said implanting portion into the bone sufficiently to securely retain said device, and the artificial tooth structure applied thereon, on said bone.

2. The device of claim 1, in which said implanting portion is substantially in the form of a ring, the lower edge of which defines said sharp edge.

3. The device of claim 2, in which the upper end of said implanting portion comprises a structural member extending laterally to both sides of said support portion, said support portion extending upwardly therefrom.

4. In the device of claim 3, a vertical member extending between the upper and lower sections of said ring in substantial alignment with said support portion.

5. The device of claim 1, in which the upper end of said implanting portion comprises a structural member

5

extending laterally to both sides of said support portion, said support portion extending upwardly therefrom.

6. The device of claim 1, in which said implanting portion is in the form of a plurality of downwardly extending, tapered, laterally spaced fingers, each of said fingers being tapered to define, at their free ends, said sharp edge.

7. The device of claim 6, in which the upper end of said implanting portion comprises a structural member extending laterally to both sides of said support portion, said support portion extending upwardly therefrom.

8. The device of claim 2, in which the upper edge of said ring is substantially horizontal.

9. The device of claim 2, in which the upper edge of said ring inclines downwardly and outwardly from said support portion.

6

10. The device of claim 2, in which the upper edge of said implanting portion extends out laterally beyond said ring.

11. The device of claim 1, in which the upper edge of said implanting portion is substantially horizontal.

12. The device of claim 1, in which the upper edge of said implanting portion inclines downwardly and outwardly from said support portion.

References Cited

UNITED STATES PATENTS

495,898	4/1893	Merrill	-----	32—13
693,884	2/1902	Nagy	-----	32—13
1,218,289	3/1917	Maker	-----	32—13

ROBERT PESHOCK, Primary Examiner