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[21] Appl. No. **843,579**
[22] Filed **July 22, 1969**
[45] Patented **May 11, 1971**

OTHER REFERENCES

Implant Research Corporation Publication, 2 pages, Copyright 1968

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Attorney—L. R. Geisler

[54] **DENTAL IMPLANT AND METHOD OF MOUNTING THE SAME**
4 Claims, 6 Drawing Figs.

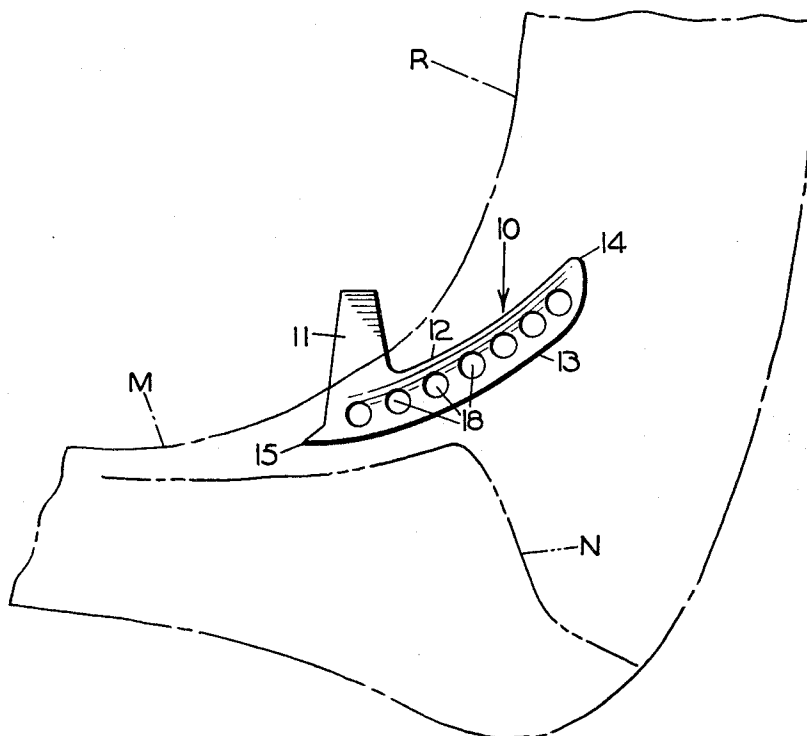
[52] U.S. Cl. 32/10
[51] Int. Cl. A61c 13/00
[50] Field of Search. 32/10 (A)

References Cited

UNITED STATES PATENTS

2,721,387	10/1955	Ashuckian.....	32/10
3,465,441	9/1969	Linkow	32/10

ABSTRACT: An implant designed to be mounted specifically in the ramus or retromolar portion of the mandible or jawbone, having an elongated main body carry a post extending up from the forward end of the main body and passing up through the epithelium; the main body of the implant being inserted into a partial incision made in the bone in a direction extending longitudinally and rearwardly, and driven in through and rearwardly beyond the incision and in beneath the top surface of the ramus; the main body of the implant extending rearwardly spaced a safe distance above the alveolar nerve and positioned between the lingual and buccal cortical plates of the ramus.



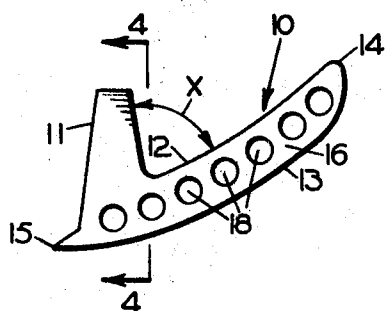


FIG. 1

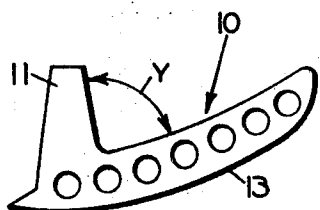


FIG. 2

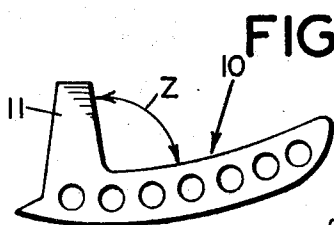


FIG. 3

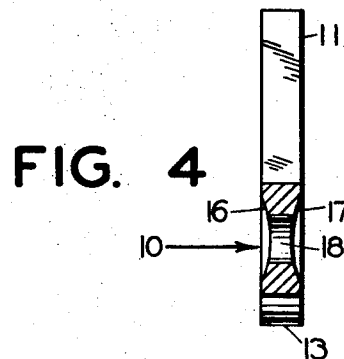


FIG. 4

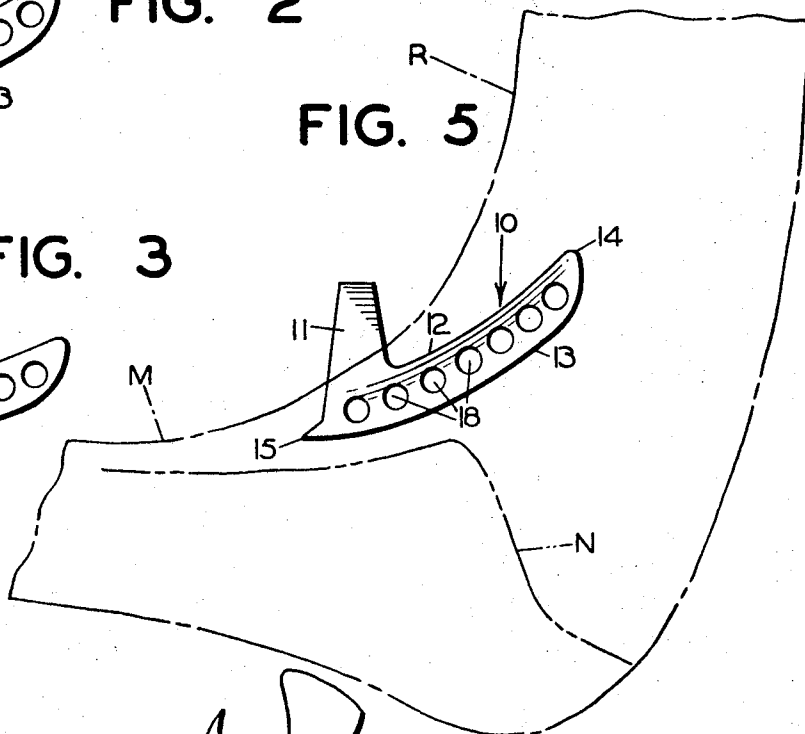


FIG. 5

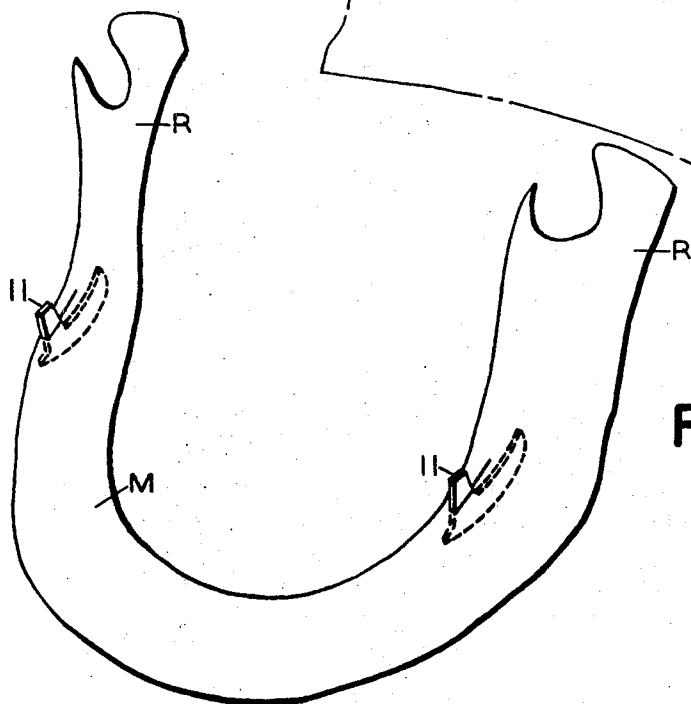


FIG. 6

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DENTAL IMPLANT AND METHOD OF MOUNTING THE SAME

BACKGROUND OF THE INVENTION

Various types of implants have been developed during recent years for anchoring artificial dentures to the bone structure. Some of these comprise subperiosteal skeleton saddles secured to or on the mandible. One problem with these is the tendency of resorption to take place under the saddle or implant, causing a slight undermining to occur beneath the same which must be accommodated.

Other types of implants comprise pins or composite posts driven or threaded into a blind hole cut into the bone. A number of designs for single and composite posts of such types have been developed, a recent example being the implant device described in U.S. Pat. No. 3,435,526, issued Apr. 1, 1969 to Brancato. Often such implants, however, cannot be used in the bicuspid and molar portion of the mandible. This is particularly true if atrophy of the bone has set in, and in this portion of the mandible atrophy is not uncommon in older persons. In cases of this nature reliance on intraosseous implants in the bicuspid and molar portion of the mandible must be wholly or partly avoided by the employment of a bridge with an end secured on the implant placed in the ramus portion of the mandible where the dense and better conditioned bone structure offers a better implant anchorage. However, the depth to which an implant post can extend, even in the ramus, is limited by the location of the inferior alveolar nerve since the bottom of the implant must not extend into too close proximity to the alveolar nerve and artery. Consequently a single pin, or even the composite pin described in U.S. Pat. No. 3,435,526, mentioned above, implanted to the necessarily limited depth in the ramus, cannot provide a bridge end support entirely capable of satisfactorily withstanding the moving stresses imposed in mastication.

The object of the present invention is to provide an improved permanently and firmly set implant, specifically developed to provide anchorage in the ramus, which can be driven rearwardly into the ramus and which will have a much greater area of contact within the bone structure and will, consequently, be more securely held by the bone, and also with which any possibility of approaching too close to the alveolar nerve area will be avoided.

OUTLINE OF THE INVENTION

The implant of the present invention comprises an elongated main body portion, specially adapted for being driven rearwardly into and imbedded in the ramus bone, with the main body portion carrying a post extending from the main body portion and through the epithelium to serve as the mounting for an artificial denture or portion of a dental bridge. The imbedded main body portion has a thickness of only approximately 2.0 mm. and a width or depth preferably not exceeding 5.0 mm. It is formed with a plurality of perforations enabling the bone to grow into the perforations in the manner characteristic of the healing or growth tendency of the inferior and superior maxilla in closing bone openings.

For an implant in the ramus an implant having a main body portion preferably approximately 31.5 mm. in length is used, the implant being set approximately along the longitudinal medial line and in between the lingual and buccal plates of the ramus. For such an implant an incision is cut into the bone not over 2.0 mm. in width, 6.0 mm. in depth, and preferably not over 18.0 mm. in length. The implant is then tapped rearwardly into the bone for a distance corresponding to the remainder of the length of the main body portion beyond the end of the incision.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a side elevation of an implant embodying the present invention and thus designed specifically for being implanted in the ramus;

FIGS. 2 and 3 are corresponding side elevations of similar implants with the post extending up at different angularities with respect to the main body portion;

FIG. 4 is a cross section on line 4-4 of FIG. 1 drawn to an enlarged scale;

FIG. 5 is a diagrammatic representation illustrating an implant in position in the left ramus, the ramus portion of the mandible being indicated in broken lines; and

FIG. 6 is a perspective view of a mandible bone illustrating a pair of ramus implants formed and mounted in accordance with the present invention and positioned in the two ramus end portions of the mandible bone respectively.

Referring first to FIG. 1, the implant of the present invention, adapted exclusively for mounting in the ramus of the mandible, consists of an elongated body portion 10 and an integral post 11 extending up from one end of the body portion.

Since the end on which the post 11 is carried will be at the rear of the implant, as the implant is driven rearwardly into place in the ramus in the manner later explained, the post 11, for the purpose of this description, will be mentioned as located at the forward end of the body portion 10, when the body portion is anchored in place.

The body portion 10 is designed to be mounted entirely within the bone, and thus within one of the ramus end portions of the mandible bone. When the body portion 10 has been properly set in place in the bone the post 11 will extend up through the epithelium or mucous membrane and skin covering the bone, so as to provide a desired denture support.

In order to cause the implant to be held more securely in place in the bone, the body portion 10 is formed with a plurality of holes 18 to permit the bone growth to enter these holes and thus cause the body portion to become more rigidly anchored in the bone. As is well known, a characteristic of jawbones is to tend to grow into and to close up openings within the bones. Also, the side faces 16 and 17 of the body portion 10 of the implant, as shown best in FIG. 4, are preferably concave with respect to the substantially vertical plane along which the implant is set so as to cause the bone growth to fill in the voids surrounding the holes 18 and add further to the hold of the bone of the body portion 10. The bottom edge 13 of the body portion 10 is upwardly curved as shown in FIG. 1.

The inner end of the body portion (with respect to the direction with which the body portion is inserted into the bone) terminates in a narrowed tip 14 to facilitate the thrusting or tapping of the body portion into place in the bone, preferably in accordance with the method and procedure now to be explained.

Assuming that the implant is to be set in the ramus R on the left side of the mandible M (as illustrated in FIG. 5), the dentist, with the aid of X-rays, determines the most advantageous and serviceable place for the implant, taking into consideration the condition of the bone, the angle of the anterior border of the mandible ramus, and the amount of the bone above the alveolar nerve. In FIG. 5 the alveolar nerve is diagrammatically indicated by the line N. Also, the dentist determines which of the available implants (thus, for example, the implant of FIG. 1 or FIG. 2 or FIG. 3) will be most suitable to use. It will be noted that the only difference in the implants of FIGS. 1, 2 and 3 is the size of the angle between the post 11 and the top edge 12 of the body portion 10 (thus the angle indicated at X, Y and Z in FIGS. 1, 2 and 3 respectively). Since the post 11 should extend up substantially vertically when the implant is in place, the dentist decides the amount of angularity of the body portion 10 with respect to the post which would be best under the particular circumstances present. It will be apparent that the angle X, Y or Z would never exceed 90°, and generally will be considerably less.

The area in which the ramus implant in question is to be located will generally be from 25 to 28 mm. distal to the mental foramen in the mandible. When severe resorption of the bone has taken place, for example in elderly patients, the dentist may position the implant further back in the ramus of

the mandible in order to have it anchored in better and more serviceable bone.

Having decided on the particular implant and the best location for its mounting, the dentist makes an incision through the oral tissue and uncovers the top of the bone where the bone incision is to be located. An incision is then made in the bone, the width of the bone incision being no greater than 2 mm., or the thickness of the body portion of the implant, the depth of the bone incision preferably being no greater than 6 mm., and the length longitudinally of the bone incision preferably being not greater than 18 mm. if the length of the body portion 10 of the implant is approximately 31.5 mm. which is the preferred length for such ramus implant. With the body portion 10 of the implant inserted into the incision of the bone, the implant is then tapped into the bone beyond the previously made bone incision for a distance equal to the remaining length of the body portion. The top and bottom edges 12 and 13 of the body portion 10 merge into the tip 14 (FIG. 1) at the inner or forward end of the body portion 10, as previously mentioned, to facilitate the penetration of this forward portion of the body into the bone during the tapping of the implant into place, and the fact that the implant enters in between the lingual and buccal cortical plates of the ramus of the mandible and, consequently, into the somewhat less dense portion of the bone, makes it possible for this tapping of the implant for the additional distance in the bone to be accomplished without difficulty.

Preferably, the body portion 10 of the implant is formed with a sharp lip 15 (FIG. 1) protruding for a distance of approximately 3.0 mm. from the opposite or forward end. When the body portion has been set entirely in the bone the implant, through the intermediary of a suitable pulling instrument, is subjected to tapping in the reverse direction so as to cause this lip 15 to be thrust forwardly under the cortical mesial bone structure and thus forwardly from the starting point of the bone incision. The entry of this lip under the cortical bone at this point prevents any possibility of the forward or post section of the implant being inadvertently lifted slightly from its bed in the bone during subsequent removal of the impression required for the fixed prosthesis ultimately to be secured to the implant post.

Thus, due to the relatively large area in the bone occupied by the body portion 10 for the implant and the formation of the body portion for promoting firmer anchoring in the bone, the post 11 of the implant of the present invention is better suited to supply the necessary rigid denture support required to withstand permanently the various moving stresses imposed in mastication, and the fact that the implant can be so satisfactorily placed in the manner and by the method described, without any prolonged expenditure of time and effort on the part of the dentist, and thus without excessive cost as well as without lengthy discomfort to the patient, provides an improved and very practical solution to recognized specific problems with which the dental profession has had to contend.

While it is to be understood that minor modifications in the shape of the implant and specifically in the body portion of the same, may be made without departing from the principle of the invention, it is believed that the best results are obtained when the implant conforms very closely to the particular shape and form herein illustrated and described, but it is not intended to limit the invention except as set forth in the claims.

I claim:

1. The method of mounting an implant in the ramus portion of the mandible bone which comprises using an implant having a narrow elongated body portion with an upwardly curved

bottom edge and a denture-anchoring post extending up from the forward end of said body portion, cutting a longitudinal slit in the mandible at a predetermined area at the back of the mandible, making the width of said slit corresponding to the width of the body portion of the implant, the depth of the slit not exceeding approximately 1 mm. the depth of said body portion, but the length of said slit being less than three-fourths of the length of said body portion, inserting the section of said implant body portion opposite said post-carrying end into said slit, and tapping said body portion for the remainder of its length beyond said slit into the ramus and in between the lingual and buccal cortical plates of the ramus, while maintaining the curved bottom edge of said body portion a desired distance above the alveolar nerve, until said body portion is entirely embedded in the mandible.

2. The method of mounting an implant in the ramus portion of the mandible bone which includes using an implant having a narrow, elongated body portion with an upwardly curved bottom edge and a sharp lip protruding for a short distance from the forward end of said body portion and a denture-anchoring post extending up from the forward end of the body portion, and which method also consists in cutting a longitudinal slit in the mandible at a predetermined area in the back of the mandible, making the width of said slit corresponding to the width of the body portion of the implant, the depth of the slit not exceeding approximately 1 mm. the depth of said body portion, but the length of said slit being less than three-fourths of the length of said body portion, inserting the section of said implant body portion opposite the post-carrying end into said slit, tapping said body portion for the remainder of its length beyond said slit into the ramus and in between the lingual and buccal cortical plates of the ramus while maintaining the curved bottom edge of said body portion a desired distance above the alveolar nerve, until said body portion is entirely embedded in the mandible, and finally tapping said body portion in the reverse direction sufficiently to cause said sharp lip at the forward end of said body portion to be thrust forwardly into the cortical mesial bone structure in front of said longitudinal slit, thereby preventing any possibility of the forward end of said body portion subsequently being slightly lifted from its bed in the mandible.

3. A dental implant designed specifically for insertion rearwardly into the ramus portion of the jawbone through an incision substantially along the longitudinal centerline of the bone ahead of the ramus portion, said implant having a substantially flat body portion with a width of approximately 2 mm., a depth not exceeding 6 mm. and an overall length of at least 30 mm., said body portion having an upwardly curved bottom edge, the top and bottom edges of said body portion converging at the rear end of said body portion to form a tip for facilitating the driving of the rear portion of said body portion rearwardly into the ramus, and an integral post extending up from the forward end of said body portion and adapted, when said body portion is implanted in the bone, to extend up through the epithelium to provide a denture anchorage, the angularity between said post and the top edge of said body portion being no greater than 90°.

4. The ramus implant of claim 3 with said body portion formed with a plurality of holes extending laterally therethrough, and with the addition of a pointed lip extending from the front end of said body portion for a distance of approximately 3 mm., adapted to extend forwardly from the bone incision and under the cortical mesial bone structure when the implant is tapped forwardly after insertion into the ramus.