Dec. 9, 1958 I. S. LICHTMAN ET AL 2,863,216

BITE CORRECTORS

Filed Jan. 27, 1955

Fig. 1.

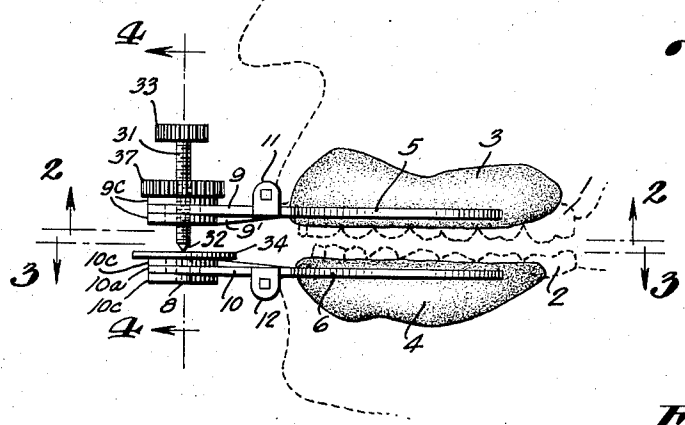


Fig. 6.

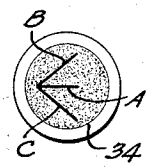


Fig. 2.

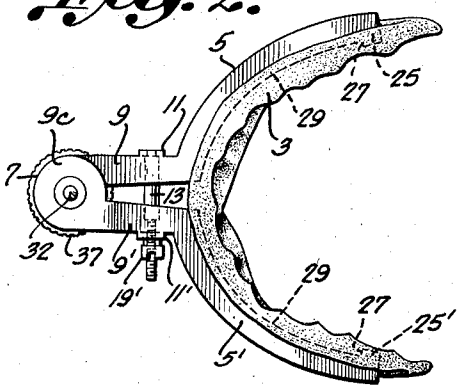


Fig. 3.

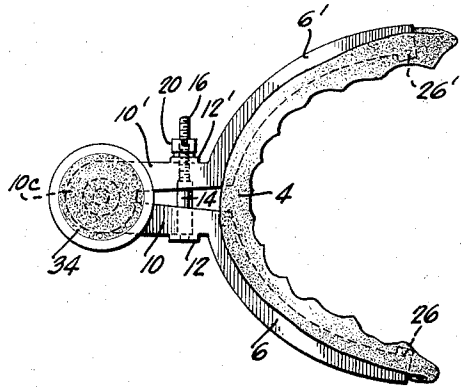


Fig. 4.

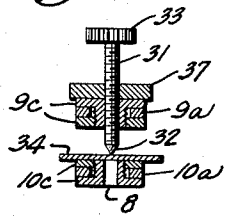
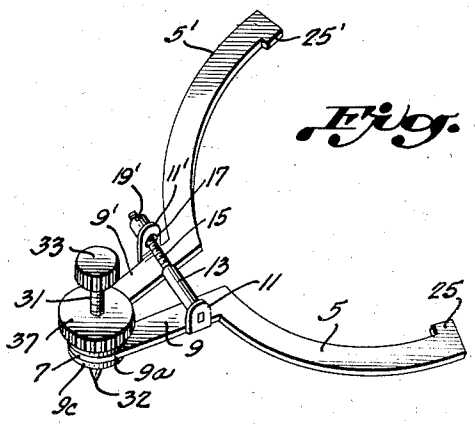


Fig. 5.



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BITE CORRECTORS

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3 Claims. (Cl. 32—19)

This invention relates to a method of and apparatus for obtaining a balanced occlusion of the natural dentition in the mouth of a patient.

It is the object of the present invention to realize most effectively dentistry's primary role, namely, the preservation of the human dental mechanism at the optimum level of health for the longest possible time. Dentists who concern themselves with this problem accept the fact that a balanced anatomical articulation or balanced occlusion of the natural dentition is the sine qua non of this broad objective. They recognize that the high frequency and long duration of occlusal trauma make this trauma an extremely destructive force. The two areas that suffer most from occlusal disharmony are the periodontal structures and the temporomandibular joint.

Generally speaking, teeth are lost because of caries or periodontal disease. Dental caries exerts its most ravaging effects in childhood and early adulthood. From the third decade onward, the preponderant number of teeth lost is on the basis of periodontal disease. The lack of a balanced anatomical articulation has been accepted as the major contributing cause of periodontal disease in the adult.

Examination of thousands of prehistoric skulls indicates unequivocally that there was substantially no periodontal disease among these primitives. Modern man, on the other hand, seems to be suffering an ever-increasing incidence of diseases of the supporting tissues of the teeth. Closer examination of the teeth found in these prehistoric skulls demonstrates the pattern of morsel wear to be consistent with normal jaw movements, doubtless on the basis of an abrasive detergent diet. In a word, prehistoric man performed his own occlusal equilibration.

Inspection of the dentition of modern man shows that the balancing of his occlusion or articulation does not take place naturally. In order to establish and maintain health of the oral tissues it is necessary to provide artificially a state of balanced anatomical articulation or occlusion.

Occlusal equilibration is the artificial modification of cuspal form to provide a multiplicity of opposing tooth contacts in all jaw relations and directing the occlusal force in such a way as to be best borne by the periodontal structures. Heretofore, it has been a trial and error procedure. The occlusolator in accordance with the present invention provides a scientific approach to the process of occlusal equilibration.

It is another object of the present invention to facilitate the detection and elimination of occlusal prematurities of natural teeth. This procedure of detection is ordinarily a very elusive undertaking because of the mobility and adaptability of the parts involved. When the point of a tooth cusp strikes an opposing inclined plane, the force is resolved into horizontal and vertical components and one or all of the following may occur: Teeth may be depressed in their sockets; teeth may be displaced laterally; the mandible may be deflected from its normal anatomical path of closure; or the temporomandibular joint may accommodate or adjust to the discrepancies.

Traditional methods of occlusal equilibration have been unable to cope with the above variables. Individual tooth movement and deviations from the mandible's normal anatomical path of closure make such methods entirely inadequate.

The occlusolator in accordance with the invention permits a controlled approach of opposing teeth so that the above deceptive factors are negated. With the use of the occlusolator these variables are cancelled or made inoperable so that adequate markings may be made on those parts of the teeth responsible for the existing disharmonies. These disharmonies thus effectively located, may be removed in a manner consistent with nature's intentions for the purpose of establishing and maintaining maximum oral health.

It is another object of the invention to provide an occlusal equilibrator which comprises matrices having internal surfaces corresponding to the facial surfaces of the natural teeth, which may be conveniently clamped onto the maxillary and mandibular sets of natural teeth of the patient, with no difficulty to the operator and no discomfort or pain to the patient. These matrices function as temporary splints for the natural teeth and overcome the excessive mobility thereof, particularly in a lateral direction. Of course, a limited amount of individual tooth movement is normal and desirable, and the splints are designed to immobilize the natural teeth from displacement beyond a particular patient's range of tolerance.

It is another object of the invention to provide a dental instrument functioning as a bite corrector, which is simple, rugged and economical in construction, easy to clean and to sterilize, which is adaptable for use interchangeably in the treatment of many patients, and which is convenient to manipulate as a result of the adjustments which are made therewith extraorally.

Other objects and purposes will appear from the following detailed description of the invention, taken in conjunction with the accompanying drawing, wherein

Fig. 1 is a side elevation of the instrument in accordance with the invention as applied to the natural dentition of a patient;

Fig. 2 is a horizontal sectional view along line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view along line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view along line 4—4 of Fig. 1;

Fig. 5 as a perspective view of the upper clamp for the natural maxillary teeth, in distended condition; and

Fig. 6 is a horizontal sectional view of the marking plate following the marking of the stylus of a Gothic arch thereon by the jaw movements of the patient.

In the drawing is shown as occlusal equilibrator or bite corrector applied to the natural dentition of a patient, comprising the upper maxillary set of teeth 1 and the lower mandibular set of teeth 2. A matrix 3, of hardened plastic material, covers the major portion of the facial surfaces of the upper teeth, leaving clear the protruding ends of the teeth which enter into the plane of occlusion with the mandibular teeth 2. Likewise, a matrix 4, of hardened plastic material, covers the major portion of the facial surfaces of the lower teeth 2. The configuration on the internal surfaces of the matrices 3 and 4 are clearly shown in Figs. 2 and 3 which conform to the facial surfaces of the natural teeth of the patient, of which impressions had been made in order to fabricate the matrices in manners well known in the art of dental techniques.

The matrices 3 and 4 function as splints to immobilize

substantially the movement of the individual teeth both against lateral displacement and against undue depression in their sockets. To effect such immobilization, the individual matrices are clamped against the teeth by means of a pair of bifurcated clamps having two arms, each of which is pivoted on a pivotal point anteriorly and extraorally. The upper clamp consists of the two arms 5, 5' which at their proximal points are provided with arms 9, 9' pivoted together at 7. The arm 9 terminates in a circular enlargement 9*a* which is embraced in a pair of spaced circular enlargements 9*c* of arm 9'. Lugs 11, 11' project upwardly from arms 9 and 9', respectively. One end of a bolt 13 is fixedly seated in lug 11, while its opposite threaded end 15 extends through an aperture 17 in lug 11' of arm 9', the free end of which bolt receives an internally threaded nut 19' adapted to control the capability of distending the arms 5, 5' and contacting them by the engagement of a special tool with the nut 19 and rotating the latter.

The distal or terminal edges of the arms 5 and 5' are provided with projections 25, 25', respectively, adapted to enter recesses 27 in the external surface of the matrix 3, while the inner arcuate edges of the arms 5, 5' seat closely within a groove 29 formed horizontally in the exterior surface of the matrix.

The distention of the arms of the instrument as shown in Fig. 5 enables the easy embracing therewith of the external surface of the matrix 3, whereupon the further contraction of the arms by advancing the nut 19 towards the bolt head 13 effects a positive clamping of the matrix onto the upper maxillary natural teeth 1.

The construction of the clamp for the mandibular teeth 2 is similar to that described above in connection with the clamp for the maxillary teeth. As shown in Figs. 1 and 3, the clamp for the lower teeth comprises arcuate arms 6, 6' from which extend forwardly arms 10, 10', respectively, terminating in circular enlargements 10*a* and 10*c*, respectively. The circular enlargement 10*a* of arm 10 is pivotally mounted between spaced circular enlargements 10*c* of arm 10', around the pivotal axis 8. The spacing between the arms is controlled by bolt 14, which is fixedly mounted in lug 12 of arm 10, and the threaded end 16 of which extends through the apertured lug 12', and receiving on its free end the internally threaded nut 20 for the purpose of adjusting the displacement between the arms 10 and 10', and the arcuate extensions thereof 6, 6', respectively. The terminal portions of arms 6 and 6' are provided with projections 26, 26' which are adapted to engage recesses formed in the exterior surface of the matrix 4 and a groove conforming to the thickness of the clamp on the external surface of the matrix accommodates the major part of the arcuate edges of the arms 6, 6'. The clamp is fitted onto the matrix 4 and upon the drawing together of the arms 10, 10' the mandibular natural teeth are immobilized against undue movement by the splint function performed by the matrix.

A bearing or marking plate 34, which may be in the form of a circular disc, may be affixed to the pivotal part of the arms 10*a*, 10*c*. While this connection may be a permanent one, it is preferable that the same be temporary and easily removable in order to conveniently interchange the discs 34. The bearing disc 34 may be affixed to the upper surface of the enlarged circular portion of the plate 10' by means of adhesive dental wax and, if desired, the same may be disposed eccentrically with respect to the pivot point, depending upon special needs of the patient.

The upper clamp is provided with a stylus 31 which may cooperate with the plate 34 as a stop for the stylus, or which may be used for the purpose of tracing a Gothic arch and comparative records indicating the character of movement of the jaws of the patient. This stylus is in the form of a threaded bolt having a shank 31, pointed end 32, and manipulating knob 33 and which

is in threaded engagement with the interior of the center of the circular portion 9*c* of the upper clamp. In addition, a locking nut 37 threadedly engages the stylus 31 above the circular portion 9*c* in order to fix the seating of the stylus at any desired point.

When the instrument is properly mounted, as shown in Fig. 1, the stylus 31 is anterior to the maxillary central incisors in the median sagittal plane, and substantially perpendicular to the plane of occlusion. The marking plate 34 is directly beneath it and at right angles to the stylus, namely, in a plane substantially parallel to the plane of occlusion.

In using the instrument, the matrix 3 is clamped upon the maxillary natural teeth and the matrix 4 is clamped upon the mandibular natural teeth by means of the upper and lower clamps, as shown in Fig. 1. The stylus is initially adjusted to project sufficiently so that it will bear against the marking plate 34 before any of the opposing natural teeth make contact so that the mandible can make all excursions with no opposing tooth contacts. This positioning of the parts is illustrated in Fig. 1, and may be used for the tracing of the movements of the mandible or lower jaw as the same is moved forwardly and laterally relative to the upper fixed jaw. Fig. 6 shows the record of the stylus point on the marking plate, which may be blackened with carbon or any other pigment, and the relative excursion of the jaws gives a tracing of a Gothic arch, which is well known in the art. Thus, line A records the protrusive excursion of the mandile, line B delineates the left lateral excursion of the mandible, while line C indicates the right lateral excursion of the mandible. This record may be compared at a later time with the record of the jaw movements permitted by the tooth surfaces when they are in occlusal relation.

However, the primary objective of the invention resides in the detection of occlusal prematurities as the opposing natural teeth are permitted to approach each other incrementally. To do this, the stylus is gradually receded from the opposing bearing or marking plate 34 until the first indication of prematurities can be noted and marked by pigmented articulating paper, which is followed by the grinding of such prematurities or by abrasion by other means.

Since there are minimal contacts of cusp tips and inclined planes of opposing teeth, there is no need for the temporomandibular joint to accommodate on the basis of an acquired position resulting from a disharmonious relationship of the opposing natural teeth. Thus, the only other variable factor standing in the way of adequate occlusal equilibration is removed.

The adjustment of the stylus is continued gradually, removing it from contact with the bearing plate, continuing the grinding after each adjustment, until an articulation consistent with the patient's normal path of closure and mandibular movements as directed by the temporomandibular joint anatomy is provided.

Thus, the instrument described above permits the entire procedure of occlusal equilibration to be carried out on the natural dentition using the patient's own temporomandibular articulation. Of course, fixed bridge work in the mouth of the patient is considered to constitute an integral part of the natural dentition. No articulator or other instrument is required. Wax bites and other intermaxillary recording materials are unnecessary, thereby eliminating the errors which are introduced by the pressures which accompany the use of such recording media. Errors arising from muscular and other extraneous anatomical movements are thus excluded.

The instrument is easily applied to the facial surfaces of the natural teeth and represents an improvement over previously known devices, such as central bearing devices, since the spaces within the dental arches are kept free of all extraneous material. Because the instrument is applied within the vestibule of the mouth,

a comprehensive equilibration may be executed with dispatch and relative comfort to the patient and operator. Since the plate upon which the Gothic arch tracing is made is extra-oral, this tracing may be readily observed at all times by the dentist so that the abrading of the teeth may be carried out consistent with the normal movements of the mandible using the Gothic arch tracing as a guide.

The instrument may be easily dismantled for sterilization and repeated use, and one device may be used over long periods of time.

While we have described our invention as embodied in a specific form and as operating in a specific manner for purpose of illustration, it should be understood that we do not limit our invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of our invention, the scope of which is set forth in the annexed claims.

We claim:

1. An occlusal equilibrator for natural dentitions comprising a matrix of hardened plastic material conforming to the facial surfaces only of the maxillary teeth of a patient, a second matrix of hardened plastic material conforming to the facial surfaces only of the mandibular teeth of the patient, a bifurcated clamp in engagement with the exterior surface of said first matrix and a second pivoted bifurcated clamp in engagement with the exterior surface of said second matrix, a single bearing plate only on said last-mentioned clamp disposed above the pivot of said clamp extraorally and anteriorly to the mandibular central incisors in a plane substantially parallel to the plane of occlusion, a single stylus only on said first-mentioned clamp disposed extraorally anteriorly of the maxillary central incisors in the medial sagittal plane overlying said bearing plate, and substantially perpendicularly to the plane of occlusion, and means for advancing said stylus towards said bearing plate so far as to prevent contact between the opposed maxillary and mandibular teeth and incrementally withdrawing the stylus to successively mark tooth prematurities for elimination by grinding until substantially complete and balanced occlusion between the maxillary and mandibular teeth is attained.

2. A device as set forth in claim 1 wherein each bifurcated clamp is maintained in engagement with the exterior surface of its matrix by means of terminal prongs at the end of the clamp projecting into recesses at corresponding points of the matrix with the rest of the exterior surface of said matrix forwardly of said recesses being grooved to receive the edge of the clamp, and means for adjusting the distention and contraction of the clamp.

3. An occlusal equilibrator for natural dentitions comprising a matrix of hardened plastic material conforming to the facial surfaces only of the maxillary teeth of a patient, a second matrix of hardened plastic material conforming to the facial surfaces only of the manibular teeth of the patient, a bifurcated clamp in engagement with the exterior surface of said first matrix and a second pivoted bifurcated clamp in engagement with the exterior surface of said second matrix, a single marking plate only on said last-mentioned clamp disposed above the pivot of said clamp extraorally and anteriorly to the mandibular central incisors in a plane substantially parallel to the plane of occlusion, a single threaded stylus only rotatably mounted on said first-mentioned clamp and disposed extraorally anteriorly of the maxillary central incisors in the medial sagittal plane and substantially perpendicularly to the plane of occlusion, said stylus having a bearing point adjacent to said marking plate, means for advancing said stylus towards said marking plate so far as to prevent contact between the opposed maxillary and mandibular teeth and incrementally withdrawing the stylus to successively mark tooth prematurities for elimination by grinding until complete and balanced occlusion between the maxillary and mandibular teeth is attained, and a lock-nut on said stylus cooperable with said first-mentioned clamp to fix said stylus in any adjusted position.

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