APPARATUS FOR RECORDING THE CLOSURE BITE POSITION OF THE JAW OF A PATIENT AND THE JAW ARTICULATION MOVEMENT DURING BITING TOGETHER

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ABSTRACT

An apparatus for recording the closure bite position of a jaw of a patient and the movement of the jaw articulation on hinges during biting together comprising an upper plate and a lower plate for receiving the cast impression or pattern of both jaws and two column members spaced from one another and anchored in a base plate. These column members support both of the plates which extend parallel to the base plate. According to the invention an inner member or part is arranged between the upper plate and the lower plate, this inner member being adjustable and positionally arrestable according to the bite position angle. Furthermore, the inner member is detachably mounted upon an element inter-connecting the columns. The lower plate member is arranged to be movable and pivotal relative to the upper plate member.

10 Claims, 6 Drawing Figures
APPARATUS FOR RECORDING THE CLOSURE BITE POSITION OF THE JAW OF A PATIENT AND THE JAW ARTICULATION MOVEMENT DURING BITING TOGETHER

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved construction of apparatus for recording the closure bite position of the jaw of a patient and the movement of the jaw articulation or hinges during biting together, comprising an upper plate member and a lower plate member serving to receive cast impressions or patterns of both jaws, and further including two columns anchored in spaced relationship with regard to one another in a base plate, the columns carrying both of the plate members which extend substantially parallel to the base plate.

When fabricating dentures, bridges, dental protheses and the like it is of extreme importance for the dentist or technician to know about the angle of the closure bite position of both jaws of the patient as well as the simulation of the movement of the lower jaw relative to the upper jaw. The proper arrangement, spacing and meshing of the fabricated artificial dental device, which should correspond extremely accurately to the actual conditions, then ensures for a comfortable trouble-free use by the patient.

It is well known that the lower jaw carries out a complicated movement during speaking and chewing. This movement is quite individualistic and is dependent upon the configuration of the ball cup or socket at the skull of the patient into which are mounted the hinges of the lower jaw. Also the inclination of a plane passing through the hinges or articulations (condylus) and the mouth opening of a patient is very different. On the average it forms an inclination of 33° with regard to the horizontal plane.

In order to reproduce the pivotal-and-wave motion of the lower jaw relative to the upper jaw there have been designed so-called articulators which are based upon different hinge systems. All of these known articulators, however, have the same drawback, namely they only approximately partake in the movements of the human jaw. Furthermore, the hinge mechanisms produced in accordance with the human joint or hinge connections can only provide an approximate or average form and not that of a specific individual. With the known articulators in many instances the upper jaw is moved instead of the lower jaw. When measuring the angle of the aforementioned inclination plane there is measured the angle at the face of the patient by means of a face bracket having different support-, displacement- or fill or backing rods and by means of such face bracket there is determined or fixed at the articulator the appropriate plane.

SUMMARY OF THE INVENTION

Hence, it is a primary object of the present invention to provide an improved apparatus for recording the closure bite position of the jaw of the patient and the movement of the jaw hinges during biting together in a manner not associated with the aforementioned drawbacks and limitations of the state-of-the-art proposals.

Another and more specific object of the present invention aims at overcoming these previously discussed disadvantages and providing an apparatus for recording the closure bite position of a patient and the jaw hinge displacement or movement during biting together, wherein there can be recorded in a very simple manner the angle of inclination of a plane passing through the hinges and the mouth opening of a patient, and further wherein the pivotal movement of the lower jaw of a patient during biting together can be authentically simulated.

Yet a further significant object of the present invention relates to an improved apparatus of the character described capable of fulfilling the aforementioned objectives, and which additionally is relatively simple in design, not readily subject to malfunction, extremely easy to use and capable of providing extremely accurate results.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention contemplates the provision of an inner member between the upper plate member and the lower plate member which can be adjusted and positionally arrested as a function of the bite position angle and which inner member is detachably mounted at an element connecting the aforementioned columns. Furthermore, the lower plate member is movably and pivotally arranged relative to the upper plate member.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a side view, partly in section, of an apparatus for recording the closure bite position of the jaw and the jaw hinge movement, illustrating the upper plate member in its pivoted-away position and a plan view of the inner member or part;

FIG. 1a is a plan view depicting details of the inner member;

FIG. 2 is a side view of the arrangement of FIG. 1, partially in section, with the cast patterns or impressions in the closed position, however without the inner member;

FIG. 3 is a top plan view of the arrangement of FIG. 2, looking in the direction of the arrow A;

FIG. 4 is a top plan view of the arrangement of FIG. 2, looking in the direction of the line C—C thereof; and

FIG. 5 is a rear view of the arrangement of FIG. 2, looking in the direction of the arrow B thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, and as best seen be referring initially to FIGS. 1 and 2 the exemplary embodiment of apparatus designed according to the teachings of this invention contemplates the provision of a base plate 1 which carries the apparatus and the front portion of which base plate bears upon an adjusting means comprising a support leg 10 and the rear portion of base plate 1 bears without any support at a surface. Consequently, the position of the apparatus is inclined with regard to a horizontal plane, the range of angular inclination of the apparatus with regard to the horizontal plane being determined by adjustment of an adjust-
ment screw 2 having a pivot or support head 3 and which is threadably connected into the adjustment support leg 10. This angle of inclination can be adjusted within a range of 25° to 40° and should represent the inclination of the hinge in which are located both jaw joints or hinges in the hinge or ball socket and the mouth opening of a patient, and the angle of which with respect to the horizontal plane on the average amounts to 35°.

Two columns or column members 5 are anchored at the base plate 1 by means of screws 4 or equivalent fastening expedients, these columns 5 being disposed in a plane perpendicular to the plane containing the base plate 1. Further, column members 5 possess guide slots 6 which extend coaxially with respect to the respective axis of the columns 5. These guide slots 6 piercingly extend through the legs 7 of a lower bracket 8, legs 7 extending outwardly behind the column members 5. An anchoring plate 9 is arranged to be pivotable about a horizontal axis at the bracket 8 between the columns 5. This anchoring plate 9 possesses two blocks 11 mounted for rotation about an axis extending parallel to the axis of the columns. The blocks 11 are pierced by two pins 12 extending parallel to the base plate 1, helical or coil springs 13 being wound about these pins 12, and such are pivotably connected with the rear edge of a lower plate member 14. A respective helical or coil spring 15 is inserted internally of each column member 5 and which upwardly displaces the legs 7 of the lower bracket 8, each of which leg 7 is shiftable in the guide slot 6.

The lower plate member 14 is provided at its front edge with a handgrip 16. At the lower face or side of the lower plate member 14 there is mounted a telescopic support leg 17 having a ball or spherical head 18, the inner compartment of the telescopic support leg 17 being equipped with a helical or coil spring 19. The ball or spherical head 18 of this telescopic support leg 17 is engageable with a substantially semispherical-shaped member 20 at the base plate 1. The two pins or pin members 12 are pivotally mounted in hubs 21 at the rear edge of the lower plate member 14. These two pin members 12 piercingly extend through the blocks 11 in the columns 5 and are likewise pivotably mounted at a transverse extending ledge 22 behind the anchoring plate 9, so that they form together with the transverse ledge 22 a parallelogram. As previously explained two helical springs 13 are coiled about each associated pin member 12, specifically in a manner that one of the springs 13 is wound about the pin portion in front of the associated block 11 and the second spring is wound about the pin portion behind the associated block, as best seen by referring to FIGS. 3 and 4.

An upwardly extending blade spring 24 secured to the base plate 1 is pivotally arranged about a horizontal axis at a holder or support arm 25. This holder arm 25 is secured by means of two screws 26 or the like to the base plate 1. Centrally of the transverse ledge 22 there are riveted two mandrels or pins 23, the blade spring 24 being guided through the narrow space between both mandrels 23 which bear snugly against one another.

The upper ends of the column members 5 are bridged by an upper bracket 27, as best seen by referring to FIG. 5, which possesses two projections or shoulders 27a. This upper bracket 27 is threadably connected by means of two screws 28 or the like with both column members 5. A support or carrier arm 29 accommodating an upper plate 30 is pivotably mounted so that it can be rocked about a horizontal axis through 180° at a bolt member 31 which piercingly extends through the shoulders or projections 27a and the support arm 29. A locking or latching mechanism 51 is provided at a recess 32 of the upper bracket 27 and into which recess pivotably moves the hinge arrangement 33 of the support arm 29. This locking mechanism 51 comprises a spring-loaded ball which engages in appropriate depressions or recesses at the periphery of the support arm hinge arrangement or pivot 33. Support arm 29 possesses an internal compartment into which can be introduced an extension or projection 34 of the upper plate member 30 and which can be arrested or locked by means of a screw 36 extending through a slot 35 at the upper side of the support arm 29 and into the threading of the projection 34. At the front side of the upper plate member 30 there is guided a control pin 38 extending parallel to the column axes, this control pin 38 being guided in a groove of a support plate 37 secured to the upper face of the upper plate member 30. This control pin 38 possesses an elongate slot 42 and can be arrested in desired position by means of a screw 39. The lower end of this pin 38 extends up to the region of the handgrip 16 at the lower plate member 14.

Between the upper plate member 30 and the lower plate member 14 there is supported an inner member or part 40 at a member or component 41 interconnecting both columns or column members 5. The horseshoe-like ring strips of the inner member 40 corresponds to the shape of the bite or denture. It is secured to a support ledge 43 which together with the strips are pivotably arranged at a bolt member 46 piercingly extending through the projections or shoulders 44 of the support ledge 43 and an arm member 45. Moreover, the inner member 40 can be arrested in desired position by a clamp screw 52. Arm member 45 possesses an elongate slot 54 in which there is arranged a screw 48 threaded into a bifurcated or forked member 47. This bifurcated member 47 is inserted into a groove 53 at the interconnecting member 41 and can be locked in desired position by a screw 49 or equivalent. The member or component 41 interconnecting the columns 5 is rigidly riveted with the columns 5 so that its ends extend beyond the columns 5, like the legs 7 of the lower bracket 8, however above such legs. Relatively long screws 55 are threadably connected with threaded holes or bores 56 of the oppositely situated ends of the interconnecting member 41, these long screws 55 extending up to the region of the associated leg 7 and retaining such in the desired position against the action of the associated helical or coil spring 15. Owing to the described mounting of the inner member 40 it is possible to positionally adjust and arrest the inner member in a number of different planes.

The above described apparatus functions in the following manner:

The cast or moulded impressions or patterns of the upper and lower jaw of a patient are connected with a hardened or setting gypsum with the lower face of the upper plate member 30 and with the upper face of the lower plate member 14. These upper and lower plate members together with the cast impressions are closed together so that both jaws bear against one another, and wherein the inner member 40 has not yet been in-
serted between the upper and lower plate members. Thereafter, the upper plate member 30 is suitably rocked or pivoted in order to render possible placement of the inner members 40 upon the member 41 interconnecting the columns 5 and to fix the angle of the closure bite position according to the position of the lower jaw. Then all of the teeth in the upper jaw are erected. When the upper jaw is finished it is placed upon the inner member and tried out at the angle of the closure bite position. Thereafter, the teeth are erected at the lower jaw with articulation and occlusion. The inner member is removed and due to manipulation of the lower plate member with the cast pattern or impression the erected teeth of the lower jaw are accommodated to the position of the teeth of the upper jaw.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto, but may be otherwise variously embodied and practiced within the scope of the following claims. Accordingly,

What is claimed is:

1. An apparatus for recording the closure bite position of the jaw of a patient and the movement of the hinges of the jaw during biting together, comprising an upper plate member and a lower plate member for receiving cast impressions of both jaws, a base plate, a pair of columns supporting both plate members substantially parallel to said base plate, said columns being anchored in spaced relationship with regard to one another at said base plate, an inner member, which can be positionally adjusted and arrested according to the bite position angle arranged between the upper plate member and the lower plate member, means interconnected said columns, said inner member being detachably mounted at said interconnecting means, said inner member comprises a substantially horseshoe-shaped strip means corresponding to the shape of a denture, means for mounting said inner member at the means interconnecting said columns such that it can be positionally adjusted and arrested in at least three planes, and means for movably and pivotally mounting said lower plate member relative to said upper plate member.

2. The apparatus as defined in claim 1, wherein said inner member comprises a substantially horseshoe-shaped strip means corresponding to the shape of a denture, means for mounting said inner member at the means interconnecting said columns such that it can be positionally adjusted and arrested in at least three planes.

3. An apparatus for recording the closure bite position of the jaw of a patient and the movement of the hinges of the jaw during biting together, comprising an upper plate member and a lower plate member for receiving cast impressions of both jaws, a base plate, a pair of columns supporting both plate members substantially parallel to said base plate, said columns being anchored in spaced relationship with regard to one another at said base plate, an inner member, which can be positionally adjusted and arrested according to the bite position angle arranged between the upper plate member and the lower plate member, means interconnected said columns, said inner member being detachably mounted at said interconnecting means, and means for movably and pivotally mounting said lower plate member relative to said upper plate member, a handgrip provided at a front edge region of the lower plate member, said base plate being provided with a recess, a telescopic supporting leg equipped with a spiral spring provided at the bottom face of said lower plate member and engageable with said base plate recess, a pair of spring-loaded pin members pivotally mounted at a rear edge region of the lower plate member, an anchoring plate, said lower plate member being connected with said anchoring plate by means of said spring-loaded pin members, a lower bracket between said columns, said columns having guides and said bracket having legs displaceable in said guides of said columns.

4. The apparatus as described in claim 3, including a pair of blocks pivotally secured at said anchoring plate, said pin members piercingly extending through said pair of blocks, a transverse ledge located rearwardly of said anchoring plate, said pin members termi- nating at said transverse ledge at which said pin members are pivotally mounted and forming together with said transverse ledge a parallelogram, and an upwardly extending blade spring for retaining said pin members with said transverse ledge in their central position, said blade spring being secured at said base plate.

5. The apparatus as defined in claim 3, wherein said guides of said columns are defined by guide slots, a respective spiral spring against the action of which the legs of said bracket can be displaced at said guide slots of said columns, and a pair of screws for arresting said legs in desired position.

6. The apparatus as defined in claim 3, further including a support arm, said upper plate member being displaceable in one direction at said support arm, a screw means for arresting said upper plate member in desired position, an upper bracket, a bolt piercingly extending through said support arm, said upper plate member being pivotable through 180° about said upper bracket and said bolt.

7. The apparatus as defined in claim 6, further including an adjustable control pin provided at a front edge of the upper plate member, and screw means for arresting said control pin in desired position.

8. The apparatus as defined in claim 3, further including means arranged at the bottom face of said base plate for adjusting said apparatus relative to a horizontal plane through an angle of about 25° to 40°.

9. The apparatus as defined in claim 8, wherein said adjusting means comprises screw means.

10. The apparatus as defined in claim 1, further including means arranged at the bottom face of said base plate for adjusting said apparatus relative to the horizontal plane through an angle of about 25° to 40°.