ABSTRACT OF THE DISCLOSURE

A disposable dental impression tray characterized in that the tray is made of a material, preferably plastic, having low heat deforming characteristics, but substantially rigid at ambient temperatures and being capable of easily being cut such as by scissors or the like. Further, the tray is characterized in that it is provided with a plurality of openings through which impression material may escape while an impression is being made, the openings being generally outwardly diverging so as to lock the material therein once the material has set and prevent withdrawal or removal of the impression from the tray.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to improvement in dental impression trays.

Description of the prior art

Generally speaking, dental impression trays are made of a size and shape to loosely conform to the area of the jaw and teeth with which they are intended to be used. Further, such trays are provided with openings to permit the escape of some impression material while the trays are used in making an impression of a patient's teeth and the surrounding jaw area. One typical example of such a tray is that shown in Veale Patent 1,346,998. It is known to provide handles for such trays to assist in the manipulation of such trays shown in Ennor Patent 3,015,815, and Wagner Patent 2,485,811. It is further known that it may be desirable to make the trays deformable, as suggested, for example, in Thompson Patent 2,685,134, so that the trays may be individually fitted to each patient's mouth.

Herefore, dental impression trays have had numerous disadvantageous features. For example, the impression material frequently became unintentionally dislodged from the trays and would separate therefrom, becoming broken or lost. These trays which possessed some pliability to permit accommodation to the individual shape of each patient's mouth were either made of a soft metal and therefore uncomfortable and sometimes injurious, or of a plastic material which required heating to a relatively high temperature before this could be formed to fit the individual patient's mouth. Such plastics were difficult to work with and sometimes uncomfortable to use, particularly if the tray was still at a relatively elevated temperature while the practitioner attempted to complete the individual fitting thereof with the tray in the patient's mouth.

Finally, the handle element for these dental trays has been formed as an independent element affixed to the tray by means such as fastening elements of the like, not lends itself to economical construction. Strengthening ribs were provided on the side of the handle facing the tray opening which then interfered with the lip and mouth of the patient.

Thus, there has arisen a need for an improved disposable dental impression tray which may be easily fitted in an individual patient's mouth without discomfort to the practitioner or the patient, which will securely hold the molded impression material against unintended or accidental withdrawal, and which is provided with an integrally formed handle with remotely formed strengthening ribs that assist in the insertion and withdrawal of the tray while being relatively economical to manufacture, simple to use and readily disposable after use.

SUMMARY OF THE INVENTION

This invention is directed, in brief, to the provision of an improved disposable dental impression tray having an integral handle and is easily pliable or deformable to fit an individual patient's mouth. The tray is also provided with means for positively locking impression material therein. The best mode currently contemplated for carrying out this invention is a dental impression tray having an integrally molded handle, the tray and handle preferably being molded of a plastic material such as polystyrene. The tray is provided with a plurality of perforations which permit the escape of some of the impression material during the time that an impression is being made of the teeth of a patient's mouth, the perforations being characterized in that they diverge outwardly relative to the interior portions of the tray so that the impression material, upon setting, becomes securely anchored relative to the tray and generally incapable of being unintentionally or accidentally withdrawn from the tray.

DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a horizontal section view, taken generally along the lines 1—1 of FIGURE 3, of a dental impression tray of this invention which is used for making an impression of the teeth of the lower jaw;

FIGURE 2 is a section view of the lower dental impression tray shown in FIGURE 1, taken generally along lines 2—2 of FIGURE 4;

FIGURE 3 is a rear elevational view of the lower dental impression tray shown in FIGURE 1;

FIGURE 4 is a top view of the lower dental impression tray shown in FIGURES 1 and 2;

FIGURE 5 is an enlarged fragmentary sectional view of a portion of the lower dental impression tray of this invention, showing in greater detail the shape of the openings in the walls of the tray;

FIGURE 6 is a horizontal section view of a dental impression tray of this invention which is used for making an impression of the teeth of the upper jaw, taken generally along the lines 7—7 of FIGURE 9;

FIGURE 7 is a sectional view of the upper dental impression tray shown in FIGURE 6, taken generally along the lines 8—8 of FIGURE 8;

FIGURE 8 is an end view of the upper dental impression tray shown in FIGURE 6; and

FIGURE 9 is a top view of the upper dental impression tray shown in FIGURE 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the illustrated embodiment, the lower and upper dental impression trays 10 and 12, respectively, of this invention are one piece molded members. Generally speaking, the material from which the impression trays are made should have the properties of being relatively stiff, so as to generally contain an impression material within the tray response to the application of pressure during the act of making an impression of a patient's mouth, so as to hold its shape and not permit the impression to crack during the manipulation of the tray and impression as they are removed from the teeth after setting of the material and so as to hold its shape during the making of the cast from the impression. However, the material should be capable of being trimmed with a shears or
the like to adapt the tray to fit an individual patient's mouth. Furthermore, the material of which the tray is made should be capable of being molded by hand after being only slightly elevated in temperature, so that it could be easily shaped or bent to conform to different sizes and shapes of different patients' mouths by the dental practitioner without discomfort of the patient or practitioner. One such suitable material which possesses these desirable characteristics is polystyrene. It is to be understood that the invention is not necessarily limited to the use of this material, but embraces any such dental impression material which possesses these desired characteristics as well as the other features of this invention. Any material that possesses sufficient rigidity at body temperature and is capable of being worked by bare hands at only slightly elevated temperatures will work.

The lower tray 10 is generally U-shaped in plan whereas the upper tray 12 is generally fan-shaped in plan. Each tray 10 and 12 includes an isthmus or base portion 14 and 16, respectively. Each base 14 and 16 is generally U-shaped as defined by arcuate outer edges 14a and 16a, respectively, and arcuate inner edges 14b and 16b, respectively. Arcuate anterior flanges from front walls 18 and 20, respectively, extend generally perpendicularly from outer edges 14a and 16a of each base 14 and 16, respectively, and define a forward wall which is intended to be juxtaposed adjacent the outer faces of the teeth of a patient's mouth during use. An inner arcuate flange 22 extends laterally and generally on base 14 of each tray 10, generally concentric with respect to flange 18. Preferably, the terminal edges 18a, 20a, and 22a of flanges 18, 20, and 22 are generally shaped to fit in a patient's mouth, but they may be trimmed to accommodate individual patients. In use, it is intended that this flange 22 would be juxtaposed with the root of the teeth of the lower jaw of a patient so that, during use, flanges 18 and 22 would straddle the teeth of the lower jaw. Tray 12 is provided with a bulbous upwardly extending arch or palatal ledge 24 which spans the area between the inner edge 16b of base 16 and is intended to be closely adjacent the root of a patient's mouth when the upper tray 12 is in use.

In the lower tray 10, the area between flanges 18, base 14 and flange 20 defines an enlarged trough 26. Trough 26 is generally of a size and shape to receive plastic impression material and hold the same about the teeth of the lower jaw of a patient. Similarly, the area between arch 24, flange 20 and bounded by the base 16 of the upper tray 12, defines a trough 28 in the upper tray 12 which is intended to receive plastic dental impression material and the teeth of the upper jaw of a patient during use thereof.

The forward end of each of lower tray 10 and upper tray 12 is provided with a handle means 30 and 32, respectively, each of which preferably is integrally molded with the tray. Each handle means 30 and 32 of tray 10 includes a handle portion 34 and 36, respectively, which protrudes forwardly from each tray generally normal to the surfaces defined by each of flanges 18 and 20, respectively. Each handle portion 34 and 36 is connected to tray 10 and 12 by means of an intermediate offset portion or web 38 and 40, respectively, thereby positioning forwardly protruding handles 34 and 36 generally away from a patient's lip. Side flanges 42a and 42b and 44a and 44b project outwardly from opposite edges of handle portion 34 and 36 and web portions 38 and 40, respectively, and are joined with the body of trays 10 and 12 in the area of the junction of the flanges 18 and 20 and bases 14 and 16, respectively, providing a somewhat dished configuration to the handle for additional strength and for ease of handling and manipulation during the use of the tray. This dished configuration forms a convenient digital notch 46 and 48, in each of tray 10 and 12, respectively, so that the tray may be easily handled with the practitioner's thumb in the dished area of each of handle means 30 or 32, respectively, and with the remaining fingers wrapped below the handle portions 34 and 36, respectively. The flanges 42a, 42b, 44a and 44b are formed on the side of the handles and trays removed from the jaw engaging portions of the tray so as to give added support and rigidity to the handle and also to permit an unencumbered offset surface of the handle and tray to the patient's lip and jaw. That is, the side of the handle and tray material being used must be unobstructed with ribs that distort and sometimes pinch the lip of the patient. The offset uncluttered handle attachment provides the tray with a better grasping and seating arrangement together with added patient comfort.

A tray is tentatively held in a patient's mouth and by visual observation the technician or dentist trims the edges 18a and 20a until the tray conforms reasonably close to the patient's jaw configuration. Next by minor heating of the tray either by means of the heat from a light bulb, hot water or the like the tray shape can be contoured to accomplish desired ends such as opening up the edges 18a and 20a or changing the configuration to allow for distorted teeth and the like.

Means are provided in the tray for permitting the partial escape of some of the impression material during the time that an impression is being made, said means being further constructed and arranged so as to prevent the unintentional or accidental withdrawal or dislodgement of the impression material after the same has set or hardened. This means takes the form of openings or perforations such as the perforations 50 in the base portions 14, 16, the side flanges 42a and 42b of tray 10, the side flanges 44a and 44b of tray 12, respectively, of base 14 of each tray 10, and the slots 52 in the flanges or walls 18, 20, and 22. Both the perforations 50 and slots 52 are formed with outwardly diverging or flaring walls 50a and 52a (FIG. 3), respectively, generally being in a form sometimes commonly referred to as "countersunk." As illustrated in FIGURE 5, after the trough 26 or 28 has been filled with elastic impression material 54, such as silicone rubber or the like, and the patient presses thereinto with the teeth of the lower or upper jaw, respectively, impression material will be forced outwardly through the several openings 50 and slots 52. As the material hardens or sets, a certain portion, 56a thereof, will bulge over the exterior of the impression tray and generally grips the angled, outwardly diverging, or "countersunk" sides, such as 50a or 52a, of the perforations 50 or slots 52, respectively. This will securely lock the impression material with respect to the tray against unintentional dislodgement.

In keeping with conventional practice, the perforations 50 and slots 52 generally small or narrow with closely spaced edges, such as 54 (FIG. 5) defining the interior of the opening so that sufficient hydrostatic pressure will be built up during the time the impression is being made to force the impression material into tooth and gum conforming relationship. The outer edges 56 (FIG. 5) of the openings are more widely spaced apart and these edges are joined by the diverging wall portions such as 50a to form the countersunk impression material retaining openings.

Once the material has set up in the tray, the tray is manipulated to remove the set material without cracking the impression. At this point the rigidity of the tray again becomes important as well as the efficiency of the locking of the impression material to the tray. As long as the tray stays rigid and the multiplicity of locks (in the form of beads) of the material to the tray through the specially countersunk openings 50 and slots 52 hold without failure, the impression and tray can be removed from the mouth without damage to the impression. Failure of one or more of the locks of the material to the tray can permit the material to give enough to crack and thereby ruin the impression. The tray and impression, is next processed and a positive cast of the impression is made. When the cast is set up, its removal from the impression and tray once again brings into play the importance of the rigidity of the tray and the positive nature of the locking of the impression to the tray. The tray and im-
pression cannot give or separate from each other or the cast will be ruined and the whole operation must be started over again. After the cast has been successfully made and checked, the impression and tray can be disposed of.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

We claim:

1. A dental impression tray comprising a generally U-shaped tooth and impression material receiving trough defined by a base and anterior and posterior wall portions; and impression material escape openings formed in the tray; said impression material escape openings being relatively small in the interior of the tray and larger on the exterior of the tray, with the sides of the openings defined by continuous outwardly diverging wall portions between the narrow and larger portions thereof.

2. The dental impression tray of claim 1 wherein the tray is molded of a material having the property of being moldable by hand after being only slightly elevated in temperature and further being capable of being trimmed with hand cutting elements.

3. The dental impression tray of claim 1 wherein a handle is integrally molded therewith and projects generally forwardly from the mid-portion of the U-shaped trough.

4. The dental impression tray of claim 1 wherein the impression material escape openings are circular in shape.

5. The dental impression tray of claim 1 wherein the impression material escape openings are elongate slots.

6. The dental impression tray of claim 3 wherein the handle is integrally molded with the tray and offset from the base of the trough in the direction opposite from the anterior and posterior wall portions.

7. The dental impression tray of claim 6 wherein the supporting ribs for the handle are on the side remote from the impression forming opening of the trough so as to support the handle and tray from the side upon which pressure is maintained.

8. The dental impression tray of claim 7 wherein the handle has a recessed area which faces away from the base of the trough providing a digital grasping area.

References Cited

UNITED STATES PATENTS

3,107,428 10/1963 Freeman

3,360,860 1/1968 Roland

FOREIGN PATENTS

848,076 9/1952 Germany

885,772 8/1953 Germany

ROBERT PESHOCK, Primary Examiner