A drop system made of a liquid to be provided in drop form in the field of dentistry is contained in a container with a vapor-tight, sealable dropper insert made of light-impermeable plastic and a hollow space running in the dropper insert provided for the supply of a liquid. The hollow space has several tubular sections and a funnel-shaped outlet. The tubular section connecting to the funnel is formed as a tapering or restriction between the funnel-shaped section and another tubular section, and the funnel is arranged in a column-shaped dropper spout. A collection channel is arranged on the outer side of the dropper between the outer wall defining the hollow space and the part of the dropper insert covering the neck of the bottle.
Fig. 8
DENTAL CONTAINER WITH VAPOR-TIGHT, SEALABLE DROPPER INSERT

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

[0002] German published patent application DE 197 13 951 A1 describes a dental adhesive-container-drop system comprising a polymerizable dental adhesive, a bottle, and a dropper. The bottle and dropper have a light-impermeable and vapor-tight construction.

[0003] The use of dental adhesives, however, can easily lead to blockage of the bottle, because adhesives also adhere to the dropper and can remain on the dropper and run down its lateral walls. Moreover, other liquids also tend to become contaminated (smudged, dirtied) in drop-like application in the field of dentistry.

BRIEF SUMMARY OF THE INVENTION

[0004] The object of the present invention is to simplify drop-type applications in the field of dentistry and to considerably reduce the contamination, in particular the adhesion to the container during its intended use.

[0005] To achieve this object, containers for liquids, which are used in drop form in the field of dentistry, are equipped with a dropper insert that has a funnel-shaped outlet. The dropper insert has tubular sections and the tubular section connecting to the funnel is formed as a tapering or restriction between the funnel-shaped section and another tubular section.

[0006] In particular, the dropper spout has a column shape and is surrounded by an outer collection channel at the column base. The collection channel is thus arranged between the outer wall limiting the passage and the part of the dropper insert covering the container rim, in particular the neck of the bottle.

[0007] Preferably, the funnel is surrounded by a small end face of the column, wherein the end face of the column forms a sharp edge on the column rim. The curvature radius of this sharp edge is less than 1 mm, particularly less than 0.5 mm, and preferably less than 0.2 mm. The end face of the column functions as the contact face for the cover.

[0008] One embodiment of the invention lies in the use of a vapor-tight, sealable dropper insert for dental products, whose passage has several tubular sections and a funnel-shaped outlet, wherein the tubular section connecting to the funnel is formed as a tapering or restriction between the funnel-shaped section and another tubular section.

[0009] Another embodiment of the invention is the use of a vapor-tight, sealable dropper insert for the drop discharge of dental products, a collection channel being arranged on the outer side of this insert.

[0010] A further embodiment of the invention comprises a method for producing a dental-adhesive drop from a dental adhesive, which is conveyed through a column-shaped dropper spout, in such a way that it first runs through a tubular region, in particular having a diameter of 2 to 10 mm, then passes through a tapering or restriction, which has, in particular, a diameter of 0.2 to 2.0 mm, whereupon the adhesive proceeds from the tapering to a funnel-shaped expansion, in which a drop is formed. A drop formed in this way does not necessarily wet the remaining end wall of the column, and the tendency for wetting the end face of the column and also the edge limiting the end face of the column is minimized.

[0011] Alternatively, the drop is formed on the end wall and discharged from this end wall.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0012] The foregoing summary, as well as the following detailed description of the invention, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there are shown in the drawings embodiments which are presently preferred. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0013] FIG. 1 is a longitudinal cross-section of one embodiment of a dropper insert according to the invention;

[0014] FIG. 2 is a longitudinal cross-section of an alternative embodiment of a dropper insert according to the invention;

[0015] FIG. 3 is another view of the dropper insert of FIG. 1, showing the drop formation on the flattened cutting edge;

[0016] FIG. 4 is a partially broken-away longitudinal cross-section view of the dropper insert of FIG. 1, showing a liquid discharge over the edge; and

[0017] FIGS. 5 to 8 are broken-away longitudinal views of variously designed cross sections of the outlet region of different embodiments of the dropper inserts.

DETAILED DESCRIPTION OF THE INVENTION

[0018] FIG. 1 shows a dropper insert 1 having an elongated dropper channel 2 as a tapered part of a passage of the dropper insert, which is guided through a tube wall 3 that is beveled at its outlet opening 4. The opening region characterized by the beveled tube wall is designated as the forward region 5. The forward region 5 is suitable for forming a drop 6, which can be discharged vertically downward by holding the dropper in an inverted position (See FIG. 3). With such an application contamination of the dropper can be largely prevented. The drop material remaining after discharge of the drop 6 in the forward region 5 can flow back into the dropper and thus does not contaminate the outer walls of the dropper.

[0019] For forming the drop, the drop quantity to be applied first arrives in the forward region 5 from the dropper channel 2 (with tapering or a restriction 10). A drop-sized quantity is produced by the funnel-shaped increase of the diameter in the forward region. The funnel volume is adapted for setting the drop mass.

[0020] According to FIGS. 1 to 4, the dropper channel 2 is a tapering 10 between the funnel-shaped outlet and the end of the passage leading into the bottle. Alternatively, a restriction 10 is arranged between the funnel-shaped outlet and the dropper channel 2.

[0021] The narrowing 10 or restriction 10 according to FIGS. 5 to 8 here has the function of regulating the quantity. Various embodiments of the narrowing/restiction 10 are shown in FIGS. 5 to 8.
FIG. 3 shows a dropper insert 1 held at an angle, so that a defined quantity drips out for application. For a successful application, the drop 6 will drip from the cutting edge flattened to an end face 7.

In the prior art, in general, dropper outlets having a round construction are used. There, it was found that the drop is distributed on the rounding and drips off after reaching a certain size, whereby the residue held adhesively on the rounding gradually contaminates the outer side of the dropper. In the construction according to the invention, an end face 7 for the straight runoff 3 is provided on the dropper opening as an end-face, flattened cutting edge, around which a drop 6 cannot so easily flow. At the sharp edge of the column toward the end face 7, a drop tends to drip off, instead of, in the case of a rounding, lying around the rounding, or flowing over the rounding and thereby being spread.

If the dropper is held upright again before releasing the drop, the drop 6 runs back into the forward region 5 and has the possibility of flowing back into the container through the tapering/restriction 10, depending on the rheology of the fluid, and of being reused.

The forward region 5 is defined by a beveled region 8 in the dropper outlet region 4. The drop formation is thereby aided or simplified. The forward region 5 has the further effect that drops 6 that have not dripped from the end face 7 are drawn back into the forward region 5 and from this region into the dropper channel 2, when the dropper is placed upright.

FIGS. 1 to 8 show a flattened cutting edge with an annular end face 7 of the column-shaped dropper spout 3, between the bevel 8 forming the funnel 5 and the outer wall of the dropper spout 3.

The flattening of the cutting edge of the tube for the end face 7 between the funnel and the tube outer wall 3 is kept so narrow that a drop 6 can be held on the end face 7, like on the end of a glass rod. The flattened cutting edge functions as an end face, on one hand for simplifying the dripping and, on the other hand, for forming a seal with the cover. It has proven effective to form the end face 7 as a narrow annular surface. This increases the service life of the seal with the cover. An end face 7 with a flattened annular width of 0.2 to 3 mm, preferably 0.5 to 1 mm, has proven effective. With these proven end faces 7, the drop 6 no longer runs as on round dispensers and can be defined and proportioned significantly smaller compared with round dispensers. One particular possibility of use arises from the fact that the drop 6 can be kept even smaller when it is applied directly to a surface, which can hold the drop. Here, the low adhesion on the flattened cutting edge, due to a reduced adhesion area relative to a round construction, has proven to be an especially important advantage for the discharge of very small, defined drop sizes.

Furthermore, it has been shown that a straight runoff of the outer tube wall 3 becomes contaminated less quickly than curved constructions. The straight runoff 3 allows the fastest possible discharge for material running over the cutting edge. Adhesive discharged at the straight runoff 3 reaches a generously dimensioned overflow groove 9, in which the adhesive is captured for preventing contamination of other components. In the overflow groove 9, the adhesive dries without contaminating other dropper parts. This is of considerable importance for use by dentists, so that the hands of the dentist or the assistant are not contaminated by a contaminated dropper during the treatment, as was the case up until now, when the dropper became contaminated due to the discharge of adhesive.

During the dropping operation, in the inclined position, a drop 6 is guided toward the end face of the flattened cutting edge 7. According to the inclined holding position of the bottle, the quantity to be applied can break away cleanly—depending on the rheology of the liquid—and the application of a certain quantity follows, or—depending on the property of the filler wetting the surface—can run inwards back into the forward region, or can run on the straight runoff into the overflow groove. Contamination is effectively counteracted according to the invention.

Another advantage is the defined discharge of small quantities in one application. Due to the geometries according to the invention, the uncontrolled distribution of a liquid on the dropper is stopped. The product appears cleaner for the duration of the application (multiple use). Adhesion to the bottle with the risk of wiping away data is eliminated.

Preferably, the surface of the dropper is treated in such a way that the liquid drop breaks away well or runs back into the dropper, but does not run down the outside of the dropper. For this purpose, a low surface energy has proven effective, which is generated by water repellant finishing.

It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the appended claims.

1. We claim:
2. 1-6. (canceled)
3. 7. A dropper system for a liquid to be provided in drop form in dental applications, the dropper system comprising a container having a vapor-tight, sealable dropper insert made of light-impermeable plastic and a passage running in the dropper insert for providing a supply of a liquid, the passage being formed in a column-shaped dropper spout comprising several tubular sections and a funnel-shaped outlet, wherein one of the tubular sections, which connects to the funnel-shaped outlet, has a passage form of a tapering or restriction between the funnel-shaped outlet and another tubular section, and a collection channel arranged on an outside of the dropper between an outer wall limiting the passage and a part of the dropper insert covering a container rim at a container opening.
4. 8. The drop system according to claim 7, wherein the outer wall 3 has an outer sharp edge for an annular face.
5. 9. A liquid dropper comprising a vapor-tight, sealable dropper insert made of light-impermeable plastic and having a passage running in the insert for supply of a liquid to be used in drop form for dental applications, wherein the passage is formed by several tubular sections and a funnel-shaped outlet, wherein one of the tubular sections, which connects to the funnel-shaped outlet, has a passage form of a tapering or restriction between the funnel-shaped outlet and another tubular section.
6. 10. A dropper for use with a container filled with a liquid designed for a dental use, the dropper comprising a vapor-tight, sealable dropper insert made of light-impermeable plastic and having a passage running in the insert for supply of
the liquid, and a collection channel arranged on an outer side
of the dropper between an outer wall defining the passage and
a part of the dropper insert covering a container rim at a
container opening.

11. A method for producing a dental adhesive drop, the
method comprising conducting a dental adhesive through a
column-shaped dropper spout, such that the adhesive first
runs through a tubular region, then passes through a tapering
or restriction, whereupon the liquid passes from the tapering
or restriction to a funnel-shaped expansion in which a drop is
formed.

12. The method according to claim 11, wherein the tubular
region has an inner diameter of 2 to 10 mm and the tapering or
restriction has an inner diameter of 0.2 to 2.0 mm.

13. A method for producing a dental adhesive drop, the
method comprising conducting a liquid dental adhesive
through a column-shaped dropper spout, such that the adhe-
sive first runs through a tubular region, then passes through a
tapering or restriction, whereupon the adhesive passes from
the tapering or restriction to a funnel-shaped expansion, and
from the expansion a drop is formed and conducted to an end
face of the spout and from the end face the drop is discharged.

14. The method according to claim 13, wherein the tubular
region has an inner diameter of 2 to 10 mm, and the tapering
or restriction has an inner diameter of 0.2 to 2.0 mm.

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