SALIVA COLLECTION SWAB

FIELD OF THE INVENTION

This invention relates generally to a series of saliva collection methods, with design variation utilizing a single swab with a double sided fold-over design to collect a user's saliva and squeeze it into a container, another variation utilizing a single swab pulled through a handle to squeeze the saliva into a container.

BACKGROUND OF THE INVENTION

Current methods of saliva collection for medical testing generally have four main concerns. Certain methods are considered to be inefficient due to the their slow rate of saliva collection, using simple items such as cotton swabs that can only collect a limited amount of saliva at a time, or passive drool that takes time to accumulate. Others require multiple complex components in order to collect a large amount of saliva in a single pass. Methods that require spitting or drooling may also be considered to be unhygienic with high chances of accidental contamination of the surroundings. Once collected, many methods also call for the use of centrifuge or a means of compression in order to separate the collected saliva from the absorbent material, thus requiring more time before the testing results are obtained. This inefficiency of time and materials usage, as well as hygiene concerns thus requires a device that utilizes fewer, simpler components, while still being able to collect and expel a large amount of saliva at a time hygienically for medical testing.

SUMMARY OF INVENTION

This patent generally relates to an invention with various design variations that utilize simple components, enabling everyday users to collect and dispense a large amount of saliva before sending for medical testing. These series utilizes methods that comprises of collection of saliva via an absorbent pad with different means of compression in each design to transfer the saliva into a collection container.

The flip-over design comprises of a base piece with a hinge and an adhesively joined absorbent pad in its assembly. A single flat base piece is produced with a hinge between its two halves to enable the swab to have a dual fold-over effect. An absorbent pad is then adhesively joined to the middle of one of the base piece's open faces, overlapping the hinge on one side. This causes the pad to be fully exposed to a user's mouth and maximizes saliva collection when

folded in half in one direction, while squeezing the absorbent pad and expelling the saliva out of it when folded over in the opposing direction. Mechanical locks on each side of the base help to hold the folded base piece in place when used for swabbing and squeezing.

The pull design comprises of at least a stick, with an adhesively joined absorbent pad on one end, and a separate squeezer handle. The stick is used similarly to regular cotton swabs and collects saliva via the absorbent pad. The stick is then dropped into the handle with the absorbent pad facing up, and after tilting the device back down towards a collection container the stick is pulled through the handle, squeezing the collected saliva out of the pad via the handle's tapered walls.

BRIEF DESCRIPTION OF FIGURES

In order that the invention may be fully understood and readily put into practical effect there shall now be described by way of non-limitative example only exemplary embodiments of the present invention, the description being with reference to the accompanying illustrative drawings. For this series of design variations, FIG. 1 will describe the figure of publication, FIG. 2A to FIG. 6C will describe the flip-over design, while FIG. 7A to FIG. 10B will describe the pull design variation.

FIG. 1: Flip-over and pull design saliva collection kit.

FIG. 2A is a perspective top view of an exemplary embodiment of a flip-over saliva collection swab 10 in assembly configuration A with the base piece 20 and an adhesively joined absorbent pad 30.

FIG. 2B is a perspective bottom view of the device 10.

FIG. 3A is a perspective top view of an exemplary embodiment of the base piece 20 without the adhesively joined absorbent pad 30, showcasing the base piece's top surface. Its sub-assembly features are shown, with the central hinge 21, top mechanical locking mechanism 221, grip enhancing ribs 231, internal protective ribs 241, and external edge ribs 243.

FIG. 3B is a perspective bottom view of the base piece 20, showcasing the base piece's bottom surface. Its sub-assembly features are shown with the mechanical locking mechanism 222 on the bottom surface, grip enhancing ribs 232, internal support ribs 242, and external edge ribs 244.

FIG. 4A is a perspective left side view of the device 10 in swabbing configuration B with base piece 20 and the adhesively joined absorbent pad 30. The top mechanical locking mechanism 221 can be seen as well.

FIG. 4B is a perspective right side view of the device 10 underside in swabbing configuration B with base piece 20 and the adhesively joined absorbent pad 30. The activated bottom mechanical locking mechanism 222 can be seen locked in place as well.

FIG. 5A is a perspective left side view of the device 10 in squeezing configuration C with base piece 20 and the adhesively joined absorbent pad 30 now inside the folded base piece 20. The central hinge 21 forms an open cavity 211 and the activated top mechanical locking mechanism 221 can be locked in place.

FIG. 5B is a perspective right side view of the device 10 underside in squeezing configuration C with base piece 20 and the adhesively joined absorbent pad 30 now inside the folded base piece 20. The bottom mechanical locking mechanism 222 can be seen as well.

FIG. 6A details the use case from the primary assembly configuration A of the device 10 to its secondary swabbing configuration B.

FIG. 6B details the use case from the secondary swabbing configuration B of the device 10 to its final squeezing configuration C.

FIG. 6C details the final squeezing configuration C of the device after usage.

FIG. 7A is a perspective left side view of an exemplary embodiment of the device 40 where a collection swab 60 is slotted into a squeezer handle 50.

FIG. 7B is a perspective right side view of the underside of the device 40.

FIG. 8A is a perspective left side view of the squeezer handle 50. This figure showcases the handle’s opening cavity 51, upper thumb rest 52, and tapered spout 53.

FIG. 8B is a perspective right side view of the underside of the squeezer handle 50. This figure showcases the handle’s tapered exit cavity 54 and lower finger rest 55.

FIG. 9A is a perspective left side view of the collection swab 60, where an absorbent pad 61 has been adhesively joined to a stick 62.

FIG. 9B is a perspective left side view of the collection swab 60 with the absorbent pad 61 separated from the stick 62. The absorbent pad 61 has tapered edges 611 at the back and a center slit 612.

FIG. 10A is a perspective left cross-section view of the device 40, with the collection swab 60 inserted into the squeezer handle 50.

FIG. 10B is a perspective left cross-section view of the squeezer handle 50. The handle's opening cavity 51 and tapered exit cavity 54 can be seen, as well as the upper thumb rest 52, tapered spout 53, and lower finger rest 55.

DETAILED DESCRIPTION OF THE INVENTION

Exemplary embodiment of the two saliva collection swab design variations will be described below with reference to FIG. 2A to 10B. The flip-over design 10 will first be described below with reference to FIG. 2A to 6C, while the pull design 40 will be described with references to FIG. 7A to 10B. The same reference numerals are used throughout the figures for the same or similar parts.

Flip-over design

The flip-over saliva collection swab design consists of at least two main components, a base piece 20 and an adhesively joined absorbent pad 30. 20 has a sub-assembly of features consisting of at least a central hinge 21, a mechanical locking mechanism on the opposing flat sides of the base piece 221 and 222, with grip enhancing ribs 231 and 232, internal protective ribs 241, internal support ribs 242, and external edge ribs 243 and 244.

20 may be made via injection molding of a low cost polymer such as polypropylene, while 30 may be a biocompatible sponge or cotton pad with a biocompatible glue, such as hot melt, used to adhere 30 to 20. This is to ensure that the materials of the swab do not cause any unintended reactions when collecting the saliva that may affect the saliva testing results.

The swab has three main configurations: assembly configuration A, swabbing configuration B, and squeezing configuration C. When in configuration A, 30 is adhered to 20 and 10 is folded in half via 21 to form configuration B in FIG. 4A and 4B, with its change in configuration as seen in FIG. 6A to 6B. Users are then able to swab their mouths and collect saliva by holding on to the area around 231.

Configuration B is held in place by 222 so that users do not have to constantly apply pressure to 20 while swabbing. 30 is thus able to absorb user's saliva efficiently in this configuration, with 231 providing better grip for users while 241 and 243 help to minimize dripping of saliva on to the user's hand.

Once done swabbing, user releases 222 and folds 10 over itself via 21 such that it forms configuration C in FIG. 5A and 5B, with its change in configuration as seen in FIG. 6B to 6C. This configuration is held by 221. 232 enables users to have a better grip on 10 while squeezing, while 242 helps to reduce flexing of the base piece when 30 is being squeezed so as to maximize the squeezing effect. 244 assists in sealing the sides of 30 to further maximize the squeezing effect and focuses the flow of the saliva towards 211 for collection.

Pull design

The pull design 40 consists of at least 2 main components, a squeezer handle 50 and a collection swab 60. 50 comprises of at least 5 features, namely the handle's opening cavity 51, upper thumb rest 52, tapered spout 53, tapered exit cavity 54, and lower finger rest 55. 60 comprises of at least a stick 62 where an absorbent pad 61 with tapered edges 611 is adhesively joined on one end via the pad's center slit 612.

50 and 62 may be made via injection molding of a low cost polymer such as polypropylene. 61 may be a biocompatible sponge or cotton pad with a biocompatible glue, such as hot melt, used to adhere 61 to 62. This is to ensure that the materials of the swab do not cause any unintended reactions when collecting the saliva that may affect the saliva testing results.

60 is placed in a user's mouth for 61 to absorb saliva and 62 is used as a handle for the swab. 60 is then dropped into 50 with 61 facing up. 51 is designed slightly larger than 61 to contain its entirety, preventing saliva from dripping down 50's external surface on to the user's hand.

40 is then tilted with 51 side tipped down and 60 is pulled through 50 via the side of 62 that has exited 54. The design of 52 and 55 provides users with an ergonomic grip while handling 50, and assists in keeping the user's fingers away from 51 and 54 to prevent contact with 61. The structure of 52 and 55 additionally enables 61 to be squeezed vertically and constrained horizontally as 60 is pulled so as to achieve the maximum amount of compression and expelled saliva from 61. 611 enables 61 to compress smoothly with minimal resistance while being pulled against 50's internal walls. 50's internal layout has also been designed such that the expelled saliva's flow will be directed towards 53. Additionally, 54 is tapered down such that

the saliva will not flow backwards out from it on to a user’s hand. A collection container is to be place at 53’s end to collect the expelled saliva and passed on for testing.

CLAIMS

The invented collection swab flip-over design claims 1-7, and the pull design claims 8-15 that:

1. The device 10 comprises of a base piece 20 and an adhesively joined absorbent pad 30.
2. The base piece 20 comprises of a central hinge 21, a mechanical locking mechanism on each side of the base piece 221 and 222, grip enhancing ribs 231, internal protective ribs 241, internal support ribs 242, external edge ribs 243 and 244.
3. The device 10 comprises 3 configurations: an assembly configuration A, a swabbing configuration B, and a squeezing configuration C.
4. The central hinge 21 enables the dual fold over effect to change the device 10 configuration between assembly configuration A, swabbing configuration B, and squeezing configuration C.
5. The external edge ribs 243 and 244 assist in the squeezing of the absorbent pad without impeding the users' swabbing.
6. The internal protective ribs 241 assist in protecting users' hands from dripping of saliva.
7. The internal protective and support ribs 241 and 242 are laid out such that they do not intersect when the device 10 is folded.
8. The device 40 comprises of a squeezer handle 50 and a collection swab 30.
9. The squeezer handle 50 comprises of an opening cavity 51, an upper thumb rest 52, a tapered spout 53, a tapered exit cavity 54, and a lower finger rest 55.
10. The collection swab 60 comprises of a stick 62 and an adhesively joined absorbent pad 61.
11. The adhesively joined absorbent pad 61comprises of a set of tapered edges 611 and a center slit 612.
12. The center slit 612 provides a means of adhesively joining the absorbent pad 61 to the stick 62.
13. The upper thumb rest 52 and lower finger rest 55 structure provides the squeezing of the absorbent pad 61.
14. The tapered edges 611 of the absorbent pad 61 enable smooth compression of the pad 61.
15. The lower finger rest and tapered exit cavity 54 structure directs the flow of expelled saliva and focuses it out through the tapered spout 53.