METHODS AND DEVICES FOR DELIVERING ANTISEPTIC SOLUTIONS TO TARGET SITES

TECHNICAL FIELD

[0001] The present invention generally relates to delivery system and method for delivering antiseptic to target sites.

BACKGROUND

[0002] During invasive medical procedures, such as surgeries, one of the biggest risk patients face is the risk of post procedure infection. Many medical providers prescribe oral antibiotics to help prevent these infections. However, some strains of bacteria are resistant to oral antibiotics, and oral antibiotics are not always effective against post-surgery infections.

[0003] More specifically, many patients that undergo surgery to the neck, shoulder, or back region suffer the risk of having an infection from Cutibacterium acnes formerly known as Propionibacterium acnes (hereinafter "acne bacteria") that are present on the patient's skin and are the leading cause of post-operative infection after shoulder replacement surgery. When the medical provider makes an incision in the patient's skin, these bacteria can enter into the patient's body on the scalpel and cause a post treatment infection.

[0004] Cutibacterius acnes is the leading cause of infections after shoulder replacement surgery costing society about $23 million (1% of 65,000 annual shoulder replacements get infected and the treatment is shown to be $35,000 per infected shoulder). Current, intraoperative solutions bacitracin are ineffective in eradicating C. acnes.

SUMMARY

[0005] It is desirable to provide a treatment to help prevent a post-surgical infection to patients that have surgery on their neck, shoulder, or back. More specifically, it is desirable to prevent acne bacteria from causing a post-surgery infection.

[0006] Accordingly, a bottle having an antiseptic solution therein is contemplated. The body is configured to easily apply an amount of solution onto the site of a medical procedure, such as a patient's neck, shoulder, or back. The solution may be applied to the target area before making an initial incision and into the open area after the incision has been made. The antiseptic solution is chosen as a solution that will kill acne bacteria.

[0007] Of course, the present invention is not limited to the above features and advantages. Those of ordinary skill in the art will recognize additional features and advantages upon reading the following detailed description, and upon viewing the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1A is an illustration of an exemplary bottle for applying an antiseptic solution.

[0009] FIG. 1B illustrates the exemplary bottle shown in FIG. 1A with a removable cap covering a nozzle of the bottle.

[0010] FIGs. 2A illustrates a top perspective close-up view of the exemplary bottle shown in FIG. 1A.

[0011] FIGs. 2B illustrates a top perspective close-up view of the exemplary bottle shown in FIG. 1A with a removable cap covering a nozzle of the bottle.

[0012] FIGs. 3A-B illustrate an exemplary bottle with two chambers for applying two different liquids or solutions.

DETAILED DESCRIPTION

[0013] FIGs. 1A-B and 2A-B are illustrations of an exemplary bottle for storing an antiseptic solution and for applying the antiseptic solution onto a target site of patient. The bottle has an interior chamber 102 that stores the antiseptic solution and a nozzle 108 for applying the solution. The nozzle 108 may be sealed by a removable cap 112 that can be placed

back onto the nozzle 108 after applying solution. The bottle 100 may optionally have markings 114 that indicate an amount of fluid or solution that is stored within the bottle. The tip 116 of the nozzle 108 has an orifice 116 configured to spray or optionally stream solution out of the bottle when the bottle is squeezed.

[0014] The bottle is made of a resilient and squeezable material, such as plastic, rubber, or a polymer. To apply the solution to the patient, the medical practitioner removes the cap, points the nozzle at the treatment site (i.e. target site) and squeezes the bottle. The pressure caused by squeezing the bottle forces solution to be squirted or sprayed out of the orifice 116 of the nozzle 108. In the embodiment shown in FIG. 2A, the orifice 116 has a Y-shape. Other orifice shapes may be utilized such as a round shape, and elliptical shape, or a star shape. Alternatively, the orifice 116 may be a known type where turning the nozzle 108 adjust how the nozzle sprays or ejects fluid when the bottle is squeezed.

[0015] The fluid or solution that is stored in the bottle is selected to kill the type of bacterium that poses the biggest threat to the patient. For example, a patient that is having neck, shoulder, or back surgery has a relatively high risk of infection from acne bacteria. Acne bacteria is present on people's skin in these areas. When a surgeon (or other medical provider) makes an initial incision, the bacteria on the patient's skin may be transferred into the patient's body via the scalpel (or other cutting instruments). These bacteria may cause a post procedure infection that is difficult to treat with oral antibiotics. In order to mitigate the risk, the bottle is filled with a solution that contains benzoyl peroxide (hereinafter "BPO"). BPO solutions are particularly effective in killing acne bacteria. The solution comprises sterilized saline and BPO. The solution has BPO at a concentration between 1%-10%. Other suitable solutions may be used such as sterilized or distilled water and BPO.

[0016] In order to utilize the bottle, the medical provider removes the cap 112 from the nozzle 108 and holds the bottle aiming the nozzle 108 at the target site. The medical provider

then squeezes the bottle to cause the solution to eject or spray from the orifice 116 of the nozzle 108. The medical provider may eject fluid onto the target site before an incision and/or into the opening made by the incision. The medical provider may refer to the markings 114 to ensure that an adequate amount of the solution has been ejected onto (or into) the target site.

[0017] FIGs. 3A-B illustrate an exemplary bottle that has two chamber 302, 304 that are separated by a divider 306. A nozzle 308 has an opening 310 at the bottom of the nozzle for allowing liquid to be ejected from one or both of the chambers 302, 304. In the illustrated embodiment, the nozzle is slidable to move laterally on top of the bottle changing the location of the opening. When the nozzle 308 is at a first position, as shown in FIG. 3A, only liquid held in the first chamber 304 can be ejected from the nozzle 308. When the nozzle is in a second position, as shown in FIG. 3B, only liquid held in the second chamber 302 can be ejected from the nozzle 308.

[0018] In one embodiment (not shown) the nozzle may be positioned in a third position where the opening 310 is centered over the divider 306. In this position, the nozzle can eject liquid held in both chambers 302, 304.

[0019] Although nozzle is shown as moving laterally on the top of the bottle, the nozzle may rotate along causing the opening 310 to rotate over the first chamber 304, the second chamber 302, or over the divider 306. In one embodiment, the divider 306 is wider at the top and completely covers the opening 310 when the nozzle 308 is located at a center position. This acts to seal the bottle without the need for an external cap.

[0020] An advantage of the two-chamber bottle is that the first chamber 304 and the second chamber 302 may each contain a different liquid. For example, one chamber may contain a BPO solution while the other chamber contains a different antiseptic solution. For example, a medical provider may use the bottle with the nozzle in the first position to eject a general

antiseptic solution onto the target area to treat most bacteria, slide the nozzle to the second position, and eject the BPO solution onto the target site to treat acne bacteria.

[0021] In another embodiment, one chamber may contain a BPO solution while the other chamber contains a sterile water or saline solution useful for rinsing off the target area or medical instruments.

[0022] In another embodiment, both chambers contain a BPO solution with one chamber containing a solution that has a higher concentration of BPO than the solution in the other chamber. For example, the medical provider may treat the target site with a low BPO concentration solution, cut the patient at the target site, and then eject a high concentration solution into the cut area of the patient.

[0023] In another embodiment of a two-chamber bottle, one chamber contains an antiseptic, such as BPO, and the other chamber contains a sterile saline solution. In this embodiment, the nozzle has a position that ejects or squirts fluid from both chambers at the same time. This allows for the antiseptic solution to be mixed or diluted as it is applied to the target.

[0024] In alternative embodiment, a bottle has three chambers, two chambers that are initially filled with a liquid, such as BPO or sterile saline, and a third chamber is provided to mix the two liquids. In this embodiment, when the user initially squeezes the bottle, a first liquid from a first chamber and a second liquid from a second chamber enter into the third chamber. The liquids mix in the third chamber and are then ejected from a nozzle of the bottle.

[0025] Of course, the present invention is not limited to the above features and advantages. Those of ordinary skill in the art will recognize additional features and advantages upon reading the following detailed description, and upon viewing the accompanying drawings.

[0026] Notably, modifications and other embodiments of the disclosed invention(s) will come to mind to one skilled in the art having the benefit of the teachings presented in the

foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention(s) is/are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of this disclosure. Although specific terms may be employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

CLAIMS

What is claimed is:

1. A method of preventing post medical procedure infection, the method comprising:

providing a squeezable bottle having an antiseptic solution provided therein, wherein the antiseptic is a benzoyl peroxide (BPO) solution having a 1-10% concentration of BPO; and

squeezing the squeezable bottle to eject the antiseptic solution onto a target site.

2. The method of claim 1, wherein the squeeze bottle has a nozzle with an orifice, wherein squeezing the bottle causes the antiseptic solution to be ejected or sprayed from the orifice.

3. The method of claim 1, wherein the antiseptic solution contains BPO with a 5% concentration.

4. A method of preventing post medical procedure infection, the method comprising:

providing a squeezable bottle, wherein the squeezable comprises:

a first chamber storing a first liquid therein;

a second chamber storing a second liquid therein;

a divider separating the first chamber from the second chamber; and

a nozzle having an opening and an orifice, wherein the nozzle is moveable between a first position and a second position,, wherein when the nozzle is positioned in the first position the nozzle is configured to eject the first liquid therefrom and when the nozzle is in the second position the nozzle ejects the second liquid therefrom;

placing or retaining the nozzle in the first position;

squeezing the bottle to eject the first liquid from the first chamber to a target site;

moving the nozzle to the second position; and

squeezing the bottle to eject the second liquid from the second chamber to a target site.

5. The method of claim 4, wherein the first liquid is an antiseptic solution having a 1-10% concentration of BPO.