A system for nasal irrigation consisting of the application to one nostril, while the patient's head, face down, is positioned in substantially horizontal orientation, of a flow of an isotonic saline water solution at a temperature of from 100° to 105°F and at a pressure pulsating between about 0 and about 5 psi at a frequency substantially above 100 cycles per minute, preferably 1,000 cycles per minute or somewhat higher. The flow of liquid is applied to the nose by means of an applicator having a nasal fitting provided with a tapering contour terminating at its smaller end in an outlet opening in liquid communication with a source of the pulsating liquid through a port having a diameter of approximately 0.1 inch. The applicator proper consists of a tubular body having an elongated tube portion and an extension disposed at substantially 90° to the tube, the nasal fitting being mounted upon the extension; and the tube has mounted thereon a finger grip member for use by the patient, spaced at least several inches from the juncture with the extension, whereby the user applies only slight force in inserting the outlet opening of the nasal fitting into the nostril, to minimize the possibility of harm if the internal nasal passages are completely clogged by mucus or foreign matter. The pulsating solution moves past the nasolacrimal duct, the ostia of the frontal, maxillary, ethmoid, and sphenoid sinuses and the eustachian tube into the nasopharynx, thence outwardly through the other nostril, past the corresponding ducts and ostia in inverse sequence. The pressure pulsations serve to enhance drainage of mucopus from the sinuses and also to loosen and expel crusted formations from the passageways.
NASAL IRRIGATION SYSTEM

BACKGROUND AND FIELD OF THE INVENTION

It is known that irrigation of the nose with a warm isotonic saline solution is beneficial in tending to remove mucous and pus, as well as the crusted formations that frequently occur in the passageway, particularly adjacent to the sinus ostia. The present invention is an improvement over prior techniques for such irrigation, and contemplates the application to a patient's nostril, while the head is positioned generally horizontally, face down, of a pulsating flow of an isotonic saline water solution at a temperature of 100°F or slightly higher. The pressure of the water is caused to pulsate between about 0 and about 5 psi at a frequency substantially above 100 cycles per minute, preferably of the order of 1000 cycles per minute or more. The solution is applied to the nostril by means of an applicator having a tubular body including an elongated tube portion, at least several inches long, and a short extension projecting perpendicularly to the tube and terminating in an outlet portion having a diameter of approximately 0.1 inch. A fitting having a central bore therethrough is mounted on the extension, and is provided with a tapering outer contour, desirably frusto-conical in shape, terminating in an outlet opening in communication with the central bore of the fitting and with the tubular interior of the applicator itself. A finger grip is mounted on the applicator tube, spaced at least two inches and preferably about 3 inches from the juncture of the tube and the extension, and the end of the tube distant from the extension is attached to a handle having a passageway connected to a source of the pulsating saline solution. When the user grasps the handle with his index finger and thumb on the finger grip, spaced laterally from the nostril, he can insure that only a light force is imposed upon the fitting extending into the nostril, and thus avoid risk of damage to the nose or ears if one or both nostrils are clogged.

The pulsating isotonic saline solution flows past the nasolacrimal duct, the sinus ostia, and the duct of the eustachian tube, into the nasopharynx, and thence outwardly through the other nostril. Some of the solution may exit through the user's mouth, particularly if the head is inclined somewhat upwardly from the horizontal, but this is not harmful. The pulsations tend to withdraw mucus or other foreign matter from the sinuses. The effect is enhanced when the solution is somewhat above body temperature, whereby to slightly heat the sinus cavities and thereby expand the air and other material therein. The pulsations also serve to loosen encrusted matter in the nasal passageways, by imposing on them a sort of rocking force during the flow.

A further advantageous result of the use of a pulsating flow in accordance with the present system is the resultant gentle massage of the nasal tissues, which is helpful in alleviating atrophic rhinitis and cases of partial anosmia.

The source of pulsating flow of saline solution in accordance with the invention is most conveniently provided by the conventional device presently being marketed for dental hygiene, using a pulsating jet of water or desired solution for cleaning the teeth and invigorating the gums.

It is accordingly a principal object of the present invention to disclose and provide a novel nasal irrigation system using an isotonic saline solution under a pulsating pressure. Additional objects of the invention are to provide, in such a system, an applicator for use by the patient providing a finger grip spaced laterally from the outlet into the nostril whereby to minimize possible damage to the nose during use; to provide, in such a system, an applicator readily attachable to a conventional device for supplying a pulsating flow of water for dental hygiene; and for other objects and purposes as will become clear from a reading of the following description of a preferred embodiment of the invention, taken in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of a person using the system of the present invention, shown leaning over a lavatory or basin.

FIG. 2 is a perspective view of the user's head and his left hand, the latter holding the device for application to the left nostril.

FIG. 3 is a perspective view, on an enlarged scale, of a preferred form of applicator in accordance with the invention, shown attached to a handle, with portions broken away for clarity of presentation.

FIG. 4 is a right front perspective view of the user's head, showing the approximate location of the sinuses.

DETAILED DESCRIPTION

In FIG. 1 there is indicated generally at 10 a patient using the system of the present invention for self treatment. It will be noted that the patient's body is bent so that his head 12 is substantially horizontal, face down, over a conventional lavatory indicated generally at 14 for receiving the drainage during irrigation. Adjacent to the lavatory 14, and here shown as mounted on a shelf 16, is a source, indicated generally at 18, of liquid under pulsating pressure, fed to a flexible hose 20. The device 18 is desirably electrically energized as indicated by the electrical cord 22, and may be of the type exemplified by that shown in U.S. Pat. No. 3,227,528.

FIG. 2 shows the patient's head and left hand in greater detail during use of the system, and FIG. 3 shows the applicator proper, indicated generally at 30, connected to a handle indicated generally at 38. Applicator 30 includes a tubular body having an elongated tube portion 32 and a short extension 34 projecting substantially perpendicularly to the axis of the tube, and terminating in an upper outlet port desirably having a diameter of approximately 0.1 inch. A central passageway 33 extends the entire length of the applicator, terminating at the end of the tube in a male coupler 36, which is detachably engageable with handle 38. An internal passageway in the handle communicates with hose 20. Adjacent to handle 38, and spaced substantially from extension 34, applicator 30 has mounted thereon a finger grip indicated generally at 40, whose periphery is desirably provided with a series of cutout portions 42 to facilitate the user's grasping the finger grip between his thumb and finger, as seen in FIG. 2.

Mounted on the extension 34 at the other end of the applicator is a tubular fitting indicated generally at 50, and desirably made of rubber or equivalent material having some resiliency and cleanable in an autoclave or
otherwise after each use. Fitting 50 has an internal passage way 52 therethrough, the lower end of which frictionally engages extension 34 and thus retains fitting 50 in correct position relative to the other parts of the applicator. The upper portion 54 of the fitting as seen in FIG. 3 is provided with a tapering contour, desirably frusto-conical, converging upwardly and terminating at an opening 56 at the upper end of the internal passageway 52.

In use, as best seen in FIG. 2, the user lightly grasps the finger grip 40 between the thumb and a finger of his left hand, and holds handle 38 in any convenient way with his other fingers. He guides the tapered portion of fitting 50 into his left nostril while he is bent over with his face substantially horizontal. He then actuates the source 18 of pulsating flow of an isotonic saline solution at a temperature of 100°F or a little above, and permits the solution thus introduced into one nostril to exit either from the other nostril or from the mouth, into sink or lavatory 14. Under typical conditions, the solution being discharged will convey mucous, crusts and other undesirable matter for between a half minute and a minute. When the discharged liquid appears clear, the user should shift the applicator so that the fitting 50 is inserted into his other nostril. This is most conveniently done by changing the applicator to his other hand.

As the isotonic saline solution moves upwardly in one nostril and then downwardly and outwardly through the other nostril, the flow passes the ostia or mouths of the sinuses, whose approximate location is shown in FIG. 4. Thus, after passing the nasolacrimal duct, the solution passes, sequentially, the ostia of the frontal sinus indicated generally at 64, the ethmoids indicated generally at 62, the maxillary indicated generally at 60 and the sphenoid indicated generally at 66. It then moves past the outlet of the eustachian tube (not shown), and thence through the nasopharynx to the upper posterior portion of the other nostril and outwardly therethrough, passing the same ducts and ostia in inverse sequence, before being discharged outwardly of the second nostril. It is to be especially noted that, using a frequency of pulsation of about 1,000 cycles per minute or higher, and a pressure varying from about 6 to 5 psi, the pressure relationships at the ostia of the sinuses are such as to draw out from each sinus a small amount of purulent matter at each pulsation, for ultimate discharge in the matter just mentioned. This action is enhanced by the temperature of the solution, a few degrees above body temperature, by which the temperature of the sinus cavity is slightly increased, thereby correspondingly increasing the pressure within that cavity, and thus assisting in the discharge of purulent matter. Simultaneously, the pulsations of the flow are effective to gently discharge crusty formations in the nasal passages, particularly near the sinus ostia and the pulsations also serve to stimulate the adjacent tissues.

It is highly desirable that the user of the irrigator in accordance with the present system be encouraged to insert the tubular fitting into his nostril with very little force, to avoid any possibility of damage in the event that the nasal passageways are clogged initially. Thus the finger grip 40 is spaced several inches from the extension 34 and fitting 50 mounted thereon, and the user is instructed not to apply much force upwardly into the nostril, but to permit the fitting to only lightly engage the nostril. This is particularly important at the beginning of a treatment when, as noted above, the passageways may be clogged.

Accordingly, there is here provided a nasal irrigation system using an irrigator applicator of specific design, to be used in connection with a source of isotonic saline solution pulsating at a rate of about 1,000 cycles per minute or more, with a maximum pressure of less than about 10 psi, preferably about 5 psi. It has been found that this desirable pressure is attained, when the pulsating source 18 has a maximum pressure of about 25 psi, when the upper outlet port of applicator extension 34 has a diameter of about 0.1 inch.

1. In a system for enhancing the draining of mucopus from a person's sinuses and for expelling it from the nose, the provision of:
2. The invention as defined in claim 1 wherein the temperature of said solution is between 100° and 105°F.
3. The invention as defined in claim 2 wherein the maximum pressure of said flow is about 5 psi.
4. The invention as defined in claim 2 wherein said frequency is above 1,000 cycles per minute.
5. In a nasal irrigation system the provision of:
    a. irrigating means for applying to a nostril a flow of irrigating liquid whose pressure pulsates between 0 and 5 psi at a frequency substantially above 100 cycles per minute comprising:
        an applicator including a tubular body having an elongated tubular portion and an extension projecting substantially perpendicularly to the tube and terminating in an outlet port,
        a finger grip member on the tube spaced from the juncture of the tube and extension,
    and a tubular fitting on said extension having a tapering portion converging to an outlet opening in fluid communication with said tubular body.
6. The invention as defined in claim 5 wherein the finger grip member is spaced from said juncture by at least 2 inches.
7. The invention as defined in claim 5 wherein said outlet port has a diameter of approximately 0.1 inch.
8. The invention as defined in claim 7 wherein the temperature of solution is between 100° and 105°F.
9. A system for enhancing the draining of purulent material from the sinuses and for expelling it from the nose comprising:
    a. placing a fitting in a user's nostril, said fitting having an external contour of generally frusto-conical shape and provided with a central passageway therethrough terminating at one end at the apex of said frusto-conical shape;
    and supplying to the other end of the fitting passageway a liquid solution pulsating in pressure below about 10 psi at a frequency of at least about 1,000 cycles per minute.

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