ABSTRACT: A nasal tube attaching device comprising a body portion having an opening extending axially therethrough. The body is in the configuration of a truncated cone having a tapered end and a substantially triangular end having a configuration substantially conforming to the natural configuration of a human nostril. The tapered end of the body portion extends inwardly of the nostril and the base portion includes a flat surface which is in substantially the same plane as the nostril opening when the device is in position within the nostril. The tapered end is adapted to receive a medical tube which extends inwardly of the patient and which is in communication with the opening extending through the body portion. The area of the base of the body portion is less than that of the area of the nostril opening, thereby providing breathing area through the nostril opening when the device is in position.
3,568,678

1

SELF-ATTACHING NASAL TUBE OF ACCEPTABLE APPEARANCE

The use of nasal tubes for feeding purposes, known as drip feeding, is a well known art. A fine tube of plastic material from 2 to 4 millimeters in outer diameter is generally utilized. The tube is introduced through the nasal cavities, past the esophagus and into the stomach. Other tubes for duodenal or intestinal uses are also passed through the nasal fossae. Tubes of this type are used for resuscitation, the feeding of patients, and are also utilized when there is a functional or organic obstruction to food intake. Feeding can be intermittent or continuous.

Nasal tubes present the disadvantage of extending for a considerable distance beyond the nostrils. Consequently, there are drawbacks of various kinds; for example:

1. Tubes of this type are in the way and have an unpleasant appearance. Normally, fixation is effected by turning the anterior end of the tube behind the ear or by use of one or two threads across the face. Sometimes an adhesive bandage is used at the nostril, while the end of the tube is out in the air. Such an unpleasant treatment is fairly well accepted in post-surgery cases and for bedridden patients but this appearance becomes very objectionable when the patient is ambulatory. Many patients refuse nasal tubes for psychological reasons.

2. The outer end of the tube, in sleep or when the patient moves, is subjected to involuntary traction causing displacement of the tube and pain in the nasal or pharyngeal passage. This is especially dangerous in agitated and/or unconscious patients or in the case of children.

Therefore, a principal objective of the present invention is to provide a device having a self-attaching means without a visible external end and for reducing disturbance in the nasal respiration system.

Another objective of this invention is to provide means to comfortably and easily affix the outer end of a nasal tube to the nose of the patient.

These and other objects of the invention will become more apparent to those skilled in the art by reference to the following detailed description when viewed in light of the accompanying drawings, wherein:

FIG. 1 is an isometric projection of a tube support attached in the nostril of a patient and directed through the nasal cavity toward the stomach;

FIG. 2 is a schematic isometric projection of the support of FIG. 1;

FIG. 3 is a schematic plan view of the exterior surface of the object of the present invention disclosing a modification of a mounting means;

FIGS. 4, 4A, 4B, 4C, 4D, 4E, 5, 6, and 8 are diagrammatic sections of the object of the invention respectively showing second and third modifications of a mounting element for obtrurating the tube;

FIGS. 6, 7 and 8 are diagrammatic views of further modifications of obturation of the tube means; and

FIG. 9 is a cross-sectional view in elevation of a further embodiment of this invention.

Referring now to the drawings wherein like numerals refer to like elements, the numeral 1 refers to a tube of conventional type that reaches the stomach via the nasal and esophageal fossae. The tube is terminated at its outer end by tip 2 which is enclosed by the nostril opening. The end surface of tip 2 is normally in the plane of the external orifice of the nostril and occupies only a part of the nostril cavity to avoid any serious interference with normal respiration.

It is to be observed that element 3 for fixation follows as closely as possible the external ala of the nose and extends along the nasogenous sulcus to avoid theesthetic drawbacks as much as possible. The fixation element 3 is terminated by a pad 4.

According to FIG. 2, the body of tip 2 comprises an element of nonoxidizable material generally presenting the form of a truncated cone with an anterior triangular base and with a rounded edge having major vertical axis. According to one characteristic of the present invention, it has the dimensions and general configuration of a nostril into which it must be readily mounted in a manner to allow sufficient passage for free respiration. The slender tapering posterior extremity of body 2 is joined to tube 1 by gluing or by simultaneous molding of plastic material. The body 2 can, therefore, be distinct from the said nasopharyngeal tube 1 or form an integral part thereof. A tube is removably inserted in the central passage of body 2 and fixed to it by suitable means a preventing it from falling back inside the nasal cavity.

In order to adapt as perfectly as possible to the nostril, the outer surface of tip 2 is rounded. The internal surface can be relatively flat. The anterior face is preferably slightly convex and supports the closure system. The upper edge can present a rounded projection that corresponds to the cavity of the lobe of the nose.

A system to adapt the above is formed by a partial annulus that includes a hook element 3 whose form, which is a crooked curve, is such that it follows as closely as practical the lower part of the juncture of the nostril and the external sulcus and the lower part of the sulcus itself. This configuration is best seen in FIG. 1. The hook 3 is terminated at its free end by a pad 4 to blunt any disagreeable scratching of the flesh. The hook 3 is advantageous constituted of a plastic material of nonoxidizable metal or of a plastic-embedded metal that has a certain elasticity to permit the exertion of gentle pressure on the external ala of the nose. Dependent upon the nature the material selected for hook 3, the pad 4 is molded at the same time as the main body 2 or it can be sealed.

As shown in FIG. 3, the hook 3 may also be mounted pivotally on body 2 about a pin 5 and urged to a nose-engaging position by a coil spring 6.

It is to be understood that the retaining hook can be integrally molded with the body portion, if desired.

Because of the special asymmetrical form of main body 2, it should be understood that it is necessary to impart direction to the device when it is introduced. To facilitate this operation, a color index is inscribed along the generatrix of tube 1 for use as reference.

To prevent reflux of liquids toward the outside, an obturating element 7 is provided in several modifications which are illustrated by FIGS. 4, 4A, 4B, 4C, 4D, 4E, 4F and 8.

An obturator valve seven can be made as in FIG. 1 to pivot about a pin 8 and to be held in closed position by spring 9, one end of which can at the same time constitute the pin 8. The valve can also be a plug as indicated by the numeral 7 b in FIG. 4.

The plug obturates by compression in the passageway. The tab or plug 7 b is fixed to body 2 of the device or molded integrally if a flexible plastic material is used for the manufacture of body 2.

FIG. 5 shows an external plug 7 a held against the orifice of tube 1 by a spring 10. The axis of spring 10 provides an axis about which the plug can pivot. Thus the cannula can be readily introduced into tube 1 which connects the nasopharyngeal tube and the receptacle or syringes containing the feeding solutions.

There can likewise be provision for opening of tube 1 by a flapper valve means. For this arrangement, a flexible plastic end of tube 1 forms a concentric valve as illustrated in FIGS. 6 and 7. The lips of the valve will separate upon introduction of the cannula and automatically close when it is withdrawn. The action here is much like that of a sphincter.

According to FIG. 8, tube 1 terminates in a valve made of a diaphragmatic slit 11 whose opening is caused by manual compression exerted simultaneously at both ends of the slit.

Thus far, there has been described an apparatus which is characterized by a combination having the outer tip of any nasopharyngeal, gastric or duodenal tube weighted or provided with an inflatable member to allow its fixation to the orifice of a nostril of the patient and simultaneously ensuring a presentable appearance together with greater ease of use through the absence of useless external elements and through improved fixation means thereof.
In FIG. 9 there is shown a detachable device for joining apparatus of the type described to a tubular element to thereby allow its ready affixation and without risk of accidental separation. This is of real importance because an accidental separation can cause the tube to drop into the natural cavities where it has been installed.

The tube of this embodiment is designated by the numeral 1. The tube support, instead of being constituted of a single element forming an integral piece with tube 1 is either molded integrally therewith or is subsequently and permanently joined thereto by gluing or similar means. An assembly of elements such as 12 and 16 permit fixation of the tube holder to the tube 1 at the time of use in a manner that the two elements (tube and tube holder) are positively joined in a manner that is both uncomplicated and secure.

According to FIG. 9, the body of tube 1 is terminated by the two numbers 12 and 16. The tube 12, beyond and olive portion 13, receives a cylindrical part 14 which has projections in the form of multiple, annular, sawtooth projections 15. These projections are characterized in that they have the form of right triangles, preferably, one leg of the right angle being angularly disposed to the axis of the device and the hypotenuse orientated in the direction away from the olive portion 13.

The female piece 16 presents a hemispherical hollow surface to the cylindrical outer end of the olive 13. The pieces 13 and 16 (or one of them) are made of semielastic material such as polyethylene. The pieces are sufficiently rigid to permit an inter-engagement between the respective sawteeth such that the tube 1 can be securely grasped between the above-mentioned hemispherical portions.

It should be understood that since pieces 13 and 16 are thus constituted, piece 16 can slide on the cylindrical part of piece 14 and if sufficient pressure is exerted on piece 16 (piece 14 being held) piece 16 will move easily over sawtooth projections 15. The elasticity of the different elements allows compression of the projections at the favorable moment. This arrangement constitutes a "ratchet" action to prevent any sliding backward (to the right) of element 16.

The number of projections 15 is such that a position can always be found for piece 16 in which it can compress tube 1 sufficiently to insure tightness and positive engagement. The piece 16 is thus rigidly joined to piece 12 and can readily support a clip 3 of a type serving to fix the apparatus on the lobe of the nose.

It is to be noted that to facilitate this function of prehension of the nose lobe, the piece 16 preferably presents in section an external configuration that is oval or semioval in order readily to bear on the inner surface of the outer wall of the nostril. The bulk of the apparatus is such that it leaves free passage for respiration as well as for nasal secretions. The member 3 is constituted by an elastic element that is sufficiently malleable, however, to permit its adaptation to various nostril forms. The pad 4 which forms the free end of piece 13 can bear on the outer wall of the nose, either directly, or being provided with an added single or double adhesive surface.

Moreover, according to a characteristic of the present invention, the outer end of body 12 presents a connecting element for quick, tight joining, to receive either an obturator or any other device that is to be connected to the tube, such as syringe, funnel, tubes, etc. for many and varied uses.

A rapid connection means has been provided in the form of a female conical element with spiraled lobes 17. The element for quick, tight joining, to receive either an obturator or any other device that is to be connected to the tube, such as syringe, funnel, tubes, etc. for many and varied uses.

A rapid connection means has been provided in the form of a female conical element with spiraled lobes 17. The element to be connected, such as tube 18 presents a complementary configuration, i.e., in the present case, a conical male element that likewise has spiraled lobes 19. The conical spiraled threadings, which is the object of the present invention, offers as advantages:

1. The allowance of rapid wedging action. One quarter turn is normally sufficient because of the very long pitch of the spiral.
2. An extremely easy cleaning of each of these elements since the spiraled lobes allow the scraping helix to reach the bottom, which is not practical with any other types of threading. This is advantageous for a piece of medical equipment.

It can be understood that the placement of elements 12 and 16 on the tube can be readily effected by means of a pincer element, for instance a hemostat, the jaws of which have a substantially flat surface provided with a slant truncated conical bowl for installation of the tube and olive and the other branch presenting a slant cylindrical bowl to receive piece 16 even thugh clip 3 is presented. These two pieces can thus easily be pushed together, the tube itself being held in place during this operation by the presence of the pincers on the olive 13. This offers the advantage of using a tube cut to a desired length secured to the tube holder after the tube has been cut to the exact required length to reach the organ in question to thereby eliminate the risk of accidental breaking apart of the two elements.

In general manner, while there has been disclosed effective and efficient embodiments of the invention, it should be well understood that the invention is not limited to such embodiments, as there might be changes made in the arrangement, disposition, and form of the part without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

We claim:

1. A nasal feeding device for nesting within the outer opening of a human nostril comprising a body portion generally in the form of a truncated cone having a tapered interior end and an anterior, lobal triangular base contoured in the general shape of a human nostril, said base having a substantially flat surface whereby when said body portion is nested within said nostril, said surface is in substantially the same plane as said nostril opening, said body portion having a passageway extending axially therethrough, a medical tube connected to said tapered end and in communication with said passageway, retaining clip means attached to the base of said body and extending outwardly of and gripping said nostril walls when said device is nested within said nostril

2. The device of claim 1 and including an obturator mounted in said axially extending opening adjacent said flat surface and adapted to close said opening.

3. The device of claim 2 wherein said obturator includes normally closed flexible sealing means which can be opened to permit the introduction of a feeding tube.

4. The device of claim 2 wherein said obturator is a springlike clip.

5 The device of claim 2 where said obturator is a flap valve.

6. The device of claim 1 wherein said body consists of a flexible, nontoxic plastic.

7. The device of claim 1 wherein said retaining clip is configured to follow the nasogenial sulcus.

8. The device of claim 1 wherein said tubular body is olive shaped and said tube substantially surrounds said body, an extension projecting outwardly from the other end of said olive, means securely holding said tube to said tubular body.

9. The device of claim 8 wherein said extension has a one-way antifriction surface about its surface and said means is formed with a surface for engagement therewith.

10. The device of claim 9 wherein said extension has second means for facilitating the attachment of a feeding apparatus.

11. The device of claim 10 wherein said second means consists of a spiraled lobelike thread adapted to receive a corresponding lobelike thread formed on said apparatus.