

## DEVICES AND METHODS FOR POSITIONING AND SECURING MEDICAL TUBES

### FIELD OF THE INVENTION

The present invention relates to devices and methods for positioning and securing medical tubes. More particularly, the invention relates to devices and methods for positioning and securing medical tubes which are inserted in a patient's mouth or nose. Still more particularly, the invention relates to devices and methods for positioning and securing one or more endotracheal or gastrointestinal tubes to a patient.

### BACKGROUND OF THE INVENTION

Endotracheal tubes are inserted into a patient's trachea, to provide a clear passage for air flow to the lungs if the trachea has been damaged. These tubes are also inserted prior to administering a general anesthetic. Endotracheal tubes can be intubated through the mouth or the nose. Feeding tubes are inserted in some patients either in the mouth or in the nose. Additionally, tubes may be used to drain saliva or mucus, or to assist in cleaning a patient's mouth. These various tubes need to be secured in a fixed position relative to the patient. Some patients require tube intubation during a relatively short time period, e.g. during surgery, while others require long term intubation. It is important that each tube is firmly secured in place, in order to prevent accidental removal or re-positioning of the tube.

Various devices and methods have been developed for securing one or more tubes in a patient's mouth or nose. Some of the devices, such as U.S. Pat. No. 5,402,776 (Islava, 1995), cover a substantial part of a patient's mouth making it difficult to access the mouth or to visually inspect the mouth. Other devices, such as U.S. Pat. No. 5,295,480 (Zemo, 1994) cover part of the patient's skin, potentially leading to skin irritation or infection due to saliva, mucus or vomitus seeping in between the skin and the cover.

Devices which cover a substantial portion of the lips, such as the '776 patent, similarly lead to potential lip irritation and infection. Other tube holding devices require a bite block, see for example U.S. Pat. No. 5,069,206 (Crosbie, 1991). Such bite blocks have the known disadvantage of limited access to the mouth or limited visual examination of the patient's mouth.

Frame or wire based medical tube holding devices are disclosed in U.S. Pat. No. 5,383,451 (Delulio, 1995) and U.S. Pat. No. 4,867,154 (Potter et al., 1989). These wire based devices are attached to the patient's head by means of adhesive tape or adhesive patches. Use of adhesive tape or patches, such as disclosed in the '451 and '154 patents makes it difficult to adjust the devices for optimum positioning and can lead to skin irritation. Also, removal of the adhesive tape or patch in order to remove or re-position the device causes discomfort to the patient.

Many of the devices are not readily adaptable to the simultaneous use of several tubes or the simultaneous use of a tube inserted in the mouth and a tube inserted in the nose.

Accordingly, the need exists for improved devices and methods for positioning and securing medical tubes, allowing improved access and visual examination of the mouth while maintaining secure positioning of the tubes and having minimal contact with a patient's mouth, lips or skin.

### SUMMARY OF THE INVENTION

The present invention provides novel devices and methods for positioning and securing medical tubes which are intubated in a patient's mouth or nose.

In one embodiment the current invention provides medical tube positioning and securing devices having frame portions which include an inverted U-shaped portion having an upper jaw portion, two cheek portions and a lower jaw portion.

In another embodiment the present invention provides medical tube positioning and securing devices having frame portions which include an inverted U-shaped portion having an upper jaw portion, two cheek portions and a lower jaw portion, wherein the devices are fastened to a patient's head by means of fasteners.

In still another embodiment the current invention provides medical tube positioning and securing devices having frame portions which include an inverted U-shaped portion having an upper jaw portion, two cheek portions, a lower jaw portion and a nose portion.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic perspective view illustrating a medical tube positioning and securing device of the present invention.

FIG. 2 is front elevation view of the device illustrated in FIG. 1.

FIG. 3 is a side elevation view of the device illustrated in FIG. 1.

FIG. 4 is a schematic side elevation view illustrating the placement of the device shown in FIG. 3, in a patient's mouth.

FIG. 5 is a schematic perspective view of an alternate medical tube positioning and securing device of the current invention.

FIG. 6 is a front elevation view of the device illustrated in FIG. 5.

FIG. 7 is a side elevation view of the device illustrated in FIG. 5.

FIG. 8 is a schematic perspective view of an alternate medical tube positioning and securing device of the present invention.

FIG. 9 is a front elevation view of an alternate medical tube positioning and securing device of the current invention.

FIG. 10 is a schematic perspective view of an alternate medical tube positioning and securing device of the present invention.

FIG. 11 is a front elevation view of the device illustrated in FIG. 10.

FIG. 12 is a schematic side elevation view illustrating the placement and fastening of the device shown in FIG. 1, on a patient's head.

FIG. 13 is a schematic side elevation view illustrating the placement and fastening of the device shown in FIG. 1, and the insertion of medical tubes in the device and in the patient's mouth.

FIG. 14 is a top elevation view of a bifurcated fastening strap of the current invention.

FIG. 15 is a schematic side elevation view illustrating the placement and fastening of the device shown in FIG. 7, and the insertion of medical tubes in the device and in the patient's mouth and nose.

### DETAILED DESCRIPTION OF THE INVENTION

While describing the invention and its embodiments, certain terminology will be utilized for the sake of clarity. It