CATHETER PLUG AND SHIELD DEVICE

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

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This invention relates to a plug and shield device and relates more particularly to a device for stoppering and simultaneously protecting the end portion of a tubular means having a longitudinal bore therethrough.

As conduite to a better understanding of the instant invention it is to be understood that it is frequently necessary to plug or stopper the opening of a tubular means such as a portion of a catheter or the like under sterile conditions. The internal bore of the tubular means must be maintained free from contamination and to effect this result it is important to maintain the base edge, that is the edge of the tubular means adjacent the opening for the longitudinal bore, and the end portion of the tubular means sterile. In the conventional plug means currently in use it is necessary for the end portion of the tubular means to be handled by the doctor, nurse or technician in order to stopper the same. Thus, the sample of material carried by the tubular means is subject to contamination.

It is therefore an object of the instant invention to provide a plug means which includes in combination a shield for protecting the end portion of a tubular means to be stoppered and to facilitate maintaining a good sterile technique.

Another object of the instant invention is the provision of a device of the type described and shown herein whereby a tubular means surrounded by a peripheral shield wherein a portion of the shield extends at least to the end of or beyond the plug means to insure the sterility of the end portion of the tubular means being stoppered.

A further object of this invention is to provide a plug and shield device wherein the stoppering means is conical in form so that it may be received in tubular means, having various diameters of internal longitudinal bores.

Another object of the instant invention is the provision of such a device whereby the plug means has step elements or ringed members defined on its surface to facilitate stoppering the tubular means by increasing the frictional engagement therewith.

A still further object of this invention is to provide a device for plugging and simultaneously protecting tubular means, particularly of hospital origin, which has a relatively soft peripheral shield with an outer surface free from any sharp edge portions to prevent trauma or soreness to the patient when the device contacts his skin.

Yet another object of the instant invention is the provision of a medical plug and shield device which may be formed of any of a number of particular materials, in a variety of sizes and shapes depending upon the particular utility to which the device is to be put.

A further object of this invention is to provide such a device which is sturdy and durable in construction, reliable and efficient in operation, relatively simple and inexpensive to manufacture and utilize and capable of being either disposable use or reusable to permit sterilization of the same for reuse.

Other and further objects reside in the combination of elements, arrangement of parts and features of construction.

Still other objects will in part be obvious and in part be pointed out as the description of the invention proceeds and as shown in the accompanying drawing where-in:

FIGURE 1 is a plan view of a catheter showing the device of the instant invention in association therewith, with parts broken away for illustrative convenience and with certain hidden parts being shown in dotted lines.

FIGURE 2 is a longitudinal cross-sectional view through the device of FIGURE 1 taken substantially on line 2—2 of FIGURE 1 and showing a portion of the tubular means being stoppered and protected in dotted lines.

FIGURE 3 is a transverse cross-sectional view taken substantially on line 3—3 of FIGURE 2.

FIGURE 4 is a longitudinal cross-sectional view through a modified form of the device of the instant invention.

FIGURE 5 is an enlarged side elevational view through another modification, partly in cross section;

FIGURE 6 is an enlarged view similar to FIGURE 5 of still a further modification of the device of the instant invention.

FIGURE 7 is an enlarged view similar to FIGURES 5 and 6 of a further modified form of the device.

FIGURE 8 is an enlarged view similar to FIGURES 5 to 7 of still another modification in accordance with the instant inventive concept.

FIGURE 9 is a plan view of a plug and shield device in accordance with this invention, shown in operative engagement with a connector element permanently affixed to the end portion of a urinary drainage tube, with parts in cross section and with parts broken away for illustrative convenience.

Like reference characters refer to like parts throughout the several views of the drawing.

Referring now to the drawing in general and more particularly to FIGURES 1 to 3, the device of the instant invention is designated generally by the reference numeral 10 and is shown as received over the end portion of a conventional catheter 12 to stopper and protect the same. The device 10 is comprised basically of a central plug means 14 and a peripheral shield 16. The plug means 14 is preferably conical in form having a blunt or rounded apex at 18 and is receivable through the opening formed by the longitudinal bore 20 within the catheter 12 or other such tubular means. It can be seen that due to the conical form of the plug means 14 it may be received in tubular means having various diameters of longitudinal bores ranging from a diameter slightly in excess of the portion of the plug means adjacent the apex 18 to a diameter slightly smaller than the portion of the plug means 14 adjacent the base thereof at 22. The open mouth edge 24 of the peripheral shield 16 extends slightly beyond the apex 18 of the plug means 14 to insure that regardless of the diameter of the longitudinal bore within the tubular means, the end portion thereof as shown at 26 in FIGURE 2 and particularly the base edge 28 will be protected and maintained free from contamination. The open mouth edge 24 preferably extends at least as far as the apex 18 to insure sterility of the end portion of the tubular means.

The device 10 will be utilized by gripping the peripheral shield 16 with the thumb and fingers of one hand while grasping the tubular means such as the catheter 12 a substantial distance from the end portion 26 thereof and pressing the plug means 14 into the opening formed by the longitudinal bore until it frictionally engages the same to be retained thereon in stoppering and protecting relationship.

The device of the instant invention may be formed monolithically and integral as shown in FIGURES 1 to 3 or the plug means may be separately formed of a relatively hard material such as shown at 30 in FIGURE 4 while a cup-shaped member 32 of relatively softer material may
be secured thereover with its substantially circumferential side portion forming the peripheral shield 34.

The frictional engagement of the plug means 14 may be increased in any manner such as by providing a plurality of stepped frictional elements 36 as shown in FIGURE 5 or a plurality of spaced ring members 38 of substantially semi-circular cross section, as in the embodiment of FIGURE 6. Thus, when the plug means of either embodiment is pressed into the longitudinal bore of the tubular means to be stopped and protected, one of the stepped or ring members 36 or 38 respectively will be frictionally engaged therewith, depending upon the particular diameter of the bore within the tubular means.

In order to save material and thereby render the device less expensive to manufacture and more readily disposable, it is possible to form the same with a hollow plug means such as shown at 40 in FIGURE 7 and an integral molded peripheral shield 42.

A tapered flexible lip member 44 with a thin edge directed radially inwardly, may be provided on the portion of the peripheral shield 46 extending beyond the apex 48 of the plug means 50 to contact the exterior surface of the tubular means with which the device is utilized, thereby further avoiding contamination by sealing the end portion thereof against entrance of foreign matter. Such an embodiment is shown such as by providing a rubber to plastic seal to improve the frictional engagement and the plugging function.

Where the tubular means is made of a rubber material such as a catheter, the device is made of a plastic material, with the peripheral shield preferably being formed of a relatively softer plastic material than the plug means.

Where the tubular means to be stopped and protected is formed of a plastic material such as the connector element 52 shown in FIGURE 9 which is conventionally secured as at 54 to a urinary drainage tube 56, the device of the instant invention is preferably made of a rubber material. The plug means 55 will then be inserted into the longitudinal bore 60 within the connector element 52 until it is frictionally engaged as shown at 62 while the peripheral shield 64 protects the end portion and the base edge of the connector element 52 against contamination as described hereinbefore.

A small magniet, diagrammatically shown by 51 in FIG. 8, may be incorporated or embedded with the peripheral shield of the device of the instant invention to allow the same to be quickly and easily removable secured to any metallic surface such as the frame of a hospital bed or the like.

The instant plug and shield device, while particularly shown for use with a catheter and a connector element on a urinary drainage tube, is clearly of use with any tubular means and may be made in various sizes and shapes to fit the particular environment for which it is intended. Each device, particularly if the plug means are conical, will have utility with a variety of sizes of tubular means. Production of these devices may be sufficiently inexpensive to render them disposable or they may be made of a material which will withstand the extremely high temperatures necessary for sterilizing in an autoclave or the like so that they may be used again.

It will now be seen that there is herein provided an improved device for stopping and protecting a tubular means which satisfies all of the objectives of the instant invention and others, including many advantages of great practical utility and commercial importance.

Since many embodiments may be made of the instant inventive concept, and since many modifications may be made of the embodiments hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. A device for stopping and protecting the end portion of a tubular means having a longitudinal bore forming an opening therein, said device comprising,
a deformable plug means of generally circular base and of right conical shape, receivable in said opening for stopping said tubular means,
and a deformable single open-ended peripheral shield of generally circular cross-section and of right cylindrical shape, coaxially surrounding the plug and contacting only the base of the plug, the shield thus being receivable over said end portion of a tubular means,
the apex of the plug being adjacent the open end of the shield and terminating slightly within the open end of the shield,
the shield at its open end, and exterior of the apex, being provided interiorly with an annular flexible lip tapering radially inwardly and terminating at its distal portion in a thin edge thus helping to protect the apex of the cone against contamination.

2. A device for stopping and protecting the end portion of a tubular means having a longitudinal bore forming an opening therein, said device comprising
a deformable plug means of generally circular base and of right conical shape, receivable in said opening for stopping said tubular means,
and a deformable single open-ended peripheral shield of generally circular cross-section and of right cylindrical shape, coaxially surrounding the plug and contacting only the base of the plug, the shield thus being receivable over said end portion of a tubular means,
the apex of the plug being adjacent the open end of the shield and terminating slightly within the open end of the shield,
the plug being of relatively harder material than the shield,
and the outer surfaces of the device being smooth and free from any sharp edge or protuberance.

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