

PRE-SLIT INJECTION SITE AND TAPERED CANNULA

This is a continuation-in-part of U.S. patent application Ser. No. 07/217,004, filed Jul. 8, 1988 now abandoned, which is a continuation-in-part of U.S. patent application Ser. No. 07/147,414, filed Jan. 25, 1988, now abandoned.

This application is a continuation of 09/181,975 filed Oct. 29, 1998 U.S. Pat. No. 6,261,266 which is a con of 8/695,040 filed on Aug. 9, 1996 U.S. Pat. No. 5,899,888 which is a con of 07/325,617 filed Mar. 17, 1989.

FIELD OF THE INVENTION

The invention pertains to coupling systems usable to transfer materials from one flow conduit to another. More particularly, the invention pertains to two-part coupling members with a first part including a pre-slit septum and second part including a blunt cannula. The pre-slit septum slidably receives the blunt cannula to effect the coupling.

BACKGROUND OF THE INVENTION

Injection sites usable with pointed cannulae have long been known. For example, such sites can be formed with a housing having a fluid flow path therein. A septum is positioned in the housing closing the fluid flow path.

One injection site usable with a piercing cannula is disclosed in U.S. Pat. No. 4,412,573 to Zbed entitled "Injection Site." The Zbed patent is assigned to the assignee of the present invention.

The pointed cannula can be forced through the septum into fluid flow communication with the flow path in the housing. Known injection sites usable with a piercing cannula can be physically damaged by repetitive piercing caused by the sharp cannula. This damage, known as coring or laceration, can result in subsequent leakage.

Due to problems associated with infectious agents, personnel using such pointed cannulae do so with great care. Notwithstanding careful and prudent practice, from time to time, accidents do occur and individuals using such pointed cannulae jab themselves.

Injection sites usable with a blunt cannula are also known. For example, U.S. Pat. No. 4,197,848 issued to Garrett, et al., entitled "Closed Urinary Irrigation Site" and assigned to the assignee of the present invention discloses one such injection site. That injection site is a relatively low pressure device having a relatively thin, molded, sealing member. The sealing member has an opening therethrough.

A blunt cannulae can be forced through the sealing member placing the cannulae into fluid flow communication with a fluid flow pathway in the injection site.

Injection sites of the type noted above usable with a blunt cannula have the advantage that the blunt cannula will not pierce the skin of a user. On the other hand, it is important that the pre-slit injection site reseal with enough force that fluids do not ooze therefrom and that airborne particulate matter, bacterial or viral matter do not enter therethrough.

Hence, there continues to be a need for a pre-slit injection site which can be used with a variety of solutions and over a range of fluid pressures. Further, there continues to be a need for such a pre-slit injection site which will reliably reseal even after many insertions of the blunt cannula.

Such an injection site should be able to receive a large number of insertions of the cannula without displaying reseal failure. Such an injection site should provide for improved alignment of the cannula on insertion. Improved

alignment will result in less chance of damage to the injection site after repeated insertions of the cannula. Preferably, the injection site would also be usable with a pointed cannula. Preferably, a pre-slit injection site usable with a blunt cannula will provide a reasonable level of insertion force such that health care personnel will readily be able to insert the blunt cannula, yet the cannula will not easily fall from or drop out of contact with the septum.

SUMMARY OF THE INVENTION

In accordance with the invention, an easily wipeable injection site usable with a blunt cannula is provided. The injection site includes a housing which defines a fluid flow channel therethrough. The housing has a first and a second end.

A flexible sealing member is carried by the housing for sealing the first end. The sealing member has a resealable opening therein. The sealing member also is formed with a curved exterior peripheral surface such that the blunt cannula can be sealingly inserted through the opening and placed in fluid flow communication with the flow path. Further, the blunt cannula can be removed from the opening with a sealing member then interacting with the housing so as to reseal the opening.

The housing can also be formed with the first end including an annular channel underlying the sealing member. The sealing member is subjected to radially directed forces by a tapered surface of the first end of the housing. These forces tend to reseal the opening in the sealing member.

The sealing member can be a cylindrically shaped rubber member. The first end of the housing can include an interior tapered surface for receiving the sealing member and for applying the radially directed forces to the sealing member.

A retaining member carried by the first end of the housing can be used to retain the sealing member within the housing. The retaining member can be generally U-shaped. Alternately, the retaining member can be formed as a coiled spring.

The retaining member applies axially directed forces to the sealing member. In one embodiment of the invention, the retaining member deflects the sealing member and forms a curved exterior peripheral surface thereon. The curved exterior peripheral surface is an easily wipeable surface.

The retaining member deflects or distorts the upper and lower peripheral edges slightly as a result of applying axial forces thereto. When the blunt cannula is inserted into the slit in the sealing member, an annular interior peripheral region of the sealing member deforms further and fills, at least in part, the annular channel.

Deformation of this annular peripheral region results in an insertion force in a range of 2.0 pounds (0.7564 kilograms) to 5.0 pounds (1.891 kilograms). Preferably, the insertion force will have a value of the order of 2.0 pounds (0.7564 kilograms).

The resealable opening in the sealing member can extend entirely through that member. Alternately, the resealable opening can extend only partway therethrough. In this embodiment, the end of the blunt cannula will be used to tear through the remainder of the sealing member.

The sealing member can be formed in two parts. An exterior cylindrical portion can be slit completely. An interior cylindrical unslit portion can be provided to seal the site until the blunt cannula is inserted therethrough the first time.

The interior surface of the first end can be formed with the taper in a range on the order of 5 degrees to 20 degrees.