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UMBILICAL CORD CLAMP

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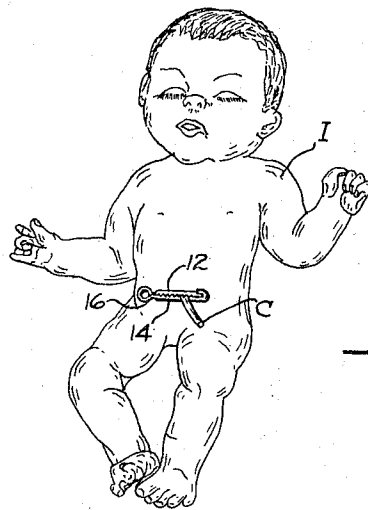


Fig. 1

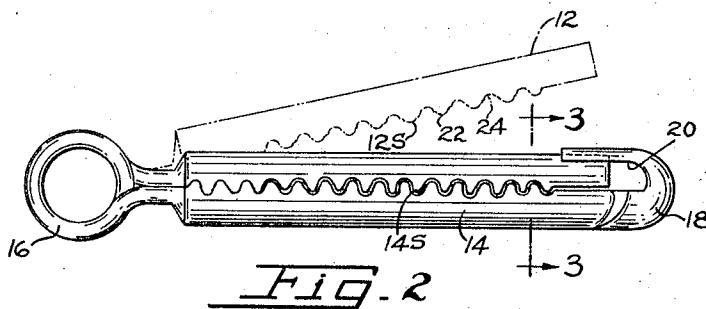


Fig. 2

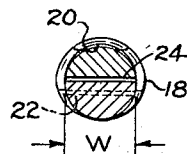


Fig. 3

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UMBILICAL CORD CLAMP

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This invention relates to a clamp for sealing an umbilical cord stump on a newborn infant and to a method for sealing such stump.

Secure closure and sealing of an umbilical cord stump on a newborn infant is essential to promote rapid healing and atrophy of the stump without risk of infection. Additionally, closure of the umbilical cord stump is preferably effected with rapidity in order to minimize disturbance and discomfort to the infant. The present invention secures the conditions to which allusion has been made above by providing a clamp having jaw faces on which faces are formed complementary serrated or undulate surfaces. A spring or the like is provided for resiliently biasing the surfaces toward one another in engagement with the stump.

An object of this invention is to provide a clamp which will securely and effectively seal the umbilical cord stump. This object is achieved by providing undulate complementary surfaces, which surfaces have sufficient width firmly to grip the cord and prevent the clamp from sliding off of the cord. The complementary undulate surfaces effect a more positive seal than smooth clamp faces of the prior art without injuring the cord.

A feature and advantage of the undulate surfaces on the clamp of the present invention is that less spreading of the cord is caused by clamp than if the surfaces of the clamp were straight. Such feature and advantage is desirable in that it distorts the cord less and thereby promotes more rapid healing.

Another feature and advantage of the present invention is that puncture of or injury to the cord is avoided by providing the complementary undulate surfaces of sufficient width to distribute the force exerted by the clamp over a large area. Consequently, the clamping pressure on the cord is reduced.

In the preferred embodiment of the present invention the members upon which the undulate jaw portions are formed are generally semi-cylindrical to the end that the clamp constructed in accordance with the invention has no sharp edges to cause injury to the infant.

Another object of the present invention is to provide a clamp for the stated purpose that can be used on cords of all diameters and thicknesses. Such versatility is accomplished by providing at one end of the jaw forming members a spring, or the like, which describes at least two full turns and a hook, or the like, at the opposite end of the jaw portions which join the latter end of the jaw portions in fixed spatial relation. Since the spring has two substantially complete turns, the undulate surfaces on the jaws can move toward and away from one another even when the opposite ends of the jaw members are hooked together.

These and other objects, features, and advantages will be more apparent after referring to the following specification and accompanying drawing in which:

FIGURE 1 depicts a newborn infant with a clamp of the present invention secured on the umbilical cord stump of the infant;

FIGURE 2 is a side elevation view of a clamp according to the present invention, the solid line portion of the drawing representing the clamp in closed position and the broken line representing the clamp in the open position; and

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FIGURE 3 is a cross-sectional view of the clamp in closed position taken substantially along line 3—3 of FIGURE 2.

The clamp of the present invention includes first and second elongate members 12 and 14 which define undulate generally sinusoidal complementary surface portions 12S and 14S. The surface portions are substantially free of abrupt discontinuities to the end that sharp convexities or concavities are avoided. Because the surfaces are complementary, they will substantially contact one another throughout their entire length when the clamp is closed. Surfaces 12S and 14S are depicted in FIGURE 2 as having a generally sinusoidal form but such form should be considered only exemplary. For example, the surface portions can be provided with teeth or serrations so long as the peaks of the teeth and the valleys between adjacent teeth are rounded off to avoid creation of sharp edges capable of puncturing the umbilical cord stump.

Jaw members 12 and 14 are joined at one end thereof by a spring coil 16 which spring coil describes at least two substantially complete turns. The spring coil serves to bias jaws 12 and 14 away from one another when the clamp is open, shown by broken lines in FIGURE 2, and permits slight relative movement between surface portions 12S and 14S when the clamp is closed. The latter provision is important in that umbilical cord diameter and thicknesses vary from infant to infant, and some slight amount of movement between the surface portions is essential to seal effectively and safely cords of varying sizes. On the end of jaw 14 opposite spring coil 16 a hook portion 18 is formed and has on the inner surface thereof a concavity 20 for receiving the end of jaw 12 therein.

Each surface portion 12S includes undulations or serrations which have peaks 22 and valleys 24. The opposing surface portion of jaw member 14 is similarly configured, having a valley for receiving peak 22 and a peak for receipt by valley 24. In other words, the surface portions 12S and 14S are complementary.

As best seen in FIGURE 3, the surface portions have substantial width, the mean width being designated at W in the figure. Substantial width is important for two reasons. First, there must be sufficient area of engagement between the clamp and the cord to assure that the clamp will not slip off the cord. Therefore, substantial width of surface portions 12S and 14S increases the friction between the clamp and the cord and avoids slippage of the clamp. Second, the cord stump is relatively tender, and the pressure to seal the cord is preferably distributed over a broad area. Wide surface portions 12S and 14S secure the foregoing requirement. Constructions of the surfaces with a width W at least as great as the distances from peak 22 to valley 24 assures that the area of contact with the umbilical cord stump will be sufficiently large to retain the clamp on the cord. Moreover, such sizes of width W limits the pressure exerted on the cord stump to an amount insufficient to puncture the stump.

Referring now to FIGURE 1, a newborn infant I is depicted with the clamp of the present invention in place on the umbilical cord C of the infant. The clamp is placed in cord sealing relation by first opening the clamp by disengaging jaw portion 12 from concavity 20 and then placing the clamp adjacent the abdomen on the infant with surface portions 12S and 14S on opposite sides of the cord. Sealing of cord C is accomplished by moving jaws 12 and 14 toward one another and engaging jaw 12 in concavity 20 of portion 18. Thus, surfaces 12S and 14S are biased toward one another and resiliency between the surfaces is afforded by spring coil 16, thereby holding the surfaces in stump sealing engagement.

A specific clamp that I have designed according to my invention and having found entirely satisfactory, has an overall length of about $2\frac{3}{8}$ inches. Such clamp has fourteen serrations on each of surfaces 12S and 14S, which serrations measure about $\frac{1}{8}$ inch from peak 22 to valley 24. Elongate members 12 and 14 are formed in semicylindric configuration wherein the width W is about $\frac{5}{16}$, although a width of from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch in this size clamp would be suitable. The clamp can be formed of a metal such as stainless steel and reused after proper sterilization or, alternatively, the clamp can be formed of a plastic material of more inexpensive structure and discarded after one use.

Thus, I have provided a clamp which can be rapidly placed on an umbilical cord stump of a newborn infant and will stay firmly in place because of the undulate complementary surface portions on the clamp. The surface portions have sufficient width to avoid injury to the stump as well as establishing a broad area of contact between the clamp and the stump to prevent inadvertent dislodgment of the clamp from the stump. The presence of spring coil 16 at one end of the clamp affords a resilient relation between surface portions 12S and 14S to the end that various sizes of umbilical cords can be sealed and the jaws will be capable of moving relative to one another to accommodate swelling, and the like, should such condition develop.

While one embodiment of my invention has been shown and described, it will be obvious that other adaptations and modifications may be made without departing from the true spirit and scope of the invention.

It is claimed:

1. A clamp for closing an umbilical cord stump on a newborn infant comprising: a pair of elongate members having complementary surface portions thereon for engaging the cord stump therebetween, said surface portions

being arcuately configured so as to avoid injury to a cord engaged therebetween, a resilient coil portion having at least two substantially complete turns therein so that said surface portions are adapted to confront one another adjacent said coil, one said elongate member having means on the end thereof opposite said coil forming a hooked portion thereon, the end of the other said elongate member opposite said coil portion being formed to be engaged by said hook portion so as to retain said complementary surface portions closely confronting one another along the entire length thereof, said hook portion affording relative movement of said elongate members in a direction parallel to the longitudinal axes thereof, whereby relative resilient movement between said surface portions is afforded so as to accommodate the clamp for secure and substantially uniform engagement with the umbilical cord stump throughout the length of contact between said cord stump and said complementary surface portions.

2. A clamp according to claim 1 wherein said complementary surface portions include complementary generally sinusoidal serrations arranged longitudinally of the elongate members.

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