

UMBILICAL CORD MINI-CLAMP

Field of the Invention

This invention relates to an apparatus for clamping an umbilical cord. Particularly,
5 this invention relates to a clamp having a certain functional structure for clamping an umbilical cord.

Prior Art

There were more than 42000 babies born in Singapore in twenty fourteen, among
10 the more than 130 million babies born every year worldwide. The umbilical cord of a newly born baby is clamped immediately after birth before it is cut preventing loss of blood as the cord dries beneath it. The clamp has to be easily placed with one hand, even if gloved and slippery. There are many types of umbilical cord clamps and ties that have been used to tie the cord and prevent bleeding from the stump. The clamps and ties have to be smooth,
15 durable and safely hold the cord securely without scratching babies' skin. There are usually made of plastic, though they can also be metal, fabric, or even kinds of tape.

After the umbilical cord is clamped and cut, the newborn wears the umbilical cord clamp on the navel area until the compressed region of the umbilical cord has dried and
20 sealed sufficiently. When the umbilical cord stub is fully healed, the umbilical cord stub falls off and is discarded. Such umbilical cord clamps are not recycled.

Typical V-shaped plastic clamps which are relatively big when compared to the size of a newborn. While easy to use, such clamps are obstructive when cleaning is required.
25 Further, it is also an eyesore.

Hence, those skilled in the art are striving to provide an improved umbilical mini cord clamp.

Summary of the Invention

The above and other problems are solved and an advance in the art is made by an umbilical cord clamp in accordance with this invention. A first advantage of an umbilical
5 cord clamp in accordance with this invention is that the umbilical cord clamp is smaller than current known umbilical cord clamps. Hence, it is less obstructive when cleaning the area around the belly button of a newborn baby. A second advantage of an umbilical cord clamp in accordance with this invention is that the umbilical cord clamp is able to clamp an umbilical cord with ease using two fingers. A third advantage of an umbilical cord clamp in
10 accordance with this invention is that the umbilical cord clamp can accommodate various sizes of umbilical cords. A fourth advantage of an umbilical cord clamp in accordance with this invention is that the umbilical cord clamp cannot be tampered with and will secure the arms in a substantially closed position tightly gripping the umbilical cord of a newborn baby.

15 In accordance with embodiments of this disclosure, an umbilical cord clamp is provided in the following manner. The umbilical cord clamp comprises a first arm, a second arm, a third arm, a first bridge, a second bridge and a locking mechanism. Each arm has a V-shaped length. The first bridge bridges the first arm to the second arm while the second bridge bridges the second arm to the third arm. The locking mechanism has a first part
20 extending from a first end of the first arm and a second part extending from a first end of the third arm. The umbilical cord clamp is arranged such that when in an unclamped position, the first part and second part are apart from each other and when in a clamped position, the first part and second part are in a lock position whereby the first, second and third arms form a three-pointed star.

25 In accordance with an embodiment of this disclosure, each of the first, second and third arms has an inner surface forming an angle of approximately 120 degrees and an

outer surface, a rib along the outer surface and teeth along the inner surface. Further, the first, second and third arms are made of flexible material. Still further, the teeth of each arm defines a groove.

5 In accordance with an embodiment of this disclosure, the first bridge connects a second end of the first arm to a first end of the second arm. Further, the second bridge connects a second end of the second arm to a second end of the third arm.

10 In accordance with an embodiment of this disclosure, the first bridge is thicker in the middle portion compared to the ends connecting the first and second arms. Further, the second bridge is thicker in the middle portion compared to the ends connecting the second and third arms.

15 In accordance with an embodiment of this disclosure, the first part of the locking mechanism comprises a base and a flexible tongue extending from the base. Further, the flexible tongue has a strip of ratchet teeth.

20 In accordance with an embodiment of this disclosure, the second part of the locking mechanism comprises a box like socket having an entrance for receiving the flexible tongue. Further, the entrance has an inclined surface at a first side, and a flexible pawl extending from a second side opposite the first side and towards a bottom of the box like socket. The flexible pawl comprises a number of short bars for engaging the ratchet teeth. Still further, the flexible pawl is spaced away from the first side at a distance slightly less than the thickness of the flexible tongue.

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Brief Description of the Drawings

a third arm 230, a first bridge 240, a second bridge 250 and a locking mechanism 260. The first arm 210 and second arm 220 are joined by the bridge 240. The second arm 220 and third arm 230 are joined by the bridge 250. The first and second bridges 240 and 250 allows the first, second and third arms 210-230 to be movable from an unclamped position as shown in Figure 1 to a clamped position as shown in Figure 2 where the umbilical cord clamp 200 forms a three-pointed star configuration.

Essentially, the umbilical cord clamp comprises three flexible arms joined in series by two bridges to form a length with two open ends and a locking mechanism at the two open ends of the length adapted to lock the umbilical cord clamp in the clamped position. Further details of the umbilical cord clamps will now be described below with reference to Figures 3-8.

Arms

Each of the first arm 210, second arm 220 and third arm 230 is in a V-shaped configuration forming a three-pointed star when in the clamped position.

Figure 8 illustrates a cross sectional view along the line A-A in Figure 4 and viewed in the direction of the arrows. While Figure 8 is a cross sectional view of the third arm 230, the cross sectional view of the teeth, groove and rib of each of the three arms are the same and therefore is applicable to illustrate the ribs 211-231, teeth 212-232, and grooves 214-234.

The first arm 210 has a V-shaped length having an inner surface forming an angle of approximately 120 degrees and an outer surface. A rib 211 is provided along the outer surface of the first arm 210 to strengthen the first arm 210. Teeth 212 are provided along a length of the inner surface of the first arm 210 for gripping the umbilical cord. Particularly,

teeth 212 are provided along the perimeter of the inner surface of the first arm 210, forming a groove 214 within the perimeter. The groove 214 is defined along the length of the inner surface and within the teeth 212. With the groove 214, the teeth 212 provide a better grip of the umbilical cord when the umbilical cord clamp is in the clamped position. A male part 261 of the locking mechanism extends from one end of the first arm 210. The other end of the first arm 210 is connected to the first bridge 240.

The second arm 220 has a V-shaped length having an inner surface forming an angle of approximately 120 degrees and an outer surface. A rib 221 is provided along the outer surface of the second arm 220 to strengthen the second arm 220. Teeth 222 are provided along a length of the inner surface of the second arm 220 for gripping the umbilical cord. Particularly, teeth 222 are provided along the perimeter of the inner surface of the second arm 220, forming a groove 224 within the perimeter. The groove 224 is defined along the length of the inner surface and within the teeth 222. With the groove 224, the teeth 222 provide a better grip of the umbilical cord when the umbilical cord clamp is in the clamped position. One end of the second arm 220 is connected to the first bridge 240 while the other end is connected to the second bridge 250.

The third arm 230 has a V-shaped length having an inner surface forming an angle of approximately 120 degrees and an outer surface. A rib 231 is provided along the outer surface of the third arm 230 to strengthen the third arm 230. Teeth 232 are provided along a length of the inner surface of the third arm 230 for gripping the umbilical cord. Particularly, teeth 232 are provided along the perimeter of the inner surface of the third arm 230, forming a groove 234 within the perimeter. The groove 234 is defined along the length of the inner surface and within the teeth 232. With the groove 234, the teeth 232 provide a better grip of the umbilical cord when the umbilical cord clamp is in the clamped position. A female part

265 of the locking mechanism 260 extends from one end of the third arm 230. The other end of the third arm 230 is connected to the second bridge 250.

The first and third arms 210 and 230 are identical in shape. One skilled in the art will recognise that the umbilical cord clamp 200 is not limited to 3 arms and may be modified to include more than 3 arms without departing from the disclosure. Further, one skilled in the art will recognise that the teeth in each arm may define more than one groove. In other words, multiple grooves may be provided for each arm.

When in the clamped position as shown in Figures 2 and 5-6, the teeth of the three arms flatten and tightly grip the umbilical cord, with a portion of the umbilical cord trapped within the grooves. The arms are made of flexible material. This provides allowance for clamping various thicknesses of the flattened umbilical cords.

Bridges

The first bridge 240 bridges the first arm 210 to the second arm 220. The first bridge 240 is flexible and shape of an arc with two ends 241 and 242. Each of the two ends 241-242 is connected to respective ends of the first and second arms 210 and 220. As shown in Figures 3 and 4, the first bridge 240 is thicker at the middle portion 243 than at the two ends 241-242. As shown in Figure 7, this shifts the center of rotation between the first and second arms 210 and 220 to respective ends 241-242. In other words, the first end 241 forms a center of rotation for the first arm 210 while the second end 242 forms a center of rotation for the second arm 220.

The second bridge 250 bridges the second arm 220 to the third arm 230. The second bridge 250 is flexible and shape of an arc with two ends 251 and 252. Each of the two ends 251-252 is connected to respective ends of the second and third arms 220 and

230. As shown in Figures 3 and 4, the second bridge 250 is thicker at the middle portion 253 than at the two ends 251-252. This shifts the center of rotation between the second and third arms 220 and 230 to respective ends 251-252. In other words, the first end 251 forms a center of rotation for the second arm 220 while the second end 252 forms a center of rotation for the third arm 230.

Locking mechanism

The locking mechanism consists of a male part 261 extending from one end of the first arm 210 and a female part 265 extending from one end of the third arm 230.

The male part 261 comprises a base 262 and a flexible tongue 263 extending from the base 262. The flexible tongue 263 has a strip of ratchet teeth 264. The female part 265 comprises a box like socket 266 having an entrance 268 for receiving the flexible tongue 263. The entrance 268 has an inclined surface 269 at a first side so that the flexible tongue 263 can be guided into the box like socket 266. This eases the insertion of the flexible tongue 263 into the box like socket 266.

Flexible pawl 267 extends from a second side opposite the inclined surface 269 and towards the bottom 2691 of the box like socket 266. The flexible pawl 267 comprises a number of short bars 270 for engaging the ratchet teeth 264. The flexible pawl 267 is spaced away from the first side at a distance slightly less than the minimum thickness of the flexible tongue 263 so that when the flexible tongue 263 is inserted into the box like socket 266, the flexible pawl 267 will be flexed towards the second side, and when the flexible tongue 263 attempts to escape from the box like socket 266, the short bars 270 on the flexible pawl 267 engages and interlocks with the ratchet teeth 264 of the flexible tongue 263, preventing the male part 261 from moving apart from the female part 265.

In the unclamped position, the male part 261 and female part 265 are apart from each other. To lock the umbilical cord clamp 200, the first arm 210 and the third arm 230 are brought together. This causes the flexible tongue 263 to be inserted into the box like socket 266. As the ratchet teeth 264 engages with the short bars 270 on the flexible pawl 267 in the box like socket 266, the first and third arms 210 and 230 are prevented from moving apart from each other. This ensures that the umbilical cord clamp 200 cannot be tampered with and will secure the arms in a substantially closed position tightly gripping the umbilical cord of a newborn baby. Such a locking mechanism allows for tightening and clamping of an umbilical cord of a reasonable size range.

For some reasons, if the umbilical cord clamp 200 has to be removed, a user can do so by cutting either of the bridges 240 and 250.

The umbilical cord clamp 200 is arranged such that with only one locking mechanism integrated together with the arms and bridges in series, allows a user to clamp an umbilical cord in one snap by applying force to ribs 211 and 231 with two fingers. Thus, the umbilical cord clamp 200 is easy to use, especially so when midwives are wearing surgical gloves.

The first arm 210, second arm 220 and third arm 230 are of a certain length so that when the male part 261 and female part 265 are wide apart from each other, the gap defined by the teeth of the first arm 210, second arm 220 and third arm 230 is wide enough to accommodate various sizes of umbilical cords.

Advantageously, each of the three arms is shorter than the arm of the typical V-shaped umbilical cord clamps. This eliminates the need for arms having extended length as required for the typical V-shaped clamps to achieve a sufficient opening size. Hence, the

overall size umbilical cord clamp 200 is relatively smaller than most of the other umbilical cord clamps. Further, a smaller umbilical cord clamp is desired as it is less obstructive when cleaning the area around the belly button of a newborn baby. Still further, having three arms allow the umbilical cord to spread more evenly in different directions during the clamping process, making it easier to close.

The umbilical cord clamp 200 has numerous unique features. It is smaller and lighter than current known umbilical cord clamp; cheap and yet easy-to-use medical device which allows the medical service personnel to attempt other activities sooner. Thus, promotes efficiency of medical service personnel.

The umbilical cord clamp 200 is manufactured as a unitary piece. Nevertheless, one skilled in the art will recognise that the arms, bridges and locking mechanism of the umbilical cord clamp 200 may also be manufactured separately and joined by known means.

The above is a description of exemplary embodiments of an apparatus for clamping umbilical cord in accordance with this invention. It is foreseeable that those skilled in the art can and will design alternative clamps based on this disclosure.

Claims

1. An umbilical cord clamp comprising:
a first arm, a second arm, and a third arm, each arm having a V-shaped length;
5 a first bridge bridging the first arm to the second arm;
a second bridge bridging the second arm to the third arm; and
a locking mechanism having a first part extending from a first end of the first arm
and a second part extending from a first end of the third arm, the umbilical cord clamp is
arranged such that when in an unclamped position, the first part and second part are apart
10 from each other and when in a clamped position, the first part and second part are in a lock
position whereby the first, second and third arms form a three point star.
2. The umbilical cord clamp according to claim 1 wherein each of the first, second and
third arms has an inner surface forming an angle of approximately 120 degrees and an
15 outer surface, a rib along the outer surface and teeth along the inner surface.
3. The umbilical cord clamp according to any one of claims 1-2 wherein the first,
second and third arms are made of flexible material.
- 20 4. The umbilical cord clamp according to any one of claims 1-3 wherein the teeth of
each arm define a groove.
5. The umbilical cord clamp according to any one of claims 1-3 wherein the first bridge
connects a second end of the first arm to a first end of the second arm.
- 25 6. The umbilical cord clamp according to any one of claims 1-5 wherein the second
bridge connects a second end of the second arm to a second end of the third arm.

7. The umbilical cord clamp according to any one of claims 1-6 wherein the first bridge is thicker in the middle portion compared to the ends connecting the first and second arms.

5 8. The umbilical cord clamp according to any one of claims 1-7 wherein the second bridge is thicker in the middle portion compared to the ends connecting the second and third arms.

9. The umbilical cord clamp according to any one of claims 1-8 wherein the first part of
10 the locking mechanism comprises a base and a flexible tongue extending from the base.

10. The umbilical cord clamp according to claim 9 wherein the flexible tongue has a strip of ratchet teeth.

15 11. The umbilical cord clamp according to claim 10 wherein the second part of the locking mechanism comprises a box like socket having an entrance for receiving the flexible tongue.

12. The umbilical cord clamp according to claim 11 wherein the entrance has an inclined
20 surface at a first side, and a flexible pawl extending from a second side opposite the first side and towards a bottom of the box like socket.

13. The umbilical cord clamp according to claim 12 wherein the flexible pawl comprises a number of short bars for engaging the ratchet teeth.

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14. The umbilical cord clamp according to claim 13 wherein the flexible pawl is spaced away from the first side at a distance slightly less than the thickness of the flexible tongue.