Introduction
The umbilical cord connects the developing fetus to the mother through the placenta six weeks gestation until birth, by supplying the developing fetus with oxygen, and nutrition, and a means of waste elimination while in the womb (WHO 1998, Hernandez & Hernandez 2005). The umbilical cord is made up of blood vessels (2 arteries and 1 vein), covered by a mucoid connective tissue called Wharton’s Jelly and a thin mucous membrane, which is bathed in amniotic fluid.

Definition of Umbilical Cord Care
After birth, the cord is clamped and then cut at approximately 2-4cm from the infants' abdominal wall to avoid pinching the skin and occlude the umbilical vessels (Dore et al 1998). The remaining stump should be classified as a healing wound and cared for in order to prevent bleeding, and reduce the risk of infection (Garcia-Gonzalez & Rivera-Rueda 1998, WHO 1998, Hockenberry et al 2003).

Guidelines for Umbilical Cord Care
The process of normal cord separation involves the stump turning from yellowish/green to brown/black with some moistness, a ‘mucky/sticky’ appearance, raw and/or an odour remaining for a day or two before becoming hard and drying out (Dore et al 1998). These signs do not necessarily indicate infection, however, the necrotic tissue of the umbilical cord remains an excellent medium for bacterial growth from the material of the genital tract and/or from the environment all of which is in close proximity to the umbilical vessels. Umbilical cord care is carried out from birth until the stump separates as it dries out and eventually falls off. This occurs within approximately the first 10 to 15 days of life, with the time being influenced by the method of care used (Garcia-Gonzalez & Rivera-Rueda 1998, Johnston et al 2003).

Indications for Umbilical Cord Care
Umbilical cord treatments vary from, isopropyl alcohol, povidone-iodine (bethadine), antibiotic/antimicrobial ointments, triple dye, chlorohexidine, soap and water, breast milk, to no treatment at all (Zupan et al 2004, Vural & Kisa 2006). However, no definitive regimen of cord care could be demonstrated as superior (McConnell 2004, Zupan et al 2004, Dore et al 1998, White & Denyer 2006). As with antimicrobial and antiseptic treatments (Barclay et al 1993; Dore et al 1998; Garcia-Gonzalez & Rivera-Rueda 1998, WHO 1998), drying, infarction, bacterial contamination, and the presence of granulocytes can influence and delay the timing of umbilical stump separation (Lund et al 1999). This has practical implications as longer separation times may increase the risk of infections (Anderson 2004). Therefore, Zupan et al (2004) advocate natural drying of umbilical cord stumps for healthy, term babies at low risk of infection. Despite this, McConnell et al (2004) states that while there appears to be little to support continuing alcohol use, there is also insufficient evidence to support the immediate change to natural drying for cord care. Furthermore, due to the changing landscape of microbes and higher prevalence of multiresistant organisms, dry cord care may not be suitable within healthcare institutions (Janssen et al 2003, WHO 1998). In the neonatal and premature infant population within critical care setting, WHO (1998) and Zupan et al (2004) recommend the application of topical antimicrobials to the umbilical stump to prevent and reduce the incidence of umbilical colonisation with pathogenic bacteria and cross-infection as a result of nosocomial infections. Therefore, while clinical judgement must be used at all times, O’Connor (2007, 2009) recommends that the type of umbilical cord care used for infants within OLCHC is dependent on the following criteria:

<table>
<thead>
<tr>
<th>Umbilical cord care with alcohol swabs</th>
<th>Umbilical cord care with sterile H2O and sterile gauze</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants with recent groin / abdominal / thorax surgery within 2 weeks of birth</td>
<td>Neonate (36/40 gestational age or 4 weeks post delivery)</td>
</tr>
<tr>
<td>Infants with fulminant sepsis</td>
<td>Premature infants (&lt; 36 weeks gestation)</td>
</tr>
<tr>
<td>Term Infants with umbilical venous/arterial catheter</td>
<td>Low Birth Weight (LBW) Infants &lt;2500g</td>
</tr>
<tr>
<td>Very Low Birth Weight (VLBW) infants &lt;1500g</td>
<td>Extremely Low Birth Weight (ELBW) infants &lt;1000g</td>
</tr>
</tbody>
</table>

Some infants may not clearly meet these criteria and care must always be individualised. It is therefore recommended that, if in doubt, seek advice and guidance from the CNS (Neonatal) and /or Neonatal consultant on call to ensure best practice is provided.
### Complications associated with Umbilical Cord

- Omphalitis (inflammation or infection of umbilical stump)
- Thrombophlebitis necrotizing faciitis
- Sepsis
- Bacterial multiresistance
- Toxicity
- Umbilical haemorrhage
- Neonatal tetany
- Patent urachus
- Severe jaundice
- Umbilical granuloma


### Equipment

- Alcohol swabs X 3 – 5 OR Sterile H2O and sterile gauze
- Topical medication, as prescribed
- Powder free non-sterile gloves
- Cord Clamp Remover (only if required, see below)

### ACTION

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE &amp; REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure the infant is comfortable and in a warm, draught free area</td>
<td>To help maintain a trusting relationship between the child and nurse and maintain the infants thermoregulation (Hockenberry et al. 2003)</td>
</tr>
<tr>
<td>Explain procedure to parent/guardian, if present.</td>
<td>To obtain verbal consent from the parents/guardians, and ensuring that the philosophy of family centred care which recognises that family is the constant in a child’s life is maintained (Hockenberry et al. 2003).</td>
</tr>
<tr>
<td>Attend to umbilical care after each nappy change.</td>
<td>To prevent the risk of cross contamination from nappy area to the umbilical area (Hernandez &amp; Hernandez 2005)</td>
</tr>
<tr>
<td>It is recommended that all Premature, LBW, VLBW and ELBW Infants should have umbilical care performed while performing other nursing care</td>
<td>Minimal handling is a basic principle of care for this population, as frequent disturbance may lead to hypoxia and health deterioration (Roberton 1996).</td>
</tr>
<tr>
<td>Wash hands at Aseptic Non-Touch Technique (ANTT) level 3 following nappy change.</td>
<td>To prevent cross infection (CDC 2002, OLSCH 2005; OLCHC 2007)</td>
</tr>
<tr>
<td>Prepare sterile field at Level 3 ANTT by opening either:- • alcohol swabs into an open alcohol swab packaging.</td>
<td>To create a sterile field (Dougherty &amp; Lister 2004, OLCHC 2007)</td>
</tr>
<tr>
<td>or • sterile gauze and moisten with sterile H2O solution</td>
<td>To prevent cross infection and reduced the incidence of cord stump contamination (OLSCH 2005; OLCHC 2007; Pezzati et al. 2003)</td>
</tr>
<tr>
<td>Wash hands, as above and apply non-sterile gloves.</td>
<td>The cord clamp usually falls off with the dried umbilical stump by day 10 – 15 (Dore et al 1998).</td>
</tr>
<tr>
<td>Cord clamps are not usually removed. However, if by Day 3 the umbilical stump is dry and the surrounding skin is assessed as being at risk of damage due to skin irritation or pressure, the clamp can then be removed using the cord clamp remover.</td>
<td>Careful umbilical assessment can help to identify if infection is present (Donovan 1998, Dore et al 1998)</td>
</tr>
<tr>
<td>Assess umbilical stump and cord for evidence of healing: • yellowish/green to brown/black</td>
<td>To optimise early detection of localised umbilical infection and prompt treatment before a local infection becomes generalised (Johnston et al 2003, McConnell et al 2004)</td>
</tr>
<tr>
<td>• some moistness,</td>
<td></td>
</tr>
<tr>
<td>• a ‘mucky/sticky’ appearance,</td>
<td></td>
</tr>
<tr>
<td>• raw</td>
<td></td>
</tr>
<tr>
<td>• and/or an odour remaining for a day or two before becoming hard and drying out</td>
<td></td>
</tr>
<tr>
<td>Observe the umbilicus and surrounding area for signs of infection or periumbilical erythema ie. redness, odour, oozing, discharge and/or build up of exudates.</td>
<td></td>
</tr>
</tbody>
</table>
If the area surrounding the umbilicus becomes red, swollen, broken or has a discharge, it may be necessary to take a swab for culture and sensitivity.

Note: the signs of a healing umbilicus and an infected umbilicus are similar. (Seek advice from the CNS (Neonatal) and/or Neonatal Consultant on Call as clinically indicated).

Using either:
- alcohol swabs,
- or
- sterile gauze moistened with sterile H2O, clean around the umbilical stump at skin level in a clockwise circular direction.

Cleaning should start at the umbilical stump and working outwards for at least 5cms and ensure that the cord clamp is clean if present.

Allow area to dry.

If infection is proven to be present, administer prescribed medication (topical creams / ointments).

Fold down and secure the nappy below the level of the umbilical cord.

Avoid applying any non prescribed creams, ointments, oils or lotions to the umbilical stump or cord area.

Dispose of all equipment ie umbilical stump and cord clamp, appropriately.

Wash hands at Level 3 ANTT.

Educate the parent(s)/guardian(s) about the procedure, if appropriate.

Record the procedure in infant’s nursing notes and report changes that may require alternative intervention or treatment to the appropriate nursing / medical personnel.

To successfully perform a swab (OLSCH 2003, Mohammed & Trigg 2006)

In accordance with the infants clinical condition and gestational age (O’Connor 2007)

Prevents contamination from soiled part of the site (Dougherty & Lister 2004)

To ensure that the whole site is thoroughly cleaned (Trigg & Mohammeh 2006)

To ensure maximum efficacy of alcohol (Dougherty & Lister 2004) and prevent moisture accumulation on the cord (McConnell et al 2004)

In adherence with Medication Policy (An Bord Altranais 2007, OLCHC 2006)

To prevent unnecessary friction, irritation or moisture accumulation on the cord (McConnell et al 2004, Hernandez & Hernandez 2005)

These can influence and delay the timing of umbilical stump separation times (McConnell et al 2004)

To promote safety and prevent cross infection (OLSCH 2005)

To prevent the spread of infection (Infection Control Department, 2005, OLCHC 2007)

Early discharge has increased the need for parents to receive accurate, relevant information on how to care for their newborn infants when discharged from hospital, and to promote family centred care approach to care (Casey 1995, Ford & Ritchie 1999)

Maintains accountability through accurate recording of nursing intervention, in accordance with the Guidelines for Good Documentation (An Bord Altranais 2002)

REFERENCES


