

# DEFERRED CORD CLAMPING



<b>TARGET AUDIENCE</b>	Consultants O&G and Paediatrics/Neonatology All trainee in O&G and Paediatrics/Neonatology Midwives and neonatology staff nurses.
<b>PATIENT GROUP</b>	All babies delivered in Lanarkshire .

## Clinical Guidelines Summary

Placental transfusion is the physiological process during which at birth, umbilical blood flow continues to flow from the placenta to the baby.

Deferred cord clamping (DCC) refers to the practice whereby babies remain attached to the umbilical cord to allow placental transfusion, while they transition to ex-utero life.

National and international guidance is overwhelmingly supportive of the practice of DCC, which is widely recognised as a gold standard of care for both preterm and term infants. The World Health Organisation, National Institute for Clinical Excellence, Cochrane Library, Royal College of Obstetricians and the British Association of Perinatal Medicine, among others, all recommend waiting **at least 60 seconds** before clamping the umbilical cord, and do not advocate immediate cord clamping. This is based on evidence demonstrating both short and long term benefits and crucially, a significant reduction in mortality in preterm infants.

This guideline will update you on the latest evidence on DCC, the eligible babies, contraindications, the best recommendations for practice

## DEFERRED CORD CLAMPING

### Introduction

Deferred cord clamping (DCC) refers to the practice whereby babies remain attached to the umbilical cord to allow placental transfusion, while they transition to ex utero life.

Various terms and durations are used to describe this process interchangeably, including delayed and optimal cord clamping or management. For the purposes of this guideline, we will use the term deferred cord clamping, whereby the baby remains attached to the cord for at least 60 seconds after birth. National and international guidance is overwhelmingly supportive of the practice of DCC, which is widely recognised as a gold standard of care for both preterm and term infants.

The World Health Organisation, National Institute for Clinical Excellence, Cochrane Library, Royal College of Obstetricians and the British Association of Perinatal Medicine, among others, all recommend waiting **at least 60 seconds** before clamping the umbilical cord, and do not advocate immediate cord clamping. This is based on evidence demonstrating both short- and long-term benefits and crucially, a significant reduction in mortality in preterm infants.

### Fetal Adaptations to Neonatal Life

Postnatal transition is a vast and complex physiological process whereby newborns must adapt from an environment of full placental support to complete self-maintenance. Dramatic respiratory and circulatory changes must occur rapidly and are crucial for survival. While these changes are well described, additional focus has now been brought to the critical timing of these events, with a greater understanding of the integral relationship between lung aeration, pulmonary blood flow and cardiac output. Placental transfusion via DCC is vital in supporting these processes to ensure a successful and stable transition to ex utero life

At birth, lung expansion via breathing and crying decreases pulmonary vascular resistance and therefore increases the blood flow directed to the pulmonary circulation. Clamping the cord disrupts oxygenated blood flow from the umbilical vein, reducing neonatal cardiac preload by up to 40%. It also occludes the umbilical arteries and increases cardiac afterload by increasing peripheral vascular resistance. The overall effect is reduced cardiac output.

DCC allows blood from the placental circulation to be transfused passively into the neonatal circulation to facilitate a more physiological transition from fetal to neonatal transition. It does this by minimising swings in cardiovascular pressures. This is in contrast to ICC, where blood must be redirected from other organ systems, leading to their under perfusion and swings in blood pressure impacting on cerebral perfusion.

The transfer of blood to the neonate postnatal via the umbilical vessels is termed “placental transfusion”. DCC can provide an additional 80-100ml of blood to the term neonate, which increases its blood volume to 90ml/kg of body weight, versus 65-75ml/kg in fetal life.

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027

## DEFERRED CORD CLAMPING

### Physiological based cord clamping

(PBCC) is also an emerging practice, which brings additional focus to the timing of cord clamping in relation to lung aeration. PBCC allows generous placental transfusion through DCC, while supporting initiation of respiration and establishment of pulmonary blood flow. PBCC has been shown to allow a smoother transition, by supporting an increase in pulmonary blood flow, maintaining systemic blood flow and providing a more stable cerebral haemodynamic transition with less hypoxia and bradycardia.

Another study found PBCC stabilised core temperature at delivery when compared to those who had immediate cord clamping. Further observational studies demonstrated increased mortality, increased risk of chronic lung disease and severe IVH if the cord is clamped prior to onset of breathing. Through these physiological processes, preterm babies who receive placental transfusion benefit from a significant reduction mortality of one third, as well as less brain haemorrhage, hypotension, anaemia, NEC and sepsis.

### Umbilical Cord Milking

Only for babies  $\geq 28$  weeks Umbilical cord milking (UCM) is the practice whereby where the cord is grasped and blood is pushed toward the baby prior to clamping of the cord, achieving placental transfusion in approximately 20 seconds. The exact technique varies between studies, a milking around 20cm every 2 seconds, performed 3-5 times, is the most frequently described process in the literature. Cord milking has been proposed as an alternative to DCC in certain situations, whereby placental transfusion can be achieved quickly in compromised or preterm infants who require resuscitation OR where cord clamping needs to be expedited due to maternal health issues.

**Not** recommended for babies  $< 27$  weeks (evidence of increase rate of severe IVH in this group)

### Benefits in Preterm Infants

The benefits of DCC are vast, and critical to improving outcomes in the preterm population. Several high-quality studies have clearly demonstrated both short and long term positive impacts of DCC and the stark evidence requiring a change to our practice. This includes:

- Reduction in mortality of up to 32%.

For every 33 babies born  $\leq 32$  weeks who receive at least 60 seconds of DCC, there is one additional survivor. In infants  $\leq 28$  weeks the NNB reduces to 20.

- Reduction in intraventricular haemorrhage.
- Reduction in late onset sepsis.

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027

## DEFERRED CORD CLAMPING

- Reduction in necrotising enterocolitis.
- Improvement in blood pressure with reduced need for inotropic support.
- Reduction in need for blood transfusion by 10%.

An additional 20-30mg/kg of iron is made available with DCC, which is sufficient for the metabolic needs of a neonate for the first 3-6 months of life

- Lower risk of severe neurodevelopmental impairment at 22-26 months.

## Multiple Gestations

Several studies have demonstrated that DCC can be **safely achieved** in multiple gestation pregnancies. Monochorionic (MCMA/MCDA) multiples present a unique challenge at delivery if there is concern around Twin-To-Twin Transfusion Syndrome. Many studies therefore excluded this group of babies. However, recent small studies have shown DCC is feasible in both monochorionic and dichorionic/trichorionic multiples, with comparable neonatal outcomes in preterm singletons and multiples, first and second order multiples and monochorionic and dichorionic/trichorionic multiples. DCC can be **considered in all multiples**, and delivery plans should be made on an individual case bases with by an experienced perinatal team. **(NEW 2024)**

## Contraindications to DCC

**All babies will be eligible** for delayed cord clamping unless there is an absolute contraindication. In reality, there are very few situations whereby deferred cord clamping is not safe or achievable. The only true contra-indications whereby DCC is not recommended are in cases of:

- Massive maternal haemorrhage, with the need for acute resuscitation
- Cord issues - such as ruptured vasa praevia, a snapped cord or lack of cord integrity, all of which could lead to significant bleeding from the baby.

## Compromised Infants

When babies are compromised at birth, the team must use their clinical judgement as to when is appropriate to clamp the cord. It is important to remember that in the absence of major haemorrhage or issues with cord integrity, compromised babies are likely to benefit from DCC, and their ability to transition may be hampered further by clamping early. In babies where there is a delay in establishing breathing, they are likely to receive substantial benefit from DCC<sup>15</sup>. Preterm babies are a particularly vulnerable group to highlight. As they may not be vigorous at birth, this often leads to anxiety and early clamping of the cord. However these infants are expected to have the greatest benefit from placental transfusion, and can potentially be harmed by ICC. We therefore must reframe any misconceptions around DCC, understand the physiology, and do our utmost to achieve **a minimum of 60 seconds DCC**. Where there are signs of life, but concerns regarding the

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027

## DEFERRED CORD CLAMPING

condition of the baby, we can initiate resuscitation by stimulating the baby, drying or placing them in a plastic bag if premature, and opening the airway to help with lung aeration. If there are no signs of life, resuscitation should not be delayed. However it is worth considering that in settings where resources are available, e.g. LifeStart™ trolley or similar, resuscitation can be commenced with an intact cord, which can allow the baby to achieve the benefits of placental transfusion and aid in their resuscitation.

### Recommendations for Practice

- The (resuscitaire) clock should be started at the time of delivery
- Ensure the neonate is kept adequately warm following delivery
  - The environmental temperature should be 24-26°C (aiming >25°C)
  - Dry the neonate and either cover or wrap them
  - Deliver preterm neonates <33 weeks into a plastic bag
- Vaginal delivery
  - Rest the neonate either below the level of the perineum or onto the mother's abdomen or chest (this does not negatively impact placental transfusion and improves bonding with immediate skin to skin)
- Caesarean section
  - Rest the neonate below the level of the incision, in-between the mother's legs
  - Position the neonate's head higher than its body
- Assess the condition of the neonate
  - Palpate the cardiac apex and ensure heart rate is >100bpm
  - Neonates who do not breathe spontaneously should initially be stimulated by rubbing the back 2-3 times.
- Duration of delay
  - Healthy term neonates: at least 1 minute or until the cord stops pulsating
  - Preterm neonates in good condition: up to 3 minutes.
- Consider "milking the cord" where DCC is not possible due to neonatal condition
  - Strip a 20cm length of cord towards the neonate three times (2 seconds each time) prior to clamping.
- Clear communication between teams is crucial; it is good practice to jointly form a plan pre-delivery, which may change rapidly depending on neonatal condition
- Document the time of cord clamping in the neonatal resuscitation and maternal labour notes (on BADGER).

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027

## DEFERRED CORD CLAMPING

### References

1. RCOG. Clamping of the Umbilical Cord and Placental Transfusion (Scientific Impact Paper No. 14). February 2015.  
(<https://www.rcog.org.uk/globalassets/documents/guidelines/scientific-impact-papers/sip-14.pdf>)
2. Uwins C., Hutcheon DJR. Delayed umbilical cord clamping after childbirth: potential benefits to baby's health. Paediatric health, Medicine and Therapeutics 2014;5 161-171  
(<https://core.ac.uk/download/pdf/25518576.pdf>)
3. WHO. Guideline: Delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes. Geneva, World Health Organization; 2014.  
([http://www.who.int/nutrition/publications/guidelines/cord\\_clamping/en/](http://www.who.int/nutrition/publications/guidelines/cord_clamping/en/))
4. Resuscitation Council UK. Guidelines: Resuscitation and support of transition of babies at birth. 2015.  
(<https://www.resus.org.uk/library/2015-resuscitation-guidelines/resuscitation-and-support-transition-babies-birth>)
5. BAPM. Improving normothermia in very preterm infants: A Quality improvement toolkit. 2019. (<https://www.bapm.org/pages/105-normothermia-toolkit>)
6. MCN for Neonatology ,West of Scotland Neonatal Guideline

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027

## DEFERRED CORD CLAMPING

### Appendices

#### 1. Governance information for Guidance document

<b>Lead Author(s):</b>	Khadeeja Ahmed for update
<b>Endorsing Body:</b>	Maternity Clinical effectiveness Group
<b>Version Number:</b>	5
<b>Reviewed by</b>	Khadeeja Ahmed
<b>Review Date:</b>	December 2024
<b>Approval date</b>	December 2027
<b>Responsible Person (if different from lead author)</b>	S Kalyanasundaram (Consultant Neonatologist), Evelyn Ferguson (Consultant Obstetrician)

CONSULTATION AND DISTRIBUTION RECORD	
<b>Contributing Author / Authors</b>	AhmedS Kalyanasundaram (Consultant Neonatologist), Evelyn Ferguson (Consultant Obstetrician)
<b>Consultation Process / Stakeholders:</b>	Maternity CEG Process
<b>Distribution</b>	All in Maternity and Neonatology

#### CHANGE RECORD

Date	Lead Author	Change	Version
------	-------------	--------	---------

<b>Lead Author</b>	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	<b>Date approved</b>	4/12/2024
<b>Version</b>	4	<b>Review Date</b>	4/12/2027

## DEFERRED CORD CLAMPING

December 2011	S Kalyanasundaram (Consultant Neonatologist), Evelyn Ferguson (Consultant Obstetrician)	<i>original</i>	1
June 2016	S Maharaj	Update	2
December 2020	Dr M Simonian, Dr Ferguson, Dr Delahunty and Dr Anenih	Update	3
December 2024	Dr K Ahmed	Update Title change to "Deferred from Delayed"	4
			5

Lead Author	Khadeeja Ahmed, S Kalyanasundaram , Evelyn Ferguson	Date approved	4/12/2024
Version	4	Review Date	4/12/2027