

## POSITION STATEMENT

### Optimal Management of the Umbilical Cord at the Time of Birth

It is the position of the American College of Nurse-Midwives that

- Optimal management of the umbilical cord at the time of birth, also known as physiologic-based cord clamping, should include waiting to clamp the cord during the first few minutes of life in all birth settings for term and preterm newborns. Promising research suggests that resuscitation can be done safely with an intact umbilical cord.<sup>1</sup>
- Physiologic-based cord clamping results in a placental transfusion, or return of the infant's own blood, and facilitates transition to extrauterine life by increasing birth weight, blood volume, hemoglobin concentration, and ferritin levels, thereby increasing infant iron stores out to 4 to 8 months of age.<sup>2-5</sup>
- For term newborns, waiting for at least 3 to 5 minutes ensures the greatest benefit. If the newborn is placed skin to skin, above the level of the placenta, waiting the full 5 minutes (or longer) is preferred.<sup>6,7</sup>
- For preterm newborns, the benefits of waiting for 30 to 180 seconds include a significant risk reduction in intraventricular hemorrhage, a reduced need for blood transfusion, and a reduction in hospital mortality by approximately 30%.<sup>8-12</sup> Infants born at less than 32 weeks' gestation who received physiologic-based cord clamping have decreased risks of death and adverse neurodevelopmental outcomes at 2 years of age.<sup>12</sup>
- If early or immediate clamping is necessary for resuscitation or cesarean birth, milking the cord may benefit term newborns or preterm infants of greater than 28 weeks' gestation.<sup>6,10,13</sup> Cord milking in extremely preterm infants (<28 weeks' gestation) is not recommended because the practice may increase the risk for severe intraventricular hemorrhage.<sup>14</sup>
- Physiologic-based cord clamping does not increase the risk of developing tachypnea, clinical jaundice, or symptomatic polycythemia.<sup>3,8</sup>
- Physiologic-based cord clamping has not been associated with an increase in postpartum hemorrhage and should not delay the administration of oxytocic drugs as needed.<sup>3,11,15,16</sup>

- The practice of physiologic-based clamping should not affect a provider’s ability to manage the delivery of the placenta.<sup>11,15,16</sup>

## BACKGROUND

Clamping and cutting of the umbilical cord after birth is one of the oldest interventions in the birth process. Although the optimal timing for this has been debated since the mid-18th century,<sup>17</sup> early cord clamping (immediately or within one minute of birth) remains the dominant practice in most Western countries, including the United States. Only recently has physiologic-based cord clamping been embraced by some as a birth practice that offers benefit, not harm, to the newborn.<sup>15,17,18</sup> The practice of early cord clamping was widely introduced in the 1960s as part of active management of the third stage of labor.<sup>19</sup> Early cord clamping was advocated in response to concerns that a placental transfusion could lead to circulatory overload, resulting in respiratory distress, polycythemia, and jaundice.<sup>10</sup> This change in practice was never examined to determine whether there was any effect on the newborn.<sup>17</sup> Most recently, researchers using large, well-designed, randomized controlled trials have found that the above-mentioned complications do not occur in term<sup>2,7</sup> or preterm<sup>10</sup> newborns when physiologic-based cord clamping is performed.

Currently, there is no set definition of what constitutes early versus physiologic-based cord clamping.<sup>3,11,17</sup> However, several organizations have advocated waiting to clamp the cord at the time of birth. The World Health Organization recommends cord clamping at “not earlier than one minute, and [that] should be understood as the lower limit period supported by published evidence.”<sup>15</sup> The American College of Obstetricians and Gynecologists (ACOG) recommends a delay in cord clamping for at least 30 to 60 seconds in vigorous term and preterm infants.<sup>11</sup> The Royal College of Obstetricians & Gynecologists suggest to avoid early clamping unless the infant appears to be asphyxiated.<sup>20</sup> The UK National Institute for Health and Care Excellence recommends not to clamp the cord before one minute but to clamp before 5 minutes to perform controlled cord traction. If the postpartum person asks to delay clamping after 5 minutes, they should be supported as long as both the postpartum person and the infant are stable.<sup>21</sup>

Researchers have demonstrated that, at term, 25% to 30% of the total fetoplacental circulating blood volume is found in the placenta.<sup>22,23</sup> This blood is abundant in iron-rich red blood cells and hematopoietic stem cells. When the cord is left intact, circulation continues for several minutes after birth, and the amount of placental transfusion the newborn receives is influenced by several factors, such as duration of time the cord is left unclamped, gravity, and uterine contractions.<sup>8</sup> When the newborn is held at or below the level of the placenta, the placental transfusion is complete by 2 to 3 minutes and delivers a mean blood volume of 81 mL (range, 50-163 mL).<sup>22,23</sup> This additional blood increases birth weight, hemoglobin concentration, ferritin levels, and iron stores out to 4 to 8 months of age.<sup>2-5,18,24</sup> When the infant is placed skin to skin, which is slightly higher than the level of the placenta, a longer wait of 5 minutes is recommended. Placental

transfusion can be accelerated by holding the newborn below the level of the introitus for at least 2 minutes.<sup>6</sup> When the cord must be cut early to facilitate resuscitation or because of other emergent clinical situations, cord milking is a safe alternative to physiologic-based cord clamping in term infants and preterm infants of greater than 28 weeks' gestation.<sup>6,25,26</sup>

Physiologic-based cord clamping has been associated with an increased incidence of asymptomatic polycythemia, but treatment is not required.<sup>8</sup> Although the authors of one meta-analysis report that physiologic-based clamping is associated with an increased risk of jaundice requiring phototherapy,<sup>3</sup> other authors have found no differences in mean bilirubin levels between infants with early clamping and physiologic-based clamping.<sup>8</sup> There is no evidence to date that either asymptomatic polycythemia or newborn jaundice secondary to placental transfusion is associated with any long-term harm.<sup>8</sup> In contrast, early clamping can be associated with iron-deficiency anemia, which has the potential to negatively affect the developing human brain.<sup>24</sup>

Studies have also shown long-term benefits of physiologic-based cord clamping. For term infants, the benefits of waiting to clamp the cord include increased ferritin levels and iron stores, a decreased risk of iron-deficiency anemia, greater brain myelin volume at 4 and 12 months, significantly higher communication scores at 12 months, and improved neurodevelopmental scores at 4 years (more benefit was seen in boys).<sup>2,3,5,27-29</sup> Also, cord milking of preterm infants was associated with higher language and cognitive scores at 22 to 26 months of age.<sup>25</sup> In very preterm infants (<32 weeks' gestation at birth), Armstrong-Buisseret et al found that delayed clamping and immediate newborn care with an intact cord may lead to a reduced risk of death or adverse neurodevelopmental outcomes at 2 years of age.<sup>12</sup>

For preterm infants, waiting to clamp the cord (between 30 and 180 seconds) has substantial benefits<sup>11</sup>: it lessens the need for blood transfusion, decreases the risk of intraventricular hemorrhage, and reduces in-hospital mortality by approximately 30%.<sup>9,10</sup>

Although more research is needed, preliminary results indicate that umbilical cord milking may benefit the preterm infant ( $\geq 28$  weeks' gestation) when physiologic-based cord clamping is not feasible.<sup>14,26</sup> Although cord milking has been shown to significantly reduce the need for packed red blood cell transfusions, concerns have been raised about poor clinical outcomes with this practice.<sup>30</sup> In a 2019 study that was halted early because of its findings, very preterm infants (23-27 weeks' gestational age) experienced an increase in intraventricular hemorrhage compared with incidence in the delayed-cord-clamping group.<sup>14</sup> As a result of this study, cord milking is no longer recommended for extremely preterm infants (<28 weeks' gestation). There is insufficient evidence to either support or refute the use of umbilical cord milking in term infants or preterm infants born at 32 to 36 weeks' gestation.

Researchers have not found any evidence to suggest that waiting a few minutes to clamp the umbilical cord increases the incidence of postpartum hemorrhage,<sup>3,11</sup> and it is compatible with current recommendations for active management of the third stage of labor.<sup>11,15,16</sup>

When a tight nuchal cord is present, physiologic-based cord clamping can be accomplished with a technique known as the “somersault maneuver.” This is preferred over immediately clamping and cutting the cord before birthing the newborn’s body.<sup>31</sup> Infants with a tight nuchal cord are often hypovolemic and benefit by physiologic-based clamping, which facilitates the return of their placental blood for an easier transition to extrauterine life.<sup>26</sup>

The usual practice at cesarean birth is immediate or early cord clamping. However, infants born by cesarean birth can also benefit from a placental transfusion resulting from physiologic-based cord clamping or umbilical cord milking. Researchers initially reported that placental transfusion did not occur at the time of cesarean birth, but this was most likely associated with uterine atony and the use of general anesthesia.<sup>32</sup> In a small observational study, Farrar and colleagues demonstrated that a full placental transfusion does occur at cesarean birth, but the optimal timing of cord clamping remains unclear.<sup>23</sup> In the recent ACOG Committee opinion on delayed cord clamping, the authors state, “in the case of cesarean delivery, the newborn can be placed on the maternal abdomen or legs or held by the surgeon or assistant at close to the level of the placenta until the umbilical cord is clamped” to facilitate placental transfusion.<sup>11</sup> Another approach at the time of cesarean birth is to milk the umbilical cord. This approach is ideal for cesarean birth when time and speed are critical factors. Physiologic-based cord clamping and umbilical cord milking are approaches the clinician may consider at the time of cesarean birth to facilitate placental blood transfer to either the term or preterm newborn.<sup>8</sup>

Physiologic-based cord clamping is currently not provided (routinely) to infants who need immediate resuscitation. One reason for this is that the ability to resuscitate a newborn at the bedside involves the use of portable resuscitation equipment designed to be used while the cord is still intact. Emerging research suggests that beginning resuscitative efforts while the newborn is still attached to the cord poses no harm to the infant and may provide additional benefits and improved recovery. In one trial of term infants, resuscitative efforts with an unclamped cord were associated with a higher oxygen saturation, higher Apgar scores, and earlier initiation of breathing.<sup>33</sup>

## CONCLUSIONS

ACNM recommends that the optimal management of the umbilical cord at the time of birth is physiologic-based cord clamping. It should be adopted as the standard of care at the time of birth, across all birth settings, with all modes of delivery, and for both term and preterm newborns. For situations requiring resuscitation, or when waiting is not feasible, umbilical cord

milking may be of benefit particularly for the preterm newborn who is greater than 28 weeks' gestation at birth.

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