

Umbilical cord clamping is not a physiological necessity

Dear Editor,

Selkirk et al (2008) state that the umbilical cord clamp has 'evolved into a physiological necessity'. This is quite nonsensical for a number of reasons. Chiefly, physiological evolution takes place over thousands, perhaps millions of years, a timescale many times greater than the cord clamp has been available.

At best the cord clamp or any method of occluding the umbilical cord could be considered as an augmentation of the physiological process which occurs at birth. In-utero the placenta provides the supply of oxygen and after birth the oxygen supply is by the newborn infant's lungs. Transition from the placenta to the lungs must take place quickly but not instantly. The moment the baby is born, breathing movements result in air entering the lungs. This leads to a number of changes which are not completely understood. It is well established that in utero the pulmonary blood flow is low owing to a high vascular resistance, however, the placental circulation has a very low resistance. This differential in resistance results in a high flow through the placenta and a low flow through the pulmonary circulation.

It needs to be understood that in the fetus the two sides of the heart are working in parallel, which means that blood flow can be equally directed to the lungs, the placenta or any other organ depending on the resistance offered by that organ's circulation. In the adult, the two sides of the heart are working in series so that the output and blood flow from the right side of the heart through the lungs must equal exactly the output and flow through the systemic circulation. While the ductus arteriosus (and sometimes the foramen ovale) remain open in the first

few days after birth there is the opportunity for minor differences in output and flow.

Changes after breathing: physiological transition

After the first few breaths the pulmonary vascular resistance markedly falls and this leads to a high blood flow through the lungs. The output of the heart does not change so the output is reduced to the other organs, especially the placenta as a result of constriction within the umbilical arteries. Oxygenated blood returning from the lungs, together with bradykinins released from the pulmonary vessels leads to a constriction of the umbilical arteries. The two effects co-operate to redirect blood to the newborn infant's lungs and away from the placenta so that within a few minutes, sometimes in less than a minute in a vigorous baby, the pulmonary circulation is fully opened up and the placental circulation completely closed down. These changes were well recognized when the first cord clamp was invented exactly 110 years ago by Mcgennis (1899).

'The clamp incorporated a cutting mechanism within the clamp and the instructions included: 'The clamp having been opened, the cord when it has ceased to pulsate is placed between the blades, resting on the plain side; the knife edge is then pressed firmly down and retained in position by the catch. The clamp is removed a few seconds after application, and if the accoucheur is afraid of haemorrhage [although French authorities say there is no need for ligatures] he can tie the cord on either side of the clamp before releasing the catch.'

Nature has evolved the physiology of birth in mammals so that the transition from placental to pulmonary respiration takes place successfully. Anyone who has seen kittens or puppies being born knows that the mother chews through the cord and eats the placenta (Catworld, 2009). This happens in virtually all other mammals except humans. In some animals ingestion of the placenta is essential for successful lactation (Nadler et al, 1981).

Whether eating the placenta could have any such benefits in the human is open to question and we have no specific view on this. However there is no doubt that there are excellent physiological mechanisms which close off the umbilical cord after birth. There is no need for a physical closure of the cord as constriction in the blood vessels is quite sufficient to stop bleeding. If the cord is clamped before this constriction has taken place then bleeding from the cut end of the cord can occur. In addition, if the length of cord with constricted blood vessels adjacent to the umbilicus of the baby is short then bleeding is more likely.

In a Lotus birth (Ceallaigh, 2010) the placenta is delivered naturally, wrapped in a towel and kept with the baby. Over the next few days the placenta and cord dry and shrink. At this stage the cord can be cut or breaks naturally without any bleeding. At conventional birth if the clamp is not applied until the after cord pulsation and circulation has completely ceased and about two inches of cord are left on the baby, it seems unlikely that any bleeding will occur on removal of the clamp. The risk associated with cord prolapse is precisely because of the umbilical arterial constriction which

occurs when the umbilical cord is subjected to cold or handling.

Nature has made excellent preparation for transition from placental to pulmonary circulation at birth and for closure of the cord and placental circulation. Over the last few thousand years the process has been sanitised, perhaps civilised so that chewing the cord and eating the placenta is no longer necessary. The inconvenience of carrying around the placenta with the baby has also been overcome and as a precaution the cut end of the cord was clamped or tied.

The cord clamp is a physiological enhancement, a precaution to ensure that the umbilical cord does not bleed. The clamp must be applied correctly across the full width of the umbilical cord when the pulsation in the cord had ceased, otherwise the clamp should be considered a non-physiological intervention.

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