

## **The cord clamp: A monument to stupidity.**

(Third draft: refs not properly included. To get Professor Morley to check this, and give attribution to parts of his work used.)

In 1981, our birth plan included in writing, that our son's umbilical cord and placenta remain attached until all pulsing had stopped and the cord had shrunk. It was NOT to be clamped. The doctor had noted our request, but as soon as our son was put on my stomach, she immediately clamped the cord right by my vagina where I couldn't see it. However, I noted the direction of the midwife's glance: It was she who confirmed the cord had been clamped. I was furious, but could do nothing, as everyone's focus was on the damage their episiotomy had caused, in order to facilitate a face presentation.

Like so many other mothers who suffered under "active" (aggressive) third stage management, our son's placenta was manually removed.

First, let's talk definitions.

***Immediate cord clamping:*** This is when a clamp is put on the cord immediately, amputating a functioning placenta and depriving the baby of around 50% of its total blood volume.

There is no excuse for this. Neonatologists say that immediate cord clamping allows them to take the baby to a resuscitation table quicker, but there is absolutely no reason why this cannot be done right there with the mother, so that the baby can still get blood that is rightfully its own.

***Delayed cord clamping:*** This varies according to arbitrary paediatric "rules" such as "Wait a minute", two minutes (Hutton et al, 2007) and if you're lucky with staff day-dreaming, or a bit busy, maybe three minutes.

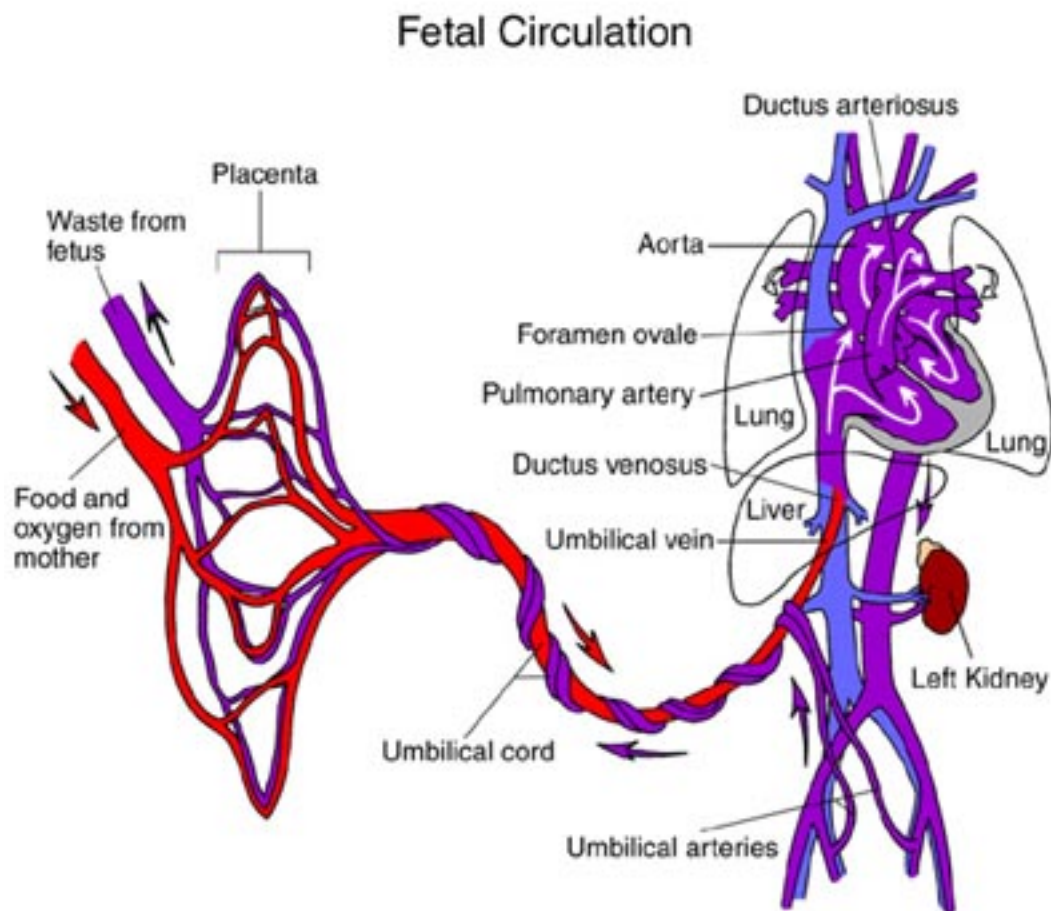
***Physiological (normal) cord closure:*** This is when the baby clamps the umbilical vein and arteries at various locations inside its own body after an optimal blood volume has been transfused into the baby. This is the same process that occurs in all other mammals born with an umbilical cord.

A baby's umbilical cord should not be clamped, even under exceptional circumstances such as caesarean sections, placenta previa or any other "excuse". Should a caesarian or surgical intervention be necessary, the baby, cord and placenta should be removed as one, and the placenta hung up like a blood transfusion bottle, in order that the baby can obtain what is rightfully its, via gravity.

Normal cord closure physiology does not obey man's clock. It is controlled by other parameters which vary according to circumstances. The transition for a baby, from life inside the womb, to life outside the womb is complex. A lot of crucial physiological changes take place unseen and interfering with this process can have serious consequences. Yet reading textbooks about ***how babies transfer from a fetal two chamber heart to an adult four chamber heart***, you are told that a clamp stops the placental circulation. That much is true. Cord clamping stops circulation! However, a clamp is not part of the

physiological design and should not be used. The only book I found, to recognise that birth for the human mammal, (like other mammalian birthing) doesn't require a cord clamp and pair of scissors, is Grey's anatomy.

As Dr George Morley would say<sup>1</sup>, "**Man is the only mammal to routinely injure its newborns with a cord clamp.**"



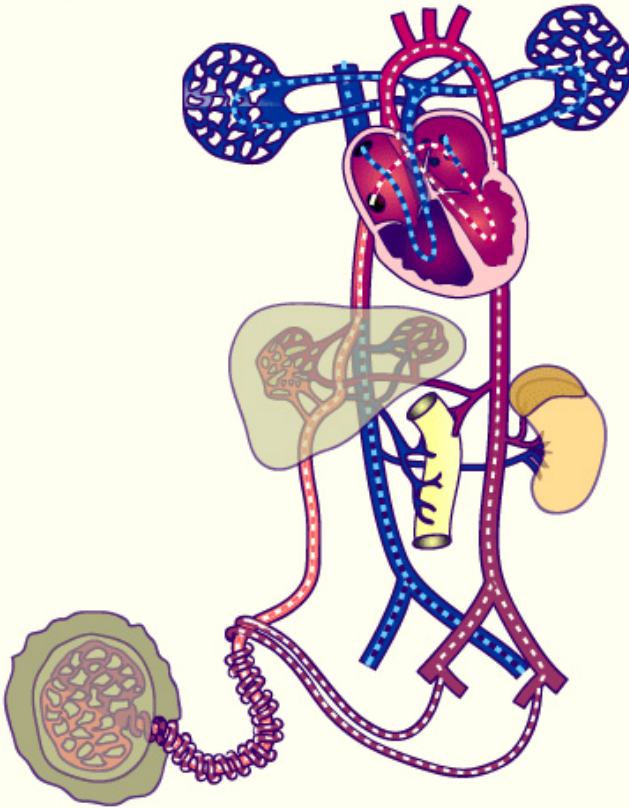
What happens between the head crowning, through the first five to ten minutes of life, with the blood in the placenta and cord, and why? Below, red blood is highly oxygenated, and blue blood has much less oxygen in it.

Inside the mother, up until the baby comes out of the vagina, **a baby's heart functions as a two chamber heart** with the two sides of the heart working in parallel. **The baby's lungs act as an organ of excretion**, producing around 400 mls of amniotic fluid a day. During labour, the baby releases

<sup>1</sup> <http://www.bmj.com/cgi/eletters/335/7615/312#175640>

catecholamines (a hormone), which results in lung fluid being absorbed, so that once a baby is born the lung alveoli (air sacs) can expand, allowing breathing to begin.

before birth

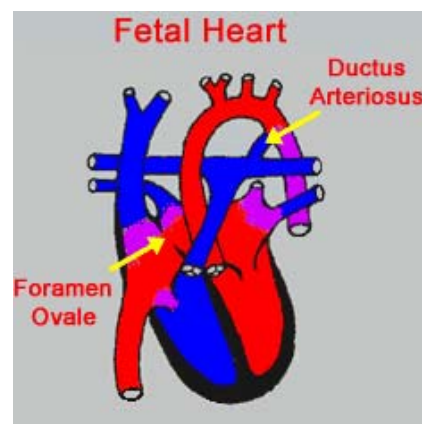


Blood from the placenta has an oxygen saturation of about 80%. It flows into the baby's inferior vena cava, by passing the liver, mixing with the blood returning from the lower part of the body. The blood flows into the right atrium, and passes through into the left atrial septum. Both atria act as ONE chamber, because the foramen ovale is OPEN as a flap inside the left atrium. The foramen ovale lets the blood from the right atrium flow into the left atrium, then down into the left ventricle. It turns around, and the oxygenated blood goes up into the aorta.

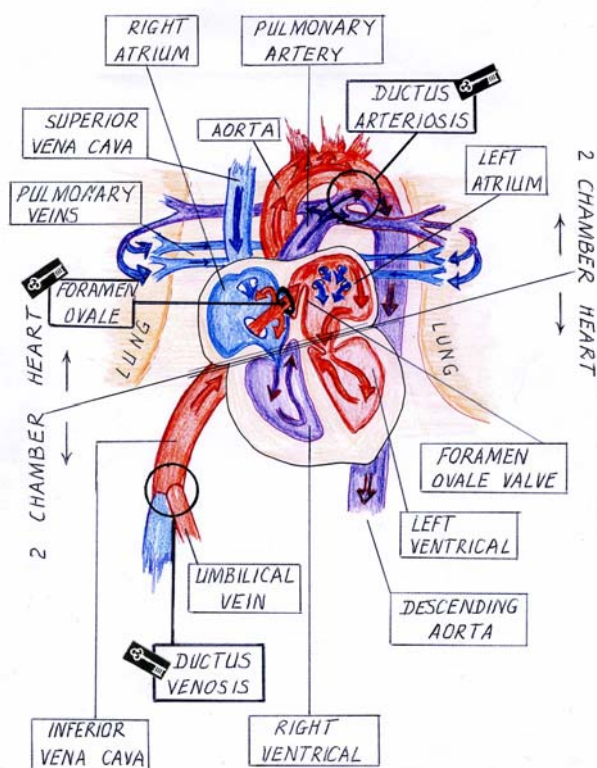
Blood from the brain ("blue") comes down the superior vena cava and is pulled into the right atrium at the same time as "red" blood is pumped

through the foramen ovale. A small amount of "red" blood from the placenta is pulled down with "blue" blood from the upper body. This blood goes down into the right ventricle, turns around, and goes up the pulmonary artery. That blood splits three ways. Two-thirds of this blood goes up through the ductus arteriosus to join blood in the aorta (from the left ventricle), and one-third goes left and right to the lungs.

Because the lungs require very little blood, that blood quickly comes back via the pulmonary veins, into the left atrium, to join the oxygenated blood from the placenta, which came through the foramen ovale and joined the bulk that went up the aorta. The blood in the aorta which is now mixed, has about 58% oxygen saturation. That blood travels into the lower part of the body, and is returned to the mother carrying out waste, and ready to be re-oxygenated.



The ventricles also act as ONE chamber. So the heart is a TWO chambered pump in utero.



At the moment of birth a normal newborn is circulating a mixture of “red” and “blue” blood. The lips and tongue of a healthy newborn at birth is the same pinkish purple colour as the foetus has been for nine months in utero.

As a baby descends, the baby’s head comes out looking like a mango with cranial plates overlapping caused by considerable moulding of the baby’s head. Once the head comes out, these plates spring out, increasing the head circumference; the skin smooths and the brain is ready to receive more blood.

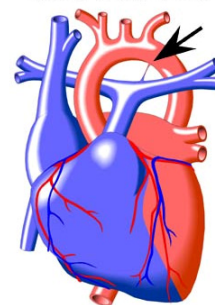
So long as the cord is still pulsating and exchanging oxygen in the baby, the tongue and lips will maintain this colour until the baby breathes on its own.

That first gasp and cry, cause the diaphragm to contract, and the intercostal muscles to increase

chest volume and create a negative intra-thoracic pressure and the needed suction to help pull in the needed blood. This one action, results in around half of the placental blood being forced into the baby in less than a minute<sup>2</sup>. At the peak of this transfusion, not only the liver, but also the vena cava, the heart, the aorta and the pulmonary vessels become distended. Once air is drawn into the lungs, another reflex is triggered relaxing the pulmonary arterioles, which causes an enormous increase in blood flow to the lungs

The baby cries, partly as a response to the wet skin cooling (cold pressor reflex), thus raising the blood pressure in the aorta. **The pressure reverses the blood flow through the ductus arteriosus causing more placental blood to be transferred to the capillaries that supply the lungs.** More oxygen in the ductus arteriosus triggers the duct to close, but it takes 15 hours to close completely. Structural closure is usually complete by two months of age.

Closed Ductus Arteriosus

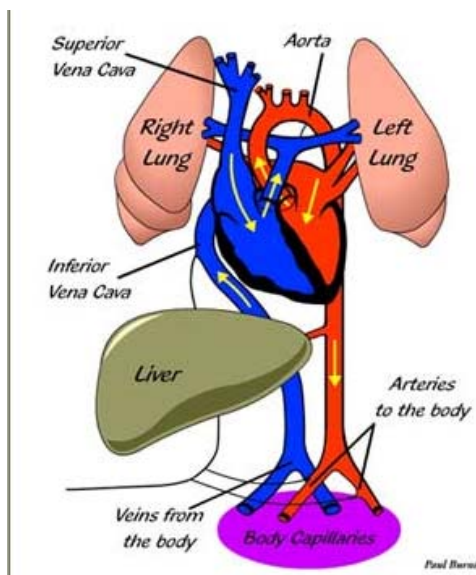


Haemoglobin in the lung alveoli, releases CO<sub>2</sub>, which triggers the need for more oxygenation of the blood. The hepatic portal vein opens, allowing more blood into the liver, distending it and causing pain. This is thought to create a “safe backup”, when air temperatures are high, as the pain in the liver substitutes for the cold crying reflex. So if your baby is born in hot water, or a hot room, the liver distention may be the trigger for the first cry.

<sup>2</sup> Mercer 2001 J midwifery and women’s health, figure 1 quoting Yao Lancet 69)

The start of breathing initiates various vessels to open or close. With the ductus arteriosus shutting off, the pulmonary arterioles open right up, causing more blood to flow through into the lungs, and more lung alveoli to expand. This high pressure perfusion of placental blood into the vena cava, heart and lungs “erects” the lung alveoli (“Jaykka” effect) allowing breathing to become efficient. It takes around five breaths for all the alveoli in the lung to expand. After that, proper oxygen transfer is established.

**The baby will now have a very large amount of blood flowing into the left atrium of the heart from the lungs.** This raises the left atrial pressure considerably, distending the left atrium and pressing the one-way foramen ovale flap valve, called the septum primum, back against the central wall of the heart, stopping blood flowing into the left atrium. Functional closure of the foramen ovale flap is usually completed quickly after the first breath, but structural closure (knitting together of flesh) takes longer.



The ductus arteriosus is properly closed within a day, and with the closed foramen ovale, the heart changes from a TWO chamber “fetal” parallel pump, to a FOUR chamber “adult” pump working serially (see left), with the right ventricle (“blue” blood) going to the lungs to be oxygenated, and the left ventricle output (“red” blood) going through the body. For this process to complete correctly, functional circulation from the placenta, pumping in all that blood is vital.

**Once breathing is properly established a second stage of shutting down the cord begins** in a two step process. The cord is also cooling, and could be considered a well designed refrigerator with no skin or blubber to keep it warm. It is only covered with a watery gel and a single layer of cells, the amnion. Water evaporation cools it rapidly, causing the vessels to constrict, helping to raise systemic blood pressure and reversing the ductus arteriosus flow. The now high arterial blood oxygen concentration triggers the umbilical arteries to close **next to the descending aorta, and behind the belly button.**

The placental vein continues to pump blood into the baby in a very measured and controlled manner as the peripheral circulation improves, helping push more blood flow through the lungs, and the rest of the body. **After the baby has received its full amount of blood,** high central venous pressure causes the placental vein flow to slow down markedly. The umbilical vein starts to close with a sphincter-like action, in portions of the vessel INSIDE the baby’s abdomen. The ductus venosus, where the umbilical vein joined the inferior vena cava, closes off, and the next contraction from the mother causes a slight blood surge, with a backwash, the pressure from which triggers for the umbilical to close completely inside the belly button. **The umbilical cord will by then look mostly empty, whitish and hard.**



**Once natural umbilical closure is complete, the cord can later be detached** within a few inches of the umbilicus **without any form of clamp**. This routinely happens in all mammals. Nothing is required for cord care other than an occasional clean with saline solution if required. Anything else prolongs the natural tissue break-down process by which the cord end “drops” off. Iodine or antibiotic gels are totally unnecessary, and counterproductive to the natural “drop-off” mechanisms.

No blood loss will occur from the baby’s cord stump, but some warm blood will drain from the placental portion of the umbilical vein showing that a bit of back-up blood in the placenta would have been there if required. The cord can be tested by stripping the cord away from the baby towards the placenta. The vein should stay empty.

The transferral of this blood from the placenta to the baby, not only provides total “life support” for the baby, and completes the baby’s normal physiological blood volume, but it also shrinks the surface of the placenta slightly, helping to initiate placental separation from the wall of the uterus. The natural transition from fetal to adult circulation via cord physiology, is **co-ordinated and controlled within the baby**, and is part of a carefully orchestrated **process which should be left well alone**. These complex mechanisms have been designed into the blue print of the human genome, to cover birth difficulties, and prevent and relieve any resultant birth asphyxiation. No chance evolution here!

According to Buckets (1965) **the average total amount of blood in the placenta and cord** is 166 mls of which some 115 mls belong to the baby. This amounts to around 30% of the baby’s final blood volume and **60% of the red cell volume**. That is a huge amount of red cells that are needed for efficient oxygen saturation. For a neonatologist, resuscitating a baby whose cord was clamped immediately at birth will always be a struggle. After all, whoever clamped that cord just amputated 60% of the red blood cells that the neonatologist needs urgently to maintain respiration and oxygenation. In 1957, Gunther measured early clamping blood deprivation as between 100 – 200 mls.

Comparing the arbitrary three minute “delay” with immediate cord clamping, the difference in blood volume for a 4000 gram baby is 360 versus 280 mls.

So what is the total volume of blood the clamped baby is deprived of, when compared with the baby whose umbilical cord is allowed to close by itself? We don’t know. None of the studies on cord clamping included controls which were allowed to complete the process themselves without intervention.

This changeover from fetal to adult circulation is efficiently achieved by the use of this 120 - 200 mls of blood (depending on the author you believe) which is crucial to allow the lungs, liver, brain and extremities to have full blood volume and effective life support.

According to Hasselhorst et al (1938), 51 – 78% of placental blood is transferred after one minute and 79 – 82% within five minutes. Nelson NM (1975) in “Neonatology” said however that only 15 – 20 mls transfused within 3 minutes. A baby delivered with the mother squatting, and received on a warm towel, while kept lower than the uterus, can complete this process in about three minutes. The

standard horizontal hospital “normal” delivery slows this process markedly. Taking the baby up to the breast immediately slows down this process further.

While a clamp can be used to stop any static blood from dribbling out the placental end, the cord clamp represents a pompous monument to obstetric arrogance and ...scientific ignorance. Humans have become the only birthing mammal with a serious defect: a clamp and scissor deficiency.

After cord vessel closure is complete, the placental transfusion of blood inside the baby is decreased over the space of four hours, as ***the baby removes fluid from the blood into the tissues***, and is excreted via the kidneys and urine. The blood thickens a bit (becomes more viscous), which increases pressure in the circulation, and hematocrit values and albumin levels rise. This increases plasma colloid osmotic pressure is a survival strategy, which helps keep the lungs dry. Wet nappies soon after birth, shows that the baby has had a decent placental transfusion.

***This extra fluid can also provide a survival buffer*** if the mother is unable to immediately provide pre-colostrum fluid to the baby.

In hospitals where “routine” is paramount and breast feeding and lactation establishment is delayed for three or more days, weight loss is common in this period. This is explained away by saying that this excess fluid from placental blood is being excreted. However, why is it that homebirth babies whose cords close naturally, and who have breastfeeding established very quickly, do not lose as much weight?

So now let’s look at ***what happens when someone comes along with a clamp***, and amputates a functioning placenta creating a “crisis” situation.

The heart size of a baby whose cord is not clamped is slightly larger than that of a baby whose cord is clamped immediately. (Buckels 65)

Babies whose cords are clamped immediately are pale, compared to the very pink babies who get all their blood. They have reduced blood thickness, much lower blood pressure, (47/62 mm HG compared versus 65/78 mm Hg for late clamped babies) which means their bodies lack the grunt required to complete the heart closure. They have a much faster and more turbulent flow rate through the patent ductus arteriosus. They have a very high rate of heart murmurs with a soft blowing character, because the fast reversal of blood flow needed to close the ductus arteriosus and left atrial high pressure to shut the foramen ovale does NOT take place. Babies whose cords are not clamped are reported to rarely have heart murmurs.

***The earlier the cord is clamped, the more blood is prevented from going into the baby and the greater the chance of serious damage.*** Reading through the medical literature, you can’t help but be alarmed by how many babies, with cerebral palsy, had hypovolemia (low blood pressure, oliguria); ischaemia (proven with an MRI brain scan) and anaemia, requiring blood transfusions. Immediately clamping off a functional placental circulation blocks placental oxygen exchange and the ability of the mother to

“breathe” for the baby, creating **a crisis situation** which results in a sudden redirection of blood flow. This is the equivalent of a massive instant haemorrhage in an adult.

The most potent stimulus that will make an immediately-clamped baby cry, is the shock of asphyxiation, caused by the inability of the baby to access that 60% of red blood cells that is lost in the amputated placenta and umbilical cord. The quick build up of carbon dioxide causes this baby to try to force the lungs to work before a lack of oxygen becomes dangerous. (Try holding your breath for two minutes!) Clamping the cord before breathing is fully established may cause asphyxia and force the child to breath using lungs with little blood flow, and that are not ready to breathe.

Depending on how fast the cord is clamped, the baby will experience **mild/moderate or severe hypoxia at birth**. Even prolonged partial hypoxia at birth can cause subtle neuronal or synaptic damage in the brain resulting in subtly impaired cognitive function later in life. Babies who have low APGAR scores at birth but who do not develop encephalopathy are likely to have reduced IQ's even if they remain healthy in the neonatal period. (Odd, David Lancet 2009)

The baby will try to get more blood into the lungs, and because blood is not available as it should be from the cord and placenta, the baby's body constricts down all the arteries and veins, as a red alert situation prioritises where blood is most needed.

Some physicians still maintain that certain babies need to have their cords clamped and cut immediately. Perhaps it is due to the way some hospital births are still medical managed without staff giving any thought to the physiological changes taking place for the babies' wellbeing.

Babies born asphyxiated because of cord compression during birth do not respond to pain, cold or carbon dioxide. Acidosis will result in increased CO2 tension, respiratory depression and reduced bicarbonate concentration. Cutting the cord, is exactly the same as leaving it compressed. **If you leave the cord intact albeit compressed** and get the baby out, the pressure will be relieved, the cord will open, and placental oxygenation will correct the asphyxia.

We experienced this first hand with our second son who was born with a double nuchal cord. Fortunately, the delivery was a home birth: The cord was unwrapped, replaced back up in the vagina and kept warm in order to prevent it from contracting.

The baby also had shoulder dystocia and it took a while longer to get him out. He tried to breathe just before he got out and with gravity, contractions, and leaving the placenta alone, his Apgar scores were 9 at one minute and 10 at 5 minutes. The doctor and midwife made sure to let him get all the blood he needed allowed him to self clamp his own cord on the inside.

**NEVER clamp the cord of a baby presenting with cord compression, or shoulder dystocia.** These infants shift blood to the placenta because of the tight compressive squeeze of the body in the birth canal, and



therefore can be born hypovolemic<sup>3</sup> (without enough blood volume). Immediate cord clamping of these babies maintains that hypovolemic state by preventing the blood in the placental from readily returning to the baby. This blood loss caused by immediate clamping and rushing the baby to ICU to be “resuscitated” initiates an inflammatory response leading to seizures, hypoxic-ischemic encephalopathy and brain damage or death. Any baby who experiences hypovolemia or hypoxia, requires all of those huge quantities of CD34<sup>+</sup> cells and stem cells present in the placenta and cord blood, which can repair any damage caused by the asphyxia. A cord-clamped baby is totally deprived of those repairing stem cells.

In an elective caesarean where there are no uterine contractions, the baby should not be delivered into the mother’s thighs above the level of the placenta. You will see the cord vessels become very full and distended. The baby should be held below the level of the uterus, until the placenta can be hung like a “unit of blood” for the baby to complete cord closure itself. If the baby is placed above the placenta, gravity can force blood back through the umbilical vein which has no valves, into the placenta in a flaccid uterus. The pulsating umbilical arteries will also contribute to engorgement of the placenta.

Babies whose cords are clamped quickly show a sudden sharp increase in cerebral pressure and flow which is a hallmark of hypoxic ischaemic encephalopathy. The inferior colliculi midbrain auditory pathway is most susceptible to damage than any other part of the brain, and hypoxic ischaemic encephalopathy can result in various degrees of mental retardation. Immediate cord clamping in premature babies causes intraventricular haemorrhaging in the brain.

Furthermore, babies whose cords are clamped immediately, have a very high risk of becoming anaemic, because there would be no breakdown of excess red blood cells with the body storing the removed iron.

Many medical people who resist returning obstetrics back to what is normal physiological function, state that delayed cord clamping results in polycythaemia with no symptoms. The supposed “worry” about polycythaemia is thicker blood than normal or hyperviscosity. But given that most babies with polycythaemia never have problems, *might that not be a normal state for a baby?* Why are hospitals not full of polycythaemic homebirth babies?

Who defined the “**normal**” haematocrit, or the “normal thickness” of babies’ blood? And using what protocol? Are these so-called “normal” ranges solely the ranges seen in babies clamped between 1 and 2 minutes after delivery?

In 1965, Peltonen considered polycythaemia an oxygen reserve provided against physiological hypoxia.

Babies born naturally without a clamp, have a much higher haematocrit than those whose cords are clamped immediately or at one minute.

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<sup>3</sup> Mercer J Med Hyp 2009.

If the medical profession used actual values seen only in babies who close their own cords, to determine the baseline volume and haematocrit, babies whose cords are clamped immediately, would have thin blood, circulation compromise and anemia; they would have potentially suffered the equivalent of an iatrogenic 4 pint blood loss in an adult.

Perhaps what is considered polycythaemia, is actually “normal” and necessary physiology.

Immediate cord clamping can cause Grade 1 intraventricular haemorrhage without symptoms, yet this is NOT considered to be a problem by paediatricians. I would suggest that bleeding in the brain, when it would not normally happen with no cord clamping at all, is indeed a problem. And I would suggest that **the logic of the above two comparative reasonings is totally inconsistent.**

Have you ever wondered why, when a baby’s cord is clamped immediately in theatre, they put two clamps on, and tell the husband to cut it between the two clamps? That’s because if there weren’t two clamps, **all that blood** in the long part of the cord and placenta, which belongs to the baby would gush out all over the table! Maybe the Dad would wonder where that blood really belonged or maybe he wouldn’t. Yet it amazes me that maternity staff can’t see the barbaric nature of this practice. Why is their knowledge of physiology so little that they can’t see what Darwin’s grandfather Erasmus Darwin wrote in 1801: <sup>4</sup>

***“Another thing very injurious to the child, is the tying and cutting of the navel string too soon; which should always be left till the child has not only repeatedly breathed but till all pulsation in the cord ceases. As otherwise the child is much weaker than it ought to be, a portion of the blood being left in the placenta, which ought to have been in the child.”***

He wrote this, because immediate cord clamping started when male midwives took over from the women, who were considered witches. He could see then that it was a bad thing.

Consider how we progressed and then decide what you should do!

From 1773 most medical texts advocated leaving the cord alone until pulsation ceased.

Around 1913, immediate cord cutting became fashionable, because drugs disrupted normal delivery markedly. Early types of delivery anaesthesia caused the uterus to relax, and mostly anaesthetised the baby while analgesics such as pethidine and chloral hydrate prolonged cord pulsing. Because women were prevented from giving birth standing, or squatting, and were drugged and laid on their backs with legs up in stirrups, siphonage and arterial loss became common and oxytocin was given to counteract this. This was the era of knocking women out, using forceps and basically interfering with natural delivery in any possible way. It was only logical that obstetricians would then take over cord management as well.

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<sup>4</sup> (Zoonomia, volume 11 page 321.)

Up until 1970, most texts still talked about leaving the cord alone until pulsation stopped.

Around 1976, textbooks stated that the cord should be clamped immediately or 30 seconds after delivery, the theory into line with the practice that had been going on for decades.

By 1986, a textbook stated that the optimal time for clamping wasn't known and in 1994, a baby was usually immediately suctioned then the cord was clamped.

Now while a few lone voices campaign for doctors to see sense and return to natural physiological cord vessel closure, many obstetricians remain unwilling to stop the practice of immediate cord clamping. They do this despite knowing that there is no scientific rationale for it. How many paediatricians or neonatologists have actually seen a baby delivered without a cord clamp?

The ultimate irony is that some physicians actually consider delayed cord clamping an "intervention" and immediate cord clamping "normal".

Then of course, there are the cord-blood banks trying to persuade you to pay them to keep your baby's blood for you, because all that blood, after the immediate cord clamp, is "wasted"; so why not keep it in case your baby gets cancer or something and you need all those stem cells which your baby should have got at birth.

What is now considered "normal medical practice" practice is a travesty of justice for the baby, when compared to natural physiological cord closure designed to give a baby the best possible start in life ... before the "clamp". Disregarding these amazing design features built in to the new born baby is child abuse of the first degree. Yet within the medical system, it is allowed to occur every day without penalty. Babies and parents have to suffer the consequences.

Should not this unnecessary use of cord clamping be classified as complicity in a criminal offence?! Why is a clamp considered an enlightened medical "advance"? Why is it assumed to be a better way, to control (through interference) the sequence of the transition steps necessary to enable the new-born baby to safely adapt to its surroundings outside the womb?

The medical profession conditions parents to believe that, "You can trust us. We know what we're doing and if anything goes wrong, we have the means whereby we can fix it." Then again, parents like us, believe that when your written birth plan includes the sentence that the cord is not to be clamped or cut in any way, and that is agreed to verbally, that that is what happens.

Straight away, when I realised that the cord clamp had been put on the cord of our first son, I pulled up the cord to remove it. Only to find that it had already been cut beyond the clamp.

It's not enough to write a birth plan, or even have your wishes supposedly accepted. Don't ever be beguiled into thinking that what you want is what they want. In a hospital, you've got to be prepared to step in and forcefully remind them that they have no right to control that process. Hospitals think what

they want, is what you want. It's important for parents to stand up to the system, and put them on notice. Until they do, the system will amble on knowing that they have control by default because everyone stayed silent.

Yes, some in the system consider parents who have convictions based on good facts, a threat. In 1984, management of childbirth in general was far too aggressive for us. I'm not confident that all that much has changed, from the stories I hear told today.

The aggressive management of our first son's birth and neonatal care, and our anger at the incident of the early cord clamping, were the reasons why we had a home birth when our second son was born and when Joan Donley was the midwife and John Hilton the doctor. They understood why we felt betrayed the first time, and they believed the importance and value of a baby's physiological cord closure design. This time, we knew that we wouldn't have to fight for what we wanted, because both doctor and midwife really wanted what we wanted so much.

Obviously, that is the way it should be. Having to beg or "fight" for what you want during labour and what you know is best only creates tension and a toxic atmosphere which in itself has the potential to ruin the wonderful natural progression of a birth.

We know!

We've been there and done that!