

# Active vs physiological management of third stage of labour



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## Introduction

This essay is primarily concerned with the arguments that are currently active in relation to the benefits and disadvantages of having either an active or passive third stage of labour. We shall examine this issue from several angles including the currently accepted medical opinions as expressed in the peer reviewed press, the perspective of various opinions expressed by women in labour and the evidence base to support these opinions.

It is a generally accepted truism that if there is controversy surrounding a subject, then this implies that there is not a sufficiently strong evidence base to settle the argument one way or the other. (De Martino B et al. 2006). In the case of this particular subject, this is possibly not true, as the evidence base is quite robust (and we shall examine this in due course).

Midwifery deals with situations that are steeped in layers of strongly felt emotion, and this has a great tendency to colour rational argument. Blind belief in one area often appears to stem from total disbelief in another (Baines D. 2001) and in consideration of some of the literature in this area this would certainly appear to be true.

Let us try to examine the basic facts of the arguments together with the evidence base that supports them.

In the civilised world it is estimated that approximately 515, 000 currently die annually from problems directly related to pregnancy. (extrapolated from <https://assignbuster.com/active-vs-physiological-management-of-third-stage-of-labour/>)

Hill K et al. 2001). The largest single category of such deaths occur within 4 hrs. of delivery, most commonly from post partum haemorrhage and its complications (AbouZahr C 1998), the most common factor in such cases being uterine atony. (Ripley D L 1999). Depending on the area of the world (as this tends to determine the standard of care and resources available), post partum haemorrhage deaths constitutes between 10-60% of all maternal deaths (AbouZahr C 1998). Statistically, the majority of such maternal deaths occur in the developing countries where women may receive inappropriate, unskilled or inadequate care during labour or the post partum period. (PATH 2001). In developed countries the vast majority of these deaths could be (and largely are) avoided with effective obstetric intervention. (WHO 1994). One of the central arguments that we shall deploy in favour of the active management of the third stage of labour is the fact that relying on the identification of risk factors for women at risk of haemorrhage does not appear to decrease the overall figures for post partum haemorrhage morbidity or mortality as more than 70% of such cases of post partum haemorrhage occur in women with no identifiable risk factors. (Atkins S 1994).

Prendiville, in his recently published Cochrane review (Prendiville W J et al. 2000) states that:

where maternal mortality from haemorrhage is high, evidence-based practices that reduce haemorrhage incidence, such as active management of the third stage of labour, should always be followed

It is hard to rationally counter such an argument, particularly in view of the strength of the evidence base presented in the review, although we shall finish this essay with a discussion of a paper by Stevenson which attempts to provide a rational counter argument in this area.

It could be argued that the management of the third stage of labour, as far as formal teaching and published literature is concerned, is eclipsed by the other two stages (Baskett T F 1999). Cunningham agrees with this viewpoint with the observation that a current standard textbook of obstetrics (unnamed) devotes only 4 of its 1, 500 pages to the third stage of labour but a huge amount more to the complications that can arise directly after the delivery of the baby (Cunningham, 2001). Donald makes the comment “ This indeed is the unforgiving stage of labour, and in it there lurks more unheralded treachery than in both the other stages combined. The normal case can, within a minute, become abnormal and successful delivery can turn swiftly to disaster.” (Donald, 1979).

chapter 1: define third stage of labour,

The definition of the third stage of labour varies between authorities in terms of wording, but in functional terms there is general agreement that it is the part of labour that starts directly after the birth of the baby and concludes with the successful delivery of the placenta and the foetal membranes.

Functionally, it is during the third stage of labour that the myometrium contracts dramatically and causes the placenta to separate from the uterine wall and then subsequently expelled from the uterine cavity. This stage can be managed actively or observed passively. Practically, it is the speed with <https://assignbuster.com/active-vs-physiological-management-of-third-stage-of-labour/>

which this stage is accomplished which effectively dictates the volume of blood that is eventually lost. It follows that if anything interferes with this process then the risk of increased blood loss gets greater. If the uterus becomes atonic, the placenta does not separate efficiently and the blood vessels that had formally supplied it are not actively constricted.

(Chamberlain G et al. 1999). We shall discuss this process in greater detail shortly.

Proponents of passive management of the third stage of labour rely on the normal physiological processes to shut down the bleeding from the placental site and to expel the placenta. Those who favour active management use three elements of management. One is the use of an ecbolic drug given in the minute after delivery of the baby and before the placenta is delivered. The second element is early clamping and cutting of the cord and the third is the use of controlled cord traction to facilitate the delivery of the placenta. We shall discuss each of these elements in greater detail in due course. The rationale behind active management of the third stage of labour is basically that by speeding up the natural delivery of the placenta, one can allow the uterus to contract more efficiently thereby reducing the total blood loss and minimising the risk of post partum haemorrhage. (O'Driscoll K 1994)

discuss optimal practice,

Let us start our consideration of optimal practice with a critical analysis of the paper by Cherine (Cherine M et al. 2004) which takes a collective overview of the literature on the subject. The authors point to the fact that there have been a number of large scale randomised controlled studies

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which have compared the outcomes of labours which have been either actively or passively managed. One of the biggest difficulties that they experienced was the inconsistency of terminology on the subject, as a number of healthcare professionals had reported management as passive when there had been elements of active management such as controlled cord traction and early cord clamping.

As an overview, they were able to conclude that actively managed women had a lower prevalence of “ post partum haemorrhage, a shorter third stage of labour, reduced post partum anaemia, less need for blood transfusion or therapeutic oxytocics” (Prendiville W J et al. 2001). Other factors derived from the paper include the observation that the administration of oxytocin before delivery of the placenta (rather than afterwards), was shown to decrease the overall incidence of post partum haemorrhage, the overall amount of blood loss, the need for additional uterotonic drugs, the need for blood transfusions when compared to deliveries with similar duration of the third stage of labour as a control. In addition to all of this they noted that there was no increased incidence of the condition of retained placenta. (Elbourne D R et al. 2001). The evidence base for these comments is both robust and strong. On the face of it, there seems therefore little to recommend the adoption of passive management of the third stage of labour.

Earlier we noted the difficulties in definition of active management of the third stage of labour. In consideration of any individual paper where interpretation of the figures are required, great care must therefore be taken in assessing exactly what is being measured and compared. Cherine points <https://assignbuster.com/active-vs-physiological-management-of-third-stage-of-labour/>

to the fact that some respondents categorised their management as “passive management of the third stage of labour” when, in reality they had used some aspect of active management. They may not have used ecbolic drugs (this was found to be the case in 19% of the deliveries considered). This point is worth considering further as oxytocin was given to 98% of the 148 women in the trial who received ecbolic. In terms of optimum management 34% received the ecbolic at the appropriate time (as specified in the management protocols as being before the delivery of the placenta and within one minute of the delivery of the baby). For the remaining 66%, it was given incorrectly, either after the delivery of the placenta or, in one case, later than one minute after the delivery of the baby.

Further analysis of the practices reported that where uterotonic drugs were given, cord traction was not done in 49%, and early cord clamping not done in 7% of the deliveries observed where the optimum active management of the third stage of labour protocols were not followed.

> From an analytical point of view, we should cite the evidence base to suggest the degree to which these two practices are associated with morbidity.

Walter P et al. 1999 state that their analysis of their data shows that early cord clamping and controlled cord traction are shown to be associated with a shorter third stage and lower mean blood loss, whereas Mitchell (G G et al. 2005) found them to be associated with a lower incidence of retained placenta.

Other considerations relating to the practice of early cord clamping are that it reduces the degree of mother to baby blood transfusion. It is clear that giving uterotonic drugs without early clamping will cause the myometrium to contract and physically squeeze the placenta, thereby accelerating the both the speed and the total quantity of the transfusion. This has the effect of upsetting the physiological balance of the blood volume between baby and placenta, and can cause a number of undesirable effects in the baby including an increased tendency to jaundice. (Rogers J et al. 1998)

The major features that are commonly accepted as being characteristic of active management and passive management of the third stage of labour are set out below.

#### Physiological Versus Active Management

	Physiological Management	Active Management
...		
Uterotonic	None or after placenta delivered	With delivery of anterior shoulder or baby
Uterus	Assessment of size and tone	Assessment of size and tone
Cord traction	None	Application of controlled cord traction* when uterus contracted



Cord  
clamping                      Variable                      Early

(After Smith J R et al. 1999)

physiology of third stage

The physiology of the third stage can only be realistically considered in relation to some of the elements which occur in the preceding months of pregnancy. The first significant consideration are the changes in haemodynamics as the pregnancy progresses. The maternal blood volume increases by a factor of about 50% (from about 4 litres to about 6litres).

(Abouzahr C 1998)

This is due to a disproportionate increase in the plasma volume over the RBC volume which is seen clinically with a physiological fall in both Hb and Heamatocrit values. Supplemental iron can reduce this fall particularly if the woman concerned has poor iron reserves or was anaemic before the pregnancy began. The evolutionary physiology behind this change revolves around the fact that the placenta (or more accurately the utero-placental unit) has low resistance perfusion demands which are better served by a high circulating blood volume and it also provides a buffer for the inevitable blood loss that occurs at the time of delivery. (Dansereau J et al. 1999).

The high progesterone levels encountered in pregnancy are also relevant insofar as they tend to reduce the general vascular tone thereby increase venous pooling. This, in turn, reduces the venous return to the heart and this would (if not compensated for by the increased blood volume) lead to

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hypotension which would contribute to reductions in levels of foetal oxygenation. (Baskett T F 1999). Coincident and concurrent with these haemodynamic changes are a number of physiological changes in the coagulation system.

There is seen to be a sharp increase in the quantity of most of the clotting factors in the blood and a functional decrease in the fibrinolytic activity. (Carroli G et al. 2002). Platelet levels are observed to fall. This is thought to be due to a combination of factors. Haemodilution is one and a low level increase in platelet utilisation is also thought to be relevant. The overall functioning of the platelet system is rarely affected. All of these changes are mediated by the dramatic increase in the levels of circulating oestrogen. The relevance of these considerations is clear when we consider that one of the main hazards facing the mother during the third stage of labour is that of haemorrhage. (Soltani H et al. 2005) and the changes in the haemodynamics are largely germinal to this fact.

The other major factor in our considerations is the efficiency of the haemostasis produced by the uterine contraction in the third stage of labour. The prime agent in the immediate control of blood loss after separation of the placenta, is uterine contraction which can exert a physical pressure on the arterioles to reduce immediate blood loss. Clot formation and the resultant fibrin deposition, although they occur rapidly, only become functional after the coagulation cascade has triggered off and progressed. Once operative however, this secondary mechanism becomes dominant in securing haemostasis in the days following delivery. (Sleep, 1993).

The uterus both grows and enlarges as pregnancy progresses under the primary influence of oestrogen. The organ itself changes from a non-gravid weight of about 70g and cavity volume of about 10 ml. to a fully gravid weight of about 1.1 kg. and a cavity capacity of about 5 litres. This growth, together with the subsequent growth of the feto-placental unit is fed by the increased blood volume and blood flow through the uterus which, at term, is estimated to be about 500 ml/min or approximately 10-15% of the total cardiac output

(Thilaganathan B et al. 1993). It can therefore be appreciated why haemorrhage is a significant potential danger in the third stage of labour with potentially 15% of the cardiac output being directed towards a raw placental bed.

The physiology of the third stage of labour also involves the mechanism of placental expulsion. After the baby has been delivered, the uterus continues to contract rhythmically and this reduction in size causes a shear line to form at the utero-placental junction. This is thought to be mainly a physical phenomenon as the uterus is capable of contraction, whereas the placenta (being devoid of muscular tissue) is not. We should note the characteristic of the myometrium which is unique in the animal kingdom, and this is the ability of the myometrial fibres to maintain its shortened length after each contraction and then to be able to contract further with subsequent contractions. This characteristic results in a progressive and (normally) fairly rapid reduction in the overall surface area of the placental site. (Sanborn B M et al. 1998)

In the words of Rogers (J et al. 1998), by this mechanism “ the placenta is undermined, detached, and propelled into the lower uterine segment.”

Other physiological mechanisms also come into play in this stage of labour. Placental separation also occurs by virtue of the physical separation engendered by the formation of a sub-placental haematoma. This is brought about by the dual mechanisms of venous occlusion and vascular rupture of the arterioles and capillaries in the placental bed and is secondary to the uterine contractions (Sharma J B et al. 2005). The physiology of the normal control of this phenomenon is both unique and complex. The structure of the uterine side of the placental bed is a latticework of arterioles that spiral around and inbetween the meshwork of interlacing and interlocking myometrial fibrils. As the myometrial fibres progressively shorten, they effectively actively constrict the arterioles by kinking them . Baskett (T F 1999) refers to this action and structure as the “ living ligatures” and “ physiologic sutures” of the uterus.

These dramatic effects are triggered and mediated by a number of mechanisms. The actual definitive trigger for labour is still a matter of active debate, but we can observe that the myometrium becomes significantly more sensitive to oxytocin towards the end of the pregnancy and the amounts of oxytocin produced by the posterior pituitary gland increase dramatically just before the onset of labour. (Gülmezoglu A M et al. 2001)

It is known that the F-series, and some other) prostaglandins are equally active and may have a role to play in the genesis of labour. (Gulmezoglu A M et al. 2004)

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> From an interventional point of view, we note that a number of synthetic ergot alkaloids are also capable of causing sustained uterine contractions.

(Elbourne D R et al. 2002)

chapter 2 discuss active management, criteria, implications for mother and fetus.

This essay is asking us to consider the essential differences between active management and passive management of the third stage of labour. In this segment we shall discuss the principles of active management and contrast them with the principles of passive management.

Those clinicians who practice the passive management of the third stage of labour put forward arguments that mothers have been giving birth without the assistance of the trained healthcare professionals for millennia and, to a degree, the human body is the product of evolutionary forces which have focussed upon the perpetuation of the species as their prime driving force. Whilst accepting that both of these concepts are manifestly true, such arguments do not take account of the “ natural wastage” that drives such evolutionary adaptations. In human terms such “ natural wastage” is simply not ethically or morally acceptable in modern society. (Sugarman J et al. 2001)

There may be some validity in the arguments that natural processes will achieve normal separation and delivery of the placenta and may lead to fewer complications and if the patient should suffer from post partum haemorrhage then there are techniques, medications and equipment that can be utilised to contain and control the clinical situation. Additional <https://assignbuster.com/active-vs-physiological-management-of-third-stage-of-labour/>

arguments are invoked that controlled cord traction can increase the risk of uterine inversion and ecbolic drugs can increase the risks of other complications such as retained placenta and difficulties in delivering an undiagnosed twin. (El-Refaey H et al. 2003)

The proponents of active management counter these arguments by suggesting that the use of ecbolic agents reduces the risks of post partum haemorrhage, faster separation of the placenta, reduction of maternal blood loss. Inversion of the uterus can be avoided by using only gentle controlled cord traction when the uterus is well contracted together with the controlling of the uterus by the Brandt-Andrews manoeuvre.

The arguments relating to the undiagnosed second twin are loosing ground as this eventuality is becoming progressively more rare. The advent of ultrasound together with the advent of protocols which call for the mandatory examination of the uterus after the birth and before the administration of the ecbolic agent effectively minimise this possibility. (Prendiville, 2002).

If we consider the works of Prendiville (referred to above) we note the meta-analyses done of the various trials on the comparison of active management against the passive management of the third stage of labour and find that active management consistently leads to several benefits when compared to passive management. The most significant of which are set out below.

#### Benefits of Active Management Versus Physiological Management

Outcome	Control Rate, Relative	95% CI*	NNT†	95% CI
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	%	Risk			
PPH $\geq$ 500 mL	14	0.38	0.32-0.46	12	10-14
PPH $\geq$ 1000 mL	2.6	0.33	0.21-0.51	55	42-91
Hemoglobin <9 g/dL	6.1	0.4	0.29-0.55	27	20-40
Blood transfusion	2.3	0.44	0.22-0.53	67	48-111
Therapeutic uterotonics	17	0.2	0.17-0.25	7	6-8

\*95% confidence interval †Number needed to treat

(After Prendiville, 2002).

The statistics obtained make interesting consideration. In these figures we can deduce that for every 12 patients receiving active management (rather than passive management) one post partum haemorrhage is avoided and further extrapolation suggests that for every 67 patients managed actively one blood transfusion is avoided.

With regard to the assertions relating to problems with a retained placenta, there was no evidence to support it, indeed the figures showed that there

was no increase in the incidence of retained placenta. Equally it was noted that the third stage of labour was significantly shorter in the actively managed group.

In terms of significance for the mother there were negative findings in relation to active management and these included a higher incidence of raised blood pressure post delivery (the criteria used being  $> 100$  mm Hg). Higher incidences of reported nausea and vomiting were also found although these were apparently related to the use of ergot alkaloids and not with oxytocin. This is possibly a reflection of the fact that ergot acts on all smooth muscle (including the gut) whereas the oxytocin derivatives act only on uterine muscle. (Dansereau, 1999).

None of the trials included in the meta-analysis reported an incidence of either uterine inversions or undiagnosed second twins. Critical analysis of these findings would have to consider that one would have to envisage truly enormous study cohorts in order to obtain statistical significance with these very rare events. (Concato, J et al. 2000)

With specific regard to the mother and baby we note some authors recommend the use of early suckling as nipple stimulation is thought to increase uterine contractions and thereby reduce the likelihood of post partum haemorrhage. Studies have shown that this does not appear to be the case (Bullough, 1989), although the authors suggest that it should still be recommended as it promotes both bonding and breastfeeding.

The most important element of active management of the third stage of labour is the administration of an uterotonic agent directly after the delivery of  
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the anterior shoulder or within a minute of the complete delivery of the baby. The significance of the anterior shoulder delivery is that if the ecobolic is given prior to delivery of the anterior shoulder then there is a significantly increased risk of shoulder dystocia which, with a strongly contracting uterus, can be technically very difficult to reduce and will have significant detrimental effects on the baby by reducing its oxygen supply from the placenta still further. The fundal height should be assessed immediately after delivery to exclude the possibility of an undiagnosed second twin. (Sandler L C et al. 2000)

There are a number of different (but widely accepted) protocols for ecobolic administration. Commonly, 10 IU of oxytocin is given intramuscularly or occasionally a 5 IU IV bolus. Ergot compounds should be avoided in patients who have raised blood pressure, migraine and Raynaud's phenomenon. (Pierre, 1992).

The issue of early clamping of the cord is complex and, of the three components of the active management of the third stage of labour this, arguably, gives rise to the least demonstrable benefits in terms of the evidence base in the literature.

We have already discussed the increased incidence of postnatal jaundice in the newborn infant if cord clamping is delayed but this has to be offset against both the occasional need for the invoking of prompt resuscitation measures (i. e. cord around the neck) or the reduction in the incidence of childhood anaemia and higher iron stores (Gupta, 2002). In a very recent paper, Mercer also points to the lower rates of neonatal intraventricular

haemorrhage although it has to be said that the evidence base is less secure in this area. (Mercer J S et al. 2006)

Other foetal issues are seldom encountered in this regard except for the comparatively rare occurrence when some form of dystocia occurs and the infant had to be manipulated and represented (viz. the Zavanelli procedure). If the cord has already been divided then this effectively deprives the infant of any possibility of placental support while the manoeuvre is being carried out with consequences that clearly could be fatal. (Thornton J G et al. 1999)

In the recent past, the emergence of the practice of harvesting foetal stem cells from the cord blood may also have an influence on the timing of the clamping but this should not interfere with issues relating to the clinical management of the third stage. (Lavender T et al. 2006)

There are some references in the literature to the practice of allowing the placenta to exsanguinate after clamping of the distal portion as some authorities suggest that this may aid in both separation (Soltani H et al. 2005) and delivery (Sharma J P et al. 2005). of the placenta. It has to be noted that such references are limited in their value to the evidence base and perhaps it would be wiser to consider this point unproven.

We have searched the literature for trials that consider the effect of controlled cord traction without the administration of embolic drugs. The only published trial on the issue suggested that controlled cord traction, when used alone to deliver the placenta, had no positive effect on the incidence of post partum haemorrhage (Jackson, 2001). The same author also considered the results of the administration of embolic agents directly

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after placental delivery and found that the results (in terms of post partum haemorrhage at least), were similar to those obtained with ecbolics given with the anterior shoulder delivery, although an earlier trial (Zamora, 1999) showed that active management (as above) did result in a statistically significant reduction in the incidence of post partum haemorrhage when compared to controlled cord traction and ecbolics at the time of placental delivery.

In this segment we should also consider the situation where the atonic uterus (in passive management of the third stage of labour) can result in the placenta becoming detached but remaining at the level of the internal os. This can be clinically manifest by a lengthening of the cord but no subsequent delivery of the placenta. In these circumstances the placental site can continue to bleed and the uterus can fill with blood, which distends the uterus and thereby increases the tendency for the placental site to bleed further. This clearly has very significant implications for the mother. (Neilson J et al. 2003)

There are other issues which impact on the foetal and maternal wellbeing in this stage of the delivery but these are generally not a feature issues relating to the active or passive management of the third stage of labour and therefore will not be considered further.

There are a number of other factors which can influence the progress of the third stage of labour and these can be iatrogenic. Concurrent administration of some drugs can affect the physiology of the body in such a way as to change the way it responds to normal physiological processes. On a first

principles basis, one could suggest that, from what we have already discussed, any agent that causes relaxation of the myometrium or a reduction in uterine tone could potentially interfere with the efficient contraction of the uterine musculature in the third stage and thereby potentially increase the incidence of post partum haemorrhage.

Beta-agonists (the sympathomimetic group) work by relaxing smooth muscle via the beta-2 pathway. The commonest of these is salbutamol. When given in its usual form of an inhaler for asthma, the blood levels are very small indeed and therefore scarcely clinically significant but higher doses may well exert a negative effect in this respect. (Steer P et al. 1999)

The NSAIA group have two potential modes of action that can interfere with the third stage. Firstly they have an action on the platelet function and can impair the clotting process which potentially could interfere with the body's ability to achieve haemostasis after placental delivery. (Li D-K et al. 2003)

Secondly their main mode of therapeutic action is via the prostaglandin pathway (inhibitory action) and, as such they are often used for the treatment of both uterine cramping, dysmenorrhoea and post delivery afterpains. (Nielsen G L et al. 2001)

They achieve their effect by reducing the ability of the myometrium to contract and, as such, clearly are contraindicated when strong uterine contractions are required, both in the immediate post partum period and if any degree of post partum haemorrhage has occurred.

Other commonly used medications can also interfere with the ability of the myometrium to contract. The calcium antagonist group (e. g. nifedipine) are able to do this (Pittrof R et al. 1996) and therefore are changed for an alternative medication if their cardiovascular effects need to be maintained. (Khan R K et al. 1998)

We should also note that some anaesthetic agents can inhibit myometrium contractility. Although they are usually of rapid onset of action, and therefore rapid elimination from the body, they may still be clinically significant if given at the time of childbirth for some form of operative vaginal delivery. (Gülmezoglu A et al. 2003)

relevant legal and ethical issues related to topic and midwife,

Many of the legal and ethical issues in this area revolve around issues of consent, which we shall discuss in detail shortly, and competence.

Professional competence is an area which is difficult to define and is evolving as the status of the midwife, together with the technical expectations expected of her, increase with the advance of technology.