FIRST STAGE OF LABOUR

Essay
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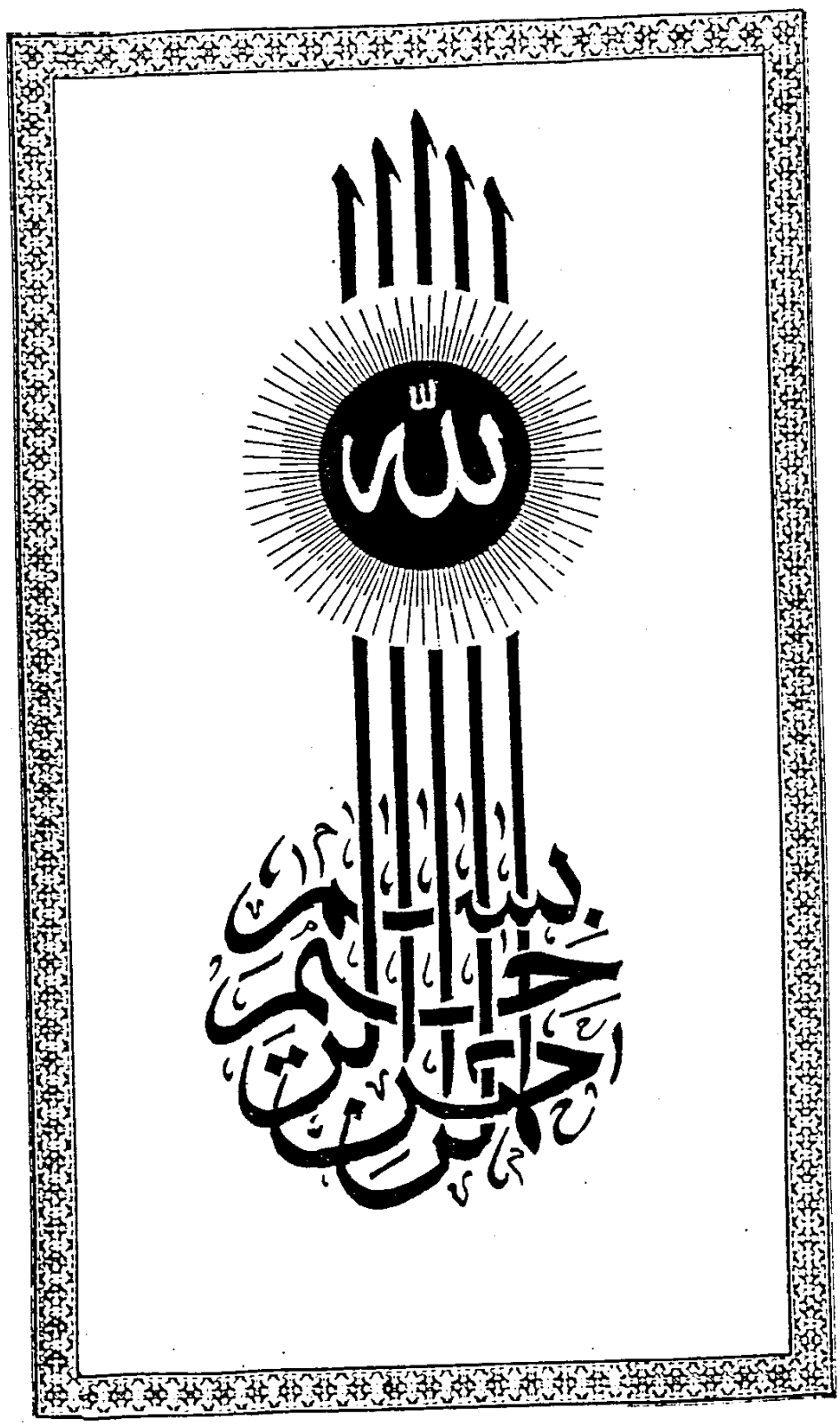

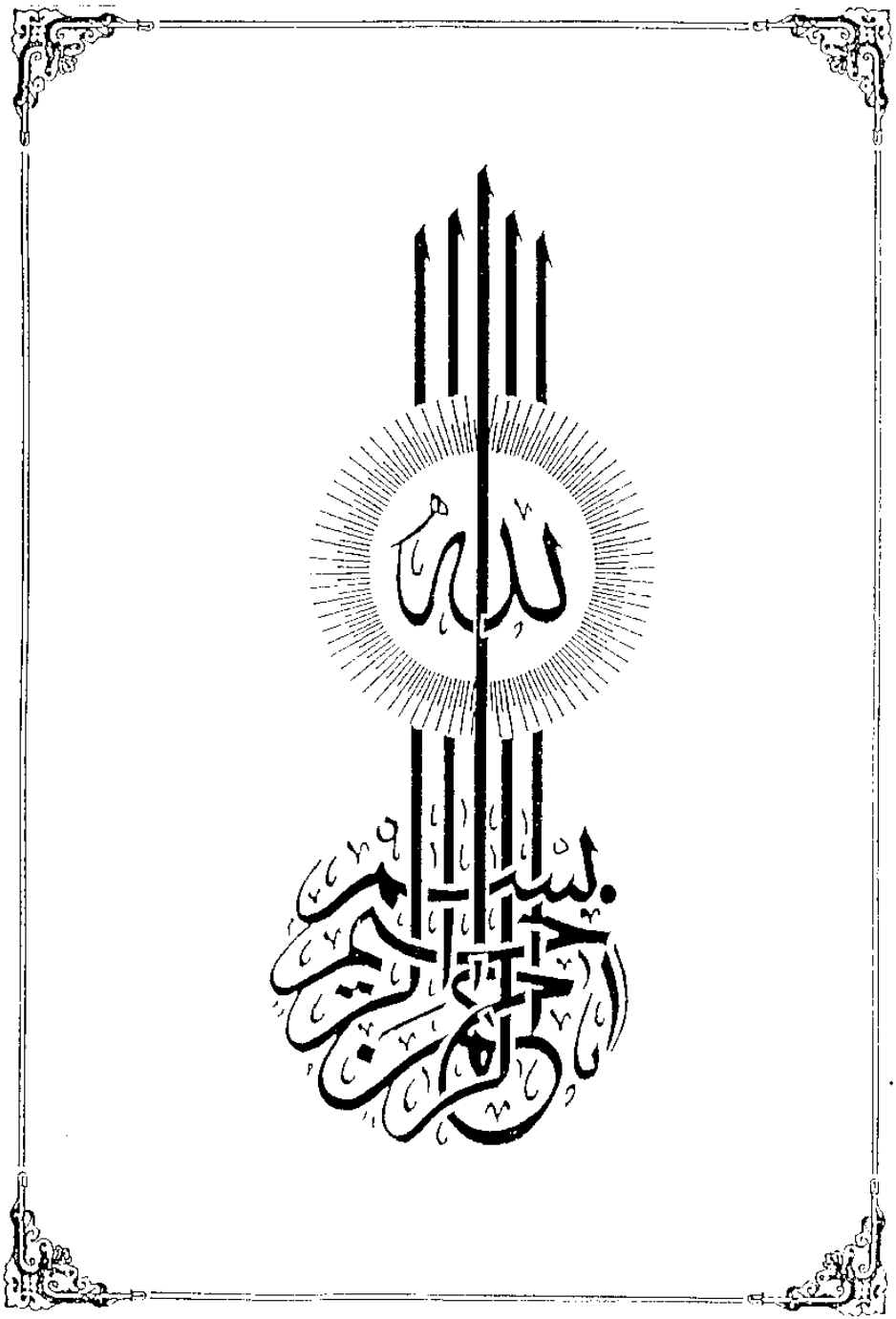

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Introduction

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The first Stage of Labour starts when the uterine contractions (myometrial forces) reach sufficient frequency, intensity and duration to bring about readily demonstrable effacement and dilatation of the cervix (true labour pains). The first stage ends when the cervix is fully dilated. So it is the stage of cervical dilatation.

Although the average duration of the first stage of labour in primigravidae is 8 hours & in multiparae 6 hours, there is marked individual variation Friedman E. A. (1978).

The cause of onset of Labour remains unkown., but there are several theories e.g (Oxytocin stimulation theory - fetal cortisol theory - Prostaglandin theory and progesterone withdrawal theory) MacDonald and associates (1978).

Physiology of uterine contraction : -

The final event initiating a uterine contraction is an increase in the intracellular concentration of ionic calcium (Ca^{2+}) in myometrial smooth muscle cell in response to the action of uterotonin. The ATP - energy - dependent translocation of clacium to a stored form in the sarcoplasmic reticulum is associated with uterine relaxation Garfield RE (1983).

Uterine contraction is involuntary independant of extrauterine control So neural blockage by caudal or epidural anesthesia if induced early reduces frequency and intensity of uterine contraction.

Uterine contraction is painful due to the following hypotheses (Hypoxia of myometrium - stretching of the cervix - compression of nerve ganglia in cervix - stretching of the overlying peritoneum).

During labour there is differentiation of myometrial muscle into upper segment and lower segment : -

A) The upper segment is thick actively contracting & retracting,

B) The lower segment contract and retract weaker than the upper segment.

The endocrinological events of parturition present a complex picture which has been recently reviewed by Fuchs and Fuchs (1984). They propose that co-ordination of oxytocin receptor formation, prostaglandins synthesis and gap junction formation are a key to the initiation and maintenance of human labour.

Pattern of cervical dilatation (Cervicogram) :

Friedman (1978) shows the pattern of cervical dilatation that takes place during the course of normal labour. It takes on the shape of sigmoid curve. The cervical dilatation curve is divided into 2 phases :

1) a latent phase and

2) an active phase.

The active phase is subdivided into (acceleration phase - phase of maximum slope - deceleration phase). Friedman considers the maximum slope a good measure of the overall effeciency of the uterus. Also developed the concept of three functional divisions of labour (preparatory, dilatational and pelvic phase).

Philpott's partograph (1978) is a composite record of all the important aspects of labour on a single chart which can lead to early recognition of deviation from normal. These are (Time - fetal heart rate - Aminotic fluid - fetal scalp PH - Cervical dilatation- descent & Intravenous fluid - Blood pressure, pulse rate - temperature and urine of mother).

Induction of labour (Termination of pregnancy) is indicated when the fetus in greater danger in the uterus or the mother's life or health endangered.

Bishop scoring system(1964) for assement of induction of labour by measuring fittness of cervix for induction through (Cervical dilatation - effacement - consistency - station - position), as shown in the following table :

Score	**0**	**1**	**2**	**3**
Dilatation	0	1-2	3-4	5-6
Effacement	0-30	40-50	60-78	80
Station	-3	-2	-1.0	+1, +2
Consistency	Firm	Medium	Soft	-
Position	Posterior	Mid	anterior	-

There are many methods for induction and ripening the cervix such as artifical rupture of membrane, oxytocin infusion - Prostaglandin by local adminstration tablet or Gel.

Active management of labour, in contrast to Friedman (1954) who advocates more or less conservative management of labour O'Driscoll et al (1973) advocate active management of labour. The duration of labour is recorded from the time of admission to the delivery unit. A policy of active management was proposed to ensure that every patients was delivered within 12 hours.

Stimulation is by artifical rupture of the membrane followed by oxytocin infusion. The objection to a policy of active management in labour is the possibility of presence of cephalopelvic disproportion. However most cases diagnosed as cephalopelvic disproportion are in fact cases of insufficient uterine contraction.

Attitudes to pain relief start from non pharmacological methods such as these based on psychoprophylaxis as advocated by Lamaze (1972) to epidural anesthesia. Which is becoming more and more common as anesthetic services improve. Of the pharmacologic methods to pain relief, pethidine is the most commonly used pain relieving drug in labour.

Aim of the work

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The aim of this essay :

1) To know the physiology of normal first stage of labour.
2) To detect abnormal first stage early by partographic control of labour. So avoiding prolonged labour excessive maternal morbidity and neonatal compromise.

Chapter 1

CHAPTER I

Physiology of The Cervix

There are three principal structural components in the cervix:

1- Smooth muscle.

2- collagen.

3- connective tissue (the ground substance).

The smooth muscle content of cervix varies, from upward to downward, from 25 percent to only 6 percent. There is in the human, however no apparent role for smooth muscle in cervical "ripening" process.

Connective tissue (the ground substance). in the ground substance important constituents of cervix which are The glycosaminoglycans, i.e. dermatan sulfate and hyaluronic acid, are formed. So this process (cervical ripening) seemingly involves changes that occur in a collagen and connective tissue thus with "ripening" cervical flexibility increases as collagen and protein concentration decrease.

Physiology of Cervical Ripening

Cervical ripening, whether physiological or pharmacological, is the conversion of the rigid cervical "sphincter" associated with maintenance of pregnancy to a compliant and readily dilating structure.

Cervical ripening is believed to be assocaited with two principal events:

(1) collagen breakdown or rearrangement of the collagen fibers and

(2) an alteration in the relative amounts of the various glycosaminoglycans ***(Van Maillot et al 1977).***

A variety of mechanisms have been postulated to explain the reduction in collagen conentration, including increased collagenolysis. Collagen is amenable to breakdown by only two enzymes: Collagenase produced by fibroblasts and leukocytes and leukocyte elastase produced by macrophages, polymorphs and eosinophils. Elastase can break down not only elastin and collagen but also proteoglycans. It may act synergistically with collagenase on collagen. The collagen fragments produced by these enzymes can be further broken down by non-specific proteases. It has been shown that as the cervical collagen content decreases through pregnancy the leukocyte elastase and collagenase activity increase (Uldbjerg et al 1983 b). In addition the amount of soluble collagen, reflecting partly degraded collagen, in the tissue increases in parallel with increased enzyme activities. There appears to be a remodelling of collagen during pregnancy and parturition. The mature collagen with many cross-links is broken down during pregnancy and replaced with new collagen which is more amenable to rapid breakdown at the time of parturition as it has fewer cross-links.

The importance of collagen content to the progress of labour may be highlighted by a study by Ekman et al (1986) which showed that among women in spontaneous labour there were significantly higher cervical collagen concentrations in those with low cervical score (i.e less cervical ripening). Once labour is established, there may be a major increase in collagenase activity in cervical tissue; a reported increase of 13-14 fold over that seen in tissue from women at term not in labour has been reported (Rajabi et al 1988).