

1962

Postmaturity

James Edmund Mabie
University of Nebraska Medical Center

This manuscript is historical in nature and may not reflect current medical research and practice. Search [PubMed](#) for current research.

Follow this and additional works at: <https://digitalcommons.unmc.edu/mdtheses>

Recommended Citation

Mabie, James Edmund, "Postmaturity" (1962). *MD Theses*. 2625.
<https://digitalcommons.unmc.edu/mdtheses/2625>

This Thesis is brought to you for free and open access by the Special Collections at DigitalCommons@UNMC. It has been accepted for inclusion in MD Theses by an authorized administrator of DigitalCommons@UNMC. For more information, please contact digitalcommons@unmc.edu.

POSTMATURITY

James E. Mabie, Jr.

**Submitted in Partial Fulfillment for the Degree of
Doctor of Medicine**

College of Medicine, University of Nebraska

March 12, 1962

Omaha, Nebraska

TABLE OF CONTENTS

	Page
I. Introduction.....	1
(a) Objectives to be accomplished.	1
(b) Definition.....	1
II. History.....	3
III. Incidence and Duration.....	4
IV. Etiology and Physiology.....	6
V. Diagnosis.....	9
VI. Perinatal Mortality.....	12
VII. Therapy.....	14
VIII. Statistical Review of the University of Nebraska Hospital Records.....	16
IX. Summary.....	21
X. Conclusions.....	23
XI. Acknowledgement.....	23
XII. Bibliography.....	24

INTRODUCTION

The problem of postmature pregnancy has been present since the time of Hippocrates and Aristotle. A review of the literature reveals many contradictory statements and statistics. This thesis will present many of these different opinions. After a review of the history, etiology, diagnosis and review of the literature, a statistical analysis of the University of Nebraska hospital obstetrical records will be accomplished. We then plan to reach a conclusion which we hope may, in at least some respects, help us gain new insight into the problem of postmaturity.

Common usage of the term postmaturity usually connotes a pregnancy which has advanced more than 294 days beyond the first day of the last normal menstrual period. Eastman thinks three weeks or more (301 days) beyond the calculated date of delivery to be more logical since 294 days is too brief a period and would include at least 12% of all pregnancies. (13)(14)

Nesbitt states that the "criterion for postmaturity varied among different authors from 285 days to 304 days after the first day of the last

menstrual period. (18) Many other criteria besides length of days from the last menstrual period have been employed and these will be discussed later under diagnosis. Daichman and Gold suggest dropping the term "postmaturity" and using instead the term "postdate labor" since they believe the term postmaturity, by its connotation, leads to undue interference by induction of labor.

Rathburn believes the problem of postmaturity important since the obstetrician is faced with, "1. A fretful patient who demands that she be delivered. 2. The fear of an ever increasing size of baby. 3. The fear, which is prevalent, that the baby may die in utero."

Postmaturity is important also from a medico-legal standpoint. The obstetrician maybe consulted by lawyers on cases involving the legitimacy of an offspring. Although many countries have specific laws regarding the duration of pregnancy, the United States and England have no law with respect to duration of pregnancy and individual cases are decided upon their own merits. (12) Nesbitt lists four such cases, of which two are listed here. All were attempts by the husband to prove adultery on the part of the wife,

solely on the basis of a prolonged pregnancy.

1. "Lockwood vs. Lockwood (Supreme court, Special term, Queen's County, 62 N.Y.S., 910, May 2, 1946) Medical witnesses testified that in the light of present day knowledge it could not be stated, that a pregnancy of 355 days was impossible. The court accordingly rendered judgement in favor of the defendant and dismissed the complaint."

2. "Preston-Jones vs. Preston-Jones (House of Lords, England, December, 1949). The husband petitioned divorce on the grounds of adultery, since the date of last intercourse with the defendant would extend the total length of gestation to 360 days. The divorce commissioner dismissed the husband's petition, and the Court of Appeals directed two rehearings before judgement was rendered in favor of the husband, granting a divorce." (19)

HISTORY

The history of postmaturity is a long one. The Roman Emperor Hadrian (A.D. 76-138) after consultation with his physician and wise men decreed that in case of a chaste woman with irreproachable conduct, a child born eleven months after her husband's death was legitimate. (8) Nesbitt tells us that "according to Ploss

and Bartels, the ancient Hindus believed pregnancy lasted nine months but could be prolonged up to twelve months. LaCoste tells us that most of the Hippocratic writing accepted 280 days as the limit of gestation. Aristotle, on the other hand, wrote that some people believed pregnancy could last eleven months." (18)

In 1634 the supreme court of Friedland recognized a birth as legitimate which occurred 333 days after the husband died. (8)

Nesbitt found in his comprehensive review of the prolongation of pregnancy, no less than 416 references intimately related to the subject and several more indirectly in some manner. (19)

INCIDENCE AND DURATION

The reported incidence of postmaturity varies widely even when the same criteria are used. Many authors have their own criterion and these cause the reported incidence to vary even more.

Of those using 294 days, Daichman reports one of the lowest estimates at 2.6%. Rathburn reported 7.5%, Nesbitt 11% (19), Eastman 12% (14), and Clayton the highest at 23%. (7)

At 301 days or more the incidence ranged from 2.45% to 4.7%. Table I shows the various author's deliv-

eries and reported incidence of postmaturity for 294 and 301 days.

AUTHOR	number of deliveries	294 days or more	301 days	%
Eastman (14)				12.0
Daichman (11)	4,673	123		2.6
Nesbitt (19)	7,415	812		11.0
Rathburn (22)	3,679	250		7.6
Lindgren (16)	13,322	1,291		10.6
"	"		577	4.7
Clayton (6)	1,524	356		23.0
Cope (10)	1,550	48		3.1
"	"	(296 days)		
"	"		40	2.45

TABLE I

Several authors use the criterion of nine pounds or heavier as a postmature infant but Daichman reported that his incidence of infants nine pounds or heavier was 8.1%, which is no higher than the regular expectancy for nine pound infants in his group of normal term deliveries. Nesbitt found the incidence in primiparas, non-white mothers, and patients over forty years to be significantly greater. (19) Other authors have also reported the incidence higher in primiparas. (8)(26)

Almost all reported prolonged pregnancies are actually based on circumstantial evidence but many reports seem reliable on the basis of the last normal menstrual period and the patient being examined in the first trimester. Some of the longest of these are as follows:

Simpson in 1853 reported four instances of prolonged pregnancy of 336, 332, 324 and 319 days respectively. Taussig in 1901 reported a case of 336 days. Lopez in 1926 reported a 352 day pregnancy. (18) S.M. Wells reported a 334 day pregnancy. (12) Cope reported a 338 day pregnancy. (10) The literature is filled with more extended pregnancies but with less reliable evidence.

ETIOLOGY AND PHYSIOLOGY

The etiology of postmaturity is obscure. A few hypotheses have been offered but not proven. Much investigation needs yet to be done, to throw more light upon the underlying causes of postmaturity.

Stewart in 1952 gave good reason that postmaturity may not even exist. He collected oral basal temperatures over a five year period on 135 women. Date of ovulation was determined by basal temperature. He found the average duration of pregnancy from ovulation to a normal live birth to be 266-270 days. The maximum duration of pregnancy was 285 days from ovulation, but the longest duration as calculated by the last menstrual period was 349 days. He concluded that prolonged pregnancy was due to delayed ovulation.

Nesbitt states many clinicians have noted prolonged gestation with anencephalic infants. (18)

According to Nesbitt, Fruhensholz and Richon state there is a definite basis for prolonged pregnancy. They feel that endocrine defects are responsible, and if labors are difficult it is because of insufficient hormonal stimulation to uterine contractions. (18) Casagrande also believes in the hormonal imbalance theory.

Nesbitt states also that familial tendencies involving either the mother or father or both have been mentioned as factors, as have diet and lack of exercise, and that it is commonly stated that multiparas and elderly primigravidas are more likely to have postmature fetuses. (18) Other authors report no difference in incidence with parity. (9)(17)(20) Some state primiparas are more likely to have postmature infants. (8)(26)

The statistical findings in a review of the literature vary widely but most authors agree that there is an increase in fetal distress with prolonged pregnancy. Much research has been done in an attempt to find the reason for this. One of the best studies was by Walker (1954). (25) He showed that as pregnancy advances and becomes more prolonged there is a falling oxygen supply and that this is a causative factor in many fetal deaths and fetal distress. He came to the

conclusion that there is a falling oxygen supply to the human fetus up to the 40th week which is gradual and after 40 weeks rapid. Most fetuses at 40 weeks are well oxygenated and have approximately 100% reserve. The number of fetuses in the next few weeks with a poor oxygen supply increase and by the 43rd week all fetuses have a low supply and no reserve. A well oxygenated baby can stand the effects of any labor but the infant with a poor supply and little or no reserve will experience a deficiency of oxygen during labor and signal this by passage of meconium. When meconium is passed the oxygen saturation in the umbilical vein is at or below 30% and the fetus cannot survive indefinitely. These studies were done on frozen cords rather than fresh blood. Other studies using spectrophotometric techniques have not confirmed these findings. (21)

Barcroft did experiments on sheep umbilical cords and found that the percentage of oxygen saturation dropped considerably but the actual amount was very inconstant.

Clifford suspects placental dysfunction as a cause of fetal malnutrition and anoxia. Nesbitt feels there is suggestive evidence also of placental dysfunction. (19)

Nesbitt states that the placenta ceases to grow before term and uterine blood flow is reduced and that Reynolds in 1939 attributed this to increased pressure from growth of the fetus on the placenta and to uterine tension. The increased flow is not sufficient to offset the loss of volume and the circulation of the placenta becomes impaired. However, the fetus can adapt by a tremendous increase in hemoglobin. (18)

Other reports show that postmaturity results in excessive sized infants. (15)(17)(20)(22) Scott, however, points out that the fetus grows quite regularly to around the 260th day then continues to increase less rapidly for twenty more days. After the 280th day there is practically no more growth of the fetus.

DIAGNOSIS

There are as many methods of diagnosis of postmaturity as there are authors writing on the subject. Nesbitt (18) lists 11 commonly used criteria. Various authors may require from one of these up to the entire eleven, in order to make the diagnosis of postmaturity. They are as follows:

1. Calculation of the estimated date of confinement by Naegle's rule.
2. Estimate from a single coitus.

3. The rate of growth of the uterus, a pause in growth being noted with prolonged pregnancy.
4. The date of quickening.
5. The size of the fetus.
6. The feel of the fetal skull by combined abdominal and vaginal examination.
7. Rigidity of the fetus.
8. Oligohydraminos.
9. Condition of the cervix.
10. Radiology (by the presence or absence of certain ossification centers).
11. A test dose of oxytocin.

Barnes and Zuspan made use of vaginal cytology to determine the estimated date of confinement and they claim 73% accuracy. They do not recommend its routine use because of margin of error and difficulty of interpretation.

The use of the last normal menstrual period as a determination of estimated date of confinement is open to error because the patient's memory for her last menstrual period may be poor. Her menstrual cycle may be 5-6 or more weeks instead of the usual four. There may be variation in the ovulation time. Variations in the luteal phase and the possibility of delayed im-

plantation always exists. (26)

Adams was impressed by the practicality and accuracy of epiphyseal ossification in determination of the gestational age of the fetus. Pre and post delivery films should be taken at a sufficiently close interval of time and compared. He feels the interpretation of the intra-uterine x-rays of the distal epiphysis of the femur to be 89% accurate. (19)

Greenhill feels sterile vaginal examination is the best method. If the cervix is closed the patient is not at term. If it is effaced and partly dilated the patient is near or beyond term. In such an instance if the menstrual history is accurate and the baby weighs more than nine pounds and the parents are small or of average weight and height he considers the pregnancy to have gone beyond term. (15)

An editorial in Lancet (1959) states the only physical sign of postmaturity is obtained by palpation when the amniotic fluid is absorbed and the fetus seems to fill the uterus.

According to Walker postmaturity or fetal distress is signaled by a steadily rising maternal weight curve with a halt and then a fall of some pounds at or before term by the pregnant women. He recognizes, however,

that this may be very difficult to recognize since it may easily be masked by fluid retention. (25)

Clifford recognizes a definite postmaturity syndrome. He believes prolongation of pregnancy with associated diminished placental efficiency results in the fetus living from its own tissue and this causes intrauterine loss of body weight. He divides the infants into three groups according to the severity of loss of vernix, dry parched skin, thinness, anoxia and liberation of meconium.

Of all the above methods, the calculation of estimated date of confinement by Naegele's rule is the most commonly used. This is accomplished by counting back three months from the first day of the last menstrual period and adding seven days.

PERINATAL MORTALITY

All papers reviewed reported that there was some increase in fetal distress. This ranged from a small to a high percentage. The papers differed in their opinions as to the role of race, age and parity in postmaturity and to the effects of postmaturity on fetal size, on stillbirths and on therapy.

In Calkin's opinion postmaturity is to be feared only when the placenta and the baby are quite small.(3)

Clifford found that postmaturity of 300 days or more ranked second only to prematurity as a cause of neonatal deaths in the primipara. After 300 days of gestation in the primipara one in every ten infants in his series died

Walker reported an increase in perinatal mortality due mainly to stillbirth in the primigravida. There was an increase in fetal distress more marked in primigravida as against multigravida and the older primigravida as against younger primigravida. (25)

Nesbitt in his series had a significantly higher incidence of contracted pelvis, fetal distress, uterine inertia, prolonged labor, breech presentation, and postpartum hemorrhage. He had a three fold increase in the postmaturity perinatal mortality rate over the control group of mature cases. (19)

Oberlin found that postmaturity was not peculiar to the primigravida. He believed that the longer the pregnancy the heavier the baby, and that there was no increase in fetal distress or mortality in his series of prolonged pregnancies.

There was no difference in age, race or parity; no increase in perinatal mortality and no increase in duration of labor in the cases of prolonged pregnancies

reported by Magram. He did find, however, a small increase in the weight of the baby and a large increase in fetal distress.

Casagrande and Rathburn in their postmature series both reported higher fetal mortality rates.

There was an increase in fetal distress more marked in the primigravida, in Clayton's series of prolonged pregnancy. (7)

Gibson had a series of prolonged pregnancies, in which he reported a 25% intrauterine death rate if the membranes ruptured 72 hours before delivery. (21)

Lindgren reported a higher perinatal mortality, because of anoxia and uterine inertia.

Eastman thinks postmaturity may impose a slightly increased risk of fetal death. (14)

Cope reported no difference in parity but he had an increase in prolonged labor and an increase in fetal distress and stillbirth in his series of prolonged pregnancies. (9)

THERAPY

The problems of therapy in postmaturity are not so varied as those of diagnosis and statistical reviews. The major controversy is over whether patients should be routinely induced, selectively induced or left alone.

Greenhill and Daichman and Clayton all believe they should be left alone and managed no differently than pregnancies of normal duration. (15)(11)(6) The majority of American authors believe in selective induction, while some in England believe more in its routine induction.

The different authors from their experience with prolonged pregnancy advocate the following methods of therapy:

Rathburn, Casagrande and Cope propose selective induction of those women with ripe cervixes. (22)(5)(10)

Clayton feels surgical induction is seldom justified, but with any suspicion of fetal distress cesarean section should be resorted to if the cervix is not dilated. (7)

Nesbitt believes in allowing pregnancy to continue unless intervention is indicated by complications other than postmaturity. Should uterine inertia or prolonged labor develop and the usual methods of rest and hydration fail, one should employ cesarean section in preference to oxytocin stimulation. (19)

Eastman wants selective induction for patients with ripe cervixes but makes exception for the primigravida over 40, who, he states, should have a cesarean section. (14)

Scott prefers selective induction and "watchful waiting" but proposes cesarean section for uterine inertia especially in the elderly primigravida.

Magram believes in expeditious use of cesarean section in some cases.

Walker divides his therapy as follows: 1. Await labor with normal multipara and primipara under thirty years old. 2. In the primipara or multigravida with hypertension or preeclampsia or previous threatened abortion, induction should be considered. 3. In the multipara with a history of a stillbirth or early neonatal death in previous pregnancies, delivery should be before and often long before term. 4. In the primipara over thirty years of age do not allow pregnancy to progress beyond 290 days. 5. Patients with a clinical disproportion of the pelvis should be induced when the cervix is ripe. (26)

STATISTICAL REVIEW OF RECORDS
OF THE UNIVERSITY OF NEBRASKA
HOSPITAL

This study comprises a statistical review and analysis of deliveries which occurred in the obstetrical department of the University of Nebraska Hospital. The period covered extends approximately from July of 1959 to July of 1961. The length of gestation

was determined, entirely by using Naegele's rule. Those fetuses delivered 294 days or more from the first day of the last menstrual period were considered to be postmature.

There were 1,348 pregnant women delivered during this period. 128 of the pregnancies were found to have lasted 42 or more weeks. This is a 9.5% incidence of postmaturity.

The maternal factors of age and parity as occurred in our series of prolonged pregnancies are given below in tables II and III. There were 27 primiparas and 101 multiparas in this series. White patients accounted for 85 deliveries in the postmature group as opposed to 43 non-whites. These were not compared against the same factors as occurred in our term deliveries.

Occurrence of postmaturity according to age of mother	
Age group	number of deliveries
Less than 15	0
15-19	32
20-24	41
25-29	28
30-34	16
35-39	10
40-44	01
Total	128

TABLE II

**Occurrence of postmaturity
according to parity of mother**

Number of previous pregnancies	number
0	27
1	17
2	19
3	22
4	15
5	11
6	09
7	05
8	02
9	01

TABLE III

There were eight abnormal presentations in this series, four breech, one face and three transverse lie. This accounted for 6.7% as against 5.2% in the usual university series.

Only five of the 128 postmature deliveries were induced by pitocin stimulation. There were three cesarean sections which is a rate of 2.5%. This is lower than the 3.6% cesarean rate for this hospital.

The length of labor was not divided into primiparous and multiparous labor. The curve for length of labor, as shown in table IV below, paralleled our normal curve. There were no labors in this series which were longer than thirty hours. There were only four abnormal labors reported, three secondary uterine dysfunctions and one abnormal uterine contraction.

Forceps in this series were used twenty one times or 17.5%. The usual university rate is 28.9%.

There were eight cases of postpartum hemorrhage, one of which resulted in shock. This was an incidence of 6.7% as compared to a 5.7% incidence of postpartum hemorrhage in the control cases.

There were no maternal mortalities and the morbidity rate was not remarkable in this series.

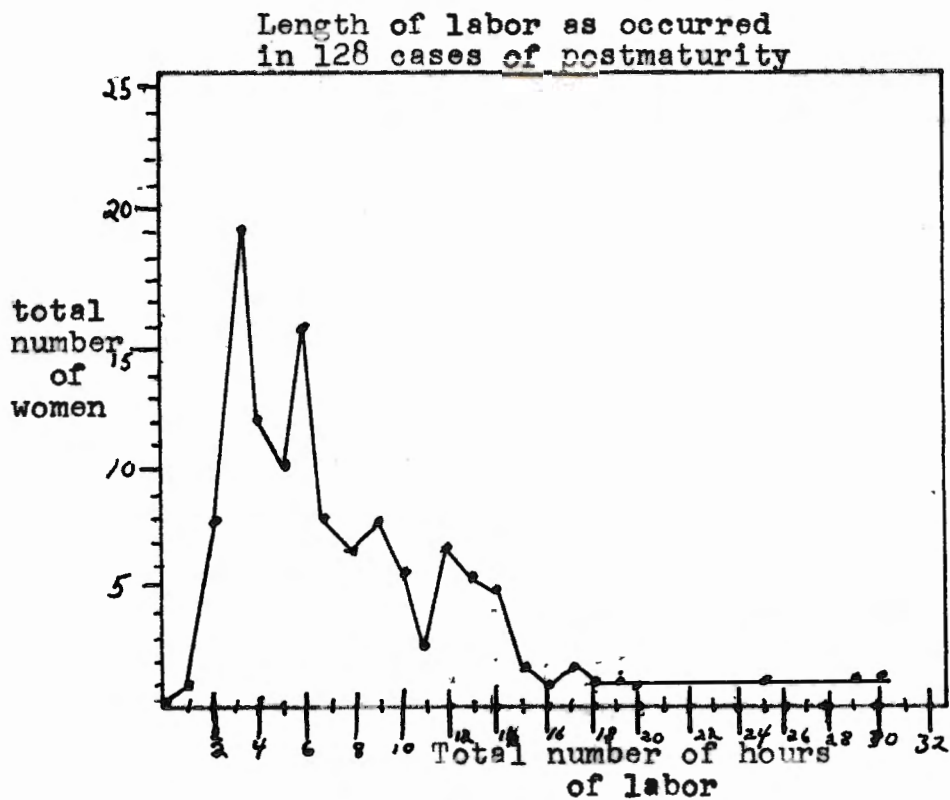


TABLE IV

The most striking difference noticed in this series of 128 postmature deliveries as opposed to our control, was the newborn weights. The postmature series had

19.2% or 23 infants classified as excessive sized (4,000 grams or more). The average weight in the postmature group was 3,538 grams. The average weight in the control group was 3,186 grams. Our percentage of excessive sized term infants at this hospital is approximately 6.9%. The postmature group had only one mother who was classified as diabetic. Table V shows the distribution of new born weights in our series of 128 cases of postmaturity.

Distribution of postmature newborn weights at university hospital

weight in grams	number of infants
2501-3000	25
3001-3500	29
3501-4000	51
4001-4500	18
4501-5000	5
Total	128

TABLE V

Our postmature group had two stillbirths or a 1.6% incidence. The control group had an incidence of 1.1%. One stillborn was dead before labor began. The fetus was macerated and the umbilical cord was around the neck. The placenta was apparently normal. The other stillborn died during labor and was hydrocephalic and had other anomalies.

There was one neonatal death in the series, which closely approximated the neonatal death rate of our control group. The woman was first seen at 43 weeks. She had a history of ruptured membranes for five weeks. She was pre-eclamptic and in labor at time of admission.

SUMMARY

A review of the literature reveals common usage of the term postmaturity to mean a pregnancy extending beyond 42 weeks from the last menstrual period. Postmaturity is important because of the medico-legal standpoint of determining legitimacy and in the eyes of the patient who fears going beyond her "due date".

The history of postmaturity is a long one which dates back to the days of Hippocrates and Aristotle.

The incidence of postmaturity varies widely depending on definition, but is commonly believed to be 10-20% of all pregnancies.

The etiology of postmaturity is obscure. Fetal anomalies, hormonal influences, familial tendencies, diet and lack of exercise as well as parity, have all been incriminated as causing prolonged pregnancy.

It has been felt by some authors, that postmaturity leads to placental insufficiency, which in turn leads to an increased incidence of fetal distress.

One author reports a definite postmaturity syndrome as judged by clinical evaluation of the newborn infant.

The pathology of postmaturity varies widely according to the author read. Increased perinatal mortality, prolonged labor, uterine inertia, increased incidence of larger babies and differences according to race, age and parity have been reported. Most authors are agreed, however, that there is an increased incidence of fetal distress.

Therapy for postmaturity is usually one of watchful waiting, with selective induction of labor when the cervix is ripe. Some authors, however, propose routine induction of all pregnancies with gestations over 42 weeks or in elderly primigravidas, or in primigravidas per se.

A review of the university of Nebraska hospital records showed an incidence of postmaturity of 9.5%. The review revealed a striking increase in the incidence of excessive sized infants. There was no increase of perinatal or maternal mortality or prolonged labor. Stillbirth and neonatal death paralleled that of the control group. There were no maternal deaths and maternal morbidity was not remarkable. There were, however, slight increases in the rate of abnormal pro-

sentations and postpartum hemorrhage as compared to a control group. The percentage of pitocin stimulation, forceps application and cesarean section were even lower than that of the control group.

CONCLUSION

Postmaturity as a definite entity does exist. The many fallacies in its diagnosis such as error in the last normal menstrual period and the possibility of delayed ovulation as well as others are also recognized. The estimated date of confinement as calculated by Naegele's rule must also be supplemented by other history and findings obtainable, such as fundal height, date of coitus, date of quickening and so on.

It is recognized that postmaturity may carry with it the possibility of a heavier infant and also result in an increased incidence of fetal distress. This increased incidence, however is not alarming enough to require the routine induction of all pregnancies past 42 weeks. Management should be that of watchful waiting and intervention only if other obstetric complications arise.

ACKNOWLEDGEMENT

I wish to make grateful acknowledgement to Dr. Warren H. Pearse for his cooperation, his generous help and his constructive criticism in the preparation of this thesis.

BIBLIOGRAPHY

1. Barcroft, J., Kennedy, J.A. & Mason M.F., J. of Physiol. 97:347, 1939.
2. Barnes, A.C. & Zuspan, F.P., Am. J. of Obst. & Gynec. 71(2):1080, 1956.
3. Calkins, L.A., Postmaturity, Am. J. Obst. & Gynec. 56:167, 1948.
4. Calkins, L.A., Am. J. Obst. & Gynec. 68:50, 1954.
5. Casagrande, J., The Postmature Fetus, Am. J. Obst. & Gynec. 37:1028, 1939.
6. Clayton, S.G., Fetal Distress in Postmaturity, Proc. Roy. Soc. Med. 46:91, 1953.
7. Clayton, S.G., Postmaturity, Postgrad. Med. J. 30:345, 1954.
8. Clifford, S.A., Postmaturity with placental dysfunction; Clinical Syndrome and Path. findings, J. Pediat. 44:1, 1954.
9. Cope, I., Prolonge Preg; its hazards and management, Med. J. Australia 46, 1(6):196, 1959.
10. Cope, I., Pearson, M.G., Brit. Med. J. 1211, 1958.
11. Daichman, I. & Gold, E.N., Am. J. of Obst. & Gynec. 68:1129, 1954.
12. Eastman, N.J., Editorial, Obst. & Gynec. Survey, 4:378, 1949.
13. Eastman, N.J., Editorial, Obst. & Gynec. Survey, 5:813, 1950.
14. Eastman, N.J., Postmaturity (In Williams Obstetrics 11th edition, New York, Appleton-Century-Crofts Inc.,) p 1067-1068, 1956..
15. Greenhill, J.P. MD., Prolonged Pregnancy or Postmaturity, (In Obstetrics, 11th edition, Philadelphia, Saunders,) p 102-3, 1955.

16. Lindgren, L., Normann, P., Vibing, L., Prolonged Pregnancy, ACTA Obst. Gyn. Scand. 37(4):482, 1958.
17. Magram, H.M., & Cavanagh, W.V., The problem of Postmaturity: A statistical analysis, Amer. J. Obst. & Gynec., 79:216, 1960.
18. Nesbitt, R.E.L. Jr., & Anderson, G.W., Prolongation of Pregnancy, A review, Obst. & Gynec. Surv. 10:311, 1955.
19. Nesbitt, R.E.L., Postmature Pregnancy, Obst. & Gynec. 8:157, 1956.
20. Perlin, I.A., Postmaturity, Amer. J. of Obst. & Gynec. 80:1, 1960.
21. Prolonged Pregnancy, Editorial, Lancet, Lond. (1) (70760):770, 1959.
22. Rathburn, L.S., An Analysis of 250 cases of Postmaturity, 46:278, 1943.
23. Scott, E., The problems of Postmaturity, J. Am. M. Women's Ass. 13(9):353, 1958.
24. Stewart, J.L. Jr., Duration of Pregnancy and Postmaturity, J.A.M.A. 148:1079, 1952.
25. Walker, J., Fetal Anoxia, J. Obst. & Gynec. Brit. Emp. 61:162, 1954.
26. Walker, J., Prolonged Preg. Syndrome, Am. J. of Obst. & Gynec. 76(6):1231, 1958.