

## THE SECOND STAGE OF LABOR; INTERNAL ROTATION\*

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**I**NTERNAL rotation has long been the most interesting feature of the mechanism of labor. This interest has been partly due to the fact that the etiology is unknown. A great difference of opinion has also existed with reference to the significance of failure of rotation.

This present study has two objectives. It was thought that if we could learn more exactly the time at which internal rotation occurred and study carefully the results of failure of rotation, we might possibly arrive at a more definite knowledge of why internal rotation takes place. Or, failing that, we might learn how better to manage the unrotated head.

For the past several years, we have tried to improve our labor records by noting carefully the direction of the sagittal suture and the exact presenting point with reference to the two fontanels at each successive examination during labor. Vaginal examinations have deliberately been made as frequently as necessary when exact information on these points was not available by rectal examination. During the second stage particularly, the direction of the sagittal suture was noted frequently. It was our impression that internal rotation usually takes place while the head is descending to the pelvic floor. We, therefore, made it a particularly urgent necessity to know whether this was true. As a result of having made these careful records on some 2,900 primiparas and some 2,500 multiparas, we can now say that internal rotation is complete at the time the head reaches the pelvic floor in approximately two-thirds of all patients (hereafter referred to as early rotation). In something less than 30 per cent, internal rotation is completed very shortly after the head reaches the pelvic floor. The length of time varies from as little as one uterine contraction in a multipara to as many as ten or twelve contractions in some primiparas.† In something over 4 per cent of all patients, rotation to the anterior does not take place. In a portion of these, rotation posteriorly to the hollow of the sacrum occurs. In another portion, partial rotation anteriorly is observed (as from an obliquely posterior position to an obliquely anterior position). The largest fraction of this 4 per cent, however, is made up of those patients in whom no internal rotation occurs. Two and six-tenths per cent of all primiparas and 1.4 per cent of all multiparas fall into this latter group. It should be pointed out that not all of these patients are truly "persistent" occiput anterior or "persistent" occiput posterior. Of 100 such primiparas, 25 delivered spontaneously

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	Primiparas	Multiparas
†Early	1827	1734
Late - soon -	347 - ave. 6.6 mins.	353 - ave. 3.3 mins
Late - delayed (?) -	564 - ave. 42.0 mins.	311 - ave. 17.5 mins
Late - 3 groups -	143	100

without any considerable delay and without harm to mother or baby. Thirty-two out of 42 similar multiparas delivered spontaneously with labor prolonged no more than a few minutes as a result of the unrotated position of the head. The remaining 75 primiparas and 10 multiparas were delivered by operative means. It could well be that a considerable portion of these latter groups would have rotated and delivered spontaneously had the application of forceps or manual rotation been delayed a few more minutes. (These latter four groups of patients—that is, those rotating anteriorly [either soon or a little later] after reaching the pelvic floor, those rotating posteriorly, those undergoing partial rotation, and those undergoing no rotation will hereafter be referred to collectively as “Late Rotation.”)

### When (and Why?)

As stated above, internal rotation occurs in approximately two-thirds of all patients by the time the head has reached the pelvic floor. In the remaining one-third, it occurs later or, perhaps, not at all. Whereas internal rotation has taken place during the first stage of labor in a very small percentage of all patients, it is, for the most part, very definitely a second-stage phenomenon. In this connection, several statements in a previous publication<sup>1</sup> will not be repeated here. The long-standing belief that only small round heads sometimes failed to undergo internal rotation is not borne out by this study. Not only does the same proportion of large heads (weight 3,500 Gm. and over) rotate, but the rotation occurs at approximately the same time, so that the size of infant's head or size of the infant is not a factor in this process. Similarly, failure of rotation occurs with occiput anterior as well as with occiput posterior. It is only slightly more frequent with the posterior position. Somewhat to our surprise (Table I), we found that early rotation was definitely more frequent in multiparas than in primiparas. What was even more interesting was the

TABLE I. INTERNAL ROTATION

		INCIDENCE OF LATE ROTATION (PER CENT)	
<i>Primiparas:</i>			
Good pains	Small babies	772 Early	33
		374 Late	
	Large babies	229 Early	
		121 Late	
Poor pains	Small babies	592 Early	42
		432 Late	
	Large babies	234 Early	
		163 Late	
<i>Multiparas:</i>			
Good pains	Small babies	716 Early	28
		272 Late	
	Large babies	434 Early	
		174 Late	
Poor pains	Small babies	349 Early	35
		186 Late	
	Large babies	235 Early	
		125 Late	

fact that, in this series, early rotation was considerably more common with good labor pains than it was with poor labor pains.\* We thus find that multiparas with good labor pains will have early rotation in 72 per cent of all cases. Primiparas with poor labor pains, on the other hand, will have early rotation in only 58 per cent of all cases. Failure of internal rotation similarly occurs in only 1.2 per cent of multiparas with good pains, and in this series was judged to have failed in 5.6 per cent of primiparas with poor pains.

Whereas the above findings do not definitely establish the etiology of internal rotation, it seems that we can very definitely state that parity and the character of the labor pains are definite factors in this process.

### Significance of Late Rotation

As previously stated, the vast majority of all heads unrotated at the time the pelvic floor is reached will rotate quite promptly thereafter. In multiparas particularly, this rotation takes place during the next one or two uterine contractions. In primiparas, three to five such uterine contractions are usually necessary. In these groups of patients, this amount of delay in rotation is not evidenced in the complete pelvic floor phase of the second stage. There seems to be sufficient distention while rotation is taking place that the whole pelvic floor phase is accomplished just as quickly as though the head had been completely rotated at the time the pelvic floor was reached.

Similarly, rotation of an occiput posterior into the hollow of the sacrum and spontaneous delivery thereof, be the patient primipara or multipara, does not materially delay the completion of the delivery.

In the remaining groups, that is, those in whom internal rotation is only partly accomplished, or in whom no rotation takes place (2.6 per cent of primiparas and 1.4 per cent of multiparas), failure of rotation is a much more significant item in primiparas but not of serious import in multiparas. Even in primiparas, it is not of great importance if the labor pains are good, but if the labor pains are poor, forceps delivery was thought necessary in 75 per cent of our primiparas.

TABLE II. SECOND STAGE IN MULTIPARAS

PELVIC FLOOR PHASE		TIME (MINUTES)	NUMBER OF PATIENTS
<i>Good pains:</i>			
Small baby	Early rotation	8.7	716
Small baby	Early rotation	add 3.0	272
Large baby	Early rotation	9.5	434
Large baby	Early rotation	add 3.5	174
<i>Poor pains:</i>			
Small baby	Late rotation	12.1	349
Small baby	Late rotation	add 8.1	186
Large baby	Late rotation	14.7	235
Large baby	Late rotation	add 6.6	125

\*Labor pains were said to be good for the purposes of this study if they occurred at intervals no longer than two minutes and of an intensity that would barely allow a slight indentation of the fundus of the uterus by the examiner's finger at the height of a contraction; at a point not directly over the body of the baby. They were said to be poor if of a long interval or a lesser intensity, or both.

Table II shows these differences for multiparas in simple tabular form. The group of large baby, late rotation, and poor pains should probably be looked upon as adding something like ten or twelve minutes to the duration of the early rotation group, rather than the 6.6 minutes recorded in the table.

Table III presents the same material for primiparas. It will be observed that significant prolongation of the pelvic floor phase of the second stage is present where the labor pains are poor. It should be noted that this difference of seventeen minutes observed in late rotation for small babies is, perhaps, not far from being entirely correct. Although approximately 25 per cent of the late rotations were delivered with forceps, only a very few could be said to have prolonged second stage in this operative group. Large babies with late rotation and poor pains present a considerably different picture. In this group, the labor may be considerably prolonged. The fact that we used forceps on 40 per cent of these patients explains the apparent contradiction noted in Table III, where late rotation seemingly prolongs the second stage by only ten minutes. This figure would undoubtedly be at least thirty to forty minutes if it were not decreased by frequent operative intervention.

TABLE III. SECOND STAGE IN PRIMIPARAS

PELVIC FLOOR PHASE		TIME (MINUTES)	NUMBER OF PATIENTS
<i>Good pains:</i>			
Small baby	Early rotation	28.7	772
Small baby	Early rotation	add 3.7	374
Large baby	Early rotation	33.6	229
Large baby	Early rotation	add 10.8	121
<i>Poor pains:</i>			
Small baby	Late rotation	44.9	592
Small baby	Late rotation	add 17.0	432
Large baby	Late rotation	61.6	234
Large baby	Late rotation	add 9.9	163

Careful appraisal of Tables II and III would suggest that poor pains is a much more significant item than failure of rotation, which is apparently of equal importance to "large" baby as a deterrent to prompt completion of the second stage. Although no data are here included, we also know from recent careful observation that voluntary effort is at least equally important to the labor pains.

Table IV presents the data for these same groups of patients with incidence of operative delivery, all but very few of which were low forceps. From this

TABLE IV. FORCEPS DELIVERIES IN PER CENT

	PRIMIPARAS	MULTIPARAS
<i>Good pains:</i>		
Small baby	Early rotation	4.0
Small baby	Late rotation	5.1
Large baby	Early rotation	4.4
Large baby	Late rotation	9.1
<i>Poor pains:</i>		
Small baby	Early rotation	15.5
Small baby	Late rotation	24.3
Large baby	Early rotation	26.1
Large baby	Late rotation	39.9

tabulation, it would seem that operative delivery is rarely if ever necessary in multiparas, except perhaps in the group of large baby, late rotation, and poor pains, where approximately one out of sixteen such patients was so delivered in this series. In primiparas, we are more and more learning that forceps are not necessary where the labor pains are good, but are, perhaps, increasing our incidence of forceps deliveries in the presence of poor pains, particularly when the baby is large or rotation is late. In the complete absence of rotation, our forceps incidence was 75 per cent of that very small group of primiparas (2.6 per cent) where the pains were poor and the baby large (1.95 per cent of all primiparas). Even in this very small group, one should not proceed to the immediate application of forceps as soon as the head reaches the pelvic floor, or even in three to five pains thereafter, as a delay of thirty to sixty minutes will produce sufficient distention of the perineal tissues that the forceps delivery will be found to be much easier than if attempted immediately. Moreover, one is frequently surprised to find that rotation does occur at the end of thirty to forty minutes, when in the first fifteen or twenty minutes it had seemed most unlikely. The old rule of "not over one hour on the pelvic floor," as stated by Litzenberg, Baer, Polak, and others, is still a reliable rule.

### Reference

1. Calkins, L. A.: *AM. J. OBST. & GYNEC.* 48: 798, 1944.

### Discussion

DR. M. PIERCE RUCKER, Richmond, Va.—From a practical standpoint, I believe the shorter the second stage the better it is for mother and baby. If proper facilities and help are available, I see no reason why the mother should not be delivered as soon as the cervix is out of the way.

As a study in the physiology of labor, Dr. Calkins' essay is important, for when all is said and done, we cannot know too much of physiology. It is the standard by which we should measure our results. When the speaker states that in two-thirds of all patients internal rotation is complete at the time the head reaches the pelvic floor, and that in something less than 30 per cent, it is completed very shortly thereafter, we may take it that this represents the true state of affairs. In slightly over 4 per cent anterior rotation does not take place. Some of these rotate posteriorly, and in some anterior rotation is arrested, but in 3.4 per cent of all primiparas, and 1.7 per cent of all multiparas, no internal rotation occurs.

The statistical value of the paper is somewhat vitiated by the forceps deliveries. These varied from 1 per cent to 75 per cent in the various subgroups. Furthermore, the author does not state his indications for the operation. He is conscious of this possible criticism when he says that the "fact that we used forceps on 40 per cent of these patients (large babies with late rotation) explains the contradiction noted in Table III where late rotation seemingly prolongs the second stage by only ten minutes." Evidently his obstetric judgment got the better of his statistical zeal.

It is interesting to note that the size of the fetal head is unimportant from the standpoint of internal rotation or failure of rotation. The character of uterine contractions is of far greater importance. By inference the tenseness of the pelvic floor is not as important a cause of anterior rotation as we were taught to believe, for in multiparas failure of internal rotation occurs in only 1.2 per cent when the pains were good in comparison with an incidence of 2.6 per cent in primiparas. Furthermore, in two-thirds of all patients, internal rotation takes place before the presenting part hits the "pelvic trough" which we used to think was the cause of internal rotation.

I wish Dr. Calkins had discussed the role of the uterus, other than its driving power, in the failure of internal rotation. He stated internal rotation was usually a second stage phenomenon. Can it be that so long as the presenting part is within the uterus, the lower uterine segment acts as a brake on rotation?

The more we study the physiology of labor, the more we feel the need of further study of the uterus. In the past, attention to mechanical difficulties has overshadowed the importance of variations in the function of this organ. Today's paper is a case in point. The character of the labor pains is of greater importance than the size of the fetal head or the character of the perineum.

DR. CALKINS (Closing).—This paper deals with patients whose pelves (in over 90 per cent) were normal. We did not delete any abnormal pelves from the series, and it can well be that a truly abnormal pelvis will definitely affect the physiology of labor. Certainly, anything that is out of the usual may be a factor, since we as yet do not know the etiology of internal rotation itself. I cannot, therefore, answer the question as to what effect the various types of pelvis may have upon the mechanism of labor. I am trying to find out what happens when the pelvis is normal, and I still do not know. This study is only a step in that direction.

As to the question whether one may by simple finger pressure on the suture line bring about more prompt rotation, there is no question but that such can be done, particularly when rotation will otherwise be early and easy, but it cannot be so readily effected with the large head and poor pains, and that is when you really need some help.