A Reliable Method of Establishing the Level of the Fetal Head in Obstetrics

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SUMMARY

A method of assessing the level of the head clinically in 'fifths of the head above the pubic symphysis' is described, illustrated, and commented upon. Its value in delineating the descent of the head in problem cases, and as a guide to whether or not the head can be delivered safely from below, has been proved in thousands of cases presenting with problems of disproportion at King Edward VIII Hospital, Durban. Confirmatory evidence by radiographic examination has been forthcoming in a large percentage of cases.

The traditional methods of assessing the level of the head, by its 'station' and 'engagement', are described and subjected to criticism. They are theoretically unsound, and practically misleading, especially in problem cases.

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Hitherto only the term 'engagement' or 'station' of the head has been employed universally to describe and assess the level of the fetal head in clinical obstetrics. The practical significance, however, of engagement is so nebulous that an examiner can be guaranteed the following definition if he asks a candidate to define this term in a final medical examination. 'When the largest diameter for that particular presentation has passed through the brim of the pelvis'. Should an examiner ask a candidate to correlate this definition with the fetal head in its clinical relationship to the maternal pelvis, he will find it difficult to do so.

The potential dangers in mistaking the level of the head deserve emphasis and elaboration, and the need to establish uniformity and an accurate method for describing the level of the head in the pelvis is the purpose of this article.

In pursuance of this, a method of assessing the level of the head, the fifths of the head above pubic symphysis method, is described. This and other established methods (of engagement and station of the head) are subjected to a critical analysis whereby the reliability of each is assessed and each is compared.

REQUIREMENTS OF ANY METHOD IN ASSESSING THE LEVEL OF THE HEAD

The point selected must be easy to palpate, have obstetric significance, and be unchanged by the pressures of difficult labour on both the fetal head and maternal pelvis. These findings should be easily and reliably carried out by both medical and nursing staffs. These being the requirements, they constitute the best yardsticks whereby the merits of available methods of assessing the level of the head can be evaluated and compared.

FIFTHS OF THE HEAD ABOVE THE PUBIC SYMPHYSIS

This is defined as that proportion of the head (described in fifths) which lies above the level of the pubic symphysis. Thus the head completely above the level of the pubic symphysis is described as five-fifths above, and the head deep in the pelvis (with neither sinciput nor occiput palpable abdominally) is nought-fifths above. The occiput can only be just tipped when the head is two-fifths above (engaged). Only the sinciput can be just tipped when a head is one-fifth above (Fig. 1).

Landmarks on the Fetal Head

These are the occiput and sinciput and, if the head is high, the midpoint on an imaginary line is drawn between them. These points are easily defined by different observers. Neither moulding nor caput of the fetal head can prejudice the accuracy of assessing their level because they lie along the base of the skull.

Landmark on the Pelvis

This is the upper border of the pubic symphysis. The landmark is easily palpable in all cases and can be reliably carried out by different observers.

Analysis of the Concept

A basovertical diameter[1] extending from the base of the skull to the most distant point of the vertex measures only slightly less than the biparietal diameter which is just over 9 cm in an average 3,182-kg baby. Therefore, 2 cm on this line represents roughly one-fifth of the head.

As regards the selection of reliable landmarks on the pelvis, it might be said that the level of the pubic symphysis is not the level of the brim of the pelvis. From a practical standpoint, however, the correlation between the levels is sufficient to render the level of the pubic symphysis acceptable as an index of the level of the brim, for clinical

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ABDOMEN					
Sinciput +++++ Occiput ++++	Sinciput ++++ Occiput +++	Sinciput +++ Occiput ++	Sinciput ++ Occiput + (: just tipped)	Sinciput + (: just tipped) Occiput Nil	Nil Felt
5/5	4/5	3/5	2/5	1/5	0/5
PUBIC SYMPHYSIS					PUBIC SYMPHYSIS
		PELVIC CAVITY			
CAESAREAN SECTION		UPPER LIMIT a. Symphysiotomy b. Craniotomy	TRIAL FORCEPS	MID FORCEPS	LOW FORCEPS

Fig. 1. Level of the head in fifths above pubis symphysis.

purposes. Theoretically, special allowances could be made in cases with very high or low assimilation pelves, but during an experience of problems of disproportion none of my staff have found correction clinically advantageous, even though it would have been easy to do so, for the interpretation of radiographs taken during trials of labour is undertaken exclusively by the obstetric staff conducting the trial of labour in our unit. Thus, correlation of the clinical level of the head with the precise level seen on radiographs taken at that time, has been forthcoming in a high percentage of cases.

Practical Application of the Method

The clear definition of the levels of the sinciput and occiput as well as the upper margin of the pubic symphysis, the bladder naturally being empty, is essential. The level of the upper margin of the pubic symphysis should be marked with an indelible line.

The sinciput and occiput levels are most accurately defined by the 'second pelvic grip'. Mistakes are common when the hands are not maintained almost in line with the forearms and when palpation commences too low, too anterior, and too forcefully, with fingers, as opposed to the gentle pressure with the flat of the hand. The fingers must be held almost parallel to the surface of the abdomen, with a little additional pressure being applied at times, by slight flexion of the metacarpophalangeal joints (not interphalangeal joints) (Fig. 2). There is no force like gentleness for this palpation.

Occasionally difficulty is experienced when the occiput lies posterior and when the lower abdomen is prohibitively resistant to palpation. A combined abdominovaginal examination will help to clarify the position, for the fingers in the vagina are able to impart small degrees of movement to the sinciput and occiput, which renders their level more easily appreciated by the fingers on the abdomen (Fig. 3). A better appreciation of the size of the fetal head is an additional advantage.

The levels of the sinciput and occiput can be marked on the anterior abdominal wall, and a line drawn between them would indicate the degree of flexion and the level of the base of the skull; but special care must be taken not to distort the level of the abdominal skin in marking these points. This practice has proved helpful in teaching and

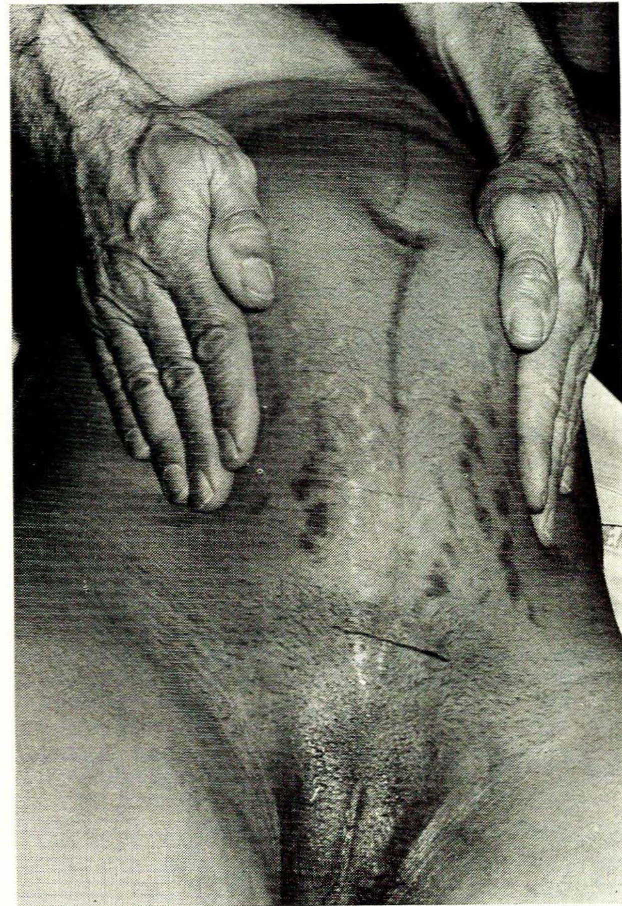
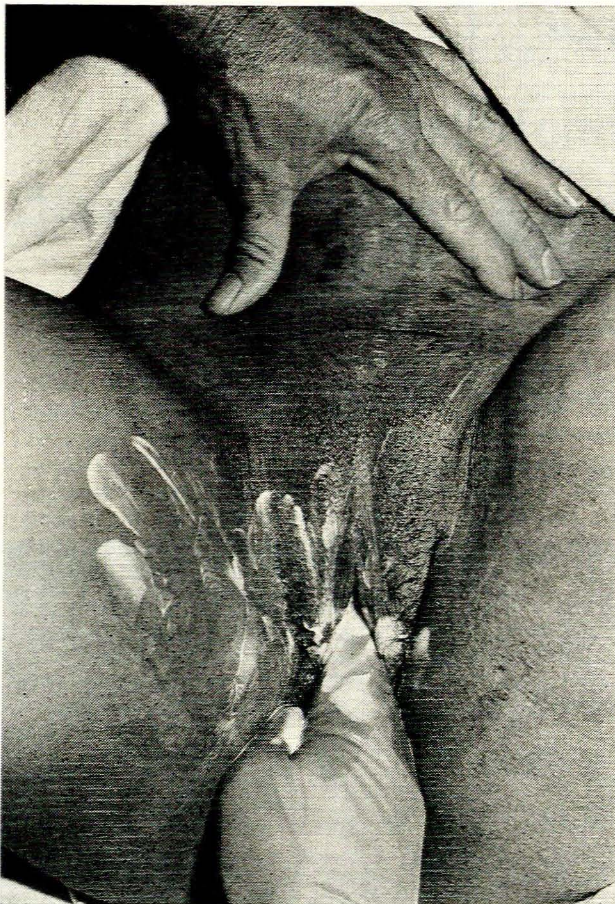


Fig. 2. Second pelvic grip—correct positioning of forearms, hands and fingers.



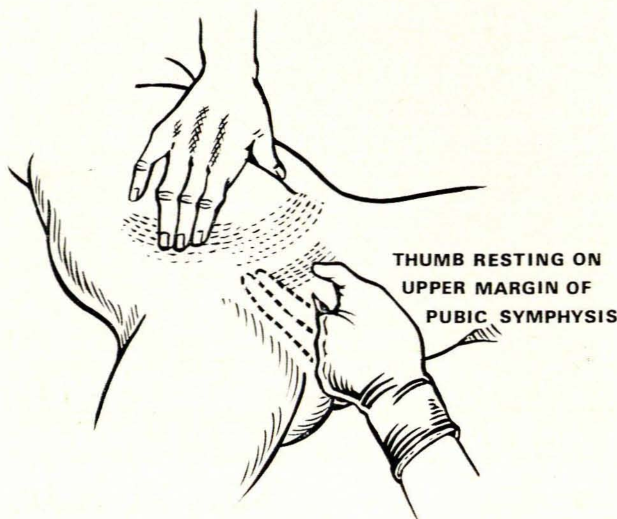


Fig. 3. Abdominopelvic method of assessing head level.

checking upon the accuracy achieved by students and staff. It is also helpful as a guide to radiographers undertaking intrapartum radiography, for they are thereby able to avoid omitting part of the head from radiographs.

It has recently been suggested[2] that this method could be modified by placing the fingers of the right hand suprapubically while palpating the sinciput and occiput with a left-hand reversed Paulic's grip. This method, however, is actually not a modification, but a different method which was evaluated some years ago in our Unit and found too inaccurate to use. The reasons are as follows:

Although the reversed Paulic's grip is supposed to be superimposed on points previously established by the second pelvic grip, all too soon the staff lapsed into 'establishing' the level of the head with the reversed Paulic's grip, whether a preliminary second pelvic grip had been done or not. Whereas the inaccuracy is not serious when the head is more than three-fifths above, inaccuracy when the head is three-fifths or less above (especially when the occiput is posterior) is often disastrous at levels which have greatest obstetric importance. Further, when it comes to assessing the level of the head as being one- or two-fifths above, this is assessed with the breadth of 1 or 2 fingers above the pubic symphysis in the suggested modification; but these head levels are well above those employed in my method (i.e. sinciput just tipped—one-fifth above, and occiput just tipped—two-fifths above).

It will be seen, therefore, that the suggested modification is actually a different method altogether, and why its inaccuracy is dangerously misleading.

ENGAGEMENT OF THE HEAD

The accepted definition of 'engagement' is when the largest diameter for that particular presentation has passed through the brim of the pelvis.

Landmark on the Head

In clinical practice it is impossible to palpate or ascertain precisely what is the largest diameter for that particular presentation. Some obstetricians attempt to defend this imaginary clinical landmark by saying that it can be correlated with the lowest point of the head palpated vaginally in relation to the ischial spines. This introduces the disadvantageous vaginal examinations, and presupposes that the head is not elongated by moulding (which it probably would be in a problem case). The further assumption that the distance between the ischial spines and the level of the brim is constant is also likely to be erroneous in problem cases.

Other obstetricians try to relate this indistinct clinical landmark on the head with the position of the biparietal diameter (passing through the brim of the pelvis), but this, too, cannot be defined clinically, and the level of the biparietal diameter varies considerably in relation to other cranial diameters, with moulding.

Landmark on the Pelvis

The brim of the pelvis is selected for this measurement. It is impossible to determine the level of the pelvic brim by abdominal palpation. Further, variations in the angle of pelvic inclination and variations in the levels of the available conjugate and transverse diameters may lower the level of the available brim below the clinical guesses made when this method is favoured. In practice the diversity of assessments of this plane when engagement is being determined is considerable.

It follows that the widely recognised fact that different observers (nurses or doctors) often give contradictory estimations of engagement in problem cases should no longer arouse surprise, but fulfil expectations in the light of the nebulous nature of landmarks selected on the fetal head and the maternal pelvis demonstrated in this analysis. Further elaboration is superfluous to prove that the concept of engagement of the head constitutes one of those meaningless clinical definitions which have been handed down from textbook to textbook; one which should be relegated to obstetric history!

STATION OF THE HEAD

The station of the head is the relationship which its lowest cranial point bears to the level of the ischial spines (Fig. 4).

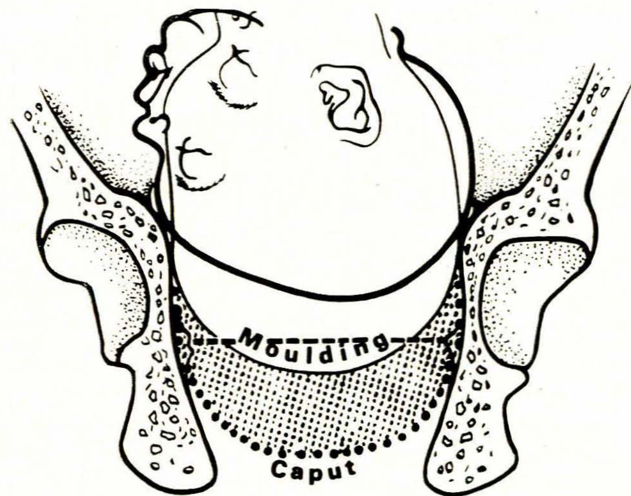
Landmark on the Head

In normal cases with no disproportion, establishment of the level of the lowest cranial point is easy. It is the problem case, associated with disproportion in labour, in which accurate establishment of the level assumes importance; here it is difficult, unreliable, and misleading. In trials of labour associated with ruptured membranes and disproportion, an overlying caput succedaneum will give the impression that the head is far lower than it really is, and will obstruct a clear definition of the lowest cranial point. Furthermore, the greater the moulding of the head, the more it elongates (lengthening of the basovertical diameter[1]), thus the lowest point of the cranium descends, whereas its base remains stationary or descends more slowly (Fig. 4).

Consequently, once again the obstetrician can easily be tempted to deliver a head vaginally when its true level is dangerously high, and deluded into the belief that there is progress in a trial of labour in terms of descent of the head when this is not so.

Landmark on the Pelvis

The ischial spines are recognisable on vaginal examination and establish the level of the bispinous diameter. Part of the confidence placed in the selection of this level, however, rests upon the assumption that it bears a constant relationship to the level of the brim which is the main obstacle to the descending head. Unfortunately, this is often an erroneous assumption in problem cases.



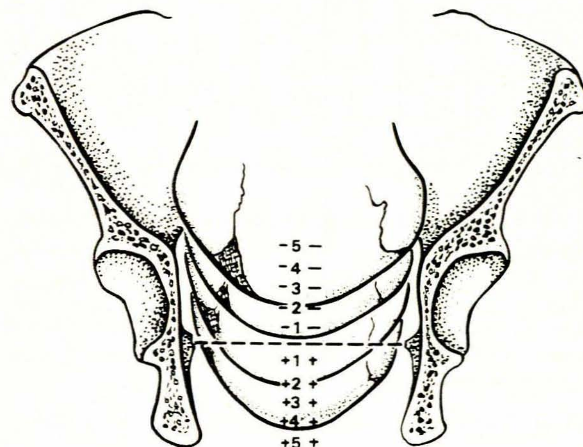


Fig. 4. Station of head (top), and moulding and caput destroying reliability of assessing head level by station (bottom).

The assessment of the level of the head in terms of station of the head has serious shortcomings; first, the assessment cannot be made abdominally—pelvic examinations are essential; secondly, the landmark selected on the fetal cranium becomes incapable of clear definition due to caput formation, and decreases in reliability proportionately to moulding; and thirdly, the pelvic landmark is unreliable in practice.

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