The correlation between permanent septal deformities and nasal trauma during birth

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SUMMARY

Both the outer and inner nose as well as the position of the parietal bones of 972 patients at an age of 3 to 82, were examined giving evidence of the configuration of the infant's head at birth and thereby of the "severity" of the birth.
In comparison with the sectio-patients the configuration of the infant's head in the birth canal reveals statistically recorded deformations of the outer and inner nose with an obstruction of the nasal breathing in 20% of the patients examined. The degree of the configuration has a definite influence on the degree of the nose deformation. The adjustment of the rotary direction of the infant's head in the 1st and 2nd vertex presentation determines the direction of the nose deformation.
The demand of many authors for an immediate rhinological examination and corrections in the newborn child, for instance on the septum, to be performed still in the obstetrical department, must due to our own examinations be advocated.

IT is now generally accepted that intrauterine trauma and injury to the nose during passage through the birth canal or as a result of iatrogenic manipulations during delivery may cause septal dislocation and/or deformation of the nasal pyramid (Birke, 1935; Cottle, 1951; Kirchner, 1955; Steiner, 960; Gray, 1965; Pease, 1969; Jeppesen and Windfield, 1972; Bianchi, 1974 and Pirsig, 1974). The relative discrepancy between the pelvic diameter and the maximum circumference of the baby's head is regarded as the reason for septal displacement during passage through the pelvis. As a rule, in the white races the occipito-nasal diameter and not the occipito-mental diameter is the greatest in the newborn infant's head (Ersner, 1944 and Cottle, 1955).
Most authors have dealt primarily with nasal changes in newborn infants in an attempt to demonstrate that the deformities were caused by the delivery, but in the following study we shall attempt to correlate the birth process with nasal changes presenting in children and adults. We agree with Gray (1965) that, unless trauma had occurred subsequently, all combined septal deviations in children or in adults must have existed from birth.

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Our group of 972 patients comprised male and female subjects between three and 82 years of age. 27 patients with a history of nasal trauma were excluded; they showed a distinctly higher percentage of nasal deformities than those without a history of trauma. We first classified the patients into caesarian-section and non-caesarian-section subjects. The patients were questioned about right, left or bilateral obstruction to nasal respiration. The external nose, the internal nose and the position of the parietal bones were checked.

We know from obstetric studies (Fehling, 1874; Bumm, 1921 and Martius, 1971) that there is a close correlation between presentation and the moulding of the infant's head, and between the "difficulty" experienced in delivery and the moulding of the skull. By moulding in the vertex presentation we mean the overlapping of the parietal bones. The longer and the greater the pressure on the skull in the birth canal, the more pronounced is the moulding. In Europe, 94% of infants develop in the occipito-anterior presentation with the posterior fontanelle leading, the back facing towards the symphysis; the head is either rotated through the first oblique diameter of the pelvic inlet when the back is on the left, or through the second oblique diameter of the pelvic inlet when the back is on the right. Depending on this rotation, as a result of the overlapping of the parietal bones in the first vertex presentation the right parietal bone is higher and in the second vertex presentation the left parietal bone is higher. In our group of patients, in the non-caesarian-section patients the right parietal bone was higher in 50% and the left in 20%; in 30% the parietal bones were at the same height.

Where the parietal bones were at the same height, there was evidently less moulding during birth; that is to say, the birth trauma had less effect on the skull than in the patients with the right or left parietal bone higher.

We shall now discuss the results of our studies in conjunction with the tables below. If we classify our patients into those delivered by caesarian section and those who were not (see Table 1), we find that there was no obstruction to nasal respiration in the patients delivered by caesarian section, whereas 16.9 patients delivered normally experienced obstructed nasal respiration. After caesarian

	Normal delivery (n = 923)	Caesarian section (n = 49)
Nasal respiration obstructed	16.9%	0 %
Crooked nose	58.6%	0 %
Septal ridging	13.6%	0 %
Floor ridging	13.5%	4.2%
High deviation	81.0%	0 %

Nasal respiration and nasal deformity.

Table 1. Nasal respiration and nasal deformity following normal delivery and following caesarian section (differences significant in the chi-squared test).

	Pronounced moulding	Slight
Nasal respiration obstructed	20.8%	6 %
Crooked nose	68 %	31.5%
Septal ridging	(14.6%)	(10.8%)
Floor ridging	15.2%	8.6%
High deviation	93 %	45.9%

Effect of degree of moulding of the infant's head on nasal deformity.

Table 2. Effect of the degree of moulding of the infant's head during normal delivery (all values not in brackets are statistically significantly different in the chi-squared test).

section there were no cases of crooked nose, septal ridge or a high deviation, whereas these were present in a varying percentage of patients delivered normally. Floor ridges were found in caesarian-section patients, although significantly less often than in non-caesarian-section patients. If the non-caesarian-section patients are further classified according to a difficult or easy birth (these patients may differ in that the right or left parietal bone may be higher or the parietal bones may be at the same height), we find that there are definite differences (see Table 2). An obstruction to nasal respiration was found in 20% of the patients in whom the left or right parietal bone was higher, compared with 6% with less moulding of the skull. Where there was greater moulding, a crooked nose was found in 68% and in 31.5% where there was less moulding. By crooked nose we mean that the external nose was visibly off the midline; we are not stating anything about the aesthetic effect. The only internal nasal deformities analysed were septal ridges, floor ridges and high deviations, since other abnormalities were uncommon in our group of patients.

Moulding is apparently of little significance in septal ridges. However, comparison with the caesarian-section patients showed the difference to be highly significant, so that there is probably a connection between septal ridging and moulding.

Floor ridging showed the same distribution as crooked nose. Where the right or left parietal bone was higher, we found floor ridging in 15.2% and where the parietal bones were at the same level we found it in 8.6%.

High deviations were found in 93% of subjects with pronounced moulding and in 45.9% of patients with the parietal bones level. Here again the degree of moulding appears to influence the curvature of the septum.

According to our studies, the direction of the nasal deformities or the predilection for one side or the other depends on the presentation of the head (see Table 3). Where the right parietal bone was higher, corresponding to the first vertex presentation in which the head is rotated through the first oblique diameter of the pelvic inlet, we found a crooked nose bent towards the right in 99.3% and towards the left in 0.7% (figures relate to all crooked noses in first-vertex-

		Vertex presentation	
		1st VP	2nd VP
		Rotation to the	
		left	right
Nasal respiration obstructed	right	(58.4%)	(58.3%)
	left	(41.6%)	(41.7%)
Crooked nose to the	right	99.3%	2.2%
	left	0.7%	97.8%
Septal ridging to the	right	7.1%	100 %
	left	92.9%	0 %
Floor ridging to the	right	9.5%	85.7%
	left	90.5%	14.3%
High deviation to the	right	98.5%	5.2%
	left	1.5%	94.8%

Effect of the direction of rotation of the infant's head on the direction of the nasal deformity. nasal deformity.

Table 3. Effect of the direction of rotation of the infant's head on the direction of the nasal deformity (all values not in brackets are statistically significantly different in the chi-squared test).

presentation subjects). Conversely, that is to say where the left parietal bone was higher or the second vertex presentation in which rotation took place through the second oblique diameter of the pelvic inlet, there were crooked noses bent towards the left in 97.8% and towards the right in 2.2%. Where the right parietal bone was higher we found a septal ridge formation on the left in 92.9% and on the right in 7.1%; in the converse situation it was only found on the right side.

We could not detect any difference between first and second vertex presentation as regards frequency of floor ridging, although the position of the floor ridge was affected by the direction of moulding.

With a higher parietal bone on the right there was left-sided floor ridging in 90.5% and right-sided in 9.5%. With a higher parietal bone on the left, there was a right-sided floor ridging in 85.7% and left-sided in 14.3%. The same applied to high deviations; we observed deviations to the right in 98.5% and to the left in 1.5% with the first vertex presentation, and in 94.8% to the left and 5.2% to the right with the second vertex presentation.

To sum up our results, the moulding of the infant's head in the birth canal results in statistically significant deformities of the external and internal nose with obstruction to nasal breathing in 20% of the patients studied .

The degree of moulding has a definite effect on the degree of nasal deformity.

The presentation with the direction of rotation of the infant's head in the first and second vertex presentation determines the direction of the nasal deformity. With the more common, first vertex presentation there are fewer deformities than with the second vertex presentation.
Many authors are of the opinion that newborn infants should be given a rhinological examination whilst they are still in the obstetrics unit and that corrections, for instance of the septum, should be carried out at once. Our results support this view. We have already started to do this in Düsseldorf.

RÉSUMÉ

Dans une série de 972 patients âgés de 3 à 82 ans, les auteurs examinent le nez externe, les fosses nasales aussi bien que la position des pariétaux. Ces examens témoignent de la présentation de la tête de l'enfant à la naissance et, par conséquent, des difficultés de cette naissance.
Comparée avec les patients nés par césarienne, la présentation de la tête de l'enfant dans le canal pelvien montre des déformations, enregistrées statistiquement, des nez interne et externe avec obstruction respiratoire nasale dans 20% des cas examinés. Le type de présentation a une influence définie sur le degré de la déformation nasale. L'ajustement par rotation de la tête de l'enfant dans les première et deuxième présentations du vertex détermine la direction de la déformation du nez.
L'attitude de quelques auteurs en faveur d'un examen rhinologique et de la correction immédiate du septum chez le nouveau-né, à pratiquer dans le département obstétrical lui-même, doit être préconisée en conséquence logique de nos propres recherches.

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