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THE PLACE OF FORCEPS IN PRESENT-DAY OBSTETRICS*

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The Former Place of Forceps

The invention of the forceps was probably the most important event in the history of obstetrics, for dissemination of knowledge of the instrument, coinciding as it did with the first serious incursions of the medical profession into the realms of midwifery, gave the supremacy to the man midwife and afforded him, for the first time, opportunities for the study of normal as well as abnormal labour—a study from which all modern knowledge has come. So great an advantage did this instrument give the obstetrician of two centuries ago that it became hated by the midwives, who did everything possible to discredit it in the eyes of parturient women. It was this attitude which prompted Smellie and others of his day to use wooden- or leather-covered forceps, which, being devoid of a tell-tale metallic rattle, could be applied surreptitiously without the knowledge of either patient or handywoman.

The early patterns of forceps were short and straight, so they can have been used only when the foetal head was low in the pelvis. This, together with the fact that anaesthesia was not available, must have given them a high degree of safety and freedom from certain, although not all, misuses. It might therefore now be argued that it was unfortunate that the early instruments were very soon lengthened, curved, and supplied with axis-traction mechanisms, because it was these modifications which not only allowed but encouraged the accoucheur to reach higher and higher for the foetal head. It should be noted, however, that Smellie lengthened and curved his forceps primarily for use on the aftercoming head, and he always preferred the short straight instrument when the head presented, insisting that the presenting part must be low before they could safely be applied (see Johnstone, 1952). Responsible obstetricians of the past always recognized and taught that forceps are useless for overcoming major degrees of disproportion, but inexperienced and less skilful practitioners repeatedly tried them when the pelvic brim or cavity was contracted—with disastrous results. The objection to forceps, based initially on prejudice and vested interests, thus quickly became justified by their abuse.

With more general observance of the rules governing the safe use of forceps, the instrument gradually became

more popular, but even to-day it has not completely lived down its evil reputation. It achieved a clearly defined place in obstetric practice during the latter half of the nineteenth century, and this place remained relatively static until about 25 years ago. At that time, when many of us were undergraduates, the high-forceps operation was banned even if it had not completely disappeared from the practice of the unscrupulous and less learned. Mid-forceps and low-forceps operations were regarded as proper in both domiciliary and hospital midwifery, but only as a last resort, conservatism in their use being justified by the risk of sepsis if by nothing more.

Recent Developments in Obstetric Practice and Results

The last 25 years has seen a revolution in obstetrical methods and outlook, a revolution which has, or should have, modified our views on the place of forceps as on other matters. The main factors in the revolution are well known: the introduction of the lower-segment type of caesarean section which made abdominal delivery safe even when carried out late in labour; the discovery of sulphonamides and later of antibiotics; the provision of facilities for immediate and adequate blood transfusion; developments in anaesthesia; the extension of antenatal supervision to cover practically all pregnant women; the increased facilities for hospital delivery; and the upgrading of maternity hospitals and of their staffs. These and other changes have brought about a dramatic fall in the mortality and morbidity rates not only of the mother but also of the child. Indeed, in some respects modern trends are better shown by foetal than by maternal results.

The fall in the stillbirth and neonatal death rates is here illustrated by the experience of the Liverpool Maternity Hospital for the 25 years 1926–50, an experience which covers the birth of 50,622 babies (Fig. 1). During this period the neonatal death rate was reduced by one-third, and the stillbirth rate by two-thirds. Moreover, there was an important change in the relative importance of the various causes of foetal death (Fig. 2). Birth injury, which has long been credited with approximately 33% of deaths, now accounts for less than 10% of stillbirths and neonatal deaths. Intranatal and neonatal asphyxia still take a heavy toll, mainly because of associated prematurity. Foetal malformation becomes relatively more important as preventable causes disappear.

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All manner of factors have played a part in this reduction in foetal mortality, and it is impossible to apportion the credit exactly, but study of the results suggests that it is mainly due to better intranatal care of the foetus. This in turn is the result of the appointment of *resident* obstetricians of greater skill and experience and, along with this, a change in obstetric management. In obstetrics, as in politics, the last quarter-century has seen a swing from the conservative to the radical outlook. There has been more and more interference with natural delivery, no matter whether the foetus presents by the head or by the breech. Thus the forceps delivery rate has risen from 6-7% to 16-17% of total births (Fig. 3), an increase which has occurred at the expense of spontaneous delivery and not of caesarean section. Indeed, during the 25 years the section rate also rose

FIG. 1.—Diagram showing the change in maternal and foetal results at the Liverpool Maternity Hospital during 25 years.

FIG. 2.—Relative importance of various causes of all foetal deaths for five-year periods during 25 years, shown in percentages. "Intranatal and neonatal asphyxia and atelectasis" includes deaths associated with prematurity except where there was definite evidence of intracranial injury. "Antenatal asphyxia" includes all deaths *in utero* before the onset of labour.

FIG. 3.—Rates for caesarean section and forceps delivery expressed as percentages of all births in the Liverpool Maternity Hospital during 25 years.

FIG. 4.—Diagram showing the falling foetal mortality associated with forceps delivery. Foetal mortality in this and other tables includes both stillbirths and neonatal deaths.

from 5 to 15% (Fig. 3). Altogether, in a hospital which deals with highly selected material and includes a high proportion of abnormal cases, approximately one-third of the babies are now delivered either by forceps or by caesarean section.

Decreased Risks of Forceps Extraction

Not only have the forceps operations increased in number, they have at the same time decreased in risk. Thus the foetal mortality attending the operation has fallen from 20 to 2% (Fig. 4). At the same time the danger to the mother has become very small. During the last 15 years of the period under review 3,522 women were delivered with forceps and 13 died. The fatal outcome was unrelated to the operation in at least seven of these; in the remaining six anaesthesia was the cause of death of three women and contributed to the death of a fourth. There was only one case, in 1941, in which the operation was the direct cause of death. In this, severe shock developed after a difficult mid-forceps delivery.

The risks of forceps have been reduced by changing their method of use and their indications.

Changes in Technique

Under this heading many matters might be mentioned: the discarding of all forms of axis-traction instrument; the substitution of skill for force in traction; the use of episiotomy; the correction of the position of the foetal head

before or after the application of the forceps, and, more recently, the use of local analgesia. The most important of all changes in technique, however, has been the ever-increasing emphasis placed on the accurate application of the blades to the sides of the foetal skull.

Changes in Indications

The decision on when forceps can safely be used is probably more important than knowing how to use them, and a modification in outlook regarding the time and place for forceps is a striking feature of the obstetrical revolution of the last 25 years, and the main reason for the improvement in results. This modification in outlook is not unrelated to other developments. The increased safety of caesarean section has, for example, done away with the need to use forceps in cases mechanically obstructed late in labour. Whereas formerly only the high-forceps operation was condemned, it has gradually but convincingly been demonstrated that many mid-forceps operations, even though technically possible, are prejudicial to the health

FIG. 5.—Duration of the second stage of labour in cases of forceps delivery, expressed in percentages. 1929 is the first year for which details are available. "Cervix barely fully dilated" refers to those cases in which the anterior lip was not fully taken up or in which cervicotomy was carried out.

and life of both mother and child. Difficult mid-forceps operations have therefore become fewer and fewer, the safer alternative of caesarean section being preferred. On the other hand, the number of forceps deliveries has become swollen at the expense of what would have been spontaneous deliveries had the second stage been allowed to continue longer. The situation might be summarized by saying that babies previously born dead with forceps are now being delivered alive by caesarean section, while those stillborn as a result of spontaneous delivery are now extracted alive with forceps.

Formerly, in accordance with conservative principles, the second stage of labour was allowed to continue almost indefinitely provided foetal distress did not develop. This usually meant that when it was finally decided to use instruments not only was the mother exhausted but the foetus was asphyxiated and already suffering from cerebral congestion if not more serious damage. A baby in poor condition was then subjected to anaesthesia and to the trauma involved in rotation and extraction, with considerable risk of a fatal outcome.

The ever-improving results are associated not only with more frequent use of forceps but with their more timely use. The trend towards a shorter duration of the second stage prior to forceps delivery is shown in Fig. 5.

Indications for Forceps Delivery in Modern Practice

Nearly every student taking the final examination, if asked the indications for forceps, gives priority to "maternal

distress" and "foetal distress." It is the traditional answer, but is it still acceptable? If by maternal distress is meant physical exhaustion manifested by a rising pulse rate, prostration, ketosis, and possibly pyrexia, then it should no longer be accepted as an indication for forceps. It is indefensible to allow any woman in the second stage of labour to reach such a state, and forceps extraction (if it is the appropriate treatment) should have been carried out much earlier. Similarly with foetal distress. This condition may come on suddenly and without much warning, in which case immediate forceps delivery is called for, provided the usual conditions are satisfied. In most cases, however, prolongation of labour and slow advance give ample warning that foetal asphyxia is likely to develop. In all such cases the distress should be anticipated and forceps applied while the foetus is in relatively good condition. Good obstetrics calls for intelligent anticipation, and if it is clear that the presenting part is held up on the perineum it is unjustifiable to withhold assistance because an arbitrary time limit has not expired or because the foetal heart is steady. Similarly, if the mother and baby have been exposed to a long and tiresome first stage of labour it can be assumed that neither is well fitted for the ordeal of the second stage, and that they will show evidence of stress sooner or later.

One condition which deserves special mention is uterine inertia in the second stage of labour. There are still some who, fearful of poor uterine action in the third stage, recommend deferring delivery. This outlook again is a relic of the past and takes no account of modern efficient methods for preventing and controlling post-partum haemorrhage. With care over anaesthesia and with ergometrine at hand, forceps extraction is nearly always the best treatment of inefficient uterine action once the cervix is fully dilated.

A low-forceps delivery before evidence of foetal distress or before an absolute indication is present is often called a "prophylactic forceps" operation—a term introduced by De Lee in 1920. It was some time before it was accepted in this country, and it has caused derision amongst older obstetricians, who regard it as an excuse for meddling some midwifery. I am not concerned to defend the term, although it is expressive in that it indicates that the operation is preventive—preventive of foetal asphyxia and death, preventive of maternal injury and nervous stress. I am concerned, however, to justify the use of forceps as a leisurely planned operation *before* the onset of a situation which results in their use becoming dangerous. Even if the prophylactic forceps operation is sometimes an unnecessary operation, no harm comes of it in skilful hands.

It is necessary to recognize, however, that the freedom with which forceps can safely be used must vary with the circumstances under which midwifery is carried out. The decision in each individual case must always rest on whether the application of forceps is safer for mother and child, bearing in mind the skill of the obstetrician, the availability of assistants, and the facilities and equipment of his environment. The indications are therefore different in domiciliary and hospital practice.

Domiciliary Practice

Outside hospital it is probably wisest and safest for no one, no matter how expert, to attempt any forceps delivery unless the vertex is below the level of the ischial spines and is visible at the vulva. Even then it is necessary to ensure that the head is really as low as it appears and that the signs are not deceptive because of shallowness of the pelvis and extreme moulding and caput formation. No part of the head should be palpable abdominally. If high standards of asepsis cannot be maintained, and if an anaesthetist is not available, it is usually best to leave it to Nature as long as is reasonably possible and until a clear indication for delivery is present. There is only a limited place for a "prophylactic" operation in domiciliary practice.

Hospital Practice

Granted a fully equipped and expertly staffed hospital, a low-forceps operation combined with episiotomy can usually be carried out with impunity, and therefore with freedom. It involves less risk for both mother and child than does a spontaneous delivery after a protracted second stage of labour. No matter whether the occiput be anterior or posterior, it does not require rotation at this level in the pelvis. Care has to be taken to exclude such possibilities as contraction of the bony outlet, but this is a boggy which has been grossly exaggerated. Outlet contraction sufficient to cause real difficulty is exceptionally rare in a pelvis where inlet and cavity are adequate.

Even in hospital, however, a mid-forceps delivery must be approached with caution, recognizing that it almost always involves dealing with an unrotated head. This does not mean that the head is malrotated; it is normal for the sagittal suture to remain transverse or oblique until the vertex reaches a low level. Other speakers are dealing with the problem of the unrotated head, and I would stress the second difficulty associated with the mid-forceps operation—namely, the presence of previously unrecognized disproportion at the level of the mid-plane of the pelvis. Although in most cases the experienced obstetrician can sift the cases accurately and decide beforehand which will deliver easily with forceps and which will not, there is always the possibility of meeting unexpected difficulty, and particularly so in a multigravida with an unusually large baby. The likelihood of an error in judgment is reduced by intranatal radiography, facilities for which should be available in all maternity units.

It is in the case in which forceps have been applied, and in which unexpected difficulty is encountered, that tragedy may occur. The tragedy results from a train of human reactions which have personal pride and prestige as their basis. We have all experienced them. The unexpected resistance to delivery is followed by a stronger pull and then removal of the blades to confirm the position of the foetal head. Further traction with little effect brings to mind the vision of a stillbirth. Now is the time to stop, but the patient and her relatives have been prepared for forceps delivery, not caesarean section. Moreover, it requires much courage to admit to assistants, midwives, and onlookers that a mistake has been made and that vaginal delivery is not safe. The remote possibility of successful delivery spurs the obstetrician to renewed and more frantic efforts. Now he is seized with dread, casts caution to the winds, and ultimately he may or may not succeed in extracting a mangled foetus, the mother also being injured in one way or another.

The situation is more dangerous if some progress is made than if the passage of the foetal head is completely obstructed. In the former case the foetal head is crowded more and more into an ever-decreasing pelvic diameter, with inevitable injury; in the latter it can come to no harm except from the pressure of the forceps themselves.

One of the fears which drive the obstetrician to make frantic efforts is that the case may become one of "failed forceps"—a label which by tradition involves everyone concerned with ignominy, and which itself can be responsible for bad obstetrics. How much better it would be if it were generally recognized that even the best exponents can make a mistake occasionally, and that failure to deliver with forceps is not so great a sin as a failure to recognize defeat at an early stage. If the forceps are applied skilfully no harm comes to the baby or to the mother, provided the attempts at extraction are discontinued immediately it becomes clear that there is greater difficulty than anticipated. All that is necessary is to have the courage to proceed to caesarean section before the life of the foetus is jeopardized.

Trial of Forceps

This raises the question of whether, under proper conditions, a "trial of forceps" is an acceptable procedure.

This means that when the head is arrested in the mid-pelvis forceps should be applied tentatively with the declared intent of abandoning the operation in favour of caesarean section if it does not proceed smoothly. The forceps need to be applied accurately to the foetal head, and traction has to be cautious. If all mid-forceps deliveries in hospital were viewed as trial operations the dread of failure would disappear from the mind of the operator and he would be happy not to proceed in the face of difficulty. The idea of a trial of forceps is not new. It was suggested and practised by Frank (1908) and again by Fraenkel (1925) and others in the 1920s. It has been recently advocated by Parry Jones (1952) and by Douglass and Kaltreider (1953).

When it was first introduced it was difficult to justify because of the maternal risk of caesarean section after interference *per vaginam*. Now, however, that this risk has largely gone, it should be re-examined and not discarded merely on the grounds of prejudice. It could, of course, be abused, and it has no place save in the hands of the expert working in hospital—the same qualifications which apply to the accepted practice of trial of labour. The only difference is that trial of labour is concerned with disproportion at the brim; trial of forceps is concerned with disproportion in the cavity. The trial of forceps may have only a small place, but if it has a recognized place it may well help to do away with the tragic condition of "failed forceps" and it may revolutionize the outlook of everyone concerned in any forceps delivery. As Douglass and Kaltreider (1953) point out, "It is a most comforting thought, when sitting down to do a mid-forceps operation, that one is not irrevocably committed to vaginal delivery."

Do Forceps Protect the Baby?

It has often been argued in recent years that the blades of the forceps, if properly and accurately applied, protect the foetal head from injury. The argument is not illogical, and its truth is already established in the special case of the after-coming head. The frequent and almost regular use of forceps for lifting the after-coming head from the cavity of the pelvis is one of the most important factors responsible for the low foetal mortality for breech delivery in the Liverpool Maternity Hospital (Cox, 1950).

Forceps are also said to protect the fore-coming head, especially the small and soft head of the premature baby (Studdiford and Salter, 1938; Scott, 1940; Assali and Zacharias, 1947). This matter still awaits proof, but in our experience forceps certainly do no harm and may do good so far as the delivery of small babies of toxæmic mothers is concerned (Hamilton, Jeffcoate, and Lister, 1949).

Advantages to the Mother

So far, the use of forceps has been considered almost entirely from the standpoint of the foetus. If under modern conditions this instrument must be regarded more and more as being primarily used in the interests of the child, it should also be recognized that Smellie, too, viewed it in this light and adopted it with the idea of reducing his still-birth rate. It offers a means for speeding delivery to give the baby opportunity to establish its own respiratory function before the respiratory function of the placenta fails. Nevertheless, the question arises whether forceps bring any advantage to the mother. If properly used after full dilatation of the cervix, and in conjunction with episiotomy, and assuming asepsis, they should have no ill-effect. They are sometimes blamed for fistulae and other injuries, but these are mostly due to the condition calling for the use of forceps. They are clearly of advantage in that they shorten labour and spare the woman much mental and physical stress.

Do they prevent prolapse? There is some evidence to show that a prolonged second stage with overstretching and devitalization of the paravaginal tissues is more important

in causing prolapse than a quicker delivery with a tear or episiotomy. The matter is still *sub judice*, but meanwhile there is nothing to suggest that forceps in the hands of the expert do any harm to the mother, and they may be instruments of good as well as of mercy.

Dangers of Forceps in Modern Practice

The greatest danger of forceps delivery at the present time is anaesthesia, and this danger has, if anything, increased with the introduction of modern anaesthetic agents whose safety depends on increasing skill on the part of the anaesthetist. As mentioned previously, there have been six maternal deaths associated with forceps delivery in the Liverpool Maternity Hospital during the 15 years preceding 1950. Three of these were the result of the inhalation of vomit during induction of general anaesthesia, and the fourth was due to the effect of an anaesthetic on a diseased heart. Since 1950 there have been more cases of inhalation asphyxia and pneumonia as a result of vomiting during induction or recovery from anaesthesia given for the purpose of the application of forceps. This risk is very great when labour has been prolonged, as it has in many cases in which forceps delivery is indicated. The other risk is third-stage and post-partum haemorrhage associated with depression of myometrial activity by the anaesthetic.

To recognize these risks, and to have them ever present in mind, is to reduce them to a minimum. They constitute the chief reasons for advocating the use of local analgesia for all easy low-forceps extractions.

Conclusion

There is danger in praising forceps too highly and in claiming too large a place for them; it might encourage their abuse. There is also danger in adopting an ostrich-like attitude and failing to recognize that times have changed, and are changing. It will not do to condemn forceps merely on the grounds that they represent interference with Nature, if it can be shown that their results improve on those achieved by Nature.

The fact that childbirth is a physiological process does not necessarily mean that it is a benign one. The reproductive function in all species is both dangerous and wasteful. Nature is not concerned with making reproduction safe for individual mothers or offspring; she expects losses, and for this reason provides a supply of potential offspring which is so bounteous as to offset them and ensure the continuance of the race.

The natural maternal and foetal mortality rates are unknown, but it is quite certain that they are much higher than those which obtain when the medical and nursing professions stand by ready to interfere judiciously with Nature. Obstetricians do well to leave childbirth to Nature only so long as she is efficient, but when she fails—as she often does—lives can be saved only by carefully planned and skilful intervention. Moreover, as the means and methods for intervention become safer, they can offer more and more to the individual than can Nature.

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"FAILED FORCEPS": A REVIEW OF 37 CASES

BY

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During the period January 1, 1948, to May 31, 1952, 37 cases of "failed forceps deliveries" were admitted to the Norfolk and Norwich Hospital. Of these patients 21 were primigravidae and 16 multiparae. This paper is based upon an analysis of these cases.

Maternal and Foetal Hazards

A study of the recent annual reports of nine hospitals shows the maternal mortality rate in "failed forceps" cases to be 2.0%, while the foetal loss is 36.2%. So far as the risk to the foetus is concerned these findings are in reasonable conformity with those in the present series as shown in Table I. It will be seen that seven infants were

TABLE I.—General Analysis of the Present Series

	No. of Cases	Maternal Morbidity	Foetus Dead on Admission	Still-births	Neonatal Deaths	Total Foetal Loss
Primiparae	21	6 (28.6%)	2	3	1	4 (19.1%)
Multiparae	16	4 (25.0%)	4	4	1	5 (31.2%)
Total ..	37	10 (27.0%)	6	7	2	9 (24.3%)

stillborn, while a further two died during the neonatal period, the total foetal loss being 24.3%, or 22.2% if correction is made for one case of hydrocephalus.

Although no mother died as a result of this intervention, the maternal morbidity rate stood at the high figure of 27.0%. The remote prognosis for these patients may thus be less favourable than the immediate results suggest, since, as emphasized by Miller (1928), Claye (1931), Stacey (1931), and Feeney (1947), the sequelae of puerperal infection often persist for many years.

Duration of Labour

Table II shows that labour tended to be prolonged in these cases compared with normal vertex deliveries, this being most marked in primigravidae. In these patients the

TABLE II.—Duration of Labour in Failed Forceps Deliveries

	Total Cases	First Stage Over 24 Hours	Second Stage Over 2 Hours
Primiparae { Failed forceps* ..	19	12 (63.2%)	14 (73.7%)
{ Normal ..	185	36 (19.5%)	19 (10.3%)
Multiparae { Failed forceps* ..	11	2 (18.2%)	7 (63.6%)
{ Normal ..	215	22 (10.2%)	1 (0.5%)

* Excluding 6 caesarean sections and 1 case in which details were absent.

first stage lasted over 24 hours in 63.2% of cases, a finding that suggests that, in some cases at least, delivery may have been attempted for this reason alone. The second stage lasted more than two hours in 73.7% of primigravidae and 63.6% of multiparae. This, however, was mainly due to the time expended in transferring the patient to hospital.

Past Obstetric History in Multiparae

The past obstetric history in the 16 multiparae is summarized in Table III. It will be seen that a history of previous dystocia was given by eight patients (50%), while of eleven cases in which details regarding the size of