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## The Vacuum Extractor

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The vacuum extractor is finding an increasingly wide application in obstetric practice and many authoritative papers have been written on the indications for and the methods of its use. Results have generally been most encouraging (Willocks, 1962; Lauridsen *et al.*, 1962; Hathout and Tannir, 1963) and subsequently it was introduced to our hospitals.

Publications available to us are from teaching units with experienced specialised staff as operators. This paper is published to demonstrate that Malmstrom's extractor is a safe and effective instrument in the hands of a general practitioner.

### MATERIALS

The obstetric ward at the Roan Antelope hospital (non-fee paying) accepts patients from four outpatients' clinics. At these clinics traditional antenatal care is administered by trained sisters and they conduct 2,000 normal deliveries annually. The medical officer visits these clinics weekly and sees all booked cases at least once. Their weight and build are noted and chest, heart and abdomen are examined for any abnormality. Primiparae and other possible problems are seen again at 36 weeks. After pelvic assessment and possibly X-ray pelvimetry, it is decided whether the case requires hospital delivery. In addition, unbooked primiparae and obstetric emergencies are delivered in the hospital under the supervision of the medical officer. These cases total 400-500 per annum.

The author has performed approximately 90 vacuum extractions. In July, 1965, a system of statistical recording and analysis was introduced to this ward. A Hollerith punch card was made for every delivery and 346 cards were prepared and analysed electrically. This number includes 38 vacuum extractions. Thirty-six are tabulated and two failures are discussed.

### Indications

These are set out in Table I.

Table I

	Easy	Difficult	Failed
Previous caesarean section	4	0	1
Previous classical caesarean section	1	0	0
Mild toxæmia	1	1	0
P.O.P. and transverse arrest	7	4	0
Delay, first stage	4	0	0
Delay, second stage	5	6	0
Foetal distress	6	5	0
Previous forceps	1	0	0

Previous classical caesarean section refers to one patient, a para 4, who presented late in the first stage of labour. She gave a history of three normal deliveries, followed by a caesarean section for a prolapsed cord. From the position of the scar it was thought that she might have had a classical section. An X-ray pelvimetry was performed which confirmed that the foetal head was engaged and that there was little moulding. An easy extraction was performed on her, the baby having an apgar score of 10.

Delay in the first stage consists of three cases of hypotonic inertia and one of pure cervical dystocia. In these four cases the cup was applied through the partly dilated cervix. A typical case is discussed later.

Delay in the second stage consists of five easy deliveries which include one case of maternal distress, three of disproportion and one where the second twin caused delay. The six difficult extractions are made up of one case of hypotonic inertia and five of disproportion.

The two cases of failed extractions are discussed separately.

Table II  
PARITY OF PATIENTS

Parity	0	1	2	3	4	5	6	6	Total
Easy	15	3	0	1	4	1	0	1	25
Difficult	10	0	0	0	1	0	0	0	11

“Easy” extraction refers to patients where single-handed traction delivers the babe within two pulls. “Difficult” is any case which is more complex. This is, of course, a subjective classification.

It should be noted that of the difficult cases the largest group is in the primiparae, as one should expect.

HEIGHTS

Of the 25 easy extractions, four only were less than 5 ft. in height, whereas of the 11 difficult extractions three, nearly a third, were notably short. Altogether nine X-ray pelvimetries were done on booked cases where difficulty was anticipated.

Records of this were kept from patient 101/65 onwards, so totals are not complete. It can be noted that 76.9 per cent. of these cases left hospital by the third day. By comparison, 73.9 per cent. of all cases were discharged by day three. This is of great importance with the usual shortage of beds that prevails in Africa.

METHOD OF USE

After cleansing and draping the perineum the largest cup that will fit is used. With few exceptions this is 5.0 cm. in diameter. The vacuum is then raised each minute by 1 mm. Hg. up to 10 mm. Hg. and then by 2 mm. Hg. up to 16 mm. Hg., when gentle traction is commenced. Whilst the vacuum is being created a check is made that maternal tissues are not caught in the cup. After three gentle pulls the vacuum is taken up to the greatest that can be achieved, usually from 20 to 22 mm. Hg. In most cases, with two or three

pulls, using moderate forearm strength, delivery is effected. Traction was never needed for more than half an hour, and in fact long before then progress should have been noted. During traction, any loss of vacuum as shown on the pressure gauge is noted and if necessary corrected. Where delivery is difficult or time of utmost urgency, the assistant pumps continuously to prevent loss of vacuum, thus allowing greater traction to be applied. It must be stressed that no maternal damage was recorded and foetal harm was minimal.

When foetal distress is the indication to use the extractor, the vagina is cleansed and the cup applied immediately and a vacuum of 2 mm. Hg. established. The perineum is then cleaned whilst the vacuum is being increased by 2-3 mm. Hg. at one minute intervals, with a routine check on maternal tissues. Gloves are then changed, and within four to six minutes vacuum of 14 mm. Hg. is obtained and traction is commenced. After 16 mm. Hg. the vacuum is again rapidly increased to a maximum and delivery completed.

Case 1—Eneya

A primipara, aged about 19 years, was found at routine antenatal examination to be under 5 ft. in height. X-ray pelvimetry revealed an inlet of 9.8 cm. by 11 cm. and an intertuberous outlet diameter of 9.8 cm. The waste space of Morris was less than 1.0 cm. It was anticipated that she would require an outlet vacuum extraction if the head engaged successfully, and she was admitted for a trial of labour and progressed satisfactorily to the second stage. After 35 minutes in the second stage the head was 1 cm. below the ischial spines. Because the occiput

Table III  
DAYS IN HOSPITAL

Days in hospital	1	2	3	4	5	6 & 7	8 & 9	10 & 11	12-15	15
Easy	5	7	4	0	0	0	0	1	0	0
Difficult	2	4	0	1	1	1	0	0	0	2

remained in a right occiput posterior position. her trial was strictly controlled, and when the change of foetal heart rate from regular 110/minute to irregular 60/minute was observed, the vacuum extractor was applied and four minutes later the baby was born—a 6 lb. 10½ oz. male; cried lustily within one minute and Ag. rating 10/10. A wide episiotomy with local infiltration of 1 per cent. xylocaine was performed to facilitate delivery.

ANALGESIA AND EPISIOTOMY

Initially all cases had local anaesthetic infiltration and an episiotomy, but as experience was gained it was found that a gentle technique and re-assuring manner dispensed with these needs in all easy cases. After commencing traction, an estimate of the ease or difficulty of delivery is made. If the latter is anticipated and if foetal distress is present, the perineum is infiltrated and an adequate episiotomy is performed. A general anaesthetic is usually not used, as co-operation by the patient is essential.

RESULTS

Maternal

There were no deaths. Two complications from the procedure arose early in this series. One patient sustained a nasty tear of the cervix when a severely distressed baby was extracted through a "rim" of the cervix. This was sutured vaginally and the live baby delivered justified the means used.

The only other difficulty was that on one occasion a general anaesthetic was used and a baby extracted without maternal contractions; a moderate postpartum haemorrhage of three pints occurred. Since then general anaesthetic has not been used.

Foetal

One death was attributable to the procedure. Three cases of stillbirth were recorded. In two of these the instrument was used to extract dead babies following cord prolapse, and in one other case the extractor was used and failed. This case is discussed in full as it represents the danger of attempting an extraction in the face of severe disproportion.

Felesia, an unbooked para. 9, was admitted in labour, with signs of mild toxæmia. Her last delivery had taken place in her village, and after a long delivery she had a stillborn boy. Abdominal palpation revealed a high head two-fifths above the brim with a suspected posterior position. Vaginal examination confirmed these findings and in addition the pelvis was found to be generally small with a prominent sacrum. It was estimated that she had been in the second stage of labour for at least 2½ hours. In view of her parity it was felt that a vacuum should be attempted despite the high head. This failed. Immediately before section a slow foetal heart was still audible, but the 8 lb. 8 oz. boy subsequently delivered could not be resuscitated.

*Apgar-Scores.*—Scoring of the baby's condition was done one minute after delivery.

It can be seen that 76.2 per cent. have a score of 10/10. However, 57 per cent. of all deliveries in the ward have a full score. Numbers are too small to deduce from this that the vacuum actually improves the babies' condition at birth! One can assume, though, that it is not detrimental. In a bigger series, with one or two persons only involved with the scoring, less dissimilarity would be found.

CEPHALHAEMATOMA AND SCALP INJURIES

There was one cephalhaematoma which settled spontaneously. In another case the skin of the scalp sloughed away. The cap slipped slightly across the skin, bruised and then tore the tissues. This healed within 21 days without scarring. As this saved doing a section on a young primipara, it was a small price to pay.

FAILED EXTRACTATIONS

There have been two cases. One has already been discussed and the other is set out in full here, so that there can be no doubt that these failures were not attributable to the extractor but to a degree of disproportion.

*Ellena, para. 5, booked*

Past History.—1959: SB in village. 1960: SB in hospital complicated by a small vesico-vaginal fistula which healed spontaneously and a severe third degree tear which

Table IV

Score	1	2	3	4	5	6	7	8	9	10
Easy	0	0	0	1	0	1	1	1	1	20
Difficult	1	0	1	0	1	1	2	2	1	2

was repaired. 1961: Elective L.S.C.S. at this hospital with a live baby.

1963: Premature twins in village; both died. The vesico-vaginal fistula recurred, but settled spontaneously.

1965: First seen at 34-week pregnancy, vertex presenting. She appeared in good general health. Vaginal examination revealed a scarred perineum and a prominent sacral promontory. X-ray pelvimetry showed an inlet of 10 cm. by 12.2 cm. and an intertuberous outlet diameter of 10.8 cm. with a waste space of Morris of 3.2 cm. She adamantly refused a repeat caesarean section, but fearing that I would be faced with some obstetric calamity at a later stage, she was persuaded to consent to a vacuum extraction. This did not seem unreasonable, as the pelvimetry was encouraging. I decided to induce labour when the baby's size was estimated at 5½ lb. She arrived a week late for this procedure and still adamantly refused operation. Nasal syntocinon spray was unsuccessful, so an A.R.M. was performed and labour established. When the cervix was four fingers dilated the head remained high; with the head three-fifths above the brim, there was no further progress. The medium size cup was gently inserted through the cervix with the intention of pulling the head down to assist in dilatation. However, despite three pulls of maximum traction, the head failed to advance. She was offered the alternative of going home or a caesarean. She relented and a healthy 7 lb. male, Apgar rating 10/10, was delivered by section. A post-partum brim view of her pelvis revealed an android inlet which was the cause of the trouble.

#### A UNIQUE INSTRUMENT

In some cases no other technique of delivery can compare, especially the familiar problem of a tired mother, nearing the end of the first stage, ceases to advance and impending foetal distress (and pressure from relatives) demands hasty and often ill-advised interference (Chalmers, 1960). However, it is in the unusual problem that the extractor is invaluable and an example is quoted.

An unbooked primipara, aged 20, was admitted with a twin pregnancy in the first stage of labour. She progressed slowly, and after approximately one hour in the second stage her contractions ceased altogether. The extractor was applied as near the occiput as possible, and after 15 minutes and a very easy extraction a 5 lb. 6 oz. female, apgar 10/10, was born. No local analgesia was needed and the perineum remained intact. The contractions did not return, so the membranes were ruptured and the second twin descended as a brow presentation and the head became fixed high in the brim. Intravenous pethilorfan 100 mg. was given and the smallest cup of 35 mm. was gently manoeuvred as near as possible to the occiput. With one finger on the brow and gentle traction, the occiput was pulled into the pelvis and an easy extraction produced a 5 lb. 9½ oz. female, apgar 10/10.

#### DISCUSSION

Detailed analysis apart, the most striking aspect of this apparatus is the peace that prevails in the

labour ward. The acceptability of the instrument to both staff and patient is such that calm and confidence prevail and the tension of a labour ward filled with staff and anaesthetist needed for a forceps, is quite unnecessary. With each delivery of a lusty child from a calm and co-operative mother, one feels indeed that obstetrics is still an art.

There are many papers strongly advocating the use of the extractor in inco-ordinate uterine action, hypotonic inertia and malrotated foetal head (Lancer, 1963; Chalmers and Fothergill, 1960; Buss, 1965) to the extent that Snoeck (1960) eliminated forceps delivery. However, caution is usually advised with cases of disproportion (Buss, 1965; Lillie, 1960; Chalmers, 1955) and doubt expressed about its effectiveness in foetal distress. It is felt that as long as disproportion is mild and not more than one-fifth of the head remains above the pelvic brim, or two-fifths with little moulding, the apparatus is most useful and certainly a trial most justified.

As demonstrated with a case, the instrument can be most effective with foetal distress. It is where foetal distress arises in a patient having a trial for disproportion that caution must be exercised. Unless one can confidently expect delivery within 20 minutes—the time it would take from the moment of decision to deliver a baby by caesarean section—then a trial with the vacuum should not be attempted. It is felt that these cases are not suitable for forceps delivery, as in the large majority such a problem usually occurs before full dilatation of the cervix. The following case admirably demonstrates these points and is included, although the extraction was performed after this present series was closed.

Esineli, a booked patient, was admitted for induction on the 8th November, 1967. She had three previous pregnancies. On the first two occasions she had delivered in the village small live babies following a long labour. On the third occasion in early 1965 she presented with a haemoglobin of 40 per cent. and had been treated with packed cell transfusion and iron-dextran. Probably because of this treatment she had a larger baby than before (8 lb. 5 oz.) and she presented as a case of secondary disproportion. With the head three-fifths above the brim and two finger dilatation of the cervix, she developed severe foetal distress. A lower segment caesarean section was performed. On discharge from the ward an X-ray pelvimetry was done and revealed an inlet of pelvis of 8.8 x 12 cm. and an android shape. The outlet was equally poor with subpubic angle of 75°, a waste space of Morris of 3.3 cm. and an intertuberous measurement of 10 cm.

This patient, too, refused an elective caesarean section, but agreed that if induction and trial labour were un-

successful, then only would she submit to repeat section. Forewarned of the previous trouble, she was admitted for induction when the baby was estimated to weigh 5½ to 6 lb. This was successful with intravenous pitocin, one unit in a litre of dextrose/water. Contractions commenced after four hours and within an hour were well established when a p.v. examination revealed a left occipito-posterior position. The cervix was 2F dilated and the head poorly applied. Despite good contractions, she did not advance and two hours later, before foetal distress had supervened, a trial vacuum extraction was embarked upon. Using the 3.5 cm. cup, the head was pulled on to the cervix, which dilated progressively till full dilatation 30 minutes later. The large cup was then applied and with moderate strength the baby was delivered, the head rotating on the perineum. An hour before this the patient had been given 50 gm. of Pethilorfan and 25 gm. of Sparine and no other analgesia was used. An episiotomy was unnecessary. The 6 lb. baby was in excellent condition and cried immediately.

I feel there is no doubt that a repeat caesarean section was prevented by the extractor in this case. Incidentally, she also highlights an increasing obstetrical problem in emerging countries. With better antenatal care and better nutrition, multiparae have much larger babies and disproportion occurs in a previously adequate pelvis. Generally speaking, disproportion in African obstetrics is a complex problem and every alternative should be considered before resort is made to caesarean section (Nixon *et al.*, 1956; Cannon and Hartfield, 1964). The extractor, which lessens diameters despite lowered mechanical forces, offers a useful alternative to caesarean section. It is felt that it is theoretically better than forceps, which further impinge on the available space and subject the baby's head to high pressure in localised areas (Snoeck, 1960). It seems to be the only logical instrument to use in conjunction with symphysiotomy. Forceps still maintain a place in the treatment of face presentation and the aftercoming head of the breech, but the majority of indications for which the forceps were used are better delivered by vacuum extractor. In the period under review two forceps deliveries only were performed, whereas in previous years about 30 took place in a six monthly period.

#### SUMMARY

A short series of extractions performed by a general practitioner is described and analysed. Evidence is presented to show that it is a unique instrument and very safe to use, gentle to both mother and baby. The number of days hospitalised shows no significant increase over the ward average. The instrument offers a useful alternative to caesarean section and has virtually eliminated the need for forceps delivery. As no anaesthetist is needed, it is an extremely important instrument in obstetrics in Africa.

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