

Forceps delivery

Science wears its art on its sleeve

A/Prof Steve Robson
FRANZCOG

Prof Caroline de Costa
FRANZCOG

Few of us think about it, but the obstetric forceps have been calculated to 'have saved more lives than any other instrument'. That's quite a rap for two pieces of interlocking surgical steel made to a design that hasn't really changed in our lifetimes. Yet with more than 130 million births around the world each year and with the perinatal death rate for unassisted vaginal birth as high as one in ten in some developing countries, such a revelation should not surprise us at all.

In countries where accurate records are kept, the rate of instrumental delivery is about ten per cent.¹ For Australian women, the proportion of all births that were instrumental vaginal births fell only slightly from 11.3 per cent in 1995 to 10.7 per cent a decade later.^{2,3} However, over that time period, the proportion of instrumental births conducted with forceps more than halved, from 7.8 per cent to 3.5 per cent. Over that same decade, the rate of caesarean birth doubled. Why the sudden drop in forceps deliveries?

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The RANZCOG statement regarding instrumental vaginal delivery (C-Obs 16, available on the College website) makes the following observation about choice of instruments: 'Each instrument has a different profile of complications. Delivery is more likely to be achieved with forceps than vacuum and will occur over a shorter time interval. The clinician should select the instrument based on his or her clinical experience and the clinical circumstances.'

Similarly, the extant RCOG *Green-top Guideline* on instrumental vaginal delivery states: 'The operator should choose the instrument most appropriate to the clinical circumstances and their level of skill. Forceps and vacuum extraction are associated with different benefits and risks.'

What has happened over a decade that forceps are being abandoned? It seems unlikely that the 'clinical circumstances' referred to by the RCOG have changed for such a large number of women. Although the rate of caesarean birth has rapidly increased, those abdominal deliveries do not seem to have been performed at the expense of operative vaginal delivery, since the rate of instrumental birth has remained essentially static. As long ago as 1972, prominent London obstetrician Peter Huntingford wrote: 'There are now only two routes of birth: easy vaginal delivery and caesarean section.' If one in ten births still require instrumental assistance, what is going on?

The obstetric forceps is attributed to the Chamberlen family and although many variations have appeared over the years, the basic principles of design are unchanged from the original Chamberlen prototype. The Chamberlens were French Huguenots who fled the 16th century pogroms of Catholic France for England, where Dr William Chamberlen established himself in 1569. William had five children, of whom two, both called Peter, were also doctors. Peter the Younger also had a son called (yes!) Peter ('Dr Peter'), who in turn had a son called Hugh who was a doctor, who also had a son called Hugh who took up medicine. All three Peters and both Hughs, as well as other members of the family, practised obstetrics extensively and were among the first 'man midwives' of the 15th and 16th centuries.

In the Middle Ages, Arab physicians referred to instruments for managing difficult births, but all these had projecting teeth or hooks so that the baby, if not already dead, died during delivery, and mothers were often injured too. Alternatively, if internal version succeeded in turning the presentation to a breech, a hook might be used to deliver the aftercoming head – with the same results. The invention of an instrument which could deliver a live baby and with less damage to the mother was therefore an enormous advance.

At the beginning of the last century, New York obstetrician Edwin Cragin, who coined the phrase 'once a caesarean always a caesarean,' journeyed by horse and carriage to his patients' confinements at home, bringing his forceps in a velvet-lined case. Such an air of mystery about obstetric forceps really began with the Chamberlens, who managed to keep their instrument secret for more than one hundred years. They did this by bringing the forceps carefully concealed in a large gilded box when they arrived at a house for a confinement, performing their deliveries with the bedsheets tied around their necks and their heads covered by the blankets. Births must have looked like Ku Klux Klan meetings. Birthing women always lay in their own soft feather beds into which they sank deeply, so the application of the forceps, by touch only in complete darkness, was indeed an art.

In 1813, some of the original Chamberlens' instruments were discovered hidden beneath the floorboards of a house in which Dr Peter had died many years earlier. All showed the basic pattern of two blades, revolutionary in its time, fitting together to form a single instrument, with fenestration of the blades to reduce compression of the fetal head and a cephalic curve. In later models, there was an articulation to lock the blades and a tape to tie them together. It appears that the Chamberlens only ever practised low forceps deliveries as there was no pelvic curve to their instruments.

The second half of the 18th century saw the development of many refinements to forceps design, including some by William Smellie, who introduced a pelvic curve to the blades enabling high forceps deliveries. A set of Smellie's forceps is on display at College House in Melbourne (see photo on page 20). To make the application of his instrument more comfortable for the mother, Smellie covered the metal with leather and greased it with lard before each application. He was also the first to record the use of the forceps to rotate the head before delivery and for the aftercoming head of a breech.

During the 19th century many different practitioners experimented with forceps design – the RCOG collection contains several hundred examples. James Simpson of Edinburgh (who pioneered the use of chloroform) developed both short and long forceps; Simpson's short forceps were the forerunner of today's Wrigley's. In France, Tarnier worked on an axis-traction device for mid-cavity forceps, aiming to achieve constant and easy traction along the changing axes of the pelvic planes. His work was the basis of several other axis-traction forceps, including the Neville-Barnes, familiar to all obstetricians to this day.

'Studies have shown that trainees now receive little or no exposure to complex vaginal births and few have any intention of being involved in breech deliveries or rotational forceps as consultants.'^{6,7}

Up until the end of the 19th century, forceps were used for one purpose only – the delivery of the child in abnormal obstructed labour. In 1920, the American obstetrician DeLee proposed the radical notion of 'prophylactic' forceps, whereby forceps delivery was performed much sooner, sparing the mother the exhaustion of prolonged labour. DeLee's idea led to the practice of performing forceps delivery for fetal distress, diagnosed at first by crude intermittent auscultation by stethoscope and for a range of maternal indications – all of which underpins our practice today.

With a caesarean section rate hovering around 30 per cent, what is the place of forceps delivery today? A recently published study from an Australian tertiary hospital found that the instrument associated with the lowest rates of adverse maternal and neonatal outcomes was Kjelland's forceps.⁴ This seems crazy, considering Kjelland's forceps' fearsome reputation. It shouldn't, because Kjelland's forceps are almost exclusively used with care by skilled practitioners who know that the stakes are high. As expected, the majority of deliveries were performed with Ventouse and indeed the outcomes were excellent for uncomplicated lift-outs. However, once the Ventouse delivery required rotation, almost one in four attempts was unsuccessful and the rates of adverse outcome were high. Worst of all were sequential instrumental deliveries, usually where a Ventouse

was unsuccessful and forceps were then tried. The rates of adverse maternal and neonatal outcome in those cases were close to two in three!

Ventouse is commonly seen as 'safe' and thus delegated to more junior staff. Forceps deliveries are rapidly becoming much rarer. This means that when a Ventouse either doesn't work or is contraindicated (for example, when the baby is preterm or there is little maternal effort) then trainees are often snookered. Their options are to try forceps, an instrument they have even less experience with, or to move to caesarean section at full dilatation, itself a highly morbid procedure.⁵ Studies have shown that trainees now receive little or no exposure to complex vaginal births and few have any intention of being involved in breech deliveries or rotational forceps as consultants.^{6,7} Are we heading the same way with forceps birth?

As a profession, we have reached a critical junction. Huntingford's prediction may well have come true. Unless a vaginal birth is likely to be swift and straightforward, a caesarean section will be performed. The media regale us with stories about climate change, 'tipping points' and 'peak oil.' Perhaps we have already passed our tipping point and have passed 'peak birth.' For those left with the requisite skills, it is probably time not for an 'earth hour' but a 'birth hour' – a summit to urgently examine whether it is worth saving our skills, or simply consigning them to history.

References

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William Smellie's straight obstetrical forceps, c1750. Donated to College House by Prof Robert Kellar, 1955.