The birth of forceps

Sukhera Sheikh • Inithan Ganesaratnam • Haider Jan

Department of Obstetrics and Gynecology, King's College Hospital, Denmark Hill, London SE5 9RS
Correspondence to: Haider Jan. Email: haider@mati4life.org

Summary

Operative vaginal delivery has been described since the Middle Ages. During this time, however, labour would be sustained over several days and intrapartum death almost inevitable. In these circumstances, intervention involving the use of surgical instruments or even kitchen utensils would serve purely as an attempt to avoid maternal mortality. The establishment of forceps-assisted delivery as a means of avoiding both maternal and neonatal morbidity was initiated in the 16th century by the Chamberlen family and later developed over several centuries by leading obstetricians of the time including Simpson, Barnes and Keilland. The evolution of forceps is a fascinating story which is rich in history. Despite the development of Ventouse and the increasing use of Caesarean section for difficult delivery, forceps remain an integral part of obstetric practice. The striking resemblance of modern day forceps to the original instruments used by the Chamberlens is a testament to both the family's ingenuity and enterprise as well as the subsequent pioneering obstetricians who followed in their footsteps.

DECLARATIONS

Competing interests

None declared

Funding

None declared

Ethical approval

Not applicable

Guarantor

SS

Contributorship

Sukhera Sheikh made substantial contributions to literature review, drafting the article and final approval of the version to be published. Inithan Ganesaratnam made substantial contributions to literature review, revising it critically for important intellectual content and final approval of the version to be published. Haider Jan made substantial contributions to literature review, drafting the article

Introduction

Operative vaginal delivery has been described as far back as the 6th century BC in Hindu medicine. Further reference to instrumental delivery can be found in writings of Hippocrates during the Greek and Roman era between 500 BC and 500 AD.[1] During this period, however, labour may have occurred over several days leading to intrapartum fetal death. Intervention in these circumstances involving the use of surgical instruments or even kitchen utensils would serve purely to remove the dead fetus in an attempt to avoid maternal mortality.[1] The establishment of forceps-assisted delivery as a means of avoiding both maternal *and* neonatal morbidity has developed over several centuries and for many years was kept a closely guarded secret by its inventors. This article looks at the origins of forceps and its evolution to the instruments we recognize today.

Methods

The main literature search utilized MEDLINE and Google databases to identify relevant articles published between January 1966 and January 2012. Medical Subject Headings terms were used. The selected key words were 'Forceps', 'history' and 'origin'. A restriction was made for English language articles only. Reference lists of all eligible articles were checked for other relevant studies. Conference proceedings were not searched. The sources were cross checked and this article was produced from those sources.

Discussion

In the 16th century, the French Huguenot William Chamberlen fled to England from Catherine de Medici after her ban on Protestant physicians and it is with his two sons Peter Chamberlen, 'the elder', and Peter Chamberlen, 'the younger', that the story of forceps as an instrument to

and revising it critically for important intellectual content and final approval of the version to be published

Acknowledgements
None

Provenance
This article was submitted by the authors and peer reviewed by Rosol Hamid

deliver live infants begins. Both were members of the Barber Surgeons Company and both fell out of favour with the College of Physicians for non-attendance at lectures and in the case of Peter the younger, a dislike for his outlandish dress sense. Despite this, Peter the elder and Peter the younger were both to have significant roles in the practice of 'man-midwifery' or as it later became known, Obstetrics.[2–4]

Whilst it is not entirely clear which of the brothers invented forceps, it is often accredited to Peter the elder who became surgeon to the Queen and attended Queen Henrietta Maria, wife of Charles I during her miscarriage at Greenwich.[2]

Peter the younger is known to have married twice, first to Jane Myddelton with whom he had two daughters and 11 sons and second to Ann Harrison with whom he had a further five children. His eldest son, Hugh, was one of three sons to continue the tradition of practising midwifery and the use of forceps. Their quest to protect their invention led to extensive means of concealment. The instruments themselves were always carried in a gilded chest and revealed once the woman had been blindfolded. The birth subsequently took place under blankets with only the Chamberlens in attendance of the patient. It was through these elaborate measures that the Chamberlens were able to keep the secret of forceps for nearly a century.[2]

In 1670, however, Hugh Chamberlen visited Paris with the intention of selling the secret to the French government in the hope of raising funds. In doing so he was challenged by Francois Mauriceau to deliver a 38-year-old rachitic dwarf with a grossly deformed pelvis who had been in obstructed labour for eight days. Unable to deliver her successfully, Hugh journeyed home with the secret still intact. He did however gain a copy of 'Observations sur la grossesse et l'accouchement'; Mauriceau's 1668 text which he translated into English under the title 'The Accomplish't Midwife'.[2,3]

In 1673 following the success of the translated text, Hugh became the Physician in Ordinary to King Charles II and in 1685 was elected a Fellow of the Royal Society. Later whilst supporting James II, Hugh was accused by the College of Physicians of practising without a licence after the King's forced abdication. This led him to flee to Holland where he is said to have sold some instruments to a Dutch Obstetrician named Van Roonhuysen.[3]

The original Chamberlen instruments (Figure 1) were only discovered in 1813 under the floorboards of the attic in their Essex residence, hidden by Peter the younger's wife Ann. Despite this, models of forceps started to appear from the early 18th century including a flexible model with a lever from the Van Roonhuysen family, which again was kept secret for many years.[3]

By the middle of the 18th century, William Smellie was probably the most significant obstetrician of the time, developing his own forceps to 'avoid this loss of children which gave [him] great uneasiness'. His instruments included the 'English lock' to allow the blades to be inserted separately into the vagina and also introduced a pelvic curve, a concept that was already being implemented in France at the time. The blades would be covered in leather and later thinner material and lubricated with hogs lard to ease insertion and prevent transmission of venereal infection. The rules of applying forceps were developed by Smellie and in 1752 he published the 'Treatise on the Theory and Practice of Midwifery'.[5]

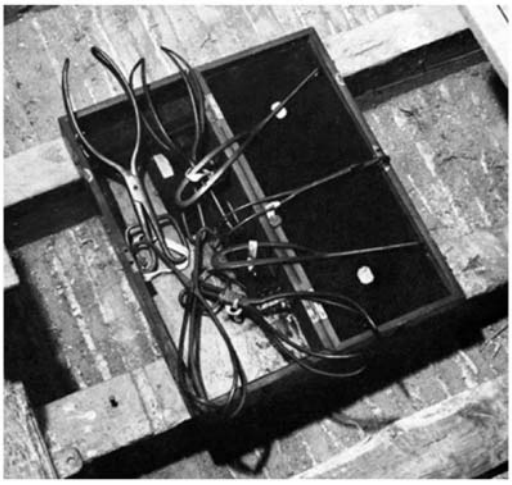

Figure 1. The original Chamberlen forceps found at Woodham Mortimer, Essex (reproduced with the permission of the Royal College of Obstetricians and Gynaecologists).

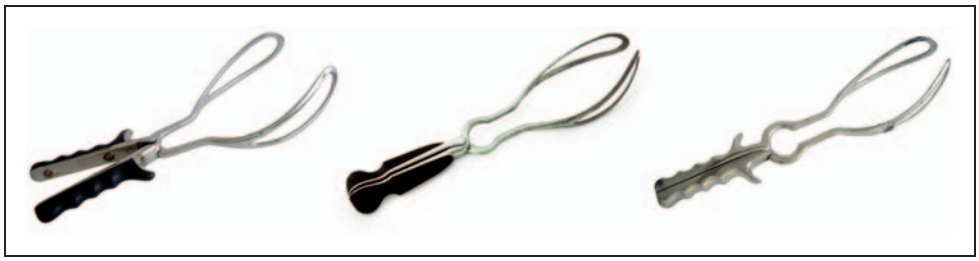

Figure 2 From left to right, Simpson, Barnes and Anderson forceps (reproduced with permission from http://medicantica.com).

Although a great teacher, he was met with violent opposition from some midwives, most notably Elizabeth Nihell who described him as a 'great horse God-mother of a he-midwife'. Amongst his compatriots was a fellow obstetrician named William Hunter. Hunter was appointed as physician to Queen Charlotte in 1762. Although he was familiar with forceps he prided himself in rarely using them, carrying with him a pair of rusty forceps to emphasize their infrequent use. He championed conservative management and was one of the first obstetricians to enter into normal labour.[3]

As conservative management gained popularity in England, developments in the design of instruments occurred mainly in Europe. However, this method of obstetric practice was strongly challenged after the tragedy of Princess Charlotte, daughter of King George IV who at the age of 21 in 1817 went into labour with her first baby. Labour occurred two weeks after the due date and lasted 50 h. The baby was stillborn. The placenta was removed with difficulty after uterine exploration and 3 h following delivery, Princess Charlotte died secondary to a concealed haemorrhage, thus leaving the King without an heir. The management of the labour in which forceps had been kept on standby but were not used was widely criticized. The incident proved too much for the obstetrician in charge Sir Richard Croft and shortly afterwards he shot himself in both temples.[3,4]

In 1819, when the Duchess of Kent became pregnant, David Davis was appointed Obstetrician. Davis was the first Professor of Midwifery in the University of London at University College. He was interested in developing instruments with particular concern for reducing injury to the baby as well as minimizing maternal trauma and as a result designed several pairs of forceps for different scenarios.[4]

Throughout the rest of the 19th century, forceps were aimed at dealing with the problems of small deformed pelvises resulting in pelvic disproportion and prolonged labours. This led to the design of numerous models of forceps focusing on the development of axis traction. Long forceps which were already being used in Europe became popular in England, most notably the designs of JY Simpson, Barnes and later Anderson who combined the features of Simpson and Barnes[4] (Figure 2).

Throughout the 20th century, emphasis was put onto fetal wellbeing and as Caesarean section became safer, high forceps delivery (where the head was above the pelvic brim) with or without rotation of the head became a rarity.[4] Nevertheless, designs specifically for deep arrest in the mid-pelvic cavity due to malposition were developed, most notably the Kielland's forceps in 1916. These forceps were straight with a slight pelvic curve that was parallel to the axis of the handle with a sliding lock to ensure adequate cephalic grip even in the presence of asynclitism. The importance of accurate diagnosis of position and the need to rotate the head separately to traction to avoid complications was emphasized by Kielland himself. Despite the growing popularity of the instrument elsewhere, it was not recognized in his own country of Norway until 1932.[6]

Additionally, shorter forceps designed to provide some protection of the fetal head were also emerging, for example the modified Simpson's forceps and also Wrigely's forceps in 1935.

Conclusions

The origins and evolution of forceps is a fascinating story which is rich in history. Despite the development of Ventouse and the increasing use of Caesarean section for difficult delivery, forceps remain an integral part of obstetric practice. The striking resemblance of modern day forceps to the original instruments used by the Chamberlens is a testament to both the family's ingenuity and enterprise as well as the subsequent pioneering obstetricians who followed in their footsteps.

References

1. Low JA. Operative delivery: yesterday and today. *J Obstet Gynaecol Can* 2009;31: 132–41.
2. Dunn P. The Chamberlen family (1560–1728) and obstetric forceps. *Arch Dis Child Fetal Neonatl Ed* 1999;81: F232–5.
3. Drife J. The start of life: a history of obstetrics. *Postgrad Med J* 2002;78: 311–15.
4. Hibbard BM. *The Obstetrician's Armamentarium*. San Anselmo, CA: Norman Publishing, 2000.
5. Studd J. Pioneers in obstetrics and gyanaecology 1: William Smellie. *Diplomate* 1994;1: 153–4.
6. Dunn P. Dr Christian Kielland of Oslo (1871-1941) and his straight forceps. *Arch Dis Child Fetal Neonatal Ed* 2004;89: F465–7.