

History of the Development of the Obstetric Forceps

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Introduction

It is a fairly recent phenomenon that women go into labour with an expectation that not only will they emerge from childbirth alive and well, but that their baby will be delivered safely. This was not usual until the first part of the twentieth century. Before this malnutrition was rife and so pelvic malformation was commonplace. Rickets was the main cause of this, and was still a problem until the Second World War¹. In addition, sepsis was an issue. Indeed, until Semmelweis observed that hand washing reduced the spread of infection (more relevant than ever today) hospitals were the most dangerous places to give birth².

An instrumental delivery describes the use of instruments to bring about the birth of a baby, ideally alive. Although instruments have been used for thousands of years in childbirth, only in the 16th century were instruments being designed to attempt to extract a living fetus. Before this, instruments were used solely to break up a dead fetus jammed in the pelvis to save the life of the mother³. In the west this was carried out mainly by barber-surgeons⁴.

Hippocrates, 'the father of modern medicine' taught that the fetus itself must make its own way into the world. Hence, only if a hopelessly obstructed labour occurred and the fetus died should assistance be given by removing the dead baby with destructive tools⁶. He himself was suggested to have used a crushing instrument⁷. This doctrine persisted well into the 1500s.

In the 10th century the Spanish/Moorish physician Abulcasis produced illustrations of crotchets - sharp hooks to decapitate dead fetuses, and crushing forceps³. Similar instruments have been described throughout the world at this period, for example the Tibetan womb-pin⁴.

In the 16th century, effort began to be made to

resolve obstructed labour by saving both mother and child. Earliest examples of instruments at the time include the fillet (a loop of material which would be hooked around the fetal head; the aim would be to pull the fetus from the birth canal without inflicting serious maternal or fetal damage) and vectis - a lever used to prise the head from the lower pelvis and aid delivery⁶.

It is commonly agreed that the most significant development in instrumental delivery was the invention of obstetric forceps. An early description of forceps (from the Latin *capere* - to seize and *formus* - hot) can be found in the writings of Ovid and Virgil who describe iron-working with such instruments⁴. A famous Egyptian frieze shows such a device, but it is not known that it was used in obstetrics and some believe these tongs were used to handle sacrifices⁴.

The invention of the forceps is commonly attributed to the Chamberlen family³. Some sources describe forceps with fixed blades in the 1600s and before, but as one can imagine, engaging the child's head with such an instrument was horrendously dangerous and damaging. The Chamberlen forceps were unique in that one could apply the blades into the pelvis one at a time¹¹.

The Chamberlen family were Huguenot refugees fleeing religious persecution in France⁸ who landed in Southampton in 1569. Peter the Elder and later his younger brother were both members of the Barber Surgeons Company and were reputed to be frequently in trouble for misdemeanours like missing lectures. The clan gained a reputation as enterprising rebels with disapproval from physicians, midwives and religious authorities. However, the combination of eccentricity, mystery and success displayed

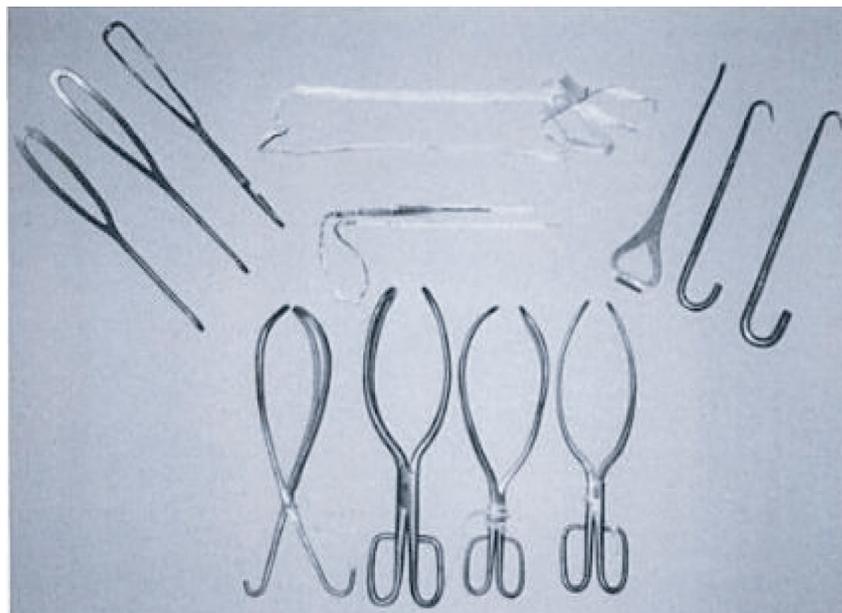
by the Chamberlens ensured business. Famous clients included Henrietta Maria who was delivered of Charles II (by Peter the Elder) and the wife of James II - Hugh Senior was engaged for the birth, but did not arrive in time⁶.

The invention of forceps is commonly attributed to Peter the Elder (1560-1631)⁹. The two brothers were paranoid in the extreme that someone would discover their secret. When a woman needed their services, a carriage would roll up to the door bearing an enormous, elaborately decorated box. The two brothers would carry it in together (leading to the belief that a large contraption was needed to aid the delivery). The room was cleared, the labouring woman blind-folded and listeners reported hearing bells and whistles as the brothers delivered the woman⁸.

The Chamberlen thought to have leaked the family secret was Hugh the Younger, the great-grandson of Peter the Younger. He had no son to pass the family secret to and shortly afterwards obstetric forceps began to come into the public eye⁸.

Once out in the open, the forceps began to be refined further. The original forceps of the Chamberlen family, ranging from the first rather crude set to the more sophisticated fourth model likely owned by Hugh the Younger, are available on display in the Royal College of Obstetricians and Gynaecologists. They were re-discovered in 1813, in Woodham Mortimer Hall in Essex, a former home of the Chamberlens⁶.

The first set of forceps appears asymmetrical and quite poorly-made, despite being a revolutionary design. The junction between the blades was riveted making manipulation difficult. Indeed, one of the key features of forceps refinement has been producing an articulation between the blades which combines ease of use with stability and a degree of flexibility. Later models of the Chamberlen forceps had screw holes at the cross-over. Some sources seem to suggest that the third and fourth versions were designed with a hole through which tape was passed and tightened. Other sources suggest this tape replaced lost screws⁶.



The evolving forceps of the Chamberlens (bottom). Left, vectri. Right crotchets. Top, fillets.

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Chapman, a contemporary of Hugh the Younger supported the use of any instrument to preserve the life of obstructed babies and was a defender of the use of the revolutionary new forceps. He was criticized by contemporaries however for being over-keen on their use. Despite his contempt⁶ for those who 'made frequent use of the hook and knife....and other barbarous instruments', Chapman was a practical man. His forceps had hooked handles which could be used as crotchets should all efforts to save the child be in vain. He was an inadvertent creator of an improved version of the Chamberlen set he possessed, when he lost the screw of the blades, twisted amongst the sheets of the woman he was attending. Mocking-up a simple cross-over joint, he invented the 'English Lock'. The shanks of the each blade now crossed each other which gave the user improved traction and grip⁴.

Different practitioners favoured different designs. William Smellie (1697–1763) wrote the first significant text on obstetrics in Britain and was the first truly to understand and illustrate the anatomy of the bony pelvis in his practice and teaching. Smellie's forceps were short and light with iron blades lubricated with hog's lard - he described Dussee's French forceps as 'long and ill-formed'. He refined Chapman's English lock to give the 'Classic English Lock'⁴.

Some would argue that the biggest breakthrough in forceps design was the pelvic curve which permitted easier insertion of blades and less risk of maternal damage. Contenders for the invention include Pugh, Levret and Smellie, though Pugh managed to publish first, so is credited⁹. Publish or perish, even in the 1700s! The pelvic curve allows the instrument to follow the axis of the woman's pelvis.

As time went on, various forceps were developed; some improved or refined, some designed for varying degrees of application

in the pelvis. A range of complex and bizarre devices were also invented such as Tarnier's axis-traction forceps which allowed calculation of traction forces to be applied for the birth¹⁰ and Burton's lobster claw forceps. Burton incidentally was ridiculed as the ineffectual 'Dr Slop' in the novel *Tristram Shandy*⁷.

The Kielland forceps were the last notable modification. They exploited earlier designs in lacking a pronounced pelvic curve, allowing turning of the head in the pelvis. Although this might seem counter-intuitive to lose modifications which took years to develop, the Kielland forceps were in fact moving with the times. The pelvic curve was developed to limit injury to the maternal tissues during delivery⁶. Episiotomies were commonly used once local and general anaesthesia was established⁴ and the Kielland's forceps required an episiotomy to prevent the injury the pelvic curve was designed to prevent. Christian Kielland (1871-1941) developed his forceps primarily for turning the head of the fetus when it was still incompletely rotated in the upper pelvis. Forceps in use at the time were adapted for delivery in the lower pelvis when the child's head was fully rotated. The advantage of Kielland's straighter forceps with a lesser pelvic curve is that blades can be turned until they are in the correct position around the fetal head. The straight instrument allows a rotation of the head and the practitioner applies traction to pull the head through the pelvic outlet^{4,6}.

For many reasons forceps are used less frequently today. They are often simply unnecessary as labour can be actively managed. A kiwi is often less traumatic. Lower segment Caesarean (or C) sections are generally safe and anaesthetists and obstetricians are available 24 hours a day. This can be quicker than a forceps delivery. There are fewer practitioners trained in their use, although Neville-Barnes and Wrigley's forceps were still on the curriculum for O&G trainees in 2008. Forceps can also be used as

an adjunct to the C-section - Wrigley's forceps can be used to extract the fetus at C-section if especially difficult. But in the right hands the forceps are often still a safe and appropriate option for delivery although they are beginning to fade as the primary tool in the armoury of the obstetrician.

The popularity and relative safety of the Caesarean Section - practically a death sentence for mothers only several generations ago - may herald the end of the tool which in essence began the colourful history of Obstetrics.

References

- 1 Loudon, Death in Childbirth, an international study of maternal care and maternal mortality 1800-1950, chapter 8
- 2 Hallett, The Attempt to Understand Puerperal Fever in the Eighteenth and Early Nineteenth Centuries: The Influence of Inflammation Theory. *Med Hist.* 2005 January 1; 49(1): 1-28.
- 3 Kingston et al, Operative Delivery: Today and Yesterday. *J Obstet Gynaecol Can* 2009;31(2):132-141
- 4 O'Dowd et al. *The History of Obstetrics and Gynaecology*, 2nd ed, 2000
- 5 Goodman, Secrecy in Research. *N Engl J Med* 1996; 335:134-136, Jul 11, 1996
- 6 Hibbard, The obstetrician's armamentarium: historical obstetric instruments and their inventors, 2000
- 7 King, *Midwifery, obstetrics and the rise of gynaecology: the uses of a sixteenth-century compendium* 1st ed, 2007
- 8 Dunn, The Chamberlen family (1560-1728) and obstetric forceps
- 9 Drife, The start of life: a history of obstetrics *Postgraduate Medical Journal* 2002;78:311-315; doi:10.1136/pmj.78.919.311
- 10 Baskett et al, *Munro Kerr's Operative Obstetrics*, 11th ed 2007
- 11 Personal communication-Archivist RCOG London, June 2008