The history of the prostate, part one: say what you see

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‘Glands which pour a humor into the urinary passages of the male to excite the sexual act’ is one very early description of the prostate gland. In this article Jonathan Goddard describes the early history of the prostate gland as our understanding of its structure and function developed over time.

The evolution of knowledge of the prostate gland has always been a little vague. It is said the prostate was discovered, lost and re-found, between Antiquity and the Renaissance.¹ For a long time now I have harboured a theory that our knowledge of the prostate was based more on its treatment than on anatomical studies - if not then it certainly seems to mirror that. Over time the diseased prostate has been prodded, tunnelled through and bypassed, then seen and resected, scanned and biopsied, and finally removed, with an increasing amount of accuracy. It has been reincarnated many times as a carnosity, a collection of lobes, layers or zones, and finally has been redefined by its close association with its neighbouring nerves and vessels.

The earliest suggestion of a prostate gland has been accredited to Herophilus of Chalcedon, a doctor working in Alexandria in the third century BC. He certainly studied human anatomy, very likely by dissection of human as well as animal corpses, and possibly by vivisection of criminals.² His writings, however, are now lost, so what we do know comes from later commentators, in particular Galen of Pergamum (c.129–c.210 AD). Galen wrote of ‘glands which poured a humor into the urinary passages of the male to excite the sexual act,’ explaining that Herophilus called these glands *parastatai adenoeides* or glandular assistants. You will note the plural: this may be because the anatomy was defined by animal dissection (many animals have bifid prostates) or perhaps because Herophilus was actually describing the seminal vesicles.³

I suspect that neither Herophilus nor Galen were aware of the prostate gland as an anatomical concept. However, the presence of some soft tissue mass at the base of the bladder and urethra must have been appreciated by the Greco-Roman surgeons as they attempted to pass catheters or dilators to relieve bladder outflow obstruction. Also, the ancient lithotomists cutting for the stone through the perineum must have encountered the prostate. According to the Roman medical writer and physician Aulus Cornelius Celsus (c.25BC–c.50AD), perineal lithotomy was best reserved for pre-pubescent boys. Did that mean they never came across a mature prostate, or was the prostate the very reason to avoid operating in adult men?

The Renaissance

The works of the Greek and Roman physicians were not challenged in the medieval era, and this remained so until the Renaissance. In 1536, the Venetian doctor and anatomist Niccolo Massa (1485–1569), in his *Anatomiae libri introductorii* (Introduction to
Galence. He produced illustrations for his students which, with the help of the artist Jan van Calcar, he published in 1538. This *Tabulae anatomicae sex (Six anatomical tables)* included the first ever illustration of the prostate (see Figure 1).4

Versalius went on to publish one of the most influential anatomical textbooks in medical history, *De humani corporis fabrica (On the fabric of the human body)*, in 1543.5 In this work, the prostate is described as: ‘The glandulous body into which the vessels that bring down semen insert after they have come together [...] located at the bottom of the bladder and its neck. It is a single body, often larger than the testes. It is not exactly round but has a depression at the front and back; at the sides it is perfectly spherical. Through the middle of it runs the vesical canal.’6

Note that the prostate has now become a single organ.

The French anatomist André du Laurens (1558–1609) has been credited with introducing the name prostate, or *prostatae*, in his *Historia anatomica humani corporis (History of the anatomy of the human body)*, published in Frankfurt in 1600.3 However, this is not correct as the French surgeon Ambroise Paré (1510–1590) had already written of the prostate in 1549 in his *Briefe collection de l’administration anatomique (Brief collection of the conduct of anatomy)*. Written in the vernacular French, he clearly writes, ‘deux glâdules nômées prostates’.7 He also described two glandulous bodies at the base of the bladder, into which the two *parastases* (vasa) enter, joining a third passage (the urethra).7

Regarding the function of the prostate, Paré says it receives the seed which is made in the testicles and contains it until it becomes troublesome! The prostate, he says, also contains an oily and viscid humour that protects the urethra from the acrimony and sharpness of the urine.7

Du Laurens’ book was one of historical anatomy, that is, anatomy taught by professors and based on the works of the ancient physicians, in particular Galen. It was not a book of scientific anatomy, the modern anatomy of the new dissections like Versalius. It is, therefore, perhaps not surprising that he was not the first writer to use the term ‘prostate’. In fact, the phrase he uses is, ‘anatomists call these glands prostatae,’ making it clear he had not invented that term but that it was already in use by other anatomists.

Note that both du Laurens and Paré suggest the prostate is a paired organ once again. According to Marx et al, du Laurens used a mistranslation of the Greek from Galen, *prostatai* instead of *parastatai*, changing Herophilus’ description of ‘the glands next to the bladder’ (*ie* the seminal vesicles) into ‘the glands in front of the bladder’ (*ie* the prostate).3

Taking a closer look
The seminal urological procedure from the seventeenth century to the early nineteenth century was perineal lithotomy, and much thought was given to the prostate as an organ in the way. It was recognised, cut through or around, or stretched or torn open to get to the stone. It was only towards the end of the nineteenth century that it was thought of as a surgical target in its own right.

The end of the nineteenth century and the beginning of the twentieth century saw the introduction of the urethroscope and the cystoscope into clinical practice. Those surgeons who classed themselves as urologists became skilled in the use of these instruments and, for the first time, the prostate was seen urethrally.

In 1912, the American urologist Oswald Lowsley (1884–1955), following detailed anatomical studies of foetal prostates, concluded that the gland had five lobes (two lateral lobes, a posterior lobe, an anterior lobe and a median lobe); that it was present in almost all foetal specimens; and that, in his opinion, it could easily cause obstruction if it were to enlarge in later life.8 He based his anatomy on the presence of ducts arising from the urethra in these five areas, predicting how the lobes would grow out from these.

The endoscopic view of the interior of the prostatic urethra reveals the bulging of the prostate from the sides, the base and, to a lesser extent, the roof. Sometimes, as the cystoscope is passed into the bladder, part of the prostate is seen to extend into the bladder cavity. Thus the lateral, posterior, anterior and median lobes could now be clearly seen. It is not surprising, therefore, that Lowsley’s lobar view of prostatic anatomy became quickly accepted (Figure 2).

Lobes versus layers
Lowsley, however, only studied the anatomy of foetal prostates; not those of boys or men. His theory was challenged first by I.E. LeDuc of the University of California,9 and then by the British pathologist Leonard Maurice (Sammy) Franks (1921–2011). They disputed Lowsley’s lobar theory, asserting that the prostate would be better thought of as in layers. In 1953, Franks, then a research pathologist at the Imperial Cancer Research Fund at the Royal College of Surgeons in
Medical history

Although the 1930s had seen the rise of the transurethral resection of the prostate (TURP), the Second World War (in Britain at least) stifled this due to a lack of diathermy machines. The prostate operation of the time was Terence Millin’s retropubic prostatectomy, a modification of the transvesical procedure developed by Arthur McGill (1850-1890) and Sir Peter Freyer (1851-1921) at the turn of the century. Once again, the new anatomy of the prostate gland fitted neatly with the

Figure 3. Enucleated prostatic adenoma. From P.J. Freyer, Enlargement of the prostate, 1920. Author’s collection

At around the same time the use of transrectal ultrasound scanning for prostatic biopsy emerged. As the ultrasound scan images improved, McNeal’s zones began to appear to the urologist. Once again anatomy matched practice (see Figure 4).

Redefining prostate anatomy

The goal of the modern radical prostatectomist is preservation of urinary continence and sexual function as well as oncological control. These goals were made possible by another redefining of prostatic anatomy. In 1981, Patrick Walsh (b.1938), Chairman of the Urology Institute at Johns Hopkins Hospital, met with his friend Professor Pieter Donker (1914–1999) in Leiden. Abandoning their original plan of visiting a windmill museum they instead went to Donker’s anatomy laboratory, where they studied the neurovascular bundles lateral to the prostate in foetal specimens. This led, in 1983, to Walsh describing an improved technique for retropubic radical prostatectomy that spared these neurovascular bundles, allowing their preservation in some cases. Today, the latest tool of the urologist, the robot, steadies the hand of the surgeon to dissect more accurately the anatomy of the prostate.

The prostate gland, so prominent in the world of urology, the media and men’s health in general, did not appear in the world of anatomy until the Renaissance. The detailed anatomy of the prostate has emerged slowly since, apparently mirroring the surgeon’s attempts to treat the problems it causes. This is the subject of the next article: how slowly, once again, it was realised that the prostate caused urinary symptoms, and how surgeons tried to manage these.

Declaration of interests: none declared

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Figure 4. 3T MRI image showing the peripheral and central zones of the prostate. McNeal’s ‘zones’ were first identified histologically and then confirmed with modern imaging techniques.

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