

## PERINATAL LESSONS FROM THE PAST

# Sir Denis Browne (1892–1967) and congenital deformities of mechanical origin

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Sir Denis Browne of the Hospital for Sick Children, Great Ormond Street, London, is regarded as the father of paediatric surgery in the United Kingdom. He made many important scientific and operative contributions, prominent among which were his studies on the origin and management of congenital deformities.

John's Ambulance Brigade. It was another happy partnership and they had two children, a son and a daughter.

DB was a complex person. While both ambitious and egotistical, there was also a shy and sensitive aspect to his makeup. He was kind and considerate, had a boyish sense of fun and adventure, and was at his best with children. He understood the anxiety of parents for their children and was devoted to the pursuit of perfection in his work. A brilliant and inventive surgeon with an original and enquiring mind and great technical skill, he had enormous energy, yet never gave the impression of being in a hurry. When in thought he had the ability to shut himself off from the rest of the world. He never conformed to established practice but, after wide reading and study, sought a logical solution to any problem before him. With great strength of character and firm convictions, he was at the same time a rebel who courted controversy. He took nothing at face value and had a disdain for the conventional approach and a contempt for bureaucracy, hypocrisy, and pomposity. He enjoyed battling against anything or anybody he regarded as ignorant, prejudiced, or incompetent and never gave an inch in debate. Blunt and with a pungent wit, he

Denis Browne was born on 2 April 1892 in Melbourne, Australia, to parents of English and Irish ancestry. His mother's father, Sir William Foster Stawell, who emigrated from Ireland to Melbourne in 1856, had become first Chief Justice and then Lieutenant Governor of Victoria. His father, Captain Sylvester Browne, and mother had married in 1890. In 1901, when Denis was nine, the family moved to a large sheep farm in New South Wales. There Denis became a fine shot and superb horseman. He was educated at King's School, Paramatta, and gained a scholarship to study medicine at the University of Sydney. There he graduated MB in 1914, a year early in order to join the Anzac campaign in Gallipoli in 1915. A severe attack of typhoid led to a period of convalescence back in Australia before he returned to Europe as a major in command of a field ambulance in France. After the end of the war, Denis Browne obtained the FRCS in 1922 and became first the casualty registrar, then in 1925 the resident medical superintendent of the Hospital for Sick Children, Great Ormond Street, London. Appointed consultant surgeon in 1928, he served there until his retirement in 1957, after which he held the position of emeritus surgeon until his death at the age of 74 on 9 January 1967.<sup>1–3</sup>

DB, as his friends came to call him, was a tall handsome man with craggy eyebrows and a flair for clothes (fig 1). Besides being a first rate shot and horseman, he played tennis to a Wimbledon standard. Although he could be brash and intolerant, he also had great charm and the ability to inspire the admiration and loyalty of his team and friends. He enjoyed the company of women and defied the Great Ormond Street edict that residents should remain single. During his period as resident medical superintendent, he secretly married Helen Simpson, a successful writer, and bought a flat for her in Sloane Street. They had one daughter before his wife's early death in 1940 during the war. Five years later in 1945, he married Lady Moira Ponsonby, a trained nurse who later became Superintendent of the St



Figure 1 Sir Denis Browne, 1892–1967.

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succeeded in making many professional enemies as well as friends.

Denis Browne's studies and teachings covered the whole field of paediatric surgery—hypospadias, hare lip and cleft palate, imperforate anus, descent of the testicles, ligation of the patent ductus arteriosus, tongue tie—the list could go on and on.<sup>3</sup> Undoubtedly though he regarded his most important scientific contribution to be recognition of the importance of mechanical intrauterine compression as the cause of a range of congenital deformities, and subsequently his approach to their treatment. In 1983, P P Richham wrote: "As early as 1931 when he published his first article on talipes equino-varus he ... pointed out that this type of malformation could be explained by assuming that the foetus had suffered from long-continued pressure while pinioned in a cross-legged position against the concave walls of the uterus. The theory ... was further evolved and enlarged ... in 1936 when talipes, torticollis, displaced ears, congenital facial paralysis, acrocephalosyndactyly, congenital dislocation of the hip, pressure dimples, arthrogryposis and a number of other conditions were postulated to be caused by selective or generalised intra-uterine pressure ... The mechanical theory of the causation of deformities led him to search for methods of treatment which would correct orthopaedic deformities by the use of selectively applied pressures and controlled movements. By the use of his splints permitting controlled movements he revolutionised the treatment of such conditions as talipes, congenital dislocation of the hip and scoliosis ... During his later years he came more and more to recognise the importance of active exercise for strengthening of muscles as a necessary adjunct to splinting."<sup>3</sup>

In fact, his broad views on mechanical deformation in utero were not new, dating back to the days of Hippocrates,<sup>4</sup> as he himself acknowledged. However, the theory had received almost no recognition or support from the profession in his day. Only after his death did his ideas receive increasing acceptance.<sup>5,6</sup>

Denis Browne's approach to any problem was based on clinical observation and anatomical dissection accompanied by wide reading, meditation, and analytical reasoning. He described his Baconian method in respect to congenital deformation as follows:

### On inductive reasoning<sup>7</sup>

"To prove the question one way or another by direct observation is at present impossible, and it appears likely ever to remain so. In consequence I am reduced to a method that might possibly be used more in medicine than it is, the method of comparing what abstract argument shows to be the consequence of the granting of the hypothesis under test with what is actually found in real life. If the results of abstract inductive reasoning of this sort coincide with those of observation over a wide and complicated range, the truth of the hypothesis on which the reasoning was conducted is proved as nearly as absolutely as most things can be in this world."

DB recognised that the newborn infant could be readily folded up into its prenatal posture soon after birth and that moulding deformities, when present, appeared to be dictated by mutual pressure within the womb or by the shape of the intrauterine container. He also observed that most children with moulding deformities were otherwise perfect specimens. He wrote: "An important part of the abstract argument is that the regions of the body most likely to be affected by mechanical pressure should also be found the most frequently deformed in real life. The parts most likely to get

misplaced are the limbs; and the arms are sheltered from pressure, by the overhanging head. Consequently it is the feet which one should expect to find far the most commonly deformed, and this by going in the easiest way they could go, by twisting inwards and so getting caught."<sup>7</sup>

### On talipes equino-varus<sup>8</sup>

"When the foot which has been caught in the folded-legged position turns inward under the pressure of the uterine wall (fig 2), there ensues a series of deformities gradually increasing in severity with increase in the pressure. This series can be conveniently divided into three parts ... metatarsal varus ... equino-varus ... and extreme varus ... The muscles are atrophied, as would be expected from immobilisation; and their balance is upset owing to the stretching of the peronei and extensors while their stronger opposing groups are left contracted. But there is not true paralysis ... This deformity, in which the stronger muscles are favoured, gets worse automatically... When the deformity is single it is never very severe, as if one foot is normal there cannot have been a very high pressure. When it is double the deformity is never exactly equal, as the foot that has been on the outer side in the cross-legged position is always about 10 per cent worse than the sheltered one."

In the same publication DB discussed talipes calcaneus-valgus:

### On the calcaneus position of the feet<sup>8</sup>

"It is not usually commented upon that the feet of a newborn baby are quite different in position and range of movement from those of an adult. They will go up into calcaneus with ease till the back of the toes touches the front of the shin. The reason is that in-utero they take the pressure of the wall upon their soles." (fig 2)

He wrote on several other congenital deformities:

### On congenital dislocation of the hip

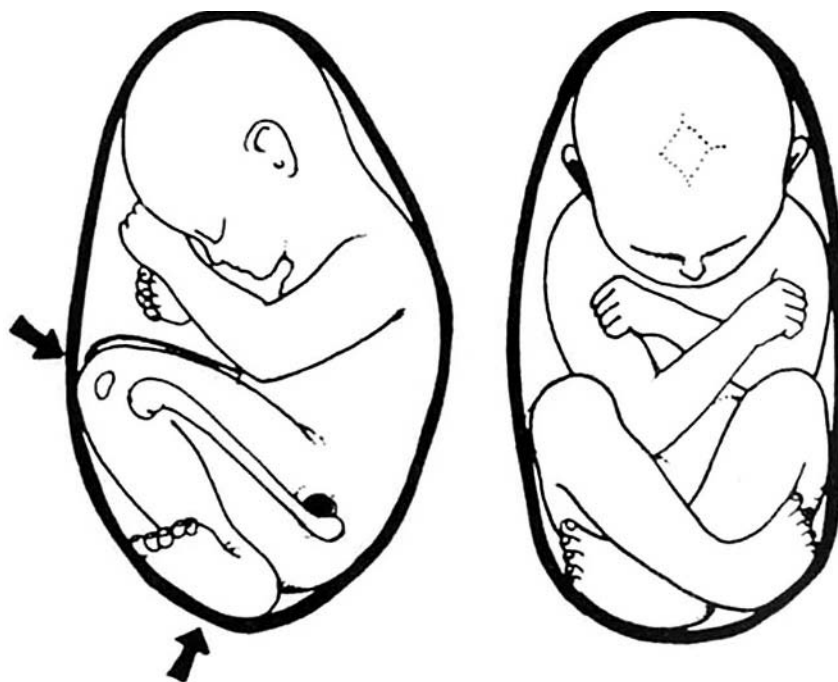
"If the hip joint is actually developed in a state of dislocation, as appears to be the most popular notion at the present time (apart from the difficulty of imagining how this could happen, given the method of formation of joints), it is curious that this disaster should happen only to the one joint that is exposed to pressure in the uterus, and that the displacement should invariably be in the only direction in which this pressure could force it."<sup>7</sup>

"It is always dislocated in the only direction in which it could be forced, that is to say backwards and downwards by pressure on the knee .. CDH is constantly associated with valgus talipes .. (it) is never associated with a straightforward varus moulding of the foot\* .. because the pressure on the outside of the foot swings the knee into abduction, which brings the head of the femur forward and keeps it in the acetabulum ..."<sup>9</sup>

### On genu recurvatum<sup>9</sup>

"The only other joint (besides CDH) to be found dislocated, the knee, is only so malformed in association

\*This is not invariably the case. PMD.



**Figure 2** Fetal positions associated with valgus (on left) and varus (on right) deformities of the feet. From D. Browne, courtesy of the *Australian and New Zealand Journal of Surgery*.<sup>13</sup>

with the (in-utero) malposition of hyperextension, the connexion being very obvious.”

#### On congenital sternomastoid torticollis<sup>7</sup>

“Postural torticollis - this is a common deformity again, though usually self-correcting. The child is born with its head on one side, and this position persists for several months, though there is no obvious failure of development beyond a flattening of the muscles of the compressed side ... the ears may be displaced ... in two cases I have seen transient facial paralysis which it is tempting to explain as being due to pinching of the nerve between the shoulder and the mastoid process ... The formation of a sternomastoid tumour, with subsequent torticollis from shortening of that muscle is, according to Middleton, a sequence of venous stasis caused during compression at birth. On the analogy of Volkmann’s ischaemia this seems extremely likely.”

#### On congenital postural scoliosis<sup>10</sup>

“This is due to the posture of the baby lying with its spine bent to one side before birth ... It is easy to overlook in the early and only curable stages. The outlook is complicated by its having a strong tendency to spontaneous correction, the rate being about the same as for unstable hips - about 80%. However, if it does not correct without treatment the result is disastrous and crippling. In consequence, I consider all these cases should be treated, as Von Rosen and Barlow teach should be done to all unstable hips.”

DB had no use for the term “idiopathic” in relation to congenital scoliosis. He wrote: “There are few critics of the medical profession who have not commented on our habit of

disguising ignorance by impressive terminology usually based on classical languages or mythology; idiopathic has no comprehensible meaning other than ‘of unknown origin’.”<sup>10</sup>

With regard to the management of congenital deformities, DB wrote:

#### On the treatment of congenital deformities<sup>9</sup>

“The essential idea of the classical treatment which I was originally taught was to treat deformities rather as if they had been cement or plaster, that is to say they were corrected as far as possible, tendons being freely cut to allow this, and they were then immobilised with the idea that they should set in the position obtained. This notion ignores the fact that the body is a vital moving structure, which only develops properly if its parts are being used in the way for which they are fitted ... The disadvantage of the old method was that the joints stiffened and the muscles atrophied under immobilisation and the effects of cutting tendons round the ankle were much the same as those of cutting them round the wrist ... I found the results of the old method to be so disappointing that I sought for new principles, and found them in the idea that certain movements which tend to correct the deformity should be permitted, and others which increase it should be prevented. To do this it was necessary to work out a new system of splinting, the main idea of which was to control the system of levers, which is formed by bones, joints and muscles, by means of a counter-balancing system of levers in the form of splints ... The advantages to be expected from the system of controlled movement would be: (1) Rapidity of correction, due to the continual manipulations supplied by the automatic actions of the infant; (2) stimulation of the growth of imperfectly developed parts, a stimulation that use alone could give; (3) the acquiring of correct muscle balance by use in the corrected position. Immobilisation, of course, simply

weakens all the muscles equally, without changing their original faulty relationships of tone. I have worked upon the idea that to reverse the moulding of the feet one should imitate the kind of pressure that has originally produced it."

In spite of numerous publications on congenital deformities, DB's hypothesis was broadly neglected by the profession. DB reacted vigorously in letters to the *BMJ* and *Lancet*. Thus in 1964 he wrote: "What is important is not so much the question of whether this hypothesis is true, as the fact that pathologists, orthopaedists, obstetricians, and paediatricians all unite in refusing to discuss it. It would be a weary task to detail instances of this refusal, but anyone who studies textbooks of pathology, particularly those concerned with that of the foetus and newborn, must be struck by it."<sup>11</sup> But while his ideas were mostly correct and have been vindicated,<sup>5</sup> it must be accepted that he damaged his own case by incorrectly claiming that four limb arthrogryposis was caused by the hydrostatic pressure of polyhydramnios interfering with venous return.<sup>7-9</sup> He also suggested that lumbar spina bifida was caused by acute flexion of the pre-embryonic primitive streak.<sup>7 11</sup>

DB's disgust with some of his professional colleagues was motivated by the harm inevitably resulting from neglect of his teachings on congenital deformities. Thus he wrote in 1960: "I have had complaints from many mothers that on taking a new-born baby with a dislocated hip to orthopaedic clinics they were told to report back, usually in six months, 'for reconsideration'. If anyone doubts this widespread reluctance to treat certain conditions of the very young, let him consider that in most orthopaedic clinics treatment of babies with congenital scoliosis is refused completely. The reason for this is apparently that some recover spontaneously; though on the other hand some progress to the dreadful crippling of "idiopathic" scoliosis ... CDH can be diagnosed at birth; I have very recently seen a case detected at 20 minutes ... Yet the average age at which I see these cases is about 20 months ... Where does the responsibility

lie? If our profession were run as an efficient business with the object of diminishing suffering, every baby would be examined for orthopaedic defects very soon after birth."<sup>12</sup>

With a worldwide reputation, Denis Browne was the first surgeon in Britain to confine his practice to children and came to be recognised as the father of paediatric surgery in the United Kingdom. A Hunterian professor on four occasions, he was also awarded the Dawson Williams prize and the William Ladd medal of the United States. He was made a Chevalier Légion d'Honneur of France. In 1961 he was appointed KCVO for services to the Royal family. On returning to Australia in 1965, he was also made an honorary fellow of the Australian Surgical College. In 1954 he had helped to found the British Association of Paediatric Surgeons and became its first president. After his death, the Association struck a medal in his honour "to mark an outstanding contribution to paediatric surgery", with the additional characteristic comment that "the aim of paediatric surgery is to set a standard, not to seek a monopoly".<sup>1-3</sup>

## REFERENCES

- 1 **Obituary.** Denis John Walko Browne. *Lancet* 1967;i:166-7.
- 2 **Williams DI.** Denis Browne and the specialisation of paediatric surgery. *J Med Biogr* 1999;7:145-50.
- 3 **Nixon HH, Waterston D, Wink CAS.** *Selected writings of Sir Denis Browne.* Farnborough: Iukon Printers Ltd, 1983.
- 4 **Dunn PM.** The influence of the intrauterine environment in the causation of congenital postural deformities, with special reference to congenital dislocation of the hip. MD thesis: University of Cambridge, 1969;i:113-220.
- 5 **Dunn PM.** Congenital postural deformities. *Br Med Bull* 1976;32:71-6.
- 6 **Smith DW.** *Recognizable patterns of human development.* Philadelphia: WB Saunders Co, 1981.
- 7 **Browne D.** Congenital deformities of mechanical origin. *Proc R Soc Med* 1936;29:1409-31.
- 8 **Browne D.** Talipes equino-varus. *Lancet* 1934;ii:969-74.
- 9 **Browne D.** Congenital deformities of mechanical origin. *Arch Dis Child* 1955;60:37-41.
- 10 **Browne D.** A mechanistic interpretation of certain malformations. In: Woolam DH, ed. *Advances in teratology.* London: Logos Press, 1967.
- 11 **Browne D.** The classification of developmental defects. *Lancet* 1964;ii:689.
- 12 **Browne D.** Congenital dislocation of the hip. *BMJ* 1960;i:564.
- 13 **Browne D.** The pathology and classification of talipes. *Aust N Z J Surg* 1959;29:85-91.