INTRODUCTION

In a series of papers from 1951 onwards, Professor J.I.P. James from the department of orthopaedic surgery in Edinburgh drew attention to a condition which he called, ‘idiopathic infantile scoliosis’ (1,2). In this condition there was persistent lateral curvature of the spine in infancy in the absence of bony malformation. Characteristically, there was a smooth curve involving perhaps eight vertebrae that was more often than not convex to the left. The apex of the curve was typically at the level of the 9th thoracic vertebra and the mean angle of curvature when the diagnosis was made, usually at the age of five months, was about 15°. It was recognised that while the majority of these curves resolved in the first three years of life, a proportion were progressive – leading to one of the most crippling of all deformities in childhood and adult life.

In 1956 the late Sir Denis Browne (Fig 1) entered the arena with a paper to the Royal Society of Medicine on the same condition to which he gave the title ‘congenital postural scoliosis’ (3). By this he implied, as others such as Ballantyne (1904), Tubby (1912), and Von Reuss (1920) had done in the early years of the century, that the curvature was due to malposture in-utero and was present at birth (Fig 2). As he wrote:

"... James argues that I cannot be right in considering infantile scoliosis due to malposition in-utero, since in only two of his cases was it present at birth. The neglect to distinguish between being present and being noticed deprives this of all meaning”.

This was a relatively mild example of the acrimonious debate which followed (4) and which continues even up to the present time (1973). Suffice it to say that the majority of orthodox orthopaedic opinion in this country today still rejects Sir Denis Browne’s hypothesis and also the name he gave to the condition. It will be my purpose to try to show that Sir Denis was, in my opinion, correct in his views. The argument is not a purely academic one about semantics as can be seen from this further quote from Sir Denis Browne’s 1956 paper:

“In the first months of life when it is essential for a rapid and complete cure that the diagnosis should be made, all that is noticeable is not a positive abnormality, since the position of the spine is one which any normal baby can, and frequently does, assume: there is simply the absence of the power of assuming the reverse curve of the spine.”

Sir Denis made this the basis of his diagnostic radiographic technique which he called ‘a triptych’ (5):

“... A picture is taken of the spine with the baby lying at ease, and then flanked by two others with the spine bent, by gripping shoulders and pelvis, as far in either direction as can be done without discomfort.”

Prior to radiological examination, it is, of course, first necessary to identify cases of suspected scoliosis. This is readily undertaken during routine examination. The infant is gently suspended with the examiner’s hand under the baby’s side to test for equal lateral flexion of the spine first to one side and then to the other (Fig 3). All infants should be examined at birth. They should be especially carefully examined if other postural deformities are present.

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* Based on a presentation to the Paediatric Research Society, March 1973
Now I wish to present two infants with congenital postural scoliosis that are of special interest in that the diagnosis was made at birth and both infants died on the first day of life and were examined at necropsy.

**Case 1**
This first infant, a boy weighing 1400g, was born after a gestation of thirty-one weeks to a mother whose membranes had ruptured prematurely eighteen weeks earlier. This event had been followed by chronic drainage of amniotic fluid. Besides a scoliosis the infant had plagiocephaly, a compressed facies, spade-like hands, a deformed thorax, flexion contractures of both knees and bilateral talipes calcaneo-valgus. He died shortly after birth. Post-mortem examination revealed no malformations, just the multiple compression deformities already mentioned. X-ray examination confirmed a postural scoliosis, convex to the right (Fig 4 above).

**Case 2**
This second infant, a girl weighing 1870g after a gestation of 38 weeks, was delivered by Caesarean Section from an amniotic cavity containing no amniotic fluid. The pregnancy had been noted to be small, tight and uncomfortable throughout, and the fetus had been lying as a breech with extended legs for at least six weeks before delivery. Like the last infant, this child was noted to have multiple postural deformities at birth involving skull, jaw, spine, hand, hips and feet. Again post-mortem examination confirmed the presence of a postural scoliosis convex to the right (Fig 5 see below).

**EPIDEMIOLOGICAL STUDY OF CONGENITAL POSTURAL DEFORMATION**
During a three year study in maternity hospitals in Birmingham and Warwick I examined 6,756 consecutively born infants and detected nine cases of congenital postural scoliosis soon after birth – giving an incidence of approximately 1 per 1,000 deliveries. In fact as this was a selected hospital population, the true incidence is likely to be lower, maybe 1 in 2,000. Eight of these nine infants with postural scoliosis had other associated postural deformities – a fact that was statistically highly significant. These other deformities included
- plagiocephaly (P< .0001),
- facial deformities (P=.00002),
- sternomastoid torticollis (P<.0001),
- congenital dislocation of the hip (CDH) (P<.0001)
- talipes (P=.0025)(6,7,8).

Some of these associations – particularly plagiocephaly and scoliosis – have been reported previously by other workers(9) – but I believe this was the first comprehensive study of a whole population at birth. In addition, as Lloyd-Roberts and Pilcher(10) have also observed, there were in some cases a direct correlation between the side of the curve and the side of the body having deformities such as plagiocephaly, torticollis, and CDH. I think the explanation for this associated laterality is that the fetus may be flexed to one side, as for instance round the promontory of the mother’s sacrum (Fig 2); in respect to CDH, the leg on the side of the convexity of the scoliosis is then likely to be strongly adducted and therefore particularly prone to dislocation.

If the sacral promontory may be responsible for congenital postural scoliosis, then this hazard might be expected to be greater in the presence of a lumbo-sacral spondelolithesis.

I only remember encountering one pregnant woman with this condition. Her baby had a left-sided scoliosis, a left-sided torticollis...
and a left-sided C.D.H. A follow-up X-ray at three years showed progression of the scoliosis while the torticollis and left CDH had resolved. (Fig 6).

The evidence from my study confirms that ‘idiopathic infantile scoliosis’ should be more correctly named congenital postural scoliosis. Firstly, it is present at birth, provided it is properly examined for. Secondly, it occurs in association with other postural deformities, which may sometimes be related to one side of the infant. Thirdly it is found to occur in infants subjected to recognised potentially-deforming prenatal environmental factors such as oligohydramnios and breech presentation. I should add that no less than half the infants I have studied with congenital postural scoliosis have presented by the breech, instead of the expected 4%; and fourth, there is a high spontaneous resolution rate during the first 3 years of life – perhaps as high as 80% - 90% - which surely suggests the removal of adverse environmental factors following delivery.

I hope you will bear with me if I restate the hypothesis on which I based my MD thesis some years ago(6).

It was suggested that quite gentle forces, if persistently applied, might lead to deformation. That such deformation occurred much more readily in the presence of growth. That the fetus is particularly vulnerable to deformation because of its rapid rate of growth and relative plasticity. That prenatal deforming forces may be intrinsic or extrinsic in origin. That most fetuses are exposed to extrinsic forces in the later weeks of pregnancy because of their increasing size and the diminishing volume of amniotic fluid. That at least 2% of infants exhibit postural deformities at birth such as talipes, C.D.H., scoliosis or sternomastoid torticollis. And that the great majority of these deformities either resolve spontaneously or respond to early postural correction after birth.

Timeprecludesmeformdiscussingmalposture after birth which is undoubtedly important in determining both the rate of resolution or of non-resolution of this congenital deformity and also of the occurrence of postnatal acquired postural scoliosis. There is also the fascinating subject of the laterality of the scoliosis – tending to the left in infancy and to the right in adolescence (Figs 7 and 8).

Before finishing, may I make a plea for both the early detection of congenital postural scoliosis at birth and then its early treatment using the management (Fig 9) suggested by Sir Denis Browne(5). May I end by quoting Hippocrates who wrote some 2,500 years ago: “As the twig is bent, so will the tree grow ....”

Indeed this concept was demonstrated in the frontpiece of Andren’s Orthopaedia published in 1741 (Fig 10).

REFERENCES