



NEWS, VIEWS & COMMENTS

Rare Conjoined Twins / Twin Research Reviews / Twins in the News

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Conjoined twins are rare, but craniopagus conjoined twins are rarer still. A pair of four-year-old craniopagus female twins with an unusual brain structure may offer new clues as to how the brain functions. This overview is followed by reviews of recent twin research on mothers of twins, twin transfusion syndrome, twin delivery options and twin literary themes. Relevant topics appearing in the media include twin tennis champions, twins' parallel lives and deaths, a new book for families with twins and a performance about a twin musical legend.

Rare Conjoined Twins

The May 29, 2011 issue of the *New York Times Magazine* published a fascinating article concerning 4-year-old conjoined twins, Krista and Tatiana Simms. These craniopagus twins (joined at the cranium vault, but otherwise separate) were born to Felicia Simms, a 20-year-old mother of two living in Canada. Simms was informed early in her pregnancy that the twins were conjoined, but she chose to continue. She delivered the twins successfully and went on to have another child several years after the twins were born.

Conjoined twins are rare, occurring in approximately 1 in 200 monozygotic twin births (Segal, 2000). Craniopagus twins are rarer still, estimated to occur in 0.6 to 2.5 million live births (Pietrini et al., 2005). What makes the Simms twins especially intriguing to scientists is their unusual brain structure: 'Their brain images reveal what looks like an attenuated line stretching between the two organs, a piece of anatomy their neurosurgeon Douglas Cochrane of British Columbia Children's Hospital has called a thalamic bridge, because he believes it links the thalamus of one girl to the thalamus of her sister. The thalamus is a kind of switchboard, a two-lobed organ that filters most sensory input and has long thought to be essential in the neural loops that create consciousness. Because the thalamus functions as a relay station, the girls' doctors believe it is entirely possible that the sensory input that one girl

receives could somehow cross that bridge into the brain of the other. One girl drinks, the other girl feels it' (p. 30).

These findings and speculations have understandably excited the interests of many scientists studying brain functions. The twins are too young right now to withstand exhaustive experimentation, but studying them when they are older could possibly reveal a great deal about how the brain works.

The twins also offer opportunities to study cooperation and negotiation in its earliest developmental stages. As one observer noted, the twins may rely on subtle movements to intuit what the other is doing or thinking. Even while they cannot completely see their sister because of the positioning of their heads, they can feel her movements.

Editor's Note: Nancy L. Segal, the writer of the News, Views and Comments column has just published her third book, *Someone Else's Twins: The True Story of Babies Switched at Birth* (Segal, 2011). A review will appear in a forthcoming issue of *Twin Research and Human Genetics*.

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The Simms twins appear to be happy at present and are well cared for by a large supportive family. However, it is likely that these 4-year-olds do not fully understand their physical situation that sets them apart from other children their age. It is important that scientific enthusiasm not get in the way of the twins' happiness and

welfare. Other conjoined twins have survived successfully to adolescence (Brittany and Abigail Hensel) and adulthood (Lori and Reba Shapell) and are leading productive lives. Listening to their stories may offer important guidelines for balancing the personal and scientific sides of this unusual case.

Twin Research Reviews

Survival and Reproduction of Mothers of Twins

Several competing hypotheses have been put forth as to why some human mothers give birth to twins. Researchers at the University of Utah tested two: (1) the maternal depletion hypothesis and (2) the hypothesis that mothers of twins have a greater capacity to bear the cost of a multiple pregnancy (Robson & Smith, 2011). The first hypothesis states that bearing twins exacts physiological costs from mothers and that these costs outweigh any benefits from bearing an increased number of offspring; this has also been called the insurance ovulation hypothesis. The second hypothesis states that mothers able to deliver twins gain fitness advantages by doing so and that being able to bear twins may be a signal of better phenotypic quality.

Robson & Smith examined natural fertility data included in the Utah Population Database. Specifically, they compared the reproductive and survival events of 4,003 mothers of twins with those of 54,183 mothers of non-twins. Mothers were born between 1807 and 1899 and lived until at least the age of 50. Their analyses confirmed the second hypothesis — the mothers of twins showed lower postmenopausal mortality, lower intervals between births, older ages at last birth and higher overall fertility than the mothers of non-twins.

Comparing these same measures between mothers of MZ twins, DZ twins and non-twins would be the next step in this research program. It is unlikely that the zygosity of the twins was known with certainty for the women that were studied. The DZ twin mothers would be expected to show greater benefits, relative to the other two groups who might not differ at all. That is because DZ twinning increases with age, has a genetic component and is twice as frequent as MZ twinning using natural twinning rates. DZ twinning also offers the advantage of producing two new (albeit, untested) genotypes, whereas MZ twinning produces identical copies of the same untested genome.

Diagnosing Twin-to-Twin Transfusion

Sonography is a critical tool in the detection and management of twin-to-twin transfusion syndrome (TTTS). TTTS is a complication that affects monochorionic twin

pregnancies, i.e. MZ twinning that occurs relatively late in the 2-week period following conception, leading to a shared amnion (inner fetal membrane) and a shared chorion (outer fetal membrane). This prenatal situation can eventuate in high levels of perinatal morbidity and mortality. Complications include hypovolemia (decrease in the volume of circulating blood) and oligohydramnios (insufficiency of amniotic fluid in the amniotic sac) in the donor twin and hypervolemia in the volume of circulating blood) and polyhydramnios (excess of amniotic fluid in the amniotic sac) in the recipient twin.

Ruben A. Quintero and his associates developed guidelines covering five different stages of ultrasound assessment. Each of the five stages have associated Quintero criteria and Sonographic parameters. Specifically, once TTTS is diagnosed, Quintero staging becomes useful for the prognosis and management of TTTS. An informative chart outlining the various criteria is included in the article.

Delivery Options

A recent review of 18 studies concerned with neonatal outcomes of twin deliveries yielded several important findings (Rossi, Mullin, & Chmait, 2011). The analysis confirmed that second-born twins face greater neonatal morbidity during delivery than first-born twins. In the case of first- and second-born twins, neonatal morbidity did not differ as a function of presentation (vertex or breech). However, when both twins are in the vertex position, the safest delivery option is vaginal.

In the case of second-borns, the highest morbidity rate occurs among twins delivered by caesarean section following vaginal delivery of the firstborn. If the C-section was done as an emergency procedure than the risk to the second born twin increases by 50%. When firstborn twins are vertex and secondborns are breech then it is best to allow for a trial of labor in the absence of risk factors that might increase the risk of a caesarean delivery for the second twin.

Literary Themes

The frequency with which twins and twin-related themes have appeared in works of fiction has been noticed by

AbeBooks.com, an online seller of discounted books (AbeBooks.com, 2011). A systematic survey of how often twins appear in novels, plays and other literary works has not been conducted, but an impressive array of 21 books was presented. It was noted that writers generally portray twins as behaving badly, being misunderstood or being treated poorly by others, the Bobbsey twins notwithstanding. To the extent that this may be true, the public will gain a misleading view of the ways twins behave and are treated.

I have observed that twins are a common literary device, allowing writers to explore an array of dualities; for example, good and evil, healthy and sick, rich and

poor. This fairly exclusive use of twins in fiction enhances fascination with twins, but often for the wrong reasons. Identical twins' fascination really comes from the matched behaviors they so often show, even when reared apart from one another. With this in mind, researchers with a creative writing bent are encouraged to publish fictional works that will depict twins with accuracy and sensitivity.

The lives of real twins, especially twins reared apart, are more extraordinary and often less believable than fictionalized accounts. It seems unnecessary to create stories when compelling stories already exist.

Twins in the News

Wimbledon Doubles

Identical twins Mike and Bob Bryan captured their second Wimbledon men's tennis doubles championship on July 2, 2011 (Pucin, 2011). It was the Bryans' 11th major tennis title, tying them with the well-known doubles team of Todd Woodbridge and Mark Woodforde. The twins defeated a team composed of Robert Lindstedt (Sweden) and Horatio Recau (Romania). Their identical appearance and the fact that one twin is left-handed may be advantageous in a fast-moving game because distinguishing between them is difficult.

The twins appeared on ABC's *Prime Time Nightline* on July 6, 2011. Growing up, their parents did not allow them to face each other in singles matches in order to avoid within-pair competition. The twins apparently continued this tradition by playing as a team.

Identical Lifelines

Identical twins and religious figures Julian and Irving Reister (born Jerome and Irving) were born in Buffalo, New York on March 27, 1919. The twins died on the same day in the spring 2011 from heart failure (Thompon, 2011).

The lives of the Reister twins progressed in striking parallels. After attending St. Joseph's Collegiate Institute they tried to enlist in the military, but could not because of poor eyesight. One twin had a bad right eye, the other twin had a bad left eye. They eventually joined the friars of Holy Name Province in New York City. This career move was followed by separate assignments until both twins joined St. Bonaventure in 1951 where they remained for five years. They worked in various parishes in the years that followed before returning to St. Bonaventure in 1973. In their twin relationship, Julian was talkative and decisive, while Adrian was relatively quiet and deferential. The same telephone rang in their separate rooms, but Adrian usually answered. These social-interactional differences are typical of identi-

cal twins who spend considerable amounts of time together, no doubt solidifying their close relationship.

Argentinian Twins

Several years ago I had the pleasure of a visit from parents of twins, Laura Pergola and her husband. Pergola is the director of *Multifamilias*, a foundation she founded in 2000, dedicated to the rearing and educating of multiple birth children. She recently authored a book, *Multifamilias*, which will assist families in Spanish speaking countries. Additional information about the book is available at www.tematika.comlibro/autoyuda—5/maternidad—2/familia—1/multifamilias—529420.htm.

Musical Legend

In May 2011 I attended a performance of *Elvis* by Cirque du Soleil in Las Vegas. It is well known that musical legend Elvis Aaron Presley's twin brother, Jesse Garon, delivered 35 minutes before him was stillborn. Twins and twin researchers would be moved by the stunning rendition of a song, 'One Night With You,' intended to capture the heartache experienced by Presley's mother at the loss of one of her sons (Szydelko, 2011). The performance showed two teenage boys dressed in identical red and white striped T-shirts and blue jeans, performing amazing acrobatic stunts on a huge wire maze. The two would come together for a time, then move apart. Biographers have noted the significant impact that the loss of Presley's twin had on his life (Guralnick, 1994), consistent with what research has shown.

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