Success Story

Update: Twins Released from Hospital November 2001

Neurosurgeons Perform Highly Complex Separation of Conjoined Twins Using SGI® Technology

Separating conjoined twins is one of the most demanding and complex medical procedures. A team of doctors in Singapore separated twins joined at the head and brain thanks to rehearsals using the Dextroscope™, a neurosurgical planning system developed by Singapore-based Volume Interactions and powered by high-performance SGI® Onyx® family systems.The Dextroscope transforms two-dimensional images of patients' bodies into three-dimensional graphics, allowing neurosurgeons to plan the best way to perform complex surgeries. The combination of the Dextroscope and SGI technology has been used successfully in more than 40 operations at the Singapore National Neuroscience Institute.

Operation Lasts 97 Hours

The 97-hour operation to separate the Nepalese twins began on Friday afternoon, April 6, 2001, and was completed the following Tuesday morning. Jamuna and Ganga Shrestha were joined at the top of their heads and shared the same brain cavity. The separation surgery was complicated by the fact that their brains, partially fused, shared many overlapping blood vessels. Two teams of surgeons worked around the clock to successfully complete the operation.

Planning for the operation was conducted collaboratively on two different continents with two key surgeons simultaneously observing the same data—in this case, virtual versions of the babies heads. With the help of the Dextroscope, Dr. Keith Goh, co-leader of the surgery team in Singapore, was able to discuss complex questions with Dr. Benjamin Carson, a surgeon based at Johns Hopkins University in Baltimore, Maryland.

The neurosurgeons utilized the Dextroscope to explore a virtual world of surgical scenarios well in advance of the actual operations. They manipulated the 3D visualization system with stereoscopic goggles, a toggle bar, and a stylus. The twins' biological features were viewed from different angles and "sliced" into with a virtual scalpel that behaves exactly like a real one.

Harnessing Technology

"SGI is proud to be powering the Dextroscope," said Lawrence Lee, general manager, SGI Singapore. "The application helps neurosurgeons to make better decisions on surgical procedures, resulting in greater successes. This is in line with our corporate objective to harness 3D graphical technology for the benefit of humankind."

Dr. Luis Serra, president and chief technical officer of Volume Interactions, was equally impressed with the systems' performance. "Since the application involved huge volumes of data, we needed sophisticated hardware to render the interactive 3D graphics. The SGI Onyx family of systems was the best platform available. With SGI hardware advances providing more texture memory, we should be able to deliver better, more accurate, and complete data in our solutions."

Bracco S.p.A., a chemical-pharmaceutical and biomedical group, and a world leader in the diagnostic imaging sector, recognized Volume Interactions' strength in visualization and 3D interaction and recently acquired a majority stake in the company.

Going Home

On November 16, 2001, the twins were released from Singapore General Hospital and flown back to Kathmandu, Nepal. Dozens of well-wishers, doctors, and nurses said goodbye to the twins at Singapore's Changi Airport. Having been captivated by the twins' plight, the people of Singapore had donated hundreds of thousands of dollars to pay their medical expenses. Doctors performed the surgery for free, and Singapore Airlines paid for travel expenses.

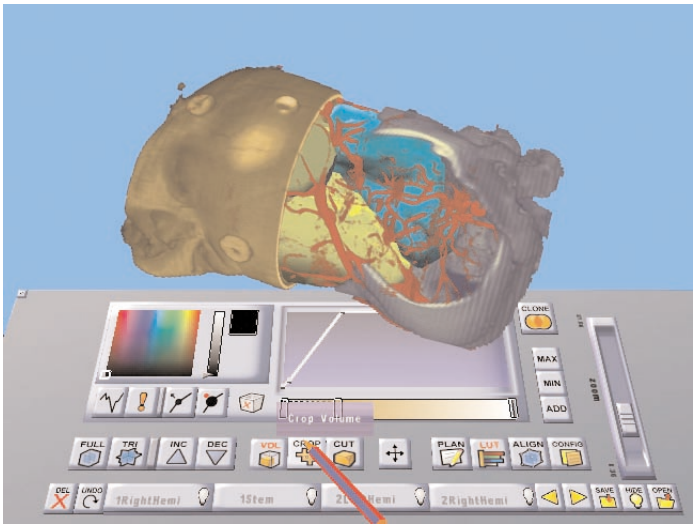
The girls are staying in Kathmandu in order to be close to a major hospital for ongoing treatments. Their parents and grandparents will also stay in the capital city rather than return to their home village of Khalanga, which is a 24-hour bus ride from Kathmandu.

Singapore has been growing as a center for medical and biotechnology research, and the success of the operation has boosted the city-state's reputation as a center for progressive medical treatment.

SGI Contributions

SGI continues to make groundbreaking contributions to the health care and medical fields. Our solutions include the hardware for computer-aided, computer-guided surgeries and simulations such as that performed on the twins, as well as high-performance graphics systems for diagnostic imaging devices, medical image management, and picture archiving/communications solutions.

The Dextroscope technology is one example of the many ways that SGI technologies facilitate virtual and enhanced visual procedures for improved preoperative planning and simulations. As a result, the need for more invasive diagnostic and surgical procedures is reduced. In addition to neurosurgery, the Dextroscope can be used in other industries that would benefit from the visualization of three-dimensional multimodal data sets, enhanced interaction, and the capacity to support planning. These industries include geophysical exploration, drug design, research, microchip defect inspection, and cell biology visualization.



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