

A personal tribute to Dr. F. Brantley Scott and the artificial urinary sphincter

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This article is a series of recollections and reflections by an Australian serving as a Fellow of Dr. F. Brantley Scott at the Baylor College of Medicine in 1977. Dr. Scott is regarded as the father of the artificial urinary sphincter (in addition to the inflatable penile prosthesis implant). It was an honour for me to be a small part of a team aided by many bio-medical engineers based in Minneapolis and supported by a company American Medical Systems, to witness the development of a hydraulic prosthesis with controlled pressure occlusion of the urethra to achieve urinary continence in patients having a history of multiple failed operations. Despite some cynical criticism within his country and internationally, the Brantley Scott artificial sphincter was born. After 50 years, there are now copious patients around the world living successful and happy lives who have benefited from the never-ending enthusiasm, dedication, and determination of Dr. F. Brantley Scott. This article is in his memory.

In 1975, I was a surgical registrar at the Whittington Hospital in London UK after obtaining my fellowship at the Royal Australasian College of Surgeons in 1974. I was a part-time Clinical Assistant at the Institute of Urology in London. It was my attendance at a lecture given by a visiting urologist from Baylor College of Medicine, Houston Texas that established my future as a urologist with a practising emphasis on the implantation of urological prostheses. Dr F. Brantley Scott was the visiting speaker and the subject of the future of prosthetic management of urinary incontinence and erectile dysfunction was simply inspirational. I did

envisage spending time in the USA before returning home to Australia but had no specific plans. Following the lecture, I introduced myself to Dr. Scott and sought some guidance to find a suitable appointment in the USA. He suggested I forward him a formal written application with a curriculum vitae. Two months later, the man who was to become a friend offered me a fellowship for 1977 if I successfully qualified for registration and immigration to the USA. This was achieved during 1976, my second year in London, so early January 1977 saw my arrival in Houston. Without knowing me, Dr. Scott had allowed me to focus on my future. I was determined to assure him he had not made a mistake!

My wife Judith and 5-year-old son Paul accompanied me to Houston. I entered the USA with a J1 visa enabling me to work within Baylor College only. Judith had a J2 visa, allowing entry but no right to any employment. On arriving at the office of Dr. Scott at St Luke's Episcopal Hospital Texas, I met my sponsor and teacher for the second time. After exchanging greetings, Dr. Scott showed me a book he had read on Australia, as he had never had an Australian on staff, and confessed, that he knew little about my country and even less about urological training in Australia and New Zealand. A few months later, by coincidence, he was invited to be a guest speaker at the Annual Scientific Meeting of the Urological Society of Australasia in Melbourne in 1979. Our close professional relationship had commenced!

Three months after I arrived in Houston and during a private conversation in his aircraft, I expressed my



Figure 1 (Left to right) Dr. Ross A. Cartmill, nurse practitioner, and Dr. F. Brantley Scott.

appreciation for the opportunity he had extended to me to join his team as a Fellow. On asking the reason for his favourable decision, he explained that when I first approached him in London, I sounded like a Pom but behaved like an American! I retorted that neither nationality was particularly favoured by any proud Australian. His responsive smile said it all!

Within the confines of the Urology Department at St Luke's, our relationship was professional—the master and the student. Steadily, however, my relationship with Dr. Scott became a friendship, rather than strictly a junior colleague. When my second son was born in August 1977, health insurance was not provided to me based on a technicality. Dr. Scott became Brantley as he provided some financial assistance by my providing the hours of call service for his patients. At the conclusion of my fellowship, Brantley offered me a permanent position in his Baylor team. Despite the obvious temptation to accept the offer, Judith and I decided to return home for family reasons. Despite this decision, our friendship flourished. During his 1979 visit to Australia, Brantley visited my home city of Brisbane before proceeding to Melbourne. The Brisbane visit enabled his support of my efforts to begin urological prosthetic surgery in my home state of Queensland—an act of true friendship.

I made several return trips to the USA, always visiting Houston. During my last trip, Brantley proudly announced he had something to show me in the garage of his home. His after-dinner moment was to show me the single-engine turbocharged plane he had assembled himself. He flew himself to the frequent urological meetings to all destinations in his nation. I was privileged to be the “co-

pilot” (*Figure 1*). His attention to detail when flying was like his surgery—very focused. During my fellowship, he upgraded his plane to a twin-engine. His claim was this plane provided more power but was safer. Our friendship grew “in the air”. I appreciated his attention to detail. His calmness on a night flight when we met an unexpected storm, was the same calmness during any unexpected surgical difficulty. His eventual tragic accidental death while flying was a stunning surprise to me.

The development of the artificial urinary sphincter centred on the management of severe female urinary incontinence following multiple operations which failed to achieve a satisfactory outcome. The quality of life for these patients was depressing. They came from all parts of the USA desperate for help. Dedicated help they were offered. Brantley had previously developed a urodynamic laboratory. This enabled a detailed understanding of the dynamics of the voiding dysfunction. Static forms of the investigation were no longer used at Baylor in 1977.

Surgical principles used to limit the incidence of infection included:

- (I) A team approach—surgeons, scrub nurses and biomedical engineers.
- (II) Operative area shave done immediately pre-operatively in the operating room.
- (III) A shave, followed by a skin scrub performed by a non-operative team member.
- (IV) Use of pre-operative and intra-operative antibiotics.
- (V) Attention to detail in surgical scrub and attire.

The sphincter design in 1977 was that of a reservoir, urethral cuff, the deflate pump in the right labia, and the inflate pump in the left labia. Each pump had two one-way valves and the cuff pressure was controlled by the cuff inflate valve. If this valve should fail, the cuff pressure would no longer be controlled, and urethral erosion under the cuff would frequently occur. The leak of the saline in the prosthesis was a further problem. Tubing tie connectors or seam leaks in the reservoir were a frustration. The bio-medical engineers were given clear directions on the problems. It was their job to find a solution!

Cuff pressure regulation needed a new concept. The valve control was too unreliable. The pressure regulator balloon was introduced into the cuff inflating section of the tubing (*Figure 2A*). This method of controlling cuff pressure still exists in the artificial sphincter of today. Using a resistor to control cuff inflation enabled the simplification of a one-pump device. The pressure-regulating balloon allowed the omission of a reservoir and hence the basis of the current

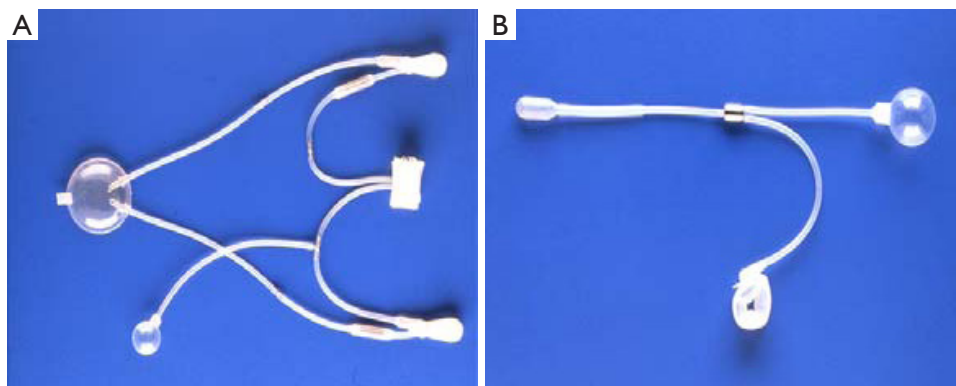


Figure 2 The artificial urinary sphincter prototypes (permission obtained and approved by Boston Scientific). (A) The AS 761 device (this device was designed in 1976–1977 and consisted of 4 separate components namely a reservoir, urethral cuff, the deflate pump and inflate pump); (B) AS 792 device (with the introduction of a pressure-regulating balloon and simplification of the artificial urinary sphincter design).

prosthesis (Figure 2B).

The difficulty of inserting the cuff in the correct position of the bladder neck was an acknowledged problem. A trial of inserting the cuff using a vaginal approach was quickly abandoned because of the resultant infection. After my fellowship year, Brantley showed his drive for improvement with the design of what he called, the “cutter clamp”. This instrument allowed the creation of a space for the cuff in the posterior bladder neck often in fibrous tissue, without the need for visual dissection. The major difficulty in sphincter surgery had been dramatically lessened.

After 50 years, I still appreciate the opportunity provided to me when my friend Brantley Scott offered me a Fellowship at Baylor College. Brantley made an outstanding contribution to global urological research and prosthetic surgery. He was an original thinker, proven by the modification of the sphincter design and the development of the penile prosthesis. His early death was a tragic loss to global urological progress.

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