

## Seymour Furman MD (1931–2006)

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**Dr. Seymour Furman**

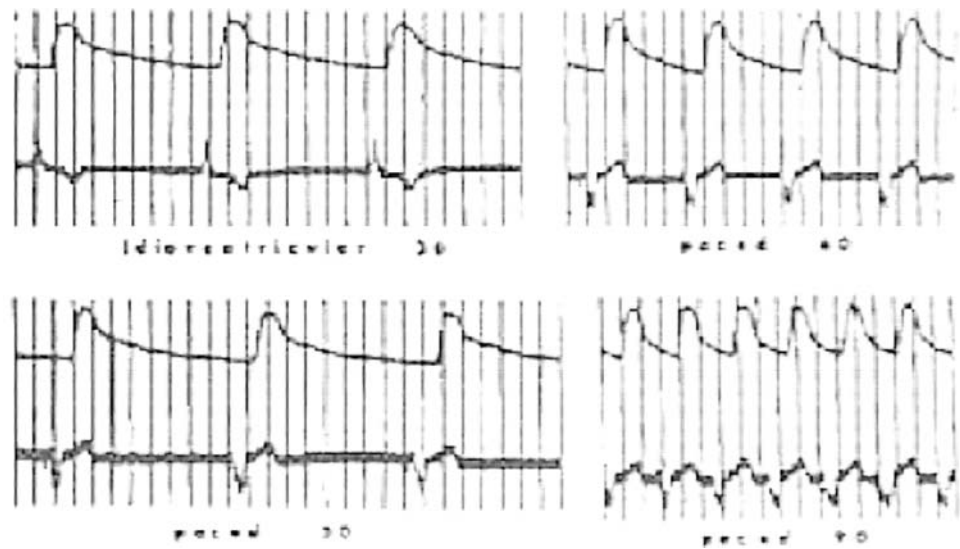
Seymour (Sy) Furman was born on July 12, 1931, in the Bronx; New York, and died February 20, 2006 in the Bronx. Furman was an internationally recognized expert on pacemakers and associated technologies. He grew up in Brooklyn, the son of garment workers from Poland and Lithuania. Furman attended Stuyvesant High School and New York University, and then State University of New York (SUNY) Downstate College of Medicine. Furman was an intern and a resident in general surgery at Montefiore Hospital in the Bronx between 1955 and 1960 and served as a surgeon in the United States Navy Medical Corps 1960–1962 at the Naval Hospital at Camp Lejeune, North Carolina. During 1962–1963 he was a thoracic surgical resident at the Baylor University affiliated hospitals in Houston, Texas. He then returned to Montefiore Hospital as a staff cardiac surgeon and thereafter spent his entire academic career at Montefiore and

at Albert Einstein College of Medicine, where he eventually became Professor of Medicine and Surgery, a rare combination of academic appointments in the United States reflecting exceptional talents.

Furman was the first to show the feasibility of non-surgical treatment of heart disease from inside the heart. He was well prepared for this groundbreaking achievement because he had formally learned to perform cardiac catheterization and had successfully paced the right ventricle (via the external jugular vein) of experimental animals in the surgical research facility. On July 16, 1958 at Montefiore Hospital in New York City, Dr. Furman paced the right ventricle with a transvenous electrode catheter in a patient with complete atrioventricular block [1]. The electrode was introduced, with fluoroscopy, via the median basilic vein into the right ventricle, in a patient who required colon resection because of a malignancy. The pacemaker was powered by ordinary line alternating current and the electrode system consisted of a lead of solid copper wire with a bare terminal tip and a skin wire to complete the circuit. Figure 1 demonstrates the simultaneous femoral artery tracing of the initial idioventricular rhythm and the more rapid dissociated atrial rate. In the lower strip the effectiveness of stimulation and the ability to control the cardiac rate and rhythm are clearly seen. Pacing was continued for two hours, during the operative procedure, and ended with slowing of the stimulation rate until an unpaced idioventricular rhythm developed (Fig. 1). The catheter was removed without complication and the patient resumed the idioventricular bradycardia. The second patient was paced successfully from the right ventricle for three months (via the basilic vein despite lead instability), and became ambulatory by pushing the large pacemaker on a rolling cart, and the use of long electric cords. The patient was able to proceed from corridor to corridor in the hospital thanks to the skilful switching of the electric plugs by Furman at the end of

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**Fig. 1** Idioventricular rhythm and varied imposed rates with accompanying femoral artery tracings. Reproduced from [1] with permission



**Fig. 2** Seymour Furman with his second patient



each corridor (Fig. 2). The experience in three patients with transvenous pacing defined the first step in the development of clinical cardiac electrophysiology as we know it today. Marvelous recollections of this early experience are available on the Internet in recorded interviews of Dr. Furman in 2001 [2].

Dr. Furman remained a world leader in electrical stimulation of the heart for almost 50 years. He was a friend, mentor and guru to many people. He trained many physicians who went on to establish their own centers of excellence all over the world. His contributions are so numerous that many are now taken for granted and their origin often forgotten. They include the development of portable pacemakers, establishment of factors controlling electrode

efficiency by utilizing the strength-duration curve, increasing battery longevity by reducing current drain, and the importance of recording endocardial electrograms. Furman found that the original pacemaker batteries (mercury-zinc) actually destroyed the pacemaker circuitry creating the impetus for seeking alternative power sources. He developed the concept of organized device follow-up in a pacemaker clinic and transtelephonic monitoring and established other standards of cardiac pacing.

In 1970 Furman and Doris Escher coauthored the first American textbook on cardiac pacing, “Principles and Techniques of Cardiac Pacing” and in 1989 he was the principal author of “A Practice of Cardiac Pacing” a book that dominated the field for many years with three

successive editions. Over his prolific career, Dr. Furman published over 400 manuscripts and book chapters, 100 editorials in *Pacing and Cardiac Electrophysiology* (PACE), 800 abstracts, and as a master teacher he made outside his institution, over 1,000 oral presentations all over the world.

Dr. Furman co-founded the North American Society of Pacing and Electrophysiology (NASPE) now called the Heart Rhythm Society (HRS) and became its second president. He remained an active member of the Society, especially lately as the creator and leader of the oral history project, *Rhythms in Time* providing at the annual HRS meetings, an impressive exhibition of history pertaining to device therapy and electrophysiology. He founded the journal PACE in 1977 and remained its editor for over 25 years. He also piloted an examination process (NASPEeXAM) to establish intellectual standards in cardiac pacing and defibrillation.

Furman was a legend of his time with many friends and admirers. He was the recipient of many awards from prestigious learned societies. In 2001 he received an honorary doctor of science degree from SUNY Downstate College of Medicine.

Furman is survived by three sons, Bruce, Neil, and Gary; his wife of 45 years, Evelyn Katz, died in 2002. Everybody in the community of implantable devices, and electrophysiology will miss Sy for his wisdom and above all, his personal touch, friendship, warmth, and humanity.

## References

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2. [http://www.hrsonline.org/ep-history/notable\\_figures/bios/seymour\\_furman/](http://www.hrsonline.org/ep-history/notable_figures/bios/seymour_furman/)