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### History of Trans Myocardial Revascularization, 1993

Advocate Aurora Health

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## HISTORY OF TRANS MYOCARDIAL REVASCULARIZATION

- 1969 Heart surgeon Mahmood Mirhoseini, M.D., and his assistant Mary Cayton, R.N., visited American Optical Company in Boston to view an industrial laser with the idea that it might be suitable for use in creating blood flow channels in the heart. An experimental procedure was performed there to test their concept.
- 1970 American Optical loaned the laser to Dr. Mihoseini for laboratory study in Wausau, Wis. The laser, approximately the size of a large bed, was transported by train.
- 1970-75 To determine the safety and effectiveness of his laser treatment, Mirhoseini conducted several years of experimental work on animals. The studies showed the laser channels remained open, the surrounding tissues experienced little damage, and the outer wall of the heart or myocardium was protected from ischemia. All of these studies were performed on the beating heart, and the research was funded by the United Fund of Marathon County.
- 1978 Mirhoseini began working to devise a laser procedure for use on an arrested heart in conjunction with bypass surgery until such time that a high-powered laser could be developed for use on the beating heart. The laser would need to work fast enough to penetrate the heart between its rhythmic pumping.
- 1983 Mirhoseini submitted a research proposal to St. Luke's Medical Center in Milwaukee to conduct the laser procedure using an existing low powered carbon dioxide laser in conjunction with bypass surgery.

- 1985 Mirhoseini performed his first Trans Myocardial Revascularization case in conjunction with bypass surgery at St. Luke's.
- 1985-87 Initial studies continued on 20 patients, and these patients continue to be closely followed. Of these 20 patients with severe heart disease, 18 continue to do well today and two died of unrelated cancers. Autopsy results revealed the laser channels had remained open and formed vessel-like walls. These early studies were supported by St. Luke's Medical Center Foundation, the Department of Anesthesiology and Cardiac Surgery at the Medical College of Wisconsin and the Clement Zablocki Veterans Administration Hospital.
- 1989 A prototype high-powered carbon dioxide laser was constructed by Laser Engineering Inc. of Milford, Mass. Mirhoseini experimented with this laser to assure its safety and effectiveness.
- 1990 Seton Medical Center in San Francisco purchased a laser from Laser Engineering Inc. and conducted Phase I clinical trials on the beating hearts of 15 patients with end stage heart disease to determine the safety of the laser.
- 1992 The FDA approved the laser for Phase II clinical studies to evaluate the effectiveness of the laser procedure on 50 patients. St. Luke's Medical Center, Seton, Texas Heart Institute and Brigham & Women's Hospital in Boston were approved as study sites.