

## Design and Development of an Expanded Polytetrafluoroethylene Valved Conduit with Sinus of Valsalva

**Authors :** Munirah Ismail, Joon Hock Yeo

**Abstract :** Babies born with Tetralogy of Fallot, a congenital heart defect, are required to undergo reconstruction surgery to create a valved conduit. As the child matures, the partially reconstructed pulmonary conduit increases in diameter, while the size of the reconstructed valve remains the same. As a result, follow up surgery is required to replace the undersized valve. Thus, in this project, we evaluated the in-vitro performance of a bi-leaflet valve design in terms of percentage regurgitation with increasing artery (conduit) diameters. Results revealed percentage regurgitations ranging from 13% to 34% for conduits tested. It was observed that percentage of regurgitation increased exponentially with increasing diameters. While the amount of regurgitation may seem severe, it is deemed acceptable, and this valve could potentially reduce the frequency of re-operation in the lifetime of pediatric patients.

**Keywords :** pulmonary heart valve, tetralogy of fallot, expanded polytetrafluoroethylene valve, pediatric heart valve replacement

**Conference Title :** ICBE 2018 : International Conference on Biomedical Engineering

**Conference Location :** Kyoto, Japan

**Conference Dates :** November 15-16, 2018