KMUTT SMART LAB invents ‘One-Way Valve Device Made From Shape Memory Alloy Utilizing For Emphysema Treatment’.

Chronic obstructive pulmonary disease (COPD) is the fourth leading cause of deaths in world population and is likely to rise to the third in 2020. This disease is often found among cigarette smokers and those with age of more than 40 years old. Until now, there is no cure for COPD, only some methods to relieve symptoms e.g. quick-relief drugs to help open the airways or lung volume reduction surgery. Still, the excessive use of quick-relief drugs may result in tremor. Meanwhile lung volume reduction surgery can help patients breathe better but it also causes large wounds and risks of other complications.

Smart Lab Research Team, King Mongkut’s University of Technology Thonburi (KMUTT), consists of Mr. Supakit Amornthitipong, Mr. Takon Kitrattanacharoen, Mr. Chawin Kayanon and Miss Papassana Wongpat, and their advisor Assoc. Prof. Dr. Anak Khantachawana. The team has invented a special medical innovation called “One-Way Valve Device Made From Shape Memory Alloy Utilizing For Emphysema Treatment.” This innovation is a specially designed medical product made from nickel- titanium shape memory alloy for the treatment of emphysema as a result of the collaboration with Faculty of Medicine, Chulalongkorn University.

The team leader Mr. Supakit Amornthitipong reveals that this device is made from shape memory alloy which is flexible and able to return to its pre-deformed shape. Using this method can help reduce air volume in the lungs without any surgery, causing the least pains for patients. This device is brought, through a catheter with the size of a drinking water tube, through the throat. The insertion will continue until it reaches the area of airflow obstruction, and the device will be left there. It does not bring in the air; instead, it takes out the remaining air inside the lungs. The team has worked with practicing physicians, and conducted lab experiments as well as tested the device with cadavers, resulting in a standard and practical product.

Assoc. Prof. Dr. Anak Khantachawana, associate professor of the Department of Mechanical Engineering, King’s Mongkut’s University of Technology Thonburi, Head of KMUTT Smart Lab, states that the use of this small device consisting of a nickel-titanium frame enfolded with silicone and a one-way valve—as an Endobronchial Valve (EBV)— is a new treatment option with no needs to rely on imported devices. This can help reduce expensive costs of importing medical equipment from abroad. More importantly, this EBV device does not cause wounds and pains during the treatment as it can be directly inserted through the catheter through the throat. Therefore, if Thailand can produce the EBV, it will help many more Thai people to access the treatment and can be patented as a national innovation for further commercial production. In addition, it helps generate basic knowledge in the design and manufacture of emphysema treatment equipment for future development.