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SUPATTRA CHANGJAI : A STUDY ON DESIGN AND CONSTRUCTION OF THE THERAPEUTIC INTERMITTENT PNEUMATIC COMPRESSION DEVICES. THESIS ADVISORS :SUMETHEE THANUGKUL,M.Sc., CHUSAK VEJBAESYA, Ph.D., SOMSRI DAOCHAI, M.Sc., SIRIPORN THITILERTDECHA, B.Sc.,M.Sc., CHANTANA AKARATHAM, M.Sc. 62P. ISBN 974-664-855-1

The therapeutic intermittent pneumatic compression device has been recognized in physical medicine and rehabilitation. It is widely utilized in prophylaxis treatment. In Thailand, application of this device is not widespread because it must be imported and the device itself is very expensive.

The objective of this research is to design and construct the therapeutic intermittent pneumatic compression device. Locally available material and components were mainly used to build the device. This designed device has a single compression unit and 4 channels employed simultaneously. The prototype device was made, consisting of pneumatic system and electrical system. The pneumatic system inflates air pressure (0-80mmHg) into 4 channels within 2 periods, compress time (5,10,15 seconds) and decompress time (30,40,50,60sec). The electrical system is controlled mainly by a microprocessor.

Test results indicate that the proposed therapeutic intermittent pneumatic compression device could be produced domestically. Experimental results indicate that this proposed device is accurate and reliable. Pressure error from device varies from –1%-+1%. In addition, compress time and decompress time are also accurate. The device was shown to function satisfactorily. Leakage current was also tested to assure safe operation. In 9 patients with arm edema postoperative mastectomy, circumference can be reduced to 3-8.5 cm (or 8.1%-23.2%) for arm, and 2-7 cm (or 7.4%-24.4%) for forearm. The result of therapy is quite satisfactory.