

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND DEVELOPMENT OF
RADIAL ARM BOARD**

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MSc

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Angiography procedure is a test to observe the arteries in the limb using an x-ray and a special dye. During the procedure, the patient's arm needs to hold still to avoid incidents, a device called the radial arm board is used to assist holding the arm of the patients. Therefore, a device is needed to assist in holding the arms of the patients. In an association with Hospital UiTM Sg. Buloh, the facility has their own self-made radial arm board. However, the board which consists of a big plane board is not ergonomic to be used by patients for a long period. Furthermore, this space also is consumed during operational and storage although some device has been designed for armrest during angiography procedure. Some tend to be unnecessarily complicated while others tend to be expensive to produce. Ready-made radial arm board is available in the global market, but the cost and features are not correlated, and the oversea manufacturers can lead to maintenance problems. Therefore, the research is aimed to determine the parameters of the existing arm board and create a new improvised arm board design. The new design concepts are generated using CATIA V5R20. The design is supported by an ergonomic standard guide and analysis using Kinovea software. The detailed design had undergone a structural analysis and Kinovea software was used to do a research on the ergonomic analysis of the proposed design. The structural integrity of the design is performed using CATIA V5R20. From the analysis, the proposed design was able to withstand Malaysian patient average weight with an additional headroom. For the ergonomic analysis, the board is positioned to provide the comfort for the patient is proven to be in a safe zone and be able to accommodate the patient during the angiography procedure. The new radial arm board was fabricated using a 3D printer at the Faculty of Mechanical Engineering at UiTM Shah Alam. The device was tested for validation by patients and Doctors at Hospital UiTM Sg. Buloh and their feedback were analyzed. The arm board design in this research is relatively inexpensive to produced, lightweight and requires minimum assembly which makes it convenient for operation and storage. This research could lead to an efficient device, an ergonomic device with ergonomic advantages as compared to conventional devices.

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