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## **KNEE JOINT PROSTHESIS: MECHANICAL PROPERTIES EVALUATION OF A TITANIUM BASED BIOMEDICAL ALLOY**

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Although the technology behind biomedical implantations has grown vastly in the past few years many complications still exist. One of the most difficult of these complications to overcome is the difference in the mechanical properties of human bone and of current prosthetic implants. The research completed in this study investigated the change in mechanical properties, induced via heat treatment, of Ti-6Al-2Sn-4Zr-2Mo (Ti-6-2-4-2); a titanium based alloy containing: 6% aluminum, 2% tin, 4% zirconium, and 2% molybdenum. Ti-6-2-4-2 is a near alpha titanium alloy containing both alpha and beta phase stabilizers. These phase stabilizers allow for the formation of the material in two different crystal structures. The ratio of the crystal structures present in the final material induces a variety of changes in the mechanical properties of the material. A various range of heat treatments was carried out as to effect the amount of alpha and beta phase present in the material, and the tensile strength and microstructure of the material was then examined. From these two pieces of data many mechanical properties can be investigated and explained. Experimental research such this provides important preliminary information about the tested alloy's usefulness in the field of biomedical implantations.