

ABSTRACT

One of the factors of body balance is biomechanics which is affected by human morphology and human posture itself. Somatotype is a method for grouping morphology of the human body, while the balance of human posture can be measured using Center of Pressure (COP), which is the center point of pressure generated when human stands. In this final project, a system is designed to measure person's height and weight, determine somatotype, and measure body balance. Determination for somatotyping is uses Heath-Carter equation where the input variables measured automatically and manually, including ultrasonic sensor to measure height, load cell sensors to measure body weight and COP, skin caliper to measure skin folds of triceps, subscapular, supraspinal, and medial calf, and measuring tape to measure circumference of the triceps and calf, breadth of humerus and femur. COP that has been obtained then calculates its mean, range, and ApEn so the center point, displacement distance on each axis, and its instability can be known. The results of the measurements then grouped and combined to display the type of somatotype associated with COP so that the relationship between the type of somatotype and subject standing posture can be obtained. In this final project, 14 male subjects were tested within age of 15-22 years. The results obtained average error range (0.37-2.58) % for ultrasonic sensors, (0.64-4.67) % for load cell sensors, (0.1-0.6) % for ApEn ML-COP, and 0% for ApEn AP-COP. The mean difference range for ML-COP is (0.027-0.842) cm and (0.142-0.580) cm for AP-COP.

Keywords: somatotype, body balance, COP