

## Kinematic Analysis of Human Gait for Typical Postures of Walking, Running and Cart Pulling

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**Abstract :** Purpose: The purpose of gait analysis is to determine the biomechanics of the joint, phases of gait cycle, graphical and analytical analysis of degree of rotation, analysis of the electrical activity of muscles and force exerted on the hip joint at different locomotion during walking, running and cart pulling. Methods and Materials: Visual gait analysis and electromyography method has been used to detect the degree of rotation of joints and electrical activity of muscles. In cinematography method an object is observed from different sides and takes its video. Cart pulling length has been divided into frames with respect to time by using video splitter software. Phases of gait cycle, degree of rotation of joints, EMG profile and force analysis during walking and running has been taken from different papers. Gait cycle and degree of rotation of joints during cart pulling has been prepared by using video camera, stop watch, video splitter software and Microsoft Excel. Results and Discussion: During the cart pulling the force exerted on hip is the resultant of various forces. The force on hip is the vector sum of the force  $F_g = mg$ , due the body of weight of the person and  $F_a = ma$ , due to the velocity. Maximum stance phase shows during cart pulling and minimum shows during running. During cart pulling shows maximum degree of rotation of hip joint, knee: running, and ankle: cart pulling. During walking, it has been observed minimum degree of rotation of hip, ankle: during running. During cart pulling, dynamic force depends on the walking velocity, body weight and load weight. Conclusions: 80% people suffer gait related disease with increasing their age. Proper care should take during cart pulling. It will be better to establish the gait laboratory to determine the gait related diseases. If the way of cart pulling is changed i.e the design of cart pulling machine, load bearing system is changed then it would possible to reduce the risk of limb loss, flat foot syndrome and varicose vein in lower limb.

**Keywords :** kinematic, gait, gait lab, phase, force analysis

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