Static Platform for Postural Balance Analysis

and Recognition

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ABSTRACT

The human balance is one of the most important factors used in the postural analysis. Among all the available technics, usually, the conventional method allows only an approximation analysis of the body balance, and gives a partial factorial study. Nowadays, stabilometry represents a perspective solution for the whole body balance study, analyzing multiple parameters at the same time and making a relationship between them. This letter deals with the design and development of an instrumented static platform. The goal is to acquire the information related to the body posture represented by the movement of the center of gravity (COG) and the center of pressure (COP). A low cost instrumented system built in the form of a platform; its dimensions are (120×80×10cm). The platform is based on two force sensors, Force Sensor Resistor (FSR) and strain gauge. Experimental tests have been carried out on healthy and pathological cases. The results show a typical pathological recognizing and allowed the detection of deficiency type, and the locomotors part responsible for postural deficiencies. Based on the obtained results, we could decide that the developed platform allows to detect both real time COP and COG movement position, in addition to the pathological recognizing.

**Key Words:** Postural balance, force sensors, center of gravity, center of pressure.

# 1. INTRODUCTION

Nowadays, having a good posture remains a potential challenge given the life and work conditions that require us to disrupt our posture. Sometimes undergo stresses more than normal affects our health. Balance posture study is an important factor determining the posture organization. So, the balance study is defined by the relative position of body segments and their orientations in space, which represents a particular geometry controlled by neutral’s mechanisms. To analyze the human balance, postural system must be studied; the latter is divided into three basic parts illustrated as follows:

• Sensory inputs represented by the external sensors that deliver to the central nervous system our situation in relation to our environment. Also, proprioceptors delivering to our central nervous system information that allow us to know the relative positions of different body segments against each other.

• A processing and integration unit represented by the central nervous system and its pathways.

• An output represented by muscle tone whose role is to maintain the standing despite the gravity and ensure balance when moving by determining the static support point [1]. Given the daily life conditions, we are all asymmetrical result of our constitution, our habits and lifestyle. Some people counterpoise this situation and have no trouble which is not the same for others.