# Measurement of Postural Sway with "Sitting Sway Measurement Device"

Y.S. Pathare<sup>1</sup>, K. Navsupe<sup>2</sup>, R. Bhand<sup>3</sup>, Y. Bhale<sup>4</sup>, P. Bhingerdive<sup>5</sup>, Dr. S.S Ganvir<sup>6</sup>

Assistant Professor and Guide<sup>1</sup>,UG Student<sup>, 2, 3, 4,5</sup>Department of Mechanical Engineering. Prof. DVVPFs College of Physiotherapy<sup>6</sup> Dr. Vithalrao Vikhe Patil College of Engineering, Ahmednagar, Maharashtra, India.

Abstract- Global measures of trunk sway is traditionally used even though the trunk comprises a multiple number of segments. Our aim was to measure the seated sway of typically motionless upward body approach. Postural sway in quite sitting is often studied as a measure of postural control. Many instruments ranging from simple ones like Digital angle Finder to one end connected to the sitting hydraulic bar stool and other end is connected through the foldable connecting road through the Digital angle finder and other end is connect the supported shoulder belt and Digital angle finder through foldable road it used to measure postural sitting sway. Digital angle finder is a simple instrumentation to measure postural sitting sway. In this study, postural sway in sitting was analyzed with Digital angle finder with led display. It was calculating the sitting position bending sway present in all directions, in the group of subjects studied. In the Digital angle finder device was much more accurate readings as compared to analog sitting sway angle finder. The direction of sway in sitting position and amount of sway is discussed in the results.

Keywords: postural sway, sitting sway meter

#### **I. Introduction**

Postural control involves controlling body's position in space for dual purpose of stability and orientation. Postural stability or balance is defined as the ability to maintain the projected Centre of Motion (COM) within the limits of Base of Support (BOS). During quite stance there is a separate Centre of Pressure (COP) under each foot. The net COP lies between the feet and depends on each limb supports. Research done on stance postural control showed that no one stands still; instead, the body sways in small amounts, mostly forward and backward. Thus, quiet stance is. characterized by small amounts of spontaneous postural sway. Some of the methods. used to measure postural sway employ postural grid, Lord's sway meter, inclinometer, and sophisticated instruments like post urography. Postural sway in quite sitting is often studied as a measure of postural control. Many instruments ranging from simple ones like digital sway meter to high end ones like digital angle protractor used to measure postural sway angle. Sitting sway angle measurement device is a simple instrumentation to measure postural sway. In this study, postural sway in sitting was analyzed with digital angle sway meter. It was found. that sway angle present in all direction of sway and amount of sway is discussed in the result.

## II. Material and methodologies

Main components-

## A. Hydraulic Bar stool

This bar stool is a piece of furniture that features a hydraulic lift mechanism. Its base and pole are made of chrome metal and its sitting space is created of durable wood. This stool is able to hold the weight of 120 Kg.



Fig 1 - Hydraulic Bar stool

#### B. Digital angle finder

- A digital protractor allows the user to measure angles with much more accuracy than a hand-held protractor. The digital protractor is electronic and comes with a variety of useful features. The angle measurements being taken are displayed on the screen for the user to read and record.
- A: Digital angle finders are almost 100% accurate. There might be a tiny variation, In the accuracy, but if you choose closely, you can even find an angle finder. With +/- 0.1 degrees of accuracy. For household usage, accuracy with +/- 0.3 degrees of accuracy is also reliable.



## Fig 2 - Digital angle finder

## **Shoulder Support Belt**

 Main purpose of the shoulder support belt is to support the shoulder and connect the connecting road through Digital angle protractor.

- 2. Provided with a breathable fabric and adjustable straps and fits both men and women.
- It aligns your neck and spine, giving you a natural upright position. By supporting your body stance and aligning your spine.
- Bad body posture and slouching often make the personality of the people dull and they become the laughingstock almost friends and colleagues.



Fig 3 -Actual Device

#### **III. Experimental Process**

#### Step I

Wear the shoulder support belt. Seat on the hydraulic bar stool in the straight condition. Rest the foot on the footrest. Didn't rest on the back rest stay on straight sitting position. Connect the shoulder support belt and connecting joint.

## Step II

1) For forward Bending angle-

Patient Bend the forward direction slowly up to their possible reach, then note their reach angle.

## Step III

2) For right side bending angle-

Rotate the chair to the left side up to 100 degrees to their initial condition and rotate the digital angle finder device up to they are in parallel condition to the hydraulic stool.

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Then connect the shoulder support belt and connecting joint. Patients bend the right side slowly up to their possible reach, then note their angle.

## Step IV

3) For left side bending angle-

Rotate the chair to the right side up to 100 degrees to their initial condition and rotate the digital angle finder device up to they are in parallel condition to the hydraulic stool. Then connect the shoulder support belt and connecting joint. Patients bend the left side slowly up to their possible reach, then note their angle.

## Step V

Then note the all the values in the table format. And analyzed the values and guess the sum, Assumption

#### **Observation Table -**

			Actual angle (readings - 90)		
Sr. No.	age in years	Weight in Kg	forward Angle	Right side angle	Left side Angle
1	22	55	64	42	42
2	56	64	14	22	26
3	35	81	54	56	58
4	49	72	60	36	34
5	49	72	60	40	40
6	44	79	52	53	50
7	35	55	60	50	48
8	36	110	26	54	50
9	36	60	58	46	50
10	58	65	50	41	45
11	51	72	38	48	39
12	21	45	66	58	52

**Table 1 - Experiment Result** 

## Note -

We have some standard sitting sway bending angles criteria of the persons that we are taken by the average of the of healthy persons.

Range of good posture forward angle [50 to above] Range of good posture right side angle [40 to above] Range of good posture left side angle [40 to above]

#### Specification Table -

Specification	Values
Position of angle	sitting
umber of angles	3
Forward angle max Reach	158
Left angle max Reach	155
Right angle max Reach	155
Output	Digital

## **Result and Discussion**

- 1. The highlighted patients have some issue of the sitting sway posture angle or sitting sway bending angle.
- 2. They didn't pass the criteria of a healthy person.
- 3. They need the therapy by the physiotherapy doctors to improve their sitting sway posture angle.
- In that we got the best range of sitting position upward body bending motion or left, Right and forward bending trunk angle.
- 5. From the research we are find the best sitting sway posture angle of the healthy person.
- 6. From this research we full fill our output in digital form in degrees.

#### Conclusion

- 1. This study supports the usage of Digital angle Finder as a clinical tool.
- Sitting Sway Measurement device calculates all bending angles in sitting position. This device is mainly used in Physiotherapy Hospitals
- 3. This device is also useful for the calculate the improvement of physiotherapy patients.
- 4. Further studies may be required to identify variations in direction specific sway.
- 5. The sitting sway measurement device is simple

instrumentation which mostly use to detect the backbone disease or measure the trunk motion angles.

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