

INVESTIGATION OF POSTURAL STATUS USING A PODOSCANALYZER

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Abstract: Posture is defined as the way we hold our body when we are standing, sitting or lying down, whether characteristic or assumed for a special purpose. The aim of this study is to observe the symptoms and to diagnose the problems that occur to patients due to poor posture in their professional activities. The digitalized biometry correlates the symptoms to a specific pathology. The procedure for all tests is non-invasive and it's formed by a Multi Sensor Electronic Baropodometric Platform, a PodoScanalyzer (2D), the D.B.I.S Software witch calculates the values of the B.P.I. Index, Body Analysis Kaptur System and Dynamic Image System (through the infrared camera) Using the Baropodometer we evaluate the balance of the human body, oscillations of the pressure center, visual information of poor posture and making adjustments and correcting posture. Postural syndrome can be caused by an inappropriate posture developed by the dentist during his professional activity.

Key words: posture, balance, baropodometer, test, disorders

1. INTRODUCTION

Posture is the relative alignment of the various body segments with one another. The stress applied to the body segments is minimal when the person has a good posture and therefore the body alignment is balanced. When a person has a exaggerated stresses to various body segments.

Over time this continual stress, even at low levels produce musculoskeletal disorders and create anatomical accumulation of the trauma causes psychic and physical stress.

2. AIM

The aim of this study is to observe the symptoms that cause the postural problems that appear at certain patients (dentists), to diagnose them using a modern technology and then treat them or refer them to other specialists. A dysfunctioning postural programme producing symptoms can induce dysfunctions at various levels of the locomotion apparatus. Therefore, it can be seen that there are many underlying causes to postural related problems that can be overlooked and patients can easily be misdiagnosed. This is a problem for both the practitioner and the patient. The physician needs to be sure and diagnose if there is a true biomechanical problem that produces pain or affects the posture or to refer the patient to another specialist if orthopedic or musculoskeletal intervention cannot help.

3. METHODS

We used a modular electronic baropodometric detection platform (with a length of 160 cm, MultiSensor with 25,600

sensors on 40cm width and 2 walkways of 80cm each), an optoelectronic system composed from an infrared video pressure by determining the length, circumference and geometry with length, angles and width. The software used to analyze and interpret the data was the Milletrix Software. It recorded the static, dynamic and stabilometry analysis. The D.B.I.S. software (Digitalized Biometry Images System) calculates the B.P.I. index which indicates the numerical values of the entire investigation. The entire system is non-invasive.

The first step consists in requiring the patient to stand on the pressure plate and remain in an orthostatic, natural and oscillations.

The he is instructed to walk along the platform, turning and then walking back for a dynamic test. For obtaining the gait or balance disorders, the patient needs to walk along the platform 3 or 4 times. Central pressure points are obtained and monitored during the roll of the plantar on the walkway.

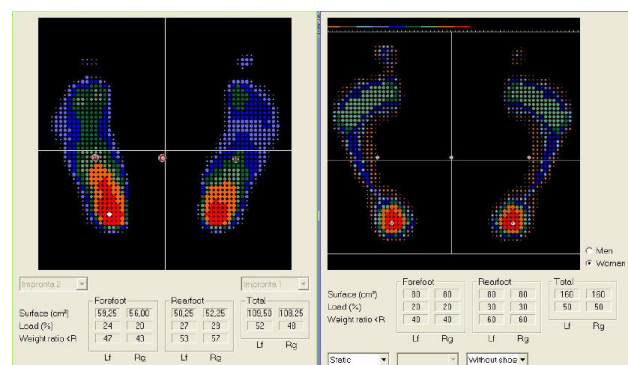


Fig. 1. Static analysis. Comparison between the acquired exam (left) and a normal footprint (right)

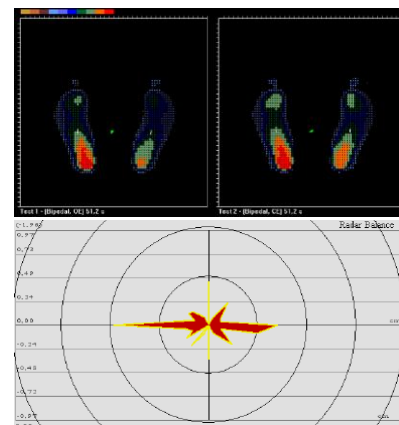


Fig. 2. Stabilometry analysis

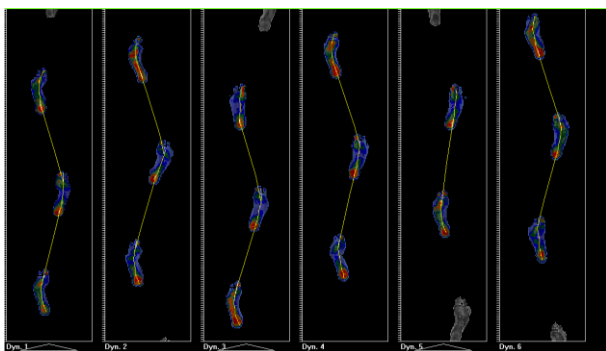


Fig. 3. Dynamic analysis

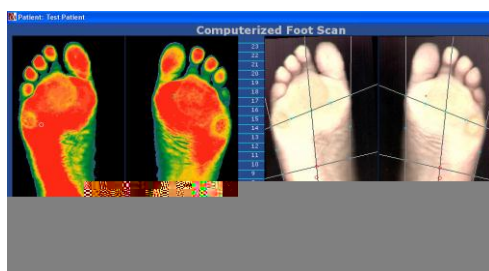


Fig. 4. Computerized Foot Scan analysis by using the PodoScanalyser

Fig. 5. Foot structure

To be performed next is the balance test which is obtained by standing on the pressure plate in bipedal or mono pedal positions with the eyes open or closed. Performing this test we can easily obtain eye or vestibular system disorders.

Using reflective markers and placing them on relevant parts of the body we can measure planes of the principal body segments by using The Body Analysis Capture test. Performing this test we obtained lack of balance, rotations of the body and limb compensation. An optoelectronic exam is performed (with the infrared camera) of the back and on the spinal cord of those patients suffering from craniosacral disorders and scoliosis.

identifying hyperkeratosis, toe deformity or any other conditions that appear at this level.

Finally the D.B.I.S. software elaborates the results of each test and all the values obtained after each and every test are analyzed and compared with physiological values and assembled in The Bio Postural Index report.

4. RESULTS

Using the Baropodometer we evaluate the balance by dislocating the pressure center and oscillations of the pressure center on the surface.

We also observed that the orthostatic position is complex an also the mechanical, anthropometrical and neuromuscular factors that influence the human balance.

In what concerned the maintaining balance of the human posture, visual information is important for making adjustments and correcting position.

We observed postural alterations such as scoliosis, kyphosis, lordosis and flat feet that can be the cause of stomatognathic problems such as occlusal disorders.

5. CONCLUSION

The use of the baropodometer is recent technology and there are very few studies about its use as it is normally used for clinical purposes, which explains the little existence of academic articles on this matter. However, recent research has proven it to be an excellent methodology for assessing balance by means of the dislocation of the pressure centre (Schmidt et al., 2003, cited in Bankoff et. Al., 2006).

With more and more dentists working in inadequate position it can be the cause of postural syndrome and caused by the unbalanced between the anterior and posterior muscles accentuated in various work positions indicating a forward head position.

An erroneous working position leads to back, neck, head, shoulders, arms and finger pains and also leg pains. These kinds of pains get worse through the years by ignoring the problem and not treat them by a specialist. By exercising on a regular basis, the patients can obtain very beneficial important results.

The dentists must adopt an ergonomically correct posture while working, because faulty posture in the everyday activity leads to physic and mental stress causing a poor dental practice.

This study is a start line for future researches that will improve the prevention of musculoskeletal disorders, and long-term remedy for those who are affected by these disorders.

6. ACKNOWLEDGEMENTS

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