Bulletin of the *Transilvania* University of Braşov
Series IX: Sciences of Human Kinetics • Vol. 17(66) No. 2 – 2024
https://doi.org/10.31926/but.shk.2024.17.66.2.7

POSTURE AWARENESS AMONG FITNESS PRACTITIONERS

E. PALADI[1] N. NICOLESCU-ŞEUŞAN[2]
L. NICOLESCU-ŞEUŞAN

Abstract: *The 21st century has brought with it the need for flexibility and in some places adaptability to current conditions, thus many people advocate for the practice of fitness, each with different goals. Posture, however, remains an undiscussed topic in the gym ecosystem. The purpose of this study is to identify neuro-muscular imbalances and implicitly possible postural deficiencies at the level of the spine and the main human joints.*

Key words: *posture, fitness, kinetotherapy, postural deficiencies.*

1. Introduction

More and more people are choosing to hit the gym either by choice or not, with a specific purpose, or perhaps out of sheer curiosity. Thus, the popularity of practicing this type of sport becomes accentuated over the years. However, a topic that seems to remain in the shadows is posture and implicitly its importance. Studies show that posture can be a predisposing factor in the onset of injury following strength training.

Every sports activity stresses the musculoskeletal system, and their effects can be amplified if the person performing them does not have the ability to adopt correct working positions [4]. Postural changes can cause increased stress on muscles, ligaments, joints and bone structures [7]. The base of international data show us that some of the most common injuries during fitness sessions were accumulated tension in the lumbar muscles, tears or tendinitis of the rotator cuff, excessive tension in the cervical muscles [4]. Postural defects and poor exercise performance are among the potential risk factors for exercise-related injuries [1].

In the national specialized literature, through a recent study conducted in Oradea by Ianc, D., et al., the high incidence of postural deficiencies among bodybuilding amateurs is demonstrated, the most common being kyphosis [3]. So, some questions arise regarding the importance of posture in the practice of fitness and implicitly in the selection of exercises.

[1] Student at the University 1 decembrie 1918
[2] PhD Student Assistant at the University 1 decembrie 1918

2. The Objectives

In other words, the objectives of this research are to evaluate the posture of fitness practitioners, to identify neuro-muscular imbalances and which of them has the highest incidence. The final goal being the subjects' awareness of the importance of posture in practicing this sports activity. Also, through the obtained result, a major objective would be to demonstrate the necessity of the existence of physical therapists in fitness rooms.

3. Posture – Description of the Term

According to specialized literature, posture represents the totality of visual reflections of how the body has adapted to gravity and external forces. The correct posture is that in which the segments of the body are positioned in relation to each other [5], the bone and muscle system being in balance and thus managing to protect other important structures of the body [10].

The term posture is also characterized as a highly automated act of movement [9].

3.1. Effectiveness of postural assessment

Postural assessment is used to identify body defects that lead to various musculoskeletal problems. It is an important tool that can be used to assess the reasons behind various sports injuries [8].

3.2. Postural aspects of bodybuilders and other sports practitioners

Trovato, B., et al. suggest the idea that repetitive loading of the body leads to certain postural changes, which can eventually cause pain and trauma [8].

In the study "Postural disorders in amateur bodybuilders" carried out by Ianc, D., et al. we find the information that bodybuilding exercises induce a high mechanical stress on the body and failure to observe a correct posture when performing the exercise can have several repercussions on the body. The authors' state: "the incidence of postural anomalies among amateur bodybuilders is very high, the most common being the kyphotic attitude" [3].

Huang et al., state that: "the participation of amateurs in certain popular sports such as swimming, football, running, demonstrated a forward bending posture. Table tennis amateurs showed less curvature of the spine in the sagittal plane and body deviation in the frontal plane" [2].

4. Methodology and Materials Used

45 subjects (23 men, 22 women) with a mean age of 30 years were evaluated. The subjects were selected from two different gyms from Alba Iulia. The inclusion criteria were practicing fitness for at least 3 months with a frequency of 3 times a week; professional activity.

Exclusion criteria were people with structural deficiencies of the spine; subjects with a sport practice of less than 3 months; extreme age, excluding adolescents aged 12-14 and adults over 50.

Postural assessments were performed using the Kinetisense 360 AI platform. Kinetisense 360 AI (Calgary, Alberta; Canada) platform that evolves the posture of the human body based on photo-video analysis. At the core of the postural assessment, Kinetisense has the lead wire assessment.

This analysis system determines the deficiencies of the spine and body segments without irradiation by means of a camera with 3D sensors connected to special software.

Results from the sagittal plane (Figure 1), frontal plane and transverse plane (Figure 2) are displayed in the postural assessment reports. We can evaluate the deviation of a segment from the axis, respectively by certain cm for the sagittal plane (Figure 1) and by certain degrees respectively for the frontal and transverse planes (Figure 2).

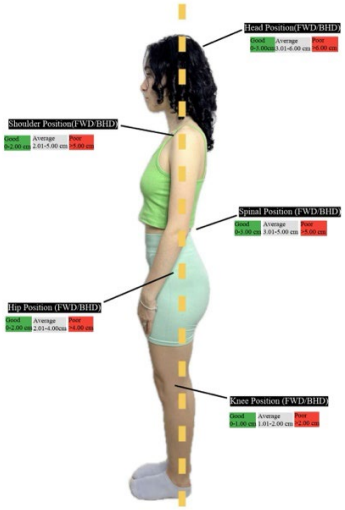

Fig. 1. *Posture analysis from the sagittal plane according to Kinetisense 360*

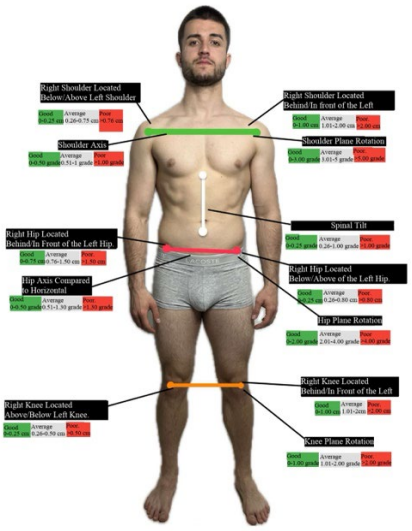

Fig. 2. *Posture analysis from the frontal and transverse plane according to Kinetisense 360*

5. Research Results

Following the interpretation of the postural assessment reports of 45 subjects, fitness practitioners, several graphs were created to obtain a certain percentage of good, average and poor postural attitudes. The graphs in the front plane show us the following results.

By the Figure 3, we observe the highest incidence of weak posture, at the level of the shoulders, approx. 62% of the subjects presented shoulder deviations from the axis, 16% of the subjects presented average postures and 22% of them presented good posture regarding shoulder positioning.

Through Figure 4, we observe that 53% of the subjects have poor postures, attitudes of lateral spine tilt, 31% have average postures and 16% had good postures regarding the assessment of spinal tilt from the axis.

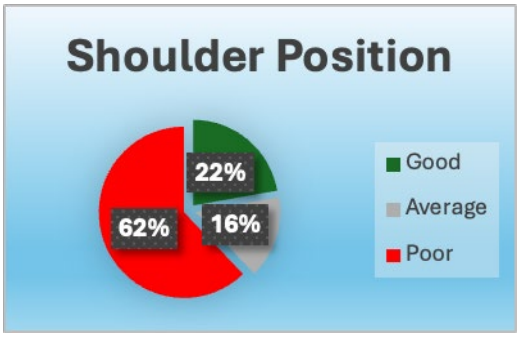

Fig. 3. *The percentage regarding the position of the shoulders of the evaluated subjects from the Frontal Plane*

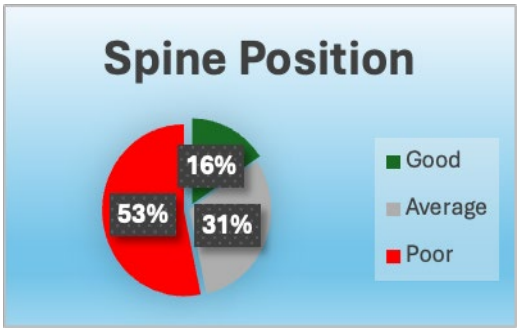

Fig. 4. *The percentage regarding the evaluation of the back position of the subjects in the Frontal Plane*

Regarding the position of the knees in the axis, Figure 5 shows us that 49% of the subjects presented poor postures in this sense. Also, 27% of subjects showed average postures and 24% reported good postures on knee alignment assessment.

Therefore, Figure 6 shows us the best result obtained from the Frontal Plan. Approx. 49% of subjects showed good posture on hip assessment, 4% reported average posture and 47% showed poor hip posture.

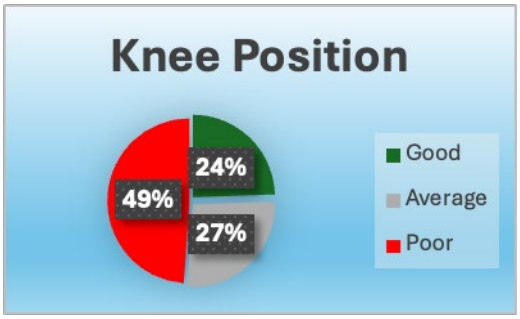

Fig. 5. *The percentage regarding the evaluation of the knee position of the subjects in the Frontal Plane*

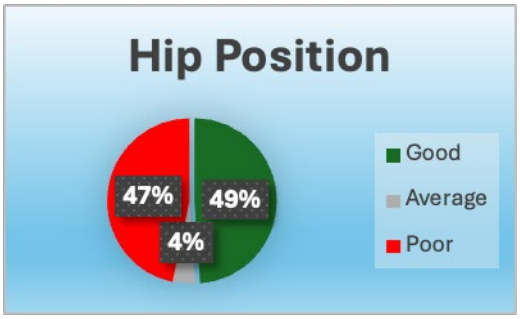

Fig. 6. *The percentage regarding the evaluation of the position of the hips of the practitioners in the Frontal Plane*

The next evaluated plan was the Transversal one, implicitly 3 graphs were made, Figures 7, 8, 9.

Thus, we can see that most of the weak posts we have registered regarding the evaluation of the knees. 87% of the evaluated subjects reported poor knee postures, showing rotation tendencies.

According to Figure 7, 60% of the subjects reported poor shoulder postures, also Figure 7 shows us that 42% of the subjects presented poor postures regarding hip positioning. Also, according to Figure 7, 31% of the subjects reported a good hip position, and 27% reported an average position.

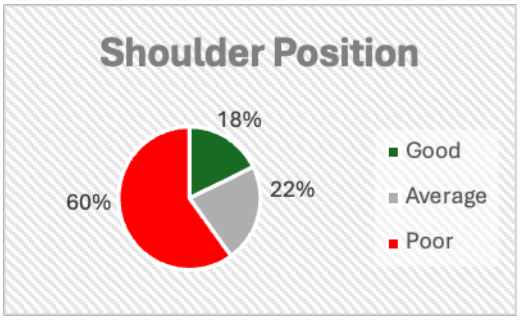

Fig. 7. *The percentage regarding the evaluation of the position of the shoulders from the Transversal Plane*

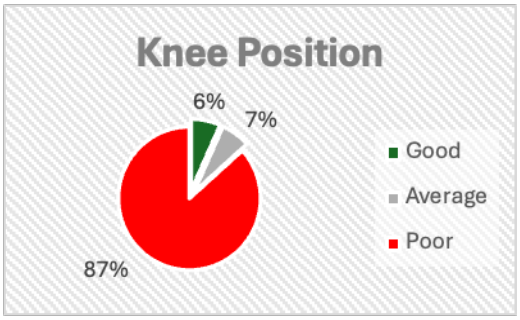

Fig. 8. *The percentage regarding the assessment of the position of the knees from the Transversal Plane*

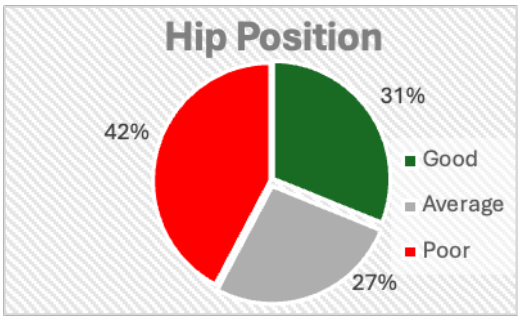

Fig. 9. *The percentage regarding the evaluation of the position of the hips in the Transversal Plane*

Therefore, from the Transverse Plane, we observe the incidence of good postures at the level of the hips, approx. 31% and 27% of the subjects reported balanced postures regarding balance assessment.

Following the analysis of the results obtained from the Sagittal Plane, the subjects present the most deficient attitudes of all body alignments evaluated. According to Figure 10, the subjects reported a 98% dominance of the weak knee position, where according to Figure 11, 89% of the subjects had a genu flexum tendency and 9% had a genu recurvatum tendency.

Fig. 10. *The percentage regarding the evaluation of the position of the knees in the Sagittal Plane*

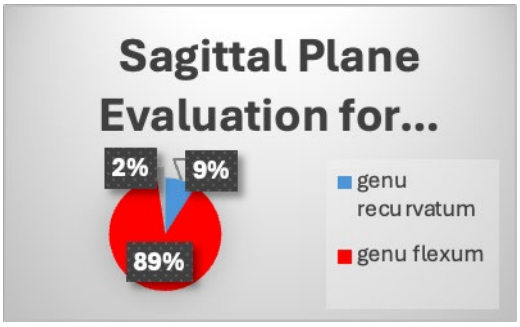

Fig. 11. *The percentage of knee evaluation regarding Genu Flexum and Genu Recurvatum from the Sagittal Plane*

In equal proportions, Figure 12 and Figure 13 suggest that 93% of the subjects reported forward head and forward shoulder postures and only 7% of the subjects had an average posture of both body segments.

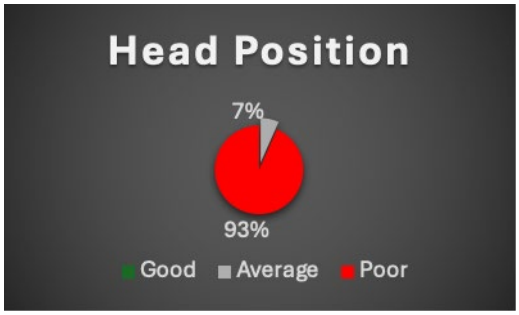

Fig. 12. *The percentage of the assessment of the tendency of Anterior Head from Sagittal Plane*

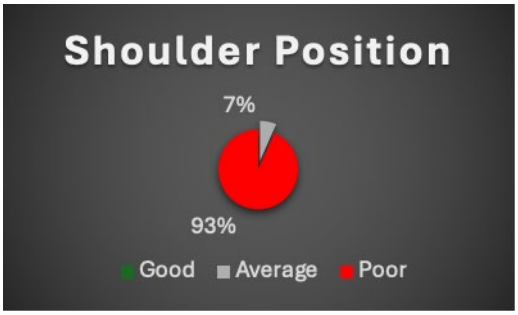

Fig. 13. *The percentage of the assessment of the tendency of Shoulder Brought form the Sagittal Plane*

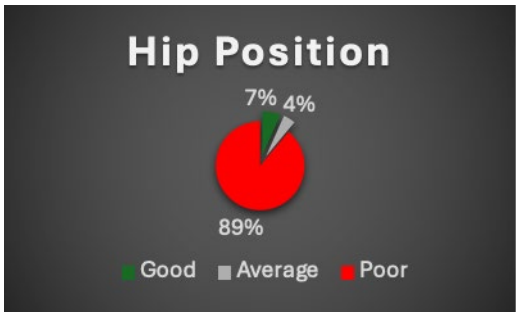

Fig. 14. *The percentage regarding the evaluations of the subjects' hips in the Sagittal Plane*

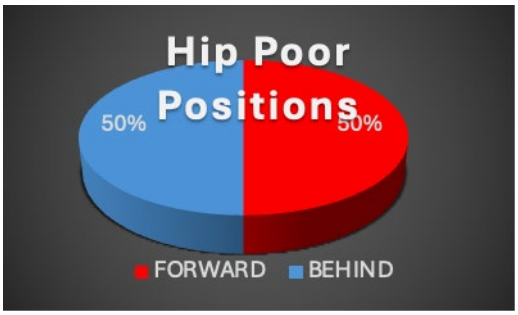

Fig. 15. *The percentage of the evaluation of the Tendency of Anteriorization and Posteriorization of the Pelvis in the Sagittal Plane*

Figure 14, regarding the evaluation of the hips, shows us that 89% of the subjects showed deviations of the hips from the Sagittal Plane, where, according to Figure 15, in proportions of 50 to 50, the subjects showed tendencies of anteriorization and posteriorization of the pelvis.

7% of exercisers reported good posture and 4% reported balanced hip posture. The best results from the Sagittal Plane were recorded when was evaluated the lumbar spine junction, according to Figure 16. 16% of the subjects reported a good posture at the lumbar level, and 4% showed average postures.

The remaining 80% had a relatively weak position of this junction, approximatively 57% of the subjects registered an anteriorization of the lumbar spine, and 43% of the evaluated subjects reported a tendency to flatten the lumbar area, according to Figure 17.

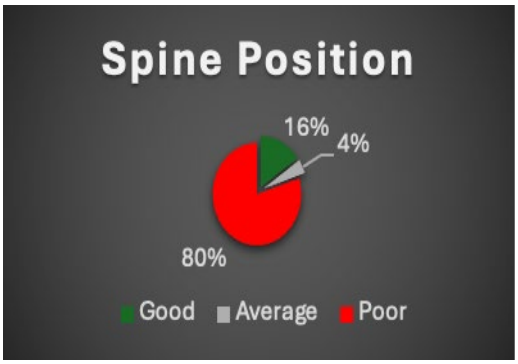

Fig. 16. *The percentage of posts regarding the evaluation of the lumbar junction in the Sagittal Plane*

Fig. 17. *The percentage of posts regarding the tendency of Anteriorization and Flattening of the Lumbar Junction in the Sagittal Plane*

Therefore, the interpretations of the results show us that the subjects, who practice fitness, register the most deficient postures in the Sagittal Plane.

6. Discussions

From our study, we describe the forward head posture, forward shoulders, being the most popular postural deficiencies among our practitioners, approx. 93% of subjects. In this section we delve into the implications of poor posture specifically addressing the forward head and rounded shoulders, commonly observed among fitness practitioners, these effects are crucial for devising effective interventions and preventive measures within fitness programs.

From this perspective, the correction of the forward head is must have, because the poor posture of the head as well as rounded shoulders, imposes significant stress on the musculoskeletal system. The cervical spine is subjected to increased

strain due to the forward positioning of the head, and therefore, this can lead to chronic neck pain, cervical disc degeneration, and even nerve impingement syndromes such as cervical radiculopathy [6].

Shoulders brought forward can alter the biomechanics and movement patterns; therefore can be created shoulder impingement syndrome and rotator cuff injuries [6]. An efficient correction can prevent restricts of thoracic expansion and diaphragmatic excursion, decreased lung capacity and the apparition of the inefficient breathing mechanics. The position of the thoracic spine and rib cage is intimately linked with respiratory function.

Also, we found that the position of the spine had also a high prevalence of the poor posture. The position of the lumbar spine is intricately connected to pelvic alignment and hip function. A forward lumbar spine posture often accompanies anterior pelvic tilt; this pelvic tilt can lead to muscular imbalances. And, a poor posture, including a forward lumbar spine, compromise the integrity of the core muscles and impairs its ability to stabilize the spine effectively. We have to say that the core muscular system is important one for the fitness practitioners, because it helps to maintain proper form and technique during exercises.

We mention that all of these should be analysed, and the correction is one of the must have thing after the evaluation of the practitioners during their journey in the world of fitness. It is important to understand fully the term of posture and its damage on the human body.

Watched the human body as a one integral organism with mechanisms that are close each other, can help to understand that these mechanisms can be altered one by one, and a cause of this can be a poor posture.

7. Conclusions

In conclusion, we can argue that the programs prescribed of followed individually by fitness practitioners are not exactly consistent with their posture. It is obvious that there is no emphasis on the selection of exercises in balance with the posture.

Thus, the idea of the existence of physical therapists in fitness rooms should be viewed proportionally, as they have a longer training in terms of specialized knowledge. Following the given research, we can say with certainty that in the Sagittal Plane, the incidence of postural deficiencies is the highest. In particular, the most common imbalances are the anteriorized head and the shoulders brought forward, implicitly the deviation of the knees presenting a genu flexum tendency.

As final conclusions, we observe the necessity of evaluating fitness practitioners. In addition to the objective of ensuring a program in accordance with the individual needs of everyone, it would mean a significant contribution in substantiating the appropriation of the term posture.

References

1. Bonnila, D.A., Cardozo, L.A., Vélez-Gutiérrez, J.M., et al.: *Exercise Selection and Common Injuries in Fitness Centers: A Systematic Integrative Review and Practical Recommendations.* In: International Journal of Environmental Research and Public Health, Vol.19(19), 2022. DOI: https://doi.org/10.3390/ijerph191912710
2. Huang, Y., Zhai, M., Zhou, S., et al.: *Influence of long-term participation in amateur sports on physical posture of teenagers.* In: PeerJ, Sports Medicine and Rehabilitation, 2022, Dec 20;10:e14520. DOI: 10.7717/peerj.14520
3. Ianc, D., Boca, I.C., Tarcău, E., et al.: *Tulburări posturale la culturiștii amatori (Postural Disorders In Amateur Bodybuilders).* In: Revista Română de Kinetoterapie (Romanian Journal of Physical Therapy), Vol.26(44), 2020, p.4.
4. Kemler, E., Noteboom, L.: *Characteristics of Fitness-Related Injuries in The Netherlands: A Descriptive Epidemiological Study.* In: Sports, Vol.10(12), 2022, p.187. DOI: https://doi.org/10.3390/sports10120187
5. Molina- Garcia, P., Plaza-Florido, A., Mora-Gonzalez, J., et al.: *Role of physical fitness and functional movement in the body posture of children with overweight/obesity.* In: Gate & Posture, Vol. 80, 2020, p.331-338. DOI: Https://Doi.Org/10.1016/J.Gaitpost.2020.04.001
6. Mossad, D.M., Abdel-Aziem, A.A., Mohamed, G.I., et al.: *Effect of forward head and rounded shoulder posture on hand grip strength in asymptomatic young adults: a cross-sectional study.* In: Bulletin of Faculty of Physical Therapy, Vol.25(5), 2020. DOI: https://doi.org/10.1186/s43161-020-00001-z
7. Pacheco, M.P., Carvalho, J.P., Cavalheiro, L., et al.: *Prevalence of Postural Changes and Musculoskeletal Disorders in Young Adults.* In: International Journal of Environmental Research and Public Health, Vol.20(24), 2023. DOI: https://doi.org/10.3390/ijerph20247191
8. Trovato, B., Roggio, F., Sortino, M., et al.: *Postural Evaluation in Young Healthy Adults Through a Digital and Reproducible Method.* In : Journal of Funtional Morphology and Kinesiology, Vol.7(4), 2022, p. 98. DOI: https://doi.org/10.3390/jfmk70400
9. Wilczyński, J., Lipińska-Stańczak, M., Wilczyński, I.: *Body Posture Defects and Body Composition in School-Age Children.* In: Children, Vol.7(11), 2020, p.204. DOI: https://doi.org/10.3390/children7110204
10. Xing, L., Popik, S.: *A Systematic Review of The Impact of Sports on Body Posture in Adolescents*. In: Journal of

Medical Imaging and Health Informatics, Vol.10(5), 2020, p. 1159-1164. DOI: https://doi.org/10.1166/jmihi.2020.3013