COMPARE MUSCLE STRENGTH, RANGE OF MOTION AND ACTIVE AND PASSIVE GIRLS ELBOW JOINT PROPRIOCEPTION WITH PUBLIC HYPERMOBILITY SYNDROME AND HEALTHY

[a]SADAF KHODABANDEHLOO, [b]DR SYED SADREDDIN SHOJAEDDIN, [c]YAHYA SOKHANGOEI

[a]MSc of Corrective Exercises and Sport Pathology, Department of Physical Education and Sport Sciences, Islamic Azad University Karaj Branch, Karaj, Iran
[b]Associate professor, Department of Physical Education and Sport Sciences, KHARAZMI University of Tehran, Tehran, Iran
[c]Assistant professor, Department of Rehabilitation sciences, Welfare and Rehabilitation sciences Tehran, Iran

Email: [a]sadaf.khodabandeloh@gmail.com,
[b]Sa_shojaedin@yahoo.com, [c]yahya.sokhanghoe23@gmail.com

Abstract: The aim was to compare muscle strength, motion range and proprioception elbow joint hypermobility syndrome girl's active and passive public. People with hypermobility by Beighton test and a minimum score of 5 identified to participate in the test, and universal goniometer used to detect hypermobility. All assessments to measure the motion range detector with flexible devices Leighton and measure muscle power and proprioception elbow with isokinetic device in two angles were 45 and 60 degrees. The results showed that muscle strength of elbow between active and inactive girls have hypermobility syndrome healthy and public there is a significant difference while the elbow joint proprioception between active and inactive girls have hypermobility syndrome and healthy and public there was no significant difference.

Keywords: muscular power, proprioception, range of motion, elbow joint hypermobility syndrome general.

1 Introduction

General public hypermobility or joint laxity is defined as the absence of synovial joints that most people have a more normal range and with nonspecific musculoskeletal complaints of the factors known to include both general and localized in the peripheral joints of the spine is a component (Smith 2005). Detailed pathological mode is not joint hypermobility but rather as an increase in joint mobility comes naturally. As noted hypermobility diagnosed with musculoskeletal symptoms and people with this condition often effects of joint instability such as recurrent dislocation, subluxation and twist, muscle and joint pain, repetitive complaints vague, non-injury-related chronic and sometimes not respond to drug therapy, anti-inflammatory and pain suffered (the Kessler Rvsk 1996 and 1999). Joint pain, chronic muscle in Hayprmvbayl, due to postural imbalance, in the long term motor function of disorders caused and as well as pain caused delays caused by tension in the long run (Kessler, 1996).

1.1 Problem statement

Hypermobility or domain more than normal in the joint, including the factors discussed in joint instability and the resulting damage, and people who have several active joint or joint range of motion in the joints of the body are affected public Shelley (Richard 2011 Russians, 2011). This diffuse and chronic pain patients often complain without any specific reason (Richard 2011). And variables such as age, gender, ethnicity, location and variation in diagnostic criteria leading to different reports about the incidence of this complication is (Ross, 2011). So that children are inherently more mobile than adults in their joints, and this gradually decreases with age. Recent studies have shown that hypermobility syndrome in children and adolescents has harmful effects is growing. So that a decrease in physical activity, fitness and bone mass in adulthood causes of decline in children's activities of daily living (Marcoleen 2009). Among the joints, the elbow joint with muscles and ligaments of multiple surrounding mobility and strength to perform fine motor and at the same time provides strong upper lateral limb. Without a doubt, make precise movements of the forearm, hand and fingers subject to appropriate joint proprioception. Otherwise the possibility of any acute injury and damage caused by hyperthyroidism and also there will be a drop in performance. On the other hand the role of proprioceptive feedback loops that provide information capsule and Lykamnt of the coordination function of the muscle, joint stability has been well recognized (Joel Christensen, 2008). Elbow limb proprioception is probably also the upper hand proprioception and has a great impact on the movements of the body as a chain and since the only joint is one of the most joints in the body and in most sports and motor activities required human, understand the condition and range of motion in the joints, especially in the hyper-mobility of the utmost importance. On the other hand knowledge of muscle strength of this category of people is of particular importance. This study tries to answer the question of whether the muscle strength, proprioception and girls active and passive range of motion hypermobility syndrome healthy girls there are differences.

1.2 Research purposes

The overall goal: Compare muscle strength, proprioception and range of motion the elbow joint hypermobility syndrome girls active and passive public and healthy

1.3 Special Purposes

1. Compare elbow muscles active and inactive girls have hypermobility syndrome public and healthy

2. Comparison of the elbow joint proprioception active and inactive girls have hypermobility syndrome public and healthy

3. Compare the range of motion of the elbow joint hypermobility syndrome girls active and passive public has healthy

1.4 Hypotheses

The main hypothesis: Between muscle strength, proprioception and range of motion of the elbow joint hypermobility syndrome girls active and passive public and healthy are differences.

1.5 Specific hypotheses

1. Between the muscular strength of elbow joint hypermobility syndrome girls active and passive public and healthy are differences.

2. Between the elbow joint Proprioception hypermobility syndrome girls active and passive public and healthy are differences.

3. Between the range of motion girls active and passive elbow joint has Hypermobility syndrome public and healthy are differences.

1.6 Defaults

A) Range or scope of the research:

The scope of this study encompasses both space and time. The research sample consisted of girls16-14years old territory that hypermobility syndrome in Karaj city schools. And the period of study, which is spring 2016.B)

B) Restrictions on out-of-control researcher:

- Psychological conditions of the subjects cannot be controlled.
- Living conditions and daily activity during the study subjects was rampant.

- Possibly damage the upper limb on the hypermobility of each person is different.

C) Limitations on self-control:

1. The subjects, all 16-14 year old girls ages hypermobility syndrome were selected.
2. None of the subjects have not a history of surgery of the elbow or elbow dislocation.
3. All subjects were selected from among active and inactive.
4. None of the subjects had at Championship level and all levels of physical activity were at the same level.

2. Background research

Certainly in every field in the first fundamental studies are needed to determine its basic principles and mechanisms. In recent years, a range of studies and research in the field of proprioception and hypermobility has been studied various issues associated with them. Investigate the causes of sports injuries prevention, treatment and recovery them crucial for researchers. Proprioception has been considered as one of the factors related to injuries. Also in the past decades has conducted a study to assess the public joint Shelley. In this section we will refer to some of these investigations.

Perany et al (2016) study compares the isometric strength of elbow and knee in adult men and women suffering have hypermobility syndrome with healthy people. The study, which included 106 adult men and women with hypermobility syndrome using isokinetic dynamometer to compare the isometric strength of elbow and knee patients and healthy people were studied. The results showed that isometric strength in men with hypermobility syndrome and healthy individuals is a significant difference.The results showed significant difference between healthy women and women with hypermobility syndrome does not exist.

Ranalta et al (2012) study examined the association between joint hypermobility public and increased risk of muscle disorders - skeletal paid from the general hypermobility. This study investigated the relationship between traumatic shoulder instability with joint hypermobility public. In this study, 100 patients with anterior shoulder dislocation general hypermobility that were treated with the arthroscopic method, in terms of Beighton criteria, in terms of general hypermobility of the joints were examined. The mean age of these patients was estimated at around 25 years. The patients with 100 healthy people matched for age and gender were similar to the first group, were compared. People in the control group, there is no history in terms of joint instability in the shoulder joints, did not Lygmany injury knee and lateral ankle sprain. This study showed no significant difference between the rate public joint hypermobility aren't two groups of patients and controls.

Chahal et al (2011) General hypermobility as a predictive factor for contralateral anterior shoulder dislocation were studied. 57 people with an average age of 30 years between 2006-2003 had suffered a shoulder instability were examined in this study. The control group in this study were 72 undergraduate students with no history of shoulder dislocation or damage were anterior cruciate ligament. Two study groups in terms of age and gender matched. The results showed that the prevalence of general hypermobility study groups (5.32 percent), compared with the control group (10.4 percent) was higher. In addition, the increase in external rotation in the opposite shoulder, compared with the control group was approximately 2-fold.

Vaktr Robinson (2011) study on public hypermobility in people who shoulder stability, are carried out under review. In this study, 21 patients and 46 patients with shoulder stabilization under review collarbone fracture were studied as a control group. All of these individuals were obtained from a series of treatment centers. In addition first obvious stability and cause of injury in these patients was studied. Clinical assessments were also carried out to assess the general hypermobility by Beighton criteria were investigated. People who have a score of 4 or higher in Beighton criteria, as people were considered Hayprmvbayl. Most methods used to stabilize the joint open surgical technique and the most common cause of fractures in the control group was traumatic fracture type. 61% of people have Beighton score of 4 or higher. The result of this study showed that the prevalence of general hypermobility shoulder stabilization in people who have been under review, are common. The main cause of fractures, traumatic causes. People with general hypermobility increased fracture rate after the initial surgery and then had shoulder stability and rehabilitation should be followed.

Westling et al (2010) study the relationship between general hypermobility and TMJ joint destruction .In this study, 96 girls and 97 boys 17 years old through Baton methods were evaluated. TMJ joint evaluation was carried out through auscultation by stethoscope. The relationship between visible signs of clinical auscultation and self-reported symptoms were shaken, were studied. The prevalence of symptoms in adolescents with general hypermobility of joint destruction temporomandibular, the Beighton score above 9.5 was more. People with more hypermobility, Oral parafunction higher score indicating a direct relationship between general hypermobility signs and symptoms of dysfunction was Cranio- mandibular.

Vahdat et al (2016), Assessment of biomechanical structure of the passive resistance torque on the elbow joint and its application in training facilities and their rehabilitation. Eight healthy men without problems and a history of previous impairment in neuromuscular system based on height and weight coefficient participated in this study. Five elbow flexion passive range of motion at speeds of 15 and 45 degrees per second in zero to 130 degree per second isokinetics bax was conducted by the dynamometer at the same time, muscle EMG activity was recorded. The results include optimized to achieve the motion, reducing joint damage and as well as reducing energy waste by natural resistance mechanisms involved moving tissue to create a mechanism of resistance in the equipment on the motion was carried.

Arab and colleagues (2013), during a study examined the association's general hyper mobility and arch feet in the healthy girls. 50 people participated in this study. Determining the degree of hyper-mobility of people using the Beighton criteria and measuring arch using the footprint was conducted. The results showed that people with more hypermobility have less arch feet. This relationship may be due to ligament laxity and loss of their consistency.

Nodehi et al (2013), a study designed to compare the static situation the shoulder in women with general hypermobility discussed with healthy individuals. In this study, 30 women with general hypermobility with 30 healthy subjects matched for the side slip shoulder of the vertebrae of the spine in three different modes were compared. Involves Status: shell hands beside the body, Situation abduction of 45 degrees and Situation abduction of 90 degrees with maximum internal rotation. This study showed that only in a situation that is on the side of the body, the distance between the shoulder and thoracic spine between the two groups was significant and in other situations difference is meaningless.

Khalkhali et al (2013) study to examine the knee proprioception in patients with public joint hypermobility and discussed comparison with healthy individuals. Subjects included 20 patients with general hypermobility in the knee and 20 healthy subjects with age ranging 18 to 30 years. Error sense of the situation in the three angles of 15-45 and 60 degrees of active knee extension in sitting position by using a goniometer, digital images, measured by AutoCAD software and the two groups were compared at different angles. The results showed important that young people suffering knee joint position sense joint mobility less than healthy individuals. The knee joint position

sense in the end both sides were more accurate than the more internal angles.

3. Research Methodology

The study is quasi-experimental comparison. The sample consisted of 40 students of Karaj city schools with an average age of 14 to 16 years who are enrolled in the academic year 2016. In four groups, 10 active students with hypermobility, 10 disabled students with hyper-mobility, 10 healthy active students and 10 disabled healthy students, is divided. Students with and without hypermobility in organized sports on a daily basis or weekly basis during the last two years have participated and healthy children as well as with Disable hyper-mobility the past 2 years have not had any regular exercise. Non-random sampling method is selective, where researchers muscle strength, proprioception and range of motion of the elbow joint cross compare the groups.

3.1 Research variables:

Criterion variable: the elbow joint hypermobility

The predictor variables: 1. Elbow muscle strength 2. The range of motion of the elbow joint 3. The elbow joint proprioception

3.2 Measuring tool:

- Consent forms and collect data
- Casio digital scale model made in Japan to measure the Weight
- Height gauge to measure the wall height
- Beighton Beighton test for the diagnosis of the syndrome with Hyper-Mobility
- Universal goniometer to determine the range of motion in helping with diagnosis of hyper-mobility syndrome
- (Biodex isokinetic dynamometer system build-America) to measure isometric strength and proprioception elbow
- Flexible Leighton gauge to measure the range of motion
- Bed laboratory measurement to measure the range of motion of the elbow joint

3.3 Statistical Methods:

In order to study and statistical analysis of raw data obtained from research, descriptive and inferential statistics were used. The descriptive statistics of mean and standard deviation were used to describe the data and determine the differences between the groups. The Kolmogorov-Smirnov test was used for data normalization. The descriptive statistics to test the equality of variances Lone statistic was used and in case of heterogeneity of variance, the test analysis of variance (ANOVA) (inter and between group) (at 95%) was used to assess differences between means. If the difference between the mean in relation with groups was significant, post hoc test (post hoc (Tukey)) was used to determine significant differences between the groups. This hypothesis was tested using SPSS version 22.

4. Analysis of the findings:

1. Compare elbow muscles active and inactive girls have healthy and public hypermobility syndrome (H1):

The results of the study (H1) showed that between active and passive muscle strength of elbow general hypermobility syndrome and healthy active and inactive girls have significant differences. Results of this study with the results of studies Perani et al (2016) and Fatou et al (2008) in this field were consistent. According to the study of perani et al muscles in women with hyper-mobility in the development of more power compared to healthy women. Resources Development is an important factor for joint stability and since people with public joint hypermobility due to shell passive structures, they may have less joint stability neuromuscular mechanisms such as the development of joint forces to rely more stable. This study did not measure the amount of force development so we can determine that if we use this hyper-mobility of the affected elbow flexors power or not. Fatou and colleagues showed that muscle torque in the hyper-mobility is high. And with the results of studies of Sahin et al (2008) was inconsistent because of this difference can be traced to several factors: In the Perani and colleagues were the main cause of the age difference could be that included adults were and hypermobility syndrome intensity decreases because age increases and As well as muscle strength decreases with increasing age, while in this study subjects were girls ages 14-17 years and because of the disparity in study Sahin et al isokinetic strength of knee flexor muscles was evaluated while in this study isometric strength of elbow flexor muscles were examined. And it should be noted that the type of muscle contraction in the torque (power) is very important. Hypermobility was one of the precipitating factors, and can even lead to premature osteoarthritis is pyrophosphate deposition.

2. Compare elbow joint proprioception girls active and inactive with general hypermobility syndrome and healthy (hypothesis 2):

Below contains the first hypothesis: the results of this study (hypothesis 2) showed, proprioception 45-degree angle at the elbow joint hypermobility syndrome less than healthy group inactive proprioception, but this difference was not significant.

Below contains the second hypothesis: the results of this study (hypothesis 2) showed, proprioception 45-degree angle at the elbow joint hypermobility syndrome active girls, less than healthy group active proprioception, but this difference was not significant.

Below contains the third hypothesis: The results of this study (hypothesis 2) showed, Proprioception 60-degree angle at the elbow joint hypermobility syndrome inactive girls, less than healthy group inactive proprioception, but this difference was not significant.

Below contains fourth premise: The results of this study (hypothesis 2) showed,

Proprioception 60-degree angle at the elbow joint hypermobility syndrome active girls, less than healthy group active proprioception), but this difference was not significant.

Results of this study in the field with the results of the study Fatou et al (2008), Sahin and colleagues (2008), Rosie (1999), Basvlntl (1995), Zemek et al (1996) outside the country, khalkhali and et al. (2013), Jadidian (2009) in the interior consistent with the results of the study Wolfgang et al. (2004) and Stillman (2002) was inconsistent.

The reason for this disparity in Wolfgang et al study that examines the proprioception of shoulder joint after surgery in patients with joint instability paid in kind could be examined in detail. The research Wolfgang et al, (shoulder joint), while in the elbow joint study in study subjects with joint instability Wolfgang, who previously had been operated hypermobility word is quite different from instability. Hypermobility demonstration of excessive laxity or increasing the length of the tissue, while increasing instability of motion, Steve kinematics and is Artrokinmatik and muscle and muscle control not possess any protective role, whereas people with hypermobility no signs of instability, but in the current study subjects not undergone any surgery and only with joint hypermobility syndrome were elbow and due to differences in study Stillman and colleagues varied the type of joint involved and the investigation was done on the knee joint, the age range of the subjects was 29 to 18 years, while in this study participants comprised students 14 to 17 years, gender is also a contributing factor in failure to comply in Stillman and colleagues study participants were men and women, while the present study subjects were only women.

3. Compare the range of motion of the elbow joint girls active and inactive with general hypermobility syndrome and healthy (hypothesis3):

Results of this study (H3) showed, between range of motion of the elbow joint active and inactive girls with hypermobility syndrome general and healthy there is a significant difference. Results of the present research in this field with the results of the study Chahal et al. (2011) and Gedaliah et al (1993) abroad and the Arab and cooperation within the consonants, According to the Arab and colleagues studied people who are more general hypermobility, because ligaments largely have lost their consistency, was not able to maintain the overall structure of joints, in fact, by increasing general hypermobility criteria such as consistency ligaments decreases cause range of motion is too joint and with results of the study Ranalta et al (2012) was inconsistent. The cause of this discrepancy can be in several factors, in the study Ranalta et al, subjects that people with a history of anterior shoulder dislocation were treated with the arthroscopic method, however, in present study people any history of dislocation

Or elbow joint had no previous injury and as well as the type of joint involved in the study Ranalta and colleagues who shoulder joint was different with present study and Average age in the study Ranalta et al 25 years. But in the present study was an average age of 15 years. According to the study, Graham and colleagues (1990) age is also a contributing factor in an article entitled hypermobility syndrome, to express the history of general hypermobility have paid and its severity in children are most commonly mentioned. It also stated that from the rate of hypermobility decreases with age. In addition, hypermobility is more prevalent in women than men mentioned in your article and general hypermobility more joints than the more common single-joint hypermobility have stated. Also general hypermobility abundance variation in different races stated.

4.1 First hypothesis

Between the muscle strength of elbow active and inactive girls with general hypermobility syndrome and healthy there are differences.

Table 1 results of Tukey post hoc test in comparison isometric strength of the groups.

Groups	Mean difference	P
Inactive healthy - Active healthy	7.85	0.032
Active healthy - Active hypermobility	1.93	0.893
Active healthy - Inactive hypermobility	4.69	0.329
Inactive healthy - Active hypermobility	9.78	0.005
Inactive healthy – Inactive hypermobility	3.16	0.656
Active Hypermobility - Inactive hypermobility	6.62	0.090

At the level of p <0.05 was significant

According to Tukey test results are shown in Table1:

- Between the elbow muscle strength in healthy inactive girls with active healthy group (p = 0.032) and active hypermobility (p = 0.005), there was a significant difference.
- The muscle strength of elbow joint hypermobility group inactive more than three groups, but this difference was not statistically significant.

In Figure 1, means and standard deviations muscle strength of elbow active and inactive girls with general hypermobility syndrome and healthy viewing.

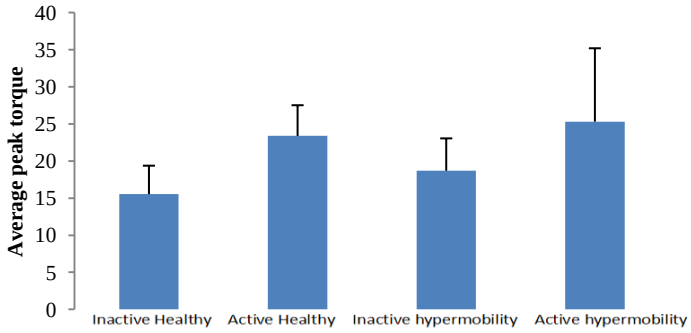

Figure (1) Average isometric strength

4.2 Second hypothesis

Between elbow joint proprioception active and inactive girls with general hypermobility syndrome and healthy there are differences.

Table 2 Results of Tukey post hoc test in comparison Proprioception angle of 45 degrees in the groups

Groups	**Mean difference**	**P**
Inactive healthy - Active healthy	2.43	0.746
Active healthy - Active hypermobility	0.71	0.991
Active healthy - Inactive hypermobility	3.07	0.586
Inactive healthy - Active hypermobility	3.14	0.568
Inactive healthy – Inactive hypermobility	5.50	0.122
Active Hypermobility - Inactive hypermobility	2.63	0.763

Table 3 Results of Tukey post hoc test in comparison proprioception angle of 60 degrees in the groups

Groups	Mean difference	P
Inactive healthy - Active healthy	3.90	0.73
Active healthy - Active hypermobility	3.83	0.579
Active healthy - Inactive hypermobility	0.24	1
Inactive healthy - Active hypermobility	6.92	30.11
Inactive healthy – Inactive hypermobility	3.33	0.682
Active Hypermobility - Inactive hypermobility	3.59	0.629

According to Tukey test results are shown in the table above:

- Proprioception angle of 45 degrees elbow inactive girls with hypermobility syndrome less than proprioception inactive healthy group but this difference was not significant (p = 0.12).
- Proprioception angle of 45 degrees elbow joint in active girls with hypermobility syndrome less than proprioception active healthy group, but this difference was not significant (p = 0.99).
- Proprioception angle of 60 degrees inactive the elbow joint in girls with hypermobility syndrome less than proprioception inactive healthy group, but this difference was not significant (p = 0.68).
- Proprioception angle of 60 degrees elbow joint in active girls with hypermobility syndrome less than proprioception active healthy group, but this difference was not significant (p = 0.57).
- Figures 4-2 and 4-3 Proprioception means and standard deviations angles of 45 and 60 degrees elbow active and inactive girls with general hypermobility syndrome and healthy is showing.

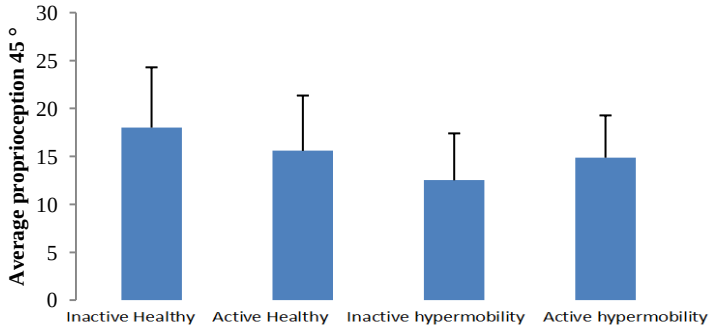

Figure (2) Average 45-degree angle elbow joint proprioception

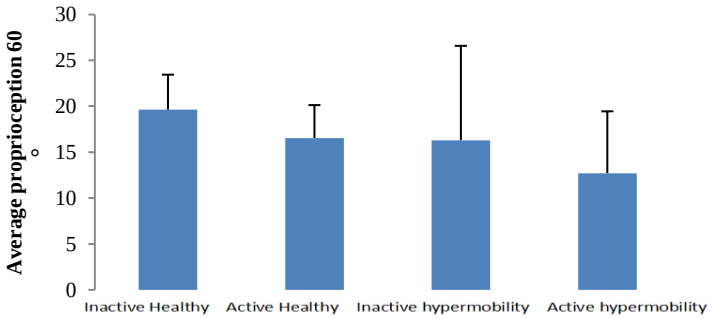

Figure (3) Average 60-degree angle elbow joint proprioception

4.3 The third hypothesis:

Between range of motion elbow active and inactive girls with general hypermobility syndrome and healthy there are differences (table 4).

Table 4 Results of Turkey test the range of motion in comparison the elbow joint in the groups

Groups	Mean difference	P
Inactive healthy - Active healthy	2	0.714
Active healthy - Active hypermobility	10.3	0.001
Active healthy - Inactive hypermobility	6.30	0.010
Inactive healthy - Active hypermobility	8.30	0.001
Inactive healthy – Inactive hypermobility	4.30	0.120
Active Hypermobility - Inactive hypermobility	4	0.164

According to Tukey test results are shown in the table above:

- Between range of motion of the elbow joint inactive healthy girls with active hypermobility group (p = 0.001), there was a significant difference.
- Between range of motion of the elbow joint active healthy girls with active hypermobility group (p = 0.001), there was a significant difference.
- The range of motion elbow joint hypermobility groups active was more compared to deactivate hypermobility but this difference was not significant (p = 0.16).
- The range of motion the elbow joint disable healthy group was more compared to active healthy group but this difference was not significant (p = 0.714).

Figure (4) Show the mean and standard deviation range of motion of the elbow joint active and passive girls with general hypermobility syndrome and healthy.

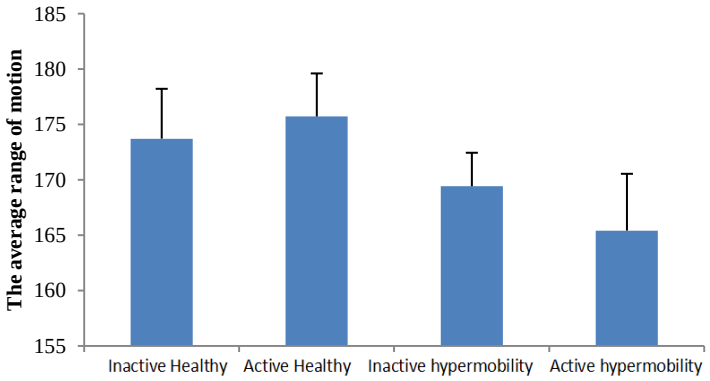

Figure (4).The average range of motion of the elbow joint

5. Conclusion:

In this study, three variables of muscle strength, proprioception at angles of 45 and 60 degrees and range of motion of elbow joint, active and inactive girls healthy and with general hypermobility syndrome was evaluated and the results showed that muscle strength elbow joint between the active and inactive girls with general hypermobility syndrome and healthy, there is a significant difference, While between the elbow joint Proprioception active and inactive girls with general hypermobility syndrome and healthy, there was no significant difference. Also amount Proprioception in hypermobility active and inactive angles 45 and 60 degrees relative to the control group decreased, but the decrease is not significant. Also between range of motion active and inactive girls elbow joint with general hypermobility syndrome and healthy significant difference was observed.

6. Suggestions:

Suggestions arose from study:

- The results showed that muscle strength elbow joint between the active and inactive girls with general hypermobility syndrome and healthy, are difference. Therefore, measuring the power in this people in order to choose sports teams and also to prevent the possibility of injury is suggested.
- According to lower elbow joint Proprioception active and inactive girls with hypermobility syndrome compared to active and inactive healthy to trainers recommended that special exercises to improve proprioception in people with hypermobility syndrome in school athletic programs should be used.

Due to significant differences in range of motion in the elbow joint active and inactive girls with general hypermobility syndrome and healthy, assessment of range of motion girl students In order to detect and prevention of problems associated with this syndrome and avoid forbidden actions in sport for detected offered to trainers.

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