Impact of Pilates Exercises on the Muscular Ability and Components of Jumping to Volleyball Players

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Abstract: This study is regarded a methodological attempt to identify the impact of Pilates exercises on the muscular ability and components of jump on Volleyball Players. Researchers have noticed the low level in skill performance and their endurance to continue the performance in a good way particularly in matches that are approximately similar in level. So, researchers tended to use Pilates exercises to identify their impact on raising muscular ability level and components of jump simultaneously. The experimental approach was applied on a sample of 20 players of eastern company sportive club in Arab Republic of Egypt, their ages ranged between 18 and 20. One of the most important results of this research was the improvement in muscular ability level of legs in the posterior measurement than the prior one by 12.04%. Also, there is an improvement in jump components. The improvement percentage of the jump height was by 12.58%. As of the flying time, it was 7.86%. As for the power, there was a decrease in level by-11.71%. Contact time decreased in the prior measurement by-5.50% than the posterior one. As for biological capacity variable, there was an improvement estimated by 12.86% in posterior measurement than prior one. There was an improvement in attack performance by 10.06% and it was 20.94% in the block.

Key words: Pilates exercises • Muscular ability • Jump components

INTRODUCTION

The widespread of volleyball all over the world has the greatest effect in promoting the level of players considerably in all sides of preparation especially the physical one. It was necessary to use advanced techniques enabling players to reach highest level technically or physically besides coaches getting ample information about their players through the continuation of developing the level and its follow-up [1].

Volleyball skills aren't easy enough and need a very long to perfect. They need training based on special scientific bases especially we take into account the speed of the ball, the smallness of the court and the necessity that every player should defend and attack at any time on changing the position with every point he scores [2].

The ability to jump plays an effective and important role in volleyball, it has to be said that its developing leads to showing its effectiveness when the competitors are on equal level [3]. Because jump skills are greatly complicated that it is nearly the outcome of vertical force and horizontal speed besides harmony and synchronization of the work of arms and feet (swings and pushing). There is also total harmony related to the skill and plan achievement during attack and block. It has become necessary that perfecting jump (which is a skill in its self) should develop the use of Fartleks and Plyometrics and Pilates and others through non-stoppingly continuous training that's because it is one of the most important necessities and requirements of the game.

With the continuation of the jump process especially during performing plan and skill duties, we have the improvement and skill development. This isn't of course a condition to improve and develop jump which most coaches think that any forms of different jump exercises will lead to apparent target which is the increase of the jump vertically or the distance of the jump whether up or forward. But with the increase of plans complexity and attack formations and block with all its different techniques (stability and motion) jumping has become a major requirement which doesn't only depend on quantity (the height of the jump) but it mixes with quality to achieve the special tasks of the player and the team...
The trunk area is the control area in performance especially if that performance depends on the force of the limbs. Matchingly, coaches should commit to three principles: (1) the development of the muscular force of trunk muscles before the limbs muscles (2) the development of the force of ligaments and cords before developing muscles (3) the balance in developing backward and forward muscles of the trunk. This is the first reason of the easiness of developing the physical force of the limbs [5].

Pilates technique is regarded one of the modern techniques in training in general and volleyball training in particular [6]. Pilates technique is regarded of exercises that help give the right form of body without prominent muscles and strengthen weak muscles. He looks upon it as an exercise which helps elongate the short muscles through concentrating on one muscular set without causing in tense of other muscles of the body. Therefore, these exercises focus on structure correctly with following rationed technique of breathing thus an individual feeling of his body is improved. One of the basic principles of the Pilates technique is the correct breathing accompanying every exercise brings out expansion of the two sides and the relaxation of abdominal muscles with breathing in and controlling the abdominal muscles and intensifying them towards the back on breathing out [6,7].

Because volleyball skills require more cooperation in the work of muscles (whatever different the muscular contraction nature is) therefore coaches must work out a technique to train their players about the nature of muscular contraction diversity. Researchers were obliged to do this study as one of the methods or techniques to solve the problem of Volleyball Players which is concentrated in the weakness of attack performance and block from the point of view of form of performance and the inability of players to perform different attack which require the ability to jump with scoring more points and developing muscular performance level, this research is one of the attempts to find a technique through which we can improve muscular ability as one of the references to improve the height jump, attack and block of Volleyball Players. This is done through the use of Pilates exercises.

Targets: This thesis aims through using Pilates exercises on muscular ability and components of jump of Volleyball Players at:

- Identifying the effect of Pilates exercises on Volleyball Players legs muscular ability level.
- Identifying impact of Pilates exercises on Volleyball Players jumping components level.
- Identifying the effect of Pilates exercises on volleyballer biological capacity efficiency level.
- Identifying the effect of Pilates exercises on skill performance of Volleyball Players block and attack.

Terminology

Pilates Exercises: It is a set of exercises defined to build muscular power, flexibility, muscular endurance and achieving the whole bodily balance through motor performance with the technique suitable breathing to re-improve the relation between mind and body [8].

MATERIALS AND METHODS

Researchers conducted this study using the experimental approach to design one set with the technique of prior-posterior measurement on a sample Sharkeyah Lelddukan Volleyball Players in Egypt and it was consisting of twenty players aging from 18 to 20 years old. This study has been conducted of three steps (1) doing the posterior measurement on Tuesday 17-6-2008 by measuring height, weight, legs muscular ability, jump components, biological capacity, block and attack performance level. (2) Applying a training course from Sunday 22-6-2008 to Thursday 31-7-2008, using Pilates exercises in this training course. (3) Third step: Posterior measurements on Tuesday (5-8-2008) are performed on all variables we already performed in prior measurements.

The components of the training course being used:

- Duration of training course is six weeks.
- Weekly training units are four.
- Time of unit is determined matching to the number of training units.
- Warming-up before the beginning of every training unit.
- Relief at the end of every training unit.

Warming-up in all training units:

- Doing 10 laps around the court.
- Running with pushing legs forward.
- Running with rotating arms forward around the court.
- Jump with rotation arms backward around the court.
- Jump aside the face towards around the court.
- Jump aside the face outside around the court.
- Running with high lifting of the knees around the court.
- Running with the touch of rump with heels around the court.
- Forward jump around the court.
- Forward jump without bending knees around the court.
Elongations and Flexibility:
- [Linear sitting] bending the trunk forward downwards (30 sec)
- [Hurdles sitting] stability (30 sec)
- [Pushing forward] pushing pelvis forward downwards (30 sec)
- [Pushing aside] pushing pelvis forward downwards (30 sec)
- (Lying down squatting) lifting pelvis forward and upward then lifting the leg forward and upward.

Relaxation:
- (Lying down opening the legs) deep breath (fast breathing in followed slow breathing out)
- (Lying down) bending the two legs against the thighs.

Training Course Exercises
Pilates Exercises:
- (Linear sitting) lifting legs upwards.
- (Balance sitting) exchanging the opening of legs.
- (Lying down aside) lifting arms and legs backward.
- (Lying down arms aside) gathering legs with clapping backward.
- (Resting heels on a box and shoulders on another) with lowering rump.
- (Leaning lying down) exchange lifting legs upwards.
- (Leaning lying down) exchange lifting the arm with the leg adversely.
- (Lying down arms upward) exchange lifting the leg with the arm adversely.
- (Lying down lift) the arm backward with lifting the adverse leg backward and upward.
- (Leaning lying down) lift the leg aside.
- (Leaning lying down on the arm) exchange putting the upper leg forward and upward.
- (Lying down two arms aside) lifting the legs upward and backward.
- (Lying down two arms aside) lifting the legs forward, upward and backward with opening.

Research Physical Variables:
- Physical ability of legs
- Jump components
- Biological Capacity
- Performance level of block and attack

Statistical Analysis:
statistical manipulations are performed after finishing posterior measurements using (SBSS), where we analyzed the results using the (mean), standard deviation, Person correlation coefficient, T test and change ratio.

RESULTS AND DISCUSSION

Results showed that there aren't any statistically significant differences in the following variables (age-height-weight) (Table 1) which indicates the harmony of sample's research as well as the possibility of conducting such an experiment in such a sample. These results made clear that there are statistically significant differences between the two distinctive and non-distinctive groups. This indicates the credibility of tests under study (Table 4). Results have also made clear that there is

Table 1: Specification of search sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement Unit</th>
<th>M(Mean)</th>
<th>Std.Deviation</th>
<th>Median</th>
<th>Convolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Year</td>
<td>19.40</td>
<td>0.68</td>
<td>19.50</td>
<td>-0.72</td>
</tr>
<tr>
<td>Height</td>
<td>Centimeter</td>
<td>189.55</td>
<td>3.46</td>
<td>5.02</td>
<td>0.46</td>
</tr>
<tr>
<td>Weight</td>
<td>Kilogram</td>
<td>86.40</td>
<td>5.02</td>
<td>84.50</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Table 2: Distributing exercises program on training units

<table>
<thead>
<tr>
<th>Program Phases</th>
<th>Program Description</th>
<th>Training Units</th>
<th>Exercises included in training units</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Day after day</td>
<td>1-6</td>
<td>Warming-up, elongation, 1,2,3,4, relaxation</td>
</tr>
<tr>
<td>Second</td>
<td>Day after day</td>
<td>7-12</td>
<td>Warming-up, elongation, 5,6,7,8, relaxation</td>
</tr>
<tr>
<td>Third</td>
<td>Accelerating</td>
<td>13-18</td>
<td>Warming-up, elongation, 9,10,11,12 relaxation</td>
</tr>
<tr>
<td>Fourth</td>
<td>Daily training to increase intensity</td>
<td>19-24</td>
<td>Warming-up, elongation, 13,14,15, relaxation</td>
</tr>
</tbody>
</table>

Table 3: Forming training load

<table>
<thead>
<tr>
<th>Phase</th>
<th>Intensity</th>
<th>Repetition</th>
<th>Groups</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>75%</td>
<td>Matching to time</td>
<td>6</td>
<td>Triple of Time performance</td>
</tr>
<tr>
<td>Second</td>
<td>80%</td>
<td>Matching to time</td>
<td>5</td>
<td>Double of time performance</td>
</tr>
<tr>
<td>Third</td>
<td>80%</td>
<td>Matching to time</td>
<td>4</td>
<td>Double of time performance</td>
</tr>
<tr>
<td>Fourth</td>
<td>85%</td>
<td>Matching to time</td>
<td>4</td>
<td>Equal to time performance</td>
</tr>
</tbody>
</table>

N.b: Intensity can be specified through maximum time of every exercise.
Table 4: Significance of differences between distinctive and non-distinctive group of variables (muscular ability-biological capacity-attack-block) to calculate discriminate validity. N=40

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement Unit</th>
<th>Group</th>
<th>N</th>
<th>M (mean)</th>
<th>Std. deviation</th>
<th>T.Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscular ability</td>
<td>Cent.</td>
<td>Distinctive</td>
<td>20</td>
<td>36.4150</td>
<td>0.40559</td>
<td>8.296*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-distinctive</td>
<td>20</td>
<td>34.1300</td>
<td>1.16307</td>
<td></td>
</tr>
<tr>
<td>Biological capacity</td>
<td>mmHg.</td>
<td>Distinctive</td>
<td>20</td>
<td>4065.0000</td>
<td>74.51598</td>
<td>7.964*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-distinctive</td>
<td>20</td>
<td>3890.0000</td>
<td>64.07233</td>
<td></td>
</tr>
<tr>
<td>Attack</td>
<td>mark.</td>
<td>Distinctive</td>
<td>20</td>
<td>55.7000</td>
<td>0.97872</td>
<td>10.174*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-distinctive</td>
<td>20</td>
<td>52.7500</td>
<td>0.85070</td>
<td></td>
</tr>
<tr>
<td>Block</td>
<td>mark.</td>
<td>Distinctive</td>
<td>20</td>
<td>20.4000</td>
<td>0.68056</td>
<td>7.095*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-distinctive</td>
<td>20</td>
<td>18.7500</td>
<td>0.78640</td>
<td></td>
</tr>
</tbody>
</table>

Tabular value of (T) at significance level (0.05) and freedom degree 38 is 1.684.

Table 5: Correlation coefficient between first and second application to calculate stability of tests. N=20

<table>
<thead>
<tr>
<th>First application</th>
<th>Second application</th>
<th>(R) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(M)</td>
<td>Std. deviation</td>
<td>(M)</td>
</tr>
<tr>
<td>36.38</td>
<td>0.39</td>
<td>36.38</td>
</tr>
<tr>
<td>4057.89</td>
<td>69.25</td>
<td>4068.42</td>
</tr>
<tr>
<td>55.36</td>
<td>0.96</td>
<td>55.68</td>
</tr>
<tr>
<td>20.32</td>
<td>0.58</td>
<td>20.26</td>
</tr>
</tbody>
</table>

Tabular value of (R) at significance level 0.05 and freedom degree 38 is 0.444

Table 6: Significance of differences between posterior and prior measurements of research variables. N=20

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement unit</th>
<th>Measurement</th>
<th>M</th>
<th>Std. deviation</th>
<th>&quot;T&quot; value</th>
<th>Improvement Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscular ability of Sargent</td>
<td>Cent.</td>
<td>post.</td>
<td>35.585</td>
<td>1.38537</td>
<td>21.449*</td>
<td>12.04%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>39.870</td>
<td>1.48576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological capacity of lungs</td>
<td>Marks.</td>
<td>post.</td>
<td>4005.0000</td>
<td>105.00627</td>
<td>18.789*</td>
<td>12.86%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>4520.0000</td>
<td>136.11141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attack level test</td>
<td>Marks.</td>
<td>post.</td>
<td>54.6500</td>
<td>1.63111</td>
<td>12.724*</td>
<td>10.06%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>60.1500</td>
<td>0.67082</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block level test</td>
<td>Marks.</td>
<td>post.</td>
<td>19.8500</td>
<td>1.03999</td>
<td>26.814*</td>
<td>24.94%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>24.8000</td>
<td>0.61559</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flying time</td>
<td>Parts of second.</td>
<td>post.</td>
<td>558.3000</td>
<td>1.83819</td>
<td>73.982*</td>
<td>7.86%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>602.2000</td>
<td>1.93581</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jump height</td>
<td>Cent.</td>
<td>post.</td>
<td>35.1300</td>
<td>1.50406</td>
<td>14.650*</td>
<td>12.58%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>39.5500</td>
<td>1.46808</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Joule</td>
<td>post.</td>
<td>24.8065</td>
<td>1.37809</td>
<td>9.652*</td>
<td>-11.71%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>21.9025</td>
<td>1.01209</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact time</td>
<td>Parts of second.</td>
<td>post.</td>
<td>535.2000</td>
<td>4.76390</td>
<td>26.232*</td>
<td>-5.50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior.</td>
<td>505.7500</td>
<td>1.33278</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tabular value of (T) at significance level 0.05 and freedom degree 18 is 1.734.

statistically significant correlation between the first and second application of the test, which stresses stability of tests (Table 5). Results made clear that there are statistically significant differences between prior and posterior measurements in legs muscular ability variable in favor of posterior measurement (Table 6) as there was a 12.04% improvement in muscular ability of the posterior measurement than in prior one. Results have also proved there are statistically significant differences between prior and posterior measurements in jump components such as height of jump and flying time in favor of posterior measurement. There was a 12.58% improvement in jump height. As for flying time, there was a 7.86% improvement in favor of posterior measurement (Table 6). We find that there are statistically significant differences in power components and contact time in the posterior
measurement rather than prior one. There were changes as there was a decrease in the exerted effort level with a percentage valued (-11.71%). There was also a decrease in contact time with a percentage valued (-5.50%). Results have proved also that there are statistically significant differences between posterior and prior measurements of biological capacity and in favor of posterior measurement as there was 12.86% improvement in that variable (Table 6). Whereas we find statically significant differences between posterior and prior measurements in block and attack variables in favor of posterior as there was a 10.06% improvement in attack, but it was 24.94% improvement in block.

From table 4, we find statistical significant differences between two distinctive and non-distinctive groups which signify validity of tests. From the table, we find statistical significant differences between first and second application which signifies the stability of tests and values of correlation coefficient range between 0.894 and 0.971.

From Table 6, it is quite clear that there are statistically significant differences between posterior and prior measurements in muscular ability, biological capacity and level of block, attack, flying time, jump height and power and contact time in favor of posterior measurement. It is quite clear that there is 12.04% improvement in muscular ability variable, 12.86% of biological capacity, 10.06% of attack level, 24.94% of block level, 7.86% of flying time, 12.58% of jump height, -11.71% of power and -5.5% of contact time.

Survey of results of Table 6, it is clear that there are statistically significant differences between prior and posterior measurements in favor of posterior measurements in vertical jump variables which express the muscular ability of legs in favor of posterior measurements. The estimated value of (t) was bigger than its tabular value with an improvement percentage (12.04%) in posterior measurement rather than prior one of legs muscular ability variable. It is regarded one of the most significant variables the volleyball player needs so as to jump higher. And it is regarded a crucial factor in the success of several skills such as attack and block as these skills require the element of ability in their performance.

Researchers refer that Pilates exercises led to the improvement of muscular work among back and abdominal muscles in motor control of limbs. Which matches what was mentioned in previous studies that trunk area is the control area in motor performance especially if this performance depends on the strength of limbs through keeping the balance in improving forward and backward trunk muscles [5, 9]. This refers that Pilates exercises led to improving the nervous system ability in increasing the harmony of muscular work between upper and lower limbs muscles. And this matches with what mentioned that volleyball player mostly needs during motor performance in matches, to considerable harmony between body’s parts during performance. And this associates with muscle tone or muscles tension which suits the nature of target performance. Also, reflexes help achieving the required balance between stimulation and refraining processes within working muscles set inside motor performance and that is called motor harmony [10].

From Table 6, there are statistically significant differences between posterior and prior measurements in flying time, jump height in favor of posterior measurement. The estimated value of (t) was bigger than its tabular value in these variables. Table 6 asserts this significance where the improvement percentage of flying time in posterior measurement rather than prior measurement was 7.86% and the improvement percentage of jump height was 12.58% in posterior measurement rather than prior measurement. While we find there are differences in two variables of contact time and power, these differences referred variables decreasing. From Table 6, there is a decrease in power level as well as a decrease in contact time in posterior measurement rather than prior measurement. Researchers explain that this decrease is because of impact of Pilates exercises which depend in the first place on similar exercises which unify body and mind using rationed breathing matching to used exercises characteristics during preparation period before competitions. Its impact appeared on flying time and jump height with exerted effort amount (the entrance of oxygen into components of blood loaded with food the thing which generates power, which may affect oxygen consumption ratio and biological capacity amount, so we will find that the jump height increased.

Researchers explain that the more air vesicles of lungs are full of a larger amount of air, the more the jumper stays longer in the air, the thing which increases flying time during jump activities. Matching to the game requirements and depending on rational illustration of jump process, so what we aspire of Pilates exercises is that exerting less effort (power) in a lesser time with highest jump during skills interrelated these elements.

Concerning counter jumps during performance, we must have the least contact time accomplish the intended target for all volleyball skills in which jump activities merge. Researchers also explain that using these exercises led to improving the muscles work between back and
abdominal muscles, so we can control trunk muscles which are the basic in motor control of limbs. In previous studies there was an emphasizing on that trunk area is the control area in motor performance through keeping the balance of front and back trunk muscles [5].

These results match other researches that the purpose of the jump is that the player achieves the utmost possible height in less time of contact with the ground, less flying time and less power ratio. Although we train the player to be able to generate the highest possible amount of power, this is only used to increase body systems capacity and not for depleting efforts resulted from repeating jumps using a specified technique in breathing which allows him to achieve this target [11, 12].

From Table 6, it is clear that there are statistically significant differences between prior and posterior measurements in favor of posterior measurement in biological capacity variable, where estimated value of (t) was bigger than its tabular value in this variable and this was stressed by Table 6. There was improvement percentage valued 12.86% in posterior measurement other than prior measurement of biological capacity variable. Researchers explain this improvement in the biological capacity amount that the use of Pilates exercises led to the increase in the flow of Oxygen-carrying blood to the muscles, therefore that led to improvement of circulation blood which contributed to increasing size of lungs with oxygen. Also, there is an increase in ratio of oxygen in blood which nourishes set of working muscles which in turn led to increase in oxygen ratio in the muscle at the expense of Carbon dioxide, which naturally delayed the feeling of tiredness.

Biological capacity is affected by the state of air passages. In case of narrowness of these passages, biological capacity decreases. In case of wideness of these passages by Oxygen, biological capacity increases. This is done through the use of a certain way of breathing (Pilates exercises). These exercises help improve the state of air passages as the wideness of these passages increase the biological capacity [4]. These results match with results of previous researchers that the use of Pilates exercises led to decrease in both weight, pulse and blood pressure and an increase in biological capacity efficiency level [4, 9]. The use of Pilates exercises led to strength of abdominal and middle muscles, flexibility of trunk muscles and raising level of biological capacity efficiency [13, 14].

From Table 6, it is clear that there are statistically significant differences between prior and posterior measurements in favor of posterior measurement in attack level which is regarded a result of the increase of muscular ability of legs in favor of posterior measurement. Table 6 emphasizes this significance with an improvement percentage valued 10.06%. It is also clear that there are statistically significant differences between prior and posterior measurements in block effectiveness level which is regarded a result of the increase of muscular ability of legs in favor of posterior measurement. Table 6 stresses that there is an improvement valued 24.94%, as attack and block are regarded the most important basic skills in volleyball which may determine final result in volleyball matches, they also express the extent of improvement in players abilities related to increase of speed of skills performance after they perfect them. This also refers to the fact that Pilates exercises led to improving nervous system ability in increasing harmony of muscles work between muscles of lower and upper limbs.

This matches with other studies which assure that technical performance won't be perfect without improving work of muscles in storing and releasing energy matching to orders and neural signs coming from central nervous system. It also led to improving ability to resist change in form under effect of external forces related to amount, direction and timing through work of both stimulants and inhibitors. Consequently, these produce appropriate amount of muscular power. This improvement shows extent of improving players their abilities to function their muscular ability during motor performance [15]. All this asserts that use of Pilates exercises led to improvement of nervous system in functioning muscles work between working muscles in motor performance [11]. Pilates exercises basically depend on integration of central nervous system, muscular system and joint system. These exercises may lead to taking right positions during motor performance with keeping balance and imbalance during performance. They can be performed without using equipment or using available equipment which help take right positions in performance [16-23].

As we previously uttered, researchers can say that Pilates exercises led to improvement of muscles work "back and abdominal muscles" which led to improvement in control of trunk muscles which are considered a basic in motor control in matches. They can also lead to jumping as high as possible and in the right time. This is related with capacity of both muscular and nervous systems to provide muscles work which suits nature of target performance. Finally it is considerable to refer that improvement in muscular ability of trunk muscles side by side with keeping balance and integration between muscles work of both back and abdominal muscles, are regarded the important and crucial factor in improving muscular ability of legs. These are all what researchers have reached so far in this respect.
CONCLUSION

- Regular use of Pilates exercises leads to improvement in leg muscular ability by 12.04%.
- Regular use of Pilates exercises leads to improvement in jump height by 12.58% and flying time by 7.86% and a decrease in power level by-11.71% and a decrease in contact time by-5.50%.
- Regular use of Pilates exercises leads to improvement in biological capacity by 12.86%.
- Regular use of Pilates exercises leads to improvement in attack performance level by 10.06% and effectiveness of block level by 24.94%.

REFERENCES
