Stages of Microtrauma In Iraqi Athletes and Ways to Reduce Their Incidence and Severity

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Abstract: The research aims to study the microtraumato which athletes are exposed and that arise from the high exercises that the athlete exerts that exceeds his physiological ability, which leads to microtraumain the areas of contact between the tendons and muscles especially in most areas of the body, as well as informing coaches and athletes of the seriousness of these injuries to prevent their recurrence and exacerbation which affects public health and sports level. The researchers assumed that most of these injuries occur in the knee joint and in the macrophage's muscles of the thighs, then analyze and scan records of the Specialized Sports Medicine Center in Baghdad for the years 2015-2016/2017-2018. The sample included (965) nine hundred and sixty-five patients who recheck the aforementioned specialized center where they suffering the pain and inflammations caused by these injuries at various areas of the body, where distributed (681) from the athletes(284) who are not athletes. Some information related to the causes of injuries was extracted and collected directly from the athletes by means of an information form prepared for this purpose. The injuries were distributed to the joints of the body, especially the knee, shoulder, ankle and elbow joints, the front muscle of the shin, the macrophage’s muscles of the thighs and other areas. The degree of infection also varied from one case to another, and the first stage was the most common form of capillary hemorrhagic injury and inflammation, followed by the second stage of fibrosis and then the third stage of calcification. There are many causes for the occurrence of these injuries, including high exercises and the repetition of certain movements with no legalization of training programs according to the athlete individual's ability and his physiological abilities to withstand the performance and the burden of training and not to give full rest, as well as the ground for the stadiums which is one of the important reasons for these injuries. The researchers recommended that the training programs should be codified according to the capabilities of the individual, pay attention to periodic checks and review the physician therapist in the specialized centers for treatment, with the improvement of the grounds for training or competition.

Keywords: Stages of Microtrauma, Athletes, Incidence and Severity, Prevention Programs

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1. Introduction

The scientific advances witnessed in the sports fields made the sport closely related to the various sciences such as physiology, biomechanical training, anatomy and sports medicine. The latter played a prominent role in maintaining the athletes from exposure to sports injuries and contributed to its treatment. Prevention of injury is an important aspect in sports medicine as well as attention to prevention programs will keep the athlete from exposure to injuries in the sports field [1].

Athletes are exposed to various sports injuries and the proportion of these injuries and the severity differ from game to game depending on the specialized activity. It is known that injuries occur due to external severity and called acute injuries which occur due to external influences such as fracture, dislocation, sprains, muscular rupture. There are other small microscopic injuries called micro-trauma [2]. These injuries began to appear due to increased training effort requirements and occur because of repetition of certain movements required by sporting activity such as frequent jumping or hitting the balls continuously, such as in tennis or volleyball game or perform fast movements in boxing beyond
the ability of the athlete. Note that these injuries are old and present, and various scientific sources and many researchers have been exposed to them, and among them are the Russian surgeon (Priorov 1958) where he mentioned the injuries that occur due to minor effects beyond the ability of the physiological resistance of the tissues leading to their occurrence and recurrence, which contributes to the change of tissue function and their configure. As for Lacafee 1985, explained that the frequency of small injuries leads to chronic functional changes in exercise that requires high exercise [3]. The problem of these injuries is the underestimation of the seriousness of the coaches and athletes, which leads to their mutual negligence and lack of treatment. The most affected areas of the body are the knee and shoulder articulations, connective muscles of the thighs and patellar tendon. The most important causes of microsurgical injuries are high voltage, the practitioner of sport before symmetry to heal by the injured.

Athletes may continue to exercise despite suffering invisible microscopic injuries (micro-trauma), so they are neglected these injuries and with the continuation of training repeated injury causing an increase in pain with the occurrence of pathological changes in the injury area of the above become clear the seriousness of these injuries, which calls for finding a scientific formula to study and clarify to athletes and coaches to reduce the risk and reduce the negative impact on the sports level.

2. Aim of research
- Identify the stages of microtrauma among Iraqi athletes.
- Trying to enlighten the coaches and athletes of the presence of these injuries and their danger to the athletes and the sports level, and trying to reduce the rates and intensity of their occurrence.

2.1 Research Hypothesis:
- The most common areas of the body are the knee and shoulder joints, the macrophage’s muscles of the thighs, Patellar tendon.
- The most important causes of microtrauma are high exercises exercise practitioner before recovering by injured.

2.2 Research fields:
- The human field: Athletes with microscopic injuries who consulted the Medical Center Athlete in Baghdad and all sports and those diagnosed with a medical condition.
- Spatial field: Sports Medicine Specialist Center / Baghdad.
- Time frame: extended period from 2/1/2015 until 31/12/2018.

2.3 Stages of Microtrauma

The changes in the affected tissue occur in three stages intertwined with each other, and only the sports doctor can find out after checking and diagnosis by assistive medical devices.

- In the first stage, due to the high exercises that exceeds the ability of the muscle tissue, delicate tears occur in these tissues, especially in the areas of connected between the muscle and bone in the tendon area. This indicates the occurrence of microtrauma with occurrence inflammatory changes in the covers of the tendons of the muscles and in the covers of the joints and bones lead to the accumulation of inflammatory cells with exudation in the connective tissue and capillary hemorrhages in area [3]. Aspirate the connective tissue and capillary hemorrhage in the area. Initially occur in the form of injury due to high exercises and at this stage the athlete feels pain after the performance of certain movements at the beginning of training or competition and then go away after these pains warm up and reappear after the end of exercise [4, 5, 6, 7]. Rest is important in the treatment of these injuries, especially in the first stage, where it helps the body to absorb fluids for inflammation accumulated by the injury and the rest of 4-6 days with giving some analgesic and anti-inflammatory drugs with the assurance that the rest is positive [3].

- The second stage called fibrosis that the presence of fibrous tissue negative impact in the performance of some of the movements required due to the disappearance of the viscous property of these tissues, which is important in the performance of the movement [3] at this stage increases the severity of pain and becomes unable to complete the training units or races only using drugs and pain reducing medicine and the rest period is from 1 to 3 weeks and may increase from 4 to 6 weeks when the injury recovery [8].
Third stage, the fibrosis in the affected tissue becomes calcified. This stage begins when calcareous deposits appear in the inflamed and fibrous tissues with exudative changes in the cartilage encapsulated in the bone inside the joint or in the bone tissue itself [3] and it is possible to detect these deposits by radiographic examination, and at this stage may reach the rest to 60 days with emphasis on physical therapy [9]. Surgical intervention is used to remove calcification and fibrosis sources confirm that the deposition of calcium in the affected area calls for surgical intervention [10].

3. Research method and field procedures

3.1 Research methodology

The two researchers used the survey method for its suitability of natural research.

3.2 Samples Included in The Study

The samples consisted of individuals and consisted of players and athletes who suffer from microtrauma in three stages, where the diagnosis was made by the attending physician at the Specialized Center for Sports Medicine in Baghdad. Five doctors alternated for diagnosis and treatment throughout the research period. Where the sample was identified from sports medicine reviewers who suffer from microtrauma that are not visible and their ages from 18 to 42 years old and the examinations were carried out by the Sports Medicine Specialist Center for the period from 2014 to 2018. All acute and other injuries were neglected.

Table 1: Number and percentages of athletes and non-athletes included in the current study in the period of 4 years.

<table>
<thead>
<tr>
<th>Years</th>
<th>Athletes</th>
<th>Percentage</th>
<th>Non-athletes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>137</td>
<td>20.11</td>
<td>68</td>
<td>23.9</td>
</tr>
<tr>
<td>2016</td>
<td>203</td>
<td>29.80</td>
<td>83</td>
<td>29.3</td>
</tr>
<tr>
<td>2017</td>
<td>159</td>
<td>23.34</td>
<td>61</td>
<td>21.4</td>
</tr>
<tr>
<td>2018</td>
<td>182</td>
<td>26.72</td>
<td>72</td>
<td>25.3</td>
</tr>
<tr>
<td>Total</td>
<td>681</td>
<td>70.56</td>
<td>284</td>
<td>29.44</td>
</tr>
</tbody>
</table>

It is clear from Table 1 that the number of injured people who visited the Specialized Center for Sports Medicine and examined by specialized doctors is 965 individuals suffering from micro-trauma. The table shows that the number of athletes for the four years is 681 athletes, representing 71.5%, while, the number of injured non-athletes for the same period, 284 individuals, representing 29.5% were excluded because the researchers do not need them.

4. Method:

The information was drawn from the injured athlete through a standardized questionnaire form to find out the reasons for the occurrence of microtrauma. Including the examinations used for diagnosis and the causes that contributed to the occurrence microtrauma and treatments used, and the type of ground these athletes have trained on and used this information to complete the search. The researchers carried out the following procedures for the purpose of completing the research:

- Searching for athletes with microtrauma and urging them to check with the Medical Center Athlete to perform examinations and confirm scientifically on the presence of microtrauma.
- The attending physician examines the injured athlete or athlete and upon confirmation of his injury, falls under sample list.
- Diagnosis is made through a medical examination as following:
  - **Clinical examination**: examination without medical devices.


- **Regular radiographic examination**: Perform radiography of the affected areas and the imaging was anterior, posterior and lateral view.
- **Colored radiographic examination**: The joint was injected with urocraven with the appropriate amount of air to determine by the attending physician for the purpose of showing and clarifying changes in non-bone tissue that cannot be distinguished in normal radiography.
- **Endoscopy examination**: used for the knee joint in case of inability to diagnose by previous examinations to see changes in the subcutaneous adipocarcinoma and lining cartilage for the patellar bone that accompanies chronic inflammation of micro-trauma in the injured joint.

5. Results and Discussion

Table 2: Number and percentages of athletes according to the stages of injury (Micro-trauma).

<table>
<thead>
<tr>
<th>No.</th>
<th>Stages of Micro-trauma</th>
<th>Number</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>First stage</td>
<td>432</td>
<td>63.4 %</td>
</tr>
<tr>
<td>2.</td>
<td>Second stage</td>
<td>176</td>
<td>25.8 %</td>
</tr>
<tr>
<td>3.</td>
<td>Third stage</td>
<td>73</td>
<td>10.7 %</td>
</tr>
<tr>
<td>4.</td>
<td>Total</td>
<td>681</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Table 2 shows the distribution of the injured according to the stage of injury, where it was found that the injured in the first stage 432 athletes make up 63.4%, while the number of injured in the second stage 176 athletes make up 25.8%, while the number of injured in the third stage 73 athletes represent 10.7%.

As for the third stage in which the injury becomes advanced and requires surgical intervention to remove calcifications in the affected area where the fibers turn into calcifications and this confirms that the injury is old and passed through two stages before reaching the third stage, indicating not caring in the injury and not to see the attending physician. The lack of guidance of coaches to the athletes to stop training or competition thus. The researchers showed that 10.7% of the sample classified within this stage which is a high rate and it is necessary not to reach the athletes to this stage but very few of them, if there is guidance and awareness of health of interest in periodic examinations. The references indicated that repeated and excessive use leads to gradual damage to the tissues and turn them into fibrous tissue and then take these fibers to turn into a bone leading to calcification.
Therefore, the researchers of current study believe that the early diagnosis of these injuries is important and the priority in maintaining the athletes when exposed to injuries and trying to prevent recurrence and that there is an awareness of coaches and athletes not to exercise sports training and competition only when full recovery with conducting some simple exercises that maintain the athlete's physical fitness with train the intake and reduce the effort on the injured area to prevent the injury from worsening and the references remember not to allow the injured athlete to return to sports practice, if this exposes him to more serious things, in order to prevent the injured athlete from injury complications [15].

5.1 Review, analyzing and distribution of microtrauma by their location in the body

Table 3: Distribution of microtrauma in joints, muscles and tendons

<table>
<thead>
<tr>
<th>Change</th>
<th>Joints</th>
<th>muscles</th>
<th>Muscle tendons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knee joint</td>
<td>Elbow joint</td>
<td>Shoulder joint</td>
</tr>
<tr>
<td>Number</td>
<td>178</td>
<td>42</td>
<td>71</td>
</tr>
<tr>
<td>Percentage</td>
<td>51.59</td>
<td>12.17</td>
<td>20.75</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>210</td>
<td>126</td>
</tr>
<tr>
<td>Percentage</td>
<td>50.66</td>
<td>30.84</td>
<td>18.5</td>
</tr>
</tbody>
</table>

Table 3 shows the distribution of microtrauma to different areas of the body in the joints, muscles and muscles of the tendons. The highest incidence of these injuries was in the knee joint was in the foreground according to the nature of the movement and anatomical work, while the rate of occurrence of these injuries appeared in the muscles, especially in the adductor muscles of the connective muscles of the thighs. It has many scientific sources, where he mentioned that the movements of the approximation of the thigh bone and the repeated high exercises that accompanies the performance lead to these injuries [16].

As for injuries in the muscle tendons, the highest percentage was in the Achilles tendon, due to the large number of movements that this tendon performs, and the increased pressure on it in movement, change of direction, and in vertical or horizontal jumping, which generates intense pressure on it leading to friction in the tendon and its outer covering, causing pain and inflammation.

As well as inflammation appears in the patellar tendon and its cover, and some sources mention that this is accompanied by inflammation in the sub capital adenoma "Bursa" due to the constant friction between the tendon and the gland when performing the required movements and exercises [2]. The researchers believe that the cause of the high injuries of the knee and shoulder joints is due to the effort exerted on them and effective use to serve the requirements of specialized sports, such as frequent jumping, for example in volleyball, to carry out offensive strikes, overwhelming strikes, and blocking wall formations, as well as when jumping in head strikes in football or jumps in the gymnasium, as well as requirements the mobility needed by the special game, as well as the knee joint of the uniaxial joints whose movement is bending and stretching, which makes them vulnerable to injuries due to the frequent repetition of the bending and stretching processes during training and competitions. In this regard, Abd Ali Nassif notes from Harrathat injuries generally occur in the knee and ankle joints because the leg stretching muscle is trained in one form, which is the bend and stretch the knees [17].

In matches, repeated jumping is used tens of times per game, and the jumping process requires the contraction of the four-head muscle of the thighs, which generates great tension on the patellar tendon and its slug, as well as when using jumping or ascending the stands and when training with weights, which generates a high exercises on this joint causing injury. On the other hand, the knee and hip joints bear most of the body weight, up to 86 – 90 % [18]. As well as the absence of bone overlap between the thigh and shin bone. The increased friction between the multiple components of the joint (ligaments, tendons of the muscles and the subcutaneous glands) make the joint more susceptible to injury. Most of the movements in volleyball and handball are fencing and games that require his movement to all directions, which generates a high exercises on it, and sources indicate that the excessive use of the shoulder joint and a long period with frequent friction and tendons of the long

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head of the muscular head in the bone leads to the occurrence of inflammation [19]. The researchers believe that the trainer's duty to develop training programs in a scientific way to achieve the goal of training is to raise the level and reach advanced levels. The sources mention that the training contains thousands of training and running hours, and it includes a factor of repetition for long hours with the reaction of the ground on the athlete's foot, which leads to conscious pressure on the device Muscular, brachial, and articular ligaments, as well as the ligaments of the foot and arches of the foot as well [20]. Therefore, the researchers see that the percentage of injuries increases as the intensity of the competition increases, as exercise exerts pressure on the joints, ligaments, muscle tendons and vertebrae. Therefore, scientific work requires according to the principles of training and the references mention that the body's systems improve their efficiency when used in a reasonable manner and achieve physiological adaptation when increasing the training load gradually in a way that suits the ability of the individual because training is a physiological challenge to which the body responds and leads to improving the body's ability in the front of the training load. Therefore, the graduation of the training load must be graduated and the necessary period of adjustment must be determined, that is, the timing of adding the increase on the one hand, and the amount of the increase in the load on the other hand, and this requires field and scientific experience for the sports coach [21]. Likewise, muscular injuries increase in the age of maturity due to severe training or competition due to the high ambition at this age, as well as having high exercises, especially in the tendons and ligaments of the joints [22], as the decrease in the concentration of glutamine in the plasma after training for a long period or physical strain and excessive training may lead, if only partially to Reducing the immunity of athletes [23], which leads to the athlete being exposed to a physical injury.

6. Conclusions

- From current study it can be concluded that a high percentage of athletes with microtrauma injuries pass the first stage to second and third stages due to neglect of the injury, as the third stage requires surgical intervention. Most of the microtrauma injuries of Iraqi athletes occur in the knee joint, the muscles that connect to the thighs, the Achilles and the patellar tendon.
- Neglect of microtrauma due to the absence of clear clinical symptoms of samples, which contributes to recurrence, they occur and double the injury until they reach advanced stages.
- Diagnosis for microtrauma injuries requires the presence of a specialist doctor, with the help of diagnostic devices different.
- The most important causes of microtrauma injuries are high action and work and poor floors that are practiced on them training and competition as well as the practice of training and competition athletes despite the presence of injury as well wrong technical performance.

6.1 Recommendations

- Paying attention to periodic examinations with the need to see the sport physician when any injury or when feeling the pain accompanying training and competitions.
- Emphasis on building the muscles of the joints, especially the single-movement joints, such as the knee joint and muscles of the shoulder joint to reduce the amount and severity of these injuries.
- Paying attention to the independent training of the injured athlete and setting a special program for him to bring him back to first level with interest in the rehabilitation program prepared by the attending physician.
- The necessity of establishing stadiums with ground to suit the specific specifications of each game, using expertise distinguished in this field.
- Rationing the training programs for athletes according to modern training methods to build sports levels consistent withathletes' functional abilities.
- That the Iraqi Olympic Committee adopts the responsibility of education, insight coaches and athletes, and opening of courses and technical workshops, and to be rehabilitated the trainers qualified scientifically in all directions to keep the athletes from these injuries.

References