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The Role of Motor Rehabilitation in Restoring Selected Motor Abilities Among Football Players: Perspectives of Physiotherapists and Physical Rehabilitation Specialists in the Province of Aïn Defla

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Abstract:

This current study intended to examine the effect of motor rehabilitation on the motor skills recovery of the injured footballers. For such purpose, descriptive research method was adopted by the researcher. A questionnaire was used to survey 32 physiotherapists and physical rehabilitation specialists who work at rehabilitation centers either public or private of Aïn Defla Province in Algeria. The questionnaire was specifically prepared to survey the process of rehabilitation including the process of carrying out the sessions of rehabilitation and its efficiency in recovering motor skills.

Based on statistical analysis, the data obtained from the questionnaire were analysed and discussed based on an objective scientific method. The findings showed that motor rehabilitation has great effects on the recovery of muscular strength, flexibility, and balance. On the other hand, motor rehabilitation cannot have any impact on the recovery of motor coordination. Therefore, motor rehabilitation can be considered as an important element in the therapy process of the injured footballers. However, it should be accompanied by physical conditioning training for the ultimate recovery of the player.

Keywords: Motor rehabilitation; Motor abilities; Football; Flexibility; Balance.

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1. INTRODUCTION

Motor rehabilitation is among the main intervention programs employed by both coaches and rehabilitation specialists for ensuring that an injured player is able to safely resume participation in the competition game. This method involves the strategic implementation of natural therapeutic methods tailored specifically for the impaired functions in order to maximize efficiency. The success of the therapy is dependent on the functional interrelation of the body systems and on the principles of kinesiology and movement science that form the foundation of the rehabilitation program designed for restoring the motor functions and reducing injury effects (Hussein, 1984, p. 55).

Thus, motor rehabilitation is among the most important stages of injury management in sports as it aims to restore the anatomical and physiological functions of the body and minimize the deficits resulting from the injury. Moreover, rehabilitation can help improve the physical condition of the injured athlete (Riyad & Najaimi, 2013, p. 255).

Football being a collective sport is associated with high dynamics, diversity, and constant changes in movement caused by constant interaction between teammates, opponents, and the ball. These features call for much physical contact and significant physical effort. In spite of the presence of internationally acknowledged Laws of the Game that provide safety measures for players, injuries occur rather frequently, having negative effect on health and sporting ability of players. Sports injuries become one of the key elements that limit performance in sports, damaging physical, technical and motor abilities of athletes, and sometimes making them completely withdraw from competitions. Therefore, injured players have to undertake the corresponding medical measures in order to recover. After the treatment stage, rehabilitation becomes crucial, being directly connected with the process of therapy and aimed at bringing back to normal the injured body part (Hammad, 2001, p. 22).

Based on the current study, it emerged that motor rehabilitation is still a relatively new field in the Province of Aïn Defla. The athletes are treated as regular patients and not taking into consideration the physiological and biomechanical requirements of sports. Additionally, there are no specific sports rehabilitation centers in the province dedicated to treating athletes. Furthermore, it was noticed that there is a total absence of strength and conditioning coaches in the sports

rehabilitation centers. There is also inadequate coordination between the rehabilitation specialists and the conditioners in the later stages of the process of rehabilitation. The absence of interdisciplinary work could lead to recurring injuries in football players.

Based on the above, the research problem can be stated as follows:

Is motor rehabilitation effective in restoring motor functions in injured football players?

Sub-questions of the Study

- Is motor rehabilitation effective in restoring muscular strength in injured football players?
- Is motor rehabilitation effective in restoring flexibility in injured football players?
- Is motor rehabilitation effective in restoring balance in injured football players?
- Is motor rehabilitation effective in restoring motor coordination in injured football players?

General Hypothesis

- Motor rehabilitation is important in the restoration of motor skills in injured footballers.

Sub-hypotheses

- Motor rehabilitation is important in the restoration of muscle strength due to football injuries.
- Motor rehabilitation is important in the restoration of flexibility due to football injuries.
- Motor rehabilitation is important in the restoration of balance due to football injuries.
- Motor rehabilitation is important in the restoration of motor coordination due to football injuries.

Importance of the Study

- In establishing the importance of motor rehabilitation in the restoration of motor skills.
- In determining the effectiveness of motor rehabilitation programs in the restoration of motor skills.
- In establishing the importance of motor rehabilitation in helping injured athletes return to competitive football.

- In stressing the importance of motor rehabilitation facilities for football clubs/teams.

Objectives of the Study

- To identify the impact of motor rehabilitation on restoring muscular strength after football-related injuries.
- To examine the impact of motor rehabilitation on restoring flexibility after football-related injuries.
- To assess the impact of motor rehabilitation on restoring balance after football-related injuries.
- To assess the impact of motor rehabilitation on restoring motor coordination after football-related injuries.

2. Operational Definitions of the Study Variables

2.1. Motor Rehabilitation

2.1.1. Conceptual Definition

Motor rehabilitation can be described as rehabilitation through therapeutic exercises which is meant to improve functional abilities and physical fitness in order to allow the individual to take part in team activities as well as sport. The main goal is to overcome the effects of reduction in the components of physical fitness by means of appropriate rehabilitation and treatment programs using natural methods of therapy notably therapeutic exercises (Kassim, 2018, p. 5).

2.1.2. Operational Definition

The concept of motor rehabilitation can be defined as the process of bringing back the injured footballer to his pre-injured physical state by employing therapeutic exercises that would help him recover his motor abilities and allow him to safely get back to training with his team.

2.2. Motor Abilities

2.2.1. Conceptual Definition

Motor abilities are those physical abilities of an individual which allow performing various sports activities (Abdelmajid, 2007, p. 318).

2.2.2. Operational Definition

Motor abilities are the physical abilities achieved from the motor rehabilitation program for injured footballers, which include muscular strength, flexibility, balance, and coordination.

2.3. Football

2.3.1. Conceptual definition

Football is a team game where two opposing teams each made up of eleven players compete using a round leather ball. A football match is played for a period of ninety minutes, which is further split into two halves of forty-five minutes each, with a rest break of fifteen minutes. The game is played between two teams wearing distinct uniforms comprising a jersey, shorts, and football boots (Jamil, 1986, p. 6).

2.4. Muscular Strength

2.4.1. Conceptual definition

Muscular strength can be defined as resistance to fatigue during physical activity (Abou El-Enein & Hammad, 1985, p. 21).

2.4.2. Operational definition

Muscular strength is the strength exercises prescribed in the rehabilitation program by the rehabilitation specialist to help the injured football player regain his muscular strength.

2.5. Flexibility

2.5.1. Conceptual definition

Flexibility can be defined as the capability of executing movements over a large range of movements at the joints without any risk of injuring the muscles or ligaments (Kassim, 2018, p. 62).

2.5.2. Operational definition

Flexibility is the stretching exercises prescribed in the rehabilitation program by the rehabilitation specialist to regain the range of movement of the joint affected.

2.6. Balance

2.6.1. Conceptual Definition

Balance is the ability to sustain physical stability during the execution of different motor skills and body positions in static, rotational, and dynamic conditions (Mohsen, 2016, p. 200).

2.6.2. Operational Definition

It is the balance exercises recommended by the rehabilitation specialist to improve the postural stability and dynamic balance of the injured football player.

2.7. Coordination

2.7.1. Conceptual Definition

Coordination is the ability to coordinate the movements of different body parts that work simultaneously (Abdel Khaleq, 1999, p. 66).

2.7.2. Operational Definition

It is the coordination exercises recommended by the rehabilitation specialist to improve the motor coordination of the injured football player.

3. Pilot Study

Pilot study was carried out from 3 March 2024 to 18 April 2024.

4. Methodology of the Study

Due to the nature of the study problematic and the necessity to provide a scientific answer to the research question, the descriptive research method was selected as the most suitable methodology. Descriptive research method can be described as a systematic scientific method aimed at describing and analyzing quantitatively some phenomenon or problem by means of collecting, organizing, analyzing, and interpreting the standardized data.

5. Scope of the Study

5.1. Spatial Scope

The study was conducted in physical therapy and motor rehabilitation centers in the Province of Aïn Defla, which includes five rehabilitation centers run by the government and seven privately-owned.

5.2. Temporal Scope

The study was conducted during the period from 16 January 2024 until 15 May 2024.

5.3. Participants

Pilot study sample included seven physiotherapists and physical rehabilitation specialists, while main sample included 32 physiotherapists and physical rehabilitation specialists.

6. Variables of the Study

6.1. Independent Variable: Independent variable was motor rehabilitation.

6.2. Dependent Variable: Dependent variable was motor abilities.

6.3. Intervening Variable: Intervening variable was football players who underwent motor rehabilitation.

7. Population of the Study

In order to conduct scientifically valid research, it is important to determine the target population and criteria for selecting its members. (Angers, 2004, p. 87)

Target population of this study included all physiotherapists and physical rehabilitation specialists in selected rehabilitation centers.

8. Sample of the Study

"Sample is a portion taken from the target population," (Alwan, 2009, p. 28).

Thirty-two motor rehabilitation and physiotherapy specialists were included in the study sample.

9. Study Tools

In order to collect data for the study, a structured questionnaire was used for physiotherapists and physical rehabilitation specialists.

10. Psychometric Properties of the Study Tools

10.1. Validity

The validity of a questionnaire indicates how well the tool measures the construct it intends to measure rather than an alternate one. (Saber & Khafaga, 2002, p. 167)

For determining the content validity of the questionnaire, it was presented to five professors at the Institute of Physical Education and Sports Sciences at Djilali Bounaama University of Khemis Miliana, who have the required expertise in this domain. The expert panel found the questionnaire clear, easy-to-administer, and appropriate for the study sample.

10.2. Reliability

Internal consistency reliability was established with the help of Cronbach's Alpha coefficient based on the pilot study results.

- It was found out that the questionnaire for the specialists demonstrated a Cronbach's alpha coefficient equal to 0.816, which is quite a high index of the internal consistency.

Thus, the questionnaire was considered to be sufficiently reliable. Furthermore, the reliability coefficient calculated on the basis of the results of the main study was almost equal to the pilot study one.

11. Statistical Methods

The following statistical methods were used:

- Percentage (%);
- Chi-square (χ^2) test.

12. Presentation, Analysis, and Discussion of the Results

12.1. Presentation, Analysis, and Discussion of the Results concerning First Hypothesis

First Hypothesis: Motor rehabilitation is important for muscular strength restoration after a football injury.

Responses	Frequency	Percentage	χ^2		Significance Level (α)	Statistical Significance
			Calculated χ^2	Critical χ^2		
Yes	23	71.88%	6.125	3.84	0.05	Significant
No	9	28.12%				
Total	32	100.00%				

According to the data provided in Table 38, 23 subjects (71.88%) claimed that football players injured fully recover their muscular strength, while 9 respondents (28.12%) stated that football players injured cannot fully restore their muscular strength.

Calculated Chi-square (χ^2) is 6.125, which is higher than critical value of 3.84 at α=0.05 significance level with df=1. Thus, the first hypothesis is statistically significant.

A) Discussion of the First Hypothesis

- All rehabilitation specialists assessed muscular strength before initiating the rehabilitation programme, indicating that individualized treatment plans were developed according to the type of injury sustained by each player.
- Most specialists evaluated strength using the muscle strength grading scale (0–5) rather than sport-specific physical performance tests.
- Most specialists incorporated strength-training exercises into their rehabilitation programmes, reflecting the soundness of their rehabilitation protocols.
- Dynamic strengthening exercises were the most frequently prescribed exercises during rehabilitation sessions.
- The majority of specialists believed that injured football players regained muscular strength comparable to that of a healthy individual, although not necessarily to the sport-specific level required for elite athletes.

As such, the first hypothesis was proven true since motor rehabilitation indeed helps in muscle strength restoration after football injury. This result is in line with the research work done by Rajaa Ismail, titled "The Role of Motor Rehabilitation in Improving Physical Fitness Components After Sports Injuries among Football

Players from the Perspective of Coaches: A Field Study of Honour Division and Pre-Honour Division Clubs in M'Sila Province," which found that motor rehabilitation increases muscle strength in football players after sports injuries.

12.2. Presentation, Analysis, and Discussion of the Results Concerning the Second Hypothesis

Second Hypothesis: Motor rehabilitation has a vital role in the restoration of flexibility after a football injury.

Responses	Frequency	Percentage	χ^2		Significance Level (α)	Statistical Significance
			Calculated χ^2	Critical χ^2		
Yes	24	75%	8	3.84	0.05	Significant
No	8	25%				
Total	32	100.00%				

From the findings as indicated in Table Number 43, 24 (75.0%) respondents found that football players injured recover all flexibility, while 8 respondents (25.0%) felt that football players injured do not fully recover all flexibility.

The Chi-square (χ^2) value determined was 8.00, which is greater than the critical value of 3.84 at 0.05 level of significance and 1 degree of freedom. The second hypothesis is statistically significant.

A) Discussion of the Second Hypothesis

- Many experts assessed flexibility before the beginning of rehabilitation, whereby different rehabilitation programs could be set in accordance with the injury of the player.
- Many used joint range of motion (ROM) in evaluating flexibility.
- Flexibility exercises were incorporated in the rehabilitation programs, indicating application of rehabilitation principles.
- Stretching muscle exercises were common flexibility exercises done during rehabilitation.
- Most experts felt that injured football players regained flexibility of the same level as that of non-injured football players.

Therefore, the second hypothesis was validated since it indicated that motor rehabilitation helps restore flexibility after football injuries. This conclusion is

supported by the results of a study conducted by Rajaa Ismail titled, 'The Role of Motor Rehabilitation in Increasing the Levels of Flexibility among Footballers following Sports Injuries from the Coach's Point of View – An Empirical Study on Honor and Pre-Honor Division Teams in the M'Sila Province'. The study found that motor rehabilitation increases flexibility levels among football players following sports injuries.

12.3. Presentation, Analysis, and Discussion of the Results Related to the Third Hypothesis

Third Hypothesis: Motor rehabilitation has a major impact on the restoration of balance after a football injury.

Responses	Frequency	Percentage	χ^2		Significance Level (α)	Statistical Significance
			Calculated χ^2	Critical χ^2		
Yes	26	81.25%	12.5	3.84	0.05	Significant
No	6	18.75%				
Total	32	100.00%				

As per Table Number 48, (26) individuals (81.25%) responded that the injured football players fully recovered their balance while 6 people (18.75%) opined that they did not fully recover their balance.

The Chi-square (χ^2) value calculated was 12.50, which is greater than the critical value of 3.84 for a 0.05 significance level with 1 degree of freedom. Thus, the third hypothesis proved to be significant.

A) Discussion of the Third Hypothesis

- Most specialists measured the balance before beginning with the rehabilitation program in order to devise an appropriate plan for the same.
- Single Leg Stance test was the most widely conducted test for balance.
- Exercises for improving balance were regularly incorporated into the rehabilitation program.
- The most common treatment was exercises on a wooden wobble board.
- Most specialists felt that the injured football players successfully regained their balance post-rehabilitation.

In conclusion, the third hypothesis was therefore proved since motor rehabilitation was important in the recovery of balance in footballers.

12.4. Presentation, Analysis, and Discussion of the Results Relating to the Fourth Hypothesis

Fourth Hypothesis: Motor re-habilitation is an important component in achieving motor coordination after an injury sustained while playing football.

Responses	Frequency	Percentage	χ^2		Significance Level (α)	Statistical Significance
			Calculated χ^2	Critical χ^2		
Yes	10	31.25%	4.5	3.84	0.05	Significant
No	22	68.75%				
Total	32	100.00%				

From the results provided in Table 53, there were 10 respondents (31.25%) who thought that injured football players could restore their motor coordination, while 22 respondents (68.75%) thought that players were not able to restore this particular function.

The value of χ^2 was 4.50, which is more than the critical value 3.84 for the significance level 0.05 and 1 degree of freedom. Hence, the fourth hypothesis is significant.

A) Discussion of the Fourth Hypothesis

- Most rehabilitation experts determined the motor coordination of injured football players prior to conducting rehabilitation since individualized programs were created depending on the type of injury in each player.
- Most experts relied on the forward and backward running tests to determine the motor coordination of injured football players.
- Most experts included coordination exercises within their programs, showing that these programs were appropriate in terms of theory.
- The most common coordination exercises conducted during rehabilitation sessions included forward and backward running exercises.
- Most experts argued that injured football players did not regain full motor coordination after being rehabilitated.

This means that the fourth hypothesis was not proven. In turn, the results suggest that motor rehabilitation is not an important part of recovery from motor coordination loss in football injuries.

13. CONCLUSION

Regarding the research objectives and hypotheses, considering the study sample, according to the results and their analysis, the following conclusions have been drawn:

- Sports injuries in football are varied and necessitate regular, almost daily rehabilitation training of adequate time duration to perform all motor exercises required for rehabilitation from the injuries. Unfortunately, these opportunities are not available both at public and private sports rehabilitation centers, which makes it necessary for the strength and conditioning coaches to practice their activities either at sports rehabilitation centers or at football clubs to prepare footballers for returning to the game.
- Except for the fourth hypothesis concerning motor rehabilitation and the restoration of motor coordination after a football injury, all the other research hypotheses have been proven.
- Almost all of the rehabilitation therapists were rather young people, as the specialization of sports rehabilitation appeared quite recently in the Province of Aïn Defla.
- The majority of the specialists worked in the public healthcare system, where high workload and many patients necessitate that the specialists have to handle the athletes just like other patients, regardless of the sport-specific needs of football.
- Publicly-owned rehabilitation centers do not possess sport-specific equipment to rehabilitate the athletes.
- Most of the specialists were not specifically trained in sports medicine, therefore, lacked sport-specific skills in the rehabilitation of athletes.
- Most of the specialists were unaware of sport-specific physical fitness tests, especially return-to-play test, which plays a very important role in assessing whether an injured footballer can play again or not.

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