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Rehabilitation method using Kinesio tapes and its effect on partial tear of the anterior thigh muscles of athletes in Al-Qadisiyah Governorate

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Abstract : Research Introduction and its importance: Despite all the precautionary measures currently used in the sports field to prevent and reduce sports injuries, whether during training or matches; We notice a continuous increase in the rate of these injuries due to the intensity of competitions and excessive enthusiasm to try to reach the best levels to achieve sports achievement, and these matters put the players in a state of constant competition, whether with themselves or with others; This competition has led to the creation of great opportunities for players to be exposed to injuries more than others. Muscle injuries are considered one of the most common injuries among athletes, due to the fact that muscles are the main tool for implementing the requirements of sports performance, as they are one of the basic factors in human movement. If the injury occurs and is not diagnosed in a timely manner, it may cause a chronic injury that is difficult to treat. The hamstring muscle injury occurs in athletes, especially those who participate in sports that require strength, speed, agility, jumping, sudden stops and change of direction, such as football, athletics, basketball, volleyball, handball, tennis and other games. The importance of the research lies in the fact that it is one of the rare scientific attempts in the field of sports injuries to develop a comprehensive rehabilitation program with the aim of reducing muscle injuries. It may also contribute to shedding light and directing the attention of trainers and researchers to address the hamstring muscle injury, which has been overlooked by most studies and research. The study aimed to: Identify the effect of the proposed rehabilitation approach using Kinesio tapes, rehabilitation exercises and physical therapy on the research sample members. The researcher used the experimental approach using two experimental groups and applying the (pre-inter-post) measurement to suit the nature of the research. The study sample consisted of (26) athletes with partial tears in the anterior thigh muscles. In light of the statistical treatments and based on the results of the study, conclusions were reached that the rehabilitation approach using Kinesio tapes, rehabilitation exercises and physical therapy applied to the first experimental group has a better positive effect than the rehabilitation approach using rehabilitation exercises and physical therapy applied to the experimental group.

Key words: Rehabilitation method -Kinesio tapes and its - partial tear - the anterior thigh muscles

1-ntroduction to the research and its importance:

Advanced countries in the field of sports devote their human efforts on solid scientific foundations and rules and material to prepare their sports teams after the higher levels became the level of scientific and civilizational progress of the state.

As a result of the increasing interest in sports and the creation of champions by governments and sports institutions, competition and attempts to control major awards and championships have increased. This has contributed to rapid progress in the field of training and its methods and increased training loads, which has led to an increase in the rate of sports injuries and complications resulting from them despite the tremendous developments that have included most aspects of life and in all fields, especially the field of sports rehabilitation. Injury is an event that prevents the athlete from continuing his progress and reaching the highest levels and achieving achievement. Therefore, athletes are exposed to injuries during the practice of some sports activities as a result of pressure on the joints, muscles, ligaments and tendons or as a result of colliding with the competitor, which may cause injury.

The researcher believes that injury occurs as a result of exposure to harm that affects the player due to an internal or external influence that exceeds the athlete's ability to bear, which leads to the injured organ's failure to perform its work normally. Muscle injuries are considered to be very common and occur among athletes, due to the fact that muscles are the main tool for implementing the requirements of athletic performance, as they are one of the basic factors in human movement. These muscles may suffer from a simple partial tear or a complete tear. This injury often occurs in athletes, especially those who participate in sports that require strength, speed, agility, jumping, sudden stops and change of direction, such as football, athletics, basketball, volleyball, handball, tennis and other games. Hence, the scientific importance emerges, as it may contribute to shedding light and directing the attention of coaches and researchers to address the injury of the anterior thigh muscle. While the practical importance of this study is that it is an attempt to use a new treatment method in our stadiums, which is Kinesio tapes (k.t) and prepare special rehabilitation exercises .

Research problem:

The problems that the injury leaves on the athlete and the institution to which he belongs, the injury has become a problem that worries clubs, coaches and players alike, as it may completely keep the athlete away from returning to sports training and participating in competitions and achieving the distinguished results he wants to obtain .

The researcher has noticed through his field experience resulting from his work in the specialized center for physical therapy and physical rehabilitation in Qadisiyah Governorate

and working as a medical therapist with the Diwaniyah Sports Club the spread of anterior thigh muscle injuries among players of various sports activities and the delay of most athletes in returning to the stadiums and recurrence of the injury again and turning it into a chronic injury that requires long periods of treatment and may lead to retirement, and some of them are influential players in their teams, which affects their absence in the results and thus material, moral and technical losses for their teams. In addition to the scarcity of special rehabilitation curricula that combine medical tapes (k.t) with rehabilitation exercises to rehabilitate this injury, as the anterior thigh muscles play an important and primary role in body movements in general and lower limb movements in particular.

Research objectives:

The research aims to:

1-Identifying the effect of the proposed rehabilitation approach using Kinesio tapes and rehabilitation exercises on the research sample members .

Research hypotheses:

-The proposed rehabilitation approach using Kinesio tapes and rehabilitation exercises has a positive effect on rehabilitating the injured anterior thigh muscles .

Research areas:

Human field: Athletes with partial tears of the anterior thigh muscles in Qadisiyah Governorate .

Time field: Athletes with partial tears of the anterior thigh muscles for the period from 9/1/2024 to 11/1/2024 .

Spatial field: The specialized center for the rehabilitation of sports injuries in Diwaniyah Governorate in Umm Al-Khail .

Search terms:

Kinesiology Tapes: It is a flexible adhesive that extends longitudinally over the muscles from the origin to the insertion. The tape is designed in a flexible way to give freedom of movement. It does not limit the patient's biomechanics. It is carefully designed to mimic the characteristics of the skin. It is almost the same thickness as the skin and has vital pores for ventilation and sweat evaporation. It is made of 100% cotton and the adhesive on the inside has waves like a human fingerprint (www.kinesiotaping.com)

Rehabilitation Methodology:

It is the proposed rehabilitation method using Kinesio tapes and special thermal rehabilitation exercises (muscle stimulation, infrared rays, ultrasound) with the aim of restoring the functional efficiency of the anterior thigh muscles for athletes with partial tears after presenting it to experts and specialists in the field of physical education and approving its implementation.

2-Research Methodology and Field Procedures:

2-1 Research Methodology: The researcher used the experimental method using two equivalent groups to suit the nature of the

research, as the method will be applied in its entirety to the experimental group (Kinesio tapes – rehabilitation exercises – thermal physiotherapy).

2-2 Research Sample: The researcher selected his research sample consisting of (26) injured athletes intentionally from the athletes with partial tears in the anterior thigh muscles who are active in the clubs of Al-Qadisiyah Governorate.

-The experimental group: consists of (13) patients who were subjected to the rehabilitation method using Kinesio tapes and rehabilitation exercises using thermal devices. The sample represented 50% of the original community.

The following tables from Table No. (1) to Table No. (3) show the statistical description of the data and divisions of the research sample.

While Table No. (4) shows the equivalence in the research variables before conducting the experiment.

Table (1) shows the statistical description of the research sample data in the basic initial variables before applying the rehabilitation method N=14

Variables	Statistical implications of description			
	Arithmetic mean	Median	Standard deviation	Coefficient of skewness
Age (years)	22,21	22	2,45	0,51
Height (cm)	17,3	17,5	4,33	0,21
Weight (kg)	70,6	69	3,72	0,11

Table (1) shows the homogeneity of the research sample data in the basic initial measurements. Table (2) Statistical description of the research sample data in muscle strength and pain level in the feet before applying the rehabilitation method N = 14

Variables			Statistical implications of description			
			Arithmetic mean	Median	Standard deviation	Coefficient of skewness
Muscle strength (kg)	injured foot	hip joint	4,70	4,55	0,41	0.13
	healthy foot	hip joint	14,75	14,66	1,31	O,10
Pain sensitivity			6,47	6,44	0,40	0,24

Table (3) shows the equivalence of the research variables in the pre-experiment for the experimental and control groups.

Variables		First trial		Second trial		T calculated	Morale (Sig)	Significance
		X	±a	X	±a			
Muscle strength of affected limb	hip joint	4.6071	.48590	4.5071	.41964	.583	.565	Non-significant
Muscle strength of unaffected limb	hip joint	14.9214	1.36842	14.6214	1.37739	.578	.568	Non-significant
Range of motion of affected limb	hip joint pronation	27.3571	3.38792	27.6429	3.41055	-.222-	.826	Non-significant
	hip joint pronation	17.4286	2.20887	17.5000	1.78670	-.094	.926	Non-significant
Range of motion of unaffected limb	hip joint pronation	119.7143	5.20988	118.9286	4.41090	.431	.670	Non-significant
	hip joint pronation	54.2857	2.97240	53.3571	2.40535	.909	.372	Non-significant
Pain level		6.5714	.48426	6.9214	.50410	-1.873-	.072	Non-significant
Motor balance		.4286	.51355	.4286	.51355	.000	1.000	Random

2-3 Methods, devices and tools (used in the research):

2-3-1 Data collection methods:

This research required many methods to collect data, which are:

-Arabic and foreign sources and references and the Internet.

-Measurements and tests used.

-Questionnaire forms.

-Observation and experimentation.

-Proposed rehabilitation exercise program.

-A special form to record the injured person's data.

2-4 Balance measurement (stand test on the instep): Muscle imbalance refers to the comparison of muscles with each other. Muscle imbalance may occur when a muscle or muscle group is stronger or weaker than its opposing muscle or muscle group.(Mohamed.1996.p71)

2-5 Measuring the degree of pain: Siham Al-Ghamry (2001) quoting William (1997) indicates that measuring the degree of pain using a pain scale is effective and simple to measure the intensity of pain, as the scale is a line whose beginning (zero) represents the absence of pain, and its end (10) represents the presence of severe pain, and the patient draws a line on the degree of pain he feels, and in 80% of cases the result of this scale is close to the doctor's diagnosis.(Siham. 2001.p2001)

2-6 Measuring muscle stretching: A measurement used to determine the presence or absence of pain in the anterior thigh muscles affected by a partial tear, and it also allows us to determine the muscle's flexibility, elasticity, and ability to contract and relax.(www.aspetar.com)

2-7 Field research procedures:

2-7-1 Design of the rehabilitation curriculum: The researcher conducted a reference survey of studies, research, and scientific references, as well as a survey of the opinions of experts* in the field of physical education, in order to know everything related to the scientific foundations for designing the rehabilitation curriculum under study, and to choose the best and most appropriate rehabilitation methods and exercises and physical therapy methods that ensure the return of those injured with anterior thigh muscle injuries to the fields in the shortest possible time.

2-7-2 Exploratory experiment: It was conducted during the period from 9/5/2024 on a sample of (4) players injured with a partial tear of the anterior thigh muscles.

2-7-3 Main experiment:

2-7-3-1 Pre-measurements: The pre-measurement was conducted on a group of individuals in the experimental research sample consisting of (26) injured, in the specialized center for the rehabilitation of sports injuries in Diwaniyah Governorate.

2-7-3-1-1 Prepared rehabilitation method: The researcher prepared the rehabilitation method including (rehabilitation exercises with thermal devices with the use of Kinesio adhesive tapes on the injured area) as follows:

1-Applying medical tapes: The researcher applied Kinesio adhesive tapes to the anterior area of the injured thigh according to the medically approved conditions from the first day of the injury until the pain completely

disappeared. The tape is continued for three days and the tape is removed on the fourth day. The process is repeated periodically until complete recovery.

2-Rehabilitation exercises: The proposed rehabilitation exercises were prepared in three stages, the experimental stage took two weeks, the control stage and the third stage took three weeks, and the total time period required to practically implement the program took eight weeks. The rehabilitation stages contain different exercises to suit the stage that the player with the anterior thigh muscle tear is going through. Rehabilitation was carried out at a rate of (5) units per week, and the number of rehabilitation units reached (60) minutes in the second week, while the time of the training unit in the control stage became (75) minutes, while in the third stage it became (90) minutes. It is worth noting that the rehabilitation program was applied to all members of the sample individually and not collectively.

3-Physical therapy: Physiotherapy with thermal devices actually began after the first week after the end of the inflammation and swelling stage, and the program prepared using physical therapy devices continued for seven weeks at a rate of three treatment units per week, as the total number of units reached (21) treatment units during the entire program. The researcher used three devices: [Infrared device, Muscle stimulate device, and Ultrasound device (Ultrasound waves)] based on the opinion of the experts.

2-7-3-3 Dimensional measurements: The dimensional measurement was conducted on the research sample eight weeks after the start of the experiment in the same order as the pre-measurements and under the same conditions for each patient separately.

2-7-4 Statistical treatments: (Arithmetic mean, Median, Standard deviation, Skewness coefficient, Repeated F test, Benferon test, Chapter Four).

3-Presentation, analysis and discussion of results

3-1 Presentation of results:

Table (4) shows the arithmetic mean, standard deviation and the calculated (t) value for the experimental and control experimental groups in the research variables in the inter-test

Morale (Sig)	T calculated	Second trial	Second trial	First trial	First trial	Variables	
		Second trial	±a	X	±a	x	
Significant	0.000	15.513	0.400	7.907	0.571	10.800	Hip joint	Muscle strength of affected limb
Significant	0.000	17.769	0.757	26.285	1.174	32.921	Knee joint	
Non-significant	0.647	0.464-	1.240	15.278	0.938	15.085	Hip joint	Muscle strength of the healthy limb
Non-significant	0.062	1.946-	0.721	41.850	0.917	41.242	Knee joint	
significant	0.000	7.876	4.955	66.642	4.177	80.285	Hip joint supine	Range of motion of the affected limb
Significant	0.000	8.635-	2.614	75.285	2.893	66.285	Knee joint	
significant	0.000	9.840	2.541	33.000	2.972	43.285	Hip joint prone	
Non-significant	1.000	0.000	4.521	120.857	4.521	120.857	Hip joint supine	Range of motion of the

Non-significant	0.822	0.227	2.267	49.714	2.702	49.928	Knee	intact limb
Non-significant	1.000	0.000	2.368	56.071	2.368	56.071	Hip joint prone	
significant	0.000	14.943-	0.365	2.735	0.313	0.814		Pain level
significant	0.000	5.883	0.940	8.500	1.167	10.857		motor balance
significant	0.000	6.209	1.224	24.500	1.610	27.857		Anterior muscle stretch

Significant < (0.05) at a degree of freedom.

It is clear from Table (4) regarding the differences in the inter-measurement between the experimental group and the control experimental group for the injured limb that there are differences between the two measurements at the 0.05 level in all research variables (muscle strength, range of motion, degree of pain, motor balance, elasticity of the anterior thigh muscles) in favor of the experimental group, as the value of T ranged between (5.883 to 17.796), and these values are greater than the tabular T value at the level .(0.05)

Table (5) shows the arithmetic mean, standard deviation, and calculated (T) value for the experimental and control groups in the research variables in the post-test

Morale (Sig)	T calculated	Second trial	Second trial	First trial	First trial	Variables	
		Second trial	±a	x	±a	x	
significant	0.000	4.101	0.770	14.650	0.893	15.942	Hip joint	Muscle strength of the affected limb
significant	0.001	3.828	0.963	42.264	0.806	43.550	Knee joint	
significant	0.570	0.575	0.919	15.814	0.986	16.021	Hip joint	Muscle strength of the intact limb
Non-significant	0.431	0.800-	0.509	42.550	0.481	42.400	Knee joint	
significant	0.002	3.500	25.960	100.571	4.475	125.214	Hip joint supine	Range of motion of the
significant	0.000	13.768-	2.931	64.857	2.173	51.428	Knee joint	affected limb
significant	0.000	9.134	3.355	54.214	1.528	63.214	Hip joint prone	
Non-significant	0.328	0.997	4.664	121.285	3.613	122.857	Hip joint supine	Range of motion of the intact limb
significant	0.001	3.694-	1.988	52.428	2.758	49.071	Knee joint	
significant	0.000	4.031	2.224	56.214	2.367	59.714	Hip joint prone	
significant	0.000	14.460-	0.292	1.128	0.000	0.000		Pain sensation
significant	0.000	5.635	1.875	26.142	0.801	29.214		Motor balance
significant	0.000	6.885	1.56	54.857	1.511	58.857		Stretching of the anterior muscle

Significant < (0.05) at (1) degree of freedom.

Table (5) shows the differences in the dimensional measurement between the experimental group and the control experimental group for the injured limb, indicating differences between the two measurements at the 0.05 level in all research variables (muscle strength, range of motion, degree of pain, motor balance, elasticity of the anterior thigh muscles) in favor of the experimental group, as the t value ranged between (0.997 to 14.460), and these values are greater than the tabular t value at the (0.05) level.

3-2 Discussion of the results:

The researcher attributes this improvement in the experimental group in the muscle strength variable to the rich diversity that the researcher used when preparing his proposed rehabilitation method, as the researcher relied on a selected group of rehabilitation exercises and his use of

a muscle stimulation device for their important role in developing muscle strength, in addition to the researcher placing Kinesio tapes on the injured muscles, which played a major role in providing sufficient support and stability to the injured muscles when performing rehabilitation exercises, and also reduced the degree of pain in the injured limb, which helped the injured to work without fear or hesitation.

This is consistent with Heather's study, which stated that those who used Kinesio tape had a higher ability to contract muscles than the other group that did not use tape (Heather.2000.31)

This is consistent with what Walid Hussein's study concluded.(Walid.2002.41)The inclusion of muscle strength exercises in the rehabilitation curriculum and practicing them regularly and gradually leads to various changes in the muscles, such as increasing the cross-section of the muscle, increasing the size of fast fibers, increasing the size and strength of tendons and ligaments, and the density of blood capillaries. As Abu Al-Ala Abdel Fattah points out Strength training using muscle stimulation gives better results than traditional voluntary strength training(abual-ala.1993.123)And remember Samia Khali IMuscle stimulation is one of the methods that recruit all muscle fibers to contract at once, and helps to grow muscle strength without affecting the compatibility of motor performance .

The proposed rehabilitation using Kinesio tapes and rehabilitation exercises, where its experimental and control phase included various stretching exercises, while its third phase included exercises with higher intensity, longer time, and more exercises than the experimental and control phases, which had a positive effect on increasing and developing the range of motion of the joint in all directions in a way that is almost like a healthy foot and perhaps sometimes better than it .

This is consistent with what was mentioned by Talha Hossam El-Din, Wafaa Salah El-Din, Saeed Abdel Rashid, Nariman Al-Khatib, and Abdel Aziz Al-Nimr that flexibility exercises work to develop the element of muscle stretching and increase the elasticity property of muscles and ligaments together, which leads to increasing the range of motion of the joint .(Talha, Wafaa.1997.246)

It also agrees with what was mentioned by Ashraf Shaalan(Ashraf.1992.77)The inclusion of stretching and flexibility exercises in the rehabilitation curriculum in addition to their positive effect on developing muscle strength leads to increasing the range of motion of the joint as there is a direct relationship between increasing the range of motion of the joint and increasing the muscle strength leading to the movements of the range of motion. The researcher refers to the positive effect of the rehabilitation curriculum used, and the researcher attributes this improvement in the change in the degree of pain in the averages of the pre-, inter- and post-measurement to the researcher's use of (Kinesio tapes and other physical therapy methods such as infrared rays,

ultrasound waves and muscle stimulation) which had a very large role in reducing the degree of pain. The use of Kinesio tapes contributed effectively to reducing the degree of pain in the injured anterior thigh muscles, as confirmed by the study of Gonzalez et al.(Gonzales.2009.32) This is consistent with the findings of the study of Erkan Kaya et al., which showed that Kinesio tapes had a significant effect in reducing the level of pain and inflammation in the injured sample more than the control group that was treated with physical therapy, especially in the first week. The study proved that the use of Kinesio tapes is an alternative option in treating shoulder pain when there is a need for an immediate effect. The researcher also attributes this improvement to the improvement in muscle strength of the muscles surrounding the joint and the increase in the joint's range of motion in all directions. This is consistent with what Mattacola mentioned that balance exercises are one of the most important exercises used in training the autonomic receptor system of the lower limb in general, as these exercises are performed by standing on an oscillation board on the feet, then on one foot, with the eyes open and then closed, and that training the autonomic receptor system is one of the important things to prevent recurrence of the injury. Abul-Ela Abdel-Fattah and Mohamed Nasr El-Din emphasize the necessity of accompanying muscle strength training with joint flexibility and muscle stretching training to increase the positive effects of strength training on flexibility..

This is due to the use of Kinesio tapes, which had an effective effect in reducing the degree of pain and supporting the anterior thigh muscles without obstructing the flow of fluids while allowing them freedom of movement without pain. This is consistent with what Abdul Basit Siddiq said, that the nature of continuous muscle work, from contraction and expansion, overuse and stress, which in turn leads to muscle dysfunction and disorders from tissue inflammation, muscle injuries, swelling or muscle stiffness, all of which leads to pressure on the space between the skin and the muscles, which leads to a contraction in the flow of lymphatic fluid and also generates pressure on the pain receptors under the skin. This transmits pain as a result of nerve signals to the brain to sense muscle pain. Therefore, the tapes work to affect the surface layer of the skin when lifting the skin with this tape. As a result of this lifting, a larger area is available for the subcutaneous layer of the skin, which is full of sensory nerve receptors, blood vessels and lymphatic vessels, which leads to increased blood circulation and increased drainage of lymphatic fluid, thus reducing pressure in the lymphatic vessels. By using different lifting techniques, each of them gives a different effect, which leads to Improved body movement when using this tape.

Thus, the researcher has verified the validity of the third hypothesis, which states that there are statistically significant differences between the experimental group and the control group in the

research variables.

Chapter Five

4-Conclusions andRecommendations:

4-1 Conclusions:

1-The rehabilitation method using Kinesio adhesive tapes and rehabilitation exercises applied to the experimental group has a better positive effect than the rehabilitation method using rehabilitation exercises applied to the control group.

2-The applied rehabilitation method achieved a substantial improvement in the muscle strength of the anterior thigh muscles.

5-2 Recommendations:

1-In light of the research objectives and hypotheses and the conclusions of the statistical treatments, the researcher recommends the following:

2-Guided by the rehabilitation method prepared using Kinesio adhesive tapes and rehabilitation exercises when rehabilitating partial tears of the anterior thigh muscles so that treatment and rehabilitation can be achieved quickly and complications can be avoided.

3-Relying on Kinesio tapes in all rehabilitation methods to reduce the degree of pain and shorten the time period of injury.

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