

EFFECT OF USING RUBBER BAND AND KINESIO TAPING AS A REHABILITATION PROGRAM TO TREAT GYMNASIUM PLAYERS WITH CHRONIC SHOULDER PAIN: RANDOMIZED TRIAL

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Abstract

In Iraq, the repeated chronic shoulder injury of gymnastics players has become common. Unfortunately, there is a lack of rehabilitation programs. Therefore, the authors conducted this study to develop an appropriate solution.

The aim of this work is to study the effect of rubber band and Kinesio tape techniques of improving muscular strength and movement range. The authors used an experimental approach, and eight players high-performance male gymnasts who participated, all of them have competed at the national level. The authors applied the rehabilitation protocol that included applying KT tapes and rehabilitative exercises using rubber bands. The rehabilitation program took three months with five rehabilitation sessions on a weekly basis. Each session took 60 minutes on three stages. Each stage lasts for four weeks. It is worth mentioning that some patients were fully rehabilitated before the end of the program, each phase lasts for four weeks, noting that some players ended their rehabilitation before the end of the rehabilitation program. The most important results obtained by the researchers was the presence of significant differences between the two measurements at a level of 0.05 in all tests and for the favor of the posttest, where the value ranged between (3.006 to 23.322) and these values were higher than tabular T value at 0.05 level. The most important results were that the rehabilitation program used rubber bands and Kinesios tapes to help in developing muscular strength and improving the motor range of the injured shoulder joint. Since more evidence-based practices are needed, future studies should include large numbers of subjects and examine diverse Rubber Band & KT application patterns.

Keywords: Rubber band. Kinesio tape. Gymnastic. Chronic shoulder. Pain

Introduction

Shoulder pain is a very common musculoskeletal complaint, and individuals with shoulder pain comprise a significant percentage of patients seeking medical attention. Shoulder pain is a very common musculoskeletal complaint, and individuals with shoulder pain comprise a significant percentage of patients seeking medical attention. As known before, therapeutic exercises are one of the best means in rehabilitation due to its positive effect on players health. These exercises can cure injuries related to muscles, bones, and joints. Recently, these exercises have been used frequently by therapist specialized in sports medicine and rehabilitation.

Sample of these exercises are using rubber bands. These bands are comfortable, effective, and easy to use. It can be used not only by injured players but also with healthy ones. Also, professionals and amateurs can utilize it. These bands are supporting muscular mass on shoulder area. The way that these bands are working is to

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support the full range of motion using body strength. Also, these bands can do unlimited exercises of strength and tension on small area.

Another sample of rehabilitation practices are Kinesio taping technique. These tapes can treat injured tissues and muscles. It can also be used without movement restriction. It can help auto recovering tissues, muscles and joints. It can also raise the skin above the injury to lower the feel of pain. Kinesio tape is an elastic tape can stretch to about 140% of its original size. (Paoloni et al., 2011)

Using Kinesio tape may help in muscle strength, relieve spasms, reduce pain and edema. It can also enhance blood circulation and lymph reflux. [3,4]

Although the kinesio tape (KT) has been used frequently in the rehabilitation process in preventing sports injuries, there is no clear evidence regarding potential mechanisms underlying the beneficial effects of KT. One of the aims of KT techniques is to normalize the scapulohumeral rhythm by altering the scapular muscle activity and correcting abnormal scapular position. It has been proposed that the control of scapula and the shoulder could be provided by the constant proprioceptive feedback, alignment correction during dynamic movements with kinesio taping. [5]

It has been shown that KT promotes the proximal stability of the scapula allowing free humeral movements without pain [6]. Kase described different types of taping methods like space correction or lymphatic correction which primarily aim to increase the subacromial space beside the control of the muscles stabilizing the scapula. [7]

Based on the above, this study came to fill the knowledge gap of studying the positive impact of using kinesio taping. The significance of this study is due to the lack of rehabilitation techniques of the chronic shoulder injury. Furthermore, there is no studies shown in literature about utilizing both rubber bands and kinesio taping of rehabilitating shoulder injuries. Thus, the authors rehabilitate eight players by using these two methods, which may lead to possibility of healing and protecting the injured area in short time.

Problem statement

Problem of the study is all about coming back early to exercise after injury

before complete healing and also without consulting the physician. This is going to take injury to the next level and make it chronic. This can destroy the player's future and ambition. Also, failing to have a specialized rehabilitation programs under supervision can also has a catastrophic results. This paper set up a rehabilitation program built on scientific and practical means. This program can reset muscular strength and movement flexibility of the shoulder joint. This can guarantee full recovery of player and going back to practice sport as fast as possible.

Aim of study

This study aims to evaluation the effect of rubber band and Kinesio taping techniques used in recovering muscular strength and movement range in recovering shoulder joint injury among gymnastic players.

Materials and Methods

Research design

The purpose of this study was to find out if the Kinesio tape with the rubber band has a direct role in improving the injured shoulder of gymnastics players, In experimental study, a one-group pretest/posttest design was employed. An experimental design is suitable for building cause-and-effect relationships (Page, 2012). Pretest and posttests were carried out one days before and after the training period where this process was assessed by the same researchers.

Participants

Eight professional male gymnasts participated in this study with the following aspects: (mean \pm SD: age 18.1 \pm 3.1 years; body mass 66.1667 \pm 5.4 kg; height 166.5 \pm 3.2 cm).

All the gymnasts had been training for over 4.75 years, for an average of 2 hours per day, 5-6 times per week. All of them have competed at national level.

What can be inferred from table 1 is that there is no statistically differences in the mean and St. deviation in the study sample regarding age, length, weight, and training age. For Skewness, values ranged between ± 3 with means that the sample is homogenous.

Table 1: Summary statistics of the studied sample.

Preliminary Basic Variables	Summary statistics			
	Mean	Median	St. Deviation	Skewness
Age (year)	17.0833	17.0000	2.90637	0.328
Height (cm)	166.5000	166.0000	2.54058	0.479
Weight (kg)	66.1667	68.0000	2.24958	-0.248
Training age (year)	4.7500	4.5000	2.37888	0.161

Measurement Procedure

In this paper, the following devices and tools has been used (Figures 1-3).

- Form for each player to record the sequence measurements.
- Restameter to measure length.
- Medical scale to measure weight.
- Measuring tape to measure the diameter of shoulder muscles (cm).
- Measuring tape is wrapped around shoulder by specifying two parallel points in the middle of deltoid.
- goniometer to measure the range of motion of injured shoulder joint.
- measure the highest point that the arm can reach.
- measure the lowest point that the arm can reach.
- Dynamometer to measure muscular strength for the shoulder joint, the pulling range up and down.



Figure 1: The way of measuring the shoulder diameter.



Figure 2: Measuring the moving range of the shoulder.



Figure 3: Measuring muscle strength.

- Treadmill
- Stationary bike.
- Rubber ropes with different thickness.

Main research Experiment

Pre-test measurements: These experiments were performed on the trial study sample. This trial sample consists of six patients. Specialized Center for Physiotherapy and Physical habilitation at Al Kut Sports Club is where the experiment took place. Experiment took place on Thursday, 5/1/2020. All participants were well informed about the experiment before the assessment. Temperature is controlled to be between 23-25 C. Each patient made the experiment privately.

Rehabilitation Protocol

In this paper, the rehabilitation program was basically putting kinesio tape and do the rehabilitation exercises using rubber ropes as follows:

- Group of rehabilitation exercises is prepared using rubber ropes. In these exercises, a gradual application was taken care of from easy to hard and from simple to complicated. This was done based on the level of injury of each player.
- Rehabilitation program took three months with five rehabilitation sessions on weekly basis. Each session took 60 minutes on three stages. Each stage lasts for four weeks. It is worth mentioning that some patients were fully rehabilitated before the end of the program.
- A physical therapist was hired to put kinesio tape on the injured area on the shoulder joint in the most painful spot. Those kinesio tapes were applied based on recommendations that are medically approved. Before applying the tape, hair was removed from skin and the skin was sanitized. The tape was put for three days and removed in the fourth day. This was repeated until the end of the program.

Post-test measurements: these experiments were performed on study sample. Experiment took place on Thursday, 5/4/2020 with the same sequence of the ex-ante measurements. Temperature is controlled to be between 23-25 C. Each patient made the experiment privately.

Statistical Analysis: In this paper. Statistical Package for Social Sciences (SPSS) is used to get the relative importance, mean, median, standard deviation, Skewness, and t-test.

Results

In order to check the hypothesis of the paper, results are going to be showed and analyzed taking into account the previous literature. After that, conclusions and recommendations will be shown (Table 2).

Table 2 shows that muscular strength , the average reached 8.4 on pulling up before the rehabilitation program. Std. deviation, median, and Skewness reached 0.74, 8.3, and 0.29 respectively. All of that was statistically significant at 0.05 level of significant. While 10.95 was the average of muscle strength when pulling down before the rehabilitation program. Std. deviation, median, and Skewness where 1.40, 10.65, and 0.57 respectively. All of that was statistically significant at 0.05 level of significant.

For movement range, the average reached on pulling down before the rehabilitation program 49.5. Std. deviation, median, and Skewness reached 3.16, 49, and 0.45 respectively. All of that was statistically significant at 0.05 level of significant.

Average, std. deviation, median, and Skewness of the Shoulder diameter got 111.16, 4.21, 111, and 0.23 respectively. All of that was statistically significant at 0.05 level of significant.

Throwing the medical ball (5 kg) got 5.14, 0.40, 5.40, and 0.23 for Average, std. deviation, median, and Skewness. All of that was statistically significant at 0.05 level of significant.

From table 3, we can realize that there are statistically significant differences between ex-ante and ex-post at 0.05 level of significant in all tests with a superiority recorded for the ex-post measurement. Calculated t-test ranged between 3.006 and 23.32 and is larger than tabular t at 0.05 level of significant (Table 3).

Discussion

There are many experiments that used rubber bands and Kinesio tapes, but as far as the researcher knows, there is no single study that collective them. A

Table 2: Descriptive statistics of variables of the studied sample before applying the rehabilitation program.

Tests		Mean	Median	St. Deviation	Skewness	Significant or not
Strength by using dynamometer for the injured shoulder	Pulling up	8.433	8.350	0.293	0.293	Statistically Significant
	Pulling down	10.950	10.650	0.574	0.574	Statistically Significant
Movement range by gneometer for the injured shoulder	Pulling up	148.833	149.000	0.042	0.042	Statistically Significant
	Pulling down	49.500	49.000	0.456	0.456	Statistically Significant
Shoulder diameter		111.166	111.000	4.215	0.619	Statistically Significant
Throwing the medical ball (5 kg)		5.416	5.400	0.402	0.233	Statistically Significant

Table 3: Statistical differences between ex-ante and ex-post measurement in studied variables for the studied sample.

Tests		Ex-ante		Ex-post		Calculated t	Level of significant	Sig. or not
Strength by using dynamometer for the injured shoulder	Pulling up	8.433	0.742	14.60	4,794	3.006	0.030	Sig.
	Pulling down	10.950	1.403	20.933	1.034	15.387	0.000	Sig.
Movement range by gneometer for the injured shoulder	Pulling up	148.833	4.445	169.333	3.777	12.755	0.000	Sig.
	Pulling down	49.500	3.619	69.166	4.167	23.322	0.000	Sig.
Shoulder diameter		111.166	4.215	112.883	3.970	5.249	0.003	Sig.
Throwing the medical ball (5 kg)		5.416	0.402	7.266	0.372	14.402	0.000	Sig.

problem has arisen for which of the two methods used has the best effect I will try to answer them below.

From table 3, statistical differences between ex-ante and ex-post can be realized with superiority for the ex-post measurements in muscular strength and motion range variables. This superiority is due to the use of rubber ropes&kt. These ropes increased muscle strength and motion range. The way that these ropes are working is that they've supported the shoulder joint and its anatomical structure. This allowed the patients to use them without excessive fear. These positive results are obtained in this study through the noticeable improvement in muscle strength and motion range [8]. This is consistent with what Yoshida and Kahanov (2007) found when they used these tapes since they provide support, stability, low pain feeling when performing the desired sport activity. [9,10]

Using Kinesio tape can lower the pain in the muscles surrounding the shoulder. This is what the study of González-Iglesias et al. (2009) has confirmed. This study showed that the pain can be lowered up to 23% after immediate application of the tape. This allowed the player to do the exercise without any problem. This is also consistent with Oliveria (1999), Kaya et al. (2011), and Treiber et al. (1998).[11,12,13]

Larious authors have previously reported improvements in function, pain, and ROM through the use of KT. [14,15,16,17] As these reports were either performed on healthy subjects or were case series, this literature represents low level of evidence; however, it points to the need for further investigation.

One thing worth mentioning is that the literature did not point implicitly or explicitly to the role of Kinesio tape in enhancing the muscle strength and motion range. They stated that the positive results were due to the use of rubber bands that contributed significantly to restoring muscle strength and motion range. In this study, the effect of Kinesio tape and rubber band is explicitly and applicably stated. Hence, this study took its importance from the first studies that dealt with the effect of Combine the two methods together.

Conclusions

- The rehabilitation program using rubber band and Kinesio tape helped in developing muscular power for the injured shoulder joint and helped in developing movement range for the injured shoulder joint.
- Kinesio tape use has a positive psychological effect may be more than the medical one. It helped patients in pin relieving which leads to do the rehabilitation process in a very effective way.
- Results obtained in this study supported the use of rubber band and Kinesio tape as an assistant factor in curing shoulder problems through the positive changes in movement and muscles performance.

- Since more evidence-based practices are needed, future studies should include large numbers of subjects and examine diverse Rubber Band & KT application patterns.

References

- Hasan, B. B. (2019). *Sports injuries and modern rehabilitation techniques*. Al Mezan Press, Najaf p. 146, Iraq.
- Marina, M., Jemni, M., & Rodríguez, F. (2013). Jumping performance profile of male and female gymnasts. *J Sports Med Phys Fitness*, 53(4), 378-386.
- Paoloni, M., Bernetti, A., Fratocchi, G., Mangone, M., Parrinello, L., Del Pilar Cooper, M., Sesto, L., Di Sante, L., & Santilli, V. (2011). Kinesio Taping applied to lumbar muscles influences clinical and electromyographic characteristics in chronic low back pain patients. *Eur J Phys Rehabil Med*, 47(2), 237-244.
- Kaya, E., Zinnuroglu, M., & Tugcu, I. (2011). Kinesio taping compared to physical therapy modalities for the treatment of shoulder impingement syndrome. *Clinical rheumatology*, 30(2), 201-207.
- Mottram, S. (1997). Dynamic stability of the scapula. *Manual therapy*, 2(3), 123-131.
- Host, H. H. (1995). Scapular taping in the treatment of anterior shoulder impingement. *Physical Therapy*, 75(9), 803-812.
- Kase, K., & Hashimoto, T. (2003). Changes in the volume of the peripheral blood flow by using Kinesio Taping. Book of abstracts. 18th Annual Kinesio Taping International Symposium Review, Tokyo, Japon.
- Ayako, kahanov, and Leamor: The Effect of kinesio taping on lower trunk range of motion, research in sport medicine, 2007;15(2)103-112.
- Yoshida, A., & Kahanov, L. (2007). The effect of kinesio taping on lower trunk range of motions. *Research in sports medicine*, 15(2), 103-112.
- Lemos TV, Albino AC, Matheus JP, et al.: The effect of kinesio taping in forward bending of the lumbar spine. *J Phys Ther Sci*, 2014, 26: 1371-1375.
- González-Iglesias, J., Fernández-de-Las-Peñas, C., Cleland, J., Huijbregts, P., & Gutiérrez-Vega, M. D. R. (2009). Short-term effects of cervical kinesio taping on pain and cervical range of motion in patients with acute whiplash injury: a randomized clinical trial. *Journal of orthopaedic & sports physical therapy*, 39(7), 515-521.
- Oliveria, R. (1999). Soft tissue injuries in sports people—The contribution of kinesiotaping. 15th Annual Kinesio Taping International Symposium Review, Page, P. (2012). Research designs in sports physical therapy.

- International journal of sports physical therapy*, 7(5), 482.
- Treiber, F. A., Lott, J., Duncan, J., Slavens, G., & Davis, H. (1998). Effects of Theraband and lightweight dumbbell training on shoulder rotation torque and serve performance in college tennis players. *The American Journal of Sports Medicine*, 26(4), 510-515.
- Frazier S, Whitman J, Smith M. Utilization of kinesio tex tape in patients with shoulder pain or dysfunction: a case series. *Advanced Healing*. 2006;Summer:18-20.
- Jaraczewska E, Long C. Kinesio taping in stroke: improving functional use of the upper extremity in hemiplegia. *Top Stroke Rehabil*. 2006;13:31-42. <http://dx.doi.org/10.1310/33KAXYE3-QWJB-WGT6> '\$ Johansson KM, Adol.
- Murray H, Husk LJ. Effect of kinesio taping on proprioception in the ankle [abstract]. *J Orthop Sports Phys Ther*. 2001;31:A37.
- Osterhues DJ. The use of Kinesio Taping in the management of traumatic patella dislocation. A case study. *Physiother Theor Pract*. 2004;20:267-270.