



LONGTERM EFFECT OF CRYOTHERAPY ON THROWING ACCURACY OF DOMINANT SHOULDER AMONG MALE CRICKETERS

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ABSTRACT

Context: Throwing is one of the most important and complex skill within the game of cricket. The integrity of the mechanoreceptors and neural pathways plays a vital role in allowing shoulder mobility. After an acute shoulder injury in sport, an athlete may return to practice or competition following a cryotherapy treatment to the injured shoulder.

Aims: To find the long term effect of cryotherapy on throwing accuracy of dominant shoulder.

Setting: The study has been carried over in SRM Medical college Hospital and Research Center kattankulathur

Study Design: Quasi experimental study

Methodology: 22 male cricketers will be selected as per the inclusion and exclusion criteria. The procedures were explained and an informed consent statement was obtained from them.

An ice bag was employed as the cryotherapy modality in this study. Treatment duration was 20 minutes, immediately after the cryotherapy, the posttest assessment was performed. Functional ability of the shoulder joint was assessed using the functional throwing performance index

Materials: Stop watch, Ice bag, Crepe bandage, Rubber playground ball.

Statistical analysis used: paired t-test was used to compare in mean values of pre-test and post-test.

Results: There was a significant change in the throwing accuracy after 20 minutes of cryotherapy application.

Conclusion: Throwing accuracy decreases immediately after twenty minutes of cryotherapy application over the shoulder. There is a gradual increase in the throwing accuracy and the significant change is found in the tenth minute after application

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INTRODUCTION

The shoulder has the greatest range of motion of any other joint in the body, potentially compromises its stability¹. As a result of this larger this larger range of motion, muscular coordination is vital to maintain joint stability². Proprioception results from the integration of neural impulses from a variety of peripheral mechanoreceptors to the central nervous system^{3,4}. Mechanoreceptors are present in skin, muscle, and joint tissues and are activated by tissue deformation, which subsequently sends afferent neural impulses to the central nervous system, and are used for joint stability and proper joint function⁵.

Injury to the body during the athletic event is often immediately treated with cryotherapy modality^{6,7}. Decreases in tissue temperature have been shown to decrease nerve

conduction velocity, muscle force production, and muscular power^{8,9}. Consequently, cryotherapy application to the shoulder may decrease the proprioception and predispose an athlete to injury as a result of decreases in nerve conduction velocity, muscle force reduction, proprioceptive afferent information, or a combination of these factors.

Ozmun *et al*¹² reported that ice pack application to the knee had no effect on proprioception. However, Hopper *et al*¹⁴ found statistically significant decrease in proprioception at the ankle joint after a 15 min ice bath immersion. The degree to which proprioception is altered after cryotherapy may be minimal, but it is possible that subtle proprioceptive deficit may result in decrease performance in playing field.

In addition to the lack of literature focusing on cryotherapy and proprioception, no authors to date have examined the influence of cryotherapy on shoulder on shoulder function and relationship to diminished proprioception⁴. Therefore, the purpose of our study was to determine the long term effect of cryotherapy on throwing accuracy of dominant shoulder

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among male cricketers and to find the difference in throwing accuracy immediately after cryotherapy till ten minutes after application by functional throwing performance index. The outcome helps to guide the players to know when to return to sport after cryotherapy⁵.

METHODOLOGY

Sample Design

Convenient sampling method was employed and informed consent was obtained from each subjects and this study has been approved by the ethical committee and Institutional review board of SRM College of Physiotherapy

Sample Size

Totally 22 Patients are included in the study

Selection criteria

Inclusion Criteria

- Males.
- Cricket players.
- Age (20 - 30)
- Height 175+/- 11.1cm.
- Weight 74+/- 10.4 kg.
- Dominant shoulder should be assessed with no history of injury within 12 months.

Exclusion Criteria

- History of major orthopedic conditions (fractures, dislocations)
- Musculoskeletal injury (tendinitis etc..)
- Shoulder girdle motor control; deficits associated with neurological disorders (e.g. stroke, sensory deficits)

Assessment parameters

Functional Throwing Performance Index

- The Functional Throwing Performance Index (FTPI) serves as an indicator of one's functional-performance levels.
- The FTPI test demonstrates good intra session reliability in healthy subjects.
- The Functional Throwing Performance Index test is an instrument used as a timed throwing accuracy test.

Study protocol

22 male cricketers will be selected as per the inclusion and exclusion criteria. The procedures were explained and an informed consent statement was obtained from them.

Training protocol

Cryotherapy Application

An ice bag was employed as the cryotherapy modality in this study. This particular application is used frequently and is the most functional type of cryotherapy for shoulder²⁰. Treatment duration was 20 minutes, based on accepted recommendations²¹. An ice bag was filled with approximately (1.15l) approximately 1500 g of cubed ice. The middle of the ice bag was centered over the acromion. The subjects were tested with their shirts off to allow maximum skin/ice bag interface. One double length 6-in elastic bandage was used to secure the ice bag using shoulder spica (fig-1). The subject

was instructed to relax during the cryotherapy application to limit muscle activity and minimize any change in tissue temperature²². Immediately after the cryotherapy, the posttest assessment was performed.



Figure 1 Application of Cryotherapy

Functional throwing performance index:

Functional ability of the shoulder joint was assessed using the functional throwing performance index¹⁹. The subject stood 4.57m from the target, a 30.48 x 30.48 cm square on the wall at the height of 1.22m from the floor. The object of the test was to throw a rubber playground ball into the target as many times as possible over 30 seconds for pretest and for posttest the subject will be made to throw at the target for one minute and will be repeated rest time of one minute will be given between each trial . The FTPI was calculated as the number of throws within the target divided by the total number of balls thrown. To avoid any discrepancies in judgments, the examiner determined the accuracy of throws. We chose to assess accuracy as we feel this is the measure most associated with proprioception.

Data Analysis

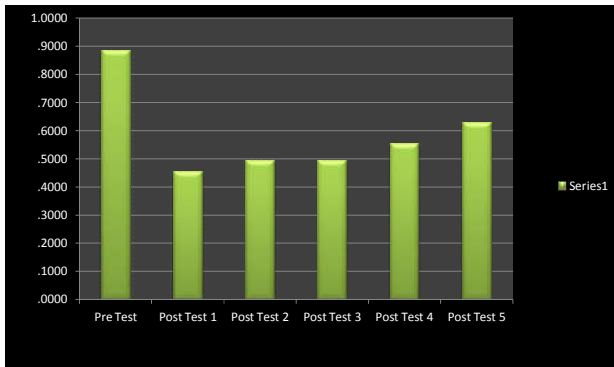
The collected data were tabulated and analyzed used inferential statistics. Mean and Standard Deviation were used to assess all the parameters. Paired t-test was adopted to find the Long term effect of cryotherapy on throwing accuracy of dominant shoulder among male cricketers. A paired t-test was used to compare in mean values of pre-test and post-test.

The above table reveal's the mean, standard, deviation t - test and p-value of long term effect of throwing accuracy between pre test and post test within who performed functional throwing performance index. In this table, p- value is less than 0.05 which is highly significant and indicates the increase in the throwing accuracy in the last minute compared to first minute

Table 1 Comparison of Pre-Test and Post-Test of Throwing Accuracy

	Paired Samples Test							
	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t-test value	df	Sig. (2-tailed)
Lower				Upper				
Pre Test – Post Test 1	.42886	.17018	.03628	.35341	.50432	11.820	21	.000
Pre Test - Post Test 2	.38932	.18472	.03938	.30742	.47122	9.886	21	.000
Pre Test - Post Test 3	.39141	.16478	.03513	.31835	.46447	11.141	21	.000
Pre Test - Post Test 4	.32841	.16686	.03557	.25443	.40239	9.232	21	.000
Pre Test - Post Test 5	.25568	.15768	.03362	.18577	.32559	7.606	21	.000

P<0.05



Graph 1 Comparison of Pre Test And Post Test of Throwing Accuracy

Series 1 [Throwing Accuracy]

RESULTS

There was a significant change in the throwing accuracy after 20 minutes of cryotherapy application. The result shows there is a gradual increase in throwing accuracy comparing he first pair of pre-test and post-test 1 and the fifth pair of pre-test and post-test 5.

DISCUSSION

The effect of ice bag application to measure the Functional Throwing Performance Index were investigated. Ice bag application for twenty minutes was determined to Functional Throwing Performance Index .Craig A. Wassinger reported decrease in Functional Throwing Performance Index immediately after ice bag application in which the immediate effect was examined. In that study they concluded that there is decrease in joint position sense, due to decrease in proprioception in the joint after 20 minutes of cryotherapy application. In this study the long term effect was examined. The statistical result shows there is a significant chance after cryotherapy initially and gradually increases by showing the statistical p value <0.05.

As males show good performance in motor activity only males cricketers were employed in this study. The importance of lower body for throwing is also been found to be importance in recent studies. The tissue temperature was well efficient with cubed ice so it was employed in the study. There are more players with right hand dominance compared to left hand dominance.

As cricket is one of the major sport in which throwing will be performed by all the players in the game, they must know the importance of cryotherapy and its relation to throwing. And it shows when a player can return to sport after cryotherapy. The players should not return to sport immediately after cryotherapy application.

They must have a warm up session before returning to the sport. This helps to regain his strength and to prevent injury during the sport.

CONCLUSION

Throwing accuracy decreases immediately after twenty minutes of cryotherapy application over the shoulder. There is a gradual increase in the throwing accuracy and the significant change is found in the tenth minute after application

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