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## Comparison between the effect of Nordic eccentric hamstring exercise versus positional release therapy on hamstring flexibility and endurance in male cricketers

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### Abstract

**Background:** Flexibility in hamstrings muscle group is necessary for the hip and knee movements as well as in many functional activities.

**Aim & Objective:** To find out comparison between the Effect of Nordic hamstring exercises Versus Positional release therapy on hamstring flexibility and strength in male cricketers.

**Method:** 30 participants were allocated to the Nordic hamstring exercise (n=20) and positional release therapy (n=20). Both group received conventional exercise as hamstring stretching for 2 weeks. Outcome included flexibility (AKE TEST), and strength (SJT).

**Result:** While applying Wilcoxon Signed Rank Test within the group, in Group A (Nordic hamstring exercise) and Group B (positional release therapy). Both group showing significant improvement in post intervention ( $P < 0.05$ ). While applying Mann Whitney U test in-between groups Group A versus Group B there is no statistical difference in-between groups ( $P > 0.05$ ).

**Conclusion:** The study shows that both the Technique Nordic hamstring exercise and positional release therapies were individually effective in improving the flexibility and strength. While comparing both the technique there is no significant difference present in between the groups.

**Keywords:** Nordic hamstring exercise, positional release therapy, hamstring flexibility

### Introduction

Sports is one of the most common and widespread recreational activity and a common cultural element of modern societies. Sport and exercise contributes both to the physical and mental health of an individual. While the social benefits of sport, such as gain of fitness, reducing risk of disease, recreation, development of self-confidence and high self-esteem. Cricket is a dynamic sport that involves many abstract skills and movements. To enhance these skills and movements, many players ensure that their bodies are kept fit and strong. There are three unique aspects of the game (bowling, batting and fielding) which are associated with risk of injury<sup>[1]</sup>. The increase in injury risk is of particular concern at younger levels as research has shown that adolescent cricket injury risk is higher than that in adult cricketers. The seasonal incidence of injury among schoolboy and club cricketers in South Africa between the age of 19 and 24 years equals 34.2–49%, with the main injuries occurring in the lower back and hamstrings for bowlers and batsmen<sup>[2]</sup>.

### Aim and Objective

#### Aim

To find out comparison between the Effect of Nordic hamstring exercises Versus Positional release therapy on hamstring flexibility and strength in male cricketers.

#### Objectives

To determine the effect of Nordic hamstring exercise on hamstring flexibility and strength in male cricketers. To determine the effect of Positional release therapy on hamstring flexibility and strength in male cricketers. To determine the comparison between the effects of Nordic hamstring exercise Versus Positional release therapy on hamstring flexibility and strength in male cricketers.

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## Hypothesis

**H01:** There is no significant effect of Nordic hamstring exercise on hamstring flexibility in male cricketers.

**H02:** There is no significant effect of Nordic hamstring exercise on hamstring strength in male cricketers.

**H03:** There is no significant effect of positional release therapy on hamstring flexibility in male cricketers.

**H04:** There is no significant effect of positional release therapy on hamstring strength in male cricketers.

**H05:** There is no significant difference between Nordic hamstring exercise and positional release therapy on hamstring flexibility in male cricketers.

**H06:** There is no significant difference between Nordic hamstring exercise and positional release therapy on hamstring strength in male cricketers.

## Review of Literature

### Nordic Hamstring Exercise

Al Attar, W. and Alshehri, M. (2019) <sup>[12]</sup> The Efficacy of Copenhagen Adduction Exercise and Nordic Hamstring Exercise on Dynamic Balance among Male Athletes: A Randomized Controlled Trial. In this study 80 subjects were divided into two groups. Group A were treated with Nordic hamstring exercise. Group B were treated with adduction exercise. After the study concluded that both groups showed overall significant improvement in balance and through biodex balance stability with limit of stability.

Ribero Alvares May 2018 <sup>[13]</sup> Four Weeks of Nordic Hamstring Exercise Reduce Muscle Injury Risk Factors in Young Adults. Twenty physically active young adults were allocated into 2 equal-sized groups: control group (CG) and training group (TG). The TG was engaged in a 4-week NHE program, twice a week, 3 sets of 6–10 repetitions; while CG received no exercise intervention. The knee flexor and extensor strength were assessed through isokinetic dynamometry, the biceps femoris long head muscle architecture through ultrasound images, and the hamstring flexibility through sit-and-reach test. The results showed that CG subjects had no significant change in any outcome.

Chaitali shah, Hiralamin December 2018 <sup>[5]</sup> Effect of Nordic eccentric hamstring stretching exercise and sciatic nerve slider technique of neural mobilization in college students: a comparative study. In this study 40 subjects were divided into two groups. Group A were treated with Nordic hamstring exercise. Group B were treated with sciatic nerve slider technique. After two weeks the study concluded that Nordic eccentric hamstring exercise showed overall significant improvement in Range of motion and strength status through Active extension test, sit to reach test and Sargent jump test.

Kayla D Seymore 2017 <sup>[14]</sup> the effect of Nordic Hamstring strength training on muscle architecture, stiffness and strength. In this study 20 subjects were randomly into two study groups.

**Group A** - 10 patients were given Nordic Hamstring exercises.

**Group B** – 10 patients treated with static stretching for 6 weeks. Outcome measures were ROM and strength with dynamometer. As per results, Nordic hamstring exercise found to be effective on flexibility and endurance.

Evans K, Williams 2017 <sup>[15]</sup> Association between Hand-Held Dynamometer Measures of Hamstring Strength and Force Obtained From the Nordic Hamstring Exercise. In this study 79 sports athletes were selected. NES obtained from a

commercial device. Hand held dynamometry break assessments of hip extension (HE), hamstring inner range strength (HI) and hamstring strength at 30° knee flexion were used. The study concluded that each hamstring strength assessment may offer unique information about the current hamstring strength quality of an athlete. Despite, HI having the largest effect, and the improved model with the addition of H30, handheld dynamometry replacing the using these measures in place of NES obtained from a commercial device is not advised.

### Positional Release Therapy

Sejal Sailor, Yesha Mehta, Neha Shah, 2019 <sup>[16]</sup> A comparative study of muscle energy technique and positional release technique on hamstring flexibility. In this study a total of 24 patients were randomly allocated to group A Muscle energy technique group B positional release technique. Stretching was given to both groups. Range of motion was outcome measure that was assessed pre and post Interventional. After 2 weeks Results showed that muscle energy technique was effective in hamstring flexibility.

### Conventional Treatment

Seung-bong Cho Mi-young Park 2019 <sup>[19]</sup> the Effect of Therapeutic Ultrasound and Static Stretching of the Hamstring Muscle on Flexibility and Static Balance Ability 2019. In this study between the ages of 20-30 were randomly assigned to two groups. Group 1 (n=15) had ultrasound therapy, called US group. Group 2 (n=15) had static stretching, called SS group. Measurements were taken prior to starting the program and after completing the experiment using Finger to floor test and Active knee extension test to get the results of hamstring flexibility and the ability of static balance. Results showed that US group and SS group had an effect on changes in hamstring length However, they did not show a significant increase in static balance.

### Review of Active Knee Extension Test

Mohammad Bagher Shams 2019 <sup>[23]</sup> Correlation between SLR and Active Knee Extension Tests in LBP Patients with Tightened Hamstring The sample size was calculated to be 50 patients. Participants with chronic low back pain (LBP) and short hamstring were selected. The hamstring muscles length of the participants were assessed using two clinical tests, 1- AKE test, and 2- SLR test. Result showed that there was a positive and significant correlation between Hamstring length score using SLR and Hamstring length in patients with AKE test. There is a correlation between the results of two types of testing hamstring muscle length including SRL and AKE tests among patients with LBP having tightness in their hamstring muscle.

## Methodology

**Study Design:** Experimental study

**Study Setting:** sports academy

**Study Duration:** Total duration of the study was 1 year.

**Sampling Technique:** Purposive sampling

**Sample Size:** 30

**N = 30**

**Group A** = 15 Patients (Nordic Hamstring exercise + Conventional Treatment)

**Group B** = 15 Patients (Positional Release Therapy + Conventional Treatment)

**Selection Criteria**

**Inclusion Criteria**

Age between 18 to 25 years Only male cricketers 20 to 40 degrees active knee extension loss with hip in 90 degree hip flexion Full passive range of motion of knee extension (to rule out inter articular pathology of knee joint) Those who were willing to participate in the study and willing to take treatment for ten successive days

**Exclusion Criteria**

- Fractures of the hip and knee
- Dislocation of lower limb
- Hamstring injuries
- Nerve lesion of lower limb
- Neurological abnormalities
- Ligaments injuries
- Balance disorders
- Spinal deformity
- Any recent surger

**Procedure**

1. Subjects were taken from various from sports academy. Those subjects who fulfilling inclusion criteria were asked to sign the written consent form for voluntary participation in the study. They were explained about the nature of the study and intervention. Both males and females were taken in the study.
2. On first visit, complete assessment was done according to the Performa. AKE and SJT explained in the local language of Gujarati and Hindi and then pre participation AKE and SJT were documented.
3. Subjects who were included in protocol were not permitted to administer any other forms of electrotherapy or other techniques (steroids or acupuncture) during the intervention period.

A total number of 30 subjects were selected for study. Patients were randomly divided into two groups of 15 patients in each group. Each patients of the study was treated for 2weeks, 5 days per week, 1 day per session.

**Group ‘A’** received Nordic hamstring exercise with conventional treatment.

**Group ‘B’** received Positional release therapy with conventional treatment.

**Result**

The present study conducted to find out comparison between the Effect of Nordic hamstring exercise Versus Positional release therapy on hamstring flexibility and strength in male cricketers. The study comprised of total 30 subjects with age distribution between 18- 25 years.

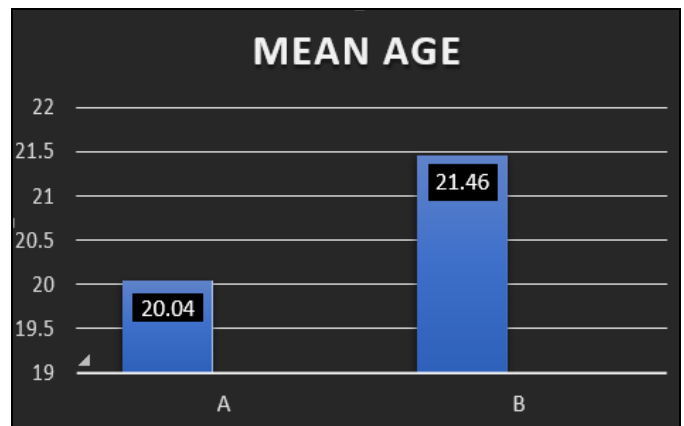
They were divided into 2 groups; 15 in each group. The data was analysed using statistical package for the social science software (SPSS) 20 version. Before applying statistical tests, data was screened for normal distribution by Shapiro-Wilk test. In this study power was kept at 95% and level of significance was kept at 5%. All outcome measures were analysed at base line and after 10 days of treatment, using appropriate statistical test. Changes in outcome measures were analysed within group as well as between groups.

**The Outcome measure were**

Flexibility- by active knee extension test& Strength- by Sargent jump test

**Table 1:** Shows mean age of patients in both the groups:

Roup	Mean	SD
A	20.04	1.804
B	21.46	2.231



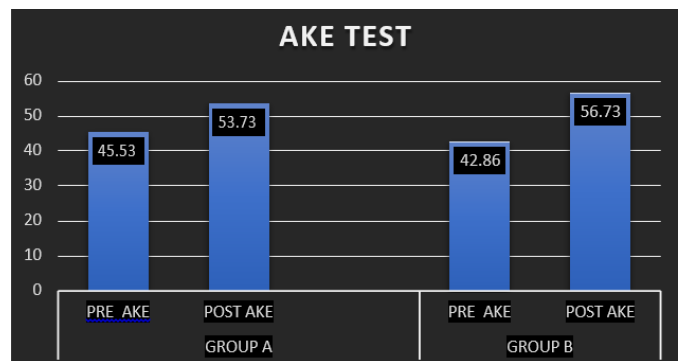
**Graph 1:** Shows mean age of patients in both the groups:

**Table 2:** Tests used to compare within and between groups

Group	Within the group analysis	Between the group comparison
Group A	Wilcoxon signed rank test	Mann Whitney U Test
Group B	Wilcoxon signed rank test	Mann Whitney U Test

**Table 3:** Mean and SD of Pre and Post AKE within Groups

Group	Pre Treatment		Post Treatment		Z Value	P value
	Mean	SD	Mean	SD		
Nordic Hamstring exercise	45.53	6.07	53.73	5.97	-4.798	<0.001
Positional release therapy	42.86	8.97	56.73	9.04	-4.835	<0.001



**Graph 2:** Mean of Pre and Post AKE within groups

Here the within group comparison of AKE Test was done by using Wilcoxon signed rank T test in all groups, and ‘p’ value was <0.001, which showed statistically Significant difference both the groups. So, both groups showed significant improvement on flexibility in AKE Test score after intervention.

**Discussion**

The present study was conducted to find out comparison between the Effect of Nordic hamstring exercise Versus Positional release therapy on hamstring flexibility and strength in male cricketers. This study was conducted on 30 subjects (male) with age group of 18-25 years and were divided into two groups by mean age of 20.04+ 1.86 n Group A, 21.46 + 2.23in Group B. baseline measurement for flexibility (ROM) by Active knee extension test and strength by Sargent jump test (SJT) were taken on day 1.



## Conclusion

According to the statistical analysis the study shows that both the Techniques Group A (Nordic Hamstring Exercise) and Group B (Positional Release Therapy) were individually effective in improving the Flexibility and Strength. While comparing both the techniques, there is no significant difference present in between the groups.

## Summary

Comparison between the effect of nordic hamstring exercise versus positional release therapy on hamstring flexibility and strength in male cricketers”.

A total number of 30 patients were selected for study. Each patient were screened initially by using a simple selection Performa relevant to the inclusion and exclusion criteria, then the selected patients who were willing to participate were randomly divided into two groups of 15 patients in each group.

**Group A** - 15 patients were given Nordic Hamstring Exercise along with conventional treatment.

**Group B** - 15 patients were given Positional Release Therapy along with conventional treatment.

## The treatment was given 10 sessions for 2 weeks

Two outcome measures Active Knee Extension Test (Flexibility) and Sargent Jump Test (Strength) were used.

In statistical analysis, analysis of outcome measure of AKE and SJT was done by nonparametric tests. Within group Wilcoxon signed ranked test and between groups Mann Whitney U test was done. Both groups showed significant improvement in AKE AND SJT Within the groups. While we compare both groups there was no significant difference in-between the groups.

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