

**IMMEDIATE EFFECT OF SUBOCCIPITAL
MYOFASCIAL RELEASE AND SOFT TISSUE
FLOSSING TO IMPROVE HAMSTRING FLEXIBILITY IN
COLLEGIATE RECREATIONAL ATHELETES- A
RANDOMIZED CLINICAL TRAIL**

Dissertation Submitted to the
UTKAL UNIVERSITY Bhubaneswar, Odisha

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In Partial fulfilment of the requirements for the degree of
MASTER OF PHYSIOTHERAPY (M.P.T)

In

SPORTS PHYSIOTHERAPY

Under the guidance of

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2022-2024**



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I hereby declare that this dissertation entitled **IMMEDIATE EFFECT OF SUBOCCIPITAL MYOFASCIAL RELEASE AND SOFT TISSUE FLOSSING TO IMPROVE HAMSTRING FLEXIBILITY IN COLLEGIATE RECREATIONAL ATHELETES – RANDOMIZED CLINICAL TRAIL** is a bonafide and genuine research work carried out by me under the guidance of **Dr. Asifuzzaman Shahriyar Ahmed, Associate Professor, Abhinav Bindra Sports Medicine and Research Institute, Bhubaneswar, Odisha.**

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With heartfelt appreciation,

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LIST OF ABBREVIATIONS

1. ABSMARI – Abhinav Bindra Sports Medicine and Research Institute
2. SMFR – Suboccipital Myofascial Release
3. AKE – Active Knee Extension
4. SRT – Sit and Reach Test
5. FHP- Forward Head Posture
6. SPSS – Statistical package for social sciences
7. BMI – Body Mass Index

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ABSTRACT

IMMEDIATE EFFECT OF SUBOCCIPITAL MYOFASCIAL RELEASE AND SOFT TISSUE FLOSSING TO IMPROVE HAMSTRING FLEXIBILITY IN COLLEGIATE RECREATIONAL ATHELETES- RANDOMIZED CLINICAL TRAIL

Background

Hamstring flexibility plays a crucial role in athletic performance, injury prevention, and overall functional movement, particularly in recreational athletes. Reduced hamstring flexibility is associated with an increased risk of musculoskeletal injuries, which can hinder athletic performance. Various therapeutic interventions, such as myofascial release and soft tissue flossing, are used to improve flexibility and muscle function. Suboccipital myofascial release targets the fascial system, which may influence distal muscle flexibility, while soft tissue flossing is a novel technique thought to enhance tissue mobility and reduce muscle stiffness. However, there is limited research comparing the immediate effects of these techniques on hamstring flexibility, especially in collegiate recreational athletes. This study aims to evaluate the immediate effects of suboccipital myofascial release and soft tissue flossing on hamstring flexibility.

Method

Twenty-four recreational athletes aged 18 to 25 years were randomly assigned to the Suboccipital Myofascial Release (SMFR) group (n=12) and the Soft Tissue Flossing group (n=12). Both groups underwent a single intervention session.

Hamstring flexibility was assessed using the Active Knee Extension Test and the Sit and Reach Test, both before and immediately after the intervention. The SMFR

group received manual suboccipital myofascial release targeting the fascial system, while the Soft Tissue Flossing group had soft tissue flossing applied to the hamstring region. The intervention was performed in a controlled setting with standardized techniques to ensure consistency across participants.

Results

Within-group analysis revealed a statistically significant improvement in hamstring flexibility, as measured by the Sit and Reach Test (SRT), in both the groups ($p < 0.05$). Similarly, the Active Knee Extension (AKE) test demonstrated a significant increase in flexibility within both groups ($p < 0.05$).

However, between-group comparisons showed no statistically significant difference in the SRT results between the groups ($p > 0.05$). In contrast, the between-group analysis of the AKE test indicated a significant difference between the two groups ($p < 0.05$), with the Soft tissue Flossing group showing a greater improvement in hamstring flexibility compared to the SMFR group.

Interpretation and Conclusion

Both SMFR and Soft Tissue Flossing improved hamstring flexibility, but Soft Tissue Flossing showed greater gains in knee extension. Soft Tissue Flossing may be the more effective option for enhancing flexibility.

Keywords

Hamstring Flexibility; Recreational Athletes; Soft Tissue Flossing; Suboccipital Myofascial Release.

INTRODUCTION

The several objects that pertain to a recreational athlete are being examined in this context: soft tissue flossing, fascia, hamstrings, flexibility, and suboccipital myofascial release.

A person who engages in physical activity for at least 20 minutes, one to three times a week, or who played sports in high school, is considered a recreational athlete. [1] [2]. In recreational athletes, hamstring muscle shortening limits the range of motion in the knee extension when the hip is flexed or the hip flexion when the knee is extended [3]. When the knee extension angle rises above twenty degrees, it is considered as Hamstring muscle tightness. [4] [5] [6]

Flexibility is the capacity to move one or more joints through a pain-free, unrestricted range of motion (ROM) with efficiency. [7] Variations in flexibility can lead to aberrant stress on the musculoskeletal system, which can result in injury [8] [9] because they impair strength, endurance, and motor coordination and increase pain levels [10]

Being a multi-joint muscle that is constantly subjected to varied degrees of tensile pressures, hamstrings are thought to have a stronger tendency to shorten. [11] [12]. Sports performance is largely dependent on the hamstring and gastrocnemius muscles; hamstring injuries are frequent and have a high recurrence rate.

Consequently, a number of risk factors have been suggested and a thorough investigation into the aetiology of hamstring injuries has been conducted. Reduced hamstring flexibility is one of several characteristics that may lead to hamstring muscle strains, according to some of the studies done. [13] [14] [15]

Sitting for extended periods of time can have detrimental biomechanical and physiological implications because static forces consume more energy than dynamic motions and because 50% of the body's muscles contract to keep the body stationary and resist gravity. Restricted mobility is the root cause of musculoskeletal issues like tight hamstrings [16]. The hamstrings become more flexible when the tone of the suboccipital muscles lowers, and they are linked by a single neural system known as the superficial back line (SBL) [17]. As a result, lowering the tone of the suboccipital muscles (either passively with fascial therapy or actively with vigorous exercises) lowers the tone of the knee flexors (hamstring muscles) and increases the amplitude of hip flexion, raising the sit and reach test score and thus increasing hamstring flexibility. [18]

According to Schleip et al. (2012), fascia is described as "fibrous collagenous tissue, which is part of a body-wide tensional force transmission system." However, recent research indicates that fascia may also play functional roles in proprioception, nociception, general movement coordination, and joint stability (Tozzi, 2012; Stecco et al., 2007). There is mounting evidence that the skeletal muscles are morphologically continuous, with fascia serving as a connecting element. Numerous investigations have emphasized the myofascial continuity between anatomically distant structures (Wilke et al., 2015; Krause et al., 2016). [19] [20]

The idea of "Anatomy Trains," created by Myers (2014), connects individual muscles into functional complexes, each of which has a unique meaning in human movement. Many human cadaveric experimental studies have consistently

identified the Superficial Back Line (SBL) among these myofascial networks (Wilke et al., 2015). Additional evidence suggests that myofascial pathways transmit force to distant anatomical tissues (Krause et al., 2016). [21] [22]

Myofascial Release (MFR) is the administration of a low load, long duration stretch to the myofascial complex in order to restore its ideal length, reduce discomfort, and improve function (Barnes, 1990). Fascial constraints in one region of the body have been speculated to produce unnecessary tension in other sections of the body due to fascial continuity; as a result, any structures enveloped, split, or supported by fascia may be stressed (Schleip et al, 2003).

FLOSS, a rubber elastic band type that can be wrapped around joints or muscle groups and then ROM exercises are performed for a short period of time, approximately one to three minutes [23]. Blood flow restriction (BFR) is a basic mechanism used in tissue flossing. The physiological mechanisms by which flossing works could include reperfusion, fascial shearing, and blockage of blood to muscle tissue [24] For instance, tissue flossing produces transient tissue ischemia and reperfusion of blood flow upon removal of FLOSS, which can improve metabolic response and modify the microenvironment by increasing levels of growth hormone and catecholamines.

NEED OF THE STUDY

- Lack of research identifying the most efficient technique for enhancing hamstring flexibility through fascia is still under debate.
- As the course through which both the technique works is same i.e fascia, so there is a strong need to evaluate which of these techniques would be better in increasing hamstring flexibility.
- Tissue flossing is found to be superior to local myofascial technique among the other MFR technique in terms of neural, vascular and mechanical factors.
- Researches have shown that remote MFR can gain a comprehensive understanding of how myofascial release influences the body as a whole.
- The suboccipital myofascial release is a common remote technique to others in terms of current population, slouched posture, dura mater and the fascial connectivity.
- To get an immediate effect there must be minimum adverse effects of both the techniques to get hamstring flexibility.
- To supplement the data already in existence demonstrating increased hamstring flexibility with suboccipital MFR or Soft Tissue Flossing.

AIM OF THE STUDY

To compare the immediate effect of Suboccipital Myofascial Release with Soft tissue Flossing on improving hamstring flexibility in recreational athletes.

OBJECTIVES OF THE STUDY

1. To know the immediate effect of Suboccipital Myofascial Release on hamstring flexibility.
2. To know the immediate effect of Soft Tissue Flossing on hamstring flexibility.
3. To compare the immediate effect of Suboccipital Myofascial Release and soft tissue flossing on hamstring flexibility.

HYPOTHESES

Null hypothesis:

- H0- There will be no significant difference between the suboccipital myofascial release and soft tissue flossing on hamstring flexibility of recreational athletes.
- H0- There will be no significant difference in hamstring flexibility between group A and group B on improving hamstring flexibility using AKE test.
- H0- There will be no significant difference in hamstring flexibility between group A and group B on improving hamstring flexibility using sit to reach test.

Alternate hypothesis:

- H1- There will be a significant difference between the suboccipital myofascial release and soft tissue flossing on hamstring flexibility of recreational athletes.
- H1- There will be significant difference in hamstring flexibility between group A and group B on improving hamstring flexibility using AKE test.
- H1- There will be significant difference in hamstring flexibility between group A and group B on improving hamstring flexibility using sit to reach test.

REVIEW OF LITERATURE

- **Durga Girish Joshi (2018), Journal of Bodywork & Movement Therapies**

Conducted a study on “Effect of remote myofascial release on hamstring flexibility in asymptomatic individuals”. It is a randomized clinical trial where 58 asymptomatic individuals were included and are divided into 3 groups, first group received static stretching, second group received MFR, third group received both SS and MFR. The combined group showed significant improvement on hamstring flexibility.

- **Hiroaki Kneda (2022), Journal of Sports Science and Medicine**

Conducted a study on “Effects of tissue flossing and dynamic stretching on hamstring muscle function”. It is a randomized crossover trial which included 17 young men. The intervention was done in 3 phases. Each subject performed 3 interventions- flossing, DS and control on three separate days with a washout period of 1 week. The study revealed that flossing of hamstring muscle significantly improve SLR, passive KE results, passive torque at end ROM and maximal eccentric knee flexion contraction.

- **Andreas Konrad (2021), Frontiers in Physiology**

Conducted a study on “Effects of tissue flossing on the healthy and impaired musculoskeletal system”. It is a scoping review in which 24 studies were taken which showed possible significant effects of hamstring flossing on ROM (acute and long term effects), effect of flossing on performance (acute and short term effects), impact of flossing on disease pain and injury and effects of flossing on recovery from DOMS. The conclusion made from this review is that flossing

applied to thigh can positively affect the ROM by increasing the stretch tolerance.

- **Soon-Hyun Kwon (2021), International Journal of Environmental Research and Public Health**

Conducted a study on “The effect of hamstring Relaxation program on headache pressure pain threshold, and range of motion in patient with tension headache”. It is a randomized control trial where 30 participants divided into 2 groups includes hamstring relaxation program and control group. The Hamstring Relaxation program was effective in reducing the degree of headache and improved ROM of suboccipital muscles and hamstring are seen.

- **Zachary Maust (2021), International Journal of Sports Physical Therapy**

Conducted a study on “The effects of soft tissue flossing on hamstring range of motion and lower extremity power”. This is a cross over study included 21 recreationally active individuals in 3 intervention group; floss sham and control. The study concluded that flossing not only immediately improve flexibility, but achieve this without hindering power.

- **Gao Jianhong (2021), International Journal of Human Movement and Sports Sciences**

Conducted a study on “The effect of tissue flossing technique on sports and injury prevention and rehabilitation”. This was a systemic review which included 23 full text journal articles which concluded that, based on the findings in the previous studies, floss band wrapping on different soft tissues or peripheral joint could be valid method to increase ROM, manage pain and reduce tightness.

- **Paul Fauris (2021), International Journal of Environmental Research and Public Health**

Conducted a study on “Does self-myofascial release cause a remote hamstring stretching effect based on myofascial chains”. It is a randomized controlled trial in which the experimental group received self MFR to the plantar fascia, gastrocnemius, hamstring, thoracolumbar fascia and epicardial fascia whereas the control group with no intervention. They concluded that the SBL can be considered a functional structure, as the application of SMR on any of its component segments improved hamstring flexibility and ankle dorsiflexion.

METHODOLOGY

- **Study Design-** Randomized Clinical Trial
- **Study Population-** Recreational athletes
- **Sample Size-** 24
- **Sampling Technique-** Purposive
- **Study Setting-** ABSMARI
- **Study Duration-** 1 year

Selection Criteria

- **Inclusion Criteria:**

- i. Participating in regular physical activity (1 to 3 times a week)
- ii. KEA >20°
- iii. FFD >5cm (finger-to-floor distance)
- iv. Both male and female
- v. Age 18- 25
- vi. Forward head posture.

- **Exclusion Criteria**

- i. H/O neck trauma or fractures
- ii. Subjects who have latex allergy
- iii. Hypertension
- iv. Venous thrombotic disease
- v. Neurological, orthopaedic or neuromuscular problems in lower legs
- vi. H/O LE surgery - 6 months
- vii. LE neurological condition

- **Materials Used:**

- i. Plinth
- ii. Goniometer
- iii. Sit and reach test box
- iv. Floss band
- v. Mat



Fig 1. Picture of Materials Used

Study Procedure

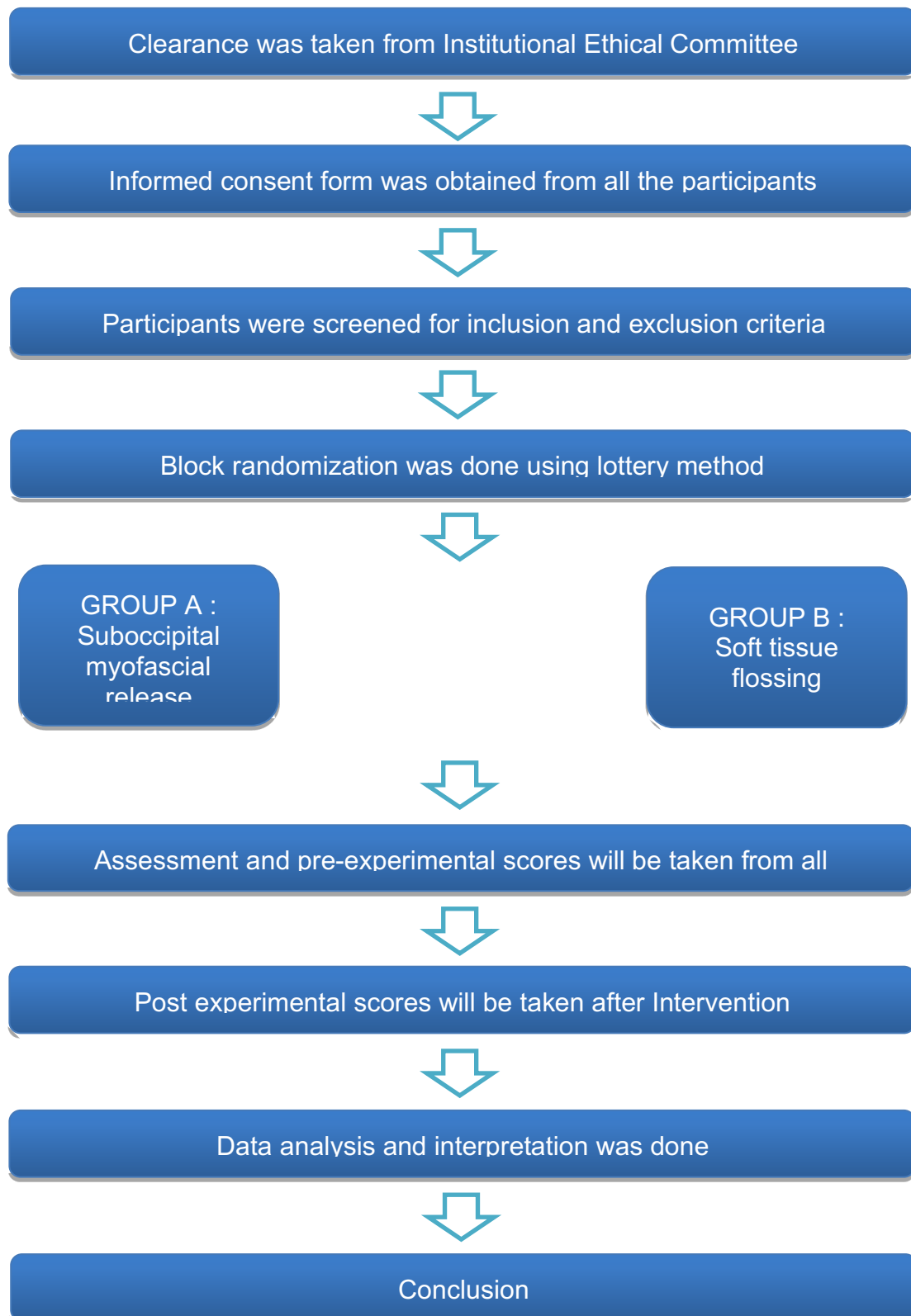


Fig 2. Flow chart of study procedure

Outcome Measures:

1. Active Knee Extension Test
2. Sit and Reach Test

Sample selection and Randomization:

- The institutional Ethical Committee evaluated and approved the current study. A total of 30 samples were screened by using purposive sampling. 24 participants were selected based on inclusion criteria and exclusion criteria and 6 subjects were excluded. They were chosen for this study based on certain criteria, such as participating in regular physical activity (1 to 3 times a week), KEA >20°, FFD >5cm (finger-to-floor distance), both male and female, Age 18- 25, Forward head posture. Everyone who participated in the study, their informed consent were taken.
- Groups' allocation was done by using Block Randomization. 1 box for SMFR group and 1 box for Flossing, each box contain 12 chits. 12 subjects were placed in Group A (SMFR Group) 12 subjects were placed in Group B (Soft tissue Flossing Group)

Procedure:

- Informed consent was obtained from the participants.
- Demographic data was obtained which included name, age, gender, height, weight, BMI
- Participants were allocated in Group A (SMFR) and Group B (Soft tissue Flossing) by Purposive sampling method.
- Both interventions were performed on respective groups i.e. Group A- SMFR and Group B- Soft tissue Flossing.

SMFR:

- Participant position- Supine
- Therapist position- Standing at the head end of the couch.
- The therapist places the pad of his fingers on the posterior aspect of the head in the upper cervical region. Stretch is applied with the fingertips from a caudal to cephalad direction while maintaining a vertical pressure deep into the sub-occipital region. While maintaining the pressure, fingers slowly glided up to the base of the occiput covering the entire suboccipital region. This was performed for 2 minutes.

Soft tissue Flossing:

- Subjects placed their leg forward in standing position.
- Floss band was wrapped around the area just above the distal 3rd between ASIS and patella as anchor.
- Floss band is stretched to 1.5 times it's natural length with maintained tension. The thigh was wrapped distally to proximally with 50% overlap of the previous part of the band.
- The subjects performed squat 10 times and AKE 20 times. Band was subsequently removed. This process was performed within 2 minutes, followed by a 2 minute break and repeated once more.

All the data were recorded and was analysed and compared using the latest version of SPSS (version 29) software.

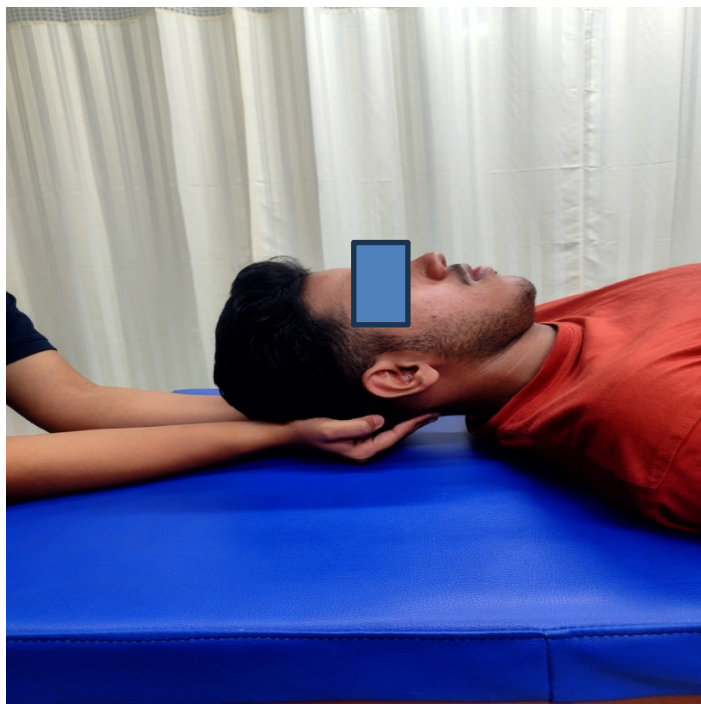


Fig 3. Position for Suboccipital MFR



Fig 4. Position for wrapping the floss band



Fig 5. Performing Knee Extensions



Fig 6. Performing Squats

SAMPLE SIZE ESTIMATION

Sample size calculation was done by using the G Power Software

(Outcome –Sit and reach test)

Effect Size (d) = 1.7

Alpha = 0.05

Power = 0.95

Noncentrality parameter = 3.92

Critical t = 2.07

Df = 22

Total sample size = 24

Group 1 (SMFR) = 12

Group 2 (Soft tissue Flossing) = 12

STATISTICAL ANALYSIS

Statistical Analysis

Data was analysed using statistical package **SPSS 29.0**(SPSSInc,Chicago,IL).

Descriptive statistics was performed to assess the mean and standard deviation of specific groups while performing **t test**. Normality of the data was assessed using **Shapiro-Wilk test**. **Interferential statistics** to find out the difference within groups was done using **paired -t test**. Analysis between two groups using **Independent Samples Test**. Level of significance was set **at** **p<0.05**

RESULTS

	MEAN	SD
SMFR	21.4	2.23437
SOFT TISSUE FLOSSING	21.6	2.64431

Table 1. Mean Age Analysis

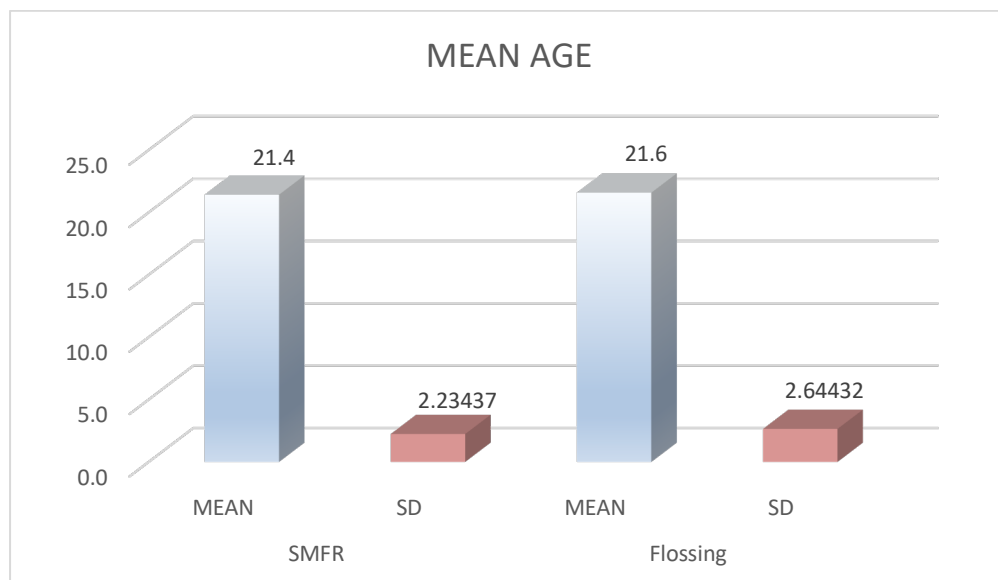


Fig 7. Graphical presentation Mean Age

	MEAN	SD
SMFR	24.79	3.91995
SOFT TISSUE FLOSSING	22.26	4.25355

Table 2. Mean BMI Analysis

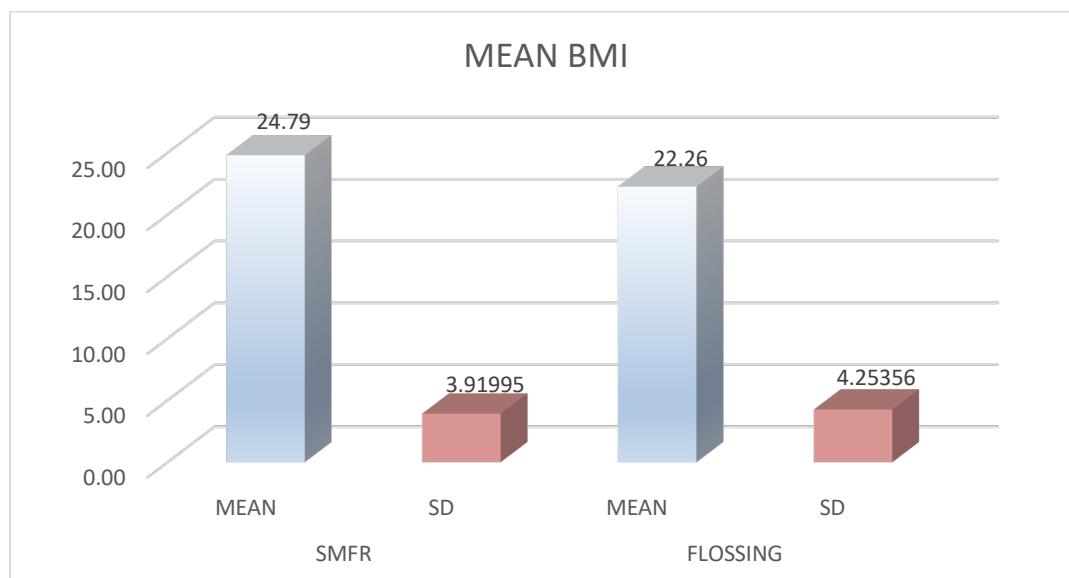


Fig 8. Graphical presentation Mean BMI

Within group comparison of SRT indicates statistically significant difference ($p < 0.05$). The mean difference within each group reported was as follows, Soft tissue Flossing Group (6.7) and SMFR group (5.2). **TABLE 2.3**

	PRE	POST	MEAN DIFFERENCE	P VALUE
SMFR	20.9	26.1	5.2	<0.05
FLOSSING	13.8	20.5	6.7	<0.05

Table 3. SRT within Group Analysis

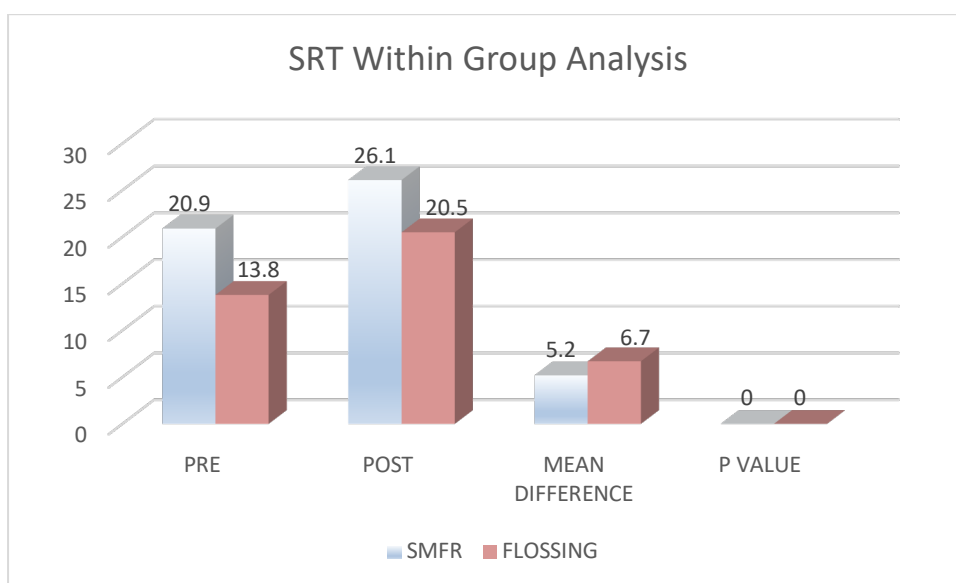


Fig 9. Graphical presentation of SRT Within Group Analysis

Within group comparison of AKE indicates statistically significant difference with ($p < 0.05$). The mean difference within each group reported was as follows, Soft tissue Flossing Group (4.1) > SMFR Group(3.3). **TABLE 2.4**

	PRE	POST	MEAN DIFFERENCE	P VALUE
SMFR	120.2	123.5	3.3	<0.05
Soft tissue Flossing	121.3	125.4	4.1	<0.05

Table 4. AKE Within Group Analysis

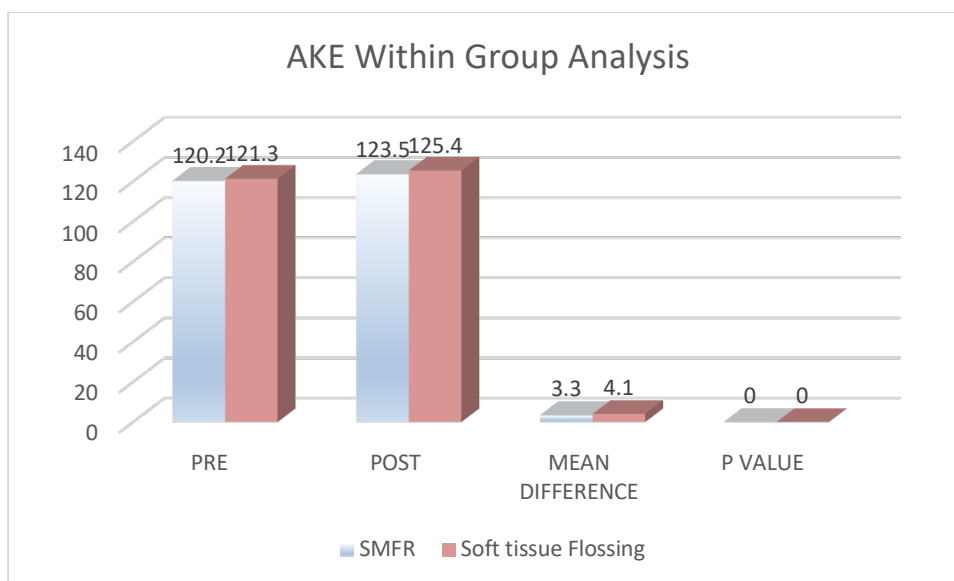


Fig 10. Graphical presentation of AKE Within Group Analysis

Between group Analysis of SRT showed no statistically significant Difference between SMFR and Soft tissue Flossing group ($p>0.05$) & Between group comparison of active knee extension angle, showed statistically significant difference between SMFR and Soft Tissue Flossing ($p<0.05$) where mean of Soft Tissue Flossing > SMFR.

OUTCOME	GROUPS	PRE	POST	MEAN DIFFERENCE	P VALUE
SRT	SMFR	20.9	26.1	5.2	$p>0.05$
	FLOSSING	13.8	20.5	6.7	
AKE	SMFR	120.2	123.5	3.3	$P<0.05$
	FLOSSING	121.3	125.4	4.1	

Table 5. Between group Analysis of outcome Measures

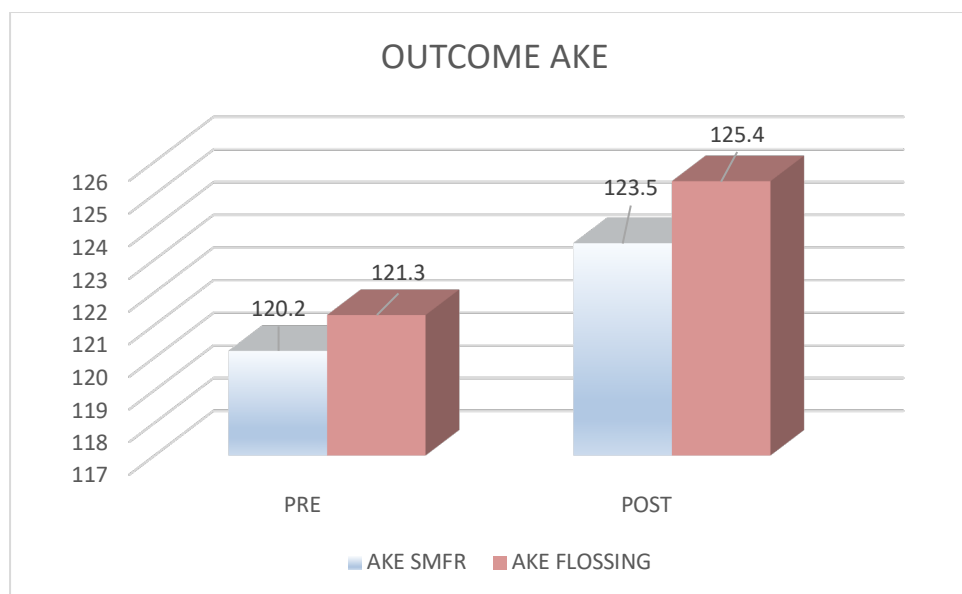
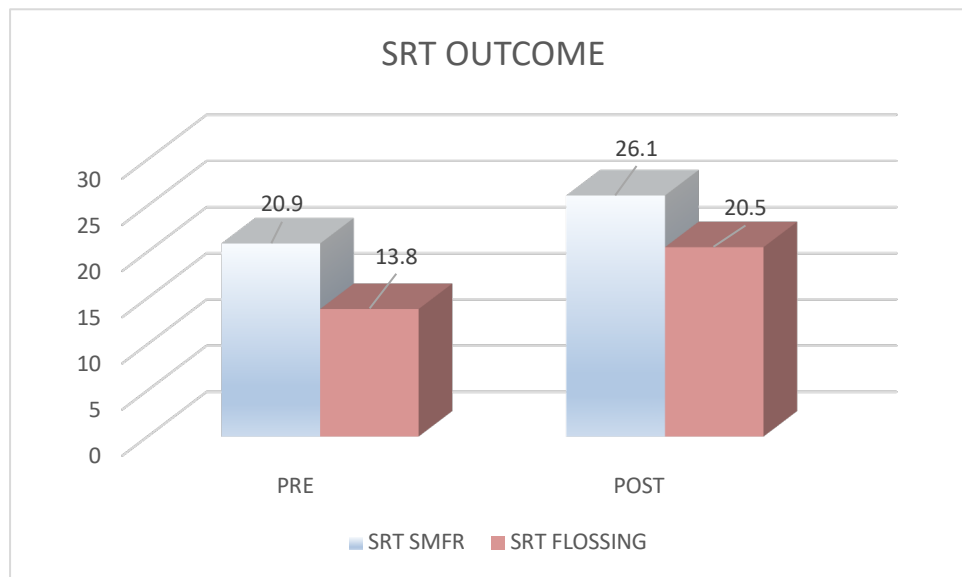


Fig 11. Graphical presentation of between groups Analysis

DISCUSSION

The goal of this study was to compare the immediate effect of Suboccipital Myofascial release and Soft tissue Flossing to hamstring on Active Knee Extension Test and Sit and reach Test to see which technique should be used to improve hamstring flexibility in recreational athletes. The result of this study reveal an important component in the complementation of the Soft tissue flossing to hamstring compared to Suboccipital Myofascial release regarding AKE and SRT in collegiate recreational athletes as a result of the increasing hamstring flexibility. The findings presented in this study fill the knowledge gap regarding Soft tissue Flossing and SMFR's role in improving Hamstring flexibility.

Active Knee Extension Test

The immediate effect of Soft tissue flossing to Hamstring and Suboccipital Myofascial Release produced significant changes in pre and post value as well as between the groups of AKE test with the P value of <0.05 . Soft tissue Flossing has shown better effects on improving flexibility of hamstring with a mean difference of 4.1 degrees on AKE test. The application of compression and decompression cycles during tissue flossing may help stimulate mechanoreceptors, potentially leading to temporary increase in ROM while on the other hand remote MFR to the suboccipital muscles.

According to Starrett K. Cordoza's hypothesis, tissue flossing enabled myofascial adhesions along the hamstrings to dissipate without changing the length of the tissue or adversely influencing the priming of muscle spindles

and Golgi tendon organs (GTOs). [25] There may occur pre-stretch activation, which could improve muscle length and flexibility. The effects of combining compression and stretching can provide insights into the underlying mechanisms, even though there is a dearth of direct scientific literature focused on "pre-stretch activation" via flossing.

In a study of 52 recreational athletes, Matthew W. Driller demonstrated significant gains in all ROM measurements as well as single-leg jump performance after applying a floss band while conducting 2 minutes of active ROM exercises. A previous study evaluated the effects of flossing on muscle soreness and recovery, which may indirectly explain how compression techniques affect muscle performance and flexibility. [26]

Sit and Reach Test

The immediate effect of Soft tissue flossing to Hamstring and Suboccipital Myofascial Release produced significant changes within the groups in pre and post value but there were no significant changes between the groups of SRT i.e. $P > 0.05$. This maybe because of the flexibility of the lower back that allows a greater range of motion during SRT. A study by Cools, A., et al analyses how stretching exercises used to improve sit-and-reach test performance influence the flexibility in the lower back and hamstrings. [27]

Individuals may notice better posture and alignment after relieving tension in the suboccipital region using myofascial release. This could aid in improving flexibility testing in the sit-and-reach test by generating a more balanced and less constrained musculoskeletal system.

A research by Paul Fauris discovered that conducting SMFR on any section of the SBL resulted in a statistically significant increase in hamstring flexibility and ankle dorsiflexion. These findings corroborate the concept of the chain as an entity, not just anatomically, as previously defined, but also functionally, as documented in recent investigations of the musculoskeletal system. [28] [29] [30]

Hamstring flossing directly targets the flexibility of the hamstrings by fascial shearing and blood flow restriction to the muscle, and thereby promotes stretch tolerance. A prior study (Burbage, J. D., & Stone, T. R.) shown that soft tissue flossing to the hamstring improved its length and flexibility, which improved the test scores on the sit-and-reach test. [31]

A key component of general fitness is flexibility. Adequate flexibility can enhance everyday functional movements, lower the chance of injury, and improve performance in a variety of physical activities. Prolonged sitting is associated with hamstring tightness in college students. If the muscle tightens, the blood vessels under the muscle compress, resulting in decreased muscular performance. [32]

Forward head posture frequently results in compensatory muscular tension throughout the body. The muscles in the neck and upper back may become overactive, while others, especially those in the lower back and pelvis, may become underactive. This imbalance can impair overall posture and body mechanics, potentially contributing to ailments such as hamstring tightness and incorrect pelvic alignment. [33]

Limitations and Future scope

The improved flexibility of hamstring through Soft tissue flossing has greater effect and can reduce the risk of injury in collegiate recreational athletes. The major limitation of this study was that the effect of both the techniques were recorded immediately and the washout period was not assesses post intervention and did not measure the long-term effects of flossing and physical performance. Secondly, the population was composed solely of healthy, college-aged individuals. Thirdly, the study conducted could not identify the band pressure that yields the best results.

Future research addressing a long term protocol of both the techniques will be used to measure the same outcome measures or other outcome measures with a follow-up. Further research should also aim to determine what band pressure provides optimal benefits.

CONCLUSION

The results show that both AKE and SRT improved in both group A and group B when analysed within the group i.e. pre and post. The between group analysis revealed that Soft tissue Flossing (group B) showed significant improvement in AKE test than SMFR (group A) but no significant improvement was seen SRT. This study provides valuable insights into the impact of Soft tissue Flossing of hamstring on AKE and SRT in collegiate recreational athletes.

Hence, implementing soft tissue flossing in collegiate recreational athletes can increase hamstring flexibility while lowering the chance of injury.

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ANNEXURE

CONSENT FORM

CONSENT FORM

Title of the study- IMMEDIATE EFFECT OF SUBOCCIPITAL MYOFASCIAL RELEASE AND SOFT TISSUE FLOSSING TO IMPROVE HAMSTRING FLEXIBILITY IN COLLEGIATE RECREATIONAL ATHELETES- A RANDOMIZED CLINICAL TRAIL have been informed by Miss. Rajeswari Mishra pursuing MPT (sports) conducting the above-mentioned study under the guidance of **Dr. Asifuzzaman Shahriyar Ahmed, Associate Professor, Abhinav Bindra Sports Medicine and Research Institute, Bhubaneswar, Odisha**; have no objection and will be a part of that group. I also understand that the study does not have any negative implication on my health. I understand that the information produced by the study will become a part of the institute's record and will be utilized, as per confidentiality regulations of the institute. I am also aware that the data might be used for medical literature and teaching purposes, but all my personal details will be kept confidential. I am well informed to ask as many questions as I can to Ms. Rajeswari Mishra either during the study or later. I understand that my assent is voluntary and I reserve the right to withdraw or discontinue the participation from the study at any point of time during the study.

I have explained to MR,MISS,MR the purpose of the research, the procedure required in the language he/she could understand to the best of my ability.

(Date)

(Investigator)

I confirm that Ms. Rajeswari Mishra (investigator) has explained to me in the language I can understand, the purpose of the study and the procedure. Therefore, I agree to give my assent for the participation as a subject in this study and I will be accountable for the decisions.

(Date)

(Signature)

DATA COLLECTION SHEET

ASSESSMENT FORM

DEMOGRAPHIC DATA:

Name-

Gender-

Age

Address-

Phone number-

Date of examination-

Weight-

Height -

Group -

• Pre test-

• Post test -

HISTORY:

• Any medical condition-

• Any musculoskeletal condition-

• Any Recent injury 'Within 6 months-

ON EXAMINATION:

TEST	PRE INTRVENTION SCORE	POST INTRVENTION SCORE
SIT AND REACH TEST		
ACTIVE KNEE EXTENSION TEST		

ETHICAL COMMITTEE CLEARANCE CERTIFICATE



ABSMARI ETHICS COMMITTEE

ABHINAV BINDRA SPORTS MEDICINE AND RESEARCH INSTITUTE,
BHUBANESWAR, ODISHA

Prof. (Dr.) E. Venkata Rao
Chairperson

Mr. Chinmaya Kumar Patra
Member Secretary

ABSMARI/IEC/2023/057

02/09/2023

Ref. No. _____

APPROVAL LETTER

Date: _____

APPENDIX- VIII

To,

Rajeswari Mishra

ABSMARI

273, PAHAL, BHUBANEWAR-752101

Protocol Title: Immediate Effect of Suboccipital Myofascial Release and Soft Tissue Flossing to improve hamstring flexibility in collegiate recreational athletes- A comparative study

Protocol ID.: ABS-IEC-2023-PHY-016

Subject: Approval for the conduct of the above referenced study

Dear Mr./Ms./Dr **Rajeswari Mishra**

With reference to your Submission letter dated 12/08/2023 the ABSMARI IEC has of the Ethics reviewed and discussed your application for conduct of clinical trial on dated 02/09/2023 (Sat Day).

The following documents were reviewed and discussed

S.N.	Documents	Document (Version/Date)
1	IEC Application Form	08-08-2023
2	Informed Consent Form	08-08-2023
3	Undertaking form PI	08-08-2023
4	CRF	08-08-2023
5	COI from the Investigators	08-08-2023

The following members were present at meeting held on 02-09-2023

S.N.	Name of the Member	Designation & Qualification	Representation as per NDCT 2019	Gender (M/F)	Affiliation with the Institution (Y/N)
1	Prof. Dr. E. Venkata Rao	Professor (MBBS, MD, Dept. of Community Med.) IMS & Sum Hospital, BBSR	Chair Person	M	N
2	Dr. Satyajit Mohanty	Director-Medcare Hospital, BBSR	Basic Medical Scientist	M	N
3	Dr. Ashok Singh Chouhan	PhD. Pharmacology, Assoc. Prof. Dept. of Pharmacology, Hi-Tech Medical College & Hospital, BBSR	Basic Medical Scientist	M	N



1



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ABSMARI

ABSMARI ETHICS COMMITTEE

ABHINAV BINDRA SPORTS MEDICINE AND RESEARCH INSTITUTE,
BHUBANESWAR, ODISHA

Prof. (Dr.) E. Venkata Rao
Chairperson

Mr. Chinmaya Kumar Patra
Member Secretary

Ref. No. ABSMARI/IEC/2023/057

Date: 02/09/2023

MEMBERS

Dr. Smaraki Mohanty,
Clinician

Dr. Satyajit Mohanty,
Basic Medical Scientist

Dr. Ashok Singh Chouhan
Basic Medical Scientist

Mr. Shib Shankar Mohanty
Legal Expert

Ms. Annie Hans,
Social Scientist

Ms. Subhashree Samal,
Lay Person

Mr. Deepak Ku. Pradhan,
Scientific Member

IEC-SECRETARIAT

Mr. Gouranga Ku. Padhy
Mr. Susant Ku. Raychudamani

S.N.	Name of the Member	Designation & Qualification	Representation as per NDCT 2019	Gender (M/F)	Affiliation with the Institution (Y/N)
4	Dr. Smaraki Mohanty	Asst. Prof-IMS & Sum Hospital/MBBS, MD (Community Med)	Clinician	F	N
5	Mr. Chinmaya Kumar Patra	Principal-ABSMARI, MPT	Member Secretary	M	Y
6	Mr. Shiba Sankar Mohanty	Junior Counsel-Lt. Ramachandra Sarangi's Chamber / BA LLB	Legal Expert	M	N
7	Ms. Annie Hans	Disability Inclusive Development Co-Ordinator in Humanity and Inclusion (India/Nepal/Srilanka). /MA in Social Work	Social Scientist	F	N
8	Ms. Subhashree Samal	Ret. Reader-Pol Sc.	Lay Person	F	N
9	Mr. Deepak Kumar Pradhan	Asst. Prof-ABSMARI, MPT	Scientific Member	M	Y

This is to confirm that only members who are independent of the Investigator and the Sponsor of the trial have voted/ provided opinion on the trial.

This Committee approves the documents and the conduct for the trial in the presented form with necessary recommendation.

The ABSMARI IEC must be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and requests to be provided a copy of the final report.

The ABSMARI IEC follows procedures that are in compliance with the requirements of ICH (International Conference on Harmonization) guidance related to GCP (Good Clinical Practice) and applicable Indian regulations.



Yours sincerely,

Mr. Chinmaya Kumar Patra
Member Secretary

ABSMARI Ethics Committee
Pahal, Bhubaneswar

Member Secretary
ABSMARI ETHICS COMMITTEE

2

📍 **Utkal Signature, Plot No.-273,**
Ground Floor, Pahal, Bhubaneswar-752101

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✉ **iec@absmari.com**

ANNEXURES.4

MASTER CHART

SI No	AGE	SEX	HEIGHT	WEIGHT	BMI	KEA	GROUP	AKE (PRE)	SRT (PRE)	AKE (POST)	SRT (POST)
1	24	F	165.0	73	26.81	60	A	120.0	18.0	124.0	20.0
2	23	F	151.0	65	28.51	60	A	120.0	29.0	124.0	32.0
3	22	F	164.0	55	20.45	60	A	120.0	29.0	125.0	31.0
4	24	M	167.0	78	27.97	70	A	110.0	17.0	115.0	20.0
5	18	M	155.4	73	30.21	55	A	125.0	8.0	125.0	10.0
6	22	F	171.0	51.5	17.61	80	A	100.0	4.0	112.0	6.0
7	18	M	169.0	67	23.46	50	A	130.0	24.0	136.0	26.0
8	24	F	163.0	59	22.21	65	A	115.0	26.0	121.0	29.0
9	21	F	164.5	60	22.17	56	A	124.0	25.0	126.0	28.0
10	20	F	164.5	65	24.02	52	A	128.0	29.0	127.0	31.0
11	22	M	178.0	77	24.30	60	A	120.0	30.0	122.0	31.0
12	19	M	185.9	103	29.80	50	A	130.0	21.0	125.0	23.0
13	22	F	167.6	78	27.75	60	B	120.0	18.0	129.0	37.0
14	22	F	164.0	53	19.71	58	B	122.0	20.0	128.0	36.0
15	21	F	158.0	67	26.84	55	B	125.0	23.0	146.0	38.0
16	20	F	158.5	62	24.68	63	B	117.0	17.0	127.0	34.0
17	24	F	171.0	68	23.26	71	B	109.0	12.0	123.0	29.0
18	19	F	155.4	52.7	21.81	55	B	125.0	9.0	130.0	25.0
19	18	M	173.7	90	29.82	53	B	127.0	7.0	131.0	23.0
20	19	F	167.6	49	17.44	62	B	118.0	8.0	117.0	23.0
21	19	F	152.4	43	18.51	63	B	117.0	9.0	123.0	18.0
22	25	M	168.0	50	17.72	55	B	125.0	19.0	136.0	38.0
23	25	M	186.0	62	17.92	62	B	118.0	7.0	126.0	22.0
24	25	M	172.0	64	21.63	48	B	132.0	15.0	139.0	30.0

