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The Effect of Matrix Rhythm Therapy on Post Exercise Recovery in Athletes

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ABSTRACT: Every athlete possesses a certain objective in life and diligently strives to attain it. The concept of sports performance encompasses four primary characteristics, namely skill, strength, endurance, and recovery. The process of post-exercise recovery is crucial for the restoration and enhancement of muscular and tissue integrity, facilitating their repair and fortification. Active recovery (AR) is a widely employed methodology within the realm of sports. Coaches commonly employ several tactics, such as warm-up, cool-down, and rest, during active recovery. The application of Matrix Rhythm Treatment (MRT) has been found to effectively mitigate muscular tension, restore tissue mobility, enhance overall functional capability, and facilitate the process of recovery. A total of sixty athletes who satisfied the specified requirements were chosen for the study and allocated into two groups, namely the control group and the experimental group, using a simple random sampling technique. The control group adhered to a standard warm-up routine, while the experimental group received Matrix Rhythm Treatment (MRT) in addition to their regular warm-up. The participant's subjective exhaustion was assessed both before and after engaging in a treadmill test that involved reaching 80% of their maximal heart rate. These assessments were conducted within a one-minute timeframe. At the conclusion of the study, it was seen that while the traditional group exhibited signs of recovery, the experimental group, which received a warm-up in addition to Matrix rhythm treatment (MRT), demonstrated superior outcomes in comparison to the conventional group.

Keywords: Post exercise recovery, Active recovery, Matrix rhythm treatment (MRT), Maximum Heart rate, Perceived Fatigue.

INTRODUCTION

Within the realm of sports, the optimisation of healing procedures assumes a crucial role in augmenting athletic performance and mitigating the likelihood of injuries. As athletes exert themselves to their maximum capacity, the build-up of physical stress, abnormalities in muscle development, and constraints in the myofascial system can inhibit the body's ability to heal and impede overall athletic advancement. Hence, it becomes imperative to investigate efficacious strategies for facilitating the process of healing. The concept of postexercise recovery is considered a fundamental premise in the field of exercise training. The significance of postexercise recovery has experienced a substantial surge in interest and focus during the past two decades (O'Connor *et al.,* 2022).

Athletes, along with their coaches and sport scientists, prioritise the recuperation interval between training sessions and competitions in order to optimise incremental improvements in performance and adaption. Intense physical activity frequently results in weariness, elevated body temperature, dehydration, loss of muscle glycogen, and injury to soft tissues (Wieloch *et al.,* 2022). Consequently, these occurrences have a detrimental impact on various bodily systems, including the central and peripheral nerve systems, cardiovascular system, thermoregulatory system, renal system, endocrine system, and immune system. The overarching objectives of post exercise recovery encompass the restoration of homeostasis, replenishment of fuels and fluids, repair of bodily tissues, and provision of rest. In order to attain these objectives, athletes have the option to employ a range of nutritional and physical interventions. These interventions encompass rehydration, consumption of carbohydrates and proteins, stretching exercises, matrix rhythm therapy, massage therapy, hydrotherapies, whole-body cryotherapy, utilisation of compression garments, and prioritising adequate sleep.

The post exercise recovery process following physical exertion is a crucial and essential component of an athlete's training protocol (Temm *et al.,* 2022). Athletes, regardless of their level of expertise, consistently strive to enhance their performance and attain a competitive advantage. In recent years, there has been a notable increase in scholarly attention and

scientific investigation focused on comprehending the complexities associated with post-exercise recovery in athletes. The spike in interest can be attributed to the acknowledgment that the implementation of efficient recovery procedures has the potential to enhance sports performance and mitigate the likelihood of sustaining injuries.

The rigorous physical requirements imposed on athletes during their training and competitive endeavours frequently give rise to a multitude of physiological and biochemical alterations inside the human body. The alterations encompass several physiological effects such as tiredness, increased body temperature, depletion of muscle glycogen, damage to soft tissues, and disruptions in multiple systems including the neurological, cardiovascular, thermoregulatory, renal, endocrine, and immunological systems (Peake *et al.*, 2017). Failure to prioritise sufficient recovery can result in the occurrence of overtraining, stagnation in performance, and reduced physical well-being.

In response to these issues, there is a growing emphasis among athletes, coaches, and sports scientists on the period of post-exercise recovery. The current time frame is perceived as a crucial interval in which athletes have the opportunity to optimise adaptations, regain equilibrium, replenish vital nutrients, mend tissues, and get ready for future training sessions or competitions.

Within this particular setting, a multitude of tactics and interventions have surfaced with the aim of enhancing the process of post-exercise recovery. The aforementioned strategies comprise several nutritional treatments, including rehydration and nutrient replenishment. Additionally, physical interventions such as stretching, massage, cryotherapy, and specialised therapies like Matrix Rhythm Therapy (MRT) are also included. The objective of these tactics is to facilitate the process of recuperation, diminish muscular discomfort, and augment general state of health.

The present review provides an in-depth analysis of the complex domain of post-exercise recovery in athletes, presenting valuable perspectives on recent scientific investigations, optimal strategies, and the potential impact of novel recovery modalities. A comprehensive comprehension of the principles pertaining to post-exercise recovery is crucial for athletes and their respective support teams. This understanding equips them with the necessary knowledge to develop customised recovery strategies that effectively enhance performance and contribute to sustained athletic achievements.

Warm-up exercises play a pivotal role as an essential preparation element in every physical activity or training regimen. Physical fitness professionals play a crucial role in augmenting an individual's performance, mitigating the risk of injuries, and optimising the overall efficacy of workouts. According to (Bishop, 2003), a properly organised warm-up routine prepares the body for the physiological requirements of physical activity by progressively elevating heart rate, enhancing blood circulation to the muscles, and raising core body temperature.

The understanding and practise of pre-exercise warm-up protocols have seen substantial development throughout the years. Historically seen as a short duration of stretching, contemporary warm-up regimens now involve a wider array of dynamic motions and exercises. The dynamic warm-up exercises have been specifically created to replicate the movements and intensities of the forthcoming activity. As a result, they offer a more focused and efficient means of preparing the body (Fradkin *et al.*, 2010).

Matrix rhythm treatment (MRT) is a recently developed method of utilising vibromassage in many settings, including special education and rehabilitation centres, sports clubs, as well as neurologic, orthopaedic, physical therapy, and rehabilitation centres. Several research and clinical observations suggest that MRT exhibits efficacy (Jager *et al.*, 2008). The range of values is 24 to 26. Nevertheless, the studies in question exhibit a poor degree of evidence. In order to elucidate the therapeutic efficacy of MRT, it is imperative to conduct an investigation on its impact on peripheral circulation (Randoll and Hennig 2001).

Due to the novelty of the MRT technique in the field of vibromassage, there is currently a lack of research investigating its impact on circulatory function. Furthermore, the existing literature presents divergent findings with regards to the impact of massage on peripheral circulation. The utilisation of a device is not necessary for the practise of massage therapy. The MRT technique involves the use of vibrational massage using a specialised equipment.

MATERIAL AND METHODS

A. Study Design

A randomised controlled experiment (RCT) was undertaken to examine the impact of Matrix Rhythm Therapy (MRT) on the recovery of athletes. The researchers opted for the randomised controlled trial (RCT) methodology in order to establish a causal association between the MRT intervention and the outcomes related to recovery.

B. Participants

The study selected a cohort of 60 highly skilled athletes, encompassing both males and females, aged 18 to 25 years. The inclusion criteria for this study encompassed a minimum of two years of experience in competitive sports and the absence of any musculoskeletal injuries or conditions that could hinder participation.

C. Intervention

Participants were randomly assigned to either the Matrix Rhythm Therapy (MRT) group (n=30) or the control group (n=30).

D. Outcome Measures

The evaluation of recovery outcomes was conducted prior to and during the implementation of the intervention, utilising metrics that have been validated. The chosen metric for evaluating the results was: Perceived exhaustion is evaluated through the utilisation of a fatigue scale questionnaire, such as the

Multidimensional fatigue Inventory (MFI), which serves to quantify individuals' subjective experiences of fatigue.

E. Procedure

The subjects that were chosen for the study were separated into two groups of equal size: the Control group and the Experimental group. The pre-test scores were obtained from both groups following a treadmill exercise session, during which they attained 80% of their maximal heart rate after 1 minute and 3 minutes, respectively. The control group was administered warm-up exercises, while the experimental group was subjected to Matrix Rhythm Therapy (MRT) in addition to the warm-up activities for a duration of two weeks. The post-test results were gathered towards the conclusion of the second week, mirroring the methodology employed during the pre-test phase.

The warm-up regimen outlined in the FIFA 11+ programme was implemented for both groups (Yang *et al.,* 2022). The experimental group participants were administered Matrix rhythm therapy in conjunction with warm-up drills for a duration of 2 weeks. The subjects were administered Matrix Rhythm Therapy in the subsequent manner. The intervention was administered four times per week for a duration of two weeks, with each session lasting 60 minutes. The initial session focused on the para spinal regions, while the second session addressed the thoracic and pelvic regions. The third session was dedicated to the upper limb, while the fourth session focused on the lower limb. The application of Matrix Rhythm Therapy was replicated in a comparable manner throughout the second week.

F. Data Collection

The process of data collecting took place at two different time points: baseline pre-test and post-test after two-weeks. The participants were provided with explicit instructions to abstain from engaging in any physically demanding activities for a period of 24 hours before to each assessment, in order to maintain uniformity and consistency throughout the study.

G. Statistical Analysis

The result measure was subjected to calculations of descriptive statistics, specifically the mean and standard deviation. In order to assess the impact of MRT on the recovery outcome across different groups, statistical analyses were conducted using paired t-tests and independent t-tests. The threshold for statistical significance was established at a level of $p<0.05$.

Table 1: The calculated paired 't' test value for the control group during the warmup.

Variable	t - cal value	t - tab value
Perceived fatigue	4.543	1.697

The calculated value of "t" is greater than the table value of "t", indicating statistical significance at the 0.05 level.

Table 2: Paired 't' test value for the experimental group-Matrix Rhythm Therapy with warm up.

Variable	t - cal value	t - tab value
Perceived fatigue	8.621	1.697

The calculated value of "t" is greater than the table value of "t", indicating statistical significance at the 0.05 level.

Table 3: Independent 't' test value for control group and experimental group-Warmup Vs Matrix Rhythm Therapy.

Variable	t - cal value	t - tab value
Perceived fatigue	5.243	1.671

The calculated value of "t" is greater than the table value of "t", indicating statistical significance at the 0.05 level.

RESULTS AND DISCUSSION

Warm up exercises were significantly effective in reducing the perceived fatigue among the athletes.Matrix Rhythm Therapy along with Warmup exercises was significantly effective in reducing the perceived fatigue among the athletes. Matrix Rhythm Therapy along with Warmup exercises was significantly more effective in reducing the perceived fatigue than warm up alone among the athletes.

The warm-up is a fundamental pre-sporting protocol that is observed by nearly all athletes, serving not only to optimise performance but also to address various objectives, such as injury prevention. The utilisation of sports massage has been extensively explored as a preferred approach for improving athletic performance, yielding varied outcomes across different performance metrics.

Matrix Rhythm Therapy, a recent innovation, has demonstrated promising outcomes in various musculoskeletal disorders. It achieves this by restoring muscle rhythm, enhancing the extracellular matrix to improve cellular conditions, optimising blood circulation, and facilitating oxygen availability to cells (Randoll and Hennig 2001). The objective of this study was to investigate the impact of regularly performed warm-up exercises, the impact of Sports massage with varying research outcomes, and the impact of a novel intervention that has not been previously studied for this specific purpose. Additionally, the study attempted to evaluate the impacts of these interventions in order to determine the most optimal choice for athletes.

CONCLUSIONS

The findings of this research support the inclusion of Matrix Rhythm Therapy along with warm-up routines to optimize recovery and reduce perceived fatigue in

athletes. This approach has the potential to enhance the overall functional capacity and performance of athletes across various sports disciplines. Future studies should explore the long-term effects of MRT on recovery and performance, as well as its applicability to different athlete populations and specific sports contexts.

FUTURE SCOPE

The effect of myofascial release on post-exercise recovery in young athletes is wide-ranging. By addressing these areas, we can enhance our understanding, improve treatment protocols, and optimize the application of myofascial release in sports medicine and athletic performance.

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Conflict of Interest. None.

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