

Study of after effects of Kathak riyaz on the physical being and mapping out a scientifically logical series of pre and post requisites

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Abstract

The practitioners of Indian classical dance styles, have groomed themselves and rehearsed for years together to achieve the fluency and the proficiency in the art form. Kathak, an Indian Classical dance style, has its peculiarity in its footwork and twirls. Both of which require the strenuous use of the lower limbs. However, the insufficient warm-up before the dance rehearsal/performances and the insufficient stretching exercises after the dance sessions, hinder the development of strength in the muscles of the lower limb and slowly start to cause muscle loss. This study is an effort to link the science and functioning of the physical being and the effect it undergoes as a consequence of the dance rehearsals providing an optimised set of prerequisites and post requisites that can help defer the process of physical deterioration amongst Kathak practitioners. The major objective of writing this article was to establish the requirements and benefits of a few practices to be followed that will increase the capacity of the human body to sustain Kathak of the changing times and as well thoughtfully increase its endurance towards the same. The methodology followed for this research work was the study of papers published in related fields. This included studying papers on over use injuries to the joints, balanced diets, the role of various macro and micronutrients on the body, the effect of flooring that was observed on Badminton players. Dance, is as much a physical activity as sports is. Hence, it is mandatory to holistically think about the effect dance rehearsals have on the physical beings and adapt ourselves to certain practices that aid in the process. The above study helps design certain lifestyle constraints that can avoid the eventual harmful effect on the body. In the conclusion it has been proved that certain exercise, diet and lifestyle changes can set the pattern straight and make the body perform wonders over extended years and truly prove that 'age is just a number'. It is important to adapt well to the changing times while keeping the purity of our Art form intact, and without damaging our body as much as possible.

Keywords: Kathak, rehearsals, footwork, muscle loss, hard surfaces, protein-rich diet, strength training, muscles stretches.

Research Paper

Introduction

Riyaz is the systematic practice of music, dance, or any performing art form under a teacher (Guru). It signifies regular and rigorous practice through which strength, balance, breath control, clarity, etc., can be acquired. These dancing bodies equipped with certain skills endows the dancer with identity. When it comes to kathak, the repetitiveness in Riyaz is like a ritual as it shapes the rigid movements of the art form in the dancer's body.

In dance, like sports, the repetition of some act, redoing and mastering to perfect it plays a big role and makes us more composed and balanced as an Artist.

This paper discusses the physical effect Riyaz has on the dancer's body and the injuries that the Kathak dancers face over prolonged years of Riyaz.

Art keeps growing, and so we learn and grow. Just like changing times, many things in Riyaz change while still keeping the essence of what Dance practice was like before. The world is changing rapidly today and we, along with our Art, need to adapt at times. However,

there are certain changes that may not necessarily be advantageous for the growth of either the Art form, or us. This paper concludes by formulating certain practices to be adapted in our day-to-day lives for the better enduring of our art by our physical beings.

Riyaz

Understanding the concept of Riyaz and its importance

To make one's art look effortless and fluent, numerous hours and years and even lives are spent on training for that specific moment of effortlessness to present itself to us, become a part of us.

The practice of consistent and persistent execution of dance sequences behind the scenes, also known as 'Riyaz', is an extremely important and inevitable part of pursuing an Indian Classical Dance. Through repetitive doings of certain given tasks, riyaz enables a performer to acquire mastery over the craft.

In the context of Indian Classical dance (and largely Hindustani Classical music), Riyaz (practice), emerging through Taalim (training), is an essential element which shapes a dancer and his/her art. It signifies regular and rigorous practice through which strength, balance, breath control and clarity can be acquired. Riyaz is part of the taalim that regulates, reproduces, and redefines the body. The interplay of pain and pleasure through which a dancer goes, creates further insights into riyaz's disciplinary and ceremonial aspects

Riyaz can be classified as Mental Riyaz and Physical Riyaz.^[1]

Riyaz in Kathak

Up until recent times the 'Gurukul' system was prevalent, where the disciples would live with their Guru to learn the form and used to grow up in their Gharana's (lineage) environment and hence their Gharana specific way of Riyaz was easier to follow. They saw, heard and followed this from the very beginning of their journey in their art form.^[2] So, with Riyaz in a Gharana system, Kathak was practiced in a certain fixed way. A positive to this was, that, after a point in time, the dance used to become a part of their being as they rehearsed it umpteen number of times. And eventually and extremely organically, their Hastak and Padannayas or footwork used to all fit together well.^[3]

With changing times, people who had a job outside of typical Gharana Dance started to learn dance, most of whom did not grow up in the culture of dance and hence started getting the 'Sanskar' or sacraments of it at an older age. Unlike the previous generations, they did not spend years and almost all their time and life practicing the Art form. This meant that they had to have some specific time or take time out of their routines for their Riyaz. Because they did not grow in the system of Gharana Gurukul, dance started getting more extensive because of the lack of the boundaries of each Gharanas. The newcomers weren't necessarily bound to a certain Gharana and had the advantage of the duality that came with learning and practicing dance. And every time these people started learning something new, they kept practicing until that Riyaz was a part of them. Previously, those who learnt Gharana Dance had their path clear for their Art form, and for that only. And now, there are multiple people who learn dance for multiple reasons.

In spite of the changing times, the guru-shishya parampara (teacher-student tradition) of training, however, has instilled an unquestionable faith and submission to the teacher that not only strengthens the adherence of the performer to the structures and aesthetics of the dance form but also towards the teacher who imparts the training. Riyaz is thus more than just a bodily habit as it gestures towards a kind of self-submission to a higher authority mostly identified as Guru and God.

Kathak is a compassionate, emotional, and intense dance form. It is physically and mentally demanding, emphasizing technical footwork execution and aesthetic arm and body movements. The dancer has to strike the ground in a specific manner to execute the routines choreographed and the rhythmic sound.^[4]

At the initial level, experiences such as stamping feet on the ground, putting the ankle bells, taking multiple pirouettes, reciting syllables in various speeds and time cycles, may not be pleasurable. The crisp sound required to be made through stamping cannot be acquired over-night. Gradually, one gets familiar with the steps and executes them correctly and gets the dancer to come on terms with the physical pain associated with the process. These efforts give way to a deep sense of pleasure that the artist feels within. A dancer derives a kinetic pleasure from the movements that further heightens the kinesthetic senses.^[5]

Effects of Riyaz on the Physical Being

Kathak involves rhythmic footwork, linear and circular extensions of the body with controlled coordination between body and hand. The dancer puts her weight on the floor and taps the feet to rhythm with ankle bells or ghunghroos secured round the ankles. These ankle bells are very important for the dancer. It is a very energy consuming process and brings about an active lifestyle. The load created by the body weight along with the weight of the ghunghroos is managed and balanced by the joints and muscles. With all the vigor and excitement, when one stamps harder and harder on the floor, it might hurt the feet and ankle, calf muscles, and the back. Wrong tapping can lead to certain marks and a minor cut on the skin or feet.^[6]

At the same time, dancing imposes immense demands on the Musculoskeletal system. Proper execution of movements minimizes the risk of injury accompanying foot-ground contact, as reported by several studies. The part of the dancer's body that suffers the most is the knee joint.

Majority of the Kathak practitioners face Overuse injuries after years of Riyaz. Weight bearing joints in the lower extremity, especially the knee, are most vulnerable to both acute and chronic overuse type injuries.^[7] These Overuse knee injuries occur because of repetitive loading of the joint tissue with insufficient rest in between episodes of impact.^[8] They are injuries sustained by athletes and dancers alike as a result of repetitive submaximal loading on the knee joint without any direct trauma to the knee joint. The individual might develop significant anterior knee pain and possibly an effusion from excessive stress on the patellofemoral joint complex.^[9] Overuse trauma from excessive activity is associated with a progressive pain pattern that causes increasing functional limitations or complete cessation of activity.^[10]

In kathak, more focus is given on chakkars; here, most chakkars are performed anti-clockwise, which pressures only one foot. Even in the tatkars performed, the right foot is focused more and has to be stamped harder for the sama, yet most gharanas stamp both feet with the same strength. Still, the sama is harder on the right foot than the left one. Together, they pressurize the lower limbs, that is, calf muscles, knees, ankles, etc. Thus, dancers from 40-50 suffer from knee pains and other muscle injuries. When the hamstrings tire the duration of the swing phase of gait increases,

placing the hamstrings in this weakened position for a longer period of time.

Overuse injuries can affect the muscle, tendon, and bone. Tendon injuries give rise to substantial morbidity, and current understanding of the mechanisms involved in tendon injury and repair is limited. Tendon physiology and structure may include ROS (Reactive Oxygen Species) involvement in various aspects of the predisposition to and participation in the degenerative process and subsequent response to injury. The joint loading may affect the progression within joint cartilage and even underlying bone and the bone can be damaged by repeated microtrauma and overuse.

A structured way to think of the functional anatomy of the knee is to subdivide it into four quadrants: anterior, medial, posterior, and lateral. The anterior portion of the knee is largely comprised of the distal extension of the quadriceps, the patella, and extending from the patella, the patellar tendon.

With an axis of motion in the transverse and frontal planes, extension of the knee is controlled by the quadriceps mechanism. When the foot taps on the floor/ is in contact with the floor, the quadriceps function eccentrically to decelerate the forces of impact. Injuries of the quadriceps mechanism can hamper this process and the shocks are transmitted with utmost impact. Some of the more common reasons for weakening of the quadriceps include imbalance between the strength of the medial and lateral quadricep muscles.^[11] These may arise because of the lack of strength training of the muscles by Kathak dancers.

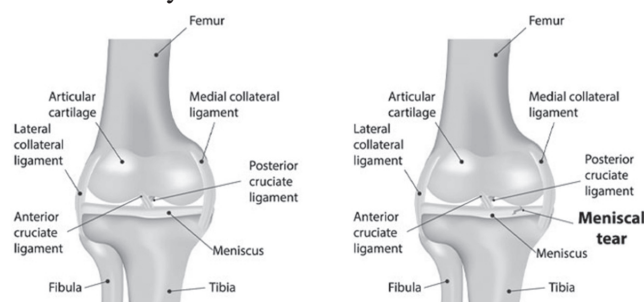


Fig 1. Representation of a Healthy Knee and Knee with a Torn Meniscus

Also causing quadricep mechanism injuries are rotational forces at the knee which cause the movement of the muscles, ligaments and tendons to happen laterally leading to their loosening and further more to a tear.^[12] These rotational forces are experienced by Kathak dancers during the practising of chakkars or twirls.

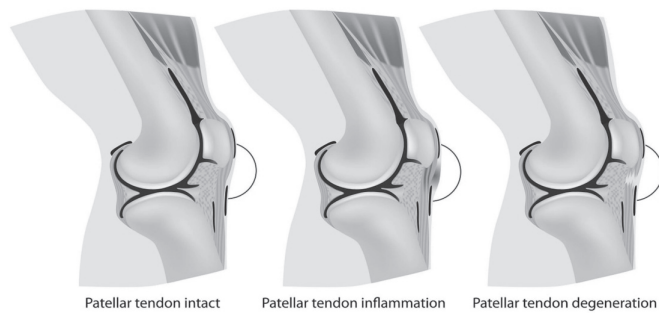


Fig 2. Representation of Tendon tear

The above effects are not commonly observed in the earlier stages as the physical aspects of younger dancers adapt to the conditions they are put through. These hidden effects start to surface at later stages in life. The onset of which leads the dancers to use knee caps to provide support to the knee. The use of knee caps is an effective way of holding the entire system intact and restricting the lateral movement of the muscles on rotation as well as the absorption of certain amount of shock by the cushioning of the caps.^[13]

In addition to the joint overloading, an imbalance in the recovery time given to the muscles as well as an insufficient warm up can eventually cause conditions such as alterations in muscle fibers, a decrease in strength and an increase in protein catabolism, leading to a state called overtraining^[14] While exercise is necessary to trigger and stimulate muscle adaptations, the post-exercise recovery period is equally critical in providing sufficient time for metabolic and structural adaptations to occur within skeletal muscle. These cyclical periods between exhausting exercise and recovery form the basis of any effective exercise training prescription to improve muscle endurance and strength. However, imbalance between the fatigue induced from intense training/performance, and inadequate post-training/performance recovery periods can lead to a decline in physical performance.

It was seen that during the overtraining condition, degradation increased and a decreased muscle protein synthesis rate leads to a decrease in muscle mass, particularly in fast twitch muscles^[15] This degradation happens because of an increase in the catabolism/anabolism ratio that occurs during the conditions of overtraining which could lead to muscle fiber atrophy^[16] With skeletal muscle atrophy, myonuclei numbers decrease, decreasing DNA units in overtrained muscle, thereby decreasing synthesis and increasing degradation rate of muscle proteins; this promotes the development of overtraining myopathy.^[17]

As seen before, the shock waves generated as a result of tapping are propagated along the human musculoskeletal system and that becomes one of the main reasons for joint degeneration and muscle loss. Apart from the poor strengthening of the muscles that results in poor shock absorption, it is also the flooring that plays a major role. It is the flooring that has the ability to aid as well as deteriorate the shock absorption process.^[18]

Indian Classical dance is rarely looked at from the physical effect point of view. It is as much a physical event as sports and the two can be compared on many grounds. For games like badminton or tennis or most other sports, there is a certain type of ground or mat or wooden floor that the players practice on. It is very important to know all the small details that make a big difference in the overall picture. When the ground we practice on is not naturally helpful, there is a high chance of an accident. Because of the lack of the right type of grip, one might slip, or twist and get sore muscles even if not a serious injury. Even the kind of footwear you wear while practicing makes a lot of difference. Doctors suggest dancers to wear proper shoes. But shoes are not used in Kathak as this dance form has to be performed bare feet because Kathak is an artform related to devotion and spirituality. The respect towards the deity and the floor does not allow the performer to make use of shoes. Yet the flooring needs to be given an appropriate thought.

Earlier, the practicing place might have been on a ground that was made with mud and cow-dung, a very natural place to have a practice session on. It was suitable for footwork and knee strides in Kathak. Hence there were fewer muscle injuries reported or ligaments of any kind. But in modern times, natural stone is scarce to find, so artificial stone or synthetic flooring is used. Such floorings affect the knees in the worst possible ways. Now that we have transitioned through almost everything that comes in between that natural ground to ceramic tiles, we have started to see some changes. It is now coming to our notice that when Dance is practiced, it is better on wooden floors or natural stones like Sangemarmar (White Marble). The number of problems that occur during the Riyaz are less in comparison with other tiles. Naturally, wooden flooring presents the least amount of damage done on the body while practicing. However, the problem with wooden flooring is that it is not economically feasible to install them for the entire Riyaz area.

With changing times, something that has advanced immensely, is technology. With higher technological advancements, it became possible to study our bodies like never before, and we can see certain changes in Sports. Unfortunately, we have nothing but a little information of what physical challenges we face when it comes to Dance forms. In Sports, every Team has at least one physiotherapist who is present to check the fitness and help through any problem that may occur. They maintain the muscles and help them with the precautions that should be taken, what should be avoided and how to deal with the issues that the Sportspeople face. This is almost completely absent when it comes to the Dance forms, even when the footwork done in these Dance forms is equally rigorous and physically stressful. So, when most of us keep on practicing, unbeknownst of the damage occurring in our body, we keep damaging our bodies for years, it eventually starts taking a toll on us and hence, on our Dance form! After a certain amount of time, because of all the wear and tear that happens and because of the lack of necessary support, eventually our body cannot keep up with the damage and cannot keep up with the best of what we have to give back to the Art form.

Effect of Dietary Habits on Endurance

Kathak has seen a paradigm shift of cultures. It originated in the temples, went through the phase of the Mughals and then outlived the British era as well. In the earlier times, there used to be more male dancers than females. But as time changed and the field of kathak started developing and becoming more open-minded, there was an increase in the female dancers of kathak. Inherently, the male dancers have been observed to give out more energy than female dancers. Hence, if the female dancers need to keep up with the same energy and strength as the male dancers, their diet needs to be balanced.

With the fast-paced chakkars or pirouettes in kathak covering the performing space, the vision gets blurred, the sound of sharp pitched tabla and harmonium fades away, the breathing is as if it almost stopped. These are primarily symptoms of fatigue while doing the riyaz or performing the dance. Fatigue has been identified as an extrinsic factor associated with RRI (factor indicating the time elapsed between two successive cardiac cycles), yet only a handful of studies have examined the effect of acute fatigue on running kinematics in healthy runners. To avoid these issues, the dancer's diet

should be all-inclusive. In olden times, Kathak dancers used to have high protein and vitamin intake, which made their muscles and bones stronger. Along with that, carbohydrates were also essential in their diet. Additionally, the rigorous riyaz done by them since dawn increased their appetite. In modern times, the diet of the dancers is highly improper. Due to the busy schedule, they face, it occurs to them that they miss the timings of their meals. Young dancers consume junk food or fast food as it is readily available. A few dancers neglect a healthy diet while they need high levels of vitamins, proteins, calcium, and carbohydrates to keep their muscles and bones intact.

The subject of diet has been highly explored for sportspersons. However, not adequately addresses for dancers. Like the sportspersons, it is the dancer's body as well that demands high amounts off protein in their daily intake. According to WHO, one gram of protein per kilogram of the body weight is required for keeping up with the wear and tear of the body [WHO Technical Report Series No.522, FAO Nutrition Meetings Report Series No. 52]. If the current lifestyles are insufficient in providing these required amounts of protein, then they must be consumed separately. Alongside proteins, it is also the micronutrients such as vitamins and minerals that make the absorption of other nutrients possible.

The modern days have seen the onset of diets that eliminate certain energy producing nutrients and hence turn detrimental to a dancer's body. Dancers must not adopt to these diets to maintain the required energy levels and sustenance abilities throughout the rehearsals.

The overuse injuries often result into the complete exhaustion of the lubricating liquids present in between joints. The inclusion of small amounts of unsaturated fats present in Ghee, Fish etc., in the diet helps replenish this and avoids the contact of the bones that junction at the joint. This further delays the process of bone injuries.^[19]

A balanced diet as prescribed by the WHO mentions the intake of 400 g of Fruits and Vegetables, 40-65% calorie intake from carbohydrates and 10% energy intake from fats [WHO – Newsroom -Factsheet – Healthy Diet]. Maintaining the same helps provide adequate amounts of macronutrients, micronutrients, vitamins and minerals required for the body and thus gives adequate levels of recovery from daily chores and regular dance rehearsals.

Strength - Training

Strength training — also known as weight or resistance training — is physical activity designed to improve muscular strength and fitness by exercising a specific muscle or muscle group against external resistance, including free-weights, weight machines, or your own body weight. The basic principle is to apply a load and overload the muscle so it needs to adapt and get stronger.^[20]

Average individuals saw no reason to engage in weight training, and participants in other sports or dancers typically felt that lifting weights actually would hinder their performance. An important aspect for everyone to know is that strength training is not just about body builders lifting weights in a gym. Regular strength or resistance training is good for people of all ages and fitness levels to help prevent the natural loss of lean muscle mass. Resistance training results in greater muscle mass that necessitates more energy at rest for ongoing tissue maintenance. It is the strength created in the muscles that bear the load during dance rehearsals. This reduces the load bearing of the joints and further protects them in the long run.

Suggested Set of Practices

Based of the above-mentioned parameters, there are certain practices, that, when followed, can help reduce the negative impact of Riyaz on the body.

Firstly, the practice of having a muscle specific warm-up can help activate them before the beginning of the practice. It makes the muscles ready for the activity and thus delays the stage of fatigue. It also helps in greater involvement of the muscles in the activity which reduces the function and involvement of the joints and avoids their overuse. The use of knee caps helps keep the entire system of the joint, muscles, tendons and ligaments intact.^[21] This avoids the incorrect movement in their functioning and reduces the risk of injury. It also avoids the horizontal movement which reduces the loosening of the ligaments in later years.

Exercise therapy is the mainstay of treatment and focuses on increasing the flexibility, strength, endurance and neuromuscular retraining of the anterior and posterior muscular chains of the lower extremity. The inclusion of Yoga and Strength Training in the regular routine of the dancer apart from dance rehearsals helps build the strength, agility and flexibility of the body that the dance demands. A daily practice of yoga helps

the body to activate each and every function of the muscles and the complex asanas involve multiple muscles holistically which helps build strength in them. It helps focus the body weight of the dancer at the core and makes the movement of the ligaments free to flow. This helps in making the overall dance of the artist, light on the feet. It appears in the form of the crisp and precise movements as well as a control and poise achieved at the end of the fast movements. Strength training on the other hand, helps prepare the muscles for the exhaustive Riyaz sessions. As the term itself suggests, the gradual loading of weight challenges the muscles gradually and helps them build strength in a step-wise manner to endure the same.^[22] A regular practice of weight training also increases the rate of metabolism in the rest times. This helps to burn the fat accumulated surrounding the muscles and causes overall weight loss.^[23] Weight is one of the important factors that increases Overuse injuries. It increases the load taken by the joints and thus causes a faster wearing out of the joints, muscles and their functioning.^[24]

The nature of flooring suited for Kathak footwork is the Wooden flooring. There are two major advantages associated with it. Firstly, it is the absorption of shocks by the floor. This absorption reduces the shock waves that are transmitted to the joints. Secondly, it also closely replicates the flooring as it is on the performance stages of majority of the auditoriums. Riyaz done on these floorings thus benefits the artist. However, its use has been comparatively low because of the poor cost effectiveness in its installation. It is rather convenient to have small, foldable wooden mats on which the Riyaz of footwork can be done. One such attempt has been made by Amruta Gogate in Pune. There is also other option such as synthetics mats that are developed for the training in Badminton. They help absorb shocks and provide a bounce that can reduce the function of the joints and keep them healthier for a longer time.^[25]

A complete balanced diet having required amounts of protein as well as the other macro and micro nutrients is essential in maintaining the nourishment required for the body to endure the exhaustive Riyaz session over many years. The adequate intake of unsaturated fats and minimal inclusion of saturated fats can help reduce the lethargy and fat accumulation in the body.

Lastly, it is the post Riyaz stretching that helps transition from the exhaustive Riyaz into the normal

routine. It is mandatory to stretch the muscles and release the stress created in them during the Riyaz. The rapid and abrupt transition from Riyaz state to routine can result into shortening and tightening of muscles. This eventually affects the strength in the muscles and their ability to expand when later subjected to stress. It then starts to transmit the strain onto the joints.

Conclusion

A dancer's soul sits in their Art form. With changing times, it is important to know how our changed lifestyle impacts our Art form especially if it causes us any damage. It is necessary to know what to avoid and how to deal correctly with an issue which might hinder our performance or our Dance form. Dance, is as much a physical activity as sports is. Hence, it is mandatory to holistically think about the effect dance rehearsals have on the physical beings and adapt ourselves to certain practices that aid in the process. The above study helps design certain lifestyle constraints that can avoid the eventual harmful effect on the body. Certain exercise, diet and lifestyle changes can set the pattern straight and make the body perform wonders over extended years and truly prove that 'age is just a number'.

It is important to adapt well to the changing times while keeping the purity of our Art form intact, and without damaging our body as much as possible.

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