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Chapter 1 Introduction

1.1. Introduction

Life is an inexhaustible source of energy. Every action on this planet is accompanied by a virtual spirit that symbolizes eternal power. Owing to this virtual spirit, our universe is separated into two parts:

- Living
- Non living

The ability to express oneself is a gift given to all living beings.

The wellspring of life's beauty is expression. Being alive necessitates the ability to communicate one self. The expression of diverse emotions is aided by movement. It is a visual expression shared by all living things. When motions are infused with rhythm, art, and grace, dance is born.

Movements are first represented in the brain, followed by the muscles. As a result, these movement patterns are considered basic dance grammar, constructed in a systematic manner, and are called classical dance concepts.

There are 8 classical dance forms of India. Bharatanatyam is one of them which is quite popular and the oldest dance form. The variety and style of the dance and musical accompaniment provide joy not only to the audience but also to those who perform it. Many learn as an extracurricular activity and few make it as a profession. Whether taken as leisure or a profession it definitely needs a lot of practice, attentiveness and commitment. Need for Strong fitness is also there to succeed in the prolonged stage performance. It means if the dancers get exhausted faster, they cannot perform energetically for the entire program and may lose the body expressions (bhava). To have a successful stage performance, the dancers must have enhanced physical abilities such as balance, stamina, breath control, core strengthening and mind-body coordination to react in proper manner.

To explain mind-body coordination, there is one shloka in Abhinaya Darpanam written by Nandikeshwara. It is an Indian text, mostly followed by the Bharatanatyam dancers.

1.1.1. नाट्यक्रमः (The order)

एवं कृत्वा पूर्वरङ्गं नृत्यं कार्यं ततः परम् ।
नृत्यं गीताभिनयनं भावतालयुतं भवेत् ॥ 35 ॥
आस्येनालम्बयेद् गीतं हस्तेनार्थं प्रदर्शयेत् ।
चक्षुर्भ्यां दर्शयेद् भावं पादाभ्यां तालमाचरेत् ॥ 36 ॥
यतो हस्तस्ततो दृष्टियेतो दृष्टिस्ततो मनः
यतो मनस्ततो भावो यतो भावस्ततो रसः ॥ 37 ॥

The dancer having performed the pūrva-ranga should start with nritya. The song expressing emotional state should be accompanied by Abhinaya and dance in conformity to the timing of the beats. The dancer ought to sing the song whose meanings should be gesticulated by limbs, the emotional states expressed through eyes and feet expressing the beat of time. The eyes should follow the hands and the mind should follow the eyes, where the mind leads the emotional state materializes which is followed by delineation of the sentiment.¹

It is obvious that when someone performs in front of you, you naturally tend to look where the person in front of you is looking, so if he/she is able to look at this beauty of movement with concentration and express the joy of doing it with their facial expressions, only then will the audience be able to experience the beauty and bliss of art, which requires concentration.

The mind plays an important role in concentration; the movement is physical, and the beauty is added through a joyful state of mind. The same as mind-body coordination.

There is no mention of workout or body conditioning techniques for Bharatanatyam dancers in Abhinaya Darpanam. So the researcher looked it up in Natyashastra and came across the shloka below.

1.1.2. Method of Exercise

तैलाभ्यक्तेन गात्रेण यवागूमृदितेन च ॥ 95 ॥
व्यायामं कारयेद्धीमान् भित्तावाकाशके तथा ।
tailabhyaktena gatrena yavagumṛditenā cha //
vyāyāmam kāravedddhimān bhittāvākāsake tathā /

Exercise should be done on the ground as well as [high up in the air], and one should massage their body with [sesame] oil or barley gruel before doing so.

1. Nandikeshwara. Abhinaya Darpanam, Translated by P. Ramachandra Shekhar. 50. Natyakrama. Verses 35,36,37

योग्यायां मातृका भित्तिस्तस्माद्भित्तिं समाश्रयेत् ॥ 96॥

भित्तौ प्रसारिताङ्गं तु व्यायामं "कारयेन्नरम् ।

yogyāyām mātrkā bhittistasmādbhittim samāśrayet

bhittau prasāritāṅgam tu vyāyāmam kārayennaram

The best place to work out is on the ground. In order to exercise, one should therefore use the floor and stretch over it.¹

Here, Nāṭya Śāstra says that one should exercise to be a better performer. But the text does not explain any particular form of exercise which should be followed by a Bharatanatyam dancer. So, we can assume that a dancer can adopt any training as per his/her need of conditioning.

Therefore, we may conclude that the enjoyment of art is experienced by both the audience and the artist only when body and mind are both integrated. To integrate body and mind- exercise plays an important role. Exercise and proper fitness training help to build up stamina as well as concentration because of which a dancer can give a quality performance. This concept is applicable not only to stage performances, but also to everyday Bharatanatyam dance education. Bharatanatyam is an ancient Indian dance form that dates back over 2000 years. This type of art is distinguished by its discipline, structure, and rigor, and it requires years of practice to achieve performance-level mastery.

Bharatanatyam is an art form, a method of expression, and a way to bring people together. It's a creative and athletic endeavor that necessitates the complete development of numerous physical abilities. Each movement must be performed beautifully, carefully, with control, and without apparent effort.

Because Bharatanatyam is a performance art, both the performer who creates the art piece and the audience who sees the art would have been taken into account when its principles were created.

When an experienced Bharatanatyam dancer performs, the grace, accuracy, and harmony of the entire movement are easy to admire. And so, the dancer has to be strong and flexible in order to give an outstanding performance. This dance form is a hard training for the mind, body, and spirit, in addition to being a beautiful and graceful art form. One must strengthen your arms, legs, and core muscles to achieve mastery.

1. Ghosh, Manmohan. Natyashastra. Chapter 11- Chari Vidhana/Page No.-289 /shloka 95 and 96

This means that great performances necessitate a fully developed body in which technique, aesthetics, and physical conditioning are all in sync. As a result, in order to achieve excellence, Bharatanatyam dancers must learn to be both an artist and an athlete.

In Bharatanatyam, the core muscles are used the most. Exercising your core is often misunderstood as training your abdominal muscles only. Core exercises also help to strengthen your hips, back, and all of your abdominal muscles. Your center of gravity and the beginning point for all body motions is your core.

Because of a lack of proper body strengthening training, the majority of Bharatanatyam dancers sustain serious injuries. Body movement training or understanding, muscle usage, and strengthening can help a dancer's body avoid long-term harm. It is vital for any dancer to strengthen the muscles that are heavily used in a particular dance form simply by practicing that dance form; dancers also require additional body training to perform better.

“Bharatanatyam Dance has a complex movement that integrates both artistry and physicality seamlessly. Bharatanatyam Dancers require the creativity and grace of an artist coupled with the strength and control of an athlete.

It's now widely accepted by dance researchers, clinicians, and educators that supplementary training is an essential part to a dancer's success and longevity.”¹

Supplementary exercises, which are very important for Bharatanatyam Dancers, are used as a therapy by physiotherapists and can be used to treat a variety of conditions. It can be used to treat those who have issues like low self-esteem or a negative body image, for example. Exercise therapy has been demonstrated to aid with depression, anxiety, and chronic pain issues. After taking these therapies Bharatanatyam dancers can gain stage confidence, mind and body coordination, and good physic which can help them reach to the stage performance level mastery.

1.2. What is Therapy?

Therapy is derived from the Greek noun 'Therepeia', which means service or treatment,' and the verb 'Therapeuin,' which means to care for or to heal. Although the term therapy may appear to be synonymous with medicine, this is not the case.

Therapy refers to a method or mode of preventing or treating an illness. Although there are numerous techniques to treating disease, they all belong under the umbrella of health science. Only good health can protect you from disease and provide you with a joyful life.

1.<https://www.trinitylaban.wordpress.com/2015/11/28/the-benefits-of-supplementary-training-for-dancers/>

It is necessary to encourage health in order to prevent diseases and maintain optimal health. Among the several techniques for promoting health, organized regular exercise is one of them. There are a variety of therapies available. For example, chronology-based therapy, energy-based therapy, procedure-based therapy, and human interaction therapy. The various treatment systems can be divided into two categories: 1. Those that use medications and 2. Those that do not. The exercise-based therapy comes under the second option, which is commonly employed by physiotherapists. Dancers, athletes, and sports people develop a passion for various exercises that serve as a form of rehabilitation for them. They choose various workouts based on their body need to tone muscles, improve performance, prevent injury, or recover from an injury. According to the researcher, a Bharatanatyam dancer should undergo an exercise which also works as a therapy and may help them achieve their fitness goals and extend their careers.

1.3. Therapeutic Value

A system or medicine that can be used to treat a disease or discomfort is referred to as “therapeutic”. The word "therapeutic value" relates to a drug's/physical training's therapeutic properties, clinical efficacy, and health outcomes. Therapeutic aids in the recovery or restoration of health, whether it's therapeutic medicine or therapeutic fitness programs. Adopting a fitness program or supplementary training that will help you achieve your goal is the best option for promoting health and a healthy lifestyle for a Bharatnatyam dancer. If a supplementary exercise helps you with both the benefits of improving your fitness and as a therapy to prevent or overcome injury, it can be a godsend.

1.4. Supplementary Exercises

Exercise can be termed as an activity that increases or maintains physical fitness and overall health. Flexibility exercises help to stretch and strengthen muscles. Activities such as stretching improve joint flexibility and keep muscles limber. The purpose of exercise is to enhance range of motion, which might decrease the possibility of injury.

Supplementary training/cross training is an exercise plan that incorporates numerous modalities of training outside of a person's primary activity-such as sports or dancing, in order to improve a certain fitness component.¹

“Although there are many forms of dance-based group and individual aerobic activity, performance dancing differs in many ways from them. Performance based dancing like the

1. Patil Smita/1-03-2022/online access- vrishika jigar dave is inviting you to a scheduled Zoom meeting/Topic: Interview/JoinZoomMeeting/<https://us02web.zoom.us/j/6366030625?pwd=WE5qeVVnNTJBTjdYY1RCU3pVRVdTUT09> /Meeting ID: 636 603 0625/Passcode: Sc10AC/ Zoom call

Indian classical dance forms tend to be performed at much higher intensity, in shorter bursts than the exercise dancing which are usually performed at moderate intensity over longer periods usually an hour. Hence a lot of the dancers do not get the intended benefits of exercises. So, the question I get asked very often is whether dancers ought to participate in other forms of exercise. The answer to that is an emphatic ‘YES’.

All dancers must incorporate ‘Cross training’ into their routine which should adequately take care of their exercise needs. I advocate weight training also to most of my dancer patients who happen to be predominantly women, for its proven benefit in preventing **Osteoporosis** [a medical condition in which the bones become weak and are easily broken.] in the long run.”¹

The dance classes are for hourly basis, weekly twice or thrice. Educators and students do not get enough time to work on fitness and dance both so a result, a dancer's cardiovascular conditioning needs may not be addressed just by attending class or rehearsal. Again and again, choreographers place increasing demands on dancers, pushing them to the limits of technique, skill, and versatility. Thus, it is essential for dancers to engage in additional fitness training and to consider important concerns regarding the type of extra training their specific body requires. Begin by identifying areas that need to be improved or strengthened. It can be in various areas, and it depends on the individual whether he or she wants to focus on cardiovascular fitness, flexibility, muscular endurance, strength, or power.

The most difficult challenge for dance teachers, choreographers, and researchers is determining what type of conditioning workout can be incorporated into the training process. Which exercise is the most effective for increasing muscular strength? How can balance and flexibility be developed to the dancer's full potential? And how can the risk of injury be minimized? So, what type of extra training supplementary exercise a dancer can adopt? The most important answer to this question is it depends on your own specific needs; previous injury, illness and current workload.

1.5. Types of Exercises

1.5.1. Yoga

Although there is little scientific evidence to support the benefits of yoga in dance, many dancers use it as a form of supplementary training. An unpublished study discovered that a

1. Thottappilli, Madhu/ “Dancing is NOT aerobic exercise!”/ <https://narthaki.com/info/healthtip/ht33.html>

four-week yoga intervention enhanced hip flexion range of motion, implying that yoga could have additional educational benefits.

Due to its emphasis on dynamic stretching, yoga may benefit dancers who are naturally less flexible. Before attending class, previous or current injuries should be considered. Yoga can help dancers improve their body's flexibility and gradually increase the flexibility of the joints. Dancers must relax tense muscles while also strengthening the body's numerous muscles. Another additional training is required for this. However, it has been observed that you will notice the changes gradually.¹

1.5.2. Aerobics and Endurance

Dancers must have strong aerobic capacity in order to dance for extended periods of time and at lower heart rates before becoming exhausted. Running or swimming as an additional form of cardiovascular exercise can be beneficial. If you are healing from an injury and wish to stay away from loaded weight-bearing exercises, swimming is a wonderful substitute for jogging. Dancers search for exercises that will give strength and control to their moves because merely decreasing weight is not enough. Aerobic and endurance training helps you lose weight quickly.

1.5.3. Plyometric Training

Dancers must have strong legs in order to perform jumping and travelling movements. By including exercises that call for the muscles to exert their maximal force in a short period of time, plyometric training, also known as jump training, aims to develop power (speed and strength). One study found that such training enhanced dancers' ability to jump higher, point their feet more accurately, and jump farther overall as judged by skilled dance faculty members. Once more, think about your injury history and workload before starting plyometric training. Some dancers worry that strengthening themselves in this way will lead to the growth of "bulky muscles" and a decline in aesthetic quality. There isn't much evidence to support this assertion, and plyometric exercise seems to have more advantages than disadvantages.

1.5.4. Pilates

Dancers have reportedly seen advantages of incorporating the Pilates method into their training since the 1920s. Scientific studies have started to show these advantages recently. Studies have shown that Pilates can help dancers achieve better alignment, flexibility, and physical strength. It also supports dancers in preventing and recovering from injury, which promotes career

1. Kefallonitou, M, M., (2014)/The effects of Yin Yoga practice on dancers' range of joint motion: a biomechanical and perceptual investigation (Unpublished thesis)/ Trinity Laban Conservatoire of Music and Dance/London

longevity. Due to its emphasis on smooth and controlled movements, it is frequently a natural choice for dancers. For dancers who desire to increase their strength and control, Pilates-based exercise may be beneficial. As you learn more about the Pilates method, you'll see that it's a fantastic exercise regimen that enables you to grow muscle without putting on mass and sculpt your body without running the danger of injury while only requiring twice-weekly sessions of 60 to 90 minutes.

Based on the researcher's experience, the researcher can say that Pilates is an effective therapeutic exercise that Bharatanatyam dancers may utilize as cross training/supplementary exercise, and the researcher wants to go into more detail about Pilates' workout.

All of the above supplementary exercises are good and dancers can adopt any exercise according to their body need but being a Bharatanatyam dancer and a certified Pilates trainer, having 7 years of experience in Pilates training the researcher wants to apply Pilates training in Bharatanatyam dance form and convey its therapeutic value to Bharatanatyam dancers.

1.6. Objective of Study

The researcher, being a Bharatanatyam dancer, teacher and Pilates trainer, aims to contribute something to the dance community for betterment of health and injury prevention for career longevity. Pilates is a fantastic way to channel both your physical and mental energies as an additional exercise. It enhances skills like balance, coordination between the right and left sides of the body, general body coordination, rhythm, focus, grasping, expression, muscle tone, breathing methods, memory, sensory skills, posture, etc.

This research aims to educate Bharatanatyam dancers on the importance of therapeutic value of Pilates.

- To educate Bharatanatyam dancers about supplementary training
- To let Bharatanatyam dancers, know what is Pilates exercise
- Similarities in Bharatanatyam dance form and Pilate's exercise
- How a dancer can use Pilates exercise for injury prevention
- Pilates exercise as a rehabilitation method for Bharatanatyam dancers
- Pilates exercise for career longevity of Bharatanatyam Dancers
- To improve posture and capacity of mobility of the dancer
- To develop a systematic method of Pilates exercise for dancers
- To promote healthy lifestyle
- To elaborate about therapeutic value of Pilates for Bharatnatyam dancers

1.7. Motivation and Aim of the Study

For more than two decades, the researcher had the privilege of studying under an exceptional Bharatanatyam Guru. The researcher was attracted by the application of Pilates exercise for Bharatanatyam dancers as an extra training when she was getting trained in Pilates exercise while pursuing Masters in Dance. Dancers use a variety of diet programs and exercises to reach fitness goals, because now there is a greater understanding of the need of living a healthy lifestyle.

While studying for MA the researcher learned about Pilates exercises and received training in them. While performing Bharatanatyam kritis, the researcher saw significant improvements in posture, body aesthetics, breath control, and stage confidence. This motivated the researcher to register in a Pilates exercise certification program, conduct additional study, and attempt to develop a good Pilates exercise exclusively for Bharatanatyam dancers. The following are some of the questions that occurred in the researcher's mind:

- Which warm-up exercises Bharatanatyam dancers should undertake?
- Is a 10-minute warm-up activity sufficient before beginning a dance class, or does a dancer require a 60-minute exercise class?
- Weekly once is enough or a dancer should be active for 5 to 7 days a week?
- What are the types of exercises?
- Which combination should be selected?
- Which exercises are appropriate for a Bharatanatyam student in their first year as well as a professional dancer? How can a dancer's career be extended by strengthening their muscles?

1.8. Importance of the study

Life and movement are inextricably linked. Stretching and running are both examples of dance. Dance has exploded in popularity in India in recent years and dance has long been an integral aspect of religion and culture. In Indian classical dancing genres, gestures are very significant. Bharatanatyam is one of the most significant classical dance genres.

Students of Bharatanatyam may become more physically fit and perform at a higher level if they are exposed to movement patterns that are organized as a routine and are based on specific principles. Higher functions are built on the foundation of proper spatial balance and coordinated movement patterns. Here, Pilate's exercise is beneficial to one's health and has a great ability to prevent injuries.

Especially in the western countries, the Ballet dancers are familiar with Pilates as a supplement training because it emphasizes artistry in movement as well as breathing, alignment and

adaptation, deep core support, and mobility. As a result, dancers may simply commit to Pilates and enjoy it. After benefiting from Pilates training to improve dance performance, the researcher believed that if western dancers can benefit from Pilates training, why can't Indian classical dancers? This concept led the researcher, who is a Bharatanatyam dancer and a Pilates trainer, to try to establish a workout routine specifically for Bharatanatyam dancers.

1.9. Scope and significance

Pilate's training can be an integral element of the regimen of a Bharatanatyam dancer. With the findings of this study, we can confidently say that including Pilates into the routines of Bharatanatyam dancers can help them extend their careers, improve their posture, develop their muscles, and most importantly prevent injuries.

There are several avenues for further research in the realm of dance and fitness studies. This topic has a wide range of characteristics and issues that could be researched further. We may learn more about the key muscles utilized in basic postures, performing Adavus and Kritis of Margam, and nutrition for Bharatanatyam dancers. It may be used to study classical dance traditions from various states and use Pilates as a supplemental exercise for dancers, and it can be expanded to include other classical dance forms from India and Southeast Asia.

In India the therapeutic Pilates is already in use by Physiotherapists for sports injuries but it can also be applied for any Indian dance forms like Indian classical, Indian Folk or Indian tribal.

1.10. Limitation of study:

Some of the points that may explain the study's limitations are as follows:

- This study focuses on Bharatanatyam dance, for limited Nritha portions only and not applicable for Nritya part which includes expressions.
- If the individual is already wounded, he or she should seek medical attention before starting this activity.
- Pilates is a foreign exercise, though physiotherapists are using it on a large level for sports and other various injuries, there are very few physical Pilates workout classes available in India for the citizens.
- Because the researcher wishes to educate Bharatanatyam dancers about Pilates exercise, this study is based on the researcher's personal experience, observations during training of Pilates exercise, results pursued after the training as well as material produced on Pilates exercise and skill in it after 4 years of practice.

- The outcome varies from person to person depending on body type.
- If a Pilates exercise is new to the Bharatanatyam dancer and the training medium is internet classes, it can be a risk factor.
- There are many types of Pilates exercises developed by the students of Joseph Pilates but in this research the researcher has included exercises that were invented by Joseph Pilates himself.
- Physiotherapists utilize Therapeutic Pilates all over the world, and the goal of this study is to introduce Bharatanatyam dancers about Mat Pilates exercises that can help them avoid injuries. The anatomy and muscle systems are not covered in depth in this study. Only physiotherapists' case studies are included.

1.11. Hypothesis

While working on the title related questions, the researcher came up with the following hypothesis.

Exercise is vital for a dancer, according to the Natyashastra. Nowadays, dancers are well-versed in yoga, endurance training, and strength training, along with many other disciplines. Pilates is a type of strength training that focuses on the core muscles and is utilized as a therapy by physiotherapists.

The structure and substance of existing Pilates Mat exercises with therapeutic purpose are based on the same principle as Bharatanatyam, an Indian classical dance style.

The existing Therapeutic Pilates exercises which are currently practiced by various experts are subject to identification based on textual and interview evidence. Various combinations of Pilates exercises may be applied and taught to existing and active dancers in order to make them aware of the use of therapeutic value of Pilates to prevent injuries and extend careers.

1.12. Literature Review

As the dancers of western countries have adopted Pilates exercise in their routine, we can find so much awareness and research work on it. There are numerous books, journals, and papers about Pilates, its therapeutic value, and Pilates for sports injuries, but the researcher observed that in India there is very less awareness and importance of Pilates and no research has been conducted on the importance of therapeutic Pilates exercise for Bharatanatyam dancers.

There has been no research done on Indian classical dance and Pilates exercises. Pilates is being practiced by dance professionals in Western countries since there is an awareness of it. As the researcher is currently based in India as a Bharatanatyam dancer and Pilates trainer chose

to educate Indian Bharatanatyam dancers about Pilates exercise and its therapeutic effects. The researcher has also communicated with injured dancers to inquire about their treatment and how it relates to therapeutic Pilates. In this thesis, the researcher has reviewed and studied this topic in depth, and has presented all of the data discovered during the investigation.

1.13. Methodology

This study employs an art exercise framework, physical analysis, Verbal Interviews, being a Pilates trainer-researcher's own Experience and an information-based method with an invention perspective. Before projecting their usage, a conscious effort will be made to analyze all of the sources. The planned study will use qualitative research methodologies and procedures, using Joseph Pilates's workouts, and interpretative analysis. This is a three-part study using Indian texts and Pilates exercises as a foundation, including literary analysis, interpretation, reconstruction, and the combination of exercises for Bharatanatyam dancers.

- Textual study - Pilates books and journals, Bharata's Natyashastra- English translation by Manmohan Ghosh, English translation of Nandikeshvara's Abhinaya Darpanam by Manmohan Ghosh
- Relative study of Bharatanatyam and Pilates-and Rehabilitation techniques given by physiotherapists
- Exercise combinations of Pilates, for Adavus and Kritis of Margam are included in the thesis.

1.14. Field and Primary resources

The researcher was encouraged to undertake Pilates exercises and tried different combinations of exercises to attain a better result. This was the researcher's own invention that doing Pilates exercises in different combinations rather than doing them as prescribed in the book for specific parts of the body would be more beneficial for dancers, and the researcher herself has created some combinations for different adavus and kritis of margam to make it easier for dancers and dance teachers to perform.

Books by physiotherapists who use Pilates as a rehabilitation. Scholarly books that give a critical analysis: These books, written by scholars and subject experts, are based on primary source data and they analyze, critique, report, summaries, interpret and restructure the data from primary sources. Natyashastra by Bharat Muni-English translation by Manmohan Ghosh,

Abhinaya Darpanam of Nandikeshwara- English translation by Manmohan Ghosh, Nrutya Saurabh by Dr. Manjiri Shriramdev, Nrityatmika by Dr. Sucheta Chapekar.

The Pilates Handbook a Young Woman's Guide to Health and Well-Being- Roger Brignel, Pilates and Dance- A Reformer for the Art by Gabriella Berkow, Pilates – A Teachers' Manual -by Geweniger and Bohlander are some of the subject experts and researchers whose books have been referred for this research.

- Interviews of Bharatanatyam dancers
- Interviews of Pilates experts
- Interviews of physiotherapists
- Researcher's own experience

1.15. Secondary sources:

Published thesis available on UGC website Inflibnet and various other universities have been referred. Some of the online sources are also consulted for this research.

Magazines and journals: Research journals, both print and online, such as South Asian Dance, Dance research, Journal of Sangeet Natak Academy, Music Academy 28 Journal, Attendance, Narthanam, Narthaki, Sangeet galaxy, Sangitikarasikpriya etc. which publish research papers on dance. These papers give inputs regarding the issues faced by a dance researcher and the tools and methods they used to deal with such issues. These papers were downloaded from different websites and the details of the same are given as and when required in the body of the thesis.

The necessary data gathered from the above mentioned primary and secondary sources are analyzed systematically and accurately.

1.16. Conclusion

From the above given details, the researcher can say that supplementary exercise is the need of Bharatanatyam dancers if they want to improve their performance, prevent injury or for rehabilitation of an injury. Natyashastra explains that exercise is important for dancers but not mentioning any particular exercise.

The researcher has briefed about some of the important types of exercises but because the researcher is a Bharatanatyam dancer and a Pilates trainer, wants to elaborate about Pilates exercises in further parts of the thesis.

Bharatanatyam dancers who practice Pilates exercise as a supplementary exercise in their routine may achieve incredible fitness gains, avoid injuries, and recover rapidly if they are already injured.

It is essential for classical dancers to be exposed to a therapy like this since it will boost their self-esteem and professional potential. Dancers may benefit from the improved self-confidence, self-esteem, and grace brought about by the Pilates therapy's designed approach, which will aid in injury prevention and recovery while also enhancing technique and performance. Therefore, it is crucial to investigate, put into practice, and create a Pilates exercise program for Bharatanatyam dancers. According to the researcher's experience, Pilates is a good supplementary training for Bharatanatyam dancers, dance teachers, and dancing professionals. Both Bharatanatyam and Pilates involve body-mind coordination.

- Learning Pilates may help Bharatanatyam dancers to be physically fit
- Learning Pilates may improve the confidence of Bharatanatyam dancer
- These research might ease their emotional stress.
- These studies may serve as a window into the practical application of Pilates in the daily lives of Bharatanatyam dancers.
- Bharatanatyam students could include an activity in their curriculum.
- Finally, and perhaps most importantly, this research may contribute to the development of a systematic Pilates training methodology as a kind of therapy for Bharatanatyam dancers, as proper exercise technique is not specified in any Bharatanatyam-related texts.

Chapter 2 Bharatanatyam

2.1 Introduction:

Bharatanatyam is an elaborate and comprehensive art. Its origin can be traced back to the Vedic period. The three major categories of Nritta, Nritya, and Natya can be used to discuss the Bharatanatyam technique. In this chapter, the researcher's focus is on the nritta part. We all understand what adavu is and how to perform it. We are all familiar with nritta kritis. Through this chapter, the researcher explains the major muscles usage while performing adavus so that in the fourth chapter, application of Pilates exercise for an adavu can be easily

understood. Bharatanatyam dancers mostly follows Abhinaya Darpanam. “We find a full and independent treatment of dance for the first time only in Abhinaya Darpana.”¹

2.1.1 नटनभेदाः (Kinds of Natana)

एतच्चतुर्विधोपेतं नटनं त्रिविधं स्मृतम् ॥ 11 ॥

नाट्यं नृत्तं नृत्यमिति मुनिभिर्भरतादिभिः ।

According to Bharata and others, dance is of three types- natya, nr̥tta and nr̥tya connected to the four types of abhinayas.²

“There are 4 types of abhinaya described in Abhinaya Darpana,

2.1.2 अभिनयः (The Abhinaya)

तत्रा त्वभिनयस्यैव प्राधान्यमिति कथ्यते ।

आङ्गिको वाचिकस्तद्वदाहार्यः सात्त्विकोऽपरः ॥ 38 ॥

The Abhinaya is the most dominant feature of nr̥tya. The Abhinaya is of four kinds: angika (bodily), vācika (verbal). ahārya (attire) and sāttvika.

2.1.3 चतुर्धाभिनयस्

आङ्गिकाभिनयः (Angika Abhinaya)

तत्र आङ्गिकोऽङ्गैर्निदर्शितः ।

The angika abhinaya is expressed by bodily gestures.

वाचिकाभिनयः (Vācika Abhinaya)

वाचा विरचितः काव्यनाटकादि तु वाचिकः ॥ 39 ॥

The vācika abhinaya is expressed through the means of literature such as poetry and dramas.

आहार्याभिनयः (āhārya Abhinaya)

आहार्यो हारकेयूरवेषादिभिरलंकृतिः ।

Aharya Abhinaya is ornamentation of the dancer, by adorning various ornaments such as bangles, necklaces, costume, etc.

सात्त्विकाभिनयः (Sāttvika Abhinaya)

1. Vatsayayan, Kapila. Indian classical dance, pg. 10

2. P. Ramachandrasekhara, natanabheda,dance gestures,pg.43

सात्त्विकः सात्त्विकैर्भावैर्भावज्ञेन विभावितः ॥४०॥
स्तम्भः स्वेदाम्बु रीमाञ्चः स्वरभङ्गोऽथ वेपथुः ।
वैवर्ण्यमश्रुः प्रलय इत्यष्टौ सात्त्विकाः स्मृताः ॥ ४१ ॥

The Sāttvika Abhinaya is expressed through the Sāttvika emotions by the past masters. The eight Sāttvika conditions (which can be taken as involuntary evidence of inner feelings) are stupor, perspiration, and horripilation, break of voice, trembling, color-change, tears, and loss of consciousness.”¹

As Bharatanatyam dancers, we understand that the communication of dance styles is through the four Abhinaya, namely Angika, Vachika, Aharya, and Satvika. They are shown using the Nritta, Nritya, as well as the Natya, which have well-defined and standardized procedures. According to the need of the thesis the researcher will now limit the attention on the Nritta portion only.

2.2 Nritta and Angika abhinaya:

नृत्तम्

भावाभिनयहीनं तु नृत्तमित्यभिधीयते ॥१५॥

“Nritta is the dance form not pertaining to any emotional state of mind.”²

“Nritta- That(dance) which does not relate to any psychological State(bhava) is called Nritta.”³

“The Nritta technique of Indian dance is the law and methodology of human movement”⁴

It is crisp, fast and rhythmic. This part of dance does not stress on facial expressions. Essentially, one may say from these descriptions of the Abhinaya Darpanam that Nritta is pure and abstract dance, with exquisite physical movements involving footwork, limbs, neck, head, hands, and other parts of the body. Nritta is completely reliant on angika abhinaya. Angika abhinaya can be expressed in three ways,

- Anga: Major limbs are 6, the head, the hands, the hip, the chest, the sides, and the feet.
- Pratyanga: Shoulders, arms, back, stomach, calves and shanks fall under Pratyanga.

1. P. Ramchandrasekhar, Dance gestures- English translation of Abhinaya Darpanam, Pg.50

2. P. Ramchandrasekhar. Abhinaya Darpanam pg. 44

3. Nandikeshwara, edited by Manmohan Ghosh, Abhinaya Darpanam, third edition 1975, pg. 15,

4. Vatsayayan, Kapila. Indian Classical dance, pg. 12

- Upanga: According to Nandikeshwara, eyes, eye-brows, pupil, cheeks, nose, jaws, lips, teeth, tongue, chin and face are upanga.

The researcher will focus on anga and pratyanga in this thesis. In Bharatanatyam, the angika abhinaya technique, which is defined as acting through bodily motions, entirely dominates the Nritya technique. The Abhinaya Darpanam of Nandikeshwara is a popular text among Bharatanatyam dancers. It focuses solely on angika abhinaya, and not only the gestures are described, but also the applications of these movements in dance also described. These are body movements made up of distinct body parts or anga, pratyanga and upanga. Nritya's emphasis on angika abhinaya also highlights how important it is for the dancer to be in good physical condition in order to perform all of the dance techniques with grace and agility, especially during the mesmerizing Nritya kritis. Even the Nattyashastra acknowledges that dancers must regularly exercise or work out. An important aspect of easy execution and carriage is the right posture, or Anga-saushthava. The most important attribute that a learner should aim for is perfect posture. The dancer should become aware of and control how much weight is on each foot as they move. Proper posture and foot placement allow for efficient and effective movement. Daily practice is required to achieve good posture. The basic goal is to move with the least amount of tension on the limbs while maintaining maximum speed and adaptability. Warm-up activities build in you a positive attitude, ease, and confidence.

The dancer's objectives include breathing, endurance, stretching muscles and joints, bending the spine laterally for flexibility, burning fat and making the body lighter, ensuring better blood flow to the brain, removing fatigue, strengthening the knees and leg muscles, and gaining and maintaining balance while performing the dance. The word "balance" refers to the physical component of Nritya in Bharatanatyam. All postures are organized around a central imaginary line, which must be maintained by the dancer. The performer's anga saushthava awareness involves that he/she correct the basic stance in Araimandi (basic half-sitting posture). The dancer must maintain his/her head still, maintain a level look, bring his/her shoulders back (rather than raising them purposefully), open his/her chest, and maintain a straight back. The stomach was drawn in, the pelvic bone was squeezed in, and the arms were parallel to the floor. The angika abhinaya is all about body gestures and movements, so for injury prevention and career longevity, Bharatanatyam dancers should acquire the above- mentioned qualities.

2.3 Nritya in Bharatanatyam:

In addition to what Bharatanatyam dancers learn from their Guru or teacher, the angika abhinaya includes several types of body movements that are described in the Abhinaya

Darpanam. With the help of these various hand and leg gestures, adavu are made. These gestures include head movements (shira bheda), eye movements (drishti bheda), neck movements (Griva bheda), single and double hand movements (asamyukta and samyukta hasta bheda), poses of divinities (Devahasta), poses of ten incarnations (Dasavatāra), different standing postures (Mandala), foot positions (Sthanaka), poses of nine planets (Navagraha), jumps (Utplāvana), variety of steps (Utplāvana), various movements (Chari), whirling movements (Bhramari), etc. The angika abhinaya, utilized to perform adavus, is mentioned above. The Nritya kritis of Bharatanatyam are performed using permutations and combinations of the adavus. Based on the above explanation, one can conclude that bodily gestures (Angika-Abhinaya) are given a high status. Pilates exercises are not directly applied to the nritya part mentioned above, but they can be applied to adavus of Bharatanatyam. The two most important limbs for gestures are the hands and feet. These are the gestures used to perform the adavus. These are the many different ways that the body components can be moved. These movements are utilized to express the Bharatanatyam Nritya, starting with the Adavu-s. There are three positions in which adavus can be performed.

2.3.1 Basic Body Positions in Nritya of Bharatanatyam:

There are three main body positions in Bharatanatyam:

- The head, eyes, nose, neck, shoulders, torso, and legs are all in an upright position in the Sthanaka position. In addition to contracting the hips and stomach, the shoulders are pulled back. The hands are in a pataka position with the palms facing out, the wrists at the level of the waist, and the arms folded back.
- The Araimandi is a half-sitting position in which the dancer sits at a height that is nearly equal to that of their legs. The torso is fixed in position. Standing straight with the hips and stomach pulled in, the feet are at a 180-degree angle with the ankles separated by two inches, and the knees are bent and pointing to the right and left sides, respectively. When not in use, the hands rest at the waist.
- The full sitting position, sometimes referred to as Muzhumandi, is known as Murumandi. The dancer is seated with her heels raised and her weight evenly distributed over both feet. The thighs and calves rub against one other, and the knees spread outward and point to the sides. The hands rest at the waist and the hips rest on the heels while not in use.

2.4 Adavu:

2.4.1 Definition of Adavu

“The name *adavu* falls from the word "*adaibu*.”¹

“Adavus includes different pattern of footwork, hand and body movements of minor limbs such as head, neck, and eyes.”²

“The unit which emerges as a coordinated pattern of movement of the feet, thighs, torso, arms, hands, neck, head and the eyes is known as the *adavu*”³

“The *adavus* (the smallest units of dance patterns or alphabets of dance) are conceived as different types of cadences where all movements relate to the vertical median on the one hand and to the fundamental proportioned flexed position of one half of the human body on the other. It is these primary units of movement where the feet and hands and other limbs of the body form a precise harmonized movement which combines together to form a dance pattern. However, none of these primary or secondary movements are conceived outside a given time cycle and without reference to the musical or rhythmic phrase which they interpret in a composition.”⁴

In short, “*adavu* is a basic rhythmic unit of dance within a specific tempo and time structure that involves composite movements pertaining to *Nritta*”⁵ Many combinations of *adavu* produce a wide range of body movements. *Adavu* is made up of three parts: *Sthana* (the body's defined position in time and space), *Chari* (leg and foot movement), and *Hasta* (*hasta mudras* or hand gestures). Many forms of *Adavu* are generally groups of movements, classified by distinct sorts of foot and floor-contact actions and execute rhythmic patterns. Each type has its own *Shollukattu* to distinguish it. *Shollukattu* are the simple but specific rhythmic sounds, it does not convey any meaning. The *tattu* (flat foot strike), the *nattu* (heel strike), and the *kutta* (toe strike) are all common foot strikes in the *adavu*. Most of the *adavu* are performed in the *araimandi* stance.

The *Adavus* must be mastered with extreme care. They must be practiced in each of the three *Kala-s* or speeds. The bodily positions must be exact. In the creation of the *Adavus*, well-defined rules, the rigor of method, and the skill of accuracy may all be seen. Everything is

1. Vatsayayan, Kapila, Indian Classical Dance, chapter 3, pg. 25.

2. Gayathri, Keshavan, Bharatanatyam *adavus*-fundamental and structural principles, pg.15.

3. Vatsyayan, Kapila Bharatanatyam, Indian classical dance, pg.24.

4. Anand, Chandra. Education in Spiritual Values through Bharatanatyam, Part VIII, Maxims of teaching and the *adavus* of Bharatanatyam, <https://narthaki.com/info/articles/art382.html>

5. Sarabhai, Mrinalini. understanding of Bharatanatyam, chapter 4, pg. 26.

fixed, including the location of the feet, the distance between the heels, the bending of the feet, the body, arms, and the head.

It is hereby clarified that keeping the object and the subject of the research at the priority and to stick to the purpose of the research, very limited and concerned areas of Bharatanatyam are discussed in this thesis. This research would be helpful to Advanced Bharatanatyam Practitioners, having knowledge of Adavus and Nritya kritis. So, to understand the integration of Pilates in Bharatanatyam becomes simpler for the dance practitioners.

2.4.2 Fundamental Rules to perform adavus:

The hasta used, in an adavu, having wrist/elbow/shoulder movement, should be held stiff and clear, throughout the step. While practicing Adavus, head straight, Shoulder down and not raised up purposely, stomach pulled in, no unnecessary bending forward, knees to the side, ankle placed properly in the ratio of the knee is required. Controlled, precise and graceful movement is expected. Eyes will follow the hand that is in motion, which helps in concentration and keeps the body and mind together. Every muscle in the body is impacted when performing any movement. The main target muscle(s) for the exercise, the effect is stronger on some muscle which are primary muscles. The stabilising and assisting muscles that keep the primary muscles functioning effectively, the impact is less on some muscles, which are referred to as secondary muscles. In this thesis the researcher describes the main muscle group involved in a specific adavu.

2.4.3 Name and descriptions of the Adavus:

- **Tattu Adavu (Tai Ya Tai) The flat foot strike**

Tattu Adavu has a lower level of difficulty because it is only the first stage of learning the Bharatanatyam. Tatta means “to tap” there is no movement of the hands in this group. The wrist is resting on the waist. There are total 8 steps in this adavu. While performing the Tattu adavu, keep the body straight, the stomach drawn in, and maintain Araimandi (half-sitting position). In Tattu adavu, from steps 1 to 6, all counts of each step are done on the right leg first, then on the left leg. Here, six continuous hits of right leg and repeat the same of left leg. In the 7th and 8th Tattu adavu, both legs are employed. In Tattu adavu, core muscles, inner thigh muscles, balance are the most important points to concentrate on.

- **Nattu Adavu (tai yum tat tat) Movement in Stretch**

Focus is on ‘movement in stretch’, as well as ankle and heel alignment. This group teaches stretching the leg to the sides and front, as well as hitting the toes on the floor with the heel up (Kutta position). There are total 8 steps in this adavu. This adavu introduces stretching

the hands from the shoulder and stretching the limbs. For this adavu inner thigh strengthening is important. 7th and 8th step- includes Muzhumandi position, which needs limb stretching, bending, control, balance, turning on toes, thighs and core muscular strengthening, and awareness of ankle muscle action, which should be controlled. Abdominal control, shoulder stability, hamstring lengthening, hip flexor lengthening, coordination, calf muscles, the oblique muscles, good control over the leg movement, torso flexibility, and leg flexibility all should be worked on for this adavu. Concentration is necessary when bending forward or to the sides, knowledge of muscle usage may help the dancer, control of movement, and awareness of available space are all required.

- **Korvai Adavu (Tat Tai Tam) A Brisk Movement:**

The leg action in this group is relatively easy. Jumping on the spot in kutta position and covering the area is introduced. This adavu has 4 steps. All of the steps require a body tilt in the direction of the movement as if the hand is pulling the body along with it. Hands move in circular motion, the movement is from the shoulder. Legs movement should be precise. With the exception of the hand movement, the foot movement is identical in all 4 steps. The shoulder girdle is the muscle that is primarily used in hand movement. Working on Flexibility and strength training for the torso and legs, shoulder girdle, hip mobility, spinal articulation, good posture, and other areas are extremely important for this adavu.

- **Kutthu Adavu (Tat Tai Ta Ha) Energetic Movements**

‘That Thai Tha Ha’ adavu is an important component of any Nritha kritis, such as Alarippu, Jathiswaram, and Thillana, since it provides a lot of energy to the sequence. Total 9 steps are included in this adavu. The footwork of the first 5 steps is done in the same place, jump on same place in kutta position. The 6th and 7th steps have a circular body and hand movement. The hand movements must be powerful yet controlled in all directions. The body will be tilted to the sides. Semi-circle or circular movements are there in few steps. The emphasis should be exclusively on shoulder mobility, with the elbow and wrist kept tight. For this adavu stretching the hamstrings, strengthening the spine extensors, training the body to rotate from the centre, and exercising back extension to increase back flexibility is important.

- **Theermanam adavu (Thading ginathom and Kitathaka Tharikitathom) Vibrant Movement**

Theermanam adavu, as the name indicates, is the finishing step, and comes at the end of a sequence. This adavu includes ‘Thading gina thom’ and ‘Kitathaka tharikitathom’. This is

an important part of all the Nritha Kritis. A korvai should end with this adavu, which is done either once or in multiples of three. This group has mainly three steps, their combinations are countless. This adavu is very noticeable in Alarippu, Jathiswaram and Thillana. In this adavu shoulder, thigh muscles, torso and gluts muscles are used the most.

- **Kudittu Mettu Adavu: (thai hath thai hi) Sound of heel**

The important point is to jump on toes in Araimandi and hit the floor with the heels in the same position (without shaking the toes). ‘Kudittu’ states the jump on toes - and ‘Mettu’ refers to the hitting of the heels. This is a powerful adavu. Total 6 steps are there in this adavu. There are variations of hand movements, while the leg movement remains common to all. This adavu needs more stamina, stretch for the back and shoulders, strengthening of hip extensors, improving balance, coordination and flexibility is the main areas on which a dancer should concentrate.

- **Veeshu adavu: (tha thai thai tha) Arc Movement**

The beauty of this adavu is that the leg moves horizontally, while the hand moves perpendicular to the body. This adavu includes 6 steps. The tilt of the body should synchronize with the hand movement. Which needs stamina, balance, concentration and coordination. This adavu includes throwing the leg gracefully. This includes limb tilting, bending, and balancing. Throwing the leg is introduced in this adavu. To throw the leg and move it in different directions, and the weight of the body is on other leg, one should have strong core to balance the weight, flexible yet strong inner thigh muscles and strong calf muscles.

- **Pakka Adavu: (thai thai di di thai) Sideways Movement**

In this adavu sideways movements are included. There are two steps in this group. The torso is bent. For this adavu, a dancer should strengthen the shoulder girdle, torso and concentrate on coordination of hands and legs.

- **Tatti Metti Adavu: Five Rhythmic Movements**

Tatti refers to the flat hit and Mettu refers to hitting only the heel on the floor without raising the leg. This group has 5 steps. Just like tatttu adavu this adavu also do not have any hand movement. For this adavu, hip stabilization and core strengthening are important.

- **Sarukkal Adavu: (thai ya thai yee) A Sliding Movement**

The word 'Sarukkal' means slide the leg or dragging the foot. While dragging the foot, the toes & the heel should not be lifted. This is the only adavu done in the standing position with feet together (Sama Paadam). A total of 5 steps are described in this group, where the leg movements are same and hand movement varies. Sliding the foot, lifting the ankles, and the wrist moving up and down are the highlights of the adavu. The first three Sarukkal adavus done sideways, must be executed symmetrically. For a controlled and precise hand movement working on shoulder girdle is important and to drag the leg properly a strong core and thigh muscles are required.

- **Paichal Adavu: (Thai Thaidat Tha) Movement of High and Far Leap**

This group is special as compared to other adavus, because, it requires a high and a far leap. Which adds to the beauty and makes it distinct from other adavus. Total 6 steps are there in this adavu. The adavu is used to cover space. The focal point is a leap from one point to another, it is not a jump in the same place. The 5th adavu in this group does not have a leap, instead has a stretching movement of leg from one point to another. The leap needs power which is more important and significant. For this adavu a dancer must work on her whole body, all the major limbs and shoulders so that he/she can achieve required stamina, flexibility, concentration, strength and coordination between mind and body.

- **Mandi Adavu: (Tha ki ta) Sitting on Toes**

This adavu is done in full-sitting or Muzhumandi, consisting of jumps in this position and touching the knee to the floor. Therefore, it is called mandi adavu. This adavu contains 4 steps. One can observe this adavu in Alarippu. To seat in a Muzhumandi position, standing up immediately and complete the step needs lots of strength, flexibility in core muscles and thigh muscles, coordination of mind with the body is essential. This adavu requires stamina and full body fitness.

- **Periya Adavu: (That thai tham -4, dit thai tham -4) Blooming Variations**

This group is referred to as "Periya Adavu" (meaning Big in Tamil) by the Nattuvanars. There are total 11 steps in this adavu. The striking feature of this group of Adavus is the variety in hand movements, consisting of circular and angular stretches, quick twists in body movements, quick sit and stand movements, and prominent leaps. This adavu is particularly known for its variety of hand movements. This Adavu is used in Jathiswaram, Thillana & Varnam frequently. It is also a relatively long adavu that involves sitting in

Muzhumandi, Sthanaka, and araimandi positions while making circular and other directional movements. To master this adavu, one must strengthen their entire body, including their shoulders, hips, inner thighs, calf muscles, core, and spine.

2.4.4 Korvai and Jathi:

The root of the verb korvai is compile, join, or thread. They are performed at a specific talam (rhythm) and kalam (speed). They normally end with the theermanam adavu. Korvais are set into swara patterns, theermanam adavu are done in end of the korvai, and basically theermanam adavu are the signal of the end of the korvai and jathi. Korvais are the combination of adavus. Shollukattus is used to set jatis. It falls under the category of "Nritta" and is a pure dance sequence. Three different speeds are used for jathi. Bharatanatyam is a dance form in which the dancer uses her or his body, every single muscle is used. All of the muscles are used to perform the jathi. Again, the jathi is a combination of various adavus. So a dancer can opt for the Pilates exercises described for different adavus in the fourth chapter, for the korvai and jathi.

2.5 Bharatanatyam Nritta Kritis:

The Tanjore brothers- Chinnaya, Ponnaya, Shivanandam and Vadivelu brought out the beauty of Nritta-pure dance, abhinaya-the expressional dance and nritya-the expression with dance at their best. The Alarippu, Jathiswaram, and Thillana are the three primary Nritta Kritis in the Bharatanatyam repertoire. The Tanjore Quartet is credited with creating modern Bharatanatyam margam i.e., Alarippu to Thillana. Short Nritta part are interspersed throughout the mainly abhinaya items like the varmans and shabdham, but the Nritta component can account for up to half of the entire kriti. The adavus are artistically weaved into the movement to generate these pure dance sequences that create interesting patterns of tremendous visual beauty. A dancer must work on the body in order to perform these nritta kriti flawlessly. Working on the body can produce excellent Bharatanatyam performances, lower injury risks, boost confidence and elegance, expose one to the body movements, and extend career life. The researcher is explaining margam's nritta kritis, but the Pilates exercises may be used with any nritta piece or kriti.

2.5.1 Alarippu:

“It's a dance of invocation with little musical content, but one that aims to perform a number of concentrated and yet basic rhythmic patterns.”¹ This is the shortest and most basic kriti in

1. Vatsyayan, Kapila. Classical Indian Dance in Literature & Arts.

the Margam, lasting around 3-5 minutes and serving as an invocation, paying homage to the Gods. It has a simple timing and rhythm as well. "Alaripu is the first number. It is short and simple. It is in the nature of an invocatory number, of offering obeisance to the gods and audience. The movements of all major and minor limbs are employed in this number."¹ Alarippu is a Bharatanatyam Margam's first nritta kriti. The movements of the neck, shoulder, and arms are introduced with great charm, beginning with perfect response and an attitude of perfect equilibrium in the standing posture. This is followed by the previously mentioned araimandi. The full mandi is introduced in the final sequences, and the dance concludes with a small adavu, or dance cadence. All major and minor limb movements are used in their most basic forms. "In a three minutes piece with which the Bharatanatyam recital normally opens, the Alarippu (literally, the unfolding of petals) there is vigorous exercise of each limb, symmetrical on both sides, complete with bending, jumping, stretching and exercising the torso, the waist, the feet, the heels and the toes, besides the face and the neck."² "Beginning with a standing posture, the movements of the neck, shoulder and arms are introduced, followed by the ardha mandali position with a final sequence in complete mandali position, the number ends with a small adavu, or dance unit. The dance commences quietly and gradually builds up the tempo of bodily movements to reach a climax."³ "The dancer stands tall and begins with motions of the head, neck, eyes, and brows, then moves on to the shoulders, arms, and hands, then the torso, and lastly the legs and feet, involving all of them in frenetic projection. The limbs draw lines and angles with precision."⁴

1. Kothari, Sunil. 1-3 Margam Repertoire: Alaripu to Thillana

2. Singh, Shanta Serbjeet 'Why we need Performing Arts Education,' Sahapedia, March 2014)

3. Kothari, Sunil. 1-3 Margam Repertoire: Alaripu to Thillana

4. Khokar Mohan, The Splendor of Indian Dance

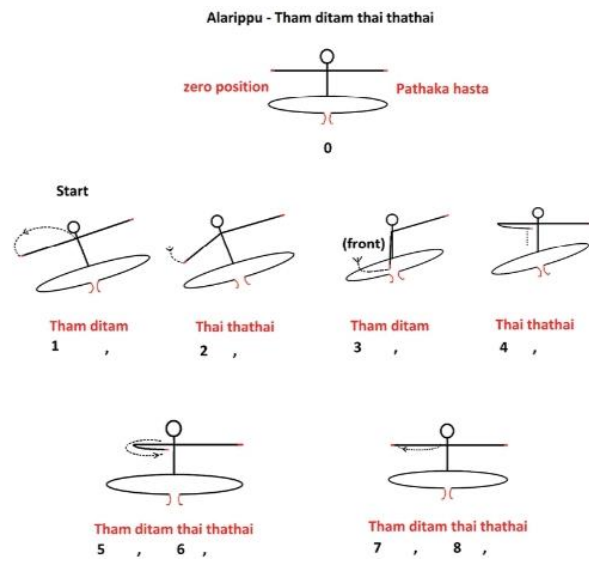


Fig.2.1

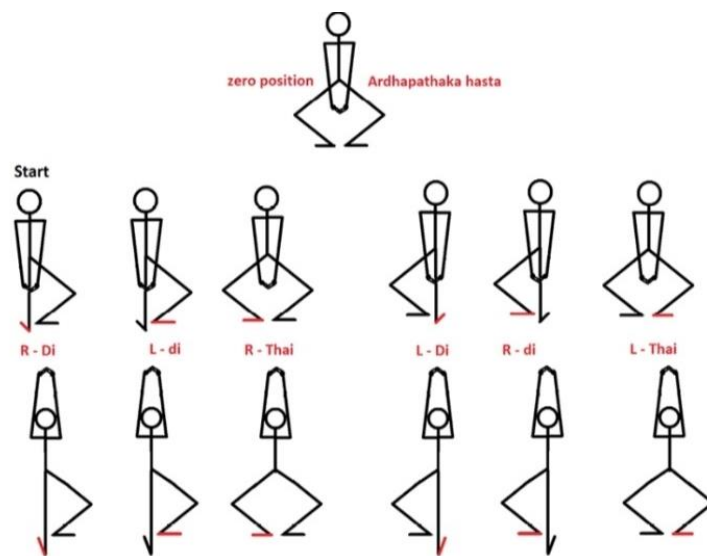


Fig.2.2

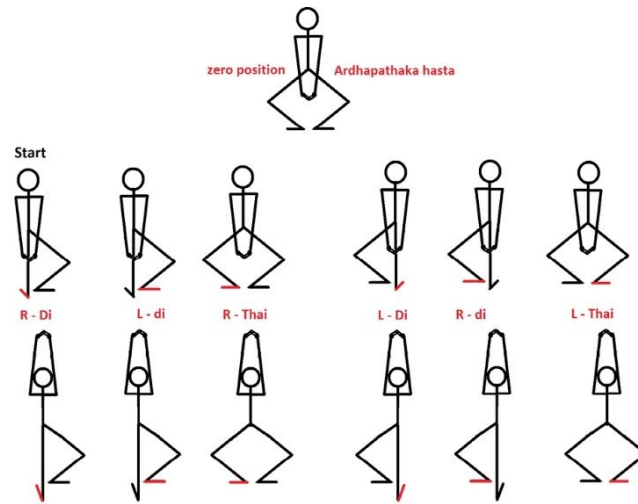


Fig 2.3

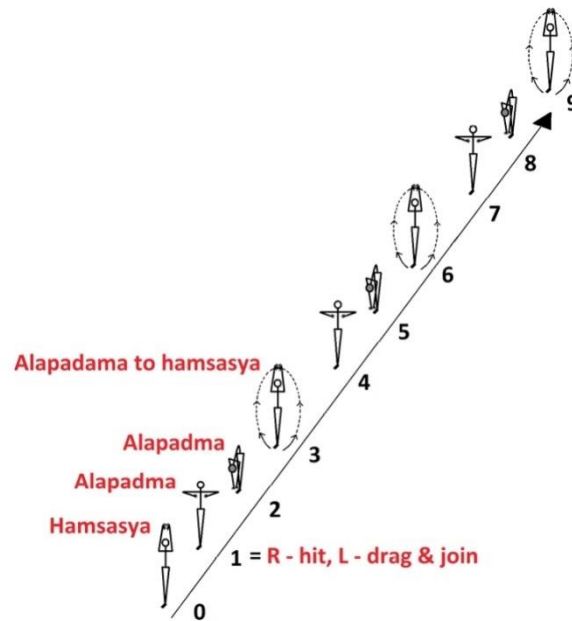


Fig 2.4

“It is the beginning of a Bharatanatyam performance and it is the shortest dance. This is the beginning of basic movements of head, eyes, neck and shoulders. Through this dance item one can know how much control the dancer has on this Upanga.”¹ Alarippu is performed using both the Anga and Pratyanga as shown in the above pictures. The exercises are provided in the fourth chapter for these various body parts, including the neck, shoulder, thighs, core muscles etc.

1. Menon, Bhaskar Radha Bhaskar, Anantha Nrityam, pg.38.

2.5.2 Jathiswaram:

“The joy of pure rhythm in Alarippu is followed by Jathiswaram where there is the added joy of melody. Melody without word or syllable, has a special power to unite us with our being. In Jathiswaram, melody and movement come together.”¹

After Alarippu, there is a harder Kriti called Jathiswaram. The musical material contains swara passages in a raga and tala. The Jati (rhythmic syllables) categories are followed by the swara groups. The musical structure is comprised of three movements: Pallavi, Anupallavi, and Charnam. The piece can be set to any of the five metrical cycle patterns used in Carnatic music. The dance patterns are measured in adavus, the fundamental dance unit, and are influenced by the nature of the swara and their duration in the tala measure.

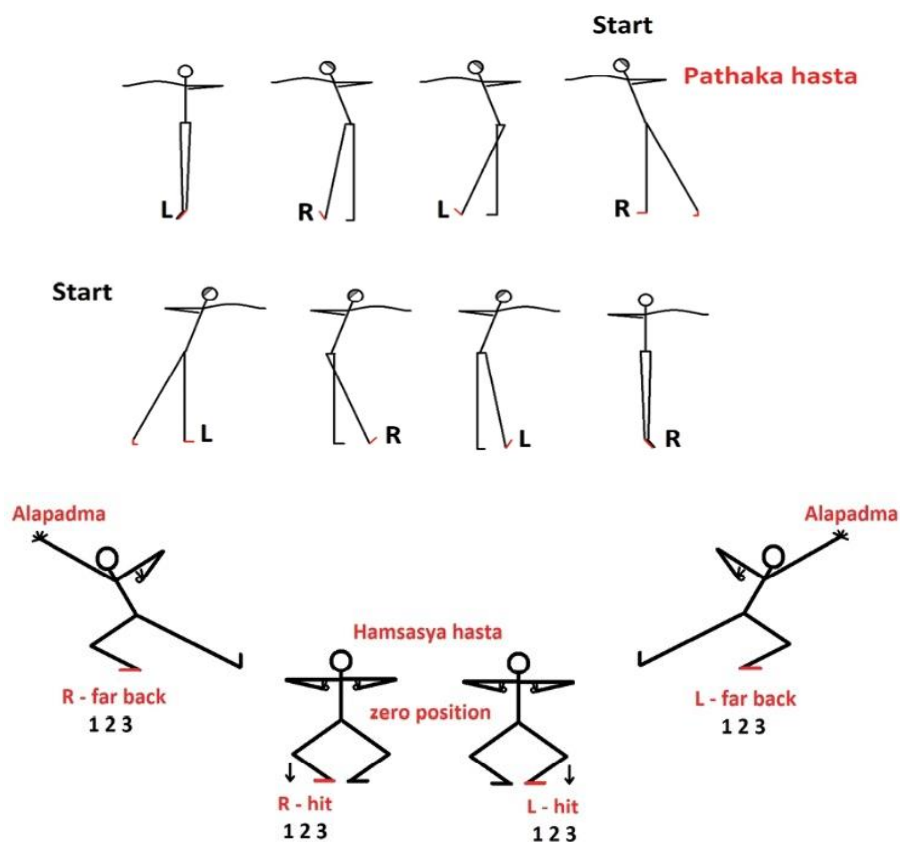


Fig.2.5

Fig 2.6

1. Presidential address of Dr. T. Bala Saraswati at the 33rd Annual Conference of the Tamil Isai Sangam, Madras, 21st December 1975, pg.3.

“Another example of pure dance (Nritta) composition in which the performer weaves several patterns on a basic musical composition. Indeed, the word Jathiswaram is the name of a musical composition which follows the rules of swara jati in musical structure and consists of three movements-Pallavi, Anu Pallavi and charnam.”¹

The combination of Adavus, set in various rhythmic patterns are called pallavi, anupallavi, and swaras. Dancers can use the various exercises described for the adavus in the fourth chapter for Jathiswaram.

2.5.3 Thillana:

As an abstract, Thillana is danced near the end of the Margam. It's built on the foundation of basic rhythm patterns. “The Thillana is a musical composition of mnemonics sung in a particular mode (raga) set to a particular metrical cycle (tala). The statuesque quality of the dance style is never more dominant as it is the Thillana.”²

A few unique steps/adavus performed in Thillana are listed below (Mei Adavu).

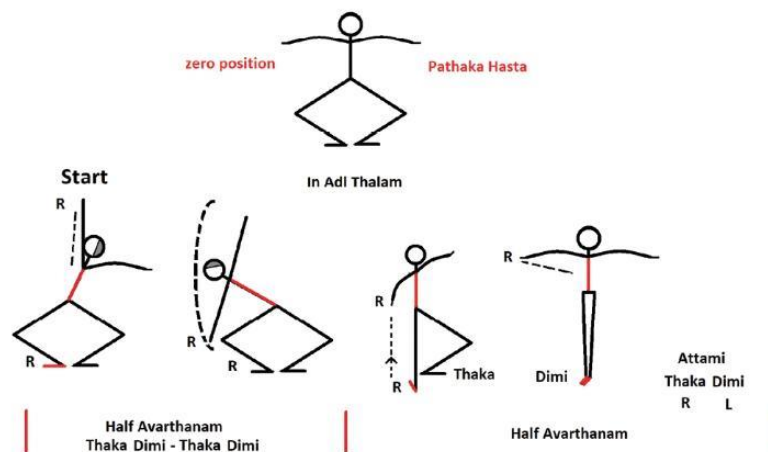


Fig.2.7

1. Vatsyayan, Kapila Indian classical dance, pg.28
2. Vatsyayan, Kapila Indian classical dance, pg.31

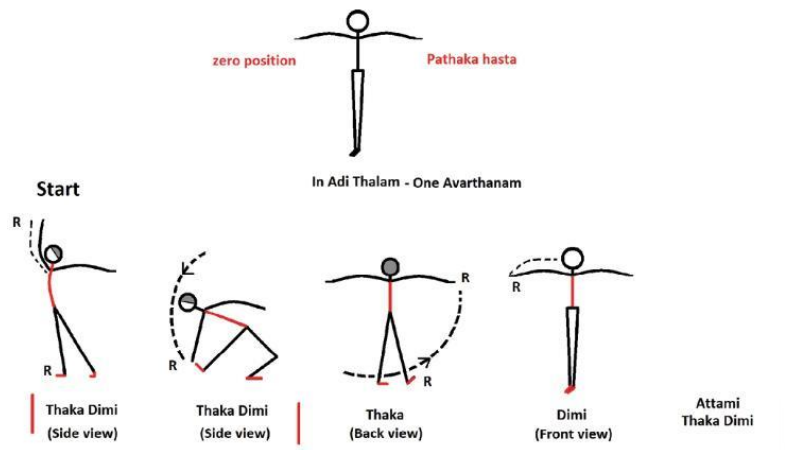


Fig.2.8

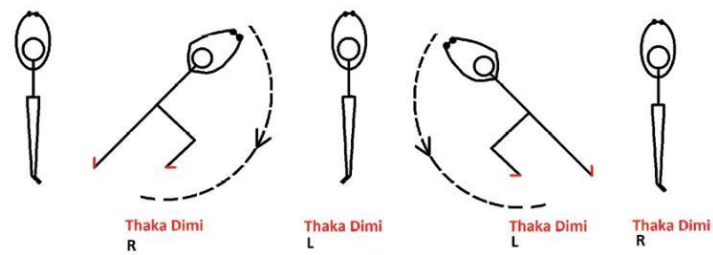
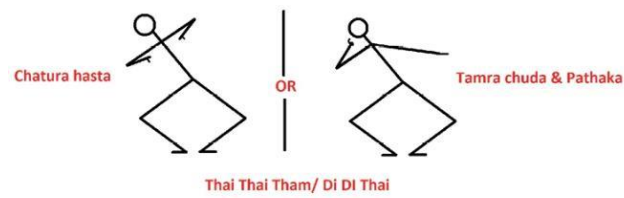


Fig.2.9

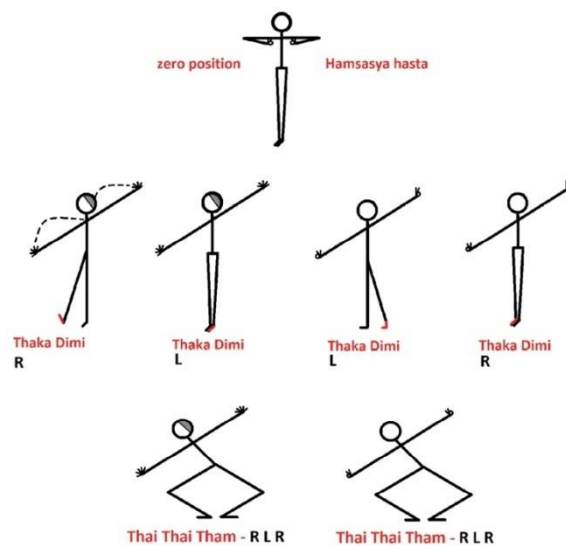


Fig.2.10

Thillana the most gorgeous of the Nritta Kritis, with sculpture-like attitudes, intricate movement patterns that highlight the artist's brilliance, grace, and beauty the performer to emphasize the beauty of the stances and the sparkling theermanam. After Alarippu, there is a harder Kirti called Jathiswaram. The musical material contains swara passages in a raga and tala. The Jati (rhythmic syllables) categories are followed by the swara groups. The musical structure is comprised of three movements: Pallavi, Anupallavi, and Charnam. The piece can be set to any of the five metrical cycle patterns used in Carnatic music.

2.6 Conclusion:

Pilates exercises are only applicable to the nritta of Bharatanatyam mentioned in this chapter. This chapter explains the major muscles used in Adavus and the nritta kritis of margam like Alarippu, Jathiswaram, and Thillana. In order to incorporate Pilates exercises into Bharatanatyam, the researcher will go into more detail about Pilates exercises, the muscles targeted in each exercise, the history of Pilates, the principles and demonstrations of the exercise in the following chapter.

Chapter 3 Pilates Bible: History of Joseph Pilates and technique of exercises invented by him- “Contrology” (Pilates)

3.1 Introduction:

In earlier chapter we saw part of Bharatanatyam on which Pilates exercises are directly applicable. In this chapter we will learn about Pilates exercise. Joseph Pilates first developed the "Contrology" technique that later became “Pilates” technique. Pilates is a fun and energizing, functional exercise routine that can help in improving overall fitness, core strength, and performance. It teaches how to maintain body and mind in sync while improving physical stability, strength, and flexibility. Before starting Pilates routine, knowing about the method, its origin and basics is necessary. As Bharatanatyam dancers learn more about the Pilates method, they may realize that it's a fantastic workout program that allows you to sculpt the body without adding bulk and build your muscles without risking injury. Ballet dancers Martha Graham and George Balanchine first realised the Pilates for dancers' advantages. They were the first in the dance community to recognise the deliberate and deliberate movements of Pilates exercise.

3.2 Definitions of Pilates exercise (Contrology):

Pilates is a form of exercise that concentrates on building core strength in the body. This enhances general health and fitness.

3.2.1 “Contrology (Pilates) is complete coordination of body, mind and spirit.”¹

3.2.2 “Pilates (pih-lah-teez) n. I. A movement system that uses spring-driven machines as well as a series of floor exercises to increase strength, flexibility, stamina, and concentration. Joseph

1. Robbins, Judd and Lin Van Heut- Robbins, Pilates’ Return to life through Contrology revised edition for the 21st Century originally published in 1945 as Return to Life through Contrology, Pg 27

H. Pilates, 1880-1967, noted German inventor of the Pilates exercise method, originally called “Contrology”¹

3.2.3 “Pilates is exercise. It is physical training regimen based on the body in its most natural state-in motion. Pilates is an art form, similar to martial arts or dance.”²

3.2.4 “Pilates (Contrology) can be used to rehabilitate and heal injuries, but it also can increase overall fitness level, improve performance and provide safe and effective cross-training in the off season.”³

Health is more than just being free from illness and disability; it also refers to a person's state of physical, mental, and social wellness. To handle the demands of Bharatanatyam dance choreography, one must have a sufficient physical strength, ability, and endurance, as well as mental steadiness. Pilates targets both general and specialized goals, whether they are related to work or daily activities, sports, dance/drama performance, injury prevention, or the need for improved overall health. The roots of Pilates exercise may be traced back to Joseph Pilates' philosophy and movement patterns, which he developed over 90 years ago. The Pilates Foundation's trainers continue to teach his fundamental approach, as well as an expanded version invented by themselves.

3.3 History of Joseph Pilates:

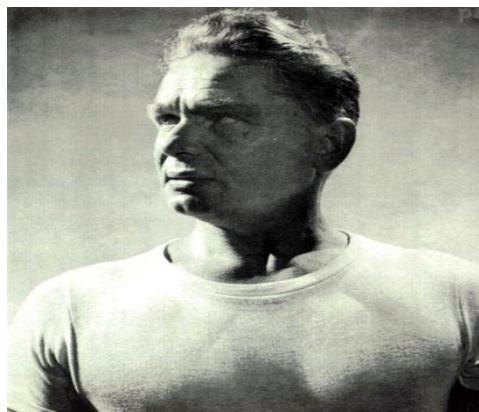


Fig.3.1

Joseph Pilates (Fig.3.1) was born in Germany. “Hubertus Joseph Pilates was born on December 9, 1883, at 0:30 a.m. in a house at 20 Waldhausener Street in Monchengladbach that no longer exists. He was the second of Helena and Heinrich Friedrich Pilates' nine

1. Ungaro, Alycea. Pilates- body in motion Real Pilates, Pg. 1
2. Ungaro, Alycea. Pilates- body in motion Real Pilates, Pg. 2.
3. Wood, Samantha, Pilates for rehabilitation, Pg. xvi.

children.”¹ It is mentioned in different books that he was frail and sick as a child (asthma, rickets, rheumatic fever and tuberculosis). Bodybuilding, boxing, gymnastics, and Kung Fu helped Joseph Pilates improve his body. It is said that he was a model for anatomical cards when he was 14 years old. After a wretched upbringing, his interest in physical fitness evolved from a desire to strengthen his own body and better his health. Joseph Pilates developed a unique sequence of movements that exercised the mind and body in harmony, based on his training in Yoga and Zen meditation. During the First World War, exercises developed by Joseph H. Pilates (1880–1967), a German-born man, were used to cure injuries and posture problems. At that time, he had already achieved success as a boxer, gymnast, and circus performer. He had also personally overcome a variety of health problems, including asthma and rheumatic disease, by devoting himself to the practice of athletics. He began sharing his mat fitness techniques with other prisoners while incarcerated in English camps. In the late 1920s, Joseph Pilates moved to New York and took with him his distinct views on physical exercise and health. Ballet dancers were intrigued by his work, researched its benefits, and began putting it into practice. “During the First World War, he fine-tuned his wellness regimen while interning in England, claiming it helped him and his fellow internees fight an influenza outbreak. Working as an orderly in a hospital, he devised a method to rig springs on hospital beds to provide light resistance workouts to bedridden patients, and thus the seed for Pilate's equipment was sown. The "Reformer", the first patented piece of equipment, employed weighted plates instead of springs for resistance. After World War I, he worked for the Hamburg Police Department as a self-defense coach. He worked in a "Boxing Gym" in 1926. Joseph Pilates relocated to New York, where he founded a studio near the New York City Ballet in 1926 with his wife, Clara Pilates. Famous dancers Martha Graham and George Balanchine were regular students of Joseph Pilates and later their other disciples also joined Pilates's studio. It wasn't long before he gained a following among dancers who were drawn to Pilates for its capacity to develop long, lean muscles and a powerful, streamlined physique. Pilates was immediately accepted by the dance community. More than 80% of Pilates-based teachers worldwide come from a dance background. His book "Your Health" was published in 1934. He used to instruct dancers at Jacob's Pillow in the Berkshire Mountains on a regular basis. He was almost 62 years old when he published his second book, "Return to Life Through

1. Geweniger, V. & A. Bohlander History, Pilates-A Teachers' Manual- Exercises with mats and Equipment for Prevention and Rehabilitation, chapter 2, Pg 6.

Contrology," showcasing the mat exercises.”¹ Joseph Pilates died on October 9, 1967. “After Pilates' death, many of first-generation Joseph Pilates students opened their own studios in the United States. The most important ones are given here.

- Carola Trier (Dancer and Acrobat)
- Eve Gentry (Dancer)
- Ron Fletcher (Graham Dancer)
- Romana Krzyzewski (Dancer)
- Kathy Grant (Dancer)
- Lolita San Miguel (Dancer)
- Bruce King (Dancer)”²

3.4 Types of Pilates exercise:

Joseph's students established their own studio, and more and more people from various professions, such as athletes, dancers, and so on, joined them. Pilates exercises have evolved in response to the demands of time and the body. If one have specific objectives and goals in mind, or if one want to take up Pilates as a hobby, one can find various types of Pilates exercises to help you reach your goal. Each type of Pilates will provide a unique set of health benefits.

3.4.1. Classical/Traditional Pilates:

Traditional Pilates, Romana Pilates, New York Pilates, authentic Pilates, and real or true Pilates are all terms used to describe classical Pilates. Classical Pilates attempts to preserve Joseph and Clara Pilates' original teachings by continuing to practice them as they were originally presented. The apparatus (props) is designed to the same exacting standards as Joseph Pilates' original designs. Classical Pilates, while it varies slightly depending on the specific school of training, is probably less variable than many other varieties of Pilates due to the shared purpose of continuing with the original work. It has a high flexion tendency when compared to other varieties. The original Joseph Pilates exercise system, which has been passed down from generation to generation of students and teachers, is practiced in classical Pilates studios worldwide. In these studios, the exercises are taught exactly as Joseph Pilates taught them, and in the same order. Although the instructor may alter a specific exercise or sequence of

1. Geweniger, V. & Bohlander A, Pilates-A teachers' manual: Exercises with mats and equipment for prevention and rehabilitation., Pg 6.

2. Geweniger, V. & Bohlander A, Pilates-A teachers' manual: Exercises with mats and equipment for prevention and rehabilitation. Pg 7.

exercises, as well as incorporate new techniques from allied fitness disciplines, newer Pilates systems frequently include a wide range of the original activities.

3.4.2. Contemporary Pilates:

Contemporary Pilates also called as modern Pilates. Contemporary Pilates is still based on the work of Joseph and Clara Pilates, it incorporates current knowledge and research into its lessons. Contemporary Pilates is by its very nature a work in progress, and as a result, it can be highly variable. Mat work, minor props like the foam roller all of the old studio equipment, and many more extra recent inventions may all be used. There are evident benefits to upgrading Pilates' original approach with current medicinal, anatomical, and physiological knowledge. There are a variety of modern Pilates exercise schools, with new ones springing up all the time.

3.4.3. Mat Pilates:

Mat work is a type of exercise that is done on the floor with nothing but a Yoga mat. Gravity and one's own body weight provide as resistance in mat exercises. It has the advantages of being less expensive and simple to do at home. The studio equipment was invented to assist those who couldn't do the mat exercises properly. Mat Pilates, on the other hand, is great for more advanced students because exercises can be modified to increase complexity and intensity and use your own body weight for resistance. Because there is no assistance from machines, you always aware about the muscles you use while practicing an exercise. Mat Pilates has numerous advantages, including strengthening your abdominals, lower back muscles, and pelvic floor, as well as your hips, glutes, shoulders, and upper body. Mat Pilates, like most Pilates, offers numerous mental health benefits, including mindfulness, relaxation, and stress reduction due to the breath work.

3.4.4. Props Pilates:

The magic circle, foam roller, Swiss ball, TheraBand, and other minor props can all be utilized as part of a Pilates workout. Small props provide variation to mat work and can be utilized in conjunction with a wide range of equipment. The majority of props, such as TheraBand and magic circles, are designed to either offer resistance or challenge stability. Small props are comparatively pocket friendly for the client to buy and utilize at home.

3.4.5. Clinical Pilates:

Clinical Pilates combines classic Pilates-style exercise with physiotherapy diagnosis and knowledge to create workouts that are specifically designed for those recovering from an injury. It is often offered one-to-one or in small groups. Clinical Pilates mainly refers to

rehabilitation. Mat work, miniature props, particularly TheraBand, and studio equipment work are examples.

3.5 Props used in Pilates exercise method:

3.5.1. Small apparatus (props):

Joseph Pilates worked diligently to make new exercise equipment designs, including the magic circle, foam roller, and Swiss ball. Small apparatus (props) is used to boost the intensity of a client's mat workouts.

3.5.2. Magic circle:

Magic circle is meant to be mindfully integrated into the body in order to support or challenge you during exercises. This means that it is usually applied to active muscles with gentle tension.



Fig 3.2. Magic circle ¹

3.5.3. Foam roller:

This small prop gives your spine a nice stretch, relieves muscle tightness and soreness. Gives you muscle massage effect and challenges your core control.



Fig 3.3 Foam roller ²

1. https://m.media-amazon.com/images/W/IMAGERENDERING_521856

T1/images/I/71V4d90tcIL_AC_UF1000,1000_QL80_.jpg

2. [https://www.amazon.in/STOTT-PILATES-Foam-Roller-Soft/dp/B00KU5NTU8\(4\)](https://www.amazon.in/STOTT-PILATES-Foam-Roller-Soft/dp/B00KU5NTU8(4))

3.5.4. Swiss ball:

Pilates exercise is all about core control. Swiss ball improves the balance, engage core muscles to keep balance, swiss ball exercises found in many therapeutic exercises.



Fig.3.4 Swiss ball ¹

3.5.5. TheraBand:

It improves stability, increase strength, also used by physiotherapists, and comes in variety of thickness.



Fig.3.5 TheraBand ²

3.5.6. Reformer:

The reformer has more movement options from any other Pilates piece of equipment. The exercises performed on the reformer range from basic to advance. With the jump board connection, one can enjoy cardiovascular and plyometric activity. In terms of rehabilitation, the reformer is really beneficial.

1. https://www.gaiam.com/products/05-51980_2

2. <https://complete-pilates.co.uk/resistance-band/>



Fig.3.6 Reformer ¹

3.5.7. Wunda chair:

The Wunda chair provides a variety of efficient core and upper extremity workouts, and it's ideal for people with hip and knee problems or balance issues. Also it is adaptable, light in weight, and low price, very little space is used, the chair is a vital piece of equipment to have in a Pilates-based rehabilitation center because it allows for multiple weight-bearing functional exercises.



Fig.3.7 Wunda chair ²

3.5.8. Spine corrector:

The Spine Corrector is a key Pilates tool for lengthening and strengthening the chest, shoulders, back, and legs while also correcting or restoring the natural curvature of the spine.

1. <https://www.womenshealthmag.com/fitness/g32850611/best-pilates-reformer-machine/>

2. <https://www.pilates.com/store/pilates-equipment/chairs/wunda-pilates-chair-system/> (8)

The Spine Corrector is an excellent piece of equipment for aligning and moving the spine, as well as improving posture. Its tilted base, deep foam padding, and smooth wooden handgrips give great comfort while meeting the needs of a wide range of clients.



Fig.3.8 Spine corrector ¹

The above given photographs of the props are only for introductory purposes. While explaining Pilates exercise, it is researcher's duty to explain all the different variations of Pilates exercise and props used in it. Researcher will focus on Mat Pilates in this research and explain the importance of Pilates rehabilitation through it.

3.6 Benefits of Pilates Exercise:

Pilates is a type of exercise that focuses on strengthening the core of the body, which includes the abdominal and spinal regions. This is accomplished via a series of precise movements. This, together with breathing and relaxation, aids in rebalancing the body and calming the mind. A modest number of movements are taught properly in a beginner's session, allowing students to discover balance in their own bodies and stimulate the correct neuromuscular connections. The concept is that if students can locate and engage the body's core muscles, which improve stability, they will eventually be able to relax the more superficial muscles, allowing them to function properly and the entire body to work more efficiently. From own experience, the researcher can say that Pilates Restores natural balance, Improves flexibility, Improves posture, Physical and mental strength increases, the body becomes toned and sleek and lean, one can move more gracefully and easily and quickly perform many task, helps prevent bone deterioration, boosts immune system, assists pre-and post-natal (during pregnancy and after pregnancy) women in breathing, body concentration, and recovering body shape and tone after pregnancy, reduces stress/fatigue, discomfort and pain, assists in a good night sleep. People like dancers, athletes, instructors of physical fitness and training, artists and

1. https://www.merrithew.com/shop/ProductDetail/ST01011_Spine-Corrector

performers, people who are afflicted with persistent pain and joint discomfort, Women who are pregnant, teenagers, elderly people, those who want to prevent osteoporosis, those who have stress and back discomfort, people that are overweight, professionals in business can get benefitted from Pilates exercise.

3.6.1. Alignment:

Proper alignment (neutral spine) balances the skeleton, allowing muscles to be retained at their optimal length. Posture gets improved having good posture allows us to use our bodies more effectively while avoiding unnecessary stress and strain. It prevents from an injury, a strong and balanced trunk is required for our limbs and spine to operate properly. Pilates focuses on optimal body and limb alignment to strengthen the body from the inside out. Injuries occurring from sitting at a desk, as well as injuries resulting from sports, dancing, running, or gym training, require a neutral, symmetrical spinal posture and proper muscle balance.

3.6.2. Strength:

Pilates is a fantastic body-conditioning exercise because it does not usually require the use of equipment to strengthen the body. To tone up and provide resistance for muscles, one can just employ own body weight. Pilates develops the entire body by combining dynamic and static strength exercise to target each muscle group evenly. No portion of the body is overlooked. It works on all planes of mobility, including sitting, laying, and standing. This means that the muscles are worked in a variety of ways even when no heavy weights are used. Pilates is increasingly being used to help professional athletes improve their performance. A strong and balanced foundation of the limbs is essential to achieve speed and power in the movement. Pilates focuses on the limb attachments at the pelvis, shoulder girdle, and core strengthening and boosting endurance.

3.6.3. Flexibility:

We all want a strong body, but it's important to strike a balance between strength and flexibility, and Pilates exercise is an excellent way to do it. Tight muscles make it difficult to move around and can cause stress, aches, and pain. Flexibility is necessary for general health and vitality. It guarantees that one's joints have a broader range of motion, which means that one's joints will stay healthy and resist regular wear and tear as they age. When one achieves good flexibility, muscles are free of tension and movement is unrestricted. Because one can hold his muscles appropriately, posture will improve. Improved flexibility improves blood circulation by

allowing the muscles to align more effectively. As one grows older, joints that are flexible and move freely, resist wear and tear better.

3.6.4 Tone and Shape:

When we're at rest, our muscle tone might be relatively low. Muscles respond quickly as a result of regular exercise, and after a few weeks of Pilates, the visible muscular tone and the evolution of one's body should be observed. Pilates exercise shapes muscles by using body weight and the prop as resistance, but it works every area of the body equally - front, back, and sides. Shape one's waist and shoulders while toning their abdominals, arms, thighs, and buttocks with Pilates exercises. With effort, a wonderfully toned and lengthened physique gets developed.

3.6.5 Endurance:

Joseph Pilates's workouts help to increase endurance. The exercises can be difficult and graded according to the individual's abilities. Pilates exercise uses a variety of exercises to build incredible strength and tone in the body. Focusing on completing each person's specific body weight, repetition, workout, and sequence improves concentration and endurance.

3.6.6 The health benefits of Pilates include:

- Improvement in flexibility
- Improved muscle strength and tone, especially in your lower back, hips, and buttocks (the body's "core muscles")
- Balanced muscular strength on both sides of your body
- Better control over your back and limbs' muscles
- Increased spine stabilization
- Better posture
- injury prevention or treatment for injuries caused by muscular imbalances
- Enhanced physical balance and coordination
- Relaxed upper back, neck, and shoulders.
- Safe joint and spinal injury rehabilitation
- Musculoskeletal injury prevention
- Deep breathing increases lung capacity and circulation
- Better concentration
- Improved bodily awareness
- Stress reduction and relaxation.

3.7 Principles of Pilates Exercise:

Joseph Pilates built his method on six primary principles like Centering, control, flow, breath, precision, and concentration. Pilates exercises consists of exercises that flow into each other at a controlled pace, that progress from smaller to larger movements, from lying on a mat to standing on it, always with an awareness of the correct alignment of the body.

3.7.1 Breathing:

“Breathing is the first act of life, and the last. Our very life depends on it. Since we cannot live without breathing it is tragically deplorable to contemplate the millions and millions who have never learned to master the art of correct breathing. This is so patently obvious. Our own instructional cues emphasize it greatly. Our reading of his words would place breathing first among the six, even if it weren’t already first in alphabetical order.”¹ Even in Joseph Pilates’s original exercise instructions you will find extra ordinary emphasis that students should use very full and deep breaths. We should expand and contract our lungs in a full, complete and similar way to pump the air fully in and out of the body. The other five fundamentals that are drawn from his words merely underlie all subsequent fitness fundamentals and exercise designs. It is more valuable to understand how these six principles integrate with one another and, in total, account for the great effectiveness of Pilates’ exercises and the resultant combination of strength, grace, balance, and ease that one experiences as a result. The benefits of right breathing include: providing enough oxygen to the blood, releasing toxins, improving blood circulation, relaxing the mind and body, and improving concentration. Work as a rhythm for movement, activates the targeted muscles.

3.7.2 Centering:

“Centering represents the act of drawing your own mental and physical focus during each exercise to the core, or center (often called the ‘powerhouse’, of your body.) This is roughly the area between your lower ribs and hips, although it also includes the lower and upper back muscles.”²

3.7.3 Concentration:

Concentration simply refers to paying attention to the nuances and details of each Pilates exercise. Bring your complete attention to the motions of each exercise in order to get the most out of them. The words of Pilates are “Concentrate on the correct movements each time you

1. Pilates, H. Joseph, and William John Miller. “Pilates’ Return to life through Contrology.

2. Geweniger, V. & Bohlander A, Pilates-A teachers’ manual: Exercises with mats and equipment for prevention and rehabilitation.

exercise, in case you do them improperly and thus lose all the vital benefits of their value. Correctly executed and mastered to the point of subconscious reaction, this exercise will reflect grace and balance in your routine activities. Contrology exercises build a sturdy body and sound mind fitted to platform every daily task with ease and perfection as well as to provide tremendous reserve energy for sports, recreation, emergencies.”¹ Pilates returns over and over again to the body and mind connection.

3.7.4 Control:

“Control represents the concept that it is your mind that directs and manages each separate muscular movement. Be certain that you have your entire body under complete mental control, good posture can be successfully acquired only when the entire mechanism of the body is under perfect control.”²

3.7.5 Flow:

“It is just a lovely word that has been extracted from Pilates’ writings about Pilates’ exercise that can and should be done in a flowing manner, with the goals of fluidity, elegance, and grace. The intention is that the energy one exerts during each exercise should connect all body parts smoothly and thereby flow evenly through your body.”³ each movement of Pilates exercise should be smooth and graceful like a classical dance form.

3.7.6 Precision:

Precision is the final fundamental principle. Whatever exercise is performed, it must be precise and accurate. Original teachings from Pilates and step-by-step instructions for each moving part of the body always precise in their positioning, alignment, and trajectory. Performing an exercise with at most accuracy is more important than doing so many repetitions with mistakes.

3.8 Different basic positions to be maintained throughout of Pilates exercise:

In the same way as Bharatanatyam has basic stance araimandi, the Pilates method too has some fundamental stances to hold throughout the practice.

3.8.1 Neutral position:

When lying on your back with one or both feet on the mat, you are in neutral posture when you maintain the natural curve of your spine.

1. Pilates, H. Joseph and William John Miller, “Pilates’ Return to life through Contrology.
2. Pilates, H. Joseph and William John Miller “Pilates’ Return to life through Contrology.
3. Pilates, H. Joseph and William John Miller “Pilates’ Return to life through Contrology.

3.8.2 Imprinted position:

You squeeze your navel against your spine in imprinted position. This exercise flattens your abdominal wall while also lengthening and strengthening your lower-back muscles.

3.8.3 C-Curve:

When you scoop in your stomach, the form of your back and spine is described as a C-curve. In the process, you will be stretching the muscles that surround your spine.

3.8.4 Tabletop:

Most of the Pilates routines begin with a tabletop position. Knees should be 90 degrees bent as you lie on your back with your legs lifted. Your shins ought to be parallel to the ground.

3.8.5 Stacking:

Stacking in Pilates refers to aligning portions of your body, such as your hips, one on top of the other while lying on your side.

3.8.6 Peeling the spine:

Peeling the spine means rolling it vertebra by vertebra.

3.9 The Classics:

The explanation of 34 exercises invented by Joseph Pilates are listed below, along with rare photographs of Joseph Pilates himself. Remember that the quality of your movement while exercising is always more essential than any numeric aiming.

1. Instructions for "The Hundred"

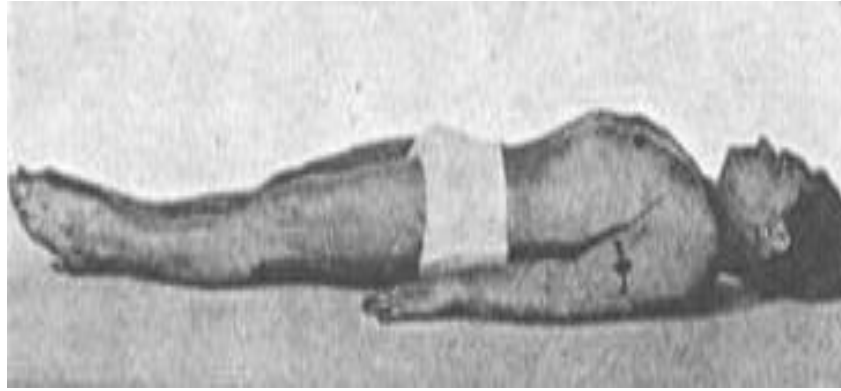


Fig. 3.9

Pose One (Fig. 3.9)

- (1) Take the position shown
- (2) Lie down on your back use a mat or on the floor.
- (3) Stretch your arms out straight in front of you, shoulder-width apart, palms down.
- (4) Stretch your legs (keeping them together and locked)
- (5) Pointing your toes forward and downward

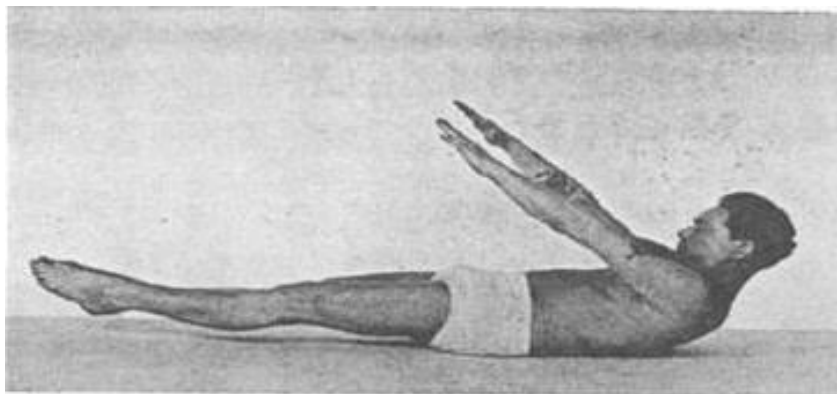


Fig. 3.10

Pose Two (Fig. 3.10)

- (1) Slowly inhale
- (2) Raise both feet by about 2 inches off the mat or floor.
- (3) Lift your head and look at your toes.
- (4) Raise both arms 6 to 8 inches above the thighs.

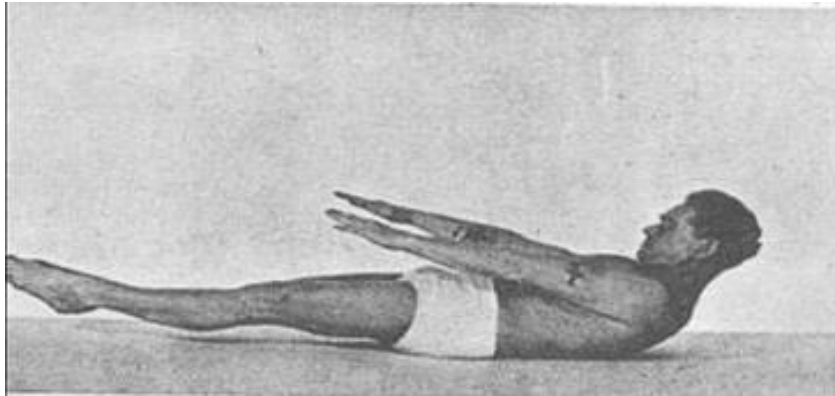


Fig.3.11

Pose Three (Fig. 3.11)

- (1) Slowly exhale
- (2) (Stiffened) Raise and lower both arms
- (3) Only from the shoulders
- (4) Do not touch your body
- (5) Within a radius of 6 to 8 inches
- (6) Count five mentally and
- (7) Slowly exhale
- (8) Alternating between 5 similar counting
- (9) Slowly inhale
- (10) Start with 20 movements only.
- (11) Increase them gradually in units of 5.
- (12) Every 5 additional counts, until a
- (13) 100 counts maximum
- (14) Do not exceed 100 counts

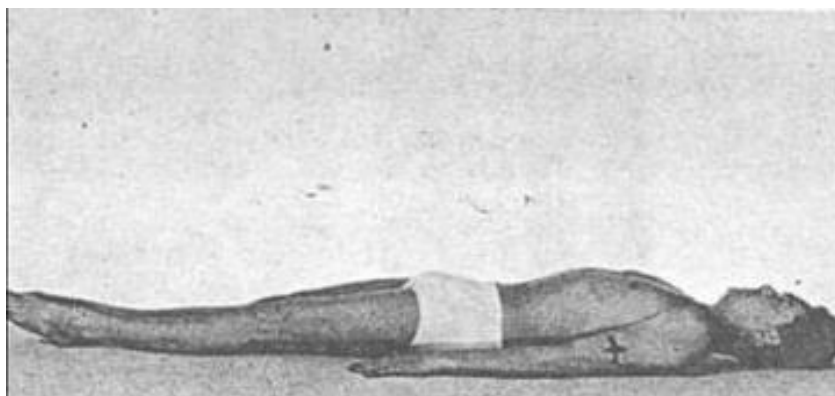


Fig 3.12

Pose Four (Fig.3.12)

- (1) Fully relax

Remarks:

This explains why these workouts and all others will help you because at first you probably won't be able to follow directions as shown in poses. However, with time and effort, you should finally succeed in realizing the aforementioned goals, along with normal health.

2. Instructions for "The Roll Up"

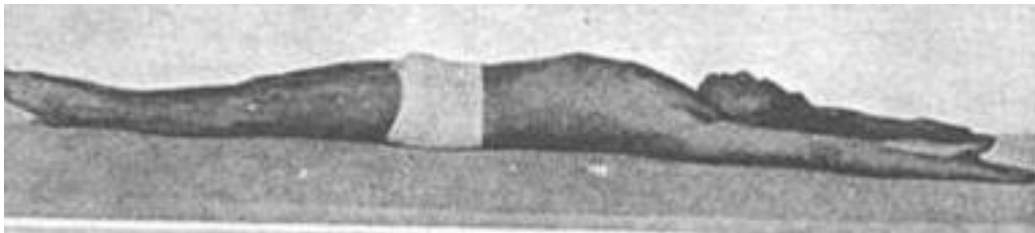


Fig.3.13

Pose One (Fig.3.13)

- (1) Lay flat with your entire body lying on a mat on the ground.
- (2) Arms extended (shoulders apart, palms up) straight-backward
- (3) Legs stretched with knees locked and close together
- (4) Pointing your toes forward and downward, extend them.

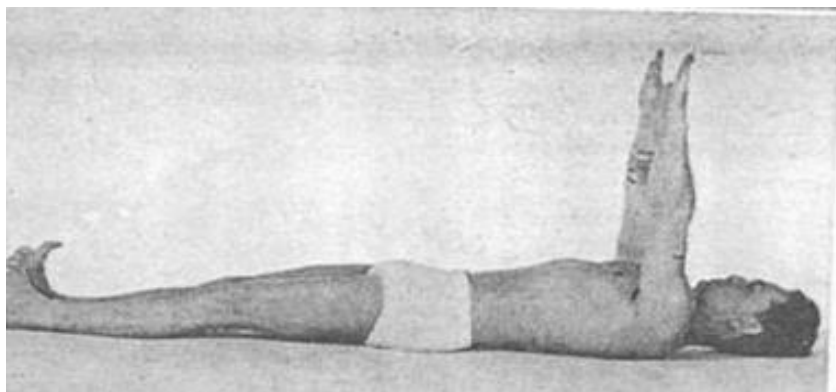


Fig.3.14

Pose Two (Fig.3.14)

- (1) Taking a steady, deep breath, raise your arms into a straight, right-angle position, shoulder-width apart.
- (2) Toes upward pointed

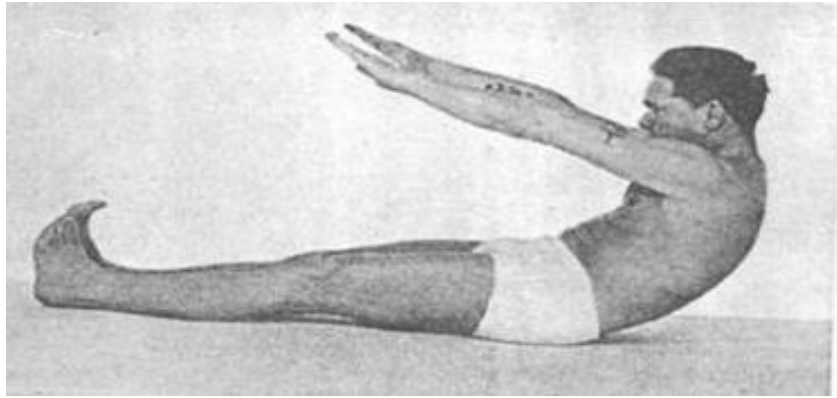


Fig.3.15

Pose Three (Fig.3.15)

- (1) Slowly inhale
- (2) Forward and downward head bending till
- (3) Chin gently touches chest and then
- (4) Start slowly exhaling, and
- (5) Begin to move steadily upward and forward, vertebra by vertebra

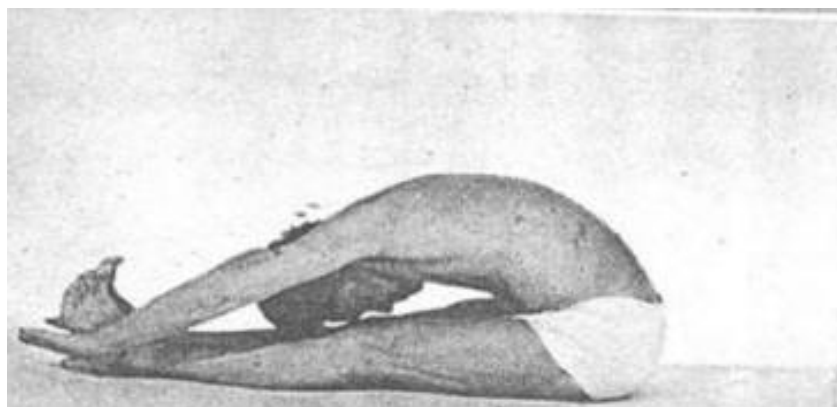


Fig.3.16

Pose Four (Fig.3.16)

- (1) Slowly breathe out
- (2) Rolling forward till
- (3) Forehead touching the legs
- (4) Inhale slowly and return to pose 3,2,1

Note:

Repeat the above exercise three (3) times, attempting to extend the entire body more and more with each repetition, as well as reach further and further straight ahead as instructed.

Cautions:

Pose One - The entire spine must make contact with the mat or the floor. Tense your body (don't bend your arms or legs).

Pose Three - Press both legs against the mat or floor; if this is difficult at first, adding a cushion under your feet will help.

Pose Four - Legs must remain flat on the mat (knees locked) and palms must remain flat on the mat (arms stretched straight ahead).

Remarks:

This exercise improves the abdominal muscles while also restoring the spine to its proper position.

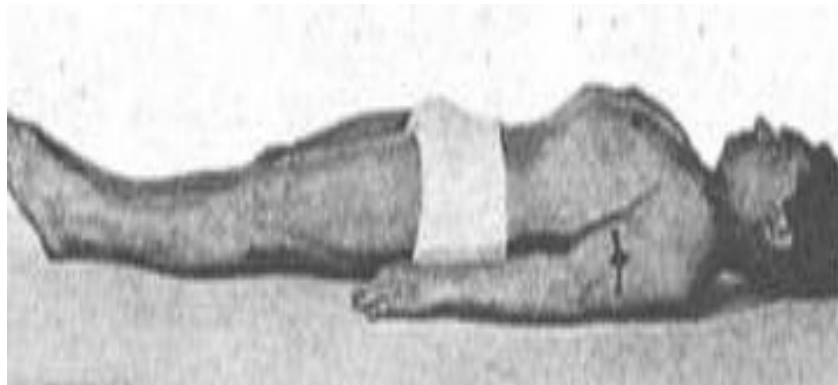
3. Instructions for "The Roll-Over"

Fig.3.17

Pose One (Fig.3.17)

- (1) Take the position shown
- (2) Lay flat on a mat.
- (3) straighten your arms so that they are shoulder-width apart and contacting your body.
- (4) Stretch forward
- (5) Stretch toes (pointed)



Fig.3.18

Poses Two-Three-Four (Fig.3.18, Fig.3.19, Fig.3.20)

(1) Slow inhalation

(2) Legs should be raised up



Fig.3.19

(3) Toes make contact with the floor.

(4) Gently exhale

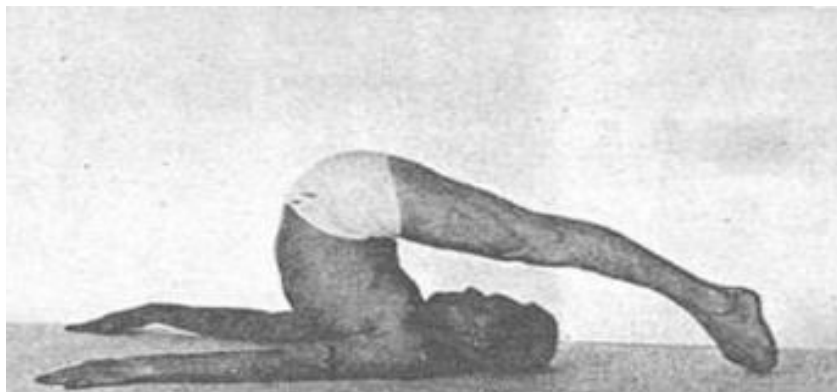


Fig.3.20

- (5) Put your arms firmly down on the mat.
- (6) Legs should be spread as widely as attainable. (Fig.3.20)

Poses Four-Three-Two (Fig 3.21, Fig. 3.22, Fig. 3.23)

- (1) Take breath slowly and



Fig 3.21

- (2) Start "rolling" downward gradually using
- (3) Straightening and spreading both legs as far apart as possible



Fig. 3.22

- (4) Until the spine touches the mat or floor.
- (5) Slowly breathe out

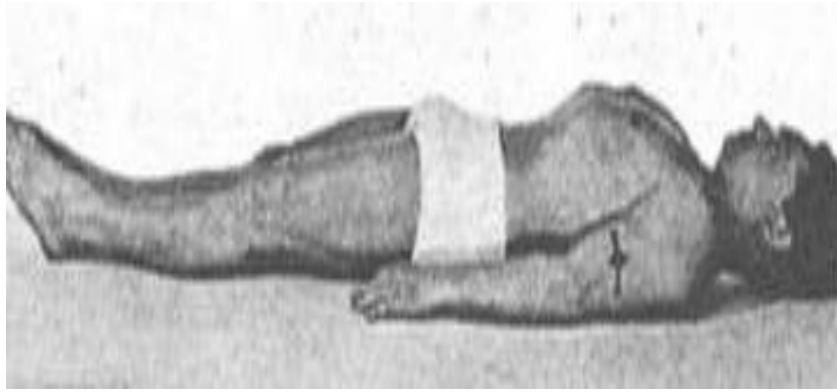


Fig. 3.23

Pose One (Fig. 3.23)

- (1) Come in position one
- (2) Legs should be two inches above the mat

Cautions:

Pose Three - Keep your legs as apart as you can (tight, knees locked). Roll from one vertebra to the next slowly and downwards.

Pose Four- Hold your head and back firmly against the mat.

4. Instructions for "The One Leg Circle"



Fig.3.24

Pose One (Fig.3.24)

- (1) Lie flat with your entire body resting on a mat.
- (2) Arms must be straight and stretched forward (shoulder-width, touching body, palms down).
- (3) Raise your right leg and move it in a circle to the right side.
- (4) Point your toes forward and downward.
- (5) Left toes up

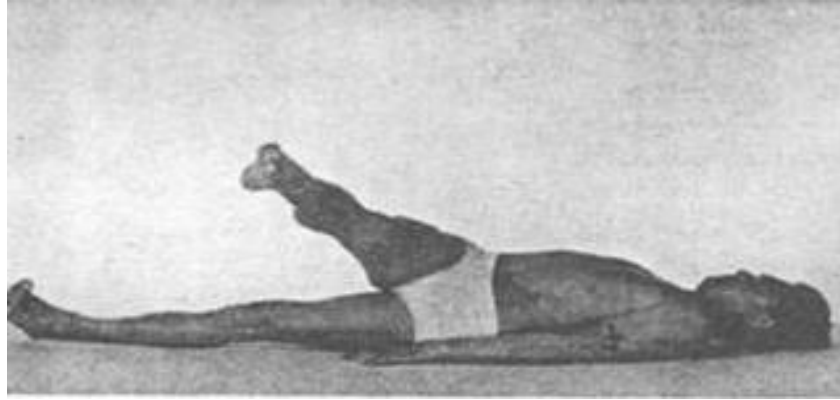


Fig.3.25

Pose Two (Fig.3.25)

- (1) After that, exhale and lower your leg to complete the circle over your left thigh.
- (2) When starting the upward motion with the right leg to complete the circle, softly inhale.
- (3) Start exhaling when you bring your left leg downwards, drawing a complete right to left circle in the air over the right thigh.
- (4) Softly inhale, when starting the upward motion with the left leg to complete the circle.

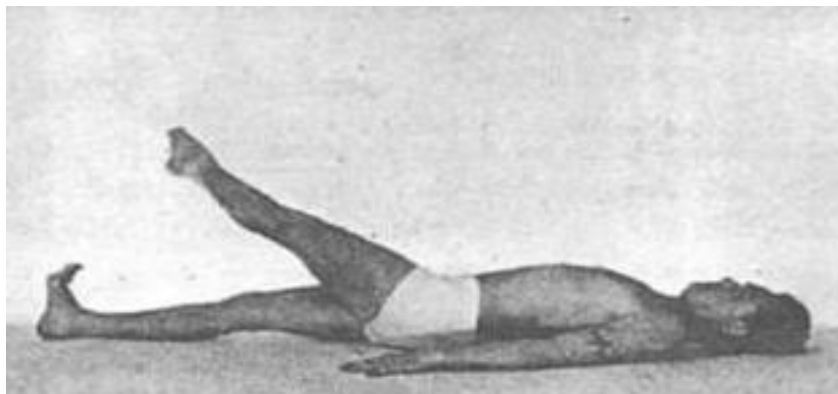


Fig.3.26

Pose Three and Four (Fig. 3.26. Fig. 3.27)

- (1) At the beginning of the upward motion, gently inhale while moving the left leg in a complete right-to-left circle over the right ankle.
- (2) To finish this circle, start a gentle exhalation as you drop your left leg with control.

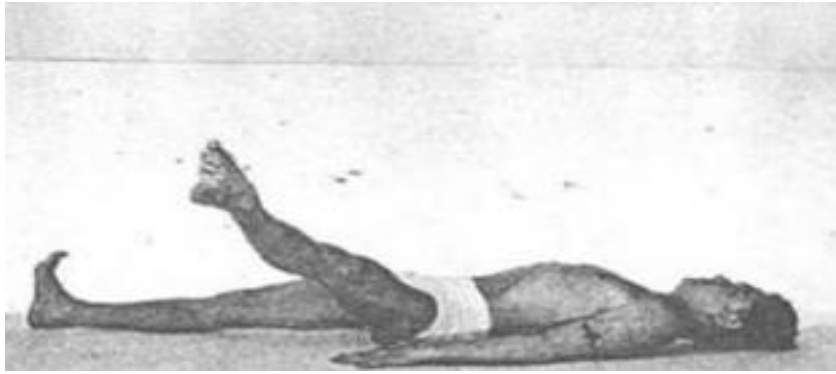


Fig.3.27

(3) When forming a complete left-to-right circle (in the air) over the left ankle, slowly begin to inhale at the beginning of the upward motion with the right leg.

(4) To finish this circle, start a gentle exhalation as you drop your right leg with control.

Note:

Repeat the aforementioned exercise, five times with each leg.

Cautions:

Pose One - Right leg: Toes must be pointing forward and downward (knee locked). Keep your left leg straight (knee locked) on the mat or floor with your toes pulled up and backward. Always keep your shoulders and head flat on the mat.

Pose Two- Similar to Pose 1, but take note of the elevated right hip.

Pose Four- Similar to Pose 2, however take note to the elevated left hip. When making circles, "swing" the left and right legs as far as you can. Always keep your shoulders and head flat on the mat or floor.

5. Instructions for "Rolling Back"



Fig.3.28

Pose One (Fig.3.28)

- (1) Take the position shown



Fig.3.29

Pose Two (Fig.3.29)

- (1) Firmly grasp the legs with the arms locked.
- (2) Try to bring your thighs up to your chest.
- (3) Head should bend forward and downward, chin should touch chest.
- (4) Forward and downward-pointing toes
- (5) Slow inhalation
- (6) "Rock" backward into Pose 3.



Fig.3.30

Pose Three (Fig.3.30)

- (1) Inhale slowly as you



Fig.3.30

(2) Return to pose two

Note:

Six times repetition of the exercise.

Cautions:

Pose Two – Keep your feet off the mat or floor and tuck your chest in, round your back, and keep your head down.

6. Instructions for "The One Leg Stretch"

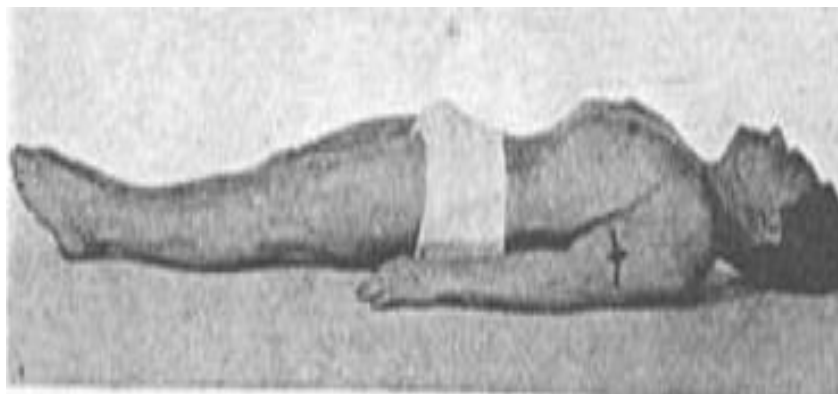


Fig.3.31

Pose One (Fig.3.31)

(1) Entire body on the floor in resting position

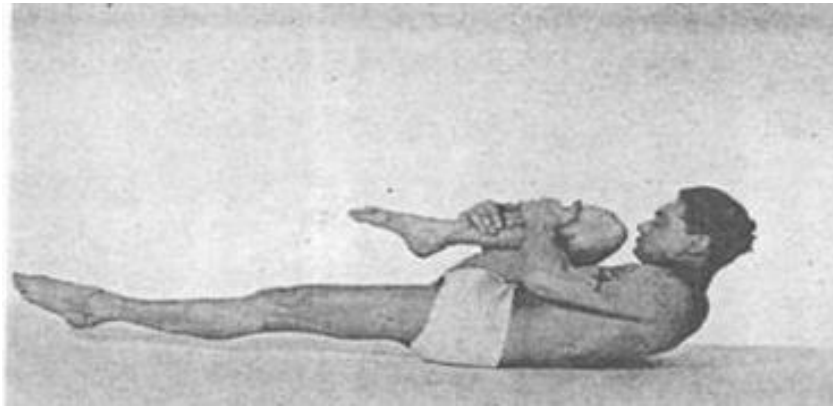


Fig.3.32

Pose Two (Fig.3.32)

- (2) Forward head-bend till
- (3) Chest and chin make contact.
- (4) Hold hands as you slowly inhale and
- (5) As far as you can, pull your right leg towards your chest.
- (6) Keep your left leg extended and locked at the knee.
- (7) Stretch your (pointing) toes forward and downward as you
- (8) Raise your heel about two inches

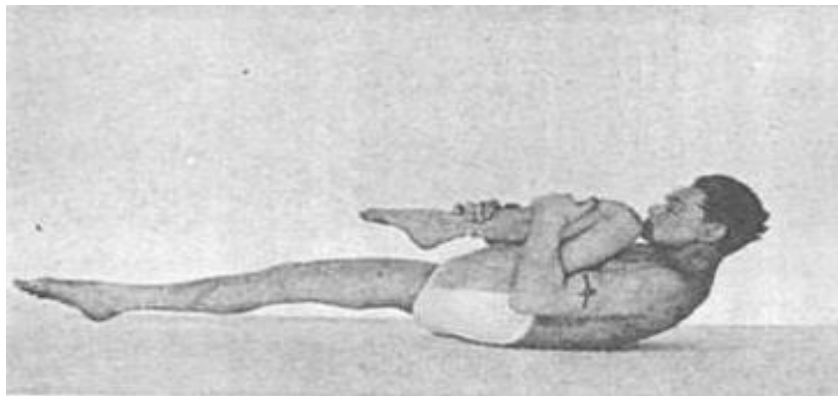


Fig.3.33

Pose Three (Fig.3.33)

- (1) As you slowly exhale
- (2) By using your hand pull the left leg as close to the chest as you can.
- (3) Keep your right leg extended and locked at the knee.
- (4) Stretch heels up two inches and toes pointing forward and downward

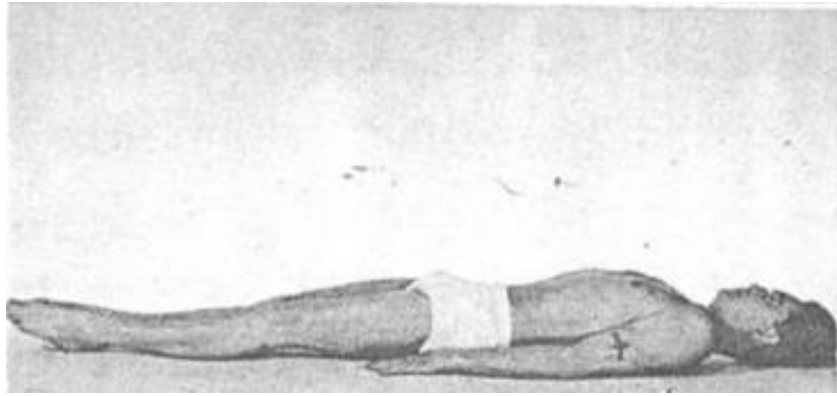


Fig.3.34

Pose Four (Fig.3.34)

(1) Return to pose one

Cautions:

Pose Two - Chest and chin must touch. Your toes must be visible. You must lift your heels two inches

7. Instructions for "The Double Leg Stretch"

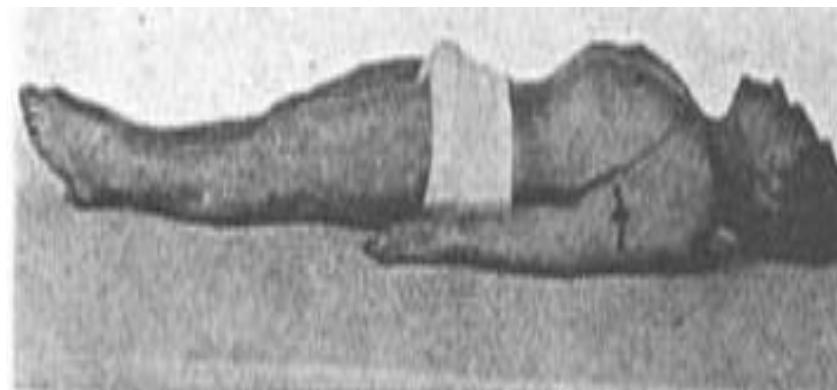


Fig.3.35

Pose One (Fig.3.35)

(1) Take the position shown and place your entire body, including your legs, on a mat. straight ahead with locked knees

(2) Arms extended straight forward beside body, palms downward, toes pointing forward and downward.

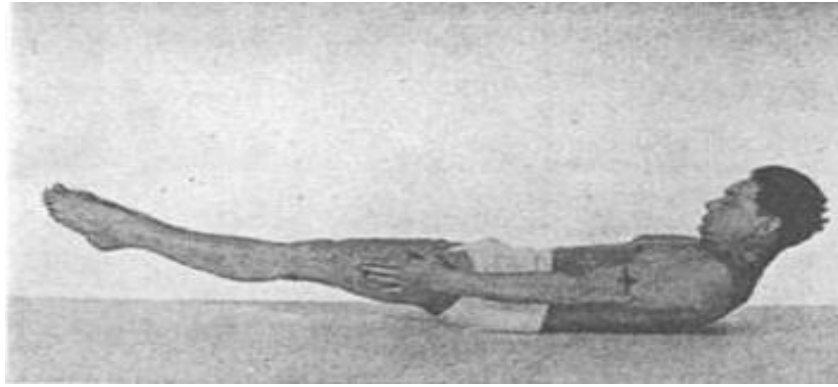


Fig.3.36

Pose Two (Fig.3.36)

- (1) Breathe slowly Head held high with chin to chest, arms straight front and firmly pressed against thighs.
- (2) Heels raised about 2" off mat or floor Raise your heels around two inches above the ground or mat
- (3) Palms facing inward

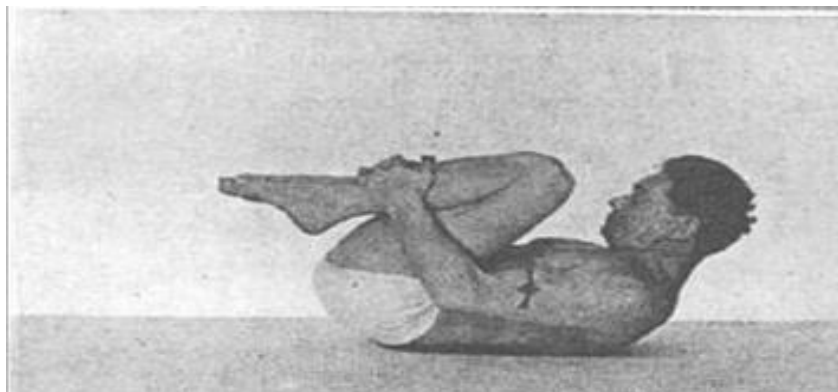


Fig.3.37

Pose Three (Fig.3.37)

- (1) Draw both legs up and forward as you slowly exhale.
- (2) Pull your legs towards you and firmly press them against your chest with locked wrists holding them in the "doubled-up" position as shown.

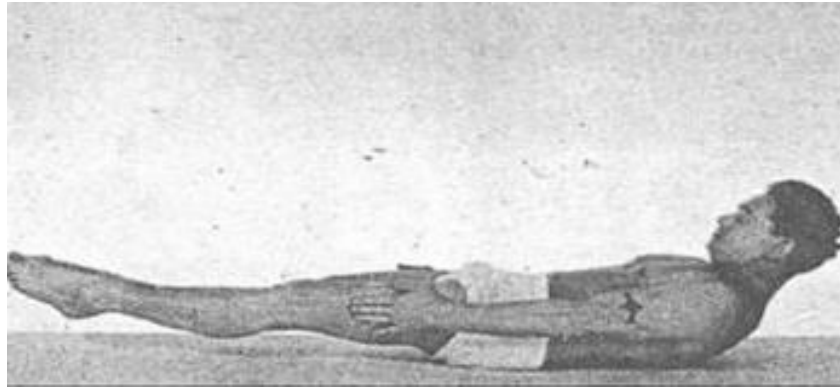


Fig 3.38

Pose Four (Fig 3.38)

(1) Slow inhalation

Note:

The previous exercise should be repeated six times. Later, to twelve.

Cautions:

Pose 2 Head was firmly resting against chest, belly in, heels are roughly 2 inches off the mat.

8. Instructions for “The Spine Stretch”

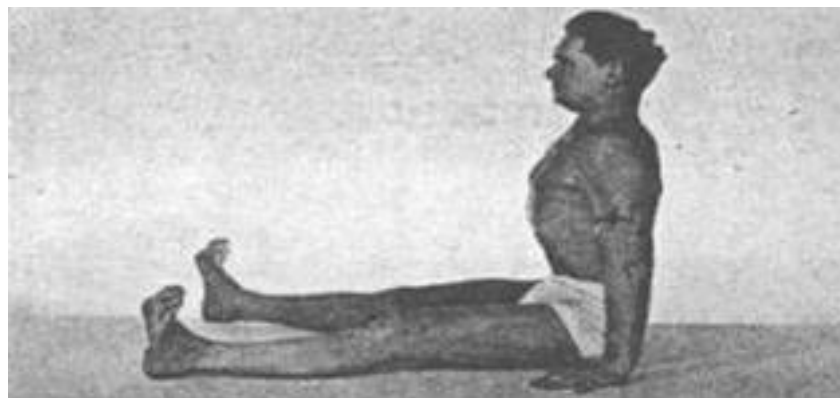


Fig.3.39

Pose One (Fig.3.39)

(1) Put yourself in the position shown, then spread your legs as widely as you can.

(2) Stretch your toes (pointed) upward and backward

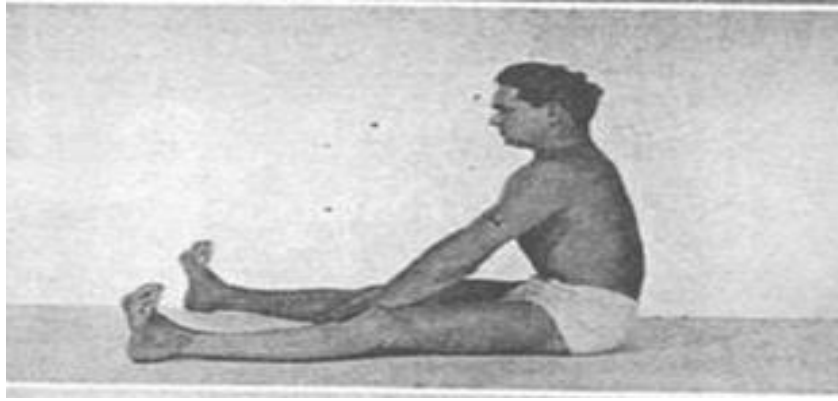


Fig.3.40

Pose Two (Fig.3.40)

(1) Rest your palms flat on the mat or floor, then extend your arms out in front of you while keeping your chin in contact with your chest.



Fig.3.41

Pose Three (Fig.3.41)

(1) Take stance illustrated

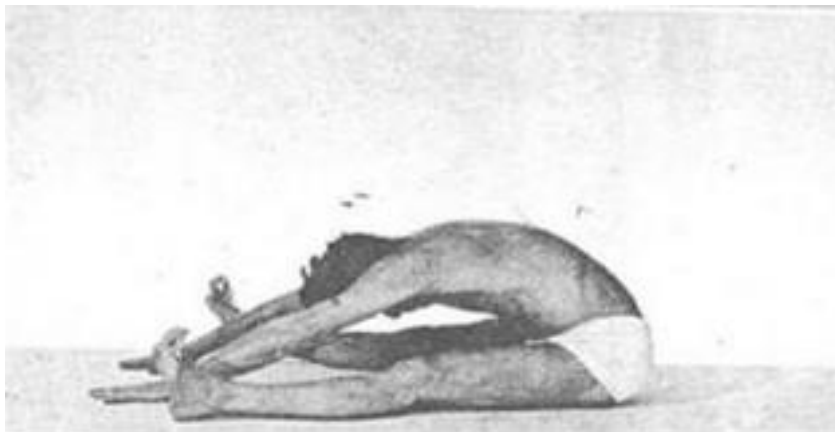


Fig.3.42

Pose Four (Fig.3.42)

(1) Reach forward as far as you can in three successive "Sliding" motion-stretching actions until you are in the position shown in Poses 3 and 4.

Note:

The aforementioned exercise should be repeated three (3) times, each time attempting to extend, reach as far forward as possible.

Cautions:

Pose Four - With the chin pressed firmly against the chest and the abdomen "drawn" in, keep breathing gently.

9. Instructions for "The Rocker with Open Legs"

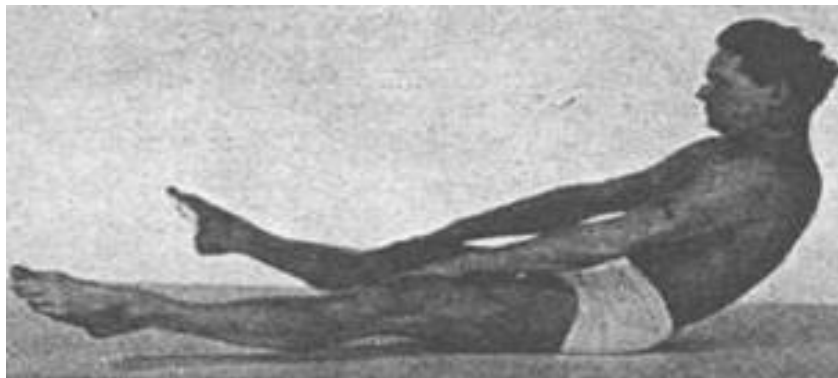


Fig.3.42

Pose One (Fig.3.42)

(1) Take the position shown



Fig.3.43

Pose Two (Fig.3.43)

- (1) Knees bend and take a slow, deep breath.



Fig.3.44

Pose Three (Fig.3.44)

- (1) Spread legs as far up and out as you can, holding ankles firmly toes pointed forward and downward (knees locked)
- (2) Keep chin resting on chest and abdomen "drawn" in as much as you can.



Fig.3.45

Pose Four (Fig.3.45)

- (1) Gently exhale and lean back, attempting to contact the mat with your toes.

Note:

The previous rocking practice should be repeated six times backward and forward.

Cautions:

Pose Three - Arms and legs are stiff (elbows and knees are locked). "Pivot" on the base of the spine, rocking backward to Pose one, then rock forward, pressing head firmly on chest and arms firmly forward against legs until you reach Pose three and try to balance yourself there.

10. Instructions for “The Cork-Screw”

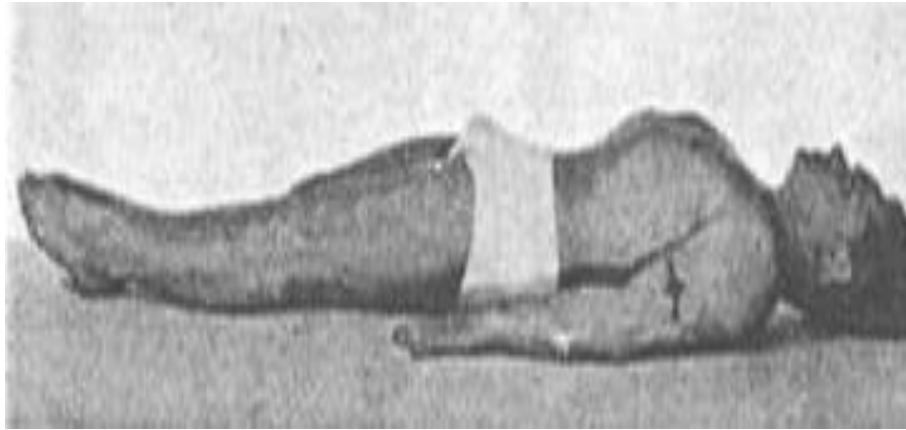


Fig.3.46

Pose One (Fig.3.46)

- (1) Perform the position presented, the entire spine must be supported by a mat, straight forward arms contacting the body hands and palms down



Fig.3.47

Pose Two (Fig.3.47)

- (1) Inhale and steadily raise your legs (close together) "rolling" upward till you reach your goal.
- (2) Body supported by shoulders, arms, and head, with knees locked and toes directed front and downward.



Fig.3.48

Pose Three (Fig.3.48)

- (1) Exhale slowly drop both legs together, but not to the mat or the floor with the knees locked.
- (2) Forward and downward pointing toes
- (3) Twist trunk 'corkscrew' style until body is partially dropped to mat on right side.

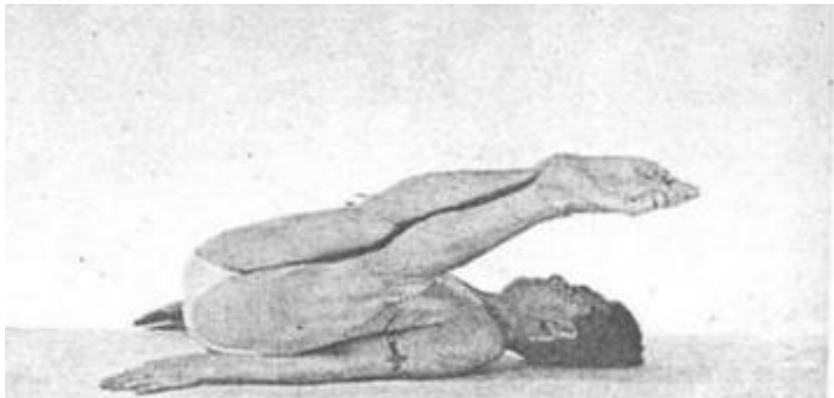


Fig.3.49

Pose Four (Fig.3.49)

- (1) Inhale slowly and make a complete right-to-left circle upward as far as you can before returning to Pose 2.



Fig.3.50

Pose Three (Fig.3.50)

- (1) Exhale gently, then drop both legs together but not to the mat, keeping the knees locked.
- (2) Toes forward and downward, twist trunk 'corkscrew' style until body is halfway lowered to mat on left side.

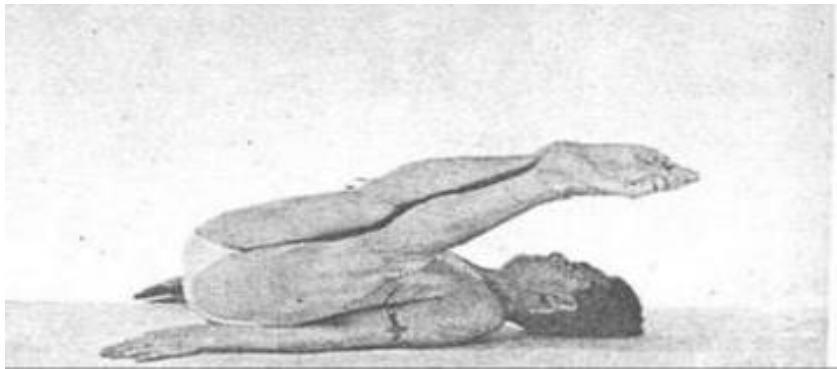


Fig.3.51

Pose Four (Fig.3.51)

- (1) Inhale slowly, then make a complete left-to-right circle upward as far as possible before returning to Pose 2.
- (2) Return to pose two

Note:

Repeat the preceding exercise three times each.

Cautions:

Pose three and Pose four - While circling, maintain your shoulders firmly to the mat and your arms straight.

Remarks:

This workout helps to strengthen the neck and shoulders while also providing an internal and spinal massage.

11. Instructions for “The saw”

Fig. 3.52

Pose One (Fig. 3.52)

(1) Position yourself as shown, with your legs as wide apart as possible, your head up, your chin "drawn" in, and your chest out.

(2) Abdomen drawn in and arms (shoulder height) squeezed backward till shoulder blades lock and slowly inhale



Fig. 3.53

Pose Two (Fig. 3.52)

(1) Twist the body to the right as far as possible (from the trunk only).

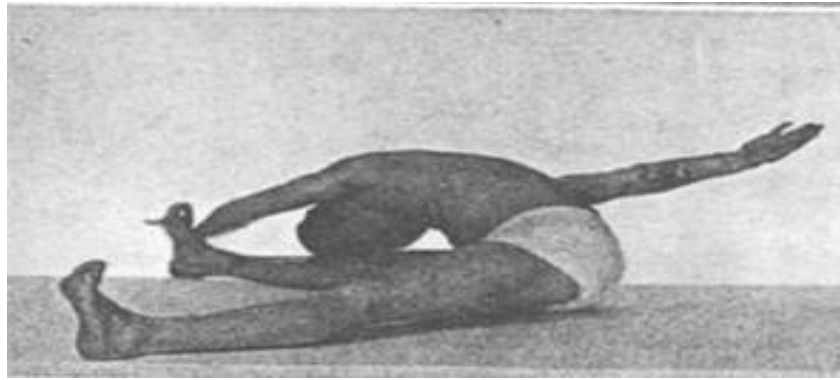


Fig. 3.54

Pose Three (Fig. 3.54)

- (1) Bend forward and downward as far as you can till you reach
- (2) The left hand crosses the right foot and rests diagonally and centrally on it.
- (3) Slowly exhale while
- (4) Stretching the body forward in three sequential sliding motions as far as possible in "saw-like" motions.



Fig. 3.55

Pose Four (Fig. 3.55)

- (1) Return to the stance shown in this pose and inhale slowly.



Fig. 3.56

Pose Two (Fig. 3.56)

(1) Twist the body to the left as far as possible (from the trunk only).



Fig. 3.57

Pose Three (Fig. 3.57)

(1) Bend forward and downward as much as you can till your right hand crosses diagonally and centrally on your left foot.

(2) Exhale gently while stretching your body forward in three sequential sliding motions as far as you can in a "saw-like" motion.

Note:

Repeat the preceding exercise three times.

Cautions:

Pose two - As in Pose three, rotate your body before bending forward.

Pose three – As shown in this stance, elevate the lifted arm backward and upward as high as possible.

12. Instructions for “The Swan Dive”

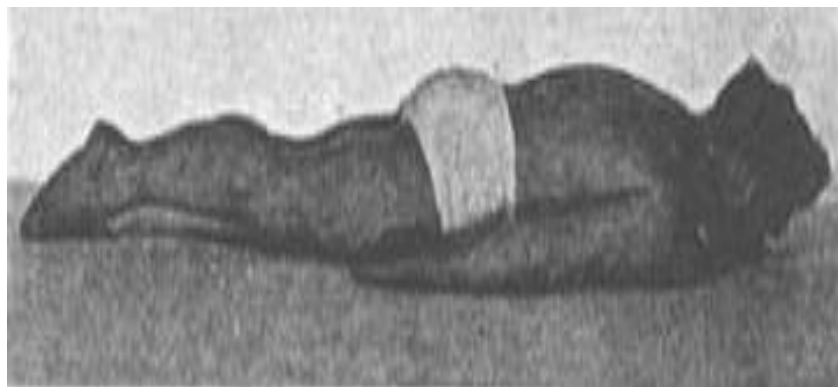


Fig.3.58

Pose One and Pose Two (Fig.3.58, Fig.3.59)

Hold the following stance:

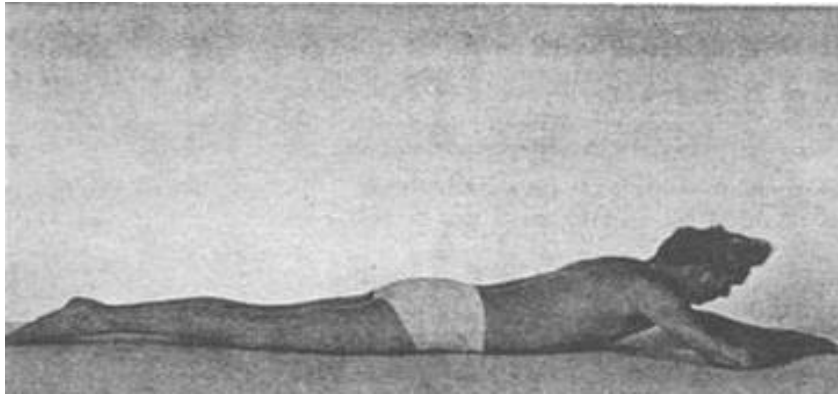


Fig.3.59

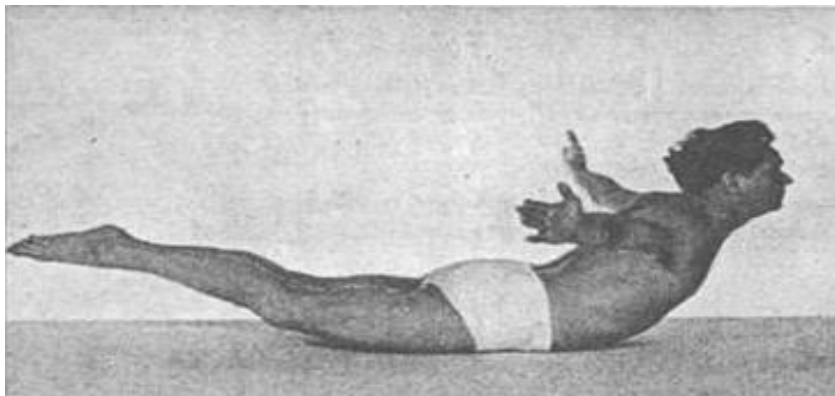


Fig.3.60

Pose three (Fig.3.60)

- (1) Inhale slowly, raising your head upward and backward as far as possible', and raising your chest high off the mat.
- (2) Lift arms forward and sideward in line with locked shoulders, turn palms upward (right to left), then extend and lift legs together off mat.
- (3) Body tight, back locked, toes (pointed) forward and downward (knees locked).

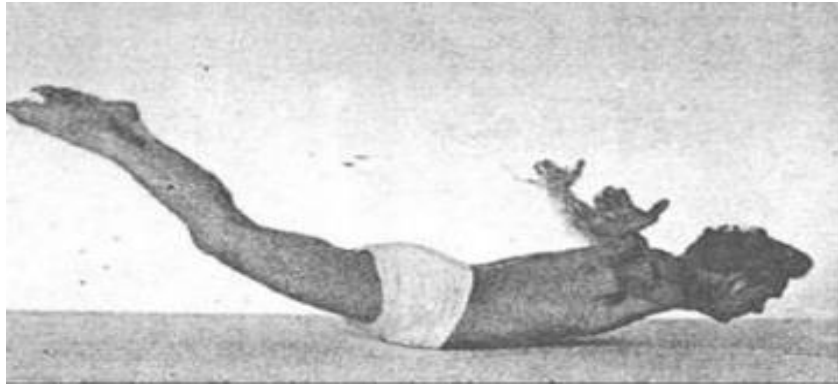


Fig.3.61

Pose Four (Fig.3.61)

(1) Exhale gently as you "rock" forward, and inhale gently as you "rock" upward.

Note:

Do the previous "rocking" exercise six times.

Cautions:

Pose Three- Keep your back tight, your legs off the mat or floor, your head back, your arms rigid, and your shoulders locked.

13. Instructions for “The One Leg Kick”

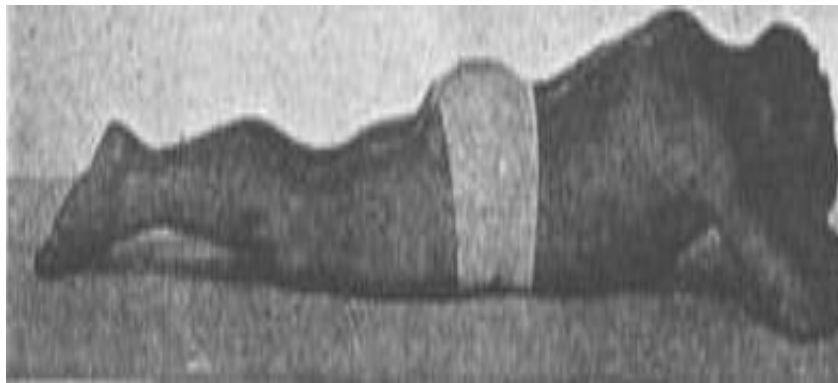


Fig.3.62

Pose One (Fig.3.62)

(1) Take the indicated stance with your arms stretched backward, firmly pressed to your sides, fists clenched, face down, and

(2) Chin on the mat or floor, toes forward and downward, knees locked

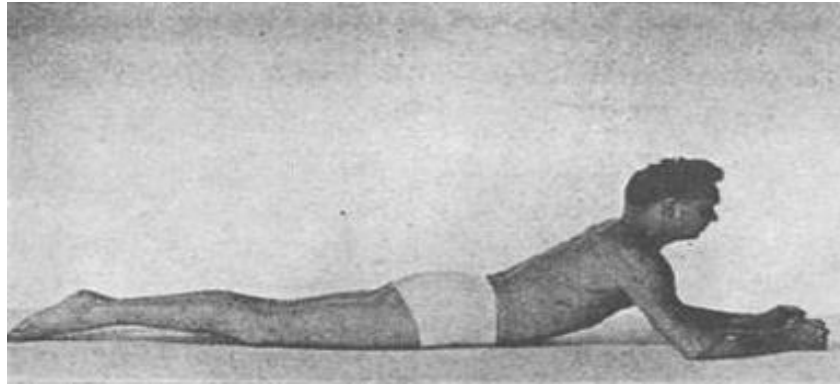


Fig.3.63

Pose Two (Fig.3.63)

- (1) When lying on your stomach, lift your head, your chest and your arms into a straight angle.
- (2) Fists clasped, stretch legs backward straight, knees locked, toes pointing forward and downward, resting on mat.

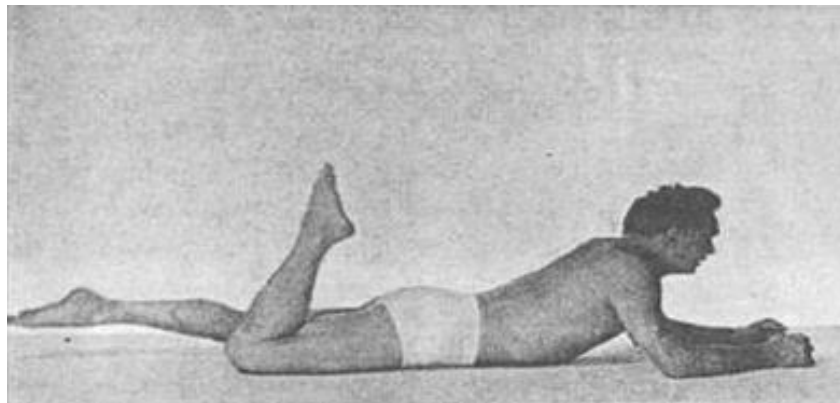


Fig.3.64

Pose Three (Fig.3.64)

- (1) Inhale gently and aim to snap-kick the right leg's heel to the buttocks by raising your legs about two inches off the mat or floor.

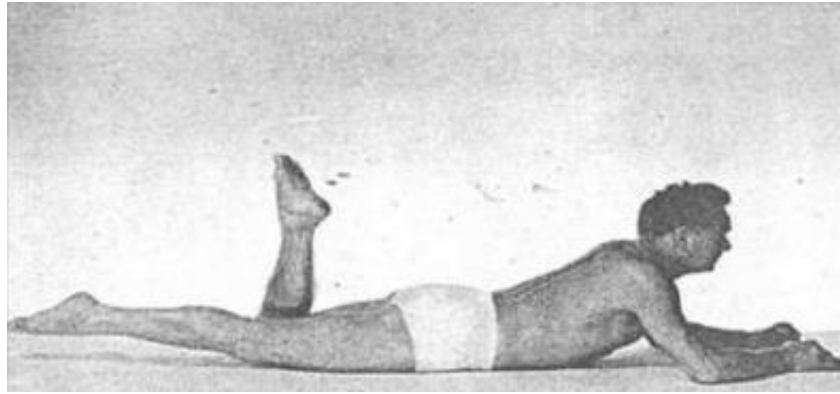


Fig.3.65

Pose Four (Fig.3.65)

- (1) Slowly exhale while extending right leg backward and bringing the heel of left leg forward.
- (2) Kick with the left leg's heel towards the buttocks.

Note:

Right and left, perform the previous exercise six times.

Cautions:

Pose Two- Look up. Chest above mat.

Pose Three- keep your toes (pointing) off the mat.

14. Instructions for “Double kick”

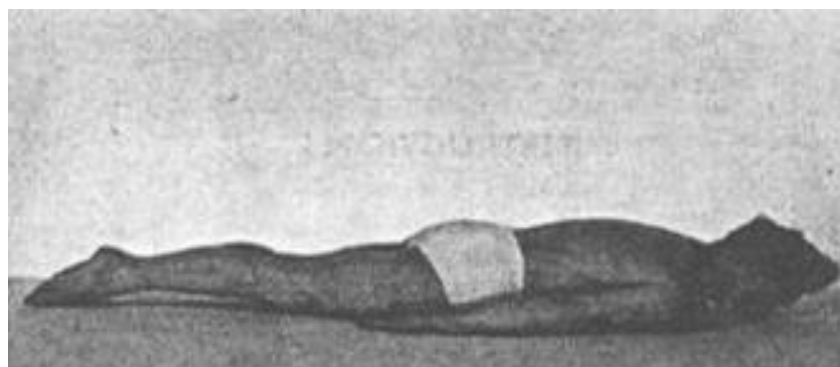


Fig.3.66

Pose One (Fig.3.66)

- (1) Position yourself as shown, lying flat with your head resting on your arms and your legs stretched out straight behind you with your knees locked.
- (2) Forward and downward-pointing toes

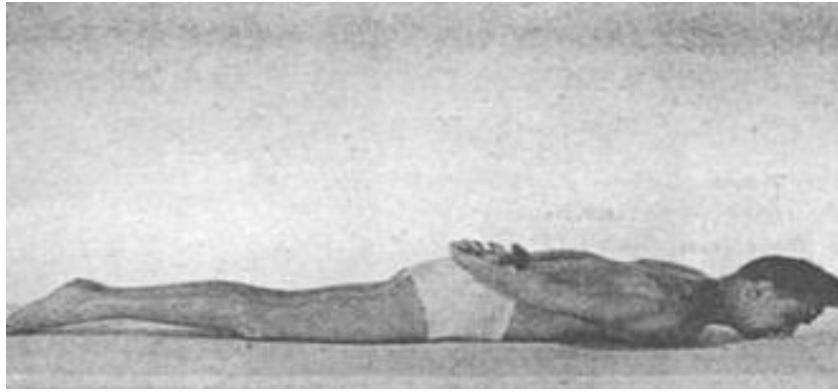


Fig.3.67

Pose Two (Fig.3.67)

- (1) Put your chin on the mat, fold your arms behind you, take hold of the left hand's fingers with the right hand, and extend your legs straight backward with your knees locked.
- (2) Backward and downward toes, lifted about one inch off the mat

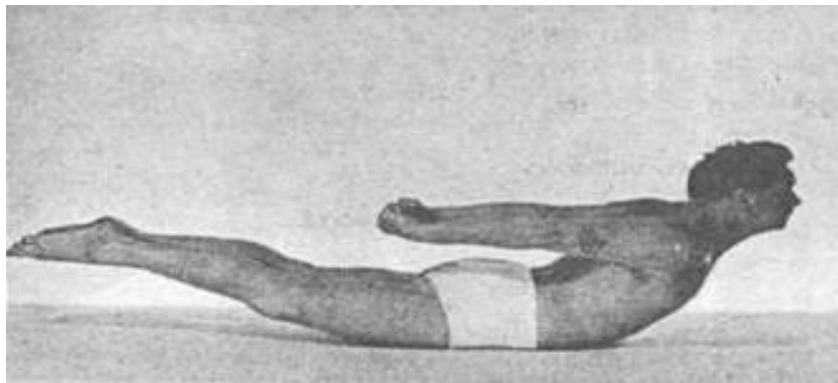


Fig.3.68

Pose Three (Fig.3.68)

- (1) Bring your legs forward to a right angle.

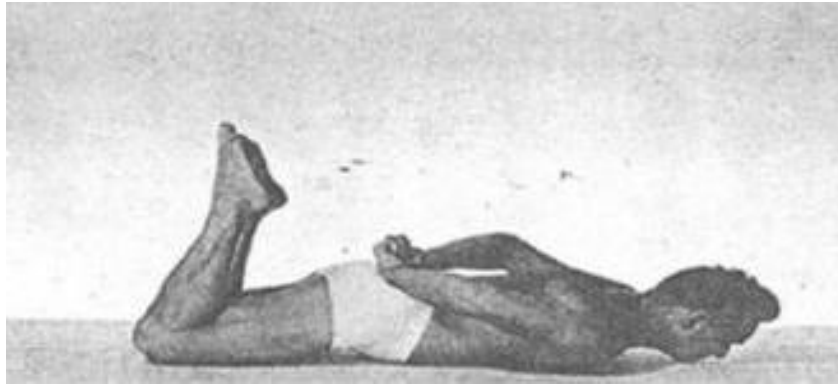


Fig.3.69

Pose Four (Fig.3.69)

- (1) Slowly inhale, push your chest out, and push your head back as far as you can.
- (2) Straight backward, stretched snap-kick legs that are raised off the mat as high as they can go

Note:

Repeat the preceding exercise five times.

Cautions:

Pose Four – Keep your head as high as you can. Stretch your arms back as far as you can without contacting your body.

15. Instructions for “The Neck pull”

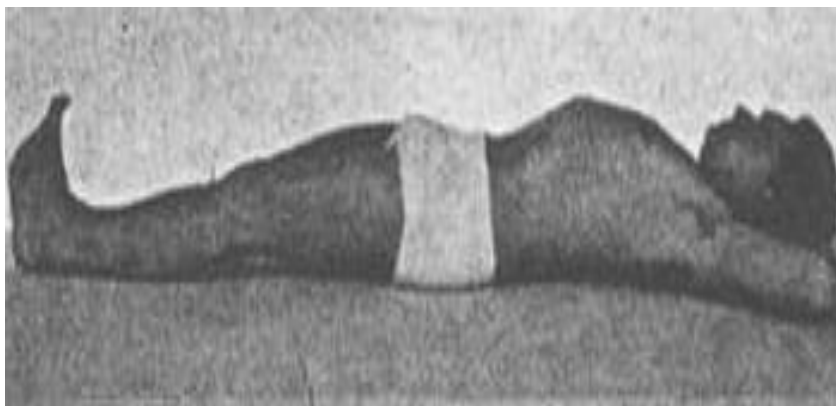


Fig.3.70

Pose One (Fig.3.70)

- (1) Take the illustrated pose and softly inhale.
- (2) Clasp hands behind head (fingers tightly interlaced), toes pointing upward and backward

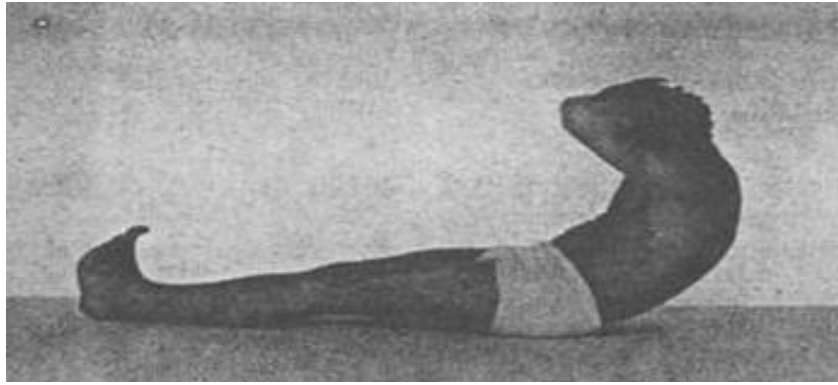


Fig.3.71

Pose Two (Fig.3.71)

- (1) Bend your head forward, your chin contacting your chest, and your abdomen tucked in.
- (2) Toes pointing up, spine bend forward off the mat



Fig.3.72

Pose Three (Fig.3.72)

- (1) Exhale slowly, tensing your muscles, and pressing your legs firmly into the mat.
- (2) Slowly move your body upward and forward to the posture indicated, toes (pointing) up.

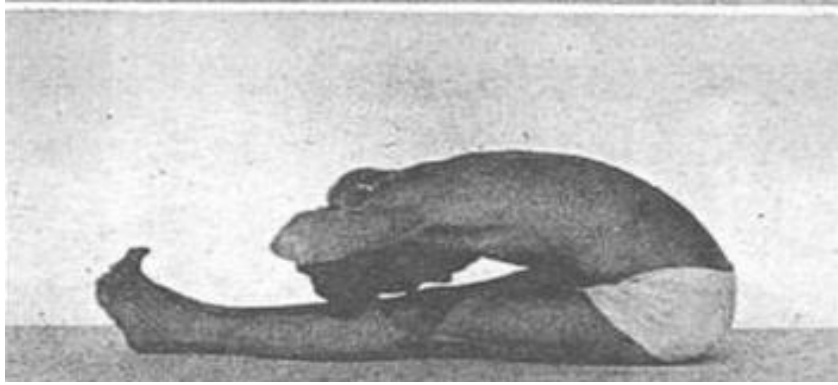


Fig.3.73

Pose Four (Fig.3.73)

- (1) Slow exhalation, bend forward until your head and knees meet, if possible, as shown, hold your elbows straight backward until your shoulder blades lock.
- (2) Return to pose three, slowly inhale and exhale.
- (3) Returning to Pose two and Pose one

Note:

Repeat this exercise three times.

Cautions:

Pose one- maintain toes pointing upward

Pose two- Maintain a strong grip on the mat with your legs (if required, place a cushion on your feet).

Pose four - Straighten your elbows backward until your shoulder blades lock.

16. Instructions for “The scissors”



Fig.3.74

Pose One (Fig. 3.74)

(1) Take the position shown



Fig.3.75

Pose Two (Fig.3.75)

(1) Bring your legs up until, your body is supported by your head, shoulders, upper arms, neck, and elbows.

(2) With hands supporting hips, take a slow inhalation.



Fig.3.76

Pose Three (Fig.3.76)

(1) Legs spread out (knees locked), toes pointing forward and downward, split legs scissors-like (right leg front; left leg backward).

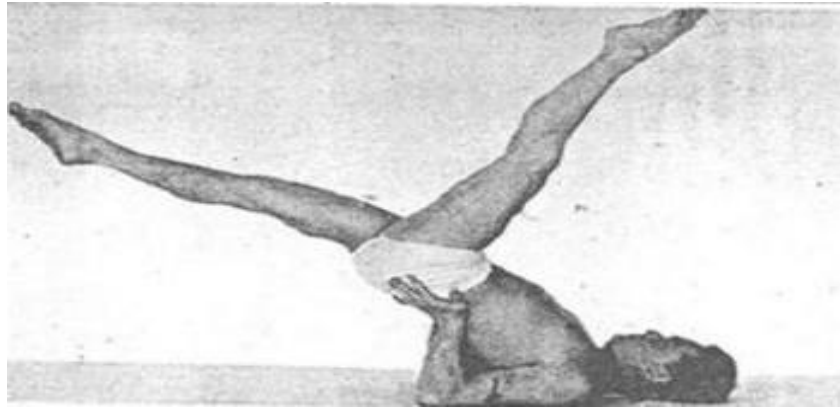


Fig.3.77

Pose Four (Fig.3.77)

(1) When you exhale, alternately "split" your legs (left leg ahead; straight leg backward) like scissors.

Note:

Do this exercise six time.

Cautions:

Pose 2- Maintain rigidity throughout; only move your legs, knees locked, toes pointing forward and downward. Try to gradually do the split such that the toes of the forward leg, in alternating movements, and the backward leg, in alternating movements, are out of your field of view.

17. Instructions for “The bicycle”

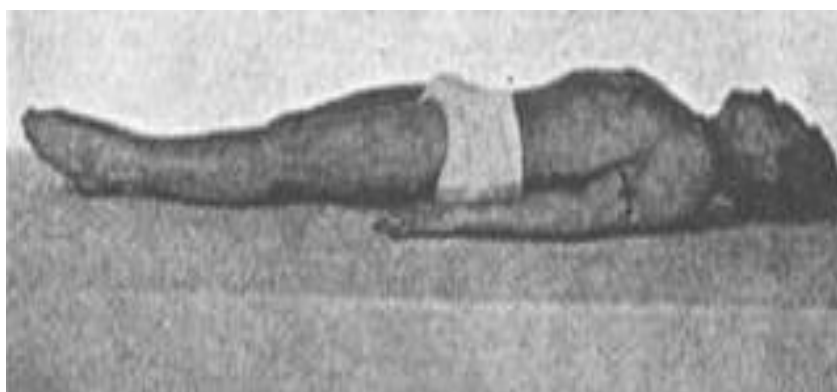


Fig.3.78

Pose One (Fig.3.78)

1) Take the stance illustrated in the image.



Fig.3.79

Pose Two (Fig.3.79)

- 1) Put your weight on arms, shoulder neck and head, now lift the body.
- 2) Take breathe slowly
- c) Move your legs as shown in fig. 3.79



Fig 3.80

Pose Three (Fig 3.80)

- 1) Bend your right knee back and down while attempting to "kick" yourself.
- 2) Breathe out slowly



Fig.3.81

Pose Four (Fig.3.81)

- 1) Right leg straight and pull it back side.
- 2) Breathe in slowly
- 3) Bend your left knee back and down while attempting to "kick" yourself.

Note:

One can do five movement on each leg.

Cautions:

Pose Three- make sure to adopt a stance that is as similar to the one shown in this pose as you can. Stretch both legs out in front of you, locking the knees and pointing the toes (forward and downward) as you go.

18. Instructions for “The shoulder bridge”



Fig.3.82

Pose One (Fig.3.82)

- 1) Take the stance illustrated

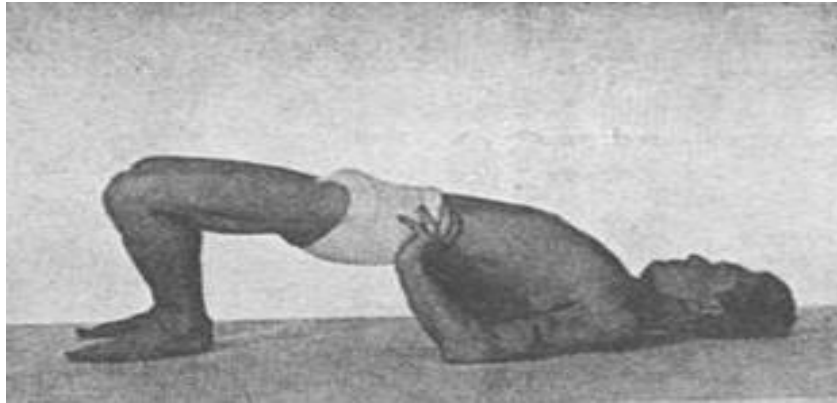


Fig.3.83

Pose Two (Fig.3.83)

- 1) Put your weight on upper body like, arms, shoulder, neck and head. Feet will be flat on mat.
- 2) Grab the waist firmly with both hands as shown.

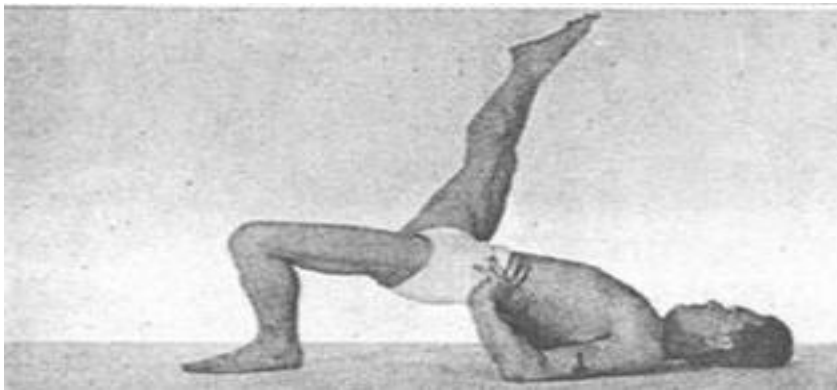


Fig.3.84

Pose Three (Fig.3.84)

- 1) Slowly breathe in
- 2) Lift your right leg upward and forward to upright stance.
- 3) Forward and downward pointed toes

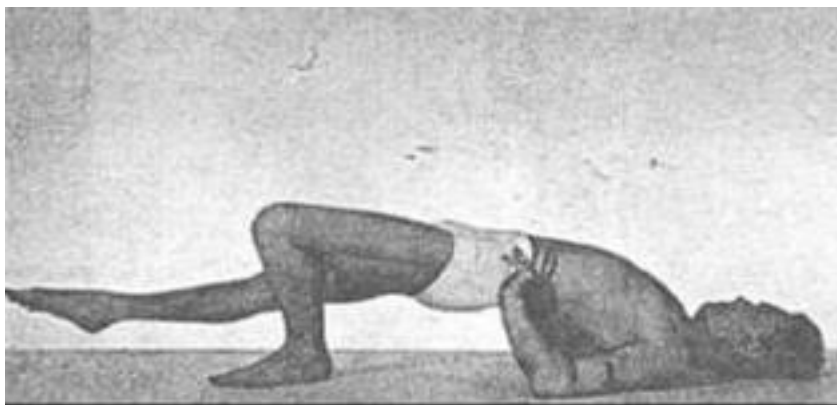


Fig.3.85

Pose Four (Fig.3.85)

- 1) Breathe out slowly
- 2) Right leg should be lowered forward and downward, knee locked.
- 3) As shown in this stance, thrust your chest as high and as far out as you can.

Pose three and four repeat again.

Note:

One can repeat this exercise three times on each leg.

Cautions:

Pose Three-Point your toes. Right leg knee is locked. Chest thrust out, push your foot firmly on the mat when you bring your each leg down.

19. Instructions for “The spine twist”



Fig.3.86

Pose one (Fig.3.86)

- (1) Take the stance shown in the figure
- (2) Breathe in slowly
- (3) Seat straight, push your chest out, contract your stomach in, head up
- (4) Lock the shoulders, arms stretched backward.
- (5) Feet on mat, together and straight, toes should be pointed as shown in the image.



Fig.3.87

Pose two (Fig. 3.87)

- (1) Legs and arms straight, slowly breathe out and twist your body as shown in the fig. 3.86.
- (2) Turn your head and breathe in slowly and return to your position one



Fig.3.88

Pose Three (Fig.3.88)

- (1) Take the stance illustrated



Fig.3.89

Pose Four (Fig.3.89)

- (1) Breathe out slowly
- (2) Twist your body to the side and turn your head too.
- (3) Slowly breathe in and return to pose one.



Fig.3.90

Pose Three (Fig.3.90)

- (1) Take the stance illustrated

Note:

Repeat this exercise three times left and Three times right.

Cautions:

Pose One- Legs and arms should be held rigidly. Locked shoulder blades. merely twist the body at the spine. Try to alternatively touch your chin to your right shoulder and left shoulder.

20. The jack knife:

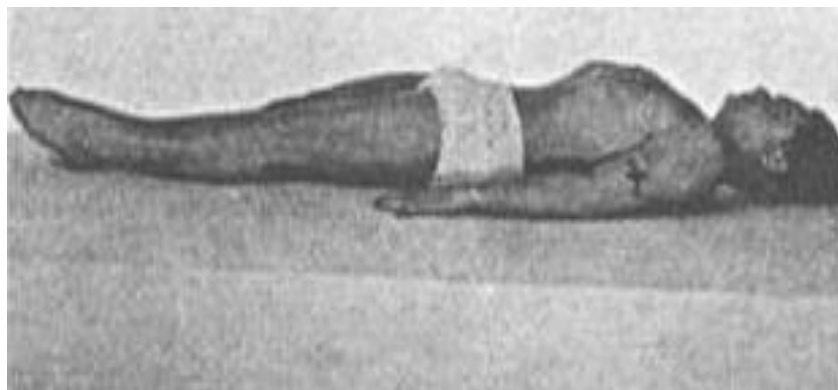


Fig.3.91

Pose One (Fig.3.91)

- 1) Take the stance shown in the image
- 2) Spine should be touched on the mat

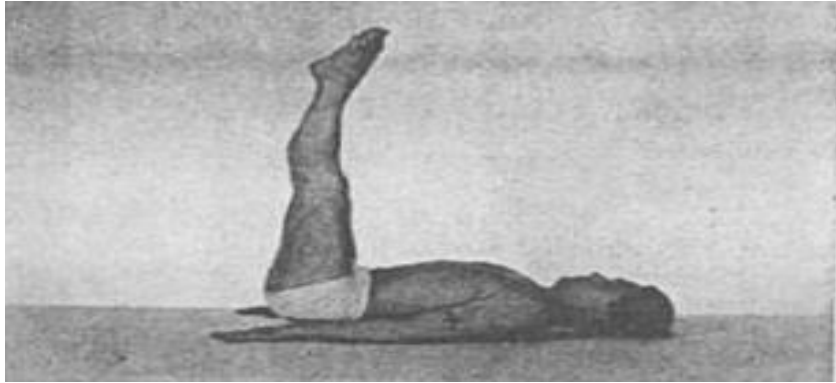


Fig.3.92

Pose Two (Fig.3.92)

- (1) Lift your legs, must be straight, lock your knees. Arms on the side
- (2) Point your toes forward and downward and breathe in slowly.



Fig.3.93

Pose Three (Fig.3.93)

- (1) Arms pressed against the mat.
- (2) Raise your spine, lock your knees



Fig.3.94

Pose Four (Fig.3.94)

- (1) Body weight on head, neck, shoulders and arms and legs in upward position stretched.
- (2) Breathe out slowly
- (3) Take stance shown in fig. 3.93 again, breathe in slowly and take stance shown in fig. 3.92
- (4) Breathe out slowly

Note:

One can do this exercise 3 times.

Cautions:

Pose two- keep your legs straight, your knees locked, and your toes pointed.

Pose three- count two while holding pose three.

Pose four- count two mentally while holding position four

21. Instructions for “The sidekick”

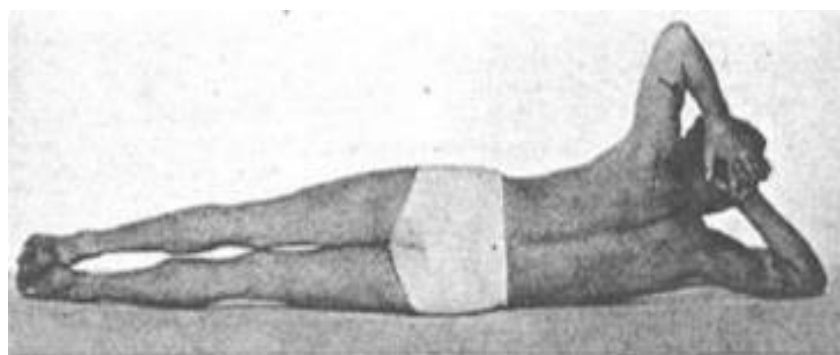


Fig.3.95

Pose One (Fig.3.95)

- (1) Take stance shown in fig. 3.95

- (2) Head raised and hands clasped behind head
- (3) Eyes straight forward, arms parallel to the shoulders
- (4) lay down on mat on your side

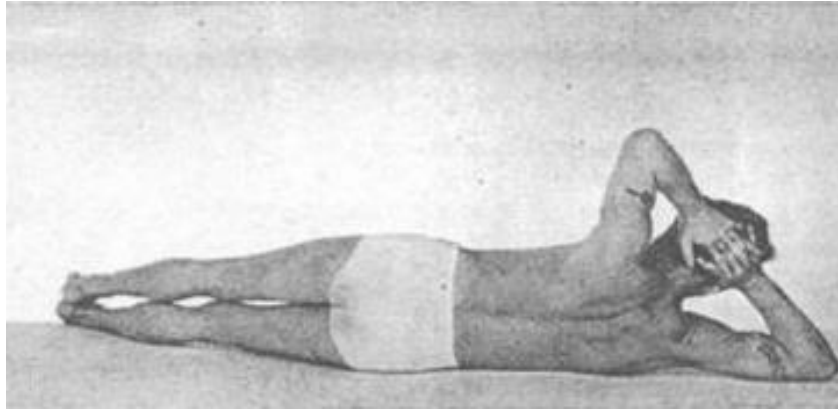


Fig.3.96

Pose Two (Fig.3.96)

- (1) legs two feet forward

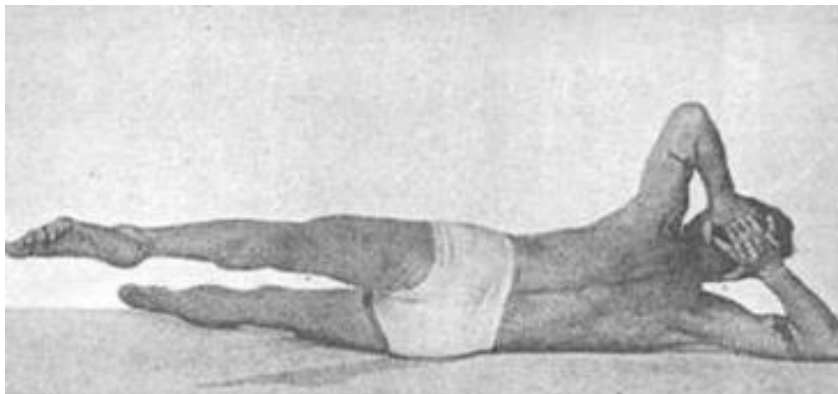


Fig.3.97

Pose Three (Fig.3.97)

- (1) Slowly breathe in and
- (2) Move your legs sideways as shown in the fig. 3.96
- (3) Return your left leg approximately a foot forward and swing your left leg forward again, attempting to improve on your initial try.

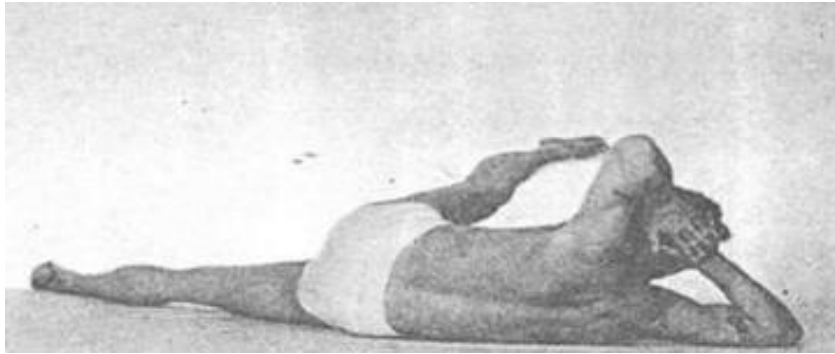


Fig.3.98

Pose Four (Fig.3.98)

- (1) Breathe out slowly and move your legs sideways as far as possible
- (2) Keep one foot distance while returning your left leg.
- (3) Swing your left leg backward again and try to do better than your previous effort.

Note:

One can perform this exercise three times. Using left leg and right leg.

Cautions

Pose three- head up elbows back. Keep the entire body stiff. Move one leg only. Another leg will be stiff on the mat.

Pose four- Do not bend your body.

22. Instructions for “The teaser”



Fig.3.99

Pose One (Fig.3.99)

- (1) Take the stance shown in fig. 3.99

- (2) Head straight, legs straight, knees locked and toes pointed towards the ground.
- (3) Arms as shown in the fig.3.98

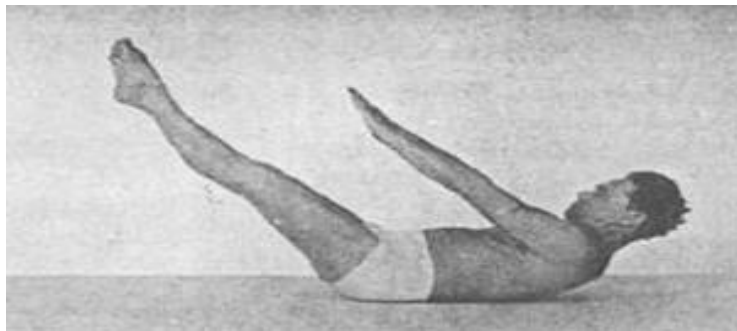


Fig.3.100

Pose Two (Fig.3.100)

- (1) Bend your head, chin touching the chest, abdomen contracted
- (2) Roll back and raise your leg up as shown in fig. 3.99

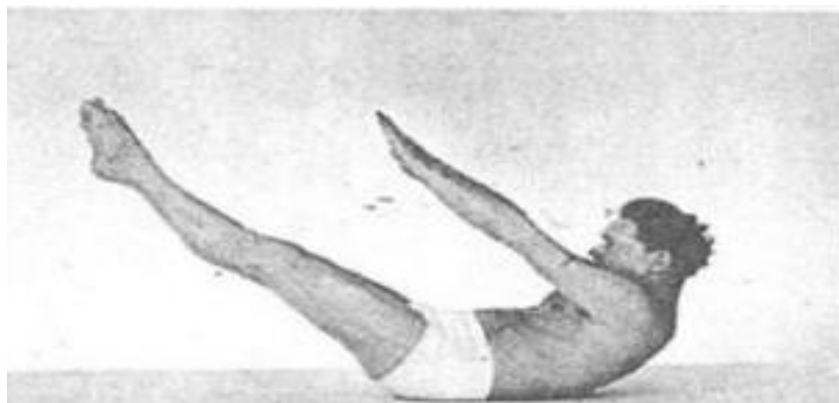


Fig.3.101

Pose Three (Fig.3.101)

- (1) Breathe in slowly
- (2) Parallel line of hands and legs should be maintained.

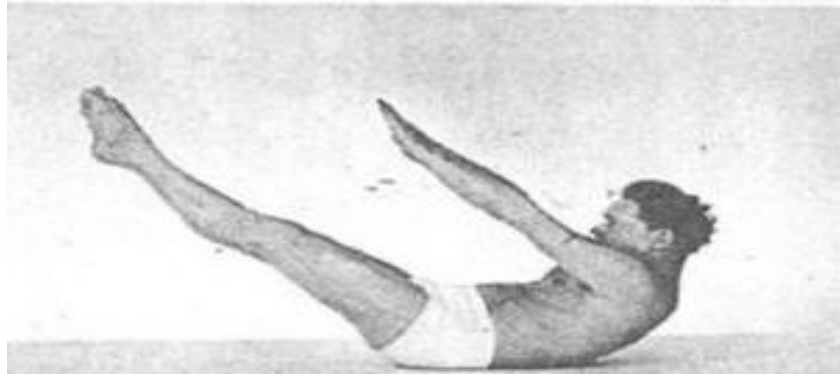


Fig.3.102

Pose Four (Fig.3.102)

- (1) Roll up, seat straight, arms should be raised and parallel to leg
- (2) Breathe out slowly
- (3) Take pose 2 position again and breathe in slowly.

Caution

Pose Three- Hand and legs should be parallel to each other, chest pressed in and back rounded.

23. Instructions for “The hip twist with stretched arms”

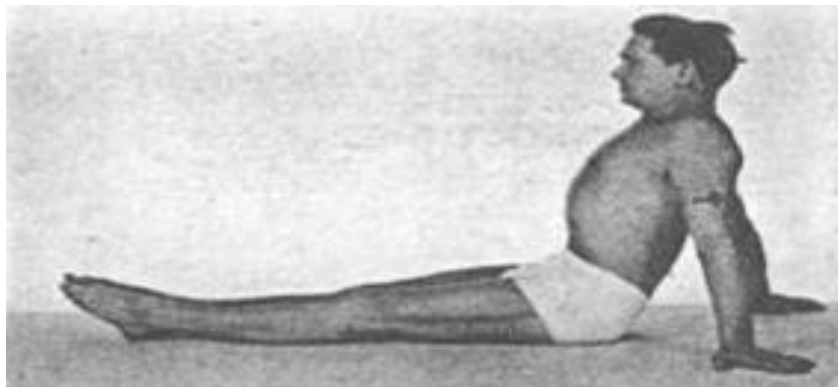


Fig.3.103

Pose One (Fig.3.103)

- (1) Take the stance shown in fig. 3.102, arms straight and pressed on mat.
- (2) Palms as shown in fig. 3.102, legs straight and toes pointed.



Fig.3.104

Pose Two (Fig.3.104)

- (1) Breathe in slowly, wave legs together, lock your knees
- (2) Toes pointed



Fig.3.105

Pose Three (Fig.3.105)

- (1) Breathe out slowly
- (2) Wave legs without contacting mat



Fig.3.106

Pose Four (Fig.3.106)

- (1) Breathe out slowly and wave legs first to the right and to the left as high as possible in circle
- (2) Without legs touching mat

Note:

Do this exercise six times, three to the right side and three to the left.

Cautions:

Pose One- Chest pressed inward

Pose Two- Chin to chest

Pose Three- Only move legs and hips and while circling, wave legs as high as possible and close to head.

24. Instructions for “The Swimming”

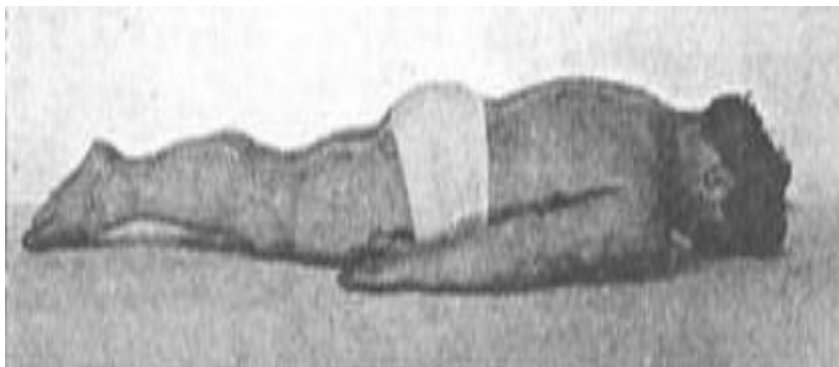


Fig.3.107

Pose One and Two (Fig.3.106, Fig.3.107)

- (1) Take stance shown in the fig. 3.107
- (2) Arms straight and palms down

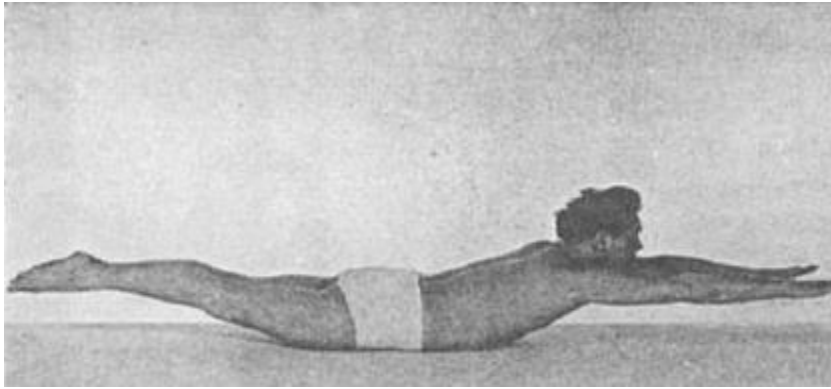


Fig.3.108

- (3) Head up, chest not contacted with mat, toes pointed
- (4) Knees locked
- (5) Breathe in and breathe out while performing alternate movement and counting mentally 1 to 10

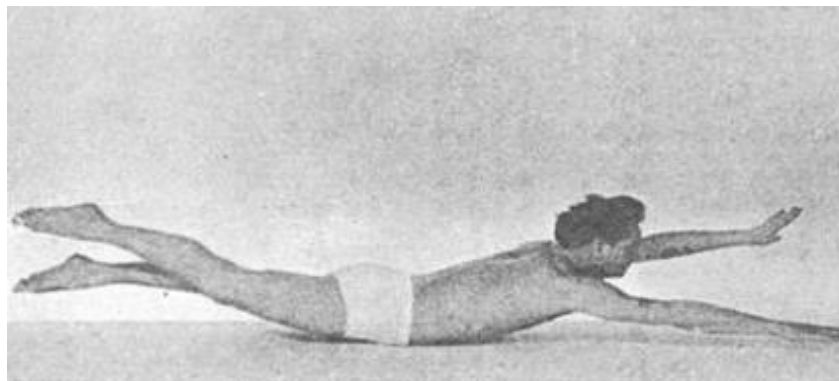


Fig.3.109

Pose Three (Fig.3.109)

- (1) Alternate arms and legs will be used, if raising right arm the left leg will be raised and vice a versa.

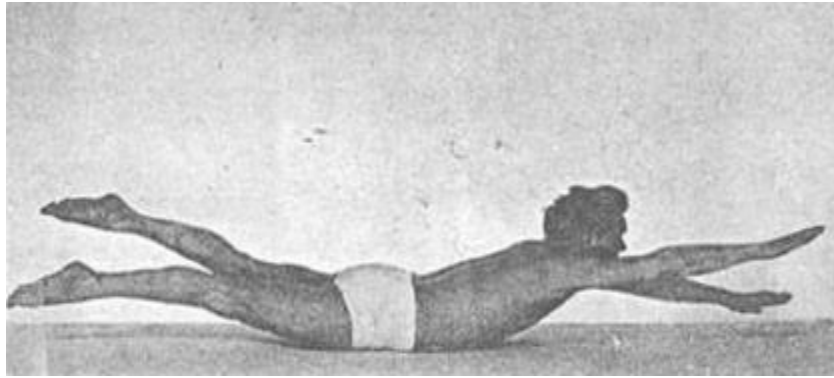


Fig.3.110

Pose Four (Fig.3.110)

(1) Right leg and left arm position as shown in the fig. 3.110

Cautions:

Pose Three- While performing the exercise alternate arm and legs should as up as possible and any of them should not touch the mat. Body should be stiff, only arms and legs will move.

25. The leg-pull-front:

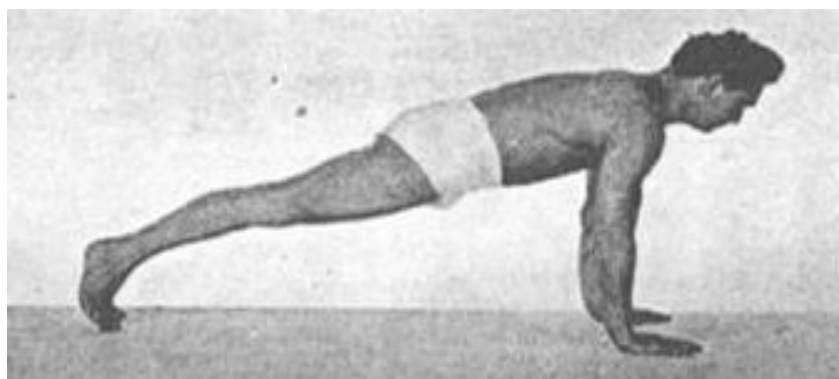


Fig.3.111

Pose One (Fig.3.111)

- (1) Take stance shown in the fig.3.111
- (2) Shoulders wide and arms straight
- (3) Hold plank position, hands and head straight
- (4) Legs together and toes pointed towards the ground
- (5) Knees locked and heels touched each other

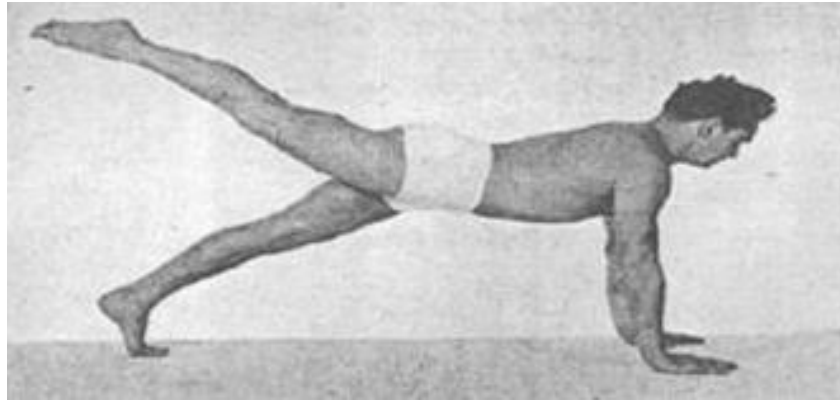


Fig.3.112

Pose Two (Fig3.112)

- (1) Breathe in slowly
- (2) Raise your right leg up as high as possible, keep it straight.
- (3) Breathe out slowly
- (4) Come to the pose one position

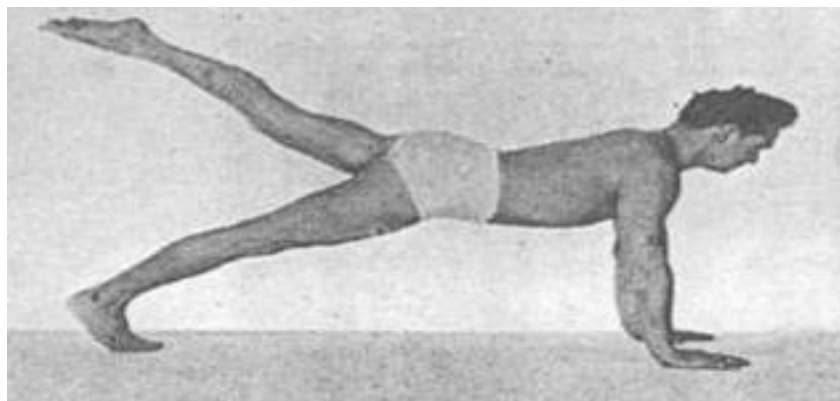


Fig.3.113

Pose Three (Fig.3.113)

- (1) Breathe in slowly
- (2) Raise your left leg up as high as possible, keep it straight.
- (3) Breathe out slowly
- (4) Come to the pose one position

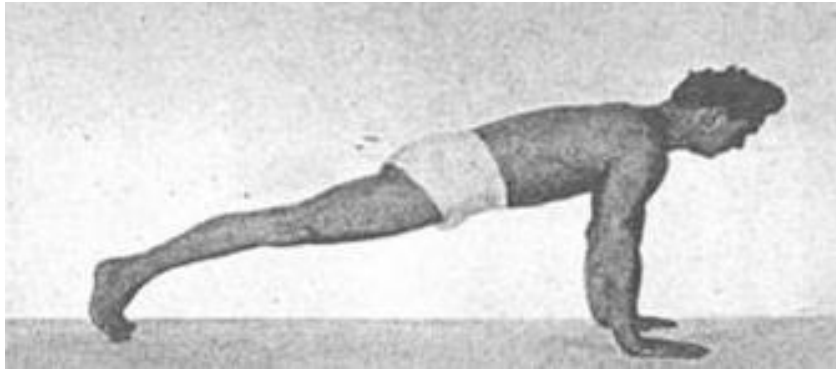


Fig.3.114

Cautions:

Pose One- arms must be shoulder-wide in right angle position.

Pose Two- only legs will move and knees will be locked

Pose Three- only legs will move and knees will be locked

26. Instructions for “The leg-pull”

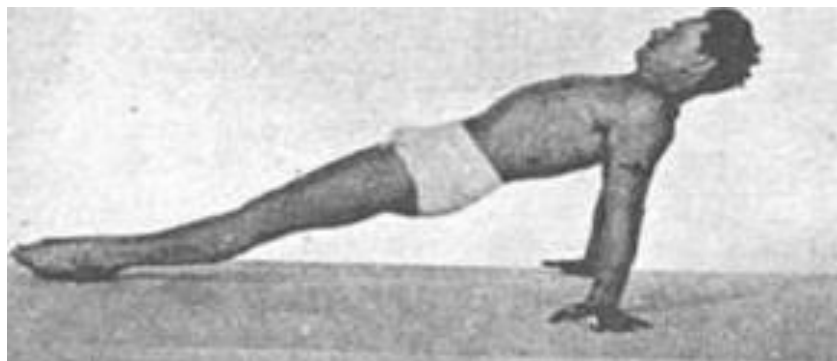


Fig.3.115

Pose One (Fig.3.115)

- (1) Take stance shown in fig.3.115
- (2) Shoulders wide and arms straight
- (3) Hold plank position, hands and head straight
- (4) Legs together and toes pointed towards the ground
- (5) Knees locked and heels touched each other

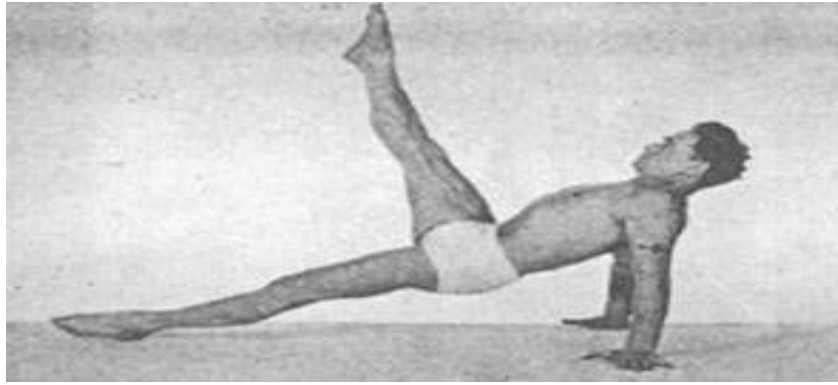


Fig.3.116

Pose Two (Fig.3.116)

- (1) Breathe in slowly
- (2) Raise your right leg up as high as possible, keep it straight
- (3) Breathe out slowly
- (4) Come to the pose one position

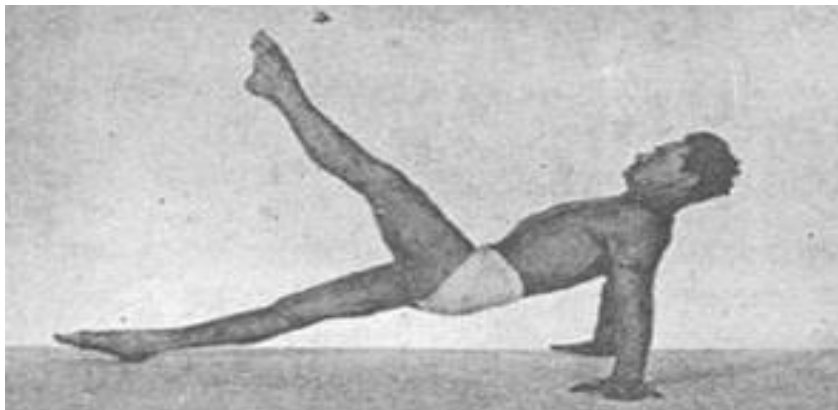


Fig.3.117

Pose Three (Fig.3.117)

- (1) Breathe in slowly

(2) Raise your left leg up as high as possible, keep it straight

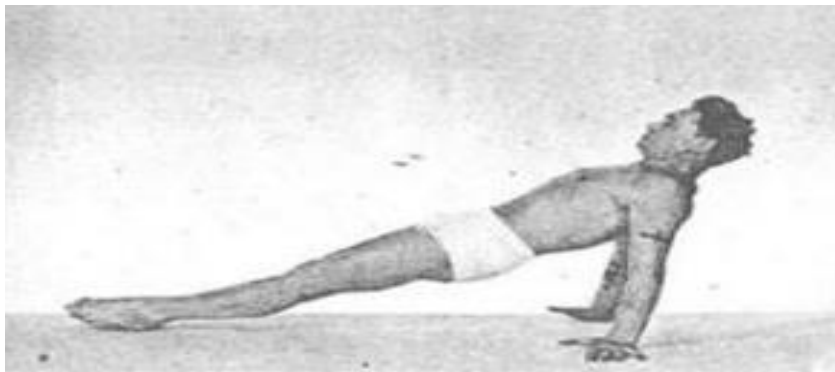


Fig. 3.118

3) Breathe out slowly

4) Come to the pose one position

Cautions:

Pose One- arms must be shoulder-wide in right angle position.

Pose Two- only legs will move and knees will be locked

Pose Three- only legs will move and knees will be locked

27. Instructions for “The side kick kneeling”



Fig.3.119

Pose One (Fig.3.119)

(1) Take stance shown in fig. 3.119

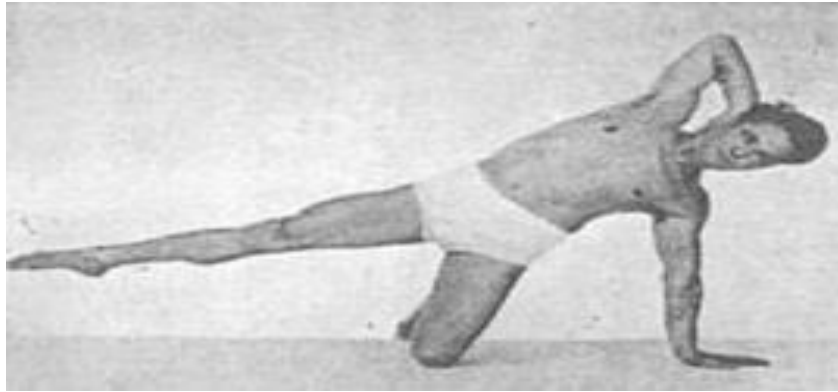


Fig.3.120

Pose Two (Fig.3.120)

- (1) Come on the left knee as shown in fig. 3.119
- (2) Support the body with your left arm, then
- (3) Right leg will be raised in straight line with the body with locked knee
- (4) Toes pointed, then
- (5) Right arm behind the head



Fig.3.121

Pose Three (Fig.3.121)

- 1) Breathe in quickly
- 2) Waving right leg forward as far as possible



Fig.3.122

Pose Four (Fig.3.122)

- 1) Breathe out quickly
- 2) Waving right leg backward as far as possible

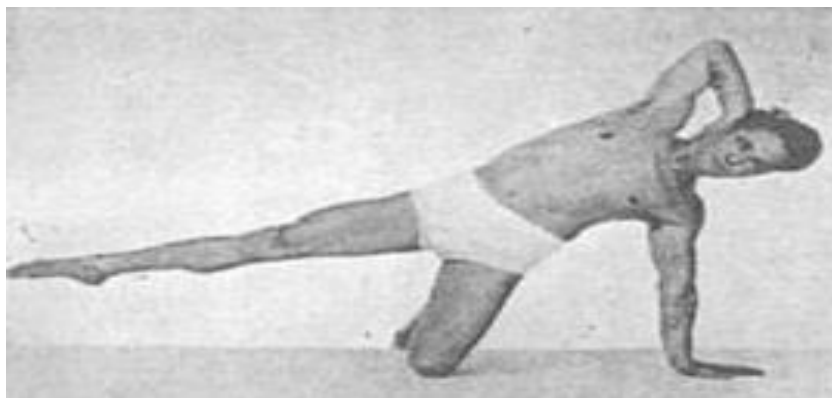


Fig.3.123

Pose Five (Fig.3.123)

- (1) Come on the right knee as shown in fig. 3.123
- (2) Support the body with your right arm, then
- (3) Left leg will be raised in straight line with the body with locked knee
- (4) Toes pointed, then
- (5) Left arm behind the head



Fig.3.124

Pose Four (Fig.3.124)

- (1) Breathe in quickly
- (2) Wave left leg backward as far as possible



Fig.3.125

Pose Five (Fig.3.125)

- (1) Breathe out quickly
- (2) Wave left leg backward as far as possible

Cautions:

Pose Two- Head straight, chest out and abdomen contracted, elbows back, keep the body stiff, only legs will move. Breathe in quickly when waving the legs forward and exhale quickly when waving the legs backward.

Remarks:

For improving balance and coordination concentrate on waistline and hips.

28. Instructions for “The side bend”



Fig. 3.126

Pose One (Fig. 3.126)

(1) Take stance shown in the fig.3.126

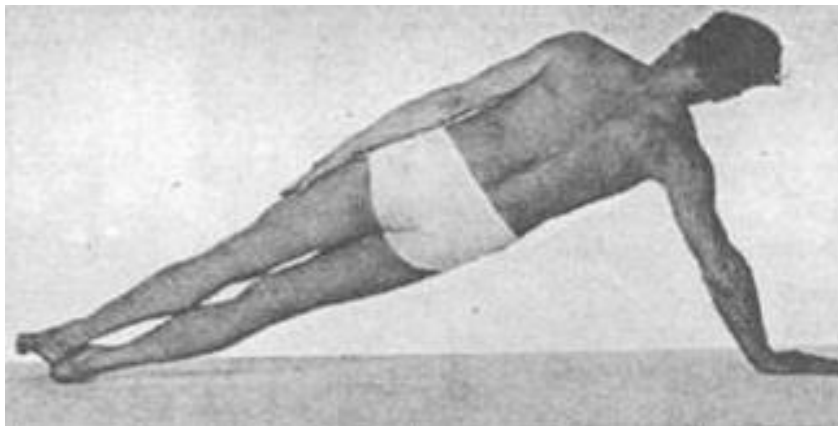


Fig. 3.127

Pose Two (Fig.3.127)

- (1) Right hand will be in line with the right shoulder
- (2) Left arm straight and touched to the body as shown in the fig. 3.127
- (3) Head straight and chin up
- 4) Breathe in slowly

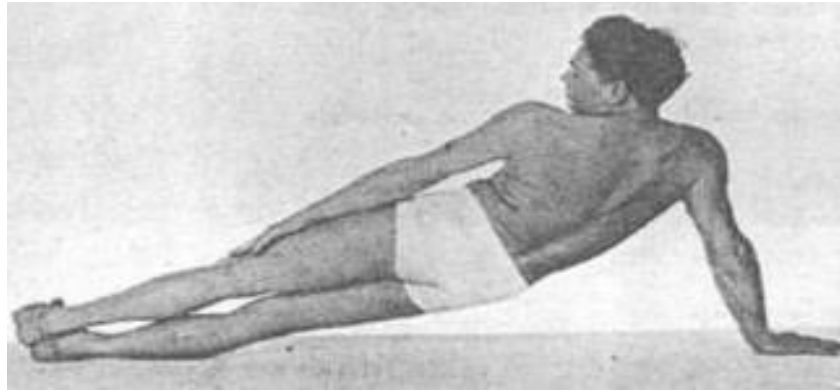


Fig. 3.128

Pose Three (Fig. 3.128)

- (1) Chin touched to the left shoulder as you turn your head left
- (2) Bring your body down until your calf muscle should touch the mat
- (3) Breathe out slowly

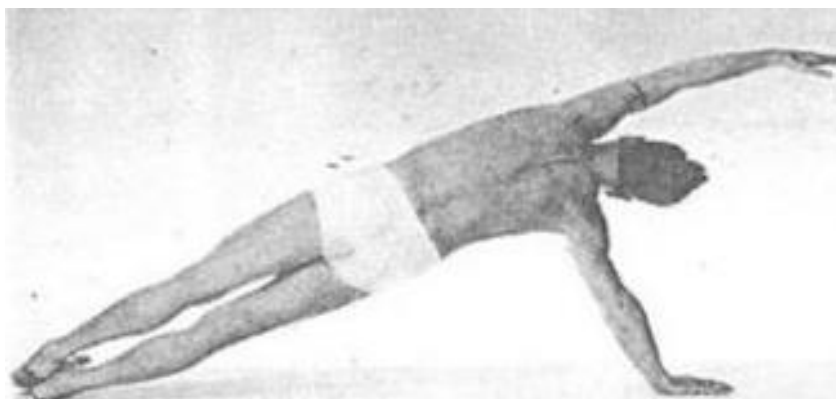


Fig.3.129

- (4) Go to the pose two position
- (5) Breathe in slowly

Cautions:

Pose Two- Keep the body- head straight, chest out and abdomen contracted.

Pose Three- When lowered, just the left and right calf should make contact with the mat.

Remarks:

This exercise targets the arm, shoulder, and wrist muscles while also stretching the hips and waistline and improving balance and coordination. You begin by switching between stances two and three. After one month, alternate between positions four and two.

29. The boomerang:

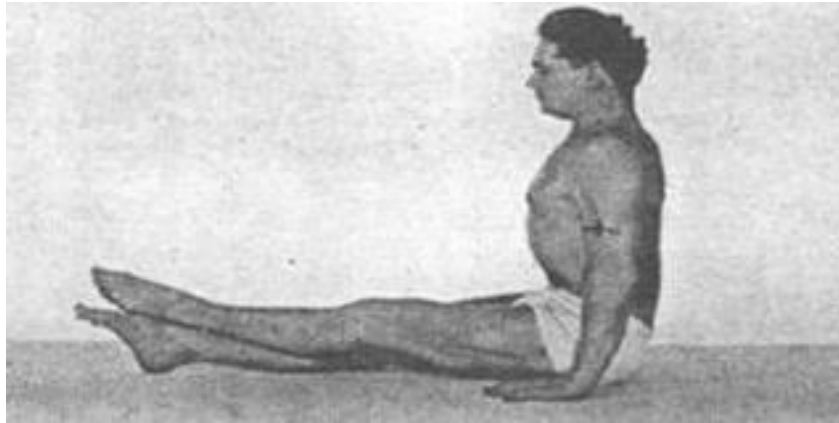


Fig.3.130

Pose One (Fig.3.130)

- (1) Take stance shown in fig.3.130
- (2) Breathe in slowly
- (3) Seat straight, head straight abdomen contracted
- (4) Cross both the leg left leg over right leg
- (5) Arms on the side
- (6) Hands pressed on the mat

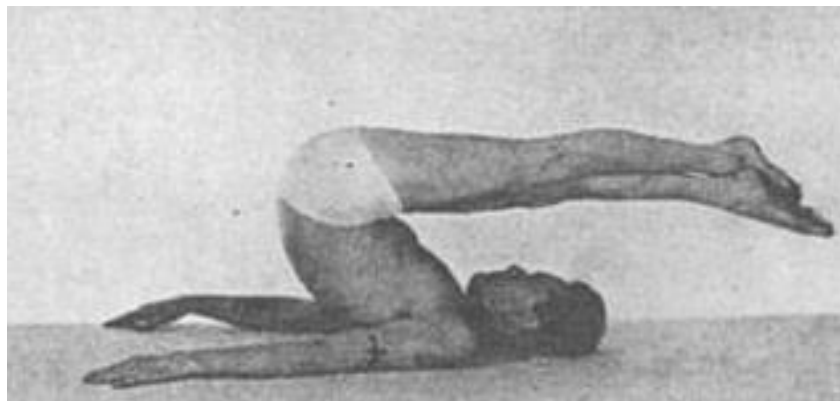


Fig.3.131

Pose Two (Fig.3.131)

- (1) Breathe out slowly
- (2) Right leg over left leg crossed and roll backward as far as possible

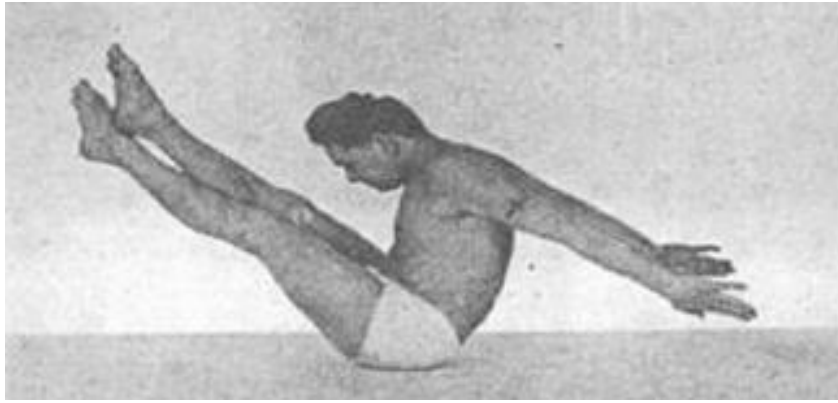


Fig.3.132

Pose Three (Fig.3.132)

- (1) Breathe in slowly
- (2) Roll forward and wave arms backward

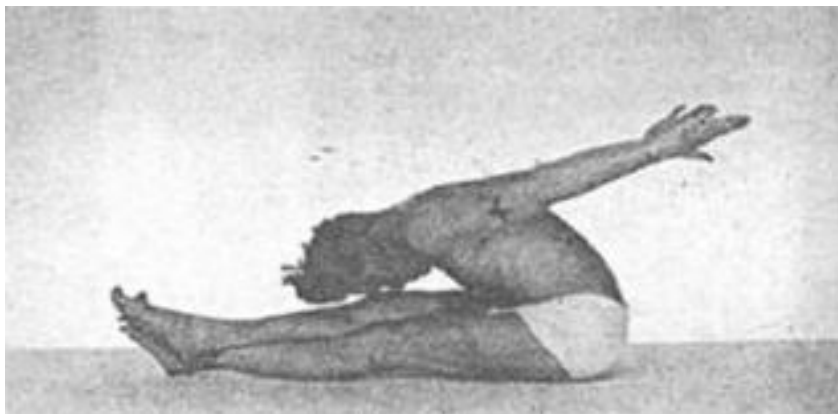


Fig.3.133

Pose Four (Fig.3.133)

- (1) Breathe out when bringing both legs to mat
- (2) Touch the head to knee
- (3) Arms stretched backward as far as possible
- (4) Come back to pose two position

Cautions:

Pose Two- Maintain a solid grip on the mat with your arms and shoulders. When returning to pose three reverse your legs while in the above position.

Pose Four- Make an attempt to touch your head to your knees. Stretch your arms (palms up) as far backward and upward as possible.

30. Instructions for “The seal”

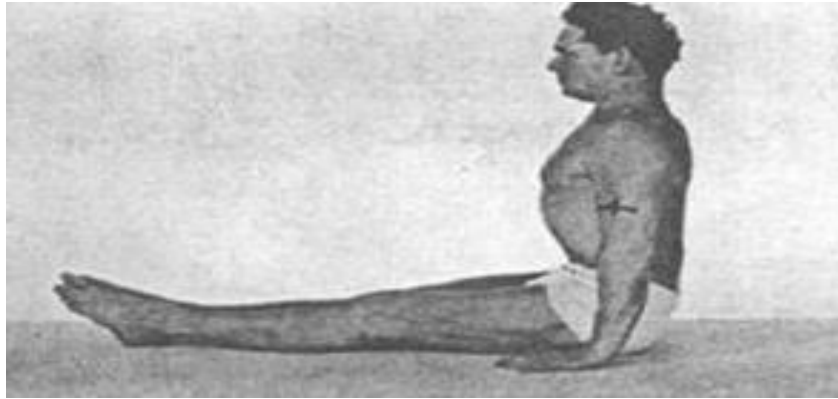


Fig.3.134

Pose One (Fig.3.134)

(1) Take stance shown in fig.3.134



Fig.3.135

Pose Two (Fig.3.135)

(1) Breathe in slowly

(2) Abdomen contracted and head bended forward to chest

(3) Soles and heel touched and calf and knees apart

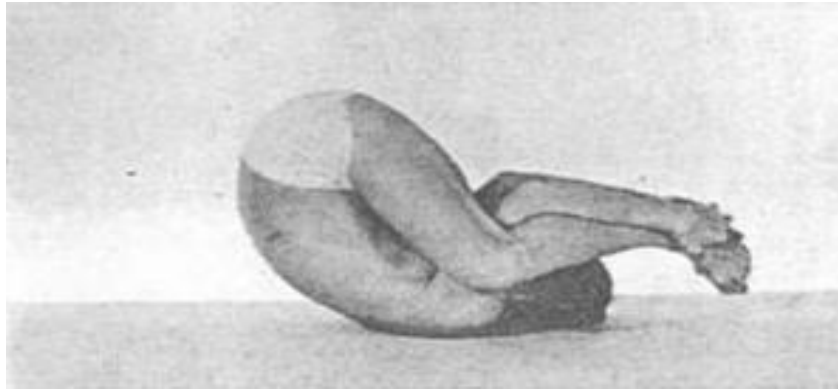


Fig.3.136

Pose Three (Fig.3.136)

- (1) Breathe out slowly
- (2) Hands coming out under the legs as shown in the fig. 3.136
- (3) Hold left foot with left hand
- (4) Hold right foot with right hand
- (5) Soles and heels close together pointed and pressed firmly`



Fig.3.137

Pose Four (Fig.3.137)

- (1) Breathe in slowly
- (2) Roll back as far as possible
- (3) Breathe out slowly
- (4) Come to pose three position
- (5) Clap with your soles

Cautions:

Pose Two- Chest pressed in, body tilted backward, raise your legs from mat, and bend your body forward

Pose Three- Breathe in while rolling backward

Pose Four- Head pressed firmly to mat when rolling up and breathe out when doing so.

31. Instructions for “The crab”

Fig.3.138

Pose One (Fig.3.138)

- (1) Take stance as shown in the fig.3.138
- (2) Breathe in slowly



Fig.3.139

Pose Two (Fig.3.139)

- (1) Breathe out slowly
- (2) Bend your head forward, cross your legs as shown in fig.3.137
- (3) Abdomen contracted and chin touched to chest

- (4) Hold your foot firmly, right leg with left hand and left leg with right hand
- (5) Knees towards the shoulder, press as much as possible



Fig.3.140

Pose Three (Fig.3.140)

- (1) Breathe in slowly and
- (2) Roll back
- (3) Breathe out slowly and roll up



Fig.3.141

Pose Four (Fig.3.141)

- (1) Head on mat
- (2) Breathe in slowly when returning to pose three
- (3) Breathe out slowly when roll up
- (4) Head on mat as shown in pose four

Caution:

Pose Two- Head to chest as close as possible, abdomen contracted, round your back, Knees to shoulder as close as possible.

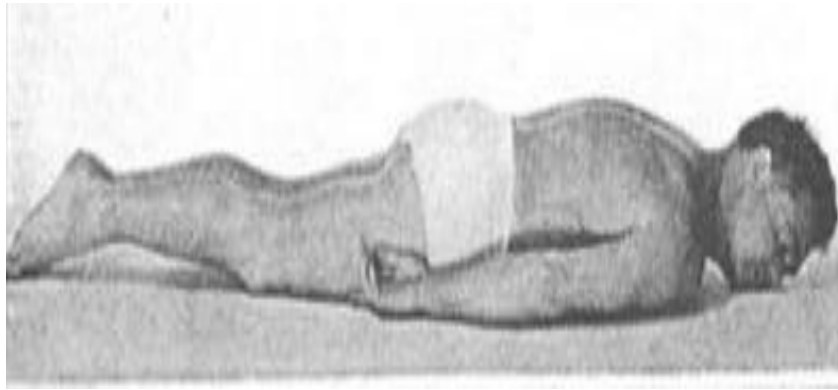
32. Instructions for “The rocking”

Fig.3.142

Pose One (Fig.3.141)

- (1) Take stance shown in the fig.3.141
- (2) Body resting on mat
- (3) Hands on side as shown in fig.3.141 and palms upwards
- (4) Legs straight backward
- (5) Toes pointed

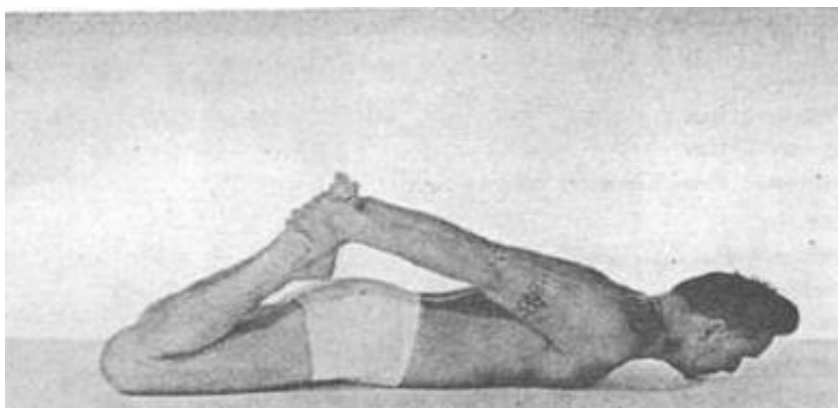


Fig.3.143

Pose Two (Fig.3.143)

- (1) Bend your legs from knees

(2) Hold your foot with your hands

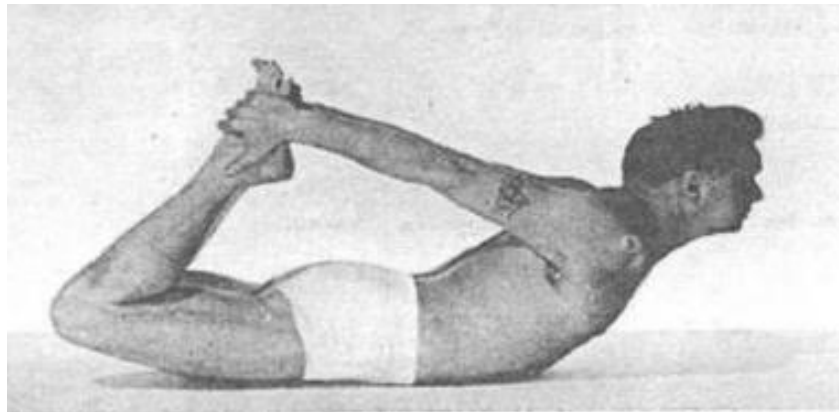


Fig.3.144

Pose Three (Fig.3.144)

(1) Breathe in slowly

(2) Lift your chest and your head as shown in fig.3.144

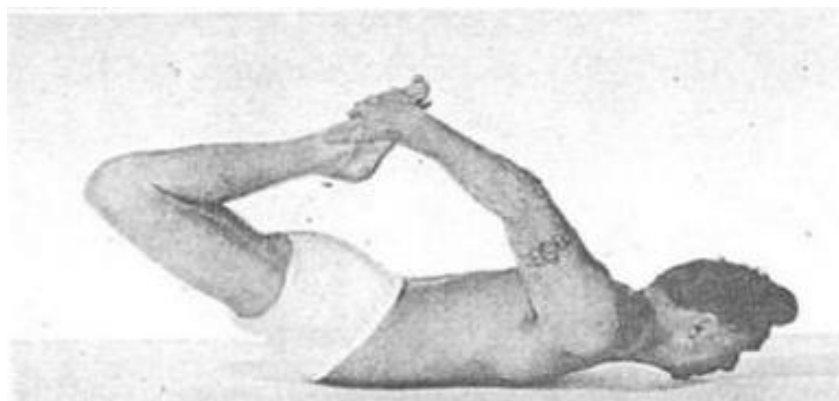


Fig.3.145

Pose Four (Fig.3.145)

(1) Chin will touch the mat, rocking movement will be there

(2) Go back as far as possible

(3) Breathe in slowly when you rock forward and breathe out slowly as you rock backward

Cautions:

Pose Two- stretch your head back as far as possible

33. Instructions for “The control balance”

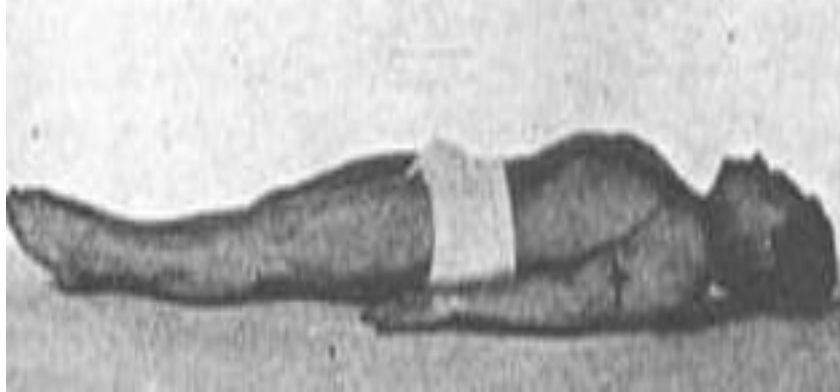


Fig.3.146

Pose One (Fig.3.146)

- (1) Take stance shown in fig.3.146
- (2) Body resting on the mat
- (3) Legs straight and close to each other
- (4) Toes pointed
- (5) Hands straight near the body and palms down
- (6) Breathe in slowly

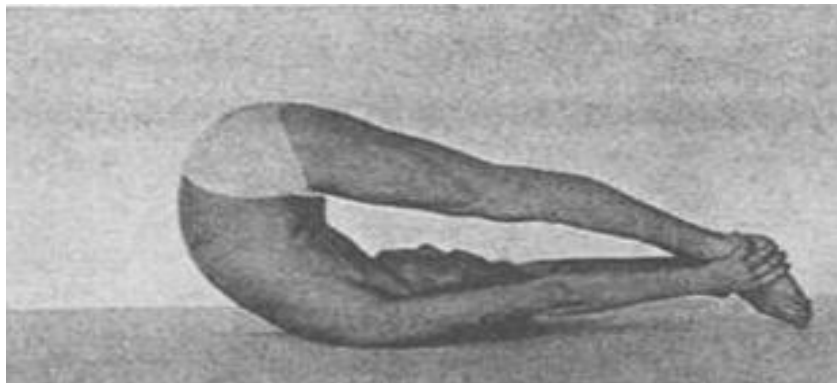


Fig.3.147

Pose Two (Fig.3.147)

- (1) Breathe in slowly
- (2) Lift your leg and roll, body weight on shoulders, arms and neck



Fig.3.148

Pose Three (Fig.3.148)

- (1) Breathe in slowly
- (2) Touch your right toe to the mat
- (3) Both the hands holding right leg firmly
- (4) Hold your left leg straight and as up as possible possible



Fig.3.149

Pose Four (Fig.3.149)

- (1) Bring left leg down and left tow will touch the mat Breathe out slowly
- (2) Release right foot and hold the left foot tightly with both the hands
- (3) Stretch the right leg straight in upward position

Cautions:

Pose Two- Keeping balance when on shoulders, arms and back, knees locked

34. Instructions for “The push up”



Fig.3.150

Pose One (Fig.3.150)

- (1) Take stance shown in the fig.3.150
- (2) Extend your arms and palms and touch the mat



Fig.3.151

Pose Two (Fig.3.151)

- (1) Heels touched on mat tightly
- (2) Begin to walk forward with the palms
- (3) Head down and continue to walk

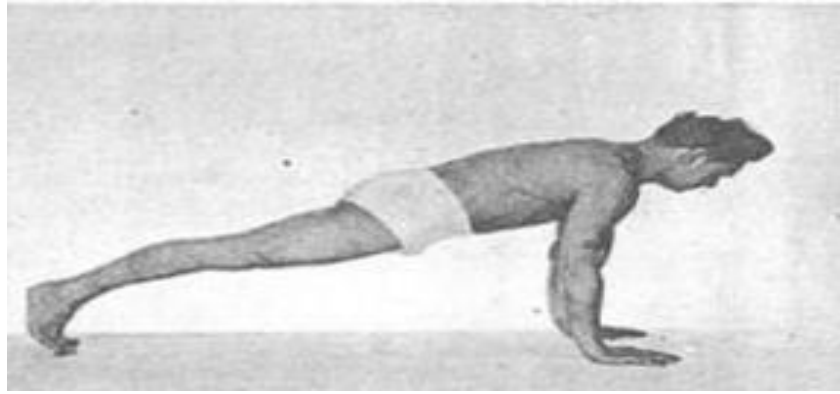


Fig.3.152

Pose Three (Fig.3.152)

- (1) Come in the pose shown in fig.3.152
- (2) Keep your body stiff and in straight line from head to heel
- (3) Body weight on palms and heels

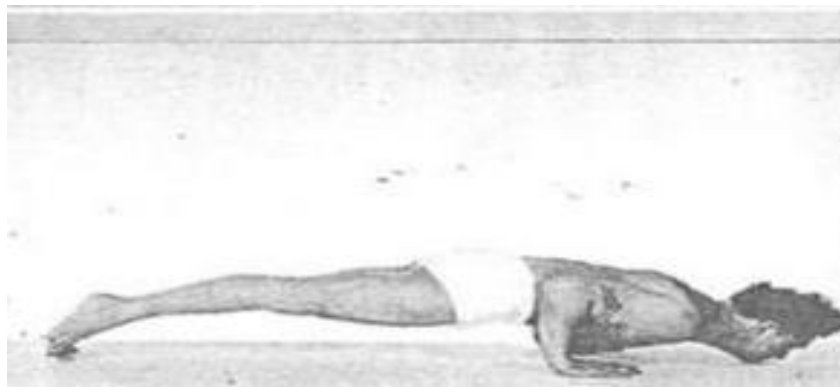


Fig.3.153

Pose Four (Fig.3.153)

- (1) Keep body stiff and straight
- (2) Back is also locked, stiff and straight
- (3) Bend your hands from elbows
- (4) Triceps touching body tightly
- (5) Slowly breathe in
- (6) Try to touch the mat with your chin
- (7) Hips stiff and neck stretched straight out
- (8) Abdomen contracted
- (9) Chest lifted as shown in fig.3.153

(10) Breathe out slowly

Cautions:

Pose Three- Hips stiff, shoulders in a straight line, head is also in a straight line with the body, and only chin will touch the mat and not the entire body or chest. ¹

Given above are the 34 mat exercises invented by Joseph Pilates with his own pictures and explanations.

3.10 Conclusion:

According to the researcher, using the Pilates method involves performing whole body exercises, promoting movement through concentration on breathing, and efficiently involving joints through balanced muscular strength and flexibility development. Maintaining throughout mental concentration using the muscle strength required for each exercise, using controlled and steady movement, i.e. using energy properly to begin all the body movement from the core. To perform precisely it is important to channel the natural rhythm of movement and stimulate muscle engagement through the breath, all these aspects are covered when practicing Pilates exercise. The researcher and many more Pilates exercise practitioners have experienced this. After this positive impact, in next chapter integration of Pilates in Bharatanatyam is explained. So, we will see the application of combination of 34 exercises invented by Joseph Pilates in Bharatanatyam nritta part in next chapter which may help Bharatanatyam dancers in injury prevention and career extension.

1. Robbins, Judd and Lin Van Heuit- Robbins, Pilates' Return to life through Contrology revised edition for the 21st Century originally published in 1945 as Return to Life through Contrology

Chapter 4 Integration of Pilates exercise in Nritha part of Bharatanatyam

4.1 Introduction:

Integration is basically the procedure of applying one technique in another to get better result. When doing so much dance practice to prepare their bodies, Bharatanatyam dancers need to undertake a separate exercise routine. Tatta adavu, despite being a simple adavu, is extremely stressful on the body. Supplemental exercises guarantees that the lower back, ankles, and knees are ready for the margam and prepares the limbs for a good araimandi. Bharatanatyam performers should focus on strengthen their bodies. The majority of Bharatanatyam dancers, choreographers, and teachers do not devote any time to body fitness, and as a result, they lose stage confidence due to lack of body aesthetics and body strengthening. Exercise routine is a matter of self-discipline. “Cross-training is a very effective method of warm-up. If you are trained in any other movement form like Ballet, Capoeira, Kalarippayattu, Kung-fu, Kick-boxing, Tai-chi etc., doing half/one hour of movement basics from these forms is an excellent way to warm-up before class, rehearsal or performance. Performing your best is must when you are a performer. The Pilates is an exercise which aware the dancer to get used to the movements of several muscles of the body. Therefore, once the dancer performs the Pilates exercise, his/her muscles get used to such movements. Thereby while performing Bharatanatyam the Dancer will be more cautious on delivering his/her best performance than to concentrate on the movements of muscles. Doing a couple of Pilates to strengthen your core muscles is highly recommended. This would ensure that the center is activated and you will be left feeling light and strong in a short span of time. A couple of push-ups or plank positions would be excellent to feel your core muscles.”¹ The majority of dance researchers have come to the conclusion that dancers need additional physical training in addition to their dance training to achieve their goals. Supplemental exercises are essential for Bharatanatyam dancers, and the Pilates exercise is one of them, after learning Pilates exercise, in this chapter, we'll explore how Pilates exercises can be integrated into the Bharatanatyam Nritha portion.

1.Basavarajaiah,Veena.Warm-up for Bharatanatyam dancers, Bangalore
<https://narthaki.com/info/healthtip/ht16.html>

4.2 Integration of Pilates in Bharatanatyam Nritta part:

In order to include Pilates into a Bharatanatyam dancer's regimen, they must first understand the necessity of Pilates exercise, its functions, advantages which are already discussed in earlier chapter. And the "how to" process which is explained in this chapter by the researcher.

To integrate Pilates exercise into Bharatanatyam as a functional training, relative study of their principle is the first step.

4.3 Relative study of Principles of Pilates exercise and Bharatanatyam Dance:

Principles	Pilates	Bharatanatyam
<ul style="list-style-type: none">Breathing:	Breathing is essential in the Pilates method. Pilates helps improving breathing. Pilates dedicates a section in his book "Return to Life through Contrology" specifically to breathing. He understood the importance of increasing oxygen intake and the flow of this oxygenated blood to every part of the body. This required proper full inhalation and full exhalation. He advised people to exhale like they would when drying a wet towel. Pilates exercise promotes properly coordinate movement and breathing practice.	You can prevent muscle fatigue by providing your body with additional oxygen. While performing Bharatanatyam breath control is must. When the dancer is performing a long Kriti, fatigue should not be seen on the face because that can affect quality of dance and expressions of a dancer. Dancers with strong muscles can dance for longer period of time while remaining alert and focused. While reciting a Jati or theermanams or Korvai, breath control is must.
<ul style="list-style-type: none">Concentration	For Pilates technique concentration and focus is must. The way exercises are done is most important.	Bharatanatyam dancers must be aware of the importance of maintaining concentration. If they will

	<p>Pilates exercises are total mind body exercises, if you concentrate on each movement and muscle used in an exercise, your ability of understanding the muscle and the movement will increase.</p>	<p>concentrate properly, they will be able to remember what the next step is. Concentration on Tala, performing the hand and leg movement accordingly with the necessary expression is the beauty of Bharatanatyam dance form. Dancers have to concentrate on dance movements and should be fully aware of the space available.</p>
<ul style="list-style-type: none"> • Control 	<p>"Contrology" was Joseph Pilates' preferred name for his method, and it was based on the awareness of muscle control. All exercises are done with control. The muscles working to lift against gravity and the resistance of the springs and thereby control the movement of the body. Pilates focuses on core muscles, glute muscles where the muscles are contracted while performing the exercise.</p>	<p>In dancing, "control" means that your body is doing what your mind wants it to do. The movement in Bharatanatyam dance should be controlled; for example, while performing a basic Natta adavu, while maintaining Araimandi and placing your leg in Anchita Pada-bheda by your side. The movement should be controlled. In anga saushthava we focus on core muscles, hip muscles, they are contracted. While jumping also we need a controlled jump. So, controlled movement leads to graceful performance.</p>

<ul style="list-style-type: none"> • Centering 	<p>For students to control their bodies, they must have a starting place: the center. The "powerhouse" muscles are a group of muscles in the center of the body that include the abdomen, lower and upper back, hips, buttocks, and inner thighs. In Pilates, all movement should start in the center and work its way out to the limbs. All movement in Pilates should begin from the center and move outward to the limbs.</p>	<p>While maintaining Araimandi, a Bharatanatyam dancer should focus on the center of her body. Then only one will be able to maintain the balance in the pose. For example, most of adavus has starting position-Araimandi. So, it is already maintaining the center line but starting is always from the core that is center of the body.</p>
<ul style="list-style-type: none"> • Flow 	<p>Pilates aims for simple movement patterns, it is always about transiting from one pose to another, creating flow through the use of right transitions.</p>	<p>Only if the movements are executed in a fluid manner, then the dance piece be considered graceful. For example, In Bharatanatyam Nritta Kritis adavus and poses are done in transitions. That means it is done in the flow.</p>
<ul style="list-style-type: none"> • Postural alignment 	<p>Using correct posture while doing Pilates exercises provides safety. It corrects muscle imbalances and improves coordination.</p>	<p>Bharatanatyam dancers must maintain proper body alignment and posture to appear elegant and confident. It also helps with overall balance and control. Dancing with proper alignment is more comfortable and promotes longevity.</p>

<ul style="list-style-type: none"> • Precision 	<p>Precision is essential to do the Pilates exercises correctly. The focus is on doing one precise and perfect movement, rather than wrong ones.</p>	<p>Bharatanatyam should be done precisely because it is our responsibility to take this ancient art form to the next level while maintaining its quality. The physical qualities and skills of the dancers determine the quality of this dance form. A dancer's body is more capable of a wide range of movement if it is stronger and more flexible. Audience can easily understand the in-depth knowledge of a Bharatanatyam dancer if the movement is Precised.</p>
<ul style="list-style-type: none"> • Relaxation 	<p>Correct muscle firing patterns and upgraded mental concentration are boosted with relaxation.</p>	<p>If a Bharatanatyam dancer is conscious and anxious then he/she will not be able to give best of a performance. But if the dancer is conscious and relaxed then the performance can be better.</p> <p>Relaxation allows for creativity. Relaxation makes room for creative thinking, which is often referred to as being in the flow or zone.</p>
<ul style="list-style-type: none"> • Stamina 	<p>With increased accuracy, motion becomes more effectual so there is less</p>	<p>Stamina is defined as increased endurance. It is essential for professional dancers to maintain their</p>

	stress to perform the exercises.	energy level throughout a performance or class. Increased stamina leads to the performance full of expressions and graceful movements.
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The researcher, being a Bharatanatyam dancer and Pilates instructor, can observe the similarities and connections between Bharatanatyam and Pilates exercise. And believes that it can be beneficial if Pilates exercises introduced and integrated into Bharatanatyam dancer's regimen. The above-mentioned Pilates exercise principles are applied in Bharatanatyam. Bharatanatyam dancers who practice Pilates exercise can increase their physical health and career span.

All of the principles can be applied to adavus, Bharatanatyam Nritya kritis are combination of adavus so we can directly apply all the principles to the Bharatanatyam Nritya kritis. Instructions and corrections that dance teachers give in their dance classes are covered by the principles of Pilates exercise. Pilates exercise can assist Bharatanatyam dancers improve their posture, physical health, dance technique, and performance.

The researcher has developed a combinations of Pilates exercises that can be practiced before practicing the specific adavu or Nritya kritis are shown below. The exercise combinations stated below are totally based on the researcher's personal experience and literature research. These exercises should be performed under the supervision of a certified trainer and a physiotherapist should be consulted if you are already suffered from an injury or now suffering from one. As we can be unaware of our postures while performing exercises. Consistency is also a crucial part. One example given during an interview with Nikunj Sir is about the importance and consistency of doing any exercise is, "Person A and Person B, both are dancers, Ms. A wake up at 8 and reaches office at 9 and Person B wakes up at 6'o clock, finishes up her exercise routine and reaches office at 9'o clock. So comparatively on an initial level, Person B's energy will be more than the p0erson B but, gradually the stamina of person B will increase, and on the day of performance, person B will wake up at 6, won't do any exercise still her performance will be better, her stamina will be better as she has trained herself for that every day.

So doing exercise on the day of performance is not recommended but consistency is always important.”¹ There are 3 levels of performing a Pilates exercise that are, beginners’ level, intermediate level and advanced level. Where advanced level exercises are more intensive. “a six-year-old should not perform high-intensity Pilates; however, three to four general Pilates exercises are fine. Teens as young as 12 or 13 years old can begin Pilates with one or two movements each from the above-mentioned set, as well as stretching as a cool-down activity. Before beginning the adavus or Nritta kritis, one might undertake the exercise combinations listed below to improve body strength and posture. Aside from that, dancers beyond the age of 12 can undertake the above-mentioned set-wise exercises as needed for their bodies, but only after knowing them well and for 60 to 90 minutes twice a week.”²

4.4 Exercises suggestion for Adavus:

According to traditional adavus practices, Sthanaka, araimandi, or muzhumandi are applied, they are the basic positions of Bharatanatyam. Throughout the performance, the dancers remain in these stances. To maintain these poses, a strong core, strong thigh muscles and stability are essential. Exercise is required to develop these muscles and improve performance. Given below are suggestion of some Pilates exercises with their benefits to improve performance and prevent injury so that one can expand the career.

More than 200 exercises have been developed by Pilates exercise practitioners and trainers as a result of Pilates' increased popularity. Given that the researcher is only discussing Joseph Pilates' original Pilates exercises and how they can be used to train Bharatanatyam dancers for functional movement, it is important to note that the combinations of Pilates exercises listed below can be performed before practicing any adavu. After becoming experts at Pilates exercise, the students can choose from a variety of combinations of Pilates exercises, based on their knowledge, but professional advice is essential to prevent injuries. Researcher have talked about the exercises and their advantages so that a Bharatanatyam dancer can perform it more clearly. Every exercise focuses on the core muscles and benefits the dancers’ body but the researcher suggests only 3 to 4 of the most beneficial exercises for each adavu so that students can finish them quickly and begin practicing Bharatanatyam dance.

Pilates Exercises given below can be done twice a week for 60 to 90 minutes, if you are practicing only Pilates exercises. Pilates exercises can be done on the basis of counts and also be done on the basis of minutes, here the researcher is providing explanation on the basis of

1. Upadhyay, Nikunj. (2022, August 27) Personal Interview.

2. Patil, Smita. (2022, march 1) Personal Interview, Pune

minutes. For, beginners, 1 to 2 minutes per exercise, Intermediate level 2 to 4 minutes per exercise and for advanced level you can do it for 3 to 7 minutes per exercise.

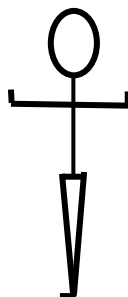
If you are practicing it as a warm up exercise, it can be done before starting with your dance routine, 10 counts each, 3 to 4 exercises are enough. The rules for Pilates exercise are the same as for the other exercises. It is advised to practice only few warm up exercises before the performance.

- 1 day prior to any Bharatanatyam performance do not experiment anything. Just follow your daily routine.
- Just before going to perform margam/ any performance: do not do any exercise just do general stretching or few warm up exercise.
- Do not forget to cool down after the performance.

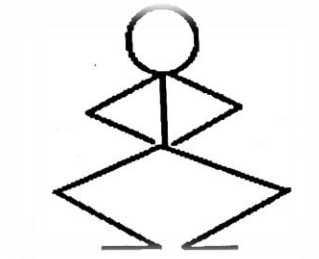
The “how to” process is already given in earlier chapter, given below is the exercises which can be done before practicing a particular adavu or Nritta Kriti. Every time one performs Pilates exercise whether specifically in a Pilates class or as a warm-up before beginning Bharatanatyam dance practice, “the hundred” (Pg. No. 14) is a must do exercise.

Basic Positions-

Sthanaka-



Araimandi-



Muzhumandi-

For Sthanaka, Araimandi and Muzhumandi strengthening of the core muscles and inner thigh muscle and gluteal muscle is must. The Pilates exercises are listed below to help strengthen these muscles.

Pilates exercises for basic positions:

1. The Hundred:

- It stabilizes core muscles which can be beneficial for basic positions.
- Increases blood circulation and supports optimal breathing pattern.

2. The Roll Up:

- It challenges core muscles.
- Tightens abdominal muscles
- Strengthens back
- Mobilizes spine.

3. The One Leg Circle:

- It articulates, stretches and strengthens leg in hip socket.

4. The Side leg kick:

- Improves hip mobility and strength
- Works inner and outer thighs

- Promotes proper alignment and good posture.

1. Tatta Adavu (Thai Ya Thai) (The flat foot strike):

Pilates Exercise for Tatta Adavu:

1. The One Leg Circle

- It articulates, stretches and strengthens leg in hip socket.

2. Rolling back

- Reduces tension in spine
- Improves abdominal control of momentum in movement

3. One Leg Stretch

- Strengthens and stabilizes the core

4. Double Leg Stretch

- Tones abdominal muscles
- Strengthens back
- Develops coordination

5. The Spine stretch

- Improves spinal articulation
- improves torso and leg flexibility
- Supports good posture

are good exercises which focus on thigh muscle, calf muscle and develop control over the ankles and to strengthen the core and keep your spine proper and fit.

2. Natta Adavu (tai yum tat tat) (Movement in Stretch):

Pilates exercises for Nattu Adavu:

1. Spine stretch

- Improves spinal articulation
- improves torso and leg flexibility
- Supports good posture

2. Shoulder bridge

- Increases shoulder stability
- Strengthens powerhouse muscles
- Opens chest and pelvic area

- Works backs of legs

3. The hip twist with stretched arms

- Strengthen the oblique muscles
- Helps to shape the waist
- Strengthens the shoulder
- Improves control over the leg movement.

4. The leg-pull-front

- Stretches Achilles tendon
- Strengthens upper limbs and shoulder girdle
- Stabilizes powerhouse muscles

5. The scissors

- Increases abdominal control
- Improves stabilization through shoulder area
- Lengthens hamstrings
- Works hip flexors
- Improves coordination

3. Korvai Adavu (Tat Tai Tam) A Brisk Movement:

Pilates exercises for Korvai Adavu:

1. Rolling back

- Reduces tension in spine
- Improves abdominal control of momentum in movement

2. The spine stretch

- Improves spinal articulation
- improves torso and leg flexibility
- Supports good posture

3. The corkscrew

- Strengthens deep abdominals
- Increase upper body stability
- Improves hip mobility

4. The neck pull

- Develops abdominal strength

- Promotes spinal articulation
- Flexibility and strength
- Improves posture

4. Kutthu Adavu (Tat Tai Ta Ha) Energetic Movements:

Pilates exercises for Kutthu Adavu:

1. The saw

- Streamlines waistlines
- Stretches hamstrings
- Enhances spinal rotation and flexibility

2. The seal

- Improves balance and coordination The shoulder bridge
- Increases shoulder stability
- Strengthens powerhouse muscles
- Opens chest and pelvic area
- Works backs of legs

3. The spine twist

- Strengthens oblique muscles
- Spine extensors
- Helps to train body to move from center when performing rotation actions.

4. The double leg kick

- Stretches the chest
- Works on abdominals
- Works on hip flexors
- Back extension improves the flexibility of back
- Help you to maintain good posture

5. Theermanam adavu: Tadhi Gina Tom: Vibrant Movement:

Pilates Exercises for Theermanam Adavu:

1. The bicycle

- It works on legs, gluts, abs, shoulders and arms at same time.

2. The swan dive

- Strengthens back

- Works on gluts and hamstrings muscles
- Works on inner thighs

3. The one leg kick

- Strengthens core muscles
- Helps you keeping shoulder open and shoulders stable

4. The double leg kick

- Stretches the chest
- Works on abdominals
- Works on hip flexors
- Back extension improves the flexibility of back
- Help you to maintain good posture

5. Rocker with open legs

- Strengthens the abdominal muscles
- Improves posture
- Improves balance, coordination and flexibility

6. Kudittu Mettu Adavu (Tai Ya Tai hi): Sound of Heel:

Pilates exercises for Kudittu Mettu Adavu:

1. The control balance

- Strengthens hip extensors
- Improves hip flexibility
- Strengthens core

2. The jack knife

- It provides a stretch for the back and shoulders
- Spinal articulation(carefully rolling the spine up and down)
- Improves flexibility and posture

3. The bicycle

- It works on legs, gluts, abs, shoulders and arms at same time.

4. The one leg kick

- Strengthens core muscles
- Helps you keeping shoulder open and shoulders stable

5. Rocker with open legs

- Strengthens the abdominal muscles

- Improves posture
- Improves balance, coordination and flexibility

7. Veeshu adavu (Tha thai tat) Arc Movement:

1. The spine stretch

- Improves spinal articulation
- Improves torso and leg flexibility
- Supports good posture

2. The side bend

- Stabilizes spine in a neutral position
- Develops balance and proper alignment
- Strengthens torso, upper limbs, and oblique abdominal muscles
- Increases upper body flexibility

3. Rocker with open legs

- Strengthens the abdominal muscles
- Improves posture
- Improves balance, coordination and flexibility

8. Pakka Adavu (Thai Thai di di Thai): Sideways Movement:

Pilates Exercises for Pakka Adavu:

1. The side bend

- Stabilizes spine in a neutral position
- Develops balance and proper alignment
- Strengthens torso, upper limbs, and oblique abdominal muscles
- Increases upper body flexibility

2. The bicycle

- It works on legs, gluts, abs, shoulders and arms at same time.

3. The spine stretch

- Improves spinal articulation
- Improves torso and leg flexibility
- Supports good posture

9. Tatti Metti Adavu:

Pilates exercises for Tatti Metti Adavu:

1. Swimming

- Challenges core stability against dynamic movement of arms and legs
- Strengthens and stretches spine

2. The boomerang

- Stabilizes the hips
- Helps develop flexibility
- Strengthen the core

3. The control balance

- Strengthens hip extensors
- Improves hip flexibility
- Strengthens core

4. The rocking

- Stabilize the torso
- Provide good posture
- Flexible back

10. Sarukkal Adavu (Tai Ya Tai Yi) A Sliding Movement:

Pilates exercises for Sarukkal Adavu

1. The push up

- Strengthens biceps, shoulders, chest, back and core
- Tones abs

2. The hip twist with stretched arms

- Strengthen the oblique muscles
- Helps to shape the waist
- Strengthens the shoulder

11. Paichal Adavu (Thai Thai dat Tha): Movement of High and Far Leap

Pilates exercises for Paichal Adavu:

1. The one leg kick

- Strengthens core muscles
- Helps you keeping shoulder open and shoulders stable

2. The boomerang

- Stabilizes the hips
- Helps develop flexibility

- Strengthen the core

3. The seal

- Improves balance and coordination

4. The crab

- Provide stretch to the lower back
- Strengthens the abdominal muscles
- Strengthens the oblique

12. Mandi Adavu (tangad tat tat dhin na): Sitting on Toes

Pilates Exercises for Mandi Adavu:

1. The swan dive

- Strengthens back
- Works on gluts and hamstrings muscles
- Works on inner thighs

2. The jack knife

- It provides a stretch for the back and shoulders
- Spinal articulation(carefully rolling the spine up and down)
- Improves flexibility and posture

3. The double leg stretch

- Tones abdominal muscles
- Strengthens back
- Develops coordination

4. The double leg kick

- Stretches the chest
- Works on abdominals
- Works on hip flexors
- Back extension improves the flexibility of back
- Help you to maintain good posture

13. Periya Adavu (tat thai tham) Blooming Variations:

Pilates exercises for Periya Adavu:

1. The leg pull front

- Stretches Achilles tendon
- Strengthens upper limbs and shoulder girdle

- Stabilizes powerhouse muscles

2. The shoulder bridge

- Increases shoulder stability
- Strengthens powerhouse muscles
- Opens chest and pelvic area
- Works backs of legs

3. The leg pull front

- Stretches Achilles tendon
- Strengthens upper limbs and shoulder girdle
- Stabilizes powerhouse muscles

4. The push up

- Strengthens biceps, shoulders, chest, back and core
- Tones abs

4.5 For Nritta kritis:

Nritta Kritis are a combination of several adavus, so the researcher will not suggest particular exercises combination for particular Nritta kritis, if you practice Pilates exercises given above constantly with discipline, you automatically improve your body and see the results while performing the Nritta kritis.

4.6 To concentrate on a particular part of the body:

Every body is unique; thus, Bharatanatyam dancers should be aware of their body type and choose workouts accordingly. A dancer should recognize which part or muscle of the body requires more attention because it varies from person to person. For example, a dancer may have a very flexible physique but a weak core, or a powerful abdomen but a weak thigh muscle, which may result in injury. To do Bharatanatyam, all of the body's muscles must be strong and flexible at the same time. So, depending on one's needs, he or she may engage in the following exercises to improve performance and avoid injury.

4.6.1 Set 1- for abdominal muscle and spine:

1. The hundred
2. Roll up
3. Push up
4. Side bend
5. One leg circle

6. The scissors
7. Roll over
8. Double leg stretch
9. Side kick kneeling
10. Leg pulls front
11. The saw
12. Corkscrew
13. Spine stretch forward
14. The one leg stretch

4.6.2 Set 2- for a stronger mid-section/core:

1. Double leg stretch
2. The scissors
3. Roll up
4. Side leg kick kneeling
5. Side bend
6. Criss cross
7. Corkscrew
8. Rolling like a ball
9. Bicycle
10. The saw
11. Teaser
12. Roll over

4.6.3 Set-3 Side lying workout:

1. Side leg kick
2. Shoulder bridge

4.6.1 4.6.4 Set-4 Leg-core engaging workout:

1. Corkscrew
2. The leg pull front
3. Rocker with open legs
4. Bicycle
5. swimming

4.6.5 Set-5 Leg workout:

1. One leg circle

2. Side leg kick
3. The one leg stretch
4. The double leg stretch

4.6.6 Set-6 The arm toner:

1. The hip twist with stretched arms
2. The bicycle

4.6.7 Set-7 Spinal call:

1. The roll up
2. The roll over with leg spread
3. The spine stretch
4. The teaser
5. The side bend
6. The spine twist

4.6.8 Set-8 Back basics:

1. Swimming
2. The roll up
3. The rolling back
4. The double leg stretch
5. The push up
6. The leg pull
7. The crab
8. The jack knife
9. The swan dive
10. The rocking
11. The double leg kick

4.6.9 Set-9 Gluts:

1. Shoulder bridge
2. The bicycle
3. The swan dive

4.7 Stretching:

Maintaining flexibility by stretching can help you avert many of the minor strains from activities of daily life that take a toll on you over time. There's also a meditative element to it that helps you focus and relax. For Bharatanatyam dancers stretching is an important element

for career longevity. Stretched muscles are more flexible and one can move without having much risk of injury.

1. Spine stretch
2. Roll over
3. Shoulder bridge

4.8 Conclusion:

In this chapter we have seen the similarities in Bharatanatyam principles and Pilates exercise principle because of which integrating Pilates exercise in Bharatanatyam is beneficial for Bharatanatyam dancers. Researcher applied Pilates workouts for multiple basic stances, Bharatanatyam adavus, and diverse body areas to prevent injury. Pilates training can help Bharatanatyam dancers, professionals, and teachers improve their learners' physical strength and flexibility by emphasizing balance, breathing, flexibility, and postural alignment. Pilates exercises are applicable to Adavus, Nritha kritis of Margam are combinations of adavus so we can apply Pilates exercise to Nritha kritis also. These exercise suggestions are researchers' personal advice being a trainer, undoubtedly there is a more scope of improving or changing the exercise sequence or type after detailed study of the muscles and body anatomy or Pilates anatomy as every body is different. Pilates is recommended because it develops the necessary capacities for dance performance while keeping the artistic component in mind. Teachers should be aware of the importance of conditioning outside of dance sessions, not only to improve performance but also to protect dancers from injury. By stressing on breathing, alignment, position, and abdominal exercises, Pilates exercise can help the dance class enhance ideal dance technique, explore and increase one's physical potential, and avoid and rehabilitate injuries.

Chapter 5 Therapeutic value Pilates for Bharatanatyam Dancers

5.1 Introduction:

In a previous chapter, we saw how Pilates exercise integrated into Bharatanatyam to prevent injury and strengthen the muscles, but if a dancer is injured, they also get benefitted from Pilates therapy. “The love story between the Pilates method and dance started in the 1930s, when Martha Graham used to send her pupils to Uncle Joe’s studio in New York. Since then, dancers of different styles have adopted the method, aiming to improve their performance in scene. Several of the names from the first generation of Pilates instructors, trained by Joseph Pilates, were dance professionals, like Eve Gentry, Ron Fletcher, Carola Trier, Kathy Grant, Lolita San Miguel, Jay Grimes, and Romana Kryzanowska. This fact leads to the conclusion that the method, since its origins, contributes positively to the performance of the dance professional, either as a way to prevent injuries or as a way to maintain health or to promote the rehabilitation.”¹ While conducting this research, the researcher learned that Mr Joseph Pilates successfully ran a rehabilitation program for injured soldiers during World War I. Later, he taught Pilates to ballet dancers in various dance studios and owned his own studio where he trained dancers and professional athletes. The Pilates method has been introduced to many dance companies and dance schools over the years, including Ballet British Columbia and the National Ballet School. Pilates exercise classes have been added to the dance curricula at colleges and high schools like Goucher College, Harid Conservatory etc. Several physiotherapists have written entire books on Pilates for rehabilitation. We read that first-generation Joseph Pilates students opened their own studios in the US. The given information indicates that physiotherapists as well as dancers adopted Pilates exercise, benefited from it, and then opened their own studio. “The Pilates method is a complete and through program of mental and physical conditioning with an expanding orbit of potential exercises. Many of the small therapeutic movements designed to help people recovering from injuries can be intensified to challenge seasoned athletes. This is what makes the Pilates method so attractive to the general public, as well as dancers and athletes.”²

When recovering from an injury, building strength, or avoiding injuries, Pilates helps people with stability, flexibility, strength, body awareness, and coordination. “In Bharatanatyam knee, calf muscles, hip muscles engaged, working out and strengthening these muscles are very much

1. Debora Pereira Bolsanello, Sai Tapikar, Debashree Marathe, Smita Patil, Is Pilates a Somatic Education Method, Brazilian Journal on Presence Studies vol.5, jan-April 2015, page 101-126

2. Craig, Colleen. Pilates on the ball, Pg 10.

important. To protect these muscles it is important to develop certain kind of an exercise which will work very strongly on knee, hip and calf, that is why some of the best choice of supplementary exercise for Bharatanatyam is Pilates exercise.”¹ To aware Bharatanatyam dancers about Pilates exercise and its therapeutic value, researcher wants to draw attention towards Pilates exercise as a therapy in this chapter, which will be explained with case studies conducted by physiotherapists and Pilates exercise experts.

5.2 Why Pilates is a Rehabilitation and Preventative exercise?

In Pilates exercise the whole body muscles are used and exercised in various ways which leads to tissue healing, building strength of the muscles, coordination and postural awareness. Another function of Pilates exercise is that it works with mind-body coordination and breathing which enhances your concentration and awareness and it is very important to breathe properly for your physical and mental health. It oxygenates your brain tissues which may help in reduce stress and relax. Because it repairs tissue and strengthens muscles, it is useful in the rehabilitation of an injury and, if practiced without injury, can aid in the prevention of injuries.

5.2.1 Preventive Pilates:

Prevention is always better than cure. A piano is an instrument, and a piano player will always take care of his instrument, just as a Bharatanatyam dancer will always take care of their body. They must lengthen and strengthen their muscles in order to prevent injury. Pilates exercise can not only help you recover from an injury, but regular practice under the proper supervision can help you avoid injuries and extend your career. Due to its low-impact nature, Pilates helps dancers to maintain their healthy muscular tone, core strength, and flexibility while protecting them from injury. Additionally, when dancers are healthy, it helps to prevent injuries by enhancing supportive muscles and resolving imbalances brought on by regular training. Its been said by the physiotherapists that from several decades, the value of Pilates exercises for prevention of an injury is undisputed².

The body's muscle imbalance can be caused by a number of factors. It is significantly influenced by things like walking, sitting, bending, sleeping, running, and exercising. The daily activities could result in some injuries because of wrong muscle movements. When we move incorrectly, we put a lot of stress on our muscles. Incorrect muscle movement causes our muscles to weaken over time, which may eventually result in imbalance and then injury. It puts

1. Chakroborty, Surjeet. physiotherapist and Pilates instructor, zoom meeting Interview, 8-03-2022,

2. Geweniger & Bohlander, Pilates: A teacher's manual, chapter 12, Pg.293.

less stress on body and whole body get exercised evenly which is the best way to prevent an injury. “Pilates is one of the fastest growing workout routines in the United States and around the world. This popularity is due to the many benefits of Pilates like enhanced strength, flexibility, and agility due to regular practice. More than just a regular exercise, Pilates is recommended by physicians for rehabilitation treatment after an injury. If you are experiencing a horrible back ache, you can try Pilates, since it has proven to be beneficial for moderate to severe spinal conditions.”¹

5.2.2 A Flexible Treatment Option:

Pilates is a flexible therapeutic method. The way a specialist uses the Pilates principles will determine how effective Pilates is as a "healing treatment." A Pilates routine offers more flexibility when compared to other conventional rehabilitation techniques. It can be done twice or thrice a week, anytime during the day also half an hour to 45 minutes are sufficient. As per the condition of the patient the level of Pilates is chosen by the therapists. In order to maximize the benefits, how to properly care for your body and adopt the best posture is taught by Pilates exercise that is why Pilates exercise is a very flexible option.

5.2.3 An excellent workout option:

Its qualities like strength, focus, Centering, control, precision, fluidity, breathing, and flow makes it an excellent workout option and that is the reason it is widely used in physical therapy. No matter where you practice Pilates, these factors are constant and help your body grow and get stronger. The main aims of the Pilates exercise are to increase your spine's flexibility and range of motion. It also encourages the practitioner to focus more intently on how to pose while performing various movements and tasks in order to avoid further injuries. This can assist Bharatanatyam dancers in understanding which muscle they are using and where they are lacking while performing any kriti. The challenging but beneficial exercise helps to develop and safeguard the muscles that support your spine. All the muscles that have weakened as a result of an injury or poor posture will be strengthened by a thorough Pilates workout. Keeping your breathing rhythm under control while exercising is also good for your muscles. Regular Pilates practice promotes the growth of your body's flexibility and strength.

1. <https://ocwellnessphysicians.com/pilates-a-great-physical-therapy-alternative-for-injury-rehabilitation/>

5.2.4 The Advantages of a Pilates Exercise:

Pilates has many benefits, but only when done properly; otherwise, injuries may take place. An expert or therapist's advice will guarantee that you are getting the right amount of exercise to recover from any injuries and prevent further issues. Pilates is a much targeted exercise that helps to increase endurance, coordination, and focus. Improved breathing, balance, spine stabilization, and shoulder movement are just a few additional advantages. These are a few advantages of regularly performing Pilates exercise under the guidance of a professional. Pilates ideas are great for recovering from injuries, but if not combined with specific therapeutic methods, they can make things worse. Pilates is a wonderful form of exercise if you are healing from an injury. Select the top Pilates instructors to aid in the recovery of injuries and the reduction of pain.

5.2.5 Pilates as rehabilitation method:

Joseph Pilates developed an exercise method and named it Contrology, he used his method on injured soldiers of World War I, proved that his method is effective and can be used as rehabilitation method. "Pilates is a great tool to assist or even enhance a physiotherapy program when someone is recovering from an injury. By strengthening the deepest muscles of the core, optimizing alignment, and creating correct movement patterns, we can also help to prevent re-aggravation of those injuries and the development of new ones. Physiotherapists are always searching for a system that can take patients from the early stages of rehabilitation to the long-term goal of a conditioned, efficiently functioning body. Pilates is that system!"¹

The entire body is engaged. Pilates exercise addresses these issues and makes the necessary corrections, allowing your body to realign and achieve balance. As a result, you can avoid further pain or injury in addition to recovering from one. It will also help you retrain your body's movement patterns, teach you how to move more effectively, and build your strength and agility. It places a strong emphasis on spinal and pelvic stability, which promotes mobility and endurance. Regularly practicing Pilates exercise enhances overall health, athletic performance, and injury recovery. Pilates teaches you about your body and how it moves, enabling you to manage your own recovery. Patients can move at their own pace and gradually increase the incline of activity to match their capabilities with Pilates exercise because they are so adaptable.

1. Pilates for rehabilitation- Recover from injury and optimize function by Samantha Wood, foreword by Rael Isacovitz. Pg 23,

While researching about Pilates technique and dance, the researcher found that At St. Francis Hospital in San Francisco, the first dance medicine clinic made the actual inroads of Pilates' method into the therapeutic area. Around 1983, a surgeon named Dr. James Garrick established the clinic. He enabled Los Angeles-based Pilates instructor Ron Fletcher to train the clinic's staff members.¹

- **Pilates Help with Spinal Diseases:**

If suffering from poor posture, especially if the muscle strain is left untreated for a long time, back and shoulder ligaments, tendons, and muscles suffering from poor posture. This may result in pain from unnatural movement patterns, as well as injury. Pilates exercise enables you to align your shoulders and spine correctly for ideal posture and to reduce some of the stress on your spine by strengthening your back and core muscles. Along with teaching you how to recognise when your spine is out of alignment, Pilates exercise also gives you the mental tools you need to become more conscious of your movements and posture. This kind of mental awareness can be very helpful for Bharatanatyam dancers who have spinal diseases.

- **It works on core strength, promoting muscular symmetry and spinal health:**

One's core gets stronger with Pilates exercise. Bharatanatyam stances like araimandi and adavus require strong core muscles. They control the balance and stability, enhancing the ability to perform and lowering the risk of injury. Pilates exercise helps you build stronger core muscles, which keeps the body away from compensating for awkward movements and getting stiff and exhausted. It keeps the posture correctly supported while enabling muscles to move freely and productively. By reducing stress and needless strain on the spinal discs, it can help treat and even prevent injuries. Additionally, Pilates exercise will equally work both sides of your body, improving its symmetry and preventing overuse and injury both of which are more likely to affect your performance.

- **Pilates exercise is proper rehabilitation technique:**

Pilates exercise is flexible as well as uses your own body as a resistance so there are very less chance of putting burden on your body muscles. And it was used on the soldiers and proven effective. Professional dancer Ron Fletcher and Kathy Grant shared that while exercising with Joseph Pilates, even with their injuries they performed better and recovered faster. It focuses on core muscles, works on stability as well as mobility, it includes both- open kinetic chain

1. <http://www.fletcherpilates.com>

(where hands or legs move freely in space) and closed kinetic chain (where hand and legs remains in constant touch with the surface), Pilates exercises are functional, emphasises on breathing, adaptable for many diseases, also works on mental conditioning. These all points achieve a goal of a physiotherapists who wants to bring change in patient's condition. That is why Pilates exercise is proper rehabilitation technique.

- **One of The Best Benefits of Pilates Is That It Increases Flexibility:**

Pilates exercise also focus on dynamic stretching. Pilates exercise routines include stretches and exercises that are intended to lengthen and strengthen the muscles. Your range of motion will increase as your muscles' dynamically functional flexibility increases, which will help you perform better. Therefore, Pilates can be a fantastic way to treat joint stiffness and other injuries related to flexibility. The body's capacity to move the joint with a greater range of motion and without pain gradually increases with stretching and strengthening of the muscles surrounding the joints.

- **Pilates is a more active rehabilitative approach:**

Because of its rehabilitative nature Pilates exercise are more effective than physical therapy. Physical therapy can seem restrictive to some, whereas Pilates is a very adaptable form of exercise. Physical therapy may concentrate on a particular body part, such as the knee following knee replacement surgery. Pilates, on the other hand, works every muscle in the body. In order to stop further harm, it not only targets the injured area but also other parts of the body. "Today, millions of people use Pilates as not only a form of therapy, but also as a main component of their training program. What a great testament to Joseph Pilates. He really was someone who was ahead of his time."¹ Pilates not only strengthens muscles but also the mind by boosting motivation and igniting feelings of hope, it has motivated many people to stay on the track to recovery. "By starting Pilates, my fitness level, core strength, and flexibility have greatly increased. This has helped my overall quality of life and with my hobbies of tennis, kayaking, and biking. Combining my Pilates sessions with my conditioning program has helped my overall leg strength, mobility, and recovery from knee surgery."² Joseph Pilates aimed to create a proper training system that would restore patients' and clients' inner and outer strength and confidence, according to the publications the researcher looked at. By promoting awareness of movement from the inside out, the Pilates method encourages internal mobility.

1. Pg. 11, Pilates and conditioning for athletes- an integrated approach to performance and recovery by Amy Lademann and Rick Lademann

2. Terry North, client, and lifelong athlete

5.3 Therapeutic Pilates and its application to Bharatanatyam:

There is a difference between normal Pilates exercise and therapeutic Pilates exercise. Therapeutic Pilates is used to treat patients after an injury or surgery. In therapeutic Pilates an individual's particular medical conditions and physical needs rather than having many people complete the same Pilates exercise. It started gaining popularity because of its effectiveness. Ballet dancers, players, and athletes are already applying it, so why shouldn't Bharatanatyam dancers? Most used muscles in Bharatanatyam are core muscles like pelvis muscles, abdominal muscles, inner thigh muscles, shoulder girdle. Pilates exercise primarily target these muscles, and the researcher's personal experience suggests that Bharatanatyam dancers can benefit if utilized correctly. Pilates training must have been effective; at the inaugural conference of the Pilates Method Alliance, professional dancers Ron Fletcher and Kathy Grant recalled that, despite their injuries, they danced better and healed faster after working with Joseph Pilates.¹ Pilates training is becoming increasingly popular among dancers due to conceptual parallels, anatomical correlations, and tactile linkages between Pilates and dance movements. The Pilates exercise routine and Bharatanatyam are linked in the following way.

5.3.1 Alignment and Core Stability:

Proper spine and pelvic positioning is must for Bharatanatyam dancers. Pilates exercise emphasis on the spine as well as pelvic muscle. Which build up core stability and alignment of the body. Pilates can give Bharatanatyam dancers the core strength they need to move, with stability, control, and a full range of motion by working the abs, lower back, and gluts throughout all exercises. Maintaining neutral spinal-pelvic alignment, or core stability, also provides central control for movement, effective weight transfer, and shock absorption to prevent injury.² Dancing in neutral position reduces the risk of injury. This "neutral" spine and pelvic position necessitates pulling in the abdominals, engaging the back extensors, and maintaining a balance of strength and flexibility between the hip flexors and extensors.³

5.3.2 Posture and the Shoulder Girdle:

The shoulder girdle is another key muscle for Bharatanatyam dancers to concentrate on because the shoulders are used continuously when performing. Core stability, alignment, and shoulder

1. (Pg. 8, chapter 1, Pilates- A teacher's manual by Geweniger and Bohlander)

2. Clippinger, 2007, p.112-113; Smith, 2009). Clippinger, K. (2007). Dance anatomy and kinesiology. Champaign, IL: Human Kinetics.

3. (Ahearn, 2006, p.93; Fitt, 1996, p.163) Ahearn, Elizabeth Lowe. (2006). The Pilates method and ballet technique: Applications in the dance studio." Journal of Dance Education, 6(3), 92-99.

girdle all contribute to appropriate posture and, if exercised properly, it may lower the risk of injury. Pilates can assist Bharatanatyam dancers in maintaining good shoulder girdle placement and correcting postural difficulties caused by rounded shoulders by strengthening and engaging the muscles of the "secondary powerhouse". Pilates emphasizes excellent posture and shoulder and chest opening. Throughout all movements, keep the shoulders down and back and the chest open. As a result, the shoulder girdle musculature functions as a "secondary powerhouse," with the muscles that stabilise the shoulder complex, depress and adduct the scapula, externally rotate and extend the shoulder, and expand the chest engaging throughout all motions.¹

5.3.3 Symmetry:

Pilates' emphasis on symmetry can assist Bharatanatyam dancers in maintaining shoulder and hip alignment, promoting bilateral muscle application, and minimizing disparities in muscle strength and flexibility. As a result, there is a greater chance that no injuries will occur to the body.

5.3.2 5.3.4 Lengthening to Avoiding Hyperextension:

“Keep lengthening your muscles as you straighten them”² The forceful extension of a limb or joint beyond its normal limits, either for exercise or therapy, or in order to injure oneself. Pilates exercises emphasize lengthening, especially of the spine, and can assist Bharatanatyam dancers in locating and maintaining complete muscle length without locked or tight joints. This emphasis, which is an overarching image in all Pilates training, can educate hyperextended dancers the patterns of muscular activation required for appropriate extension, minimizing their risk of injury.

5.3.5 Integrated and Full-Body Muscle Engagement:

Pilates and Bharatanatyam dance movements both incorporate full-body muscle actions, including lengthening, contracting, and full range of motion. As a result, Pilates exercises allow Bharatanatyam dancers to focus on alignment and muscular sensations while strengthening and stretching.

5.3.6 Injury Rehabilitation:

Pilates is especially popular among dancers for injury rehabilitation due to these kinesthetic parallels. Pilates' emphasis on good alignment, "total integration of the body," and strength

1. (Massey, 2009, p.12). Massey, P. (2009). The anatomy of Pilates. Berkeley, CA: North Atlantic Books.
2. (Siler 21). Siler, B. (2000). The Pilates body. New York, NY: Broadway Books

training through a full range of motion, as well as its ability to replicate dance moves with resistance control, making it unique. “Ideally suited to use with dancers in the rehabilitation of an isolated joint”¹

Given the evidence that Pilates can benefit Bharatanatyam dancing technique in a variety of ways. It is essential to introduce Pilates exercises gradually to Bharatanatyam students in order to help them identify their centers, concentrate their minds, improve their warm-up, and clearly tie Pilates exercises to the core Bharatanatyam motions. “As physiotherapist I will always choose Pilates over Yoga, yoga has fantastic aspects but strength training component is much higher in Pilates than Yoga.”²

5.4 Injuries and its rehabilitation through Pilates exercise- Body part wise for Bharatanatyam dancers:

It should be noted that the information given below is by the physiotherapists, intended to be general for patients with the associated diagnoses. However, because each person is different and has different issues, it is important to assess each client individually and choose the appropriate modification. Exercises should not be included in the programme if the client lacks the strength, flexibility, or control to perform them correctly. Examples of diagnoses are provided merely as a guide for Bharatanatyam dancers to understand the therapeutic benefits of Pilates exercise.

5.4.1 The Neck:

Neck pain is extremely common in Bharatanatyam dancers and can be caused by a variety of factors, including continue being in one postures, minor falls or accidents, referred pain from upper back injuries, overuse, and stress or tension. Two-thirds of all dancers will experience neck discomfort at some point in their careers, according to research, and neck pain is the second most common disorder leading in injury and disability claims. Pilates is helpful for neck injuries and cervical disorders due to the emphasis on good posture, correct breathing, and muscle extension.

In diagnoses of-Cervical Disk Pathologies, Cervical or thoracic Osteoarthritis, Cervical Stenosis, Thoracic Outlet Syndrome, Whiplash Injury, Osteoporosis one can practice Pilates exercise like Single leg lifts, Spine twist, Single leg stretch, swimming, Pelvic curl, Chest lift, Single leg, supine spine twist, hundred.³

1 (Loosli, A.R., & Herold, D. (1992). Knee rehabilitation for dancers using a Pilates-based technique. *Kinesiology and Medicine for Dance* 14(2), 1-12.) (Loosli, 1992, p.1, 10-11).

2. Surjeet Chakraborty, 8-3-2022, Interview, Zoom meeting

3. Wood, Samantha., Pilates for rehabilitation- recover from injury and optimize function, Pg no. 223-228

5.4.2 The Spine:

Lower back pain is both unpleasant and costly. It may occur in Bharatanatyam dancers because of a lack of muscle awareness or an accident during performance or practice. Some dancers may feel less discomfort after an injury because they are already doing cross training activities and their lower back muscles are stronger.

In diagnoses- like Lumbosacral Osteoarthritis, Lumbar Stenosis, Spondylolisthesis, Lumbosacral Facet Joint Syndrome, Postural syndrome Sciatica, Sacroiliac joint dysfunction- the common problem is, pain in low back and buttock, area and often referred to groin or posterior thigh, pain aggravated by unilateral weight bearing, Lumbosacral instability, tight hamstrings, hip flexors, or piriformis, weak gluteal muscles one may practice Pilates exercise like Pelvic curl, Single leg lifts, Spine twist, chest lift, single leg stretch, front support, leg pull front, side bend.

5.4.3 The Shoulder:

The shoulder is the most frequently used portion in Bharatanatyam. Dancers' hands are regularly moved upward, behind, downward, and sideways. It is likely that over-practicing will result in shoulder injury. Other connected parts, such as neck and back injuries, may produce shoulder pain.

In diagnoses like- Impingement syndrome, bursitis, and tendinitis, Rotator cuff injury, Frozen shoulder, Shoulder Labral tear one may practice Pelvic curl, single leg lifts, spine twist, chest lift, hundred prep, Single-leg stretch, side bend etc.

5.4.4 The Hip:

Hip bears the most load of the body and it has the strongest ligament and largest joint. It supports the weight of the head, arms, and body. To perform daily activities maintaining adequate hip range of motion is essential. Although in Bharatanatyam dancers hip injuries are less frequent than knee or lumbar spine injuries. Hip dysfunction or weakness frequently contributes to or even causes issues in other areas. Study says that hip replacements will increase by 174% by the year 2030. However, the majority of experts concur that low-impact therapeutic exercise like Pilates is very effective in reducing pain and delaying the need for hip replacements.

In diagnoses like- Hip joint replacement, Hip Osteoarthritis, Hip bursitis, Piriformis Syndrome, Hip flexor Injury, Hip Labral Injury Pilates exercise like Pelvic curl, spine twist, chest lift, Hundred, Swimming, Single leg stretch, Shoulder bridge, Side bend are useful.

5.4.5 The knee:

The most common injury in Bharatanatyam dancers are knee injury. Bharatanatyam dancers are tend to put their weight either on their knee or ankle, this may cause injury. This happens because of lack of muscle awareness. To avoid knee injuries, pelvic muscles, trunk and hip muscles should strengthened. The researcher believe that Pilates is the best type of exercise for people with knee pathologies because all Pilates exercises incorporate pelvic, trunk, and hip control.

In diagnosis like- knee osteoarthritis, knee joint replacement, meniscal injury, anterior cruciate ligament injury (ACL), Patellofemoral pain syndrome, Iliotibial band syndrome, Patellar tendinopathy, Pilates mat exercise like Pelvic curl, hundred, single leg stretch, leg pull front, side bend, swimming, shoulder bridge can help.

5.4.6 The Ankle:

Overuse or trauma from high-impact sports such as dancing, running, jumping, and cutting cause the majority of foot and ankle injuries. As a result, the Pilates approach is an excellent therapeutic exercise for maintaining overall strength and fitness while the foot and ankle heal in the early phases of foot and ankle rehab. In her work titled "Use of Pilates in Foot and Ankle Rehabilitation," physical therapist Deborah Cozen (2001) says that integrating Pilates in the rehabilitation program will considerably improve a patient's healing process. She describes Pilates as a functional kind of exercise since it combines various planes of movement and encourages muscular balance between opposing muscles and the right and left sides of the body. Adequate ankle strength and mobility are obviously required for people to be able to dance, run, leap, and cut, but they are also required for simple daily activities such as walking, balancing on one foot, and getting up and down from a chair.

In diagnoses like-ankle ligament injury (ankle sprain), Achilles tendinopathy, shin splints, plantar fasciitis Pilates exercise like pelvic curl, leg pull front, shoulder bridge are useful.

5.5 Examples of rehabilitation through Pilates exercise:

5.5.1 Case studies done by physiotherapists:

Case-1

Background: Pilates is an exercise program that emphasizes breathing, stretching, and controlled movement. Today, Pilates is favored for both physical fitness and rehabilitation

program. The effectiveness of Pilates as a rehabilitation tool for a variety of conditions in an adult population is reviewed in this paper in the literature.

Methods: A systematic review of the literature was conducted in accordance with PRISMA recommendations. Cohort studies and randomised controlled trials (RCTs) were sought out using electronic databases, and inclusion and exclusion criteria were used. Utilizing the PEDro and CONSORT 2010 checklists, the final RCTs were evaluated.

Results: The inclusion criteria were met by twenty-three studies that were published between 2005 and 2016. These papers evaluated the effectiveness of Pilates in the treatment of chronic neck pain, postmenopausal osteoporosis, non-structural scoliosis, multiple sclerosis, low back pain, and ankylosing spondylitis. Pilates was found in 19 studies to be more effective than the comparison or control group at reducing pain and disability levels. The quality of the papers varied when evaluated using the CONSORT and PEDro scales, with more papers falling toward the higher end of the scale.

Conclusion:

Pilates has been found to be effective in achieving desired outcomes in the majority of clinical trials conducted in the last five years into its use as a rehabilitation tool, particularly in the area of reducing pain and disability. It highlights the need for more research in these many areas, particularly on the advantages of specific Pilates exercises for the treatment of particular conditions.¹

The researcher might conclude from the above case study that Pilates exercises are becoming more popular in rehabilitation, and their popularity is growing as people see positive results. Therapeutic Pilates exercises are extremely beneficial, and when done by Bharatanatyam dancers, they can aid in the rehabilitation of any injury, eliminating the need to leave the profession.

Case-2

Orthopaedic (chronic/Acute) Disease- Chronic Lumbar syndrome

Patient Example

Case History

Mr. M. has been complaining about back pain for more than 4 years. He is a chemist who is 52 years old and plays sports (swimming once in a week). His symptoms didn't begin right away and got worse with continuous standing and sitting; they weren't brought on by overloading.

1. Byrnes Keira, Ping-Jung Wu Stephney Willier, Is Pilates an effective rehabilitation tool? A systematic review

Mr. M. has experienced recurrent "low back pain" episodes, which have become more frequent over the past year.

Findings

Presents with a generally back flat and a slight pelvic tilt when standing. Extremely lengthened knees, external rotation of the feet, and extended legs. Forward bending causes a significant weight shift to the heels and a significant flexion of the middle and lower lumbar spine. Mr. M. claims that his lower back is slightly pulling. The distance between fingers and the floor is 3 cm.

The Laségue straight leg lift test, commonly known as the Safety Test, which screens for nerve irritation, demonstrates no disc involvement or any significant disease. Muscle testing and the Pilates screening reveal weak abdominal muscles, substantial contractures in the hip and pelvic region, and poor lumbar spine segmental stability.

Therapeutic Pilates Exercise Program:

Mr. M. is currently in the subacute period (phase II), preparing to enter the recovery stage (phase III). As a result, the Pilates movements used should be active/assistive in nature, with an emphasis on moving the lumbar spine and including axial elongation and dissociation to alleviate stress on the lumbar region. Furthermore, trunk strength should be increased, particularly in areas of segmental instability, and hip/pelvic area range of motion should be increased.

Mat exercises:

1. The Hundred
2. The Single leg stretch
3. The Bridge
4. The Dart
5. The Assisted roll up

Results:

For a period of six weeks, the aforementioned Pilates routine was practised twice a week. After that, Mr. M. continued his home mat training with proper progressions and began attending a weekly Pilates group session. Mr. M.'s back pain decreased as a result of improvements in segmental articulation and dynamic stability, as well as changes in his posture and everyday activities.

Case 3:

Impingement syndrome:

Patient Example

Case History

42-year-old Mr. S is the owner of an insurance company. He has been complaining for a number of months about right shoulder pain, which is made worse by prolonged side lying and overhead movements. Mr. S. plays tennis occasionally and jogs twice per week.

Previous Therapy: Mr. S's doctor discovered a subacromial impingement and a minor supraspinatus tendon inflammation. He was given a cortisone injection and told to take anti-inflammatory drugs as needed.

Findings

Mr. S. is a little overweight and has a thoracic kyphosis when he stands.

A painful arc of flexion between 80° and 120° is revealed by active movement analysis. The range of motion is completed when the shoulder is elevated to 170 degrees. Both shoulders have extension.

Therapeutic Pilates Program

The thoracic spine is the structure that supports the shoulder. The anatomy of this region is important because it influences how the glenohumeral joint operates mechanically. To accurately align the joint surfaces in the plane of movement, adequate thoracic extension is necessary during bilateral arm elevation and unilateral rotation during single arm movements. It is critical that the shoulder girdle muscular system has balanced strength relationships. Breathing and breathing-related motions can have a substantial impact on the shoulder region.

Taking these functional linkages (as well as the limits of the subacute period (Phase II) of rehabilitation) into mind, the Therapeutic Pilates Programme concentrates on thoracic spine mobility and shoulder joint stabilisation exercises. Following successful dynamic stabilisation over restricted motion ranges, more difficult activities can be added.

Mat exercises:

1. Dart Swimming

Result

After 8 weeks of manual massage treatment for the shoulder and functional taping for support, Mr. S. was able to move the unweighted arm pain-free. It took another 6 weeks for him to be able to perform exercises while playing sports with his arm moving practically painlessly. He

used the Pilates foam roller for corrective stretches on a regular basis and supplemented his other physical pursuits with Pilates sessions on occasion.

Case 4

Neurology (Peripheral/Central)

Condition Following Discectomy with Partial Paralysis

Patient Example

Case History

Mrs. P had microsurgery five weeks ago to remove a sequestrum that had been partially paralysing her right calf muscle for several weeks. She is a 46-year-old business consultant who enjoys competitive sports but currently suffers from moderate back discomfort when stressed. However, due to her partial paralysis, she struggles to walk swiftly upstairs.

Previous Therapy:

Exercises for isometric stabilisation dominated postoperative physical therapy. She also received electrotherapy for muscle stimulation.

Findings

Mrs. P has a sway-back posture when standing. Her right side has been freed. She is unable to complete a heel rise while standing on her right foot. Active rehabilitation is recommended for up to three months after surgery, according to medical standards. Mrs. P. should avoid active flexion for the first three months after surgery and should not sit for more than 15 minutes at a time. Mrs. P. want to complete her therapy at our facility and include Pilates training into her routine.

Therapeutic Pilates Program

Mrs. P. is currently at the subacute (Phase II) stage. In accordance with medical guidance, training focuses on back stability and right leg strength. Mobilisation exercises at the location of the operation must be avoided while surrounding vertebral segments are mobilised to prevent mobility impairments in the thoracic spine due to lumbar spine difficulties.

Exercises

Pilates Mat exercises:

1. The Dead Bug
2. The Side-lying
3. The Dart
4. The Leg Pull Front

Result:

The programme was followed twice or three times per week, with ever more stringent restrictions. Mrs. P's right leg had regained 80% of its former strength after three months, and she was starting to feel better. She planned to begin swimming lessons and continue her once-weekly Pilates routine in either private or group reformer courses.

Case-5**Multiple Sclerosis****Patient Example**

Case Analysis Mrs. W., 51, was diagnosed with multiple sclerosis four years ago. The illness's evolution follows a devious pattern. Mrs. W. complains of a shaky walk, weakness throughout her body, particularly on her left side, and feeling shaky when climbing stairs.

Previous treatment

Mrs. W. has so far participated in an inpatient rehab programme. She sees a neurologist and a physician who specialises in holistic medicine for her treatment, and she goes to physiotherapy (PNF/Vojta) once a week.

Findings

When standing, the tone on the left side of the trunk and shoulder is slightly lessened, and she favours that side. As she takes a stride forward while still standing, her weight shifts heavily to the left. A walk. Her movement is unpredictable, and the length of her steps is unequal. According to a modified fitness test, less strength is noted on the left side of the body, particularly in the hamstrings. There is significantly reduced trunk stability.

Therapeutic Pilates Program

Pilates exercise requires specialised training and experience to support those with neurological diseases. The therapeutic emphasis places a strong emphasis on the body parts that are still largely unaffected by Multiple Sclerosis because the disease is brought on by damage to the central nervous system, which is only marginally impacted by conventional training methods. It is important to avoid adding to your existing exhaustion, disappointment, or frustration while practising Pilates.

The closed kinetic chain is frequently the best place to start when stimulating and stabilising the trunk muscles and connections to the extremities, with a focus on the functional muscle chains.

Warning

When dealing with multiple sclerosis patients, stay away from exhaustion and frustration!

Exercise

Pilates Mat exercises:

1. The Chest Lift
2. The Bridging
3. The Side-lying
4. The Dart
5. The Possibly Roll Down
6. The Standing into Push Up

Result:

Due to the prognosis of the disease, expectations must be adjusted from the beginning. The maintenance of function and stabilisation of the mind and body are of utmost importance. Mrs. W continues to practise Pilates once a week and is happy with the physical improvements made possible by this particular training approach.¹

Case-6

Other medical conditions:

Oncological issues:

Pilates education can be a very beneficial tool for cancer patients, especially if exercise can reinforce a good body image. The guiding principle of the Pilates technique encourages the development of both the mental ('mind') and exterior ('body') elements of wellness. A lot of studies support the favourable impacts of physical activity and sports in general (Dr. Freerk Baumann, Sporthochschule Köln, <http://innerel.uk-koeln.de/forschung/ag-sportonkologie>). This is especially true in Pilates training, which emphasizes developing the entire person as well as the entire body throughout the training process.

While group training concepts have recently been developed in consultation with oncologists in order to assist those suffering from oncological diseases in stabilising their bodies and health, positive findings and experiences have recently been associated primarily with individual training.²

The researcher wants to make Bharatanatyam dancers aware of the seriousness of Pilates exercise, its application in medically proven injuries, and successful rehabilitation through it. This way, they will take it seriously, begin practising it, and be able to prevent and recover

1. Geweniger, V and A. Bohlander, Pilates- A teacher's manual, Pg No.-266 to 271

2. Geweniger, V and A. Bohlander, Pilates- A teacher's manual, Pg No.-266 to 271

from injuries. The researcher can infer from the case studies mentioned above that Pilates exercises are popular in rehabilitation and that this popularity is increasing as individuals become more aware of the benefits. When Bharatanatyam dancers perform therapeutic Pilates exercises, they can help with the recovery of any injury, preventing the need to leave the profession.

5.5.2 Personal experience:

The researcher was injured in an accident while obtaining an M.A in Bharatanatyam. The injury was to the shoulder, which caused the hand to be immobile. After visiting a physiotherapist and receiving correct treatment, the researcher's injury was gone but the pain remained. Later, the researcher joined a Pilates exercise class where shoulder muscles were strengthened and there is no pain in the shoulder. After that, the researcher decided to undertake a study because the researcher felt that Bharatanatyam dancers needed something strong as well as graceful like Pilates exercises, in their routine.

5.5.3 Cases shared by dancers in Interview:

Bharatanatyam dancer Shri Pavitra Bhatt ji revealed that he had a 1-foot-long rod in his legs with screws and 4 plates inside the face, his hip was not properly aligned, and his jaw was dislocated, but that with great effort, good rehabilitation, and perseverance, he is now a well-known Bharatanatyam dancer. Shivangee Vikram ji, a Bharatanatyam dancer, said that she suffered a grade 2 meniscal injury in her knee and recovered, but she continued to strengthen her knee to avoid further injury. Strength training, according to her, should be systematic and scientific. Manali Natali, a Bharatanatyam dancer, also revealed that after her pregnancy, she was unable to dance properly due to her heavy physique and lack of flexibility. She started doing exercise and strength training and now she can perform better.

5.6 Conclusion:

In this chapter, the researcher explained therapeutic value of Pilates exercise. The research studies discussed in this chapter show that Pilates is effective at treating injuries. Studies like these significantly contribute to the body of evidence supporting the use of Pilates for Bharatanatyam dancers. This chapter explains why Pilates is so effective for rehabilitating and healing injuries and can be used by the Bharatanatyam dancer to improve performance, providing safe and effective cross-training, raising overall fitness levels and extend careers. We can infer from the research, the case studies conducted by physiotherapists, and the

examples provided above that Bharatanatyam dancers should adopt Pilates exercise, practice it, and benefit from it.

Chapter 6 Conclusion

The thesis' main objective is to explain the importance of supplementary exercise for Bharatanatyam dancers, introduce Pilates exercise, and explain its benefits, method of use, and therapeutic abilities so that dancers can trust the method and practice it to avoid injury and expand their career. The conclusion that can be drawn from the information presented in the thesis is that Bharatanatyam dancers need additional exercise if they want to enhance their performance. Few options of supplemental exercises offer advantages for injury prevention,

injury rehabilitation, and career longevity. Despite not mentioning any specific exercise, Natyashastra explains exercise is essential for dancers.

The researcher describes the various kinds of supplementary exercises and their importance in the first chapter. The researcher emphasizes Pilates exercise as a Pilates exercise instructor. To incorporate Pilates exercise into a Bharatanatyam dancer's regimen, it is necessary to first discuss Bharatanatyam and Pilates exercise, as well as the Bharatanatyam Nritya part on which Pilates exercises can be applied directly. The researcher has discussed a portion of Bharatanatyam on which Pilates exercises can be directly implemented in the following chapter. Following that, the third chapter explains the entire history and evolution of Pilates exercise, as well as the current state of Pilates exercise. The researcher introduces 34 exercises created by Joseph Pilates himself as well as all the fundamental guidelines and rules of Pilates exercise in the third chapter. This chapter covers Joseph Pilates' life and work, the evolution of Pilates exercises, and a step-by-step demonstration of the exercises with rare photographs of Joseph Pilates himself.

In the following chapter the researcher is recommending Pilates exercises for each adavu of Bharatanatyam, which can also be applied to Nritya Kritis of the margam, which is systematically set by the researcher specially for Bharatanatyam dancer on the basis of own experience. The process goes from explaining the meaning of integration, relative study of the Principles of Bharatanatyam and Pilates exercise, and then the researcher is integrating Pilates into Bharatanatyam. Pilates is a great way for dancers to supplement their conditioning. Pilates and dance share conceptual and anatomical similarities that can be very helpful in executing movements correctly, preventing injuries, and extending dance careers.

The researcher then uses case studies conducted by physiotherapists and personal experiences to explain the therapeutic value of Pilates exercise for Bharatanatyam dancers. The purpose of this study is to educate Bharatanatyam dancers about Pilates exercise and its extraordinary benefits. During research, the researcher confirmed the same. With the interview of Bharatanatyam dancers they shared that there is a need of systematic and scientific exercise routine for Bharatanatyam students to aware about their muscles usage during dance and prevent injury and career extension.

After the interviews with Pilates trainers the researcher come to the conclusion that there is a strong need of strengthening and lengthening the muscles to prevent injury and Pilates can fulfil that need of Bharatanatyam dancers. Additionally, according to physiotherapists, Bharatanatyam dancers should have strong hip and core muscles and Pilates exercise focuses

mainly on these areas. As a result, Bharatanatyam dancers may choose Pilates exercise and incorporate it into their regimen.

According to the researcher, Bharatanatyam dancers may benefit from functional Pilates training to stay physically fit. A Bharatanatyam dancer's confidence may increase after taking Pilates exercise classes. This research could serve as a starting point for research that how effectively Pilates exercise can be used by Bharatanatyam dancers in their daily lives.

Finally, and perhaps most importantly, as choosing dance as a profession is increasing, this research could contribute to the systematic methodology of Pilates Functional training as a form of physical therapy for Bharatanatyam dancers because proper exercise technique is not mentioned anywhere in any Bharatanatyam-related texts. Dance teachers should be aware of the value of conditioning outside of dance sessions, not only to improve performance but also to protect dancers from injury. Pilates is advised because it develops the necessary capacities for performance while keeping the artistic component in mind. Pilates can support the dance class in enhancing ideal dance technique, exploring and developing one's physical potential, avoiding injuries, and healing from injuries by emphasising breathing, alignment, position, and abdominal exercises.

Both Bharatanatyam and Pilates require the core muscles to be contracted in order to maintain proper posture. The information provided leads us to the conclusion that Therapeutic Pilates is very helpful for dancers, Bharatanatyam dancers can benefit from Pilates concepts. Performers of Bharatanatyam can progress quickly in their careers by working out Pilates exercise twice a week for 60 to 90 minutes. They can improve their posture, strength, and ability to prevent injuries. For Bharatanatyam dancers, Pilates training is specifically created to help them improve their physical skills in a precise way.

Applying the Pilates method entails, in the researcher's opinion,

- Doing full-body exercises and encouraging natural movement through conscious breathing.
- To effectively load joints through the development of muscle strength and flexibility in a balanced manner.
- To maintain sustained mental focus
- To exert as much muscle power through controlled movement as is required for each exercise, i.e., to use energy effectively.
- To start every body movement from a solid centre.
- To direct the natural rhythm of movement and stimulate muscle engagement through the breath.

- To execute precise, defined movements as accurately as possible.

Given exercise suggestions are the researchers' personal opinions as a trainer; there is unquestionably more room for improvement or modification of the exercise sequence or type after careful examination of the muscles and body or Pilates anatomy. Although the current research is only focused on the Bharatanatyam dance form, Pilates exercise may be incorporated in other Indian classical dance styles if they share some of the same core principles as Pilates exercise. The Pilates method is an excellent way for dancers to supplement their dance training. Pilates and dance share conceptual and physical implications in terms that can improve movement execution, prevent injuries, and lengthen the career of a dancer. It is crucial that Bharatanatyam dancers are aware of the nature of Pilates exercise and the evidence supporting its numerous therapeutic effects.

Bibliography

Reference Books in Gujarati

1. Upadhyay, Dr. Amrut, Abhinaya Darpanam, Saraswati pustak Bhandaar, Ahemdabad, first edition 2010.
2. Shastri, Dr. P.U. Natyashastra ma Nrutya ane sangit nirupanam, Saraswati pustak Bhandaar, Ahemdabad, First edition 2012.

Reference Books in Hindi/Marathi

1. Chapekar, [Sucheta Bhide.](#), Nrityatmika, continental Publication Vijayanagar pune, first edition, 2007
2. Deo Shreeraam, Manjari, Nrityasaurabh, Dr. Manjiri, Shreeram deo Publication, 2022.

Reference Books in English

1. Ghosh, Manmohan. Translator Natyashastra-A Hindu Dramaturgy and Histrionics Vol. I chukhambha Surbharati prakashan, edition 2020.
2. Vatsyayan, Kapila. Indian Folk Dance, Publications Division Government of india, fifth edition 2018.
3. Gupta, Dr. Roxanne Kamayani. A yoga of Indian classical dance, Publisher Inner Traditions Bear and Company, Original edition 2000.
4. Dey, Sreeti. Therapeutic advantages of Bharatanatyam, Notion Press, First edition 2021
5. Vivekananda, swami. Patanjali yoga sutras, Fingerprint Publishing, Prakash Books India Pvt Ltd, 2019.
6. Koch, Liz. Core awareness, North Atlantic Books Berkeley, California, Revised edition 2012.
7. Eisen, Isabel. Anatomy of Pilates, Human Kinetics Second edition 2019
8. Lademann, Amy & Rick Lademann, Pilates and conditioning for athletes, Human Kinetics, First edition 2018
9. Craig, Colleen. Pilates on the ball, Healing Arts Press; Pap/DVD edition 2003
10. Isacowitz, Rael & Karen S. Clippinger, Pilates anatomy, Human Kinetics Publishers; 1st edition 2011.
11. Winsor, Mari. The Pilates Powerhouse, perseus books, Da Capo Press, 1999, Cambridge
12. Ungaro, Alycea. Pilates body in motion, Dk Publishers, 2000
13. Zatsiorsky, Vladimir M. & William J. Kraemer, Science and practice of strength training,
14. Keshavan, Gayatri. Bharatanatyam Adavus, Notion press Channai, Tamil nadu First edition 2020.
15. Wood, Samantha. Pilates for Rehabilitation, Human Kinetics; 1st edition, 2018
16. Kenyon, Jonathan & Karen Kenyon, The Physiotherapist's Pocket Book, Elsevier; 3rd edition, 2018.

17. Ramchandrasekhar, P. Dance gestures English translation of Abhinaya Darpanam, giri tradindg Agency Pvt. Ltd. First edition 2007
18. Ghosh, Manmohan. Nandikeshwar's Abhinaya Darpanam, indian Mind/Dist. by Indica, third edition 1975
19. Sarabhai, Mrinalini. understanding of Bharatanatyam, Darpana Academy of Performing Arts 1981
20. Khokar, Mohan. The Splendor of Indian Dance, Hyperion Books 1986,
21. Menon, Bhaskar Radha Bhaskar, Anantha Nrityam, Mudra Publications, 2000
22. Chapekar, Sucheta Bhide. Nrutyatmika, Bookmark Publications 2018.
23. Geweniger & Bohlander, Pilates– A teachers' manual: Exercises with mats and equipment for prevention and rehabilitation. Springer, edition 2014.
24. Sile, Brooke. The Women's Health Big Book of Pilates: The Essential Guide to Total Body Fitness, Rodale Books 2013.
25. Gallagher, Sean P. & Romana Kryzanowska the Pilates method of body conditioning, Bainbridge Books Philadelphia, Illustrated edition 1999
26. Isacowitz, Rael & Karen Clippinger, Pilates Anatomy, Human Kinetics Publishers, First edition 2011
27. Gallagher, Sean P. & Romana Kryzanowska, The Complete Writings of Joseph H. Pilates: Return to Life Through Contrology and Your Health, Bainbridge Books 2000.
28. Friedman, Philip. & Gail Eisen, The Pilates Method of Physical and Mental Conditioning, Studio publication 2004.
29. Pilates on the Ball: The World's Most Popular Workout Using the Exercise Ball, Craig, Colleen. Healing Arts Press, Rochester, Vermont, Original edition 2001
30. Lademann, Amy. & Rick Lademann, Pilates and Conditioning for Athletes: An Integrated Approach to Performance and Recovery, Human Kinetics, First edition 2019.
31. Delavier, Frederic. & [Michael Gundill](#), The strength Training Anatomy workout Starting Strength with Bodyweight Training and Minimal Equipment, Human Kinetics publication 2011.
32. Clippinger, Karen. Dance anatomy and kinesiology, Human Kinetics, Second edition 2016.

33. Massey, Paul. The anatomy of Pilates. Berkeley, North Atlantic Books, First edition 2009.
34. Siler, Brooke. The Pilates Body: The Ultimate At-Home Guide to Strengthening, Lengthening and Toning Your Body- Without Machines, Harmon, first edition, 2000.
35. Zatsiorsky Vladimir M , William J. Kraemer Science and practice of strength Training, Human Kinetics, second edition, 2006.
36. Friedman, Philip., Gail Eisen, The Pilates Method of Physical and Mental Conditioning, Publisher Studio, 2004
37. Craig, Colleen., Pilates on the ball, Healing Arts Press; Original edition, 2001.

Paper/Articles

1. Ahearn, E. L., Greene, A., & Lasner, A. (2018). Some Effects of Supplemental Pilates Training on the Posture, Strength, and Flexibility of Dancers 17 to 22 Years of Age. In Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science (Vol. 22, Issue 4, pp. 192–202). <https://doi.org/10.12678/1089-313X.22.4.192>
2. Berkow, G. (2006). Pilates and Dance: A Reformer for the Art. Aahperd.Confex.Com, 96–97.
[http://aahperd.confex.com/aahperd/2011/webprogram/Handout/Session49856/Pilates and Dance manuscript PDF.pdf](http://aahperd.confex.com/aahperd/2011/webprogram/Handout/Session49856/Pilates%20and%20Dance%20manuscript%20PDF.pdf)
3. Bolsanello, P. D. (2014). Is Pilates a Somatic Education Method? Brazilian Journal on Presence Studies, 1, 101–126.
4. Brenton, S., & Kozai, A. (2017). The Importance of a Good Warm-Up : Are you warm enough to start dancing ? Iadms, 1–5.
<https://www.iadms.org/blogpost/1177934/General?tag=warmup>
5. Challis Jasmine, & Stevens Adrienne. (2019). RESOURCE FOR DANCERS AND TEACHERS Nutrition Resource Paper. International Association for Dance Medicine and Science, 1–39. [http://www.mayoclinic.org/healthy-](http://www.mayoclinic.org/healthy-living/nutrition/healthy-living/nutrition-resource-paper-for-dancers-and-teachers/full-story)
6. Chapter I: INTRODUCTION. (1972). Acta Medica Scandinavica, 191(527 S), 9–12.
<https://doi.org/10.1111/j.0954-6820.1972.tb18460.x>
7. Hampton, L. (2022). Therapeutic Exercise - Physiopedia. In [www.Physiopedia.com](http://www.physio-pedia.com).
https://www.physio-pedia.com/Therapeutic_Exercise
8. Irvine, S., Redding, E., & Rafferty, S. (2011). Dance Fitness. International Association for Dance Medicine and Science, 1–5. www.DanceScience.org

9. Sally A.,Radell Ma,Mfa,& IADMS Dance Educators'committee. (2019). Mirrors in the Dance class: Help or hindrance. International Association for Dance Medicine & Science.
10. The Benefits of Supplementary Training for Dancers | Trinity Laban. (n.d.).
<https://trinitylaban.wordpress.com/2015/11/28/the-benefits-of-supplementary-training-for-dancers/>
11. Wilmerding, M. V., & Krasnow, D. (2011). Dance pedagogy : Myth versus reality. International Symposium on Performance Science, 283–289.
12. Wilmerding, V., & Krasnow, D. (2009). Resource papers for dancers and teachers Motor Learning and Teaching Dance.
13. Woodyard, C. (2011). Exploring the therapeutic effects of yoga and its ability to increase quality of life. International Journal of Yoga, 4(2), 49.
<https://doi.org/10.4103/0973-6131.85485>
14. Ann,McMillan. Luc Proteau & Rose Marie Lebe, The Effect of Pilates-based Training on Dancers' Dynamic Posture, Journal of Dance Medicine & Science, Volume 2, Number 3,101-107
15. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation, Geneva, 28 January -- 1 February 2002.
16. Elizabeth Lowe Ahearn, (2006),The Pilates Method and Ballet Technique: Applications in the Dance Studio,Journal of Dance Education,92-99.
17. Berkow Gabriella,“Pilates and Dance: A Reformer for the Art” Pg.1
18. Bittar, A/Melo, R/Noieto, R/Lemos T/The effects of Fletche Pilates in the respiratory systems of young female ballet dancers/from a public dance school/In: IADMS 27thAnnual Conference, 2017/ Houston.

Links

1. <https://www.trinitylaban.wordpress.com/2015/11/28/the-benefits-of-supplementary-training-for-dancers/>
2. Thottappilli, Madhu/ “Dancing is NOT aerobicexercise!”<https://narthaki.com/info/healthtip/ht33.html>
3. https://post.greatist.com/wp-content/uploads/sites/2/2016/06/GRT_Pilates_Leg-1200x628-Facebook.jpg

4. Anand,Chandra. Education in Spiritual Values through Bharatanatyam, Part VIII, Maxims of teaching and the adavus of Bharatanatyam,
<https://narthaki.com/info/articles/art382.html>
5. https://www.researchgate.net/publication/340952611_IMPORTANCE_OF_FITNESS_FOUNDATIONS_TOWARDS_BHARATHANATYAM_PERFORMANCE
6. www.futurefit.co
7. https://post.greatist.com/wp-content/uploads/sites/2/2016/06/GRT_Pilates_Leg-1200x628-Facebook.jpg
8. <https://www.trinitylaban.wordpress.com/2015/11/28/the-benefits-of-supplementary-training-for-dancers/>
9. www.academia.com
10. www.iadms.org
11. <https://www.betterhealth.vic.gov.au/health/HealthyLiving/dancing-preventing-injury>
12. <https://www.futurefit.co.uk/content-hub/pilates-benefits-for-dancers/>
13. https://www.losaltosonline.com/health/pilates-a-physical-therapy-alternative/article_aa25bc4f-6349-558a-9bf9-eb4fe1325615.html
14. <https://www.youtube.com/watch?v=SMKwgNRX8qw&t=250s>
15. <https://www.amazon.in/STOTT-PILATES-Foam-Roller-Soft/dp/B00KU5NTU8>
16. https://www.gaiam.com/products/05-51980_2
17. <https://complete-pilates.co.uk/resistance-band/>
18. Stamina Pilates Magic Circle-Pilatesology
19. Pilates_based_exercise_in_muscle_disbalances_prevention_and_treatment_of_sports_injuries.pdf
20. <https://narthaki.com/info/healthtip/ht35.html>
21. <https://photos.app.goo.gl/GoW25YEsD2f8XSpr9>
22. Image of Magic circle. <https://pilatesology.com/product/stamina-pilates-magic-circle/>
23. Image of Foam roller. <https://www.amazon.in/STOTT-PILATES-Foam-Roller-Soft/dp/B00KU5NTU8>
24. Image of https://www.gaiam.com/products/05-51980_2
25. Image of TheraBand. <https://complete-pilates.co.uk/resistance-band/>
26. Image of Reformer machine.
<https://www.womenshealthmag.com/fitness/g32850611/best-pilates-reformer-machine/>

27. Image of Wunda chair. <https://www.pilates.com/store/pilates-equipment/chairs/wunda-pilates-chair-system/>
28. Image of 0Spine corrector: https://www.merrithew.com/shop/ProductDetail/ST01011_Spine-Corrector
29. The Anatomy of Exercise and Movement for the Study of Dance - [Jo Ann Staugaard-Jones](#)
30. The Anatomy of Exercise and Movement for the Study of Dance
books.google.co.in › books
31. The Bharathanatomy Series: Anatomical Movements and Directions Sneha Rajagopalan <https://narthaki.com/info/healthtip/ht47.html>
32. McKinnon, M., & Etlin-Stein, H. (2015, November 09) Pilates: A natural choice for dancers [Web log post]. Retrieved from <http://www.iadms.org/blogpost/1177934/231658/Pilates-A-natural-choice-for-dancers>
33. Rajagopalan Sneha/The Bharathanatomy Series: Anatomical Movements and Directions/ <https://narthaki.com/info/healthtip/ht47.html>
34. Basavarajaiah Veena/Bangalore/Warm-up for Bharatanatyam dancers
<https://narthaki.com/info/healthtip/ht16.html>
35. Kefallonitou, M. M., (2014). The effects of Yin Yoga practice on dancers' range of joint motion: a biomechanical and perceptual investigation (Unpublished thesis). Trinity Laban Conservatoire of Music and Dance, London.
