Part-I

CONCEPTS, CLASSIFICATION OF YOGÄSANAS AND RELATION TO AYURVEDA FROM TEXTS OF YOGA AND SPIRITUAL LORE

Part-II

A COMPARATIVE STUDY OF THREE DIFFERENT YOGA MODULES ON ATTENTION AND CONCENTRATION IN NORMAL CHILDREN (9-12 YEARS)

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE MASTER'S DEGREE IN YOGÉ C SCIENCES (M. Sc)
BY

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Bhuyan Bhagavan

CERTIFICATE

This is to certify that Dr Bhagaban Bhuyan is submitting this dissertation containing two parts: Part-I; Literature Research on concepts, classification of yogäsanas and relation to ayurveda from texts of yoga and spiritual lore and Part-II; Experimental Research on a comparative study of three different yoga modules on attention and concentration in normal children (9-12 years), in partial fulfilment of the requirements for the Master's degree in Yogic Sciences. He registered for the course on September 11, 2002 in Vivekananda Yoga Mahavidyapeetham of Swami Vivekananda Yoga Anusandhana Samsthana under the division of Yoga & life sciences and this dissertation is a record of the work carried out by him in this institute.

12 January 2004
Prashanti Kutiram

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DECLARATION

I hereby declare that the work presented in this dissertation is done by me under the guidance of Dr R Nagarathna & Dr H R Nagendra. I also declare that this work entitled Part-I

Concepts, classification yogäsanas and relation to Ayurveda from texts of yoga and spiritual lore.

Part- II

A comparative study of three different yoga modules on attention and concentration in normal children (9-12 years).

Has not previously formed the basis of any degree, diploma, membership or similar titles.

Place: Prashanti Kutiram Bhagaban Bhuyan

(32 kms from Bangalore)

Date: January 10, 2004

ABSTRACT

PART- I

This literature survey of Āsanas presented here includes the concept of Āsanas from scriptures as Upaniṣads, Gītā, Yoga Sūtras of Patañjala, Haṭha Yoga Pradīpikā, Śiva Saṁhitā, Gheraṇḍa Samhita, Haṭha Ratrnāvalī and teachings of modern Yogīs as Sivananada, B.K.S Iyengar, Dhirendra Brahmacārī, Swāmi Satyānanda Saraswati and Ramaṇa Maharshi.

The aim of the study is to find out (i) the relations between and differences among the thoughts of yoga schools and modern thoughts of yogīs about the names of Āsanas and (ii) what are the ayurvedic body types and the related Āsana practices.

It was found that there were similarities among the names of Āsanas in the ancient scriptures. But differences are found in performing Āsanas. The benefits and limitations are mostly similar in different texts but mechanism is explained in different ways.

ABSTRACT

PART-II

The present study was aimed to assess attention and concentration ability in children following intensive practice of integrated approach of yoga and to compare the effects of three different modules of yoga on attention and concentration through cancellation tests. Normal healthy-English-medium school children [n=338, 9-12 years (10.0± 0.83)] were randomly assigned into three groups, såñöi [= Creativity Development](CR) *Sthiti* [= IQ Development](IQ); *Laya* [= Physical stamina Development](PS). They were taught three different yoga modules including yoga postures, breathing exercises, kriyä (cleansing technique), meditation, games and lecture by trained instructors. Cancellation (Digit, Letter and Character) tests were administrated to children in all three groups on first and ninth day of the residential program. As data were normally distributed, the analysis was done using parametric, paired t-test. Comparison of pre and post values showed that there was significant improvement ($p< 0.001$) in digit cancellation test for all the three groups. [IQ group (31.11%); CRG group (25.69%) and PS group (24.35 %)] as well in character cancellation [IQ group (43.82%); CR group (34.81%) and PS group (32.45 %)]. Between the three groups analysis was done through one way ANOVA and multiple comparison Tukey test, which showed that the group which practiced the yoga modules for CR showed significantly more improvement compared to PS group in digit cancellation test. But there was no significant difference between IQ and CR groups. Males and females of each group (IQ, PS and CR) did not show significant difference.

Results suggest that (i) all the three integrated yoga modules improve attention and concentration (ii) the module designed for CR group was best and (iii) there was no gender effect.

These results may be due to (i) reduction of anxiety and there by improvements in performance (ii) the emphasis given to improve the brain functioning in CR & IQ groups and (iii) the probable non difference between boys & girls in this age range.

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Part-II

A COMPARATIVE STUDY OF THREE DIFFERENT YOGA MODULES ON ATTENTION AND CONCENTRATION IN NORMAL CHILDREN

(9-12 YEARS)

CHAPTER-1

INTRODUCTION

Yoga Sūtra defines Äsana as that which is comfortable and easy, as well as firm. It is a dynamic position, in which the practitioner is poised between activity and non-activity, being doing and "being done by" the posture. A corresponding mental balance exists between movement and stillness. Yoga teaches that each posture reflects a mental attitude, whether that attitude be one of surrender, as in a forward bending Äsana, or the strengthening of the will, through backward bending postures, or the creation of a physical prayer or meditation with the body, as in the practise of padmäsana (lotus posture). A posture or Äsana can be used for rejuvenating specific organs and glands as well as the spine. Research is going on round the world in the field of yoga therapy and to find out the hidden potential, which can be applied in the medical management of various diseases and for long term rehabilitation.

According to Swami Vivekananda, there are four main streams of yoga. Out of these four "Rāja Yoga" the path of will or Psychic control, which plays the role of culturing the mind, is one of the streams. It is also named as, Astänga Yoga, Räja Yoga or Pataïjali Yoga which approaches to reach higher state of consciousness (1)* . One of the major contributions of Pataïjali yoga sütra is the eight limbs of yoga, which gives the systematic approach for developing the mind. The eight limbs are yama, niyama, Äsana, Präëäyäma, pratyähära, dhärana,dhyänä and samädhi. The third limb is yoga Äsana, the word Äsana means sitting in a particular posture comfortably. In the yogé c scriptures it is

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* Numbers within parentheses denote reference given in bibliography

said that there were originally 84,00,000 yoga postures which represent the eighty four lakhs incarnations every individual must have passed through before attaining liberation from the cycle of birth and death. (2) Down through the ages great åñies and yogés modified and reduced the number of Äsanas to a few numbers known today. Out of these few hundred only eighty-four are selected for special mention, while thirty two are considered as the most important, eight or nine are only ranked as the most important and

even among these, four are singled out for special mentions, two of which are classified as outstanding and finally one is selected as superior to others (Haöharatnävalé)

CHAPTER-2

AIMS AND OBJECTIVE OF STUDY

The aim of the study is to find out the relation between and differences among the thoughts of yoga schools and modern thoughts of yogé about the names of Āsanas.

AIM OF PATAÏJALI YOGA-

The aim of the system is to develop an inner awareness and unfold the higher level of consciousness. Movement without jerks and effortless maintenance characterize this system. This result is strength and forbearance (titīksā). There is also a proportionate growth of the body. The control of food and the other Yama and Niyamas are common to both school of yoga Äsana. While non- yogé c exercises and dynamic Äsanas effect in expenditure of energy and perspiration, the yogäsana based on Pataïjali's aphorism results in deep relaxation and energy conservation, results in freshness. This is basically a nerve culture as it calms down the nerves. The features of yogäsana are summerised below:

1. Evoking the dormant potentiality in man is the goal
2. To raise man from his animal nature to normalcy and rise him further up the steps to achieve the goal of the total freedom.
3. Flexibility of the spine is aimed at.
4. Emphasis on positive health and overall personality development. (1)

OBJECTIVE OF ĀSANA IN HAÖHA YOGA :- Āsana in the Haöha yoga has two objectives .The first one is to practise any meditation , one needs at least one posture in which one can feel perfectly comfortable for a long period of time . The more such posture one can master, the better the basis for the develop the inner meditation technique.

The second objective of exercising Äsana in the Haöha yoga is to bring health and energy to body and mind by opening the nädés . If such an exercise one regulerly performs , the

path of yoga is opens automatically , even though one still has to follow it further. The mere mastering of the posture is no objective in itself , through mastering various postures certainly strengthens the power of will and concentration and the habit of not paying too much attentation to the information input by the senses. This practicing Äsana in the Haöha yoga directly opens the path to pratyähära. (2)

CHAPTER –3

CONCEPT OF YOGĀSANA

हठ योग प्रदीपिका

नासनं सिद्धसदृशं न कुम्भक ः केवलोपमः ।

न खेचरीसमा मुद्रा न नादसदृशो लय ॥४३॥

Haṭha Yoga Pradīpikā

Nāsānaṁ siddha-sadṛśaṁ na kumbhakaḥ kevalopamaḥ

Na khecarī-samā mudrā na nāda-sadṛśo laya.(Ref. 2, H.Y.P. CH-I, V-43, P-116)

There is no Äsana like siddha Äsana, no kumbhaka like kevala kumbhaka, no mudra like khecaré mudrä and no laya or dissolution of mind like näda, the inner sound.

हठ योग प्रदीपिका

अथासने दृढे योगी वशी हित हिताशनः ।

गुरूपदिष्ट-मार्गेय प्राायायामं समाभ्यसेत् ॥

Haṭha Yoga Pradīpikā

Athāsane dṛḍhe yogī vaśīhita mitāśanaḥ

Gurūpadiṣṭa-mārgeṇa prāṇāyāṁam samabhyaset.

(Ref.12, H.Y.P. CH-2, V-1, P-149)

Being established in **Äsana** and having control (of the body), taking a balanced diet; präëayämä should be practised according to the instructions of the Guru.

Patañjali

स्थिर-सुखमासनम्।

Sthira-sukhamĀsanam (Ref. 3, P.Y.S. 19 P-155)

Äsana is practised firmly with ease.

This means that the student should try to get absolutely disciplined in the various Äsanas, so that he can sit motionless and relaxed for various advanced disciplines and practise s in yoga

योगचुडामण्युपनिषत्

एकम् सिद्धासनम् प्रोक्तम् द्वितीयम् कमल्सनम्

षट- चक्रम् षोडशाधारम् त्रि-लक्ष्यंव्योम-पञ्चकम्

स्व-देहे यो न जानति तस्य सिद्धिः कथं भवेत् ।

Yogacūḍāmaṇyupaniṣad

Ekaṁ siddhĀsanaṁ proktaṁ dvitīyam kamalsanam

ṣat-cakram ṣoḍaśādhāraṁ tri-lakṣyaṁ vyoma-pañakam

sva-dehe yo na jānati tasya siddhiḥ kathaṁ bhavet.

(Ref. 4, Y.C.U. 1, 3-4 P-210)

How can one who has not known the siddhäsana, vrajräsana, six cakras, sixteen bases, three ideas and five types of akasa achieve perfection?

Here the padmäsana is refer to by them kamaläsana similarly in (Y.K.U) siddhäsana is term as vajräsana and padmäsana by the termed as kamaläsana. Student of yoga should not be confused by the terminology. Out of these Äsanas, one is the valued as the base. This one is truly the king among the eighty four lakhs Äsanas & is siddhäsana.

श्वेताश्वतर उपनिषत्

Śvetāśvātaropaniṣad

त्रिरुन्नतम् स्थाप्य सममम् शरीरम् हृदीन्द्रियि मनसा सन्नैबेश्य ब्रह्मोडुप्न प्रतरेत बिद्वान स्रोतसि सर्बानि भयाबहानि।

Keeping the body that has three parts erect and withdrawing the organ into the heart with the help of mind, the enlightened person should earn over all the terrible currents by mean of the float that is Brahman. (5)

Gītā

सम् काय-शिरो-ग्रीवम् धारयन्नचलम् स्थिरः

सम्प्रेक्ष्य नासिकाग्रम् स्वम् दिशश्चानवलोकयन्।

Gītā Says

Samam kāya-śiro-grīvaṁ dhārayannacalaṁ sthiraḥ

Samprekṣya nāsikāgraṁ svaṁ diśaścānavalokayan.

(Ref. 6, B.G., CH-6, V-13, P-282)

Holding the trunk, head and neck steady, remaining firm and fixing the gaze on the tip of the nose without looking in other direction.

Patañjali yoga sūtra

प्रयत्नशैथिल्यानन्त-समापत्तिभ्याम्

Prayatna-śaithilyānanta-samāpattibhyām (Ref. 3, P.Y.S.V-20, P-156)

An Äsana is performed through the process of exertion and relaxation until its completion.

ततो द्वन्द्वानभिघात ।

Tato dvandvānabhighātaḥ (Ref. 3, P.Y.S. V-21, P-158)

By practicing Āsana properly, one is free from impact of pair of opposites.

SWĀMI ŚIVANANDA

Yoga means –it is the union of individual soul (Jivātman) with the supreme soul (paramātman).Is Āsana an easy and comfortable seat or pose or posture. Thus the term of yoga Āsana means certain posture by assuming any one of which the individual soul is united to supreme soul quite easily by yogīc practitioner (7).

B.K.S. IYENGAR

Āsana is a steady and pleasant posture to produce mental equilibrium and prevent fickleness of mind. It is not merely a physical or gymnastic exercise. True Āsana is that in which the thought of Brahman flows effortlessly and incessantly through the minds of sādhakas (8).

SWĀMI SATYĀNANDA SARASWATĪ

Yoga Āsana have often been thought of as a form of exercises. But they are not exercises. Āsana is a technique, which places the physical body in positions that cultivate awareness, relaxation, concentration and meditation. It is complimentary to exercises (9).

RAMAṆA MAHARṢI

Q. What are Āsanas (postures or seats)? Are they necessary?

A: Many Āsanas with their effects are mentioned in the yoga śāstra .The seats are the tiger skin, grass, etc. The postures are the 'Lotus posture', the 'easy posture' and so on. Why all these only to know oneself? The truth is that the ego rises up form of the self, confuses itself with the body, mistakes the world to be real, and then, covered with the egoistic conceit, it thinks wildly and looks for Āsanas (seats). Such a person does not understand that he himself is the center of all and thus forms the basis for all (4).

The Āsanas (seats) are meant to make him sit firm. Where and how can he remain firm except in his own real state? This is the real form of the Āsana.

Attaining the steadiness of not swerving from the knowledge that the base (Āsana) upon which the whole universe rests is only self, which is the space of true knowledge, the illustrious grand, alone is the firm and motionless posture (Āsana) for excellent Samādhi.

CHAPTER – 4

ORIGIN OF ĀSANA NAMES

Many of the Āsana have animal names, such as the fish posture and the cobra posture. This is because yogī as devised their asāna partly by observing how animal instincts work in the wild. When animals are sick they would only eat certain herbs and grasses. Similarly, they would stretch and contract muscles in various postures instinctively.

yogīs also observed how animals relaxed. Cats, especially, are experts in relaxation. On awakening from sleep, they instinctively stretch, arch the spine in both directions and then relax.

Names based on: (3)

1) Plants: Vṛkṣāsana, Tādāsana
2) Animals: Siṁhāsana, Gomukhāsana, Uṣṭrāsana.
3) Birds: Mayurāsana, Garuḍāsana
4) Insects: reptiles and other creatures Śalabhāsana, Maṇḍukāsana, Matsyāsana.
5) Objects: Dhaṇurāsana, Halāsana, Trikonāsana
6) Impact and bodily form: Śīrśāsana,Śarvāṅgāsana

CHAPTER-5

SCHOOLS IN YOGĀSANAS

Āsanas defined as the body posture according ancient sage Patañjali. He did not mention any name of the Āsanas. In the Haṭha yoga Pradīpikā, different bodily postures are defined. It tells Āsana is specic body posture. It opens the energy channels and psychic centers. Yogāsanas are the bodily postures by the animals, tree, mountain, birds, reptiles, gods, ṛṣis and as many species in the world. Till today a large number of new Āsanas are found. Some of the Āsanas names are same but their way of performance may vary according to different schools.

THE TWO MAIN SCHOOLS:

They are divided into two schools of Yogāsanas. One is called Patañjali School and other is called Haṭha Yoga School (1)

A) HAṬHA SCHOOL OF YOGĀSANA OR DYNAMIC TYPE OF YOGĀSANA.

This school uses the speed, repetitions, and maintenance with strength (Isometric) and often jerks for performance. The objective of this school is predominantly to shatter the laxity, lethargy and tamas in general. By repetitions and quick actions it develops the strength of the muscles and the stamina of the organs and systems in the body.

B) PATAÑJALI SCHOOL OF YOGĀSANA.

In Patañjali system, it emphasizes on mental equipoise through relaxation and effortlessness. Maintenance for longer duration with ease is the key factors. The objective is to gain mastery over the pairs of opposite and conquer the body consciousness. In the final posture the breathing must become slow, relaxation, and calmness of the mind are the features.

CHAPTER- 6

CLASSIFICATION OF YOGĀSANA

There are five basic postures (11)

1. Standing
2. Supine (lying on back)
3. Inverted
4. Prone (lying on stomach)
5. Sitting, Kneeling

Some of the traditional texts like Manasollasa by Sureswaracharya, direct disciple of Adiśankara and first teacher of spiritual head of the Dwarakamath, classify Āsanas as favorite postures some of gods

1. Brahmā, 2.Viṣṇu 3. Rudra.

The yoga Āsana can be classified in various ways according to their respective scientific aspects, however, keeping in mind practical and utility point. It is evident that the classification made in whatever way will not be exhaustive. Some Āsana fall under more than one category. It is obvious that any classification would not cover all the aspects. There are two aspects of Āsana, 1.Dynamic 2.Static or stationary. Another classification into three groups from an anatomic physiological viewpoint: 1. Resting postures and posture of meditation. 2. Posture of controlled muscular–skeletal activity.

a) Forward of the spinal column (i) with gravity. (ii) against gravity

b) Backward bending of the spinal column (i) with gravity. (ii) Against gravity.

(iii) Twisting or sideward bending and rotation of the spinal column.

(iv) Essentially abdominal exercises.

c) Topsy-turvy Āsana

One can classify Āsana according to the movement they give to the spine

1) Forward bending.

2) Backward bending.

3) Lateral bending.
4) Twisting.
5) Topsy-turvy.

One another classification is 1.Meditative 2. Culturative. 3. Relaxative.

Swami Satyananda Saraswati of Bihar school yoga classifies Āsana in three groups.

1) Beginners group: This group has no previous experience of any Āsana they are first exposed to Āsanas. For them simple Āsanas without maintenance can be thought.
2) Intermediate group: This group contains Āsanas, which will be for beginner group with out any stress or strain. Here the person performs them with little maintenance, steadiness, concentration and co- ordination with breath.
3) The advance group: In this group persons must master Intermediate Āsanas. But they performed it with extensive control over muscles and nervous system with great care and full of awareness. It is better to practise under the guidance of a teacher.

Kaivalyadhāma:
They classified it as follows
1) Sitting Posture
2) Abdominal Posture
3) Hand Posture
4) Supine Posture
5) Knee Posture (Kneeling Posture)
6) Leg Posture (Standing Posture)
7) Head Posture

Swami Vivekananda Yoga Anusandhāna Samsthāna

They classified it as follows (1)

1) Standing Posture
2) Sitting Posture

3) Prone Posture
4) Supine Posture

Most of the other schools of yoga classify the Āsana as follows:

1) Standing Posture
2) Kneeling Posture
3) Supine Posture
4) Prone Posture
5) Inverted Posture
6) Sitting/Lying Posture
7) Restful Supine Posture

CHAPTER-7

AYURVEDIC BODY TYPES AND ĀSANA PRACTICES

To understand the Āsanas potentials of different people we will want to look at them according to their doşic body types

VĀTA BODY TYPE: Vāta types have thin and long bones that are often weak or brittle. They have low body weight and poor development of the muscles, but a good deal of speed and flexibility. Their bone structure makes them good at bending and stretching, particularly of the arms and legs, when they are young. As they get older, however, the dry quality of Vāta increases and causes them to lose mobility if they don't exercise regularly. A gentle, slow Āsanas practise evenly balanced on both sides of the body is the ideal exercise for Vāta types. Vātas are most in need of Āsanas practise because Āsanas alleviates accumulated Vāta from the back and the bones, where it easily gets lodged. Vāta diseases begin with an accumulation of the downward moving air (Apāna

Vayu) in the colon, which gets transferred to the bones, where it causes bone and joint problems. Vāta benefits from the massaging action of Āsanas on the muscles and joints, which releases nervous tension and balances out the system.

PITTA BODY TYPE: Pitta types have an average build with a generally good development of the muscles and a looseness of the joints, which gives them a fair amount of flexibility. They are good at Āsanas practise but cannot do some of the more exotic poses that Vātas can do because of the shorter bones that they usually have. Pittas benefit from Āsanas practise to cool down the head, cool the blood, calm the heart and relieve tension. For example, Pittas tend to hypertension because of their fiery temperament that keeps them always wanting to succeed or to win.

KAPHA BODY TYPE: Kaphas are typically short and stocky, gaining weight easily. With their short and thick bones they lack flexibility and cannot do poses that require flexibility like the lotus pose. Yet they are sturdy and strong and have the best endurance of the different types. Kaphas need movement and stimulation to counter their tendency to complacency and inertia. They are good at keeping a practise going for longer periods of time, once they get it going in the first place. The Ayurvedic way of performing Āsanas.

Ayurveda does not look upon Āsanas as fixed forms that by them either decrease or increase the doṣas . It views them as vehicles for energy that can be used to help balance the doṣas, if used correctly. The same is true of the ayurvedic view of food. While Ayurveda says that foods of certain tastes are more likely to increase or decrease specific doṣas, it also says that we need some degree of all the tastes. So too, we need to do all the major types of Āsanas to some degree. It is the degree and exertion that varies with the doṣas type. Each person requires a full range of exercise that deals with the full range of motion in the body (12 & 13).

CHAPTER-8

BENEFITS OF YOGĀSANAS

How does the Āsanas work?

Āsanas are based on five principles.

i) The use of gravity. The inverted postures such as the headstand, shoulder stand and the reverse posture take advantage of gravity to increase the flow of blood to the desired part of the body; in the headstand to the brain, in the shoulder stand to the thyroid gland and in the reverse posture to the gonads (sex glands)

ii) Organ massage. The position of the Āsanas causes a squeezing action on a specific organ or gland, resulting in the stimulation of that part of the body.

iii) Stretching muscles and ligaments. This causes an increase in blood supply to the muscles and ligaments as well as relaxing them. It also takes pressure of nerves in the area. This stretching is involved in all the Āsanas, since it has such a beneficial effect on the body.

iv) Deep breathing. While holding the yoga posture we breathe slowly and deeply, moving the abdomen only (abdominal or low breathing). This increases the oxygen and prāṇa supply to the target organ or gland, thereby enhancing the effect of the Āsanas.

v) Concentration. As well as breathing slowly and deeply, we also focus our attention on the target organ or gland. This brings the mind into play, and greatly increases the circulation and prāṇa supply to the organ or gland.

This concentration has the second benefit of increasing your general powers of concentration through regular practise. This benefits every aspect of your life. Your mind is less distracted and swayed by external events and you are therefore calmer and worriless. You will be able to solve day-to-day problems better and have more success in whatever activity you undertake (22).

1. Physical exercise draws the prāṇa out. Āsanas send the prāṇa in and distribution quite evenly throughout the body and different system. Āsana are not physical but also

spiritual, as they awaken the serpent power that is sleeping in Mūlādhāra cakra. This is the third anga (limb) of the Astanga RājaYoga of Patañjali Maharṣi .A particular Āsana removes the Particular disease.

2. Āsanas are not mere physical exercises alone. They are something more than that. They have spiritual basis. They help a long way in controlling senses, mind and body. Body nerve and muscle are purified (śarira suddhi and Nādī suddhi) Kuṇḍalinī is awakened which gives bliss, power and yogī Samadhi to the aspirant.

3. If you develop vairāgya, if you subdue your Indriya and sense enjoyment and pleasures of this world as dung and poison, as they are mixed with pain, sin, fear craving, miseries, disease old age and death, nothing can tempt you in this world. You will have eternal peace and infinite bliss.

Āsana and prāṇāyama remove all sorts of disease, improve the health energetic digestion invigorate the nerves ,strength the Sushumna nādī, remove the Rajas and awaken the kuṇdalinī .Practise of Āsana and Prāṇāyāma bestows good health and steady mind (14).

1) YogĀsanas are preliminarily aimed at improving the muscle tone (suppleness) and plasticity of muscle.
2) Activation of muscles that were once important at earlier evolutionary stages but have fallen into disuse.
3) Priming or activating the stretch reflexes at the level of spinal cord. The neural impulses that are needed to travel up the long sensory pathways up to the Ascending Reticular Formation (Mid Brain) and further through the thalamus to the cortex are rendered unnecessary. This automatically helps in maintaining the alpha activity of the E.E.G (Electrical recording of the brain waves) but not disturbing the thalamo-cortical pathways. This ensures a resting, relaxed activating at the level of cerebral cortex.

4) The static comfortable postures accompanied by a meditative state, dampens the inflow of sensory impulses to the brain. This is turn, causes less stimulation to the "Emotional Brain" (Limbic Cortex Hypothalamus Anterior Pituitary and their connections with the Adrenal gland). Therefore, there are less visceral gland disturbance to disturb attention and connection. Further more, the reduction of sensory input creates a reciprocal chain, relaxing the muscles. Inhabitation of synapses at the neuromuscular junctions, in turn, reduces the sensory input further.

5) Yoga is smooth graded exercises from the initial posture to the final state. This is achieved not through forcible jerky movements, but slow dynamic movements, gradually changing over to static states. The risk of over-straining or injuring muscle and ligaments are therefore reduced considerably. There is a little fatigue induced by Āsanas. (Baldev Singh et al 1974).

6) The exercises are done with a few warm-up movements to improve the blood flow and body temperature and are done in a sequence that keeps at the rest certain group of muscles in one Āsana and brings into active operation the opposite group of muscles in the next Āsanas. For exercise, involves the flexion of the spine, those that extend the spinal muscle in the (Bhujaṅgāsana s) follow (Paschimottanāsana). This is called "Vianyas" the exercises are interspersed with the restful periods (Shavāsana) to eliminate the factor of fatigue.

7) The Yogāsanas do not require the use of extra calories 2-14 calories per minute (and a man resting on the bed spend about 0.9 to 1 calorie per minute). Yogāsanas require only about 0.8 to 3 calories per minutes (Vaishwaner 1975).

8) The sequential activation of agnostic (Prime mover muscles) and antagonistic (counter acting muscles) assures the muscles suppleness, plasticity and phenomenon of reciprocal inhabitation remains in efficient operation. Yoga Āsanas improves the perceptual motor co-ordination.

9) In yoga Āsanas, breathing is kept as natural as possible and at any state of hyperventilation, the person is supposed to restore to relax the postures (Shavāsanas). This is the major reason why fatigue is not a usual phenomenon and the expenditure of calories remains minimum. That allows yoga Āsanas to be induced soon after a common illness or some Āsanas can be performed during early in the pregnancy.

10) Āsanas are primarily involved with postural reflexes which are mediated by sub cortical centers-medulla, pons, cerebellum, basal ganglia etc. that are under the inhibitory control of cortical area of the brain. The greater the repetition and the habituation, lesser would be the involvement of the Thalamus-cortical circuits, through the Ascending Reticular System.

11) The Āsanas are also to be seen as training for assumption for good relaxed postures that are the least expensive calorie wise. Our urban habits of sitting, sleeping, excretory habits etc. have distorted many movements of our joints and muscles, which we are using during the earlier centuries. One of the glaring examples is our lack of opportunities for being close to the ground for squatting, lying etc. the bed postures, due to the continual gravitational pull, lead to the accumulation of fat over the torso, buttocks, thighs, breasts etc. and drooping of shoulders, lordosis ("bulging out tummy") double-chin (fat under the chin and around the neck) and cease and pouches around the eyes and or face etc. The relaxed postures of yoga practitioners free from such hazards.

12) The topsy-turvy postures not only relieve antigravity muscles and help drainage of venous blood towards the head but are also suppose to help in the proper positioning of the internal viscera which often show sign of Slackening (Visceroptosis), Prolepses or Hernization etc.

13) The relaxed state of skeletal muscles in some yoga Āsana , when the intra abdominal pressures is continuously raised (by 10 to 80 mm/Hg) it is presumed to

have good effect on the blood circulation to the viscera or to the remote internal areas of the body (11).

CHAPTER-9

THE AYURVEDIC EFFECTS OF ĀSANA PRACTICES

Each Āsanas has a particular effect defined relative to the three doṣas. This is the same as how Ayurveda classifies foods according to their doṣas effects as good or bad for Vāta, Pitta and Kapha, depending upon the tastes and the elements that compose each food article. We can look upon different Āsana s according to their structural ability to increase or decrease the doṣas.

However, this doṣas equation of Āsana s should not be taken rigidly because the prānic effect of a Āsana can outweigh its structural affect as we just noted. The form of the Āsana is not its main factor. Through the use of the breath we can modify or even change the doṣas effects of the Āsana. We must remember the importance of thought and intention in Āsana practise as well. Considering the Āsana, Prāṇa and the mind, we can alter a particular Āsana or adjust the entire practise toward a particular doṣas result. Through combining specific Āsanas, prāṇāyama and meditation a complete internal balance can be created and sustained.

Doṣas application of Āsanas is twofold.

- According to the constitution of the individual defined by their doṣas type as Vāta, Pitta and Kapha and their intermixtures.
- Relative to the impact of Āsanas on the doṣas as general physiological functions. Each doṣas has its sites and actions in the body that Āsana will effect depending upon their orientation.

An Āsana may not be good for a particular doṣas type; it doesn't mean that they should never do it. It means they should practise the Āsana in a way, which guards

against any potential imbalances. Take, for example, backbends. The forceful or quickly done full backbends can cause major Vāta aggravation, with severe strain to the nervous system perhaps more so than any other Āsana. However, gentle partial backbends are great for reducing Vāta that accumulates in the upper back and shoulders. Each Āsanas family like standing poses, forward bends, or inverted postures has general benefits for the body as a whole and its overall movement potential. Each Āsana family exercises certain muscles and organs that, as part of our entire bodily structure, should not be neglected. To counter any tendencies toward imbalance, you should select poses within each Āsana family that are better for your body type than others within the same group. In general, you should make sure that all the main muscle groups in the body are represented in your practise at least several days each week. Similarly, that if a particular Āsana is good for a particular doṣas doesn't mean that all persons of that doṣas type should do it. It means that the Āsanas can be good for them if done in the right way and if they are physically capable of it. Each Āsanas also has its degree of difficulty that may require certain warm up or preparatory postures to approach it safely. For example, the right preparation for a headstand creates the arm and shoulder musculature needed to sustain a good and safe head balance. Because a headstand is good for your doṣas type doesn't mean that you should simply jump into the posture or can it without possible side-effects. In addition, the effects of different Āsanas vary according to the sequence in which they are done. This means that Āsanas practise should always be viewed as a whole—not merely in terms of the single Āsana s that compose it but in terms of the flow and the relationship between all the particular Āsana s done. Āsanas practise —meaning the sequence and manner of doing Āsanas as well as the specific—should Āsanas be designed to keep the doṣas in balance relative to the individual's constitution and condition. It is helpful to view Āsanas sequence like an herbal formula. An ayurvedic herbal formula contains a number of herbs used for various purposes that contribute to the overall effect of the formula, fulfilling specific

roles. The overall doṣas effect of the formula is determined by the formula as a whole, not by any single herb within it viewed in isolation. Combining these ayurvedic considerations with the general factors listed above, to effectively prescribe Āsanas teachers must learn

- Assess the ayurvedic type and imbalances of the person.
- Assess the structural condition of the person, including their posture, age and physical condition.
- Assess their prāṇic condition, their control of the breath and senses, along, with their vitality and enthusiasm.
- Assess the mental state of the person, their attention, will and motivation, as well as their emotional condition.

The same Āsanas should be done differently relative to whether the person is Vāta, Pitta or Kapha. The same Āsanas should be done differently depending upon the age, sex and physical condition of the person. It should vary depending upon the whether the person has a strong or weak vitality. Additional variations will occur if a person is suffering from anger, grief, stress or depression.

This reflects four primary goals for an ayurvedic Āsanas practise.

1. To balance the doṣas
2. To improve the structural condition of the body
3. To facilitate the movement and development of prāṇa
4. To calm and energize the mind (12 & 13).

CHAPTER-10

THE BASIC SESSION

Āsanas are posture to be held, rather than exercised and are performed slowly and meditatively, combined with deep abdominal breathing. These gentle movements not only reawaken awareness and control of the body, but also have a profound effect spirituality feeling from fears and helping to instill confidence and serenity. There are

three stages to each Āsana –coming into the pose, holding it, and coming out it. The real work of Āsana is done while you hold the position – adepts of yoga will remain motionless in a pose for hours at a stretch. Try to keep still while you maintain the pose and breath slowly and deeply, concentrating the mind. Once you are able to relax in a pose, you can adjust your position to achieve the greater stretch. Always release your body from an Āsana with as much grace and control as you used to come into it. Āsana work on the all various system of the body, creating suppleness in the spine and joints and toning the muscle, glands and internal organs. Though at first it will be the physical experience of the posture that effects mostly, as you progress you will grow more and more aware of the prāṇa, the vital energy, and of the impotence of correct breathing – Prāṇāyama .The ultimate purpose of both Āsana and Prāṇāyama is to purify the nādī or nerve channel so that prāṇa can flow freely through them, and to prepare the body for the rising of kuṇdalinī, the supreme cosmic energy, which leads the yogī to a state of god consciousness .The basic session is suitable for all ages and levels of students (16).

CHAPTER- 11

GENERAL INSTRUCTIONS FOR PRACTITIONERS

Cleanliness: before commencing the Āsanas the bowel and bladder should be empty. If you find it is not cleared then drink two to three glasses of water but warm with slightly salty water and practise śaṅakhaprakṣālana. You should not use any drug for evacuating the bowel.

Bath: take a bath before or after the Āsanas. But it is better to take the bath after fifteen minute of Āsanas practices. Don't take a very hot or a very cold bath immediately after the Āsana

Place: clean airy places free from insects and noises should be used. Ground and floor should be well level and a folded blanket should be laid on the floor to practiced Āsanas.

Time: early in the morning and late in the evening is the best's morning at the brahma muhūrta and evening at the godhūli or sandhyākāla.

Food: the food, which is easily digestible and freshly cooked. Milk and milk products should more beneficial. Food should be eaten after half an hour after completing the Āsanas. Only after three hour of heavy meal one should practise the Āsanas.

Cautions: No undue strain should be felt in the facial muscles, ears, and eyes and in the breathing during the practise s. Do not practise Āsanas after being in the hot sun for several hours.

Relaxation: After each Āsanas we must relax for a few moments. Then we go for shavāsana till the fatigue goes away and body becomes normal.

Breathing: Breathing should be only through the nostrils and breathing should not be through the mouth. In the final posture the breathing must be natural and normal.

Awareness: We must be aware of physical movements of the posture itself to control and synchronization, mentally counting, sensation in the body movement of prāṇa and any thought which comes to the mind. Then only we will receive maximum benefits from the practices.

Mind: During the practise of Āsanas only the body has to be active. But mind must be calm. It must be watchful and alert.

Counterpoise: If the Āsana is forward bending then we must followed it by backward bending and vice versa. This is to bring the body to a balanced state. Specific counter poses are recommended for certain Āsanas described in certain books. But when practicing a particular Āsana for therapeutic reasons a counter pose may not be required.

Duration: we should maintain the posture accord to one should not be over strained oneself.

Age limitation: both men and women can practise their own convenient Āsanas.

Contra-indication: person with fractured bone or suffering from chronic pain or ailments and diseases such as stomach ulcer, tuberculosis or hernia, recently under gone surgery should consult the yoga teacher and doctor before practicing the Āsanas.

Caution during special situations

Pregnancy: all the Āsanas can be practise d during the first three-month of pregnancy. All the posture and the forward bending Āsanas may be done with mild movements. UpaviṣṭhakoṇĀsana and baddhakoṇĀsana are practise d through out the pregnancy any time of the day. No Āsanas should be done during the first month after the delivery. Only three month after the delivery all Āsanas may be practised comfortably.

Affected by pus in the ears or displaced retina: They must avoid forward bending and topsy-turvy pose.

For women: during menstrual period avoid Āsanas. But if the flow is excess.

UpaviṣṭhakoṇĀsana, baddhakoṇĀsana, virĀsana, januśīrsĀsana, pascimottān Āsana , uttānĀsana may be performed with beneficial effects.

Suffering from dizziness or blood pressure: do not start with śīrṣāsana or sarvaṅgāsana.

Inverted Āsanas: avoid inverted poses if there is a gas or fermentation in the intestine, if the blood is excessively impure, during menstrual or later stage of pregnancy. This is important to ensure that toxin does not go to the brain and cause the damage and also in case of menstrual period the blood does not enter to the fallopian tubes (8).

CHAPTER -12

SUMMARY & CONCLUSIONS

There is no jerky movement in the Āsanas in fact all jerky movements are cautioned against. The posture is acquired slowly and steadily. They are maintained for an optimum duration without fatigue. At the end of Āsanas the body slowly assumes a relaxed starting position. The Āsanas become perfect when they really become effortless. Each posture has a counter posture, thus assuring an activation of antagonistic group of muscles. Body becomes balanced leading to a harmonious growth. There will be great speed in movements due to agility and higher flexibility. The body becomes as soft as cotton and as hard as diamond when the need arises. There is relaxation in action and conservation of energy, tranquility of the mind and clarity of thought that is harmony of the body and mind.

According to Ayurveda, the same Āsanas should be done differently relative to whether the person is Vāta, Pitta or kapha and also depending upon the age, sex and physical condition. The goal of Ayurvedic Āsana practise is i) To balance the doṣas. ii) To improve the structural condition of the body iii) To facilitate the movement and development of prāṇa iv) To calm and energize the mind.

All the things mentioned above are achieved with the persistent and regular practise of yoga Āsanas. This effect of yoga Āsanas is described in the yogīc texts indicating that yoga Āsanas not only work on the Annamaya kośa but also operate in tune bringing stability and harmony in the other kośas.

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PART-II

A COMPARATIVE STUDY OF THREE DIFFERENT YOGA MODULES ON ATTENTION AND CONCENTRATION IN NORMAL CHILDREN (9-12 YEARS)

CHAPTER –1

INTRODUCTION

There are several studies on the efficacy of yoga and other relaxation technique on different aspects of mental function in both normal and subnormal adults and children (1). Integrated approach of yoga have shown significant improvement in Intelligent Quotient and social adaptation parameter in mentally retarded children (2).Yoga breathing through a particular nostril in four groups of school children who performed either right nostril breathing or left nostril breathing or alternate nostril breathing or breath awareness showed significant increase in spatial memory, average scores of (84%) without lateralized effect (3). Ten days yoga program for school children (9 to 13 years) improved their static motor performance compared to control group (4). Sixteen elementary school learning disabled children showed significantly fewer numbers of errors on the attention task measure and significantly lower impulsive score after biofeedback induced relaxation training as compared to control group (5).

There were no studies on the effect of yoga in normal healthy school children (9-12 years) on their attention and concentration. The present study was designed to compare the attention and concentration in three different modules of integrated approach of yoga intended to facilitate intelligent quotient (IQ), Creativity (CR) and Physical stamina (PS). These specific tests give information about two aspects of visual attention i.e., sustained attention (ability to maintain consistent performance level over time) and selective visual attention (ability to select relevant stimuli while ignoring distracters).

CHAPTER-2

AIM AND SCOPE

1. The present study was designed to compare the attention and concentration in three different modules of integrated approach of yoga intended to facilitate intelligent quotient (IQ), Creativity (CR) and Physical stamina (PS)
2. To examine the gender effect in yoga intervention.

The scope of the study was limited to students in the age group 9-12 years using digit, letter and character cancellation test for assessing their attention and concentration. The hypothesis that the yoga intervention developed for IQ and / or groups should show more improvements than PS group.

CHAPTER-3

LITERATURE REVIEW

3.1 YOGA, ATTENTION AND CONCENTRATION

Traditional oriental thinking attracts the growing scientific interest of occidental practitioners. Etevenon (Paris) investigated neurophysiological effects of yoga in connection to ancient Indian concepts (Upanishads) on sleeping, meditation and degree of consciousness. Several hypotheses are set forth to explain brain activities underlying sites of concentration. The possibilities of developing a Präëäyama conscious mastering of dreams are also under research, and special attention is paid to the works of Saint Denys (1867), and hindu tradition (6) .The effects of three different procedures, relaxation, visualization and yogic breathing and stretch (Präëäyama) on perceptions of physical and mental energy and on positive and negative mood states have been assessed in a group of normal volunteers (n = 71, age range 21-76). Präëäyama produced a significantly greater increase in perceptions of mental and physical energy and feelings of alertness and enthusiasm than the other two procedures ($p < 0.5$) (7). Two groups of 45 children each, whose ages ranged from 9 to 13 years, were assessed on a steadiness test, at the beginning and again at the end of a 10-day period during which one group received training in yoga, while the other group did not After 10 days, the 'Yoga' group showed a significant decrease errors in static motor performance, whereas the 'control' group showed no change (4). A study was conducted in first MBBS students (n = 50) to determine the benefit if any of yogic

practices on anxiety status during routine activities and prior to examination. Feedback scores were assessed to determine how the students had benefited from the practices.

Anxiety status as assessed by Spillberger's anxiety scale showed a statistically significant reduction following practice. The improvement in various parameters such as better sense of well being, feeling of relaxation, improved concentration, self confidence, improved efficiency, good interpersonal relationship, increased attentiveness, lowered irritability levels, and an optimistic outlook in life were some of the beneficial effects enjoyed by the yoga group indicated by feedback score (8).

3.2 RELAXATION, CHILDREN'S ATTENTION AND CONCENTRATION

The study showed the effects of biofeedback-induced relaxation training on attention to task, impulsivity, and locus of control among 32 learning-disabled children between the ages of 8 and 11 years. Attention to task and impulsivity were measured by the Matching Familiar Figures Test and locus of control was measured by the Nowicki-Strickland Scale. Participants were randomly assigned to experimental (n = 16) and control (n = 16) groups. The study spanned a total of 8 weeks, with the experimental treatment consisting of three sessions spaced approximately 2 weeks apart. The treatment included EMG biofeedback training used with relaxation tapes. Univariate F values and discriminate analysis procedures revealed that the attention to task and impulsivity measures proved to be valid discriminators, respectively beyond the 0.01 and 0.05 levels of significance. Experimental group subjects had significantly less number of errors on the attention to task measure and significantly lower impassivity scores. It

was concluded that the biofeedback-induced relaxation training affords promise in assisting learning-disabled children in reaching their education potentials. It was recommended that future research examine the long-term efficacy and the transfer to school-related tasks of this intervention (5). Comparison of self-instruction and relaxation training in reducing impulsive and inattentive behavior of learning disabled children on cognitive tasks. (9)

3.3 EFFECT OF UNI-NOSTRIL BREATHING ON COGNITIVE PERFORMANCE

A study on spatial and verbal task performance was done on 126 subjects, using breathing through dominant uninostril and forced uninostril breathing [UFNB] (10). This showed that there was a tendency for subjects exhibiting baseline right nostril dominance to perform verbal tasks better (relative to spatial performance) than subjects exhibiting

left nostril dominance. However there was no effect of forced uninostril breathing on relative verbal and spatial task performance. These results showed that at least in baseline (not forced breathing) condition the function of the contralateral hemisphere are enhanced. It is interesting that an earlier study (11) investigated this question correlating performance with gender. Unilateral forced nostril breathing influences spatial and verbal performance in both males and females was studied. In males, they observed that UFNB influences both spatial and verbal tasks ipsilateral where as in females, UFNB influenced them contralaterally.

3.4 PRÄËÄYAMA (NOSTRIL MANIPULATION) AND CANCELLATION TASK

The study showed the visual attention ability through both letter and character cancellation tests, before and after 30 minutes of yoga breathing practices viz, right nostril yoga breathing (SAV), left nostril yoga breathing (CAV), alternate nostril yoga breathing (NDS) and breathe awareness (BAW) in male adult subjects. Their ages ranged from 20 to 45 years (mean age ± S.D., 28.45 ± 5.69). Data analyses were done using a non-parametric Wilcoxon signed ranks test. Results showed that for both letter and character cancellation tests, the alternate nostril yoga breathing (NDS) have shown the maximum reduction in total errors (-62.5% and -42.9% respectively). Following SAV and NDS there was a significant reduction in total time taken to complete letter cancellation tasks (-13.1% and -13.3% respectively).Whereas for the total time taken to complete character cancellation tasks there was a significant reduction (-12.1%) following BAW. Following SAV and NDS there was a significant reduction in the characters left-out in character cancellation task (-46.2% and -44.3% respectively). However, since total errors is the most important variable, taking other variables into account, this shows that the immediate effects of alternate nostril breathing brought about an overall improvement in visual attention compared with other yoga breathing practices and breathe awareness (12)

3.5 EFFECT OF PRÄËÄYAMA (NOSTRIL MANIPULATION) ON COGNITIVE PERFORMANCE

Yoga breathing through a particular nostril increases spatial memory scores without lateralized effects and suggesting a right hemisphere activating effect. Uninostril

breathing facilitates the performance on spatial and verbal cognitive tasks, said to be right and left brain functions, respectively. Since hemispheric memory functions are also known to be lateralized, the present study assessed the effects of uninostril breathing on the performance in verbal and spatial memory tests. School children (n = 108 whose ages ranged from 10 to 17 years) were randomly assigned to four groups. Each group practiced a specific yoga breathing technique: (i) right nostril breathing, (ii) left nostril breathing, (iii) alternate nostril breathing, or (iv) breathe awareness without manipulation of nostrils. These techniques were practiced for 10 days. Verbal and spatial memory was assessed initially and after 10 days. An age-matched control group of 27 were similarly assessed. All 4 trained groups showed a significant increase in spatial test scores at retest, but the control group showed no change. Average increase in spatial memory scores for the trained groups was 84%. It appears yoga breathing increases spatial rather than verbal scores, without a lateralized effect (3).

3.6 CANCELLATION TESTS

These paper and pencil tests require visual selectivity at fast speed on a motor response task. They asses much function, not least of which is the capacity for sustained attention. Visual scanning, and activation and inhibition of rapid responses are also necessary to the successful performance of cancellation tasks. Lowered scores on these tasks can reflect the general response slowing and inattentiveness of diffuse damage or acute brain condition or the more specific defects of response shifting and motor smoothness or of unilateral inattention. With the addition of a motor component, these tasks call upon a set of functions similar to those relevant to other complex tests of attention (13). The basic format for these tests follows the vigilance tests pattern. It consists of rows of letters or numbers randomly interspersed with a designated target letter or number. The patient is instructed to cross out all target letters or numbers. The performance is scored for errors and for time to completion; if there is a time limit, scoring is for errors and numbers of targets crossed out within the allotted time. The possibilities for variations on the basic format are virtually limitless. Several similar tasks can be presented on one page (14). The task can be made difficult by decreasing the space between target characters or by the number of non-target characters between the targets (15).

After studying the literature which gives a background to the present study to assess the attention and concentration on the normal school (9-12year), cancellation test was used. So a hypothesis was set forth which sought to examine the effect the specific yoga modules to enhance the attention and concentration demonstrating the effectiveness of IQ & CR groups

CHAPTER-4
METHODS

4.1 Subjects

The children were participants of ten days residential yoga course at Swami Vivevekananda Yoga Anusandhana Samsthana, Bangalore, India, during summer holidays. Out of the 900 students screened, 338 children were selected who satisfied the following inclusion criteria.

a) Age group 9-12 years.
b) Normal health.
c) Those who knew English.

Students with abnormalities or ailments of any kind were sieved out of the study. Among them 201 were boysand137 girls. The group mean and Standard deviation was 10.88±0.83. The students were randomly allocated to three groups called IQ, CR and PS. The details are given table-1

TABLE –1 Group wise gender distribution with Mean age ± SD

Group	Male	Mean± SD	Female	Mean± SD	Total	Mean± SD
IQ	57	10.76±1.07	52	10.80±1.08	109	10.78±1.06
PS	74	10.95±1.00	42	11.02±0.85	116	10.97±0.95
CR	70	10.81±0.98	43	10.90±0.87	113	10.83±0.94
				Total	338	10.88±0.83

4.2 Study design

After the selection of students and random allocation to three groups, the pre-assessment was done on day 1 of the 10 days personality development camp in a residential setting. They were then given their respective interventions: IQ (intelligent quotient), CR (creativity), and PS (physical stamina). On day 9, the post assessment was done on all the three groups.

4.3 Randomization

Out of 900 children selected 378 children, who satisfied the inclusion criteria. The subjects were then randomly allocated to the three groups. This was done with using lottery method, where the chits were picked by the person who had no other role in the study to group 378 children into three groups 126 each. Three groups were then designated as Intelligence quotient groups (IQ), Creativity group (CR), and Physical stamina group (PS) by the co-ordinator of the camp, who had no role in the intervention.

4.4 Masking

It is difficult to assess the yoga practices in double blind trials, because the intervention requires active participation of the subjects and hence identities become known after allocation (16). However there was an attempt to blind the subjects by giving another set of names for the three groups which were used all through the ten days camp namely *Sthiti* for IQ group, *Såñöi* for CR group and *Laya* for PS group. The assessments were made and scored by a blind investigator. Analysis of data was done in the end by a statistician.

4.5 Assessments

Letter and Character cancellation tests consist of a sheet with 25 printed rows and in each row there were 29 letters or character depending on the test. Similarly digit cancellation test consists of a sheet with 25 printed rows and in each row there were 25 digits depending on the test at the extreme left of each row a letter or a character in a box. This digit, letter and character have to be cancelled wherever it is instructed. Variables were made into 3 categories. (1)

Within 1 minute how much the subject could cancel digit, letter and character (2) digit/Letter/character left out (3) digit /Letter/Character wrongly cancelled. For the test material see Appendix-9

4.6 Intervention

All three groups i.e, IQ, CR and PS underwent 10 days of "personality Development camp" during which they are engaged in IYM (Integrated Yoga Module) for 8 hours per day (17). This included activities under the following categories:

1. Breathing Exercises : 15 minutes/day
2. Çithélékaraëa vyäyäma : 15 Minutes/day
3. Āsana (Physical Posture) : 45 Minutes/day
4. Präëäyäma : 1 Hour/day
5. Meditation (OM) : 15 minutes/day
6. Lecture on yoga philosophy : 45 minutes/day
7. Kriòä yoga (yogic game) : 1 hour
8. Trātaka(yoga based eye exercise) : 45 minutes
9. Happy assembly : 1 hour

However, the practices within each of the categories mentioned above, were differed for each group and were specific to facilitate the faculty that was focused for each group. i.e, IQ, CR, and PS

In addition to the above, each group had specific special yoga breathing practices included to facilitate the quality of the group. They are:

(i) IQ Group1.Surya Anulaoma Viloma (SAV-Right nostril breathing):1 Hour/day
2. Chanting (Gita-Jïana yoga) : 1 Hour/day

(ii)CR Group1. Candra Anuloma Viloma(CAV-Left nostril breathing) : 1 Hour/day
2. Chanting (Gita-Bhakti Yoga) : 1 Hour/day

(iii)PS Group 1. Nādi Sudhi (NS -Alternate nostril breathing) : 1 Hour/day
2. Chanting (Hanuman Chalisha) : 1 Hour/day

SAV, CAV & NS were performed before breakfast, lunch, dinner & before sleep. SAV& CAV were for 27 rounds while NS was for 13 rounds. Normally it took 15 minutes for each time totally to one hour per day.

The details of the daily routine practices for each group are given in appendix 2

4.7 Data extraction

The subject is seated comfortably and given the three cancellation sheets. She/he is then instructed thus 'here is a sheet with a number (digit). When 'start' is said, the subject starts canceling the digit / letter/ character, proceed horizontally and work as fast as the subject can operate. Time given was 1 minute to do the task. At the end the experimenter says 'stop' and takes back the sheet. Each number that is cancelled is given a score of 1. Each error is scored 1 and each omission is also given a score of 1. Finally, the total scores are tabulated for correct ones, omissions & errors separately. For the present study, only the correct scoring was taken into consideration.

4.8 Data analysis

The raw data is given in appendix -8. Data were analyzed using he statistical package (SPSS version 10). Trial profile is given in appendix 3. The appendix 4 gives the results of the descriptive statistics table 1, normality test table 2, pre data for one way ANOVA table 3, paired t-test for three groups 4a, 4b & 4c, post data ANOVA table 5a & multiple comparison table 5b. Test for skewness and normalcy were made. As the data were (skewness<1), Pre-Post comparison within the groups was done using paired t-test. Pre-Post comparison within the groups was done using non-parametric (Wilcoxon signed ranks test), which is given in appendix 5. While the between groups comparison was made using one way ANOVA. An unpaired t test was used to compare the difference between the boys and girls to study gender effect

CHAPTER –5

RESULTS

Trial profile is given (Appendix -3). Non significant ANOVA (Appendix 4, table-3) for base line values of cancellation test showed, the groups were well matched.

After log transformation of data, it does not show normalcy. As the data of all three groups were found to be non skewed (skewness < 1) hence parametric statistics were used.

Paired t-test: There was a significant increase in cancellation score (digit and character) in all the three groups IQ, PS, and CR ($p<0.001$, two tailed). The mean value and standard deviation of all the three groups were recorded on day 1 and day 9 are given in table 2.

One way ANOVA: It showed significant difference between the groups ($F(2,338) = 4.24$, hence $p< 0.01$). The multiple comparisons showed that group which practiced the yoga modules for IQ group showed significant difference as then PS in character cancellation.

The unpaired t test: There was no significant difference between the boys and girls in each group, which is showing no gender effect. (Table -3)

Table-2a Mean ± SD of cancellation score for character cancellation on day 1 and day 9 in three groups

Groups	Day 1	Day 9	% change
IQ	35.26±12.94	50.71±16.51***	43.82%
CR	37.52±14.21	50.58±18.03***	34.81%
PS	35.19±46.61	46.61±13.24***	32.45%

***P<0.001, two tailed paired t test comparing character cancellation scores of day-1 and day-9 values in all the three groups.

Table 2b Mean ± SD of cancellation score for letter cancellation on day 1 and day 9 in three groups

Groups	Day 1	Day 9	% change

IQ	30.55±8.91	30.79±7.95	0.78%
CR	32.07±11.3	30.63±7.25	-4.49%
PS	29.5±8.59	29.92±7.08	1.42%

p>0.05, two tailed paired t test comparing letter cancellation scores of day-1 and day-9 values in all the three groups

Table 2c Mean ± SD of cancellation score for letter cancellation on day 1 and day 9 in three groups

Groups	Day 1	Day 9	% change
IQ	39.88±11.19	52.29±12.05 ***	31.11%
CR	43.11±14.34	54.19±14.14***	25.69%
PS	40.12±11.52	49.89±12.27***	24.35%

***p<0.001 two tailed paired t test comparing digit cancellation scores of day-1 and day-9 values in all the three groups

Table –3 Gender comparison Male Versus Female (unpaired t-test)

Group	Male n=201		Female n=137	
	Mean	SD	Mean	SD
DS	11.78	12.38	10.00	9.97
LS	0.76	7.31	-1.75	10.54*
CS	12.54	9.56	14.34	11.76

*p< 0.01

Legend: - There was significant difference gender in letter cancellation test.

CHAPTER-6

DISCUSSIONS

The data of all three groups were found to be non skewed and hence parametric test (Paired t-test) was chosen for analysis. Analysis of base line values of three groups was done with one way ANOVA, which showed data to be well matched. The pre–post analysis was also done using paired t-test. The results showed significant increase in cancellation scoring (digit and character except letter cancellation) in all the three groups (IQ, CR and PS). Pre-Post comparison within the groups were done non-parametric test

(Wilcoxon signed rank test). Which also gives same result as parametric test (Paired t-test). In results section only parametric calculations are given.

The task of cancellation requires sustained visual attention, scanning without distraction and better concentration (13). A previous study was done on 108 school children, who performed better in spatial memory task and averaged 84%, following yoga breathing with nostril manipulation with no changes in verbal memory scores (3). It is known that reduced anxiety can improve the performance on tasks requiring attention, learning and memory (18). The anxiety-reducing effects of yoga practice, which are already known (19) could have facilitated in improving attention. Biofeedback induced relaxation training on sixteen learning disabled children showed significantly fewer numbers of errors in the attention task and significantly lower impulsive score compared to control group (5). Self-instruction and relaxation training showed significant change in attentive behavior of learning disabled children on a cognitive task (9). Drawing evidence from these previous findings, it may be tentatively concluded that significant improvement in cancellation score (digit and character scoring) could be attributed to the relaxation effect of yoga. In all three-cancellation tests, there was no significant difference in letter cancellation test, it could be due to the fact that letter cancellation is more complex than digit and character cancellation (20).

The group comparison done with Tukey test for multiple comparisons showed that the group, which practiced the yoga modules for CR, was significantly better than PS group in digit cancellation performance. The yoga module emphasizing technique to improve the brain functioning has normally shown better effect that yoga module which emphasized in physical stamina. The CR group showing greater improvement is probably indicated of greater connections to digit cancellation with right brain functioning.

A similar study was done which studied the visual attention ability through cancellation test before and after 30 minutes of different yoga breathing practices (SAV, CAV, NDS and breath awareness) on adults. This study indicated an over all improvement in visual attention (12).

Male versus female showed significant difference in letter cancellation test. It suggests, there was gender effect in letter cancellation in age range of 9-12 years.

CHAPTER- 7

SUMMARY AND CONCLUSIONS

SUMMARY

1. There are several studies on the efficacy of yoga in improving mental functions of normal and subnormal adults and children but there are no studies on the effect of yoga in normal healthy children on their attention and concentration.
2. The aim of study was to assess the efficacy of three intensive integrated yoga modules on children in regard to their attention and concentration.
3. Total 378 children randomly allocated to three groups were studied and assessed with the help of standard cancellation test. The intervention used consisted of three different integrated yoga modules.
4. The base line data was analyzed by one way ANOVA. Pre-post data of all three and full group were analyzed with Paired-t test and group comparison by Tukey test. The gender effect was explored by Paired-t test for all three and full groups. Male and female comparison was done by unpaired t test.

5. The results showed that

- The pre- pre data were well matched after analysis.
- Comparison of pre and post values showed that there was significant improvement ($p<0.001$) in digit and character cancellation test for all three groups.
- The group comparison showed that the group which practiced the yoga modules for CR showed significantly more improvement compared to PS groups in digit cancellation test. There was no significant change between IQ and CR groups
- The unpaired t test for male versus female showed significant difference in letter cancellation test.

CONCLUSIONS

1. The three integrated yoga module are found to be effective in improving attention and concentration probably due to relaxation & anxiety reducing effects of yoga practices.

2. Among them CR group showing significant difference compared to PS group in digit cancellation is indicative of a probable connection of digit scoring with right brain functioning.
3. Male versus female showed significant difference in letter cancellation test. It suggests, there is gender effect in letter cancellation this age range.

CHAPTER -8

LIMITATION OF THE STUDY

1. Signed consent for participation in research was not taken, though the guardians gave their signed consent for participation in yoga training.
2. The inference is made based only on cancellation score only, error of omission and mistakes were not considered.
3. Previous exposure to yoga if any was not eliminated

CHAPTER -9

SUGGESTIONS FOR FUTURE STUDY

Cancellation tasks are used to test the ability of visual attention and scanning while ignoring distractions. Hence, any mind modifying techniques, Integrated module of yoga practices, which improve the attention, could be helpful for disorders such as, attention deficit disorders or acute damage affecting specific functioning of the brain. This study can be improved and extended to school children in the school premises. The intervention, integrated approach of yoga module can be studied on sub-normal children also. The design can be improved for future work and the scope can be expanded to develop learning and motor skills in the field of school education.

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