

All India Institute of Medical Sciences, Rajkot (Gujarat)

Department of Physiology

[E-Bulletin]

YOGA INSIGHT
JUNE 2022



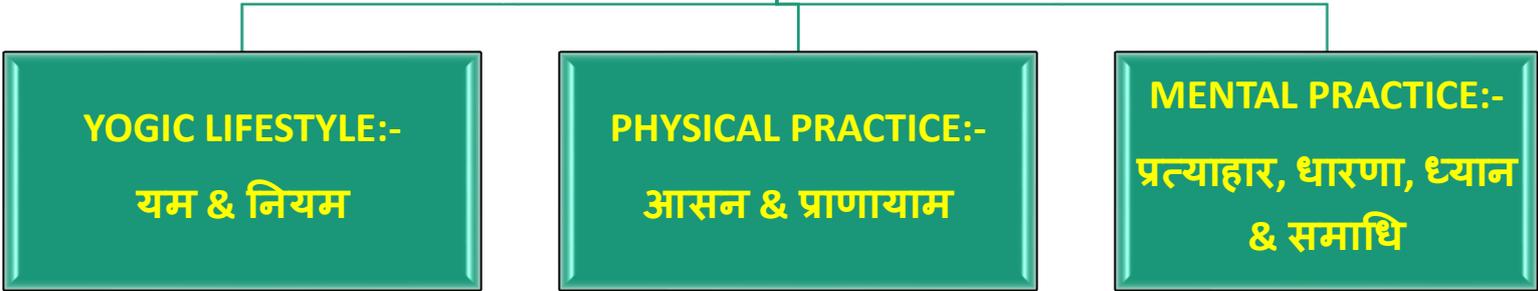
Is Yoga merely an Exercise?



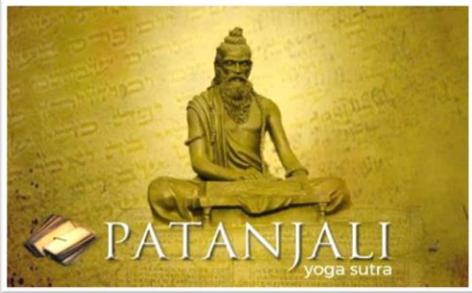
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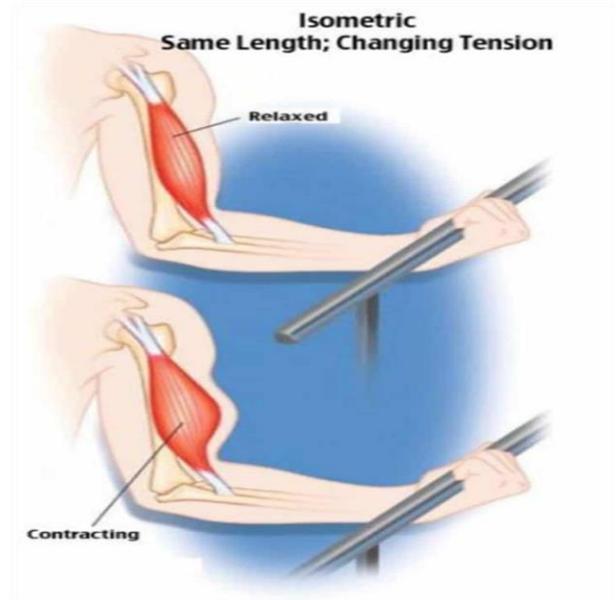
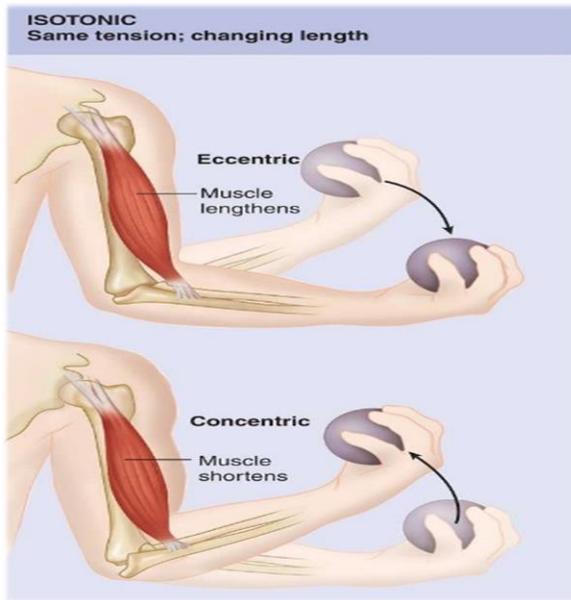


योग



ORIGIN AND INTENSION

YOGA	EXERCISE
<ul style="list-style-type: none"> • Yoga signifies the importance it attaches to mental and spiritual well-being, stretching beyond just physical well-being (1,2). • Around 2500-3000 years ago that it got a structured format when Sage Patanjali consolidated the theory and practical concepts of yoga, • Aim– ‘controlling the mental modifications’ with physical postures as one of the scaffolds. • The concept of yoga has been fabricated with the idea of achieving peace rather than health alone unlike exercise (3). 	<ul style="list-style-type: none"> • The Oxford English dictionary defines exercise as ‘activity requiring physical effort, carried out to sustain or improve health and fitness’. • It dates back to the origin of the species. Though, sports, athletics and gymnastics as a profession started developing only in the 18th century (4). • From historical point of view, exercise and related activities were mainly a form of recreation in earlier civilizations and slowly emerged as a form of therapy (preventive/curative) in recent times. 



Process of Doing Exercise

Exercise typically involves the following sequence

A. Warm up

B. Exercise

C. Relaxation (Stretching & Rest)

A



B



C

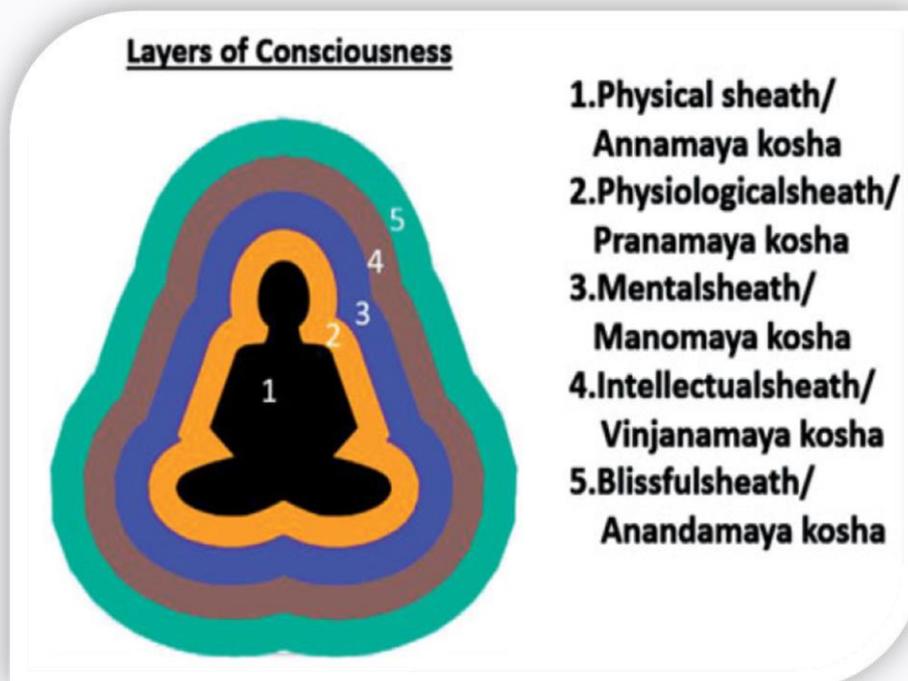


Process of Doing Yoga

Classically yoga practices follow the below sequence.

- a. Starting prayer-salutation to sage Patanjali/other invocation of interest.
- b. Slow movements with breathing awareness and loosening exercise - to prepare the lungs and muscles for asanas and pranayama practices, and also to avoid muscle soreness.
- c. Asanas/Bodily postures-different sets of asanas depending on the need of the subject.
- d. Pranayama/Regulated breathing- Different sets depending on the need of the subject.
- e. Direct contemplative practices/ Meditation-Dharana and Dhyana
- f. Post meditative relaxation with positive suggestion.
- g. Ending Prayer-Giving good wishes and pure feelings for all beings of the universe.

The whole sequence is built in a way that trains an individual to slowly transcend from the gross materialistic physical level to a deeper divine level of existence (5,6)





Process of Doing Yoga

Performing an asana involves three levels as follows,

- a. Attaining the posture with movements
- b. Maintaining the posture comfortably with no movements
- c. Releasing the posture with movements.

As per Patanjali’s definition of asana (‘sthiram sukham asanam’), step b mentioned above only is asana, not the movements used to reach the state or to release the state.

Misunderstanding the movements as asana makes one compare yogasana to physical exercise.

- If holding the posture is asana, then can its benefits to be equated to just that of isometric exercise or more?
 - The answer is No, its always more than that of routine isometric exercise
 - Because asana is not just holding a posture, but holding “comfortably” with the “mind” in an expansive state, focusing on infinity in a relaxed state an experiment at Kaivalayadhama in Maharashtra shows Paschimottanasana when performed as isometric exercise led to increase in the heart rate increase by 32% whereas when performed as asana (with effortlessness & relaxation), it led to only around 6% increase in heart rate (7)

Energy and metabolic system

Basic metabolic system in muscles (8) are:

- a. **Phosphocreatine-creatine system-for short burst of few seconds**
- b. **Glycogen-lactic acid system- for intermediate activity**
- c. **Aerobic system- for prolonged activity**

Yoga	Exercise
<ul style="list-style-type: none"> ✓ Oxygen consumption and metabolic demand is lower during yoga practice, including asana, pranayama and meditation (9). ✓ Sympathetic activation in trained yoga professionals is lesser compared to novice practitioners (10). ✓ Type of fibers: primarily involves red type Muscle fiber 	<ul style="list-style-type: none"> ✓ The energy system used again depends on the duration of exercise and the intensity. ✓ Where lactic acid accumulation and oxygen debt leads to post-exercise exhaustion and fatigue. ✓ Type of fibers: mainly white type

Effect on mind and body

Mindful awareness of all the components of yoga gradually shifts the autonomic nervous system more towards the parasympathetic side or a balanced sympathetic-parasympathetic tone, finally leading to overall positive health in a cascading manner (1).

EFFECTS OF YOGIC PRACTICES ON INDIVIDUAL ORGAN SYSTEMS

NEUROMUSCULAR AND ENDOCRINE SYSTEM

- Nervous system moves from sympathetic to parasympathetic dominance as the yogasana practice retunes the muscle fibres away from type-II and towards Type-I fibres (11).
- In another study it was also found that with yogasana practice the aerobic power VO₂ max increased significantly, whereas anaerobic power decreased significantly (12,13).
- Yoga, involving slow and often non-strenuous activity positively affects the HPA axis response to stress by lowering sympathetic stimulation, therefore lowering levels of nor-epinephrine and epinephrine (14).
- BDNF, Oxytocin and serotonin levels are found to be increased with yoga (1)

YOGASANA PRACTICE

- Increases the level of the neurotransmitter Gamma Amino Butyric Acid (GABA), which can induce a relaxed state conducive for meditative practices (15).
- It reduces activity in limbic system, suggesting a role in regulation of emotions (16).

IMMUNE SYSTEM

YOGASANA:

- Increased parasympathetic tone -boosts immune system
- Promote formation of red blood cells (RBC) and white blood cells (WBC)
- Improves circulation
- Inverted postures -improve venous & lymphatic drainage
- Reduces markers of inflammation

CARDIO-RESPIRATORY SYSTEM

- Inverted postures- sensitize baroreceptors
- Pranayama- sensitize chemoreceptors, Improves lung volumes and capacities

ABDOMINAL SYSTEMS (DIGESTIVE, RENAL AND REPRODUCTIVE)

- Various asanas -by massage action improves circulation in visceral organs
- Various kriyas- cleansing action on digestive, pulmonary, renal and reproductive functions by improving mucociliary clearance and circulation

ADVERSE EFFECTS AND PRECAUTIONS

If practiced under supervision adverse effect of yoga are rare.

- Most common injury is muscular – improper warm up/unguided practice/untrained persons.
- Neurological or vascular damages -inverted postures without proper guidance
- Overstretching beyond one's limit may damage ligaments, muscles, nerves.
- Improper unguided practice of Pranayama for a longer time, can lead to agitation, anxiety, and tremors (2).



Effects of exercise on individual organ Systems

- Aerobic exercise, on the other hand, appears to stimulate the sympathetic nervous system, therefore raising plasma epinephrine and nor - epinephrine (12)
 - BDNF increases with moderate exercise
 - Mild or moderate exercise can have antidepressant/anxiolytic effect – by increase in serotonin. High intensity exercise has opposite effect
 - Also improves pain relief by stimulation of endogenous analgesic system
 - Regular moderate aerobic exercise improves immune system functions
 - Strenuous exercise may diminish NK cell activity
- Moderate exercise has positive effect on most of systems of body and mainly targeted to muscular and cardiovascular systems.

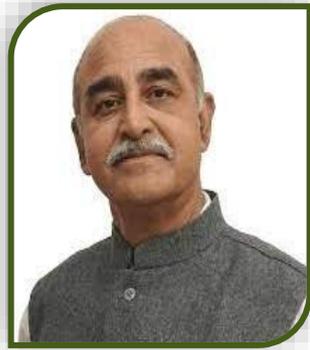
ADVERSE EFFECTS AND PRECAUTIONS

- Exercise have higher chances of injury
- Considering the wide range of activities involved and range from mild sprain to serious fracture depending on nature of activity.
- Improper guidance and training being a major factor

Buzz Your Brain...



1.	Yoga means only yoga-asana postures.
	A. True B. False
2.	Yogasana involves repetition of activity rather than maintaining a stable posture.
	A. True B. False
3.	Yogasana involves mainly type 1 muscle fibers.
	A. True B. False
4.	After doing yoga under expert guidance one always feel exhausted at end of session and need to take rest.
	A. True B. False
ANS: - 1- B, 2 – B, 3 – A, 4 - B	



Message from the Executive Director

I heartily congratulate the Department of Physiology for bringing this informative newsletter on "Yoga Insight" in line with IDY-2022. My best wishes to the entire team.

Prof. Dr. (Col.) CDS Katoch,
Executive Director, AIIMS, Rajkot.



Message from HoD

This is an effort to bring forward important information on Yoga and difference between yoga and exercise in line with 8th International Yoga Day Celebration. This initiative will definitely be useful for all readers. We hope that this e-bulletin will increase your knowledge on Yoga and its importance.

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