

# **RHEUMATOLOGICAL AND IMMUNOLOGICAL ASPECTS OF AGING AND THE IMPORTANCE OF INTEGRATED APPROACH OF YOGA IN SENIOR CITIZENS**

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**ABSTRACT:** This paper takes a look at important aspects of the aging process through Immunogerontology and Gerontorheumatology that deal with the rheumatological and immunological aspects of aging. Different conditions that are peculiar to the aging population are detailed. An integrated approach of Yoga for the senior citizens is given with emphasis on lifestyle, proper diet, adequate exercise and use of relaxation and meditative practices for health and well being. The Kriya Yoga of Maharishi Patanjali is put forth as a model that may be followed by the silver citizens to attain and maintain a healthy and harmonious state of being during the challenging end years of their life.

## **INTRODUCTION:**

Thanks to the recent advances in medical technology and better nutrition, people are living longer than ever, especially in developed countries where life expectancy has nearly doubled from ~45 in 1900 to ~80 in 2000.

The aging process depends on a combination of both genetic and environmental factors. Overall, genetic factors seem to be more powerful than environmental factors in determining the large differences among people in aging and lifespan. However, many environmental conditions, such as the quality of health care have a substantial effect on aging.

A healthy lifestyle is an especially important factor in healthy aging and longevity. This includes:

- Not smoking and drinking alcohol
- Adoption of a proper exercise routine
- Getting adequate rest
- Eating a healthy diet rich in fruits and vegetables
- Coping with stress in a healthy manner and
- Having a positive outlook towards the later half of life

## **CELLULAR CHANGES ASSOCIATED WITH AGING:**

With age the cells tend to undergo functional changes and even the rate of cells multiplication slows down. Important cells of the immune system such as the T-lymphocytes decrease with age and the response to environmental stresses is hampered. Apoptosis or programmed cell death is hampered leading to the emergence of many health problems. This process is necessary for tissue health and to slow down immune responses once an infection has been cleared from the body. As a result we find that cancer cells continue to multiply and invade or

take over surrounding tissue, instead of dying as originally programmed. Other diseases may cause cells to die too early as in Alzheimer's and Parkinson's diseases.

#### CHANGES IN THE REGULATION OF BODY SYSTEMS

With age the body's self regulatory systems tend to go into disorder with decreased regulatory ability of blood pressure, blood sugar, body temperature, immune function and fluid balance. This can be influenced even further by lifestyle behaviors such as cigarette smoking, physical activity, and nutritional intake as well as by the socioeconomic circumstances.

#### **IMMUNOGERONTOLOGY:**

Immunogerontology is the study of the immune system in the elderly. The immune system is profoundly affected by aging, and as it interacts with every part of the body, focused research on the immunology of aging helps to understand the aging process better.

- Immunocompetence declines with age
- Thymic involution has a great influence
- Decline in the T cell subpopulations and functions
- Decline in the T cell receptor proteins - signal transduction and T cell activation
- Naive to memory T cells ratio changes
- Defective T cell activation because of decrease in calcium
- As T cells age, they lose their capacity to produce and respond to Interleukin -2.
- Reduced function of T cells also affects B cell function decreasing the antibody diversity necessary to recognize a wide range of antigens
- Increased levels of auto antibodies can lead to autoimmune disease such as Lupus, rheumatoid arthritis, and multiple sclerosis
- Reduced activity of leukocytes such as macrophages, monocytes, neutrophils and eosinophils

#### IMPLICATIONS FOR HEALTH CARE OF THE ELDERLY

As we have seen, aging affects many components of the immune system, and since the immune system interacts with every organ in the body, a clearer understanding of the immunological changes due to aging is critical for designing effective health care for the elderly.

- The elderly do not respond to vaccinations in an adequate manner as compared to the children and young people.
  - T cell and antibody responses are slower and not as strong in the aged population
- Nutrition plays a prominent role in immune response

- Reduced caloric intake slows the aging process and helps maintain higher numbers of naive T cells and levels of IL-2.
- Vitamin E and zinc are important nutrients for proper functioning of the immune system.
- Vitamin E has recently been in the news as a possible treatment for Alzheimer's disease and it seems that vitamin E supplements may also boost the immune system.
- Vitamin E is also an antioxidant that can protect lymphocytes, the brain, and other tissues from destructive free radicals.

### **GERONTORHEUMATOLOGY:**

Gerontorheumatology deals with the musculoskeletal conditions of the elderly. These are the most frequently reported disorders in patients over 65 years of age. It has been projected that by the year 2050 the number of elderly people will be about 324 million in India alone!

The aims of Gerontorheumatology are:

- To improve and preserve quality of life by
  - preventing unnecessary impairment and disability
  - preserving independence
  - improving the mobility and
  - decreasing the pain.
- To improve the quality of the care
- To reduce the quantity of care needed

### **COMMON PROBLEMS IN GERONTORHEUMATOLOGY**

- Osteoarthritis is the most frequent
- Spondylosis is the second most common
- Crystal induced arthritis
- Osteoporosis
- Rheumatoid arthritis

**OSTEOARTHRITIS:** Osteoarthritis (formerly known as degenerative joint disease) is not only the most common type of noninflammatory arthritis, it is also the most common type of arthritis in general. Osteoarthritis starts when cartilage begins to become ragged and wears away. In the worst cases of osteoarthritis all of the cartilage in a joint wears away, leaving bones that rub against each other. People are most likely to have osteoarthritis in the hands, neck, lower back, or large weight-bearing joints of the body, such as knees and hips. Osteoarthritis symptoms can range from stiffness and mild pain that come and go with activities like walking, bending, or stooping; to severe joint pain that continues even when the person rests or try to sleep. Growing older is what most often puts us at risk of developing osteoarthritis.

**SPONDYLOSIS:** Spondylosis is a general term for age-related wear and tear affecting joints of the neck and lower back. Also known as cervical or lumbar osteoarthritis, this condition usually appears in men and women older than 40 and progresses with age. As we age, the bones and cartilage that make up the backbone and neck gradually deteriorate, sometimes forming irregular bony outgrowths called bone spurs. Drying and loss of elasticity also occurs in the spinal and cervical disks with bulging and sometimes herniation of disks so that disk material protrudes from between two vertebrae. This can also lead to the stiffening of the paraspinal ligaments and back muscles. Some people with signs of spondylosis on X-rays manage to escape the associated symptoms, which include pain, stiffness and muscle spasms while at the other extreme, spondylosis may compress spinal nerves causing radiculopathy or bony spurs and irregularities may reduce the diameter of the spinal canal causing myelopathy.

**GOUT:** Gouty Arthritis is one of the most painful forms of arthritis. An attack can begin when crystals of uric acid form in the connective tissue and/or joint spaces. These deposits lead to swelling, redness, heat, pain, and stiffness in the joint usually that of the big toe. Gout attacks often follow after someone has eaten foods like shellfish, liver, dried beans, peas, anchovies, or gravy. Being overweight and using alcohol or certain medications may also make gout worse. In older people, some blood pressure medicines can also increase the chance of a gout attack. Swelling may cause the skin to pull tightly around the joint and make the area red or purple and very tender.

**OSTEOPOROSIS:** Osteoporosis is caused by low bone mass and deterioration in the bone structure, which leads to fracture after mild or moderate trauma. The most common fractures occur in the arms, vertebrae, and hips. Fracture risk increases with age, is more common in post menopausal women and has an important impact on quality of life, mortality, and health care costs in most countries.

**RHEUMATOID ARTHRITIS:** Rheumatoid arthritis is an autoimmune polyjoint disease where the immune system attacks the lining of the joints just as it would if it were trying to protect the person from injury or disease. Rheumatoid arthritis leads to inflammation in the joints causing pain, swelling, and stiffness that can last for hours. The patient might not even be able to move the joint. Rheumatoid arthritis can attack almost any joint in the body, including the joints in the fingers, wrists, shoulders, elbows, hips, knees, ankles, feet, and neck. If rheumatoid arthritis is present in a joint on one side of the body, the same joint on the other side of the body will probably have rheumatoid arthritis as well. Rheumatoid arthritis not only destroys joints but can also attack the heart, muscles, blood vessels, nervous system and the eyes.

#### PREVENTION STRATEGIES IN GERONTORHEUMATOLOGY

The first step in preventing Gerontorheumatological problems is to be aware of the risk factors. Being overweight or obese, having joint injuries, and having weak thigh muscles are a few of the possible risk factors for this condition. Prevention also involves using this knowledge to make lifestyle changes aimed at controlling the risk factors. Among the lifestyle changes that may help with prevention are exercising regularly, maintaining a healthy weight, and preventing joint injuries.

Many affordable strategies such as good nutrition and exercise underpin many of the preventive and treatment strategies:

- Weight reduction reduces pain and disability from osteoarthritis of the knee. It also helps in back pain where obesity is an important factor.
- Poor diet contributes to gouty arthritis
- Smoking and excessive alcohol use is linked to osteoporosis.
- Adequate calcium intake helps to maintain bone density and reduce the risk of fractures

The best way to prevent these conditions is to

- Engage in adequate physical activity for fitness
- Maintain an ideal body weight
- Follow a balanced diet meeting the requirements for minerals and vitamins such as calcium and Vitamin D
- Put in place accident prevention programs related to road traffic crashes, leisure activities, and workplaces.

## EXERCISE AND ARTHRITIS

It is absolutely safe for patients of arthritis to exercise as studies have shown that exercise helps them in many ways by reducing joint pain and stiffness, increasing flexibility and muscle strength, improving cardiac fitness and endurance, helping with weight reduction, and contributing to an improved sense of well-being. Arthritis research has shown that people with weak quadriceps are at an increased risk of developing knee osteoarthritis. This may be due to the fact that the quadriceps act as shock absorbers and stabilize the knees. The stronger the thigh muscles, the more shock and stress they are able to keep off the knees. This is why strengthening these muscles decreases the chances of developing arthritis.

## MANAGEMENT STRATEGIES

Treatment of musculoskeletal conditions starts with pain relief through massage, ice, physical therapy, and/or pain relief medications. Many cases of osteoarthritis, soft-tissue rheumatism, and inflammatory arthritis require Nonsteroidal anti-inflammatory drugs or other stronger or more specific drugs.

The best strategy for addressing osteoarthritis in the developing world is pain management, along with education to facilitate self-management and rehabilitative programs to improve function, activities, and participation. For osteoporosis, a combination of vitamin and mineral supplementation, and specific medications may be needed.

Exercise programs, rehabilitation, and education on daily functioning, including encouraging a "bone-healthy" lifestyle to reduce the risk of falls and prevent fractures, are all important.

## **AN INTEGRATED YOGA APPROACH IN SENIOR CITIZENS**

The senior years are a testing time as many physical, emotional, mental, financial and social challenges begin to surface and confront the elders in an unpleasant manner. Following the Kriya Yoga of Maharishi Patanjali with an understanding of Tapas as a disciplined facing of the challenges of senior life, Swadhyaya as introspectional self analysis and Ishwara Pranidhana as doing one's best and leaving the rest can help our Silver Citizens develop and maintain a healthy and harmonious state of being during the challenging end years of their life. Patanjali promises us Samadhi through the adoption of Kriya Yoga and for the silver citizens this high state of mind will enable them to be at the very peak of their existence when it is time for them to leave this world.

Adoption of a healthy Yogic lifestyle with cultivation of the Karma Yoga, Bhakti Yoga and Raja Yoga principles in daily life will help create a sense of inner happiness and reduce the friction that tends to build up in families during the senior years.

It is important to follow a Yogic diet with attention to proper hydration to ensure health of all the vital systems of the body. Aspects of a healthy diet include the following.

- Take lots of fruits, green leafy vegetables, green vegetable salads and sprouts.
- Vitamin C in Citrus fruits will help the healing process.
- Grains, fiber, and fat-free or low-fat milk and milk products
- Good hydration will help intervertebral discs retain their health.
- Limit foods with saturated fats, trans-fats, cholesterol, sodium (salt), and added sugars.
- Avoid refined foodstuffs and junk foods.
- Honey in warm water or herbal teas are good for cleansing the bowels and help relieve many backaches by preventing constipation.
- Avoid tobacco products and the intake of alcohol.
- Eat just enough calories to achieve or maintain a healthy weight.

Senior citizens need to have adequate rest and must avoid straining the joints and musculature. Some healthy tips in this regard are:

- Avoid high-impact activities
- Warm fomentation of the neck and other joints region
- Avoid lifting weights
- Take short breaks while driving, watching TV or working on a computer
- Work on the overall posture keeping the neck aligned with shoulders and importance to the curves of the spine
- Take adequate rest. When lying down it is best to lie on the side. Avoid sleeping on the face.
- Use a thin and hard pillow to support the head and neck

Gentle stretching and strengthening practices such as Jattis / Sukshma and Sthula Vyayama and other breath-body movement activities can help to restore psycho-somatic harmony that is a root cause of many health problems. These can be usually done by most of the seniors and is a good way to introduce the Yoga practices in a gentle and safe manner in the initial stages.

The use of gentle Hatha Yoga Kriyas helps facilitate psychosomatic balance. This includes practices such as the Chatus Pada Kriya, Ardha Kati Chakra Kriya, Pawan Mukta Kriya, Chri Kriya, Sethu Kriya and the Vyagraha Pranayama with awareness of the spinal movements with the conscious rhythmic breathing.

It is important to strengthen the thigh and abdominal musculature especially in those prone to arthritis of the lower limb. Healthy and strong thigh and abdominal muscles reduce the pain and improve mobility. This can be done by practices such as Uttanpada Asana, Ardha Utkat Asana, Veera Asana, Nava Asana, Shalaba Asana and the use of Moola Bandha and Uddiyana Bandha.

The thymus gland is vital for proper functioning of the immune system and twisting postures create a healthy flow of Prana into the Anahata Chakra. Some examples are Vakra Asana, Bharadwaja Asana, and Ardhamatsyendra Asana. Paryanka Asana has beneficial healing properties for the thymus gland when used with the Hastha Mudra sequence as taught by Swami Gitananda Giri.

The weakness in the back and neck region can be tackled with practices that strengthen the back and torso musculature as well as the paraspinal ligaments. This includes practices such as the Manduka Asana, Gomuka Asana, Sarpa Asana, Shalaba Asana and Bhujanga Asana.

Neck pain and upper back pain are common complaints in the elders that often incapacitate them to a great extent. The Brahma Mudra when done with the breath sequences and appropriate Nada or vibrational sounds such as AAA, OOO, EEE and MMM can relax and energize the neck region and relieve the frequent occurrences of a, "pain in the neck".

For the seniors it is useful to work with a partner in Yoga practices for betterment of physical and emotional health. This includes simple aspects such as helping to push a bit more in forward bending postures, supporting the partner in the back bending postures, helping to improve the range of joint movement in different practices and giving isometric resistance to the movement in the postures to improve strength of the musculature.

Pranayama is an important link between the body, emotions and mind. There are simple Pranayamas that can help to reduce the prevalent stress and bring about psycho-neuro-immuno-endocrine balance and harmony essential for overall health and well being. Some of these Pranayamas are the Vibhagha and Pranava Pranayamas, Nadi Shuddhi, Bhramari Pranayama and Chandra Nadi Pranayama that also helps reduce the blood pressure and blood sugar levels.

Self traction is helps in spinal health and can be done in the morning before getting out of bed and when going to bed at night. Turn the head from side to side as if the head is a bottle cap and is being taken off the bottle. Let the head move away from the body pulling the upper part of the spine upwards. Then move the heels, one by one as if walking away from the body downwards. Hold this self-traction on the entire spine for 30 seconds. Then release and relax for a minute. Repeat at least three times in the morning before getting out of bed and at night before going to bed.

Yoga relaxation helps to relieve the stress and produce autonomic balance thus helping correct numerous psychosomatic conditions that are prevalent in older age. Shavasana with Savithri Pranayama, Spandha-Nishpandha Kriya, Kaya Kriya, Tala Kriya and Yoga Nidra are very useful in this regard.

The inner aspects of Dharana and Dhyana help normalize the higher functions and modulate the individual perspectives thus cultivating the proper attitude towards life. These practices include the Brumadhya Drishti Trataka and Prana Kriya to activate the Ajna Chakra and energize the neuroendocrine axis, the Mandala Dharana and Chakra Dhyana with special emphasis on the Anahatha Chakra to activate the thymus and Ajna Chakra to normalize the neuroendocrine axis. Other important practices include the use of Japa in the form of Om Japa and Ajapa Japa that focuses on the Hamsa-Soham Mantra.

### **CONCLUSION:**

Though the process of aging is irreversible and inevitable, the ability to learn and adjust is with us throughout our life. This ability to choose the right attitude is strongly influenced by our interests, activities, and motivation.

The adoption of a healthy diet and positive habits with regular exercise along with the avoidance of negative habits will help our 'Silver Citizens' retain their mental ability & prevent degenerative disorders. The frequent and debilitating falls can be minimized thus avoiding expensive joint replacement surgeries.

So many of our great Yogis even in modern times such as Yogamaharishi Dr Swami Gitananda Giri, Yogendraji, Yogeshwarji, Yogashri Krishnamacharya, Kannaiah Yogi, Suddananda Bharathi, Shri Pattabhi Jois and Padma Bhushan Shri BKS Iyengar have shown us that its is possible to grow old without losing any physical or mental faculties of youth.

The Kriya Yoga of Maharishi Patanjali with an understanding of Tapas as the challenges of senior life, Swadhyaya as introspectional self analysis and Ishwara Pranidhana as doing one's best and leaving the rest can help our Silver Citizens develop and maintain a healthy and harmonious state of being during the challenging end years of their life.

With the adoption of a proper attitude and lifestyle through the Yogic way of life, we can rise above our own circumstances and old age, despite the physical limitations, can be a time of variety, creativity, and fulfillment.

May we all grow old gracefully through Yoga, the mother of all sciences.

### **SUGGESTED READING AND VIEWING**

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