

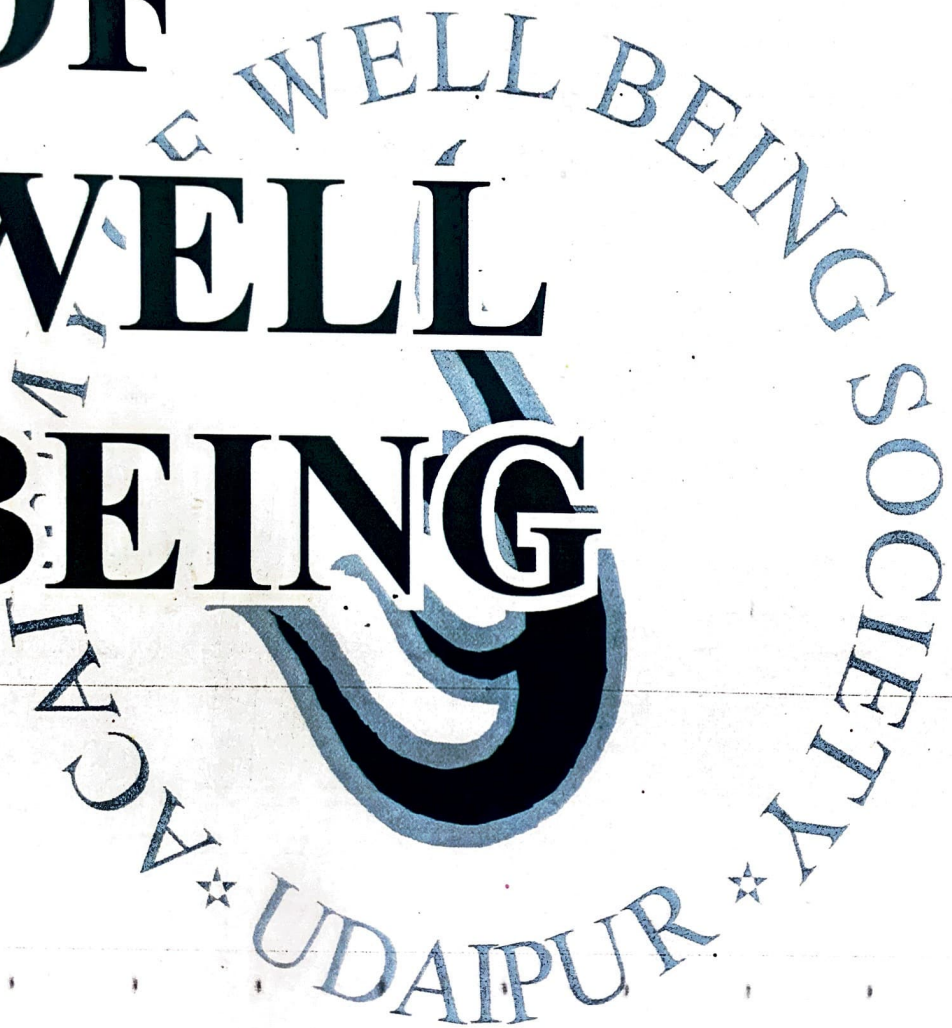
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EFFECT OF YOGA INTERVENTION ON INTERSTETIAL LUNG DISEASE: A CASE STUDY

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ABSTRACT

In this paper a case study of a patient suffering with Interstitial lung disease, considered as incurable, is presented. Yoga asanas, breathing exercises accompanied with some physical exercise, meditation incorporated with prayers were found to be effective to cure this lung disease completely given with the medical treatment.

Objective : To study the effect of yoga on Interstitial Lung Disease through case study.

INTRODUCTION

Lungs are located in the chest area, within the rib cage. They are spongy and conical in shape. At the base they touch the diaphragm. Gas exchange is the main function of the lungs. They intake oxygen and expel carbon dioxide. Bodily functions need oxygen and produce carbon dioxide as a waste product. Healthy lung tissue is flexible enough to expand the chest muscles to draw air into the lungs (Sharadchandra, 2018).

The respiratory centers in the brain contain chemoreceptors that detect pH levels in the blood and send signals to them to adjust the respiratory rate to change acidity levels by carbon dioxide removal. Medulla oblongata (primary respiratory control center), Pons (respiratory rate controllers), Cortex (voluntary controller of respiration) and some of the Nerves used in respiration are located in brain (Takishima, 1994).

History of the client

The patient was a 57year old man who was previously physically and mentally healthy and without any medical history. He was a semiprofessional badminton player along with a business of his own. He has lived a very normal life with healthy diet and routine.

Symptoms began on 9th March 2020 when he became unconscious for a few seconds. A similar instance was observed on the consecutive day. He was immediately taken to a hospital where he was diagnosed Pulmonary Fibrosis in his Lungs. The patient was taken to an another hospital situated in a bigger city in the hope to get better facilities of diagnosis of the problem. Follow-

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ing 7 days treatment and thorough medical examinations, he was diagnosed to suffer with Interstitial Lung Disease (ILD), an incurable disease caused due to pigeon dropping allergy. He was then shifted back home but on an oxygen cylinder (concentrator), for 24 hours. His medications included Tab. Medrol 16mg BOD, Tab. Azaron 50mg BOD, Tab. Shellcal 500, and Tab. Pentoacid DSR.

Hence, owing to the situation, he sought help to practice yoga and breathing exercises as recommended by the doctor. The patient contacted the first author in April 2020.

Problems shared by the patient:

The patient reported when the first author met him that he was experiencing, particularly being acute shortness of breath without the oxygen cylinder. He also complained of frequent coughing, heavy sputum production. A sudden drop in oxygen level concentration was observed by the patient while performing day to day activities like forward bending, wearing clothes, speaking, exercising, hand or leg movements, sitting, bathing, brushing, etc. He used to live on first floor of the building, so to go to ground floor was a dream for him. He had lost the hope to ever go downwards or to climb stairs. He delineated instances of sticky cough all the day along. He also reported difficulty in sitting cross legged on floor for even a brief span. He also complained of numbness and swelling in right leg. Due to all these unusual and unanticipated problems, he felt sad often. It was like an environment of melancholic air all around.

Intervention

On the basis of evaluation of the medical reports of the afflicted, it was concluded that Pranayama and Breathing techniques might do some improvements. He under the guidance started breathing exercises and pranayama sitting on chair along with external oxygen 5 LPM for ease as he had great difficulty sitting cross legged on ground. This case was treated in 2020. On the very first day, yoga session began with a prayer at 5:30am. The whole month the following module was followed. This module took one and half hour for administration depending on the situation of the client.

1. Prayer 1:

OM Sahana Vavatu, SahanauBhunaktu
 Saha ViryamKaravavahai, Tejasvi Navaditamastu
 Ma Vidvishavahai, OM Shanti ShantiShantihi
 Om, may God protect both teacher and student
 May He nourish us together
 May we work together with great energy
 May our studies be enlightening
 May there be no hate among us
 Om peace, peace, peace

2. Neck movement – Brahma Mudra

Brahma mudra being a slow process of neck movement doesn't create much pressure on trachea and hence was suitable for the patient as fast movements led to a decline in oxygen level of patient.

3. Eye movement

1. Text

2. Eye rotation

1. Right to left (5 times)

2. Left to right (5 times)

3. Up and down (5times)

3. Inhalation at centre and exhalation while going up, down, right, left.

4. Eye rotation clockwise, anticlockwise.

5. Blinking eyes (5 times)

6. Eyes wide open while concentrating half minute.

4. Deep breathing (50 times)

5. AnulomaViloma (50 times)

6. Surya Bhedi Pranayama (30-45 times)

7. Meditation of Swaptama Ram ji (Niranjananand Saraswati, 2011). was followed. It concentrated on all the chakras & their colours.

All the exercises from the **second month** were done by him cross legged.

1. Prayer:

YogenaChittasyaPadena Vacha

Malam Sharirasya Cha Vaidya Kena

Yopakartham PravaramMuninam

Patanjalim Pranjali Ranatosmi

I praise sage Patanjali who gave us the science of yoga to purify our mind and consciousness. And who gave us grammar and vocabulary to use the words and express ourselves with perfection.

He gave us the gift of medicine i.e. Ayurveda so that we remove the impurities of the body.

Dear Lord, let me be closer to the sage who gave us all these gifts.

I bow down with folded hands in reverence of Lord Patanjali.

2. Neck movement

1. Right to left (5 times)

2. Left to right (5 times)

3. Up and down (5 times)
4. Semi rotation (5 times)
5. Full rotation (anticlockwise and clockwise)
3. Eye movement
 1. Text
 2. Eye rotation
 1. Right to left (10 times)
 2. Left to right (10 times)
 3. Up and down (10 times)
3. Inhalation at centre and exhalation while going up, down, right, left.
4. Eye rotation clockwise, anticlockwise.
5. Blinking eyes (10 times)
6. Eyes wide open while concentrating half minute twice.
4. Deep breathing (100 times)
5. Anuloma Viloma (30 times)
6. Surya Bhedi Pranayama (30 times)
7. Meditation
8. Breathing Patterns
 1. Diaphragmatic breathing
 2. Extended Exhalation
9. Yogic jogging
10. Shankh Dhvani using hand formation

On **third month** the following module was adopted.

1. Prayer

Bhaktambarstotra 28 (5 times)

uchchairashoka-tarusanshritamunmayukha-

mabhatirupamamalambhavatonitantam |

spashtollasatkiranamasta-tamovitanam

bimbamraverivapayodharaparshvavartie 28 e

O Tirthankara ! sitting under the Ashoka tree, the aura of your scintillating body radiating, you look as divinely splendid as the orb of the sun amidst dense clouds, piercing the growing darkness with its rays.

2. Neck movement
 1. Right to left (10 times)
 2. Left to right (10 times)
 3. Up and down (10 times)
 4. Semi rotation (10 times)
 5. Full rotation (anticlockwise and clockwise)
3. Eye movement
 1. Text
 2. Eye rotation
 3. Right to left (10 times)
 4. Left to right (10 times)
 5. Up and down (10 times)
 6. Inhalation at centre and exhalation while going up, down, right, left.
 7. Eye rotation clockwise, anticlockwise.
 8. Blinking eyes (10 times)
 9. Eyes wide open while concentrating half minute twice.
4. Deep breathing (75-100 times)
5. Bhastrikapranayam
 1. Hands in front of chest (10 times)
 2. Hands up and down (10 times)
 3. Hands sideways and stretch (10 times)
 4. Folded hands up and down (10 times)
 5. Breathing bhastrika pranayama (10 times)
 6. Anuloma Viloma (50 times)
 7. Surya Bhedi Pranayama (30 times)
 8. Palm tapping exercises
 1. One hand fist tapping on other hand palm (right, left)
 2. Tapping palm on back of other hand's fist (right, left)
 3. Wrist tapping
 4. Tapping of edges of palm
 5. Rubbing of fingers
 6. Tapping of mounts in palm

7. Clapping
9. Bhujangasana (3 times)
10. Dhanurasana (2 times)
11. Bridge pose (3 times)
12. Breathing Patterns
 1. Diaphragmatic breathing
 2. Extended Exhalation
 3. Belly breathing with help of pillow
13. Tadasana (2 times with 5 sec hold)
14. Yogic jogging
15. Heart meditation
16. Om chanting
17. Shankh Dhvani using hand formation (3times)

From the **fourth month** following sequence was followed:

1. Prayer

Jain Bhaktambarstotra - 2ndshloka (5 times)

Ya%sanstuta%sakala-vâEmaya-tattvabôdhâ-
Dudbhûta-bud'dhipamubhi%suralôka-nâthai% |
Stôtrairjagattritaya-citta-harairudârai-
StôcyçkilâhamapitaAprathamaAjinçndram ||2||

Meaning

The king of all gods "*Indra*", having acquired prudence through the true understanding of all the scriptures and mastering the secrets of the scriptures, have eulogized and worshipped Bhagwan Adinath with his generous and captivating "Stotras"(verses) which charms the three realms (Heaven, Earth and Hell). *Shree MantungaSuriji*, an humble man with little wisdom, avers that he too shall indeed endeavour to compose a hymn to eulogize the first Tlrthankara (Bhagwan Adinath).

2. Neck movement
 1. Right to left (10 times)
 2. Left to right (10 times)
 3. Up and down (10 times)
 4. Semi rotation (10 times)

5. Full rotation (anticlockwise and clockwise)

3. Eye movement

1. Text

2. Eye rotation

3. Right to left (10 times)

4. Left to right (10 times)

5. Up and down (10 times)

6. Inhalation at centre and exhalation while going up, down, right, left.

7. Eye rotation clockwise, anticlockwise.

8. Blinking eyes (10 times)

9. Eyes wide open while concentrating half minute twice.

4. Deep breathing (100 times)

5. Bhastrikapranayam

1. Hands in front of chest (10 times)

2. Hands up and down (10 times)

3. Hands sideways and stretch (50 times)

4. Folded hands up and down (10 times)

5. Breathing bhasrika pranayama (10 times)

6. Anuloma Viloma (50 times)

7. Shankh Dhvani using hand formation (3 times)

8. Surya Bhedi Pranayama (30 times)

9. Palm tapping exercises

1. One hand fist tapping on other hand palm (right, left)

2. Tapping palm on back of other hand's fist (right, left)

3. Wrist tapping

4. Tapping of edges of palm

5. Rubbing of fingers

6. Tapping of mounts in palm

7. Clapping

10. Hand Movements

11. Leg Movements

12. Bhujangasana (3 times)

13. Dhanurasana (2 times)
14. Bridge pose (3 times)
15. Breathing Patterns
 1. Diaphragmatic breathing
 2. Extended Exhalation
 3. Belly breathing with help of pillow
16. Tadasana (2 times with 5 sec hold)
17. Yogic jogging
15. Chakras meditation
16. Om chanting
17. Shankh Dhvani using hand formation (3 times)

In next **four months** same yoga practice as above with minor changes in frequency and sequence of the practice was followed.

Slowly & slowly difficult asanas like Ardha Chakrasana (Half wheel pose), Ustrasana (Camel pose), Gomukhasana, Marjari Asana, Bhujangasana, Dhanurasana, Setu Bandhasana (Brij pose) were introduced.

Diaphragmatic, Belly (with help of pillow) breathing were also asked to do.

Meditation of Anahat chakra and crown chakra were more frequently given.

Bhaktambarstrot45th Shloka (5 times) was also used for prayer.

Result: Following progress were observed during and after the intervention.

The healing mechanism began as he became positive within a week and reduced his negative thoughts that he has to be dependent on oxygen concentrator.

He could not sit on the floor for past 10 years. Due to Yoga and pranayama, his flexibility improved and within a month he was able to sit crosslegged for an hour or two and even in ardhpadmasana after three months.

He reported improved vision after 6 months due to eyes movement exercises.

When he had started doing yoga, the oxygen concentrator was needed to be set at 5 LPM but gradually it was reduced to 1 LPM and within five months need of oxygen support finished while doing yoga.

He learned to manage breathes, started walking and climbing stairs within four months. And after eight months he started going for work as well.

The CT Scan Report also improved after 6 months.

Discussion:

Starting the day with prayer created positive vibes and elevated ~~his~~ positive mood state hence giving a pleasant beginning. The positive mood state stimulates the atmosphere around for the blessings of cosmic powers according to indian philosophy. He felt really enthusiastic while praying. His [negative thinking reduced due to prayer and thus helped in early healing.]

The work of breathing involves neck muscles too. [Neck movement] helped in improving the condition neck muscles. Also, brahma mudra helped him escalate his concentration level aiding less oxygen consumption by body. [Eye movement] released tension in shoulders, neck, and jaw and prevented tension and headaches which proved to be a great advantage for him. He gained [an optimistic attitude] also. *helped gain*

[Deep breathing shot ~~his~~ oxygen level to around 92/93 which on exhalation would return to 87. This showed increased capacity of lungs. Deep breathing with retention, helped in improving lungs functioning.] When he inhaled deeply, a good amount of oxygen filled his lungs, which helped to expand the lungs. And when he stopped inhalation and held the air providing good amount of time to the air exchange process. In exhalation, exhaled out the carbon dioxide, resulting in decreased CO₂ in blood. This improved lung capacity, helped brain cell's protection, reduced stress and anxiety and strengthened diaphragm (Singh et al. 1990). In this activity, his oxygen level on inhalation came around 91-93 and on exhalation – 87.

Anuloma Viloma is a Nadishodhan technique in Yoga. In this case, new type of Anuloma Viloma was tried. In this, he had to breathe 20 times in and out from left nostril and 20 times from right nostril. The results were fascinating. In one inhalation, the emphasis was on single lung, so that lung can get almost 80% of the inhaled air. On the contrary, the other lung remains idle. As was the thought, the lung with excess of air, have to expand more than its routine capacity and has to do more functioning than other one. At the same time, the other lung, which seems to be idle, have ample time to get relaxed, to provide more space and time, to blood to store in it. At the time when this second lung gets more inhaled air, stored blood can react with much more inhaled air, than usual, so can get benefit of more dissolved oxygen. [During pranayama, he got heavy coughing and has to spit it. It helped to clean lungs. Anulom vilom pranayam also helped him to calm his mind by releasing accumulated stress in mind and body, improved respiratory problems. It harmonized the left and right hemispheres of brain, correlating logical and emotional sides of personality and purifying and balancing nadis thereby ensuing a smooth flow of oxygen. Owing to all the above benefits, his SpO₂ level increased from 87 to about 92 during the asana.]

There were several other specific yoga asanas
Suryabhedipranayama technique reduced phlegm and gas in his body, by increasing heat in the body. It even additionally helped him in better digestion. It helped him cure the insufficiency of oxygen in blood and improved the blood circulation. This pranayama is said to awaken the *benign*

kundalini shakti. In Surya Bhedi Pranayama, SpO₂ reading - 80-85.

In yogic jogging SpO₂ touched 57, with pulse 120, so had to stop jogging initially. Ujjai Pranayama resulted into signs of heavy coughing and the client even experienced problem in respiration with SpO₂ - 65, so it was not included in the daily schedule.

In meditation, oxygen level was 75 along with almost same pulse rate too, but he was still bit sad in the beginning which improved the later.

Yoga helped to improve flexibility and hence only after one month of yogic practices he was able to sit for more than 1 hour cross legged on ground. Even after two months he was able to sit in Ardha Padmasana. This installed in him a zeal to achieve greater good. Even in the second month the oxygen concentrator was adjusted at 2 LPM and the outputs were almost same as in the first month.

Diaphragmatic breathing pattern slowed down his breathing and resulted in more air in and out of lungs. It improved lungs efficiency to get more O₂ in and CO₂ out of lungs. It even helped him do asanas more efficiently. Extended exhalation fostered a long exhalation span thus favoring more CO₂ out of the body by supporting parasympathetic nervous system. Belly breathing with help of pillow helped him to use diaphragm as a tool to support his breath. Diaphragm aided in inflating the lungs. This made him use his diaphragm more which put him to bit ease. In the second month during meditation SpO₂ level increased to 92.

Bhastrika being a process of rapid inhalation and exhalation gave boost to his body and benefited against respiratory issue. Palm tapping exercises increased energy level. It sent signals to the part of the brain which controls stress. Bhujangasana helped him to expand lungs and therefore in breathing better. It also helped him stay in a good posture all the time thus increasing lung's efficiency. Dhanurasana (wheel pose) improved capacity of his lungs and strengthened them while breathing helped clear mucus pathways. Bridge pose helped him regulate breathing hence strengthening the lungs also opening up the chest to fill in more air. Tadasana helped in filling the lungs with plenty of fresh air while he inhaled and expanded the rib cage and abdomen. All the alveoli in the lungs are filled with extra oxygen and this enhanced the performance of the lungs.

Deep breathing through shankhdhwani using hand formation is a unique, easiest, convenient and natural mudra helped to combat stress and anxiety and to improve digestion. It helped him strengthen his respiratory organs in a remarkable way and activated his thymus gland, boosting his immune system. Hand formation activated his acupressure points, resulting in the purification of blood in the nerves, cleansing and detoxification. Hand and leg movements were also useful. Our body has more than 100 lymph nodes, mostly in neck region and in underarms region, which are very close to the respiratory system. Lymph nodes train the T cells to oppose the foreign particles strengthening the Immune system (Selman, et al. 2001).

In Ardha Chakrasana he felt more relaxed because of back bending. This expanded the chest area and gave more space to the lungs and the intercostal muscles to take in more air. In Ushtrasana (Camel pose) & Gomukhasana (Cow Face Pose) his throat, chest, abdomen all got stretched to their fullest length. This provides the flexibility to the whole upper body, including the spine. As a result, increased the breathing capacity also. The Marjariasana (Cat Pose) expansion and contraction provided flexibility to lung muscles and strengthen them.

During the covid pandemic most of the deaths are caused due to the poor functioning of lungs. [This case study clearly indicates that yoga can be helpful for better functioning of lungs if done properly under the guidance of expert.]

Conclusion: Yoga (Pranayam, Asana, Prayers) helped in treatment of Interstitial Lung Disease.

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