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TRAVERSING THE CONCEPTS OF SIDDHA PRANAYAMAM WITH SPECIAL REFERENCE TO ADVERSE REACTIONS

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ABSTRACT

Background: ***Pranayamam = pranan + iyamam*** - Regulatory methods of breathing. There are many types such as *Naadishodhana, Sheethali, Ujjayi, Kapalpathi, Viloma, Anuloma, Brahmari, Bhastrika* and many *gurumuraigal* such as *'Thirumoolar pranayamam', 'vaanmeegar pranayamam', 'pathanjali pranayamam'*. Breathing exercises have been practised by people all around the world with and without the proper advice of physicians. Pranayamam has numerous benefits but can cause harm with error performance due to misguidance and self-induced. **Aim:** This presentation is here to discuss the adverse reactions of the pranayamam to wrong practices and their possible underlying mechanisms. **Methods:** Data were obtained by searching the books *'Thirumanthiram - moolamum urayum', 'Agathiyar sowmiya saagaram', 'Pathinen Siddhar Varalaaru', 'Siddha Maruthuvam Sirappu',* 'K.Chembulingam's Essential of Medical Physiology' and also searched online scholarly articles in PubMed, Google scholar, science direct by using keywords. Corresponding data are kept for the base. Some case studies and clinical trials are collected and included. **Conclusion:** To attain wholeness and increase efficacy, a physician should know the possible positive and negative outcomes of therapy. As per the words, 'The weapon is not important; the way we use it is important' Our ancestors gave us powerful weapons and also listed out their marvels and limits. For the correct usage, high-quality trials and proper vigilance are required.

KEYWORDS: Siddha medicine, *Thirumoolar pranayamam, siddha pranayamam*, Adverse reaction, Therapovigilance.

INTRODUCTION

Pranayamam is a breath regulatory technique (*Kaatrai pidikkum kanakku*).[1] Many schools of thought explain *pranayamam*. Such as *Thirumoolar Pranayamam*, *Pathanjali Pranayamam*, *vaanmeegar pranayamam* etc. As per the 552nd verse of Thirumanthiram, it is a fourth limb technique in the eight limbs of yoga practice called *Astaanga yogam*.

Fig. 1: Illustration of eight-fold yoga practice (*Astaanga yogam*).

Pranayamam has practised for decades in *the siddha* system of medicine as a broad-spectrum therapy. Nowadays, it's being practised by people all around the world as breathing exercises with or without the guidance of physicians.

Although *pranayamam* is a definite boon to mankind, we should be aware that misused medicine will also cause illness.

As per the 564th verse of *Thirumanthiram*, there is a head person (Life force/ the top most regulatory mechanism of the body) for five workers (Five senses); he is also the head of this city (Body); he happened to have a pony (Breath) for his ride; only the talented people gets the reins; others gets their bodies into ruin.[1]

Siddhar Thirumoolar personified breath into an untamed horse. Without knowledge touching the beast will only bring tremendous hurt to the body. But once we take control, the benefits that we are going to receive are also tremendous.

Such benefits are, *Pranayamam* increases antioxidant profiles[2],[3] reduces reactive oxygen species and increases the supply of oxygen to the cells thus reducing telomere damage,[4] enhances respiratory functions, reaction time, and respiratory endurance[5],[6] *pranayamam* induces vagal nerve stimulation and causes a parasympathetic shift of the body thus lower the blood pressure, heart rate[7],[8] vagal stimulation alters the anterior cortical area thus brings positive changes in the cardio vagal functions; relieve stress,[8] it is helpful in the management of cancer[9],[10] chronic diseases,[11] diabetes,[12] cerebrovascular accident rehabilitation[13] useful in glaucoma[14] and so on.

The importance of prudence in *pranayamam*

Pranayamam gives broad spectrum benefits to the various systems of our body. In other words, it has tremendous influence over various systems of our body. Which means the simplest mistakes can cause adverse reactions.

It's important to note that not all the *pranayamam* mechanisms are the same. Thus they tend to produce different physiological responses. Not all *pranayamam* causes parasympathetic shifts and lowers blood pressure.[15]

The things that need to be in consideration while undergoing *pranayamam* as therapy are illustrated below.

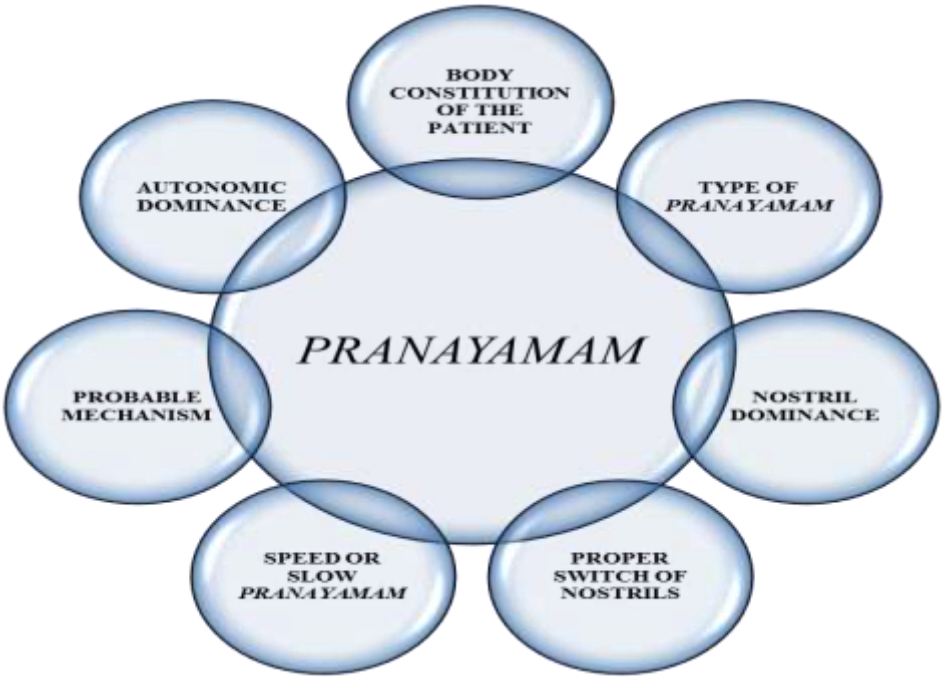

Fig. 2: Illustration of factors affecting the benefit of *Pranayamam*.

Relationship between the breath and the brain

In our body, the brain is separated by a median longitudinal fissure into the right and left cerebral hemispheres. Each of them is specialized to attend to different information and control different motor behaviours. This is known as lateralization of the brain.[16]

Alternative congestion and decongestion of right and left nostril spaces at a regular time interval (30 mins - 2 hrs)[17], [18] is called the nasal cycle. This nasal cycle is an example and reflection of alternating lateralization of the brain.[19],[20] It is due to sympathetic outflow to the nasal venous sinusoids. An increased sympathetic activity causes increased airflow by decongesting the airspace.[21],[22]

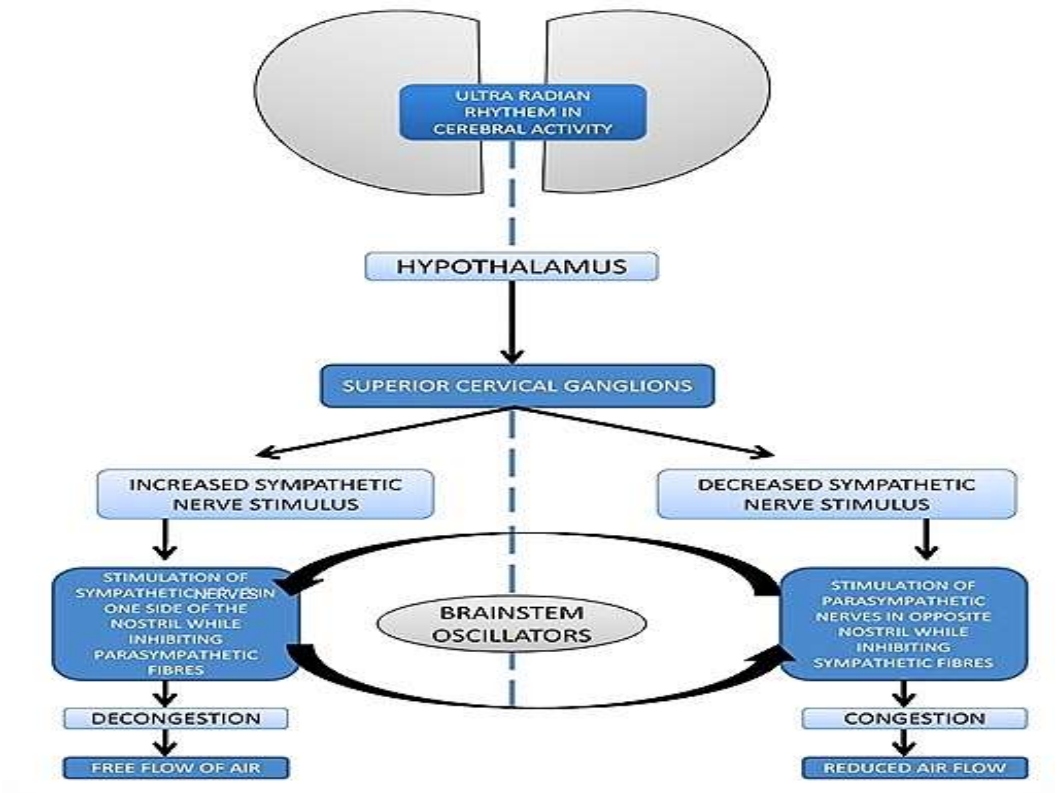

Fig. 3: Flow chart about the nasal cycle and autonomic lateralization.

Sympathetic activity is induced by the left brain hemisphere, and parasympathetic activity by the right brain hemisphere. Since unilateral breathing can induce contra lateral hemisphere, left nostril breathing results in parasympathetic dominance; right nostril breathing results in sympathetic dominance of the body.

Sympathetic activity is related to the energy-mobilising mechanism. Parasympathetic activity is associated with energy-conservatory mechanisms.[17]

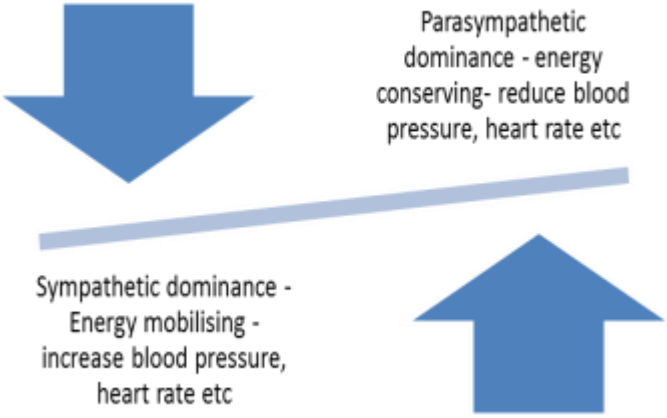

Fig. 4: Illustration of autonomic influence over the body.

As per the 570th verse of Thirumanthiram, wherever we breathe, left nostril breathing is good for health. That is a path of longevity.

It is better to use left nostril breathing than right nostril breathing. Still, if there is a need for a sympathetic shift in the body then right nostril breathing is most beneficial.

Study evidence on right and left nostril breathing

Gopal Krishna Pal et al conducted a study on specific nostril breathing and its influence on autonomic dominance. The study was conducted in three groups
RNB group - n = 30 (right nostril breathing group)
LNB group - n = 30 (left nostril breathing group)
Control group - n = 25

The RNB and the LNB group trained in specific nostril breathing for 6 weeks while the control group did not practice. The HRV indices represent that sympathetic activity was increased in the RNB group.[23]

Telles S, et al reported that the galvanic skin resistance increased while left nostril breathing which represents the reduction in sympathetic activity.[24],[25]

Another mechanism related to breathing and the dynamic lateralization of the brain

Nasal mucosal receptors get stimulated with the airflow. Those signal are transmitted to the hypothalamus and induces the hypothalamus pituitary adrenal axis thus altering the autonomic dominance in the body.[26]

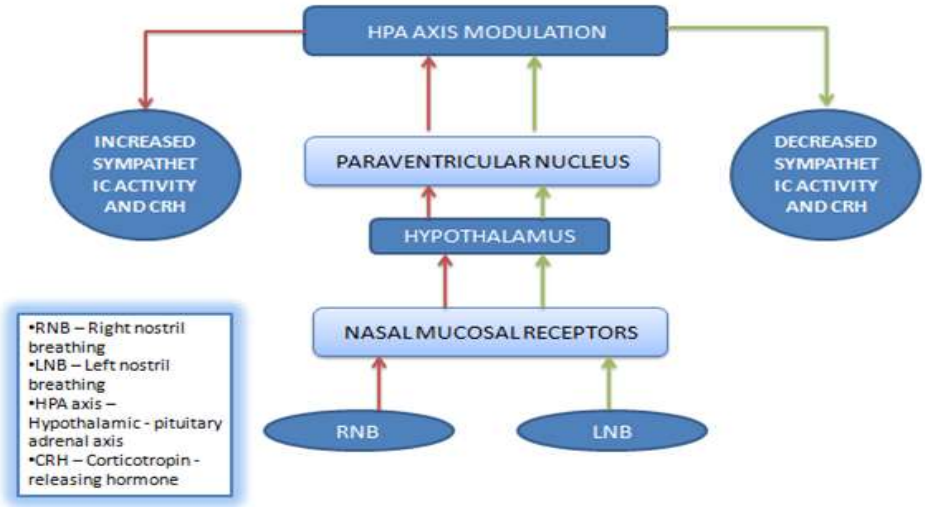

Fig. 5: Flowchart explaining the mechanism of breathing and the dynamic lateralization of the brain.

The science behind the slow and speed breathing process

The sympathetic and parasympathetic shift over the body is altered with the tempo of respiration. Slow inhalation and exhalation move the body towards a parasympathetic state. While fast breathing moves the body towards a sympathetic state.

Study evidence on slow and fast breathing pranayamam methods

According to the comparative study conducted by Madhan Mohan et al, on assessing the effects of slow (*savitri pranayamam*) and fast (*bhastrika*) breathing *pranayams* the heart rate the rate pressure product and double product are significantly reduced in *savitri pranayamam* group while increased in fast breathing *bhastrika* group.[27]

Krzysz lot Mankiewicz et al, tested and proved that muscle sympathetic nerve activity and chemoreflex sensitivity are related to the respiratory rate in normal subjects. The fast respiratory rate group had greater MSNA (muscle sympathetic nerve activity) than the subjects of the slow respiratory rate group.[28]

As per the 574th verse of *Thirumanthiram*, doing *pranayamam* for longevity should be slow-paced. The speed and force should not be exceeded than the force which could make the bran fly away. The practitioner of *pranayamam* should be relaxed. He shouldn't put his body (a home created by god) under any kind of pressure while doing *pranayamam*.

Fig. 6: Area diagram explaining about the tempo of breathing and autonomic dominance.

The severity of the complications

The *kapalpathy pranayamam* also called the breath of fire is known for its fast and shallow abdominal respiratory movements. The *kapalpathy pranayamam* was reported to cause spontaneous pneumothorax.[29]

Starcak. A. et al conducted a study among 17 advanced yogic practitioners on *kapalpathy* and reported that heart rate, systolic blood pressure and diastolic blood pressure were increased and the R-R interval was reduced during *kapalpathy*.[30]

Fast-breathing *pranayamams* tend to move the body towards sympathetic dominance. Increased sympathetic activity can result in sudden and no sudden cardiac death.[31] Thus, the adverse effects of *pranayamam* can be life-threatening also. Similar cases were reported in ancient works of literature too. According to *Agathiyar sowmiya saagaram* a *Brahmin* named S*ambukeshan* died while practising *pranayamam* without the proper guidance of a yogic guru.[32]

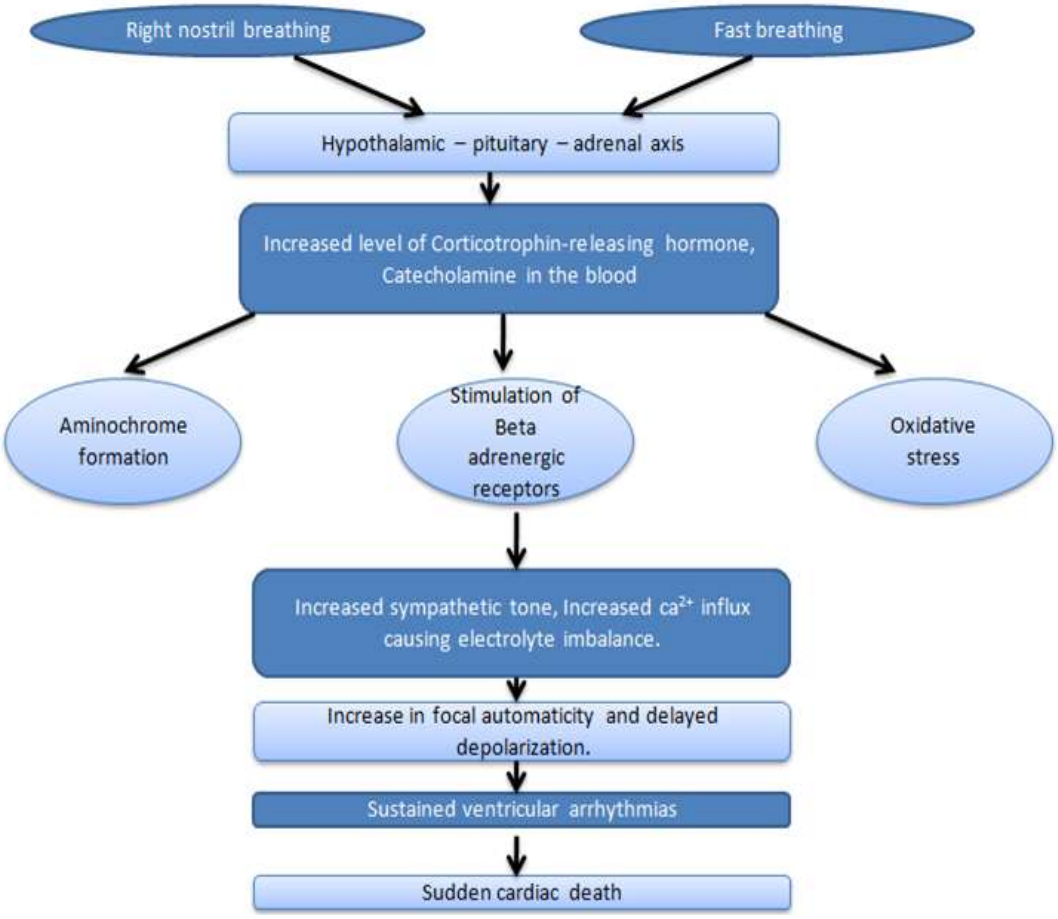

Fig. 7: Flowchart about how persistent sympathetic activity induce sudden death.

Proper switch

We discussed the nasal cycle and dynamic lateralization before. If the nostril switch is not proper while doing *pranayamam* it will lead to autonomic imbalance. Which may result in psychosomatic problems such as hypertension.[15] *Siddha marutthuvam sirappu* is one of the *siddha* textbooks there is a mention - *of 'pooritha naadiyaalae resakam seithaal, viyarvai nadukkam aagiya thunbangal undaam'* which means if exhalation is done in the same nostril that inhaled the air then it will cause hyper sweating, tremors like unwanted effects.[33],[34]

According to the Thirumanthiram verse 565, "When comes to breath, there are two horses. One is well-behaved and good; the other one is just the opposite. There is no one to know and tame them. If someone with the blessing of guru (Spiritual teacher) took over the reins then they will get tremendous benefits."

Similarly when comes to breathing exercises, the sympathetic and parasympathetic shift during the nasal cycle is the main mechanism behind it.

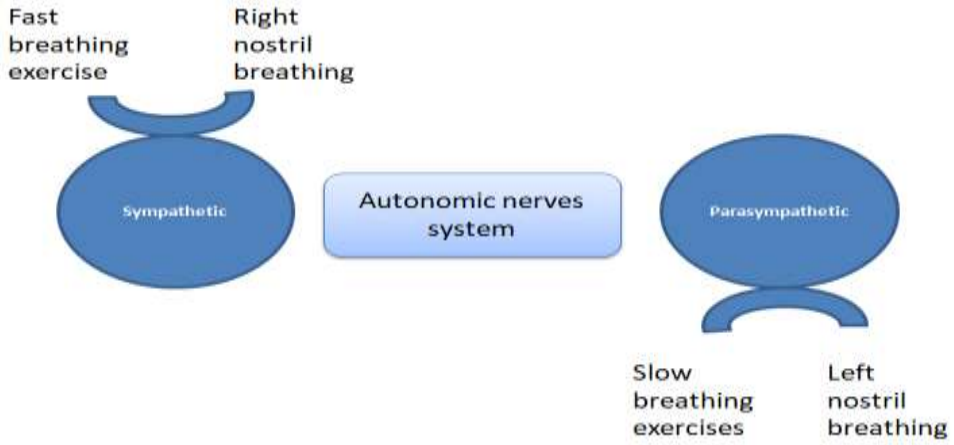

Fig. 8: Illustration of the relationship between autonomic shift and breathing.

Other protocols mentioned in *siddha* texts

There are 126 yogic postures suitable for doing *pranayamam* among them the 8 *aasanas* are more suitable for doing *pranayamam.* They are,

- *Padmam - Lotus pose*
- *padram - Throne pose/ butterfly pose*
- *Komugam - Cow face pose*
- *Kesari - simhasana/ lion pose*
- *Sothiram - swasthikasana/ cross pose/ auspicious pose*
- *kukkudasana - cock pose*
- *Veeram - hero pose*
- *Sugathanam - easy sitting pose*[1].

The ratio of inhalation: holding: exhalation should be 16:64:3.[1],[34]

Doing *pranayamam* in the evening will reduce the aggravated *kabam*; In the noon, it will reduce the aggravated *vaatham*; in the morning will reduce the aggravated *pittham*. A person who is already a low *kabam* containing *theagi* practising *pranayamam* in the evening will only worsen his condition.[1]

CONCLUSION

The blade can hurt the same blade can cure. The only difference is having correct knowledge of usage. Pranayamam is also a medical intervention with a huge influence over various systems of our body. It should be only done accordingly with the guidance of physicians. Shouldn't practice randomly at will without complete knowledge of this great science. Further studies are necessary in this aspect.

Annexure - 1

Serial number	Verse number in Thirumanthiram.	Tamil song	Transliterature	Meaning
1.	552	இயம நியமமே எண்ணிலா ஆதனம் நயமுறு பிராணாயாமம் பிரத்தியாகாரம் சயமிகு தாரணை தியானஞ் சமாதி அயமுறும் அட்டாங்கம் வது மாமே .	*Iyama niyamame ennilaa aathanam Nayamuru pranayamam prathyagaram Sayamigu thaaranai thyaanam samaathi Ayamuru attaangam aavathumaame*	Abstinence (iyamam), Austerity (niyamam), and Posture (aasanam) are numberless The wholeness of Control of breath (pranayamam), and detachment from the sensory world (pratyagaram) alike Concentration (Dharanai), meditation (Thyanam), and the complete union (samaathi) to triumph These are the iron like eight limbs of yoga
2	564	ஐவர்க்கு நாயகன் அவ்வூர்த் தலைமகன் உய்யக்கொண்டு ஏறுங்	*Ivarkku naayagan avvoor thalaimagan Uyyakondu aerum kuthirai matrondru undu Meyyarkku patru kodukkum*	There is a head person (life force/ the top most regulatory mechanism of the body) for five workers (five senses); he is also the head of this city (body); he happened to have a pony (breathe) for his ride; only

		குதிரைமற்றொன்று உண்டு மெய்யர்க்குப் பற்றுக் கொடுக்கும் கொடாதுபோய்ப் பொய்யரைத் துள்ளி விழுத்திடுந் தானே	*koodaathu poai Poyyarai thulli vizhuthidum thaaney*	the talented people gets the reins; others gets their bodies into ruin.
3.	570	எங்கே இருக்கினும் பூரி இடத்திலே அங்கே அதுசெய்ய ஆக்கைக்கு அழிவில்லை அங்கே பிடித்தது விட்டளவுஞ் செல்லச் சங்கே குறிக்கத் தலைவனு மாமே .	*Engae irukkinum poori idatthilae Angae athu seiyya aakkaikku azhivillai Angae piditthathi vittalavum sella Sangae kudukka thalaivanum aame*	where ever we breathe, left nostril breathing is good for health. That is a path of longevity.
4.	574	இட்டதவ்வீடு இள காதே ரேசித்துப் புட்டி படத்தச நாடியும் பூரித்துக் கொட்டிப் பிராணன் அபானனுங் கும்பித்து நட்டங் கிருக்க நமனில்லை தானே .	*Ittathaveedu ilagaathu resitthu Puttipada thasa naadiyum pooritthu Kotti pranan abananum kumbitthu Nattangu irukkil Naman illai thaaney*	Doing *pranayamam* for longevity should be slow-paced. The speed and force should not be exceeded than the force which could make the bran fly away. The practitioner of *pranayamam* should be relaxed. He shouldn't put his body (a home created by god) under any kind of pressure while doing *pranayamam*.
5.	565	ஆரியன் அல்லன் குதிரை இரண்டுள வீசிப் பிடிக்கும் விரகறிவார் இல்லை கூரிய நாதன் குருவின் அருள்பெற்றால் வாரிப் பிடிக்க வசப்படுந் தானே.	*Aariyan Allan kuthirai irandulla Veesi pidikkum viragarivaar illai Kooriya naathan guruvin Arul pattaal Vaari pidikka vasappadum thaaney*	When comes to breath, there are two horses. One is well behaved and good in nature; another one is just opposite to it. There is no one to know and tame them. If someone with the blessing of guru (spiritual teacher) took over the reins then they will get tremendous benefits

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