

***KUMBHAKA* - A VITAL PAUSE:**

The development of *kumbhaka* from ancient to modern times

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ABSTRACT

The focus of this dissertation is to highlight the nature of *kumbhaka* within *prāṇāyāma*, tracing its history, modern applications and clinical research to assess the benefits of *kumbhaka* today. Also known as breath retention, The Yoga Sutras say that *kumbhaka* is *prāṇāyāma* and vice versa.

In pre-modern India breath control defined the practice of yoga. Ancient ascetics performed *kumbhaka* as part of *prāṇāyāma* in order to access powerful energies for the purpose of liberation. Today breathing techniques based on yogic practices are taught to help with health issues such as stress and anxiety.

I hope to show how practicing different forms of *kumbhaka* can restore balance and wellbeing. For this purpose I also 'lengthen' my study to include how it can be understood as the 'pause' or rest; how embracing this 'pause' would make a positive contribution to our perceived and actual lack of time/ space in our conversations, work and daily life, and maybe world peace.

INTRODUCTION

The word kumbhaka is derived from kumbha, meaning a water pot. Just as a water pot contains water, “similarly, when the lungs hold air, they are referred to as kumbhaka (Raghuvira, 2016, xxxi).

I look at how *prāṇāyāma* connects with *prāṇa*, trace some historical origins of yogic breathing, focusing on the relationship between *prāṇāyāma* and *kumbhaka* and its role in yoga practice today. In medical research, *kumbhaka* and *prāṇāyāma* are often described as ‘breathing exercises’ and ‘techniques’ such as the title of a Harvard Health Publication (March 2016).¹

Buddhist and yogic traditions were similar in some ways, separate in others. In the latter, breathing exercises are controlled and ‘interfered’ with, and breath control “the defining practice of physical yoga” in pre-modern India (Mallinson and Singleton, 2017, 127). Bhagavan Sri Ramana Maharshi says,

The thing is to kill the mind somehow. Those who have not the strength are advised pranayama as a help to control the mind (Tiruvannamalai, 1995, 32).

¹ <https://www.health.harvard.edu/mind-and-mood/relaxation-techniques-breath-control-helps-quell-errant-stress-response> March 2016(last accessed 23.8.17)

The Buddhist way is observing, attending to the breath, without attempting to change it, as a key factor in expansion of consciousness. "Theory and practice of meditation is a main feature with regards to mindfulness of one's breathing", such as found in *Majjhima Nikāya*, a fundamental to Theravāda Buddhism (White, 2009, 9).

Mind control is achieved by controlling the breath. The *Hathayogapradīpikā* states it is through *kumbhaka* that success in *hatha* is "born" (HYP 2.75 (Akers, 2002, 51) The *Hathayogapradīpikā* 2.12.17 (Akers, 2002,37) mentions although practice of *kumbhaka* weakens disease, persevering with the sweat and trembling (Ibid,36) involved is ultimately for the purpose of liberation. Among yoga practitioners today controlled breathing is still the bridge between yoga and meditation. Strom (2015) teaches it as a simple way to de-stress and increase our health.

Yoga once led the trend for gaining the perfect body and mind, but breathing practices might take over. Pearse's article (Vogue 11.8. 2016) *Breathing is the New Yoga* offers breathing techniques that alleviate stress levels. The Mindfulness Initiative notes that

Since 2009 the number of sick days lost to stress, depression and anxiety has increased by 24% and the number lost to serious mental illness has doubled (2016, 9).²

With hectic lives, on-line guidance and even technology might be the way forward, a preliminary to meditation. Stefan Chmelik, a Breathing Specialist (Chmelik, S. 2017:Interview with Stefan 5th July)³ has just devised a wearable Tech+App solution, providing the benefits of deep relaxation for

² http://themindfulnessinitiative.org.uk/images/reports/MI_Building-the-Case_v1.1__Oct16.pdf (last accessed 11 August 2017)

³ www.newmedicinegroup.com The London Medical Centre, 144 Harley Street, London W1G 7LE

those who don't have time to stop or meditate. Another device used in America trains patients with panic disorder to breathe more slowly. A small study found 68 per cent of patients were panic-free after using it regularly (Lally, 2016).

As Patanjali says, "...disturbances are disease. Failure to obtain a base for concentration and stability are distractions for the mind" (Bryant, 2009, 118). *Kumbhaka* may improve physiological function by slowing down the heart and metabolism but the focus was originally spiritual. *Kumbhaka* without concentration is unlikely to help, psychologically and/or spiritually. *Kumbhaka* techniques are also misunderstood, with breath retention spoken of as a way of tensing, or forcing the body and mind. But as Iyengar explains, "it should not be misinterpreted as re-tension of the brain, the nerves and the body to hold the breath" (Iyengar, 2016, 121). He specifies performing it "...with a relaxed brain in order to re-vitalise the nervous system" (Ibid, 121).

There are two main varieties of *kumbhaka*: *sahita* (accompanied by inhalation and exhalation) and *kevala* (unaccompanied), and both include other forms of *kumbhaka*. Specific techniques of performing the inhalations, exhalations and pauses can "appear paradoxical" (Mallinson, 2011, 776) as *kumbhaka* means holding the breath in one form or another, and life breath coexists with this retention "...a holding that is in fact in flagrant contradiction to life" (Eliade, 2009, 98).

Bringing *prāṇāyāma* in mainstream awareness may have various effects. It might encourage people to take up yoga, deepen their practice, dilute its efficacy or show how breathing exercises facilitate mindfulness. However, by pausing between breaths, *āsanas* or conversations, I hope to show that breath retention derived from ancient practices contributes to wellbeing.

Restoring physiological/emotional balance can provide a strong base for holistic personal and social development.

Chapter 1 The Nature of Prāna

"Breathing is the universal sign of being alive" (Muller, 1910, *Rig Veda* 10.129)

To understand *prāṇāyāma*, we need to be aware of its connection with *prāṇa* (life force), as one aim of *kumbhaka* is to increase "*prāṇa* concentration and *prāṇic* pressures within the body" (Maehle, 2012, 81). From the beginning of India's literary record, *prāṇa* is mentioned as life breath, and although there is no record of controlling breath in the older Vedas or older *Upaniṣads* (Mallinson and Singleton, 2017, 128) breath, *brahman* and *ātma* feature significantly, with intimate connectivity. Textual studies are complex but Olivelle notes from his research how *prāṇa*, *ātman*, and *brahman* cause difficulty for the translator as they

...have multiple meanings, but in the original Sanskrit the identity of the term recalls to the reader all the related meanings even when only one is primary within a given context (Olivelle, 1998, xxii).

The Vedic world view saw rituals, the cosmos and man as intimately connected, and scholars note how: "The Atharvaveda description of *prāṇas* (upward breaths) *apānas* (downward breaths) and *vyānas* (pervasive breaths) seem to connect with the workings of the cosmos" (Mallinson and Singleton, 2017, 129). Within this perspective everything including time, space and karma are regarded as cosmic spirit, with many interpretations of *prāṇa*. For example, Shrikrishna notes that "... in *Caraka-saṃhitā* in

Sūtrasthāna Chapter XII, there are more than seventeen distinguishing features ascribed to this *Prāṇa*" (Shrikrishna, 2012, 26).

Breathing is seen as an external aspect of subtle *prāṇa*-movement thought to penetrate the entire universe. The *Yoga Vāsistha* (111.13.31) talks about *prāṇa* , the "vibratory force" and Feuerstein, (1974, 96) summarising his findings after collating "many fragments of ancient scriptures" sees *prāṇa* as "...the material from which the 'subtle body' (*sukūśma-śarīra*) is built and presents itself as a fivefold appearance in the human body but as a subtle counterpart" (Ibid, 96).

The ultimate cosmic divine nature was central to thinking about breathing. In *Atharvaveda*, (xi-4.15) *prāṇa* is "the benefactor and lord of all creatures" (Gharote, 2007, 9), and on a level with *Kāla* as a continuum of past, present and future whereas in *Kenopaniṣad* it represents the active power of *brahman*. In *Kathopaniṣad*, "...the substance of life does not depend on the *prāṇic* activity of inhalation and exhalation, but is controlled and supported by the *brahman*" (Ibid, 9). In the early *Upaniṣads* the Vedas are seen as breath of *brahman*, the highest level of consciousness. "The great spirit is universal breath" (Shasti and Frawley, 2014, 37). And, "Lord of all truly is the lord of all that breathes, and all that does not breathe" (AV.11.4.10, Bloomfield, 1897). Bodewitz (1973,20) refers to the fact that *prāṇa* is life breath or vital powers, not just sense organs. The textual analysis is complex, *prāṇa* is either breath in general, or inhalation according to Dewey (2012,18.)

For White (2009) *Atman*, the term for the 'self' or 'soul' in the classical *Upaniṣads* is etymologically linked to the Sanskrit verb *an* 'breathe' and says it is via breath channels leading up from the heart "that the self leaves the body at death to merge with the Absolute (*brahman*) at the summit of the

universe " (White, 2009, 9). *Prāṇa*, according to Deussen (1908, 275) became "an empirical and consequently symbolical representation of the atman". Yet over time it "became subordinate, as its manifestation" (Burns, 2010, 24). It is not my intention to elucidate connections between *prāṇa*, *ātman* and *brahman* or how theories of respiration and bodily winds evolved. However, two ascetic traditions, separated by their beliefs, variously diverging and converging over time, explored this early science which contained the techniques of breath control, "physiology of bodily wind" and respiration. (Zysk 1993, 211)

The five *pranas*

Of many subdivisions of *prāṇa* in its traceable history, five were most common, with *prāṇa*, inhalation and *apāna* exhalation, emphasised. *Prāṇa*, "the front breath" (Zysk, 2009, 201) draws life force into the body as we inhale on a physical level and ensures respiration and swallowing. *Apāna* is expelling life force on exhalation, the downward moving breath, associated with various expulsions. *Vyāna* is *prāṇa* circulating through the whole body and "that breath situated between inhalation and exhalation" (Ibid, 201). *Samāna* "the complete breath" (Ibid 201) balances and aids digestion, while *udāna*, the uprising vital force, responsible for the separation of the subtle body from the physical 'vehicle' at death, produces speech.

In the *Chandogya-Upaniṣad*, 11.13.6 these five forms of *prāṇa* are known as "...gatekeepers to the heavenly world and only he who knows their secret can hope to reach the Absolute." (Feuerstein, 1974, 98). They are also known as senses, or 'sheaths'. I focus on the 2nd sheath (*kosha*). According to Vedic teachings, the energetic sheath of *prāṇa* lies between the threefold mental sheath and the material body. "It is the medium of exchange in the whole psychophysiological system," and has indeed influenced thinking in India for centuries (Feuerstein et al, 2001, 224). He adds:

This is not mere academic analysis but an integral part of the effort by sages and mystic explorers to map out a practical path to self-realization (Ibid, 224).

The ancient sages paid great attention to the study of energetic fields, describing how *prāṇa* is not evenly distributed in the *prāṇic* sheath wrapping the body but “forms vortices that would appear to be connecting points of the nervous and physical body.” We refer to them today as chakras” (Ibid, 2001, 226).

Various stories describe the five *prāṇas*. Breath *prāṇa* is considered indispensable as life functions without the others: other sense perceivers plead to *prāṇa* to stay, recognising its superiority (Baumer, 2002, 15). The *Brhadaranyaka Upaniṣad* (1.5.21) has the original story of how they became known as *prāṇa*, as well as how breath became superior to thinking, sight, speech and hearing. Prajapati created each of them, but they argued, and

Taking the form of weariness, death took hold of them; it captured and shackled them.

But breath remained free, and the others sought to become like breath. Therefore they are called “breaths” after him (Olivelle, 1998, 21).

Chapter 2 Prāṇāyāma

When the breath is unsteady, the mind is unsteady. When the breath is steady, the mind is steady, and the yogi becomes steady. Therefore one should restrain the breath

HYP 2.2 (Akers, 2002, 33)

What is Prāṇāyāma?

Prāṇāyāma is a compound word of *āyāma* (control) and *prāṇa* (life breath) the latter sustaining life, sometimes identified with *jīva* (life principle), and mentioned from the earliest Indian texts, according to Mallinson and Singleton (2017, 128). The meaning of *āyāma* in *prāṇā-āyāma* in Amarakośa (fifth century Sanskrit dictionary) is expansion of breathing, according to Feuerstein (1974, 97) and "...the expanse or the field or the whole range of these *Prāṇic* activities" (Shirkrishna, 2012, 11.) Breathing practices familiarise us with this, making conscious what is automatic. "*Prāṇāyāma* is a technique bringing under control all that is connected with *Prāṇa* (Vital Force)" (Vishnu Puranam, VI, VII, 40). Whatever the source, ancient Rishis all agreed that there is a vital energy called *Prāṇa*, and that it can be controlled, *Āyāmā*. "The science of this breath control, or its deeper energetic aspects in relation to *prāṇa* is "*Prāṇāyāma*" (Shirkrishna, 2012, 11).

The *Bhagavad Gita* recognises *prāṇāyāma* as the process of perfecting inhalation and exhalation, a devotional or meditational discipline, *Bhagavad Gita* IV.29 (Nabar and Tumkar, 1997, 22). Krishna explains how offering *apāna* (incoming breath) into *prāṇa* (outgoing breath) and *prāṇa* into *apāna* leads to complete cessation of both breaths. During *kumbhaka* the senses are naturally withdrawn from external stimuli, and the yogi 'gifts' this state of being to the Divine within.

This suspension "implies the profound teaching that each force in the universe contains its own counter force" (Maehle, 2012, 17) and it also answers why sometimes *prāṇa* was referred to as exhalation (Ibid, 39). Deusson agreed, based on Sanakara, but he later concluded *prana* is the "more usual expression" for inspiration (Deusson, 1908, 276).

Kumbhaka is an intrinsic part of *prāṇāyāma* of which there are many forms. In answer to why there are so many *prāṇāyāmas*, and also *kumbhakas*, Iyengar

says that just as many *āsanas* evolved to exercise the various and different parts of the body to function in a harmonious manner, so *prāṇāyāmas* have evolved “to meet physical, mental, intellectual and spiritual requirements of the student under fluctuating mental conditions” (Iyengar, 2016,19).

Prāṇāyāma consists of four movements, of which two are specifically called *kumbhakas*: *Pūraka* (in breath), *anta-kumbhaka* (retention after breath), *recaka* (out breath), *bāhya-kumbhaka* - retention of breath after out breath, (sometimes referred to as *Shūnya Kumbhaka*). During the *kumbhaka* phase, the air is suspended, a moment of respiration technically described as *śvāsa-praśvasa-gati-vicchedaḥ*, Yoga Sutras of Patanjali 11.49, (Gharote and Devnath, 2016, xxxii) The principle *kumbhakas* include these along with *Kumbhaka* (in- between interrupted *pūraka* and *recaka*) and *kevala kumbhaka*, with Maehle quoting Vasishta Samhita 111.28 saying “any technique that does not consist of *kumbhaka* is not *prāṇāyāma*” (Maehle, 2012, 56).

The 19th Century ***Kumbhaka-paddhati*** text was based on yoga texts from various traditions and the evolution of *kumbhaka* can be divided roughly into 5 different stages as per Kuvalayananda's *Evolution of Prāṇāyāma YM-V1.1:55-59*. These are the religious sutra period: *kumbhaka* part of a religious ceremony; Smṛti period: *kumbhaka* part of meditation; Puaranic period: *kumbhaka* accompanied by mental recitation; Yoga Sutra period: *kumbhaka* part of *prāṇāyāma* but the word not used; Hatha Yoga period: *kumbhaka* is internal and divided into eight types (Gharote and Devnath, 2016, x1-X1i). White (2004) relates *prāṇāyāma* to yoga based Indian gnoseologies.

It is ultimately breath, breathing in and breathing out, that unites the microcosm to the macrocosm...so many levels at which the human becomes joined to the absolute, through the bipolar dynamic of breathing in and breathing out. It is for this reason in

particular that breath-control plays such a paramount role in the entire yogic enterprise (White, 2004, 46-7).

Āgarbha Prāṇāyāma emphasises the technical aspect. Great importance is paid to the specific way of carrying out inhalation, exhalation and inner or outer retention of breath, "...their time duration (*Sankhya*), the concentration on various sensations arising at different locations (*Desha*), the total duration of the practice (*Kala*) etc..." (Shrikrishna 2102, 55). Each maneuver must be performed with complete focus.

There are four types of *kumbhaka* described in the *Gorakṣastaka*, with four more added in the HYP. In the *Kumbhaka-Padhatih* of Raghuvira it mentions fifty seven types of *kumbhaka*. Iyengar likens this to how "God is one, but people call him by different names" (Gharote and Devnath, 2016, viii).

Breathing for a reason:

i. For breath control

Prāṇāyāma has maintained its focus in yoga practice "since earliest descriptions of yoga began" (Birch 2011, 547) as restrained breathing - extending and stretching the breath helps prepare the mind for *dhāraṇa* (concentration).

The yogin who attempts to practice yoga without controlling the breath is compared to a person who wants to cross the ocean in an unbaked earthen vessel, which soaks up water and is bound to sink *Yoga-shikhā-upaniṣad* 1.62 (Feuerstein, 2011, 276).

Breath control is essential to the practice of Hatha Yoga and other yogas; the breath is easier to control than the mind, detailed in *Hathayogapradīpikā*. In

Svetâsvatara 2.9 Prāṇāyāma: Introversion and breath control, we find this classic analogy:

Having repressed his breathing here in the body and having his movements checked
 One should breathe through his nostrils with diminished breath
 Like a chariot yoked (*yuktam*) with vicious horses
 His mind the wise man should restrain undistractedly (Crangle, 1994, 112)

ii. For spiritual goals

"Such were the *vrātyas*, ascetics of the *Artharvaveda* (AV), lived for breath alone and their reputation to make their breath long" AV 15.11.5 (Zysk, 1998, 202).

Atharvaveda (4.1) "appears to describe" (Mallinson and Singleton, 2017, 128) joining two breaths for the purpose of attaining immortality, and Mallinson notes that in *Jaiminīya Upaniṣad Brāhmaṇa* (3.3.1) there is a recommendation to not breathe during recitation of *Gāyatrī* chant, an ascetic practice. "These two brief and obscure early references to breath control may be forerunners of the two traditions of *prāṇāyāma* practice which subsequently developed" (Ibid, 128).

In *Bṛhadāraṇyaka Upaniṣad* 1.5.23 we find one of the earliest references to such breathing:

One should indeed breathe in (arise) but one should also breathe out (without setting) while saying, 'Let *not* the misery that is dying reach me'. When one would practice that (breathing) one should rather desire to thoroughly realise that (immortality). It is rather through *that* (realization) that he wins a union with this divinity (breath), that is a sharing of worlds (Wells, 2011, 71 text 45).

Breath control can ultimately mean no inhalation or exhalation. Feuerstein (1974, 98) quotes Dasgupta (1927) but regards the descriptions of “suspended animation without any external signs of life” as a deviation, stressing the focus is to expand or lift the consciousness for complete absorption, one-pointedness, and then achieve ultimate liberation. Many of the most common textual sources of ‘classical yoga’, such as the *Yoga Sūtras* and *Bhagavad Gītā* (that yoga practitioners use today) give little emphasis to breath control: “They are more concerned with human salvation, realized through theory and practice of meditation (*dhyāna*) in yoga sūtras” (White, 2009, 3).

The circulation of winds appear in early *Upaniṣadic* sources such as *Bṛhadāraṇyaka Upaniṣad* and *Kaṭha Upaniṣad* (5.1.1.) indicating that death is reached when *prāṇa* leaves the body through the head. In the P.Y.S “*udana* (upward moving) allows the yogin to perform *ukrānti* (yogic suicide) leading to final liberation” and “is the forerunner of Kundalini ascent and models of *utkrānti* (yogic suicide) (Mallinson and Singleton, 2017, 173) and Black (2007). Tantric and Hatha texts teach the yogi to join *prāṇa* and *apāna* in order to move up the central channel to the head (*Niśvāsatattvasamhitā Uttarasūtra* (5.1.3) then exit the body through the top of the skull. The yogi then “projects his breath outside his body and into a corpse” (Mallinson and Singleton, 2017,133).

iii. For penance and purification

Hatha yoga is used to gain control of the breath, but it’s not possible “until the body is thoroughly purified” (Bernard, 1958, 9). Since Vedic time, *Prāṇāyāma* was essential in terms of purification. Regulated breath during rituals was a way of generating heat. “In its basic form it is a preliminary, purificatory technique” (Mallinson and Singleton 2017,130) and its role as expiation

connects it with tapas. *Baudhāyanadharmasūtra* 4.2.22-4. 28-30 emphasised it was for purification, together with chanting "OM and the obligatory sections of the Vedas" (Ibid,139). Raghivira quotes PYS-11.52-3, where *prāṇāyāma* weakens karma, purifies and aids concentration, adding how "It brings stabilization of *prāṇic* currents contributing to the health mind and body and arousal of kundalini force" (Gharote and Devnath, 2016, x1).

Increasingly, in medical texts, the development of *prāṇa* was explored due to interest in how the body worked. This was probably due to gradual internalisation of sacrificial rituals, such that "the bodily microcosm transformed into the seat of sacrifice" (White, 2004,184) where "... *tapas* associated with exertion and self denial is placed in the service of meditative brooding and contemplative power" (Kaelber, 1989,146).

In Tantric texts prior to rituals, three kinds of *prāṇāyāma* were often practiced and thought to enhance *nadīśuddhi* (purification of the channels). In the *Dattātreyayogaśāstra* (67-9) 13th century, the practice of *kumbhaka* was always through the nostrils at different intervals of the day and night. "If he perseveres for three months, purification of the nadis arises" (Mallinson 2013, 4). Eventually, it says, the breath can be held as long as desired with the practice of *kevala* pure breath-retentions.

Once pure breath-retentions, free from exhalation and inhalation, is mastered, there is nothing in the three worlds that is unattainable for [the yogin] (Ibid, 4).

Purification of channels in *Vasisthasamhitā* 7.6 allows the yogi to practice breath controls by meditating on the syllable *OM* and holding in particular parts of the body. Later texts of the *Goraksaśataka* and *Hathapradīpikā* distinguish their methods of inhalations and exhalations by adjusting and

making a bee sound when breathing out. These practices are predominantly physical, whatever their final goal.

Gheranda Samhitā Chapter 1.11 talks about the six cleansing techniques.

Dhauti, Basti, Neti, Nauli, Trataka and *Kapalabhati* (1.12) "From *prāṇāyāma*, lightness arises, realisation of the self. Then liberation is achieved through *samadhi*" 1.11 (Mallinson 2004, 4).

These techniques are said to be great value for the yogin's health and for destroying sins. The main accomplishment is to purify the *nadis*, *Siva Samhitā* 111.26, and *Hathayogapradīpikā* 11.4-9 (Eliade, 2009, 229-231).

Gheranda replied, "The wind cannot flow through nadis clogged with dirt. How could *prāṇāyāma* succeed? How could knowledge of Reality arise? Therefore the yogi should first purify the nadis and then practice *prāṇāyāma*." *The Gheranda Samhita*, 5.35 (Mallinson, 2004, 97).

Chapter 3 The Development of Yogic breathing

Prāṇāyāma is the stoppage of the inspiratory and expiratory cycle movement of the breath which follows, when that (*Asana*) has been secured *Yoga Sūtras* 11.49 (Bryant, 2009, 290).

i. Patanjali's Yoga Sūtras

Patanjali's classical yoga sūtras, a key development, were compiled somewhere between 500BCE and 200 CE. Regarding historical aspects of *prāṇāyāma* development, Birch delineates two main phases in terms of yogic practices, in which "breathing was a central element" (Birch 2011, 547.) The first phase was a variety of practices in early Buddhism, including the

principle *Upaniṣads*, Epic literature, culminating in the Yoga Sūtras of Patañjali.

Within the yogic tradition, more so with PYS, *prāṇāyāma* is noted as the fourth *anga* of the eightfold path. The breath in the sūtras practiced together with *kumbhaka*s is advised to be deep, prolonged, gentle and effortless with the aim of complete silence. Referring to Patañjali's Ashtanga Yoga, known as the Eight Limbs of Yoga, (Birch, J. Lecture: 22.02.17, SOAS, Ancient Traditions of Yoga) pointed out we should use the word *anga*, not limb, when dealing with ancient texts as there are eight components, each one necessary for the attainment of the other *angas* and the goal. "Drop one, and the system doesn't work." ⁴(Ibid, 2017)

Anga refers to stretching or expansion of *prāṇa*, the vital force, involving breath control. Patañjali has several versions of *prāṇāyāma* described by Bryant (2009). **The first** is, "When that [*āsana*] is accomplished *prāṇāyāma*h, breath control [follows]. This consists of the regulation of the incoming and outgoing breaths" Y.S.2.11.49 (Bryant, 2009, 288). This eliminates agitation from inhaling and exhaling.

The second is using *kumbhaka*s (breath retentions) between breaths, practised with concentration, an extension of *prāṇa* but a measured length. "[*Prāṇāyāma*] manifests as external, internal, and restrained movements [of breath]. These are drawn out and subtle in accordance to place time and number." YS, 2.11.50 (Ibid, 290) with breath control breathing in, holding, and breathing out.

The third is when the breath is held in the lungs or stopped from entering the lungs.

The Fourth Pranayama

⁴ <https://cikitsa.blogspot.co.uk/2012/07/sanskrit-anga-not-limb.html?m=1>

Zysk describes this in the context of *prāṇāyāma* being a threefold operation of breathing out, breathing in and suppression, (*stambha*) of breath. The fourth “transcends both internal and external operations” (Zysk 2009, 208). It’s difficult to understand this cessation of breath described in the Yoga Sutras, and controversial.

I contacted Rosen (email:Richard.Rosen26@gmail.com 23/08/16) who is still “at a loss to its meaning”. Birch’s interpretation of the fourth “has perplexed him for many years”. He says, “no expert on *Patanjayayogaśāstra* has explained it adequately” (email: jb92@soas.ac.uk, 01.05.17). Having read explanations by various scholars Birch’s view of how the fourth *prāṇāyāma* is similar to, but not the same as *kevala kumbhaka*:

Simple explanation, *abhyantara prāṇāyāma* emphasises the in-breath, *bāhya* the out-breath and *stambha* is the normal, deliberate breath retention (i.e *kumbhaka*) The fourth *kumbhaka* is similar, in this thinking to *kevala kumbhaka*, which is a natural spontaneous retention that is akin to the state of *samadhi*. In *kevala*, the breath is not deliberately held, but fades away naturally and can disappear (to the practitioner) for extended periods of time. It is therefore free of inhalation and exhalation (Birch: 2017email:Jb92@soas.ac.uk 1st May).

The *Bhāṣya* of the Yoga Sutras on the four types seems more complicated than Birch’s interpretation. I wrote to Phillipp Mass as Birch suggested, but haven’t received a reply. Another view is:

It’s suggested the fourth is a spontaneous or natural cessation which requires repeated practice of *Bāhya* and *ābhayantara Vritti Prāṇāyāma*. Ultimately out of this practice one reaches the stage where the full mastery is achieved and the spontaneous cessation now lasts for as long as one wishes and does not require the practice of *Bāhya* or *abhyantara Prāṇāyāma* just prior to it, anymore” (Shrikrishna, 2012, 56).

Maitri Upanisad (VI,19) mentions how to attain this fourth state, (*turiya*):

Now it has been elsewhere said, 'Verily, when a knower has restrained his mind from the external and the breathing spirit (*prāṇa*) has put to rest objects of sense, thereupon let him continue void of conceptions. Since the living individual (*jīva*) who is named 'breathing spirit' has arisen here from what is not breathing spirit, therefore, verily, let the breathing spirit restrain his breathing spirit in what is called the fourth condition (*turiya*)' (Misson, 2014.1164).

He enters into a "deep sleep" and into the "fourth state (*turiya*, the cataleptic state) with the utmost lucidity, he does not sink into self-hypnosis" (Eliade 2009, 99).

Bryant states this fourth variety requires "complete contemplation on the chosen object of attention" (Bryant, 2009, 290) reinforcing how yoga needs disunion from material reality for spiritual freedom, union with the chosen goal.

Eliade (2009, 55) querying why, although *prāṇāyāma* is a yogic exercise of great importance, Patanjali only devotes three sutras to it, suggests Patanjali was primarily concerned with theoretical aspects of ascetic practices. Perhaps it's due to the brevity and "laconic nature" (Zysk, 1993, 209) of Patanjali who would have assumed a guru would add more detail. Burns agrees the "terseness" of sutra format would preclude detail and/ or assume it would be added by a guru, but adds a theological dimension, saying it may be due to "the downplaying of *prāṇa* in Samkhya philosophy" (Burns, 2010, 33). Patanjali certainly advocates a teacher should guide and supervise. The focus is practical each *anga* increasing concentration leading to *dhāranā*, *dhyāna* and then *samādhi*, and higher practices of yoga (PYS 1.34).

He is concerned with “the removal of agitation and turbulence of the inhalation and exhalation of the breath, in order to achieve a calm breath and mind for the purpose of meditation (Yoga Sutra 11.53, Bryant, 2009, 15)

ii Hathayogapradāpikā (HYP)

Correct prāṇāyāma will weaken all diseases. Improper practice of Yoga will strengthen all diseases. HYP (2.16) Akers 2002, 37)

Here in the second phase of development, according to Birch’s outline mentioned above (Birch, 2011, 547), some origins are in pre-tantric texts, independent of Patanjali, yet influenced by him as well as yoga techniques incorporated into Hindu and Buddhist tantra, where yoga (*Mantra, Laya, Hatha* and/or *Raja*) was the chief means to liberation, *prāṇāyāma* having a significant role. Of the four, Hatha is distinguished from the other three due to its practice of *āsanas, prāṇāyāma* and its ten *mudras*, accompanying and strengthening *kumbhaka*.

The *Hatha* Yoga tradition saw a shift from religious rituals like *Sandhyāvandana* in *prāṇāyāma*, and *Abhyantara Kumbhaka* became an important element of *prāṇāyāma*. This is why in Hatha Yoga, “*Kumbhaka* is used as a synonym for *prāṇāyāma*” (Shrikrishna, 2012, 47) where, rather than regulation of breaths, “it has been their complete stoppage that has characterised yogi practice” (White, 2011, 92).

Hatha and Rajayogas both became prominent during the 12- 15th Centuries. Svātmarama drew together earlier systems in compiling *Hathapradīpikā* (HYP) for the purpose of health and spiritual realisation. Health and longevity,

influenced by alchemical traditions (Eliade, 2009, 340) feature as much as spirituality in the practice. It is “largely an anthology”, as shown by Bouy (1994: 81–86) Mallinson (2008: 2–3) and (Birch 2011, 529) who identified the earlier texts by tracing those verses borrowed by the *Hathapradāpikā*.

The HYP is the first text on yoga to include *āsana* among the techniques along with *kumbhaka* and *nādānusandhana* (concentration on internal sound) as Hatha Yoga’s constituents (Brill, 2011, 772). Svātmarama establishes the connections between breath, mind and *prāṇa* as well as detailing everyday practice and benefits. Most of the early Haṭha texts mention *kumbhaka*. The *Hathapradāpikā* and later texts “distinguish eight kinds of *kumbhaka* (i.e., *sūryabhedana*, *ujjāyī*, *sītkārī*, *śītalī*, *bhastrikā*, *bhrāmarī*, *mūrcchā*, and *plāvinī* (HYP 2.44.). These are preliminary to *kevalakumbhaka*” (Birch 2011, 529). Svātmārāma included the word *amanaska* as a synonym for *samadhi*. It’s ironic that Amanaskayoga’s verses on *Sāmbhuavimudra*, mind and breath, the basis for its dismissal of Hathayoga as superfluous, were used by Svātmarama in order to justify the practice of *prāṇāyāma* (Birch 2011, 546). But as the author’s purpose is considered to bring Hatha and Raja yoga together, the former in the service of the latter, no doubt he made compromises. Certainly *Amaraughaprabodha* provides concise explanation of Hathayoga “as the practice of stopping the breath” (Birch, 2011, 547).

Hathayoga derives from literature based on “*Goraknātha* yogis, *Hathayogapradāpikā*, *Gheranda Samhitā* and *Siva Samhitā*” (Eliade, 2009, 229). In the Hathayoga period, the emphasis is on internal *kumbhaka* and time units for *puraka*, *kumbhaka* and *recaka* were in a “1:4:2 ratio, accompanied by *mūlabandha*, *jālandhara bandha* and *uḍḍiyāna bandha*” (Gharote and Devnath, 2016, x1ii.).

In later Hatha texts “pure breath retention remains the ultimate breath practice” (Mallinson and Singleton, 2017,131). Known as *kevala kumbhaka*, this is unaccompanied by breathing in or out, and can lead to supernatural abilities. It is not merely having no inhalation and exhalation in mind, as *Sahaja Kumbhaka*. Sivananda quotes *Vasistha samhita*: “When giving up inhalation and exhalation, one holds his breath with ease, it is absolute *Kumbhaka (Kevala)*” (Sivananda 2008, 82) .The practitioner retains their breath as long as they like through this *kumbhaka* practice and attains the state of Raja Yoga. “The HYP and *Hatha Tatva Kaumaudī* endorse the mastery of Raja Yoga (i.e. objectless *samadhi*) to external *kumbhaka*.” (Maehle, 2012, 59) This pause or *kumbhaka* represents a transcendence of duality, of inhalation and exhalation, time and words, being somewhat indescribable and often accompanied by *samadhi*.

i Mudras and Bandhas

Bandhas are neuromuscular locks that “prevent the *vāyu* from going astray in *kumbhaka*” (Maehle, 2012,147) enabling voluntary control of breath and mind as required, recommended after establishing *kumbhaka* of ten seconds or more.

Hatha Yoga’s concern is control of *bindu*, “...*Bandhas* are bodily positions through which the adept is able to control the nerves and muscles of the genital region,” by the control of breaths. The practitioner is then able to control his semen while he controls his breath” (Eliade, 2009, 406).

Sarasvati (2013, 438) gives a variety of *mudras* of hands and body, even eye (*shambabhavi mudra*) where eye and breath are coordinated.

In the HYP *Mudras* and *Bandhas* are dealt with together as in the tantric texts. The aim of the *bandhas* is described as locking the energy of *prāṇa* in

certain areas of the body, directing the flow into *Sushumna nadi* for the purpose of spiritual awakening.

Of the network of channels that carry *prāṇa*, *Pingala Nadi*, *Ida Nadi* and *Sushumna* are the most important in interacting and regulating subtle energies. The balance of *Ida* (lunar, more intuitive, right hemisphere, left nostril) and *Pingala* (solar, rational, left hemisphere, right nostril) leads to the *Sushumna* being activated, so energy moves freely in the body and changes in consciousness take place. Kundalini is aroused, energy passes freely up the *Sushumna* channels in the spine, and the practitioner can, for example, recharge themselves, and distribute energy to others through various forms of *prāṇic* healing.

The three main *Bandha* are *Jalandhara Bandha* (throat lock) *Uddiyana Bandha* (abdominal contraction) *Mula Bandha* - anal lock, and *Maha Bandha* (the great lock) all three. Applying all three during *kumbhaka* extends breath-holding time, and improves physiological function by slowing heart and metabolism. In a recent interview Birch said

...it's through my reading of the texts that I've come to understand the importance of applying the bandhas during *prāṇāyāma*, particularly *uddīyaṇabandha* on the exhalation." (Impossible Yoga Interview with Birch, 25.7.17) ⁵

Many techniques of *Laya yoga* are taught in HYP, the *Sakta laya* technique for raising *Kundalini* being overlaid onto the physical techniques of Hatha Yoga originally used for the purpose of *bindhudharana*. *Mudras* taught in the *Dattātreyayogaśāstra* and *Vevekamārtanda* became methods for raising Kundalini. (Olesen, 2106)

⁵ <http://www.impossibleyoga.com/2017/07/25/un-intervista-con-jason-birch-yoga-tra-ricerca-accademica-e-pratica-an-interview-with-jason-birch-yoga-between-academic-research-and-practice/>

Mallinson also takes a composite view on how the variety of Hatha yoga techniques known as *mudras*, or seals is "... for controlling vital energies including *kundalini*, breath and *bindu*." (Mallinson, J. in Brill, 2011, 771) According to Mallinson, "...the only other texts older than the *Hathapradipika* to teach Hatha Yoga mudras are *Sivasamhitā*, *Yogabīja*, *Amaraughaprabodha* and *Sārngadharpaddhati*." (Ibid, 771) "This awakening of *kundalini* is achieved through the *cakras* by the bodily position of *mudra* and performing the technique of arresting respiration (*kumbhaka*)". (Eliade, 2009, 245)

Health warning

If practicing *kumbhaka* has potency for therapeutic purposes, there are also dangers. When everyone had a personal guru, practice was supervised. Following the instructions of qualified practitioners avoids the dangers of a superficial approach and misapplication of rules. There are detailed instructions: one saying to practice regularly but not overdo it, otherwise "they can twist their facial muscles while doing *kumbhaka*, and far worse" (Sivananda 2008, 91). *Prāṇāyāma* techniques are potent and effective, and thus "a sword with a double edge" (Shrikrishna, 2012, 15).

The HYP 11.65 (Akers, 2002, 42) describes the effects of *prāṇāyāma* on the body and mind, but if not practiced properly it can weaken the body (HYP 11.16). It's always advised to suit the pace to the individual and not force *āsanas* or breathing techniques, especially *Kumbhaka*. Those who see Hatha Yoga as a forceful approach misunderstand the time, patience and practice required to reach the goal.

Misuse of yogic powers from pure breath retention (*Dattātreyayogaśāstra* 10.16), referred to by Mallinson and Singleton (2017, 386-7), such as

levitation, and hopping around like a frog are often described and these authors explore the ambivalence felt toward such powers. Yogis need to keep powers a secret "otherwise everyone will want them" (Ibid, 360) and indeed, this is also a spiritual health warning, as they're considered a distraction from the ultimate spiritual purpose of yoga practice.

Swami Gitananda Giri Guru (SGGG) has studied 99 *prāṇāyāma* techniques, and groups them into three. 1/ *yoga prāṇāyāmas* to encourage good health 2/ *samayama prāṇāyāmas* for more introspective or meditative work on withdrawing the senses and 3/ *shakti prāṇāyāmas*, or *uddanas*, for full *prāṇā* arousal. They include *kumbhaka*, warning that, "All *Kumbhakas* from No. 13 to No.22 are dangerous to practise by a beginner and only under a Guru should they be perfected"(SGGG, 2013, 4.) Only advanced yogis must attempt any that involve inner work. Clear guidelines given as to how and when it is advisable to practice (Maehle, 2012, 77) and these vary due to commitment, expertise and understanding as well as circumstantial, cultural and environmental factors, including the presence or absence of guru or expert trainer.

Chapter 4 *Kumbhaka* - moving into the present day

Just as a lion, elephant or tiger is tamed step by step, so the breath is controlled. Otherwise it kills the practitioner HYP 2.15 (Akers, 2002,36).

Mallinson states:

One need not be concerned about *Kumbhaka* not always being the word used to describe breath-retention. Just because the name is new doesn't mean the practice is. The term first appears in the earliest tantric text, the *Nisvasatattvasamhita* and breath-

holding is described in plenty of earlier texts including the Pali Canon.

(email:jm63@soas.ac.uk 09/02/17)

He continues, "The earliest references to the terminology of *kumbhaka*, *recaka* and *pūraka* are the *Śaivāgamas*, in particularly the 5-6th century *Niśvāsasamhitā*"

Today ancient wisdom of the science of breath is conveyed to the western world alongside contemporary knowledge of respiration, but not always acknowledged. They "...will in due time discover and...after renaming, they will present to the world as a great truth" (Ramacharaka, 2012, 9.) Yoga develops and evolves and scientific enquiries confirm many benefits plus much needed "new strategies for injury prevention" (Broad, 2012, 105) in today's health conscious world.

The way it works

i Physiology of yogic breathing

Follow your nose

An essential portion of nitric oxide comes from the nostrils, playing a significant role in homeostasis. It's a bronchodilator and antibacterial agent that helps neutralize germs. No wonder ancient practices encouraged nose breathing. Each nostril has a different role in relation to the nervous system, left parasympathetic, right sympathetic. It's a significant research area for asthma control with evidence that asthma is reduced by 30% through nose breathing. (Buteyko, 2015, 33)

The diaphragm

Various respiratory muscles enable the mechanical activity of breathing, and surprisingly, the diaphragm, a key muscle, moves down as we breathe in and

up as we breathe out. Farhi (1996) among others points out this contradiction.

The heart and digestion

As we breathe, oxygenated blood circulates via the left auricle of the heart, returning via the right auricle to the lungs for elimination. If this process is hindered impurities are retained or returned to the blood, and disease manifests. "Lack of sufficient oxygen means imperfect nutrition, imperfect elimination and imperfect health" (Ramacharaka 2012,12).

It's not all about O2

CO₂, nitric acid and O₂ need to be balanced for health, levels of CO₂ being critical (known in relation to haemoglobin as The Bohr Effect) as it's not merely a waste gas; we need a certain amount of it in our lungs. Gune was intuitive knowing how "The idea that an individual absorbs larger quantities of O₂ during pranayama is a myth" (Broad, 2012,12). There's a duality to oxygen, and although necessary for life, "excessive amounts will prematurely accelerate oxidative damage and aging" (McKeown, 2013). His advice is to avoid excessive amounts, using the minimum necessary.

ii Psychology of Respiration

Breathing patterns change in response to emotions and over time become a reflection of them, plus a pathway for changing them. Modern research validates this (Khalsa et al, 2016,53.) In response to a perceived stress or emergency response, breathing becomes faster, shallower, focused on the upper chest, in an effort to pump oxygen-rich blood to muscles. As O₂ levels rise, CO₂ levels fall, with blood diverted away from the organs and brain. This is directly responsible for the physical symptoms people describe during an anxiety attack, as O₂ causes muscles to tense in readiness. The relative absence of CO₂ impedes the relaxation response and our ability to assess there's no physical threat present. Conversely, rapid breathing may be an

advantage if the situation is dangerous, as "breathing affects neural activity that enhances memory and emotional judgment" (Gottfried, J. 2016,1)

iii No chance to pause

Rapid shallow breathing makes a pause more or less physiologically impossible. Stefan Chmelik says that when locked in this state of hyper-vigilance, breathing patterns remain dysfunctional. It's measured using respiratory capnography, and

People suffering from the effects of hypocapnia (reduced respiratory CO2 level) perceive that they are unable to breath in and need more oxygen. In clinical reality, they are hyperventilating and have elevated O2 levels, and need to breath out to allow CO2 levels to naturally rise. (Chmelik, S. 2017 email: stefan@newmedicinegroup.com 6th July)

iv In and out

Breathing is both under voluntary and involuntary control, and yoga's purpose has always been to make it more conscious, though not at the cost of disturbing breathing. T.K.V. Desikachar, son of Krishnamacharya tells students in relation to *kumbhaka*:

...if it in any way affects the quality of the Inhale or Exhale and our own relation with this flow, then there is no meaning (1978).

The emphasis is about being fully aware of our own natural breathing patterns rather than force anything (Farhi,1996, 207), as in "steady and comfortable" (Bryant 2009, 283).

Teachers approach the practice of *kumbhaka* in various ways, some focus on internal, others on external retention. *Sahita kumbhaka* is significant as a preliminary practice as it's accompanied by inhalation and exhalation. The benefits are mostly physical, for example, *surya kumbhaka* is said to alleviate *vāta*, while *bhastī kumbhaka*, with its forceful exhaling, is said to waken Kundalini. Niranjananda confirms there are significant differences between internal and external *kumbhaka*. "Internal *kumbhaka* triggers the parasympathetic nervous system, whereas the external *kumbhaka* brings the sympathetic nervous system to the fore." (Niranjananada, 2009, 146)

Broad calls the expert ability to move from the former cooling to the sympathetic arousal the 'yoga paradox' (Broad, 2102, 177). This flexibility also brings "stress resilience" (Wilson, 2014). If both forms of *kumbhaka* are practised in the same round a healthy balance between both branches of the nervous system is achieved. Khosru, quoted by Eliade (2009) said practitioners could live for "three hundred and fifty years", and tell future events by the breath of their nostrils, according to whether the left or right was more or less open (Eliade, 2009, 276).

External *kumbhakas* can appear more difficult than internal because during internal *kumbhakas* the lungs are full of oxygen, *prāṇa* can still be extracted. During external *kumbhaka* the lungs are empty and inhalation is required earlier. Techniques of *kumbhaka* practice are complicated, hence the need for individual supervision.

v Inner science of breathing

The subtle movement of *prāṇa* is the reverse of the gross breath. Ancient meditators noticed this "upward and downward movement present during inhalation and exhalation at the same time" (Ewing, 2012, 5, Shrikrishna,

2012, 75) but didn't describe it in physiological terms. Shrikrishna speaks of this as one of the great secrets of meditation. The yogis were aware of it but if we're not mindful, we remain unaware of its subtleties.

This inner movement of *prāṇa* is mostly not visible to mainstream scientific analysis. On this subtle level, *prāṇas* have time to balance during breath suspension and the whole body is filled with the deep breath going in all directions, the secret of pranayama described as:

The art of spacing the intelligence of the self, judiciously in the body (*deśa*) by *pūraka*. Uniting together the space in place is *antar kumbhaka*. Releasing the breath delicately for the place to reach the inner space of the body is *bahya-kumbhaka*. (Gharote and Devnath, 2016, xi).

One needs to progress carefully in *kumbhaka*, paying attention to rules and stages of *prāṇāyāma* to reach the higher stages of yoga "When the air is exhaled slowly and breath is retained outside by a *yogi*, it is called *bahih-kumbhaka* or *recita*"(Ibid, 9).

vi All is connected

Ramacharaka (2012) writes specifically for Westerners on how *prāṇa*, the spirit of life, is in the air but not the air. We can store this *prāṇa* in various parts of our body, and relate to it wisely following yogic teachings. He explains how just as the body uses up air, the mind uses up *prāṇa*, by thinking, willing, acting, feeling, worrying, hence the need for replenishing and/or emotional non-attachment.

Body and mind via the breath have a reciprocal relationship; we're also intimately connected to the environment in different ways, from air quality to subtle vibrations, from light and sound to atoms within and around us. The

latest neuroscientific research suggests granularisation is achieved by learning yoga, as detailed body movements and breathing techniques change patterns of behaviour to rewire our brains (Bartelle, 2017).

These are forces of nature or laws of physics. As Einstein deduced, all matter is vibrating, "Even atoms wiggle - they do the back and forth. Wiggles, vibrations, and oscillations are an inseparable part of nature." ⁶

By changing our breathing or consciousness we can tune into this, learn to direct *prāṇa* within our own bodies and toward others. As Lysebeth says (2013, 9), "Prana is to yoga what electricity is to modern civilisation".

vii Measuring breath retention

Buteyko's Control Pause is used to evaluate breathing volume, and measures carbon dioxide in the lungs (McKeown, 2015, 39). His method emphasises holding the breath after exhalation to overcome over-breathing. Benagh's approach, based on Buteyko's work, uses the Control Pause to help people assess their own lung condition and teach themselves new breathing habits (McCall, 2007, 176).

Measured counting of retention can be based on heartbeats. Units of inhalation and exhalation are generally the same, although retained breath can start at half this unit. Many practitioners follow the 1:4:2 rule but the aim is generally to increase retention.

Focusing the mind or "calm commanding with the mental picture" (Ramacharaka, 2012, 29) makes a clear way forward possible. The whole process is relaxed. It's not about straining, or taking in more air, just fully distributing it, which results in beneficial internal massage of organs like the liver and stomach, with the *bandhas* giving protection from any adverse

⁶ <http://www.physicsclassroom.com/class/waves/Lesson-0/Vibrational-Motion> (last accessed 24.8.17)

effects of massage. *Prāna* as “flowing with the breath” is considered the accurate definition (Khalsa, 2016,41).

Chapter 5 Modern applications of breath retention

I still think of retention not so much as holding the breath but as a reasonable prolongation of the natural breathing pause...I've found that retention can be an amazing transformational tool (Rosen, 2006,184).

i Like a pause of fresh air

Pauses in breathing create more meditative moves, which is truer to traditional yogic practice, as it allows the mind to harmonise with the body. This is achieved by gradually lengthening the pauses, creating awareness of the breathing process. Zi (1986,66) offers 37 exercises to improve performance and well being, focusing on visualisation, breathing into various parts of the body, as you “Hold your breath and remain for a few seconds” directing the breath to the back.

Traditional methods of practicing retention are a set ratio connected to the lengths of inhalations and exhalations, *sama vritti prāṇāyāma*, whereas unequal ratio breathing is *vshama-vritti prāṇāyāma*. Relaxation is essential, (Farhi 1996, Beeken, 2004, Brown and Gerbarg, 2012 Rosen 2006)

In April 2017 I began a small study with my yoga students with no real counts, an exercise to control and notice the pause, offering them options:

1/ Pause physically in static pose, even within a sequence, focusing on 3-5 rounds of breathing.

2/ Restrain, suspend the breath and physically come to a standstill; in the pause be aware of stillness, physically and mentally.

3 Move within *āsana* or sequence but without breathing, just aware of the retention.

Students became more aware of breathing, controlled it to create calm and noticed how breath holding caused tension. Encouraging a creative approach, some discovered the lengthened calm pause, where face, mind and body relax, 'the sweet spot' (Brown and Gerbarg, 2012, 9) where capillaries open to optimise blood flow.

ii Time place and circumstance

From 1990 onwards, a speeded up version of Krishnamacharya's *Yoga Makaranda* became very popular with Western practitioners. Pattabhi Jois, an advocator of long slow breathing, realising there was a time issue in "our push button society", reduced the retention time from 20 to 3 seconds. (Lawton, 03.5.17)

But Bernard's *prāṇāyāma* training led him to experiment with various counts of *kumbhaka* from a one to ten minute hold. (Bernard, 1958, 57-8) although this is a preliminary compared to accounts where yogis held their breath for an hour or more, for example, Siva Samhita iii, 53-4 (Ibid, 1958, 58).

Caution is exercised especially in medical settings. I met with Ruano (Ruano.S.: 2017, Interview, The Breathing Practice 16th July) who teaches breathing techniques at Imperial College Hospital to patients with respiratory problems. Many are based on *prāṇāyāma*, with retention after the inhale or exhale. From the medical point of view, Ruano stressed how *kumbhaka* could potentially be unbeneficial for conditions such as uncontrolled hypertension or orthostatic blood pressure, heart failure and COPD (Chronic obstructive

pulmonary disease). "All these conditions have the potential to increase cardiac output and increased breathlessness." She added that *kumbhaka* practiced without supervision by a qualified teacher or performed incorrectly, could also:

Exacerbate the valsalva manoeuvre, which results in an increase in parasympathetic (vagal) activity and hence in a drop in heart rate, causing an abnormal blood pressure response, or even exacerbate symptoms of congestive heart failure.

This confirms the need for scientific validation of techniques, reinforcing how *Kumbhaka* within yoga therapy requires qualified supervision and care (Khalsa, 2016,487-517. Broad (2012, 217) discusses qualifications, urging "alignment with clinical trials and professional accreditation", although considers yoga's truths outstretch science.

iii Short is better

Telles (1991) demonstrated that short periods of *kumbhaka* in yogic *Ujjayi* breathing were more beneficial than long. Ruano commented how

It was remarkable that oxygen consumption and metabolic rate increased with the short practice of Kumbhaka (52%) compared to the long-holding pranayama practice with an increase of only 19 % of oxygen consumption and metabolic rate. (Ruano, 2017 :email: Shere.ruano@gmail.com 27th June)

Kumbhaka is an important exercise to strengthen and develop respiratory muscles and lungs. Occasional holding of the breath, after the lungs have been filled with Ramacharaka's Complete Breath, is very beneficial, "not only to the respiratory organs but to the organs of nutrition, the nervous system and blood itself." (Ramacharaka, 2003, 39) Purification is part of this, contributing to a big cleanse as it gathers up waste material.

Strom's approach doesn't use long retentions and is simple and effective (Breathing Workshop, 10.2.15).⁷

iv Health benefits

Breath is a two-way bridge between conscious and unconscious, body and mind and the only autonomic system we can influence directly. When cleanliness, diet and behaviour or the eight *angas* were fully observed, *Kumbhaka's* purpose was spiritual. Holding the breath for the sake of it was not enough, rather created an environment for concentration *dharanasu ca yogyata manasah* PYS 11.53 (Gharote and Devnath, 2016, xxxiii). Calm awareness is still valued therapeutically, but length of *prāṇāyāma* and retention reduced.

According to Krishnamacharya, (2013) the power of *prāṇāyāma* strengthens "bones, bone marrow, heart and the strength of breath, and *prāṇa* sharpens the senses and intellect" (Krishnamacharya, 2013, 9). However, he explains *puraka kumbhaka* is associated with *Brahmana kriya* and "should be practiced by someone who is thin, whereas one who is obese should practice *langhana kriya* associated with *recaka kumbhaka*" (Ibid, 27).

Positive effects of targeted breathing techniques across a range of stressors have beneficial effects for health and wellbeing. The Coherent Breath, which involves *kumbhaka* "relieves stress, tension, anxiety, worry, phobias, insomnia and respiratory problems" (Brown and Gerbarg, 2012, 134). Broad (2012) puts yoga's health claims into perspective but on balance states "the benefits unquestionably outweigh the risks" and reveals how the potency of breathing techniques lead to restored health and creativity. (Ibid, 2012, 210)

⁷ Held at Tileyard Studios, Kings Cross, London www.tileyardstudios.co.uk

McCall describes Singh's *Lancet study* where extending exhalation prevented asthma attacks, and other controlled studies using breathing techniques that worked preventatively for asthmatics, long term (McCall, 2007, 175).

Ashtanga yoga practitioner Mick Lawton's practice was difficult due to a rare auto-inflammatory disease. He conducted a simple self study to see the advantages of adding *kumbhaka*, practicing *prāṇāyāma* for two months with *kumbhaka*, two months without. He noticed that periods with *kumbhaka* brought an improved state of health reflected in his blood tests, "showing lower CRP, lower SAA and lower cytokine markers of inflammation". His flair up would also heal faster when *kumbhaka* was incorporated.

It is during *Kumbhaka* that we find incredible stillness. For me, it's during the moments of *Kumbhaka* that I can "stop the world" and see things with much greater clarity (Lawton, 2014).

Beeken successfully promotes breath retention, using *Ujjayi prāṇāyāma* for energy, asthma, and relieving anxiety and depression; the pause at the top of the inhalation is a crucial step, but stresses, "it always needs to feel as though it is a natural movement" (Beeken, 2004, 48). A Yoga breath programme, Sudarshan Kriya Yoga (SKY), has been taught to millions globally by the Art of Living Foundation, alleviating stress, depression and anxiety in clinical practice, based on ancient breathing techniques. (Brown and Gerbarg, 2009, Yoga Breathing Meditation and Longevity, in Bushell et al, (eds) 2009, 54-62)

As yogic techniques are subject to scientific analysis, this could validate the wisdom of ancient breathing practices bringing together textual scholarship with clinical research, albeit using new terms of reference. For example, Loizzo et al (2009, in Bushell et al, 2009)) refer to *prāṇa* as 'neural energies'

and bindu as 'drops' while Anandi (2016, 37) assumes "Mr Prana is the Project Manager".

v Diving and daring

Deep sea divers adopt yogic breath techniques. Borg-Olivier (2015), a yoga teacher and physiotherapist, advocates a few seconds *kumbhaka* after a slow inhalation up to 30 seconds, exhaling for ten seconds. Free divers practice this in relaxation mode, breathing into different parts, shifting the inhalation, exploring and adding various lengths of *kumbhakas*.

Severinson (2010,16) also emphasises the need to achieve this "when you are relaxed and in control". *Breathology* and other similar books are appealing to the fitness demographic, sometimes including quotes from texts such as HYP, exchanging information across cultural divides. Interestingly, The Guinness World Record for Static Apnea as used by divers is 11 minutes 54 seconds set by Branko Petrovic on October 7th 2014, under the supervision of the Guinness adjudicators. (Todorova, The National 7.10.14).

The trend for extreme behaviours, plunging into freezing water, seeking extreme altitudes in order to renew 'lost evolutionary strength' (Carney 2017, 59) suggests renewed interest in austerity. But apart from mentioning visualisation practices, his *Getting Started with Basic breath holding* chapter doesn't mention yogic techniques.

Chapter 6 Pause and effect

Prāṇāyāma has been left behind while the beautiful sister asana is the guest of honour at yoga studios. But give breathing a chance and you'll realize it's the true queen (Max Strom, 2015)

i The Social Context: Give pause a chance!

Yoga classes are often fast paced, vital individual differences rarely acknowledged and mostly āsanās for fitness, rather than a space to breathe and be.

Oppawsky (2016) sees western society as uncomfortable with long pauses whereas “Inner stillness is a feature of spiritual enlightenment in Buddhism and a measure of inner growth in Hinduism”. He suggests society discourages silence, with pauses seen as embarrassing, threatening, or personally rejecting although as psychologists know, incubation periods or the creative pause are valuable (Markham 2012, 173).

We often anticipate the other person’s response, interrupting without a valid ‘pause’ of waiting for them to finish and our response is thus invariably “suboptimal” (Nemko, 2015).

In contrast, Glyn’s *Pause Prompt Praise* is an effective, remedial reading project for 10-12 year olds. (Wearmouth et al, 2002, 61). Following the reader’s error, there’s a pause to allow them to self- correct, preventing the tutor from interrupting too soon. This enables the child to decide what type of error occurred or give tutors the chance to prompt.

ii Breathe the difference

Beeken (2004, 10) shows how we hold our breath when we think of uncomfortable past thoughts and diseases associated with holding the **breath in** are high blood pressure, heart disease, tension angina and stress related

illness. Diseases associated with holding the **breath out** are low blood pressure, depression and lack of energy.

Forbes discovered after years of clinical work that breathing exercises had a stronger influence on emotional healing than either mental or physical practices alone and began to incorporate yoga therapy into her clients' treatment. "Rapid and shallow breathing... hinders the body's response to emotion and stress" (Forbes, 2011, 87) in contrast to deep slow breaths which improve the body's response to emotional stress.

The World Health Organisation (WHO) estimates that by 2020 depression will be the second cause of death worldwide (Nataraja 2008, 29). Modern findings finally link body mind and breath: Devices like the GSR (Galvanic skin response) meter measure psychophysiological response and can be used to see "how effective contemplative techniques such as focusing on the breath are" (Nataraja 2008, 167). EEG (Brown and Gerbarg 2012, 112) and fMRI (Ibid, 100) are increasingly the research tools demonstrating how breathing positively effects brain and behaviour.

CONCLUSION

"The notes I handle no better than many pianists. But the pauses between the notes - ah, that is where the art resides" Artur Schanabel (pianist) 1882-1951

It's hard to summarise the development of *kumbhaka*. There are many social and psychophysiological aspects to how and why we access these breathing practices or 'pause'. For example, loneliness is a stressor so yoga, mindfulness and breathing workshops offer community where people have a sense of belonging while connecting to themselves. Spirituality is a word that's attached itself to this but "Spirituality has no universal meaning and

has always reflected political interests” (Carette and King, 2016,30). If untrue in ancient times, it seems so today.

Yet we don’t need to escape to monasteries or yoga studios to pause. On New Year’s Eve many reflect on the year gone and the one ahead. New Year’s Eve derives from Winter Solstice (Latin for the sun coming to a stop). “It is, in effect a celestial pause” (Tomkins, T. 2013, Tedtalk). Summer Solstice, celebrated in Times Square with dusk until dawn yoga and meditation embraces ‘The power of the pause’. Starting ten years ago with 3 people, last year 14,000 people attended, to breathe, pause and recover a sense of “awe”.

Epenetos, a consultant onologist is convinced:

Medical understanding of the nature and mechanism of breathing is important, but equally so is practicing intermittent control of breathing, taking a moment to pause and reflect, even just for 1 minute. This allows our minds to generate some space and regain vital energy in the body (email: a.epenetos@epenetos.com 17.6.17).⁸

Being full of energy *and* being able to relax are drivers of well being, but if lacking, stressors that weaken us psycho-physiologically. Yogic breathing enables people with mild or extreme trauma to cope more effectively, (Brown and Gerbarg, 2012) and the 4-4-6-2 *kumbhaka* routine has been shown to reduce violent thought, suicidal or impulsive tendencies (Ibid, 146).

I thought I’d conclude *kumbhaka* was always beneficial, based on ancient yogic practices, but my research confirms how much modern yogic practices have evolved. Civilisation reduces resolve and capacity for disciplined practice; ability to follow the eight *angas* is limited, so breathing practices have adapted. Despite limited neurophysiological respiratory knowledge the

⁸ <http://agamemnonepenetos.com>

ancient yogis knew breathing was central to their endeavours, and we still benefit from their timeless wisdom.

However, science can now evaluate, guide and encourage us to make the most of ancient insights and practices, according to time place and circumstance. We need to avoid both highly regulated, 'learned breathing' and the unconscious involuntary, speedy breath, and instead find the "essential breath" (Farhi, 1996,9). Being mindful, paying attention to breath is preparatory work, but slower breathing and breath holding seem valuable for stress relief. There is much clinical research on *prāṇāyāma* with benefits confirmed by a range of studies, (Brown and Gerbarg, 2009 in Bushell et al, (eds) 2009, 54-62). Methodological weaknesses need addressing, but clinical analysis of those that use retention would be invaluable, how *prāṇāyāma* with *kumbhaka* is effective and the pause a catalyst for change, plus full research of the components of breath control (Khalsa, 2016,62)

Evidence points toward the potential for alleviating distress and dis-ease as McCall (2007,28) shows in his review of the wide range of medical conditions helped by yogic practices, as does Broad (2012, 137-148) plus revealing essential safe-guards needed. McKeown's work reveals how Buteyko controlled breathing corrects asthma and sleep apnea (2004,149-153) and Brown and Gerbarg (2102, 121) show how various breathing techniques alleviate distress, depression and PTSD. Reducing breathing rate lowers metabolism and heart rate, reduces the amount of CO₂ exhaled, and re-breathing the same air is "one of the easiest methods" for entering a euphoric trance (Broad, 2012, 21).

Rosch (2009 in Bushell et al, 2009, 307) confirms how communication on every level of our being, from atomic to quantum, is known to be critical to healthy body/mind homeostasis. Controlling the mind through breathing

brings harmony of body and mind. Refining and improving the quality of our breathing are central to changing dysfunctional habits or *samskaras*, using the concept of neuroplasticity (Khalsa et al, 2016,40).

Kumbhaka offers opportunities for enhanced conceptual and emotional awareness, greater discrimination and specificity. Neuroscientists are exploring emotional granularity, with Feldman Barrett's melding of cognitive science and neuroscience paving the way for research on the adaptive consequences of emotional granularity and "will contribute to the construction of training programs ...designed to improve emotional adjustment" (Feldman-Barrett, 2017).

Using mindful, specific, and expansive movement practice in order to boost the connections between the areas of your brain which govern the conscious movements of your body can only increase both your felt sense of mind-body oneness and the level of nuance in your conscious understanding of yourself and the world around you. (Bartelle, 2017)

Breath retention can play a significant role in reducing stress if we understand our individual breathing pattern, use the pause to facilitate focus and balance and move toward harmonious linking of breath, consciousness and spirit, which the ancient yogis knew brought peace, personal and universal.

BIBLIOGRAPHY

Akers, B.D 2002

Svatmarama: *The Hatha Yoga Pradipika*

YogaVidya

Anandi, 2016

Breathe Better, Sleep Better

How to use the breath to get a great night's sleep

Balboa Press

Bartelle, Michael, 2017

[https://www.michaelbartelle.com/blog/2017/7/27/](https://www.michaelbartelle.com/blog/2017/7/27/my1ehacer8lziehd85wo5hyr2n5mzy)

[my1ehacer8lziehd85wo5hyr2n5mzy](https://www.michaelbartelle.com/blog/2017/7/27/my1ehacer8lziehd85wo5hyr2n5mzy)

(Last accessed 10.08.2017)

Bäumer, B. 2002

Kalātattvakośa: Manifestation of Nature,

Motilal Banaridass

Beeken, Jenny, 2004

Dont hold your breath A guide to good Breathing

Polair Publishing

Bernard, Theos 1958

Hatha Yoga, The report of a personal experience, London: Rider and Company

<https://terebess.hu/english/Theos-Bernard-Hatha-Yoga.pdf>

(Last accessed 26.08.16)

Birch, Jason

Meaning of Hatha in Early Hathayoga,

<https://www.academia.edu/1539699/>

[Meaning_of_haṭha_in_Early_Haṭhayoga?auto=download](https://www.academia.edu/1539699/Meaning_of_haṭha_in_Early_Haṭhayoga?auto=download)

(Last accessed 23.08.17)

Birch, Jason *Impossible Yoga Interview* 25 July 2017

<http://www.impossibleyoga.com/2017/07/25/un-intervista-con-jason-birch-yoga-tra-ricerca-accademica-e-pratica-an-interview-with-jason-birch-yoga-between-academic-research-and-practice/>

(Last accessed 25.8.17)

Black, Brian 2007,

The Character of the Self in Ancient India, Priest, Kings and Women in the Early Upanisads

State University of New York Press

[www.ahandfulofleaves.org/document/The%20Character%20of%20self%in%20ancient India](http://www.ahandfulofleaves.org/document/The%20Character%20of%20self%in%20ancient%20India)

(Last accessed 24.08.17)

Bodewitz, H.W. 1973, *Jaimināya Brāhmaṇa* 1,1-65,

Leiden: E.J.Brill

[https://books.google.co.uk/books?](https://books.google.co.uk/books?id=QuMUAAAAIAAJ&printsec=frontcover&source=gbs_ViewAPI&redir_esc=y#v=onepage&q&f=false)

[id=QuMUAAAAIAAJ&printsec=frontcover&source=gbs_ViewAPI&redir_esc=y#v=onepage&q&f=false](https://books.google.co.uk/books?id=QuMUAAAAIAAJ&printsec=frontcover&source=gbs_ViewAPI&redir_esc=y#v=onepage&q&f=false)

(Last accessed August 23, 2017)

Borg-Olivier, Simon 2015

<http://simonborgoliver.com/breath-training-for-health-and-longevity/>

(Last accessed 11.08 2017)

Bouy, Christian 1994

Les Nātha-Yogin et les Upaniṣads Paris: Diffusion de Boccard.

Bloomfield, M 1896/7

Trans. *Hymns of the Athava-Veda Together with extracts from the Ritual books and the commentaries, Sacred Books of the East*, Vol 42,
John Hopkins University Baltimore

Brill's Encyclopedia of Hinduism, Volume 111, 2011
Society, Religious Specialists, Religious Traditions, Philosophy, Editor in
Chief, Jacobsen, K.A,
Leiden: Boston

Broad, William J. 2012
The Science of Yoga, The Risks and the Rewards
New York: Simon and Schuster, 2012

Brown, Richard P. and Gerbarg, P.L Yoga Breathing, Meditation and
Longevity (2009) in Bushel et al, (eds)
Boston:Blackwell Publishing

Brown, Richard, P. and Gerbarg, Patricia, 2012
The Healing Power of the Breath
Boulder: Shambala

Bryant, Edwin F. 2009
The Yoga Sūtras of Patañjali,
NewYork:North Point Press

Burns, Graham 2010
Vedic and Ayurvedic Roots of the Hatha Yoga Theory of Prana, MA
Dissertation, SOAS

Bushell, William C. Olivo, Erin L. and Theise, Neil D. (eds) 2009, Longevity,
Regeneration and Optimal Health, Integrating Eastern and Western

Perspectives, *Annals of the New York Academy of Sciences, Volume 1172*
Boston:Blackwell Publishing

Carette, Jeremy and King Richard, 2016
Selling Spirituality, The Silent Takeover of Religion, London and New
York:Routledge, Taylor and Francis Group

Carney, Scott, 2017
What doesn't kill us
Melbourne and London: Scribe Publications

Crangle, E.F. 1994
The Origins and Development of Early Indian Contemplative Practices
Harrassowitz Verlag, Wiebaden

Dasgupta,S. 1927
Hindu Mysticism
Chicago Press

Desikachar, TKV, 1978, Switzerland
<http://www.yogastudies.org/sanskrit/kumbhaka/>
(Last accessed 24.08.17)

Deusson, Paul 1908
The Philosophy of the Upanishads, Authorised English Translation by Geden,
A.S.
Edinburgh: T.&T. Clark
<https://archive.org/details/philosophyupani00deusgoog>
(Last accessed 23.08.2017)

Eliade, Mircea 2009

Yoga: Immortality and Freedom New Jersey:
Princeton : Princeton University Press

Ewing, Arthur Henry, 2012
The Hindu Conception of The Functions of Breath - A Study in Early Hindu
Psycho-Physics, *Journal of the American Oriental Society*, Vol.22, 249-308
Lightning Source, UK Ltd

Farhi, Donna 1996
The Breathing Book Good Health and Vitality Through Essential Breath Work
New York: St Martin's Griffin

Feldman Barret, Llsa
<http://grantome.com/grant/NSF/SES-0074688>
(Last accessed 12.08. 2017)

Feuerstein,Georg 1974
The Essence of Yoga,
London: Rider and Company

Feuerstein, Georg and Kak, S. and Frawley, David 2001
In Search of the Cradle of Civilisation,
Motilal Banarsidass, Private Limited

Feuerstein, Georg 2011
The Encyclopedia of Yoga and Tantra
Shambala Publications

Forbes, Bo 2011
Yoga for Emotional Balance
Boston and London: Shambala,

Frawley, David 2000

Gods, Sages and Kings, Vedic Secrets of Ancient Civilisation

Lotus Press

Frawley, David 2001

How I became a Hindu: My discovery of Vedic Dharma Voice of India

Frawley, David 2009

Secrets of the Five Pranas

<https://auomere.files.wordpress.com/2009/02/frawley-secretsofthefivepranas.pdf>

auomere.files.wordpress.com

(Last accessed 23.08.17)

Frawley, D. 2014

The Path of the Rishi, Twin Lakes: Lotus Press,

[https://books.google.co.uk/books?](https://books.google.co.uk/books?id=LbXFoAEACAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

[id=LbXFoAEACAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false](https://books.google.co.uk/books?id=LbXFoAEACAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

(Last accessed 23.08.17)

Geden, A.S. 1966

The Philosophy of the Upanishads

Dover Press

Gharote, M.L. 2007

Prāṇāyāma The Science of Breath, Theory and Guidelines for Practice

India: The Lonavia Yoga Institute

Gottfried, J. et al 2016

Neuroscience News, December 6, 2016

<http://neurosciencenews.com/memory-fear-breathing-5499>

Iyengar, B.K.S. 2016

Light on Pranayama

London: Harper Element

Kaelber, W.O. 1989

Tapta Marga Asceticism and Initiation in Vedic India,

State University of New York

Khalsa, Sat B.S., Cohen, Lorenzo, McCall, Timothy, Telles, Shirley 2016,

The Principles and Practice of Yoga in Health Care

Edinburgh: Handspring Publishing

Krishnamacharya, Sri T 1934

Yoga Makaranda or Yoga Saram First Part Kanada Edition

<http://yogainthecity.co.uk/wp-content/uploads/2013/07/YogaMakaranda.pdf>

(Last accessed 24.08.17)

Lalley, Maria The Telegraph, 3.01.16

The secret to wellbeing: learning to breathe properly

<http://www.telegraph.co.uk/health-fitness/body/the-secret-to-wellbeing-learning-to-breathe-properly2/>

(Last accessed 11.08. 2017)

Lawton, Mick (14.03.14)

Krishnamacharya's Original Ashtanga Yoga at Home, Introduction to Breath Control

<http://grimmly2007.blogspot.co.uk/search/label/Kumbhaka%20breath%20retention> (14.3.2014)
(Last accessed 23.08.17)

Lawton, Mick, (3.05.17)
<http://grimmly2007.blogspot.co.uk/2017/05/integrating-simon-borg-oliviers.html>
(Last accessed 24.08.17)

Loizzo, Joseph, Charles, Mary and Peterson, Janey, A Program in Contemplative Self-Healing, Stress, Allostasis and Learning in the Indo-Tibetan Tradition (2009) in Bushel et al (eds) 2009

Lysebeth, A 2013 *Pranayama The Energetics of Breath*, Edinburgh: Harmony, 2nd Edition

Maehle, Gregor 2012
Pranayama The Breath of Yoga
Australia: Kaivalya Publication

Mallinson, James, 2004,
The Gheranda Samhita: the Original Sanskrit and an English translation
Woodstock: Yoga vidya.com

Mallinson, James 2103
Dattātreyā's Discourse on Yoga
<https://terebess.hu/keletkultinfo/lexikon/Datta-Mallinson.pdf>
(Last accessed 28.08.17)

Mallinson, James 2008

Siddhas, Yogins and Munis, but No Nāths: The Early History of Haṭhayoga.
Unpub. paper.

Mallinson, James and Singleton, Mark 2017
Roots of Yoga,
London: Penguin Random House

Mallinson, James 2011
in *Brill's Encyclopaedia of Hinduism* Volume 3, Edited by Jacobsen. Knut A.
Brill Leiden, Boston

Markham, Art 2012
Smart Thinking, Britain
Piatikus

McCall, Timothy, 2007
Yoga as medicine
New York: Bantam Dell

McKeown, Patrick, G. 2013
<http://articles.mercola.com/sites/articles/archive/2013/11/24/buteyko-breathing-method.aspx>
(Last accessed 21.08.2017)

McKeown, Patrick, G. 2015
Close Your mouth Buteyko Breathing Clinic Self Help Manual,
Buteyko Books

McKeown, Patrick

buteykoclinic.com

Misson, P. 2014

Science of the Absolute 11.64

<http://www.advaita-vedanta.co.uk/index.php/content/9-content/science-of-the-absolute/106-science-of-the-absolute-chapter-9-epilogue>

(Last accessed 26.08.17)

Muller, M. Editor 1910

The Sacred Books of the East translated by Various Oriental Scholars Vol 1.

Oxford University Press

Muller, Max Rig Veda 10.129

The Creation in Rig Veda translation

<http://www.creationmyths.org/rigveda-10-129-indian-creation/rigveda-10-129-indian-creation-2-max-muller-translation.htm>

(Last accessed 24.08.17)

Nabar, V. and Tumkar, S. Transl. 1997

Bhagavadgita

Hertfordshire: Wordsworth Classics Editions

Niranjanananda Saraswati, Swami 2013

Prana and Pranayama,

Bihar India: Yoga Publications Trust

Nataraja, Shanida 2008

The Blissful Brain, Neuroscience and proof of the power of meditation

USA: Octopus

Nemko, Marty, September 2015

“In Praise of the One-Second Pause” Psychology Today

<https://www.psychologytoday.com/blog/how-do-life/201509/in-praise-the-one-second-pause>

(Last accessed 24.08.17)

Olesen, Bjarne Wernicke (ed) 2016

Goddess Traditions in Tantric Hinduism: History, Practice and Doctrine,
Routledge

Olivelle, Patrick 1998

The Early Upanishads Annotated text and translation

The University of Texas Center for Asian Studies and
Oxford University Press

Oppawsky, Jolene, 2016

Journal of the American Association of Integrative Medicine January

<http://www.aaimedicine.com/blog/2016/01/silence-is-a-counseling-skill/>

(Last accessed 24.08.17)

Pearse, Emma 11.08./2016

Breathing is the new yoga!

Vogue.com

<http://www.vogue.com/article/breathing-techniques-stress-anxiety-reduction-sudarshan-kriya-mindfulness>

(Last accessed 25.08.17)

Raghuvira 2016

The Science of breath book

India: The Lonalva Institute

Ramacharaka, Yogi, 2015

The Science of Breath

Life Transformation Publishing

Yogi Ramacharaka, 2003

The Science of Breath

<http://www.arfalpha.com/ScienceOfBreath/ScienceOfBreath.pdf>

(Last accessed 24.08.17)

Ranade, L.A and Frawley, D. 2003

Ayurveda and Marma therapy Energy Points in Yogic healing Lotus Press

[http://www.narayana-verlag.com/homeopathy/pdf/](http://www.narayana-verlag.com/homeopathy/pdf/07173_2Energy_Points_in_Yogic_Healing.pdf)

[07173_2Energy_Points_in_Yogic_Healing.pdf](http://www.narayana-verlag.com/homeopathy/pdf/07173_2Energy_Points_in_Yogic_Healing.pdf)

(Last accessed 23.08.17)

Rosch, Paul J. Bioelectric and Subtle Energy Medicine: The Interface between Mind and Matter, 2009 in Bushel et al (eds) 2009

Rosen, Richard. 2002

The Yoga of Breath, A Step by Step guide to Pranayama, Boston and London: Shambhala

Rosen, Richard, 2006

Pranayama Beyond the Fundamentals,

Boston and London: Shambala

Ruano, Sherezade

Arrhythmia cardiac specialist research nurse

<http://thebreathingpractice.com/>

(Last accessed 23.08.17)

Samuels, G. 2010

The Origins of Yoga and Tantra

Cambridge: Cambridge University Press

Satyananda Saraswati, Swami 2013

Asana Pranayama Mudra Bandha, Yoga Publications Trust Munger India

Severinson, Stig Avali 2010

Breatheology

Blue Consult

Sivananda, Sri Swami 2008

The Science of Pranayama

BN Publishing

Shrikrishna, 2012

Essence of Pranayama Kaivalyadhama Lonavia

<https://terebess.hu/english/Shirkrishna-Pranayama.pdf> 2012

(Last accessed 23.08.17)

Strom, Max, 10.2. 2015

Breathing Workshop

Tileyard Studios, Kings Cross. London

Strom, M

A Life Worth Breathing, 2012

New York: Skyhorse Publishing

Telles, Set al. 1991

Indian Journal Medical Research

Oxygen Consumption during Pranayamic type of very slow-rate breathing

<http://www.ncbi.nlm.nih.gov/pubmed/17948>// UNABLE TO ACCESS THIS SITE

I have the abstract handout

Tiruvannamalai, Sri R. 1995

Day by Day with Bhagavan S.India Ramanan

V.S Ramanan

Todorova, Vesela The National ,October 7 2014

<https://www.thenational.ae/uae/health/freediving-daredevil-will-be-holding-his-breath-and-count-to-696-1.274431>

(Last accessed 24.08.17)

Tompkins, Tim, 2017

<https://www.youtube.com/watch?v=3kVblc5mVCw>

(Last accessed 22.08.2017)

Wearmouth, Janice, Soler, Janet and Reid, Gavin 2002

Addressing Difficulties in Literacy Development

London and New York: Routledge Falmer, Taylor Francis Group

Wells, J. 2011

Translation and Commentary, *The Brihandarangayaka Upanishad* Book 1

darshanapress.com

<http://darshanapress.com/Brihadaranyaka%20Upanishad%20Book%201.pdf>

(Last accessed 23.8.17)

White. David Gordon, 2004

The Alchemical Body, Siddha Traditions in Medieval India New Delhi:
Munshiram Manoharlal Publishers Pvt.Ltd

White, D.G. *Yoga, Brief History of an Idea*, 2009
Princeton University Press

White, D.G 2011
Sinister Yogis,
London: Chicago Press

Wilson, Angela, 2014, *Yogic Breathing: The Physiology of Pranayama*
http://www.huffingtonpost.com/kripalu/yoga-practice_b_4762303.html
(Last accessed 24.8.17)

Yogamaharishi Dr Swami Gitananda Giri Guru Maharaji
<http://icyer.com/documents/1.pdf>
Pranayama The Science of Vital Control and Description of 99 Yoga
Pranayama Techniques
(Last accessed 23.08.17)

Zi Nancy, 1986
The Art of Breathing,
California: Bantam New Age Books

Zysk, Kenneth G. 1993
The Science of Respiration and the Doctrine of the Bodily Winds in Ancient India
Journal of the American Oriental Society Volume 113, No.2, 198-213

WEBLINKS

<https://cikitsa.blogspot.co.uk/2012/07/sanskrit-anga-not-limb.html?m=1>

(Last accessed 27.08.17)

<http://www.physicsclassroom.com/class/waves/Lesson-0/Vibrational-Motion>

(Last accessed 24.08.17)

Harvard Health Publications, Harvard Medical School, 2016

<https://www.health.harvard.edu/mind-and-mood/relaxation-techniques-breath-control-helps-quell-errant-stress-response> March 2016

(Last accessed 24.08.17)

http://themindfulnessinitiative.org.uk/images/reports/MI_Building-the-Case_v1.1_Oct16.pdf

(Last accessed 11.08.17)

ADDITIONAL READING

Bahadur, Krishna P. 1977,

The Wisdom of Yoga

A Study of Patanjali's Yoga Sultra

Sterling Publishers Put Ltd

Pillai , G.K. 2005

Upanishads For The Modern World

Jaico Publishing House

Second edition

Mahony, William K. 1998

The Artful Universe

An Introduction to the Vedic Religious Imagination

State University of New York Press

Olivelle, Patrick 2008

Upanishads ,A new translation

Great Britain: Oxford University Press

Yogiramacharaka

Hatha Yoga

Or the Yogi Philosophy Of Physical Well- Being

London L.N.Fowler (No date of publication noted)

Singleton, Mark 2010

Yoga Body, The Origins of Modern Posture Practice

New York: Oxford University Press

Surendranath, Dasgupta 1989

A Study of Patanjali

Delhi: Motilal second edition

Swami Prabhavananda and Manchester, Frederick 1957

The Upanishads ,Breath of The Eternal

The Wisdom of the Hindu Mystics

Signet Classic

