Notes on the physiology of birthing breathing and on the role of the vagus nerve in lowering anxiety in yoga breathing and relaxation during Prenatal Yoga classes

(Notes from Perinatal Yoga Level 3 course - Françoise Freedman)

Yoga breathing during the first stage of labour

During the first stage of labour, the conscious use of deep relaxation, yoga breathing and visualisation is a priority. In the various positions that women use in their individual 'labour circuits' yoga breathing helps with 'grounding', 'centring' and keeping the connection with the baby. Yoga breathing creates a rhythm that facilitates the internal concentration required to access the inner wisdom of the female body to give birth.

When a contraction comes: long exhale (that can be voiced as haaah - opening the uvular & pelvic diaphragms) to relax tension in anticipating the pain of the contraction and to transform this tension in a 'welcome' of the positive effect of the coming contraction together with visualisation: 'each one is one less'; 'each contraction brings me closer to meet my baby'; 'each contraction opens my birth passage for my baby'.

During a contraction: use **either** 'golden thread breath' /classic yoga 'ribbon breath' or, if the contraction is sharp, 'candle breath': these three practices work through extending the exhalation, or 'ujjayi breath', deepening both inhalation and exhalation with partial closing of the glottis. Actually being spontaneous and using any breathing that feels good are probably the best advice for managing contractions effectively rather than trying to control the process, even if breathing becomes shallow at the height of contractions BUT: remembering to consciously relax and let go of the contraction with another long exhale (haaah, repeated if need be) from the moment the contraction peaks, (when the uterus feels hardest :women in labour recognise this sensation) is most important, rather than waiting until it has faded. This gives the labouring woman a signal that 'this contraction' is over.

Between contractions, the priority is to move into 'deep rest' and recharge even during short intervals. Any yoga techniques that women find helpful to save energy are helpful, particularly moving from active 'golden thread breath' and 'ujjayi' to 'deep rest' without a conscious focus on breathing. Bhramari humming can also work well.

Birthlight practices during antenatal classes for women at all stages of pregnancy: full yoga breathing in aligned positions; golden thread breath with hand movement; Ujjayi progression; vowel sounds; collective breath recovery using lengthened exhalations; bhramari humming variations. Also 'Aah of delight', 'Hawaiian Haaah'.

To facilitate all yoga breathing practices during labour use 'de-focusing the gaze' (something women do spontaneously as their labour deepens).

This is a time when women draw on their inner strength and most often they best do this on their own. Talking to them or directing them at this time even with the best intentions can be counterproductive. Partners can be guided to take a purely supportive role at this time and only respond if asked.

Review of midwifery/obstetric terms used for the second stage of labour

- **Directed Pushing** (sometimes called 'purple pushing' because women get blue in the face). The directing may be a count of up to 10 on a held breath through contractions, then take a breath and repeat. Directed pushing is used with the Valsalva manoeuvre.

- **Mother directed pushing** (also 'spontaneous pushing'). The mother is in charge and follows the rhythm of her contractions. Practices of 'exhale pushing' and 'labouring down' are two ways in which mothers guide the birthing process with their out breath, engaging birthing muscles in semi-voluntary actions of their bodies or let their bodies expel their babies spontaneously without effort.

All these practices can be used in combination or in complementary ways in any given labour.

From Birthing Breathing to experimenting with 'pushing' in pregnancy yoga classes.

1. Yoga-based pelvic floor exercises provide the foundation to isolate the muscles necessary to push effectively. By identifying the pushing she does for a bowel movement, a mother to be can become familiar with the closeness yet the differentiation between her back passage and her vagina as birth passage.
2. Slow practice of finding the resistance that mothers need to either surrender to or push through (according to their disposition) at the end of the out breath, feeling it, getting familiar with it and realising that they can find release. Then as the breath is progressively lengthened new strata of resistance are reached and new releases are invited.
3. Some mothers are embarrassed by the sensations around their birthing muscles in the yoga class and can be anticipated to tense in their second stage with the concern that body fluids or faeces may be excreted. It is important to reassure women that this does not matter to birth professionals as it makes more space for the baby to be born. Practice 2 with affirmations or visualisations produced by women themselves is effective in liberating women from possible early trauma associated with potty training that can interfere with their birthing process.

What pushing positions? Reviews of practices taught in Birthlight Perinatal Yoga in relation to Birthing Breathing.

Reclining

This is the classic hospital pushing position on a delivery bed. Many women use this position because it is the position they are most familiar with from TV and films. It is the position in which women are directed to 'push' actively using the Va Isa Iva manoeuvre. Some women like the way this position allows support persons to assist them. Supporters of 'active birth' as opposed to 'active management of labour' are concerned that reclining positions may cause unnecessary pressure on a mother's back and that a reclining position may increase the length of the second stage by causing the woman to push uphill against gravity.

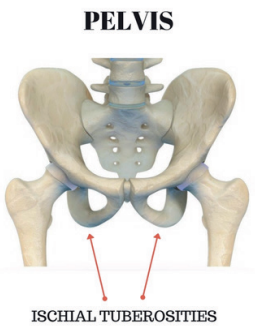
<u>Review</u>

1. Birthlight pregnancy yoga practice 'on the rockers' to find neutral pelvic floor;
2. Empowering women to secure lower back alignment by tilting the hospital bed's head at roughly a 45 degree-angle (if more reclined, there is a risk of slipping down with pressure on the sacrum). The Birthlight practice called “Find your Rockers” can be used from mid-pregnancy to help pregnant women find the position where their pelvic floor muscles can best relax. Once awareness is gained, during labour this position will be sought based on body memories adquired during pregnancy.

Find Your Rockers

At first this practice is used for gaining elasticity (maximum tension/maximum release), in contrast with a focus on toning. Elasticity includes tone and excludes the risk of hypertoning with Kegels or sustained Mula Bandha during pregnancy as this not conducive to the subtle transition from vagina to birth passage, both physically and psychologically/mentally. If this transition is well done, the reverse transition from birth passage to postpartum vagina will be much easier.

Sitting reclined with your knees bent, slighter more than hip width apart, support yourself with your hands on the floor behind your back. Explore the sensation of rocking forwards and back on the bony base of your pelvis (ischial tuberosities) with small movements. You will notice that if you recline back, you reach a position where your pelvic floor locks when you try and draw in your muscles. The same happens if you raise yourself in a nearly upright sitting position. Now find the happy middle, where you feel that your pelvic floor muscles can move easily: draw in easily and release easily. You can even wiggle



in this position and feel the muscles, ligaments and tissues around your vagina move together. It can be a funny sensation that extends to your whole body! With experience you can even do micro-circles.

From the second trimester of pregnancy up to about 36 weeks in the third trimester, “Find Your Rockers” can be used to find a relaxed reclined position for drawing in your pelvic floor muscles naturally as you breathe, ensuring a gentle but effective muscle tone. Following the rhythm of your breath, you will find that the pelvic diaphragm relaxes down on the inhalation, together with the thoracic diaphragm, as air enters the lungs. On the exhalation, both diaphragms are drawn back up, engaging the four layers of abdominal muscles that link them together. Each breath is truly a massage for your baby through the action of the deepest abdominal muscle (the Transversus, which we call “the baby blanket” in Birthlight speak). If you practice the Golden Thread breath, (extending your exhalation while the outward flow of CO2 is restricted in the small opening of your lips as a ffff or ssss) you will notice a slight tightening at the base of your abdominal muscles under your bump. This is normal and shows that your breathing is effective.

Do not forget that the head to knees position (all fours if you have low blood pressure) is the best alternative to ensure the elasticity of your “three sphincters” throughout your pregnancy. This is the main position used to teach pelvic floor practices the Birthlight Yoga way.

From around 36 weeks, “Find your Rockers” can be used to practice the “Birthing Breath” as a preparation for physiological “exhale pushing”, or “mother directed pushing”, an alternative to forceful pushing (“directed pushing”) with the Vasalva Manoeuvre in a reclined position on a bed.

Research Evidence of the detrimental effects of sustained Valsalva Manoeuvre

Despite evidence of adverse fetaI and maternal outcomes from the use of sustained VaIsaIva bearing down efforts, current second-stage care practices are still characterized by uniform directions to “push” forcefully upon complete dilatation of the cervix while the woman is in a supine position.

J. Roberts and L. Hanson’s article summarises research evidence about detrimental effects of the Valsalva Manoeuvre.

Best practices in second stage labor care: maternal bearing down and positioning. Journal of Midwifery & Womens Health. 2007 May-Jun;52{3):238-45.

Directed pushing might slightly shorten the duration of second stage labor, but can also contribute to deoxygenation of the fetus; cause damage to urinary, pelvic, and perineal structures; and challenge a woman’s confidence in her body. Research on the second stage of labor care is reviewed, with a focus on recent literature on maternal bearing down efforts, the “la boring down” approach to care, second-stage duration, and maternal position. Clinicians can apply the scientific evidence regarding the detrimental effects of sustained Valsalva bearing down efforts and supine positioning by individualizing second stage labor care and supporting women’s involuntary bearing down sensations that can serve to guide her behaviours.

‘A common and long standing practice at our hospital here in Aruba which I would like to address is closed glottis *pushing or ‘’purple pushing”. This is when a woman, who in the second stage of labor or the ‘’pushing stage” has coached pushing. The nurse/OE, stands in.front or next to you and instructs you to hold your breath and push for JO counts/seconds. This is the part where you feel: 1) you’re either going to poop out contents that have not even reached your bowels or 2) your head is going to explode and will be a huge mess to clean up afterwards ... whichever comes first.‘*

Purple pushing--or closed-glottis pushing--during which the patient holds her breath for 10 seconds while pushing, is safe in the approximately 80% of women with low-risk pregnancies. But that doesn’t mean it works best. Furthermore, in physiologically high-risk cases, the baby can’t tolerate that kind of pushing. This manoeuvre causes a trapping of blood in veins, preventing it from entering the heart. When the breath is released, the intrathoracic pressure drops and the trapped blood is quickly propelled through the heart, producing an increase in the heart rate (tachycardia) and the blood pressure. Immediately, a reflex brachycardia ensues. All of this disrupts the blood flow to the uterus and ultimately to the baby. This disruption in blood flow indicates a disruption in oxygen flow, which ultimately shows up on the fetal heart monitor as fetal distress. There is no clear evidence that closed glottis

pushing (Valsalva's Manoeuvre) shortens second stage, decreases fatigue or minimizes pain. It has otherwise been suggested that bearing down for a prolonged period with a closed glottis alters the contractile pattern of uterine smooth muscle, leading to inefficient contractions and failure to progress. Studies suggest that encouraging women to believe in their ability to push the baby out may be as important as the type of breathing. A variety of studies published between 1992 and 1996 show that physiological effects of Valsalva's Manoeuvre can include: impeded venous return; decreased cardiac filling and output; increased intrathoracic pressure; affected flow velocity in middle cerebral artery; raised intraocular pressure; changed heart action potential/repolarization; increased arterial pressure; increased peripheral venous pressure; altered body fluid pH, which contributes to inefficient uterine contractions; decreased feta I cerebral oxygenation. (Nursing Times 95:15, April 15, 1999)

In a randomised study of second stage of labour practices[1], first time mothers with uncomplicated labourrs and without epidural analgesia were randomly assigned to coached (n = 163) versus uncoached (n = 157) pushing. Women allocated to coaching received standardized closed glottis pushing instructions by certified nurse-midwives with proper ventilation encouraged between contractions. These midwives also attended those women assigned to no coaching to ensure that any expulsive efforts were involuntary. The second stage of labor was abbreviated by approximately 13 minutes in coached women (P = .01). There were no other clinically significant immediate maternal or neonatal outcomes between the 2 groups. The authors concluded that although associated with a slightly shorter second stage, coached maternal pushing confers no other advantages and withholding such coaching is not harmful.

Compared anatomy of the VaIsaIva manoeuvre and Exhale Pushing

'Exhale pushing' is not easily feasible in the supine position in which women have to fight gravity to push their babies out. 'Exhale pushing' works with gravity's downward force. How does the pushing urge occur? As the baby's head descends into the birth canal, increased pressure on the perineum produces a stretch reflex and peak of vaginal distension , which in turns causes a release of oxytocin from the pituitary gland. This produces a stronger uterine contraction and the urge to push.

The position of the baby in the birth canal (how high or down it is) seems to be a crucial factor in the development of the pushing urge. (This is why the voluntary learnt release of the perineum and pelvic floor muscles that we practice with the extended exhalation is important to ensure the stretch reflex and vaginal distension mentioned above).
If a woman has been 10 cm dilated for some time and still does not feel any pushing urge, a supported squat position or a supported forward kneeling position for a few minutes can help. For some women, sitting on a toilet on their own without trying to push allows the distension to happen spontaneously.

So: 1) in exhale pushing: extension of the fibres of the walls of the vagina brings about a release of oxytocin that triggers the strong bearing down contractions of the fibres of the lower part of the uterus. These different tissues are meant to complement one another in the second stage. It does not mean that there is no 'pushing'. Some women are lucky to experience contractions that completely take over the birth process but others need to apply pressure at the end of the exhalation. Ideally, only birthing muscles are involved in an oscillation of contraction and release using their elasticity.

2) in VaIsaIva, all the fibres are voluntarily contracting (ideally at the same time as the onset of a uterine contraction) in a forceful action with both thoracic and pelvic diaphragms locking on the inhalation. All the muscles in the woman's body are tensing in the action. When the tension is released there is no real muscular relaxation and the women is more rapidly exhausting, which often results in instrumental deliveries using forceps or ventouse. Then the forceful pushing is replaced with a forceful traction.

1 Bloom S.L et al. 2006. A randomized trial of coached versus uncoached maternal pushing during the second stage of labor. Am J Obstet Gynecol. Jan;194(1):10-3.

Teaching 'birthing breathing' effectively to pregnant women in antenatal classes

There is a controversy among childbirth educators about teaching women 'how to push'. At Birthlight, we hold the view that women in the second stage of labour do best by 'birthing from within', accessing their bodies' inner wisdom. But in the same way that we have lost the natural ease to experience the toning and relaxing of our pelvic floor muscles, we need help to 'remember' how to open our bodies for birth without tensing all over. The Birthlight practice of the "Birthing Breath", coupled with that of "The External Pelvis" done in pairs, primes the birthing muscles for effective stretching and letting go following the involuntary powerful contracting of the lower part of the uterus and the engagement of the whole set of pelvic floor muscles from the tailbone to the pubis as babies make their way through the birth passage. The "External Pelvis" practice also helps women to feel how the downward journey of their breath anticipates their baby's birth journey following a U bend against the sacrum and then reaching the perineum. The memory of these vivid sensations of the breath's journey in "Birthing Breath" is likely to carry over into labour and can help prevent tears.

Birthing Breath

This practice helps women develop an embodied awareness of 'exhale pushing', the power of the out breath to support birthing contractions that bring babies into the world. This practice can be safely used from 36 weeks of pregnancy.

The 36 weeks caution is because when women have weak pelvic floor muscles, a strong action might trigger a stretch of the lower fibres of the uterus near the cervix and draw the baby deeper into the pelvis leading to an early onset of labour. It's a slight risk but it exists and for the same reason we have opted not to use the sound HUUUUH that creates pressure on the pelvic floor while OOOH and AAAH are safe.

Gentle long exhalations with Golden thread are safe and a fine preparation for birthing breath, but birthing breath involves going beyond the natural end of the exhalation until pressure builds up and is felt against the perineum. Birthing Breath is truly a childbirth preparation practice rather than a pregnancy yoga breathing practice.

Birthing Breath and the downward opening/expelling force of Apana Vayu

With the practice of "Birthing Breath" to prepare for "exhale pushing", women prepare themselves to accompany the powerful expulsive contractions of the second stage of labour with a full exhalation that goes beyond the normal physiological tightening of the pelvic floor in ordinary exhalation.

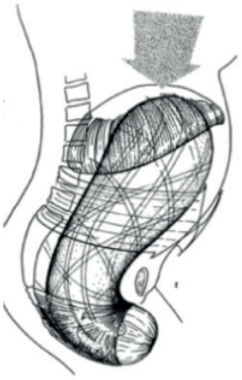
First, get on your "rockers" in a reclining back sitting position as described above. Breathe in this open position in which your pelvic floor muscles are relaxed. When you feel the tightening pressure in your pelvic floor area at the end of your exhalation, (at the beginning this is not specific), resist it to feel that you stay open. To make this easier, take short in breaths followed by longer exhalations. If you are familiar with Ujayiii yoga breathing with your glottis partially closed, use it while keeping your mouth open as to say AAAh. This will help you to access the sensation of keeping your perineum soft and open while experiencing pressure in your lower abdominal muscles. This can be strange at first but becomes more familiar as you progressively expand your exhalations: you may notice that the small muscles under your tailbone (this is the rear end of your pelvic floor) are involved, your sit bones part slightly and your whole perineum gets gently pushed down, as a lotus bud ready to open into a flower (to use ancient Indian imagery). The more you practice (but once a day is more than sufficient) the more subtle and precise your sensations become. Your body will remember them as (hopefully the head, but breech babies can be fine too) your baby stretches your birth passage.

This is also a stimulating massage that has been shown to activate all your baby's body functions.

Apana Vayu (downward expelling energy) in Ayurveda

The apana vayu is one of the five energy subdivisions of Prana. It influences digestion, elimination and reproduction, active in the pelvic and lower abdominal areas. If Prana Vayu is the energy of inspiration, Apana Vayu is that of expiration. The movement of this Vayu is heavy by nature and always descending. Energetically, Apana Vayu is located in the Muladhara Chakra or Root Chakra, our vital center that sits in the base of our body. It governs the kidneys, intestines and bladder. Its elements are earth and water.

Blandine Calais Germain has offered an excellent illustration of the contrast between “Exhale pushing” with the common obstetric practice of pushing babies out with a blocked inhalation in our Western culture of maternity care.



Diagrams from Blandine Calais Germain, The Female Pelvis.

Action of the thoracic and pelvic diaphragms when ‘pushing’ with a held or blocked Inhalation: the mid uterine fibres do most of the expulsion work.

Action of the thoracic diaphragm in Exhale Pushing: it doesn’t interfere when pushing during exhalation. The superior, middle and inferior uterine fibres are simultaneously involved in the expulsion process, with greater stretch in the rear part of the pelvic diaphragm.

Pros and cons of held breath pushing

After a forceful inhalation in which the uvular diaphragm is locked, the thoracic diaphragm contracts pushing the dome down on the whole abdomen like a piston. Women may be instructed to take a deep breath, hold it tight while tucking your chin in and Push! Or ‘push into your bottom as if you’re going to the toilet!’.

This practice is classically used in obstetrics with the ‘valsalva manoeuvre’ for which women are asked to birth on their backs with their legs open and raised, in some places still with feet in stirrups. An enormous physical effort is then required to push babies out against gravity, as if pushing up a slope.

Pros:

- This kind of pushing is very efficient and will birth the baby more quickly.

Cons:

- There is intense pressure and compression of tissues in the woman’s whole body. It is sometimes referred to as ‘purple pushing’ as women often go purple in the face (to the point of bursting blood vessels in their eyes)
- Women can get exhausted particularly if they are not in a vertical position. The expenditure of energy is extreme since many other muscles than the birthing muscles are involved in this body effort.
- Forceful pushing can lead to a reflex reaction in the pelvic muscles and they may contract instead of relaxing thereby increasing the risk of muscular injury and tears.

Pros and cons of “exhale” pushing

We have a birthlight saying that ‘a woman always has enough air in her lungs to give birth to a baby’ so that a forceful In-breath is not conducive to best ‘pushing’. The thoracic diaphragm can be allowed to relax-stretch upwards with a sustained exhalation so that it is actually taken out of play at the moment of expulsion. The lower uterine muscular fibres that are precisely designed for the task become most active in the birthing action, together with the powerful involvement of all the pelvic floor muscles, not just the pelvic diaphragm. As the birthing woman focuses on breathing out (being vocal helps expand and sustain the exhalation), the expulsion is principally guided by involuntary physiological reflex actions as the baby descends through the birth canal.

As the thoracic diaphragm is kept neutral in its upward extended position, the uvular and pelvic diaphragm can

relax more ('Drop your chin, relax your lower jaw'). The pressure that is felt as the head goes down then is only the stretching of the birth passage and perineum tissues rather than that caused by forceful compression. The greater this relaxation (that can be accompanied with 'feather blowing'(see below) to allow stretching without engaging the birthing muscles), the more effortless the bearing down contractions can be gently but powerfully moving the baby down and out of the birth passage.

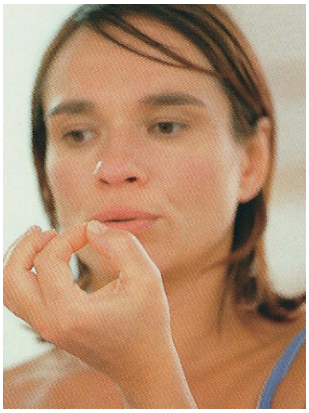
Pros:

- When combined with a birthing position making use of gravity, 'exhale pushing' facilitates the release of the tailbone for the 'fetal ejection reflex', resulting in an effective and gentler progression of the second stage.
- Much more gradual compression of the perineum, giving the muscles more time to relax and stretch.
- The push is more precisely in the direction of the vagina and anterior part of the perineum, and there will be less risk of tearing the central tendinous point of the perineum. This is also gentler on the baby's head, allowing moulding of the cranium.
- Once the baby's head has started 'crowning' in the birth canal, sustained exhalation stabilizes the forward movement of the head after each 'pushing contraction' securing progress instead of having the head recede in the birth canal and then repeating the effort.

Cons:

- This way can take longer. If the unborn baby is at risk, then the blocked inhalation pushing produces faster results.
- Women who have not practiced 'birthing breathing' before labour may not be able to activate their pelvic floor muscles in sync with their exhalation, so that midwives in attendance may not see 'exhale pushing' as an effective way of pushing and then recommend 'blocked inhalation pushing' instead.

Feather Breath



The practice of "Feather Breath" helps pregnant women to contrast the engagement of the pelvic and thoracic diaphragms in breathing with a superficial action of the thoracic diaphragm in 'clavicular' or upper chest breathing. Refraining from engaging pelvic muscles in second stage can be useful to give the cervix time to stretch fully if there is a "lip" (a small band of cervix that has not completely effaced) when a woman starts having a bearing down urge. It can also be invaluable to allow the perineum to stretch when "the baby is at the door", crowning through the birth passage.

We say: 'Use a breath, waste a breath' to contrast feather blowing with the full use of the pelvic diaphragm

Blowing softly as if to blow a feather away or to cool hot soup only involves few muscles around the lungs, in contrast with an out breath practiced from the back of the throat and involving the thoracic and pelvic diaphragms.

The use of the sound HUH! may be helpful for women who find it difficult to engage their pelvic diaphragm in their exhalations and therefore do not experience the connection between their breathing and their birthing muscles.

Follow it with a sequence of short ah-ah-ah-ahs that are produced from the upper chest.

The contrast between disengaging muscles and fully using muscles with the out breath is best experienced before women go into labour. "Feather breath" is more effective than the use of terms such as "panting" which make women use Ha Ha Ha exhalations in rapid succession using their thoracic diaphragms (and if done forcefully, their pelvic diaphragms as well) with the risk of being dehydrated and of hyperventilating.

Practice of the “External Pelvis” with a partner to help women ‘giving birth to the breath’

For women who find it difficult to extend their out-breath by themselves and also for partners to gain an experiential understanding of the birthing breathing, the practice of ‘external pelvis’ is very helpful.

Partners (ideally birth partners but pregnant women may also partner with one another in class) kneel in front of pregnant women sitting in a reclined “on their rockers” position. Yoga blocks, cushions or bolsters can be used for ease and comfort of both partners.

Using their middle fingers to find the top sides of the pelvis (there is a small dip that makes the placement of the finger tips easy on each side), helping partners can bring their thumbs under the base of the bump towards the top of the pubic bone: in many cases, thumbs can rest on the pubic bone, if not, place the thumbs where comfortable. This positioning of the hands creates a frame over that of the pelvis for late pregnant women to experience the resistance of their lower abdominal muscles and find the way to release tension as they breathe out. At first, many women end their out breath in the area of the middle opening of the pelvis, roughly at the height of their navel. Patience and relaxation are needed to extend the out-breath gently until the lower back muscles become involved in this downward journey of the breath through the pelvis, that anticipates the baby’s journey during labour. A long OOOH sound may ease the involvement of muscles around the sacrum. If the breath is still held up in the abdominal area, it is best to stop and try again another day.

With practice, the out breath can be felt moving ‘through’ the pressure area around the middle opening of the pelvis. Once this release has been found, the out breath can deepen. The involvement of birthing muscles can then be experienced all the way to the perineum. Partners clearly feel the deepening and the trajectory that accompanies the extended out-breath. This will help them support their birthing partners more effectively and with greater sensitivity when the time comes.

In my experience, all pregnant women eventually feel their out breath gradually engaging the birthing muscles. Once they and/or their partners have had the sensation of the out breath causing a bulging of the perineum (birth partners can place the palms of their hands upon women’s perineum and feel the pressure through clothes), this is an extremely empowering sensation. Giving birth becomes a real possibility rather than the fearsome passage of a grapefruit-sized baby’s head through their perineum.

Tips

- The “External Pelvis” is a safe practice that does not entail the risk of inducing labour prematurely when done in class but doing this practice in repeated ways or even on a daily basis is counterproductive.
- Awareness is most powerful and can be trusted.
- For women threatened with artificial induction of labour, or if stage one contractions are not effective in effacing the cervix, this practice can be helpful if used with the sound Huuuuuh (that involves the pelvic diaphragm)
- in vertical positions to help babies engage more readily in the pelvis.

Vocal breathing practice combined with Birthing Breath

Aaah or Oooh sounds can be used as indicators of preferred birthing positions based on women's pelvic anatomy.

Try the two sounds in different positions (leaning backwards or forwards) and add a OUH-HH sound when you feel you are running out of breath

Which sound do you feel facilitates the release and expansion of your birthing muscles most (make you feel more open in your lower pelvis)?

Try this practice with your students. Ask them if they are Aaah or Oooh?

Most women feel the trajectory of the Aaah more to the front of the body and the pelvis, while they experience Oooh more to the lower back and at times under the tail bone.

Focusing on their choice of sound also makes women lengthen their voiced exhalation, finding their chanting power with greater and less self-conscious effects.

Simultaneously with the practice of birthing breathing, women can be encouraged to voice their out-breaths using an Aaah or Oooh sounds. This helps lengthen their exhalation and discover stages when it can be expanded further. When reaching what you perceive to be the end of your out-breath, intensifying sound by opening the mouth more and finding a deeper root opens the possibility of expanding the breath further. Then your voiced out-breath becomes not only longer but also more powerful than you thought was possible. This practice empowers women to find their true birthing ability, feel free to use deep sounds to support their birthing process (particularly if they are inhibited to sing) and release the primordial energy of birth with its accompanying cocktail of positive hormones. The ancient practice of chanting (Nada Yoga) is especially helpful during late pregnancy and labour, but simple vocal breathing is easier to teach and very helpful in helping pregnant women to extend exhalations and to promote self confidence in producing effective sounds.

Vocal breathing may also be more relaxing than deep breathing without sound. It calms the mind more effectively and provides the practitioner with a strong physical focus. Sounds and breath combined are powerful tools that can help open the cervix and release pelvic floor muscles. In addition, the baby inside the womb can hear and respond to sounds and recognise them after birth, providing mothers (and fathers also) with a comforting tool to calm their newborns. Long before they are born, babies can experience their mothers' chanting as a pleasurable experience after receiving what amounts to a 'sonic massage' in utero.

Practising the release of the pelvic floor muscles is an essential element of 'birthing breathing'

The cultural pressure on super-toned pelvic floor muscles in the West has produced an increasing inhibition on relaxing them. Many women find it very challenging to relax their pelvic floor due to a learned conditioning to keep them artificially toned (most extremely in advanced Ashtanga Yoga practice).

Besides the Birthlight pelvic floor exercises, 'birthing breathing' helps women gain greater awareness of how to soften their perineum at the time when their baby 'crowns' just before being born, when the crown of the head becomes visible against the perineum. As a special practice, 'birthing breathing' can be done on a chair with a soft cushion to increase the sensation of soft release at the end of the exhalation. The cushion facilitates the feeling that the release can be expanded further and further. Smiling and relaxing the lower jaw support the practice.

In mid pregnancy it is important to draw in the pelvic floor muscles after releasing them, to cultivate elasticity and tone. In the last few weeks of pregnancy however it is best to focus on release only because this is the most important goal. Toning back will be effective using the Postnatal Breathing (Reverse breathing).

The awareness counts most: intensive daily practice is counterproductive. A few minutes are sufficient.

Importance of keeping the anal muscles relaxed during second stage

Many expectant mothers find daily elimination an uncomfortable and frustrating experience in late pregnancy. Constipation during pregnancy is considered "normal" because of the abnormal design of the modern toilet and the focus of pelvic floor exercises (Kegels) on the walls of the vagina.

Besides improving elimination, both yoga squats (Birthlight progressive practices rather than straight full squats, please review teaching points for progression from sitting on a chair) and Birthlight pelvic floor exercises also help in other ways during pregnancy:

- Preventing haemorrhoids, which affect up to 50% of pregnant women (and new mothers)
- Avoiding the build-up of toxins in the colon, to give the growing foetus a cleaner, healthier environment
- Developing the flexibility needed for giving birth in the most advantageous and natural posture. Birthlight pelvic floor exercises, with a focus on the back passage and the rear urogenital triangle, fully open the birth canal, maximize the power of the abdominal muscles, and help protect the pelvic floor from injury.
- Birthing breathing practice, combined with antenatal pelvic floor exercises, helps neutralise tension of glutei (buttock) muscles and the muscles around the back passage when the forceful pressure is applied it is far gentler than in a supine position with legs up. The birth partner can hold the woman's knee up, giving her added resistance to bear down.

Ask for a second opinion about the reasons for imposing the Valsalva particularly if there is time pressure given second stage protocols but the baby's heart beat is fine and the mother is not exhausted.

One selected yoga practice to help pregnant women with centring

Candle meditation (*Trataka*)

This simple and short meditation helps women to have a calm and focused mind throughout pregnancy and to remain centred during labour and birth.

Trataka means to gaze steadily. This meditation involves gazing at the flame of a candle. It can be practised at any time during pregnancy to develop powers of concentration and it is claimed to alleviate insomnia. It is a safe practice but if any discomfort is experienced in association with it, the recommendation is to stop and adopt other forms of concentration such as breathing using 'circular pattern imagery'.

Place a lighted candle in front of you (about one foot away) ideally at eye level. Sitting in a comfortable position -as aligned as possible-, close your eyes and exhale three times to help access a full relaxation. Then open your eyes and gaze steadily at the tip of the candle wick. Try not to blink or move your eyeballs, which may come with practice. It is important to keep all your facial muscles relaxed.

In the yoga class, practicing these wise and slow breathing methods, pregnant women are working to re-balance what for many in our modern culture is an out-of-whack system. For those suffering from high anxiety, a conscious effort to implement this re-balancing act is imperative.

Research on the vagus nerve is currently in full swing. It will likely hold key information on the mindbody connection. The nerve is bi-directional, meaning it sends messages from the brain to the body and vice versa. However, 80% of its capacity is directed towards carrying information from the body to the brain.

Also note that the vagus nerve is the "vagabond" nerve that wanders around and surrounds our heart and core area. It is heart-centred and reckoned to be the nerve of intuition and the nerve of compassion. When we feel safe, without threat or anxiety, these abilities and inclinations are free to expand. We need to nurture and celebrate our vagus nerve!

Gross anatomy of the Vagus Nerve

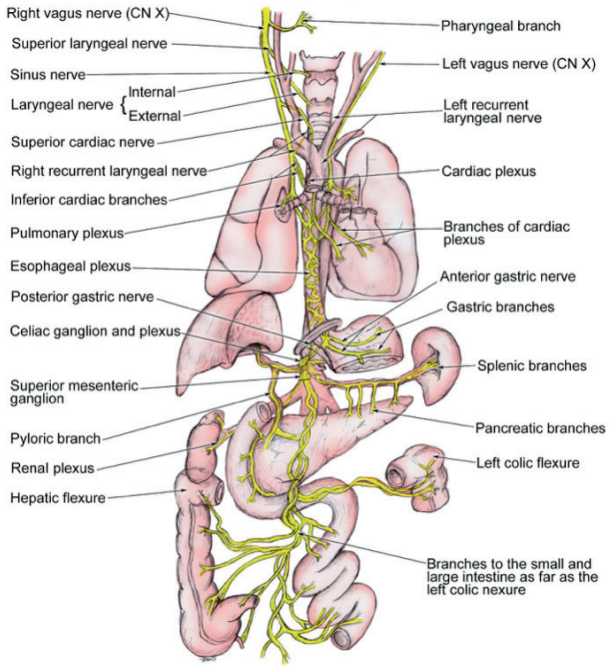
The vagus nerve is the longest cranial nerve. It contains motor and sensory fibres and, because it passes through the neck and thorax to the abdomen, has the widest distribution in the body. It contains somatic and visceral afferent fibres, as well as general and special visceral efferent fibres.

Course of the vagus nerve

It then inclines behind the hilum of the right lung and courses medially toward the esophagus to form the esophageal plexus with the left vagus nerve.

The anterior and posterior gastric nerves are then formed from the esophageal plexus. The anterior gastric is formed mainly from the left vagus, but it does contain fibers from the right vagus.

Similarly, the posterior gastric nerve is formed mainly from the right vagus but contains fibers from the left vagus nerve. The gastric nerves supply all abdominal organs and the gastrointestinal tract ending just before the left colonic (splenic) flexure.



The Vagus nerve and its branches.
Source: Medscape, e-medicine

Vagus nerve branches in the jugular foramen

The meningeal branch arises at the superior ganglion and reenters the cranium through the jugular fora men to supply the posterior fossa dura.

The auricular branch supplies sensations to the posterior aspect of the external ear (pinna) and the posterior part of the external auditory canal. It arises also from the superior ganglion and enters the mastoid canaliculus in the lateral part of the jugular fora men. It exits again through the tympanomastoid suture of the temporal bone to reach the skin. It communicates with branches of the seventh (facial) and ninth (glossopharyngeal) cranial nerves.

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Vagus nerve branches in the neck

The branches in the next consist of the following:

- Pharyngeal branches
- Superior laryngeal nerve
- Recurrent laryngeal nerve
- Superior cardiac nerve

Pharyngeal branches

The pharyngeal branches arise from the inferior ganglion and contain sensory and motor fibers. The motor fibers are contributed by cranial nerve XI. They reach the middle constrictor muscle after crossing between the external and internal carotid arteries. They reach the pharyngeal plexus formed by cranial nerve IX and the sympathetic chain. Branches of the pharyngeal plexus supply the pharyngeal muscles and mucous membrane and palate except for the tensor palatini muscle.

All the intrinsic laryngeal musculature is supplied by the ipsilateral recurrent nerve except the cricothyroid muscle, which is supplied by the superior laryngeal nerve. The interarytenoid muscle is the only one that receives a bilateral supply (ie, from the left and right recurrent laryngeal nerves).

The ram us communicans, or nerve of Galen, connects the superior and the recurrent laryngeal nerves. It provides the tracheal and esophageal mucosa and smooth muscle with visceral motor input.

Superior cardiac nerve

The superior cardiac nerve is made up of 2-3 branches. They communicate with the sympathetic fibers.

Vagus nerve branches in the thorax

The inferior cardiac branch is also called the ramus cardiaci inferiors. On the right side, it arises from the trunk of the vagus as it lies beside the trachea. On the left side, it originates from the recurrent laryngeal nerve only. These branches end in the deep part of the cardiac plexus.

The anterior and posterior bronchial branches are distributed as 2-3 branches on the anterior surface of the root of the lung. They form the anterior pulmonary plexus after joining branches from the sympathetic trunk. The posterior bronchial branches are larger than the anterior and lie on the posterior surface of the root of the lung to form the posterior pulmonary plexus (with contributory sympathetic fibers) as well.

The esophageal branches are anterior and posterior branches. Together they form the esophageal plexus. The posterior surface of the pericardium is supplied by filaments from this plexus.

Vagus nerve branches in the abdomen

The gastric branches (rami gastrici) supply the stomach. The right vagus forms the posterior gastric plexus and the left forms the anterior gastric plexus. The branches lie on the posteroinferior and the anterosuperior surfaces, respectively.

The celiac branches (rami celiaci) are derived mainly from the right vagus nerve. They join the celiac plexus and supply the pancreas, spleen, kidneys, adrenals, and intestine.

The hepatic branches originate from the left vagus. They join the hepatic plexus and through it are distributed to the liver.

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Summary of Central Connections, Components, Function, and Peripheral Distribution of the Vagus Nerve

Components	Function	Central connection	Cell bodies	Peripheral distribution
Branchial motor (efferent special visceral)	Swallowing, phonation	Nucleus ambiguus	Nucleus ambiguus	Pharyngeal branches, superior and inferior laryngeal nerves
Visceral motor (efferent general visceral)	Involuntary muscle and gland control	Dorsal motor nucleus X	Dorsal motor nucleus X	Cardiac, pulmonary, esophageal, gastric, celiac plexus, and muscles, and glands of the digestive tract
Visceral sensory (afferent general visceral)	Visceral sensibility	Nucleus tractus solitarius	Inferior ganglion X	Cervical, thoracic, abdominal fibres, and carotid and aortic bodies
Visceral sensory (afferent special visceral)	Taste	Nucleus tractus solitarius	Inferior ganglion X	Branches to epiglottis and taste buds
General sensory (afferent general somatic)	Cutaneous sensibility	Nucleus spinal tract V	Superior ganglion X	Auricular branch to external ear, meatus and tympanic membrane

Connecting anatomy with yoga practice

In the same way that 20 years ago understanding the actions of the muscles in the Asanas was new, neuro-endocrine processes associated with yoga practice need to be researched. Aspects of Vagus nerve anatomy and physiology that I think are of particular interest to teachers of yoga for pregnancy are the following, in relation to the descriptions above:

- Importance of fully releasing the uvular diaphragm (glottis and epiglottis) for the release of the pelvic diaphragm
- Facilitates adjustments of the baby before engaging in the flexion and rotation for delivery (more reading is necessary to understand better cords round necks and hands against cheeks)
- Possibly best practice for vaginal breech deliveries, particularly in standing positions in order to create more space and ease

Objections:

- Because this process is slow, it may not always be appropriate.

When a woman reports that she has 'breathed her baby out' the expression of joy on her face is unparalleled and worth all our efforts in teaching Birthing Breathing and associated pelvic floor yogabased exercises.

When a woman reports that she was able to make use of the breathing techniques all the way to the second stage but then problems arose and led to interventions, we take heart in the thought that she has learnt to comfort herself and pacify her Vogus Nerve so that she and her baby can bounce back now and in the future.