



REVIEW

Meditation Beneath the Surface

A Narrative Review of Underwater Mindfulness, Breath-Hold Physiology and Contemplative Tradition

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ABSTRACT

Background. Contemplative traditions have long associated water with stillness, concealment and renewal, and divers frequently describe underwater experience as meditative. This review asks whether immersion and submersion offer a distinctive context for mindfulness practice, and what the current evidence can and cannot support.

Keywords: mindfulness; meditation; freediving; scuba diving; apnoea; diving response; interoception; flotation-REST; pranayama

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1. Introduction

Mindfulness is commonly defined as deliberate, non-judgemental attention to present-moment experience. In most practice traditions, the breath and the body serve as the primary anchors for that attention. The practitioner returns, again and again, from wandering thought to the sensation of air moving and the weight of the body. The difficulty, as every beginner discovers, is that the ordinary environment competes relentlessly for attention: sound, light, conversation, posture, and the background hum of devices and obligations.

The underwater environment changes almost every one of these conditions at once. Sound is muffled and transformed, and for the scuba diver the dominant sound becomes their own breath through the regulator. Vision narrows and softens. Gravity is largely cancelled by buoyancy, so that the habitual muscular work of holding a posture falls away. Temperature, pressure and the feel of water on skin become vivid. For the breath-hold diver, the urge to breathe rises steadily and must be met with calm acceptance rather than struggle. Many divers describe the result as the most complete stillness they have known, a state in which mind, breath and body seem to become one.

This review examines that intuition. The central proposition is that submersion may function as an environmental amplifier of mindfulness: by stripping away competing exteroceptive input and making breath and bodily sensation unavoidable, water might draw attention into the present more readily than a cushion on dry land. A stronger version of the claim holds that underwater meditation is superior to conventional practice. The aim here is to set out what the textual, physiological and empirical evidence supports, to distinguish the weaker from the stronger claim,

and to identify the necessary safety boundaries.

The review first revisits images of water and stillness in Indian tradition, then summarises the physiology of immersion and breath-hold diving. Three bodies of evidence follow: diving-based mindfulness programmes, the neuroscience of elite apnoea, and adjacent work on flotation, blue space and aquatic therapy. A critical appraisal, a safety section and a research agenda close the paper.

2. Approach

This is a narrative rather than a systematic review. The empirical literature on meditation performed underwater is too small and too heterogeneous for meta-analysis, and the question spans disciplines that rarely cite one another: Indology and religious studies, diving physiology, clinical psychology and contemplative neuroscience.

Sources were identified through searches of PubMed, Frontiers, Springer and open repositories using combinations of *scuba*, *freediving*, *apnea*, *breath-hold*, *immersion*, *flotation*, *mindfulness* and *meditation*, supplemented by backward citation tracking. Primary texts were consulted in standard English translations, principally K. M. Ganguli's translation of the *Mahābhārata* and the Pāli canon. Priority was given to peer-reviewed studies with a comparison condition. Single-case, uncontrolled and qualitative studies are included where they illuminate mechanisms, and their limitations are stated explicitly.

3. Water, stillness and breath in Indian tradition

The Indian sources discussed below span more than two thousand years (Table 1). Ideas linking water, breath and a still mind are therefore ancient in Indian thought, though explicit descriptions of underwater meditation are rare in the classical texts.

Table 1. Approximate dates of the traditions discussed

Tradition or source	Approximate date
<i>Mahābhārata</i> (events narrated)	Placed by tradition at the start of the Kali Yuga, c. 3102 BCE; many historians place the underlying events c. 1000 BCE
<i>Mahābhārata</i> (text as composed)	Grew over centuries, c. 400 BCE – 400 CE
Life of the Buddha	c. 563–483 BCE (traditional); c. 480–400 BCE (many modern scholars)
Patañjali's <i>Yoga Sūtra</i>	Between c. 2nd century BCE and 5th century CE; many scholars favour c. 325–425 CE
<i>Haṭha Yoga Pradīpikā</i>	c. 15th century CE
Jacques Mayol's first 100 m breath-hold dive	1976

3.1 Duryodhana in the Dvaipāyana lake

The most striking image of a troubled mind retreating beneath water in Indian literature comes from the *Śalya Parva* of the *Mahābhārata*, in the sub-book known as the *Hrada-praveśa Parva* ("entering the lake"). On the eighteenth day of the Kurukṣetra war, with his army destroyed and his brothers dead, Duryodhana flees the field on foot, mace in hand. He tells Sañjaya that, though badly wounded, he will rest within the depths of a lake. He then enters the Dvaipāyana lake and, by his power of illusion (*māyā*), "charms" or solidifies the waters, making a space for himself within them (Ganguli, *Śalya Parva* 29). Later retellings name this skill *jala-stambhana*, the stilling or

binding of water.

The episode is often read as Duryodhana meditating to recover his strength before the mace duel with Bhīma. The text supports part of this reading. When Yudhishtira taunts him for hiding out of fear, Duryodhana replies that he entered the lake not from fear but in order to rest (*Śalya Parva* 31). The lake is thus explicitly a place of recuperation for a body and mind in extremity.

Three cautions are nonetheless needed for scholarly use. First, the epic describes rest and concealment, not a meditative technique in the contemporary sense; the language of yoga is largely supplied by later interpreters. Second, Yudhishtira and Kṛṣṇa frame the act as illusion and evasion, and the narrative judges it ambivalently. Third, the outcome does not vindicate the retreat: Duryodhana emerges, fights and is defeated. The episode is therefore best cited as a powerful cultural image of water as refuge for a conflicted mind, rather than as evidence that underwater practice restores power.

Modern perspectives on Duryodhana's retreat. Modern research nonetheless lends partial support to the idea that stillness in water aids recovery. Thermoneutral immersion shifts the autonomic nervous system towards parasympathetic, "rest-and-repair" activity (Schipke & Pelzer, 2001). Floating with reduced sensory input lowers anxiety and muscle tension and heightens awareness of breath and heartbeat (Feinstein et al., 2018b). Meditation more broadly is associated with reductions in cortisol, blood pressure, heart rate and inflammatory markers (Pascoe et al., 2017). A wounded, exhausted warrior resting motionless in a still lake would thus plausibly have experienced a calming of the stress response and some physical recovery, though not the healing of injury or the restoration of strength.

3.2 The Buddha's teachers: canon and modern retelling

The Hindi television serial *Buddha – Rajaon Ka Raja* (Zee TV and Doordarshan, 2013–2016), produced by Dr B. K. Modi, gives the clearest modern portrayal of water as a setting for meditation in the Buddha's life. It presents three teachers. **Kauṇḍinya** appears first, as Siddhārtha's childhood teacher in the palace, who introduces him to meditation on the breath. After the renunciation, Siddhārtha seeks out **Ālāra Kālāma**, his first teacher beyond the palace walls. Finding the hermitage empty, he waits, and sees his teacher rise from the water after a period of meditation beneath it. Siddhārtha takes up the practice himself and, in time, surprises his teacher with his attainment. Ālāra confirms that he has nothing more to teach, and Siddhārtha moves on. He then finds **Uddaka Rāmaputta** in a cave and learns from him about the nature of perception, before continuing alone to enlightenment.

The broad arc of this portrayal follows the canonical account. In the *Ariyapariyesanā Sutta* (Majjhima Nikāya 26), Siddhattha studies first under Ālāra Kālāma, attaining the sphere of nothingness so completely that Ālāra invites him to lead the community as an equal. He then studies under Uddaka Rāmaputta, who teaches the sphere of neither-perception-nor-non-perception, before judging both attainments insufficient and setting out on his own. The serial thus preserves the canonical sequence of teachers and the motif of the student surpassing the master. To that frame it adds a vivid image of meditation beneath water.

This portrayal should be cited with care. The underwater practice of Ālāra Kālāma and Kauṇḍinya's role as a childhood teacher are not found in the Pāli canon or in Aśvaghoṣa's *Buddhacarita* (c. 1st–2nd century CE). In the canonical tradition, Kauṇḍinya is the youngest of the eight brahmins who predicted the infant's Buddhahood, later one of the five ascetics, and the first to understand the first sermon. The serial is nonetheless significant: it shows how naturally Indian audiences today associate water with deep meditation, and is best treated as a contemporary cultural representation rather than historical evidence.

Water also appears in canonical imagery: in the *Mucalinda Sutta* (Udāna 2.1) a serpent king shelters the meditating Buddha from a week-long storm. But the Buddhist contribution to the present argument lies chiefly in method. The Buddha's core instruction, *ānāpānasati*, or mindfulness of breathing, makes the breath the primary object of attention, which is precisely the faculty the underwater setting is claimed to heighten.

3.3 Prāṇāyāma, kumbhaka and modern freediving

The yogic tradition supplies the clearest bridge between Indian contemplative practice and diving. Patañjali's *Yoga Sūtra* (2.49–2.51) defines *prāṇāyāma* as the regulation of inhalation, exhalation and retention, and medieval haṭha texts elaborate breath retention (*kumbhaka*) as a central technique for stilling the mind.

This lineage entered modern freediving directly through Jacques Mayol (1927–2001). In the 1960s Mayol travelled to India to learn *prāṇāyāma*, and he made yoga and meditation the centre of his training, using them to slow his heart rate and oxygen consumption. He became the first person to reach 100 m on a single breath, in 1976 (Patrician et al., 2021), and argued in *Homo Delphinus* that yogic discipline could reawaken latent aquatic capacities. Yoga, breath-work and relaxation now form a standard part of freediving instruction. The historical connection is therefore real, but it runs from land-based practice into the water: yogic breath control was developed on dry ground and later adapted by divers.

Duryodhana and breath retention. Read in the light of this tradition, Duryodhana's *jala-stambhana* invites an interpretation in terms of *kumbhaka*. The two terms share a root: *stambh*, "to hold fast" or "to arrest", appears both in *jala-stambhana*, the stilling of water, and in Patañjali's description of breath retention as *stambha-vṛtti* (*Yoga Sūtra* 2.50). A warrior trained in breath control might plausibly have used retention to calm himself beneath the surface, much as modern freedivers use yogic breathing to slow the heart and quieten the mind. This reading should be offered as a hypothesis, not as what the epic states. The *Mahābhārata* attributes the feat to *māyā*, not to a breathing technique, and has Duryodhana propose to remain within the lake through the night. That far exceeds human physiology: the breath-hold world record at the time of Lindholm and Lundgren's review was 10 minutes 12 seconds (Lindholm & Lundgren, 2009). The episode is therefore best seen as a mythic amplification of a real human capacity, the deliberate stilling of breath and mind, which the yogic tradition later systematised and modern freediving has put to the test.

4. The physiology of a body in water

The claim that "mind, breath and body become one" underwater can be partly translated into physiological terms. Four mechanisms are relevant, and they differ in how well they are established.

4.1 Immersion and autonomic balance

Simply immersing the body shifts autonomic regulation. In a study of 25 trained scuba divers in a 27 °C pool, Schipke and Pelzer (2001) found that head-out immersion was a powerful stimulus to both branches of the autonomic nervous system, and that all heart rate variability (HRV) measures indicated increased parasympathetic activity. Because heart rate and HRV did not change further on moving from immersion to full submersion, the authors attributed the effect mainly to haemodynamic changes: hydrostatic pressure displaces blood towards the chest, loading the heart and engaging baroreflexes. Thermoneutral immersion therefore offers a physiological starting point that resembles the relaxed, vagally dominant state that many meditation practices seek. The effect depends on temperature and age, however, and cold water adds a competing sympathetic

drive.

4.2 The diving response

When the face is submerged and the breath is held, humans express a version of the mammalian diving response. It comprises a parasympathetically mediated bradycardia, sympathetically mediated peripheral vasoconstriction that preserves blood flow to heart and brain, and apnoea; its primary function is oxygen conservation (Foster & Sheel, 2005; Lindholm & Lundgren, 2009). Stimulation of trigeminal receptors on the face is required for the full response (Panneton & Gan, 2020). Even in a laboratory basin, cold-water face immersion during breath-holding produces bradycardia attributable chiefly to cardiac vagal activity (Kinoshita et al., 2006).

The diving response is sometimes called a built-in "calming reflex", but this overstates it: vagal slowing of the heart coexists with intense sympathetic vasoconstriction and rising blood pressure. It may feel calm to trained divers, but it is a protective response to asphyxia rather than relaxation as such.

4.3 Slow, deliberate breathing

Recreational scuba training teaches slow, deep, continuous breathing, both to conserve air and to avoid lung over-expansion during ascent. Slow breathing at around six breaths per minute is one of the better-studied psychophysiological interventions. A systematic review found it associated with increased HRV and respiratory sinus arrhythmia, increased alpha power and reduced theta power on EEG, and improvements in comfort, relaxation and vigour alongside reduced anxiety and arousal (Zaccaro et al., 2018). The diver's regulator does more than permit breathing: it makes each breath audible and effortful enough to remain in awareness. This converts a land-based meditation instruction ("notice the breath") into an environmental necessity.

4.4 Breath-hold, carbon dioxide and interoception

Breath-hold diving adds a stronger interoceptive challenge. As apnoea progresses, arterial carbon dioxide rises and oxygen falls. Chemoreceptor drive produces a mounting urge to breathe and, in later stages, involuntary diaphragmatic contractions. Trained apneists show a blunted ventilatory response to carbon dioxide (Ferretti, 2001) and can tolerate very low alveolar oxygen. Freediving instruction frames the management of this phase in explicitly contemplative terms: observing discomfort without reacting to it. This closely parallels the "acceptance" component of mindfulness. The same blunting of the alarm system that allows long breath-holds, however, also removes the body's warning before loss of consciousness, a point developed in Section 9.

Can the skin take over from the lungs? Yogic and popular literature sometimes suggests that advanced breath retention might allow the body to draw oxygen through the skin. Present evidence does not support this. In humans, atmospheric oxygen supplies only the outermost 0.25–0.4 mm of skin, meeting about 0.4% of the body's total oxygen requirement (Stücker et al., 2002). Water holds roughly one-thirtieth as much oxygen as air, so cutaneous uptake underwater is smaller still. Amphibians can breathe through their skin because it is thin, moist and richly supplied with blood; human skin is built as a barrier. What *kumbhaka* can plausibly do is reduce oxygen *demand*, by slowing the heart and calming the body. Prolonged breath-holds therefore draw on stored oxygen used more economically, not on a new source. Believing otherwise is dangerous, because it encourages breath-holds beyond safe limits (see Section 9).

5. Evidence from scuba diving and mindfulness programmes

The most directly relevant empirical work comes from a small group of studies, mostly French and British, that treat scuba diving as a form of mindfulness training. They are summarised in Table 2.

Table 2. *Studies of scuba diving and mindfulness or psychological well-being*

Study	Design	Participants	Intervention	Main finding
Beneton et al. (2017)	Non-randomised controlled; 1-month follow-up for divers	67 healthy adults (37 divers, 30 multisport controls)	One-week recreational scuba course	Perceived stress fell only in divers, sustained at 1 month; mindfulness scores rose
Gibert et al. (2022)	Randomised pilot; 1- and 3-month follow-up	34 survivors of the 2015 Paris attacks with PTSD	Bathysmed: 10 dives with sophrology and mindfulness exercises vs multisport	Intrusion symptoms improved significantly more at 1 month; no between-group differences at 3 months
Morgan et al. (2019)	Service evaluation, mixed methods	15 male UK veterans with combat injuries	Deptherapy scuba programme	Lower anxiety, depression, social dysfunction and insomnia; benefits greatest with psychological injury
Blumhorst et al. (2020)	Exploratory pre-post	28 US veterans	Single 45-minute adaptive scuba session	Improved psychological well-being, including mindfulness

5.1 Recreational diving and perceived stress

Beneton et al. (2017) start from the observation that scuba training places divers in a state of open monitoring combined with slow, ample breathing, both hallmarks of meditation. Comparing a one-week diving course with a multisport holiday, they found that mood improved in both groups. Perceived stress, however, fell significantly only among divers, the reduction persisted at one month, and it was associated with increased mindfulness. This is the strongest controlled evidence that diving engages processes overlapping with mindfulness. Its limitations are substantial: allocation was not randomised, outcomes were self-reported, the sample was modest, and the diving holiday differed from the control holiday in novelty, setting and social context as well as in submersion.

5.2 Meditative diving for post-traumatic stress

The same research network then designed an explicitly meditative diving protocol, Bathysmed, combining dives with psychoeducation, sophrology and breath- and body-awareness exercises rehearsed on land and performed underwater. In a randomised pilot with 34 survivors of the November 2015 Paris attacks, Gibert et al. (2022) found that Bathysmed improved overall PTSD scores more than a multisport programme, but not significantly. It was significantly superior for intrusion symptoms at one month, and showed a non-significant trend towards greater trait mindfulness immediately after the course. By three months, no differences remained.

The authors note two points of particular importance for this review. First, the protocol was delivered as a whole, and diving alone might have been less effective; the contribution of submersion itself was not isolated. Second, they attribute the fading of benefits to the general principle that mindfulness requires sustained practice. Notably, all diving exercises could be achieved even at a depth of three metres, which suggests that depth is not the active ingredient.

5.3 Veterans and adaptive diving

Two veteran studies extend the picture. Morgan et al. (2019) evaluated the UK charity Depththerapy with 15 male veterans and reported reduced anxiety, depression, social dysfunction and insomnia, with the clearest benefits among those whose injuries were predominantly psychological. The authors suggested that diving's requirement for complete focus, together with weightlessness, may underlie its benefits. Blumhorst et al. (2020) found improved psychological well-being after a single adaptive scuba session among 28 US veterans. Both are uncontrolled and involve strong co-interventions: peer support, achievement, novelty and the relief of weightlessness for people with physical injury.

Taken together, these studies support the claim that diving can induce mindfulness-like states and short-term psychological benefit. They do not yet show that being underwater is what produces the benefit, nor that it outperforms structured mindfulness training on land.

6. Evidence from freediving and the neuroscience of apnoea

If scuba diving resembles focused breath-awareness, freediving resembles something closer to the yogic ideal of breath retention with a still mind. Here the evidence is neurophysiological rather than clinical, and it comes almost entirely from elite athletes.

6.1 A world champion in the scanner

The most cited study is a single-case investigation of the French champion freediver Guillaume Néry, who co-authored the paper. Annen et al. (2021) recorded high-density EEG and fMRI during 6.5 minutes of dry static apnoea. Compared with resting baseline, breath-holding showed increased EEG power and functional connectivity in the alpha band, decreased delta-band connectivity, and increased fMRI connectivity within the default mode network (DMN) and visual areas, with decreased connectivity in pre- and postcentral (sensorimotor) cortices.

The authors noted that these changes overlap with regions implicated in several meditation practices, but also show unique features suggesting altered somatosensory integration. Together with the diver's own reports, they interpreted the pattern as an ability to create a state of sensory dissociation during prolonged apnoea. This finding is important for the present argument because it cuts both ways. The freediver's mind does appear to enter a distinctive, quiet, internally focused state. But that state may involve *disconnection* from bodily sensation rather than the heightened, non-reactive *contact* with sensation that mindfulness traditions describe. Feeling one's body more fully and shutting out its distress signals are not the same thing.

6.2 Autonomic and cognitive studies

Laurino et al. (2012) examined mind-body relationships in elite apnoea divers by tracking autonomic responses to the acute hypoxaemia of breath-holding, an approach consistent with the view that trained divers use psychological strategies to modulate their physiology. Steinberg and Doppelmayr (2019) found that in ten experienced freedivers holding their breath for four minutes, early visual and later cognitive event-related potentials, including the P300, were not impaired. Trained apneists therefore appear to maintain cognitive function through substantial breath-holds, at least on dry land.

6.3 What these studies cannot tell us

Three limitations constrain inference. The key neuroimaging study involves one individual of exceptional ability, whose brain state cannot be generalised to novices. All imaging was performed in dry apnoea, because the scanner cannot be submerged; the contribution of actual water contact is therefore unknown. And the studies examine performance athletes pursuing maximal duration, not meditators pursuing awareness. Whether modest, safe breath-holds in water produce

meditative benefits in ordinary practitioners remains entirely untested.

7. Adjacent evidence: flotation-REST and blue space

Three neighbouring literatures help isolate the possible active ingredients of underwater practice: reduced sensory input, contact with water as an environment, and buoyancy.

7.1 Flotation-REST: water without the dive

Flotation-REST (Reduced Environmental Stimulation Therapy) involves floating supine in a warm, shallow pool saturated with Epsom salt, in a dark, quiet chamber. Visual, auditory, thermal, tactile, vestibular and gravitational input are all minimised. In effect, it reproduces the sensory profile that divers describe, without breath-hold, pressure, equipment or risk of drowning.

In an open-label study of 50 people with anxiety- and stress-related disorders, a single one-hour float substantially reduced state anxiety, with an estimated effect size (Cohen's *d*) above 2 (Feinstein et al., 2018a). In a randomised crossover study of 31 people with high anxiety sensitivity, a 90-minute float produced significantly greater reductions in anxiety and muscle tension and greater serenity than a comparison condition, and heightened awareness of interoceptive sensations such as heartbeat and breathing (Feinstein et al., 2018b).

Flotation offers the closest controlled evidence for the core intuition of this review: when external input is removed, attention turns towards breath and body, and anxiety falls. It also suggests an important caveat for the stronger claim. If the benefits derive from reduced stimulation and weightlessness, they may be obtained more safely by floating on the surface than by submerging.

7.2 Blue space and well-being

A systematic review of 35 quantitative studies associated greater exposure to outdoor blue spaces (sea, lakes, rivers) with better mental health and well-being (Gascon et al., 2017). These observational studies concern living near or visiting water rather than immersion, but they support the plausibility that aquatic environments are restorative.

7.3 Aquatic therapy and disability

Clinical experience with children with disabilities offers further support for the restorative role of water. Buoyancy reduces the effect of gravity, relaxes muscles and allows children with motor impairments to move their limbs more freely than on land, always under the supervision of trained therapists. A meta-analysis of 15 randomised trials in children and adolescents with cerebral palsy found that aquatic exercise improved gross motor function more than land-based exercise, although the effect was small and the evidence of very low certainty (Pauluka et al., 2025). These findings are consistent with the veteran studies in Section 5.3: for people whose bodies are constrained on land, the relief of weightlessness may be a benefit in its own right, and possibly a gateway to calmer, more embodied awareness.

8. Critical appraisal: is underwater meditation superior?

The evidence reviewed supports a weaker claim with some confidence and leaves the stronger claim untested. Table 3 sets out the main propositions against the current evidence.

Table 3. Propositions about underwater meditation and the strength of current evidence

Proposition	Current evidence	Strength
Immersion shifts autonomic balance towards parasympathetic activity	Repeated HRV studies of immersion and face immersion	Moderate
Scuba diving imposes slow, attended breathing	Inherent to equipment and training; slow breathing itself well studied	Moderate
Diving increases self-reported mindfulness and reduces stress	One non-randomised controlled trial, one randomised pilot, uncontrolled veteran studies	Low
Elite apnoea produces brain states overlapping with meditation	One single-case EEG/fMRI study in dry apnoea	Very low
Reduced sensory input in water heightens interoception and lowers anxiety	Flotation-REST trials, including a randomised crossover	Low to moderate
Underwater meditation is superior to land-based meditation	No direct comparison exists	Untested

8.1 The missing comparison

No study has compared the same meditation instruction delivered underwater and on land. Every diving study compares diving with a different activity (multisport holidays, usual care) or with nothing. Their positive results are therefore compatible with explanations that have little to do with submersion: novelty, a holiday setting, natural beauty, mastery of a challenging skill, group cohesion, physical exercise and the expectations of participants who chose an unusual intervention. Until a trial holds instruction, setting and dose constant while varying only immersion, superiority cannot be claimed.

8.2 "Nothing to disturb" is only partly true

The intuition that underwater "there is nothing to disturb you" captures something real about external noise. But the diver's attention is in fact heavily loaded. Scuba divers must manage buoyancy, equalise ear pressure, monitor depth, time and air supply, and keep track of a buddy. Cold, current, poor visibility and, at depth, nitrogen narcosis add further demands. For beginners, the dominant experience may be anxiety rather than calm, which is why the Bathysmed protocol began in a swimming pool and progressed gradually. The underwater state of absorbed focus may therefore resemble task-focused concentration, or what sport psychology calls flow, as much as it resembles open, receptive mindfulness.

An optimal environment hypothesis. These demands are not intrinsic to water, however; they depend on conditions and skill. It is therefore reasonable to hypothesise that when the environment removes them, the underwater setting may become an excellent place for mindfulness practice. The setting envisaged is shallow, still, warm and clear water, such as a calm lake or pool, with no current, a comfortable temperature and good visibility. The practitioner would have trained to the point where buoyancy and equalisation have become automatic, and would be accompanied by a trained buddy. Two findings support this. The designers of the Bathysmed protocol deliberately chose warm, clear water to avoid the stress of a colder water layer, and found that all meditative exercises could be performed at a depth of only three metres (Gibert et al., 2022). Flotation research shows that when demands on attention are removed, anxiety falls and

awareness of breath and heartbeat rises (Feinstein et al., 2018b). Under such conditions, effort now spent on managing the environment would be freed for awareness itself. Section 10 sets out how this hypothesis can be tested.

8.3 Presence or dissociation?

Mindfulness traditions emphasise intimate, non-reactive contact with experience, including unpleasant experience. The best neuroimaging evidence from freediving instead points towards *sensory dissociation*: a capacity to disconnect from the body's distress signals during apnoea (Annen et al., 2021). Both states may feel quiet and timeless from the inside, yet differ in mechanism and in their consequences for daily life. Future studies need validated measures that can distinguish decentred awareness from detachment. Related work on hypnosis offers a useful parallel: Gallardo and Chetri (2026) review neural, cognitive and experiential evidence that hypnotic states reorganise activity across the default mode, executive control and salience networks, and propose *Fundamental Peace* — flexible attentional control without effortful suppression and emotional coherence across self-states — as an integrative construct for adaptive emotion regulation and self-integration. Such a framework may help distinguish an integrated, regulated absorption from mere disconnection from bodily signals, and could inform how underwater absorption states are measured.

8.4 The problem of transfer

Much of mindfulness's clinical value is thought to come from regular practice that generalises into ordinary life. An underwater practice is, by its nature, occasional, costly, equipment-dependent and location-bound. The Bathysmed trial's effects had disappeared by three months, which its authors attributed to the absence of continued practice. A plausible role for underwater meditation is therefore as an *induction* experience: a vivid demonstration of what breath-centred awareness feels like, which is then consolidated through daily land-based practice. That is a more modest claim than superiority, but a more defensible and potentially more useful one.

9. Safety

Any article that encourages meditation underwater carries a responsibility to state the risks plainly, because the defining features of the practice (stillness, breath-hold, inward attention, suppression of the urge to breathe) are also the conditions under which people drown silently.

Hypoxic blackout. During breath-holding, consciousness can be lost without warning when brain oxygen falls below a critical threshold. Hyperventilation before a breath-hold lowers carbon dioxide and delays the urge to breathe without adding meaningful oxygen, making blackout more likely. Mortality in breath-hold diving is concentrated among less well-trained recreational divers and spearfishers who fall victim to hypoxia (Lindholm & Lundgren, 2009). Experienced swimmers and competent athletes are not protected; trained tolerance of the urge to breathe may increase the danger.

Barotrauma, narcosis and decompression. Scuba and deep breath-hold diving expose practitioners to pressure-related injury of the ears, sinuses and lungs, and at depth to nitrogen narcosis and decompression sickness (Patrician et al., 2021). Meditation instructions that encourage holding the breath while ascending on scuba are dangerous, as breath-holding during ascent can cause pulmonary barotrauma.

Cardiac and medical risk. Immersion loads the heart, and the diving response combines bradycardia with sharp increases in blood pressure. People with cardiovascular disease, arrhythmia, epilepsy or certain respiratory conditions require medical screening. Psychological

contraindications also matter: panic disorder and trauma can be triggered by submersion, which is why clinical protocols such as Bathysmed used medical screening, professional instructors, and close instructor-to-participant ratios (Gibert et al., 2022).

Minimum safeguards. Any underwater contemplative practice, recreational or research, should observe at least the following:

- Never practise breath-hold in water alone; a trained buddy must watch continuously, within reach.
- No hyperventilation before breath-holds.
- Keep breath-holds well within personal limits; the aim is awareness, not duration.
- On scuba, never hold the breath; meditate on continuous, slow breathing.
- Begin in shallow, warm, clear water or a pool, with certified instruction.
- Obtain medical clearance for diving where indicated.
- Prefer surface floating, with the face in or out of water, as a lower-risk alternative for exploring reduced-stimulation meditation.

10. A research agenda

The central hypothesis arising from this review can be stated as follows: *in a safe, still, warm and clear aquatic environment, with technical demands minimised, guided breath- and body-awareness practice performed in or under water will produce deeper states of mindfulness, and greater reductions in anxiety and physiological stress, than the same practice performed on land.* The gaps identified above translate into a programme of research to test this hypothesis. In rough order of priority:

1. **A three-arm comparison of setting.** Randomise participants to the same guided breath-awareness practice delivered (a) on land, (b) floating at the surface, and (c) submerged on scuba in shallow water, matched for instructor, duration and setting. This is the single study needed to test superiority.
2. **Testing the optimal environment hypothesis.** Conduct the comparison in item 1 under deliberately optimised conditions: a pool or calm, shallow lake; water temperature of about 30–33 °C; good visibility; no current; experienced practitioners for whom buoyancy and equalisation are automatic; and one-to-one supervision. The hypothesis predicts that the underwater arm will outperform the land arm on state mindfulness, state anxiety and heart rate variability. It also predicts that this advantage will shrink or reverse as conditions worsen, for example in colder water, poorer visibility or with novice divers. A positive result under optimal conditions alone would show that the setting is beneficial; a dose-response pattern across conditions would point to *why*.
3. **Validated state measures.** Use instruments that distinguish decentred mindfulness from absorption, flow and dissociation (for example the Toronto Mindfulness Scale alongside a dissociation scale), administered immediately after each session.
4. **Physiological markers in water.** Waterproof ECG for HRV and respiratory sensors are already practical; underwater EEG remains technically difficult but would allow the first direct comparison with the dry-apnoea findings of Annen et al. (2021).
5. **Durability and transfer.** Follow participants for at least six months, comparing underwater induction alone with underwater induction followed by structured daily land practice.
6. **Populations.** Separate studies of healthy adults, of clinical groups (anxiety, PTSD), and of people with physical disability, for whom weightlessness may be a distinct benefit.
7. **Safety reporting.** Pre-register adverse-event definitions and report all incidents, including near-misses, panic and ear injury.
8. **Cultural and textual scholarship.** Collaboration with Indologists to trace how *jala-stambhana* and related ideas developed from the epic into later yogic and popular traditions, and how far they influenced modern freediving culture.

11. Conclusion

Water has long served Indian imagination as a place where a troubled mind can withdraw, as when Duryodhana rests within the stilled waters of the Dvaipāyana lake, and the yogic science of breath has travelled from the forest ashram into modern freediving. Contemporary physiology confirms that immersion favours parasympathetic regulation, that scuba diving enforces slow and attended breathing, and that breath-hold diving trains a calm, accepting relationship to rising bodily discomfort. Early studies suggest that diving can increase self-reported mindfulness and reduce stress, and flotation research shows that removing external stimulation turns attention inward and lowers anxiety.

These findings make underwater meditation a serious and interesting hypothesis. They do not yet make it a superior form of mindfulness. The decisive comparison with equivalent land-based practice has never been run, the best neuroscientific evidence comes from a single elite athlete, and what freedivers experience may sometimes be detachment from the body rather than deeper presence in it. Above all, the risks are real and, in the case of hypoxic blackout, potentially fatal. The most responsible conclusion is that the underwater world may offer a uniquely vivid doorway into breath- and body-centred awareness. Whether it is a better doorway, and for whom, is a question that careful, safety-first research is now well placed to answer.

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