

“It didn’t bring back the old me but helped me on the path to the new me”: Exploring posttraumatic growth in British veterans with PTSD.

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“It didn’t bring back the old me but helped me on the path to the new me”: Exploring posttraumatic growth in British veterans with PTSD.

Purpose: This study explores the role of scuba diving therapy in growth experiences of ex-servicemen. Previous research has focused on difficulties arising from re-entering civilian life after deployment. Known mental health challenges occurring after severe combat related trauma exposure include depression, anxiety, and posttraumatic stress disorder (PTSD). However, less is known about the potential positive transformation which can occur when individuals navigate these challenges. Known facilitators of this positive transformation, often referred to as posttraumatic growth, are still sparse in this participant pool. **Method:** This study utilised an in-depth qualitative approach of Interpretative Phenomenological Analysis utilizing semi-structured interviews. A homogeneous sample of five male British ex-service personnel with a diagnosis of PTSD who identified with posttraumatic growth was recruited. **Results:** All participants reported positive mental health benefits from diving with four themes emerging: Human Connection; Meaningful Leisure; Embodiment; and The Calm. **Conclusions:** Scuba diving appeared to afford instant access to lasting relief of anxiety, stress, and symptoms of PTSD and reduction of physical symptoms of their trauma connected to underwater weightlessness. The reduction of PTSD symptoms carved space for PTG, facilitated through a meaningful leisure environment with opportunities for human connection with individuals who had gone through similar experiences.

Keywords: ex-service personnel; veterans; rehabilitation; scuba diving therapy; bluespace; posttraumatic stress disorder; posttraumatic growth

Introduction

Anecdotal evidence for therapeutic effects of Scuba diving has existed for decades. The explorer Jacques Cousteau once said, “man has only to sink beneath the surface and he is free” [1]. With conflicts in Iraq and Afghanistan increasing awareness about posttraumatic stress disorder (PTSD) and other mental health issues facing returning service personnel in UK [2], a growing body of contemporary research into rehabilitation has developed [e.g., 3-6]. There is also cumulating evidence that

successfully working through the aftermath of traumatic events can sometimes lead to positive psychological change, most commonly referred to as posttraumatic growth (PTG) [6-8]. Interest is also growing into how to facilitate this positive transformation in service personnel returning to the UK.

In the wider PTG literature physical activity (PA) and meaningful leisure have been identified as potential facilitators of growth [9,10]. Additionally, PA has been connected to improved wellbeing and lessening effects of depression and anxiety [11], with this positive effect increasing in green or blue spaces such as coastal areas [12]. Scuba diving is a PA that places people in weightless, tranquil bluespace [13-15], suggesting that it could offer benefits for individuals navigating the aftermath of traumatic events. It is used in several countries as rehabilitation from physical or mental trauma [3,16,17]. However, until now scuba research has focused more on tourism and the medical aspects of diving, [13,14,18] with its effects on mental health sadly lacking [15].

With cumulating evidence of positive transformation stemming from individuals working through the impact of traumatic events [7]; the facilitating effects of PA on PTG [9,10]; and evidence that bluespace can increase wellbeing [19], this study aimed to explore the role of scuba diving in the positive transformation of ex-service personnel.

Trauma in ex-Service Personnel

Trauma is a complex phenomenon and can be defined in many ways [20,21]. However, within the theory of PTG, trauma is defined as “highly stressful life events” which have “a seismic impact on an individual’s assumptive world” [22,p.16]. Deployed military service personnel are more likely to be exposed to severe traumatic events than the

average population. A recent UK study of serving service personnel found 22% suffered symptoms of common mental disorders with 4.8% reporting probable PTSD. This rose to 7.4% in discharged personnel [2]. Over 2,000 American and British Service personnel suffered amputations between 2001 and 2014 and deployed personnel experience lower quality relationships than those not deployed [23,24]. Resnik and Allen [25] suggest loss of identity following medical discharge may create a double trauma after injury, while Palmer et al. [8] go further, suggesting veterans suffer a series of traumas: repeated combat events; lack of agency under orders; and broken relationship with identity when discharged, and these multiple traumas can lead to ongoing depression, aggression, substance misuse issues and posttraumatic stress disorder (PTSD). Thus, there is a clear need to find ways that could potentially aid the rehabilitation of ex-service personnel.

Posttraumatic Stress Disorder

PTSD has been recently reclassified from an anxiety disorder to a trauma and stressor-related disorder in the DSM-5 [20]. PTSD symptoms within the DSM-5 fall under four categories: “intrusion, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity” [20,p.4]. Untreated it can persist for years and is associated with increased risk of suicide and physical conditions such as arthritis, chronic pain, coronary artery disease and asthma [26]. Trauma may be reexperienced through involuntary intrusive recurrent flashbacks or hallucinations creating physical and psychological distress. Avoidance of places, people or activities that remind them of trauma may result in withdrawal from social contact, reduced interest in activities and increased emotional numbness. Individuals might experience negative alterations to their thinking around themselves, others, or the world. Furthermore, they might persistently struggle to experience any positive emotions. Negative alterations might

also be seen in the level of arousal and reactivity, with individuals experiencing hypervigilance, exaggerated surprise responses, reduced concentration, sleep irregularities and anger [27].

PTSD has a major impact on quality of life and there is a pressing need for activities that could help to manage and reduce such symptoms. Currently, the most utilized interventions for PTSD are Exposure Therapy and Cognitive Processing Therapy. Veteran populations appear to respond less positively than civilians to these existing therapies [6], suggesting it is worth exploring alternative ways to support the therapy processes.

Posttraumatic Growth

Although the negative aftermath of trauma has understandably been studied rigorously, individuals also regularly report unexpected positive transformation through their struggles with traumatic events [7, 8]. It is essential to recognize that PTG is both a process and an outcome. This paper adheres to the definition that this transformative change is both action-oriented [28], as well as corporeal [9,29,30]. The potential process of growth is initiated when the trauma challenges an individual's previous assumptive world requiring the individual to work through the changes. PTG can emerge as the individual navigates through these challenges over time. The process evolves through initial experiences of intrusive rumination, which in time turn more purposeful as the individual starts to be able to manage emotional distress and cope with the challenges. Self-disclosure and self-reflection are facilitators for this process and may take many forms (e.g., disclosing to others or journaling). Both proximate and distal sociocultural influences can further facilitate the process (e.g., role models, support with the challenge). The change is transformational for the individual and can be seen in different PTG outcomes such as personal strengths, closer relationships, greater

appreciation for life, recognition of opportunities and spiritual/existential growth [31, 32], as well as having a new relationship with the body [9,29,33]. However, it is important to acknowledge that it is completely normal to not experience growth and not everyone who experiences trauma will experience PTG.

PTG appears organically, without planning, and may be simultaneously present with ongoing negative experiences, even within the same dimension [7]. PTG research is also not without controversy, with some positing that without prospective longitudinal methodologies, it is difficult to test whether PTG is merely *perceived* growth [34]. Some research in military populations has found that perceived growth measured soon after post deployment predicts higher levels of distress later [35]. However, it is also emphasized in PTG literature that the process of growth can take years and that it is natural for distress and growth to initially coexist [7,36]. In fact, it has been suggested that initial posttraumatic stress (PTS) may work as a catalyst for positive change [36].

Joseph [36] uncovered a positive, yet paradoxical association between PTG and PTS and suggested that, despite a correlation, the “changes in one will not necessarily be related to changes in the other” [36,p.20]. More recently a meta-analysis of 42 papers concluded this relationship is curvilinear, with higher levels of trauma being associated with higher levels of PTG up to a point [37]. The complex nature of both trauma and growth calls for research methodologies which enable depth and flexibility to explore such complicated phenomenon, particularly in a participant pool of ex-service personnel, who are likely to experience both growth and distress simultaneously. Two studies have found promising findings on how to facilitate growth experiences among combat veterans: both white water rafting, and surfing have been found to be effective [5,38], which raises the question about whether scuba diving could do the same.

Scuba Diving: Physical Activity in Bluespace

St Leger-Dowse et al. [15] describes scuba diving as requiring ‘both physical and mental discipline, organization, and the ability to interact with other divers in an environment where initiative and dependency are crucial for the safety of all involved’ [15,p.291]. It is an adventurous physical activity in bluespace. Physical activity (PA) has been shown to reduce depression, anxiety, and distress [39,40], three known symptoms of PTSD. It has been previously found to have a positive effect on physical and psychological wellbeing of veterans with physical impairments or PTSD. See for example [5,41,42]. Furthermore, PA can facilitate PTG through new meaningful relationships [43,44], more so when there is high group cohesion, a shared focus and camaraderie [45]. Anderson and colleagues [38] also found improved wellbeing of veterans through formation of new relationships with a shared focus, along with feelings of awe in their study of white-water rafting, another adventurous physical activity in bluespace.

A qualitative study of UK veterans with PTSD found that key facilitators of growth were connecting with others with common experiences; having a well-informed, understanding support network; reaching a crisis point in their lives, followed by a commitment to change; and an open mind to receiving help [8]. A study of Bosnian war amputees explored the role of dive training reported increased perceived support alongside reported lower anxiety levels, which was thought to be related to skills attainment [17]. However, Carin-Levy & Jones’ [46] study of the psychosocial aspects of diving found that divers with disabilities increased their social circle through diving. Furthermore, participants reported increased feelings of freedom stemming from their new abilities underwater. Improved relationships, recognition of new opportunities in being equal underwater to able-bodied divers, and increased perceptions of personal strengths are all recognized aspects of PTG [7,44,47].

Bluespace can increase physiological and psychological effects of exercise [19], increasing positive emotions and decreasing stress [12]. Blue and green spaces have restorative qualities which have aspects of soft fascination, like watching light sparkling off ripples; and are large enough to create interest [48]. Caddick et al.'s study of surfing (a physical activity in bluespace) in combat veterans, found it kept them "focused on the present" rather on past experiences and helped form new relationships [5,p.81].

Underwater environments may also be therapeutic because of changes in auditory perceptions underwater: Dimmock [13] highlighted the benefits of tranquility and escape from reality when diving, alongside feelings of weightlessness and the benefits of shared experiences; while Straughan [14] proposed similarities between diving and mindfulness or meditation. Mindfulness is known to have a positive effect on PTG, especially in the domains of spirituality, relating to others and appreciation for life. Beneton et al. [49] reported able-bodied divers experience 'a state of well-being' after diving, with perceived stress reducing more than other multisport activities [49,p.2]. They reasoned slow deep breathing helps balance the autonomic system, while suggesting nitrogen narcosis could play a role as it alters mood, reducing cognition and performance. These findings in mentally healthy populations suggest that it is worth exploring the potentially unique benefits which scuba diving could offer ex-service personnel who have suffered trauma, due to it being a PA in bluespace, which encourages mindfulness.

Morgan et al.'s [3] mixed methods study evaluated the effectiveness of Depththerapy, a UK charity that trains ex-service personnel to dive. They focused on the measurable medical effects of diving, with supplementary interviews and uncovered reduced anxiety, insomnia and depression, with improved relationships. These effects were greater in participants suffering psychological rather than physical impairments.

All divers in the study were declared fit to dive by the United Kingdom Diving Medical Committee (UKDMC), who describe the relationship between fitness to dive and mental health issues as complicated and poorly understood [15].

Despite Morgan and colleagues' [3] paper and earlier suggestions that diving may improve wellbeing [14,49], St Leger-Dowse et al. [15] stated that, "the effects of Scuba diving on mental health have not been studied" [15,p.292]. This paper therefore aimed to explore the experience of scuba diving and its role in PTG in British ex-servicemen who have experienced trauma and have had a diagnosis of PTSD. The aim was to better understand the role of scuba diving in a complex experience of distress and growth coexisting in one's life.

Methodology

Design

This study utilized a qualitative methodology, Interpretative Phenomenological Analysis (IPA) [50]. IPA focuses on "particular instances of lived experience" of participants via a double hermeneutic, with the researcher decoding the participant's verbal explanation of experiences [50,p.37]. IPA is grounded in principles of phenomenology, hermeneutics, and ideography [50;52]. This study adhered to these principles throughout the process of research. The first author focused on the "unfurling of perspectives and meanings which are unique to the person's embodied and situated relationship to the world" [50,p.21]. The first author interpreted the participant's verbal explanation of their experiences, therefore recognizing their role as a facilitator of the meaning making of the phenomenon [50]. All participants were seen as individuals, in line with the principle of ideography. The personal experiences of these ex-service personnel were respected through in-depth focus on a small sample [50,51].

IPA was chosen as it was an ideal methodology to inform an exploration into the lived experiences of ex-service personnel with PTSD, who identify with PTG, and who have engaged in Scuba Diving.

Participants

Ethics approval was gained from the University of East London and Depththerapy, who gave access to twelve potential participants, who identified with the concept of PTG. Seven initially agreed to participate, but two found the process of arranging the interview too stressful, resulting in semi-structured interviews with five British men, aged 30 to 39 years old. As Smith et al. [50] recommend “purposeful homogeneous sampling” [50,p.49] they were all ex-service personnel who had suffered trauma; suffered from PTSD; had been declared medically fit to dive, despite mental health issues; and were more than two years post trauma. Four of the five participants had physical impairments including: combat-related visual impairment; loss of limb mobility; brain injury; and multiple sclerosis. Some had a combination of combat and non-combat physical impairments. All had dived within the previous 12 months to ensure the quality of the memory was not degraded. Chris had qualified as an Open Water Diver and had less than one year’s experience of diving, whilst the other four divers had between two and four years of dive experience and were all Rescue Divers. Peter and Jerry had started training as Dive Masters at the time of the interviews.

Data Collection and Analysis

Interviews were conducted from August to December 2019 by phone and video call, as participants were geographically distanced. Interviews consisted of nine semi-structured, open interview questions and lasted from 30 to 60 minutes. They were allowed to develop naturally with questions used flexibly and supplementary questions

added to develop depth of data, as recommended by Smith [52]. The name of each participant was changed according to a previously selected random allocation of names to preserve anonymity.

Interviews were recorded and manually transcribed in their entirety before the researcher started data analysis using the steps laid out by Smith et al. [50]. The first author coded the transcripts line-by-line, highlighting descriptive and linguistic components. The analysis was both inductive and ideographic. The text was read cyclically, looking for metaphors and emergent themes before being reread to contextualize these themes. This was repeated and a list of emergent themes was compiled. These were examined for overlap and recombined to create the four superordinate themes with accompanying illustrative quotations. All final themes were explored and discussed with the second author facilitating further reflexivity.

Ensuring Validity

As qualitative studies cannot be judged by replicability, the researcher ensured adherence to Yardley's [53] four dimensions demonstrating quality qualitative research:

1. Sensitivity to context: Levitt et al. [54] recommends prior knowledge of a subject area is disclosed, therefore the primary researcher declares she is a diver of thirty years' experience. A reflexive diary, highlighting thoughts and feelings was kept informing the researchers of potential bias and preconceived assumptions throughout the research process. The data was allowed to speak for itself.
2. Commitment and rigor: the researcher manually transcribed the data, following instructions by Smith et al. [50] during analysis;
3. Transparency and coherence: multiple quotations illustrate every theme; regular meetings with the second author were conducted to adhere to best practice in qualitative research to assure transparency and coherence;
4. Impact and

importance: the study fills a gap in the knowledge of the effects of scuba diving on mental health, offering new insights into PTG in combat related PTSD.

Results

This study revealed four interrelated themes of the experience of diving: Human Connection, Meaningful Leisure, Embodiment and The Calm (see table 1).

[Table 1 near here]

1. Human Connection

The social consequences of PTSD are highlighted by the participants' description of their lives before diving. All participants described experiencing a struggle with returning to civilian life after combat. The theme of human connection contrasts their lack of social connectedness and the stress of symptoms of PTSD with the sense of camaraderie they discover when scuba diving.

1.1 Previous Disconnection

Participants described being introduced to Depththerapy by word of mouth and three explicitly described how they had suffered difficulty fitting back into civilian life after military discharge. Ben shares the difficulty of living with hypervigilance, which was potentially lifesaving on active duty, but is now a symptom of his PTSD, disrupting his ability to fit back into civilian life:

In every waking second of the day your mind is stretched like an elastic band. When you then come home you have still got that level of alertness or stretch, but you have no real threat, unless you step out onto a motorway and the threat becomes real.

When Ben describes how his levels of alertness are disrupting his life, he emphasizes this by using the words 'every waking second'. He underlines that he has no

break from the hypervigilance, a symptom of his PTSD, unless he puts himself into danger in his civilian life, giving the alertness a purpose again. This very strong description by Ben highlights the social consequences of PTSD. Equally, disruptive are Jerry and Peter's words that reveal how being discharged made them feel. Peter describes his isolation "*I had zero self-worth. I was living in a box room in my (parents) house. I was going to work and that was about it*" while Jerry specifically alludes to the trauma of lack of agency when leaving the military, describing his disappointment, almost a sense of loss after being discharged:

I was trained to do a job, and I was good at my job, and then because I was non-deployable, they got rid of us, which knocked all my belief in my abilities.

When he stated that the army 'got rid of us', he likened himself to something no longer wanted, needed or of value, even though he was clearly motivated and skilled at doing his job. We can see that medical discharge from the Army has damaged the self-confidence of some of the participants, resulting in reduced quality of life and increased social isolation.

1.2 Brotherhood and a Sense of Belonging

In contrast, when diving the role of the underwater environment in allowing them to form strong bonds with other people is emphasised. Andy stated simply that "*Probably the biggest thing which I have experienced through diving is getting to know people in the diving world*". Peter explained how diving made making new friendships easy, "*As soon as you meet divers, you instantly have something in common*". Chris thought that shared experiences were important in creating new friendships, saying:

"In that sort of environment, where everything is beautiful around you and you are learning these skills, and feeling a sense of achievement, that always ends up bringing people together."

For Chris it was the combination of acquiring new skills and feeling achievement in the *beautiful* environment. This emphasis on the word *beautiful* highlights his appreciation for the importance of the underwater world for his experience. Shared diving experiences and working towards shared training goals appears to result in widening friendships, decreasing the social isolation described earlier by Peter, and increasing the social support available.

While becoming part of “*the diving community*” (Andy), those diving with Depththerapy also shared another sense of belonging stemming from their shared past experiences: they were all ex-service personnel. When describing this, they shared a sense of family: “*that gives you instant brotherhood*” (Ben), “*They are your brothers and sisters*” (Peter), “*We are all squads*” (Chris). This comfort in training with other ex-service personnel gave them a feeling of being understood: “*They are the people who have been through what you have been through*” (Peter). Participants described identifying both as divers and ex-service, thereby re-establishing their sense of belonging and identity that was lost after discharge, and suggesting this environment of understanding was otherwise missing in their everyday lives. Participants also found new action-oriented opportunities to help others, of giving back and focusing on the wider community:

We’ve done a sort of dying wish for a guy called [name removed], who had a brain tumour and he was very close to death and he wanted to scuba dive one last time. And me and [name removed] took him diving in the pool. (Ben)

For this group of participants, training with other ex-service personnel increased the feelings of connection with a well informed and understanding network.

2. Meaningful Leisure

The theme of meaningful leisure describes both the sense of adventure that was personally valuable for these participants and the immersion into the natural world, which brought perspective into their lives. The leisurely activity of diving appeared to give the individuals purpose and meaning on an individual level whilst simultaneously moving them away from an individualistic perspective towards the collective.

2.1 Unique Adventure

Ben described diving as being *“like an action movie”*. For him there appeared to be a clear difference between the two worlds above and below the surface: *“as soon as my head goes into that water and I am living that adventure, it doesn't matter where I am”*. The change was instant for Ben, entering another world: that of *adventuring*. This sense of adventuring was strongly connected to the uniqueness of their experience underwater. The participants were aware that what they experience underwater is unique, that they are part of a minority seeing what they get to see. Peter stated that *“I am like a massive wreck diving fan, and I know that 99% of the world will never see that, ever be in that engine room”*. Andy also describes one of the things he loved about diving was *“being able to see things that not everyone has seen, nor can see”*. This uniqueness of experience was acknowledged and appreciated by the participants and appeared to create a renewed sense of value into their lives, giving back a status which had previously been lost.

2.2 Nature Providing Perspective

When asked about memorable experiences underwater every participant mentioned how they felt when they encountered nature underwater and the new perspective it gave them. There was a sense of awe attached to these encounters, and this gave them new

perspectives on their worries and their place in the world. For example, Ben says of seeing a pod of dolphins, *“When you are face to face with that sort of phenomenon, it just puts a lot of things into perspective”*. Of meeting a group of squid that had inspected him one-by-one, Chris says, *“It kind of made you feel quite small, but also kind of connected to other things”*. This connection redirected their focus away from ruminating on the self to thinking about the environment they live in. Not every experience was positive, however meaningful to the diver: Peter describes his grief at seeing underwater destruction, *“I’ve got memories of being in Thailand diving, and seeing the coral reef just absolutely smashed to bits with the tsunami, and I just bawled”*. This connection to and appreciation of the natural environment is also seen by their increased action-based pro-environmental behaviour as Andy describes:

Since I started diving, I make a conscious effort keeping hold of rubbish an hour or two, keeping it in my hands until I find a bin instead of doing what I have previously done, potentially not putting it in a bin.

This, together with the pro-social behaviour seen in theme 2, underlines their focus away from the individual towards a wider perspective.

3. Embodiment

Diving is a physical activity, affecting the body and mind. Effects of diving on the body were mentioned by most participants. Peter found it relaxing *“I can do an hour underwater and not even bat an eyelid. I think I feel as if I have just been lying down asleep”*. Similarly, Chris emphasized the tranquil nature of diving and compared it to surfing saying *“This is like a bit more relaxing, less movement, like therapeutic sort of feeling”*. Both Peter and Chris described a very calming, relaxed dream like environment underwater, which is in stark contrast to their described physical existence with PTSD symptoms. However, when describing training, Chris said, *“It was*

demanding. I was knackered by the end, and that felt like a physical tiredness more than maybe a mental tiredness". This is an interesting contradiction, because he draws attention to the difference between physical and mental tiredness, suggesting that what he normally feels is a mental exhaustion, possibly from his PTSD. Equally, he may have found the training more physically demanding than expected due to reduced PA in everyday life, caused by PTSD related avoidance behaviours.

3.1 Weightlessness

Weightlessness was inextricably intertwined with the theme of relief from physical and psychological symptoms. Neutral buoyancy, a state where you are neither floating upwards nor sinking, was connected to decreased physical stress compared to land based physical activity:

I guess it is that feeling when you get into a perfect position of neutral buoyancy and weightlessness I guess and what that probably does to the body in terms of releasing certain stresses underwater... I definitely felt that at times. (Chris)

When asked what he enjoyed about being underwater, Jerry stated simply "*The weightlessness*" adding the explanation "*because I've got arthritis in my lower limbs*". He describes being able to move underwater effortlessly, unlike on land:

A lot of other sports have so much impact on your lower limbs, and my lower limbs are never going to take it, so that makes it a lot easier. With fins on you make a little kick and you're gone.

Chris directly attributes the relief of stress to the weightlessness underwater that diving provides, while for Jerry, this weightlessness has a very physical role as well in reducing the impact on his legs.

3.2 Relief of Physical Symptoms

Reduction of pain underwater was a strong motivator to dive for those participants with physical impairments. Jerry, who suffers from multiple sclerosis, said, *“It doesn’t hurt my body, it helps my body”*. This was echoed by Peter, *“You never get that stress or the pain that I get with my injuries”*. Andy, whose injuries mean he normally has restricted movement of his arm, became overwhelmed when describing the effects of diving on his body:

When I am underwater, my arm... I have that movement back.

So, going from not being able to use it to being able to use it, even if it is just for half an hour or forty-five minutes, however long you are under the water for, it still makes you feel... (he tailed off, not finishing the sentence).

Andy’s description of regaining movement in his arm shows how personally meaningful this is to him and demonstrates his grief over the loss of mobility he has suffered. Regaining that relationship with his arm, even for short moments appears almost too powerful to describe. Thus, the weightlessness of underwater environment has both mental and physical benefits for these individuals. Not merely reducing symptoms but producing new abilities and wellbeing.

4. The Calm

All participants described the phenomenon of The Calm with its interwoven and overlapping subordinate themes of peaceful presence and the relief from anxiety and PTSD. Ben describes it as *“the shutting down of the mind and the opening up of the senses”*.

4.1 Mindful Tranquillity

The act of diving requires a form of mindfulness: being present to focus on gauges and the buddy. Andy explains *“I am so involved in what I am doing underwater, doing my*

buddy check, checking my own gas". Participants describe being fully in the present while underwater, partly driven by the need to control risk. Ben states "*When you enter the water, it's not like you are in threat, but you are in a situation where you have to focus and so your mind calms down... it's almost like mindfulness, you become in the moment*". He is describing how entering the water enables him to calm down through purposeful focus and his description is in stark contrast to how he felt before diving, where danger was the only way for redirecting his constant level of alertness (see theme 1) and find relief from his PTSD symptoms. Furthermore, Ben goes further suggesting that by tuning into physical senses, his focus and time perception also changed, helping him to calm his mind: "*The world seems to slow down because you are completely fixated on physical senses*".

The divers all described an instant silence the moment their heads sank below the surface, contrasting this to the noise of the world above the water. Jerry stated that "*As soon as I was underwater it was silent, no ambient noise and it was just peaceful*", while Chris simply said: "*I just found it extremely peaceful*". This combination of mindful presence and tranquility underwater appears to lead to two main experiences: relief from everyday worries, negative thoughts, and anxieties; and relief from symptoms of PTSD such as hypervigilance. Interweaving with the theme of Brotherhood and a Sense of Belonging, Peter states that "*It allowed me to talk to people because I have a bit of peace and tranquility underwater*", something he finds difficult in other situations and further behavioural evidence of PTG.

4.2 Relief from Anxiety and PTSD

Everyday stresses, negative emotions and anxiety appeared to disappear for the participants underwater. Andy describes how "*it feels like there are not any other cares in the world*", while Peter explains that "*All the problems of the world disappear as*

soon as you get wet". Jerry echoes this relief saying, *"It feels like there is no weight on your shoulders and no pressure anywhere"*. They link this relief of negative emotions and worry with a change of focus to the present *"If I have been having an argument with the family, the girlfriend, whoever. If I go diving, it's the last thing I am thinking about"* (Andy).

In addition to everyday stressors being alleviated by diving, almost all the participants described the symptoms of PTSD such as invasive thoughts and hypervigilance being reduced by the combination of the peace and being present. Chris says, *"You are thinking in the present moment instead of thinking about previous invasive thoughts that you get on top of the water"*, while Peter explains *"There is no noise, there is no bangs, there's no cracks, there's nothings that trigger people like me"*. This relief inspires hope and optimism:

If I can be in one place, like underwater, and be able to switch off and not have anxieties and PTSD and not have worries, then logically I should be able to be somewhere else in this world and also not have to have these worries and this anxiety and this PTSD. (Ben)

The effects of anxiety relief and relief from the symptoms of PTSD are also used proactively by the divers to relieve anxiety, either by physically choosing to go diving or by using mental imagery from their dives to create a place of calm later:

When I am feeling low and like that, I can just go and take my dive kit and do a bit of... just practice my skills and stuff in the swimming pool and it helps clear my mind, just putting my kit on and getting underwater. (Andy)

If I have to go back to a place of stillness or quietness, then I can go back to those images. (Chris)

The calm appears to have an instant impact on intrusive rumination, which is both a symptom of PTSD as well as an initial element recognized in the process of PTG

Discussion

The symptoms of PTSD described by participants appeared to reflect a complex combination of previous trauma from service and the challenges faced with their discharge and return to civilian life. This aligns with the theory that the loss of service identity creates additional trauma on top of the physical or psychological trauma experienced in combat [25]. The contrasting decrease of social isolation after diving echoes findings of previous studies into PA in disabled divers [46]; parasports [43,44]; and other adventurous activities such as white water-rafting and surfing [5,38].

Undertaking dive training with other ex-service personnel with related trauma experiences appears to create an even greater sense of belonging and reconnection with their past lives in this group of divers. Diving with the role-models of other ex-service personnel also offers opportunities for self-disclosure and self-reflection, while the formation of new identities aligns with the experiences of elite parasports athletes who experience PTG [44]. These proximate sociocultural influences are known facilitators of the PTG process, allowing people to work through the process of reappraisal and acceptance of their trauma in a safe and understanding environment. See, for example, role models among Paralympians [44]. Like these parasports athletes, these divers formed an elite once more, experiencing adventure away from everyday life, while learning new skills.

The role of nature in their experiences draws parallels between the divers' encounters with animals altering their perspectives by increasing their sense of being part of something bigger and the sense of awe that Anderson et al. [38] described when white-water rafting. Even small encounters with animals increased joy and appreciation for life, connecting to previous studies on the increased positive effects of PA in green and blue space [48]. Appreciation for life and existential growth are two domains of PTG [31,55], and here we can see how diving could facilitate both. These growth

experiences are evidenced by their focus away from the individual towards a wider perspective, including the new action-focused environmentally aware behaviour [28].

The changed relationships with their bodies that some of the divers experienced draws further parallels with experiences of PTG in para-athletes, through the negative relationship some athletes had with their bodies following their trauma, and their realisation of new possibilities through PA [44]. Scuba appears to change this relationship even further: the reduced impact of moving through water, and the weightlessness that is unique to diving, are strongly associated with regaining movement in limbs and reducing pain. This aligns with findings of Morgan et al., [3] and Carin-Levy and Jones [46] who ascribed finding participants felt “free from their impairment” underwater [46,p.10]. This new relationship with their body appears to inspire hope, and an awareness of unrealized physical potential, which draws parallels with themes of PTG found in parasports athletes [9,10,29,33].

The calm found underwater by the divers brings to mind Straughan’s [14] findings on touch and changes in auditory perceptions. The calm appears to help individuals to approach their challenges purposefully after the respite from their physical symptoms. This connects to the process of PTG, as an individual starts to manage their emotional distress and engage in coping mechanisms to deal with their challenges [7]. It is not clear what the process of *The Calm* involves. Unlike mindfulness or meditation, it is instantaneous: occurring the moment the head submerges, almost akin to a state of flow [56]. Similar findings have arisen from Caddick and colleagues’ [5] exploration into surfing and veterans, where the surfing appeared to offer “temporary absence of trauma-related thoughts and feelings” [5,p.79] which they experienced through embodied sensations of being immersed in the ocean environment. The concept of flow, which is described as when you are fully emerged into an activity,

purely from enjoyment of the activity, and which often entails a changed perception of time [56], fits with the descriptions of participants mentioning the calm occurring even on the first dive. It may be also that different sensory properties underwater play a part here. It is worth noting that despite breathing being identified as a route to stress reduction in divers [49], with the role of breath in maintaining buoyancy and speed of air consumption drawing parallels with meditation, no participant mentioned the breath. This could be because the primary researcher is an experienced diver and participants took it for granted. Finally, previous suggestions explaining relief of stress underwater includes nitrogen narcosis. However, these effects are rarely felt at shallow depths [15], whereas The Calm occurs even in shallow water, so it is unlikely to be a major factor. One thing is certain, like the relief of pain, The Calm leads to hope and optimism, identified as a correlates of PTG [57].

Conclusion

The aim of this paper was to explore the lived experiences of ex-service personnel suffering from PTSD when they dive, to develop an understanding of how scuba diving affects mental health. The benefits of Scuba Diving appeared to be two-fold for the ex-service personnel in this study. Scuba diving seemed to *reduce* the symptoms of PTSD as well as *facilitate* the process of growth.

Findings align with previous studies on PA in para-athletes, and veterans with PTSD in regard to building a new identity, forging new relationships, and increasing a sense of belonging. Scuba diving differs to other PAs, crossing into other disciplines in three areas: appreciation of nature; the relationship to the body; and the effect of The Calm. Encounters with creatures underwater appears to engender a sense of awe, leading to spiritual growth and increased pro-environmental behaviours; the weightlessness of diving relieves physical symptoms of the participants' injuries; and

the instant peace, focus on the present and relief of anxiety and symptoms of PTSD gives participants hope for future relief elsewhere.

Evidence that scuba diving can improve participants' mental health was uncovered: all the participants described positive effects on wellbeing and relief of negative physical or psychological effects of their traumas. That diving is perceived as peaceful, reducing everyday anxieties is in agreement with previous studies of divers without mental health issues. What is new is the evidence that diving relieves symptoms of PTSD, such as hypervigilance and invasive thoughts; that participants actively plan participation in diving when they need this relief; and that they actively transfer this experience to bring relief at a later time.

It is fair to say that the findings from this study suggest that the process of posttraumatic growth was not complete in these ex-service personnel, While the participants self-identified as experiencing PTG and some action-oriented and corporeal growth outcomes could be detected such as the formation of new meaningful relationships, existential growth through seeing oneself as part of something bigger, for example humanity, [10] and the formation of a new relationship with their bodies, this process of growth was still evolving at the time of the interviews. Scuba diving appeared to have an essential role in carving the space for the growth process to begin via reduction of severe life-limiting PTSD symptoms. The calming effect of Scuba on their bodies and minds could potentially have a vital role in the facilitation of the PTG process.

The authors acknowledge that this study has limitations. Women comprise almost 8% of serving armed forces [58], yet the small homogenous sample size meant all participants were male, British and in their thirties. None had amputations, although

all suffered from PTSD. Women, para-athletes and people from other cultures, may experience diving differently.

The intriguing and promising findings around The Calm and relief of pain should be further investigated to understand the mechanisms better, which could potentially lead to new treatments for pain, anxiety, and PTSD, and more clarity of guidelines regarding mental illness and diving. As traditional therapies for PTSD work less well in veterans, alternative therapies, such as scuba diving, could be considered as an option in parallel to traditional therapies for individuals returning from service. Further research should also investigate how encounters with nature affects mental health; the mechanisms of regaining movement in limbs underwater; and explore the reduction of pain reported. Quantitative scales such as PTGI-X could verify perceived PTG, although as mentioned earlier, these self-report scales could be problematic for some; while grounded theory studies could examine process. A deeper understanding of the longevity of relief from anxiety and PTSD and diving's contribution to PTG could be uncovered by some much needed longitudinal studies in this area, including contemporaneous interviews and quantitative measures. However, researchers should also consider the ethical issues around working with people with poor mental health, if it requires coming off medications to start diving, as is currently required under UKDMC guidelines. However, if any doubt remains that scuba diving and mental health should be the focus of further research, we leave the last words to Ben, who stated simply, "Scuba diving saved my life".

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