After everything has been done medically to improve a patient’s quality of life but they are left with a burden of symptoms and disability—and the loss, worry and stress that goes with this—what more can be done? From a psychological viewpoint, an awful lot. The premise of mindfulness training is that it is not so much one’s situation that affects one’s mental state, but the way that one either unthinkingly reacts to it or consciously responds to and works with it. This is potentially entirely in each person’s control, and this knowledge is in itself a source of hope and empowerment. This is not a new idea or one limited to mindfulness; it is central to cognitive behaviour therapy and it was the core message in the writings of one of the 20th century’s great heroes, the psychiatrist, psychotherapist and neurologist, Viktor Frankl, who, as a Holocaust survivor, tested this premise to the very limits. Mindfulness training offers a straightforward way to put this possibility into practice, and does not depend upon complex analysis or therapy but upon learning a simple method of working directly with ordinary experience.

WHAT IS IT?
Mindfulness is simply paying attention to moment-by-moment experience in an open and non-judgemental way. So it is practising awareness of sensory and mental experiences as they happen. Although this is a natural capacity, doing it deliberately and repeatedly as an end in itself and building a practice of cultivating this mental mode is very different from what people usually do, which is to operate without conscious awareness on so-called ‘automatic pilot’ much of the time.

Mindfulness training offers a straightforward way to put this possibility into practice, and does not depend upon complex analysis or therapy but upon learning a simple method of working directly with ordinary experience.

WHAT IS THE EVIDENCE?
There is a large volume of published literature examining the psychological effects of mindfulness training, particularly for symptoms of depression and anxiety, with a preponderance of smaller, uncontrolled or ‘waiting list controlled’ studies, and fewer randomised controlled studies. The most recent meta-analytic review in 2010 analysed 39 studies in a wide range of physical and mental health populations. Uncontrolled pre–post effect size estimates were within the moderate range for anxiety symptoms (Hedges’ g=0.63) and depressive symptoms (g=0.59) for the sample as a whole, and within the large
range in patients with anxiety disorders and depression (anxiety: $g=0.97$; depression: $g=0.95$). Fail-safe $N$ and funnel plot analyses suggested the pre–post uncontrolled effect sizes were robust, unlikely due to publication bias, and maintained over an average 27-week follow-up (median 12 weeks). Controlled effect sizes were smaller but still significant (in active treatment controlled studies $g=0.81$ in reducing anxiety and $g=0.50$ in reducing depression, and in ‘waiting list’ and ‘treatment as usual’ controlled studies $g=0.32$ for anxiety and $g=0.41$ for depression). Fail-safe $N$ analysis suggested this should be treated with caution, except for measures of anxiety symptom severity in active controlled studies for which the analysis suggested reasonable confidence. For the same reason, intention-to-treat effect sizes (anxiety $g=0.55$, depression $g=1.06$) should be considered preliminary.

Although less directly applicable to neurological populations, the most robust evidence addresses relapse prevention in depression. A meta-analysis of six randomised controlled trials showed that MBCT reduces relapse risk by 43% compared with ‘treatment as usual’ in patients with three or more previous episodes, although none of these used an active control other than usual care. In a more recent and large randomised controlled trial, MBCT was compared with an active control in the form of maintenance antidepressant medication over 24 months and, using an intention-to-treat analysis, there were equivalent outcomes in preventing relapse. Another recent randomised dismantling trial in this population compared MBCT with a plausible psychological control (a cognitive psycho-education group modelled on MBCT without the mindfulness training) and ‘treatment as usual’, and found, interestingly, no significant difference between MBCT and the active control on risk of relapse in the overall sample, but a superiority of MBCT over active control (HR=0.61) in half the sample with greater severity of childhood trauma. This supports the view that some of MBCT’s effectiveness is attributed to the group psycho-education elements, but that there are also specific MBCT effects that may be more evident in people with greater childhood vulnerability, at least in depressive relapse prevention.

**Box 1 A simple mindfulness exercise: awareness of breathing**

1. Sit on a chair and adjust your posture to be comfortable and balanced, with your feet flat on the ground and your back upright but not stiff. You can have your eyes open or closed.
2. Notice sensations in your body, especially any sensations of tension or holding. Notice the more obvious sensations where your body is in contact with floor and chair, and the sensations in your legs, pelvis, abdomen, back, arms, shoulders, neck, head and face.
3. The main practice is to bring your attention to the sensations of breathing in your abdomen or chest. Notice the sensations as your breath moves naturally in and out, allowing your breathing to continue naturally without controlling it. Let thoughts be there in the background. Focus on the sensations of breathing. Rest your attention gently on these sensations without striving too hard, just noticing normally and staying with these sensations.
4. Whenever you notice your attention has waned or drifted from breathing sensations to something else entirely, recognise where your mind is and then, without judgement or regret, simply return to the sensations of breathing and pick them up wherever you find them.
5. You might like to do this for 5 or 10 minutes.
In neurological populations, one study in multiple sclerosis is noteworthy because of reasonably large numbers (n=150) and a randomised controlled design versus usual care. This study showed post-treatment small-to-medium effect sizes on anxiety (Cohen’s d=0.39), depression (d=0.65) and fatigue (d=0.41), a large effect size on a quality of life measure (d=0.86) and 6-month follow-up effect sizes in the small to medium range (d=0.3–0.5). Post hoc subgroup analyses in a more severely symptomatic subgroup found larger effect sizes (post-intervention, d=1.0–1.7; 6-month follow-up, d=0.58–1.09).

There have been several other studies of lower methodological quality in neurological populations. Three small studies in stroke and one in traumatic brain injury showed benefit to measures including depression, anxiety and fatigue. Our own results in Oxford9 in an uncontrolled pre–post design (n=98) provide preliminary evidence that a medium effect size in anxiety (Cohen’s d=0.70) and depression (d=0.71) can be achieved in a clinically referred neurological population with diverse diagnoses, including functional conditions. There were statistically different responses between subgroups: patients with functional diagnoses showed small effects (d=0.2); patients with non-progressive neurological conditions showed medium effects (d=0.62), and patients with progressive conditions showed large effects (d=1.13). All patient groups showed large effects on a measure of stress coping (d=1.41–2.96).

Of further interest, unpublished clinical outcomes in our mindfulness clinic of a case series of 15 patients with psychogenic non-epileptic seizures suggest that group mindfulness training helps to reduce seizure frequency and would justify further research. Relatedly, a report of a case series of six people with psychogenic non-epileptic seizures showed promising results and confirmed the feasibility of 12-session mindfulness-based individual psychotherapy (box 2).

### WHAT DOES MINDFULNESS INVOLVE IN PRACTICE?

The basic procedure is multiple repetition of a simple training cycle during periods of formal meditation (see figure 2). This consists of bringing attention to an aspect of experience, such as body sensations in a particular part of the body, and maintaining simple awareness of that, not thinking about it but attending to the simple experiential quality of it. After a short while, attention wanes or is distracted into other thoughts, and this continues for a variable amount of time until the sudden awareness arises that the mind has wandered from where it was intended to be. When that happens, the subject redirects attention to the current experiential focus, in this case certain body sensations, and the cycle continues. During a period of practice, the cycle might be repeated tens or a hundred times or more.

There are multiple aims of this procedure:

1. On the face of it, mindfulness is the training of stability of attention and increased awareness when the mind wanders. The various practices also train flexibility as

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**Box 2 Note on effect sizes**

Cohen’s d expresses the difference between two sample means in units of SD. Hedge’s g is a variation of Cohen’s d, which corrects for biases due to small sample sizes. The magnitude of both these effect sizes can be interpreted in terms of the convention recommended by Cohen:

- <0.2 is trivial
- 0.2–0.5 is small
- 0.5–0.8 is medium
- ≥0.8 is large

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**Figure 2** The mindfulness training cycle, repeated tens or a hundred or more times during a 45 min practice session. In the body scan practice shown here, the focus is on body sensations, beginning usually with the feet and moving around the body sequentially.
attention is deliberately shifted from one focus to another, to all the sensory modalities as well as to thoughts and feelings. The ‘spotlight’ of attention is sometimes made very narrow and at other times is allowed to be very broad and open to all aspects of experience.

2. During this cycle, the thinking mind is not idle. Although the ostensible task may be paying attention to body sensations, the aim is also to observe the activity of the mind, thrown into relief by this very simple experiential task. With practice, the aim is to build the capacity for observing the mind, which enables a more general capacity of recognising and decentering from thoughts. Thoughts can then be seen as events in the mind and treated as ‘just thoughts’ and not necessarily true, real or imperative, enabling a weakening of the effects of depressogenic or anxiogenic thoughts. In particular, a non-judgemental stance is central to mindfulness training and patterns of judgement in thinking are highlighted in two ways. First, the way in which judgement or categorisation of experiences (eg, of an intense sensation as an unbearable one) shifts the mode of mind from an experiential mode to an abstracted cognitive mode, so that the concept replaces the experience; useful for intellectual work or problem-solving but not effective for constantly changeable experiential difficulties in the form of emotions or difficult symptoms. Second, the way in which judgement in the form of self-criticism (eg, of the simple fact of mind-wandering) can be seen as actively harmful and with a tendency to increase anxiety. Mindfulness training involves a radically different approach: instead of reacting by trying to fix the way the mind is or to punish oneself, an attitude is fostered of accepting observation of experience as it is and responding kindly to what is needed—self-care rather than self-judgement on a very fine-grained momentary scale.

3. A further aim is to gain insight into automatic patterns of stress reactivity and to develop the capacity to intervene consciously in these. Phenomena of particular interest are the way in which the mind automatically gives a valence to experiences as pleasant, unpleasant or neutral, and the reactions that follow from this. The reactions include trying to avoid or to get rid of some experiences, trying to hold on to or getting hold of others, and ignoring or not noticing the rest, which in turn form the basis of stress reactions and unhelpful patterns of coping. For example (see figure 3), there might be an experience of pain that naturally will be unpleasant; but on top of this there will usually be an emotional reaction including anxiety that may be magnified by negative thoughts such as, “This will go on forever and I can’t cope”, and then attempts to relieve this anxiety by avoiding or getting rid of the experience. Some of these attempts, such as distraction, may be partially successful but will maintain the anxiety as they need to be constantly worked at or renewed; others of these strategies may have self-defeating side effects, for example, ignoring body sensations and engaging in overactivity, or reducing activity and withdrawing, or overengaging in cognitive problem-solving that becomes ineffective rumination and worry about the future, magnifying the subjective problem and increasing anxiety and stress. Insight into these processes and online observation of what is happening allows people to learn to refrain from unhelpful reactivity and to respond in new and creative ways. For example (see figure 4), there may be nothing to be done about a certain pain but the anxious thoughts that “this will go on forever and I can’t cope” or “I will never walk again” could be observed mindfully and seen to be unrealistically catastrophic, allowing decentering from these thoughts. Physiological anxiety can be regulated and allowed to subside gradually by which time the pain might be changing naturally, further eased by reducing anxiety and the situation will seem more workable. With repeated experiences like this confidence in being able to deal with difficult experiences can grow, further reducing hyper-vigilance and anticipatory anxiety and allowing a reduction in avoidant behaviour patterns.

Figure 3  Reactive processes in the mind increase stress and anxiety, lower mood and lead to maladaptive behaviours. Here, the example is a physical pain.

Figure 4  Mindfulness may be applied at each stage in the process of reactive stress, weakening it or ending it altogether and enabling more creative and positive responses.
The same procedure that has been practised during formal periods of meditation is then generalised and applied in everyday life situations, not only to help with coping in moments of stress and reactivity but also to include pleasant experiences and previously ignored neutral experiences, counteracting the negative attentional biases of depression, anxiety and habitual patterns of thought and behaviour.

WHAT IS ITS ROLE IN A NEUROLOGICAL SERVICE?
Mindfulness training appears a promising treatment option for anxiety, depression and stress secondary to physical and neurological illness, with effects comparable to other established treatments but with particular features that may make it more relevant in certain situations and with certain patients. As a group intervention, it requires fewer resources than one-to-one cognitive behaviour therapy. Because it addresses common pathways of anxiety regulation, cognitive decentering, self-care and behavioural change, it can be appropriate for mixed and diverse groups with differing individual needs. Because it aims to develop a long-term coping skill and an emphasis on enhancing quality of life, it may be particularly relevant to people with chronic and relapsing or deteriorating conditions, and it is for this reason that it may be a good match to the needs of many neurological patients who are also suffering with anxiety, depression or stress.

There is no evidence of potential harm in routine practice, but there are certainly patients for whom it may not be suitable, such as those who cannot tolerate a group, those with receptive aphasia, those who may not be able to undertake home practice independently (such as patients with severe dysexecutive syndrome, dementia or severe depression with apathy), those who need a one-to-one approach or those who might benefit but for whom another specific treatment is more indicated.

REFERRALS AND SELF-HELP RESOURCES
By far the best way for patients to learn mindfulness is within an 8-week group training course, ideally run by a clinical psychologist with an understanding of the issues of neurological patients. This could be either within specialist neurosciences or neurorehabilitation services or within general mental health services. Nevertheless, relatively few psychologists in the UK in physical health are trained mindfulness teachers and the training process is substantial although this would be a valuable resource to encourage for the future. Because of this, not all areas have a public health mindfulness course or one for which neurological patients are eligible. High-quality courses are indeed available in the private sector but clinicians must be cautious as the background of teachers varies and includes non-mental health professionals; such courses may be suitable only for patients without significant mental health problems. For those patients with enough self-motivation, there are several self-help options including an online course and self-help books with CDs (box 3).

Box 3  Self-help resources
1. http://www.bemindfulonline.com an online course of at least four weeks with flexible scheduling. In a pre–post uncontrolled design in a large self-referred online sample, patients showed significantly reduced depression, anxiety and perceived stress, comparable with other studies. Requires payment.
3. Burch V and Penman D. (2013) Mindfulness for Health: A practical guide to relieving pain, reducing stress and restoring wellbeing. London: Piatkus. This is a self-guided mindfulness course particularly relevant to patients for whom pain and/or physical symptoms are more salient than mood issues. Includes CD.

Key points
1. Mindfulness training—mindfulness-based cognitive therapy and mindfulness-based stress reduction—is an evidence-based group programme for reducing symptoms of anxiety and depression and building long-term capacity for emotion regulation, stress coping and enhancing quality of life.
2. It combines training of attention to moment-by-moment experience with practising a self-caring attitude and insight into self-defeating patterns of thought and behaviour.
3. It has been applied effectively in diverse clinical groups, including neurological patients and a variety of physical and mental health conditions.
4. It may be particularly relevant for people with long-term or deteriorating conditions.
5. It is best learned in a formal 8-week course. It is worth suggesting self-help and online formats to those who are sufficiently motivated.

Acknowledgements I thank Christina Surawy for her helpful comments on an early draft.
Funding This work was unfunded, but I gratefully acknowledge the support of my employer, Oxford University Hospitals NHS Trust.
Competing interests None declared.
Provenance and peer review Commissioned; externally peer reviewed. This paper was reviewed by Jon Stone, Edinburgh, UK.
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