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Original Article

“I’m More in Balance”: A Qualitative Study of Yoga for Patients with Chronic Neck Pain

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Abstract

Objectives: This study investigated the perceived influence of yoga on body perception and psychosocial aspects of life for patients with chronic neck pain.

Design: This qualitative study was conducted using semistandardized interviews.

Setting: The interventions and interviews took place in a referral center’s research department.

Subjects: Eighteen (18) patients with chronic nonspecific neck pain were recruited from a larger randomized controlled trial of yoga for chronic neck pain.

Interventions: Participants attended 90 minutes of Iyengar yoga once a week for 9 weeks.

Outcome measures: Participants completed a drawing of their neck and shoulder regions to reflect their subjective body perceptions before and after their yoga program. Semistandardized interviews were used to explore their body perception, emotional status, everyday life and coping skills, as well as any perceived changes in these dimensions postparticipation. An interdisciplinary group analyzed the study data using content analysis techniques.

Results: Participants reported change on five dimensions of human experience: physical, cognitive, emotional, behavioral, and social. Physically, most participants cited renewed body awareness, both during their yoga practice and in their daily lives. Such change was echoed in their postparticipation body drawings. Cognitively, participants reported increased perceived control over their health. Emotionally, they noted greater acceptance of their pain and life burdens. Behaviorally, they described enhanced use of active coping strategies. Finally, socially, they reported renewed participation in an active life.

Conclusions: Participants linked yoga to change on all dimensions of human experience, attributing reduced pain levels, increased coping ability, better pain acceptance and increased control to it. Body awareness appeared a key mechanism in these changes.

Introduction

CHRONIC NECK PAIN causes substantial personal suffering due to pain, functional impairment¹ and decreased health-related quality of life.² A recent qualitative study found that it also influences body perception. In this study, patients completed drawings of their upper back and neck, showing apparent distortions of body perception, with elements that were missing or deformed. Patients saw their pain as predominant and beyond their control, influencing their body perception.³

Yoga is a commonly used complementary treatment for neck and back pain,⁴ with an estimated 3 million American

adults using it explicitly to treat such pain.⁵ Deriving from ancient Indian philosophy, yoga comprises lifestyle advice, spiritual practice, and physical postures.⁶ It is thought to create physical, emotional, and spiritual balance, with the infinite goal of uniting body, mind, and spirit.⁷ In North America and Europe, yoga is most often associated with physical postures (*asanas*), breathing techniques (*pranayama*), and meditation (*dyana*).⁶

Yoga has proven effectiveness in randomized controlled trials on musculoskeletal disorders including osteoarthritis,⁸ carpal tunnel syndrome,⁹ and low back pain.^{10–15} A recent clinical trial demonstrated the effectiveness of Iyengar yoga

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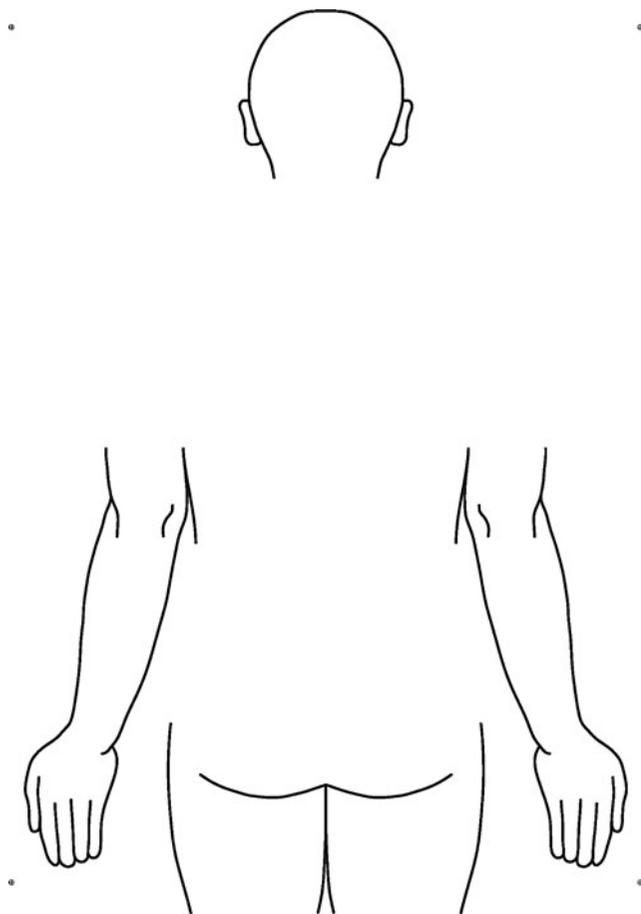


FIG. 1. Incomplete body drawing.

Semistructured interviews

Participants were interviewed after completing their second body drawings at the end of the 9-week program. Interviewers were neither involved in planning nor conducting of the yoga intervention. Participants were initially asked to share the meanings of their before and after body drawings with interviewers and then to compare and contrast these drawings. Subsequent interviews queried participants' body perceptions before and after the yoga program and any perceived influences on these perceptions. Participants were also interviewed about their emotional status, everyday life, and preferred coping strategies before and after the yoga program. Main questions are presented in Table 2. Further open-ended questions on each topic were possible.

These interviews, which lasted about 30 minutes, were conducted in private at the study center. They were audio-recorded, professionally transcribed verbatim, anonymized, and translated into English for publication purposes.

Data analysis

An interdisciplinary group of scientists and practitioners from psychology, medicine, pain therapy, nursing, and cultural science analyzed the interview data using content analysis techniques.²⁴ Interviews were coded using Atlas.ti software (Version 6.2; Atlas.ti Scientific Software Development GmbH, Berlin, Germany), with their content being

TABLE 2. INTERVIEW TOPICS AND MAIN QUESTIONS

Topic	Questions
Drawings	<ol style="list-style-type: none"> 1. Please tell me about today's drawing. 2. In how far does the drawing reflect your body perception? 3. What similarities and differences do you see between this drawing and the first drawing you made 10 weeks ago?
Body perception	<ol style="list-style-type: none"> 1. How do you perceive your body in the neck/shoulder area? 2. In how far has your body perception changed since the start of the yoga course?
Emotions	<ol style="list-style-type: none"> 1. What emotions do you connect to your neck-shoulder area at this moment? 2. In how far have your emotions towards your neck-shoulder area changed since the start of the yoga course?
Everyday life	<ol style="list-style-type: none"> 1. In how far do your neck-shoulder complaints influence your daily life? 2. In how far has your daily life changed since the start of the yoga course?

paraphrased, reduced, and summarized. Five (5) broad categories were developed from the inductive analysis of the first six interviews. These categories, which reflected five dimensions of human experience (physical, cognitive, emotional, behavioral, and social), were then applied to the remaining interviews. Results of this analysis process were discussed in this group. Disagreements were discussed until consensus was achieved. Participants' body drawings were not independently analyzed, but were presented to the participants generating them, at interview, for their interpretation.

Results

Study sample

Fifteen (15) women and 3 men aged 19–59 years were interviewed. None had ever practiced yoga before. Participants' sociodemographic and pain characteristics are shown in Table 3.²⁵ Adherence to yoga practice is shown in Table 4.

Perceived changes

Physical dimension. Participants saw focusing their attention on their bodies and perceptions during yoga as an important part of the yoga program. They cited intensified perceptions of their bodies' sensations and renewed awareness of their bodies' parts and functions during yoga. One (1) participant said: "I was feeling muscles or areas of my body, of which I didn't even know that I had muscles there." (P40/188–191) She described taking "a different approach to my body, because I realized how it all works." (P40/321–323) Participants saw this intensity of inner participation and attention differentiating yoga from conventional exercise.

Cognitive dimension. Participants reported that focusing their attention on the yoga poses enabled them to calm their minds and to block out extraneous cognitions while doing yoga. They thus experienced yoga not only as physical exercise, but also as a form of meditation. One participant saw

T2 ▶

◀ T3
◀ T4

◀ AU2

TABLE 3. SAMPLE CHARACTERISTICS

	Women	Men	Total
Sociodemographic characteristics			
Age			
18–30 years	2	0	2
31–40 years	2	1	3
41–50 years	5	0	5
51–60 years	6	2	8
Education			
<High school	6	0	6
High school	5	0	5
University degree	4	3	7
Employment			
Employed	11	2	13
Homemaker	3	0	3
Retired	0	1	1
Student	1	0	1
Neck pain characteristics			
Duration			
Less than 6 months	0	0	0
6 months–1 year	2	2	4
1–5 years	2	0	2
More than 5 years	8	0	8
Baseline intensity ^a			
Mild pain	6	0	6
Moderate pain	8	2	10
Severe pain	1	1	2
Postintervention intensity ^a			
Mild pain	13	3	16
Moderate pain	2	0	2
Severe pain	0	0	0

^aParticipants rated their neck pain intensity on a 100-mm visual analog scale (VAS) before and after the yoga program. Categories for pain intensity given according to Jensen et al.²⁵: mild pain, <45 mm VAS; moderate pain, 45–74 mm VAS; severe pain, 75–100 mm VAS.

it as “letting go...that is, while doing yoga, you really forget about anything else because you’re so busy...to stand right or to stand well. Not really to do the pose properly, but to make yourself feel good. There’s no space left for anything else. I believe that this is a reason, for me, why yoga is good for me.” (P45/329–334)

Participants also cited more perceived control over their general well-being in daily life, noting that their newfound

body awareness helped them to see how their behaviors and well-being were linked. This gave them a renewed sense of control over their bodies and health, freeing them from feeling controlled by their pain, as before. “Yes, I’m more aware about the association between my own actions and the way I feel...awareness, that you can change a lot yourself [...] and that you can achieve something this way. That you can...strengthen your body.” (P09/173–181)

Many participants said that they had avoided physical activity before their yoga program, fearing pain and re-injury. Participants’ experience of being able to influence their well-being through such activity, however, led many to reinterpret it cognitively. “By doing yoga I have to say, for the first time in a while I felt able to do sports. I’ve lost a lot of fear of making a wrong move.” (P48/68–71)

Emotional dimension. Participants also experienced emotional distance from burdensome situations during yoga. This led to a sense of deep relaxation and, for some, a different way of seeing their emotions. As one participant said “During [yoga] practice, I really listen into myself...I realized two or three times that, while I was doing that, I’m now – I don’t know – totally angry because of something completely different, but I wasn’t aware of that before [...] I discovered a different emotional starting point by concentrating on myself for a time and blocking out anything else.” (P40/349–360)

Body awareness seems to be an important precondition for relaxation during yoga. One participant described how his lack of body awareness had hindered relaxation: “I don’t have such a connection to my body, that I, yes...can perceive my body, that I keep my shoulders down and things. That’s an effort for me.” (P36/233–235) He described that in everyday life “I don’t see any...any big differences or emotional changes.” (P36/165–166)

Other participants reported using their newfound relaxation skills in their everyday lives, noting that they had become more even-tempered about their pain and more accepting of it and their disability. Participants spoke less negatively about their necks and seemed better able to accept this body part and their pain. “It’s OK, [my neck] is a part of me, even if it hurts a bit once in a while...But I’m not a robot, you see. And...yes...it’s OK just the way it is.” (P40/150–152)

Participants also saw themselves becoming generally more relaxed and less irritable over time, as well as more able to accept and cope with life’s burdens. “I am more in balance. And that doesn’t just mean [that my body is more balanced] but also this equanimity. That I not always go through the roof [...] and then calm down again and I am normal again, but, you know, that my mood swings are generally less intense.” (P40/278–283)

Behavioral dimension. Before the yoga program, participants tended to ignore their pain due to its seeming inescapability. They generally used endurance strategies to cope or, when pain became unbearable, sought help from others such as health professionals. Study participants saw yoga as an active self-help strategy, using yoga poses in stressful situations to relieve or even prevent pain. As one participant said, “I notice, when the pain increases that, from the yoga classes, I know for example that this half forward bend, that is now like a painkiller for me. That’s so brilliant! I just stand against a wall and try to do the half forward bend three, four, five times in

TABLE 4. ADHERENCE TO YOGA PRACTICE

	Women	Men	Total
Attended yoga classes (out of 9)			
0–1 classes	0	0	0
2–3 classes	0	0	0
4–5 classes	1	0	1
6–7 classes	8	3	11
8–9 classes	6	0	6
Mean days of home practice/week ^a			
0–1 days	0	1	1
2–3 days	8	2	10
4–5 days	5	0	5
6–7 days	2	0	2

^aParticipants noted home practice in a diary.

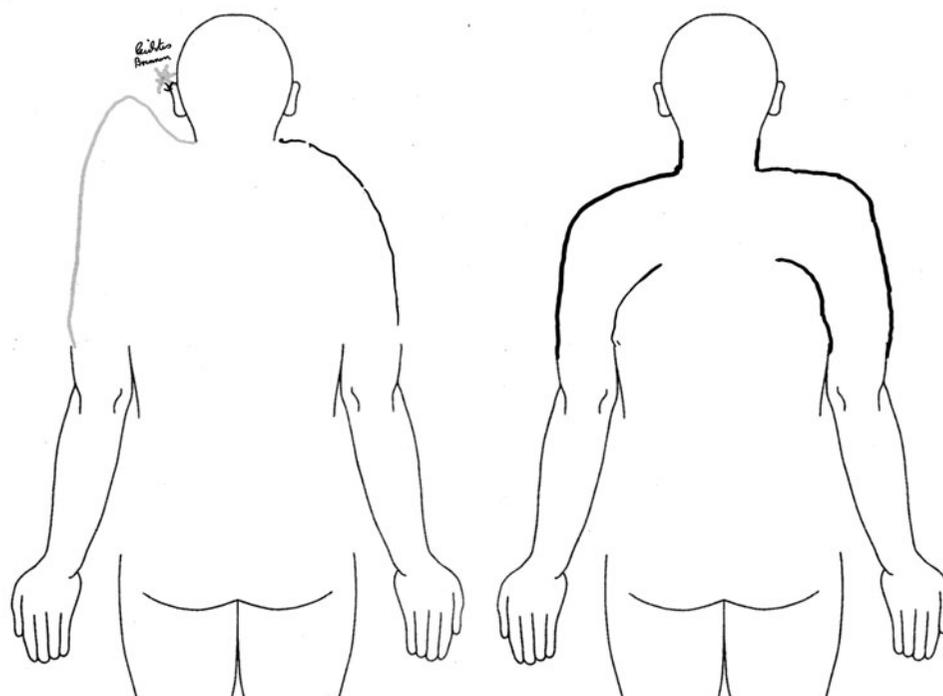


FIG. 2. One patient's drawings. **Left:** Drawing before the yoga program: "The right side has been in the background for me and the left side in the foreground [...] as if the left shoulder was on the top or really hunched up." (P47/53–57) **Right:** Drawing after the yoga program: "Two congruent areas...the left and the right neck-shoulder area, which for me are both unremarkable in this resting position." (P47/12–14)

◀ AU8
◀ AU9

a row, and that helps me dramatically." (P48/75–81) Some participants said that they had reduced their reliance on pain medication, and other passive treatments, through such behaviors. Yoga was also used as a stress management strategy. "[I felt] very tense...and very stressed, at a normal level though. That's life, but I have...the feeling now, that with yoga I've found a good way to cope with this and to come to rest." (P40/112–115).

However, if participants were unaware of their body, yoga was not perceived suitable for pain or stress relief. The aforementioned participant with low body awareness stated: "For me, yoga is no such form [of exercise], I have a strong motivation to continue." (P36/230–231)

Other participants' new body awareness also enabled them to actively monitor and control their posture in daily life, further relieving their pain. As one participant said, "It doesn't take much. 'OK, keep your shoulders down'. That's not...that's not yoga, but during the day, if I'm in the tram or in the car, or wherever I sit or stand, I can remember that. And it helps." (P49/274–278) Such changes also influenced participants' views of their personal capabilities; enhancing their perceived ability to identify and respect their physical and mental limits.

Social dimension. Many participants initially saw themselves as disabled by their pain, describing how they had limited their daily activities for physical or emotional reasons, and had increasingly withdrawn from activity and/or society for fear of worsening their pain. Yoga allowed participants to re-engage with their preferred activities and to lead more self-determined lives by relieving their pain and disability. One (1) participant (a student) described the social benefits of yoga as "That I could participate in training regularly, and didn't miss lessons at school because of the pain, that I

could do school sports normally. That I'm not disabled in my daily routines any more, in school, but also out of school. That I could meet my friends, or go to the cinema without having pain." (P35/125–131) Participants saw that yoga helped not only despite, but because it involved physical activity, actively countering their fears. As one participant said, "I'm no longer so anxious in some situations or in some activities." (P51/71–72)

Participants saw themselves as more efficient in their work and social lives. "I did my work before [yoga] too, but...it was really, really difficult for me. And...now I've found a new ease at work. I enjoyed work then and now, but it's different...now it's not so tense anymore, because it's easier when you don't feel pain anymore." (P51/118–124) Participants saw their work and social lives as enriched, and enjoyed them more, as they felt less tired and less in pain.

Discussion

Study participants reported experiences on physical, cognitive, emotional, behavioral and social dimensions. They described an active inner involvement during yoga practice, as well as renewed body awareness, a perceived internal locus of control, the cognitive reappraisal of physical activity and an increased acceptance of pain and disability.

Inner involvement

A distinct feature of Iyengar yoga is the awareness of muscle tension, joint position, and breathing patterns during practice.¹⁷ In the current study, participants experienced an intensified self-perception, seeing this as a precondition for relaxation during yoga practice. Yoga originally developed as a spiritual practice, with meditative involvement as an integral part.^{7,26} The importance of this active inner involvement in yoga practice has also been scientifically

demonstrated, since it has been linked to increased life satisfaction and mindfulness and lower symptom burden.²⁷ Such links suggest that inner involvement during yoga practice may be an important factor in mental stabilization and emotional regulation; to practitioners' benefit.²⁷

Renewed body awareness

Patients with neck pain often sense their necks and/or shoulder regions solely through pain.³ Pain distorts individuals' body perception by demanding attention, blocking their awareness of nonpainful body parts.²⁸ This is even measurable on the cortical level, where the painful body part becomes overrepresented,²⁹ influencing perception of form and position of the body in space.³⁰ In this study, participants reported increased body awareness during yoga and in their everyday activities. Yoga gave participants a new approach to their bodies, a mindful awareness of their actions and perceptions. Enhancing body awareness has been seen as a common ground of mind/body–medicine.¹⁹ A mindful, nonjudgmental, experience of bodily perceptions is thought to enhance connections between the body and the mind, and to promote the acceptance of body symptoms.^{19,31} Yoga, but not conventional exercise, has been shown to increase individuals' awareness and responsiveness to bodily cues,³² with such awareness being seen as an important factor in neck pain relief due to yoga.¹⁸ Regular practice is thought to increase yoga practitioners' awareness of bodily cues, helping them to recognize and change habitual patterns of posture and muscle tension.¹⁸ In the current study, increased body awareness helped participants to influence their body posture and muscle tension actively and thereby to reduce and at times prevent their pain.

Internal locus of health control

Through their active control of their body posture and tension, and experience of being able to relieve and prevent their pain, participants in this study experienced a new sense of control over their well-being. An internal locus of health control³³ has been shown to promote individuals' use of internal, active, coping strategies such as active strategies for lifestyle change. An external locus of health control instead is linked to using external coping strategies such as consulting health professionals.³⁴ Although many patients with chronic pain use external coping strategies, such strategies result in lower life satisfaction.^{34,35}

Cognitive reappraisal

Negative appraisals of pain and its consequences such as pain catastrophizing lead individuals to avoid daily activities, worsening their pain rather than relieving it²⁰: physical inactivity causes muscular atrophy,³⁶ and social withdrawal increases mood disturbances such as depression and distress, known to be neck pain risk factors.³⁷ Graded exposure to movement and activity is one way to overcome this "fear-avoidance-pain" circle.³⁸ Experiencing activity as pain-relieving rather than pain-inducing challenges negative appraisals, so that social activities are seen positively once again. Current study participants' experiences (i.e., that yoga helped them to overcome their fear of moving and resulting social withdrawal) exactly echo these findings.

Acceptance

Pain acceptance, striving to maintain psychosocial function regardless of pain, is linked to reduced pain, disability, inactivity, and depression.³⁹ Such acceptance has been seen as one mechanism for yoga's pain-relieving actions. Yoga aims to enhance participants' compassionate understanding of their health, enabling a nonjudgmental perception of pain without avoidance or social withdrawal.⁴⁰ Pain acceptance can also change patients' perspectives: Current study participants saw yoga as positive, even if it did not make them pain free.

Limitations

This study used a convenience sample. While female participants appeared to be a sufficiently heterogeneous group, especially regarding age and pain characteristics, this was not true for the few males who took part. The study's findings and conclusions may be more limited for the male, than the female participants, as a result. Other limitations are that results only reflect experiences during and immediately after the yoga program and no long-term experiences and that results might apply only for patients with muscular neck pain but not for patients with other sources of pain.

Conclusions

Yoga was seen as a multidimensional intervention linked to change in all dimensions of human experience. Body awareness seems to be a key mechanism in these changes.

Further qualitative research should focus on exploring perceived differences between yoga and other exercise or between different yoga styles. Quantitative studies might assess changes in, for example, body awareness or fear-avoidance using standardized instruments or even changes in cortical representations after yoga practice using imaging techniques.

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Disclosure Statement

No competing financial interests exist.

References

1. Vernon H, Mior S. The Neck Disability Index: A study of reliability and validity. *J Manipulative Physiol Ther* 1991;14: 409–415.
2. Daffner SD, Hilibrand AS, Hanscom BS, et al. Impact of neck and arm pain on overall health status. *Spine* 2003;28: 2030–2035.
3. Lauche R, Cramer H, Haller H, et al. My back has shrunk: The influence of traditional cupping on body image in pa-

- tients with chronic non-specific neck pain. *Forsch Komplementmed*. In press.
- AU3** ▶
4. Wolsko PM, Eisenberg DM, Davis RB, et al. Patterns and perceptions of care for treatment of back and neck pain: Results of a national survey. *Spine* 2003;28:292–297.
 5. Saper RB, Eisenberg DM, Davis RB, et al. Prevalence and patterns of adult yoga use in the United States: Results of a national survey. *Altern Ther Health Med* 2004;10:44–49.
 6. Feuerstein G. *The Yoga Tradition*. Prescott, AZ: Hohm Press, 1998.
 7. Iyengar BKS. *Light on Yoga*. New York: Schocken Books, 1995.
 8. Garfinkel MS, Schumacher HR Jr, Husain A, et al. Evaluation of a yoga based regimen for treatment of osteoarthritis of the hands. *J Rheumatol* 1994;21:2341–2343.
 9. Garfinkel MS, Schumacher HR Jr, Husain A, et al. Yoga-based intervention for carpal tunnel syndrome: A randomized trial. *JAMA* 1998;280:1601–1603.
 10. Williams KA, Petronis J, Smith D, et al. Effect of Iyengar yoga therapy for chronic low back pain. *Pain* 2005;115:107–117.
 11. Williams K, Abildso C, Steinberg L, et al. Evaluation of the effectiveness and efficacy of Iyengar yoga therapy on chronic low back pain. *Spine* 2009;34:2066–2076.
 12. Sherman KJ, Cherkin DC, Erro J, et al. Comparing yoga, exercise, and a self-care book for chronic low back pain: A randomized, controlled trial. *Ann Intern Med* 2005;143:849–856.
 13. Sherman KJ, Cherkin DC, Wellman RD, et al. A randomized trial comparing yoga, stretching, and a self-care book for chronic low back pain. *Arch Intern Med* 2011;171:2019–2026.
 14. Saper RB, Sherman KJ, Cullum-Dugan D, et al. Yoga for chronic low back pain in a predominantly minority population: A pilot randomized controlled trial. *Altern Ther Health Med* 2009;15:18–27.
 15. Tilbrook HE, Cox H, Hewitt CE, et al. Yoga for chronic low back pain: A randomized trial. *Ann Intern Med* 2011;155:569–578.
 16. Cramer H, Hohmann C, Lauche R, et al. Randomized controlled trial of Iyengar yoga for chronic neck pain [Abstract]. *J Tradit Chin Med* 2011;31(suppl):17.
 17. Shapiro D, Cook IA, Davydov DM, et al. Yoga as a complementary treatment of depression: Effects of traits and moods on treatment outcome. *Evid Based Complement Alternat Med* 2007;4:493–502.
 18. Krucoff C. *Healing Yoga for Neck & Shoulder Pain: Easy, Effective Practices for Releasing Tension & Relieving Pain*. Oakland, CA: New Harbinger Publications, 2010.
 19. Mehling WE, Wrubel J, Daubenmier JJ, et al. Body awareness: A phenomenological inquiry into the common ground of mind-body therapies. *Philos Ethics Humanit Med* 2011;6:6.
 20. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain* 2000;85:317–332.
 21. Broom A. Using qualitative interviews in CAM research: A guide to study design, data collection and data analysis. *Complement Ther Med* 2005;13:65–73.
 22. Verhoef MJ, Casebeer AL, Hilsden RJ. Assessing efficacy of complementary medicine: Adding qualitative research methods to the “Gold Standard”. *J Altern Complement Med* 2002;8:275–281.
 23. Mitchell LA, MacDonald RA. Qualitative research on pain. *Curr Opin Support Palliat Care* 2009; 3:131–135.
 24. Mayring P. *Einführung in die Qualitative Sozialforschung*. 5th ed. Weinheim, Basel: Beltz Verlag, 1998.
 25. Jensen MP, Chen C, Brugger AM. Interpretation of visual analog scale ratings and change scores: A reanalysis of two clinical trials of postoperative pain. *J Pain* 2003;4:407–414.
 26. Desikachar TKV. *Religiousness in Yoga: Lectures on Theory and Practice*. Lanham: University Press of America, 1980.
 27. Büssing A, Edelhäuser F, Weisskircher A, et al. Inner correspondence and peacefulness with practices among participants in eurythmy therapy and yoga: A validation study. *Evid Based Complement Alternat Med* 2011;pii:329023.
 28. Eccleston C, Crombez G. Pain demands attention: A cognitive-affective model of the interruptive function of pain. *Psychol Bull* 1999;125:356–366.
 29. Flor H, Braun C, Elbert T, Birbaumer N. Extensive reorganization of primary somatosensory cortex in chronic back pain patients. *Neurosci Lett* 1997;224:5–8.
 30. Le Bars D, Cadden SW. What is a wide-dynamic-range cell? In: Bushnell MC, Basbaum AI, eds. *The Senses: A Comprehensive Reference*, vol. 5, Pain. San Diego, CA: Academic Elsevier, 2008:331–338.
 31. Bishop SR, Lau M, Shapiro S, et al. Mindfulness: A proposed operational definition. *Clin Psychol Sci Pract* 2004;11:230–241.
 32. Daubenmier JJ. The relationship of yoga, body awareness, and body responsiveness to self-objectification and disordered eating. *Psychol Women Q* 2005;29:207–219.
 33. Rotter JB. Generalized expectancies for internal versus external control of reinforcement. *Psychol Monogr* 1966;80:1–28.
 34. Büssing A, Ostermann T, Matthiessen PF. Wer kontrolliert die Gesundheit? Adaptive Krankheitsverarbeitungsstile bei Patienten mit chronischen Erkrankungen. *Deutsche Zeitschr Onkol* 2008;40:150–156.
 35. Büssing A, Ostermann T, Neugebauer EA, Heusser P. Adaptive coping strategies in patients with chronic pain conditions and their interpretation of disease. *BMC Public Health* 2010;10:507.
 36. Bortz WM. The disuse syndrome. *West J Med* 1984;141:691–694.
 37. Linton SJ. A review of psychological risk factors in back and neck pain. *Spine* 2000;25:1148–1156.
 38. Crombez G, Vervaeke L, Lysens R, et al. Do pain expectancies cause pain in chronic low back patients? A clinical investigation. *Behav Res Ther* 1996;34:919–925.
 39. Nilges P, Köster B, Schmidt CO. Schmerzakzeptanz: Konzept und Überprüfung einer deutschen Fassung des Chronic Pain Acceptance Questionnaire. *Schmerz* 2007;21:57–67.
 40. Evans S, Cousins L, Tsao JC, et al. A randomized controlled trial examining Iyengar yoga for young adults with rheumatoid arthritis: A study protocol. *Trials* 2011;12:19.
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AU1: affiliation 1 and correspondence affiliation must match; please translate items added to affil. 1 into English

AU2: Please indicate at this first mention what the "(P../(etc.) numbers represent

AU3: Ref. 3: update?

AU4: Please translate ref. 24 book title into English, with "[in German]" after

AU5: Ref. 34: Translate article title into English, and add "[in German]" following

AU6: Ref. 39: Translate article title into English

AU7: Please translate „Kliniken“ and „Knappsschafts-Krankenhaus“ into English

AU8: Explain meaning of "(P47" (etc.) in Fig. 2 legend?

AU9: Please cite Figure 2 in the text.