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The role of Iyengar Yoga practice in chronic, non-malignant pain. A clinical review focused on current evidence

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ABSTRACT

Background: Chronic pain leads to severe functional disability and worsening of quality of life. The aim of this review is to assess the efficacy of Iyengar yoga on chronic non-malignant pain, in terms of pain intensity, functional status, and quality of life.

Methods: Research focused on the efficacy of Iyengar yoga on non-malignant chronic pain, from 2019 and back, with studies only in English language.

Results: Studies about Iyengar yoga were limited (N=17). Six studies were identified on low back pain, 3 on chronic neck pain, 2 on osteoarthritis, 2 on rheumatoid arthritis, 1 on irritable bowel syndrome and 1 on multiple sclerosis. Results were positive for low back pain, and beneficial in all other entities. Furthermore, Iyengar yoga requires an experienced certified teacher, and regular home practice.

Conclusions: Iyengar yoga with could be beneficial as an adjuvant for chronic pain diseases, especially in patients with low back pain.

Key words: Yoga-Iyengar-pain-chronic

1 INTRODUCTION

Chronic pain affects a large number of patients leading to severe functional disability and worsening of quality of life. Along with conventional pharmacotherapy and interventional pain management, complementary therapies such as yoga, have gained a distinct position in the management of pain. ¹

Yoga was developed in ancient India, including a series of body postures, combined with breathing patterns and meditation techniques. Of the various schools of yoga, Iyengar yoga (IY) was created and taught by BKS Iyengar, fo-

cusing on body alignment, balance, strength, and correct breathing.^{1–7} He has systematized over 200 asanas (body postures) and 14 types of pranayama (breath-control exercises), ranging from simple to more complex ones. The use of props as blankets, blocks, bricks, belts, ropes and trestles, facilitates the correct performance of the yoga postures, thus minimizing the risk of injuries. This, together with the high standards of teaching of Iyengar yoga certified teachers, are the main reasons why Iyengar yoga has been endorsed by various medical societies and used in medical studies.^{1,8}

Until now, there are some studies published, regarding the efficacy of yoga on pain, but not always referring to Iyengar yoga. The aim of this review is to emphasize on the efficacy of Iyengar yoga on chronic non-malignant pain, in terms of pain intensity, functional status, and the overall

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quality of life.

2 MATERIALS AND METHODS

Research was focused on the effectiveness of Iyengar yoga on chronic non-malignant pain. A number of keywords were searched in several databases (PubMed, Scopus, Web of Science, Google Scholar), aiming for papers in English language. Keywords used alone and in combination were: yoga; Iyengar; non-malignant pain; chronic. Of the studies that included the general term "yoga" in their title, only studies referring specifically to IY were included in this review. Research was performed from 2019 and back, without restriction in the year of publication, due to the lack of extensive literature on the subject.

3 RESULTS

A number of studies that examined the term yoga in relation to chronic pain of non-malignant origin were identified. However, the studies about Iyengar yoga alone, were extremely limited (N=17). Six studies were identified on low back pain, 3 on chronic neck pain, 2 on osteoarthritis, 2 on rheumatoid arthritis, 1 on irritable bowel syndrome and 1 on multiple sclerosis (Table 1). Examples of postures used in Iyengar yoga practice in the studies reviewed are presented on Table 2. The characterization "positive" or "negative" (Table 2) is applied to studies, based on the favorable effect of Iyengar yoga, on pain intensity and functional status.

Low back pain

Low back pain (LBP) is one of the commonest causes of non malignant chronic pain.^{8,9} It is usually treated with pharmacotherapy, combined to physiotherapy, exercise and psychosocial interventions. However, the use of yoga is still under investigation.

One of the earliest randomized controlled trials studying Ivengar voga was performed by Williams et al,⁸ including 60 patients with chronic, non-specific LBP. Patients were randomized into two groups; the IY group, consisted of 30 patients, performing one 90-minute class/week, combined to 30 min practice at home, 5 days per week, who practiced a sequence of 29 asanas. The other 30 patients formed the control group. Both groups received 16 weekly advice letters on back care; and two 1-hour lectures on occupational and physical therapy on LBP, combined to educational handouts. The main outcome measures included the Pain Disability Index (1-10), pain intensity (VAS 0-10 and McGill), fear of movement (Tampa Scale of Kinesophobia), pain attitudes and behaviors (Survey of Pain Attitudes, SOPA), the Coping Strategies Questionnaire Revised, the Back Pain Self Efficacy Scale, the range of spinal motion (Saunders Digital Inclinometer), and analgesic requirements. A significant reduction in pain intensity, functional disability, and pain medication was revealed favoring the IY group at 3 months, without significant difference on pain attitudes and behaviors. This may be due to the small sample size, and the short interval of assessment, since psychosocial factors may require more time to show improvement.

The same team of researchers¹⁰ studied in a randomized manner, 90 participants with chronic non-specific LBP, comparing IY to self-directed standard medical care. Iyengar yoga included 2, 90-minute classes/week, for 24 weeks, with additional home practice, while the other group used only standard medical care. Follow-up was performed with the Oswestry Disability Index, a Visual Analogue Scale for pain, Beck Depression Inventory and a medication questionnaire to assess analgesics. A significant improvement in pain and functionality was observed in patients who practiced yoga, combined to a lower percentage of depression. Pain medication was also reduced, but there was no difference between the groups. The efficacy of yoga on depression is of major interest, since psychological symptoms often overlap or coexist in most pain disorders.

Similarly, Cox et al,¹¹ conducted a pilot study to assess the effectiveness of Iyengar yoga in patients with chronic LBP, compared to usual care. Twenty participants were randomized to either a 12-week IY program once a week (75 minutes), or to usual care, accompanied by written advice. The authors assessed mainly the functional improvement, and secondarily pain, quality of life and self efficacy. Change, as measured by the Roland Morris Disability questionnaire was the primary clinical outcome. Changes in the Aberdeen Back Pain Scale, SF-12, EQ-5D, and pain selfefficacy were secondary outcomes. Data were collected via postal questionnaire at baseline, and after 4 and 12 weeks. This study did not reveal any significant differences between the groups in all outcomes, except of the Aberdeen Back Pain Scale, which was better at the four-week follow-up. However, the very small number of enrolled patients is a serious limitation.

In a larger scale study, Tirbrook et al, 12 studied the outcome of 313 participants with chronic non-specific LBP. This was a multicenter study with a large number of patients, which explored the efficacy of Iyengar-style yoga after 12 weeks of practice, and also after 12 months. Patients received 12 weekly 75-min classes, in addition to home practice for 30 minutes daily (>2 times/week), versus a usual care group. Both groups received a booklet on managing LBP. Outcome measures included the Roland-Morris questionnaire at 3, 6, and 12 months, the Aberdeen Back Pain score, the SF-12 scale, the Pain Self-efficacy score, the EQ-5D and the Physical Component Score, as well as medication and healthcare use over the follow-up period. Findings revealed that patients who practiced yoga had a better functional status, at all time points compared to the usual care group. As for pain, both groups had similar results.

Similarly, Wattamvar et al, ¹³ included 24 patients with chronic, non-specific LBP. Half of participants received IY (one 45-minute class/week for 10 weeks) combined to 2x45-60 minutes of occupational therapy. The control group received only occupational therapy, with some simple asanas added to the program. Outcome measures included the Oswestry Disability Index at 10 weeks, as well as the Roland-Morris, the change in range of motion of the lumbar spine,

as well as the muscle strength of the abdominal muscles and back. Results showed that the combination of occupational therapy and yoga was more effective than occupational therapy alone, especially regarding the strengthening of back extensors and the spinal range of motion. The social life of patients was also positively affected. However, due to the small sample, results may only indicate a small clinical benefit of adding yoga to standard therapy.

Nambi G, et al,¹⁴ studied in a randomized manner 60 patients with non-specific LBP, comparing the effect of IY to that of conventional exercise for 4 weeks, regarding pain intensity and Health-Related Quality of Life. Each patient attended a structured IY class, once a week, for 4 weeks, combined to exercise at home of at least 30 minutes, 5 days/week. The other group of conventional exercise had a specific training program, for 3 days/week, for 4 weeks. Results revealed that the yoga group showed a significant reduction of the intensity of pain, together with a significant improvement on quality of life.

Neck pain

Chronic neck pain is also a condition responsible for considerable personal disability. Common analgesics, combined to non steroidal anti-inflammatory drugs and physiotherapy are prescribed in most cases. ¹⁴ However, alternative treatments still have a place, requiring further investigation.

Cramer et al, 15 studied the efficacy of IY on pain and disability on patients with chronic non-specific neck pain. The study included 51 patients who had IY for 9 weeks combined to home practice, for 12 months. The program was designed by experienced teachers and physiotherapists. Outcome measures included pain intensity (0-100), disability (Neck Disability Index), SF-36, generic disability (days of restricted abilities) and general improvement. Results showed that pain intensity was significantly improved, as well as the neck related disability and SF-36. An interesting observation was that the improvement in pain intensity was related to the time of voga practice per week, and that the majority of patients reported an improvement in their general health status. In addition, a major finding was that regular IY practice at home was very important. On the other hand, a limitation of this study was the absence of comparison with a control group.

Michalsen et al,¹⁶ also studied the effectiveness of IY on chronic neck pain versus usual care. The study included 77 patients, who were randomized to receive either IY (90 minutes/week for 9 weeks) or usual care, with a self care manual for assistance. Outcome measures included neck pain intensity at rest between baseline and 10th week of treatment (VAS 0-100), neck related disability, SF-36, and mood (CES-D, POMS). Results of the study showed that the mean pain intensity and disability were significantly reduced in the Yoga group, at rest and during motion.

Similarly, following a randomized manner, Ulug et al, ¹⁷ studied the effects of IY and pilates or isometric exercise in 56 patients with chronic neck pain. Patients were randomized to receive either IY (n=18), pilates (n-18), or isometric exercise (n=20) for 6 weeks, all combined to physiotherapy for 15 sessions. Outcome measures included the thickness of

neck muscles (measured by ultrasound), the degree of cervical motion, pain intensity (McGill), the Neck Disability Index, the Nottingham Health Profile and Beck Depression Inventory. Results of the study showed a similar improvement in all groups, with no significant differences in most outcome measures. The only difference revealed was the superiority of the pilates group on semispinalis capitis muscle thickness. However, this study has serious limitations, including the short duration of treatment, partial supervision of exercises and the limited exercise protocols.

 $Rheumatoid\ arthritis$

Rheumatoid arthritis (RA) represents a serious, chronic muscoloskeletal disease, affecting younger as well as older adults, leading to chronic pain and significant reduction of quality of life. ¹⁸

Evans et al, 18 performed a pilot study on eight young adults with RA. All patients exhibited reduced range of motion in many joints, especially hips, knees, wrists, shoulders and fingers. All patients followed an IY program for sixweeks, with two sessions/week. Outcome measures included Pain Disability Index (0-10), Health Assessment Questionnaire for arthitis (0-100), SF-36, as well as a weekly monitoring assessment form about pain, anxiety, depression and energy (0-10). Psychological and spiritual evaluation was performed with the Brief Evaluation Inventory (BSI-18), while beliefs and coping strategies were assessed with the Arthritis Self-efficacy Scale and the Chronic Pain Acceptance Questionnaire. Participants reported a significant improvement regarding pain, disability, depression, as well as general vitality, mental health, mood, and self-efficacy. Although not statistically significant, a trend was also observed for decreased anxiety, increased mindfulness and acceptance of their chronic pain condition compared to baseline. The main problem identified was the rather short time that attendants practiced yoga.

The same authors published a new study during 2013, ¹⁹ which evaluated in a randomized manner the effect of IY on Health-related quality of life including pain and disability, on 26 young women with RA. Outcome measures were similar to their previous study. The participants were randomized on receiving IY versus usual care. All patients were assessed at baseline, after 6 weeks of IY and after 2 months. A statistically significant improvement was revealed in pain disability score, as well as at two of the SF-36 subscales (general health and vitality) in the yoga group. Additionally, patients of the yoga group showed improvement in RA symptoms. Almost half of the patients who received IY, showed a clinical improvement in HRQOL, general health, pain disability and in weekly reports, as well as in psychological parameters.

Osteo arthritis

Iyengar yoga has been studied in chronic osteoarthritis, a condition affecting many patients worldwide.²⁰ However, studies regarding yoga are very limited. Specifically, Garfinkel et al,²¹ investigated the efficacy of IY on pain and functional status of hand osteoarthritis in a randomized manner (60 minute sessions/week for 8 weeks). They studied 14 patients who had yoga versus 11 controls that

had no therapy, using as a primary outcome the Stanford Hand Assessment questionnaire, referring to pain, movement, strength, motion, tenderness and joint circumference. Results showed that the yoga group improved significantly compared to the control group. However, the very small sample size and the absence of detailed description of the asanas, limits the clinical applicability of the results.

Similarly, Kolasinski et al,²² observed a series of 7 patients with knee osteoarthritis, who attended IY classes of 90 minutes once a week for 8 weeks. Patients were assessed using the WOMAC score, the Arthritis Impact Measurement Scale-2, and the 50-foot walk. Findings showed a significant improvement in all measures compared to baseline values, indicating a positive role of IY. However, the small sample size and the absence of randomization and of a control group, significantly limits the impact of this result.

Irritable bowel syndrome

Irritable bowel syndrome (IBS) is a common chronic condition, but studies regarding the effect of yoga practice are lacking. Evans et al,²³ systematically studied the efficacy of an IY program of 6 weeks (twice a week) in young adults and adolescents (14-26 years) with chronic IBS. Patients were randomized in two groups: IY group (n=29) and usual care control group (n=22). The main outcome measures included primarily IBS symptoms and an abdominal pain intensity scale, and secondarily global improvement, disability, psychological distress, sleep and fatigue. All parameters were recorded at 6 weeks and after 2 months. The study showed no significant improvement in pain, but a global symptom improvement after yoga, which was not however, maintained during the follow-up period. The symptoms that were improved were the worst abdominal pain, constipation, nausea and global health, but only global health, worst pain and nausea were maintained after 2 months.

Multiple Sclerosis

Multiple Sclerosis is a progressive neurodegenerative disease, causing a variable degree of disability and chronic pain. Oken et al,²⁴ performed a randomized controlled trial of of 69 patients, who had IY (90 minutes, twice a week plus home practice), versus a control group which included aerobic exercises or waiting list patients. The outcome was assessed after 6 months including the Profile of Mood States, the State-Trait Anxiety Inventory, the Multi-Dimensional Fatigue Inventory and SF-36. Results showed significantly improved fatigue symptoms compared with the wait-list controls, but the differences between the IY group and the exercise control group were very limited. However, there is a major limitation in this study: the outcome was measured only in the short term, while pain and functional status were not assessed.

Discussion

The results of current literature research regarding the effect of Iyengar yoga (IY) on chronic pain are promising, especially for conditions such as non-specific low back pain (LBP) and neck pain. The six studies that were identified on LBP revealed that it is effective both for pain management and functional improvement. The studies investigated IY compared to an educational program, standard medical care, 10-12 occupational therapy, a exercise, or other

styles of yoga.²⁷ They all revealed positive results as for pain reduction and functional improvement, combined in some cases with strengthening of back muscles and improved spinal range of motion,¹³ depression reduction,¹⁰ and pain medication consumption.⁸

In current literature, the most recent evidence on the efficacy of yoga, including Iyengar, on LBP, comes from a systematic review²⁶ that included 12 trials (1080 participants). Findings revealed that yoga compared to non-exercise led to small-to-moderate improvement in back-related functionality at 3-4 up to 12 months of follow up (low to moderate quality evidence). As for pain, yoga was revealed to be better at 3, 6 and 12 months. The problem with this review is that its results do not refer only to Iyengar yoga, but to all kinds of yoga. However, since half of the studies included in this study were Iyengar or modified-Iyengar, the findings can still be considered appropriate and are in accordance with findings of the current review.

As for chronic neck pain, the 3 studies identified in literature, also show positive results. Cramer et al,²⁷ on their systematic review on the efficacy of yoga on chronic neck pain, reviewed 3 studies (188 patients) including all types of yoga. Results showed that the short-term effects for pain intensity, disability and mood, were positive for all patients practicing yoga. However, since neck pain is commonly associated with serious pathology, it is essential that a thorough medical evaluation is performed before initiation of practice. In this case, the cooperation of physicians, physiotherapists and certified Iyengar yoga teachers is very important, in order to avoid stress of the fragile neck structures, which would possibly result in unwanted neck muscle stress.

As for rheumatoid arthritis, isolating one kind of pain is really difficult, since the disease is poly-systematic. Even when the joint inflammation is partially controlled, pain and disability continue to be a major issue, especially in younger patients. This is the place where voga was effective as an adjuvant therapy. However, due to the limitation of data, this clinical situation should be evaluated in a larger population and for a longer period of time. As for other forms of arthritis, studies showed also a positive effect, although the evidence is limited. The two existing trials revealed positive results, but they are not homogenous and include a very limited number of patients. Larger scale studies that will include patients with osteoarthritis of large, weight-bearing joints, such as the knee and hip, are certainly required in order to prove a beneficial effect. The same applies for multiple sclerosis and irritable bowel syndrome, where there is not enough evidence for pain improvement

The beneficial effect of Iyengar yoga on chronic musculoskeletal conditions is of great importance, since in many cases pharmacotherapy fails to improve functional status, or has adverse effects. In Iyengar Yoga, muscle groups are strengthened and lengthened, providing awareness of body position, improved body posture and relaxation. The main advantage of IY is the emphasis on proper body alignment and the care taken to protect the joints. The use of assisting devices is helpful to relieve tension and stress from the aching joints and protects from irritation, permitting

patients of all stages of arthritis to perform the poses. Practice can be individualized, in order to meet the needs of each patient, depending on the stage of the disease, the levels of pain and the difficulty in body functioning.

One of the main problems recognized in current literature is the duration of yoga practice required to achieve a beneficial effect on pain. There is great variability, ranging from 6 to 24 weeks. It is believed that the longer the duration of practice, the better the benefit. Home practice also seems to make a difference, since most studies used in their protocols standardized asanas for home practice more than once per week.

Other kinds of chronic pain should also be evaluated, such as chronic headaches, neuropathic pain, pelvic pain, etc. The therapeutic effect of yoga as a complementary technique combined with a multimodal pain management plan may be extremely beneficial.

4 CONCLUSIONS

In conclusion, Iyengar yoga with an experienced certified teacher, and a regular home practice, could be beneficial as an adjuvant for chronic pain diseases as shown in current literature. However, care must be taken to identify certified (that is properly educated)²⁸ teachers in terms of patients safety, and secondarily in terms of efficacy. Consultation and discussion between the referring physician and the teacher, describing in detail patients' health problems, mobility restrictions and the exact cause of pain, will make the Iyengar yoga intervention more effective. Further studies are required, aiming to investigate in a standardized manner the long term effectiveness of Iyengar yoga on various forms of chronic pain. [1–28]

REFERENCES

- [1] Nambi G, Shanmugananth, Devi S, Inbasekaran D, Jagannathan K, Khuman R. Changes in pain intensity and health related quality of life with Iyengar yoga in nonspecific chronic low back pain: A randomized controlled study. International Journal of Yoga. 2014;7(1):48–48. Available from: https://dx.doi.org/10.4103/0973-6131.123481.
- [2] Cohen SP, Hooten WM. Advances in the diagnosis and management of neck pain. BMJ. 2017;358:j3221–j3221. Available from: https://dx.doi.org/10.1136/bmj.j3221.
- [3] Evans S, Moieni M, Taub R, Subramanian SK, Tsao JCI, Sternlieb B, et al. Iyengar Yoga for Young Adults with Rheumatoid Arthritis: Results From a Mixed-Methods Pilot Study. Journal of Pain and Symptom Management. 2010;39(5):904-913. Available from: https://dx.doi.org/10. 1016/j.jpainsymman.2009.09.018.
- [4] Evans S, Subramanian S, Sternlieb B. Yoga as treatment for chronic pain conditions: A literature review. International Journal on Disability and Human Development. 2008;7(1):25–32. Available from: https://dx.doi.org/10.1515/ijdhd.2008.7.1.25.
- [5] Wieland LS, Skoetz N, Pilkington K. Yoga treatment for chronic non specific low back pain. Cochrane Data base Syst Rev. Issuel Art. 2017;.

- [6] Iyengar B. The Tree of Yoga. Boston: Shambhala Publications: 2002.
- [7] Williams K, Abildso C, Steinberg L, Doyle E, Epstein B, Smith D, et al. Evaluation of the Effectiveness and Efficacy of Iyengar Yoga Therapy on Chronic Low Back Pain. Spine. 2009;34(19):2066–2076. Available from: https://dx.doi.org/ 10.1097/brs.0b013e3181b315cc.
- [8] Evans S, Lung KC, Seidman LC, Sternlieb B, Zeltzer LK, Tsao JCI. Iyengar Yoga for Adolescents and Young Adults With Irritable Bowel Syndrome. Journal of Pediatric Gastroenterology and Nutrition. 2014;59(2):244–253. Available from: https://dx.doi.org/10.1097/mpg.0000000000000366.
- [9] Hochberg MC, Altman RD, April KT, Benkhalti M, Guyatt G, McGowan J, et al. American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. Arthritis Care & Research. 2012;64(4):465–474. Available from: https://dx.doi.org/10.1002/acr.21596.
- [10] Whitehead A, Fogerite SG. Yoga Treatment for Chronic Non-Specific Low Back Pain (2017). EXPLORE. 2017;13(4):281–284. Available from: https://dx.doi.org/10. 1016/j.explore.2017.04.018.
- [11] Iyengar B, Life RLO. London; 2005.
- [12] Garfinkel MS, Schumacher HR, Husain A. Evaluation of a yoga based regimen for treatment of osteoarthritis of the hands. J Rheumatol. 1994;12:2341–2344.
- [13] Kolasinski SL, Garfinkel M, Tsai AG, Matz W, Dyke AV, Schumacher HR. Iyengar Yoga for Treating Symptoms of Osteoarthritis of the Knees: A Pilot Study. The Journal of Alternative and Complementary Medicine. 2005;11(4):689– 693. Available from: https://dx.doi.org/10.1089/acm.2005. 11.689.
- [14] Michalsen A, Traitteur H, Lüdtke R, Brunnhuber S, Meier L, Jeitler M, et al. Yoga for Chronic Neck Pain: A Pilot Randomized Controlled Clinical Trial. The Journal of Pain. 2012;13(11):1122–1130. Available from: https://dx.doi.org/10.1016/j.jpain.2012.08.004.
- [15] Iyengar B, London DKY; 2001.
- [16] Wattamwar RB, Nadkarni K. Effect of conventional occupational therapy and yoga in chronic low back pain. Indian Journal of Occupational Therapy. 2013;45(3):13–20.
- [17] Tilbrook HE, Cox H, Hewitt CE, Kang'ombe AR, Chuang LH, Jayakody S, et al. Yoga for Chronic Low Back Pain. Annals of Internal Medicine. 2011;155(9):569–569. Available from: https://dx.doi.org/10.7326/0003-4819-155-9-201111010-00003.
- [18] Ulug N, Yilmaz OT, Kara M. Effects of pilates and yoga in patients with chronic neck pain: a sonographic study. J Rehab Med. 2018;50:80–85.
- [19] Cramer H, Klose P, Brinkhaus B, Michalsen A, Dobos G. Effects of yoga on chronic neck pain: a systematic review and meta-analysis. Clinical Rehabilitation. 2017;31(11):1457–1465. Available from: https://dx.doi.org/10.1177/0269215517698735.
- [20] Iyengar G, Yoga, For G, Women. Timeless books; 1990.
- [21] Oliveira CB, Maher CG, Pinto RZ, Traeger AC, Lin CWC, Chenot JF, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview. European Spine Journal. 2018;27(11):2791– 2803. Available from: https://dx.doi.org/10.1007/s00586-018-5673-2.
- [22] Cramer H, Lauche R, Hohmann C, Langhorst J, Dobos G. Yoga for Chronic Neck Pain: A 12-Month Follow-Up. Pain Medicine. 2013;14(4):541–548. Available from: https://dx. doi.org/10.1111/pme.12053.

Table 1. Studies reviewed (year, author, type of study, type of pain examined, number of patients included, duration and type of Iyengar yoga employed, main and secondary outcome measures, follow up time and efficacy of Iyengar yoga).

Year	Au- Type thors of study	of	No of patients	Duration and type of Iyengar yoga	Outcome measures	Fol- Efficacy low up
1994	Garfin RC T et al.21	of	N=25 Iyengar syoga, n=14 vs controls (no therapy)	8 weeks Iyengar yoga 60 min/week controls, no therapy	Pain, strength, motion, joint circumference, tenderness, hand function Stanford hand assessment questionnaire	(time) 8 POSITIVE weeksReduction of pain, improvement of mobility
2004	Oken RCT et al.25	MS	n=11 N=69 IY, n=22 vs Aerobic exercise, n=15 & wait list controls, n=20	8 weeks Iyengar yoga, 90 min 2 times per week & home practice Aerobic exercise & wait list controls,	Profile of Mood States, State-Trait, Anxiety Inventory, Multi-Dimennal Dimensiional Fatigue Inventory, SF-36	6 POSITIVE monthsignificantly improved fatigue in IY group compared with the wait-list controls, No differences observed on mood or cognitive functioning measures.
2005	lasin- ser- ski va- et tiona	OA of the l knee	n=7	8 weeks 90 min IY/weekly	WOMAC, AIMS2, Patient Global Assessment, 50-foot walk time	8 POSITIVE weeksSignificant reduction in WOMAC pain, physcial function, AIMS2 compared to
2005	al.22 WilliaRi©T KA, et al.8	LBP	n=60 Iyengar yoga and education: n=30 vs education only: n=30	16 weeks 90 min Iyengar yoga per week & home practice (29 Iyengar yoga asanas) vs educational program	Pain Disability Index (1-10) Pain intensity (VAS 0-10) McGill Pain Questionnaire, Fear of Movement (TSK), Pain Attitudes (SOPA), coping strategies questionnaire revised, CSQ-R spinal range of motion (Saunders digital inclinometer), back pain self efficacy scale, BPSES	prior yoga therapy 3 POSITIVE monthReduction in pain intensity (64%), functional disability (77%) and pain medication usage (88%) in the yoga group
2009	Willia Ri ©T et al.10	LBP	N=90 Iyengar yoga vs standard medical care	24 weeks 2x90 min Iyengar yoga per week & home practice vs standard medical care	Functional status (Oswestry Disability Index), Pain (VAS 0-100), Beck Depression Invetory, Medication questionnaire	6 POSITIVE monthReduction in pain intensity, improvement in functional status significantly better in yoga group. Less depression in Yoga group. No difference in pain medication.
2010	EvansCase S, se- et ries al.18	Rheu toid arthr tis		6 weeks Iyengar yoga structured program	Pain Disability Index (0-10) Health Assessement Questionnaire (HAQ) 0-100 SF-36 Weekly form 0-10 on pain, anxiety, depression, energy Brief Symptom Inventory (BSI-18), Arthritis Self-efficacy Scale, Chronic Pain Acceptance Questionnaire. 15-item Mindfulness Attention Awareness Scale,	POSITIVE monthsignificant improvement in pain intensity, pain disability, depression, vitality, mental health, mood, and self-efficacy in the yoga group.
2010	Cox RCT et al.11	LBP	$\label{eq:substitute} Iyengar\\ yoga,\\ n=10\\ vs\\ usual care,\\ n=10 \ \&\\ written\\ advice for$	12 weeks 76 min Iyengar yoga structured program, 1/week	semi-structured interviews Functional status (Roland Morris), Aberdeen pain scale SF-12 EQ-5D Information of Medical and Hea	12 POSITIVE weeks Yoga group had better results in Aberdeen pain scale only at 4 weeks of follow up No other significant alth Scientiff WOVE IS 05 W 337 + 844 (2020 groups
2011	TilbroRCT	LBP	LBP N=313	12 weeks	Roland-Morris Disability	12 POSITIVE

Table 2. Examples of postures (asanas) used in Iyengar yoga practice in the studies reviewed.

Low back pain Rheumatoid arthritis Chronic neck (Williams et al.)8,10 pain (Evans et al.) 18,23 (Ulug et al.)17 Adho Mukha Savasana II with bolster and sandbag; with sacral Supported Savasana Supta Baddhakonasana Virasana, traction Prone Savasana with 25 lb weight on buttocks Upavista Konasana Tadasana. Prone Supta Padangusthasana with raised knee bent Bharavajasana Torso twist Virabhadrasana and supported Sirsasana Supta Pavanmuktasana—1 knee to chest, both knees Salamba Sarvangasana Chair Bharadvajasana Viparita Dandasana to best Supta Padangusthasana I-II—bent knee and straight Setubandha Sarvangasana leg with support of the wall; with assisted traction; Adhomukha Svanasana Utthita Tikonasana traction with two straps Pavanmuktasana on the bench Tadasana Uttanasana on the stool Urdhva Baddha Hastasana Ardha uttanasana onto halasana box with double Adho Mukha Svanasana using simhasana box and upper wall ropes Lumbar traction with straight legs and bent legs Adho Mukha Virasana over holster Parsva Pavanmuktasana on bench Prasarita Padottanasana on bench with traction on the upper thighs Parsvottanasana Maricyasana III at trestler Tadasana with block between the legs Utthita Hasta Padangusthasana I and II with bent knee and straight leg Parivritta Hasta Padangusthasana III straight leg supported on stool at trestler Utthita Padmasana—forward bend (adho mukha) and lateral stretch (parsva) Adho Muhka Sukasana Parsva Sukasana Trikonasana (at trestler with traction) Virabdrasana II (at trestler with traction) Parsvakonasana (at trestler) Parivritta Trikonasana (trestler) Bharadvajasana (chair) Supported Urdhva Prasarita Padasana Supported Baddha Konasana\

- [23] Oken BS, Kishiyama S, Zajdel D, Bourdette D, Carlsen J, Haas M, et al. Randomized controlled trial of yoga and exercise in multiple sclerosis. Neurology. 2004;62(11):2058– 2064. Available from: https://dx.doi.org/10.1212/01.wnl. 0000129534.88602.5c.
- [24] Mehta S, & DKI. London; 1990.
- [25]; 2002.

Supported Halasana

- [26] Williams KA, Petronis J, Smith D. Effect of Iyengar yoga therapy for chronic low back pain. Pain. 2005;115:107–124.
- [27] Iyengar B, Yoga LO. Thorsons, London; 2001.
- [28] Cox H, Tibrouk H, Aplin J. A randomised controlled trial of yoga for the treatment of chronic low back pain. Results of a pilot study. Complementary Therapies in Clinical Practic. 2010;16:187–194.

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