Rheumatoid Arthritis
Structural Yoga Therapy Research Paper
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1. Case study

a. Initial intake

Interview

M.M is a 59-year old woman who was diagnosed with rheumatoid arthritis (RA) in 1999. She tested positive for rheumatoid factor, an antibody found in a majority of patients with RA. Since the diagnosis her RA has continued without remission. M.M. has extensive impairment of joint mobility, mild to severe chronic pain, ongoing joint inflammation, recurrent flare-ups of the disease, morning stiffness, stiffness after prolonged immobility, mild to debilitating fatigue, sleep disruption, and pervasive muscle weakness.

The joints most affected by RA are her left and right ankles, knees, elbows and wrists. There is considerable visible thickening and deformity in the left knee, both ankles and the left wrist, and visible but more moderate thickening and deformity in the right knee and right wrist. She had x-rays in 1999. No structural damage to the joints was apparent at that point but she has not had x-rays since that time. The joints that are most painful and vulnerable to strain are, in descending order, her left knee, left wrist, right wrist, right knee, left ankle, right ankle, fingers, and toes. She does not have localized joint pain, inflammation, excessive stiffness or other symptoms of RA in the hips or spine. As of April 2005 she had been experiencing "clicking" sensations in the right shoulder during flexion. Similar sensations had been the precursors to RA activity in other joints.[*]

It is difficult for M.M. to climb stairs, stand up from a seated position, walk or remain standing without support for extended periods of time, get in and out of her car, open jars and bottles, turn knobs, lift or carry unwieldy, large or heavy items, bend down from a standing position, or carry out everyday tasks that require significant energy expenditure. She uses a walker when experiencing a particularly severe intensification of symptoms and a cane at other times.

Her pain is chronic, ranging in severity from aching to piercing. On a scale of intensity from 1-10, she rated her average daily level of pain over the past year at 3-4 and average level of pain during flare-ups at 8-9. She has days with low levels of pain (1) but has had no pain free days since onset of RA. The pain typically centers in the areas of the most affected joints but sometimes manifests as a radiating pain or generalized dull ache. She cannot reliably predict whether movement involving even low levels of exertion or limited range of motion will cause pain, because gentle movements and low intensity exertion sometimes trigger joint pain or inflammation. She has identified several consistent triggers of flare-ups: infections, stress and climatic changes. The latter include high humidity, cold, and changes in barometric pressure.

M.M. has not seen a rheumatologist since her diagnosis. At the time of diagnosis the rheumatologist recommended that she embark on the intensive drug regimen typically

[*] In August she reported that on days when her overall levels of pain and stiffness were higher she had "crackling" sensations in both shoulders. See Section 1(d) for the effects of SYT on these symptoms.

prescribed for RA patients. M.M. chose not to take the medications because of their side-effects and high costs. For three years she took the anti-inflammatory medication Celebrex, but discontinued it after experiencing an allergic reaction. She now takes Aleve, an over-the-counter non-steroidal anti-inflammatory drug, for pain relief. M.M. does not have health insurance and access to conventional health care for RA through private physicians is prohibitively expensive for her.

She was evaluated for osteoporosis in 1999 or 2000. No abnormal loss of bone mineral density was found. Her weight is 160 pounds.

In March 2004, she began treatment with a Traditional Chinese Medicine practitioner who prescribed herbal compounds and nutritional supplements, together with a stringent diet. (See Appendix B). These are intended both to lessen the severity of symptoms and eliminate the underlying causes of RA. She reported a dramatic lessening of pain since beginning the diet and supplements regime, from an average daily pain level of 7 to down to 5. She has had fewer flare-ups. When they do occur they are of shorter duration and lower intensity. The intensity of her fatigue has also moderated and her energy levels have been more constant.

M.M. was a sannyasin, a yogi renunciate, for 17 years. She was physically active and enjoyed walking, hiking and dancing. In 1970 she was introduced to Integral hatha yoga and taught it for 25 years. She still teaches pranayama and raja yoga. As a sannyasin, she had maintained an extensive and regular sadhana. Since the onset of RA she has not attempted to practice hatha.

She left sannyas in 1994 and now earns her living as a free-lance editor and writer. She faces ongoing economic pressure. When her RA is relatively quiescent, she works at a computer for periods up to 8 hours per day. M.M. is single and her closest family member lives out of state. Although she has good friends in her community, she lacks a stable social support system. She undergoes recurring periods of depression about her health and fear about the future, but these are not unrelieved. She is frustrated by the constraints RA has created on her physical capacity, energy levels, and ability to work and travel.

On most days, M.M. walks with the dog who has been her longtime companion. She periodically does gentle Qigong exercises, which she finds energizing and pleasurable. but does not do them regularly. Fluctuations in her levels of pain and fatigue make it difficult for her to maintain a consistent movement practice. In addition, she finds that when she her is feeling well she needs to use that time for work. She sometimes does visualizations to cope with pain, and on occasion practices Integral Yoga pranayama.

1b. <u>Physical Assessment and Findings</u>

Postural body reading

M.M's most significant postural imbalances are:

- eversion of both ankles;

- flattening of the arches of both feet;
- knock knees, which increase the strain on her medial knees and contribute to her instability while standing and walking;
- inability to extend either the left or right knee to standard range of motion. Both knees remain flexed while standing, walking or lying down. The left remains in an average of 15 degrees flexion and the right in an average 12 degrees flexion;
- inability to maintain the hips in anatomical position while standing, which appears to be in part a compensation for the inability to fully extend the knees. Both hips remain in flexion an average 5-10 degrees standing and walking;
- internal rotation of both shoulders;
- pronation of the right forearm, which cannot be held in anatomical position or supinated when the elbow is flexed;
- hyperextended metacarpals and ulnar "drift" of the fingers on both hands. The fingers of the left hand are deviated about 2-3 degrees toward the ulna, and those of right hand about 2 degrees toward the ulna;
- collapsed chest and kyphosis; and
- forward carriage of the head.

When walking she often uses a cane on the right and shifts the left leg laterally to compensate for the limited mobility in the left knee. The restricted range of motion (ROM) and pain in her left knee are the primary causes of her limited mobility when walking or rising to a standing position. Restricted ROM and pain in the right knee, weakness in major muscle groups and the use of the cane have all contributed to a series of compensatory postural imbalances, such as rotation of the shoulders to the right.

The forward carriage of her head, internal shoulder rotation and rounding of the upper thoracic spine had begun to develop prior to the onset of RA, possibly due to extended hours of computer work.

Summary of assessment process

When I began working with M.M. she was experiencing higher levels of inflammation and pain from flare-ups and the effects of cold weather, making her joints more vulnerable to strain. Her hip and leg muscles were visibly very weak during most movements. She had limited ability to isolate muscles. She also had the habit of tensing large groups of muscles and tendons to guard against injury to her joints.

To gage her muscle tone and strength I relied on palpation and monitoring of muscle reactions during movement, as well as her own perceptions. I postponed ROM and strength assessments due to concern that even the most cautious manipulation would exacerbate her pain and the likelihood that the results of an assessment at that stage would be highly inaccurate, in light of her difficulty in isolating movements and her habit of widespread reflexive tightening

I recommended an adapted version of the Joint Freeing Series (JFS) for the overarching purpose of balancing vata and the specific purposes of: i) practice in isolating movements more effectively; ii) lessening the tendency to tense entire areas of her body when

moving, and iii) re-patterning body movements. Prior to working with her as my case study I had twice guided M.M. through a modified seated version of the JFS. I identified additional adaptations so that she could begin practicing the JFS (see below, pp. 12 -15). I also recommended pranayama for vata and kapha balancing and mild hip flexion exercises for strengthening.

For six weeks, M.M. did the JFS between 2-4 times per week, depending on the intensity of her pain. She also did the hip flexor strengthening exercises approximately 2 times a week, and daily pranayama. The JFS did not trigger increased pain or inflammation. Although M.M. did experience flare-ups they did not seem to be reactions to her increased levels of activity or specific movements.

Six weeks later her pain levels had subsided. During that period M.M. improved her ability to isolate movements. In doing the JFS she had also built more confidence in experimenting with movement, as it had not increased her pain and she had actively enjoyed a number of the movements. The process of working together increased her trust that the ROM assessments and muscle testing would not be harmful, which supported a relaxation of fear. However, the delay in testing ROM and muscle strength means that the baseline assessment is not an accurate reflection of her status prior to the SYT intervention: it presumably reflects the effects of these preliminary recommendations. The importance of avoiding harm, from stress as well as the overworking of joints, outweighed the need to establish baseline readings pre-SYT.

ROM and muscle strength assessments were carried out in seven short sessions rather than a single session, in order to: (i) avoid triggering a flare-up or increased tenderness; (ii) minimize the depletion of energy; and (iii) allow M.M. to feel more at ease with the process and gain practice in reducing tension during movement. In each session I worked slowly, guided her breathing, and gave periods of rest with wave breath. Assessments were begun at the end of April 2005 and completed July 2005, with a hiatus of several weeks from mid-May- mid-June due to a flare-up and heightened levels of pain.

To assess ROM I began with the joints M.M. was most comfortable moving and allowing me to manipulate, rather than proceeding in the standard order for testing. To assess muscle strength, I used the recalibrated scale given by Mukunda, in order to broaden the range sufficiently to allow meaningful comparison of strength among different muscles. Her strongest muscles would have been rated at 1.5 or 2 on the standard scale.

Recalibrated scale for testing muscle strength

0	Inability to contract the muscle
1	Ability to contract the muscle
2	Ability to hold a position using the correct muscles without extensive recruiting of other muscles and without shaking for 1-2 breaths
3	Ability to hold a position using the correct muscles without extensive recruiting of other muscles and without shaking for 3 breaths

4	Ability to hold a position using the correct muscles without extensive recruiting of other muscles and without shaking for 4-5 breaths
5	Ability to hold a position using the correct muscles without extensive recruiting of other muscles and without shaking for 5-6 breaths

Because M.M. last had X-rays six years ago, I could not be certain of the extent to which the ROM limitations in her most severely affected joints are due to structural damage rather than ongoing inflammation. However, muscle tightness could be ruled out as a cause of those restrictions because palpation during passive manipulation indicated that the muscles were flaccid. It seems likely that the left and right knees, the left and right wrist and the right elbow have undergone structural damage, since the degree of restriction is fairly constant irrespective of whether MM is experiencing a flare-up or a more general increase in inflammation.

The results of the assessments were reliable for purposes of identifying: i) the joints with most restricted ROM; ii) weaknesses to be addressed as a matter of priority; and iii) areas of relative strength to be built upon. They therefore provided a basis for recommendations and monitoring any changes in M.M.'s joint mobility and strength. However, the results lack a high degree of objective accuracy. The subjectivity built into these tests was heightened by her chronic vata imbalance, which manifested as marked fluctuations in both ROM and strength during testing sessions and among testing sessions.

The ROM and strength tests had significant utility independently of their results: the assessment process itself had important treatment functions. With guidance, M.M. was able to identify and work with her habitual patterns of muscle tensing and the emotional states associated with physical pain and discomfort.

In movements involving the hips and legs M.M. typically tensed not only the areas surrounding target muscles but also her back and the opposite hip and leg. This tightening in anticipation of pain itself sometimes triggered pain. With breath, light touch and longer pauses to allow her fear to subside, she was frequently able to relax. However, in movements affecting the knee, particularly those involving knee flexion, she was unable to remain relaxed for more than a few minutes.

Several of the movements involving knees and hips brought up powerful states of fear and grief. The surfacing of these emotions pointed to her underlying vata and kapha imbalances. (See section 3 for discussion of the Ayurvedic significance of various aspects of M.M.'s condition). When these states emerged I guided her through a process of working with them as the objects of mindfulness and insight (Vipassana). She was thus able to have repeated direct experience of the shifting, impermanent nature of unpleasant or painful sensations and feelings.

Repetitive passive movement with breath, together with encouragement to enter into her experience, triggered several emotional releases. The release was especially strong in prone left hip rotation. Her ROM increased dramatically during one stage of this process:

external rotation increased an estimated 30 degrees and internal rotation increased an estimated 15-20 degrees. However, when we resumed testing a few minutes later the tension and fear had re-established themselves and ROM was markedly reduced.

The treatment functions of the assessment process included:

- ***Emotional release***s. Emotional releases were triggered by the combination of passive movement with breath and guided inquiry into the nature of sensations, thoughts and emotions as they arose;
- ***Insights.*** M.M. arrived at helpful insights into her experience of her mind-body. She realized that some of the pain she experiences is caused by reflexive tensing that represents both an anticipation of pain or injury and an effort to protect against injury. She also realized that many of her muscles are weak and that this weakness is an important factor in her limited mobility and pain; and
- ***Skills.*** With instruction and focused awareness, she increased her ability to isolate muscles and reduced the tendency to transfer effort to her more painful joints or generalize effort across large areas of her body.

The assessment sessions did not trigger additional pain or flare-ups.

Results of ROM and strength tests

Results given are for the initial assessments only. Follow-up testing was postponed through November 2005 due to a prolonged flare-up and increased levels of stress, and I subsequently moved out of the country. With Mukunda's permission the final assessment was based on an interview rather than ROM and muscle testing. For discussion of the results of recommendations, including assessments of changes in ROM and muscle strength, and a post-script on developments following my work with M.M., see below, pp. 19-21.

The results for joints in which M.M. has persistent or occasional RA symptoms are included even where the ROM fell within standard range, because these results pointed to the absence of structural damage limiting mobility. This inferred absence of structural damage in turn suggested that wider ranges of movement could be recommended, with the need to avoid exacerbating inflammation as the primary caution.

ROM tests April – June '05	*Left/Right*
Ankle dorsiflexion	0/0*
Ankle plantar flexion	80/75
Ankle inversion	45/40
Ankle eversion	40/40
Knee flexion prone	87/90
Knee extension	+10/+8
Hip flexion bent knee	130/130
Hip flexion straight knee	60/75
Hip extension	22/20
Hip external rotation prone	36/40**

Hip internal rotation prone	30/34**
Hip adduction	45/40
Hip abduction	55/50
Elbow flexion	147/129
Elbow extension	0/0
Elbow carrying angle	15/25
Shoulder flexion	185/180***
Shoulder extension	49/50
Wrist flexion	42/43
Wrist extension	40/40
Wrist ulnar deviation	20/27
Wrist radial deviation	10/7
Neck flexion	42
Neck extension	45
Neck lateral flexion	20/21
Neck rotation	47/50

Ankle plantar flexion, inversion and eversion results are significant because the lack of restriction suggests that there is no structural damage obstructing ROM. The results for straight knee hip flexion reflect the effects of the restricted knee extension: past 60/75 degrees hip flexion the knees must move into deeper flexion and the ROM for straight legged hip flexion cannot be accurately assessed.

* Although M.M.'s ROM in passive dorsiflexion is 0 degrees, against resistance she is able to move the left ankle to 25 degrees dorsiflexion and the right to 18 degrees.
** These are the ROM results measured with a goniometer. They reflect a high level of muscle tension. As explained above, repeated passive manipulation created a release that increased external rotation an estimated 30 degrees and internal rotation an estimated 15-20 degrees.
*** In our initial session M.M. described "clicking" sensations in her right shoulder during flexion. The ROM results were within standard range but there was a sensation of grittiness when palpating during flexion and M.M. felt a mild non-specific sensation at 160 degrees flexion. In late May M.M. reported that after a few weeks of doing the shoulder movements in the JFS the clicking sensation had disappeared. In August she reported that on days when her overall levels of pain and stiffness were higher she sometimes felt "crackling" sensations and restriction in both shoulders. These also disappear with regular practice of the JFS.

Muscle Tests April – June '05 Left/Right

Ankle dorsiflexors	2.5/2.5
Ankle plantar flexors	3/2.5
Ankle invertors	2/2
Ankle evertors	2.5/3
Hip flexors	3/3
Psoas isolation	2./1.5

Sartorius isolation	3/3.5
Upper abdominus rectus	3.5
Lower abdominus rectus	1.5
Hip abductors	4/4.5
Hip adductors	4/4.5
Knee extensors prone	3.5/4*
Knee flexors prone	2.5/3
Hip extensors	3.5/3*
Gluteus medius isolation	0
Hip external rotators (prone)	2/3.5**
Hip internal rotators (prone)	1.5/2**
Lower erector spinae	2.5
Upper erector spinae	2
Middle trapezius	2.5
Shoulder abductors	3.5/3
Shoulder adductors	3.5/4
Shoulder external rotators	2/2.5
Shoulder internal rotators	3/3.5
Shoulder extensors	2.5/3
Shoulder flexors	3.5/4
Wrist extensors	1.5/2
Wrist flexors	1.5/2
Wrist Ulnar deviation	1/1
Wrist radial deviation	1/1
Elbow extensors	4.5/4
Elbow flexors	3.5/4
Neck extensors	4.5
Neck flexors	1.5
Neck lateral flexors	3/3
Neck rotation	3.5/4
Quadratus lumborum isolation	3/4
Latissimus isolation	4/4.5

* The results for strength testing of knee extensors and flexors are from the end of the assessment process and do not represent the baseline prior to SYT. At the point when these results were recorded, M.M had been doing strengthening movements for the quadriceps and hip extensors for several weeks.

** As noted above, hip rotation was particularly affected by M.M's deep vata imbalance. These results are of limited objective value. M.M.'s ability to mobilize the hip rotators in variations of JFS # 5 is a more useful indicator of the strength of these muscles. In the initial session she was unable to execute any modification of JFS#5 without high levels of strain in her knees. This difficulty persisted for 5 months. In September she was able to effectively isolate the correct muscles in a seated version of JFS #5 without transferring strain to the knees.

1.c. Summary of Findings

Tightness

The left and right upper trapezius and sternocleidomastoids are tight. The reduced ROM in neck extension is related to the forward carriage of her head. No other muscle tightness was detected. Although M.M. has knock knees, testing revealed her left and right hip abduction to be 5-10 degrees beyond standard ROM. The restricted ROM in her knees, wrists and elbows is caused by inflammation and/or structural changes in the joints, not muscle tightness.

Weakness

As indicated in the chart of muscle testing results, M.M. has generalized weakness in both the upper and lower body.

Release

As indicated in the summary of the assessment process, the internal and external hip rotators require release and are able to be released. However, the release does not hold, pointing to the severity of the vata imbalance.

1.d. Recommendations

RA is both systemic and, if unarrested, progressive in nature. In addition, M.M. experiences chronic pain. For these reasons, the recommendations encompassed a wide range of physical practices involving the entire body, together with practices to address mental and emotional facets of her experience, rather than targeting a specific set of priorities. The breadth of the recommendations was also intended to provide a range of methods and techniques from which M.M. can develop a framework for self-management of her condition. For those with chronic illnesses, self-management encourages a greater sense of ease because it creates a sphere within which action can be taken. The sense of helplessness in the face of illness is thereby lessened. The overarching and specific aims of the recommendation are detailed below.

The recommendations should be seen in the context of two key aspects of my work with M.M.: i) as a therapeutic intervention our work together was intensive in terms of both time and engagement in emotional and spiritual inquiry; and ii) M.M. has a high degree of openness to new practices, long-established familiarity with classical yoga practices and teachings, a deep spirituality, strong perceptive capacity and skills, and considerable courage. These qualities made her more receptive to, and able to participate in, the practices recommended than might be the case for other people with moderate to severe RA.

Aims

The primary intent guiding my recommendations was to increase M.M.'s sense of physical, mental and emotional ease within her day-to-day experience of her mind-body. The overarching aims were thus to help her feel more at home in her body as it is in the present and to offer methods for dealing with chronic pain that would allow her to feel

less constricted within the reality of that pain. "Feeling more at home" in her mind-body meant:

- sharpening her discernment, to gain clarity about both her limitations and the steps that she could take that might increase her overall mobility, strength and energy; and
- taking steps to increase mobility, strength and overall comfort levels as far as possible.

The aim of eliminating her chronic pain through SYT alone was unrealistic. Given the systemic nature of RA and the relatively advanced stage of her disease, M.M.'s pain requires a multifaceted response, which includes dietary guidelines, herbal and nutritional supplements, meditation, deep relaxation, and emotional support, in addition to SYT exercises and pranayama. The dietary guidelines, herbal and nutritional supplements are provided by M.M.'s Traditional Chinese Medicine (TCM) doctor.

With regard to her chronic pain, I sought to reduce the pain through vata balancing practices and to help her change her relationship to pain through Vipassana meditation. I introduced her to a form of Vipassana meditation based on my own practice and work with Buddhist teachers. My approach to Vipassana was particularly shaped by my main teacher, whose approach reflects both Soto Zen and Theravadin Buddhist practices.

The contributions of SYT to pain reduction within this approach were to: i) integrate vata-balancing practices; ii) reduce the excess pitta manifesting as inflammation by enhancing discernment about her actual experience of her body and about how to move in ways that minimize strain on inflamed joints and tendons; and iii) balance kapha by strengthening weak muscles and releasing prana in "congealed" joints.

The *specific aims* of my recommendations were to help M.M.:

- maintain existing ROM to extent possible in the most affected joints;
- increase ROM to the extent possible where the limitations are not due to permanent structural changes;
- build muscle strength in legs, hips, back and neck in order to increase overall mobility, counteract muscle wasting, and lessen postural imbalances;
- reduce stiffness and unsteadiness in standing and walking;
- reduce pain through vata balancing and lessening strain on joints and tendons;
- break down the apparent solidity of the experience of pain; and
- build the capacity to access steady mindfulness and expand its scope.

I recommended practices involving the entire body to the greatest extent possible, while trying to keep the level of effort and time required within manageable limits. Although greatest emphasis was given to working with leg and hip muscles, strengthening exercises for the back and shoulders were included in order to address: (i) the possibility of future disease activity in the shoulders and cervical spine; and (ii) the effects of kyphosis and the forward carriage of her head on her balance and comfort while standing and walking. In addition, M.M. feels a greater sense of freedom in her upper body. The upper body movements thus allowed her to connect with, and enjoy, a comparative lack

of restriction. A whole-body practice also promotes increased circulation of blood and lymph fluids.

Finally, two practical considerations shaped the recommendations: (i) getting into and out of positions demands significant effort by M.M. In creating sequences for movement practices I therefore tried to minimize the need for transitional movements. In developing prone, supine and side-lying movements for strengthening I sought to avoid positions that require her to shift her weight with the support of her arms, as this is tiring and risks straining her wrists, elbows and knees; and (ii) M.M. is unable to get down onto or up from the floor. For strengthening exercises she works on her sofa or her bed.

Prior to working with M.M. as my case study I had guided her through a seated version of the JFS, with modifications. As explained above, I postponed my assessment of ROM and muscle strength due to her heightened levels of pain and stiffness from flare-ups, the ongoing effects of colder weather and her difficulty in isolating movements. I recommended that she begin doing the JFS immediately. Additional modifications were identified over time, as indicated below.

M.M. particularly enjoys a QiGong movement in which she swings hip, shoulders and arms from side to side in a standing posture. She finds that it frees the flow of prana through her body. I suggested that she continue to do this movement in addition to the SYT movements outlined below, at the point in her day when it feels most beneficial.

I. Joint Freeing Series adapted to seated posture, with additional modifications to specific movements

Emphasis was given to:

- creating a steady, slow, easeful flow of movement in coordination with the wave breath. "Steady" means maintaining a continual flow of movement and a uniform level of effort throughout the entire ROM, rather than intensifying effort at the end points of ROM. "Easeful" refers to a reduced level of overall effort, equal to approximately 50% on days when her pain levels are low. I recommended that she not hold any of the movements, in order to: (i) maximize the vata balancing effects; and (ii) avoid aggravating pitta-inflammation, straining muscles and tendons, triggering pain or depleting energy;
- staying within a comfortable ROM. As guidelines for remaining within comfortable ROM I suggested that she: (i) move back and forth across the midpoint of the ROM, working across the midpoint to expand the range gently while taking care not to press to the end points of the ROM; (ii) focus on the muscle contracting rather than the muscle stretching; and (iii) identify the sensation of stretch as a signal that the movement is exceeding comfortable ROM;
- cultivating mindfulness of the body as the body, with close attention to sensations in joints, muscles and tendons and her level of effort throughout each movement;
- maintaining awareness of the breath and its relationship to the movements; and

- cultivating a state of patience and gentleness toward herself throughout the process. I encouraged her to avoid struggling against either the physical or mental aspects of her experience during the JFS.

Daily practice of the entire JFS, as permitted by her levels of pain and fatigue, was recommended. I suggested that when she could not do specific movements due to pain and/or inflammation in the affected joints, she do the movements in the JFS not involving those joints. In particular I encouraged her to do the movements involving the spine, including the neck, on days when moving her ankles, knees, wrist and elbows was too painful.

The number of repetitions in movements involving the most affected joints was limited to 3. For other movements I recommended 6 repetitions. M.M. cannot always determine during the process of moving whether a movement will later trigger a flare-up. Modifications were identified in a process of checking for immediate pain, strain or discomfort and subsequent monitoring over time.

The following modifications to specific movements were identified in order to make it easier to isolate the correct muscles and avoid causing pain or strain:

Ankle movements (JFS ##1-3)
The initial modification was to avoid pressing to the endpoints of the ROM, focusing instead on moving gently back and forth across the midpoint of ROM. In June ankle rotation (#3) was omitted entirely in order to avoid triggering or aggravating pain and/or inflammation. As alternatives at this point in the JFS, M.M. spreads and curls the toes, wiggles the toes, and presses the balls of the feet out, with the aims of freeing the joints, increasing circulation, and enhancing sensitivity in, and awareness of, the soles of the feet as the base of support while standing and walking.

Knee extension/flexion (JFS #4)
This movement was modified by raising the flexed knee before straightening it, to the point where M.M. is able to release what she described as a "catch," which she releases through repeated extension-flexion. Particular attention was given to avoiding pressure at her endpoint of flexion, which is 90 degrees.

Hip internal and external rotation (JFS #5)
In the initial session and for several months afterward M.M. was unable to isolate the movement in the right or left hip. Discomfort was greatest on internal rotation. Efforts to modify the movement by limiting ROM, varying the height of her seat and changing her position on the seat met with little success. The standing version was too stressful to the knee and ankle of the supporting leg. She experienced difficulty with the seated version due to weakness in both her external and internal rotators. She transferred the effort to initiate movement into her knees, causing acute pain in the medial and anterior knees. Internal rotation was particularly difficult due to her limited ability to lift her buttocks. She also experienced difficulty in identifying hand and arm positions that would allow her to support her upper body without causing wrist pain.

In June I recommended that she work with external rotation only, by moving into external hip rotation, hip abduction, hip flexion and knee flexion (as in cross legged seated posture). This movement was pain free and it was relatively easy for her to lift the foot and lower leg up toward the level of the hip.

In September, M.M.'s strength and her ability to isolate movement in the hip had improved to the point she was able to do a seated version of JFS #5 with both internal and external rotation. The ability to do JFS# 5 without transferring strain to the knee also reflected a heightened level of awareness; to avoid strain she must maintain close awareness of the alignment of the knees and the position of the hips on the chair.

Hip flexion/extension (JFS #7)

Attempts to modify # 7 for a seated posture were unsuccessful due to the combination of limited hip flexor strength and restricted knee flexion. The initial recommendation therefore was to do hip flexion/extension standing, with very light effort on flexion and emphasis on extension, on those days when the knees and ankles were comfortable enough to support weight bearing. This proved to be too uncomfortable for the supporting ankle and knee on most days and was eliminated from the sequence. I recommended seated hip flexion and lying hip extension as a part of strengthening exercises (see below).

Hip adduction/abduction(JFS #8)

This sequence was omitted initially because her weakness and difficulty in isolating the movement resulted in anterior and medial pain in both knees in all variations attempted. As an alternative I recommended that she squeeze a block between her thighs as one of her strengthening exercises. In July I added side-lying hip adduction and abduction strengthening exercises to address these hip movements.

Also in July I substituted strengthening exercises for the tibialis anterior at this point in the JFS sequence, because M.M found that they worked well within the flow of movements. With ankles positioned underneath or slightly forward of her knees, she presses the heel into the floor and lifts the toes and balls of the feet up for 3 repetitions, increasing the number of repetitions as permitted by her level of comfort.

Wrist movements (JFS # 9-11)

In the initial session I recommended working within an extremely reduced ROM for all wrist movements, with particularly small movements in rotation. I added finger curls and spreading the fingers to the series. In June wrist rotation was omitted entirely due to ongoing high levels of wrist pain and the strain caused when the forearm was allowed to pronate or supinate too far.

Shoulder horizontal adduction-abduction (# 13)

In July M.M. reported that the restriction in her right elbow flexion was a source of frustration and distress. I recommended that she do the movement with both elbows extended comfortably, keeping the height of the elbows just below shoulder level,

allowing her to get the benefit of shoulder adduction-abduction without adding frustration to her experience.

Spinal twist (JFS #18)

In July M.M. reported that she was avoiding the spinal twist because she felt her movement to be significantly restricted. The twist was modified to give greater emphasis to maintaining length in the spine, with awareness of opening across the front of the chest and avoiding pushing to the endpoint of neck rotation. The movement of the arm reaching back behind the body was modified to lift it just below shoulder height, in order to enhance ease of movement and the sense of openness in the front of the body.

II. Pranayama and kriya practices

M.M. had been practicing Integral Yoga pranayama for many years but these practices were apparently not effective in lessening her ongoing levels of discomfort. She had also developed a tendency to breath shallowly and/or hold her breath. I therefore taught her SYT wave breath and slow kapalabhati for vata and kapha balancing, respectively, rather than recommending that she continue any of the techniques familiar to her. In addition, I wanted to move her in the direction of less restricted, more open experience. Pranayama techniques that involve fixed ratios of inhalation and exhalation, intentional breath retention or the use of the hand may create a sense of greater constraint, in addition to necessitating greater physical effort.

SYT wave breath and slow kapalabhati were recommended as practices that encourage a more uncontrived, natural experience of breath and prana. I suggested that before beginning either practice, she observe the breath for a short period without attempting to direct it. This practice of clearly distinguishing mindfulness of the breath "just as it is" from intentional control of the breath was aimed at anchoring her awareness in the experience of the body in the present moment.

I recommended the wave breath or "complete" breath for 5 minutes each day, as a means of balancing vata and of mobilizing the diaphragm and the abdominal and intercostal muscles. In addition, wave breath opens space within the body and so offered a means for M.M. to experience a sense of expansiveness within her body. The instructions were to rest the awareness on the sensations of breath and movements of prana, with a gentle intention – rather than effort – to allow the breath to slow and expand its amplitude. No intentional pause after inhalation or exhalation was included, opening the possibility for khumbaka to arise spontaneously. I suggested that she practice for longer periods of time if she felt that it would create a deeper vata balancing and that she do the wave breath even on days when her pain and fatigue were too intense for her to do any of the other practices.

As a kriya, I recommended slow Kapalabhati at steady pace for 3 minutes, in order to address her deep kapha imbalance. Awareness was to be centered on the sensations of breath and the movements of prana during, and in the period after ending, the practice.

III. Strengthening

Recommendations for muscle strengthening were intended to: (i) increase the efficiency of muscles in order to lessen the joint strain created by weakness; (ii) balance kapha; and (iii) counteract the effects of muscles wasting to the extent possible with low intensity strengthening exercises.

Initial recommendations for strengthening

Strengthening elements were incorporated in the following JFS movements by increasing the level of effort and/or the number of repetitions:

- JFS # 6, for abdominals and erector spinae, and for the middle and lower trapezius by increasing scapular adduction during spinal extension;
- JFS # 7, for hip flexors (as a substitution for sunbird);
- JFS # 13, for the middle and lower trapezius by increasing scapular adduction during shoulder abduction; and
- JFS # 16, for the middle and lower trapezius during scapular adduction, and for the erector spinae by increasing spinal extension.

In the JFS sequence, ankle dorsiflexion against resistance to strengthen the tibialis anterior was substituted for JFS # 8 (hip adduction/abduction).

Several strengthening exercises were explored in the first six weeks, as follows:

- A mild *quadriceps* strengthening exercise was within M.M.'s capacity: in seated position on the sofa, with the back supported, the leg is lifted 2-3 inches, with the knee extended to the degree permitted by comfort, lifting and lowering with the breath, without holding, for 1-3 repetitions daily;
- Mild strengthening of *hip adductors* was possible using a block or blanket between the thighs, in either standing or seated position, alternately squeezing the block and releasing, with the breath, for 6 repetitions;
- Mild strengthening of *hip extensors* was attempted through standing hip extension but proved on most days to be too stressful to the ankle and knee of the supporting leg; and
- Standing *hip abduction* was similarly too stressful to the ankle and knee of the supporting leg to be done with regularity.

Strengthening sequence introduced July 2005

After M.M had practiced the JFS with strengthening components and the mild strengthening exercises for three months, the following sequence was added. The order of this sequence was determined by its effectiveness in encouraging a balanced flow of energy and minimizing transitional movements. The strengthening components in the JFS were retained. For both I emphasized that M.M should not exert a level of effort beyond her zone of comfort.

A. Prone

1. Ardha salabasana
Alternating right and left legs, allow the knee to remain comfortably flexed, inhaling as the leg lifts, exhaling as it lowers. 3 repetitions with each leg, without holding.
2. Shoulder horizontal abduction and scapular adduction
With the arms extended out to the sides in a T-position, in line with the top of the shoulders, palms facing down and elbows in slight flexion as dictated by comfort, lift arms up toward ceiling and draw shoulder blades together. Inhale as the arms lift, exhale to lower. 3 repetitions without holding.
3. Cobra
With the arms down by the hips, palms facing the thighs, inhale up and exhale down for 3-4 repetitions without holding.

B. Side lying

1. Hip abduction
With the support of pillows for the comfort of wrists and elbows, lift the top leg up while keeping pelvis neutral, lifting and lowering with the breath, for 3 repetitions with each leg, holding 1-3 breaths on the final repetition.
2. Hip adduction
With the support of pillows for the comfort of wrists and elbows, the upper knee flexed, and lower leg extended, lift the bottom leg, lifting and lowering with the breath, for 3 repetitions with each leg. The top knee is supported on a pillow.

A and B are done on alternate days, or as permitted by M.M.'s levels of pain and fatigue.

C. Supine

1. Neck flexion
Neck strengthening exercise described in *Structural Yoga Therapy* (p.181), modified as follows: flexion only, without rotation, lifting to approximately 75% of her maximum range, lifting and lowing with the breath for 2-3 repetitions, holding for 2 breaths on the last repetition if possible without shaking. Daily, or as permitted by pain and fatigue levels.

D. Seated on sofa

1. Quadriceps strengthening
With legs extended and back supported, lift the leg 2-3 inches with the knee extended to the degree dictated by comfort, lifting and lowering with breath, without holding, for 1-3 repetitions with each leg. Daily, or as permitted by pain and fatigue levels.

The primary purpose of quadriceps and hamstrings strengthening exercises was not to change the ROM in knee extension and flexion, but to improve the efficiency of those muscles in all movements in order to reduce knee strain. M.M. needed to strengthen her

hip flexors and extensors in order to counteract her tendency to initiate movements from the knee, including climbing stairs or rising from a seated position.

E. Standing

1. Gastrocnemius and soleus strengthening
In a standing posture holding onto a chair for balance, slowly and steadily rise up onto the balls of the feet and then lower down, lifting and lowering with the breath, for 6 repetitions. Daily, or as permitted by pain and fatigue levels.

F. Seated in chair

1. Strengthening for back, shoulders and arms: "Fierce M.M"
Inhaling, lift the arms up overhead into shoulder flexion, exhale while bringing the arms straight back into shoulder extension, using a slightly increased effort to lift into extension. Inhaling, lift the arms back up overhead into shoulder flexion. Exhaling, turn palms forward and pull the arms down and out to the sides in external shoulder rotation with elbow flexion, bringing the hands slightly behind the line of the shoulders. When pulling the arms down and out to the sides establish a slight backbend in the upper back. Drawing the shoulder blades together, press the spine into the chest, expand the front of the chest and open the heart center. Simultaneously open the mouth, stick out the tongue, widen the eyes – like Kali Ma – and roar loudly with the exhale. Inhaling, lift the arms back up overhead into shoulder flexion and continue the sequence.

IV. Modified asanas

In September, the following modified asanas were added:

1. Urdhva Prasarita Padotanasana
I recommended Urdhva Prasarita Padotanasana as a means of opening the hip, knee and ankle joints from a non-weight bearing position, to be done in the morning in bed as a part of the mild stretching movements M.M. often does.

Lying supine with legs extended and the backs of the knees supported. Exhaling, flex the right knee in toward the chest, exercising care to remain below 90 degrees of knee flexion. Inhaling, lift the foot up toward the ceiling with ankle dorsiflexion. Continue alternately flexing and extending the knee, with the breath, for 3-6 repetitions. Hold on the final repetition with the leg lifted for 1-3 breaths, with a minimal level of effort and awareness on lengthening the elevated leg. Repeat with the left leg.

2. Supported inversion
I recommended a supported inversion as a means of enhancing circulation. The hips are raised on a bolster and the elevated legs well-supported. The inversion is held for 3-5 minutes, to be done in the afternoon at the point when M.M. is often most fatigued.

V. Deep relaxation

M.M reported in our intake interview that she had been using deep relaxation with visualizations to deal with increased pain. In September I recommended that she do a deep relaxation with yoni mudra after supported inversion in order to regularize the practice to a greater extent.

VI. Emotional support

I suggested that M.M. identify an on-line support group for people with RA, since geographic isolation makes it impractical for her to participate in support group meetings. I also encouraged her to explain the nature of RA to friends and members of her community who are not aware of the systemic and chronic features of the disease. Like many people with chronic pain and disability, M.M. often encounters the social expectation that she downplay the severity of her pain or conceal its persistence. I suggested that when faced with inquiries or advice about her health, she respond as honestly and directly as she wants to, without feeling that she should minimize the difficulties she experiences.

VII. Meditation

I introduced Buddhist mindfulness and Vipassana meditation practices to offer M.M. alternative ways of relating to her chronic pain. Appendix A describes basic Buddhist mindfulness and Vipassana practices, summarizes the instructions given to M.M., and notes differences between those practices and yogic meditation techniques that involve sensory withdrawal, concentration and absorption.

1.e. <u>Summary of Results of Recommendations</u>

Results and observations

Based on M.M.'s experience over a 6 month period, the following results and observations regarding the recommendations can be identified:

(i) The JFS *as modified* did not trigger flare-ups or increased levels of pain or inflammation. It can therefore be practiced regularly. Regular practice is needed to maintain ROM in undamaged joints and to help sustain a higher level of physical activity, which may in turn help to stabilize energy levels, relieve stiffness, and reduce muscle atrophy;

(ii) The regularity of M.M.'s practice was interrupted by flare-ups (possibly triggered by climatic changes, infection and insect stings) and by less intense upswings in pain and fatigue. In cases of active RA the results of SYT must be assessed over a longer period of time, both because flare-ups and increased levels of pain and fatigue will interrupt therapy and because the systemic nature of the disease requires a broad-based and deep therapeutic response;

(iii) The JFS was an effective vehicle for reshaping M.M.'s awareness of the range of sensations in her body and of her mental and emotional states in connection with the body. This enhanced awareness helped her to inhabit her body *in the present* more

fully, and to identify more effective ways of moving and of protecting her joints from strain.

(iv) The JFS provided a context for M.M. to challenge herself physically and achieve progress. In this process she was able to experience pleasure in movement. It thus opened up her experience of her body, beyond the boundaries of restricted mobility, limited strength, and pain. It also provided a specific means by which to care for her body. In August she stated that the JFS "has become my friend."

(v) With regard to ROM, muscle strength, ability to isolate movements and overall ease of movement, M.M.'s self assessment and my observations indicated that:

- Decreased ROM in the most affected joints had not changed, with the exception of left and right ankle dorsiflexion, which appeared to have increased by several degrees. In October, following six to eight weeks with elevated levels of overall inflammation and pain, she was experiencing increased stiffness and radiating pain in her left knee. Left knee flexion and extension had become more difficult and was jerky, with audible clicking sounds.

- ROM had not decreased in the joints which do not have localized symptoms of RA. From May through early August the clicking sensations in her right shoulder during flexion stopped when she was able to do the JFS regularly but returned when flare-ups or ongoing pain prevented her from doing the JFS movements for several days in a row. In August she began to experience "crackling" sensations and a sense of restriction in both shoulders on those days when her overall levels of stiffness and pain were higher, but these sensations similarly disappeared from both shoulders with regular practice of the JFS.

- Overall ease of movement had increased. Her ability to maintain steadiness while moving through the ROM in most joints had improved; the movements were smoother and less jerky.

- The strengthening components of the JFS and the strengthening exercises increased muscle strength to the point that in routine movements like standing up or climbing stairs she was able to reduce knee strain by mobilizing the quadriceps, other hip flexors and the hip extensors more effectively.

- She was able to isolate movements in the hip more effectively over time, which points to increased strength and heightened awareness. In September she was able to do the seated variation of JFS#5 for the first time and she reported that in daily activities she had noticed a definite increase in her hip flexor strength. Improved isolation skills should increase the efficiency of her efforts to strengthen key muscles.

- The ability to isolate muscles more effectively, as a function of both enhanced strength and more focused body awareness, provided M.M. a means of reducing strain on painful joints by exploring her body mechanics and identifying alternative ways of moving. M.M. has not had physical or occupational therapy, both of which would help her to identify adaptations for painful and/or difficult movements, but she can use the heightened awareness of body sensations in general and the isolation skills gained through SYT to discover adaptations on her own.

Follow-up ROM and strength testing to confirm these observations were not possible due to M.M.'s increased levels of pain and inflammation throughout September, apparently triggered by a tooth infection, a prolonged flare-up in the first half of October, and heightened levels of stress throughout October and November in the weeks prior to my departure.

vi) In taking steps to increase her strength and reduce muscle and tendon strain through more effective body mechanics, M.M. was able to exercise a measure of control over the effects of RA. She reported that she felt more hopeful because there were concrete actions that she could take to help her deal with the disease. The ability to exert some forms of control over the experience of chronic pain and illness may in turn reduce the stress which is associated with loss of control.[1]

vii) Mindfulness and insight meditation practices became increasingly accessible to M.M. both in sitting meditation and when disturbing mental states arose in daily life. For example, in June she stated that she had been able to practice Vipassana during an attack of fear and panic and she experienced the impermanency and lack of solidity of those states. Over the course of six months she reported that it helped her to: "shift from tightening around thoughts, sensations and emotions to relaxing around them…; be aware of her body as it is now, be fresh with it instead of trying to deal with it in the old sense...; honor who [she] is now in this moment just as [she] is …; honor and live with this pain…; [and be] more in touch with [her] true self." By remaining present to disturbing thoughts and emotions and looking into their nature she was able to practice discernment about her experiences of both those negative states and her physical limitations.

Post-Script - In the course of our work together I urged M.M. to see a rheumatologist for an evaluation of the damage to her joints and the current level of RA activity, in order to support informed decision-making about treatment. I also suggested that she would benefit from occupational therapy. We identified possible means of accessing these services, including the process for consulting a rheumatologist through a nearby medical school. In January 2006 she received a referral to a rheumatologist and following the evaluation decided to undergo treatment through the medical school. A principal reason for her decision was the desire to prevent progression of joint damage. Secondary reasons included decreasing pain, fatigue and other symptoms. In May 2006 M.M. began taking methotrexate, an antirheumatic drug, and seeing a physical therapist. She also

continued to take most of the supplements prescribed by her TCM practitioner and to follow his dietary recommendations.

2.a. Name and Description of Condition

Overview

RA is an autoimmune disease by characterized by inflammation of multiple synovial joints, accompanied by reduction or loss of joint function, muscle wasting and chronic pain. RA typically affects joints symmetrically, impairing the same joints on both sides of the body. The most commonly affected joints are the wrists, hands, shoulders, knees, feet, and ankles. The process often begins in the small bones of the wrist and ankles. Although its primary effects are on the musculo-skeletal system, RA involves systemic disruption of the body's normal immune functions and several organ systems may be compromised. The inflammatory processes typically fluctuate in intensity but RA is a chronic and progressive disease unless arrested by treatment or remission.

In RA, the inflammatory processes that are part of the body's normal defense mechanism against external organisms, like viruses and bacteria, are unleashed against the body's own tissues. This autoimmune response begins in the synovium, the tissue lining joints. White blood cells that ordinarily combat infection and tissue damage malfunction and attack healthy synovial cells. This attack triggers further cellular and antibody defense responses, including the release of inflammatory chemicals and the production of autoantibodies that destroy healthy collage and bone cells. The biochemical mechanisms that normally regulate the immune system fail to suppress these responses and an ongoing cycle of inflammation is launched. The heightened activity of the immune system causes an increase in metabolism, which leads in turn to muscle wasting, as messenger proteins called cytokines signal the body to burn more protein and less carbohydrates and fat.

If unchecked, RA progresses through successive stages from inflammation in the synovial lining of the affected joints, to thickening of the synovium, to the destruction of bone and cartilage, resulting in irreversible joint destruction and deformity. If not arrested by treatment or remission, joint destruction and deformity begins rapidly and early in the course of the disease, often within the first 2 years. Irreversible structural changes result from the destruction of cartilage, the erosion of bone, and the displacement and rupture of tendons.[2]

In a significant number of cases, the inflammatory processes of RA extend beyond the musculoskeletal system as the body's immune system attacks healthy tissues in the cardiopulmonary, endocrine, neurological, ocular or vascular systems. RA is associated with deterioration in general health status and increased mortality rates. Studies point to mortality rates twice that of healthy people of the same age. Average life expectancy may be shortened by 3 to 7 years and patients with severe forms of RA may die 10-15 years earlier than expected.[3] Functional disability increases over time. Approximately half of patients with RA are unable to work ten years after the onset of their disease.[4]

Clinical course

RA may follow one of several courses: remission, a pattern of fluctuating activity and inactivity, or steady progression. Permanent remission occurs in about 10% of patients within a year and between 30-50% have complete remission within 2 years. Most frequently it takes a fluctuating course, in which the inflammatory processes wax and wane. This pattern, in which acute disease activity intensifies and then subsides, is a distinguishing feature of RA. If the joints undergo damage during this cyclical waxing and waning, the destruction is cumulative and permanent. In many patients whose disease activity has not been arrested, ongoing inflammation is punctuated by periodic flare-ups, in which symptoms are sharply exacerbated.[5] In some 10-20% of cases RA continues to progress steadily despite pharmaceutical treatment.

Rheumatoid factor

Rheumatoid factor is an antibody found in 70% to 80% of patients with RA. The presence of rheumatoid factor is not by itself diagnostic of RA but a positive test for the antibody is considered confirmation of diagnosis based on physical symptoms. In addition, "patients with a high titer rheumatoid factor are more likely to have erosive joint disease, extra-articular manifestations, and greater functional disability. In contrast, generally, rheumatoid factor negative patients exhibit a milder disease course."[6]

2.b. Gross and Subtle Body common symptoms

Overview: effects on joints

The hallmark of RA is the inflammation of synovial tissues in multiple joints, leading in a significant number of cases to impaired joint function and permanent deformity and destruction of joints. Musculoskeletal symptoms in later stages of the disease include muscle wasting, erosion of bone, degeneration of cartilage, partial dislocation at the articular surfaces of joints, and the dislocation and rupture of tendons.

As previously noted, RA affects joints symmetrically, most frequently manifesting in the wrists, hands, elbows, shoulders, knees, ankles and feet. The first joints affected are usually the smaller joints in the extremities, the fingers, wrists and toes.[7] Joint inflammation in the early stages may follow other patterns, however; for example, "it may begin in a single, large joint, such as the knee or shoulder, or it may come and go and move from one joint to another." [8]

As RA progresses the joints become more unstable and range of motion is increasingly restricted. [9] Erosion and destruction of bone, cartilage and tendons creates visible deformities. Underlying structural changes are detectable by x-ray. These include: erosion of bone at the margins of joints where the synovium attaches; narrowing of joint spaces; decreased mass of cartilage; and osteoporosis around joints. Generalized osteoporosis may develop in advanced stages.[10] The erosion of bone contributes to misalignment of joints. Cartilage loses integrity, resilience and fluid content.[11] Tendons may develop flexion contractures, subluxations and ruptures.

Decreases in range of motion and other functional impairment may be due to the structural changes that occur in the later stages of joint damage or to continuing inflammation, or a combination of these factors. In order to develop appropriate treatment therapies, it is important to identify which of these is the major factor.[12] Strengthening exercises should be approached with caution in active phases of RA, as they may exacerbate inflammation even at low levels of intensity.[13]

Muscle wasting

RA prompts metabolic changes that elevate resting energy expenditure, signal the body to burn more protein, and lead to increased fat mass. The result is muscle wasting and fat accumulation, which further heighten the risk of disability, illness and death.[14] Known as rheumatoid cachexia, this complex of symptoms results from the overactivity of the immune system which, like muscles, is built of proteins. The protein necessary to maintain the activated immune system is drawn from the protein stored in muscle tissue, resulting in muscle wasting.[15] Pain and weakness typically lead to reduced levels of physical activity among people with RA. These lower levels of physical activity cause muscle atrophy and increases in fat mass, which may in turn exacerbate the effects of muscle wasting.

Muscle wasting cannot be counteracted by eating more protein because any protein not consumed by the immune system is converted to fat, not muscle. Nor is cachexia significantly affected by the drug treatments given to reduce inflammation. However, researchers have demonstrated that resistance training allows RA patients to retain and build muscle mass. A 2003 study of protein wasting in RA and several other chronic diseases like AIDS and cancer concluded that "patients with wasting conditions who can and will comply with a proper exercise program gain muscle protein mass, strength and endurance, and, in some cases, are more capable of performing the activities of daily living."[16]

Extra-articular symptoms

RA may manifest outside of the musculoskeletal system in the form of non-specific systemic symptoms and organ system disease. Non-specific systemic symptoms include: persistent moderate to severe fatigue; malaise (generalized weakness); flu-like symptoms, including a low grade fever; depression; loss of appetite; weight loss; and insomnia.[17]

Patterns in disease activity

As noted above, RA usually follows a fluctuating course in which inflammation waxes and wanes. Active phases are distinguished by: longer periods of morning stiffness; increased fatigue; higher levels of pain while moving and at rest; swelling and tenderness in the affected joints and surrounding tissues; and additional reductions in range of motion, muscle strength and aerobic capacity. Inactive phases are marked by: weakness resulting from muscle wasting and atrophy; lower levels of chronic pain; and the effects of progressive structural damage, including decreased range of motion and pain during movement.[18]

Recurrent flare-ups are common. They are characterized by an upsurge of inflammation and sharp increases in pain and fatigue, often accompanied by fever and depression. Flare-ups may be triggered by a wide range of factors, including: overexertion in physical activity; overactivity even at low levels of exertion; viruses or bacterial infections; physiological or psychological stress; incautious manipulation of, or pressure on, joints; falls and similar traumas; dietary factors, including alcohol, caffeine and white sugar; and climatic changes, including increased humidity, cold, and increased barometric pressure.[19]

2.c. Related Challenges

Challenges related to the pervasive effects of RA

People with RA typically face loss of mobility, debilitating fatigue and chronic pain during both active and inactive phases of disease. For those with moderate to severe RA these symptoms may disrupt routine activities at home, job responsibilities, and relationships with friends and family. Simple tasks such as getting dressed, bathing, climbing stairs or preparing a meal may become an ordeal. Chronic pain and fatigue may make it impossible to meet social obligations, the needs of family members or the demands of a job that requires higher levels of physical activity or has inflexible hours or deadlines. For those who are unable to continue working or find employment that pays sufficiently well and can be adapted to their level of functioning on a day-to-day basis, the lack of financial resources may make the most basic aspects of life an ongoing struggle. Conventional or alternative health care may be unaffordable. Even for those with health insurance, alternative health care services are typically not covered sufficiently. For allopathic care the World Health Organization estimates that "when good physician care is available, the medical care costs for [RA] exceed US$ 6000 a year per patient."[20]

Participation in physical activities, from hatha yoga, dancing or hiking to swimming and other sports may be dramatically curtailed by RA or no longer possible at all. Pain and fatigue can create a cycle of increasing immobility: people avoid exercise and limit their movements due to pain and fatigue, joints then become stiffer and muscles atrophy, and the increased stiffness and weakness further restrict mobility. Standing and walking balance may be compromised by pain, joint deformity and muscle weakness.

Daily life in all its dimensions may thus be dramatically narrowed by the effects of RA. People with RA may experience fear, despair and a deep sense of loss – the loss of their healthy bodies, of identities connected to their accomplishments, and of pleasure that sustains the spirit. RA can generate prolonged physiological, psychological and social stresses.

Depression is common and has both chemical and cognitive aspects. Chronic pain and the sense of loss of control create stress, leading in turn to chemical changes in the brain's neurotransmitters which result in depression. Cognitively, it is difficult to maintain a positive emotional outlook and hold a belief that difficulties can be overcome when confronted with significant loss of mobility, constant pain, and the far-reaching

changes in social and economic circumstances experienced by many with RA. Because RA is both chronic and progressive, despair and sense of helplessness over its persistence may be accompanied by fear of what will happen in the next stages of the disease. Insomnia is also common and can amplify depression and anxiety.

Dietary challenges

A number of alternative health practitioners suggest that food allergies are a factor in triggering RA. They therefore recommend dietary changes as a means of addressing the underlying causes of the disease, as well as avoiding foods that exacerbate symptoms. Among the foods and beverages that many practitioners recommend eliminating are: meat; diary foods; shellfish; refined sugars; processed grains; alcohol; soft drinks; coffee; caffeinated tea; eggs; peanuts; chocolate; corn; gluten (wheat, rye, barley and oats); and nightshades (potatoes, eggplant, bell peppers and tomatoes). Foods that are considered beneficial due to their anti-inflammatory and anti-oxidant properties include: fish; flaxseed oil; broccoli; kale; spinach; cabbage; legumes; and fresh fruits. In general, people with RA are urged to: eat whole, organic foods; increase intake of omega 3 fatty acids and decrease intake of omega 6 fatty acids; and drink plenty of filtered water. [21] The squash and rice arthritis diet given to Mukunda by Indra Devi is an effective means of releasing the toxins that contribute to RA. (See Questions and Answers with Mukunda, April 2002, at www.yogaforums.com). Several studies suggest that fasting can temporarily alleviate symptoms.[22]

Although their resting energy expenditure (basal metabolism) is accelerated, people with RA are generally less active than people without the disease and thus have reduced caloric needs. In a study of caloric needs, researchers found that in the subjects with RA, "low energy expenditure from physical activity was directly linked to lower total energy expenditure."[23] People with RA thus do not need to eat more despite their elevated resting metabolisms. The researchers recommended that they eat nutrient-rich diets and engage in physical activity throughout the day to increase total energy expenditure.[24]

Challenges related to conventional medical treatment

Those who undergo conventional medical treatment often must cope with adverse reactions to drug treatments. Several of the frequently prescribed drugs have toxicities that must be monitored and can generate serious organ disease, including diseases of the gastrointestinal system, kidneys, liver and lungs.[25] The economic burden of RA is substantially increased by the high costs of pharmaceutical treatment and hospitalization in connection with symptoms of RA or the side effects of drug treatments.

3. Ayurvedic Assessment and Ayurvedic-based Yoga Recommendations

RA is a manifestation of tridoshic imbalances, particularly in its middle to late stages:

- *Vata imbalance* expresses itself as: acute pain; chronic pain; the fluctuating course of disease activity, with cycles of waxing and waning; migration of disease activity into different joints and organ systems; limitations in ROM and overall mobility caused by reflexive tightening of muscles and tendons to guard against joint pain or strain; disrupted sleep; fear; and anxiety;

- *Pitta imbalance* expresses itself as: active inflammation; sharp intensification of pain and inflammation in the form of flare-ups; heightened resting metabolism; weakening or loss of discernment about one's experience, often due to the effects of living with chronic pain and frustration; and
- *Kapha imbalance* expresses itself as: stiffness; swelling from excess fluid in and around joints; reductions in ROM due to joint destruction and deformity; degradation of bone and cartilage leading to joint destruction and deformity; the process of calcification of joints and the immobility that results from calcification; muscle atrophy; muscle wasting; debilitating fatigue; depression; a loss of ojas as pleasure; a sense of despair or powerlessness; and insecurity resulting from the unraveling of physical and emotional sources of security.

In addition to these Ayurvedic aspects of the symptoms of RA, the underlying autoimmune disorder has Ayurvedic dimensions. The disruption of body's capacity to regulate immune responses by turning them on and off appropriately, and to maintain homeostasis points to a vata imbalance. The autoimmune response also might be seen as a pitta imbalance manifesting as a loss of discernment at the cellular level: the immune system mistakes the body itself for a foreign invader and attacks healthy cells – the body sees itself as other. The deep-seated accumulation of toxins that appears to be a genesis of RA and the role of hormones in triggering RA are kapha imbalances.

The primary Ayurvedic-based recommendations for addressing these imbalances were:

- Vata balancing through the JFS, wave breath and deep relaxation;
- Pitta balancing through mindfulness and Vipassana practices to enhance discernment; and regular, open communication about her experience with explicit permission not to censor the unpleasant;
- Kapha balancing through the strengthening components of the JFS, additional strengthening movements, slow kapalabhati, empowering M.M. by identifying steps she can take to enhance her well-being, and increasing ojas derived from pleasure and companionship.

The JFS benefits all three doshas: moving repetitively with the breath balances vata; practicing discernment about the sensations in the body and breath balances pitta; and relieving stiffness and strengthening muscles balances kapha. Mindfulness and Vipassana practices also act on all three doshas. Increasing discernment – clear seeing – helps to balance pitta. In addition, according to Mukunda, the "courage to look at the problem" balances vata. Practicing discernment about limitations and building the capacity to remain present to disturbing thoughts and emotions can thus help to balance vata. Building the capacity to remain steady in the face of fear and other destructive mind states helps to strengthen sattvic forms of kapha and decrease its expression as immobility and despair.

To be effective, recommendations should take into account the interrelationship among the doshic imbalances. For example, movement is needed to balance both vata and kapha but activity and exertion must remain at levels which do not inflame pitta. Regularity of practice is needed to balance vata but the experience of pleasure should be integrated into

practice in order to strengthen kapha and avoid making practice yet another task to be completed.

4. Common Body Reading

See the typical patterns of joint dysfunction outlined in section 2(b). Muscle atrophy and wasting may lead to a range of postural misalignments in addition to the misalignments directly related to joint damage. Several of the postural imbalances in the lower body observed in M.M. may be common in people with RA. In particular, because RA often has severe effects on the knees, the inability to fully extend the knee is likely to create compensatory shifts, including hip flexion.

5. Contraindicated yoga practices and general activities

For people with moderate to severe RA activities to be avoided include: high intensity exercise; prolonged weight-bearing exercise; prolonged immobility in seated or lying positions; stretching past the comfortable endpoint of ROM; consuming foods or beverages identified as triggers for inflammation and pain; emotionally draining social interactions; and employment that generates high levels of stress.

In movement therapies, including asana practice, fixed increases in the number of repetitions and or in the length of time for which postures are held (static strengthening) should be avoided. Both the number of repetitions and length of time for which positions are held should be carefully monitored and adjusted to avoid aggravating inflammation and pain.

Although a number of yoga publications include lists of asanas considered beneficial for arthritis, most of these recommendations are intended to deal with osteoarthritis. Osteoarthritis does not manifest in multiple joints symmetrically or entail ongoing joint damage through inflammatory processes, as does RA. Moreover, most of the postures recommended are suitable only for those with relatively low levels of joint inflammation and less severe restrictions in ROM. The majority are not appropriate for those with moderate to severe RA. An exception is the handbook *Arthritis: The Powerful Program for Greater Flexibility, Strength, and Freedom*, by Alice Christiansen, who herself has RA. The asanas she describes are adaptable for many people with RA.

In general, contraindicated yoga practices include those that strongly increase pitta, such as holding postures for more than short intervals, stretching past the endpoint of comfortable ROM, and bastrika or rapid kapalabhati. Rapid vinyasa is contraindicated as it may aggravate vata, pitta and kapha imbalances by intensifying fatigue, aggravating inflammation and, if the body is overtaxed, increasing weakness.

6. General Recommendations

General considerations

The following general recommendations are targeted to RA cases with moderate levels of ongoing disease activity and joint damage. Several of the distinguishing characteristics of RA have significant implications for the efficacy of SYT and the types of recommendations that may be appropriate. These include:

- the systemic nature of the disease. RA affects not only multiple joints but the entire physical body and the subtle bodies. A multifaceted therapeutic response is therefore necessary. The yoga therapist should offer referrals for in-depth therapies to address key aspects such as diet, herbal and nutritional supplements, and other alternative healing modalities. Even if the SYT recommendations offered focus narrowly on joint mobility and strength, the outcomes will be affected by how other therapies impact the systemic manifestations of the disease. The yoga therapist therefore will need to situate recommendations within this broader context;
- active RA is affected by a broad range of environmental factors, including unavoidable exposure to triggers of disease activity. Its course is therefore unpredictable. Linear progression toward improvement is unlikely even if the client scrupulously follows all recommendations;
- the fluctuating course of the disease, which makes it difficult to determine whether therapy is lessening or exacerbating symptoms. Only over time can the impact of therapy be assessed separately from the normal waxing and waning of the disease;
- active RA will manifest both as flare-ups and as less intense but significant increases in pain and inflammation which require the client to interrupt or dramatically reduce the physical aspects of therapy;
- movement therapies are a double-edged sword. Movement is essential to prevent further decreases in ROM and loss of muscle strength and mass but movement can trigger flare-ups or lower level exacerbations of inflammation, pain and fatigue;
- pain triggered by physical activity may be delayed and movement may exacerbate pain and inflammation with or without overexertion of effort or overextension of ROM. The yoga therapist cannot rely on absence of pain during SYT exercises as an indication that the movements and or the level of effort are appropriate, but must consistently monitor their effects;
- decreases in muscle strength and mass as a consequence of both muscle atrophy and wasting require longer term therapy. The client may face pronounced difficulty in isolating the correct muscle or muscle group in order to achieve the intended benefits of strengthening movements. In addition, when muscles are already substantially weak at the outset of therapy clients are likely to have

developed compensatory and reflexive patterns that need to be deconstructed before efforts to strengthen muscles can be effective; and

- the chronic nature of the disease, and, in particular, the presence of chronic pain challenge both the client and the therapist to release attachment to the results of the actions taken to support healing. This means shifting from the aim of curing RA or wholly eradicating its symptoms, to the aim of enhancing physical, mental, emotional and spiritual well-being to the greatest extent possible.

a - <u>therapeutic/free of pain</u>

In the initial stages the following steps may be taken to create a broad framework for therapy:

(i) Given the systemic nature of the RA, the goal of eliminating joint pain or generalized pain through SYT alone is unrealistic: supporting therapies are essential. In the initial phases of STY, the focus should be on reducing pain and giving the client methods for lessening their suffering when in pain – that is, changing their relationship to pain. For these purposes the following practices may be recommended: the entire JFS, adapted to the client's specific needs; deep relaxation; wave breath; visualizations; mindfulness meditation techniques; and guided mindfulness exercises during the JFS and pranayama.

(ii) To maintain ROM and build muscle strength, the entire JFS and additional mild strengthening exercise should be recommended. In the JFS the client should be encouraged to: remain within a comfortable ROM and level of effort; avoid holding movements; limit the number of repetitions in movements involving the most sensitive joints; integrate breath and movement; and increase mindfulness of bodily sensations and breath. For the purpose of strengthening, mild strengthening exercises should be introduced as soon a possible; these may be integrated into the JFS. Attention should be given to improving isolation skills and minimizing tensing of muscles and tendons. The therapist should monitor closely for adverse reactions to the JFS or strengthening exercises. During active inflammation strengthening elements should be dropped or the level of effort and number of repetition reduced even further.

(iii) The client should be urged from the outset to maintain a regular and, when possible, daily practice of the JFS, pranayama, meditation and deep relaxation, in order to begin to build a structure within which she can take action to promote well-being.

(iv) If the client is not receiving treatment to address diet and alternative therapies for the symptoms and underlying causes of RA, the therapist may suggest that she explore these options, and assist where possible by providing information and referrals to trusted practitioners.

(v) Activities that give sattvic pleasure and increase ojas should be encouraged and incorporated from the outset of therapy. These may take a wide variety of forms

large and small – from doing specific types of movements to reading spiritual texts, engaging in social activities with favorite human or animal companions, or sharing their talents and knowledge with others as a form of karma yoga.

(vi) Basic mindfulness techniques should also be introduced in the early stages of therapy. For those clients with established mediation practices in other traditions, basic mindfulness techniques may be practiced in addition to their established practices, without creating religious or philosophical conflict. For those who have not practiced meditation previously, the therapist may want to introduce mindfulness techniques and other methods with which she is familiar, or refer the client to a meditation teacher or group.[26] Vipassana may or may not be an appropriate practice, depending on the client and whether the therapist herself has an established Vipassana practice. If the client practices formal sitting meditation, it is helpful to sit for shorter periods of time and/or or include breaks. Clients should be encouraged to move as necessary during meditation to relieve joint pain or discomfort.

b - <u>stabilize situation</u>

When the client has established familiarity with the recommended practices through repeated experience (even if consistency is interrupted by flare-ups or lower level intensification of symptoms), the following steps may be taken to stabilize the situation:

(i) The JFS and strengthening exercises should be modified as appropriate to respond to changes in mobility and strength, adverse reactions or persistent non-compliance with specific recommendations;

(ii) The client should be encouraged to participate in support groups for those with RA and other chronic illnesses;

(iii) When the client has increased her familiarity with, and capacity to do, the recommended practices, she should be encouraged to explore self-management of her therapy, by more systematically adapting the recommendations as necessary to changes in her symptoms and in the broader circumstances of her life;

(iv) Continued emphasis should be given to the use of mind-body awareness as method for recognizing habitual patterns of moving that create strain and learning new ways of moving;

(v) Taken as a whole, therapy should aim toward creating a sustainable increase in the level of overall activity, in order to guard against loss of function, reductions in energy levels and depression. The American College of Rheumatology and other medical sources have identified physical activity as an essential component of the treatment of rheumatoid arthritis;[27]

(vi) The client should continue and deepen her meditation and pranayama practices;

(vii) Strengthening components should be expanded in order to counteract muscle atrophy and improve overall mobility, but should be approached with great caution when there is active inflammation and/or severe joint damage. Studies have demonstrated that strength training is effective in counteracting muscle atrophy and muscle wasting in RA. ROM exercises alone are not as effective for building muscle strength. Intensive resistance training with weights under clinical supervision has been shown to counteract muscle wasting and build muscle strength. However, this level of training may not be appropriate for those with moderate to severe disease activity and requires clinical supervision to avoid joint damage.[28] A study by European researchers found that high-intensity, weight-bearing exercise is likely to accelerate joint damage in people with preexisting extensive damage in large joints.[29]

The implications of these studies for SYT approaches to strengthening are positive: SYT strengthening movements use only the resistance of the body's weight against gravity and therefore do not pose a risk of harm as great as that which may be created by strength training with weights at higher levels of intensity. In addition, if SYT recommendations, taken as a whole, address kapha imbalances in the subtle body, efforts to strengthen the physical body should prove more beneficial. Nonetheless, caution should be exercised with regard to the level of intensity even in the absence of active inflammation, particularly for patients who are in later stages of RA and/or have joint damage. Before expanding their strengthening components, clients should build the capacity to isolate the correct muscles or muscle groups. A gradual approach is needed, in which the client learns to monitor for adverse reactions.

(viii) To the greatest extent possible, a regular daily practice should be maintained, with the JFS, strengthening movements, pranayama, meditation and deep relaxation. Some time should be set aside each day for an activity that is pleasurable. On days when pain, inflammation or fatigue levels are too high to do the entire JFS or any strengthening movements, the client should be urged to find some movement, however small, that can be done with the less painful joints and to practice wave breath and meditation on such days, in however curtailed a form.

c – maintenance

In the maintenance stage of therapy, the practices that have been introduced and adapted as necessary in earlier stages should become the foundation for self-management of the disease. Given the chronic and progressive nature of RA, the following key elements will need to be retained: the JFS for maintaining ROM and vata balancing; strengthening movements to counteract muscle weakness and atrophy; pranayama for vata and kapha balancing, and specifically for stress reduction; deep relaxation for vata balancing, and specifically for pain management; meditation to deepen spiritual growth, hold discernment and decrease the suffering that accompanies pain; and ojas-enhancing activities to water the heart and give sattvic sensory pleasures. Ideally, the client will move toward integrating these practices into their daily routines, at different points during the day. Engaging in practices of shorter duration several times during the day is especially likely to be helpful in reducing stiffness and relieving tension.

7. Questions and Answers from www.yogaforums.com

31 January 2002

Question: My mother was diagnosed with Rheumatoid Arthritis about 5 years ago. The medicines doctors have prescribed for her never seem to work. I was watching the news last week and saw a woman with RA talking about how yoga therapy has helped her become more mobile. Do you believe that it could work for my mother? Some days she can't even get out of bed because she hurts so bad. Thank you for your time. If it will help, could you tell me how to get her started on it? Thanks again.

Answer: Learning yoga breathing (specifically the wave motion of ujjaye pranayama as described in my book - Structural Yoga Therapy) can help a great deal with management of pain. In addition I would recommend getting the Yoga Therapy for Knees and Shoulders reprint from Yoga International magazine or from my Website bookstore. It has articles on Yoga and Arthritis. Also I would recommend the arthritis diet from my teacher Indra Devi. I have attached it below for you. This works wonders if your mother will restrict her diet for 10 days.

8. References

Arthritis: An Alternative Medicine Definitive Guide, Eugene Zampieron & Ellen Kamhi, (1999). Alternative Medicine.com.

Arthritis: Stop Suffering, Start Moving, Darlene Cohen (1995). Walker & Company.

Arthritis: The Powerful Program for Greater Flexibility, Strength, and Freedom, Alice Christianson (2001). Kensington Publishing Corporation.

Breath by Breath, Larry Rosenberg (1999). Shambhala Publications.

"Factsheet: Rheumatoid Arthritis," American College of Rheumatology, available at http://www.rheumatology.org/public/factsheets/ra_new.asp?aud=pat.

Full Catastrophe Living, Jon Kabat-Zinn (1990). Dell Publishing.

"Guidelines for the Management of Rheumatoid Arthritis: 2002 Update," American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines, Arthritis & Rheumatism (Feb. 2002), Vol. 46, No. 2, pp. 328–346.

Insight Meditation, Joseph Goldstein (2003). Shambhala Publications.

Rheumatoid Arthritis, Zoltan Rona (2000). alive Publishing Group.

"Rheumatoid Arthritis: Clinical Presentation," Alan Matsumoto, Johns Hopkins Arthritis Website, available at http://www.hopkins-arthritis.org/rheumatoid/rheum_clin_pres.html.

"Rheumatoid Arthritis: Overview," Arthritis Foundation, available at http://www.arthritis.org/conditions/DiseaseCenter/RA/ra_overview.asp.

The Arthritis Bible, Craig Weatherby & Leonid Gordon (1999). Healing Arts Press, Inner Traditions International.

Turning Suffering Inside Out, Darlene Cohen (2000). Shambhala Publications.

Strong Women and Men Beat Arthritis, Miriam Nelson, Kristen Baker, Ronenn Roubenoff & Lawrence Lindner (2002). The Berkley Publishing Group.

Why Zebras Don't Get Ulcers, Robert Sapolsky (2004). Henry Holt & Company.

9 . Appendices

APPENDIX A

Mindfulness and Vipassana meditation practices

Vipassana meditation is the experience of direct insight into the nature of reality, including all internal and external phenomena. Mindfulness is the capacity to remain in a non-distracted state of awareness of the present moment. In contrast to yogic meditation practices aimed at sensory withdrawal, concentration and absorption, mindfulness and Vipassana practices direct the meditator to enter into, rather than attempt to transcend or cut off, sensory perceptions, thoughts, emotions and beliefs, with the aim of clearly seeing the true nature of all phenomena. This intimacy with experience begins to dissolve the apparent solidity of physical sensations, including those associated with pain, and of disturbing mental states like fear and anger. They are seen through direct experience to be impermanent and to exist only in dependency on an ever changing confluence of causes and conditions - and so to lack inherent existence. This realization is a core aspect of the "insight" to which the term "vipassana" refers.

The fundamental realization at the heart of Vipassana is insight into the three seals, or marks, of existence: impermanency, unsatisfactoriness (sometimes translated less accurately as "suffering") and not-self. All major Buddhist traditions practice some form of Vipassana ("Vipashyana" in Tibetan Buddhism), taking various aspects of experience and ultimate reality as the object of insight. These practices build the capacity to relate to all experience with a sense of greater spaciousness. They aim at clearing away the ignorance and delusory states which obscure our understanding of the true nature of reality.

Practices for stabilizing the mind are used to create a foundation for Vipassana. Mindfulness is cultivated through close observation of internal and external phenomena as they arise, persist and dissipate. As mindfulness becomes more steady and effortless the practitioner develops the capacity to maintain a state of undistracted awareness. In this state of undistracted awareness, called "calm abiding," "tranquility" or "shamatha" meditation, the mind remains stable and is not caught by sensation, thoughts or emotions when they arise. A specific object, often the breath, is used as the object of awareness to aid in establishing calm abiding. Awareness also may be opened to take whatever arises in the mind – the flow of sensory perceptions, thought and emotion – as the anchor for the mind.

When the mind is settled in a state of tranquility, the meditator is able to experience insight into experience without being swept away by disturbing emotions or conceptual proliferations – or she is able to recognize when she has been swept away and then return to a undistracted state. The process of insight itself is one of uncovering direct, intuitive understanding, rather than engaging in abstract analysis or intellectual explanation. The mind is used to see into the nature of reality, including the nature of the mind itself, by peeling away discursive thought and concept to lay bare the underlying reality. In

Buddhist understanding "mind" refers to consciousness - the capacity for awareness - and encompasses what is referred to as heart in Western understanding, not merely the intellect or the brain. It is not a kind of psychic substance, however: mind is itself empty of inherent existence. What the West and several other spiritual traditions understand by "mind" is referred to in Buddhism as "deluded mind."[30]

Vipassana builds the capacity to relate to life off the meditation cushion with more freedom. We do not try to make our experience anything other than what it is. In the context of meditation we thus practice relinquishing any preference for peace or other pleasant experiences and remaining present to unpleasant as well as pleasant sensations, thoughts and emotions. By returning again and again to this practice of acceptance, the sense of constriction that often characterizes our relationship to unpleasant experience is loosened. And by remaining steadfastly present we come into contact with the reality that internal and external phenomena are impermanent and lack solidity. Working in this way during meditation softens the mind so that it becomes more supple in daily life. As poet and Zen practitioner Gary Snyder explains: "[m]editation is not just a rest or retreat from the turmoil of the stream or the impurity of the world. It is a way of *being* the stream, so that one can be at home in both the white water and the eddies."[31]

To offer M.M the possibility of altering her relationship to pain and feeling more at home in her body, the body itself was taken as the foundation of mindfulness and the object for Vipassana. Because M.M had a well-established ability to stabilize the mind through mantra and breathing techniques my initial instructions emphasized maintaining mindfulness of the sensations of the body without dropping into a state of quietude or absorption. To support an alert awareness I suggested several methods common in Buddhist forms of mediation: keeping her eyes open; using an object other than the breath to stabilize awareness, as breath awareness tended to move her toward the intent of stilling the mind; and using the technique of mental noting to label objects of experience as they arise. Noting or labeling is an accessible and effective tool for maintaining mindfulness of whatever is arising while discouraging distraction and conceptual proliferation. It helps the meditator to remain with the simplicity of direct experience. Labeling is done at the level of broad categories -- for example, by noting "thinking" when thoughts arise, or more specifically "judging mind" when critical thoughts arise, or "hearing" when sound arises. Like other tools it is to be used skillfully; this means not engaging in thinking about the labeling and allowing it to fall away as mindfulness and awareness become more steady.

The basic instructions were to:

- allow the mind to settle toward a state of undistracted awareness, in which she notices when the mind has become distracted by discursive thought or caught in sleepiness or agitation and returns to the object used to stabilize the mind;
- notice whatever arises, without attempting to change it or create a particular experience, and use the technique of noting to support active awareness;
- notice what happens to the object of awareness as she observes it, including whether it persists, changes or dissipates;

- notice how she is relating to whatever is arising, including reactions like aversion, attraction, or judgments about her experience;
- when sensations, thoughts or emotions persist, turn toward them rather than pushing them away or substituting other thoughts or emotions, and to inquire closely into the specific nature of the experience, recognizing conceptual categories and habitual reactions and beliefs and then looking into the underlying layers of experience; and
- rest her awareness on the breath if the sensations, thoughts or emotions are too overwhelming for her to remain within them.

I suggested that M.M sit for 20 minutes each day. This was later revised to two 10 minutes sessions, with a short break in between for stretching to relieve stiffness. We sat together an average of 2-3 times each month, followed by short discussions.

This approach is based in several sources: widely-used Buddhist methods for working with the Four Foundations of Mindfulness; specific instructions for working with pain from Zen teacher Darlene Cohen and Insight Meditation teacher Joseph Goldstein; and teachings and instructions from my teacher Jeff Collins which draw on Theravadin Vipassana practices, Soto Zen teachings and practice and other Mahayana teachings, and Diamond Heart practice. It is influenced by the particular combination of clear seeing and compassion in relating with others that is embodied by Jeff and by Traleg Kyabgon Rinpoche - a way of relating that encourages students to be both rigorous and generous with themselves.

A form of mindfulness-based meditation pioneered by Dr. Jon Kabat-Zinn is widely taught in the U.S. for stress reduction and has been shown in multiple studies to be effective for both stress reduction and dealing with chronic pain.[32] Kabat-Zinn and his colleagues chose mindfulness meditation as a technique for pain management because: "[i]n the case of pain perception, the cultivation of detached observation of the pain experience may be achieved by paying careful attention and distinguishing as separate events the actual primary sensations as they occur from moment to moment and any accompanying thoughts about pain."[33] The overall experience of pain is altered by observing the separation between physical sensation and psychological elaboration: the sensory experience of pain "may be undiminished, but the emotional and cognitive components of the pain experience, the hurt, the suffering, are reduced."[34] This approach is centered primarily on mindfulness and awareness, with less emphasis on classical Buddhist teachings.[35]

In addition to our meditation and discussion sessions, on my recommendation M.M. read and listened to teachings by Tibetan Buddhist teacher Pema Chodren and Darlene Cohen, a Soto Zen teacher who herself lives with RA.

APPENDIX B

M.M.'s diet & herbal and nutritional supplements

Foods to avoid

- Citrus, grapes, dried fruit
- Corn, eggplant, white potatoes, peppers, creamed vegetables
- Wheat corn, barley, spelt, kamut, rye, all-gluten containing products
- Peanuts, peanut butter, pinenuts, pistachios
- Beef, shellfish, pork, frankfurters, sausage, canned meats, eggs
- Diary products, including yogurt
- Margarine, butter, shortening, processed and hydrogenated oils, mayonnaise
- Sodas and soft drinks, alcoholic beverages, caffeinated beverages
- Chocolate, ketchup, mustard, chutney, soy sauce, barbeque sauce or other condiments
- White or brown refined sugar, honey, maple syrup, corn syrup, or desserts made with these sweeteners

Nutritional supplements and herbs

- Glucosamine
- Chondroitin
- MSM
- Cats claw
- UltraInflamix anti-inflammatory herbal compound (Ingredients: Tu-Huo, Cinnamon twig, Siler, Cnidium, Chin-chin, Clematis, Morus Twig, Red Atractylodes, Coix, Acanthopanax, Chiang Huo, Stephania, Dried Ginger, Aconite (Chuan Wu), Tumeric

10. Biographical note

Donna Karuna Das Sullivan is a certified Structural Yoga Therapist and Integral Yoga teacher at the Beginning and Intermediate Levels. From November 2003-2005 she lived at the Satchidananda Ashram in Virginia, where she taught hatha yoga and meditation. She is a student of Buddhist philosophy and practiced Buddhist Insight meditation (Vipassana) under the direction of Jeff Collins for six years. She currently practices Mahamudra, a form of Tibetan Buddhist meditation, as taught by Traleg Kyabgon Rinpoche. For twenty years she worked as an international human rights lawyer. She has taught and published widely on human rights issues, most recently contributing to a 2006 study by the United Nations Secretary-General on violence against women.

Endnotes

[1.] Why Zebras Don't Get Ulcers, Robert Sapolsky (2004), pp. 258-263 (reviewing research on the loss of control or predictability and the perception that things are getting worse as triggers of the stress response).
[2] The pathology of RA can be summarized as follows: "[t]he initial reaction appears to be a cellular immune response directed against an unknown antigen or antigens in a genetically predisposed host. The activation of helper T-lymphocytes leads to release of inflammatory cytokines by these cells, and attraction of macrophages into the synovium and of polymorphonuclear leukocytes into the synovial fluid. The synovial lining cells proliferate in numbers and state of activation. The proliferative "pannus" behaves as a locally invasive malignancy, burrowing into and destroying articular cartilage and subchondral bone." "The changing dimensions of rheumatoid arthritis and its treatment," Editorial, Edward D. Harris, Jr.,

Bulletin of the World Health Organization (2003), Vol. 81, No. 9, available at http://www.who.int/bulletin/volumes/81/9/Editorial%203.pdf. For discussion of pathology, see also "Rheumatoid Arthritis: Pathophysiology," Joan Bathon, Johns Hopkins Arthritis Website, http://www.hopkins-arthritis.org. For general overviews of RA, see "Definition of Rheumatoid Arthritis," Medline, National Institutes of Health, available at http://www.nlm.nih.gov/medlineplus/ency/article/000431.htm#Definition; "Rheumatoid Arthritis: Clinical Presentation," Alan Matsumoto, Johns Hopkins Arthritis Website, http://www.hopkins-arthritis.org/rheumatoid/rheum_clin_pres.html; "Factsheet: Rheumatoid Arthritis," American College of Rheumatology, available at http://www.rheumatology.org/public/factsheets/ra_new.asp?aud=pat; "Overview of the management of rheumatoid arthritis," Edward D. Harris, Jr., Peter Schur & R. Maini (Aug. 2004), available at http://patients.uptodate.com/topic.asp?file=rheumart/7684 (UpToDate.com is an information service for physicians and is designated by the American College of Rheumatology as one of its official education programs); Strong Women and Men Beat Arthritis, Miriam Nelson, Kristen Baker, Ronenn Roubenoff & Lawrence Lindner (2002), pp. 20-26; "Rheumatoid Arthritis: Overview," Arthritis Foundation, available at http://www.arthritis.org/conditions/DiseaseCenter/RA/ra_overview.asp.

[3] See Matsumoto, note 2: "[r]ecent studies have demonstrated an increased mortality in rheumatoid patients. Median life expectancy was shortened an average of 7 years for men and 3 years for women compared to control populations. In more than 5000 patients with rheumatoid arthritis from four centers, the mortality rate was two times greater than in the control population." See also "Mortality in rheumatoid arthritis: time to take it seriously," Anwar Arshad & Mohammed Shahid, Asia Pacific League of Associations for Rheumatology Journal of Rheumatology (2005), Vol. 8, pp. 154–158, available at http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1479-8077.2005.00158.x?cookieSet=1. See also "Rheumatoid Arthritis: Expectations," Medline: Service of the National Institutes of Health and U.S. National Library of Medicine, available at http://www.nlm.nih.gov/medlineplus/ency/article/000431.htm#Expectations%20(prognosis): "[w]ith regard to reduced life expectancy for rheumatoid arthritis patients, the standardized mortality ratio from different studies has ranged from 1.13 to 2.98. This mainly applies to rheumatoid factor positive cases, although a subgroup of rheumatoid factor negative cases with an adverse long-term prognosis exists. Clinically based studies probably overestimate the true shortening of life span and population-based studies may underestimate it."

[4] See "Chronic Rheumatic Conditions," World Health Organization, available at http://www.who.int/chp/topics/rheumatic/en/print.html. See also Matsumoto, note 2:"[d]isability is higher among patients with rheumatoid arthritis with 60% being unable to work 10 years after the onset of their disease." According to information from the U.S. National Institutes of Health, the percentage of those disabled from work may be slightly lower: "50-70% of patients remain capable of full-time employment. After 15-20 years, only 10% of patients are severely disabled, and unable to perform simple activities of daily living (washing, toileting, dressing, eating)." Expectations," Medline, note 3.

[5] "Rheumatoid Arthritis [and the] Spine," Michele Calleja & Geoff Hine, updated Jan. 5, 2005, available at http://www.emedicine.com/radio/topic836.htm. Emedicine is an information service and database for consumers with content provided by physicians.

[6] Matsumoto, note 2; see also "Patient information: Treatment of rheumatoid arthritis," R. Maini, available at http://patients.uptodate.com/topic.asp?file=arth_rhe/7798.

[7] "Rheumatoid Arthritis: Symptoms," Arthritis Foundation, available at http://www.arthritis.org/conditions/DiseaseCenter/RA/ra_symptoms.asp.

[8] "Patient information: Clinical manifestations and diagnosis of rheumatoid arthritis," R. Maini & P. Venables, available at http://patients.uptodate.com/topic.asp?file=arth_rhe/2411.

[9] Unarrested joint damage proceeds through four stages: "1) synovitis (inflammation of the synovial membrane) develops from congestion and edema of the synovial membrane…and the joint capsule; 2) [f]ormation of pannus (thickened layers of granulation tissue) marks the onset of the second stage. Pannus covers and invades cartilage and eventually destroys the joint capsule and bone; 3) [p]rogression to the third stage is characterized by fibrous ankylosis - fibrous invasion of the pannus and scar formation that occludes the joint space. Bone atrophy and misalignment causes visible deformities and disrupts the articulation of opposing bones, causing muscle atrophy and imbalance and possibly, partial dislocations or subluxations; 4) [i]n the fourth stage, fibrous tissue calcifies, resulting in bony ankylosis and total immobility." "Rheumatoid Arthritis: Symptoms, Treatment & Prevention," HealthScout Network, available

at http://www.healthscout.com/ency/68/120/main.html. HealthScout Network is an information service for consumers with content provided by physicians.
[10] Matsumoto note 2; Bathon, note 2.
[11] Bathon, note 2.
[12] Matsumoto, note 2; Harris, Schur & Maini, note 2.
[13] Orthopedic treatment recommendations include full passive ROM daily to prevent deformity, rest and splintage, and increases in activity as inflammation subsides. See Flinders University School of Medicine, South Australian Orthopedic Registrar's Notebook, available at http://som.flinders.edu.au/FUSA/ORTHOWEB/notebook/disease/rheumarthritis.html. See generally Guidelines for the Management of Rheumatoid Arthritis: 2002 Update, American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines, Arthritis & Rheumatism (Feb. 2002), Vol. 46, No. 2, pp. 328–346.
[14] Nelson, et al., note 2, pp. 25-26; "Nutritional Implications of Rheumatoid Arthritis," U.S. Dept. Agriculture, Agricultural Research Service, available at http://www.ars.usda.gov/is/AR/archive/jul04/nutr0704.htm.
[15] Nelson, et al., note 2, p. 25.
[16] Exercise treatment to counteract protein wasting of chronic diseases," E. Zinna & K. Yarasheski, Current Opinion in Clinical Nutrition & Metabolic Care. 6(1):87-93, Jan. 2003, abstract available at http://www.co-clinicalnutrition.com/pt/re/conutrition/abstract.00075197-200301000-00013.htm;jsessionid=DKKNy9GT3TnA52g4OVulwYOfE0Rjs2dgXIbX9cKF4O79QGsNx1nE!-836056069!-949856144!9001!-1.
[17] Matsumoto, note 2.
[18] American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines, note 13, pp. 331-32.
[19] Barometric Change and Cooler Temperatures Do Affect Joint Pain," report from the 2004 American College of Rheumatology Annual Scientific Meeting, available at http://www.rheumatology.org/press/2004/mcalindon_weather.asp.
[20] Editorial, Harris, note 2.
[21] Rheumatoid Arthritis, Zoltan Rona (2000), pp. 20-21; Arthritis: An Alternative Medicine Definitive Guide, Eugene Zampieron & Ellen Kamhi (1999), pp. 250-64.
[22] The Arthritis Bible, Craig Weatherby & Leonid Gordon (1999), p. 112.
[23] Nutritional Implications of Rheumatoid Arthritis, U.S. Dept. Agriculture, Agricultural Research Service, available at http://www.ars.usda.gov/is/AR/archive/jul04/nutr0704.htm, citing "Low physical activity reduces total energy expenditure in women with rheumatoid arthritis," R. Roubenoff, J. Walsmith, N. Lundgren, et al., American Journal of Clinical Nutrition (2002), Vol. 76, pp. 774-779.
[24] Nutritional Implications of Rheumatoid Arthritis, U.S. Dept Agriculture, Agricultural Research Service, available at http://www.ars.usda.gov/is/AR/archive/jul04/nutr0704.htm.
[25] American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines, note 13, Table 5.
[26] For guidance in mindfulness and Vipassana techniques, see Insight Meditation, Joseph Goldstein (2003); Breath by Breath, Larry Rosenberg (1999).
[27] American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines, note 13, p. 332: "[i]nstruction in joint protection, conservation of energy, and a home program of joint range of motion and strengthening exercises are important in achieving the treatment goal of maintaining joint function. Physical therapy and occupational therapy may help the patient who is compromised in activities of daily living. Regular participation in dynamic and even aerobic conditioning exercise programs improves joint mobility, muscle strength, aerobic fitness and function, and psychological well being without increasing fatigue or joint symptoms."(Footnotes omitted).
[28] According to researchers involved in one study "[a] ny patient with rheumatoid arthritis should undertake low-impact, moderate intensity exercise, ….but not necessarily the intensive training used in [their] study. [In their view], 'the intense PRT program [they] used to stimulate muscle growth in rheumatoid arthritis patients should probably be treated as a 'pharmacological' form of exercise and prescribed only to patients with severe (muscle wasting)…. [Nonetheless, a]ny patient with low to moderate disease activity can undertake this level of progressive resistance training….Although very intense on muscles, PRT is actually a low-impact activity in terms of forces imposed on the joints when performed correctly….This is why it is

very important that patients are initially supervised and appropriately instructed by a clinical exercise physiologist.'" Medline, http://www.nlm.nih.gov/medlineplus/news/fullstory_25509.html (citing "Can progressive resistance training reverse cachexia in patients with rheumatoid arthritis? Results of a pilot study," S. Marcora, A. Lemmay & P. Maddison, Journal of Rheumatology (June 2005), Vol. 32(6), pp.1031-39, abstract available at _http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=Abstract&list_uids=15940763&query_hl=1&itool=pubmed_DocSum). See also "Long term high intensity exercise and damage of small joints in rheumatoid arthritis," Z. de Jong, M. Munneke, A. Zwinderman, H. Kroon, K. Ronday, W. Lems, B. Dijkmans, F. Breedveld, T. Vliet Vlieland, J. Hazes, and T. Huizinga1, Annals of the Rheumatic Diseases (2004), Vol. 63(11), pp. 1399-1405 (concluding that "[t]he progression of radiological joint damage of the hands and feet in patients with RA is not increased by long term high intensity weightbearing exercises. These exercises may have a protective effect on the joints of the feet.") available at http://ard.bmjjournals.com/cgi/reprint/63/11/1399, abstract available at http://ard.bmjjournals.com/cgi/content/abstract/63/11/1399; "Effect of intensive exercise on patients with active rheumatoid arthritis: a randomised clinical trial," C. van den Ende, F. Breedveld, S. le Cessie, B. Dijkmans, A. de Mug, J. Hazes, Annals of the Rheumatic Diseases (Aug. 2000), Vol. 59(8), pp. 615-21, available at http://ard.bmjjournals.com/cgi/content/full/59/8/615 (concluding that "[a] short term intensive exercise programme in active RA is more effective in improving muscle strength than a conservative exercise programme and does not have deleterious effects on disease activity.")

[29] "Effect of a high-intensity weight-bearing exercise program on radiologic damage progression of the large joints in subgroups of patients with rheumatoid arthritis," M. Munneke, Z. de Jong, A. Zwinderman, H. Ronday, D. van Schaardenburg, B. Dijkmans, H. Kroon, T. Vliet Vlieland, J. Hazes, Arthritis & Rheumatism (June 15, 2005), Vol. 53(3), pp. 410-7, abstract available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=15934121&dopt=Abstract.

[30] On this distinction, see The Benevolent Mind: A Manual in Mind Training, Traleg Kyabgon Rinpoche (2003), p.61, available from Evam Institute, www.evam.org.

[31] "Just One Breath," Gary Snyder, in Breath Sweeps Mind, Jean Smith (ed.), pp. 57-59, 58 (1998).

[32] For an overview of the research and the techniques used in Mindfulness-Based Stress Reduction, see Full Catastrophe Living, Jon Kabat-Zinn (1990).

[33] "The clinical use of mindfulness meditation for the self-regulation of chronic pain," Jon Kabat-Zinn, L. Lipworth & R. Burney, Journal of Behavioral Medicine (1985), Vol. 8, pp. 163-190, 165.

[34] "An out-patient program in Behavioral Medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results," Jon Kabat-Zinn, General Hospital Psychiatry (1982), Vol. 4, pp. 33-47, 35.

[35] For a general overview and instructions, see Kabat-Zinn, note 32, pp. 31-40, 51-53, 56-58, 61-93.