

**Osteoarthritis of Hip with  
Piriformis & Psoas Involvement  
in Senior Citizens**

**Structural Yoga Therapy Course  
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## Introduction

This paper is an examination of two male senior citizens (62+ years) who presented themselves with painful right hips (diagnosed or suspected arthritis). In general, individuals in this age group present a unique challenge in yoga due to their physical and sensory-motor conditions. In general, they have reduced flexibility, decreased strength, reduced acuity in vision and hearing along with various levels of bone loss or degeneration and other degenerative conditions specific to their life span. Both individuals in this case study belonged to this age group and showed to varying degree some of these characteristics.

## I. Case Study #1 - Mack

### A. Initial Intake: 1/24/06

Mack is a yoga student of mine who has complained of a sore right hip for some time. He is presently a high school math teacher, in his second year of teaching. As exercise, he likes to power walk around our neighborhood which does aggravate his condition. As a neighbor, Mack was easily accessible and was very willing to participate.

Mack is a very social person who has meditated for a number of years. He attends a local meditation group every Monday night. He originally began meditating using Transcendental Meditation™) but has switched to Zazen form of meditation. He mentioned that when he sat cross-legged, his hip did begin to hurt, and he has switched to *Virasana* with a safe (meditation cushion). He has lived in this neighborhood for a number of years. He also helps his wife periodically with managing a B&B in the nearby town.

Mack is an ABD in Anthropology and also extremely gifted in math. He loves abstract problems and looks through mathematics journals studying the problems and solutions. He said during his graduate work he enjoyed using the mathematics to show correlations in his anthropological research. He never taught until recently and owned a Post Boxes Inc. mail store for many years up in Boston. He recently went through the "NC Teach" program here in North Carolina to be certified as a math teacher. He has found teaching to be extremely frustrating. He has a very hard time with classroom management and the behavioral modification techniques used in the educational setting.

In addition, his mother has recently been diagnosed with bladder cancer (she lives in Idaho) which is somewhat advanced – terminal. His father is still living and is a retired medical doctor so his mother is being cared for. Even so it is distressing to him to see his mother in the phases of dying.

His symptoms were right-front hip and upper-thigh tenderness/pain along with some tightness and tenderness in gluteus area.

He described the pain as a stinging type pain like a bee sting. The tenderness is local, and there seems to be a little "stinging" on the joint. On a scale of 1-10 his pain goes from 4-7 especially at night. In addition, he said that walking down stairs was a bit painful. (This is a one of the classic symptoms of Osteoarthritis of the hip.) His walking also showed a slight compensation for the right hip (whole hip raised when walking with no hip flexion which is also indicative of osteoarthritis of the hip).

He stated that the only way he can relieve the pain is to lay over a yoga block to stretch out his hip flexors. He also experienced tenderness in the right side of the gluteus area. Mack does a lot of race walking and practices yoga about once a week at my home. He mentioned that in the morning that many times his leg felt as if it would give out from under him. At times there is radiating pain down to the knee, but no numbness.

Other than the hip pain, Mack has no other maladies. He is in general good health and is very active with his grandchildren.

Mack is a sincere person who wants to improve his physical situation. His body awareness is average in that given some direction he can "feel" the movement.

Mack's goals were to:

Alleviate his pain so that he can continue to stay active and sleep at night

Gain more suppleness in his hamstrings and hips

Improve his physical condition and alleviate some of the stressors in his life  
(secondary goal)

## B. Physical Assessment

Initial Body reading – 1/24/06

**Front view** - Left shoulder a little more protruded (rolled) forward giving impression of higher shoulder. (Possible tight left pectorals and Serratus Anterior or weak middle and lower Trapezius and Latissimus) (**Note:** Not primary concern in this study since he had no shoulder symptoms.)

**Back view** - Right scapula wings out a little more than left (Possible Tight Serratus anterior, pectoral and anterior deltoid, with possible weak right middle Trapezius and Rhomboid). (**Note:** Not primary concern in this study since he had no shoulder symptoms.)

**Side view** - Little forward lean (Possible tight Tibialis Anterior, Psoas, Rectus Abdominis with possible weak Gluteus Maximus and thoracic Erector Spinae).

**Sacroiliac Test** - Left side positive (not moving)

Follow-up Body reading – 3/29/06

**Front view** - Left shoulder still slightly higher than right. (Possible upper Trapezius and Levator Scapulae with possible weak lower Trapezius, Latissimus and Pectoralis Sternal)

**Front view** - Elevated left hip (especially when in Warrior I with left foot forward see photos), shows possible tight left QL and Psoas and possible weak QL and Psoas on right. Also right foot turned out shows possible tight external rotators or Gluteus Medius, TFL.

**Front view** - Marked lean to the left with turn out of right foot showing possible tightness of Psoas, external hip rotators, Sartorius and Gluteus Medius (see left-hand photo on bottom row labeled "natural stance").

**Side view** – Forward lean (Possible tight Tibialis Anterior, Psoas, Rectus Abdominis with possible weak Gluteus Maximus and thoracic Erector Spinae) (see right-hand photo in top row).

**Back view warrior lead up (left leg forward)** – Shows marked elevation of left hip (possible tight Lattisimus Dorsi or Guadardus Lumborum).

**Table 1** - ROM Results

Range Of Motion	1/24	1/24	3/29	3/29
	Left	Right	Left	Right
Knee Flexion Supine	121	121	125	120
Hip Flexion Supine Bent Knee	100	105	100	104
Hip Flexion Supine Straight knee	52	72	58	75
Hip External Rotation Supine	28	30	28	37
Hip Internal Rotation Supine	21	27	20	14
Hip Abduction Side	30**	30	45	45*
Knee Flexion Prone	111	111	103	109
Hip External Rotation Prone	46	25	43	29
Hip Internal Rotation Prone	35	19	25	18
Hip Extension Prone	20	20	19	18
Adduction on Side	Normal	Normal	Normal £	Normal

\* Hip "leaning" slightly

\*\*Cramping in TFL and Glut Med area

£ indicates a greater than normal pull feeling on this side

Psoas and quadriceps test (Supine) were positive for right hip flexors/quadriceps on both dates (when knee is pressed into chest opposite leg comes off the table)

**Table 2 - Muscle Testing**

Muscle Tested	1/24 Left	1/24 Right	3/29 Left	3/29 Right	Comment
Hip Flexors	5		5		
Trunk Flexion	5		5		
Psoas Iso	3	3**	2.5	4	**Feeling of tenderness- can't externally rotate leg
Sartorius Iso	3	3	2.5	2.5	Although small decrease, both sides are equal
Hip (Side) Ext. Rotation	5	4*	4	4	* = recruitment
Hip (Side) Int. Rotation	4	3.5	4	4	
Hip (Side) Abductors	4	4	5	5	
Hip (Side) Adductors	4	3.5	4	4	
Knee (Prone) Extension	4	4	5	5	
Knee (Prone) Flexion	2	2**	1.5	1.5	** = Immed. Cramping in Hamstring
Hip (Prone) Extension	5	5	4	5	
Glut Max Iso	1	1	1	1	Hips off the table (tight flexors) on both assessments – indicating tight hip flexors
Hip (Prone) Int. Rotation	2	2*	4	4	*Stinging sensation in upper right Glut max
Hip (Prone)	4	4	2.5	2	
Back Lower	5		5		Compensate by slight twist to right
Mid Back	5		5		Compensate by slight twist to right
Upper Back	5		5		Compensate by slight twist to right
Seated QL test	1	1	1	1	Unable to lift hip without raising knee
Lat Isolation test	5	5	5	5	

### C. Summary of findings

**Table 3** – Results from initial assessment

<b>Muscles to Stretch</b>	<b>Muscles to Release</b>	<b>Muscles to Strengthen</b>
Both left and right external rotators Internal Rotators Hip Flexors (especially right) Both rt & lf Hamstrings Left Quadratus Lumborum	Right Psoas Right Piriformis	Hip internal rotators right side Right Adductors Gluteus Maximus both sides Hamstrings Sartorius both sides Quadratus Lumborum both sides

The results of Mack's initial range of motion assessment showed tight external and internal rotators of both hips (with very tight right Psoas and Piriformis). In addition, his right hip flexors (Rectus Femoris) as shown in the (GM isolation), hamstrings, and left Quadratus Lumborum was tight. The initial muscle test showed weak right internal rotators and adductors, Gluteus Maximus and Sartorius and Quadratus Lumborum, in addition his hamstrings appeared very weak in the knee flexion test. Overall, there was a general tightness and weakness in the right hip region with compensation of the left hip.

## D. Recommendations from initial session

SI "Magic Bullet" for SI imbalance

JFS (hip/leg part) – specifically #4-8 (Knee extension/flexion, Hip internal/external rotation, cat stretch, sunbird, hip add/abd).

Savasana whenever possible - For emotional release from teaching (Later to attend yoga nidra sessions led by my wife and me.)

Due to Mack's schedule and general state of tightness, no yoga poses were prescribed at this time. I wanted to work more on awareness (prana) of hip movements than ROM.

Because Mack practiced meditation, I did not stress wave breath at this time.

## E. Summary of recommendations

**2/13** - Mack is has made some progress working with the JFS. Last week he said for the first time, he could stand up out of bed without feeling as if his foot would give out (right foot). His wife commented on a call that he is continuing to do JFS and magic bullet "religiously". He also noted at this session (see data above) that when walking the front part of his hip (TFL and Gluteus Medius) is tight vs. the Piriformis. There appears to be a shift in awareness in what muscles he is using when he walks. Since the TFL and GM are internal rotators (as well as abductors-GM), it appears that he is over using these muscles. As stated earlier, he tends to "over-stride" when he walks and comes down hard on his heels (especially this right heel), the over striding motion is probably irritating the TFL/GM.

He, as he observed, has a bit more awareness of his movements in his hip than when he was initially examined. We modified the JFS knee flexion to minimal ROM but with maximal "tracking" (moving leg straight whereas he was allowing the right knee to externally rotate so that the knee went out to the side as he brought it up), so that internal rotators can strengthen, especially on right side, on left side a little of the opposite (strengthen the external rotators) also I wanted him to use his arms more in knee flexion so that the hip flexors wouldn't be used so much because they were tight as shown in the examination.

We introduced lunges with chairs and will do two repetitions on each side alternating, 10 breaths each working to make the inner "thighs kiss" (not collapse but make sure the hip rotates internally).

Yoga poses recommended:

Lunges (with chairs) to stretch hip flexors (rectus femoris and psoas especially).

**3/1** - reviewed JFS #5 & 8 (hip add/abd/ql stretch and also worked on Warrior 1 lead up to get his spine straightened and less recruitment in the Hip abductors and QL (see left-hand photo bottom row). I took a second ROM and MT of his right side, measurements are in Table 2. Also mentioned that he could use the supported bridge and lay on the block longer to try to stretch out his Psoas. I did not mention how long to hold the pose, which was a mistake, as noted in next entry.

**3/10** - Talked to Mack today and he said that his Psoas was really sore a couple of days after our 3/1 session – In the session I had told him that he could lay over a block in supported bridge position. He did it for 6min. But after the second day, the pain subsided and his gait was very smooth and he can walk up stairs without



adjusting his gait. (I appeared to give him a more "pitta-like" stretch when *vata* was called for—the stinging sensation appeared to be a *pitta-like* symptom).

**3/29** – Again, we reviewed the SI joint exercise and also worked at refining the cat-stretch along with *Vrkansana* against the wall with the emphasis on releasing waist and working hip flexor Sartorius and sunbird with turn out to strengthen Gluteus Maximus. Mack tends to overdo the movements in the SI exercise and so we tried to isolate and differentiate the pelvic movements from the gross torso movements. At this stage I wanted to start strengthening Mack's hamstrings and Gluteus Maximus that appeared weak (in addition to Sartorius).

Yoga Poses recommended: Tree pose (*Vrkasana*) for Sartorius strength (little emphasis on turning hip out more on lifting leg up).

Modified Locust with turnout for Gluteus Maximus.

**6/4** – Again, we have both been busy but Mack has been able to continue the program. His is motivated by the fact that when he practices the prescribed movements, he can sleep at night. He stated that when he doesn't do his "exercises" he can't sleep in bed and has to sleep either on the couch or in his car where he can adjust the seat.

I called Mack up a couple of days later for a status check. He said that his pain has been bad for a couple of days and it has been hectic at school. Today was better and he was able to perform the movements (SI stabilizer) and others. He mentioned that he is under a lot of stress at school (this is the end of the school year and so there is a lot of pressure on teachers to get grades/assessments in). He also mentioned that when under stress he begins to eat sweets that seem to aggravate his pain. We met again on 6/6.

**6/6** – We went over the SI stabilization exercise since he still appears to "overdo" it a bit and then reviewed the movements that he has been practicing. (See results from 3/29 session.) When he demonstrated the Warrior I lead up against the wall, his right hip was no longer as elevated as before (see photos).

**6/23** – I phoned Mack to see how he was coming along; he told me that he is on his fourth day of the arthritis rice and squash diet. I was very surprised that he had decided to embark on this endeavor, and he was sticking with it. He said the first few days that his hip pain seemed very severe but today it felt a little better. I told him to drink plenty of warm water and let me know if anything comes up since there can be some side effects during this diet. Urged him to do the SI stabilization movement "religiously" and other movements we went over.

**6/29** – This was Mack's 10<sup>th</sup> day on the arthritis diet. I phoned him and asked him how he was feeling. He felt a little "spacey" and I told him that was how I felt and it was normal, part of the clearing/de-toxification process. He has lost some weight and I told him that he could keep it off by continuing the chewing (only 25 times vs. 50) and this will help his digestion and allow his appetite to be satisfied with less food. I congratulated him because I was only able to last seven days where he had gone the full ten. I told him that we should get together in the next week and go over the next steps and also I would explain the Ayurvedic theory behind the diet and also behind arthritis.

# **I. Case Study #2 – Henry**

## **A. Initial intake: 1/13/06**

This study involved Henry, a 76-year old male, who recently was diagnosed with arthritis in his right hip. He is of Chinese ancestry and moved to this country in 1948 when he went to college in Ohio. (He later went to Princeton for his PhD in Chemistry; he later worked for Phillips Petroleum in their chemical division until he retired.)

Henry has been a student of mine for over a year. He originally came to me with complaints of “frozen shoulders” which he has had for over 10 years. During spring/summer of 2005, when he was preparing to move to a retirement center, he began complaining of “hip” pain. On examination, I believed it to be a Piriformis issue (since he was pointing to the area where his Piriformis is. In addition, he had recently moved to a rental unit and he and his wife were waiting to move into the local retirement center. He complained that he spent a lot of time looking for things they had packed which was frustrating to him.

In late fall he went to China (yearly visit) and he began to have groin pain when walking. On returning to the states, he went to an orthopedist who concluded that he had arthritis of the hip and started him on Glucosime and Chondrosin combination. He has refused to take any medication for his hip pain preferring to take only aspirin. On his first session with me after being diagnosed, he had not been to yoga class for several months (moving into the retirement center and traveling). He looked tired and very unsteady on his feet.

He complained that when we walked he had to waddle and he had to frequently stop for the pain in his hip/groin to subside. His symptoms also included pain in going down stairs and favoring hip when walking (classic symptoms of hip arthritis).

## B. Physical Assessment

1. Initial Body reading 1/13/06

**Back view** - No deviations in spine.

**Side view** - Little forward lean (Possible tight Tibialis Anterior, Psoas, Rectus Abdominis with possible weak Gluteus Maximus and thoracic Erector Spinae)

**Front view** Right foot turns out more than left. (Upon palpation, tenderness in Piriformis on right hip along a little tightness in inner groin of right hip possibly Psoas tightness but was "negative" on table exam for tight Psoas does show possible tight Rectus Femoris/Quadriceps as shown in quad/psoas test.

**SI test** – positive on left side (no movement)

2. Second body reading – 3/12/06

Same as initial reading as above except in side view where the forward lean was not as noticeable.

**Table 1** – Range of motion

Range of Motion	1/24 Left	3/29 Left	1/24 Right	3/12 Right
Supine Knee Flexion	120	120	112	112
Supine Hip Flexion – Bent Knee	84	78	75	80
Supine Hip Flexion - Straight knee	55	46	59	50
Hip Flexor / Psoas Test	Leg straight out – possible tight quads		Same result as 1/24 test see photo on page 12	
Supine Hip – External Rotation	44	38	34	31
Supine Hip – Internal Rotation	18	18	15	15
Side Hip Abduction	34	27	34	30
Prone Knee Flexion	65	98	70	96
Prone Hip External Rotation	46	30	30	30
Prone Hip Internal Rotation	24	26	18	20

**Table 2 – Muscle testing**

Muscle Test	1/13 Left	1/13 Right	3/12 Left	3/12 Right	Comment
Hip Flexors	3	3.5*	2.5	3.5	* Gripping in right groin
Trunk Flexion	4		3.5		
Psoas Isolation	2	2	3*	3.5*	*Recruitment used on both sides
Sartorius Isolation	3	3	4	3*	*Pain in right groin during test
Side Hip Ext Rot	3	3	4	4	
Side Hip Int Rot	3	3	3.5	3.5	
Side Hip Abduction	4	4	4	4	
Side Hip Adduction	2	2	3.5	3.5	
Prone Knee Extension	2.5	2.5	5	4	
Prone Knee Flexion	2.5*	2.5*	3	4	*Strong Recruitment on both sides
Prone Hip Extension	3	3.5	4	3	
Glut Max Isolation	2	2*	2	2	*Feels weakness on right side
Prone Hip External Rot	2	3*	3	2.5	*Has strong "pulling" sensation in area of right piriformis
Prone Hip Internal Rot	3	2	2	2	
Seated QL test	2.5	1	1	2.5	

## Summary of Findings:

**Table 3** – Summary of findings

<b>Muscles to Stretch</b>	<b>Muscles to Release</b>	<b>Muscles to Strengthen</b>
Hamstrings Gluteus Maximus Hip Flexors Right and left internal and external Rotators	Right Piriformis (use tennis ball) Psoas on right side	Back muscles (lats, teres major/minor, posterior deltoids and infraspinatus. Gluteus Max Adductors Quad Lumborum Internal rotators (TFL, Glut med) External Rotators

Overall, Henry is pretty much locked up in his torso and hips with very little range of motion. His history of frozen shoulders has created weak back muscles (Erector Spinae and Middle Trapezius) as well as his Gluteus Maximus. In addition, his internal rotators, adductors, and psoas muscles need strengthening and stretching. Similar to Mack, he has piriformis/psoas involvement and tenderness.

## D. Recommendations

Joint freeing series (JFS) and Sacroiliac “magic bullet”, is recommended to free his joints up and work the sacrum / hip area. His primary physician also recommended water exercises, but he decided not to participate until the end of our sessions. (Henry did start these classes in late May after three months of treatment).

Recommended program – Initial program to last minimum of one month

Full Joint Freeing Series (JFS) 6 repetitions 4-5x a week.

S/I joint “magic bullet 6 repetitions 4-5x a week work up to 12 reps.

A gentle yoga class on Thursdays, (taught by my wife), where he can reinforce the movements of the JFS.

Appointment with me every 10 days or so.

## E. Summary of recommendations

February, 5<sup>th</sup>

We worked on the JFS with some other awareness movements (variations of the JFS lying on his side) to help free shoulder and hip girdle and trying to get some awareness of freeing up his torso.

Also did lateral flexing of spine variation of JFS lateral trunk flexing to help tone his QL.

In addition, I gave him a rubber ball to lay on for psoas pain. (See Appendix B for procedure.)

February 14<sup>th</sup>

Henry appears not to be able to rotate right hip without pointing toe so I broke the inward/outward rotation movement (JFS #5) down into discreet parts so that he can concentrate on “flexing” his right foot while rotating thus strengthening his Tibialis Anterior.

We also reviewed shoulder movements such as: rotation, adduction, abduction, flexion and extension in the JFS. My rationale for working on the shoulders is to help strengthen his back to “pull” him back to erect posture.

February 23<sup>rd</sup>

Over all impression – Henry appears to stand up straighter and seemed more “lively” (i.e., good color in face and smiling and energy). The “pain” in his right Piriformis muscle is quite manageable and lying on the tennis ball helps. He now can walk long distances (1/4 -1/2 mi without stopping with pain) He was quite excited about this. Before he could only “waddle” about 100 yds before stopping.

We went over internal / external hip rotation in JFS again. He made the comment that he still got a “stretching sensation” in Piriformis on internal which I said was “normal” with his situation. The sensation was not very painful but it made the movement a little harder to accomplish. But he was experiencing another pain, the “gripping-slight tenderness” in his inner right groin. I questioned him further on this and he told me that he gets a sharp pain when he lifts and crosses his leg to tie his right shoe. This sounded suspicious, so I re-tested his Psoas and Sartorius muscles (muscle tests that isolate these muscles). On testing the Psoas he said there was a slight gripping sensation, but on testing his Sartorius muscle gave big gripping pain up in groin area. I asked him to point and it went deep into the lower groin near the testicles in entire right groin. Not knowing the exact “symptom” of hip arthritis and his complaint was not a “textbook” symptom of arthritis pain (for example, cracking and popping with pain), I suspected that there might be a slight pull or irritation in the right groin (although adduction muscle test on side was “negative” and strength was around 3. I also tested his hip flexors and the test result was “positive” for tightness. (See photo below.)

e was going to see his primary doctor in around 2 weeks, so I told him he could put some heat on it (at this time I did not know about castor oil packs).

I told him to continue the internal / external hip rotation JFS with maximum awareness and minimum effort (rest is best for groin pulls) and some ice/heat. Continue lying on the ball. Also mention it to his doctor when he sees him again.

Also, asked him to do the following yoga postures:

Roll up bridge hold for 1 breath and roll down. Repeat 3 times. (For Gluteus Maximus, hamstrings and back muscles.)

In a chair twist with hand around back of chair, roll shoulder back and feel muscles in middle back contract (lift through pit of abdomen). 3x on each side. (Stretching muscles along the IT band, loosening the waist and strengthening the upper back.

Cat / cow posture (JFS) either in chair or on the ground if he could manage it. To free up muscles in his torso and pelvis.

Begin to concentrate on freeing neck with JFS neck series. This was a suggestion and again to begin to free up his torso.

Overall, he appears to have more relief from "hip" pain, and more specific awareness on his groin area. There is still pain in that region but less acute, but does still have pain.

He continues to go to the gentle class which uses SYT postures.

March 12<sup>th</sup>

Saw Henry and conducted a second ROM and MT session. (See tables 2 and 3 above)

He also mentioned that he saw his doctor and that his doctor said that symptoms of arthritis can feel like muscles because the joint is so deep.

His measurements have changed very little for the most part.

I wanted him now to begin to emphasize a smooth full breath when doing all movements bring intent to the stiff area so that he can get a relaxation response and start to bring awareness to his lower abdomen. (This is intended to bring awareness to his colon which, from an Ayurvedic perspective is the seat of arthritis.) I also suggested that he perform the following movements:

Full joint freeing series (he can do some of it in bed).

Stretch hip flexors by laying leg over side of bed.

Try to do cat stretch very slowly to begin to differentiate back muscles and free up trunk.

Also do the torso sways in JFS for QL.

Continue taking gentle yoga class.

I also suggested that he get a series of massages at the local wellness center to free up his muscles and do some physio-therapy his groin.

I also suggested that he begin using the whirlpool at the health center and doing the hip part of the JFS while in the pool could probably help.



April 5<sup>th</sup>

Saw Henry for the final time. He had just got the results of his x-rays from the orthopedic surgeon and the surgeon stated that the cartilage on his right hip was worn, but it was worn uniformly in one spot which the surgeon thought was good. It meant that surgery was not imminent. Both Henry's primary doctor and surgeon were not advocating immediate surgery because of his age (76). But both physicians stated that he would eventually have to have surgery. He also went to a physical therapist who showed him some movements almost identical to what I had shown him, and also stated that he couldn't help Henry this was a bit frustrating for him. (His frustration is with "experts" telling him the same thing I was telling him.)

I mentioned that he might try the arthritis detoxification diet. He was not too excited about the prospect, saying that it would be difficult because of the meal plan at the retirement center. I also suggested that if he decides to have surgery, it would be very wise to continue the JFS to help his post-surgery rehab.

Henry has continued to go to the gentle yoga class but I have not seen him since April.

## F. Comparison of both clients

Mack and Henry both exhibit similar conditions of hip pain with Psoas/Piriformis involvement. Both appear to also suffer from disruptions to their lifestyles (what I have labeled a "vata disturbance") and both have encountered elevated levels of stress in the past 18 months.

Mack's disturbance and elevated stress level comes with beginning a teaching career and being placed with low achieving students at risk that calls for much discipline and class control, something that his temperament type is not good at as well as the detailed regiment of teaching and the bureaucratic regimen that goes with the public education sector. In fact when he and his wife participated in a *Yoga Nidra* session that my wife and I led, he looked totally spaced out when he came in. I mentioned it to him and he said that he had been "doing grades" all day. Needless to say, he pretty much "conked out" during the session. What Mack enjoys about teaching is the sharing of his knowledge and love of mathematics. He especially likes tutoring or small-group session because he can connect with the students.

In addition, Mack tends to be a bit "*rajastic*" in his activities, sometimes overdoing it and not listening to his body. Just lately when engaging in *Indra Devi's Arthritis diet*, he continued to exercise pretty vigorously (unbeknownst to me) which is contra-indicated in the diet. I suggested that he spend the time in either relaxation or meditation instead of exercising. Overall, he is enthusiastic with what has happened in the program and very thankful for any help that I have provided. Because the pain has not subsided, I have encouraged him, since he's off for the summer, to have a physician examine him.

Henry, on the other hand, is probably experiencing imbalanced *kapha* with *ama* buildup) as exemplified by his locked torso and pelvis. He was very faithful in keeping his appointments, but he really didn't seem to comprehend the movement. When I questioned him on his program he stated that he was complying and performing the JFS and other suggested activities, and I have no reason to doubt him but I believe that there has been so much external activity (trips, celebrations, guests visiting) that he has not had time to "internalize" the movements. He is attending the arthritis water classes and still takes the gentle yoga class once a week. At this time, he is still debating when to have the hip surgery. I mentioned to

him to continue with the program and classes so that when he did have surgery, the rehab would probably go smoother.

While I don't consider either of my clients to be a "success" because their symptoms did not totally go away, I do believe that their efforts helped both of them to be more conscious in their habits and activities. I am especially gratified at Mack successfully completing the arthritis diet for two reasons: one, it seemed to help him and two, is represented a form of trust between us that he would undertake such a regimen.

## II. Name and description of the condition

### A. Osteoarthritis

The following information is taken directly from the Arthritis Foundation website. It is a very complete overview of osteoarthritis and, I believe, that it deserved to be copied in full for this paper.

#### 1. Diagnosis of Arthritis

The diagnosis of a degenerative hip starts with a complete history and physical examination by your doctor. X-rays will be required to determine the extent of the degenerative process and suggest a cause for the degeneration. Other tests may be required if there is reason to believe that other conditions are contributing to the degenerative process. MRI scanning may be necessary to determine whether avascular necrosis is.

Here is a link to the Arthritis Foundation website giving a short quiz on arthritis symptoms: <http://www.arthritis.org/conditions/JointHealth/Quiz/symptoms.asp>

#### 2. Causes of Osteoarthritis

Osteoarthritis used to be seen only as an older person's disease. Now, because of the modern stresses in our lives, people of all ages suffer from the aches and pains associated with osteoarthritis.

General wear and tear on the joints can cause osteoarthritis. However, playing sports such as jogging, tennis and skiing are also potential instigators of the disease. If your occupation entails heavy lifting or excessive use of your hands, you may be at a greater risk of developing osteoarthritis.

There is no known cause of osteoarthritis. A specific joint injury or other joint disease like rheumatoid arthritis may cause osteoarthritis. Gout and congenital defects to the joint are secondary causes of osteoarthritis. Hypermobiles, or people that are extremely flexible, are also more prone to the disease.

Some recent studies have pointed to genetics as a possible cause. It could be possible that some cartilage is more likely to degenerate than others. Chemical reactions in your body could also lead to the breakdown of cartilage, various experts believe (*The Arthritis Bible*, Healing Arts Press, 1999). At this time researchers are trying to develop a test that will detect the breakdown of cartilage. As with most types of arthritis, being overweight also plays a role because of the added pressure on the body.

### B. Gross and subtle body common symptoms

This following is also taken from the Arthritis Foundation website.

The symptoms of a degenerative hip joint usually begin as pain while bearing weight on the affected hip. You may limp, which is the body's way of reducing the forces that the hip has to deal with. The degeneration will lead to a reduction in the range of motion of the affected hip. Bony spurs will usually develop, which can limit how far the hip can move. Finally, as the condition becomes worse, the pain may be present all the time and may even keep you awake at night.

The most common symptoms *are pain and stiffness* in the joint. Early on in the disease, pain may only be felt after exercise, but will go away after you rest. Over time, the occasional pain may become constant and wake you up at night. The

cartilage may continue to wear away until *bone is crunching on bone and a grating sound is heard*.

In the long term, loss of mobility may occur. The joint may feel warm to the touch and may be swollen. This is called erosive inflammatory osteoarthritis. Deformity may result when one side of the joint collapses more than the other side. However, most people do not become crippled as a result of osteoarthritis.

If you suspect you have osteoarthritis, visit your doctor. He or she will perform a series of tests to determine if you have arthritis and what type. X-rays may be ordered to see if the bone and cartilage have been damaged. Blood tests may be ordered to rule out other types of disease.

The outlook for the disease depends mainly on which joints are affected and how serious it is. There are many forms of treatment and, by starting early, you can start to live your life more fully.

### 3. Medical points of view

There are many conditions that can result in degeneration of the hip joint. Osteoarthritis is perhaps the most common reason that patients need to undergo hip replacement surgery. This condition is commonly referred to as "wear and tear arthritis." Osteoarthritis can occur with no previous history of injury to the hip joint. The hip simply "wears out." There may be a genetic tendency in some people that increases their chances of developing osteoarthritis.



Avascular necrosis is another cause of hip joint degeneration. In this condition, the femoral head (the ball portion) loses a portion of its blood supply and actually dies. This leads to collapse of the femoral head and degeneration of the joint. Avascular necrosis (AVN) has been linked to alcoholism, fractures and dislocations of the hip, and long-term cortisone treatment for other diseases. Abnormalities of hip joint function resulting from fractures of the hip and some types of hip conditions that appear in childhood can lead to degeneration many years after the injury. The mechanical abnormality leads to excessive wear and tear, much like the out-of-balance tire that wears out too soon on your car.

## III. Ayurvedic assessment and ayurvedic-based yoga recommendations

### A. Overview

Ayurvedic doctors Vasant Lad (1998 [Home Remedies](#)), David Frawley (2000 [Ayurvedic Healing](#)), and Robert E. Svoboda (1998, 2003 [Prikiti](#)) agree that arthritis is originally a *Vata* disturbance. Lad (1998) states that, "Vata, the main active *dosha*, brings the *ama* (undigested waste) into the colon, and from there it travels through the system and lodges in the *asthi dhatu* (bone tissue [one of the seven dhatus]) and in the joints, giving rise to the stiffness and pain characteristic of arthritis."

David Frawley (2000) describes arthritis as, *Amavata*, a toxic air condition. Agreeing with Lad, Frawley states that arthritis is mainly a Vata disease. It involves pain and weakening of the bones, and main Vata tissues in the body. It can also be divided into types or stages according to the three *doshas*." Like Lad, Frawley states that, "In Ayurvedic thought the stage of the bones is reflected in the state of the colon (which is the home of Vata), where nutrients are absorbed for the bones. Vata (waste-gases) absorbed in the colon go to the bones and cause arthritis. So in treating arthritis consider treating the colon as well."

Svoboda (1998, 2003 Prikiti) also describes the psycho-physical dimension of the condition. He states that, probably the first step to take in controlling a set of rheumatic joints is to acknowledge that your body may be being made to undergo conflict to protect your mind from having to confront confused or repressed feelings. If you can admit to yourself the willingness to eventually deal with it you have taken the first step toward cure. Then you can use physical therapies to control the physical effects of the disease, confident that the hidden causes of your condition will not aggravate it while the physical housecleaning is going on.

## B. Types of arthritis

According to Dr. Vasant Lad, Ayurveda distinguishes between three categories of arthritis corresponding to *vata*, *pitta* and *kapha*. (See Lad, 1998 pp. 129-130 for rx on dosha-specific arthritis). In general, it is important to know that arthritis begins in the colon (p. 129 Lad 1998 Home Remedies). Depending on the person's lifestyle, diet, and emotional pattern, either *vata*, *pita*, or *kapha* goes out of balance. Then that particular dosha slows down *agni* (digestive fire), resulting in the toxic, sticky bi-product of inadequate digestion known as *ama* which eventually can settle into the joints if it isn't cleared from the system causing joint pain.

Dr. John Douillard (1998) in his *Ayurvedic Pulse Reading Course* (Tape 4) states that "vitiation" of subdoshas (weak *Samana* [V-3], (the *prana* that deals with digestion problems, especially weak digestion and improper formation of *dhatu*), and *Apana* [V-4], (the *prana* that deals with digestion, excretion, menstruation and sexual function), can lead to joint pain and improper formation of tissue (*dhatu*). (Douillard, 1988, p. 30) In addition, the *Kapha* subdosha *Shleshaka* (V-5) is the final stage of *ama* depositing and arthritis and congestion are symptomatic of this subdoshic imbalance (Douillard, 1988, p. 30).

## C. General characteristics of each doshic-type of arthritis

These descriptions are taken from David Frawley's book, Ayurvedic Healing (2000).

**Vata** - Joints crack and pop are cool to the touch. They are painful mostly upon movement with usually one particular tender spot. Any strenuous activity (jogging, walking, jumping, etc. aggravates the pain.

**Pitta** – Inflammation of the joint and the joint becomes swollen and is painful even without movement. It often looks red and feels hot to the touch. Gout is categorized as a pitta form of arthritis.

**Kapha** – the joint also becomes stiff and swollen, but it feels cold and clammy rather than hot. A little movement tends to relieve pain rather than aggravate it. The pain is greater in the morning (the time of day when the affect of kapha is strongest) and as the person starts moving around, the pain diminishes

From an Ayurvedic perspective, both Mack and Henry suffer from an increase in *ama*, and both men's symptoms appear to be more *Vata* in character, that being, aching and stinging with no inflammation (also no cracking and popping as described in the article from the Arthritis Foundation). For Mack, the long hours of standing in front of a "hard to manage" class probably exacerbates this condition. For Henry, the onset of his symptoms probably was initiated with the move from his home into the retirement center (coupled by a 6-month interim in a rental after he sold his house and was waiting for his cottage to be finished). In addition, the process of packing and lifting boxes probably led to the symptomatic onset of his arthritis.

## IV. Common Body Reading

### Osteoarthritis of the hip

Common postural characteristics of osteoarthritis of the hip are:

- Favoring of one leg
- Pelvis is higher on one side
- Foot or whole leg of affected hip is turned out
- Observation of walking can show no flexing of hip joint which appears like a “frozen hip”
- Body may “lean” over to opposite side taking weight off of affected side

## V. Contraindicated poses

Contraindicated poses are any poses that stress the hip joints through undue weight bearing such as extreme lunges or quick ballistic movements which would cause inflammation. All standing poses should be modified to decrease weight bearing and contraction of the joint.

The doshic character of the condition should also be examined. For example, if the arthritis is more Vata in character (general aching and stinging), then keep from holding the postures for a long time and work on subtle movements to foster awareness. If the condition is pitta in character, then avoid any “heating” practices. If the condition is kapha in nature, the poses must be modified so that they are not held for a long time with minimum stress on the joints.

## VI. Theoretical recommendations

### A. Therapeutic / free of pain

Most important step is to reduce inflammation. Once the inflammation is controlled then gentle range of motion exercises/posture are called for to get the muscles stronger through a range of motion.

As it was mentioned on page 24, exercise, weight loss, rest, proper nutrition, and medication are very helpful in treating this condition and bringing down inflammation. Also hot castor oil packs are good for reducing pain and inflammation.

From an ayurvedic perspective, there are various diets and herbs one can take to help take down the inflammation and decrease pain. One such diet is one recommended by Indra Devi (see [Arthritis Cleanse Diet by Indra Devi](#)) which is a detoxification diet consisting of rice (90%) and squash (10%). Another common remedy is fresh lemon juice in water taken several times a day (see the websites section – arthritis and diet). Also, Glucosimine and Chondroitin supplements seem also to be of value. Adding yogic relaxation into one’s daily routine is also very beneficial in combating stress. See David Frawley’s [Ayurvedic Healing](#), (2000) pp. 281-282 for Ayurvedic treatments.

Recommended yoga asanas for osteoarthritis of the hip from SYT JFS

JFS #1 – Ankle Flexion/Extension (Ankle ROM)

JFS #2 – Ankle Inversion/Eversion (Ankle ROM as well as int/ext hip rotation)

JFS #3 – Ankle Rotation – (ROM of ankle)

JFS #4 – Knee Flexion/Extension (For stretching quads, hamstrings, and ROM of knee joint)

JFS #5 – Hip Internal/External Rotation (Start with int/ext rot and no swinging, then incorporate swinging the hip in and out in order not to tax the hip rotators.)

JFS #6 – Torso Flexion Extension (Cat Stretch: For pelvic mobility)

JFS #7 – Hip Extension/Flexion (Sunbird) (For Glut Strength)

JFS #8 – Lateral Flexion of Spine (for QL)

JFS #16 – Spinal Extension/Flexion (for lower spine and pelvic mobility)

JFS #17 – Spinal Lateral Flexion (for QL)

Recommended yoga asanas for hip arthritis from SYT 24 postures

**NOTE:** All postures may need to be modified according to the needs of the client.

Virabhadrasana I (Warrior I) – This tones hip extensors (as well as shoulder flexors), and also strengthens internal hip rotators and adductors stretches gastrocnemius, psoas and hip flexors on back leg side see appendix A for picture)

Parsvottanasana – (Side of Hip Stretch) – This stretches extensors and gluteus medius and strengthens adductors and psoas. (for arthritis begin with using a chair for support on front leg)

Vrikshasana (Tree) – Strengthens adductors and external rotators, and with modification, (not supporting foot on leg), hip flexors see Appendix A for picture)

Utthita Trikonasana (Triangle) – Strengthens hip flexors (rectus femoris), obliques stretches adductors and hamstrings (for arthritis begin with using a chair for support on front leg see Appendix A for picture)

Adho Mukha Svanasana (Downward Facing Dog) – For arthritis stretches gastrocnemius, hamstrings and spine ((for arthritis begin with using a chair for support see Appendix A for picture)

Setubandhasana (Bridge) – Strengthens hamstrings and gluteus maximus and stretches hip flexors.

Jathara Parivartanasana (Abdominal Twist) – Strengthens Hip adductors and obliques stretches gluteus medius, and latissimus dorsi.

Salabhasana (Locust) – Strengthens hamstrings, gluteus maximus and erector spinae and stretches hip flexors and abdominals

Ustrasana (Camel) – Strengthens gluteus maximus, erector spinae and latissimus dorsi, stretches psoas and quadriceps

Gomukhasana (Cowhead Posture) – (just legs) strengthens psoas, adductors and stretches gluteus maximus and medius

Baddha Konasana (Bound Angle) – Strengthens Sartorius, gluteus medius and external rotators, stretches hip adductors

Savasana (Corpse) – attentive relaxation (used in conjunction with yoni mudra).



## B. Stabilize situation

Once pain and inflammation has been reduced, adjust lifestyle with weight maintenance and proper diet (stay away from caffeine, alcohol, tobacco, and sugar [C.A.T.S.]) as well as regular exercise such as water classes, gentle yoga (JFS), or mild non-impact aerobics can help keep the hip muscles toned and hip joint healthy. If there is muscle restriction, then yoga asanas or range of motion exercises are strongly suggested. Adding yogic relaxation into one's daily routine is also very beneficial in combating stress. Dietary supplements such as glucosamine/chondroitin can be beneficial as well as good water intake (preferably warm water with a little lemon acts as a good lymph cleansing/detoxifying agent).

## C. Maintenance

Watch diet, stay active and supple, relax/meditate and watch your emotional state.

## VII. Questions and answers from yoga forums website

There are several hip-related Q&A's from the Yoga Forum website (<http://www.yogaforums.com>).

Hip Shear – 2/19/04

**Q** - Thank you for your helpful newsletter. I thought I'd pose a few questions. I'm 50 years old, in excellent condition and health, quite flexible, and maintain a vigorous 90 minute daily asana practice.

However, lately I've noticed several annoying things:

in seated poses my weight distribution now favors my left sitting bone while the right barely bears any weight; when standing in tadasana I feel extreme tightness in the right groin area; on long automobile drives (and in paschimottanasana) pain arises in my right sitsbone area, on back of thigh on right side, and on right side of my right foot; my right leg now has a slight external rotation when I stand at ease, with the right foot no longer parallel to the left foot; in uppavista konasana, I am no longer able to bend forward along my right side without lots of pain occurring along my right sitsbone and back of right thigh; overall it feels like my right pelvis has shifted/rotated/unleveled itself and I've lost the energy flows and kinesthetic sense along my right pelvis and right leg.

I've been to a hip specialist, chiropractors, podiatrists, cranial-sacral massage therapists, have had x-rays, and consulted with many yoga teachers, but have gained no real understanding of the problem nor alleviation of any the pain/symptoms.

Is there a simple way to self-diagnose a hip shear or un-leveling of the right pelvis? And what might one do about it? Start wearing compression shorts to bind the pelvis?

**R** - Sounds like pelvis is indeed uneven. I would highly recommend doing the sacroiliac mobility exercise described here earlier. Also do longer and persistent stretches of the right inner thigh (adductors). You need to avoid stretching the right hamstring. Even when sitting in car it is getting too much workout so if you stretch the antagonists to the over stimulated muscles - which would be quadriceps and adductors - that should help immensely. So poses i would recommend would be camel (ustrasana) both with legs open knees together with a focus to tone gluteals and stretch groin region and also dynamic version twisting pelvis sideways to stretch across thigh from inner to outer sections of the quadriceps. Also recommend you do the rolling bridge from my book, as this often provides great relief from the symptoms you are describing. The more you can tilt the pelvis coming down slowly the more you will relieve the tight psoas which is probably at the root of your challenges.

Also remember to do plenty of deep breathing using Ujjaye wave breath pattern described in my book, as this promotes balance of vata subtle energies of prana. doing all asanas with wave breath makes a significant difference in a short period of time.

Yoga and hip pain – 1/31/02

**Q** - I write on behalf of my Mom who has been experiencing increasing pain in her right hip joint. She is 67, very thin, fit, and yet very stiff. She has little to no hip turn out, so essentially all hip openers have become impossible. What would you recommend? She can barely do the JFS exercises. What would you recommend? Is there a structural yoga therapist you would recommend in the Philadelphia area?

**R** - All the SYTherapists i have trained are listed on my website [www.yogatherpycenter.org](http://www.yogatherpycenter.org) under graduates of training page. there is no one there but might be someone close. I would work with turn out motions in JFS #3 (hip flexion especially), #7 (sunbird) and also in locust. Those are more affective than in JFS #5. That open is much harder for those with hip troubles. In future is best to ask questions via my website [www.yogaforums.com](http://www.yogaforums.com) that way answers can be shared with others who search that site for topic questions.

## VIII. References and websites for further information

Arthritis definition from Seniors Magazine online -

<http://www.seniormag.com/conditions/arthritis/osteoarthritis.htm>

Arthritis Yoga and Diet Articles

This is the arthritis cleanse diet developed by Indra Devi. This diet consists entirely of rice and squash, each mouthful being chewed 50 times. I and one of my students have undergone this diet and found some benefit.

<http://www.nshouseofyoga.com/Arthritis%20Diet.htm>

Arthritis and diet – This short article is an ayurvedic description of arthritis and some general dietary recommendations

<http://ayurveda-foryou.com/treat/arthritis.html>

Arthritis advice – this very short article discusses arthritis and gives some very general advice

<http://www.suzannes.com/arthritis.html>

Arthritis – this article describes rheumatoid arthritis and provides some ayurvedic practices in helping manage the condition. It also provides some yoga postures that benefit this condition

[http://www.naturecurettreatment.info/rheumatoid\\_arthritis.htm](http://www.naturecurettreatment.info/rheumatoid_arthritis.htm)

Lemon as healing herb – this short “info-article” provides information on the properties medicinal uses of lemon juice. It has some good information in it.

<http://www.ageless.co.za/herb-lemon.htm>

Arthritis treatment (contra-indications in arthritis diet) - This article provides information on foods that can exacerbate arthritic conditions.

<http://www.betterhealthusa.com/public/338.cfm>

Arthritis treatment (contra-indications in arthritis diet) – This article gives one person’s experience with diet and arthritis and how lemon juice seemed to make the condition worse. This article caught my attention because of the negative affects that lemon juice had on him. Shows that its hard to “cookbook” cures.

<http://www.sensiblehealth.com/allergy.html>

Arthritis home ayurvedic remedies – This article provides information on ayurvedic conception of arthritis (vata aliment) and provides some diet suggestions during arthritic attacks.

<http://www.ayurveda-herbal-remedy.com/home-remedies/arthritis.html>

Arthritis and lemon cleanse diet – This article talks about using lemon juice as a cleansing/detoxification diet similar to the Indra Devi's Rice and Squash diet. I personally use lemon juice in warm water a lot, but if you practice this diet, make sure you invest in "lemon futures" you are going to be spending a lot of money on lemons!

o <http://www.positivehealth.com/permit/articles/Nutrition/leach73.htm>

General websites on arthritis:

<http://www.hopkins-arthritis.som.jhmi.edu/mngmnt/yoga.html>

(arthritis and Johns Hopkins)

This is an article from the Arthritic Foundation on the benefits of yoga. Nice simple intro to yoga and arthritis. "Lets do yoga"

<http://www.arthritis.org/conditions/Exercise/Yoga/default.asp>

This article is from the Yoga Vidya Dham "Yoga Point" website. It provides different ways to treat arthritis. It actually recommends warm water and lime juice first thing in the morning on an empty stomach. This is the first mention of limes instead of lemons. (yoga and arthritis - yogacharya vishwas mandlik)

[http://www.yogapoint.com/therapy/yoga\\_arthritis.htm](http://www.yogapoint.com/therapy/yoga_arthritis.htm)

This article is from "Yoga Online: Mind and Body" an outfit from New Zealand. Provides general information on yoga postures and arthritis.

[http://yoga.org.nz/benefits/physiological\\_benefits/yoga\\_arthritis.htm](http://yoga.org.nz/benefits/physiological_benefits/yoga_arthritis.htm)

Yoga & arthritis a review by Manoj Dash

This is a review of an article on yoga and arthritis. It has good information about yoga with references.

<http://searchwarp.com/swa3687.htm>

Piriformis syndrome

This article from the Rice University Sports Medicine Web Site discusses the symptoms of Piriformis syndrome and some stretches that will "duplicate" the pain.

<http://www.rice.edu/~jenky/sports/piri.html>

This article from "Dr. Stephen M. Pribut's Sport Pages" website gives a very good explanation of piriformis syndrome and its causative factors. I give this web page "2 thumbs up" for every SYT practitioner.

<http://www.drpribut.com/sports/piriformis.html>

This article is from *SpineUniverse*, a chiropractic website. Has some good information on causes and diagnosis.

<http://www.spineuniverse.com/displayarticle.php/article170.html>

This article from "Sciatic.org" entitled, "Diagnosis and Treatment of Piriformis Syndrome" by Dr. Loren Fishman is a more detailed article that talks about the neurophysiologic aspects of diagnosing piriformis syndrome.

<http://www.sciatica.org/piriformis.html>

Flexibility and Aging reference

Excerpt from Current Issues in Flexibility and Fitness from President's council on Physical Fitness website:

[http://www.fitness.gov/digest\\_jun2000.htm](http://www.fitness.gov/digest_jun2000.htm)

More recently, data have clearly demonstrated that static flexibility changes across the lifespan. Prior to primary school, children are quite flexible because of limited calcification and development of the joints. Static flexibility varies with physical activity, but overall tends to remain the same or gradually decrease to about age 12 and then increases to peak between 15 and 18 years of age (Clarke, 1975). Research has shown significant decreases in static flexibility and increases in muscle stiffness with aging in adulthood (Brown & Miller, 1998; Gajdosik, 1997; Gajdosik et al., 1999; Vandervoot et al., 1992). However, the decrease in static flexibility with aging is small relative to the typical variation in flexibility between individuals and the potential for improvement in flexibility with stretching (Roach & Miles, 1991). Decreases in flexibility are primarily due to changes in activity and arthritic conditions (Adrian, 1981) rather than a specific effect of aging. Therefore, stretching programs can be effective for individuals of all ages.

### **Ayurvedic References**

Frawley, David. Ayurvedic Healing: A Comprehensive Guide. Lotus Press. Twin Lakes, WI. 2000.

Lad, Vasand. Ayurveda: The Science of Self-Healing. Lotus, Press. Twin Lakes, WI. 1984.

Lad, Vasand. The Complete Book of Ayurvedic Home Remedies. Three Rivers Press. NY, NY. 1998.

Svoboda, Robert E. The Hidden Secret of Ayurveda. The Ayurvedic Press. Albuquerque, NM. 2002.

Svoboda, Robert R. Prikriti: Your Ayurvedic Constitution. Lotus Press. Twin Lakes, WI. 2003

## Appendix A

### Modified standing poses for hip arthritis

These are pictures of adapted standing postures for students with hip problems such as osteoarthritis.



Modified Tree with chair



Modified warrior



Modified Down Dog



Modified Triangle

## **Appendix B**

### **Piriformis release with rubber ball**

Lying on your back, take a rubber ball, (either a tennis ball or a toy ball the size of a hardball), and place under the hip where the piriformis muscle is located. Lie on it and gently roll the ball very slowly over the affected area. Perform this exercise for about 3-5 min once a day. If the area is more sensitive the next day, reduce time to 2-3 minutes.



## **Biographical Sketch**

Bob Roth began practicing yoga when he was in high school. He has been teaching asana since 1983.