



Waterworks Fighting Osteoporosis

*Article by Catherine Morisset published in CALA Wavelink newsletter
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Maude (pseudonym) is an accountant with her own home business. She has three grown children. When she married at age 25, she looked fragile because of her small frame and light hair. As she got older, she appeared to be more sturdy because she gained weight... weight that she fought by dieting on and off for many years. She figured her eating habits were quite good, despite the sporadic dieting. She sat at a desk all day and could not find much time for fitness. At night she was too tired to exercise and felt more like relaxing with a good book, and only occasionally, a short walk.

Maude has many predisposing factors towards osteoporosis: she is small boned, has light skin and hair; a sedentary lifestyle and has dieted frequently (which brings into question whether she had adequate calcium or excessive protein).

Maude was 54 when the back pain she had been having for years was diagnosed as osteoporosis. Her doctor cautioned her against falls which could break a bone, prescribed hormones and bone enhancing medication. She was told to exercise by walking a little, with caution. Maude was lucky to be diagnosed before her back vertebrae became crushed, compressing her internal organs, and causing her to lose height. Maude contacted her local Osteoporosis Association and found information about a water exercise class for women and started taking classes three times a week.

Osteoporosis progresses silently until either a fracture, severe back pain or a sudden loss of height reveals its presence. Maude's doctor dealt with her situation by combining HRT (hormone replacement therapy) to prevent further bone loss, with bone enhancing medication (vitamins: calcitrol, calcitronin) and advice regarding the importance of exercise.

Maude was told impact exercising could trigger back pain and crush vertebrae. Eventually, Maude moved more easily outside the pool as well as during the class. We chatted many times about the improvement in her health which was apparent both in the exercise class and her daily life. She couldn't believe how much stronger she felt. Maude observed that even stairs at home seemed less steep than before. Her wrists and hands felt stronger, and she stood taller. She felt relatively pain free, and more confident about the future. She moved with her chest open and a longer more self assured stride.

Many women with osteoporosis feel progressively better as they realize that they can have a positive affect on slowing the progression of the disease. The combination of information socialization and water exercise addresses their psychological, mental and physical needs.

Francine (a pseudonym) is 62 years old and has had osteoporosis for years. Her upper back shows the progress of the disease. She recently saw her doctor and reported the following: "I was tested again for bone mineral density. My doctor



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couldn't believe that I had gained 1% bone mass over the last year. He told me that whatever I was doing, worked. I can't walk much and the only exercise I get is water workout. I told him that I was doing aquafitness three times a week; I hope he recommends the Aquafit to others.

Pam (a pseudonym) was always quite active, playing golf and doing aerobics regularly. Her small stature, Asian background and dislike of milk put her at risk for osteoporosis. She was diagnosed last year with porous bones and has a very weak upper body, preventing her from playing her favourite sport of golf. Pam started aquafitness when she was cautioned about the negative events that jumping and jarring would have on her 63 year old bones.

Muscle Mass: Bone Mass

Bone is a living tissue which is constantly remodeling or 'turning over'. The remodelling is mediated by systemic and local factors. Think of bone as a spongy structure (trabecular bone), with a hard cortex (cortical bone). The periosteum, a membrane, adheres tightly to the cortex and nourishes the entire bone, both the trabecular and cortical bone. In healthy bone, this sponge-like structure is made up of thick mineral (mostly calcium) alveolae which give bone its strength. The structure is constantly remodeling as blood and nutrients bring new material which cells (osteoblasts) transform into a thick sponge. If there is not enough local or systemic stimuli to remodel efficiently, the bones become osteoporotic. The resulting thin, fragile sponge structure cannot resist the usual loads on it and the bone becomes crushed or fractured when submitted to shock or the effects of gravity. Vertebrae consist mostly of trabecular bone which can become crushed. The long bones such as the femur (cortical bones), are easily fractured. Osteoporosis can affect both types of bone.

A sedentary lifestyle does not help maintain strong muscle or bones.

People often sit for hours every day. We sit to drive to work, work, eat, relax, read and watch TV. We do not exercise much according to Campbell Survey (1988) and to Canada's Health Promotion Survey (1990), 11 % of the over 10 year old population are considered moderately active for 30 minutes every other day, while 43% among us are considered inactive.

Use it or lose it.

Over years, many studies have found that a decrease in physical activity leads to a decrease in bone mass and a corresponding increase in osteoporotic fractures.

Athletes have more bone. Cross sectional studies show that athletes have greater bone mineral density (BMD) than the average muscle mass and maximal oxygen uptake. Long term studies show that strength training and weight-bearing endurance training increase BMD, with the best results achieved with strength training.



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Osteoporosis is both local AND systemic. In the same way that the CALA aquafitness arm movement called "elbow flexion" (working biceps & triceps) will do nothing to improve your leg muscles, "elbow flexion" will do nothing to improve the hip bones or femurs. Bones are built by a direct local effort of the muscles which in turn put a strain on the bones, helping in the remodelling of stronger bones. Exercise increases both bone and muscle mass. In various studies involving tennis players the active arm may be as much as 24% "heavier" than the non-playing arm. A combination of proper diet and exercise are the most effective means of prevention of osteoporosis.

Water is a powerful resistance tool:

Water is denser than air. We become aware of the resistance of water when we try to walk in it or we drag an arm at its surface. In a water workout, instructors are responsible for educating participants about how to change the position of their body parts in order to increase or decrease the amount of resistance they will experience. Water is a powerful "resistance tool". Water can be used to create an ideal strength training environment where one has infinitely adjustable resistance to work with. An interval strength training water workout can be used efficiently to increase muscle and bone mass.

Water Buoyancy: low impact vs no impact: We often hear from osteoporotic clients that they cannot "lightly bounce" on the pool floor, because their doctors told them they can't do any impact exercise. It is important to explain to both health professionals and clients that the impact experienced during shoulder depth aquafitness class is much lower than land impact. Body weight is significantly reduced as the depth of immersion increases. Also clients with osteoporosis may be more buoyant due to light bones. Inactive individuals are more buoyant because of a low muscle to fat ratio. Most of these clients will have problems bringing their feet down to touch the pool floor. "Shallow water" aquafitness classes geared to clients with osteoporosis should be conducted in shoulder to neck deep water.

This depth of water offers enhanced buoyancy and very low impact. Suspended or deep water aquafitness classes are also an option, but the results may not be as good. Often, deep water workouts are intimidating for sedentary people. They may not know how to stabilize their body, or may not have the strength to maintain a stable position which will enable them to execute the movement safely and effectively.

Water Turbulence:

The turbulence of water can be used to increase resistance and to improve dynamic balance. Moving in water creates a gentle but palpable turbulence around the body. Water turbulence increases the need for stabilization and forces participants to work on their balance, a skill which is usually lost with aging, disuse and inactivity.

Turbulence can be intimidating to newcomers: Many women feel they are fragile and when asked to try a complex move such as the jumping jack tuck jump, may



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feel that it is impossible. They need to learn that this movement is feasible in water. Teaching the components of the movement by first getting them comfortable with the jumping jack, then introducing the wide tuck will ensure success. This complex movement involves working the shoulders, arms, chest and torso stabilizers as well as the leg and gluteal muscles. When working muscles in the water, the contraction of the muscles causes them to "pull on" or put a "strain on" the bone or connective tissue to which they are attached. This activity facilitates efficient bone remodelling.

How to implement an osteoporosis prevention workout

Never underestimate your clients: Participants are thirsty for knowledge. As people get older, they often become more attuned to the fact that their body has to last them a lifetime. They are ready to learn and to do what it takes to remain healthy, independent, mobile. However, if they have been cautioned against exercise with any impact, they might be extra cautious, for fear of fractures, especially if they are convinced of the irreversibility of the aging process.

The keys are participation, motivation, partnership, follow up:

- 🔗 Educate participants by providing simple concise information about osteoporosis before, during and after the workout which will help to dispel myths.
- 🔗 Help participants understand that you are providing a muscle and bone building workout.
- 🔗 Talk about the importance of working out at your own pace, within their own tolerance.
- 🔗 Teach about using proper hand and foot positions, to maximize the workout potential.

Motivate clients through your professional attitude, compassion and humour.

Help them feel they are wholly supported physically, in the water, mentally through your information and spiritually through the pleasure of being in water and developing new friendships.

Class Planning Recommendations

Class duration: 45-50 minutes 3 times a week seems adequate. Sixty minute classes may be too long for older, unfit adults.

Warm Up:

It should be at least 8-10 minutes to help get into the action, to chat easily as you provide small to large range of motion movements. Touch base with newcomers, and give information on prevention of osteoporosis.

Combined cardio/muscular conditioning: For approximately 30 minutes, alternate moves that are less challenging by varying hand and foot positions. This actually leads to an "interval" workout format, using water as a variable resistance to help



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work all muscles of the body. Osteoporotic clients enjoy anchored moves (no bouncing, with one foot maintaining contact with the pool bottom at all times), which provide resistance with virtually no impact, in neck deep water.

Precautions: Women with osteoporotic spine problems should not do twisting moves. Avoid the following CALA moves: narrow and wide swivels; hip flexor and hamstring swivels; over exaggerated sartorius jogmarch at half tempo with a focus on spinal rotation; crossover jogmarch with a focus on spinal rotation and torso pendulum with a focus on spinal rotation. These twisting moves may put too much pressure on the vertebrae. A loss in height corresponds to an increase in abdominal pressure and for this reason; moves that increase this pressure further should not be used. Avoid the narrow tuck.

The remodelling effect of exercise on bones is local, so you have to provide a total body Aquafit class, focusing on all muscles groups to be effective (for instance, upper back and chest).

Stretches:

The last 5-9 minutes should be devoted to stretching all muscles, and relaxing in the water. The length of the stretch and relaxation phase will be limited by the temperature of the water. This time provides a wonderful opportunity for making personalized contact and providing extra information on the effect of an active lifestyle on the maintenance of bone mass

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Are you at risk?

1. Are you a Caucasian or Asian woman past the age of menopause?
2. Did your mother or sister have osteoporosis?
3. Are you considered small (i.e. less than 5ft 6inches – 1.68m and 140lbs – 60kg)?

Hormonal Factors

1. Did you start menstruation late and stop early (either naturally or from surgery)?
2. Did you ever stop menstruating for a prolonged period?
3. Are you taking estrogen (either hormone replacement therapy or birth control pills)?

Nutritional Factors

1. Do you diet frequently?

Lifestyle factors

1. Do you smoke?
2. Do you often have more than 2 alcoholized drinks per day?
3. Do you sit more than a few hours a day?
4. Do you avoid exercise such as walking?



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Medication/illness factors

1. Were you ever confined to bed for an extended period of time?
2. Did you ever take medication that causes bone loss, such as thyroid supplements?
3. Do you have scoliosis?
4. Have you ever had any illness causing bone loss?

If you answered YES to any of the above questions, you may be at risk for osteoporosis

Protection Factors

1. Do you drink at least 2 glasses of milk or eat calcium-rich foods every day?
2. Do you walk regularly (45 minutes, 3 times a week)?
3. Do you exercise several times a week at any level intense enough to develop a sweat?

If you answered YES to these questions, you may be protecting yourself from the effects of osteoporosis. (This questionnaire was adapted from the Osteoporosis Society of Canada, Ostop Ottawa and other resources.)