

Aquatic Exercise and Osteoporosis: Myths and Facts

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It is known that loss of bone mass and micro architectural deterioration of bone tissue are directly related to decrease in bone strength and increased risk of fracture, condition known as osteoporosis. After the comprehension that bone is a dynamic tissue, exhibiting continuous remodeling activity, a lot has been said about the benefits of a non-pharmacological approach to improve bone mass. Physical activity has been shown to promote positive effects on bone metabolism, but not all types of exercise have been recommended. In research to date, it seems that only weight bearing activities have evidence of a positive osteogenic effect. But is it 100% true? Is osteoporosis and fracture risk only a matter of bone mass? Which are the myths and facts about aquatic exercise in osteoporosis? These are the questions that we'll try to answer in this review.

Osteoporosis is not an isolated entity. It is known that it can be associated with physical decline, mainly related with aging, joint limitations, chronic pain, amyotrophy, and therefore high impact exercise is not always indicated.

Water based exercise (WBE) presents lower risk of traumatic fracture and the joints are exposed to less stress and impact. It can also reduce pain, so the dropout rate among subjects participating in WBE is lower than that for similar land-based activities, mainly in elderly people who feel safer exercising in water.

However, a consensus regarding the effects of exercise practiced in water on bone health has not been reached.

The true is that literature shows that WBE can improve balance and proprioception and for that it is already recommended in this population because it will directly reduce the risk of falls and therefore the risk of fracture.

In the other hand, the reviews to date focus water based exercise only in terms of swimming effects, but this is very reducer considering all the activities that can be done in an aquatic environment. In fact, water can act as a dynamic loading while producing resistance to movement that causes muscle contraction and consequently increase load on bones, generating stress and strain reactions in bone tissue. Besides

it is well documented that a dynamic loading has a more positive effect than a static one. WBE has also a psychological effect that can't be forgotten, with literature showing a reduction in stress levels and increase in self referred quality of life.

Conclusion:

When prescribing exercise for an osteoporotic subject, we need to see the person in front of us, his limitations and expectations. There is no "one-size-fits-all prescription", so we need to adapt the exercise program to each individual in order to reduce dropout rate and promote bone health.

Myth 1: Only weight bearing activities have evidence of a positive effect on prevention of osteoporotic fractures

Facts: 1) The fracture risk on osteoporosis is not only related to bone mass! In fact the micro architecture of the bone is the as important as the actual density of the tissue in terms of resistance to external forces; 2) The fracture risk is directly related to the risk of fall. In a exercise program focusing osteoporosis issue, it is mandatory to have balance and proprioception training. Water based exercises are accepted to be an excellent option on this field; 3) WBE

Myth 2: Being submerge promotes discharge, so it is not recommended to prevent osteoporosis.

Facts: 1) In water based exercise, the joints are exposed to less stress and impact, so movement will be less painful!; 2) In the other hand water can act as a dynamic loading while producing resistance to movement that causes muscle contraction and consequently increase load on bones, generating stress and strain reactions in bone tissue. Besides it is well documented that a dynamic loading has a more positive effect than a static one; 3) Exercise in water is not only swimming!; 4) Walking in water at an umbilical level increased the activity of the erector spinae and activated the rectus femoris to levels near to or higher than walking on dry ground. Therefore, considering the muscle demands and the dynamic component of WBE, there might be adequate stimulus to generate osteogenic stress and strain reactions in bones; 5) - WBE will also provide additional benefits for neuromuscular and functional fitness, and also cardio metabolic health.

Myth 3: It is difficult to maintain people in aquatic exercise programs

Facts: 1) WBE can actually reduce joint pain, the literature shows a lower dropout rate comparing to land based exercises; 2) In the other hand the exercise can be done in classes, promoting social participation and integration, which is extremely important specially in older adults; 3) WBE has also a psychological effect that can't be forgotten, with literature showing a reduce in stress levels and increase in self referred quality of life.