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Jan Van de Rakt *

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Review Article

Training to Reduce the Risk of Falling, Training in Water

Jan Van de Rakt [1]*, Steve McCarthy-Grunwald [2]

[1]Physical Therapist NDT teacher IBITA, Course Leader and teacher on the Dutch Institute for Allied Health Sciences. Nursing Home "Waelwick" in Ewijk the Netherlands.

[2]MSc BSc RMN Lecturer in Mental Health Nursing with Dementia Specialty. University of Cumbria, Bowerham Road, Lancaster, LA1 3JD England.

***Corresponding Author:** Jan Van de Rakt, Physical Therapist NDT teacher IBITA, Course Leader and teacher on the Dutch Institute for Allied Health Sciences. Nursing Home "Waelwick" in Ewijk the Netherlands.

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Abstract

Background/ Aim

Training to improve balance in people who have already given up a lot of that control and therefore gain nothing from a "prevention" program. Especially the "effort" that the remaining system has to exert against gravity often triggers pathological tone that suppresses selectivity.

Design.

Mapping out the problem, understanding why this group falls so frequently, and creating an environment that is both safe and significantly reduces the effects of gravity.

Result

The water environment creates what this group needs to be able to move at their level and from there train. In order to make a transfer to land, this training must meet the training rules, and these are often quite frequently violated, resulting in an inadequate transfer of what practiced to land.

Discussion and conclusion.

To train balance in a group that already has limited ability, occasional movement is never enough. It first requires the ability to move and a training framework focused on improving coordination and power. For this group, this can be achieved in water with a minimum training frequency of twice a week.

Key Words: hydrotherapy; balance issues; pathological tone; training rules

Introduction

Why such a "cautious" title?

Simply because the term "fall prevention" gives the illusion that falls and thus their negative consequences can be prevented. Of course, training will help to delay and/or temporarily prevent serious consequences, but sooner or later the system will no longer be capable of this. That does not mean that training may not still be useful, but no longer with the hoped-for result. Well-known research conducted in nursing homes/long-stay facilities shows that many falls are actually caused because people no longer distribute their weight optimally and therefore unable to recover from a loss of balance in time, and of course there is always something that can be improved in the environment. [1 -6]

A good example is the study by Van Schooten et al. into the higher frequency of falls in a ward where the chairs could be a contributing factor to the increase in frequency. [7] Or the study that looked at where on the ward falls occurred most frequently. Possible causes could be limited ability to walk due to crowding and/or a lack of sufficient support points such as handrails in those areas, particularly near doors. [8] Here, training will always have to be accompanied by scanning the hazards of the environment, and the training will obviously never be able to include fall exercises unless the environment is safe enough to do so without danger. This would involve the use of harnesses or practicing in water. Training people who are at risk of falling, especially in a nursing home or long-term care facility, has its limitations, particularly because most residents often suffer from a neurological degenerative disease and their balance control is already very fragile due to pathological muscle tone. This is an additional reason to prioritize training in water, because that is where the influence of gravity is lowest and therefore the need for high muscle tone is much less, and water will eliminate the risk of falling.

Analysis of why this group has difficulty maintaining optimal balance while moving around in their environment.

By analysing video recordings [1], researchers at Frazer University in Canada came to the following conclusions as to why balance control was inadequate. We must now take a close look at the target group, because it is precisely the group living in a protected environment that often has a neurological disease (Parkinson's, MS, stroke, etc., but also dementia) and, due to pathological tone, already lacks elements necessary for optimal balance control, namely selectivity and speed. With this in mind, we must therefore examine this analysis and also look at the results. This will also limit the treatment options if pathological tone is the cause, because in addition to a suboptimal response, it also involves impaired perception. Pathological tone and impaired perception [9 - 13] go hand in hand, which could explain weight displacement as a reason for losing balance and falling. Pathological tone can be measured, but unfortunately this is often done in a lying or sitting position, and it would be very important to do so in a standing position, because then something is already being asked of the patient to maintain balance, and this can be done passively by flexing/extending the elbow at the Asworth tempo [14,15,16,17].

Falls in long-stay facilities. Fall prevention programs?

It is clear that the group studied by Robinovitch and his colleagues will not benefit from this, simply because their balance system is no longer capable of doing so. It would therefore be very useful to carefully assess people's capabilities in advance to prevent them from being enrolled in "fall prevention programs" that they are actually unable to participate in. Unfortunately, pathological muscle tone is often one of the causes.

Nevertheless, it is possible to offer these people therapy, but this must be done in an environment where the tone is reduced. There must therefore be a clear distinction between people who can benefit from fall prevention therapy after an incidental fall [18] and those who need to monitor their balance with additional aids. Of course, there will always be people who fall somewhere in between, but both groups will benefit from the water-based program.

Research into the causes of falls. [1- 4]

Cause	Number	%
Incorrect weight transfer	93	41.0
Tripping	48	21.1
Impact	25	11.0
Loss of support	25	11.0
Collapse	24	10.6
Slipping	6	2.6
Unclear	6	2.6

Table 1: (2012) Most common cause of falls in long-stay facilities.

This table shows that the most common reason is not the one we often find in fall reports. This can also be explained by the fact that most fall incidents are not witnessed and people try to investigate the reason/cause afterwards. Only after studying the video recordings of fall incidents in long-stay facilities.

But it was still a surprise that so many incidents were related to incorrect weight shifts. Incorrect weight shifts mean that the weight is not correctly distributed on one leg, preventing the other leg from moving optimally, which can occur when standing up, standing, walking, etc. The reason for this may lie in the perception from the feet, resulting in incorrect translation in the brain and a suboptimal response. The analyses carried out by the group from Frazer University confirm this picture and also provide other data.

Cause	%
Incorrect weight transfer	49.5
Loss of support	22.0
Tripping	12,5
Impact	8,8
Collapse	6,7
Slipping	0,5

Table 2: (2024) Most common cause of falls in long-stay facilities.

Clearly a different result, but incorrect weight transfer continues to score highly.

So any problem where too much weight remains on the two feet, but also on the arms when standing up/sitting down, can lead to a situation where it is no longer possible to restore balance. Also look at the percentage of loss of support, because that is precisely what these people need in many places in order to create an extra point of support in time when their balance fails. This study yielded more remarkable results, showing that pathological tone has a greater influence than is often thought, particularly in this group, and that therefore requires tailored treatment.

Direction	%
Achteruit lopen Backward walking (met en zonder rollator)	33,8
Sidewards walking	28,8
Straigth down	19,2
Forward walking	18,2

Table 3:(2024) Direction of the fall in the long stay Facilities.

Walking backwards is precisely what causes the big fall, and often after two or three steps, things go wrong. People are unable to keep their torso in front of their "toes" and are no longer able to shift their weight from one foot to the other.[19].

Activity	%
Walking	33,6
Standing	24,0
Stand to sit transfer down	17,5
Sitting	14,2
Sit to stand transfer	10,7

Table 4: (2024) Activity at the time of the fall. (long stay facilities)

Sitting down is more likely to go wrong than standing up. One of the most striking findings was that in long-stay facilities, the people who fell frequently were in the group that stood up and sat down, so the emphasis here should be on furniture such as the height of the chair and the support on the side and front, etc.

What is very noticeable in long-stay facilities may not be so clear in the situations that precede them. However, it appears that people with neurological disorders have much more balance problems than their peers, including those with dementia. [20,21]

Analyse of an attitude that can lead to an greater fall danger and especially backward falling.



Photo 1 Photo2 Photo 3

Photos 1, 2, and 3: Three people who participated in a well-known "fall prevention program" in the countryside after a balance test indicated that they did not score optimally. The men in particular "failed" and were strongly advised to participate.

It was striking that the two men gave up fairly quickly because they were unable to cope with the program and that the supervisors needed extra people to prevent these two accidents. Therefore, an analysis in addition to the balance test and a check according to the guidelines is very important in order to identify individuals who will not benefit from "fall prevention training" and who would benefit more from a customized program and an environment that reduces pathological muscle tone. The red plumb line from the ear should put everyone on the right track in terms of what affects balance (weight transfer problem).

Photo 1: Weight transfer while walking appears to be fine at this point, but what is striking is the rigid upper torso, bent elbows, and stiff cervical spine. A simple test [22] revealed so many problems that he either clearly had difficulty maintaining this walking pattern or that the steps were not completed, but also that he often had difficulty stopping. A standing tone test revealed increased tension in the elbow, both in the flexors and extensors, and indicated a form of paratonia [23]. This gentleman will therefore be at the limit of his abilities in the group training "fall prevention" program, and the risk of accidents is too great, so the conclusion must be a separate program with a tone-reducing environment.

Photo 2 This gentleman needs to move as far back as possible, but it is clear that the tone of his muscles has been affected by a neurological disorder. The movement stops while the (red) plumb line is still in front of his feet. He therefore feels that he has lost control when moving further back, yet we do not see the "braking strategy" in the feet/hips/torso that we do see in photo 3. This is because the greatest muscular activity takes place at the back, the extensors of the torso all the way up to the head are active and inhibit the torso/hip muscles at the front. [24,25] If he continues, his feet will have to do the work because his torso/hips remain in the same position, which will lead to incorrect and insufficient weight transfer and result in a fall.

Photo 3 is doing well and was able to perform the balance test almost flawlessly and will be able to train perfectly in a "fall prevention training" program. Comparison also immediately gives an idea of what pathological tone does to our selectivity and what stiffness we see.

As an example, look at the tension in the arms in photos 1 and 2 compared to photo 3, hence the test of tension in a standing position with a gentle passive movement in the elbow [26] according to Asworth or a little faster according to Tardieu [14,27]. In order to train this group in a somewhat targeted manner, we must ensure that the need for this pathological tone decreases while at the same time allowing for safer, more selective movement. Each training session requires a thorough examination to determine whether other factors are affecting the balance and also need to be treated in order to optimize the results of targeted training.

Complete examination according to the guidelines

The guidelines list a number of items that really need to be reviewed, because this will allow the training program to be much more effective. Many people have been working on adaptation for years before any problems arise, using various elements that are directly or indirectly related to the balance problem. [28,29,30].

1. Eyes /ears:

The scanning ability of the eyes to the environment is important for building alertness, but in older adults, we often see that this scanning ability is used primarily to observe where the feet should be placed, which means that objects further away are not seen. This is therefore an adjustment to another issue, namely that the sensation and perception in the feet are not optimal.

2. Dizziness.

Dizziness presents an additional problem, as it causes the vestibular system to provide incorrect information, requiring the brain to perform extra work to recalibrate the body in space, whereas the process should ideally occur the other around.

3. Mobility and Balance sec. At the end of this list.

4. Incontinence.

The tension and increased attention cause risks to be taken more quickly, and also the phenomenon that the pressure on the sphincter muscles rises rapidly compared to a lying position.

5. Medication.

It is clear that careful consideration must be given to their effects, as low blood pressure can cause dizziness, but also delay reactions or even reduce muscle tension. [31].

6. Home and environment factors. [32]

These factors often indicate that balance checking has become more difficult and that an update of the home and environment is necessary, and the aids are already is use.

7. Pain. [33]

The impact of pain on movement is significant and can therefore hinder balance recovery.

8. Inflammations.[34]

Inflammation also has a negative effect on our balance ability.

9. Tone, especially pathological tone. [35,36]

We see pathological tone in neurological disorders, and measuring this tone is therefore essential to know what influence it has, especially on movement speed. Particularly in balance recovery, speed is an essential element and can thus be decisive. The measurement is performed passively and often in an "rest"-position, and then it appears that this increase in not so necessary. The difference between measurement in the sitting or standing position of the elbow was significant higher. [37] Higher tonus in elbow is a sign of higher tonus in the entire back of the torso and one of the reasons why walking backward often can end in a fall.

Ad.3. Mobility and Balance sec. [38,39]

This is the central system capable of detecting and responding well within time.

The detection involves weight shift and approaching limits, and the reaction of muscles patterns creates a counter-movement to correct it. All other systems require more time and are therefore actually used to detect danger and make correction unnecessary and/or to keep the system extra alert. This system monitors the borers and intervenes, but at the same time, the system is at its sharpest when things "almost" go wrong at the border and everything must be brought out to restore balance on the spot or with an excursion- step.

The last two elements:

1. Tone (tone, and in particular pathological excessive tone, often in combination with pathological synergy) and

2. Mobility and balance can be treated through training. This does not mean that the loss is reversible, but that muscle capacity in particular can be improved. Muscle recovery and plasticity [40,41] of muscle tissue is unprecedented, but this requires the ability to move and, if possible, to move against resistance, causing muscle fatigue, which stimulates greater coordination and an increase in muscle patterns. [42].

The population studied here by means of video recordings needs less "stress" on the "feet" so that weight transfer can be practiced more effectively.

Furthermore, it is essential for this group to practice task-specific exercises so that the transfer of what has been trained is optimal. [43,44,45].

The element: pathological tone, pathological synergies, which make movement stereotypical and very "poor," requires a decrease in gravity because this increase is necessary if the damaged brain wants to keep the body moving. When that "load" is removed, we see that the tone decreases, but that more selectivity often becomes possible and can therefore be trained. [46] Exercising in water will produce this effect and also stimulate the input system [47,48,49,50], which can lead to increased capacity, initially in the water but certainly also on land.

However, anyone who trains coordination and muscle patterns/power must adhere to the training rules. [46,47]

1.Determination of 1 RM (Repetition Maximum) for the movement we want to train. For example, holding back the pressure at the front until it becomes so high that it is no longer possible. Just before that, you have 1 RM of the muscle patterns that prevent you from being pushed backward and that you use when breaking a weight movement backward.

The reaction in the feet and torso/hips must also be observed and tested, dorsal flexion in the ankles and flexion in the torso/hips. We now know what coordination/power is present and we also know whether there is pathological tone, and it is important to test this again after 10-20 minutes in chest-high water and adjust if necessary.

2.After the assessment, we can put together a program in which this movement can be specifically trained with a 1 RM of 75% and 3 sets of 10 repetitions, less resistance than more repetitions, twice a week with a minimum frequency of twice a week. This means that training in the water once a week does not meet the training rules, and it will therefore be very difficult to expect an effect both in water and on land with less training. [51] In studies where the frequency of at least twice a week was achieved, it was

clear that the effect was also present on land. And we are not referring to all those additional effects on mental well-being, sleep, etc. [52].

3.Task-specific training requires a number of elements to be present in order to achieve this effect.

A. A task-specific exercise requires equality in the internal movement structure, i.e., the muscle patterns required for that movement, in order to perform the movement optimally.
B. What applies to muscle patterns also applies to the external movement structure, which must also match the movement we want to train. Of course, you can also train both the internal and external aspects in parts, but try to stay as close to the task as possible.
C. The energy required for that task must be at least the same, but actually more, so that "fatigue" occurs.
D. The sensory input must be consistent with the task. This means that the brain receives input that directly matches the task.
E. The intention of the movement must be related to that task, in contrast to the intention often found in isolated strength training. The intention is to perform the task better/faster.

Training this group therefore often requires tone reduction, which can really only be achieved in water. Combined with the training rules, even this group could still achieve reasonable results. Group therapy is often not feasible; it is best done individually or with a maximum of two patients per therapist, and the exercises must be adapted. However, what often happens—a little walking and playing games/doing assignments without paying specific attention to the task and/or training rules—is not exercise aimed at optimizing the coordination and power of muscle patterns. Often, the main program focuses solely on walking, dual tasks, and balance training, but muscle pattern training is lacking, as is movement in other positions such as lying down and/or sitting; even standing up from a sitting position is rare.

Nevertheless, there are even results to report, especially in patients with dementia [53,54], who are actually encouraged to move by the water and also because the need for muscle tone is less in water and movement is also possible. This in turn stimulates the cardiopulmonary system, which has positive effects due to the improved blood circulation in the brain. The element that water offers is therefore movement with less need for extremely high muscle tone and, with sufficient repetition and frequency, this will also be noticeable in movement on land, especially for people with neurological disorders. [55,56]

Practice:

This group often already moves with an aid, so the first goal is to see if they can move without help/aids and, if not, to focus the training on that. This means getting into the water with a wheelchair, standing up, and walking along the edge of the pool, with assistance if necessary. In the meantime, work on water adjustment [57], so that people get used to the water again and dare to go under, and always make use of this if people want to swim.

Be especially careful at the beginning, because many people haven't swum for a long time and when they get into the water, they often take risks too quickly by going "too deep" or bending their knees, which also causes you to go "deep" into the water and maximizes the upward pressure. And then different rules apply to movement, especially because the information under the feet also changes due to the loss of support.

The best example is that when you are standing in water up to your neck, moving your head forward (looking at your feet) will cause your feet/legs to "push" backward and upward, and to reverse this, the movement can be reversed by moving your head and upper torso backward.

In other words, water at that level requires control from the upper torso, around Thoracic 11 both above and below (feet/legs), and below it most resembles the movement control on land but with less force and muscle tension. Training in water naturally has a "learning effect," but this happens "automatically" because it involves adapting to the environment, which anyone can do. So let people experience it and don't interfere too much, but provide simple assistance to ensure that everything goes well. And with sufficient frequency, there will also be a transfer, first to a lower water level and then to land. [58,59] Start by walking along the edge, or under supervision and/or with flotation devices, and build on this. From the start, make sure that walking backwards and sideways is included. Walking backwards [19] is particularly important for this group!



Photo 4: Walking training with extra flotation devices. Walking backwards is an activity that this group definitely needs, but is often difficult due to the "rigidity" of the back, which is necessary for them to maintain their balance. When walking backwards, this tension must be reduced, and more flexion in the torso/hips gives much more control over walking backwards. By eliminating gravity, the need for that higher back/hip tension becomes less necessary, allowing for more selectivity and making it possible to walk backwards again. Again, we can turn this into task-specific resistance training with the right repetitions and frequency, but backward walking can also be practiced with less resistance and more repetitions, or with no resistance at all and at increasingly higher speeds.

In this patient group, movements include lying down and sitting up from a lying position. These movements often require assistance from others or devices and are rarely or never trained.

Training refers to a task-specific resistance program with sufficient repetition and frequency, resulting in muscle pattern fatigue that stimulates the system to function optimally.

Rotating around the axis, which is often not possible on land, turns out to be possible in water, and now this can also be trained, making it easier on land as well. Moving from lying down to sitting and maintaining balance while sitting can be trained perfectly in water. What seems too difficult on land turns out to be possible due to the reduction in gravity. **



Photo 5



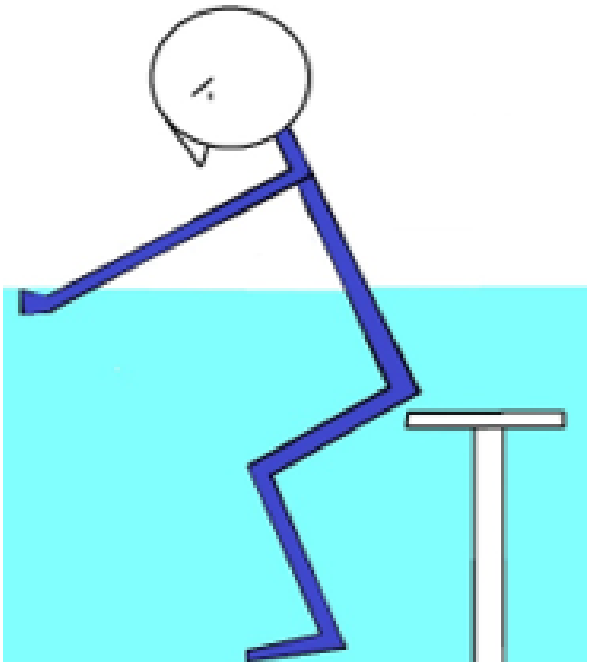
Photo** 6



Photo 7

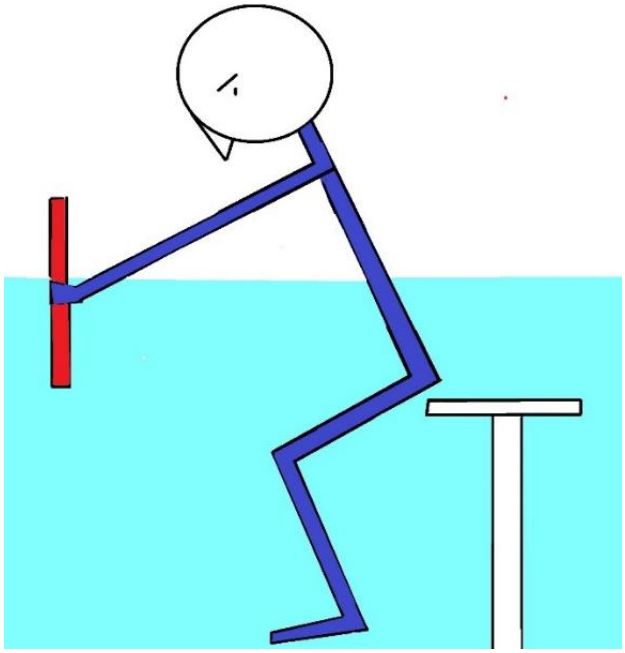
Photos 5, 6, and 7: Training trunk movement in lying position and from lying to sitting and back. Task-specific training, resistance possible, and training rules can be applied. Provided that the frequency of training is at least twice a week.

Be aware that the maximum effect that can be achieved is that the ability to move in bed, from sitting on the edge to standing up, improves through training in the water, but this requires training according to the training rules, otherwise that transfer will not take place.



Picture 1: Stand-up training with an unprecedented amount of variation, simply by adjusting the water level. Picture 1 shows a level at approximately Th 11, which requires a great deal of concentration to perform the movement perfectly and maintain balance with a falling waterline and therefore more load. And when people enter the water with a wheelchair, it immediately becomes a movement—standing up—that is very difficult on land but is now suddenly possible due to the water level.

From that starting point: standing up from a wheelchair in the water, a movement that is now possible again, we can determine the 1 RM for standing up and draw up a training schedule.



Picture 2: Stand up with a plank in your hands and to determine a form of 1.R.M., it is important to look at how it is performed and how often in succession. Ask for a slow movement and then you can assess how heavy it is, especially by repeating it a few times. Often, after just a few times, you will see that it leads to muscle pattern fatigue and you are close to 1 R.M. However, you could also do the calculation using 10 R.M. to determine what load should be performed how often and for how long.

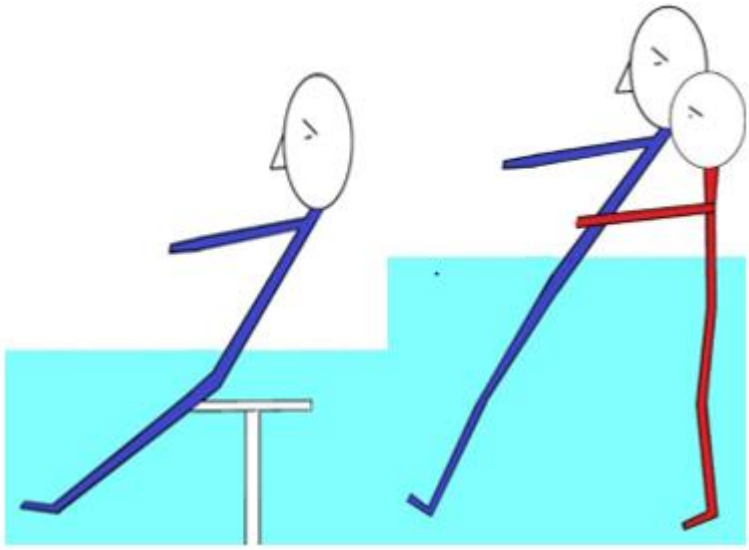


Photo 3 Photo 4

Pictures 3 and 4: From a sitting position on the table, a training program can be developed to further train lying down and sitting. This improves transfers to and from bed, but also teaches how to prevent falling backwards in water.

This element—falling backward—is a common cause of falls in this group, even when walking with a walker [19]. It appears that the ability to reduce tension in the spine and hips is no longer functioning optimally. People with degenerative neurological disorders in particular need this high tone to be able to walk, especially forward, but when they walk backward or turn with or without an assistive device, maintaining balance appears to be very problematic. Exercising in water at least twice a week can have a positive effect, and this also includes practicing movements in and out of bed. Don't underestimate the effect of practicing in a lying/sitting position and all the variations in between, and their transfer to movement in and out of bed. In the pool with a lift, buoyancy is quickly used, and you can practice moving to a sitting position and even standing position and back again.



Photo 8 Photo 9

Photos 8 and 9: A person on land sitting in a wheelchair, still able to walk with assistance and a walker under supervision. Movements such as getting up and turning in bed, and getting up from a sitting position, were almost always dependent on assistance. Training in water makes these movements easier, and we immediately have an opportunity to train the muscle patterns specifically for specific tasks and try to improve the level.

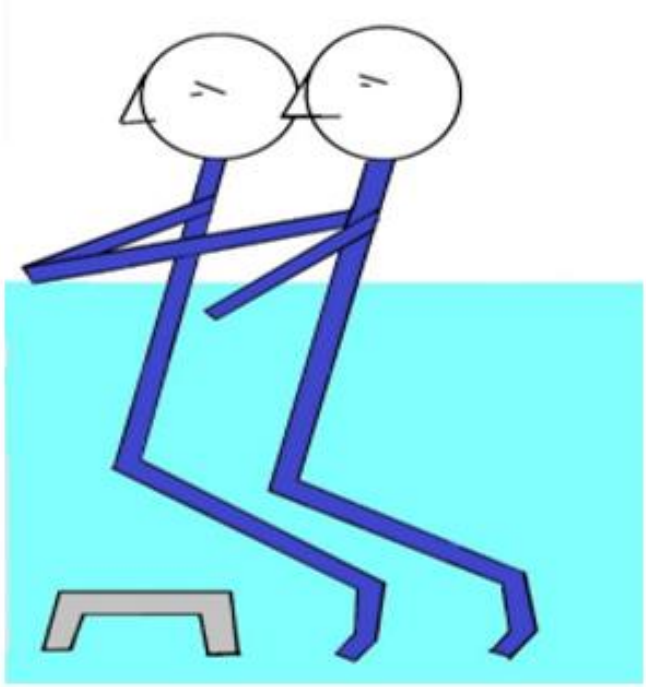
Sitting on the table and moving to stand up or lie down is a training similar to bedtime exercises, while simultaneously practicing the release of high tension in the posterior spine. This stiffness is often caused by gravity and will therefore decrease in water, often revealing selectivity and the ability to flex the torso and hips.

Photo 8 shows the start of a relaxing movement in water [61,62] – Watsu – to achieve this effect and from there start a training to train the movements associated with moving in and out of bed but also with walking backwards and this can be partly task specific but also as a whole in the water.

Photo 9 shows the chair lift in the bath, and of course, the effect of water on

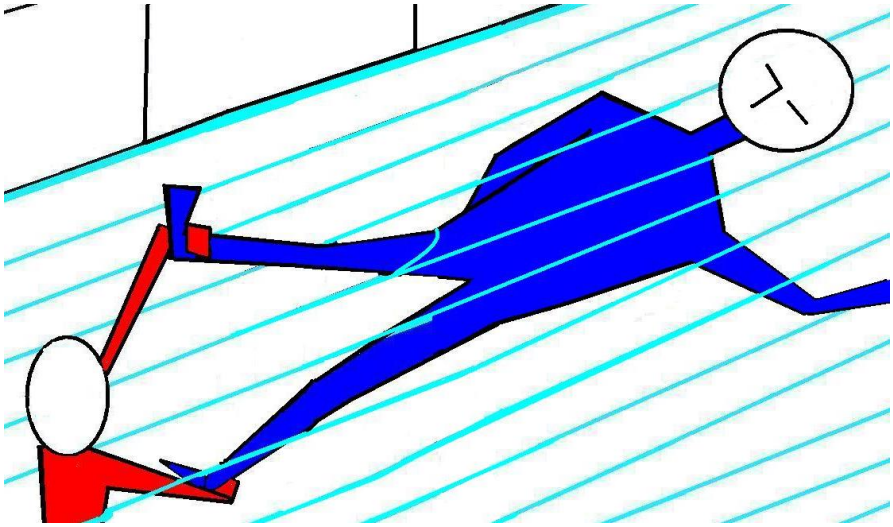
muscle tone won't be optimal yet, but we can use the chair at any time to practice getting up and also to train according to the training rules. [44,45]

Fall training for this group is "utopian," yet the section on practicing the backward movement is very useful for practicing movements in and out of bed and walking backward.



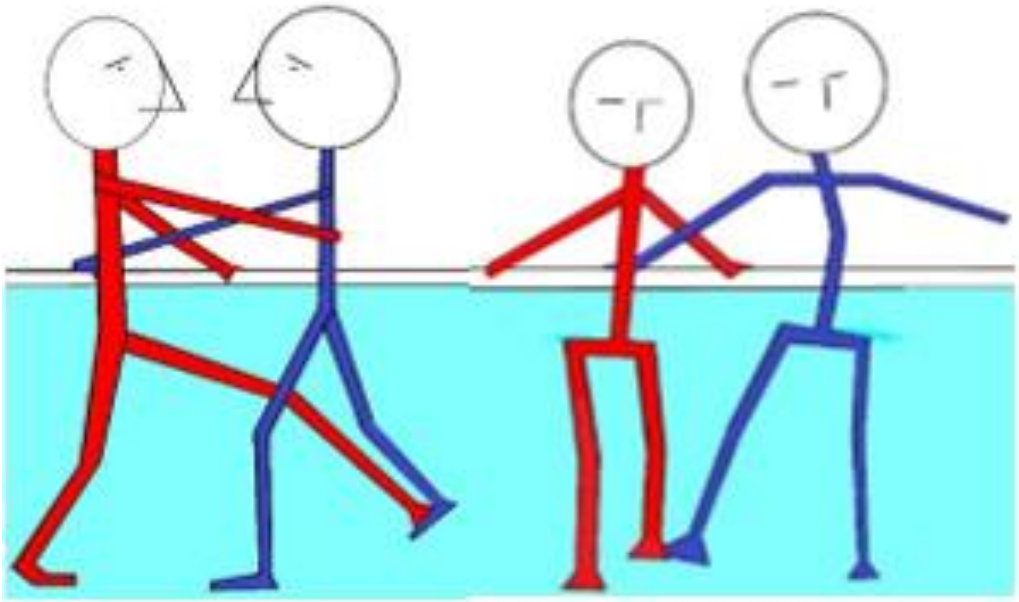
Picture 5: Kneeling on a raised platform in the pool (step board) is very difficult for many older adults with and without neurological disorders. People who have suffered a stroke, in particular, have considerable difficulty flexing their knees while maintaining hip extension. This selectivity is often impossible on land for people who require extension synergy to bear weight (with pathologically high muscle tone) because all leg joints are flexed[63,64,65]. However, the buoyancy of the water can reduce this high muscle tone and lessen the inhibition on selectivity, making this movement—possibly with guidance—possibly possible.

The advantage of this kneeling exercise is that it allows you to work on training the hip extension muscles and thus maintain this selectivity longer. Many movements require selectivity in the hips, from movements in and out of bed, getting up, and walking/climbing stairs.



Picture 6: Training the muscle patterns associated with walking, as well as moving in and out of bed. This requires establishing 1 RM and then performing 10 repetitions three times in a row. This should be done 2-3 times during this session, at least twice a week.

Performing this exercise while lying down will cause a reaction throughout the body. Resistance against the heel during extension will cause hip flexion in the other leg, but the opposite reaction in the arm, as we see when people walk [26]. So, with this training, we can also train turning in water against resistance. However, it is essential that the training rules (picture 6) are followed so that muscle fatigue occurs, which is the necessary stimulus for improving coordination and power.



Pictures 7 and 8: Resistance to the swing leg to train the other leg. Picture 7 focuses on the extension pattern of the other leg during a specific phase of the gait. Picture 8 focuses more on the abductors on the other side. Training according to the training rules[43,44,45]

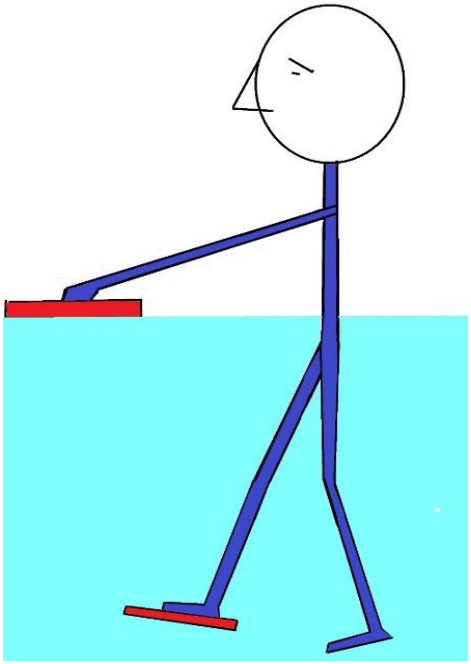
Recent research [66] also showed that foot training can help with optimal balance control, and this group, in particular, has considerable potential. Walking on toes and heels will be impossible on land, but water, with the right water level, provides an excellent environment for optimal muscle training. This can be achieved simply by walking on toes or heels, but also by demanding more of the foot muscles to maintain balance.



Photo 10



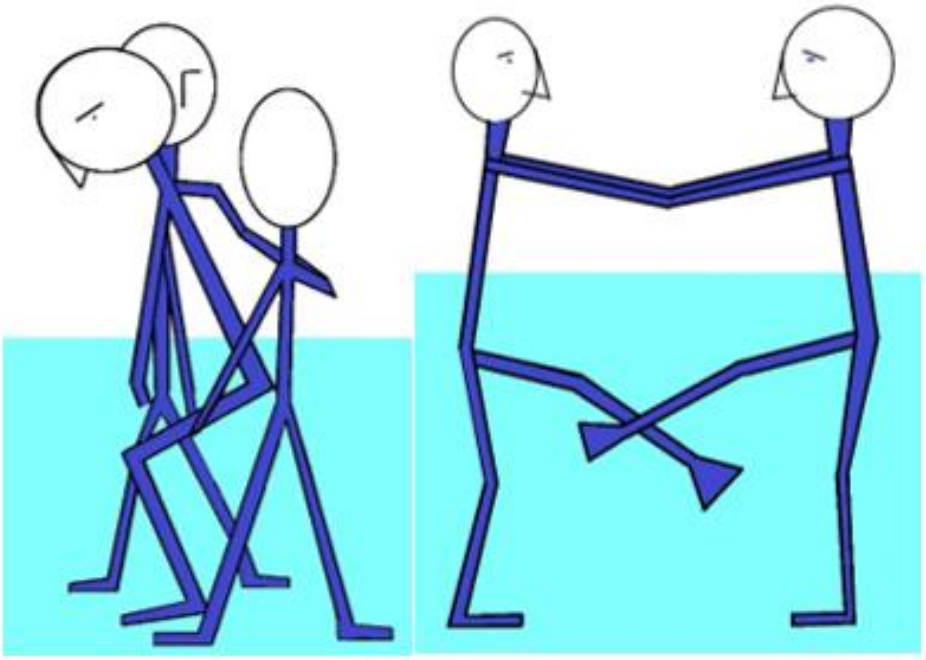
Photo 11



Picture 9

Photo 9, 10, and Picture 9: Reaching requires the utmost effort, even standing on your toes. Walking on a balance beam, on the other hand, demands a great deal of footwork, both in terms of feeling (perception) and control in the foot itself. Walking and simultaneously controlling boards under your feet requires a lot of foot selectivity, i.e., foot muscles, but also foot perception, because you have to feel that the board is still where it should be and you have to learn to react to that when it moves. And here's a combination of standing on it and moving forward without the board shooting up, and doing so with various water levels.

Group therapy is often possible but requires a great deal of guidance The water environment forces each person to develop their own control, but because abilities often vary so much, this requires much closer supervision. However, exercises can easily be done with two or three people, such as exercises to practice standing up and sitting down, as well as strength training to improve coordination and power according to training guidelines.



Picture 10 Picture 11

Pictures 10 and 11. Picture 10: Two people "make" a chair, and the third participant tries to sit, lie down, and stand up on it.
The "chair" tries to facilitate this, but the opposite is also possible, making sitting, lying down, and standing up increasingly difficult.

Picture 11 shows a game between two participants in which they, standing on one leg, try to unbalance the other so that he has to pivot with his standing leg, etc.

Conclusion:

This article is no longer about restoring balance control/restoration through training, but rather about developing training programs for a group of patients to maintain their limited balance as effectively as possible, or even improve certain aspects. The reason we chose water for them is primarily because movement is much easier in water, and this immediately has positive effects on general fitness, blood circulation, and sleep. [67,68] However, water also has a positive effect on pathological tonus in many participants in this group due to underlying neurological conditions, resulting in a loss of selectivity essential for balance control and recovery. This increase in tonus is necessary on land, but in water it clearly decreases, revealing which potentials are still present and therefore trainable in water.

To train this, training must be done according to the training rules, which means establishing a 1 RM for a task-specific movement. This is the basis for resistance training, with 75% of that 1 RM repeated 10 times in a row, and 2 x 3 x 10 repetitions per session. Essential is the reduction in power development around the 8th repetition and rapid recovery after a short rest. This muscle fatigue is the stimulus needed to improve the coordination and power of the muscle patterns. This program should be performed at least twice a week. This is often the problem because it is not applied, resulting in no improvement, which could be achieved. This also means that nothing extra can be transferred to movements on land. In this case, there will be little or no transfer of the training, and research that differs the weekly frequency between training on land and water is therefore unreliable.

Exercising in water makes selective movement possible again, which is necessary for balance control!

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