



To Pool or not to Pool

Aquatic Physical Therapy Precautions and Contraindications

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Disclaimer

This document contains information to allow the practitioner to make a clinical judgment about whether or not to select aquatic physical therapy as a treatment intervention but will not give specific guidelines for precautions or

contraindications. It is the responsibility of the practitioner to understand the particular circumstances, and the application of the information in this document for each individual case. In particular, the practitioner must take into consideration the need the individual patient as well as the resources and limitations unique to their facility. While the Aquatic Physical Therapy Section of the American Physical Therapy Association endeavors to ensure that this document is current at the time of their preparation, it takes no responsibility for information which may have become available subsequently.

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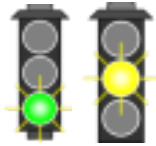
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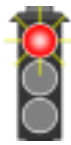
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Precaution: a measure taken in advance to prevent something dangerous, unpleasant, or inconvenient from happening.



Contraindication: is a condition or factor that serves as a reason to withhold a certain medical treatment due to the harm that it would cause the patient.

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Every patient is unique.

Physical Therapist needs to make a clinical judgement for decision to use aquatic physical therapy as treatment intervention.



risk > reward = Land Therapy

reward > risk = Aquatic Therapy

For more details see



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Universal Pool

Precautions

Following precautions for

EVERYONE in your pool

Maintain proper pool chemicals and ventilation.

Shower with soap before entry.

Take bathroom breaks as needed – at least every 60 min.

Proper hygiene and handwashing.

Don't swallow pool water.

And more....

For more details see



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Aquatic Pool Chemicals and Safety and

Aquatic Risk Management Issues - eLearning online modules

aquaticpt.org/certificate

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SKIN

Non – intact skin / Wounds / Surgical Incisions

Potential concerns

Areas of open skin may contain infection and risk of contaminating the pool water. Contamination poses a risk to public safety.

If skin is not infected, the risk to public is small but need to consider risk to patient who may come in contact with germs from poorly disinfected pool water or surfaces at pool area.

Immersion of open skin sites may experience degradation of area, increasing the risk for infection.

Recommendations to manage concern

Use a waterproof dressing on non-intact area of skin during immersion. Waterproof dressing should be applied so the site is covered by a 'securely attached bandage or dressing that will contain all drainage and will remain intact throughout the activity.' (taken from CDC verbiage)

If you are not confident that you can maintain waterproof dressing for entire session make judgement of risk of exposure of pool water on non-intact skin (based on size, location, immune status etc)

Additional information

1. See addendum – Transparent Film Waterproof Dressing Procedure

References

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7. <https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb47.pdf> (accessed 3-8-17)

Skin Conditions – Rash, eczema, psoriasis, contact dermatitis, sensitivity to pool chemicals

Potential concerns

Patients with skin conditions such as eczema or psoriasis may experience an exacerbation of their condition after immersion in pool water. Long bouts of immersion, especially immersion in halogen-treated water, can remove moisture and break down protective mechanisms of the top layer of skin.

Patients with sensitivities to chemicals such as chlorine may experience a contact dermatitis with exposure to pool water.

Even individuals without these halogen sensitivities may develop rashes from excessive immersion or poor water quality. Contact dermatitis has been deemed an occupational hazard for aquatic therapists (especially if over 1,000 hours of swimming pool exposure.)

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Recommendations to manage concern

Check pool chemicals to ensure proper maintenance

If multiple people complain about skin irritation consider possibility of pseudomonas dermatitis/folliculitis (hot tub rash) due to poor pool chemical management.

This sensitivity typically worsens with warm water so avoid hot tubs.

Shorten immersion time to reduce exposure to sensitive skin.

Before immersion apply thin layer of a protective lotion (such as petroleum jelly or mineral oil) to area of sensitive skin.

Immediately after immersion shower with non-irritating soap and apply moisturizer while skin

is still damp.

If you are unable to manage with the steps above and the skin irritation outweighs the benefits of aquatic therapy you should avoid pool for this population.

Additional information

1. See addendum – Relationship between Ph and Water Quality

References

1. <https://www.psoriasis.org/about-psoriasis/faqs/weather> (accessed 1-30-17)
2. <http://acaai.org/allergies/types/allergy-myths/chlorine-allergy> (accessed 1-30-17)
3. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/operating-public-swimming-pools.html> (accessed 1-30-17)
4. <http://www.cdc.gov/healthywater/swimming/rwi/illnesses/hot-tub-rash.html> (accessed 1-30-17)
5. https://www.cdc.gov/healthywater/pdf/swimming/resources/pseudomonas_factsheet_hot_tub_rash.pdf (accessed 1-30-17)

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LINES/OSTOMIES/STOMAS

Intravenous Lines – Central Venous Catheter

Potential concerns

Risk of unsterile pool water entering body through or around line increasing risk of infection.

Accidental action in pool causing line to dislodge from vein when in pool.

Recommendations to manage concern

Apply waterproof dressing, using sterile technique, over site to keep dry and contained (avoid any portion of the line free floating when in pool) during immersion.

Waterproof dressing should be removed, using sterile technique, immediately after shower following exit of pool with caution taken to hold onto catheter to prevent dislodgement while removing waterproof dressing.

If you are not confident that you can manage this risk you should avoid pool for this population.

Additional information

1. See addendum – Transparent Film Waterproof Dressing Procedure

References

1. Robbins J, Cromwell P, Korones DN. Swimming and central venous catheter-related infections in the child with cancer. *J Pediatr Oncol Nurs.* 1999 Jan;16(1):51-6. 2. Miller J¹, Dalton MK, Duggan C, Lam S, Iglesias J, Jaksic T, Gura KM. Going with the flow or swimming against the tide: should children with central venous catheters swim? *Nutr Clin Pract.* 2014 Feb;29(1):97-109. doi: 10.1177/0884533613515931. Epub 2013 Dec 17. 3. <http://www.nursingtimes.net/clinical-archive/respiratory/central-venous-catheters-some-common-clinical-questions/200945.fullarticle> (accessed 1-31-17)
4. <http://complexchild.org/articles/2015-articles/july/swimming-splashing/> (accessed 2-20-17)
5. http://oley.org/?page=Swimming_TeamEffort (accessed 2-27-17)

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<h2>Feeding Tubes – Nasogastric (NG), gastrostomy (G or PEG)</h2>

Potential concerns

A NG, G or PEG tube could be accidentally dislodged with pool activities or motion of exercise can cause irritation at catheter entrance into body.

Prolonged water surrounding tube area after immersion could cause skin irritation or increase chance of infection.

Recent G or PEG tubes might have area of non-intact skin if the surgical site is not fully healed. In this case the same precautions that apply for non-intact skin should be followed.

Recommendations to manage concern

If the abdominal site (G or PEG) is not fully healed and has an area of non-intact skin follow recommendations for non-intact skin or wait until skin is fully healed.

Secure tubes to prevent accidental dislodgement or excessive movement. Ideas include the use of waterproof tape, waterproof dressing, neoprene sleeve or tucking into snug fitting bathing suit.

Shower, change out of swimsuit and dry off tubes immediately after pool session. Assess the area for sign of skin irritation or breakdown.

Additional information

1. See addendum – Transparent Film Waterproof Dressing Procedure

References

1. <http://www.feedingtubeawareness.org/navigating-life/on-the-go/swimming/> (accessed 1-31-17)
2. <http://www.eatef.org/node/5> (accessed 1-31-17)
3. <http://complexchild.org/articles/2015-articles/july/swimming-splashing/> (accessed 2-20-17)

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Urinary Catheters Condom, Urethral and Suprapubic/Indwelling catheters

Potential concerns

The catheter could be accidentally dislodged with pool activities or motion of exercise can cause irritation at catheter entrance into body.

Prolonged water surrounding tube area after immersion could cause skin irritation or increase chance of infection.

Recent surgical catheters, such as suprapubic catheters, might have area of non-intact skin if the surgical site is not fully healed. In this case the same precautions that apply for non-intact skin should be followed.

Possible but unlikely chance of accidental urine excretion in pool due to faulty catheter system. Excess urine can lead to increase chloramine build up and result in skin, eye and respiratory tract irritation especially in indoor pools with inadequate ventilation. However, a properly maintained pool will be able to handle some sweat and urine as that is the job of the pool chemicals.

Recommendations to manage concern

If the surgical site (for urethral or suprapubic catheters) is not fully healed and has an area of non-intact skin follow recommendations for non-intact skin or wait until skin is fully healed.

For condom catheters – Instruct patient to void and remove the condom catheter prior to entry of pool.

For indwelling catheters - Ensure catheter balloon is inflated properly and disconnect the drainage bag and plug the tubing. If disconnecting the bag is not desired you can switch out drainage bag for smaller bag which is easier to secure when in pool. Secure catheter, and bag if attached, to prevent accidental dislodgement or excessive movement that may cause irritation. Ideas include ostomy belt, ostomy swimsuit, snug fitting bathing suits, high-waist compression shorts and sun protection shirts.

Shower, change out of swimsuit and dry off catheter immediately after pool session. Access the area for sign of skin irritation or breakdown.

If accidental urine leakage in pool no special steps need to be taken assuming pool chemical balance is appropriate. If accidental urine leakage on pool deck or locker room surface clean use using CDC protocol for Bodily Fluid Spills on Pool Surfaces.

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Additional information

1. See addendum – Free Available Chlorine Germ-Killing Timetable (from CDC) 2. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17) CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

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1. <http://www.uhb.nhs.uk/Downloads/pdf/PiSupraPubicUrinaryCatheter.pdf>
2. <http://www.livestrong.com/article/478825-swimming-with-a-catheter/>

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Urinary Ostomies / Stomas Urostomy, Vesicostomy

Potential concerns

Recent surgical urostomy or vesicostomy may have area of non-intact skin if the surgical site is not fully healed. In this case the same precautions that apply for non-intact skin should be followed either cover with waterproof dressing if confident you can get a good seal or wait until skin is fully healed.

Pouch could be accidentally dislodged with pool activities causing leakage of urine into pool

(which should be disinfected by pool chemicals in a well maintained pool), embarrassment for the patient and concern for bystanders.

Prolonged water surrounding pouch area after immersion could skin irritation or increase chance of infection.

Recommendations to manage concern

Vesicotomy (no pouch) – no special precautions need to be taken if skin fully intact.

Urostomy (with pouch)- Empty pouch before entering pool. Make sure skin barrier (or ‘wafer’) is waterproof. If not apply waterproof dressing surrounding the skin barrier (or ‘wafer’). Secure the pouch tight to the body enough to prevent dislodgement with aquatic movement without restricting the flow into pouch. Ideas include ostomy belt, ostomy swimsuit, snug fitting bathing suits, high-waist compression shorts and sun protection shirts.

If the surgical site is not fully healed and has an area of non-intact skin follow recommendations for non-intact skin or wait until skin is fully healed.

Shower, change out of swimsuit, remove waterproof barrier and dry off pouch immediately after pool session. Assess the area for sign of skin irritation or breakdown.

Additional information

1. See addendum – Transparent Film Waterproof Dressing Procedure

References

1. <https://www.schn.health.nsw.gov.au/files/factsheets/vesicostomy-en.pdf> 2. <https://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/ostomies/urostomy/sports.html> (accessed 2-20-17)
3. <http://www.mayoclinic.org/diseases-conditions/colon-cancer/in-depth/ostomy/art-20045825> (accessed 2-20-17)
4. <http://complexchild.org/articles/2015-articles/july/swimming-splashing/>

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Intestinal Ostomies/ Stomas Colostomy, Ileostomy

Potential concerns

Recent intestinal ostomies may have area of non-intact skin if the surgical site is not fully healed. In this case the same precautions that apply for non-intact skin should be followed or wait until skin is fully healed.

There is a chance the pouch could be accidentally dislodged with pool activities causing leakage

of feces into pool, causing need for fecal contamination procedure, embarrassment for the patient and concern for bystanders. Luckily this rarely happens and is not typically a reason to prevent someone from coming in the pool.

Prolonged water surrounding pouch area after immersion could skin irritation or increase chance of infection.

Recommendations to manage concern

Empty pouch before entering pool. If desired you can change bag to smaller size that is easier to conceal and secure to body. Make sure skin barrier (or 'wafer') is waterproof. If not apply waterproof dressing surrounding the skin barrier (or 'wafer'). Secure the pouch tight to the body enough to prevent dislodgement with aquatic movement without restricting the flow into pouch. Ideas include ostomy belt, ostomy swimsuit, snug fitting bathing suits, high-waist compression shorts and sun protection shirts.

In the off chance the pouch becomes dislodged and fecal matter enters pool or pool surface follow CDC instructions for fecal contamination procedure and/or Cleaning up of body Fluid Spills on pool surfaces.

If the surgical site is not fully healed and has an area of non-intact skin follow recommendations for non-intact skin or wait until skin is fully healed.

Shower, change out of swimsuit, remove waterproof barrier and dry off pouch immediately after pool session. Assess the area for sign of skin irritation or breakdown.

Additional information

1. <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf> (accessed 1-31-17)
Link to CDC fecal contamination procedure

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2. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17) CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

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3. http://www.ostomy.org/uploaded/files/ostomy_info/ostomy_aquatic_therapy.pdf?direct=1
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Communicable Disease

Immunocompromised

Potential concerns

People who are immunocompromised have an increased chance of infection even in situations that might not present as a significant risk for those with strong immune systems. It is important to minimize exposure to communicable diseases for this population.

All the communicable disease risks mentioned in this document will be a greater risk for those with compromised immune systems. The degree of risk can be related to the patient's absolute

neutrophil count (ANC).

Recommendations to manage concern

Recommend clearance to participate in aquatic therapy from doctor who is familiar with patient's immunocompromised status.

Consider ANC count with any precaution for immersion that might lead to infection and understand the risk for this population. This higher risk must be weighed against the reward of aquatic therapy.

Additional information

1. Stats from ChemoCare.com to help with Clinical Judgement.

<http://chemocare.com/chemotherapy/side-effects/infection.aspx#VTfOnE10yUk>

Risk of Infection based on Absolute Neutrophil Count (ANC)	
ANC > 1500	No increased risk of infection
ANC 1000-1500	Slight increased risk of infection
ANC 500-1000	Moderate increased risk of infection
ANC 100-50	High risk of infection
ANC less than 100	Extremely high risk of infection

References

1. https://www.cdc.gov/parasites/crypto/gen_info/prevent_ic.html (accessed 2-25-17)
2. <https://www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/physical-activity-and-the-cancer-patient.html> (accessed 2-25-17)

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Blood Borne Communicable Diseases
Hep B, Hep C, HIV

Potential concerns

There is low risk that Hep B, Hep C or HIV will spread in properly maintained pool water because chlorine kills most germs found in blood. The CDC is not aware of any instances in which a person has become infected with these germs after being exposed to a blood spill in a pool. But the risk of spread on pool surfaces such as equipment, rails, pool deck floor and/or

locker room is a concern.

Recommendations to manage concern

If the patient has intact skin and no other source of blood contact (such as menses) no special precautions need to be taken.

Menstruating women need internal protection or should remain out of pool until end of menses.

If an accidental blood spill occurs (ie. – accidental scrape of skin, nose bleed, menses leakage) no special actions need to be done with pool water assuming the pool chemistry is properly maintained. However, any blood found on pool area and locker room surfaces should be cleaned according CDC Cleaning of Body Fluid Spills on Pool Surfaces.

Additional information

1. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/vomit-blood-contamination.html> (accessed 1-31-17)
CDC Vomit-Blood Contamination of Pool Water
2. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

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1. http://www.hepatitiscentral.com/news/is_hepatitis_tr/ (accessed 1-31-17) 2. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1341164/pdf/bmjcred00244-0005.pdf> (accessed 1-31-17)

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Skin to Skin Communicable Diseases
MRSA

Potential concerns

MRSA does not live long in properly maintained pools. CDC states there have been no reports of MRSA spreading through contact with pool water.

Concern is about spreading MRSA on pool deck and/or locker room areas by direct and indirect contact and is the same as on land. MRSA is most likely to spread when it comes into contact

with an uncovered cut or scrape.

Recommendations to manage concern

Any non-intact skin should be covered with a waterproof dressing and universal precautions taken for application and removal of waterproof dressing immediately followed by clean dry dressing. If you are not confident that you can maintain a waterproof seal during immersion and maintain universal precautions for application/removal of the dressings you should avoid pool for this population until skin is intact.

No sharing of towels or use of pool equipment until disinfected.

If accidental bodily fluid spill occurs no special actions need to be taken with pool water assuming the pool chemistry is properly maintained. However, any bodily fluid found on pool area and locker room surfaces should be cleaned according CDC Cleaning of Body Fluid Spills on Pool Surfaces.

Additional information

1. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

References

1. <https://www.cdc.gov/healthywater/pdf/swimming/resources/mrsa-factsheet.pdf>

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<p>Fecal Communicable Disease Hep A, Giardia, Cryptosporidi, Clostridium Difficile, Shigella, Noroviros</p>

Potential concerns

Since many fecal communicable diseases are moderately or severely chlorine-resistant there is a significant risk of contamination of pool water placing entire pool population at risk with intentional or accidental ingestion of pool water.

Recommendations to manage concern

Anyone with known ACTIVE fecal communicable disease OR diarrhea in the past 2 WEEKS should not be allowed into pool.

All persons who enter pool should shower and have proper toileting hygiene prior to entry with emphasis on to remove all residual fecal matter.

Signage for proper handwashing techniques kept in all locker rooms and on pool deck.

Do not encourage intentional water in mouth during pool session with any patients.

Any activity involving potential contact with feces such as changing of diapers should be completed away from pool side. All fecal material should be disposed of appropriately in toilet or separate human waste container.

Frequent checking of pool diaper (approximately every 30-60 minutes) when in pool.

If an accidental fecal contamination occurs follow CDC procedure on fecal contamination and Cleaning of Body Fluid Spills on Pool Surfaces.

Additional information

1. See addendum – Free Available Chlorine Germ-Killing Timetable
2. <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf> (accessed 1-31-17)
Link to CDC fecal contamination procedure
3. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
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CDC – Hepatitis transmission and swimming pools

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CDC – Risk of norovirus from swimming
8. <https://www.cdc.gov/healthywater/swimming/pools/diarrhea-and-swimming.html>

CDC – Diarrhea and Swimming

9. <https://www.cdc.gov/healthywater/swimming/swimmers/rwi/diarrheal-illness.html>

CDC – Diarrhea and Swimming

10. <https://www.cdc.gov/healthywater/swimming/swimmers/swim-diapers-swim-pants.html>

CDC on swim diaper and swim pants

9. <https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb47.pdf> (Accessed 3-8-17)

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Diarrhea

Potential concerns

Most commonly reported recreational water illnesses (illness caused by germs in pool water) is diarrhea which is spread by germs found in stool such as Cryptosporidium, Giardia, Shigella, norovirus and E. Coli. A diarrheal fecal incident is a higher-risk event than a formed-stool incident. With most diarrheal illnesses, the number of infectious germs found in each bowel movement decreases as the diarrhea stops and the person's bowel movements return to normal. Pool Chemicals do not kill all germs instantly and many germs found in stool are resistant to pool chemicals. Specifically, cryptosporidium can stay alive for days even in well maintained pools and have become the leading cause of swimming pool-related outbreaks of diarrheal illness.

Recommendations to manage concern

No not allow entry to anyone in pool with diarrheal illness.

CDC and Model Health Code recommendation is that patient should remain out of pool for 2 weeks following episode of diarrhea.

In case of accidental diarrheal fecal contamination in pool follow CDC procedure for fecal incident. In case of accidental fecal contamination on pool deck or locker room follow CDC guidelines.

Additional information

1. See addendum – Free Available Chlorine Germ-Killing Timetable (from CDC)
2. <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf> (accessed 1-31-17)
Link to CDC fecal contamination procedure
3. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

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1. https://cmahc.org/search_the_mahc.php Model Aquatic Health Code – MAHC - Section Number 6.4.2.2.3 (accessed 2-26-17)
2. <https://www.cdc.gov/healthywater/swimming/swimmers/rwi/diarrheal-illness.html> CDC – Diarrheal Illness (accessed 2-26-17)
3. <https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-47.pdf> (Accessed 3-8-17)
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<p style="text-align: center;">Airborne Communicable Disease Adenovirus (cold) , Influenza (flu), mycoplasma pneumonia (pneumonia), Pertussis (Whooping Cough), Active Tuberculosis</p>
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Potential concerns

Increase risk of spread of airborne disease in the moist, warm and often under ventilated pool environment.

Recommendations to manage concern

Any persons with known airborne communicable disease should avoid pool therapy until recovered and fever free (100 degrees F/ 37.8 degree C) for at least 24 hours.

References

1. <https://www.cdc.gov/h1n1flu/guidance/exclusion.htm>
CDC – recommend fever free (100 degrees F/ 37.8 degree C) for at least 24 hours.
2. https://www.cdc.gov/hicpac/2007IP/2007ip_part3.html
CDC – Standard precautions for to prevent transmission of infectious agents

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Vomiting

Potential concerns

Vomit may contain infectious material, most commonly noroviruses, and can contaminate pool water or pool surfaces and spread communicable disease.

Recommendations to manage concern

If a patient vomits regurgitated water it is most likely not infected and CDC does not recommend any action other than removal of solid material from the pool.

If the vomit contains more than regurgitated water it should be considered possibly infectious and you should follow procedures for fecal incident response and/or cleaning of body fluid spills on pool surfaces.

Additional information

1. <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf> (accessed 1-31-17)
Link to CDC fecal contamination procedure
2. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

References

1. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/vomit-blood-contamination.html>
2. CDC – Vomit and Blood contamination of pool water.

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Other Communicable Diseases
Tinea Pedis (Athletes Foot/Jock Itch), Lice, Pinworms

Potential concerns

Spread of tinea pedis, lice or pin worms in locker room or when in pool

Recommendations to manage concern for Tinea Pedis

To control existing active tinea pedis CDC recommends avoiding the use of swimming pools, public showers or foot baths. Treat with medication, proper hygiene and keep feet dry when not in shower.

For prevention of tinea pedis (athletes foot/jock itch) footwear should be used in pool, on deck and in locker room.

Recommendations to manage concern for Lice

Although pool chemicals do not kill head lice , the lice are not likely to let go when a person’s head goes under water. So lice is unlikely to be spread in swimming pools but does have risk of spreading in locker room if towels, combs, hairbrushes or other items that come in contact with hair are shared.

CDC recommends waiting 1-2 days after the use of anti-lice shampoo because pool immersion will make the treatment less effective.

Recommendations to manage concern for Pinworms

Although pinworms are not killed in swimming pools the presence of a small number of pinworm eggs in hundreds or thousands of gallons of water make the chance of infection unlikely. CDC reports pinworms are rarely spread through the use of swimming pools.

This small risk can be managed by enforcement of proper hygiene.

Additional information

1. <https://www.cdc.gov/healthywater/hygiene/swimming/>
CDC Swimming Hygiene – Healthy Swimming Behaviors

References

1. <http://www.webmd.com/skin-problems-and-treatments/athletes-foot-myths#2>
2. https://www.cdc.gov/healthywater/hygiene/disease/athletes_foot.html
3. <https://www.ncbi.nlm.nih.gov/pubmed/17988347>
4. <https://www.cdc.gov/healthywater/swimming/swimmers/rwi/other-infections.html>

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BLADDER AND BOWEL

Urinary Incontinence

Potential concerns

Excess urine excretion in pool can lead to increase chloramine build up and result in skin, eye and respiratory tract irritation especially in indoor pools with large populations and inadequate ventilation. However, a properly maintained pool will be able to handle some sweat and urine as that is the job of the pool chemicals.

Potential for urine leakage onto pool deck or locker room surface.

This is not typically a reason to deny entry into pool assuming the person can manage bladder control in the locker room and on pool deck.

Recommendations to manage concern

Instruct patient to empty bladder and shower prior to pool entry and encourage visits to bathroom during treatment session as needed.

If accidental urine leakage in pool no special steps need to be taken assuming pool chemical balance is appropriate. If accidental urine leakage on pool deck or locker room surface clean use using CDC protocol for Bodily Fluid Spills on Pool Surfaces.

Additional information

1. See addendum – Free Available Chlorine Germ-Killing Timetable
2. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17)
CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

References

1. <https://www.sciencenews.org/blog/gory-details/what-happens-when-you-pee-pool>
(accessed 2-7-17)
Science News - article about what happens when you pee in the pool.
2. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/chloramines.html>
(accessed 2-7-17)
CDC on chloramines and pool operation

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Urinary Tract Infections (UTI)

Potential concerns

Urinary tract infections are caused by bacteria outside the bladder traveling into the bladder via the urethra in large enough numbers to attach to cause infection. Risk of UTI increases with poor genital hygiene and 'holding of urine' but not with pool immersion. There is no evidence that immersion in tub or swimming pool increases risk of getting UTI. One study showed that there is no evidence of vulvourethral reflux of pool water in the bladder. More likely, remaining in wet swimwear for prolonged periods of time after leaving pool may more of a risk.

Recommendations to manage concern

Those prone or recovering from UTI with antibiotics with no active symptoms can participate in pool activities with special care for proper genital hygiene and change into dry clothes immediately following pool session.

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3. <http://www.livestrong.com/article/334467-swimming-urinary-tract-infections/>
(accessed 2-7-17)
4. <http://www.wakehealth.edu/Urology/Pediatric/UTIs-in-Children.htm> 5.
<http://www.physiotherapy.asn.au/DocumentsFolder/APAWCM/The%20APA/National%20Groups/Aquatic%20Physiotherapy%20-%20Guidelines.pdf>
(accessed 2-7-17)

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Fecal Incontinence

Potential concerns

Although, formed stool is probably less of a risk than a diarrheal incident that you may not see, it is still a concern for potential to create recreational water illness. Pool Chemicals do not kill all germs instantly and many germs found in stool are resistant to pool chemicals.

Recommendations to manage concern

If your facility allows infants, children and/or adults into pool who have fecal incontinence it is highly recommended the person empty bowels prior to pool entry, thoroughly clean anal area with soap and place snug fitting 'swim diaper/ containment swimwear' prior to pool entry. Swim diaper/containment swimwear should be checked every 30-60 minutes while in pool.

All diaper changing stations should be in locker room away from pool. Special trash receptacle for diaper waste should be in locker room with diaper changing area.

In case of accidental fecal contamination in pool follow CDC procedure for fecal incident. In

case of accidental fecal contamination on pool deck or locker room follow CDC guidelines.

Additional information

1. See addendum – Free Available Chlorine Germ-Killing Timetable (from CDC) 2. <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf> (accessed 1-31-17) Link to CDC fecal contamination procedure 3. <https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf> (accessed 1-31-17) CDC – Cleaning up of Body Fluid Spills on Pool Surfaces.

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1. <http://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-47.pdf> (accessed 2-7-17)
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3. <https://www.cdc.gov/healthywater/swimming/swimmers/swim-diapers-swim-pants.html> (accessed 2-7-17) CDC
4. <https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-47.pdf> (Accessed 3-8-17)

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METABOLIC DISORDERS

Renal Disease and/or Dialysis

Potential concerns

Most patients with renal disease will do well with aquatic therapy and in fact can benefit from the increased water intake/diuresis from immersion.

Patients on dialysis with catheters should not get their catheter wet due to risk of infection.

Immersion causes a significant increase in voiding so this must be taken into consideration with people who have kidney disease since hydration is very important with this population.

Recommendations to manage concern

Educate patient about the increased diuresis with immersion and exercise and encourage

proper hydration at all times. Recommend poolside hydration during session and monitor for hypotension.

Patients on dialysis should have physician clearance for pool. Consult with physician if patient can be allowed in pool with waterproof dressing over fistula if you are confident you can contain the fistula/port. Recommend patient inform dialysis team they are receiving aquatic therapy.

Additional information

1. Physiological Response to Immersion and Temperature effects charts (in addendum)
2. See addendum – Transparent Film Waterproof Dressing Procedure

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2. Brody L, Geigle P. *Aquatic Exercise for Rehabilitation and Training*. Human Kinetics. 2009.
3. Becker B, Cole A. *Comprehensive Aquatic Therapy- 3rd edition*. Washington State University Publishing ; 2011.
4. <http://www.kidneylosangeles.com/2012/08/can-dialysis-patients-participate-in.html>
5. <http://www.renaldiseases.org/ckd-basics/1488.html> (accessed 2-7-17)

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Diabetes

Potential concerns

Patients with diabetes often get great benefit from aquatic physical therapy. However, aquatic exercise, like any exercise, will produce an almost immediate drop in blood glucose which may result in a hypoglycemic state if glucose/insulin levels are not properly maintained. In addition, patients are often not aware of the intensity of aquatic exercise and may under estimate energy consumption resulting in hypoglycemic state.

Recommendations to manage concern

Educate patients on the need to monitor blood glucose before arriving to therapy and again following therapy especially in first few visits until they get familiar with management of blood glucose in a safe range when participating in aquatic exercise.

Refer to manufacture to determine if insulin pump is safe to be used in the pool

Recommend patient bring sugar source and keep poolside during treatment. The facility should have sugar source poolside. Recommend glucose gel which can be administered to gums even when unconscious.

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Thermoregulation

Pregnancy – overheating

Potential concerns

Pregnant women need to keep core body temperature of 102 or less for protection of the fetus especially during the first trimester. Warmer pools with humid air conditions especially after heavy exercise can create an increase in core temperature.

But this population can often benefit greatly from aquatic therapy programs without an increase in core temperature if monitored appropriately.

Recommendations to manage concern

When possible select cooler pool temperature that is comfortable for patient.

Avoid pool temperatures above thermoneutral (>95 degrees Fahrenheit or >35 degree Celsius). Hot tubs should be avoided with this population.

Adjust aquatic exercise with core temperature in mind. For example, avoid heavy cardiovascular work in warmer pools when patient will have more difficulty with temperature regulation.

Monitor for signs of overheating such as redness in face, fatigue, face sweating when in pool. If this occurs instruct to lower exercise intensity or exit pool until cooled down.

Have thermometer poolside and monitor patient's temperature as needed when there is concern about overheating.

OBGYN clearance and guidelines for high risk pregnancy.

References

1. Becker B, Cole A. *Comprehensive Aquatic Therapy- 3rd edition*. Washington State University Publishing ; 2011. Pg 47

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3. <http://americanpregnancy.org/pregnancy-health/hot-tubs-during-pregnancy/> (Accessed 2-20-17)
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Multiple Sclerosis - Uhthoff phenomenon

Potential concerns

Many people with multiple sclerosis (MS) experience the Uhthoff' phenomenon which is a temporary worsening of their symptoms any time they have even a very slight increase in their core body temperature (.25 to .5 of a degree). This can occur in the often hot and humid environments of therapeutic pools especially if participating in aerobic exercise. Warmer pools with humid air conditions are especially at risk for this reaction.

But this population can often benefit greatly from aquatic therapy programs without significant symptoms if monitored appropriately.

Recommendations to manage concern

Select the coolest pool temperature that is available and comfortable for patient.

In warmer pool (at or above thermoneutral temperature of 92-95 Celsius or 33 to 35 Fahrenheit) use pre-exercise cooling techniques prior to pool entry. Hot tubs should be avoided with this population.

Adjust aquatic exercise with core temperature in mind. For example, avoid heavy cardiovascular work in warmer pools when patient will have more difficulty with temperature regulation.

Monitor for signs of heat intolerance such as increased weakness, worsening balance, fatigue or blurred vision. If this occurs instruct to lower exercise intensity or exit pool until cooled down. Have thermometer poolside and monitor patient's temperature as needed when there is concern about overheating.

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Pulmonary

Pulmonary disease (COPD, Asthma, Supplemental O2)

Potential concerns

People with pulmonary disease can have great benefit from aquatic therapy since the properties of water create increased work load for respiration. The increased workload can be

therapeutic but caution should be taken with patients who have severe pulmonary disease to ensure they maintain adequate oxygenation during immersion and exercise.

There is also concern about inadequate air circulation that can sometimes be associated with indoor pool settings. This could increase chance of respiratory infection which would be extremely detrimental for this population.

Recommendations to manage concern

All patients with pulmonary disease should be introduced to shallow water first and assess response prior to deeper immersion.

Inhalers should be kept poolside.

If needed supplement pool side ventilation with fans and fresh air.

If patient uses supplemental O₂ on land they should also use in pool. O₂ tank can be supported with floatation in pool (i.e. on raft) or have long hose and keep O₂ tank deskside.

Patients with severe pulmonary limitations should be monitored closely to assess their O₂ saturation to the aquatic environment. Vitals should be taken often especially in early stages of treatment. Modify aquatic activity based on tolerance and vitals.

Additional information

1. Normal SaO₂ range at rest and during exercise is 95%-100%. Referral for medical evaluation is advised when resting saturation levels fall below 90%. The exception is for clients with a history of tobacco use and/or COPD. Some people with COPD tend

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to retain carbon dioxide and become apneic if the oxygen levels are too high. For this population SaO₂ levels are normally kept lower. Refer to physician for patient specific SaO₂ guidelines.

2. Physiological Response to Immersion and Temperature effects charts (in addendum)

References

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Support for SaO2 range for normal and COPD.

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Aspiration risk: Absence of cough reflex ,
dysphagia, Tracheostomy

Potential concerns

Patients with absence or inadequate cough reflex or a tracheostomy will have risk of water aspiration into trachea/lungs. This could happen with accidental 'dunk' of mouth/nose in pool or via splashing of water to mouth or nose. If water enters lungs it could lead to dangerous respiratory infection or drowning.

Recommendations to manage concern

The aquatic therapist should be confident they can provide direct supervision and keep airway clear during all treatment activities (including splashing from other pool participants).

Patients with recent tracheostomy with non-intact skin should wait until skin healed before

pool entry.

Patient with healed tracheostomy will need to cap trach prior to entry into pool.

There is specialized equipment that prevents water from entering body via the stoma or incision site during immersion. If a decision is made to do any immersion activities (which obviously presents an increased risk of aspiration) then this special equipment must be used.

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2. <http://www.livestrong.com/article/550050-swimming-with-a-tracheostomy/> (accessed 2-20-17)

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CARDIOVASCULAR

Cardiomyopathy:
Congestive Heart Failure, Myocardial Infarction
(MI), myocarditis

Potential concerns

Immersion and aquatic exercise has significant influence on the cardiovascular system. There is a large central shift of blood volume resulting in an increased stroke volume output. There is also a drop in peripheral vascular resistance resulting in a drop in blood pressure. In most people with cardiac disorders the effects of immersion are beneficial but in cases of SEVERE or recent significant cardiomyopathy the increased stroke volume typically found with immersion and aquatic exercise may be contraindicated.

Recommendations to manage concern

Recent or severe cases of cardiomyopathy should have clearance from cardiologist prior to aquatic therapy.

This clearance should be made by the cardiologist with the knowledge that immersion alone typically causes a 30% increase in stroke volume, along with a reduction blood pressure and heart rate with a resulting increase in cardiac output.

Close monitor of vitals before and during pool session for those with severe cardiomyopathy.

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Additional information

1. Physiological Response to Immersion and Temperature effects charts (in addendum)
2. Tables below developed based on material from Becker/Cole- Comprehensive Aquatic Therapy – 3rd edition...

Myocardial Infarction onset	Myocarditis onset	Recommendation
Older than 6 weeks	Older than 6 months	OK for aquatic therapy
Less than 6 weeks	Less than 6 months	NOT recommend for aquatic therapy

New York Heart Association Functional Classification	Recommendation
NYHA II: Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath).	OK for aquatic therapy – monitor vitals before aquatic session and during session if cardiac symptoms occur.

<p>NYHA III: Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea □ <u>AND MD clearance that patient can tolerate 30% increase in stroke volume</u></p>	<p>OK for aquatic therapy – need CLOSE monitoring of vitals before, after and during session to assess response.</p>
<p>NYHA III: Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea □ <u>but NO MD clearance that patient can tolerate 30% increase stroke volume</u></p>	<p>NOT recommended for aquatic therapy</p>
<p>NYHA IV: Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.</p>	<p>NOT recommend for aquatic therapy</p>

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Deep Vein Thrombosis (DVT)

Potential concerns

The risk with DVT is that a blood clot comes loose from a vein in your leg and moves through your bloodstream so it ends up blocking a lung artery (pulmonary embolism) which can be a life threatening situation. There is evidence to support early exercise for this population after receiving medical intervention (anticoagulants) to address DVT. There is conflicting evidence about the use of compression stockings for people to manage complications from DVT but this is still a common practice. The concern that comes up with aquatic therapy is whether or not to wear the compressive stocking in the pool during exercise.

Hydrostatic pressure exerts 22.4 mm Hg pressure for every foot of water. So a person standing in 4 ft depth water will have 89.6 mm Hg pressure on their feet and about 56mmHg at their knee (assuming knee is 1.5 ft above pool floor). This is more pressure than a typical compression stocking (30-40 mm Hg pressure) so there is no need to wear the compression stocking in the pool.

An added benefit of immersion is the increase peripheral blood flow and shifting of blood centrally. This effect combined with the graded hydrostatic pressure encourages movement of blood back to the heart and reduction of blood clot in deep veins.

Recommendations to manage concern

Patient's with history of DVT should be on anticoagulant therapy and have medical clearance

for exercise. Compression stockings are not needed in aquatic environment.

Additional information

1. Physiological Response to Immersion and Temperature effects charts (in addendum)

References

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Hypertension

Potential concerns

Immersion and aquatic exercise has significant influence on the cardiovascular system. There is a large central shift of blood volume resulting in an increased stroke volume and cardiac output. There is also a drop in peripheral vascular resistance resulting in a drop in blood pressure. In most people with hypertension these effects are extremely beneficial

However, in cases of hypertensive crisis any form of exercise (water or land) is undesirable as emergency care may be needed.

Recommendations to manage concern

Patients with history of uncontrolled hypertension should be monitored prior to any exercise or entry into pool.

Based on American Heart Association criteria for Hypertensive Crisis....

Blood Pressure	Recommendation
Systolic 179 or lower or Diastolic 109 or lower	OK for aquatic therapy
Systolic 180 or higher or Diastolic 110 or higher	Hypertensive Crisis (as defined by American Heart Association) No exercise or entry into pool. Immediate medical care is needed

Additional information

1. Physiological Response to Immersion and Temperature effects charts (in addendum)

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1. http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/UnderstandSymptomsRisks/Why-High-Blood-Pressure-is-a-Silent-Killer_UCM_002053_Article.jsp#.WK8VwvkrKUK (accessed 2-23-17)
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Orthostatic Hypotension

Potential concerns

People with orthostatic hypotension can often exercise in the pool safely with a few precautions.

Immersion and aquatic exercise has significant influence on the cardiovascular system. There is a large central shift of blood volume resulting in an increased stroke volume and cardiac output. In addition, hydrostatic pressure of the water exerts graduated compression on the limbs. These properties can be beneficial for patients with orthostatic hypotension when exercising in the pool, however, in thermo-neutral or higher temperature water there is a drop in peripheral vascular resistance resulting in a drop in blood pressure which has potential to exacerbate symptoms of orthostatic hypotension.

The biggest concerns occur when the patient leaves the pool because this drop in blood pressure continues for a period of time after the patient exits the pool and there is no

hydrostatic pressure to encourage central blood flow. In addition, there is increased diuresis in the pool which can cause dehydration and exacerbation of orthostatic hypotension if not managed properly.

Special considerations should be taken with this population to prevent adverse event from orthostatic hypotension especially when leaving the pool such as dizziness, weakness, nausea, syncope, palpitations and fainting.

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Recommendations to manage concern

Monitor patient's outward and vital signs for orthostatic hypotension before and after each treatment session.

Encourage drinking water during treatment session to replenish

Exit pool slowly, have chair available immediately when out of pool in case symptoms occur. Take vitals in standing when out of pool. (or sitting if needed due to patients functional status)

In severe cases, stop mid way out of water and check vitals and signs for orthostatic hypotension. If needed perform counter maneuvers such as contracting muscles below waist to return blood to heart.

If patient wears compression stockings or abdominal binder, these items should be put on immediately after exiting pool (or wear while in pool if needed for safe transition out of pool).

Patient should be educated that their blood pressure may be lower for a few hours after pool therapy and they should be cautious and slow with postural transitions.

Avoid pool temperatures above thermoneutral (>95 degrees Fahrenheit or >35 degree Celsius).

(for example – hot tubs)

Additional information

1. Physiological Response to Immersion and Temperature effects charts (in addendum)

References

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NEUROLOGIC

Seizures

Potential concerns

Patient may have seizure while in pool and potential to aspirate pool water and or fatal drowning if not managed properly.

Patients with seizure disorders have the ability to participate in aquatic therapy safely if under close supervision especially if their seizures are under good control.

Recommendations to manage concern

If patient has a past history of seizures the treating therapist should collect more information to help assess risk with immersion. Including but not limited to...

1. Frequency of seizures

2. Type and intensity of seizures
3. Known triggers
4. Known warning signs of impending seizure

Patients with history of seizures should ALWAYS have direct supervision (within hands reach) while in pool. Aquatic staff should be educated and comfortable in proper technique to manage seizure in aquatic environment. If these criteria cannot be met the patient should avoid pool.

Patient Recommendations to Reduce Risk of Seizures

If patient has a past history of seizures the treating therapist should consider the following to help reduce risk with immersion. Including but not limited to...

1. Wear a medic alert bracelet or necklace
2. Schedule appointment early in day or optimal times to avoid fatigue
3. Maintain hydration
4. Avoid hypothermia
5. Use polarized sunglasses or goggles if glare/reflections cause seizures
6. Notify companion/therapist if fatigued or not feeling well, if medications were missed or if patient feels warning signs of seizure.

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Additional information

1. Driving laws for seizures by state. <http://www.epilepsy.com/driving-laws> (accessed 2-2-5-17)
1. The Epilepsy Foundation has the following recommendations for handling seizures in water... <http://www.epilepsy.com/article/2014/3/seizures-water> (accessed 2-25-17)

Here are steps to follow if someone is having a seizure in water and they have a change or loss of consciousness:

- Support the person in the water with the head tilted so the face and head stay above the surface
- Call for help and remove the person from the water as quickly and safely as possible.
- Do not restrain the person unless this is needed to get the person out of the water safely.
- Check to see whether the person is breathing. If not, begin CPR immediately.
- If breathing is normal, turn person on their side and hold them in side-lying position until they recover.

If a seizure occurs in water but without any change in the person's awareness:

- Call for help and remove the person from the water as quickly as possible.
- Help the person to a safe place out of the water.
- Stay with them until the seizure is over.

Seizure emergencies- **activate 911** with:

- Any seizure that last > 5 minutes.

- One seizure occurs right after another without the person regaining consciousness or coming to between seizures
- Seizure clusters: Seizures occur closer together than usual for that person and/or the person does not recover between seizures
- Any injury sustained during a seizure
- Any chance of swallowing or aspiration of water
- The person has never had a seizure before or no documentation of seizure
- The person has difficulty breathing or waking after the seizure or is choking
- The person has a health conditions such as diabetes, heart disease or is pregnant
- The person asks for medical help

References

1. <http://www.epilepsy.com/learn/types-seizures> (accessed 2-25-17)
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3. <http://www.redwoodsgroup.com/safety-resources/aquatics-guidance-and-tools/safety-guidance/precautions-for-swimmers-with-seizures-ymcas/> (accessed 1-5-18)

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5. <https://www.epilepsy.com/learn/seizure-first-aid-and-safety/general-first-aid-steps> (accessed 1-5-18)
6. https://www.epilepsysociety.org.uk/swimming-and-water-sports#.Wk_zVU2Wxy0 (accessed 1-5-18)
7. <http://www.epilepsymersey.org.uk/docs/swimming.pdf> (accessed 1-5-18)
8. <http://www.epilepsy.com/article/2014/3/seizures-water> (accessed 3-3-17)

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Autonomic Dysreflexia Spinal Cord Injury Patients

Potential concerns

Autonomic dysreflexia is a phenomenon associated with spinal cord injuries above T6. Autonomic dysreflexia is an uninhibited sympathetic response to a noxious stimuli resulting in dangerously and potentially fatal high blood pressure. Common noxious stimuli that have a

theoretically potentially higher possibility in the pool include bladder distension and accidental tugging of bladder catheter.

Recommendations to manage concern

Take land resting blood pressure as baseline blood pressure (which tends to be lower with high paraplegia/quadruplegia) and educate patient to alert therapist to any signs of autonomic dysreflexia when in pool.

To prevent autonomic dysreflexia in patients with high spinal cord injuries have them empty bladder prior to pool.

Take precautions listed in catheter section to secure catheter to body to prevent accidental tugging of catheter while in pool.

If any signs of autonomic dysreflexia occur during treatment and/or systolic blood pressure becomes elevated by 20 mm Hg above resting systolic level, quickly assess and eliminate noxious stimulus. Start procedures for safe removal from pool and activation of emergency action system as needed.

Additional information

1. https://www.rah.sa.gov.au/hampstead/downloads/Auto_Dysreflexia2.pdf
http://www.medscape.com/viewarticle/771222_3 (accessed 2-25-17)

Signs of autonomic dysreflexia

- a. Sudden pounding headache
- b. Flushing of face
- c. Sweating of face
- d. Chills
- e. Sudden nasal congestion
- f. Blurred vision
- g. Shortness of breath

References

1. <https://www.usaswimming.org/Rainbow/Documents/281d02ca-449e-4839-b32c-d0dba6af0327/RiskMgt.pdf> (accessed 2-25-17)

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Behavioral/Cognitive Safety Concerns

Potential concerns

Patients with impulsivity, poor judgment, aggression, and sexual inappropriateness, excessive fear of water or other behavior /cognitive issues might be difficult to manage safely in the pool. This can be a concern for the patient, therapist or other pool participants.

Recommendations to manage concern

Treating aquatic therapist must be confident that they can manage patient safely at all times when in pool environment. Consider developing a behavior plan with patient/caregiver. If not, the patient should not be allowed in the pool.

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SENSORY SYSTEMS

Hearing Impaired/ Hearing aids/ Cochlear implant

Potential concerns

Hearing aids and external sound processor for cochlear implants are typically not waterproof.

The acoustics in pool areas tend to be challenging for people with hearing impairment.

Recommendations to manage concern

Most hearing aids and cochlear implant- external sound processor should not get wet and will need to be removed before entry into pool.

There are a limited number of waterproof hearing aids or cochlear implant- external sound processors that are designed for swimming but the patient should always check with the manufacturer before assuming waterproof ability.

Ask patient if they hear better from one ear and/or if they hear certain sounds better than others. Adjust your treatment style to maximize the patients hearing abilities. Often if you speak slowly, clearly on the side of the least impairment instructions can be understood in the pool environment.

Use non-verbal styles of communication when needed such as demonstration, tactile cues, drawings etc. Consider using stethoscope to enhance hearing.

Explain details that are difficult to convey non-verbally before or after pool session when hearing aid is in place or with ELS translator.

References

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Ear infections and ear tubes

Otitis Media, Otitis Externa, Tympanostomy tubes

Potential concerns

Otitis Media - Middle ear infection

This can be caused by bacteria or virus that enter middle ear canal from inside the body following events such as colds and flu and is often accompanied by fever. Ear infections are not contagious but the colds that result in ear infections are. Similar precautions for airborne communicable disease should be followed.

Otitis Externa - Outer ear infection – “ Swimmers ear”

It is typically caused by leaving contaminated water in ear after swimming. It usually appears within a few days following underwater immersion activities. Swimmers ear cannot be spread from one person to another. It is typically treated with antibiotic ear drops.

Concern with this population is prevention and minimizing symptoms during treatment.

Tympanostomy Tubes - Ear Tubes

Since ear tubes are typically performed in children due to persistent middle ear infections it is often assumed that children should wear ear plugs when immersing head in water. However, clinical practice guidelines suggest this is not needed.

Recommendations to manage concern

Otitis Media - Middle ear infection

Follow all precautions for airborne communicable disease – If fever is present. No pool

If recovering from middle ear infection but no fever or signs of communicable disease patient can participate in aquatic exercise. Recommend head out immersion until symptoms resolve since head immersion can create pressure on sensitive inner ear.

Otitis Externa - Outer ear infection – “ Swimmers ear”

Those with active swimmers ear infection should avoid getting water in ears until symptoms are resolved.

For prevention, all patients who immerse ears under water should be educated to thoroughly dry ears immediately after showering following pool session.

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Use of swim caps and/or ear plugs during water immersion is desired for those prone to swimmers ear infections.

Tympanostomy Tubes - Ear Tubes

No special precautions need to be taken when in pool for shallow water immersion or out of head activities. It is advisable to avoid deeper water immersion.

References

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4. <https://www.drgreene.com/ga-articles/swimming-ear-tubes/> (accessed 2-23-17)

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Vestibular Dysfunction

Potential concerns

People with vestibular disorders may feel more challenged in the water. This population may be sensitive to excessive turbulence, light bouncing off water, water in ears especially in floating positions. But this population can do well in the water with a few considerations.

Recommendations to manage concern

Assess motions and conditions that aggravate symptoms (for instance – turbulent water during class times, frequent head rotations, circular motions when floating) and make adjustments as needed to manage symptoms.

References

1. Gabila Y, Perracini M, Munhoz M, Gananc, F. Aquatic physiotherapy for vestibular

rehabilitation in patients with unilateral vestibular hypofunction: Exploratory prospective study. Journal of Vestibular Research, 2008. vol. 18, no. 2,3, pp. 139-146

Peripheral neuropathy - Decreased sensation - Decreased proprioception

Potential concerns

Patients with decreased sensation may unknowingly scrape body part (most often foot/toes) when walking or exercising in pool causing skin abrasion.

Recommendations to manage concern

Properly fitted water shoes will protect feet and toes from scraping bottom of pool but poorly fitted water shoes may cause rubbing and increase in skin abrasions. Snug-fitting socks with grip on bottom for traction in pool may be beneficial.

Recommend close monitoring, especially to feet and toes, for signs of skin abrasion while in pool and at the end of each session.

References

1. <https://www.foundationforpn.org/living-well/lifestyle/exercise-and-physical-therapy/>
(accessed 2-25-17)
2. <http://www.podiatrytoday.com/blogged/closer-look-exercise-patients-diabetic-wounds>
(accessed 2-25-17)

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Visual Impairments Eye Glasses/ Contacts

Potential concerns

Contact Lens: If face is submerged or water splashed onto face the pool water may collect behind lenses and increase chance of eye infection.

Glasses: Prolonged exposure to pool water may create damage to frames or scratch resistant coating.

Visual Impairment: Risk of accidental submersion or even drowning if unable to see pool transitions and negotiate themselves in deeper levels in pool. For those with severe visual impairment and/or blindness there is a risk of collision with pool wall or other people.

Recommendations to manage concern

Contact lens: Remove contacts before aquatic therapy if planning to get face wet.

Glasses: Wear eyeglasses for out of head activities if corrected eye sight will improve outcome. Avoid getting eye glasses wet when in pool.

Visual Impairment: Close supervision needed for those with severe visual impairments until they can navigate safely in pool.

References

1. <https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/ConsumerProducts/ContactLenses/> (accessed 2-25-17)
2. <http://www.livestrong.com/article/380959-how-to-swim-with-contact-lenses/> (accessed 2-25-17)
3. <https://www.cdc.gov/contactlenses/water-and-contact-lenses.html> (accessed 2-25-17)

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ORTHOPEDIC

Weight Bearing
ROM Restrictions

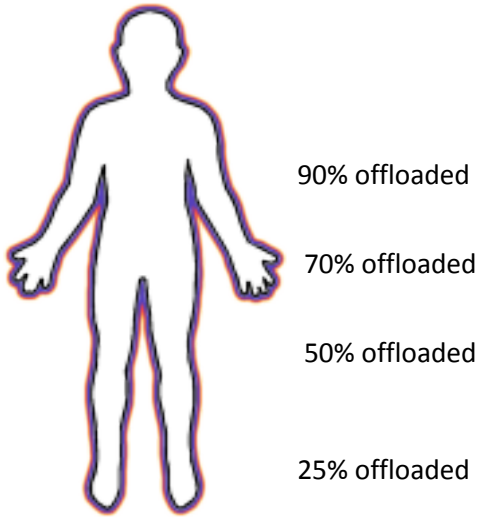
Potential concerns

Patients with weight bearing or ROM restrictions need extra care to make sure they maintain their restrictions in the water. The reduction of pain along with increased freedom of movement from immersion, coupled with turbulence and unpredictable movement of water may result in difficulty maintaining loading or ROM precautions.

Recommendations to manage concern

Therapist must use clinical judgement to assess if the patient maintains restrictions based on body awareness and general behavior (impulsivity, compliance etc).

Additional information



Stationary Immersion

response

Wei
Leve

immersion	
C7	
Xiphoid	
ASIS	
Brody L, Geigle P	
Speed	

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References

1. Roesler H, Hauptenthal A, Schütz GR, de Souza PV. Dynamometric analysis of the maximum force applied in aquatic human gait at 1.3m of immersion. *Gait Posture*. 2006 Dec;24(4):412-7
2. Adegoke BO, Bello AI, Abass AO. Variation in percentage weight bearing with changes in standing posture during water immersion: implication for clinical practice. *BMC Musculoskelet Disord*. 2014 Aug 4;15:261. doi: 10.1186/1471-2474-15-261.
3. Becker B, Cole A. *Comprehensive Aquatic Therapy- 3rd edition*. Washington State University Publishing ; 2011.
4. Brody L, Geigle P. *Aquatic Exercise for Rehabilitation and Training*. Human Kinetics. 2009.

Osteoporosis

Potential concerns

Current evidence supports utilizing resistance exercise along with supplementation with calcium and vitamin D to alleviate bone loss. This is generally considered the gold standard for osteoporosis management.

However, at times there are other concerns that will bring a patient to aquatic physical therapy and osteopenia or osteoporosis may be a co-morbidity. For these patients there are ways to exercise in the water that will maintain or improve bone health. Studies have shown that resistive aquatic exercise can be beneficial to maintain and promote bone growth in people with osteoporosis.

Recommendations to manage concern

Resistive exercises are needed for bone growth stimulation with this population. It is important to educate patients that they need to feel resistance with the water exercise to get the benefits of combating osteoporosis.

References

1. Beck BR, Daly RM, Singh MA, Taaffe DR. Exercise and Sports Science Australia (ESSA) position statement on exercise prescription for the prevention and management of osteoporosis. *J Sci Med Sport*. 2016 Oct 31. pii: S1440-2440(16)30217-1. doi: 10.1016/j.jsams.2016.10.001. (accessed 2-26-17)
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3. Pernambuco CS, Borba-Pinheiro CJ, Vale RG, Di Masi F, Monteiro PK, Dantas EH. Functional autonomy, bone mineral density (BMD) and serum osteocalcin levels in older female participants of an aquatic exercise program (AAG). *Archives of gerontology and geriatrics*. 2013 May-Jun; 56(3): 466-71.
4. Bello M, Sousa MC, Neto G, Oliveira L, Guerras I, Mendes R, Sousa N. The effect of a long-term, community-based exercise program on bone mineral density in postmenopausal women with pre-diabetes and type 2 diabetes. *J Hum Kinet* 2014 Nov 12;43:43-8.
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OTHER

Medication Concerns

Chemotherapy, medication patches, topical medicine

Potential concerns

Chemotherapy – therapist exposure: Many anti-cancer medications are released from the body through bodily fluids such as urine, stool, vomit, blood and sweat for 48 hours after treatment

has stopped. It is important for the patient and caregivers to avoid physical contact with bodily fluids for the first 48 hours after treatment to prevent accidental exposure to chemotherapy medication.

Chemotherapy – patient risk: See immunocompromised section for risk to patient with aquatic therapy who is immunocompromised due to chemotherapy medication.

Medication patches: Pool immersion may interfere with medication absorption of some medication patches and could potentially expose therapist. This is specific to each medication patch.

Recommendations to manage concern

Chemotherapy – therapist risk : Recommend waiting 48 hours before pool immersion for anyone who has bodily fluid chemotherapy precautions .

Chemotherapy – patient risk: See immunocompromised section.

Medication patch: If practical and approved by physician, remove medication patch when in pool. If not, check with manufacturer of patch to see if it can be immersed in pool or safely covered with waterproof dressing while in pool.

Additional information

1. See addendum – Transparent Film Waterproof Dressing Procedure

References

1. <https://www.oncolink.org/cancer-treatment/chemotherapy/chemotherapy-safety/home-safety-for-patients-receiving-anti-cancer-medications>

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Weather

Potential concerns

Lightning strike may induce shock for persons in pool or on pool deck.

There is clear agreement that immersion in an outdoor pool near lightning poses a significant risk of shock.

There is conflicting opinions about the risk of shock with indoor pools.

Recommendations to manage concern

Review information below from National Lightning Safety Institute, CDC and Aquatic International as well as the pool manufacturer or facility manager to make a lightning policy for your facility.

Additional information

National Lightning Safety Institute Recommendations:

Indoor/Outdoor Pool - When Flash to Bang ratio is thirty or lower (thirty seconds from seeing lightning to hearing associated thunder) the pool should be evacuated. Pool activity should be suspended until 30 min after last thunder is heard.

Center for Disease Control (CDC) Recommendations:

Do NOT bathe, shower, wash dishes, or have any other contact with water during a thunderstorm because lightning can travel through a building's plumbing.

Aquatics International Recommendations:

Lightning should not be a problem in for indoor pools that are grounded.

References

1. http://lightningsafety.com/nlsi_pls/indoor_pools.html (accessed 2-26-17)
2. <http://www.aquaticsintl.com/safety/when-lightning-strikes.aspx> (accessed 2-26- 17)
3. <https://www.cdc.gov/disasters/lightning/safetytips.html> (accessed 2-26-17)

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Weight Restriction

Potential concerns

Pool lifts will have a weight restriction. Anyone over this weight restriction may be unable to safely enter and exit the pool.

Recommendations to manage concern

Refer to the facility pool lift manufacturer for weight restrictions. If a patient's weight is over the lift recommendation an assessment will need to be made on how to safely exit the pool under normal or emergency situations using other methods (stairs, ramp, backboard).

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ADDENDUM

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PHYSIOLOGIC RESPONSE TO IMMERSION

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TEMPERATURE EFFECTS

(Young males – immersion without exercise)

Taken from Becker B, Andrew C, *Comprehensive Aquatic Therapy*. 3rd ed. Pullman WA; Washington State University Publishing, 2010- page 48)

	Water Temperature		
	Cold (59F)	Neutral (95F)	Hot (111F)
Heart rate	-15%	-15%	32%
Stroke Volume	19%	39%	9%
Cardiac Output	-1%	18%	44%
Systolic Blood Pressure	19%	-8%	-17%
Diastolic Blood Pressure	2%	-7%	-14%
Peripheral Vascular Resistance	-32%	-14%	-32%
Diuresis	365%	400%	225%
Muscle Blood Flow	80%	44%	4%

Relationship between pH and Water Quality
(taken from CDC website)

Water Quality	pH
Poor Chlorine Disinfection Eye Irritation Skin Irritation	> 8.0
Most Ideal for Eye Comfort and Disinfection	7.8-7.2
Eye Irritation Skin Irritation Pipe Corrosion	< 7.0

**Organism Inactivation Time in Chlorinated Water 1ppm
(1mg/L) chlorine at pH 7.5 and 77°F (25°C)**
(From CDC website)

Organism	Time
E. coli O157:H7 (bacterium) and Shigella	Less than 1minute
Hepatitis A (virus)	16 minutes
Legionella	18 minutes
Norwalk and Rotavirus (virus)	30 minutes
Giardia (parasite)	45 minutes
Cryptosporidium (parasite)	15,300 minutes (10.6 days)

Transparent Film Waterproof Dressing Procedure

Application Tips

1. Select a dressing size that will adequately cover the site needing waterproofing. Ensure at least a one inch margin of dressing adheres to healthy, dry skin. To tailor a dressing for a special application, use sterile scissors to cut the dressing into desired shapes or sizes before removing the printed liner. For best results and ease of application, cut the pieces so that a portion of the frame remains on at least two sides.

2. Prepare the site according to your institution's approved protocol. Also, to ensure good adhesion, clip excess hair where the dressing will be placed. Do not shave the skin because of the potential for microabrasions. Make sure skin is free of soaps, detergents, and lotions. Allow all preps and protectants to dry thoroughly before applying the dressing. Wet preps and soap residues can cause irritation if trapped under the dressing. Additionally, adhesive products do not adhere well to wet or oily surfaces.

3. If site is located on joint position the joint to avoid stretch of dressing with end range of motion during aquatic exercise and transfers. (For example, apply dressing onto a fully flexed knee)

5. Do not stretch the dressing during application. Applying an adhesive product with tension can produce mechanical trauma to the skin. Stretching can also cause adhesion failure.

6. The adhesive of the dressing is pressure-sensitive. To ensure best adhesion, always apply firm pressure to the dressing from the center out to the edges. Check for wrinkles that may affect the integrity when immersed in pool. If needed you may apply an additional dressing on top of the existing dressing until you have a secure 1 in margin on all sides of the dressing.

Removal Tips

Support the skin and any indwelling tubes when removing the waterproof dressing. Use one of the following removal techniques based on your patient's skin condition and your own personal preference:

--Gently grasp one edge and slowly peel the dressing from the skin in the direction of hair growth. Try to peel the dressing back over itself, rather than pulling it up from the skin.

Or

--Grasp opposing corners of the dressing and gently pull in opposite directions until adhesion releases, then gently peel dressing away.

Or

--Apply an adhesive remover suitable for use on skin to the adhesive edge while gently peeling from the skin. To aid in lifting a dressing edge, secure a piece of surgical tape to one corner and rub firmly. Use the tape as a tab to help you slowly peel back the dressing.

More Resources

Importance of good hygiene/showering before pool

<https://www.cdc.gov/healthywater/hygiene/swimming/>

Fecal contamination procedure –

<https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf>

Blood and Vomit contamination procedure

<https://www.cdc.gov/healthywater/swimming/aquatics-professionals/vomit-blood-contamination.html>

Blood spill on pool deck – clean up procedure

<https://www.cdc.gov/healthywater/pdf/swimming/resources/cleaning-body-fluid-spills-factsheet.pdf>

Model Aquatic Health Code (MAHC)-

<http://www.cdc.gov/healthywater/swimming/pools/mahc/>

http://cmahc.org/search_the_mahc.php (Search tool for MAHC)

National Swimming Pool Foundation

<https://www.nspf.org/>

American Red Cross – Basic Water Rescue

https://safety-solved.com/wp-content/uploads/2015/12/Basic_Water_Safety_Rescuesb0606.pdf