



Introduction to Adaptive Scuba Diving



Course Objectives

- ▶ **Demonstrate** an introductory-level understanding of what is adaptive scuba diving.
- ▶ **Describe** at least two physiological and two psychosocial benefits associated with adaptive scuba-based therapy for individuals with disabilities
- ▶ **Understanding** of how an adaptive dive program can be incorporated into current aquatic offerings





What is Adaptive Scuba Diving?



History of Adaptive Diving

1972

- YMCA adaptive scuba programming
- **Viability of scuba** for individuals with disabilities
- Minimal modifications needed

(Boyd)



1981

- Founding of Handicap Scuba Association
- Developed **conditional certifications** for adaptive divers in 1986

(Villalta, 2013)



1984

- Outlined **need** for specialized certifications
- Standard certifications may not be appropriate for people with disabilities

(Williamson et. al.)



1988

- **Psychosocial benefits** of adaptive scuba
- Viability of scuba for those with **more profound physical impairments**

(Mordorsky & Mordorsky)



History of Diveheart



▶ History of Diveheart

- ▶ 2001: Founding of Diveheart
- ▶ Interlude: Diveheart became a leader in certifying individuals with disabilities
- ▶ 2014: Launching of Diveheart Certifications
 - ▶ Adaptive Diver
 - ▶ Surface Support Buddy
 - ▶ Adaptive Pool Buddy
 - ▶ Adaptive Dive Buddy
 - ▶ Advanced Adaptive Dive Buddy
 - ▶ Adaptive Dive Instructor



Precautions & Contraindications

Precautions:

- Autonomic dysreflexia
- Decreased sensation
- Diminished thermoregulation
- Mental health disorders
- Cognitive impairment
- Communication barriers

Contraindications:

- Open wounds or sores
- Hx of seizures (Almeida et al., 2007)
 - Off medication & seizure free 5 years
- Pressure-related illnesses
- Cognitively impaired → breath holding
- Under 10 y/o

Diver Alert Network (DAN) Emergency Hotline: +1 (919) 684-9111

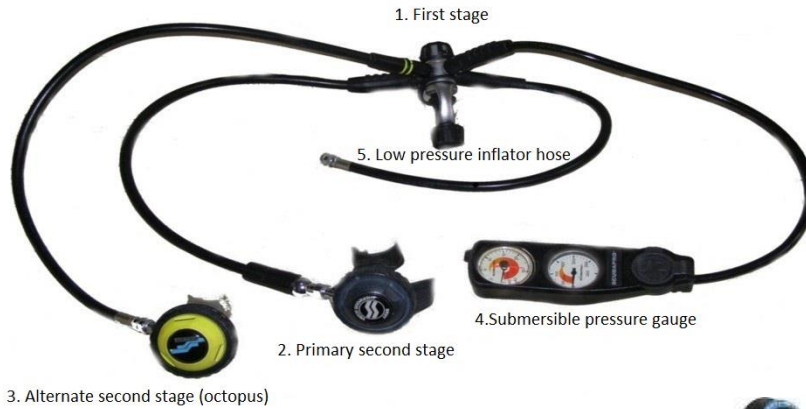
DAN General Inquiries: Option 1 +1 (919) 684-2948



Adaptive Equipment for SCUBA



Typical Scuba Gear





Specialized dive equipment is **NOT** required to make diving accessible

There are no standard answers in adapting scuba diving because the solutions are based on the individual's unique needs



Full Face Mask



► Uses:

- Unable to hold regulator in mouth
- Difficulty breathing with regulator
- Full face mask with communications



Webbed Gloves



► Uses:

- Increase swimming efficiency
- Hand protection
- Keep warm





Thermoregulation Tools

► Uses:

- Maintain core body temperature
- Protection from cuts and scrapes
- Increased proprioceptive feedback





Adaptive Communications

► Uses:

- Unable to form typical dive hand signals due to motor deficit
- Unable to see hand signals
- Atypical signals for unique needs

NOTE: Divers proficient in ASL will have an advantage with communication in the water





Swim Prosthetics

► Uses:

- Increase mobility and swimming efficiency
- Look like every other diver



Buoyance Compensation Device (BCD)



- ▶ Uses:
- ▶ Stabilizes adaptive diver at surface
- ▶ Provides several grab points for adaptive team to use
- ▶ More D-rings and compartments allows for multiple weighting scenarios





Adaptive Diver Case Studies



Adaptive Entry



Barb on Scuba



Walking Underwater



Underwater Puzzle



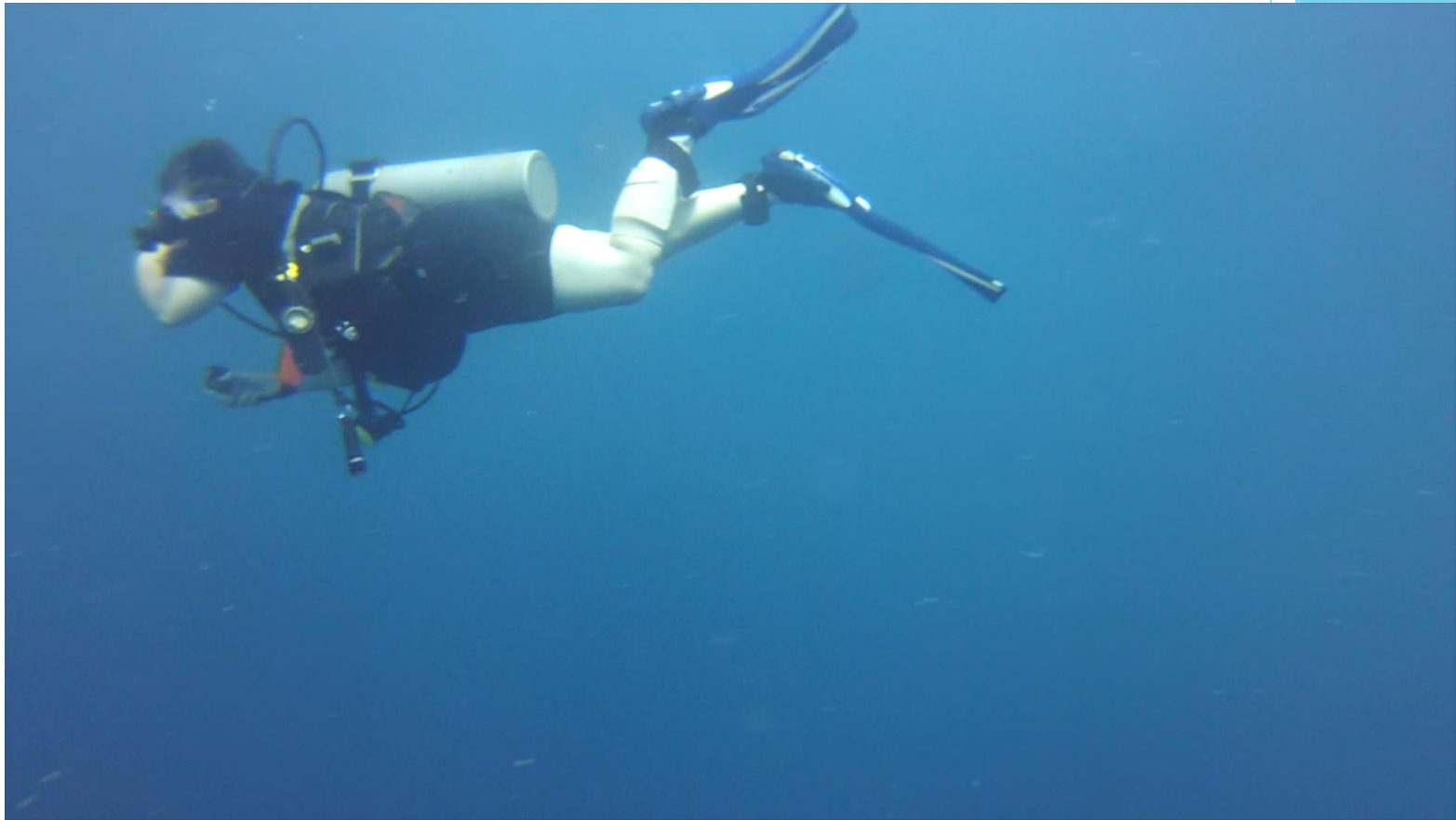
Torpedo Game

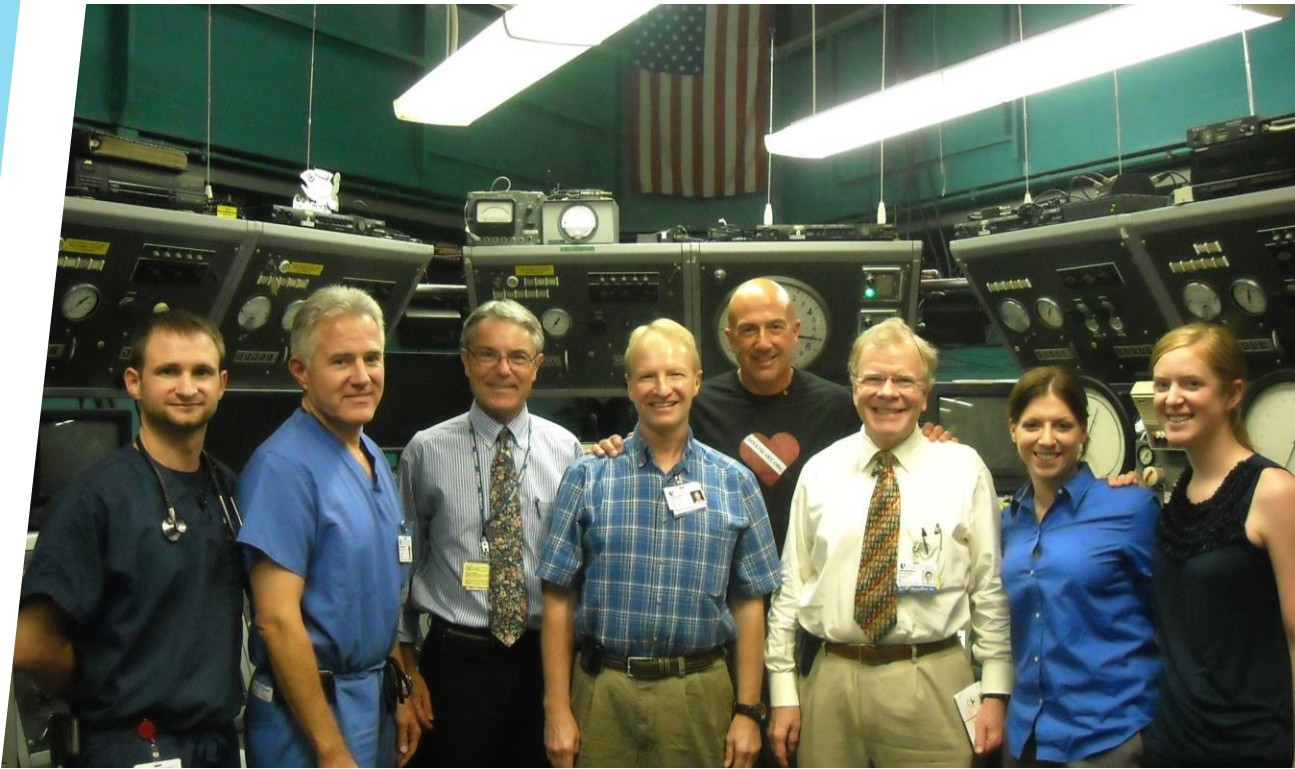


Indigo's Swim Prosthetic



Swim Prosthetic





Research on SCUBA for individuals with disabilities



Psychosocial Benefits of SCUBA



- ▶ **Perceived benefits of adaptive scuba:**
 - ▶ Freedom from impairment
 - ▶ Enhanced social participation
 - ▶ Increased self concept
 - ▶ Optimal experience

(Carin-Levy & Jones, 2007)



Psychosocial Benefits of SCUBA: Benefits for Veteran Populations

Benefits of Scuba for Veterans:

- Decreased symptoms of PTSD
- Decreased symptoms of depression
- Decreased anxiety
- Decreased stress
- Increased socialization

(Morgan et. al. 2018; Krpalek et. al 2020)

Why does this matter?

- Combat veterans post 9.11.01 increased risk of mental health disorders
- **73%** diagnosed PTSD also comorbid disorder

(Crum-Cianflone et. al., 2016)



Psychosocial Benefits of SCUBA: Benefits for Veteran Populations



- ▶ Anecdotal reports decreased chronic pain (Morgan et. al. 2018)
- ▶ Connection between military experience and scuba (Morgan et. al. 2018)
- ▶ Longer lasting and more generalizable benefits when paired with therapeutic interventions (Krpalek et. al 2020)



Physiological Benefits: Intersection of Adaptive Scuba & Aquatic Therapy



- ▶ Benefits for individuals with paraplegia (Haydn et. al. 2007):
 - ▶ Increased QOL
 - ▶ Decreased spasticity
- ▶ Aquatic programming **increased swimming skills and physical activity** for children with disabilities (Fragala-Pinkham et. al. 2010):
 - ▶ Children with ASD have increased risk of drowning (Guan et. al. 2017)
 - ▶ Children with disabilities decreased participation in physical activity (Jung et al., 2018)



Physiological Benefits: Intersection of Adaptive Scuba & Aquatic Therapy



- ▶ Benefits of aquatic therapy for children with **all severities** of Cerebral Palsy:
 - ▶ Improved motor functioning
 - ▶ Increase enjoyment in therapy
- ▶ Features of an aquatic environment:
 - ▶ Increased motivation
 - ▶ Thermal effects: pain and spasticity
 - ▶ Mechanical effects (antigravity):
 - ▶ Reduced joint loading
 - ▶ Improved postural support and muscular strength

(Lai et. al. 2014)





Practitioner Involvement



What you will need:

- Interested participant
- Scuba certification
- Adaptive dive training
- Support from Diveheart
- Permission from your organization
- Pool space

What you can do:

- Schedule a scuba experience
- Complete activities in zero gravity
- Facilitate learning of scuba skills

Get Involved: In the Water



At the clinic

- Practice specific components of scuba
 - Ex. assemble and disassemble gear
- Build generalizable skills that increase success for scuba
 - Ex. fine motor coordination and strength needed for gear assembly

Other

- Mention Adaptive diving/ Diveheart as an option
- Complete dive screening tool
- Get information about programming
- Scuba Art group activity

Get Involved: On Land





Get Involved: with Diveheart

- ▶ Join us on our adaptive dive trips
- ▶ Become an adaptive dive buddy
- ▶ Become a volunteer
- ▶ Conduct research



Thanks!



Contact us:



Phone: 630-964-1983



Email. Info@diveheart.org



Website: [www,diveheart.org](http://www.diveheart.org)





Questions?

References

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