

BENDS

IS NOT A DIRTY WORD

**A Practical Look at
Decompression Illness**

**Extended Range Diving Organization Inc.
Joel D. Silverstein, Director**

What is The Bends?

- It is the syndrome of joint pain, numbness, paralysis and other symptoms caused by the release of gas dissolved in tissues, which forms bubbles in the blood upon surfacing after a scuba or compressed gas dive.
- Bubbles forming in tissues near joints cause the pain of classical “bends.” When high levels of bubble formation occur, complex reactions take place, which can cause other symptoms.

When does it show up?

- Symptoms and signs can appear within 20 minutes to 48 hours after surfacing from any dive.
- Severe cases can show symptoms “in-water” or immediately upon surfacing.

Who is thought to be a “Bent Diver?”

- **Divers who exceed no-deco limits**
- **Deep divers**
- **Cold water divers**
- **Inexperienced divers**
- **Divers with “risky” profiles**
- **“Stupid” divers**
- **“Bad” divers**

CITY ISLAND CHAMBER

1994-1995 STATISTICS

0 % Technical Diver	42% No Safety Stops
17% Deeper than 130 fsw	52% Computer Users
17% No Timing Device	55% < 100 fsw
41% Multi-day Trips	79% Repetitive Diving
48% Caribbean/Mexico	79% No-Deco Dives
52% Fly < 24 hrs. after diving	

Population n = 45 divers

What the Statistics Mean

- **Of divers who required treatment, most of the profiles would on the surface not warranted treatment.**
- **However, neurological examinations showed significant deficits which required treatment.**
- **Most divers who required treatment believed that they were “within tables” but were really way outside no-stop time limits.**
- **Divers who dive often and have additional training are better prepared to prevent DCI.**

Sources of Myths

- **Instructors**
- **Retailers**
- **Resort Operators**
- **Medical Personnel**
- **Training Agencies**
- **Poor Press Coverage**
- **Uninformed Divers**
- **Divers in Denial**
- **Effects of Alcohol**
- **“Party” Mentality**
- **Peer Pressure**

Emotional Issues Divers Face

- **Anxiety**
- **Shame**
- **Humiliation**
- **Guilt**
- **Incompetence**
- **Exaggerated fears of treatment**
- **Fear of inability to dive again**
- **Real concern for physical well-being**

Diver Denial

“The diver may mobilize defenses and engage in behaviors that temporarily ease the psychological burden.”

Jennifer C. Hunt, Ph.D. aquaCorps, N5

Injured Diver's First Reactions

- **“Not me, I’m a good diver.”**
- **“Only bad divers get bent.”**
- **“It’s only a sprain.”**
- **“I probably have the flu.”**
- **“I’m just tired.”**
- **“I’m within the tables.”**
- **“My computer says I’m O.K.”**
- **“I don’t want to ruin the trip.”**

Secondary Reactions

- **“Maybe I am hurt.”**
- **“It will probably go away.”**
- **“I don’t want to go to a chamber.”**
- **“Can I afford treatment?”**
- **“Am I insured?”**
- **“If I am bent can I ever dive again?”**
- **“I’m probably not bent.”**

DCI Signs and Symptoms

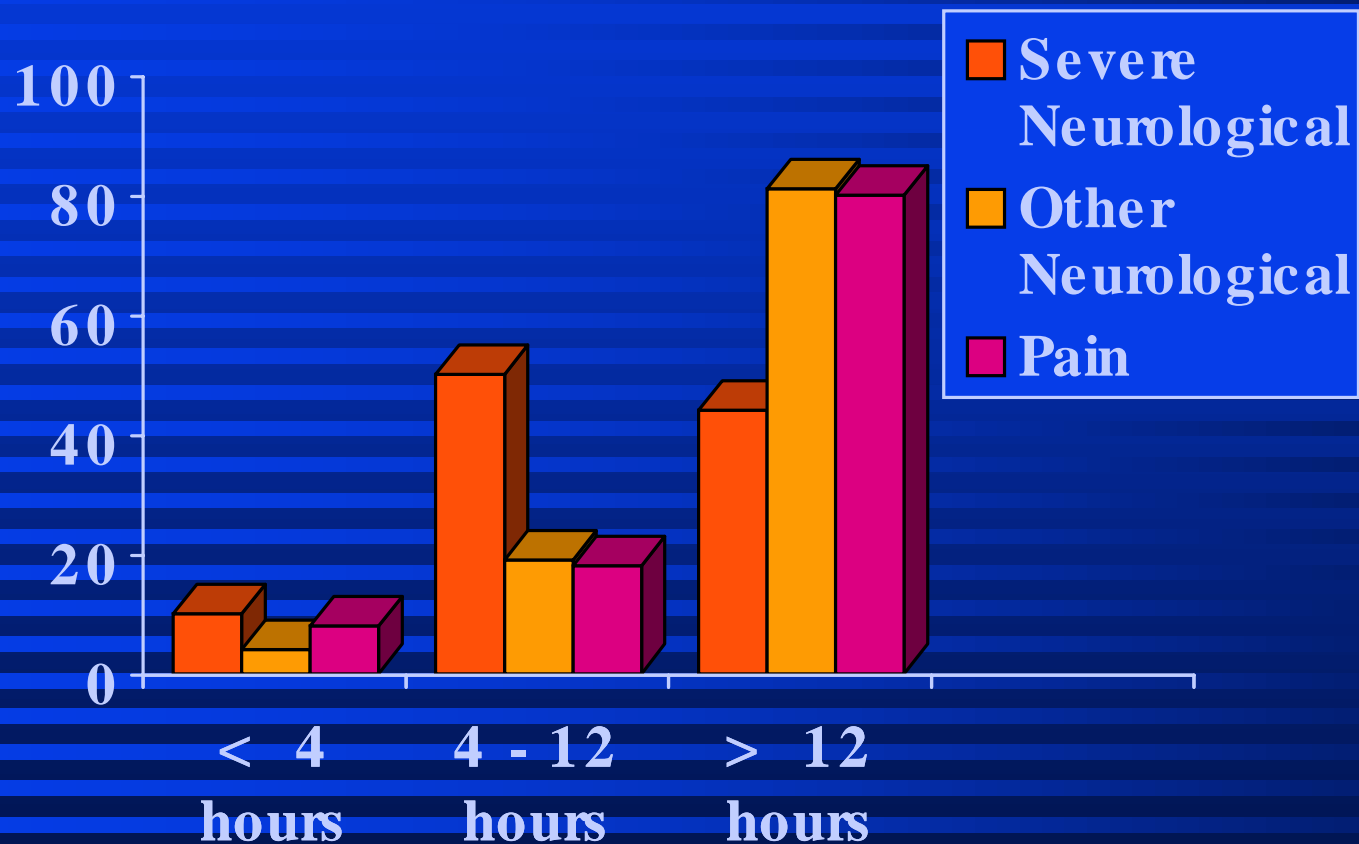
- **Disorientation**
- **Dizziness**
- **Fatigue**
- **Hearing Difficulties**
- **Muscle Pain**
- **Numbness**
- **Joint Pain**
- **Paralysis**
- **Skin Rash**
- **Slurred Speech**
- **Agitation**
- **Tingling**
- **Vision Problems**
- **Weakness**

Treatment Delays

- **55 % of divers delayed treatment for 48 hours or longer.**
- **38 % had signs and symptoms that forced them to seek treatment in under 24 hours.**
- **14 % had significant delays due to seeking help from non-diving medical personnel.**

DELAYING TREATMENT

% of Divers with Post-Treatment Residuals as a Function of Treatment Delay



- **Treat Early**
- **Don't Delay**
- **The sooner the treatment the better the outcome**

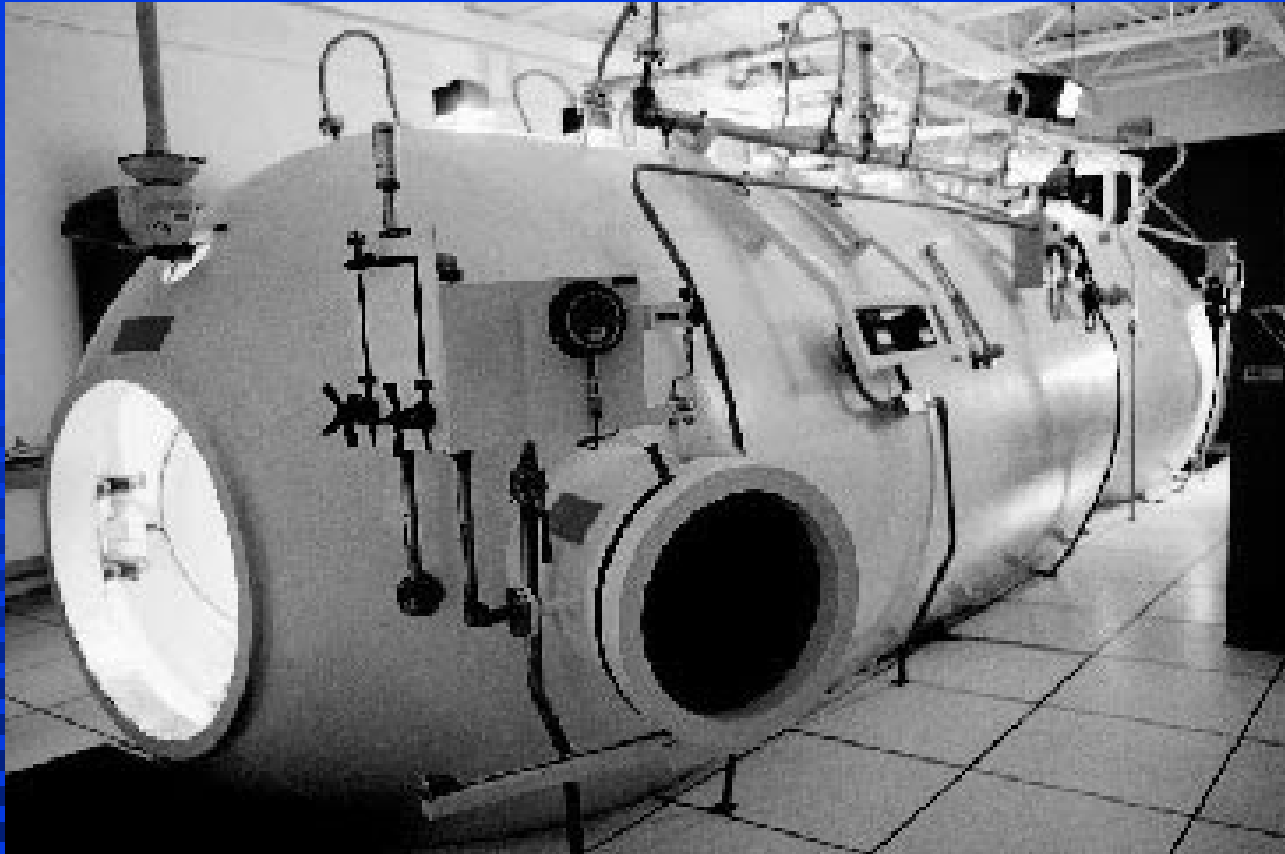
Incident Management

- **At first sign - 100 % Oxygen.**
- **Tell someone (buddy, boat captain, etc.)**
- **DO NOT let *anyone* minimize your urgency.**
- **Monitor your changes.**
- **Call for help - EMS - USCG - DAN.**
- **Drink plenty of non-alcoholic fluids.**
- **DO NOT take minor signs lightly.**
- **Never re-enter the water.**
- **Get to a recompression facility *fast*.**

How Recompression Works

- A room is pressurized with air while a diver and a medical tender relax inside.
- Most treatments are done at 60 feet - 2.8 atm.
- The diver breathes 100 % oxygen by a mask/hood, producing a surface equivalent of 280% oxygen.
- Oxygen eliminates nitrogen in the body and maximizes bubble resolution.
- Oxygenation of areas with compromised blood flow promotes healing.

Multiplace Hyperbaric Chamber



- A multiplace chamber is the preferred choice.
- Mono-place chambers offer few treatment options.

Treatment Schedules

- Average initial time at a hyperbaric facility 8 hours
- Repeat oxygen treatments last 2 hours each.
- Depending on DCI severity, treatments can be from 2 to 36 hours .

US Navy Treatment Table 5	60 fsw	2 hours
US Navy Treatment Table 6	60 fsw	4 - 6 hours
COMEX 30 Treatment Table	100 fsw	7 - 9 hours
US Navy Treatment Table 6a	165 fsw	5 - 7 hours

Bends Prevention

- Dive within your training level.
- Always do a safety stop on no-stop dives.
- Limit decompression dives to one a day.
- Deepest dive first.
- Use conservative dive tables
- Take a day off every two on long trips.
- 24 hours minimum before flying.
- Stay well hydrated.
- **NO ALCOHOL !**

What *you* can do now

- Training / Attitude
- Community Participation
- Peer Support
- Organization Support

Training

- **CPR / First Aid**
- **Oxygen Provider Certification**
- **Nitrox Certification**
- **Intro To Hyperbarics**
- **Advanced Diver Certification**

Community Participation

- Dive club meetings
- Tours of hyperbaric facilities
- Encourage oxygen availability
- Promote Responsible Diving
- Display safety signs and phone #'s

Peer Support

- Learn signs of diver denial
- Encourage early treatment
- Don't promote myths
- Take “bends” out of the closet

“Decompression sickness is not an accident; a certain incidence of it is expected from practical diving”

R.W. “Bill” Hamilton, Ph.D

“The strong negative social reaction and stigma surrounding DCI increases the trauma, and jeopardizes the healing process.”

Jennifer C. Hunt, Ph.D. aquaCorps , N5

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**This presentation is a public safety message of the
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