

# Psychological Issues in Diving

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## Psychological Disturbances

- Neuroses
  - Anxiety, Panic, Phobias
  - Hysterias, Hypochondriasis
  - Post traumatic stress disorder
  - Compensation neurosis
- Psychoses
  - Depression (Manic depression)
  - Schizophrenia
  - Narcolepsy

# Underwater environmental problems occur due to:

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- propulsion problems;
- rapid heat loss;
- breathing compressed gas;
- altered cardiorespiratory system;
- accommodation to changes in gas volume and pressure;
- accommodation to the effects of the partial pressure of gases.
- Only the last of these is related thinking and decision making and none are related to unreasonable, or erroneous thinking.

# Relationship between mental conditions and scuba diving.

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- There are obvious restrictions against someone diving that is out of touch with reality;
- Who are severely depressed and suicidal;
- Who are paranoid with delusions and hallucinations
- However, there are many who dive with everyday anxieties, fears and neuroses.

# Successful divers profile

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- positively correlated to intelligence;
- characterized by a level of neuroticism that is average or below average;
- score well on studies of self-sufficiency and emotional stability.

# Hazards of effects and side effects of medications

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- A mood-altering medication can be dangerous, in combinations even more so.
- No good scientific studies
- Medication is usually less important than the condition
- Drugs dangerous to drivers are also dangerous for divers.
- The interaction between the physiological effects of diving and the pharmacological effects of medications is usually an educated supposition.

■ Each situation needs careful individual

# Effects on divers of various gases under pressure

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- Each diver responds differently to effects of various gases under pressure
- Reactions are similar to a psychoneurotic reaction or one of the organic cerebral syndromes.
- These occur as inert gas narcosis, carbon dioxide toxicity, oxygen toxicity, HPNS, and deep water blackout

# Overview of Depressive Illnesses and Its Symptoms

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- Depressive and manic depressive illnesses are the two major types of depressive illness, also known as affective disorders, or mood disorders.
- Over 17.4 million adults in the U.S. suffer from an affective disorder each year--that's one out of every seven people. (25-44 age group)
- Women are twice as likely as men to experience major depression.

# Overview of Depressive Illnesses and Its Symptoms

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- Where do these illnesses come from?  
Genetic, biochemical and environmental factors
- Depressive disorders are characterized by their extremes in intensity and duration.
- People with severe, untreated depression have a suicide rate as high as 15 percent. (#1 cause in US)
- Most responsive to treatment. (80 percent)
- Success lower for bipolar disorder

# The Cause of Affective Disorders

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- Genetic predisposition to affective disorders.  
(Clinical depression)
- Altered body chemistry can trigger the onset of a depressive disorder, due to the presence of another illness, altered health habits, substance abuse, or hormonal fluctuations.
- Distressing life events, resulting in reactive depression.
- Depression or manic-depressive illness indicates an imbalance in the brain chemicals called neurotransmitters.

# Symptoms of depression

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- Unexplained sadness and crying spells
- Changed appetite and sleep patterns
- Irritability, anger, worry, agitation, anxiety
- Pessimism, indifference
- Loss of energy, persistent lethargy
- Feelings of guilt, worthlessness
- Inability to concentrate, indecisiveness
- Loss of interests, social withdrawal
- Unexplained aches and pains
- Recurring thoughts of death or suicide

# Symptoms of Mania (Bipolar disorder)

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- High mood, optimism and self confidence
- Decreased need for sleep without fatigue
- Delusions of grandeur and self-importance
- Excessive irritability, aggression, religiosity
- Increased physical and mental activity
- Rapid speech, flight of ideas, impulsiveness
- Poor judgment, easily distracted
- Reckless behavior (spending sprees, rash business decisions, erratic driving, sexual indiscretions)
- In the most severe cases, hallucinations

# Advice About Diving: Depression

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Whether diving should be allowed:

- Should be decided on the merits of each case; the type of drugs required; the response to medication; the length of time free of depressive or manic problems.
- Most probably could be allowed to dive, particularly those who have responded well to medications over a long term.

# Advice About Diving: Depression

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- Points to Consider: Decision-making ability, responsibility to other divers and relationship to drug induced side effects that would limit ability to gear up and move in the water.
- Prospective divers should in all cases provide full disclosure of their condition and medications to the dive instructor and certifying agency.

# Advice About Diving: Depression

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The depressed person should not dive:

- if there is any possibility of seizures. (0.02% in all anti depressives)
- if there is difficulty in concentrating or following instructions.
- if suicidal or has psychiatric problems that would deter interaction.
- if medications cause any change in sensorium that might be worsened at depth due to the additive effect of nitrogen narcosis.

# Psychotropic Drugs

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Side Effects may include:

- Decreasing the epileptic seizure threshold (0.02%)
- Sedation, drowsiness, dizziness, blurred vision, hypotension, tremor
- Cardiac arrhythmias
- Reduced exercise capability
- Autonomic nervous system interference
- Bruising
- Bronchial spasm (beta blockers)

# Anxiety

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- Normally, fear and anxiety can be helpful, helping us to avoid dangerous situations.
- Anxiety causes worried feelings, tiredness, loss of concentration, irritability and insomnia.
- Physical effects include irregular heartbeat, sweating, tense muscles and pain, heavy rapid breathing, dizziness, faintness, indigestion and diarrhea and are often mistaken by anxious people for evidence of serious physical illness.

# Anxiety, Panic and Phobias

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- Sudden unexpected surges of anxiety are called panic, and usually lead to the person having to quickly get out of whatever situation they happen to be in.
- Panic occurring at depth can lead to near-drowning and lung over-expansion injuries and death.
- Susceptible people exaggerate the normal anxiety induced by the undersea environment.
- A vicious circle results and the diver may then develop an actual phobia to descent into the

# Anxiety, Panic and Phobias

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- Anxiety is a normal human feeling. We all experience it when faced with situations we find threatening or difficult.
- An over-reactive anxiety state usually occurs in response to some inadvertent mishap, such as a mask flooding.
- This results in irrational behavior and lack of concern for the safety of others.
- This is seen more often in those divers who have an above normal neuroticism gradient.

# Phobias

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- A phobia is a fear of particular situations or things that are not dangerous and which is associated with intense symptoms of anxiety, as described above.
- A phobia will lead the sufferer to avoid situations in which they know they will be anxious, but this will actually make the phobia worse as time goes on.
- Sufferers usually know that there is no real danger, they may feel silly about their fear but they are still unable to control it.

# Phobias

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- True claustrophobia:
- may prevent immersion or even entry into a recompression chamber.
- may only surface during certain times of stress and diminished visibility, such as in murky water or night diving, causing illusions and heightened suggestibility.
- An agoraphobic reaction - often called "blue orb or dome syndrome", is seen when a diver loses contact with the bottom and the surface and becomes spatially disoriented.

# Panic disorders

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- More than half of divers report experiencing at least one panic or near-panic episode.
- Panic attacks are often spurred by entanglement, an equipment malfunction or being startled by some unexpected sea creature leading to irrational and dangerous behavior.
- Sometimes experienced scuba divers experience panic for no apparent reason.
- Divers lose sight of familiar objects, become disoriented and experience a form of sensory deprivation, called the "blue orb syndrome."

# Panic Disorders

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- Among inexperienced divers, there is usually an objective basis (e.g., loss of air or a shark) behind the panic response.
- Panic response is when a diver behaves irrationally. The diver's attention narrows and he loses the ability to sort out his options.
- There are some obvious diving activities which tend to lead to panic episodes, such as the stresses of equipment malfunctioning, dangerous marine life, loss of orientation during a cave, ice or wreck dive, and so on.

# Panic Disorders

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- The psychological concept known as "trait anxiety" that is a stable or enduring feature of personality, whereas "state anxiety" is situational or transitory. (Morgan)
- A diver with trait anxiety is more likely to have increased state anxiety and panic during scuba activities, is at greater risk and often treatment is ineffective.
- Students with a history of panic episodes should be counseled during scuba training classes about the potential risks.

# Advice About Diving: Anxiety, Phobias and Panic

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- ❑ Diving should be decided on the merits of each case, the type of drugs required, the response to medication, the length of time free of anxiety and phobic problems, decision making ability and responsibility to other divers.
- ❑ Divers with high trait anxiety are more likely to have increased state anxiety and panic during scuba activities.
- ❑ Most probably should not dive but if allowed to dive should be carefully monitored and fully informed of their risks.

# Narcolepsy

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- Narcolepsy is a chronic disorder of the brain center where regulation of sleep and wakefulness take place.
- No scientific studies have been done on narcoleptics diving.
- People with narcolepsy can fall asleep while at work, talking, and driving a car and can last from 30 seconds to more than 30 minutes.
- They may also experience periods of cataplexy (loss of muscle tone).

# Narcolepsy

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- With a prevalence of about 0.03% of the general population, or, about one person in 2000, it can occur at any time throughout life, but its peak onset is during the teen years.
- Narcolepsy is hereditary along with some environmental factors.
- Symptoms include excessive sleepiness, temporary decrease or loss of muscle control (sometimes associated with getting excited), vivid dreamlike images when drifting off to sleep and waking up unable to move or talk for a period of time.

# Narcolepsy

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Driving restrictions for narcolepsy usually entail a narcolepsy-free period of one year after starting treatment; and, no drug-related symptoms.

- Medications used to treat narcolepsy include stimulants, anti-cataleptic compounds and hypnotic compounds, some of which have definite effects and side effects that are adverse to diving. Stimulants that increase the metabolic rate can cause an increased risk of oxygen toxicity in nitrox divers.

# Advice About Diving: Narcolepsy

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- Whether or not a person with narcolepsy should be certified as 'fit to dive' should be decided on the merits of each case, the type of drugs required, the response to medication, and the length of time free of narcoleptic problems.
- Relationship to excitement, emotions and stressful situations should be taken into consideration.
- Full face mask?

# Schizophrenia

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- Schizophrenia is a serious mental illness that affects one person in a hundred.
- It usually develops in the late teens or early twenties, though it can start in middle age or even much later in life.
- Although it is treatable, relapses are common, and it may never clear up entirely.
- Thoughts, feelings and actions are somewhat disconnected from each other so that what a person says may be out of keeping with what they feel or do, or what they do may be out of keeping with what they say or feel.

# Schizophrenia: Positive Symptoms

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Symptoms are positive, negative or disorganized.

- **Positive symptoms**
- Schizophrenia interferes with the feeling of being 'the captain of the ship'.
- Hallucination is the experience of hearing, smelling, feeling or seeing something that is not there.
- Delusions are false and usually unusual beliefs, which cannot be explained by the believer's culture or changed by argument.

# Schizophrenia: Negative and Disorganized Symptoms

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- Negative Symptoms
- These affect interest, energy, emotional life and everyday activities. They avoid meeting people, say little or nothing and may appear emotionally blank.
- Disorganized Symptoms
- Schizophrenia often interferes with a person's train of thought and it becomes difficult to understand their gibberish. They will shout back at their voices or will comply with the instructions of the voices, often hurting themselves or others.

# Causes of Schizophrenia

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- The cause of this condition is unknown. Ten percent of people with schizophrenia have a parent who suffers from the illness.
- An episode of schizophrenia often occurs after some stressful event.
- Long-term stress, such as family tensions, may also make it worse.
- Street drugs like ecstasy, LSD, amphetamines and marijuana (hash, pot, ganja) are thought to bring on schizophrenia –like illnesses..

# Medications for schizophrenia

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- Most drugs work by blocking the path of a particular chemical messenger, dopamine, in the brain.
- The drugs usually suppress positive symptoms; delusions and hallucinations gradually go away in a few weeks.
- Anti-schizophrenia drugs may cause Parkinson's like symptoms and tardive dyskinesia.
- Fortunately new drugs are now available which block different chemical messengers and are much less likely to cause side-effects.

# Advice About Diving: Schizophrenics

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- ❑ Decision-making ability, responsibility to other divers and relationship to drug induced side effects that would limit ability to gear up and move in the water should be taken into consideration. Most probably should not consider diving.
- Those responsible for divers should be alert to those with inappropriate responses or activity, paranoid behavior or unusual ideation and be quick to ask and find out more about the possibility of schizophrenia.

# Marijuana Effects on Divers

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- Some general effects of smoking marijuana:
  - The more marijuana is used, the shorter its effects last.
  - Tolerance to the psychoactive effects develops with continued use.
  - Psychological and mild physical dependence gradually occurs with regular use.
- The cannabinoid effect may be additive to nitrogen narcosis.
- CO retention leads to high partial pressures of CO at depth - causing hypoxia on ascent.

# Marijuana Effects on Divers

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- Withdrawal symptoms include:
  - Restlessness, insomnia, nausea, irritability, loss of appetite, sweating.
  - Risk of adverse reactions is greater for persons who have had schizophrenia or other psychotic disorder, depression, dysthymia, and bipolar disorder (manic-depression).
  - Tar content of marijuana is significantly greater than cigarettes, with more carcinogens.
- Risks to diver of cascading events leading to near-drowning or arterial gas embolism.

# Marijuana Effects on Divers

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- Potentially harmful effects to divers include:
- Accidents caused by distortions in perception.
- Impairment of recent memory, confusion, decreased concentration.
- Decreased muscle strength and balance.
- Decreased blood flow in brain.
- Impaired ability to perform complex motor tasks. Poor memory. Amotivational.
- Depression, especially in new users.
- Severe panic reaction (50%)
- Rapid heart and lower exercise tolerance.

# Marijuana Effects on Divers

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- High doses may cause:
  - Hallucinations
  - Depersonalization
  - Paranoia
  - Agitation
  - Extreme panic
- **Risk to Divers** -cascading events leading to drowning and death. Possible injury to buddy and others in dive party.

# Marijuana Effects on Divers

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- Chronic use may cause:
- Bronchitis, Sinusitis, Pharyngitis, Chronic cough, Emphysema, Lung cancer.  
**Risk to Divers** -- Pulmonary barotrauma, over expansion injury, arterial gas embolism.
- Poor immune system functioning;  
**Risk to Divers** -- marine infections.
- Poor motivation, depressed mental functioning.  
**Risk to Divers** -- errors of omission, commission with cascading events leading to drowning.

# Alcohol and Diving

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- Beer While Diving?
- By drinking alcohol before and during diving trips a diver severely endangers himself, his buddy and others on the dive trip!
- Alcohol causes: Dehydration, Diminished awareness of cues and reduced inhibitions at relatively low levels of blood alcohol. (Perrine, Mundt and Weiner) Blood Alcohol Concentration (BAC) 180# man, two beers/1 hour = 0.04%
- Reduction in information processing, particularly in tasks that require undivided attention long after the blood alcohol level has reached 0.0%.

# Alcohol Impairment

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All of the following behavioral components required for safe diving are diminished when alcohol is on board or has been on board in the prior 24 hours:

- Reaction time
- Visual tracking performance
- Concentrated attention
- Process information in divided attention tasks
- Perception (Judgment)
- The execution of psychomotor tasks.

# Review of 150 studies – Effects of Alcohol, Engstrom

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Ingestion of even small amounts of alcohol does not improve performance: to the contrary it degrades performance.

- Variables can speed up or delay the onset of the effects of alcohol, but they do not overcome the decrements to the central and peripheral nervous system.
- Alcohol can be cleared from the blood at a predictable rate. Generally on the order of .015% BAC per hour.
- One drink can depress the entire central nervous system.

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- The effects are mood elevation, mild euphoria, a sense of well being, slight dizziness and some impairment of judgment, self control, inhibitions and memory.
- Increases in reaction time and decreases in coordination follow the dose/response curve quite well.
- Alcohol is involved in 50% +/- of all accidents involving persons of drinking age.
- Divided attention tasks are found to be affected by alcohol to a greater degree than those tasks with single focus of concentration.

# Links & References

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- Here is a very good article written by one of our consultants: 'Alcohol and Aquatic Performance' by Glen Egstrom, Ph.D  
<http://www.jellis.com/news/may96/alcohol.htm>
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# More References

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- --Hamilton K, et al. Nitrogen narcosis and ethyl alcohol increase the gain of the vestibular ocular reflex. *Undersea Biomed Res.* 1989

# Psychotropic Drugs

- Mood Disorders
- ANTIDEPRESSANTS:
  - Tricyclics
  - SSRIs
  - MAOIs
  - Others
- MOOD STABILIZERS:
  - Anticonvulsants
  - Anxiolytics
  - BENZODIAZEPINES
  - OTHERS
- Hypnotics
- BENZODIAZEPINES
- ANTI HISTAMINES
- OMEGA-1
- RECEPTOR AGONISTS
- OTHER
- Antipsychotics
  - TYPICAL
  - ATYPICAL