

A review of recent advances in technical drinking and the treatment of technical or extreme drinkers

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Abstract

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The likelihood of contracting DCI or DCS (drink clearance illness or drink clearance sickness) is known to be higher in drinkers who use SCUBA (self-contained undiluted bottled alcohol). In recent years, there has been a growing body of drinkers who employ advanced drinking techniques in order to prolong drinking immersions without the concomitant increase of risk of DCI/DCS. Commonly termed 'technical drinking', this can take the forms of trimix, saturation drinking, use of re-drinkers, or extreme drinking. Recent advances in these areas of technical drinking are reviewed along with possible treatment protocols for drinkers who do suffer the consequences of DCI/DCS following technical drinking.

Introduction and background

For many years, an increasing proportion of recreational drinkers have suffered from the effects of DCI or DCS (drink clearance illness or drink clearance sickness). Commonly termed 'the staggers', the symptoms of DCI/DCS are often separated into type 1 (simple, pain only; cranial and/or wrist and elbow, right more commonly than left) or type 2 (serious, neurological) effects. The most noticeable of neurological signs and symptoms of type 2 are sweating, tremor, reduction in cerebral function, hallucinations and convulsions. Occasionally the victim presents with vestibular DCI/DCS, 'the staggers', which is characterised by dizziness, nystagmus, difficulty in walking and a tendency to fall over. These symptoms may be indicative of hepatopathic post-potency neurological syndrome (HPNS). Associated with type 1 and type 2 cases of DCI/DCS are problems of toxicity, narcosis, decompression, limb bends and embolism.

The increasing incidence of DCI/DCS has often been related to the wider use of SCUBA (self-contained undiluted bottled alcohol) drinking. A single SCUBA drinking event is typified by high, rapid rates of alcohol on-loading into the blood stream over periods of two to four hours, followed by a gradual reduction and finally a rapid cessation of uptake. This typically skewed drink profile, commonly-termed 'bounce drinking', very rarely produces incidences of DCI/DCS as long as the depth and duration of uptake is conducted around tables.

Incidences of DCI/DCS have been recorded where the depth and duration of single bounces are excessive (extended-range drinking), or where multiple bounce-drinking episodes occur over a number of days (multi-day drinking) or repeatedly within a 24- to 36-hour period (repetitive drinking). Often the victims end up on or under the tables and their drinking is typified by aggressive profiles.

Professional drinkers recognise that significant drink

exposures can be managed within low but accepted rates of DCI/DCS in a variety of ways, e.g., for the drinker to take on mixtures of relatively volatile substances (RVS) over extended periods. This procedure usually involves the use of three RVS and has been termed 'trimix drinking'. Although trimix drinking permits extension of depths and durations of drinking sessions it requires higher levels of drinking discipline and training to be able to execute the changes in mixtures when the drinker is subjected to probable signs of narcosis.

The logical extension to trimix drinking is 'saturation drinking' where, in a properly managed environment, the drinker can continue to drink for periods of many days as long as the alcohol attains complete saturation of the bloodstream and is not permitted to drop in level. However, when the saturation drinker does have to surface this requires a well-managed and very slow withdrawal protocol. In all cases of deep or technical drinking, the drinker should always be 'drink fit'. This involves undertaking a number of preliminary drinks, sometimes referred to as 'work-up' drinks, whereby the drinker drinks to levels close to or exceeding the depths of the subsequent technical-drinking session. There is anecdotal evidence to suggest that fully worked-up drinkers are less prone to hits; less worked-up drinkers are often just prone.

In recent years, the recreational-drinking industry has started to adapt advanced drinking techniques that were first developed for professional drinkers. One example of this is the rapid development of the use of re-drinkers by recreational drinkers. Covert military drinkers have long used re-drinkers to disguise active drinking programmes. Originally developed during the Second World War, the design for the covertly drinking beer apparatus (CDBA) has recently been adapted for recreational use. Of more concern is the gradual development of 'extreme drinking', sometimes incorrectly termed 'free drinking', whereby drinkers descend rapidly to great depths using RVS of extremely high alcohol content.

This review summarises recent advances in a selection of forms of technical drinking. However, the rates of avoiding DCI/DCS are not 100% and technical drinkers may require advanced forms of treatment. Therefore in addition, this account details current practices in treatments for technical drinkers. A more extensive review is available from the authors on request to the e-mail address provided.

Trimix drinking

The mixing of forms and contents of RVS has long been known to prolong the depth and duration of the drinking excursion. However, improper or reverse profile mixing can cause problems. The UK Navy rule, derived in the 1960s, refers to simple two-RVS mixtures.

Beer and wine and you'll feel fine
Wine and beer and you'll feel queer

recognised the dangers of getting the mixture order wrong.

Trimix is a combination of three forms of RVS in varied proportions. The ranges found in typical trimix drinking regimes are given in Table 1. Trimix drinking requires prior training and a certain degree of discipline in order to be executed safely. Drinkers undertaking trimix drinking must adhere to alcohol toxicity dose (ATD) guidelines. The ATD value is a factor of percentage alcohol and time, and a general rule is that the higher the percentage the shorter time that can be spent drinking. However, ATD rules can be further complicated by 'bar pressure' that can result in ATD levels being exceeded. Many trimix drinkers, therefore, tend to 'solo' drink to avoid bar pressure but this can bring its own risks if excessive levels of narcosis are experienced. Having a buddy drinker present is recommended to ensure that mix changes occur smoothly. Often mix changes occur when the drinker moves between bars and in such cases a 'travel' mixture can aid prolonged movement times.

Saturation drinking

Although mixed drinking techniques allow for significant increases in depth and duration of drinking, the drinker still has to surface in order to reduce the threat of DCI/DCS. In the 1970s, professional drinkers in Scotland developed techniques that permitted prolonged submersion for many days by allowing the bloodstream to become saturated with RVS. The development of saturation drinking coincided with the discovery of large deposits of oil. The oil was initially recovered through adherence onto a range

of organic transfer substrates that were submerged into the deep hot-oil reserves but was later also discovered in veins. Saturation drinking permitted the recovery of oil reserves for many years.

A typical saturation drinking event starts in the same way as most trimix drinking immersions (Table 1). Once fully immersed the drinker has to carefully enter the saturated state. This is achieved through continual intake of RVS but at levels that do not exceed permitted ATD rates (see trimix section). Typically a period of three hours of RVS intake, with at least two RVS 'breaks' every hour, is followed by a maximum of two hours with no RVS intake; any more than two hours and the drinker can come out of saturation.

Surfacing from a saturation drinking session must be managed with extreme care; the surfacing schedule is a routine 36 hours and 4 minutes irrespective of the time spent in saturation as the level of saturation will always be the same. This is effectively an inverse exponential relationship where alcohol intake is reduced rapidly at first but then there is a gradual decline in the rate of surfacing, during which RVS mixtures may need altering. At all times in the surfacing schedule, the drinker intersperses periods of RVS intake with drinking increasing volumes of inert solutions. The schedule is also dependent on maintaining hydration levels.

Re-drinkers

Re-drinker technology is based around the fact that the drinker's body does not use alcohol efficiently and so a proportion of the on-loaded alcohol will always be excreted in the urine. Re-drinkers are twin-hosed devices (the original CDBA design was single hosed, but pendulum drinking has been found to be less efficient than twin-hose drinking) that pass the drinker's urine through a filter (a canister containing soda and lime; sometimes referred to as sodalime) to leave only the alcoholic content of the solution (technically termed low alcohol gain expelled regularly, or LAGER) and then remix the filtered alcohol with a continuous inflow of high content alcohol. In the basic models of re-drinkers, the inflow mixture is pre-mixed and the flow set depending on the alcohol content of the mixture. More modern re-drinkers have separate alcohol and mixer bottles permitting the drinker to alter the alcohol content of the mixture depending on the drinking profile. One side-effect of re-drinkers is that the chemical reaction in the filters can warm the resultant fluid. This is not a

Table 1
Typical limit ranges for trimix drinking regimes. The order of uptake must be strictly adhered to

Order of RVS uptake	Common name	Alcohol (%)	Flow rates (ml.hr ⁻¹)	Duration of flow (hrs)
1	Hop extract	3.8 – 5.2	1500 – 2000	1.5 – 3.0
2	Grape extract	11.5 – 14.5	300 – 700	1.0 – 2.0
3	Grain distillate	40.0 – 46.5	50 – 120	Until early hours

problem in countries where alcohol is consumed warm.

Extreme drinking

A very recent development in technical drinking is extreme drinking. This is based on obtaining the maximum depths of immersion in the quickest time. At the start of an excursion, extreme drinkers usually on-load rapidly and repetitively with relatively small volumes of hyper-alcoholic RVS. It is usual not to mix the form of RVS, but percentage content of the fluids usually has to exceed 50%. Up until the early 1970s the navy employed navy reality undermining mixtures (Navy RUM at 54.5%) in extreme drinking trials. The effects of extreme drinking are typified by the rapid onset of narcosis on descent and symptoms similar to DCI/DCS on ascent.

Extreme drinking has also been termed 'free drinking'. This can occur if the RVS are supplied by other drinkers and regular competitions used to be staged to determine the maximum depths that could be achieved with no means of support. There are extreme dangers of personal injury to the free drinker if they rely on other drinkers over prolonged periods of time and in some cases the rapid increase in bar pressure associated with free drinking can be extremely aggressive. Extreme periods of free drinking can result in a series of 'hits'. Many extreme drinkers actively dissociate themselves from the free-drinking faction and the inter-use of the terms extreme and free drinking is, in fact, incorrect.

Treatment protocols for technical drinkers

It is debatable whether the treatment of DCI/DCS in technical drinkers should vary from that for illness caused by standard drinking protocols. However, immediate recompression is known for its benefits and requires returning the sufferer to a depth of intoxication to relieve symptoms.

Whether the DCI is type 1 or type 2, the non-recompression treatment is administered using a drink-denial chamber (DDC). The chamber must be staffed with adequately trained and equipped personnel, and HDU (heavy drinking unit) or, preferably, ITU (intensive tequila unit) facilities must be available. Rehydration and the correction of hypovolaemia are important aspects of therapy. The DDC is not all it seems, as treatment is usually between two or three bars. During recovery an excellent time can be had in a good atmosphere, usually about eight tenths of the way between the second and third bar.

Discussion and summary

The present account outlines recent advances in technical drinking. Although there are obvious benefits in terms of depth and duration of immersion, technical drinking requires more discipline and planning than standard drinking, and can be time consuming if the drinker enters

into saturation. The cumulative effects of bar pressure cannot be understated. Technical drinking can also be costly unless the individual is sponsored or is persuaded to undertake very dangerous forms of free drinking. Because the risks associated with these more advanced forms of drinking are higher, drinking with experienced buddies is advisable and many technical drinking events now insist on having medical personnel present.

Colin Wilson and his colleagues are (ir)responsible for the care or otherwise of divers at the Dunstaffnage Marine Laboratory and Hyperbaric Centre, near Oban, Scotland, whilst John Ross is a consultant in Environmental and Occupational Medicine at the University of Aberdeen, who should know better. They wish everyone a grand wee Hogmanay.

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The Poetry Doctor

John Parker

Twilight Diving

I've dived for many decades.
It used to be a game.
But now I'm getting older
Things are not the same.

For hours on end I'd free dive
To thirty metres' depth.
Now I float the surface
For I can hardly hold my breath.

I used to suck a twin set dry
That I threw over my head.
Now I hardly use one tank
That my buddy lifts instead.

I dived in rip and surf and swell.
I'd fin where I would go.
Now I only dive the calm
Or gently drift the flow.

I'd be first in and out the last.
To the deepest depth I'd drop.
Now I'm in last, first one out,
Including safety stop.

I might now seem shallow and slow
But at least I did survive.
It's nice to have no more to prove
I just enjoy to dive!

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