

15. Alcohol dependence/abuse

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Summary

Alcohol dependence and abuse is often a chronic condition, even if there may be long periods of sobriety. Excess consumption of alcohol is a known risk factor in the development and aggravation of many other diseases, and treatment must therefore be oriented to both the addictive state itself and the complications of alcohol abuse. Structured physical training constitutes an important addition to therapy in the withdrawal phase and in the following treatment of anxiety and depression, as well as in the treatment of secondary diseases such as diabetes and cardiovascular disease. The training should include fitness training starting at low intensity and gradually working up to higher intensity, strength training and coordination training. Suggested prescription:

	Type of training	Intensity	Frequency (times/week)	Duration (min./session)
Withdrawal treatment	Low intensity aerobic fitness training	40–60% of APM*	4	15
	Strength training	40–70% of 1 RM**	3	20
Subsequent treatment	High intensity aerobic fitness training	50–75% of APM*	3	30
	Strength training	50–70% of 1 RM**	2	30
	Ball sports	50–85% of APM*	2	40

* APM = Age Predicted Maximal Heart Rate (220 – age)

** RM = Repetition Maximum. 1 RM corresponds to the maximum weight load that can be lifted through the entire exercise movement one time.

Definition

The diagnoses of alcohol *dependence* and *abuse* are made based on patient history with the aid of the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV (1). *Abuse* exists when a person meets one of the following criteria within a 12-month period:

1. Recurrent use of alcohol resulting in a failure to fulfil major obligations at work, school, or home.
2. Recurrent use of alcohol in hazardous situations, such as at work or driving while intoxicated.
3. Recurring legal problems resulting from the substance use.
4. Continued use despite recurring problems.

The diagnosis of *dependence* requires that the person meet three of the following seven criteria within a 12-month period:

1. Needs increasing amounts of alcohol to achieve the same effect (increase in tolerance).
2. Experiences withdrawal symptoms when not drinking.
3. Drinks more or for longer periods than intended.
4. Persistent desire or unsuccessful efforts to cut down on drinking.
5. Spends a significant amount of time drinking, planning to drink, or recovering from drinking alcohol.
6. Important social, occupational or recreational activities are neglected.
7. Continued use despite physical or psychological problems.

In conclusion, *dependence* and *abuse* are characterised by the individual losing control over his or her consumption, which has led to significant disability or suffering for the individual and/or his or her surroundings.

Prevalence/Incidence

Despite the fact that the consensus in various studies on alcohol use is only 50–70 per cent, there is agreement that alcohol problems, in the form of hazardous consumption, abuse and dependence, are a common occurrence and growing problem in Sweden. The incidence of alcoholism in men is approximately 2.5 per 1000 per year. The prevalence is estimated at 5–9 per cent for men and about 1.5 per cent for women. The prevalence in Europe is between 0.6 and 20 per cent, as varying definitions are used (2). In the USA, an estimated 10–15 per cent of men and 5 per cent of women suffer from chronic alcoholism, of whom one quarter are actively using (3).

Cause and risk factors

Alcohol dependence has a multifactorial genesis. Individuals with so-called type 2 alcoholism (4) have a characteristically clear genetic predisposition and other characteristics have been found in the form of early onset of alcoholism, “novelty seeking” behaviour, aggression, a tendency towards hypoglycemia, low levels of serotonin metabolite 5-HIAA (5-hydroxyindoleacetic acid) in cerebrospinal fluid and low MAO-B (monoaminooxidase B) activity in the thrombocytes. This type of alcohol dependence is also called *primary alcoholism* and occurs to a larger extent in men. *Secondary alcoholism* or type 1 alcoholism traditionally occurs more in women, and develops secondarily to other psychological disorders such as depression and anxiety, which in turn can present in conjunction as a response to a crisis and adjustment disorders (5).

Symptoms and diagnosis

A diagnosis is made in the first instance according to the criteria listed above under *Definition*. When a diagnosis cannot be made with the aid of a specific patient history, a somatic examination and blood analysis can serve as a guide. Swelling of the parotid glands, an enlarged liver, elevated blood pressure, elevated blood levels of AST (Aspartate aminotransferase), ALAT (Alanine aminotransferase), gamma GT (Glutamyl transpeptidase), MCV (mean erythrocyte volume), CDT (Carbohydrate deficient transferrin), urate and IgA (Immunoglobulin A) confirm suspicions of problems with alcohol.

Current treatment principles

With the exception of treatment of withdrawal symptoms, all other pharmacological therapies should be given in combination with psychosocial interventions.

Pharmacological treatment

Withdrawal treatment

The primary goal is treatment and prevention of life-threatening alcoholic delirium, epileptic seizures and other withdrawal symptoms. The most common treatment in Sweden is either a benzodiazepine or chlome-thiazole (Hemineurin) programme, often supplemented with anti-spasmodic drugs and vitamin B.

Alcohol dependence and relapse prevention therapy

There are two approved substances for pharmacological treatment of alcohol dependence in Sweden: acamprosate (Campral) and naltrexone (Revia). The former increases the number of completely sober individuals by reducing the craving for alcohol, and the latter reduces alcohol consumption. A third pharmaceutical, disulfiram (Antabuse), a so-called “aversion” drug, does not have the anti-craving effect and is only used under controlled conditions.

Psychosocial treatment

The Swedish Council on Technology Assessment in Health Care's (Statens beredning för medicinsk utvärdering, SBU) compiled knowledge base (3) compares a host of psychosocial treatment methods. The most effective of these share a number of features, such as a clear structure and well-defined measures with detailed guidelines. Included in such methods are cognitive behavioural therapy and a 12-step programme that follows the Minnesota Model, often combined with self-help programmes such as Alcoholics Anonymous (AA) and other motivation-boosting measures.

In people with psychological disorders, alcoholism is treated parallel to the mental disorder, and in homeless persons a combination of behavioural therapy methods with structured and coordinated support is given.

Effects of physical activity

Organised physical activity and training, a part of several complex treatment therapies, have proven positive effects in both the treatment of the acute withdrawal phase and in treatment of alcohol craving, anxiety and depression. Continued regular physical activity then has an anxiety-alleviating and depression-prevention effect, as well as a significant psychosocial function in that it fills the emptiness following alcoholism and builds up the individual's self-confidence (6).

Withdrawal phase

One English intervention study using a cross-over design (7) showed that brief sessions of exercise (10 minutes of cycling) in the withdrawal phase led to a cautiously mild, but temporary, effect on alcohol craving. Otherwise, clinical experience suggests that physical training in the acute stage alleviates above all somatic withdrawal symptoms. Several studies have shown a significant decrease of the shakes, sweating and reduction of anxiety following organised low-intensity fitness training (8, 9). Another important effect of physical activity in the acute detoxification stage is better sleep (10).

Long-term effects

Restoration/improvement of physical fitness is the most important long-term effect of physical activity and training, and serves as a basis for other physical improvements in heart function, peripheral circulation, blood sugar levels and body image, accompanied by a reduction in neurological symptoms. Regular physical activity has a positive impact on mood (11–13) and relieves anxiety. A study on movement therapy (14) covering three basic movement elements (running, jumping and ball sports) measured improvement in somatic parameters (increased strength and reduced neurological symptoms) as well as improved stress and anxiety management. The long-term effects of physical activity and exercise are, however, completely dependent on regularity.

Indications

There is a lack of controlled epidemiological studies on the relationship between the effects of physical activity and development of alcoholism. Regarding the indications for secondary prevention, individually adapted physical activities are recommended for all patients regardless of age.

Prescription

Light physical training begins after the initial withdrawal problems have subsided, which generally occurs in the second week of detoxification. After somatic examination and a functional test, the first step is low-intensity aerobic fitness training, and, after a few days, combining this with strength training. Subsequent exercise programmes span several months time and aim to establish a permanent change in the way of life. They can therefore be started at a day unit and then followed up in out-patient care, with evaluation of somatic parameters and functional tests (Table 1).

Table 1. Types of physical training for alcohol abuse.

	Purpose	Type of exercise	Intensity	Duration (min./session)	Frequency (times/week)	
Withdrawal treatment	Relieve withdrawal symptoms	LFT*	40–60% of APM***	15	4	
	Improve sleep quality	LFT: Walking, strength training	35–70% of APM	20	3	
Subsequent treatment	Improve aerobic fitness	HFT**:	50–75% of APM	40–70% of 1 RM****	30	3–5
				Cycling, walking, running		
	Increase strength	Strength training	50–70% of 1 RM	30	2–4	
	Improve coordination	Ball sports	Moderate intensity, exercise of choice	50–70% of APM	45–60	2–4
50–70% of 1 RM			50–85% of APM	40	2–4	

* LFT = Low Intensity Aerobic Fitness Training.

** HFT = High Intensity Aerobic Fitness Training.

*** APM = Age Predicted Maximal Heart Rate (220 – age).

**** RM = Repetition Maximum. 1 RM corresponds to the maximum weight that can be lifted through the entire exercise movement one time.

Functional tests

Somatic examination and function testing should always be used as a guide for structured physical training. Follow-up and ongoing evaluation of measurable parameters are of great importance even as a motivation-boosting and supporting component of the treatment. Before training begins and at evaluation, a standardised 6-minute walk test (6MW test) (15) is most suitable. The test can be conducted either on a treadmill or in a hallway with a straight stretch of at least 30 metres. See the proposed reporting sheet in Figure 1. The Borg CR10 scale (16) is used for assessment of subjective symptoms of fatigue and breathing difficulties (for more on this, see the chapter on “Assessment and management of physical activity”). The scale is shown to the patient, who responds with a perceived level of difficulty/discomfort between 1–10. The instructions “rate your shortness of breath” and “rate your level of fatigue” are repeated in the beginning and at the end of the test.

Figure 1. Proposed Reporting Sheet for 6MW Test.

Patient name _____

National ID no. _____ Date _____

6MWD no. _____ Monitored by _____

Age _____ Sex _____

Weight (kg) _____ Height (m) _____ BMI (kg/m²) _____

Blood pressure _____ Resting heart rate _____

Medications before test (drug, dose and time) _____

	Beginning of 6MW test	End of 6MW test
Time		
Heart rate (beats/min)		
Dyspnoea (Borg scale)		
Fatigue (Borg scale)		

Stopped or rested before end of test? No _____ Yes, reason _____

Symptoms during test: Chest pain, nausea, dyspnoea, cramps, dizziness, other

Number of lengths: _____ (x 60 m) + last partial length (m): _____ = _____ m

Total distance in 6 minutes: _____ metres

Percentage difference compared to first 6MW test: +/- _____ %

Comments _____

Contraindications and risks

Contraindications for physical training in alcohol dependence are dependent on the patient's cardiovascular, pulmonary and neurological status. *Absolute contraindications* include severe cardiac insufficiency, uncontrolled arrhythmia, high blood pressure, unstable angina, severe obstruction, recent heart infarction and severe neuropathy. The *relative contraindications* include cardiomyopathy, severe diabetes and other metabolic diseases, as well as complications such as acute pancreatitis, acute hepatitis and portal hypertension.

Interactions with drug therapy

The approved medications for alcohol treatment, acamprosate (Campral), naltrexone (Revia) and disulfiram (Antabuse), do not constitute contraindications to physical activity. To the contrary, regular exercise can relieve drug side-effects such as headache and fatigue.

Proposed intervention programme based on fitness treatment

At Charter Hospital in Texas, Fridinger and colleagues (17) have come up with a treatment programme for chemical substance abusers, which can be applied in most abuser/addiction groups. The programme's philosophy is based on a combination of mental and physical education aimed at increasing the chances of total recovery, and builds on four phases.

1. Somatic/psychiatric examination
2. Screening of fitness and nutritional status
3. Organised exercise activities
4. Education sessions

Somatic and psychiatric examination forms the basis for planning the patient's participation in common physical activities. The individual need for detoxification method and time frame is planned and a contract is written with the patient.

Within 72 hours after admission, the patient goes through the screening phase, which includes functional tests and a self-assessment of his or her motivation according to step 4 of the AA 12-step programme. An individually based nutrition plan with the consumption of fats, cholesterol, carbohydrates and fibre is created with the aid of computer software.

The next phase contains daily exercise and scheduled activities. Every morning starts with 15 minutes of stretching, followed by a 15-minute walk outside or an indoor activity. In addition to these daily activities, the programme includes 20–30 minutes of exercise training, 3–4 times per week, comprising either ergometer cycling, walking, jogging on

a treadmill, or taking part in an exercise class. In addition to these activities, are three compulsory occasions focusing on muscle strength (e.g. strength training with weights).

The final phase is education in six key areas.

1. The importance of physical activity for well-being
2. Education of the risk factors for relapse
3. Stress management
4. The significance of smoking in relapse to abuse of other substances
5. Nutrition
6. The psychological benefits of physical activity

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Washington DC. American Psychiatric Association; 1994.
2. Prytz H. Alkoholismens epidemiologi [The epidemiology of alcoholism]. In: Nordén Å, Ed. Alkohol som sjukdomsorsak [Alcohol as a cause of disease]. Stockholm: Norstedts förlag; 1988. p. 64-70.
3. SBU (Swedish Council on Technology Assessment in Health Care). Behandling av alkohol- och narkotika-problem. En evidensbaserad kunskapssammanställning. [Treatment of alcohol and drug problems. A compilation of evidence-based knowledge.] Report no. 156/1. Stockholm: SBU; 2001.
4. Virkkunen M, Linnoila M. Serotonin in early onset, male alcoholics with violent behaviour. *Annals in Medicine* 1990;22:327-31.
5. Ottosson J. Alkoholism [Alcoholism]. In: Psykiatri [Psychiatry]. 5th edn. Stockholm: Liber; 2000. p. 99-134.
6. Martinsen EW. Fysisk aktivitet for sinnets helse [Physical activity for mental health]. *Tidsskr Nor Laegeforen* 2000;120: 3054-6.
7. Ussher M, Sampuran AK, Doshi R, West R, Drummond DC. Acute effect of a brief bout of exercise on alcohol urges. *Addiction* 2004;99:1542-7.
8. Palmer J, Vacc N, Epstein J. Adult inpatient alcoholics. Physical exercise as a treatment intervention. *J Stud Alcohol* 1988;49:418-21.
9. Sinyor D, Brown T, Rostand L, Sereganian P. The role of physical fitness program in the treatment of alcoholism. *J Stud Alcohol* 1982;43:380-6.
10. King AC, Oman RF, Brassington GS, Bliwise DL, Haskell WL. Moderate-intensity exercise and self-rated quality of sleep in older adults. *JAMA* 1997;277:32-7.
11. Meyer T, Broocks A. Therapeutic impact of exercise on psychiatric diseases. Guidelines for exercise testing and prescription. *Sports Med* 2000;30:269-79.
12. Byrne A, Byrne DG. The effect of exercise on depression, anxiety and other mood states. A review. *J Psychosom Res* 1993;37:565-74.
13. Sexton H, Maere Å, Dahl NH. Exercise intensity and reduction in neurotic symptoms. *Acta Psychiatr Scand* 1989;80:231-5.
14. Tsukue I, Shohoji T. Movement therapy for alcoholic patients. *J Studies Alcohol* 1981; 42:144-9.
15. ATS statement. Guidelines for the Six-Minute Walk Test. *Am J Respir Crit Care Med* 2002;166:111-7.
16. Borg G. Psycho-physical bases of perceived exertion. *Med Sci Sports Exerc* 1982; 14:377-81.
17. Fridinger F, Dehart B. A model for the inclusion of a physical fitness and health promotion component in a chemical abuse treatment program. *J Drug Education* 1993;23:215-22.