

Commentary

The Potential Role of Physical Exercise in Addiction Treatment and Recovery: The Social Costs of Substance Misuse

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Substance misuse is a significant public health problem of national and global proportions. For example, substance abuse represents a major source of illness and death in Canada: in 2002 it accounted for 21% of total mortality, 25% of total potential years of life lost, and for about 20% of acute care hospital days (Rehm et al. 2006a). In that same year Canada spent 39.8 billion dollars—or \$1,267 per citizen—on substance abuse: \$14.6 billion on alcohol addiction, \$17 billion on tobacco addiction, and \$8.2 billion on illicit drug addiction (Rehm et al. 2006a). These costs include resources spent on treatment, prevention, law enforcement and loss of productivity due to increased morbidity and mortality rates. To consider an example from another jurisdiction, in New Zealand it was estimated that 1.2 billion dollars was spent in 1996 on alcohol-related car crashes alone (Miller and Blewden 2001). In global terms, alcohol misuse alone is associated with more than 60 causes of death (Rehm et al. 2006b) and accounts for a significant disease burden worldwide (Babor et al. 2003).

Physical activity denotes any bodily movement (e.g., daily activities) produced by the skeletal muscles that results in caloric expenditure while exercise refers to its subset in the form of activity that is more structured and performed for the purpose of health, fitness (Fox et al. 2000) or recovery in the context of substance misuse treatment. Even moderate levels of physical activity or exercise can result in health benefits and prevent a great number and diversity of diseases (Fox et al. 2000). As those with substance misuse problems experience significantly lower levels of physical and mental health—and a greater prevalence of illness—

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in many of those areas in which exercise has been shown to have a positive impact within the general population provides the logical impetus to consider it within the context of substance misuse treatment. In terms of physical health those with substance misuse problems are commonly sedentary, experience significantly lower levels of cardiovascular fitness and health (Read and Brown 2003), and suffer from musculoskeletal degeneration as a result of their substance use (Donaghy and Mutrie 1999).

There is consistent evidence regarding the positive and rapid impact that exercise can have on the physical health of those in alcohol misuse treatment. Existing studies point to improvements in cardiovascular fitness (Donaghy and Mutrie 1999) strength, co-ordination, and flexibility (Tsukue and Shohoji 1981; Donaghy et al. 1991; Donaghy and Mutrie 1997). Such fitness improvements appear to be possible despite a long history of severe and chronic substance misuse problems and the very poor health that may accompany it (Gary and Guthrie 1972; Sinyor et al. 1982).

In terms of mental health, those with substance misuse problems show significantly higher rates of depression and anxiety than the general population (Brown et al. 1997) and commonly enter treatment with heightened symptoms and illness in these areas (Ross et al. 1997; Donaghy and Mutrie 1999). Meanwhile, a tremendous body of evidence with both general and clinical populations has begun to show that exercise can be just as effective as psychotherapy in the treatment of these two conditions, and as effective as pharmacological interventions in the particular case of depression (Mutrie 2000; Taylor 2000). While studies examining the impact of exercise on depression and anxiety in the specific context of substance misuse treatment have arrived at mixed results this might be attributed to methodological limitations that have yet to be resolved within this much smaller area of research activity. One question that has been raised, for instance, is whether exercise is able to provide relief from depression, above and beyond that provided by a very high level of psychotherapeutic care in the control arm (Donaghy and Mutrie 1999), a question that might clearly be of less relevance in the context of actual practice setting where such a high level of care may not be feasible.

In a related vein, those dealing with substance misuse may experience, and may be particularly vulnerable to a greater number of life stressors, which can serve as triggers for further use. Stressors that contribute to many health-related problems (e.g., hypertension; Taylor 2000), that are more prevalent among those dealing with substance misuse problems (Read et al. 2001) Meanwhile, there is a sizeable body of evidence within non-clinical populations that shows that increased activity, improved fitness and, most notably, recent bouts of exercise can reduce psychological and physiological stress reactivity, as well as the time required to recover from it (Taylor 2000). Such findings provide tentative support for the suggestion that exercise may reduce stress reactivity within substance misuse treatment in addition to supplanting use as a primary coping mechanism (Read and Brown 2003). While there is limited research regarding the role of exercise as a coping mechanism within substance misuse treatment the existing evidence is encouraging, suggesting that exercise can provide a relaxing “time out” for those in treatment (Murphy et al. 1986) and can reduce alcohol-related urges when delivered as a program or simply in brief moderate bouts (Ussher et al. 2004).

The abuse of substances, such as alcohol, has also been shown to result in reduced blood flow, atrophy and cell loss in the brain which has been implicated in diminished cognitive functioning amongst drinkers (Maltzman 2000). Regular physical activity, on the other hand, has been shown to have positive effects on cognitive activities. For example, regular exercise improves the cognitive function which has been attributed to abilities of elderly women (Weuve et al. 2004) and reduces the risk of dementia in elderly men (Abbott et al. 2004). In fact, research has even shown how exercise based interventions can be beneficial

for children with reading difficulties (see Reynolds et al. 2003). While the potential role of exercise in maintaining or even restoring cognitive functioning in substance misuse treatment is an area which has yet to be explored, clinical accounts provide some support as clients who exercise have been described as experiencing much clearer state of mind (Hays 1999) which might clearly have the added advantage of improving the effectiveness of talking therapies for substance misuse as well (Ala-leppilampi 2006).

Exercise as Harm Reduction

All of the physical—and potentially psychological—health benefits outlined above may clearly be reason enough to promote exercise as an adjunct to substance misuse treatment. In fact, given such benefits exercise might clearly be considered as a very effective form of health promotion and/or harm reduction that should be recommended immediately, even in the case that directs reductions in substance misuse are not yet proven or even ultimately even achieved (Ala-leppilampi 2006). While the generally poor health of those dealing with substance misuse might discourage practitioners from recommending it owing to fears of injuries or medical complications, it is important to point out that not a single significant harm has been suggested in all of the studies that have been identified in this area (Ala-leppilampi 2006). Moreover, as some have suggested the major benefits versus the minor risks associated with exercise need to be considered alongside of those inherent within alternative treatments for substance misuse (Read and Brown 2003). For example, one might compare the side effects associated with pharmacotherapy, the sedentary behaviour that may be promoted by an over-reliance talking therapies and even the unhealthy cigarette smoke, coffee and donuts that sometimes accompany attendance at self help groups (Ala-leppilampi 2006).

Mechanisms by Which Exercise Might Contribute to Recovery

A number of compelling theories have, in fact, been posited as to how exercise might also result in a specific and positive impact upon substance misuse in particular. As Read (2003) suggests in a recent review exercise may: (1) activate dopaminergic reinforcement mechanisms in the neural system similar to alcohol; (2) have a positive impact on depression and anxiety symptoms and psychological problems that may be the causes of alcohol consumption; (3) increase exercise self-efficacy, i.e., belief in one's ability to master particular exercise skills, that might be generalized to self-efficacy in situations which need coping strategies and, therefore, help maintain sobriety; (4) provide the social support and “sober” networks that help to reduce the need for alcohol use; (5) provide a positive, non-drinking alternative to drinking; (6) decrease stress reactivity and improve coping skills for dealing with the stress as a potential trigger for alcohol use.

Presently, a combination of intuition, anecdotal accounts and some promising but equivocal research findings of direct and indirect nature lend some level of support to each of these mechanisms (Ala-leppilampi 2006).

Positioning Exercise Within Existing Treatment

While the existing treatment for substance misuse consists of various talking therapies and or pharmacological interventions, their somewhat limited cumulative impact upon

substance misuse problems thus far certainly suggests that there is much room for improvement (Ala-leppilampi 2006). This may be partly attributed to the fact that practitioners very often deliver substance misuse treatment in accordance with professional and practice based traditions, procedures, beliefs and values rather than on the base of the evidence base per se (Miller et al. 2003). Many researchers may also be culpable, however, for failing to deliver on their promise of providing clear guidance with respect to some superior singular treatment interventions. A growing number of researchers have now abandoned this elusive search in favor of recommending a variety of potential treatment options with sufficient empirical support (Miller and Hester 2003). Realizing that substance misuse is a multifaceted condition and that clients all present with unique treatment needs they have abandoned prescriptive conclusions and have suggested that the key is to offer clients a range of potential options from which clients might select those that best suit their particular situation and needs. Researchers have also begun to appreciate how broader lifestyle factors that reach well beyond treatment intervention characteristics might contribute to long term recovery and how in many cases substance misuse might well be a chronic and relapsing condition requiring much more cost effective means of long term management (Agne and Paolucci 1982; Marlatt 1985; Hodgson 1994).

In the context of such existing realities and trends, exercise may clearly be viewed as an innovative and refreshing alternative by those individuals for whom the status quo of substance misuse treatment—which might be described suffering from a rather dogmatic in its reliance upon the same general talking therapies—has failed (Ala-leppilampi 2006). It is most certainly consistent with the trend toward providing individuals with a greater variety of options and facilitating major lifestyle changes vis-à-vis major changes in such things as social networks and daily routines. While no formal cost effectiveness studies have been conducted to date, it has also been intuitively suggested that exercise could well provide a cost effective alternative to formal psychotherapeutic and pharmacological treatments particularly if very popular and less resource intensive activities are employed such as running and walking (Read and Brown 2003). Of course such savings would be compounded in the case of those individuals requiring longer term management of their substance misuse as a potentially chronic condition.

However, the ultimate feasibility of exercise interventions would ultimately depend upon how they are received by the target population. While there is limited research in this area, the research that has been conducted does appear promising. A study by Read et al. (2001) found that “exercise-based interventions may be well-received” by persons in the early stages of dealing with substance misuse problems (2001, p. 203). Participants in this study— $N=105$, 70 men, 99 white, ages 18 to 63—indicated that they “saw a number of benefits in initiating or continuing to engage in physical exercise as part of their recovery” (p. 203). Physical exercise is appealing for those with substance misuse problems because it is easily accessible, inexpensive, and does not necessarily require a trained treatment provider or insurance approval. The two most common barriers to engaging in exercise were identified by participants to be lack of motivation and instrumental obstacles (e.g., transportation, cost). Read et al. argue that an important measure of likelihood of people with substance misuse problems engaging in exercise is their perception of its benefits and costs.

The Research Evidence

While the important physical health benefits of exercise have had a very long history of being studied and promoted within preventive programs, and there is already a large and

growing body to attest to its role in addressing mental illness and in promoting positive mental health, there has been conspicuous paucity of research to consider its potentially magnified importance in terms of improving the compromised physical and mental health of those dealing with substance misuse. This is all the more surprising given the compelling mechanisms that have been posited to support the specific role that exercise might play in supporting recovery from substance misuse, the manner in which exercise appears to dovetail with existing treatment trends, and the potential receptivity of the target population itself. To the knowledge of these authors only 11 outcome studies have been conducted on exercise within alcohol misuse treatment, almost all of which have been carried out 10–30 years ago. In the case of exercise and treatment for illicit drug use six studies have been conducted over the span of the last 15 years. Equally bewildering is the fact that only four studies have actually reported upon alcohol misuse outcomes—a seemingly obvious outcome measure—which might help to explain why only two studies to date have arrived at positive findings in this regard (Sinyor et al. 1982; Murphy et al. 1986). Five of the six studies involving illicit drug use treatment ultimately considered subsequent use as an outcome, three of which arrived at positive results (Burling et al. 1992; Collingwood et al. 1994; Lie and Mo 2002). The remainder of the studies, which looked at alcohol or drug use as an outcome found no significant difference between participants in treatment/exercise and control groups.

The Anecdotal Evidence

The lack of research findings to actually support the role of exercise within substance misuse treatment contrasts strongly with a growing body of informal first hand accounts with respect to how exercise has contributed to the recoveries of everyday individuals. In fact, in the absence of adequate scientific evidence psychologist Hays (1999) suggests that such stories presently serve as the primary source of in depth knowledge within this area and includes such accounts in her recent book on exercise in psychotherapy (Hays 1999). A broader review of such anecdotal evidence indicates that her suggestion is certainly warranted (Ala-leppilampi 2006). Other therapy-related literature provided similar accounts (Kostrubala 1984; Sachs and Buffone 1984; Summers and Wolstat 1984) and there are further examples in exercise-related literature as well. A recent *New York Times* article even described how exercise supported the recoveries of a number of people from across America. David Hobler and Todd Crandell stand out as two extreme examples of this phenomena for after crediting endurance sport with playing a major role in their recovery from alcohol and drug misuse respectively, they have subsequently become major public figures in advocating its role in this regard (Brant 1999; Crandell and Hanc 2006). In many of the anecdotal accounts that have been identified individuals make reference to the mechanisms suggested within the research literature, and touched upon earlier in this paper, but they also point to a myriad of other potential factors and complex relationships that might be at play (Ala-leppilampi 2006).

Explaining the Gap Between Research and Anecdote

In considering the chasm between the limited research evidence regarding the role of exercise within substance misuse treatment and its posited mechanisms on the one hand and the very powerful anecdotal accounts on the other one might suggest that the latter are still

relatively isolated, exceptional or exaggerated accounts. Alternatively, it might also be explained by the limitations of existing studies. While a simple lack of research in this area represent the most significant limitation at present, even in the case of the studies that have been conducted, major methodological weaknesses exist. Only a handful of random control trials have been conducted that might be considered to be of reasonable quality, and studies in general suffer from small sample sizes which limit generalizeability and statistical power to detect treatment effects (Read and Brown 2003). Moreover, the validity and reliability of many of the measures used to determine physiological and psychological outcomes have also been questioned (Donaghy and Mutrie 1999). As most of the studies to date have relied mainly upon aerobic activities as their primary form of exercise, more studies need to be conducted in order to consider the potential role of anaerobic exercise. Moreover, as most studies have involved adult men they have yet to adequately consider the impact of exercise on the recoveries of women or adolescents.

The specific issues of ensuring equal professional contact across treatment and control groups and of avoiding cross-contamination between the latter have also been raised as specific problems, as has inadequate follow ups and poor accounting for drop outs (Donaghy and Mutrie 1999). In general, the lack of research coupled by the lack of methodological quality has meant that the potential impact of all treatment (e.g., type, duration, intensity, frequency etc.) and sample—(e.g., gender, age, previous exercise experience, fitness level at baseline) related factors have yet to be studied in any systematic and significant fashion. This of course, has compromised the ability to develop interventions that might have the greatest possible impact upon ultimate substance misuse outcomes.

At an even more fundamental level existing research could be criticized on the basis of being somewhat atheoretical (Ala-leppilampi 2006). Rather than being guided by, and contributing to the development of broader theoretical framework regarding the potentially complex relationship between exercise and recovery from substance misuse existing studies seem to have focused upon methodological concerns regarding the measurement and analysis of a rather narrow set of repeated outcome variables (e.g., depression, anxiety, self esteem and substance misuse) and in each case have offered the same general rationale for doing so. As a result they have failed to truly expand our knowledge within this area over a span of decades. Existing research could also be criticized on the basis of failing to employ qualitative methods (Ala-leppilampi 2006). Methods that might be far better equipped to elucidate the much greater number of potential factors and complex relationships that might exist and which might bring to light important idiographic data that has thus far been undervalued within quantitative experimental designs. Such qualitative research might also include hermeneutic methods that would finally consider the important meaning that participants might attach to exercise as part of their recovery and everyday life. Finally, by focusing exclusively upon participants in formal treatment existing research has failed to consider the potential role of exercise within natural recovery (Ala-leppilampi 2006), which simply refers to recovery without the aid of treatment. While estimates of natural have ranged from 50–90%, depending upon measurement methods employed (Sobell et al. 1992; Cunningham 1997; Granfield and Cloud 1999), at the very least there now seems to be a some general consensus that most of those who recover do so naturally (Granfield and Cloud 1996). This revelation would logically lead one to question whether exercise may very well constitute a special form or component of natural recovery.

While one of the authors is presently embarking upon a qualitative inquiry into the potential role of exercise within natural recovery which will be aimed at expanding theory in this area from both realist and interpretive perspectives (Ala-leppilampi 2006) clearly much work remains to be done in order to address all of the gaps that have been outlined

above. In more enthusiastic terms, the potential role of exercise within substance misuse treatment clearly represents a relatively un-chartered and exciting area of future study but it is important that it still be explored within its broader socio-economic context. In considering the potential role of exercise within health promotion/harm reduction amongst substance misusers, for instance, one must consider the work of Stronks et al. (1996) who have detailed the role of both behavioral factors and structural factors—e.g., employment, income—in creation of health inequalities Frankish et al. (1998) have provided a detailed review of the sizeable literature on the relationship between physical exercise and its various health benefits and the socio-economic determinants of this relationship—e.g., race, gender, income, age, education. Stronks et al. argue that structural conditions “are of great importance in the generation of inequalities of health” (1996, p. 670). Such health inequalities effect populations’ preventive health behaviors, therefore, are of significant importance in considering the very adoption of exercise and ultimately and the long-term social health of societies (Alvarez-Dardet et al. 2001).

In fact, if one were to consider the suggestion that exercise might constitute a form of natural recovery within its broader socio-economic context one is forced to consider the qualifying statements made by Granfield and Cloud (2001) in their analysis of individuals who had undergone such recovery. As they suggest ‘natural’ or ‘spontaneous’ recoveries are strongly associated with “the social context and the resources that adhere to a person’s social position” (2001, p. 1546). One such resource, according to Granfield and Cloud, is Bourdieu’s social capital: “*the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition*” [Italic original] (Bourdieu as quoted in Granfield and Cloud, 2001, p. 1547). Based on Granfield and Cloud’s ideas it is possible to conclude that the quality and form of exercise, as an intervention for substance abuse, should be viewed as a resource that corresponds to individuals’ social position, and as such, may be unequally distributed in society. Much like criticisms sometimes leveled at organizations such as alcoholic anonymous, for instance, exercise might well be criticized as being something that is best suited to white middle class males.

However by the same token, and on a much more positive note, one might well argue that involvement within exercise might actually provide individuals with access to a whole new world of social capital which they can draw upon in dealing with their substance misuse problems. Of course, considering Bourdieu’s more subjective internalization of structural inequalities embodied within his concept of “class habitus” (Bourdieu 1984)—put simply as the personal dispositions based upon objective conditions—one would firstly have to assume that exercise is even within the realm of possibility envisioned within the subjective but structure-influenced worldview of the individuals pursuing recovery within a particularly socioeconomic position. While broader socioeconomic context and the specific issue of social capital will be addressed within the research being conducted by one of the authors (Ala-leppilampi 2006) clearly it should clearly be considered to some degree within any informed work in this area.

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