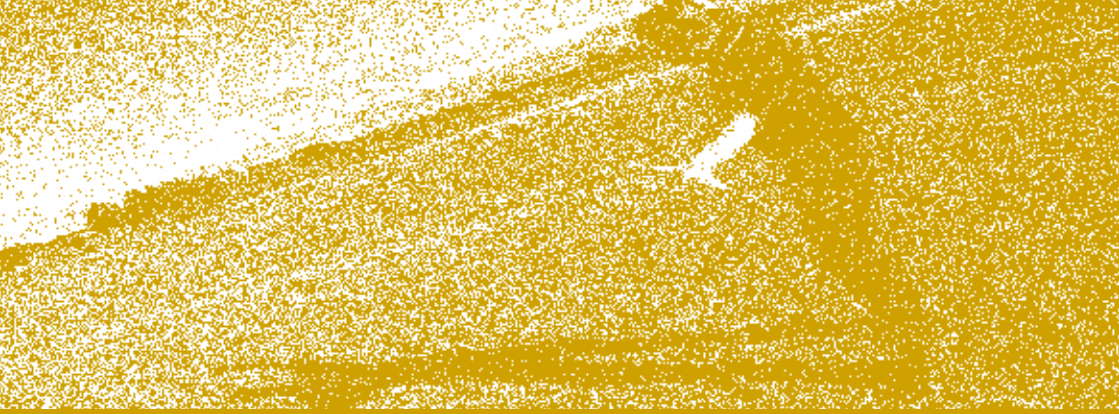

CASTLE CRAIG
HOSPITAL

A Review of Evidence Supporting Castle Craig's Treatment Programme

Oliver Barnes

THE CASTLE CRAIG PAMPHLET SERIES

CASTLE CRAIG
HOSPITAL

In choosing to publish our resource material on recovery from all forms of addiction, together with other related therapeutic material, we hope to extend this part of the experience available at Castle Craig Hospital to the community at large.

Addiction is a complex illness, and understanding it is a critical part of recovery. The educational elements to our programme - whether they be pamphlets, videos, lectures, workshops, or books - are a fundamental part of everyone's recovery journey. Education or insight alone do not produce recovery but they serve to inform, validate and motivate those struggling to take responsibility for change.

These pamphlets are dedicated to all those affected by addiction, be they sufferers themselves, family members, close friends, or those working in the health, psychiatric, therapeutic or social work sectors. We also gratefully acknowledge the help and support given by the Twelve Step fellowships.

Our educational materials offer a variety of information on addiction and related areas. These publications do not necessarily represent Castle Craig Hospital or its programmes, nor do they officially speak for any Twelve Step organisation.

The personal stories in this material are composites of many individuals and any resemblance to a single person, living or dead, is strictly coincidental.

Dr. Margaret Ann McCann

THE CASTLE CRAIG PAMPHLET SERIES

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2016

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Introduction

Castle Craig is a residential, addiction rehabilitation hospital in the Scottish Borders that treats alcohol and drug addiction ("Residential Alcohol & Drug Addiction Treatment Centre | Castle Craig"). The methods employed by Castle Craig are a distinct mix of 12 step facilitation adapted from the Minnesota model (see McElrath, 1997, or Spicer, 1993 for more details regarding this model), alongside therapies such as cognitive behavioural therapy (for a description of cognitive behavioural therapy see Beck, 2011). The purpose of this review is to examine the evidence base that supports the efficacy of treatment offered by Castle Craig, focusing on three main areas: outcome studies conducted with patients that leave Castle Craig, evidence in support of residential as opposed to outpatient rehabilitation, and evidence in support of 12 step facilitation as a treatment method.

Further, concurrent psychotherapies such as cognitive behavioural therapy, and motivational enhancement therapy are employed by Castle Craig because there is evidence to suggest that certain psychotherapies may be useful in treating addiction directly (for example see Magill & Ray, 2009; Carroll, Nich, Ball, McCance, & Rounsavile, 2002), and with the understanding that addiction is often accompanied by other comorbid mood and anxiety disorders (Regier et al., 1990). However, the efficacy of these therapies will not be discussed in this document because our focus is on treatments and methods that deal primarily with addiction.

Residential Rehabilitation

Residential rehabilitation is any rehabilitation programme based in a residential setting ie. one where the patients or clients live in the facility or on its premises ("What is Rehab | rehabonline"). This contrasts with outpatient treatment, which is a method in which the patients attend the facility for therapy but return to their own home afterwards.

The potential advantages of a residential setting are that it removes the patient from the temptations inherent in their drug-associated environment. It can provide a period of safety, stability and respite in sometimes very chaotic lifestyles. It also allows the patient to be monitored by medical staff so that any complications arising from detoxification or underlying medical conditions can be safely managed. These protective factors combine to create a window of opportunity during which the patient may become permeable to the psychological interventions that may then ensure they maintain sobriety.

However, potential disadvantages include logistical considerations such as space needed for accommodation, difficulty for clients that have important issues to take care of in their home, and the requirement for clients to take leave from any jobs they may have. It can also be argued that the important environment in which abstinence from the drug or alcohol is learned is the person's usual living situation rather than a somewhat protected environment. A further consideration is that residential rehabilitation may often, but not always, be more expensive than outpatient rehabilitation. From a treatment perspective the key issues are whether there is evidence to show the necessity for residential rehabilitation, and from a practical perspective, whether it provides better outcomes than outpatient treatment.

The Disease Model of addiction

Castle Craig uses a disease model of addiction that is characterised by both biological and environmental factors, in turn portraying addiction as a chronic, progressive illness. Studies such as McLellan, Lewis, O'Brien, and Kleber (2000), or Hyman (2005) examine and provide further evidence for the claim that addiction is a disease, by assessing factors such as genetic heritability, neurobiological change, and cognitive deficits. It is noted that many of the changes that have been observed in addiction mirror changes seen in other classically defined diseases, and therefore it would not be unreasonable to count addiction among them.

The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V American Psychiatric Association, 2013) devotes 110 pages to "Substance-Related and Addictive Disorders", (while only giving 36 pages to "Schizophrenia Spectrum and Other Psychotic Disorders"). For example, it states "genetic influences contribute to the development of cannabis use disorders. Heritable factors contribute between 30% and 80% of the total variance in risk of cannabis use disorders" (p. 514). Also, "Alcohol use disorder runs in families, with 40%-60% of the variance of risk explained by genetic influences" (p. 494).

If addiction itself is considered a primary disease it therefore follows that abstinence from alcohol and drugs is a requisite for the condition to be considered treated in its entirety, and thus Castle Craig pursues abstinence as their main goal for treatment. The second major focus of this review is to examine whether the Minnesota model, or more generally, 12-step facilitation, produces outcomes that are as favourable, or more favourable, than other treatment modalities.

Evidence from Castle Craig

Perhaps the strongest evidence that any treatment centre can produce in support of its efficacy are outcome studies carried out on cohorts of patients treated there. Due to the differences in treatment options, methodologies,

and quality offered by separate rehabilitation centres, outcome studies produced by one centre cannot necessarily be extrapolated from one centre to another. Results produced by other centres can only lend support to certain general treatment methods, such as 12 step facilitation or outpatient versus inpatient, but cannot be directly applied to an overall treatment structure where there may be other confounders. These concerns in applicability disappear when considering outcomes produced by the treatment centre under scrutiny.

Castle Craig has produced three recent sets of results through independent analysis of data, all of which strongly display the positive outcomes the centre offers (Christo Research Systems, 2015, 2010, 2007). The first study, completed in 2007, followed cocaine-addicted patients three to five years after treatment and found that 84% lived with reduced alcohol or drug use and that 66% were completely abstinent. The second, carried out in 2010, recorded similar results. It focused on a cohort of patients that had left treatment over 67 weeks previously and, as before, enquired about current consumption. This particular study found 89% living with reduced drug or alcohol intake, and 61% totally abstinent.

The most recent study (Christo Research Systems, 2015) focused on all patients from the Netherlands who entered Castle Craig between July 2011, and December 2012, and stayed in treatment for at least one day. 233 patients met these criteria, of whom 158 were successfully contacted (70.9% of the sample, comprised of 130 males and 28 females). This study measured not only severity of drinking or drug taking as an outcome measure, but also used the Christo Inventory for Substance-misuse Services (CISS; Christo, Spurrell, & Alcorn, 2000). The CISS is a validated, single page outcome evaluation tool completed by drug / alcohol service workers either from direct client interviews, or from personal experience of their client, supplemented by existing assessment material. It comprises a ten item scale, in which each item is scored 0 (no severity), 1 (moderate severity), or 2 (severe severity), and covers

social functioning, general health, criminal involvement, drug / alcohol use, psychological functioning, and ongoing support. The minimum score is 0, and the maximum is 20. The CISS is commonly used in Scotland (Effective Interventions Unit, 2001), and England and Wales (Audit Commission, 2002).

The results from this study suggested that, of the 158 patients who were successfully followed up, 116 were totally abstinent (73.4% of the sample), 129 showed only low problem severity and were classed as a 'good outcome' (this is defined as a CISS score of under 6; 81.6% of the sample), and 145 showed any reduction in levels of dysfunction, as given by CISS score reduction (91.8% of the sample). A score of under 6 was chosen as the boundary for a 'good outcome' or 'low problem severity' because Christo, Spurrell, and Alcorn (2000) had previously identified that a threshold of 6 or under had correctly predicted 88% of outcomes for drug users assessed the month before follow-up. However, it was also found that alcoholics tend to score one point lower than drug addicts on the CISS scale, and therefore the threshold was moved from 6 and under, to under 6. The mean intake CISS score of the 158 patients who were followed up was 9.6 (SD = 2.2). The average CISS score at follow up was 3.4 (SD = 3.1). This reduction was statistically significant, $t(157) = 23.6$, $p < .001$, indicating an increase in average general functioning following treatment. Interestingly patients who were readmissions to Castle Craig were significantly more likely to have good outcomes than those who were first admissions, $\chi^2(1) = 4.3$, $p = .04$. This is a notable finding because it supports the idea that longer, repeated treatment may be beneficial, and that if a patient relapses further treatment is an effective option.

These three studies indicate Castle Craig's credentials as a consistent, and high quality rehabilitation hospital that is able to produce positive outcomes for many patients. Most significantly, not only do the above studies provide evidence of the quantitative efficacy of the treatment offered by Castle Craig, they also demonstrate the

long-term nature of the outcomes. All three of the cited pieces of research followed-up the patients more than one year after treatment – and all still found complete abstinence in over 60% of cases, thus fulfilling the DSM-V criterion for "sustained remission", i.e. to be symptom free for a year or more. Therefore we can conclude that not only do many patients leaving Castle Craig show significant improvements in their quality of life, and drug and alcohol using habits, but that these changes continue for extended periods of time. On the basis of this evidence it can be concluded that patients treated at Castle Craig, on the balance of probability, are likely to maintain complete abstinence from their previous habits over a year after their treatment, and will also show great reductions in the severity of comorbid physical and psychological health problems.

Evidence for residential rehabilitation

Residential rehabilitation has the distinct advantage of removing the addict or alcoholic from their usual circumstances and surroundings. Addiction, as an illness with cognitive components, is driven a least partially by learning mechanisms (see Hyman, 2005 for more details). This means that over time an addict or alcoholic begins to associate an increasing number of experiences, people, and locations with their drug of choice, which in turn present significant relapse triggers to the individual who is in recovery. By removing the client from their home environment some of these triggers to relapse can be avoided in the early months of recovery, when they may be particularly vulnerable. Other triggers related to interactions with others, and inner emotional turmoil are still experienced, but in a safer setting where new learning can occur, as is intended in the 'therapeutic community'. Over time, as confidence grows, reintegration becomes a more sensible prospect. There are two questions to be

answered in this section: the first is whether there is evidence to suggest that removing an addict or alcoholic from their 'normal' environment is theoretically beneficial, and the second is whether these actual outcomes support this when compared to, for example, outpatient care.

Research by Bunce et al. (2015) suggests that, theoretically, longer term, residential treatment for opioid addicts will be helpful because the brains of such individuals show very slow re-regulation of reward systems, during which time the individual is cognitively highly sensitive to drug related cues. The study compared seven patients who had gone through opioid withdrawal within the last week or two weeks, to seven individuals who had gone through withdrawal within the last two to three months. A group of normal controls were also studied. Those who had recently withdrawn showed heightened activation in brain areas responsible for attention, such as the prefrontal cortex, to pictures of drug related cues. Those who had longer clean time showed less activation in the prefrontal areas when viewing the same cues. Furthermore, those who had recently withdrawn showed less pleasure responses (compared to both controls and patients who were extendedly withdrawn) to stimuli portraying natural rewards – e.g. food. Finally, those who had recently withdrawn had higher levels of the stress hormone cortisol than those who had withdrawn two to three months prior. Healthy controls had the lowest levels. Sustained high cortisol levels have been linked to medial temporal degeneration (brain areas broadly responsible for memory and learning), and to depression.

It seems that opioid dependence results in the brain prioritising opiates and drugs as a reward, over natural cues. The study provides evidence that this state persists even when the drugs are withdrawn. For these patients, longer, and most likely residential rehabilitation is preferable because they need time for their brain to recover to a healthy state in which drug use is no longer prioritized. The neural activity of these individuals suggests two things: they are fixated on drug seeking,

demonstrated by heightened attention to drug related cues, and they find 'everyday' life less compelling than healthy controls, due to reduced hedonic responses to natural reward cues. In essence the brain of an addicted, or recently withdrawn, individual is operating in a way such that the individual seeks out drugs over other rewards. This study provides one of the theoretical justifications for residential, longer, treatment by highlighting the extremely fragile state of the newly sober addict. Notably, not only does the study highlight neural mechanisms but it also looks at manifesting behavioural differences too. This is important because biological differences do not necessarily produce measurable behavioural differences in all cases; therefore examining both is a large strength. In summary, this study suggests reasons why outpatient therapy may not be the best choice for recently sober addicts and alcoholics because they are still very sensitive to drug related cues.

The link between compulsion in addiction and neural changes is well accepted. Volkow, Fowler, Wang, and Goldstein (2002) described the role of dopaminergic brain systems in addiction, which further supports the behavioural differences highlighted by Bunce et al. (2015). The dopamine system is postulated to be important in learning and memory– especially the association with reward and punishment. Withdrawal from drugs and alcohol results in a low dopaminergic state with loss of dopamine (especially D2) receptors, and a lack of dopamine release. This state is associated with anhedonia and dysphoria and this therefore could explain the compulsion addicted individuals feel to use certain drugs or alcohol that promote dopamine release leading to pleasurable feelings. Thus, individuals sense that they need the substance to feel rewarded because little else is able to stimulate their natural reward pathways in the brain.

This hypodopaminergic state also has consequences for areas of the brain associated with future planning, attention, and logical thought. Decreased D2 receptor density around the anterior cingulate gyrus and orbitofrontal

regions is a concerning sign because it suggests a lack of conscious control over behaviour. Frontal regions of the brain are very important for determining priorities, planning future behaviour and the ability to foresee consequences to behaviour. Lower activation in these regions signals an individual that would be impaired in these cognitions, which could result in impulsive and short-sighted behaviour. Rando et al., (2011) support this view with the critical finding that the level of frontal lobe grey matter damage in recently recovered alcoholics is predictive of future relapse; as frontal lobe structural deficits increase, the time to relapse decreases. This ground breaking research links previous evidence regarding the role of the frontal regions with the consequences that arise from their damage, thus highlighting the vulnerability of recovering addicts. In order to protect these individuals it can be argued that a period of residential care is appropriate.

Alcohol is a neuro-toxic drug (i.e. damages brain cell function). Newly detoxified adult alcoholics often exhibit deficits, sometimes mild but still significant for their recovery, in cognitive abilities, especially problem-solving, short-term memory, and visuospatial abilities (Sullivan, Rosenbloom, Lim, & Pfefferbaum, 2000a). Some alcohol-related cognitive impairment is reversible with abstinence, as evidenced by Volkow, Wang, and Doria, (1995) and many others. Evidence suggests that by remaining abstinent, the recovering alcoholic will continue to recover brain function over a period of several months to one year (Sullivan, Rosenbloom, & Pfefferbaum, 2000b), with improvements in working memory, visuospatial functioning, and attention - accompanied by significant increases in brain volume, compared with treated alcoholics who have subsequently relapsed to drinking (Sullivan, Rosenbloom, Lim, & Pfefferbaum, 2000a). In the presence of cognitive impairment, the ability to learn new patterns of behaviour (i.e. recovery) is reduced and individuals may resort to old over-learned patterns of behaviour (i.e. more drinking).

Therefore there appear to be two important neurological changes in addictions: the first is a loss of sensitivity in reward pathways which drugs directly stimulate, and the second is a loss of function in circuits associated with future planning, motivation, and control of behaviour. Residential rehabilitation permits time for brain recovery when the addict's mental functioning is impaired and they are compulsive and still highly driven by a desire to acquire and use substances. Outpatient therapy is well known to run the risk of relapse because they re-enter their old environment where they meet the familiar triggers and can acquire drugs or alcohol, which aborts the brain recovery process. Residential rehabilitation on the other hand presents a safer environment that healthcare staff are more able to control. This would make the potential for relapse significantly less likely.

Not only is there theoretical evidence that supports the efficacy of residential rehabilitation but there are also outcome studies that demonstrate its superiority directly. Results from the Australian Treatment Outcome Study (ATOS), as analysed by Teesson et al., (2005), found that residential treatment resulted in abstinence rates among recovering heroin users of 63% one year post treatment, whereas more simple detoxification treatments resulted in abstinence rates of 52%. All treatment modalities were superior to the control group (non-treatment) in which only 25% were abstinent. It was further demonstrated that more positive outcomes were associated with greater cumulative treatment days, and fewer treatment episodes. Therefore a single, long, residential treatment produced the best outcomes out of any treatment analysed in the study. These positive outcomes included reduced psychopathology, risk taking, crime, and injection related health issues. However, participants in this study were not randomly allocated to the separate treatment modalities, and therefore client motivation and biases may have some impact on these results. For example, it is possible that those who were more highly motivated to achieve abstinence chose residential rehabilitation, over detoxification therapy and therefore this factor led to the superior abstinence rates, not the treatment itself.

Another major study that lends support to the efficacy of residential rehabilitation is the Drug Outcome in Scotland (DORIS) research, which re-interviewed a cohort of drug users recruited from a wide range of treatment services in Scotland whilst they underwent treatment and then after they had left. The study aimed to establish whether drug users in treatment were progressing and whether better progress was associated with particular types of treatment. It was the largest cohort study of drug users ever undertaken in Scotland, following-up 1033 drug users starting new treatment in a range of services, including prisons. The participants were interviewed initially then after eight, 16, and finally 33 months had passed. McKeganey, Bloor, McIntosh, and Neale (2008) brought together the key findings of the study. DORIS is notable because it convincingly demonstrated the superior outcomes produced by residential rehabilitation as compared to other treatment methods at the final point of follow-up; 33 months after initial contact. Odds ratios were calculated for continuing drug use following residential rehabilitation, compared to continuing drug use following different treatment methods. The study demonstrated that continuing drug use was less than half as likely after 33 months following residential treatment as compared to alternatives ($OR = .45$, $p = 0.023$). There was no evidence to suggest that those that entered into residential rehabilitation scored lower on scales of severity than other participants in the study. The study also questioned service users about their treatment goal, a key aspect of motivation, and found a preponderance of individuals across all treatment modalities striving for abstinence. However, no specific statistical data is given. This certainly goes some of the way towards answering whether motivations differed across clients in separate treatment settings. Therefore the superior outcomes post residential treatment appear to be driven by differences in the treatment received and not in the characteristics of the separate groups of patients. It is concluded from this that residential rehabilitation leads to significantly better outcomes than outpatient rehabilitation.

Another study that lends support to the hypothesis that inpatient treatment is more successful than outpatient is Walsh et al. (1991). In this randomised trial individuals were randomly allocated to inpatient treatment, outpatient AA groups, or a choice of either. The inpatient, hospital treatment consisted of mandatory AA meetings and worked towards abstinence as the main goal. Those assigned to the outpatient arm were referred to a local AA meeting which they were advised to attend, and offered an escort. The results found that, after 24 months, the hospitalised group were significantly more likely to maintain abstinence than the outpatient group (37% abstinent versus 16% abstinent, $p = 0.005$) or the choice group (37% abstinent versus 17% abstinent, $p = 0.0018$). Those in the inpatient group were also significantly less likely to require further treatment than those in the choice group ($p = 0.039$). Those in the outpatient AA group were significantly more likely to require further treatment than those in the choice group ($p = 0.005$). This study demonstrates that inpatient care is more effective at ensuring that patients maintain sobriety than outpatient care.

The studies in this section demonstrate that not only is residential rehabilitation supported from a theoretical view, but also that it can produce superior treatment outcomes. As previously discussed it is important to understand that addiction is characterised by a shift in motivation from natural rewards to drugs or alcohol, and that this state persists for an extended period of time even when the individual is sober. This information gives a convincing explanation as to why residential rehabilitation is preferred – because it presents a safer environment for the recovering addict. The latter studies in this section demonstrate measurably superior treatment outcomes for those that attend residential treatments. Therefore this effect is not only based in academic understanding but also carries over to measurable differences in a practical sense. It seems likely that these results are based on multiple factors such as the heightened supervision present

in a residential unit, the support networks individuals build whilst in a residential setting, and perhaps the closer nature of the care provided.

Evidence for 12 step facilitation

Castle Craig takes a holistic approach to treatment, but the primary treatment method it employs is 12 step facilitation (TSF), which is a widely used therapeutic tool in the treatment of alcohol and drug addictions. It is based on the philosophy of Alcoholics Anonymous (for more information about the 12 steps and their application therapeutically see Nowinski, Baker, & Carroll, 1992). Despite the consistently high quality outcomes that Castle Craig produces, it is important to establish whether 12 step treatment is supported or not in order to either justify the treatment model, or to suggest suitable alternatives. Therefore this section is devoted to analysis of 12 steps methodologies both in treatment and in outpatient groups such as Alcoholics Anonymous (AA).

One of the largest studies of patients in treatment for alcohol addiction was Project MATCH (Project MATCH Research Group, 1997 Project MATCH did not set out to prove the overarching efficacy of any particular treatment; what it intended to do was examine several matching hypotheses. The idea was that matching participants to specific treatments that met their individual needs would produce better treatment outcomes. The study focused on three treatments: TSF, CBT, and motivational enhancement therapy (MET). It also examined two different treatment arms: those receiving outpatient therapy, and those receiving aftercare therapy after inpatient treatment. Examples of matching hypotheses were that those with higher alcohol use would do better in CBT and TSF, over MET. Or, those with higher motivation would do better in CBT than MET.

Project MATCH, did not show many significant differences for participant outcomes based on matching criteria; most of the initial hypotheses were not met.

So, for example, more severely addicted alcoholics did not show significantly better outcomes after CBT than they did after MET. However, it is worth noting that in various measures TSF was associated with better outcomes than other treatments. Therefore whilst many of the primary hypotheses were not met, results were obtained suggesting differences between treatment modalities.

Project MATCH examined three different outcome measures: time to first drink, time to three successive heavy drinking days, and percent days abstinent. All of these measures were recorded three, six, nine, 12, and 15 months after the first therapy session was held. Project MATCH found no overall differences in outcomes between treatment types. However multiple interaction effects were found. TSF clients in the aftercare arm had significantly more percent days abstinent towards the end of the follow-up period, compared to the other treatments ($p < .001$). Those that received TSF were fully abstinent for longer than those that received other therapies. In the outpatient arm clients who received TSF showed higher rates of abstinence at month 15 than CBT or MET respectively ($p = 0.002$). Furthermore the time to first drink outcome measure for the outpatient arm of treatment was significantly higher for those who received TSF during months 4 to 15 (24% avoiding drinking) as opposed to CBT (15% avoiding drinking) or MET (14% avoiding drinking; $p = 0.007$). Similar results also extended to the three successive days of heavy drinking outcome measure for those in the outpatient arm. 53% of TSF clients did not reach the criterion, whereas only 49% did not reach it after receiving MET, and 48% did not reach it after receiving CBT, $p = 0.127$. Finally, for clients in the outpatient arm, those who had low psychiatric severity and received TSF had more percent days abstinent, than those who received CBT ($p = 0.01$). However, the reverse was not true; those who had high psychiatric severity did not have more percent days abstinent after receiving CBT, as opposed to TSF. This is therefore a one-way effect, not two-way. These results all suggest that TSF produces superior patient outcomes to CBT and MET

in key areas, most notably in areas surrounding duration of abstinence and percent of days the patient is abstinent overall.

Whilst Project MATCH is an extremely important study, it is not without its limitations. It is worth noting that Project MATCH excluded participants who were or had 'residential instability', 'probation or parole requirements', 'currently a danger to self or others', and 'severe organic impairment'. The included participants therefore seem to not have had severe consequences as a result of their addiction. Generalising results from these arguably more stable participants to individuals who have these problems would not be valid. Furthermore Project MATCH excluded participants who had comorbid drug addiction. Stinson et al. (2006), in a 12 month longitudinal study of over 43,000 individuals, found that 55% of those with a specific drug use disorder would also show an alcohol use disorder within the same 12 month period. Conversely comorbid drug use disorders in those who had an alcohol use disorder were around 13%. Therefore the Project MATCH data cannot be extrapolated to many of the patients who are seen at treatment services. Another problem with Project MATCH is that the study utilised only highly accredited clinicians and observed (filmed) all therapy as it was in progress. Given that this quality of care is not present in a normal treatment centre, it is, again, not valid to generalise results from Project MATCH to treatment in more routine settings. Finally it is worth noting that Project MATCH did not include a control group and therefore it is not possible to conclude that any of the treatments are more effective than no treatment, or the natural evolution of the condition.

Nevertheless Project MATCH provides important evidence suggesting that TSF is in some ways superior to other treatment modalities, particularly for sustaining abstinence over longer periods of time.

Another study that supports the efficacy of Hazelden-type AA-based treatment was published by Keso and Salapuro (1990). In this study 141 patients were randomly

allocated to either an AA-based inpatient treatment ($N = 74$) or a more traditional inpatient treatment ($N = 67$). The AA-based treatment recorded a better dropout rate than the traditional treatment (7.9% versus 25.9%, $p < 0.02$), and a significantly higher percentage of patients who remained abstinent during a 1-year follow up period (14% versus 1.9%, $p < 0.05$). Therefore the treatment following the 12-step programme was not only more successful in engaging and maintaining patient engagement during treatment, it was also more successful in ensuring that patients remained abstinent after treatment.

An important result for patients from societies, such as the UK, where drinking alcohol is widespread was found by, Longabaugh, Wirtz, Zweben, and Stout (1998) who reanalysed Project MATCH. They examined whether the environment to which the patient returned after treatment – whether it was one where there was a social expectation to drink, or support for abstinence, affected the outcomes for sobriety. An interaction between treatment type and support network was highlighted. Those who had close family or friends that encouraged drinking had better outcomes after three years if they had been allocated to the TSF group rather than the MET group. This could be attributed to the fact that TSF and the outpatient groups that utilise the 12 steps such as Alcoholics Anonymous (AA) offer support networks of like-minded individuals who are pursuing complete abstinence. This grants an alternate network for anyone who is otherwise surrounded by those who encourage drinking – which leads to better outcomes for these individuals. Alternative treatment methods such as MET do not focus on the importance of linking with supportive networks.

Castle Craig's most recent outcome study (Christo Research Systems, 2015) demonstrates a strong association between attendance at 12-step meetings and positive treatment outcomes. Using the CISS score cut-off of 5 as indicative of a 'good outcome' from treatment (Christo, Spurrell, & Alcorn, 2000), it was found that 93.1% of patients that attended

12 step meetings fit this criteria, whereas only 67.6% of non-attendees qualified as having a 'good outcome'. This difference was statistically significant, $\chi^2(1) = 16.9$, $p < .001$. The mean attendance rate for attendees was 2.2 meetings per week (SD = 2.2). There was also a strong negative correlation between CISS score total and frequency of attendance ($r(87) = -.45$, $p < .001$), indicating that those who attended more meetings had lower CISS scores. This evidence suggests a strong relationship between AA meeting attendance and superior treatment outcomes. However, it could be that attendance at 12 step meetings leads to lower CISS scores, or it could be that lower CISS scores leads to higher 12 step meeting attendance.

There are multiple studies that find an association between better outcomes and attendance at Alcoholics Anonymous, post treatment. Gossop et al. (2003) followed up 120 alcoholic patients, six months after inpatient rehabilitation. It was found that the patients who attended meetings at least once a week had a greater reduction in alcohol consumption ($t(117) = 8.8$, $p < 0.001$) and a higher proportion of abstinent days ($t(119) = 9.1$, $p < 0.001$) than those who did not. This relationship persisted after controlling for confounding variables such as motivation when treatment commenced. It is sometimes argued that AA groups and the 12 steps are not specifically beneficial for treatment, but that people who attend these meetings are more motivated to change and hence willing to commit to the AA fellowship. This motivation could be the driving factor for explaining differences in outcomes, and not the effects of the groups themselves. Gossop et al showed that after controlling for initial motivation there was still AA attendance and treatment outcome. Therefore it seems to be the case that attendance at AA, a support group based around the 12 steps, produces significantly better outcomes.

Furthermore, Timko, and Debenedetti (2007) carried out a study with 345 participants who were randomly assigned to either a standard referral to a counsellor or an intensive referral to a counsellor

who checked on their AA meeting attendance. After 12 months 93% (321 participants) were contacted again, and it was found that 51% of those in the intensive referral group were abstinent, compared to 41% in the standard referral group; a significant difference ($p = 0.048$). This study provides further evidence that higher engagement with 12 step groups produces favourable outcomes and suggests that AA groups have a beneficial effect. However, it is worth noting that the confounding variable of motivation is present here; it could be the case that those in the intensive group were more motivated by their counsellor and this led to the outcome differences, although the two conclusions are not mutually exclusive. It could be the case that both higher motivation and greater attendance at 12 steps treatment is beneficial.

Finally Fiorentine and Hillhouse (2000) conducted an extensive study in which 356 clients were followed-up eight months after treatment and asked about their drug use, criminal activity, attitude, health, 12-step involvement, and other qualitative measures. The key outcomes that were found were that those familiar with 12-step groups were significantly more likely to have successfully completed treatment programmes ($p < 0.001$), and that an additive effect was found whereby those that attended both treatment and separate 12-step groups showed significantly higher rates of abstinence than those that either attended treatment meetings, or 12-step groups separately ($p < 0.001$) i.e. 12-step group can be an additional factor that aids the progress of treatment. This could be because these groups encourage an individual to be open and honest – which would aid the therapeutic process elsewhere. Another reason for this could be that familiarity with multiple types of treatment (i.e. 12-step groups, and one-to-one therapy) would lead a patient to be more comfortable with the process and more willing to engage. Finally the additive effect of 12-step groups and treatment on abstinence rates demonstrates that such groups may have directly increased the possibility of recovery for those individuals that utilise both methods. Involvement with group structures similar to AA

certainly seems to have a robust effect on recovery rates that is measurable even when considering multiple types of treatment.

Overall there seems to be significant evidence in favour of TSF as a treatment method for addiction. It has been shown to produce outcomes that rival other treatment modalities in extremely large and renowned studies. Further, more recent research has associated attendance at AA and other groups that utilise the 12-steps framework as beneficial for treatment outcomes such as abstinence rates at follow-up. Castle Craig's own studies suggest that attendance at AA meetings and the continuation of the 12-steps is an integral part of aftercare for patients, associated with significantly lower CISS scores. The evidence as presented therefore suggests that 12-step methods may lead to benefits that range across the individual's life from their mental health, to occupational security – as these are all factors that are considered in the CISS.

Conclusions

This review sought to address three main avenues of evidence: those studies that came from Castle Craig itself as direct examples, those in favour of residential rehabilitation, and those that supported TSF and other 12-step treatments. For all three of these areas evidence has been presented that supports the treatment model offered by Castle Craig Hospital.

Notably this evidence comes from multiple avenues: the treatment centre itself, theories from the neuroscience behind addiction, evidence from other treatment centres, and longitudinal studies carried out on addicts and alcoholics over the past 40 years. Castle Craig Hospital not only has academic and theoretical backing but also its own mounting evidence on its own outcomes. There are few treatment services that can show this depth of support.

In closing; this review has presented evidence that supports the treatment model of Castle Craig specifically in providing residential care that utilises TSF as one of its primary treatment methods. This treatment approach has been associated with longer periods of sobriety, large increases in measures associated with quality of life such as physical health or occupation, and a greater proportion of clients reaching sobriety than is observed after alternative methods.

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Castle Craig Hospital
Blyth Bridge
West Linton
Peeblesshire
EH46 7DH
Tel. +44(0)1721 722763
Fax. +44(0)1721 752662
info@castlecraig.co.uk
www.castlecraig.co.uk

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