COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) TREATMENTS FOR BEHAVIORAL AND SUBSTANCE USE DISORDERS

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This Behavioral Clinical Policy provides assistance in interpreting and administering behavioral health benefit plans that are managed by Optum and U.S. Behavioral Health Plan, California (doing business as OptumHealth Behavioral Solutions of California (“Optum-CA”)). When deciding coverage, the member-specific benefit plan document must be referenced. The terms of the member-specific benefit plan document [e.g., Certificate of Coverage (COC), Schedule of Benefits (SOB), and/or Summary Plan Description (SPD)] may differ greatly from the standard benefit plan upon which this Behavioral Clinical Policy is based. In the event of a conflict, the member’s specific benefit plan document supersedes this Behavioral Clinical Policy.

All reviewers must first identify member eligibility, the member-specific benefit plan coverage, and any federal or state regulatory requirements that supersede the COC/SPD prior to using this Behavioral Clinical Policy. Other Policies and Coverage Determination Guidelines may apply. Optum reserves the right, in its sole discretion, to modify its Policies and Guidelines as necessary.

This Behavioral Clinical Policy is provided for informational purposes. It does not constitute medical advice.

Optum may also use tools developed by third parties that are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.

BENEFIT CONSIDERATIONS

Before using this policy, please check the member-specific benefit plan document and any federal or state mandates, if applicable.

Pre-Service Notification
Admissions to an inpatient, residential treatment center, intensive outpatient, or a partial hospital/day treatment program require pre-service notification. Notification of a scheduled admission must occur at least five (5) business days before admission. Notification of an unscheduled admission (including emergency admissions) should occur as soon as is reasonably possible. Benefits may be reduced if Optum is not notified of an admission to these levels of
Additional Information
The lack of a specific exclusion for a service does not necessarily mean that the service is covered. For example, depending on the specific plan requirements, services that are inconsistent with Level of Care Guidelines and/or prevailing medical standards and clinical guidelines may be excluded. Please refer to the member’s benefit document for specific plan requirements.

Essential Health Benefits for Individual and Small Group
For plan years beginning on or after January 1, 2014, the Affordable Care Act of 2010 (ACA) requires fully insured non-grandfathered individual and small group plans (inside and outside of Exchanges) to provide coverage for ten categories of Essential Health Benefits (“EHBs”). Large group plans (both self-funded and fully insured), and small group ASO plans, are not subject to the requirement to offer coverage for EHBs. However, if such plans choose to provide coverage for benefits which are deemed EHBs, the ACA requires all dollar limits on those benefits to be removed on all Grandfathered and Non-Grandfathered plans. The determination of which benefits constitute EHBs is made on a state by state basis. As such, when using this policy, it is important to refer to the member-specific benefit document to determine benefit coverage.

COVERAGE RATIONALE

Acupuncture is unproven as a treatment for behavioral and substance use disorders.
- Findings in the clinical evidence are insufficient to conclude whether acupuncture is an effective treatment for behavioral disorders or substance use disorders.

Art therapy is unproven as a treatment for behavioral and substance use disorders, including schizophrenia, posttraumatic stress disorder, depression, anxiety, and phobias.
- The reviewed evidence provides inconsistent results on the effects and limitations of music therapy. Further research using larger sample sizes is needed.

Dance/movement therapy is unproven as a treatment for behavioral and substance use disorders.
- There is a lack of randomized controlled trials or well-designed cohort studies that would allow causal conclusions about the impact of dance/movement therapy to be drawn.

Equine therapy is unproven as a treatment for behavioral and substance use disorders, including autism spectrum disorder.
- There is a lack of randomized controlled trials or well-designed cohort studies that would allow causal conclusions about the impact of equine therapy to be drawn.

Music therapy is unproven as a treatment for behavioral and substance use disorders, including schizophrenia and autism spectrum disorders.
- The reviewed evidence provides inconsistent results on the effects and limitations of music therapy. Further research using larger sample sizes is needed.

Naturopathic detoxification at all levels of care is unproven for the treatment of substance use disorders.
- A number of significant limitations exist in the reviewed literature, and it is unclear if naturopathic detoxification treatment programs utilize a mixture similar to that used in the reviewed studies.

Sauna/niacin detoxification (e.g., New Life Detox) at all levels of care is unproven for the treatment of substance use disorders.
- There continues to be a lack of conclusive evidence from peer-reviewed journals that sauna/niacin detoxification is an effective treatment of drug and alcohol abuse/dependence.

The requested service or procedure must be reviewed against the language in the member’s benefit document. When the requested service or procedure is limited or excluded from the member’s benefit document, or is otherwise defined differently, it is the terms of the member’s benefit document that prevail.

Per the specific requirements of the plan, health care services or supplies may not be covered when inconsistent with Level of Care Guidelines and/or evidence-based clinical guidelines.

All services must be provided by or under the direction of a properly qualified behavioral health provider.
DEFINITIONS

Diagnostic and Statistical Manual of Mental Disorders (DSM): A manual produced by the American Psychiatric Association which provides the diagnostic criteria for mental health and substance-related disorders and other problems that may be the focus of clinical attention. Unless otherwise noted, the current edition of the DSM applies.

Proven Services: Services or technologies that, after a review of the evidence, demonstrate they can be safely and effectively administered to a defined patient population, under a set of specific conditions that are clearly identified. A service found to be proven does not necessarily indicate that the service is covered. The member’s specific benefit plan must be referenced to determine coverage, limitations, and exclusions.

Scientific Evidence: The results of controlled clinical trials or other studies published in peer-reviewed, medical literature generally recognized by the relevant medical specialty community.

Unproven Services: Services including medications that are not consistent with prevailing medical research that has determined the services to not be effective for treatment of the condition and/or not to have the beneficial effect on behavioral health outcomes due to insufficient and inadequate clinical evidence from well-conducted randomized controlled trials or cohort studies in the prevailing published peer-reviewed literature. Unproven services and all services related to unproven services are typically excluded. The fact that an unproven service, treatment, device, or pharmacological regimen is the only available treatment for a particular condition will not result in benefits if the procedure is considered to be unproven in the treatment of that particular condition.

DESCRIPTION OF SERVICES

According to the National Center for Complementary and Integrative Health (NCCIH, 2016a), treatments that are “complementary” or “alternative” represent approaches developed outside of mainstream Western, or conventional, medicine. These terms are often used interchangeably, but refer to different concepts:

• If a non-mainstream practice is used together with conventional medicine, it is considered “complementary”;
• If a non-mainstream practice is used in place of conventional medicine, it is considered “alternative.”

Acupuncture
According to the National Center for Complementary and Integrative Health (NCCIH, 2016b), acupuncture describes varying procedures and techniques that involve the stimulation of points on the body. The most studied technique involves penetrating the skin with thin, solid, metallic needles that are manipulated by either hands or electrical stimulation. Most commonly, acupuncture is used for back and neck pain, osteoarthritis, and headache. Research has also been conducted on the use of acupuncture to treat behavioral health conditions, such as depression and substance use disorder.

Art Therapy
Art therapy combines the knowledge and understanding of human development and psychological theories/techniques with visual arts and the creative process. Art therapists incorporate the use of art media and verbal processing of produced imagery to help clients improve psychological health, cognitive abilities, and sensory-motor functions. According to the American Art Therapy Association (AATA, 2016), art therapy can provide an alternative form of communication for those who cannot verbally express anxiety, pain or emotions as a result of trauma, combat, physical abuse, loss of brain function, depression, and other debilitating health conditions.

Dance/Movement Therapy (DMT)
Dance/movement therapy (DMT) is defined as the psychotherapeutic use of movement to further the emotional, cognitive, physical, and social integration of the individual (American Dance Therapy Association [ADTA], 2015). Dance/movement therapy interventions apply affective, behavioral, motoric, cognitive, and systemic strategies, including the principles of development, wellness, and pathology. The use of specific methods, techniques, modalities, and verbal interventions within the practice of professional dance/movement therapy is restricted to professional dance/movement therapists appropriately trained in the use of such methods, techniques, or modalities. Dance/movement therapy may be identified by other terms in the research literature, including “dance movement psychotherapy”, “dance therapy”, “body psychotherapy”, or “therapeutic movement”.

Equine Therapy
Equine therapy uses the purposeful manipulation of equine movement to engage sensory, neuromotor, and cognitive systems in achieving functional outcomes (American Hippotherapy Association, 2016). Equine therapy can be conducted by physical therapists or occupational therapists as part of a larger plan of care involving other neuro/sensorimotor techniques. Individual riding centers may also employ “certified path instructors” or “horsemanship instructors”. Equine therapy is identified by other terms in the research literature, including “hippotherapy”, “therapeutic horseback riding”, “horse therapy”, “therapeutic horsemanship”, and “equine-assisted
Music Therapy

Music therapy is the clinical use of music interventions to achieve individualized goals within a therapeutic relationship, and is typically conducted by an individual completing an approved music therapy program. Therapists may assess emotional well-being and social functioning through musical responses, and develop music sessions based on specific client needs. According to the American Music Therapy Association (AMTA, 2016), allows exploration of personal feelings and promotes positive changes in mood and emotional states (AMTA, 2016).

Naturopathic Detoxification

Naturopathic detoxification therapy (also known as “All-Natural Detox Therapy”, “Natural IV Therapy”, “Nicotinamide Adenine Dinucleotide (NAD) IV Therapy”, “Amino Acid Therapy”, “Neurotransmitter Restoration Therapy”, “Brain Restoration+”, “Gentle Detox”, “Easy Detox”, etc) is part of a holistic approach to alcohol and drug addiction treatment. It involves an unknown and non FDA-approved combination of vitamins, minerals, amino acids, and/or NAD coenzymes, administered intravenously and/or orally. This therapy claims to eliminate cravings from a drug or alcohol addiction and promote recovery. While the actual treatment regimen may vary by site, the following have been identified as common components of a naturopathic detoxification for substance abuse:

- Preadmission assessments, including a medical evaluation
- Laboratory testing to help determine individual need of the patient
- Approximately 10-15 IV infusions in addition to oral therapy – the content of the infusions and oral therapies is unknown

Sauna/Niacin Detoxification

Sauna/niacin detoxification for substance use disorders (also known as “New Life Detoxification”, “sauna detoxification”, “Purification Rundown/Program”, “Purif”, “Effective Purification Program”, etc) typically follows a protocol where the following components are delivered on a daily basis (e.g., Crinnion, 2007; Schnare, 1982):

- Physical exercise
- Sauna, done in 30 minute sessions for up to 5 hours daily
- A multi-vitamin cocktail, the main ingredient of which is niacin
- Mineral supplements, including calcium, magnesium, iron, zinc, manganese, copper, iodine, and potassium

Treatment programs may be delivered at varying levels of care, depending on the individual patient. The purpose of sauna/niacin detoxification is to eliminate from the body any drug residues and other toxic substances that remain locked in fatty tissues and may be present in the blood stream.

CLINICAL EVIDENCE

Acupuncture:

Grant and colleagues (2016) conducted a systematic review to estimate the effects of acupuncture for adults with substance use disorders (SUDs). The review included 41 studies (total n = 5,227), with quality of evidence assessed using the GRADE approach. Results found no significant differences observed between acupuncture and comparators (e.g., passive controls, sham acupuncture, treatment as usual, active interventions) at post-intervention for outcomes of relapse, frequency of substance use, quantity of substance use, and treatment dropout. The authors did identify a significant difference in favor of acupuncture versus comparators for withdrawal/craving at post-interventions, but also evidence of publication bias. These results were not significant at longer follow-up. Safety data from 12 trials suggests little risk of serious adverse events. The authors conclude that the available evidence suggests no consistent differences between acupuncture and comparators for substance use.

Shen and colleagues (2014) reviewed the effects of acupuncture (alone or when used as a combination treatment) compared with placebo, no treatment, or any other treatment for people with schizophrenia or related psychoses. This review updated an existing review to now include 30 studies testing different forms of acupuncture across six different comparisons (acupuncture added to standard dose antipsychotics, acupuncture added to low dose antipsychotics, acupuncture with antipsychotics, acupuncture added to Traditional Chinese Medicine drugs, acupuncture with TCM drugs, electric acupuncture with electroconvulsive therapy). The authors note that all identified studies were at a moderate risk of bias. Results found that acupuncture plus standard antipsychotic treatment was compared with standard antipsychotic treatment alone, people were at less risk of being ‘not improved’. When acupuncture was added to low dose antipsychotics and compared with standard dose antipsychotics, relapse was less in the experimental group, but no difference for the outcome of ‘not improved.’ When acupuncture was compared with antipsychotic drugs of known efficacy in standard doses, there were equivocal data for outcomes such as ‘not improved’. The authors conclude that limited evidence suggests that acupuncture may have some antipsychotic effects with few adverse effects, and that better designed large studies are needed to fully and fairly test the effects of acupuncture for people with schizophrenia.
Smith and colleagues (2010) conducted a Cochrane Review to examine the effectiveness and adverse effects of acupuncture in the treatment of depression. The review was part of an update to a previous Cochrane Review, and now contains data from 30 studies (total n = 2,812). Studies were included if they were randomized controlled trials that compared acupuncture to sham acupuncture, no treatment, pharmacological treatment, other structured psychotherapies, or standard care. Primary outcomes were reduction in depression severity (measured by self-rating scales or clinician-rated scales) and improvement in depression (defined as remission versus no remission). The authors noted a high risk of bias in the majority of trials. Results found there was insufficient evidence of a consistent beneficial effect from acupuncture compared with a wait-list control or sham acupuncture control. Two of the reviewed trials found that acupuncture may have an additive benefit when combined with medication, compared with medication alone. The majority of trials compared manual and electroacupuncture with medication and found no effect between groups. The authors conclude that there is insufficient evidence to recommend the use of acupuncture for people with depression.

Bearn and colleagues (2009) examined auricular acupuncture as an adjunct to opiate detoxification treatment and its effects on withdrawal symptoms. The study used a randomized, placebo-controlled study design with a sample of 83 drug users meeting DSM-IV criteria for opiate dependence. Treatment was delivered in a 21-bed inpatient unit of a large psychiatric hospital. Treatment began with an initial 2-3 day assessment period during which methadone dose was titrated to subjective symptoms and objective signs of opiate withdrawal. Patients assigned to acupuncture received daily treatment of weekdays, for 14 days. Patients assigned to control treatment were given oil to the ear followed by the attachment of five metal clips, using the same daily protocol. Therapists were not blinded to treatment assignment. Daily measurement of withdrawal severity and craving was taken using the Short Opiate Withdrawal Scale and an eight-item craving questionnaire. Results found that auricular acupuncture had no effects on withdrawal severity or craving when provided as an adjunct to standard methadone detoxification treatment. The authors conclude that the findings of this study add to the growing literature that has failed to find any effect of acupuncture as a treatment for drug dependence disorders.

Jordan (2006) conducted a systematic review of acupuncture as treatment for opiate addiction. The author reviewed 33 years of literature on the topic, published in western scientific journals. The author concludes that acupuncture treatment does not demonstrate the type of qualitative and quantitative research necessary to validate its efficacy in the treatment of opiate-addicted patients. The author notes there was a lack of controls in supportive clinical trials, and that supportive evidence often came from noncontrolled, nonblinded methodologies. The author points out that some of the current supportive evidence for efficacy also came from Chinese journals that have not yet been translated into English.

Gates and colleagues (2006) conducted a Cochrane Review to determine whether auricular acupuncture is an effective treatment for cocaine dependence when compared to sham acupuncture or no treatment. A total of seven studies (total n = 1,433) were included, and all were considered by the authors to be of generally low methodological quality. Separate meta-analyses were conducted for studies that compared auricular acupuncture with sham acupuncture, and those comparing it with no treatment. Results found no difference between acupuncture and sham acupuncture, or acupuncture and no acupuncture. The authors note that number of participants included in the meta-analyses was low, and power was limited. They conclude that there is currently no evidence that auricular acupuncture is an effective treatment for cocaine dependence.

Mukaino and colleagues (2005) conducted a systematic review of randomized controlled trials (RCTs) on acupuncture as a therapy for depression. A total of 7 RCTs (total n = 509) were included; these studies investigated either manual acupuncture or electroacupuncture in comparison to control procedures in subjects with depression. There were four types of comparison observed: (1) acupuncture vs. sham control (3 studies); (2) acupuncture vs. waiting list (1 study); (3) electroacupuncture vs. antidepressant medication (4 studies); and (4) electroacupuncture or manual acupuncture as adjunct to antidepressant medication (2 studies). The authors note that the randomization procedure was not reported in adequate detail in any of the reviewed studies. Additionally, only two studies described the number and reason for withdrawal of subjects. The authors found the evidence to be inconsistent on whether manual acupuncture is superior to sham, and suggestive that acupuncture was not superior to waiting list. Additionally, evidence on the effect of electroacupuncture was not found to be significantly different from antidepressant medication, and there was inconclusive evidence as to whether acupuncture had additive effect when given as an adjunct to antidepressant medication. Overall, the authors conclude that evidence from controlled trials was insufficient to conclude whether acupuncture is an effective treatment for depression, and that further trials of electroacupuncture are necessary.

Margolin and colleagues (2002) investigated the effectiveness of auricular acupuncture as a treatment for cocaine addiction at six community-based clinics. A total of 629 cocaine-dependent adult patients (mean 38.8 years of age) were randomly assigned to either auricular acupuncture (n = 222), a needle-insertion control condition (n = 203), or a relaxation control condition (n = 195). A total of 412 patients used cocaine only and 208 used both opiates and cocaine and were receiving methadone maintenance. Treatments were offered 5 times weekly for 8 weeks, along with
concurrent drug counseling. Results found a significant overall reduction in cocaine use but no differences by treatment condition. No differences between conditions were observed in treatment retention, with counseling sessions for all three groups being poorly attended. The authors conclude that acupuncture was not more effective than control in reducing cocaine use, and that research is needed to examine acupuncture's contribution to addiction treatment.

Bullock and colleagues (2002) conducted a randomized, single-blind, placebo controlled trial to report clinical data on the efficacy of acupuncture for alcohol dependence. A total of 503 patients whose primary substance of abuse was alcohol were assigned to specific acupuncture, nonspecific acupuncture, symptom-based acupuncture, or conventional treatment alone. Assessments were conducted on alcohol use, depression, anxiety, functional status, and preference for therapy. Results found significant improvement shown on nearly all measures, with few differences associated with treatment assignment. There were no treatment differences on alcohol use measures, although nearly half of subjects reported that acupuncture reduced their desire for alcohol. The authors conclude that generally, acupuncture was not found to make any significant contribution over and above that achieved by conventional treatment alone in the reduction of alcohol use.

Art Therapy:
Uttley and colleagues (2015a) conducted a study to systematically appraise the clinical and cost-effective evidence for art therapy for people with non-psychotic mental health disorders (e.g., depression, anxiety, and phobias). The authors conducted a comprehensive literature search, identifying eleven randomized controlled trials (RCTs) that included 533 total patients. The authors were unable to conduct a meta-analysis due to clinical heterogeneity and insufficient comparable data on outcome measures across studies. While control groups varied, studies included a no treatment/wait-list, attention placebo control and/or psychological therapy comparator. The authors found art therapy to be associated with significant positive changes in mental health symptoms relative to the control group in the majority of studies (7 of the 11). Art therapy also appeared to be cost-effective compared to wait-list, but there was insufficient evidence on the cost-effectiveness of art therapy compared to group verbal therapy. The authors conclude that from the limited available evidence, art therapy was associated with positive effects compared to control in a number of studies; however the included trials were generally of poor quality and likely a high risk of bias. For this reason, they note that the results should be interpreted with caution.

Uttley and colleagues (2015b), as part of a larger Health Technology Assessment, conducted a quantitative systematic review on the clinical effectiveness of art therapy in people with non-psychotic mental health disorders. A comprehensive literature search identified reviews, randomized controlled trials (RCTs), economic evaluations, qualitative research and all other study types relating to art therapy. Included in the quantitative review were a total of fifteen RCTs (11 studies conducted in adults, and four conducted in children), representing a total of 777 patients. Nine studies compared art therapy with an active control group, and six studies compared art therapy with a wait-list control or treatment as usual. The majority of the studies were conducted in community/outpatient settings. Study duration ranged from 1 session to 40 sessions, with a mean number of 9 sessions. In 14 of the 15 studies, there were improvements from baseline in some outcomes in the art therapy groups. Both the intervention and control groups improved from baseline in four studies, and in eight studies, art therapy was significantly better than control for only some of the outcome measures. Randomization methodology was not described in seven of the studies, leading the authors to note that there is an unclear/high risk that randomization was not adequately performed in these particular studies. Additionally, allocation concealment was not reported in any of the included studies. The authors conclude that the small evidence base, consisting of low-quality RCTs, indicated that art therapy was associated with an improvement from baseline and was a more effective treatment for at least one outcome than control in the majority of reviewed studies.

van Westrhenen and Fritz (2014) conducted a review of creative arts therapies used to address child trauma. Research conducted throughout the previous 12 years was included in the review, totaling 38 articles. The authors considered the methodology used, with specific attention given to the reliability and validity of research findings. Studied age groups ranged from 16 months to 18 years, with group sizes varying from 1 to 3,100. A large number of studies included participants who showed symptoms of PTSD, with 16% of studies including participants with fully diagnosed PTSD. Nearly 75% of the included studies used art therapy as the creative treatment. The authors found that nearly half of the selected articles were found to be non-empirical and merely descriptive of the therapist's or child's personal experience. They conclude that existing studies over the review period have shown methodological weaknesses that have allowed the scientific foundation in this therapeutic field to fall behind other popular therapeutic approaches. They recommend that researchers and art therapists need to work more closely together in the future to establish a higher standard for research and develop comprehensive theoretical frameworks.

Montag and colleagues (2014) conducted a pilot study to evaluate the feasibility of a randomized controlled trial (RCT) of psychodynamic art therapy for the treatment of patients with schizophrenia. A total of 58 inpatients were randomized to either 12 twice-weekly sessions of psychodynamic group art therapy (AT) plus treatment as usual, or to standard treatment alone. Primary outcome measures were positive/negative psychotic and depressive symptoms,
as well as global assessment of functioning. Assessments were conducted at baseline, post-treatment, and 12 week follow-up. At the 12 week follow-up, a total of 55% of those in the art therapy group, and 66% of those receiving standard treatment were examined. In the per-protocol sample, those patients receiving AT had a significantly greater mean reduction of positive/negative symptoms at 12-week follow-up when compared to patients receiving standard treatment alone. There were no group differences regarding depressive symptoms. In the per-protocol sample, global assessment of functioning was significantly higher in the AT group at both visits, but not in the intention-to-treat sample. The authors note that the findings are based on small case numbers and therefore might overestimate the impact of the intervention, and they encourage further research to substantiate these preliminary positive results regarding symptom reduction.

Crawford and colleagues (2012) evaluated the clinical effectiveness of group art therapy in people with schizophrenia and to identify whether any benefits exceeded those of active control treatment. This three arm trial randomized participants (age 18 and over) to 12 months of weekly group art therapy (access to a range of art materials and encouragement to use these to freely express self) plus standard care, 12 months of weekly activity groups (various activities not including use of art or craft materials) plus standard care, or standard care alone. A total of 417 participants were enrolled (art therapy = 140; activity groups = 140; standard care alone = 137). The primary outcomes were global functioning and mental health symptoms, measured 24 months after randomization. Secondary outcomes included levels of group attendance, social functioning, and satisfaction with care at 12 and 24 months. Results found that primary outcomes between the three study arms did not differ. Secondary outcomes also did not differ between those referred to art therapy or those referred to standard care at either 12 or 24 months. The authors conclude that referring people with schizophrenia to group are therapy did not improve global functioning, mental health, or other health-related outcomes.

Richardson and colleagues (2007) conducted an exploratory randomized controlled trial (RCT) of group interactive art therapy (AT) as an adjunctive treatment in chronic schizophrenia. A total of 43 patients, randomized to 12 sessions of AT were compared to those of 47 patients receiving standard psychiatric care. However, based on the expectation of small to medium effect sizes on main outcome variables, the authors identified a necessary sample size of 64 participants per group. AT consisted of brief group interactive art therapy involving 12 weekly sessions of 1.5 hours. On six of the seven outcome measures, statistically non-significant differences were found in favor of the AT group over standard care. On the remaining measure (Scale for the Assessment of Negative Symptoms), a significant incremental benefit of art therapy was found. The authors conclude that while the results provide very tentative support for AT in adult psychiatric patients, the study demonstrated considerable logistic difficulties of achieving high levels of recruitment and follow-up in the study population. The insufficient statistical power of the study was also noted as a limitation.

Lyshak-Stelzer and colleagues (2007) examined the efficacy of an adjunctive trauma-focused art therapy intervention on the reduction of chronic posttraumatic stress disorder (PTSD) symptoms among adolescents (aged 13-18) in two inpatient psychiatric facilities. In this controlled pilot study, patients either received trauma-focused expressive art therapy (TF-ART), consisting of trauma-specific art activities, or treatment-as-usual (TAU), consisting of a 16-session protocol of arts and crafts. The same therapist at each site provided treatment for both conditions. The primary outcome measure was the UCLA PTSD Reaction Index for DSM-IV, Child Version. By the end of the 2-year study period, a total of 14 patients completed treatment in the TF-ART group and 15 patients completed treatment in the TAU condition. There was a significant effect of treatment over time for both groups across treatment conditions. The TF-ART protocol was found to be significantly more effective in reducing trauma symptoms from pre-treatment to post-treatment. The authors note limitations in that the number of treatment participants was low, and that the greater efficacy of TF-ART may be an artifact of attrition or other unrecognized variables. Additionally, long-term follow-up assessments were not able to be conducted to examine endurance of treatment effects. The authors conclude that TF-ART may be a promising adjunctive treatment for inpatient adolescents with PTSD symptoms, but the results await replication in a larger sample of youths who can be follow-up with after treatment completion.

Ruddy and Milnes (2005) reviewed the effects of art therapy as an adjunctive treatment for schizophrenia. This Cochrane Review identified randomized controlled trials (RCTs) where art therapy was compared to either standard care or other psychosocial interventions. Studies where more than 50% of participants in any group were lost to follow up were excluded. While the initial search strategy by the authors identified 61 reports, a total of two RCTs (n = 137) met the inclusion criteria, both comparing art therapy to standard care. The authors note that the studies did not include enough participants to provide clear conclusions regarding benefits and/or harms of art therapy. They suggest that additional research is necessary to understand the value of art therapy in patients with schizophrenia.

**Dance/Movement Therapy**

Priebe and colleagues (2016) conducted a randomized controlled trial (RCT) to assess body psychotherapy as a treatment for negative symptoms of schizophrenia when compared to an active control group. Both body psychotherapy and control condition (Pilates) were delivered in 20 sessions of 90 minutes each, over a 10-week period. Primary outcome was negative symptoms at the end of treatment, measured by the Positive and Negative...
Lee and colleagues (2015) investigated the effects of dance/movement therapy (DMT) on affect and psychotic symptoms in 38 patients with schizophrenia. A 60-minute DMT session was held once a week for 12 consecutive weeks. In the initial stage (sessions 1-4), self-awareness was developed; in the intermediate stage (sessions 5-8), interpersonal relationships were facilitated; and in the final stage (sessions 9-11), relationships between the individual and group were formed, with session 12 serving to conclude the intervention and conduct post-tests. A total of 18 patients with schizophrenia received both the DMT and medical treatment, and 20 patients with schizophrenia received only medical treatment as a control group. Participants were randomly assigned to the DMT or control group. The DMT group showed a significant decrease of state anger and depression compared to the control group after treatment. The effect of the DMT was observable whether the patient was taking antidepressant medication or not. At follow-up, between group effect sizes were medium in favor of the DMT group. The authors noted limitations of small sample size, a fairly short follow-up period, and use of self-evaluation measures only. The participants were also allowed to join groups on the basis of self-selection, and were not randomly divided.

Meekums and colleagues (2015) examined the effects of dance movement therapy (DMT) for depression with or without standard care, compared to no treatment or standard care alone, psychological therapies, drug treatment, or other physical interventions. As part of this Cochrane Review, inclusion criteria were randomized controlled trials (RCTs) studying outcomes for people of any age with depression with at least one group receiving DMT. A total of three studies with 147 participants (107 adults and 40 adolescents) met inclusion criteria. Of these individuals, 74 took part in DMT treatment, and 73 comprised the control groups. All included studies collected continuous data using two different depression measures: the clinician-completed HAM-D, and the SCL-90-R. There was no reliable effect of DMT on depression (very low quality evidence). A planned subgroup analysis indicated a positive effect in adults, across two studies (107 participants), but failed to meet clinical significance. One adult study reported drop-out rates, which were found to be non-significant (low quality evidence). The authors conclude that the low-quality evidence from three small trials does not allow any firm conclusions to be drawn regarding the effectiveness of DMT for depression. They note that larger trials of high methodological quality are needed to assess DMT for depression, with economic analyses and acceptability measures and for all age groups.

Lee and colleagues (2016) conducted a randomized controlled trial (RCT) to examine the effectiveness of manualized dance/movement therapy (BPT/DMT) on negative symptoms of patients with schizophrenia. A total of 68 outpatients with a diagnosis of schizophrenia were randomly assigned to either 20 sessions of dance/movement therapy (n = 44) or treatment as usual (n = 24), comprised of medical treatment only. Patients were aged 14-65 (mean age of 40 years), and on stable medication - all patients additionally received treatment with a single antipsychotic. Primary outcome was changes in negative symptoms scores on the Scale for the Assessment of Negative Symptoms (SANS). Power calculations revealed that 90 participants would be required to detect moderate to large treatment effects. Additionally, there was a large amount of missing data, mostly due to drop-outs of participants (drop-out rate of 30.9%). After 20 sessions of treatment, patients receiving movement therapy had significantly lower negative symptom scores (mean symptom reduction of 20.65%), with moderate effect sizes noted. The authors conclude that movement therapy was effective in the treatment of patients with schizophrenia, but acknowledge limitations of a high drop out rate, baseline differences in major study variables, and use of a waiting control group.

Martin and colleagues (2016) conducted a randomized controlled trial (RCT) to examine the effectiveness of body psychotherapy compared to TAU on negative symptoms in patients with schizophrenia. Negative Symptoms (SANS). Power calculations revealed that 90 participants would be required to detect moderate to large treatment effects. Additionally, there was a large amount of missing data, mostly due to drop-outs of participants (drop-out rate of 30.9%). After 20 sessions of treatment, patients receiving movement therapy had significantly lower negative symptom scores (mean symptom reduction of 20.65%), with moderate effect sizes noted. The authors conclude that movement therapy was effective in the treatment of patients with schizophrenia, but acknowledge limitations of a high drop out rate, baseline differences in major study variables, and use of a waiting control group.

Pylvanainen and colleagues (2015) investigated the effects of dance movement therapy (DMT) in a psychiatric outpatient clinic with patients diagnosed with depression. The authors compared DMT + treatment as usual (TAU) with TAU. Patients entered the study voluntarily and could choose between participating in the DMT or TAU group. The TAU group received other treatment options the clinic provides (pharmacological treatment, individual counseling, etc). Measurements for DMT were completed at the start of the intervention period, after the 3-month DMT intervention, and after 3 months (follow-up). A total of 25 patients were recruited for the DMT groups, and 19 completed all measures. A total of 18 patients joined the TAU groups; of these, 12 patients answered pre-measurement self-evaluations and were included in the study. Only 8 patients completed the self-evaluations at all three measurement points. Both the DMT and the TAU groups received individual counseling during the study. The DMT intervention was delivered by a psychologist and dance movement therapist trained in DMT methods, consisting of 12 dance/movement therapy sessions (one session a week for 12 weeks). Primary self-evaluation outcome measures were the BDI-II, HADS, SCL-90, and CORE-OM. Results found that compared to the TAU, adding DMT seemed to improve the effect of the treatment. The effect of the DMT was observable whether the patient was taking antidepressant medication or not. At follow-up, between group effect sizes were medium in favor of the DMT group. The authors noted limitations of small sample size, a fairly short follow-up period, and use of self-evaluation measures only. The participants were also allowed to join groups on the basis of self-selection, and were not randomly divided.

Meekums and colleagues (2015) examined the effects of dance movement therapy (DMT) for depression with or without standard care, compared to no treatment or standard care alone, psychological therapies, drug treatment, or other physical interventions. As part of this Cochrane Review, inclusion criteria were randomized controlled trials (RCTs) studying outcomes for people of any age with depression with at least one group receiving DMT. A total of three studies with 147 participants (107 adults and 40 adolescents) met inclusion criteria. Of these individuals, 74 took part in DMT treatment, and 73 comprised the control groups. All included studies collected continuous data using two different depression measures: the clinician-completed HAM-D, and the SCL-90-R. There was no reliable effect of DMT on depression (very low quality evidence). A planned subgroup analysis indicated a positive effect in adults, across two studies (107 participants), but failed to meet clinical significance. One adult study reported drop-out rates, which were found to be non-significant (low quality evidence). The authors conclude that the low-quality evidence from three small trials does not allow any firm conclusions to be drawn regarding the effectiveness of DMT for depression. They note that larger trials of high methodological quality are needed to assess DMT for depression, with economic analyses and acceptability measures and for all age groups.
DMT group also showed a significant decrease of negative psychotic symptoms compared to the control group after treatment.

Koch and colleagues (2014) conducted a meta-analysis to evaluate the effectiveness of dance movement therapy (DMT) and the therapeutic use of dance for the treatment of health-related psychological problems. A total of 23 studies were included in the analysis; 16 investigated the effect of DMT on psychological variables, and 7 investigated the effects of dance on different clinical outcomes. In 15 studies, the control group received no intervention or formed a wait-list control group. The other studies differed in their control group activity (leisure time program; home trainer group; music listening group; etc.) or did not specify the control intervention. A total of three studies researched the effects of dance or DMT on patients with depression, two studies focused on patients with somatization problems, and the effects of DMT on patients with autism, schizophrenia, and dementia were also investigated. Overall, the authors determined that the included studies offered a satisfactory degree of methodological quality; however, there were differences in the quality of the included studies, especially with regard to randomization, blinding strategy, and the analysis of baseline differences. A moderate effect size was found for clinical outcomes, and sub-analyses resulted in a moderate pooled effect size of DMT and dance interventions in the reduction of depression and anxiety. The authors caution that methodological shortcomings of many primary studies limit these encouraging results and, therefore, further investigations to strengthen and expand upon evidence-based research in DMT are necessary.

Ren and Xia (2013) evaluated the effects of dance therapy for people with schizophrenia or schizophrenia-like illnesses compared with standard care and other interventions. The search methods for this Cochrane Collaboration were to update the original search for the Cochrane Schizophrenia Group register. Chinese main medical databases were also searched. After initial identification of 1020 citations, all but 12 were removed as being duplicate and irrelevant references. The remaining 12 references were considered as potentially relevant and retrieved for further assessment; 11 were ultimately excluded, leaving only one study to include in this Cochrane Review. This study was a randomized, single-blind study (n = 45), which lasted for 10 weeks with a follow-up after four months, and compared dance therapy plus routine care with routine care alone. Most people tolerated the treatment package, but nearly 40% were lost to follow-up in both groups by four months. At the end of treatment, significantly more people in the dance therapy had a greater than 20% reduction in Positive and Negative Syndrome Scale (PANS) negative symptom score (moderate quality evidence), and overall, average negative endpoint scores were lower (moderate quality evidence). There was no difference in satisfaction score and quality of life data were also equivocal. The authors conclude that – based on predominantly moderate quality data – there is no evidence to support or refute the use of dance therapy in this group of people, and that this therapy remains unproven. The authors suggest that those with schizophrenia, their carers, trialists, and funders of research may wish to encourage future work to increase high quality evidence in this area.

Malkina-Pykh (2012) conducted a study to (a) examine associations between pre-treatment BMI, body dissatisfaction, perfection, alexithymia, and restraint, emotional and external eating behavior in obese patients; (b) analyze the impact of the pre-treatment measures in psychological variables on the outcome of a cognitive-behavioral therapy (CBT) program; and (c) test the effectiveness of rhythmic movement therapy (RMT) in the treatment of disordered eating behaviors and obesity with the CBT non-responders. A total of 104 patients (mean age 37.6 years) who were self-referred or referred by professionals to a weight management program were selected at random to participate. Patients were assessed with the following measures: (1) eating behaviors were investigated using the Dutch Eating Behavior Questionnaire (33 items) – a self-report containing three scales – restraint eating, external eating, and emotional eating; (2) alexithymia was investigated using the Toronto Alexithymia Scale-26 – a self-report measure; (3) body image dissatisfaction was investigated using the Body Image Test; (4) Personal Perfectionism Scale and Social Perfectionism Scale(s). In the first stage of treatment, outpatient CBT was provided (24 weekly individual treatment sessions, each 45-50 minutes in duration). After CBT, two groups of patients were formed. Group 1 consisted of 46 individuals who reduced weight significantly and Group 2 included 58 individuals who reduced weight non-significantly or not at all. The second stage of treatment investigated the effectiveness of RMT for those patients who did not show improvement in weight status after CBT. The CBT-non-responders were randomly divided among two groups: the continuing CBT individual treatment group (n = 28) and the RMT group (n = 30). This stage also included a control group of obese/overweight subjects. The duration of each RMT session was 45-50 minutes. All patients in this stage of treatment completed 24 biweekly sessions. Results from the first stage of treatment indicated that the success of CBT for weight reduction was significantly associated with the pre-treatment psychological wellness of the participants. Results from the second stage of treatment found efficacy of the RMT approach for weight reduction as well as for the improvement of psychological status for CBT-non-responders. The author acknowledges a small sample size, which limits interpretation of comparative results and generalization of study findings, and discusses the need for future research using larger samples and random assignment to multiple treatment arms. Additionally, the author mentions that conclusions regarding the efficacy of the RMT evaluated in the trials are limited by the absence of follow-up data, and that longer studies with follow-ups are needed to better assess the overall effectiveness of the RMT approach.
Akandere and Demir (2011) examined the effect of dance on depression. A total of 120 healthy students, ages 20 to 24, volunteered to participate in the study. They were divided randomly into 1 of 2 groups: a dance training group (DTG; n = 60) and a control group (CG; n = 60). All students had a weekly volume of regular physical activity ranging from 8-10 hours. The DTG intervention was applied to the subjects 3 days a week for 12 weeks. The subjects in the control group only participated in the pre- and post-test measurements. All subjects abstained from physical activity not related to the study during the 12-week period. The BDI was applied to evaluate the effect of dance training on depression. Testing was conducted before and after the 12 weeks of dance training. The dance training group had average pre-test BDI scores of 15.72, and post-test scores of 13.90. The control group had pre-test BDI scores of 16.52, and post-test scores of 17.48. The authors conclude that 12 weeks of dance training was found to be effective on the depression levels of the subjects participating in the DTG group.

Strassel and colleagues (2011) evaluated therapeutic benefits of dance therapy by systematically analyzing and summarizing available systematic reviews, meta-analyses, and randomized controlled trials (RCTs). The Overall Quality Assessment Questionnaire (OQAQ) was used to assess review quality, and RCT quality was assessed using the Jadad Scale. The search identified seven reviews and one meta-analysis published between 1996 and 2009. Only three reviews focused specifically on dance therapy, with others including therapies such as art and music therapy, tai chi, and creative therapy. All but three reviews concentrated on the effects of dance therapy for specific diseases, mostly mental disorders. The number of trials included in the reviews ranged from 1 to 23 (median of 5), with very few of these trials being RCTs. According to the OQAQ, seven of the eight reviews were of poor methodological quality. Two RCTs were included in a review specifically focusing on depression, and one review with a total of one RCT focused specifically on anxiety. A total of 18 RCTs also met inclusion criteria, ranging in quality from poor to good. Among the RCTs, positive effects of dance therapy were reported for people with dementia, depression, anxiety, learning disabilities, and Parkinson’s disease. The authors note that because of generally poor-quality and potentially biased findings of the research evaluating the effectiveness of dance, the findings of these studies must be considered tentative, but that the trials do provide direction for research questions to be posed in future, better-quality trials. Additionally, they state that the inconclusive results of most of the reviews about the effectiveness of dance therapy can be attributed to the limited number and low quality of the studies included in the reviews; these studies often lacked a control group, had small sample size, and used poor study designs.

Kiepe and Keil (2010) assessed the effects of dance therapy/dance movement therapy (DMT) for adults with mental and physical illnesses in comparison with standard care and other types of intervention. A systematic search for the time period 1995-2010 was conducted. The quality of the studies was assessed using Jadad Scale for randomized control trials (RCTs) and the NewCastle-Ottawa Quality Assessment Scale for cohort and case control studies. Mental and physical disorders were analyzed separately, following the grading system of evidence-based medicine. A total of 21 studies were identified for inclusion. Eleven of these studies were RCTs: depression (n = 3), breast cancer (n = 2), idiopathic Parkinson syndrome (n = 2), dementia (n = 1), heart failure (n = 1), diabetes (n = 1), and fibromyalgia (n = 1). The remaining studies were controlled trials, cohort, and pre-post studies. The RCTs were determined to be of moderate or low quality. Preliminary evaluation showed that DMT may have some benefits for patients with breast cancer, improving quality of life, as well as for patients with depression, decreasing psychological distress and changes in neuro-hormones. The authors conclude that there seems to be some evidence that DMT and dance is beneficial for patients with certain physical and mental illnesses, but suggest that further research, particularly randomized control trials with larger sample sizes, longer treatment periods and active control groups, are needed to gain more profound insight into the efficacy of these treatment options.

Koch and colleagues (2007) investigated the specific effects of a dance intervention on the decrease of depression and the increase of vitality and positive affect in 31 psychiatric patients (mean age 42.7) diagnosed with depression. The study used a three-group repeated-measure design, comparing the treatment group (dance) to a music-only (music) and a movement-only control group (biking on a home trainer), each lasting 20-30 minutes. Results suggest that depression decreased significantly in the dance group only as compared to the music-only group and the movement only group. Participants in the dance group also showed a significantly higher increase in vitality than participants in the music group. Effects on the difference score of affect were not significant. The authors note that limitations of the study include the brevity of the intervention, and possible demand effects from the researchers. Additionally, depression pre-test scores of patients in the dance group were slightly but not significantly lower than that of the music group.

Jeong and colleagues (2005) investigated the efficacy of dance movement therapy (DMT) in reducing the negative psychological symptoms of mild depression in adolescents and to identify the mechanisms underlying these effects. A total of 347 female middle school subjects were asked to respond to a questionnaire that included the Beck Depression Inventory, of which 300 (86.5%) were completed. Of those completing the questionnaire, 112 subjects with higher depression scores were selected as possible subjects. Subjects were then selected from this group of 112 using the following criteria: (a) no past or present diagnosis of psychiatric or internal illness, (b) no neuroendocrine disorders, (c) no history of regular exercise within the past 6 months, (d) not using prescription medication or any other therapeutic treatment for depression, (e) no habitual smoking or drinking, and (f) parental permission to...
participate. Forty subjects were randomly selected (from 51 eligible) to participate in the study and randomly assigned into either a DMT group (n = 20; mean age = 16) or a control group (n = 20; mean age = 16). The DMT group participated in a 45-min DMT session 3 times a week for 12 weeks. The DMT sessions were designed around four major themes: (a) awareness of the body, the room, and the group; (b) movement expressions and symbolic quality of movement; (c) movement, feeling, images, and words; and (d) differentiation and integration of feelings. The subjects in the control group did not participate in treatment, but were invited to participate in a similar program after the end of the study. Results found that negative psychological symptoms were improved by 12 weeks of DMT (measured by the Symptom Check List-90-Revision), but not in the control group. Significant changes were also found in the levels of serotonin and dopamine (measured using high performance liquid chromatography with electrochemical detection). The authors note that this was a preliminary study with several limitations, such as a small sample size and the lack of an equivalent exercise control group to estimate expectation effects. They suggest that further randomized studies with objective measures, larger sample sizes, measurements after multiple sessions, and long-term follow-up are needed to show the effects of DMT in patients with mild depression.

Equine Therapy

Maber-Aleksandrowicz and colleagues (2016) reviewed the literature on animal assisted therapy (AAT) in people with intellectual disabilities. A search identified studies using AAT that measured psychosocial outcomes (behavioral, cognitive, emotional, and social). Quality of studies was assessed using a standardized tool and rated as strong, moderate, or weak. A total of 10 studies were included in the final review – two rated as moderate quality and eight rated as weak quality. Results found a positive improvement reported from studies for all psychosocial outcomes. The authors conclude that AAT may be a potentially useful supportive intervention, and future research should better address the methodological limitations of existing work.

Lentini and Knox (2015) summarized and tabulated literature on the various forms of equine-focused psychotherapy to better describe what is being done and determine best practices. Selected articles were classified according to whether the study was predominantly quantitative or qualitative, with 47 studies selected for review. Although variability between studies was identified, the modal intervention was one 60-minute session per week for 12 weeks. The majority of reviewed papers found benefits for a variety of presenting problems and disorders, mostly in at-risk youth and children with an autism spectrum disorder diagnosis. The authors note that despite the results, several challenges remain. These included a need for more randomized, controlled studies with large samples using non-subjective outcome measures.

Davis and colleagues (2015) conducted a systematic review to evaluate the results of animal-assisted interventions on symptoms associated with autism spectrum disorders (ASDs). Studies were included for the review if they evaluated the effects of animal interaction with at least one child, under the age of 18, with ASD. A total of 20 studies met the criteria for inclusion in the review, representing a total of 330 participants (sample size ranging from 1-64). In addition to ASD, 15 participants were reported to have an additional diagnosis (most frequently included an intellectual disability). Six of the studies taught the child a specific skill with the animal, such as mounting and riding a horse. Eight of the 20 studies found positive results, with the remaining 12 studies finding mixed results. The authors assigned a certainty of evidence to the reviewed studies, with the majority of the studies (90%) classified as insufficient, the lowest level of certainty. All of the studies reporting positive results were classified as having an insufficient certainty of evidence. Among many of the studies, threats to internal validity compromised the methodological rigor of the study. The authors conclude that caregivers and practitioners should exercise caution in selecting animal-assisted interventions as part of an intervention package for children with ASD.

Anestis and colleagues (2013) examined the quality of and results from peer-reviewed research on equine-related treatments (ERT) for mental disorders and related outcomes. A total of 14 peer-reviewed studies that examined treatment for mental disorders or closely related outcomes were identified from databases. To be included, studies needed to involve the use of an intervention in which an equine plays a pivotal role either as a standalone or adjunctive treatment of a specific mental illness or conditions closely related to mental illness. Additionally, studies needed to employ an experimental protocol and report how efficacy and effectiveness was assessed. Of the 14 studies, 10 used child participants. Results found that all studies were compromised by a substantial number of threats to validity, calling into question the meaning and clinical significance of their findings. Additionally, the authors note that the studies failed to provide consistent evidence that ERT is superior to the mere passage of time in the treatment of any mental disorder, The authors conclude that the current evidence base does not justify the marketing and utilization of ERT for mental disorders, and that such services should not be offered to the public unless and until well-designed studies provide evidence that justify different conclusions.

Ward and colleagues investigated the association between therapeutic riding (TR) and the social communication and sensory processing skills of elementary students with autism. A total of 21 children, with a mean age of 8.1 years, participated. All children received speech services and all but one received occupational therapy (OT) services; the specific duration and specifications of these services are unknown as school records were not accessible by the researchers. The Gilliam autism rating scale-2 (GARS-2) and the sensory profile school companion (SPSC) were used...
to assess autism characteristics and sensory responses, respectively. The study was a single group quasi-experimental interrupted time series design with two phases of THR lessons and one phase of planned interruption. Measures were completed at three points during each riding phase: prior to the first lesson, midpoint, and after last lesson. THR lessons averaged 45 minutes in length, and were offered for ten consecutive weeks, followed by a 6-week break, then another eight consecutive weeks. Teacher ratings indicated that participating children with autism significantly increased their social interaction, improved their sensory processing, and decreased the severity of symptoms associated with autism spectrum disorders following THR. Gains were not maintained consistently after 6-week breaks from THR, but were recovered once THR was reinstated. The authors note that findings from the study are considered preliminary and should be interpreted with caution due to limitations in sample size and lack of a control group. The authors state that future research should investigate whether multiple measures and data sources demonstrate a similar impact, and findings from THR should be compared to other alternative leisure interventions.

Selby and Smith-Osborne (2013) conducted a review to systematically identify, summarize, and evaluate any existing empirical studies of animal-assisted interventions (AAI) for autism spectrum disorder (ASD) in order to document currently researched AAI practices and their reported findings, as well as to provide directions for further, more rigorous research. The final sample included 14 articles published between 1989 and 2012 that met the inclusion criteria of empirically evaluating AAI for ASD. The most common AAI animals were dogs (n = 7) and horses (n = 6). All AAIs with horses occurred at riding centers. The most common designs were single-subject or within-participant (n = 13), with only one study using a control group design. Reported outcomes included improvements for multiple areas of functioning known to be impaired in ASD, namely increased social interaction and communication, as well as decreased problem behaviors, autistic severity, and stress. The author comments that despite unanimously positive outcomes, most studies were limited by many methodological weaknesses. The author concludes that the review demonstrates a preliminary “proof of concept” of AAI for ASD and highlights the need for further, more rigorous research.

O’Haire (2013) conducted a review to systematically identify, summarize, and evaluate any existing empirical studies of animal-assisted interventions (AAI) for autism spectrum disorder (ASD) in order to document currently researched AAI practices and their reported findings, as well as to provide directions for further, more rigorous research. The final sample included 14 articles published between 1989 and 2012 that met the inclusion criteria of empirically evaluating AAI for ASD. The most common AAI animals were dogs (n = 7) and horses (n = 6). All AAIs with horses occurred at riding centers. The most common designs were single-subject or within-participant (n = 13), with only one study using a control group design. Reported outcomes included improvements for multiple areas of functioning known to be impaired in ASD, namely increased social interaction and communication, as well as decreased problem behaviors, autistic severity, and stress. The author comments that despite unanimously positive outcomes, most studies were limited by many methodological weaknesses. The author concludes that the review demonstrates a preliminary “proof of concept” of AAI for ASD and highlights the need for further, more rigorous research.

Kang and colleagues (2013) tested changes in equilibrium among disabled participants after engagement in horseback riding. A total of 26 participants (mean age: 9.8) were divided into three groups (6 children with cerebral palsy, 14 children with intellectual disability, and 6 children with autism). Participants engaged in therapeutic horseback riding (TR) two times per week for 30 minutes per session, lasting for a total of 5 months. Results found the participants to have a marked increase in equilibrium, with an average equilibrium time of 58.62 seconds vs. 14.4 seconds before the program. Specifically, the autism group showed the greatest improvement with a change from 24.62 (+/- 15.29) seconds to 93.93 (+/- 55.07) seconds, for an average increase of 69.30 (+/- 44.08 seconds). Chief limitations noted by the authors include the small sample size and lack of consideration of individual symptoms. Also, little information was gathered on individual exercise or training habits.

Jenkins and Reed (2013) evaluated the effects of therapeutic horseback riding (THR) on the behavior of children with autism using a multiple baseline across participants design and a waitlist control group for comparison purposes. A total of seven children between 6-14 years of age (mean: 9.5 years) participated in the study. Participants were divided into a treatment (n = 4) and a waitlist control group (n = 3), with participants assigned to the latter group not receiving THR until after completion of the study. Participants were observed weekly in an after-school program during four center-based activities and during therapeutic horseback riding lessons. The authors also conducted intermittent probes of behavior at home. Weekly 60-minute therapy sessions were conducted during an established 9-week THR program. The same instructor taught all but one lesson for all participants throughout the study. The authors found that therapeutic horseback riding did not produce systematic changes in affect, responding to others’ initiations, spontaneous initiations, off-task behavior, compliance, problem behavior, or performance on two standardized measures (Child Behavior Checklist; Teacher Rating Form). Three of the four participants in the treatment group had improved posture during the course of the 9-week THR program. Several limitations are noted by the authors, including dependent variables being measured for one participant at a time during therapy, and that THR was offered for a shorter amount of exposure time (9 weeks) than other studies.

Ajzenman and colleagues (2012) investigated whether hippotherapy increased function and participation in children with autism spectrum disorder (ASD). A total of 6 children with ASD, aged 5-12, participated in this pilot study consisting of 12 weekly 45-minute hippotherapy sessions. Data were collected 1 week before and 1 week after completion of the intervention, and included the Vineland Adaptive Behavior Scales–II (VABS–II) and the Child Activity Card Sort (CACS). When pre- and post-therapy results were compared, the authors found a significant improvement
in postural stability in children with ASD. On the VABS-II, significant increases with small effect sizes were also observed in overall adaptive behaviors, such as receptive communication (from low functioning to moderately low functioning) and coping, and in participation in self-care, low-demand leisure, and social interactions. No significant differences were found in the daily living and motor skills domains, nor the expressive communication or interpersonal skills domains. On the CACS, significant increases in changes scores in participation in daily activities were observed. Moderate to large clinically significant daily participation increases were seen in self-care, low-demand leisure, and social interaction. The small sample size is noted by the authors as the primary limitation of the study, and they comment that this study will provide a foundation on which to design a larger study in which the number of participants may allow for increased statistically significances in other factors of adaptive behaviors and participation. The authors also suggest that in future studies, to prevent parental biases, teacher-rating forms in addition to parent forms should be used, along with blinding teachers to the therapy that participants receive.

Gabriels and colleagues (2012) examined the effects of ten 1-hour weekly lessons of therapeutic horseback riding (THR) on 42 participants diagnosed with an autism spectrum disorder, compared to a subset (n = 16) of the total study population who were first evaluated before and after a 10-week waitlist control condition. All participants in this pilot study were diagnosed with either autistic or Asperger's Disorder, were between ages 6-16 (mean age 8.7) and had a nonverbal IQ range of 44-139 (mean: 95.2). Thirty-eight percent of participants’ caregivers reported having comorbid psychiatric conditions and 33% reported participants taking psychoactive medications. All participants received baseline and post-condition assessments in the areas of self-regulation, adaptive living skills, and motor skills. The 16 participants that participated in the 10-week waitlist control condition were evaluated within one month prior to the waitlist control period and these evaluations were used as these participants’ baseline measurements. At the end of the waitlist period, these participants were again evaluated. Measures utilized included the Aberrant Behavior Checklist-community (ABC-C), the Vinelad Adaptive Behavioral Scales-Interview Edition (VABS-II), the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2), and the Sensory Integration and Praxis Test (SIPT). Comparing baseline-THR evaluations to those conducted post-THR intervention, participants demonstrated significant improvements on measures of self-regulation, adaptive expressive language skills, motor skills, and verbal praxis/motor planning skills. A comparison to the waitlist control group found that four of the changes were significant: irritability, lethargy, stereotypic behavior, and hyperactivity scales of the ABC-C. All other measures showed no significant differences on this analysis. The study did not indicate that there was a specific profile that best predicted the significant improvements made as a result of the intervention. The authors note that the study results are limited by rater bias because raters were not blinded to participants’ intervention condition. They also note the lack of a more powerful randomized controlled design and a standardized THR intervention protocol.

Cuypers and colleagues (2011) investigated the effects of therapeutic horseback riding on behavior, health-related quality of life, and motor performance in children with attention deficit hyperactivity disorder (ADHD). The pilot study employed a time series quasi-experimental design with two pretests and two posttests conducted 8 weeks apart. A total of 5 children, aged 10-11 years received a 1-hour therapeutic horseback ride twice a week for 8 weeks at a riding school. Behavior and health-related quality of life was assessed using Strength and Difficulties Questionnaire (SDQ) and the KINDL(R)-Health-Related Quality of Life Questionnaire. The Modified Function-Neurological Assessment and the Movement Assessment Battery for Children assessed the subject’s motor performance. Pre and posttests were compared with the Wilcoxon paired sample tests and Friedman test for nonparametric multiple test samples. Therapeutic horseback was found to have a positive effect on all five children with ADHD in several domains of the social role behavior and quality of life. Motor performance also improved after the intervention. The authors conclude that this pilot study constitutes a good scientific prospect for future studies.

In a review of hippotherapy effectiveness, the Association for Science in Autism Treatment (Zane, 2010) comments that “no well-designed studies on hippotherapy have been reported to date. Many of the published papers are either simply descriptive in nature or case studies that do not allow any confidence in a causal relationship between hippotherapy and improvement in the participants. In sum, it seems that the level of quality research that would allow us to conclude that hippotherapy is an effective strategy for persons with developmental disabilities does not exist at this time.”

Kern and colleagues (2009) conducted a prospective trial to examine the effects of equine-assisted activities on overall severity of autism symptoms, measured with the Childhood Autism Rating Scale (CARS), the quality of parent-child interactions using the Timberlawn Parent-Child Interaction scale, and changes in sensory processing, quality of life, and parental treatment satisfaction. A total of 24 participants between the ages of 3-12 participated; twenty-two completed the first 3 months of riding, and 20 participants completed the entire 6 months of riding. The participants were assessed at four time points during the study: (1) when placed on the waiting list, (2) immediately before the participant began riding, and (3) at three months and (4) six months after the participant began riding. The participants rode once per week for 60 minutes. Results found a reduction in the severity of autism symptoms with the therapeutic riding treatment. There was no change in CARS scores during the pretreatment baseline period, but there was a significant decrease after treatment at 3 months and 6 months of riding. None of the overall tests for Timberlawn Parent-Child Interaction Scale indicated significant changes on any of the six subscales. There was an
overall increase in the parent-rated quality of life measure; however the authors note that this effect may be due to enrollment and not specific to treatment. Other limitations include participants not being randomized into treatment conditions, and the small number of children enrolled in the study. The authors also note that it was difficult to control all factors and keep them consistent throughout the study, such as keeping a child with the same horse and/or instructor throughout the period. The authors conclude that their findings suggest that equine-assisted activities confer benefits to individuals with ASDs, and emphasize the importance of continued research in this area.

Keino and colleagues (2009) applied a novel psycho-educational horseback riding program to the treatment of four children with pervasive developmental disorders (PDD) to facilitate the acquisition of verbal and nonverbal communication skills. Four children participated in the study, and were scored on a scale designed to assess the behavioral improvement based on 10 items (human relationships, imitation, emotional expression, sudden physical movement, fixative behavior, adaptation to change, visual response, fear or nervousness, and verbal and nonverbal communication). The evaluation of the scale was carried out by the mother of each child along with two experimenters from the study. All subjects took part in the riding program for varying lengths of time, ranging from 12-37 months. After several months of participation, all subjects showed improved scale scores and marked improvements in eye contact with others in the riding area. As the program progressed, children reportedly showed enhanced verbal and nonverbal communication skills, and became more expressive in their emotional and empathetic interaction with parents. It was unclear if the participants had concomitant therapies during the treatment period.

Bass and colleagues (2009) examined the effects of a 12 week therapeutic horseback riding intervention on social functioning in children with autism spectrum disorders (ASDs). A total of 34 children diagnosed with ASD participated in the study. All met criteria for DSM-IV-TR autism spectrum diagnosis. All parents had to consent to pre-testing, 12 weeks of therapeutic horseback riding, and one post-testing session. The experimental group consisted of 2 girls and 17 boys ranging from 5 to 10 years of age. The wait-list control group was made up of 3 girls and 12 boys ranging from 4 to 10 years of age. Almost all participants had undergone conventional therapies. Post-test assessment of both groups took place at the completion of the 12 week intervention. The Social Responsiveness Scale (SRS) and Sensory Profile (SP) were used to assess social functioning at pre- and post-intervention. Each child in the treatment group received a therapeutic riding session for 1 hour per week over the span of 12 weeks. Results found that autistic children exposed to therapeutic horseback riding exhibited greater sensory seeking, sensory sensitivity, social motivation, and less inattention, distractibility, and sedentary behaviors. Treatment effects on three subscales were not significant: fine motor/perceptual, social cognition, and social awareness. The authors note several limitations: there was no information about medication regimens, and a total of nine participants dropped out of the study (six from the experimental and three from the control). The authors note that future studies are needed to further assess the therapeutic effects of horseback riding for children with ASDs, and these studies should increase the length and number of sessions to test whether a more intense form of treatment would result in greater improvement in social functioning.

Klontz and colleagues (2007) integrated equine activities with the theory and techniques of experiential therapy. Treatment outcomes were assessed in a 4.5 day residential program providing 28 hours of equine-assisted experiential therapy (EAET) in a group therapy format, with groups averaging 8 participants per group. Upon arrival, participants were administered a pretest consisting of the Brief Symptom Inventory (BSI) and the Personal Orientation Inventory (POI). The same measures were administered again after the final day of treatment, and participants were mailed a follow-up assessment battery 6 months after treatment. A total of 49 individuals agreed to take part in the study and provided pretest and posttest data. Of the sample, 31 participants mailed in their follow-up data and were included in the data analysis. Participants ranged in age from 23-70 (mean age of 44.7). The authors found that reported reductions in psychological distress and enhancements in psychological well-being were significant immediately following treatment and were stable at 6-month follow-up. The authors note that the results are difficult to interpret due to the absence of several experimental controls, such as the lack of a control or comparison group and the use of a non-random sample. They encourage future research in this area to utilize random selection and assignment and use of a control or comparison group. The study was also limited in its reliance on client self-report data, and no data were collected on individuals who declined to participate.

**Music Therapy**

Zhao and colleagues (2016) conducted a systematic review and meta-analysis of randomized controlled trials to determine the efficacy of music therapy in the management of depression among elderly individuals (aged 60 or older). The primary outcome measure throughout the included studies was change in depressive symptoms, measured using a range of scales (either self-rated or score by independent rater). A total of 19 articles met inclusion criteria and were included in the synthesis. Studies included those where music therapy was added to standard therapies vs. standard therapy alone, and music therapy vs. no treatment. Nine studies were found to have used adequate random allocation sequences, with the randomization methods of the other studies unclear. Six studies blinded the participants or outcome assessments, and two studies did not use correct blindness methods. Two studies reported attrition bias. The findings of the meta-analysis suggested that music therapy plus standard treatment had a statistical significance in reducing depressive symptoms, but music therapy alone did not have a statistically
significant effect in reducing depressive symptoms when compared with standard treatments. The authors note that further research that reports the method of blinding and allocation concealment and uses the correct method of randomization is needed.

Bidabadi and Mehryar (2015) conducted a single-center, parallel-group, randomized clinical trial to investigate the role of music therapy as an adjunct to standard treatment for obsessive-compulsive disorder (OCD) and co-morbid anxiety and depression. A total of 30 patients with OCD were randomly assigned to either standard treatment (pharmacotherapy and cognitive-behavior therapy) plus 12 sessions of individual music therapy (n = 15), or to standard treatment only (n = 15) for a period of 1 month. Primary outcome was change in the obsessional symptoms as measured by the Maudsley Obsessive-Compulsive Inventory (MOCI). Anxiety and depression measures, as measured by the Beck Anxiety Inventory (BAI) and Beck Depression Inventory-Short Form (BDI-SF) were measured as well. Forms were administered at baseline and after the one month treatment period. Results found that adjunctive music therapy resulted in a greater decrease in total obsessive score (checking and slowness, but not washing or responsibility) when compared to standard treatment only. Music therapy was also found to be significantly more effective in reducing co-morbid anxiety and depressive symptoms compared to standard treatment. The authors acknowledge the relatively small sample of included participants as a limitation. The authors recommend further study of whether the demonstrated short-term benefits can be sustained over longer periods of time.

Kamioka and colleagues (2014) summarized the evidence for the effectiveness of music therapy (MT) and to assess the quality of systematic reviews (SRs) based on randomized controlled trials (RCTs). Studies were eligible if they were RCTs; in total, 21 studies met this criteria. A total of 16 Cochrane Reviews were included in the study selection. Eight studies specifically focused on MT for mental and behavioral disorders. The results found that MT improved global and social functioning in schizophrenia and/or serious mental disorders, gait and related activities in Parkinson’s disease, depressive symptoms, and sleep quality. The review showed that there was no special adverse effect or harm associated with MT. The authors note that future research should explore long-term effects, consensus of the framework of music intervention, and dose-response relationships.

Geretsegger and colleagues (2014) assessed the effects of music therapy for individuals with autism spectrum disorders (ASD). This Cochrane Review included all randomized controlled trials (RCTs) or controlled clinical trials that compared music therapy or music therapy added to standard care to placebo therapy, no treatment, or standard care for individuals (age 2-9 years) with ASDs. Primary outcomes included social interaction, communicative skills, initiating behavior, social-emotional reciprocity, and adverse effects. A total of 10 studies (n = 165) were identified; these examined short- and medium-term effect of interventions (1 week – 7 months). Nine of the studies were RCTs, and half of the trials examined therapy for 1-2 weeks (applied on a daily basis). No long-term follow-up assessments were included in any of the studies. Six of the studies had sample sizes varying from 4-10 participants, and the largest study had a sample size of 30. Results found that music therapy was superior to placebo therapy or standard care on all primary outcome measures except for non-verbal communicative skills outside of the therapy context. None of the included studies reported any adverse effects. The authors note that the small sample sizes of the studies limit the methodological strength of these findings. They recommend more research, using larger samples and generalized outcome measures to corroborate these findings and determine whether the effects of music therapy are enduring.

Carr and colleagues (2013) conducted a systematic review to identify how music therapy is provided for acute adult psychiatric inpatients, and what outcomes have been reported. Studies were included if they described music therapy as the main component of treatment with adult inpatients (age 18+), admitted for treatment of acute symptoms in psychiatric hospitals. All interventions used active and/or receptive musical activities as the primary treatment component in conjunction with the relationships formed through these activities to promote health. A total of 98 papers were identified for inclusion, of which 35 reported research findings. Results found that outcome studies suggested effectiveness in addressing a range of symptoms, but were limited by methodological shortcoming and small sample sizes. The authors conclude that no single clearly defined model exists for music therapy in this patient population, and described models are not conclusive. They note that further research is required to develop specific music therapy models for this patient group that can be tested in experimental studies.

Mossler and colleagues (2011) reviewed the effects of music therapy for people with serious mental disorders, such as schizophrenia. This Cochrane Review identified randomized controlled trials (RCTs) that compared music therapy with standard care, placebo therapy, or no treatment for this population. Studies were excluded if more than 30% of participants in any group were lost to follow-up. In total, eight studies (n = 483 participants) were included for review. These studies examined effects of music therapy over a period of 1-4 months, with treatments varying from 7-78 sessions. All studies stated explicitly that randomization occurred, but concealment of allocation was unclear in all but one study. Blinding of assessment was reported in four of the studies. Results found that music therapy in addition to standard care was able to help schizophrenia patients to improve their global state, mental state (including negative symptoms as measured by the Scale for the Assessment of Negative Symptoms), and social functioning. Effects were inconsistent across studies and depended on both number of total sessions as well as quality of the
therapy provided. The authors note that further research should address long-term effects of music therapy, dose-response relationships, and relevance of outcome measures in relation to music therapy.

Erkkiela and colleagues (2011) conducted a randomized controlled trial (RCT) to determine the efficacy of music therapy added to standard care compared to standard care only for treatment of depression among working-age individuals. A total of 79 adults with unipolar depression (age 18-50 years) were included. All were included irrespective of medication status and allowed to continue medication during the study. Participants were randomized to either music therapy (n = 33) or standard care (n = 46), and psychiatric assessments were conducted at baseline and 3- and 6-months. In the intervention group, a total of 20 bi-weekly music therapy sessions were offered, each lasting 60 minutes. Primary outcome measure was the Montgomery-Asberg Depression Rating Scale (MADRS). On average, those assigned to music therapy received 18 sessions. Results found those receiving music therapy plus standard care showed greater improvement than those receiving standard care only. Chances of response (50% or greater decrease in MADRS score) at 3 months were significantly greater with music therapy than with standard care; this difference was not significant at 6 months. The authors conclude that music therapy added to standard care helps people with depressive episodes to improve their levels of depression, as well as anxiety and functioning. The authors note that the present trial was larger and more rigorous than previous studies, but might still be regarded as an exploratory trial in a statistical sense.

Gold and colleagues (2009) conducted a systematic review and meta-analysis to examine the benefits of music therapy for people with serious mental disorders. Prospective studies that evaluated music as a form of psychotherapy compared with no treatment, standard care, placebo, or an active control condition were included. In most of the included studies, the interventions were a combination of improvisation, playing music on instruments, singing, writing songs, listening to music, and verbal reflections on music experiences. Sessions were attended from 1-6 times per week for 1-6 months, and were individual, group, or both. In half of the studies, music therapy was compared with standard care, and in the other half, with antidepressants, minimal therapeutic contact, cognitive therapy, no treatment, or no comparison group. Age of participants ranged from 18-86, and two-thirds of participants were diagnosed with a psychotic disorder. Outcomes included general mental state, functioning, positive/negative symptoms, depression, and anxiety. Studies that had attrition rate of > 30% or were not blinded were excluded. Fifteen studies (n = 691) were included in the review; eight were randomized controlled trials (RCTs). Assessor blinding was “adequate” in six studies and “uncertain” in nine studies. Only those studies comparing music therapy with standard therapy were reported, as a lack of data precluded the meta-analysis of other comparisons. The analysis found that music therapy was effective for people with psychotic and non-psychotic severe mental disorders in improving global state, symptoms, and functioning. Longer courses or more frequent sessions were required to achieve more substantial benefits. Differing study designs and a small number of studies for some of the outcomes were noted as limitations.

Maratos and colleagues (2008) examined the efficacy of music therapy with standard care compared to standard care alone among people with depression and to compare the effects of music therapy for people with depression against other psychological or pharmacological therapies. This Cochrane Review identified randomized controlled trials (RCTs) comparing music therapy with standard care or other interventions for depression. The primary outcome was reduction in symptoms of depression, based on a continuous scale. A total of 5 studies met inclusion criteria for review, though variations in the interventions offered did not allow for meta-analysis. Four of the five studies reported greater reduction in symptoms of depression among those randomized to music therapy than to those in standard care conditions. Dropout rates among those in music therapy appeared to be low in all studies. The authors note that the reporting of studies was poor, with information about randomization procedures partial or absent, and that data from the studies needs to be interpreted with caution. They conclude that the findings suggest that music therapy is associated with improvements in mood, but the small number and low methodological quality of studies mean it is not possible to be confident about its effectiveness.

Gold and colleagues (2007) conducted a quasi-experimental study to investigate the effectiveness of individual music therapy in outpatient treatment services for children and adolescents with mental disorders, and to examine the possible impact of client variables (e.g., age, sex, primary diagnosis, comorbid conditions) on the effectiveness of music therapy. A total of 136 children and adolescents (70% boys; age range 3.5-19 years) were assigned to the intervention group (n = 75) or comparison/wait list group (n = 61). The three main disorder categories were adjustment/emotional disorder (n = 37), behavioral disorder (n = 36), and developmental disorder (n = 63). Additionally, medical conditions were present in 73 of the 136 participants. For the intervention group, one 45-minute session per week was offered. On average, intervention group participants received 23 sessions of music therapy. Among the sample, 18% of individuals received other psychological or psychotherapeutic counseling or treatment, and 9% received psychotropic medication. There was a total of 18 drop-outs. Outcome was assessed using multiple domains and multiple observer perspectives. The overall analysis of the primary outcome variables did not reveal a significant interaction. The intervention group showed significant improvement of a small to medium effect size on two outcomes: parent ratings of symptoms and parent ratings of quality of life. The effects of music therapy were smaller for children with comorbid medical conditions than for those without. Young age was also associated with greater
improvement on three outcome measures. The authors note that there may be a discrepancy between good efficacy and poor effectiveness, and that further investigation in several areas would be beneficial.

Whipple (2004) conducted a meta-analysis to examine the effects of music and no-music conditions on treatment of children and adolescents with autism. Studies were selected if they used group or individual subject experimental treatment designs that allowed replicated data analysis, involved children or adolescents diagnosed with autism, and utilized music as a separate independent variable contrasted with a no-music control condition. Twenty-nine studies were located, and 10 studies met criteria for inclusion in the meta-analysis, with a total population of 76. Among the interventions, 50% were conducted by music therapists. Results from the analysis found all effects were in a positive direction, indicating benefits of the use of music in intervention with this population. The author notes that additional studies with larger sample sizes are needed, and that many studies appeared to be in the form of post hoc analysis of clinical work. The author notes that the goal of future research, while addressing sample size and design clarity deficits, should be to assess the efficacy of specific applications of music in the treatment of children and adolescents with autism.

Gold and colleagues (2004) conducted a meta-analysis to assess the efficacy of music therapy for children and adolescents with psychopathology. Studies with a pre-test post-test design (controlled or uncontrolled) of music therapy were eligible for inclusion; studies with only one participant and those addressing the effects of music alone or of music education were excluded. The included studies covered a range of clinical diagnoses, ranging from developmental disorders to conduct disorders. Participants were aged 4-19 years. A total of 11 studies (one randomized controlled trial; 5 non-randomized controlled trials; 5 studies with no control group), involving 188 participants were included in the review and meta-analysis. The pooled effect of music therapy was large and statistically significant, but there was significant heterogeneity between the studies. No subgroup analysis separated controlled studies from uncontrolled studies, and study quality was not assessed. The authors conclude that music therapy produced a clinically relevant effect, but that there is a need for further research, using multiple outcome measures, on models of music therapy and its effectiveness in clinical settings.

**Naturopathic Detoxification**

Miller and colleagues (2012) evaluated a natural dopaminergic agonist to improve dopaminergic function in substance use disorders. Subjects were administered either oral-only treatment or IV treatment with Neuroadaptagen Amino Acid Therapy (NAAT) variant [KB220] along with other (oral) vitamin and mineral nutrients. The subjects were polydrug abusers and in all cases drank alcohol to excess. The subjects were detoxified from drugs within the last two months and had symptoms of craving behavior associated with protracted abstinence. The basic patented formula for NAAT Variant [KB220] included amino acid precursors such as L-phenylalanine, L-tyrosine, L-tryptophan, 5-hydroxytryptophane, L-glutamine, a serotonin concentrating substance chromium, an enkephalinase inhibitor D-phenylalanine, a neurotransmitter synthesis promoter vitamin B6, as well as both methionine and leucine. The amounts of these ingredients varied according to individualized assessment. The IV administration was a 4-hour infusion once a day, over seven days. For the oral therapy protocol, everyone received nutrients including thiamine, riboflavin, niacin, B6, folate, B12, pantothenic acid, magnesium, choline, para-aminobenzoic acid, lecithin, and inositol. In addition, those who met the criteria for being serotonin deficient also received vitamins A, C, E, K, and D, glycine, leucine, DLPA, tyrosine, boron, calcium, biotin, zinc, potassium, methionine, selenium, copper, iodine, and manganese. Those who met the criteria for being DA deficient also received iodine, zinc, copper, selenium, manganese, chromium, potassium, boron, calcium, biotin, and 5-HTP. In the first phase of the study (n = 49) The authors found that the IV and oral group did significantly better than the oral-only group over the first week and 30-day follow-up period on chronic symptoms, as measured by the Chronic Abstinence Symptom Severity (CASS) Scale. In the second phase of the study (n = 129), the combination of IV and oral treatment was provided to all subjects, and three factors (emotion, somatic, and impaired cognition) were extracted for baseline CASS-Revised variables. All three scales showed significant declines from pre- to post-treatment. In the third phase of the study, a total of 23 subjects were followed up at six months, one year, and two years post-IV treatment via phone interview to determine both sobriety and relapse rates. A total of 21 (91%) reported being sober at six months with 19 (82%) having no relapse; 19 (82%) reported being sober at one year with 18 (78%) having no relapse; and 21 (91%) reporting being sober at two years post-treatment with 16 (70%) having no relapse. It is noted that the major limitation of the present experiment was the small number of subjects. The authors encourage others to further confirm these results in a larger population and stringently controlled studies.

Behere and colleagues (2009) conducted a review of the evidence around complementary and alternative medicine (CAM) in the treatment of substance use disorders. The authors acknowledge that established medications include disulfiram, acamprosate, naltrexone, opioid maintenance and nicotine replacement therapies. They define CAM interventions as those that by definition are not accepted by conventional practitioners, because they have not yet been shown to be effective clinically. The review identified a number of trials that were categorized as “biological supplementation”. These approaches included amino acid supplemenations, magnesium supplementation, and use of melatonin. The authors conclude that although a few preliminary studies show encouraging results, none of the alternative therapies have significant evidence; of those reviewed, acupuncture, EEG biofeedback and herbal therapies
hold promise for the future. In general, the authors note that studies of CAM face methodological difficulties relating to standardization of procedures, provision of a control arm and blinding, and a paucity of research, most notably a lack of rigorous human trials.

Chadwick and colleagues (1990) conducted a six-month double-blind study in an inpatient chemical dependency facility. A total of twenty-nine cocaine-dependent subjects were studied to determine if the amino acids L-tryptophan and L-tyrosine would decrease cocaine craving and withdrawal symptoms. Patients were randomized to receive placebo or L-tryptophan (1 g/day) combined with L-tyrosine (1 g/day) orally, over a period of 4 weeks. The authors found no effect of treatment, relative to placebo, in either cocaine withdrawal or craving. The authors conclude that this study's findings are consistent with literature in demonstrating that the amino acids do not significantly reduce most symptoms of cocaine craving and withdrawal when used alone.

Blum and colleagues (1988) investigated the effects of an oral amino acid and vitamin mixture SAAVE in a double-blind, placebo-controlled, randomized study of 62 alcoholics and polydrug users to evaluate the role of neurotransmitters in facilitating recovery and adjustment to a detoxified, sober state. Ingredients in the nutritional supplement SAAVE were D-phenylalanine – 230 mg; L-tryptophan - 25 mg; L-glutamine – 25 mg; and Pyridoxal 5'-phosphate – 5mg. Subjects were randomly divided into four appropriate groups: alcohol-SAAVE, alcohol-placebo, polydrug-SAAVE, and polydrug-placebo. Four individuals left the program immediately after detoxification; eight more individuals left the program before completing treatment. The base set therefore contained 50 individuals. The alcohol subset consisted of 25 individuals, 15 and 10 each in the SAAVE and placebo subgroups, respectively. The polydrug subset consisted of 25 individuals who were abusing several drugs including alcohol, cocaine, barbiturates, tranquilizers, amphetamines, hallucinogens, and marijuana. Thirteen of these individuals used SAAVE, and 12 were provided with placebo. Two SAAVE or placebo capsules were given three times daily for 21 days to the 50 patients. These subjects were then observed for an additional seven days without SAAVE or placebo – to verify that use of SAAVE did not produce dependency. The authors found that SAAVE patients had a significantly reduced stress response as measured by the skin conductance level (SCL), and significantly improved Physical Scores and BESS Scores (behavioral, emotional, social and spiritual). After detoxification there was also a six-fold decrease found in leaving against medical advice (AMA) rates when comparing SAAVE vs. placebo groups. Administration of SAAVE had no significant effect on any cardiovascular measure, such as pulse, systolic or diastolic pressure. The authors note that it may be appropriate for future studies to include, in separate control groups, individuals who receive each amino acid alone. The authors do not list any limitations of the study, however do note that studies are in progress to more systematically define the promising features of [SAAVE], especially in outpatients.

**Sauna/Niacin Detoxification**

Ross and Sternquist (2012) conducted an uncontrolled, retrospective medical chart evaluation of Utah police officers treated with a sauna detoxification protocol for employment-related methamphetamine exposures. The nonprofit American Detoxification Foundation (ADF) established and administered The Utah Meth Cops Project (UMCP), which used the Hubbard detoxification protocol and monitored health and quality of life among Utah police officers to address symptoms consistent with (and appearing after) line-of-duty exposures to methamphetamine and related chemicals. The chart evaluation was for the first 69 police officers sequentially entering the UMCP, each of who had documented contact with methamphetamine and related chemicals through law enforcement activities, and subsequent development of persistent medical symptoms or chronic ill health. Treatment components included 20-30 minutes of aerobic exercise; comprehensive nutritional supplementation including increasing doses of niacin; and moderate-temperature sauna therapy, with breaks every 30 min for fluid and electrolyte restoration, totaling about 4 hours daily. Treatment was given each day until ”maximum gains were achieved” (typically 4-6 weeks). Symptom changes and quality of life were assessed using a baseline history and physical examination, follow-up interviews, and a series of pre- and post-treatment assessments (RAND 36-item Short Form Health Survey; 50-item pre- and post-treatment survey of symptoms, sick days, and sleep patterns; 13-item pre- and post-treatment neurotoxicity questionnaire; Mini-Mental State Examination; daily report forms). A total of 66 men and 3 women, averaging 44.6 years of age enrolled with a 92.8% completion rate. Mean treatment length was 33 days (range: 15-56). Results found that statistically significant health improvements were seen in the SF-36 evaluations, symptom scores, and neurotoxicity scores. It is noted by the authors that the ‘Hawthorne effect’ should be considered, given that many of the officers were told their health was ‘normal’. The authors conclude that despite the obvious limitations of this preliminary study, including the lack of matched controls, the clinical outcomes make a case for continued investigation of the sauna-based Hubbard detoxification protocol.

Schnare and colleagues (1982) conducted a self-selected study with non-matched control group to examine clinically observed physiological and psychological changes in subjects who underwent a comprehensive extrarenal excretion regimen intended to remove lipolhilics and other xenobiotics from the body. This study was developed “to evaluate clinical manifestations associated with the regimen, and is preliminary to a study of its efficacy.” A total of 103 individuals exposed to recreational drugs and other chemicals enrolled in the detoxification and volunteered for additional testing. In addition to the experimental group, a control group of 19 individuals was used. The detoxification regimen consisted of seven components: physical exercise for 20-30 minutes immediately prior to
sauna exposure; forced sweating by sauna at 140-180°F for 2.5-5 hours daily; nutritional supplement centered around gradually increasing doses of niacin; water, salt, and potassium taken as needed; polyunsaturated oil, from 28 tablespoons daily based on individual tolerance; calcium and magnesium supplements; regular daily schedule with balanced meals and adequate sleep. No medications, drugs, or alcohol were permitted during the period of the regimen, followed daily for about 3 weeks. The individual filled out a progress report daily. Prior to commencement of the regimen, lab analysis of blood cholesterol and triglycerides was conducted. Upon completion of the regimen, physical examinations and blood tests were repeated. The WAIS and MMPI were administered to individuals in the experimental and control groups before and after the regimen. In general, the regimen was tolerated well, with only minor complications reported (pneumonia, external otitis, and diarrhea). The authors also note that the use of large quantities of niacin was followed by reactions and flushes which appear to mimic radiation burns like sunburn. These somatic conditions appeared in decreasing intensity over the course of a few days. The average length of the regimen was 31 days (range: 11-89). The average niacin dose reached 3285 mg/day (range: 800-6800 mg/day). The authors note that the program resulted in improvements in high blood pressure, cholesterol, and psychological test scores. IQ improved significantly more in the experimental group (6.7 points on the WAIS) than the control group (2.1 points). High MMPI profiles decreased on the third, fourth, fifth, and sixth scales. The authors conclude that the program appears to be safe as long as it is done under the care of a physician, and that the efficacy of the program should next be determined.

U.S. FOOD AND DRUG ADMINISTRATION

As the practice of CAM has increased in the United States, the Food and Drug Administration (FDA) has seen increased confusion as to whether certain products used in CAM are subject to regulation under the Federal Food, Drug, and Cosmetic Act (U.S. Food and Drug Administration, 2007).

Some niacin products are FDA-approved prescription products for treating high cholesterol; these prescription niacin products typically come in high strengths. Both niacin and niacinamide are approved by the FDA for treatment and prevention of niacin deficiency, and certain conditions related to niacin deficiency. Niacin and other naturopathic therapy combinations have not been reviewed by the FDA for substance use detoxification.

CENTERS FOR MEDICARE AND MEDICAID SERVICES

A National Coverage Determination (NCD) for acupuncture states the following: "Until the pending scientific assessment of the technique has been completed and its efficacy has been established, Medicare reimbursement for acupuncture, as an anesthetic or as an analgesic or for other therapeutic purposes, may not be made. Accordingly, acupuncture is not considered reasonable and necessary..."

No other Local Coverage Determinations (LCDs) or National Coverage Determinations (NCDs) were identified for these services in the treatment of behavioral or substance use disorders.

APPLICABLE CODES

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member-specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Coverage Determination Guidelines may apply.

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### REFERENCES


**ADDITIONAL RESOURCES**

**Clinical Protocols**
Optum maintains clinical protocols that include the Level of Care Guidelines and Best Practice Guidelines which describe the scientific evidence, prevailing medical standards, and clinical guidelines supporting our determinations regarding treatment. These clinical protocols are available to Covered Persons upon request, and to Physicians and other behavioral health care professionals on www.providerexpress.com.

**Peer Review**
Optum will offer a peer review to the provider when services do not appear to conform to this policy. The purpose of a peer review is to allow the provider the opportunity to share additional or new information about the case to assist the Peer Reviewer in making a determination including, when necessary, to clarify a diagnosis.

**Second Opinion Evaluations**
Optum facilitates obtaining a second opinion evaluation when requested by an member, provider, or when Optum otherwise determines that a second opinion is necessary to make a determination, clarify a diagnosis or improve treatment planning and care for the member.

**Referral Assistance**
Optum provides assistance with accessing care when then provider and/or member determine that there is not an appropriate match with the member’s clinical needs and goals, or if additional providers should be involved in delivering treatment.

**HISTORY/REVISION INFORMATION**

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