

# The Effectiveness of Neurofeedback Therapy in Craving of Methamphetamine Use

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## Abstract

**Introduction:** Relapse in methamphetamine dependency is one of the most difficult parts to treat. Therefore treatment of craving for usage is one of the essential sections of treatment in methamphetamine dependency (addiction). This study evaluates the effect of neurofeedback therapy on craving for use. **Methods:** In this study 20 male patient with methamphetamine dependency who diagnosed on the basis of DSM-V were selected. None of the patients had any psychiatric and neurologic disorder except addiction of methamphetamine. Patients were divided into 2 groups of 10. The first group has taken real neurofeedback therapy sessions while the second has undergone non-real neurofeedback (sham) therapy. Then the two groups have been compared with t-test. **Result:** The result shows that in the first group (real neurofeedback), craving for methamphetamine use has been decreased significantly whereas in the second group (non-real or sham), the decrease was not significant. **Conclusion:** Neurofeedback therapy is effective in treatment of craving for methamphetamine use.

## Keywords

**Methamphetamine, Neurofeedback, Craving**

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## 1. Introduction

There are many studies showing the effectiveness of neurofeedback therapy in the remission of alcohol and substance dependency [1]-[6].

Passini and colleagues (1977) [7], Fahrion and his team (1992) [8], and Peniston and Saxby (1995) [9] concluded that neurofeedback therapy was effective in alcoholic patient.

Goldberg and colleagues [10] in 1976 showed the effect of neurofeedback therapy (alpha conditioning) on patients with methadone dependency.

In 1989, Peniston and Kulkosky [11] showed similar result in patients with alcohol dependency.

Kelley (1997) [12] and Kaiser and colleagues (1999) [13] evaluated the effect of alpha/theta training in alcoholic patient within a 9-month period and resulted in marked decrease of relapse. Bodehnamer and Callaway [14] have extended the follow-up of peniston protocol result in 2003. Raymond and colleagues [15] in 2005 showed more avoidance and remission in patients who took neurofeedback therapy sessions. Several studies have been done on alpha/theta protocol on P<sub>z</sub> or P<sub>4</sub> [15] [16].

The objective of this study is to find out the effect of neurofeedback therapy on methamphetamine craving on P<sub>z</sub> region.

## 2. Method

This study is clinical trial with 20 male patients who were referred to Ebne-Sina Hospital in Mashhad, Iran. They were selected by psychiatrist using convenience sampling and then divided into two groups of 10 after matching age and IQ. The first group consisting of 10 has undergone real neurofeedback therapy and the second group has undergone non-real neurofeedback therapy (sham). Each patient took 10 sessions of 30 minutes neurofeedback therapy. Theta/Alpha enhancement has been done on P<sub>z</sub> region with protocol of unipolar in the two groups. DDQ (Desire for drug questionnaire) is used for measurement of craving [17]. Validity and reliability of this questionnaire have been checked in Iranian population [18] [19].

Paired t-test was used to compare data using SPSS software, version 20.

## 3. Result

The following table shows the descriptive statistical analysis of change in craving in the two groups (Table 1).

The difference between pre-test to post-test within each group were measured and compared with paired t-test (Table 2).

As seen in Table 2, the craving for methamphetamine use from 1<sup>st</sup> session to 10<sup>th</sup> session was significantly decreased in real neurofeedback group ( $p < 0.005$ ), whereas the decrease was not significant in non-real group.

## 4. Discussion

This study shows that theta/alpha enhancement (Deep Relaxation) in P<sub>z</sub> region significantly reduces craving for use of methamphetamine.

This study shows the positive effect of neurofeedback therapy in craving for methamphetamine use as it was for other substance or alcohol use in other researches [1]-[15].

## 5. Conclusion

Theta/Alpha enhancement protocol (Deep Relaxation) in neurofeedback therapy in P<sub>z</sub> region is an effective method for treatment of Methamphetamine craving.

**Table 1.** Descriptive statistical analysis of change in craving in each group.

Craving	Max		Min		SE		SD		Mean	
	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre
Case group	55	69	21	36	3.6363	3.76372	11.499	11.9019	36.70	52.10
Control group	63	68	31	40	3.4583	3.4649	10.936	10.9569	49.40	52.50

**Table 2.** Comparison of craving between the two groups.

Paired Sample t-Test	Pre/Post-Test	
	Real Neurofeedback Group	Non-Real Neurofeedback Group (Sham)
t	3.774	1.491
p-value	<0.005	>0.05

## Suggestion

This study has been performed on male patients. Researches on female subjects and their comparison are suggested.

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