The Matrix Model
Treatment Approach for Methamphetamine Dependence

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Overview

- Methamphetamine effects on the brain
- Treatment approaches in light of brain effects
- The Matrix Model treatment approach
- Does methamphetamine treatment work?
Meth Treatment is Challenging

A Major Reason People Take a Drug is they Like What It Does to Their Brains

Natural Rewards Elevate Dopamine Levels

Source: Di Chiara et al.

Source: Fiorino and Phillips
Effects of Drugs on Dopamine Levels

Source: Di Chiara and Imperato

Meth Treatment is Challenging

Prolonged Drug Use Changes the Brain in Fundamental and Long-Lasting Ways
Decreased dopamine transporter binding in METH users resembles that in Parkinson’s Disease patients

“This is your Brain on Meth”

- Dr. Paul Thompson of UCLA; brain mapping study.
- Meth users in their 30s with 10 years of use.
- 11% loss in brain pleasure/reward center tissue.
- He described “a forest fire” of brain damage.
- Navigating through daily life and applying what is learned in treatment may be difficult (reminders, simplicity, redundancy)

Meth in the Brain
Methamphetamine: Neurochemical Mechanisms

- Enters dopamine vesicles
- Vesicles deplete themselves of dopamine
Meth Treatment is Challenging

- Prolonged meth use changes the brain
- Prolonged effects require appropriate treatment approaches
Effective Treatments for Methamphetamine Dependence

The Matrix Institute

- Established 1984
- 5 clinics in Southern California
- San Bernardino County 1985; >50% meth users
Some Core Elements of the Matrix Model

Elements of Effective Treatment with Methamphetamine Users

- Focus on the present; behavior vs feelings
- Structure: 3 X week meetings; 16 weeks
- Information on addiction and recovery
- Teach relapse prevention
- Urine testing
- Introduce and encourage self-help
Matrix Program Schedule (Sample)

<table>
<thead>
<tr>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weeks 1-4</strong>&lt;br&gt; Early Recovery Skills</td>
<td><strong>Weeks 1-12</strong>&lt;br&gt; Family/Education</td>
<td><strong>Weeks 1-4</strong>&lt;br&gt; Early Recovery Skills</td>
</tr>
<tr>
<td>Weeks 1-16&lt;br&gt; Relapse Prevention</td>
<td>Weeks 13-16&lt;br&gt; Social Support</td>
<td>Weeks 1-16&lt;br&gt; Relapse Prevention</td>
</tr>
</tbody>
</table>

Urine and breath alcohol tests once per week, weeks 1-16
Ten Individual/Conjoint sessions during 1st 16 weeks

Simple, redundant, & relevant information

- Classical conditioning and craving
- The brain and addiction
Pavlov’s Dog
Conditioning Process During Addiction

**Social Phase**

Strength of Conditioned Connection

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Parties</td>
<td>• Pleasant Thoughts about AOD</td>
</tr>
<tr>
<td>• Special Occasions</td>
<td>• No Physiological Response</td>
</tr>
<tr>
<td></td>
<td>• Infrequent Use</td>
</tr>
</tbody>
</table>

Mild

**Addiction Phase**

Development of Craving Response

Thinking of Using

Powerful Physiological Response

- ↑ Heart Rate
- ↑ Breathing Rate
- ↑ Energy
- ↑ Adrenaline Effects

Mild Physiological Response

- ↑ Heart Rate
- ↑ Breathing Rate
- ↑ Energy
- ↑ Adrenaline Effects

Use of AODs

- Heart
- Blood Pressure
- Energy

Entering Using Site

AOD Effects
Cognitive Process During Addiction

Disenchantment Phase

- Social Currency
- Occasional Euphoria
- Relief From Lethargy
- Relief From Stress
- Nose Bleeds
- Infections
- Relationship Disruption
- Family Distress
- Impending Job Loss

Conditioning and the Brain: Message to Patients

- Will power, good intentions are not enough
- Behavior needs to change
- Insight will not affect cravings
- Deal with cravings: avoid triggers
- Deal with cravings: thought-stopping
- Scheduling
Treatment: Information & Persuasion

Early Recovery Skills Group

- Drug cessation
- Identify triggers
- Get rid of paraphernalia
- Avoid triggers - schedule time
- Thought-stopping for cravings
- 12-step introduction
Matrix Model Key Component

Information

The Roadmap to Recovery

Information: Roadmap for Recovery

• Withdrawal
• Early Abstinence, Honeymoon
• Protracted Abstinence, the Wall
• Adjustment/Resolution
Information: the Wall

- Protracted Abstinence: “The Wall”
- 45-120 days after last use
Partial Recovery of Brain from Methamphetamine After Abstinence


Dopamine improvements after 1 year, but not cognitive and motor functioning.

Roadmap for Recovery

Return to Old Behaviors
Anhedonia
Anger
Depression

Emotional Swings
Unclear Thinking
Isolation
Family Problems

Cravings Return
Abstinence Violation

Protracted Abstinence
The Wall

- Treatment implications
  - Simple
  - Redundant
  - Frequent visits for an extended period

- Message to patients
  - It takes a while for your brain to heal
  - Don’t make mistakes explaining your feelings
  - Be patient; Don’t give up

Relapse Prevention Groups

- Relapse Prevention
  - Patients need to develop new behaviors
  - Learn to monitor signs of vulnerability to relapse
  - Recovery is more than not using D.O.C.
  - Recovery is more than not using drugs and alcohol
Relapse Prevention Topics

- Relapse Prevention
  - Overview of the concept; things don’t “just happen”
- Using Behavior
  - Old behaviors need to change
  - Re-emergence signals relapse risk (it’s a duck)
- Relapse Justification
  - “Stinking thinking”
  - Recognize and stop

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Relapse Prevention Topics

- Dangerous Emotions
  - Loneliness, anger, deprivation
- Be Smart, not Strong
  - Avoid the dangerous people and places
  - Don’t rely on will power
- Avoiding Relapse Drift
  - Identify “mooring lines”
  - Monitor drift
Relapse Prevention Topics

- Total Abstinence
  - Other drug/alcohol use impedes recovery growth
  - Development of new dependencies is possible
- Taking Care of Business
  - Addiction is full-time
  - Normal responsibilities often neglected
- Taking Care of Yourself
  - Health, grooming
  - New self-image

Relapse Analysis

- Session to be done when relapse occurs after a period of sobriety
- Functional analysis
- Continued drug use is better addressed with Early Recovery topics
- Relapse should be framed as learning experience for client
Relapse and Sex

My sexual drive is increased by the use of …

Percent Responding “Yes”

Primary Drug of Abuse

- opiates
- alcohol
- cocaine
- meth

- male
- female

(Rawson et al., 2002)
My sexual **pleasure** is enhanced by the use of …

My sexual **performance** is improved by the use of …

(Rawson et al., 2002)
Other Components of the Matrix Model

- Family Education Lecture
- Conjoint Sessions
- Urine Testing
- Self Help Initiation

Matrix Model
Urinalysis And Breath Testing

- Method for Monitoring Treatment Progress
- Treatment Accountability
- Assistance for Patient
- Reduces Arguments
- Provides Data for Family or Employer
The “5%” Myth

- Myth: Only 5% of meth users are successful in treatment
- Does treatment work?
- Fact: Some treatments work
- Evidence-based treatments
  - Motivational Interviewing
  - Contingency Management
  - Cognitive/Behavioral Treatment (Matrix Model)

The “5%” Myth

- Wide dissemination may be self-fulfilling
  - Communities won’t support treatment
  - Funders won’t fund treatment
  - Meth users won’t enter treatment
  - Practitioners won’t expect treatment to work
Comparison of Meth and Cocaine Users
Rawson et al., 2000, Journal of Psychoactive Drugs

- 500 methamphetamine users
- 224 cocaine users
- Matrix San Bernardino County
- Identical program and staff

Comparison of Meth and Cocaine Users
Rawson et al., 2000, Journal of Psychoactive Drugs

- Identical treatment outcomes

![Mean Weeks in Treatment](chart1)

![% Clean Urines](chart2)
Matrix Model vs TAU
Rawson et al., 2004, Addiction

- 978 Methamphetamine users seeking treatment
- CSAT multi-site study; 1998-2002
  - Costa Mesa; San Diego; Hayward; Concord; San Mateo; Billings; Honolulu
- Matrix Model vs Treatment as Usual
- Random assignment

Baseline Demographics

- Age 32.8 years
- Male 55%
- Education 12.2 years
- Meth use 7.5 years
- Marijuana use 7.2 years
- Alcohol use 7.6 years
Route of Methamphetamine Use

Route of Administration

Percent Using by Route

- nasal
- smoke
- iv

Weeks in Treatment

- Matrix: 8.2
- TAU: 5

**
Weeks Continuous Abstinence

Mean Number of UA’s that were MA-free during treatment
Mean Number of Weeks in Treatment

Self-report of MA use during the past 30 days at baseline, discharge, and 6-month follow-up.
Urine Results: % Meth-free

- Discharge: 66%
- 6 months: 69%
- 12 months: 59%