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Dietary Management of Juvenile Delinquency

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THE Program Plan for fiscal year 1978 of the Law Enforcement Administration (LEAA) of the United States Department of Justice[1] comments as follows:

> *"Retribution, deterrence and rehabilitation are usually considered the fundamental purposes of corrections. The first two concepts are based on traditional beliefs taht antedate our judicial system. Rehabilitation lacks this long tradition, as its historical development spans only 250 years of sporadic attempts to substitute 'treatment' for punishment. Furthermore, the nature of rehabilitation is to mitigate punishment, thus contradicting the purposes of retribution and deterrence—the two correctional goals presumably most important to society's welfare.*
>
> *Today, the most important issue of rehabilitation is the growing conviction among both experts and lay persons that most treatment has been ineffectual for rehabilitating offenders."*

The various rehabilitation techniques have been structured upon concepts that link deviant and criminal behavior to psychosocial factors. In view of the failure of these procedures, it is necessary to look elsewhere for the answer and correction of these problems.

This disenchantment with present day rehabilitation techniques prompted the Ford Foundation in its annual report for 1977 to recommend that the role in delinquency of biochemical and organic factors, with a focus on nutrition be investigated.

The favorable and at times dramatic responses of behavioral disturbances and delinquency to dietary intervention lends strong support to a biochemical or organic basis for these disturbances.

My interest in dietary intervention for behavioral disturbances, learning disabilities and delinquency is an outgrowth of our studies on food additives. Twenty-five years ago our research laboratories were involved in studying the allergic reaction to flea bites. Very early in our observations we demonstrated that the allergic reaction to flea bites is due to a low molecular weight chemical present in flea saliva. In immunological parlance such compounds are labeled haptens. By virtue of this observation, we became interested in studying the behavior of the haptenic mechanism in the immune response and the adverse reactions to medications and food additives which are low molecular weight compounds.

Although throughout the world thousands of low molecular weight compounds are introduced into the food supply as intentional additives, not one has ever been subjected to pharmacological study such as required for compounds licensed as medications. Actually, nothing is known regarding the pharmacological behavior of food additives. A number of additives have been studied for toxicological effects, such as carcinogenesis, mutagenesis or blastogenesis, but none pharmacologically.

In the United States there are approximately four thousand compounds, classified into thirteen categories, which are introduced into food as additives. With the recognition that any compound, natural or synthetic, can induce an adverse reaction in any individual with the appropriate genetic profile or predisposition, it becomes necessary to evaluate every compound and class of compounds on the basis of benefit compared with risk. Applying this measure to the classes of intentional additives, we learn that the synthetic colors and flavors and the antioxidant preservatives butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) are the most pervasive in our food supply. The colors and flavors alone occur in approximately eighty percent of all foods. Because of this wide distribution colors and flavors are the commonest causes of adverse reactions affecting practically every system of the body (Table I).

Since colors and flavors have no nutritional value, merely a cosmetic function in foods, it becomes apparent that the risk for colors and flavors outweighs the benefit. Of all the adverse reactions perhaps the most important and the most dramatic are the behavioral disturbances. The following case[2,3] history is our initial experience linking behavior to the ingestion of food additives:

TABLE I. *Adverse Reactions Induced by Synthetic Colors and Flavors*

1. *Respiratory*
   - Rhinitis
   - Nasal Polyps
   - Cough
   - Laryngeal Edema
   - Laryngeal Nodes
   - Asthma
2. *Skin*
   - Pruritus
   - Dermatographia
   - Localized Skin Lesions
   - Urticaria
   - Angioedema
3. *Gastrointestinal*
   - Macroglossia
   - Flatulence and Pyrosis
   - Constipation
   - Buccal Cankers
4. *Ears*
   - Recurrent Serous Otitis
5. *Genitourinary*
   - Enuresis
6. *Neurological Symptoms*
   - Headaches
   - Behavioral Disurbances
   - Seizures
   - Retardation
   - Autism
7. *Skeletal System*
   - Arthralgia with Edema

> An adult white female, forty years of age, reported to the Allergy Department with a complaint of periorbital edema and urticaria which, following a thorough investigation, was attributed to food additives. The patient was managed with a salicylate-free diet, which resulted in complete control of the angioedema and urticaria. At the time of the initial visit the patient had not disclosed she had been under psychiatric care because of her hostility toward all individuals, including her husband. When placed on the elimination diet, not only her angioedema cleared, but her behavior showed a striking improvement. Any infraction induced an immediate recurrence of both her somatic and behavioral complaints.

Following the experience with this patient, other adults were noted with personality problems, which cleared under dietary management. We also observed a number of children who presented with somatic complaints, e.g. nasal symptoms, urticaria, or other skin involvement. The parents failed to report that the children in some cases were also experiencing behavioral disturbances, labelled as hyperkinesis or MBD. It was only following dietary intervention, when the somatic complaint had responded, that the parents would also report a dramatic improvement in the child's behavior. Children with a history of behavioral disturbance, often dating to early infancy, children who were disruptive, aggressive, restless, with short attention span, muscle incoordination and failing at school, showed a marked improvement within days or a few weeks. Many of the children had been receiving behavior-modifying medications of various types. They no longer required medication, which in many of the children had not been effective (See Table II).

We have now managed approximately 600 children with the diet. Initially, our successes for control of observed behavior ranged between 30 and 50 percent; however, since we are emphasizing the elimination of BHT (butylated hydroxtoluene) and BHA (butylated hydroxyanisole), our successes for control of behavior average between 60 to 70 percent of our samples.

A number of studies have been reported, confirming that food additives and particularly food dyes influence behavior in children.[4-9]

Since our initial observations a number of patterns have evolved depending upon the age of the child and the duration of medication with behavior-modifying drugs.[10]

In infancy the most commonly encountered offenders are the pediatric vitamin drops, which contain artificial colors and flavors. Upon removal of the drops the behavior is controlled within 24 to 36 hours. Any challenge or infraction induces a recurrence within 2 to 4 hours.

Children from 2 to 5 years of age usually respond within 3 to 5 days. They, too, will react within 2 to 4 hours to any challenge or infraction.

Children from 6 to 12 years of age present several patterns. The majority of children will manifest a complete control of all deficits. Drugs can be discontinued. Within weeks behavior in school and scholastic performance improve.

TABLE II. *Descriptive Characteristics of Clinical Pattern of H-LD*

GROUP I

Marked hyperactivity and fidgetiness
- Constant motion
- Rocks and jiggles legs
- Dances, wiggles legs
- Runs, does not walk
- In infancy, crib rocking, head knocking, restlessness, fretfulness, colic

Compulsive aggression
- Disruptive at home and at school
- Compulsively touches everything and everyone
- Disturbs other children
- Perseverates
- Cannot be diverted from an action even when life threatening

Excitable—impulsive
- Behavior is unpredictable
- Panics easily
- Becomes frustrated which leads to temper tantrums

No patience
- Low tolerance for failure and frustration
- Demands must be met immediately

Short attention span
- Unable to concentrate

Poor sleep habits
- Difficult to get to bed
- Hard to fall asleep
- Easily awakened

GROUP II

Self-Mutilation
- Nail biting
- Scratching
- Tearing of skin
- Life-threatening behavior

GROUP III

Anti-social deficits
- Low self-esteem
- Lying and stealing
- Abusive—foul language
- Unprovoked assault
- Defiant—disobedient
- Delinquent
- Withdrawn

GROUP IV

Gross muscle incoordination
- Exceptionally clumsy
- Trips when walking
- Collides with objects
- Cannot function in sports
- Cannot bicycle or swim

Fine muscle incoordination
- Eyes and hands do not seem to operate together
- Difficulty with: buttoning and tying
  writing and drawing
  speech—stuttering
  reading—dyslexia

GROUP V

Cognitive and perceptive disturbances
- Auditory memory deficits
- Visual memory deficits
- Deficits in understanding
- Difficulty in reasoning, e.g. a math problem

In addition to the 6- to 12-year-olds who show a complete response, there are those who do well at home but are not improved in their school environment. This latter group falls into two classes. First are those who do poorly at school because of the reputation they have established over the years for aggression, disruptiveness, destructiveness, inattentiveness, etc. Their peers and even the teacher fail to recognize the change in the child's behavior. This leads to conflicts, resulting in behavioral disturbances and inability to learn. For such children a change in environment—a new class or even a new school will provide a new set of peers and a new teacher, leading to complete recovery on the diet.

The second class of children with continued behavioral disturbances and failure at school include those with specific learning deficits, e.g. disturbances of auditory perception, visual perception

or disruption of the higher association centers. For such children it is important to identify the specific deficit and provide one-to-one instruction by trained personnel. Once behavior is controlled, with patience and concentration upon the specific learning deficits, the child will show a complete recovery over a period varying from a few months to 12 months or more. It can be stated as a general rule that improved behavior portends a good prognosis for improvement in all deficits.

As the troubled children pass through puberty they may experience a spontaneous alteration in their behavioral pattern, with a lessening of hyperactivity and aggression. This may occur with or without specific therapy, e.g. behavior-modifying medication, behavior modification, reinforcement or dietary management.

This spontaneous alteration in the behavioral pattern is frequently misinterpreted as "growing out" of the disturbance. However, this is an illusion, since these children do not grow out of their problems. What on the surface appears as an improved individual, upon close study reveals a troubled person with deeply rooted psychological deficits, muscular incoordination of varying degrees, and learning deficits, which prevent performance up to the level of mental competence.

The inability to cope with the environment and compete with peers leads to a lowered self-esteem, withdrawal, development of antisocial tendencies, e.g. lying, stealing, abusiveness, vandalism and truancy from school. These individuals are candidates for deviant, asocial and criminal behavior, who are contributing to the rising tide of delinquency.

It is generally recognized that behavioral disturbances in children antedate delinquency in about 80 percent. However, instead of behavioral disturbances, the emphasis has been placed upon learning disabilities as the predisposing factor in juvenile delinquency. However, the link between learning disabilities and juvenile delinquency has not been supported by recent studies reported by the LEAA of the U.S. Department of Justice (April 1976) and the Comptroller General of the United States (March 4, 1977). This conclusion is unquestionably correct. There are many children with learning disabilities who do not become delinquent and many delinquents who manifest no learning disabilities. Actually, they may be quite precocious students. The cause(s) should be sought in behavioral disturbances. Whatever causes behavioral disturbances may also cause delinquency.

With the recognition that many of the distinguishing characteristics of delinquency, e.g. lying, stealing, abusiveness, destructiveness, violence and even assault are not infrequently encountered in the child labelled as MBD or hyperkinetic, the relationship between behavioral disturbances and delinquency is not remark-

able. And further, the observations that with dietary intervention 60 to 70 percent of behaviorally disturbed children will respond favorably is strong support that dietary management may be an important modality for the treatment of delinquency.

The following cases illustrate the response of delinquent behavior to dietary intervention:

Case 1: A 13-year-old boy, apprehended for repeated theft, was remanded to the custody of an uncle, pending final disposition and placement. When first interviewed on November 11, 1974, the boy offered a history of hyperactivity dating to infancy. At 4 years and 9 months he entered kindergarten but was unable to perform because of continued hyperactivity and constant talking. At 6 years of age he entered the first grade at school, where the behavioral pattern characterized by hyperactivity and the inability to sit still and concentrate led to considerable conflict with peers.

At the time of the initial interview the boy was in the ninth grade at school, but was deficient in his performance because of his inability to concentrate. He was reported to read well with good comprehension and had an estimated IQ of 117, yet his grades were poor. The teacher reported the boy fails to listen to orders and instructions, wanders about the room and fails to cooperate.

Physical examination revealed a pleasant, cooperative pubescent child with no physical deficits.

A review of the diet diary for a five-week period revealed a high concentration of foods with synthetic colors and flavors as well as the antioxidant preservative BHT. On Jan. 6, 1975, the boy was placed in a residential program where strict surveillance of his diet was possible. Following a two-week period of stormy adjustment, the boy's behavioral pattern changed dramatically to a pleasant, cooperative youngster who performed well both in and out of the school.

On one occasion following a blind challenge with restricted foods, within a matter of hours the boy reverted to his disturbed behavioral pattern, which persisted for two days.

The boy continues to perform extremely well and only displays behavioral disturbances following an infraction, which is usually prompted by peer pressure.

Case 2: A 15-year-old boy, ward of the Juvenile Court, accompanied by his parents, reported because of his behavioral disturbances, predominantly lying and stealing.

Hyperactivity dated back to infancy. In kindergarten he had no conflict with his peers, but was unable to be quiet. At 6 years of age he entered first grade at school. Because of extreme hyperactivity he was placed on methylphenidate, 10 mg daily, which after one year was changed to dextroamphetamine tannate, 17.5 mg daily, which was continued until age 12 (sixth grade at school).

When initially interviewed, the boy was in grade 9 at school. He was receiving no medication. His reading was at grade level, but he performed poorly in mathematics, both multiplication and division. For

two years prior to his initial visit he was seen by a psychiatrist twice weekly.

The following target symptoms characteristic for MBD, the hyperkinetic syndrome, were displayed by this boy:

disturbs other children
wants to run things
restless; overactive
excitable; impulsive
fails to finish tasks he starts; short attention span
blames others for his mistakes
fabricates stories
stealing: from parents, at school, stores, and other places
fire setting—very occasionally
gets into trouble with the police

The repeated thefts were the most troublesome feature of this boy's behavior, which frequently brought him to the attention of the police and the Juvenile Court. In 1976 the boy stole $300. On Dec. 25, 1977, the boy was apprehended for forging and cashing his mother's checks, which brought him to the jurisdiction of the Juvenile Court.

A review of the boy's diet for a period of eleven days revealed it to be literally loaded with all sorts of so-called "junk foods", which are potentially exciting agents in behaviour.

Because of the history of recidivism the boy was to be sentenced to serve one year in an institution for juvenile delinquents. Prior to sentencing, the court was requested to remand the boy to the custody of the parents who were eager to establish a regimen of dietary control. This request was granted.

Within two weeks the boy showed a dramatic response in his entire behavioral pattern. He continues to do well, but the slightest infraction induces a return of his behavioral deficits. With the recognition of cause and effect when an infraction occurs, he is kept under strict surveillance for a few days, which permits a return to his normal behavioral pattern.

Case 3: A 13-year-old boy reported with his parents because of behavioral disturbance and delinquency.

The history during infancy was unremarkable. In nursery school he was very active, disruptive and disturbing to all the children. In kindergarten, because of his disruption, he was referred to a psychologist. At 5 years of age he would lie down before an oncoming car and threaten his life. On several occasions he tried to jump from a window, endangering his life. He repeated kindergarten for a second year.

At 7 years through 9 years of age he attended classes for special education in the elementary schools. At 11 years of age, in grade 5, he was threatened with expulsion from school. A psychologist was again consulted. One year later, in grade 6, he was again threatened with expulsion from school. He was tested and found up to grade level academically but emotionally was at the 7½ ear level. At this time he was placed on methylphenidate, 10 mg every AM, which controlled activity somewhat. With an increase in behavioral disturbance the

methylphenidate was increased to 10 mg. AM and PM. On June 20, 1977, the methylphenidate was discontinued, and the boy was placed on the elimination diet. For a week he was very hostile and then showed a definite improvement in his behavior.

At the time of his thirteenth birthday he stole some money, purchased prohibited foods, following which he ran away for 27 hours. He was returned by a foster brother.

On Sept. 1, 1977, the boy was placed on a ranch where his food intake could be strictly monitored. The first two weeks on the ranch were quite stormy, following which a definite improvement in the behavioral pattern, free of all the customary deficits, was observed. On one occasion the boy was challenged blindly with foods containing prohibited additives. Within about three hours the disturbed behavior returned and persisted for about 48 hours.

It is now ten months that this boy is observing the diet strictly. His behavior continues to be well controlled, and his scholastic performance is at grade level for his age. He has on a few occasions inadvertently experienced an infraction, with a rapid return of the behavioral pattern, which persists for a few days.

The three case reports illustrate two important points: (1) A history of behavioral disturbances dating to infancy or early childhood usually precedes delinquency. The cause of the behavioral disturbances may often be the cause of delinquency. (2) Nutrition plays an important role in delinquency. Dietary intervention can frequently be successful in controlling the behavioral pattern.

Management with the diet listed in Table III will lead to a favorable response in observed behavior in approximately 60 to 70 percent of the disturbed children. For those who fail to respond to this regimen, other factors, both synthetic and natural, must be

TABLE III. *The Feingold Diet*

Eliminate:

Part I. Artificial colors and flavors contained in food
Butylated hydroxytoluene (BHT)
Butylated hydroxyanisole (BHA)

Part II. Selected foods with natural salicylates

Almonds	Peaches
Apples (cider and cider vinegar)	Plums or Prunes
Apricots	Tangerines
All Berries	Cucumbers and Pickles
Cherries	Green Peppers
Currants	Tomatoes
Grapes or Raisins	Cloves
(wine and wine vinegar)	Coffee
Nectarines	All Teas
Oranges	Oil of Wintergreen

TABLE IV. *Etiologic Factors*

Gestation Factors
- Maternal nutrition
  - alcohol
  - tobacco
- Toxemia
- Eclampsia
- Radiation
- Hemorrhage
- Drugs—medications
- Infection
- Environmental toxicants
  - atmosphere
  - water
  - soil

Perinatal Factors
- Parturition (delivery)
  - sedatives
  - anesthesia
    - general
    - caudal
    - sacral
  - premature separation of placenta
  - trauma (forceps)
- Post Partum
  - infection
  - jaundice
  - hemorrhage
  - asphyxia

Postnatal Factors
- Prematurity of entire organism
- Delayed maturation of nervous system
- Infection
- Jaundice
- Drugs
- Nutrition
- Environmental factors
  - atmosphere
  - water
  - soil
  - food

considered, e.g. milk, eggs, corn, wheat, perfumes, sprays, etc. It must be recognized that any compound, natural or synthetic, can induce an adverse reaction if the individual has the appropriate genetic profile.

Each compound acts upon a substratum generated by a variety of etiological agents (Table IV), which produces either genetic variations or teratogenic alterations, to give each individual a unique biological profile. It is this difference in individuals that explains the capacity of persons to be selective in the response to environmental factors. For example, a family of three, four or even more members may have only a single person react adversely to the identical dietary routine or environmental factors.

Any of the etiologic agents listed in Table IV may operate, either singly or in combination as toxicants or teratogens. The differentiating fetus and the newborn are extremely susceptible to toxicants of a low order, as well as to transitory periods of even mild asphyxia. These produce teratogenic alterations which are manifested as a variety of disorders at various periods of postnatal life, up to and including adulthood."

The increased prevalence of delinquency over the last few generations is an expression of the reaction to our technological development and the attendant alterations in our life style, which has introduced numerous mutagenic and teratogenic factors that operate from conception through gestation and even into postnatal life. The answer to many of our social problems must be sought beyond psychological and psychiatric factors, in the evolutionary process to which man is exposed in a rapidly changing environment.

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