

# Juvenile Delinquency:

## THE ROLE OF OPTOMETRY IN REMEDIATION

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### Abstract

*Juvenile delinquency is on the increase and is a major social issue. Associated risk factors are many, extending from various psycho-social considerations to health conditions. Of particular note is a high prevalence of early childhood head trauma and associated perceptual disorders. Learning disabilities are common in this population, as well, with some researchers linking this to neurological dysfunction. Visual studies have shown that juvenile delinquents suffer from general binocular dysfunction, accommodative dysfunction, motility disorders and motor-perceptual problems; it is rare for them to manifest ocular disease. In fact, the visual profile of the juvenile delinquent mirrors that of the learning-disability population. Therefore, optometric intervention, teamed with remedial education, can play a key role in the overall remediation of this special population by bringing various visual functions to acceptable levels of performance, thus equipping these youth to succeed in the academic setting.*

### Key Words

*juvenile delinquent, neurological dysfunction, visual dysfunction, optometric intervention*

**5**00,000 children in the United States, about 2.3% of all children in the vulnerable age group of 10-17, are referred to juvenile courts each year.<sup>1</sup> Demographic experts predict that juvenile arrests for violent crime will more than double by the year 2010.<sup>2</sup> Longitudinal studies indicate that 25 to 35 percent of adolescents will have committed a legal offense by the age of 19. This rate is even greater for selected populations: youths with learning disabilities, adolescent parents, youths who abuse alcohol/drugs, and youths physically/sexually abused.<sup>3</sup> Clearly, juvenile delinquency is considered to be a major social issue. And while the examples above are from the United States, it is a global issue affecting many communities throughout the world.

Social scientists have examined the relationships between various psycho-social factors and juvenile delinquency. Some have even suggested causality. The literature on this topic illustrates that the connecting factors are many, making the associated risk factors very complex. At best, we can say there are many risk factors to consider. Some studies suggest that visual dysfunctions put youth at risk for deviant behavior. This article will explore this possibility in the context of the broader health profile of the juvenile delinquent.

### Health issues

National health statistics indicate that certain groups of lower socio-economic juveniles have a greater than expected

number of unmet health needs.<sup>4</sup> Individuals entering the juvenile justice system are often disproportionately from lower socio-economic and minority groups. Therefore, it can be anticipated that delinquent juveniles will have greater health care needs than the general juvenile population.

A history of trauma is common in this population.<sup>5</sup> Delinquent youths are far more likely to be seen in accidents, particularly involving head or face trauma. And in a parallel sense, they make significantly more hospital visits, especially before age 4 and between ages 14-19. One study indicates that a history of head trauma is nine times greater in delinquent vs. non-delinquent boys.<sup>6</sup> These are but examples in the many reports showing this population to be highly vulnerable to events affecting the central nervous system (CNS).

Neurodevelopmental testing also shows significant differences in performance of juvenile delinquents and control groups in specific areas, with the juvenile delinquents doing poorer in most tests. Of particular significance are differences found in visual processing ( $P=0.002$ ) and auditory-language function ( $P=0.001$ ).<sup>7</sup> Neuropsychological testing shows significant differences in performance as well. Juvenile delinquents have difficulty with fine motor control, three-dimensional tasks/object recognition, and complex perceptual tasks.<sup>8</sup>

A unique approach investigating the relationship between neurodevelopmental measurements and violent behavior was

taken by Kandel *et al.*<sup>9</sup> This was a longitudinal study done in Denmark. The research was based on the hypothesis that disruptions in fetal neural development may increase the predisposition to adult mental illness, and specifically violent behavior. Using a technique involving the measurement of minor physical anomalies they concluded that recidivistic violent offenders may suffer neural development disturbances which compromise their ability to inhibit impulsive, aggressive behavior.

So, in putting all this into context, there are a greater number of unmet health care needs in the juvenile delinquent population than in the general juvenile population. Head trauma is particularly common, with these juveniles highly vulnerable to events affecting the CNS. Performance tests show marked differences from the expected in visual processing and auditory-language function. They also have difficulty in fine-motor control and complex perceptual tasks. Research utilizing psychoneurological tests shows a possible neurological cause, linking learning disabilities and juvenile delinquency, the connection made through motor development and perceptual-motor skills described above. We are, therefore, able to see a possible linkage between head trauma, neurological dysfunction, various difficulties in perceptual processing, learning disabilities and the juvenile delinquent. Much of this trauma is related to childbirth (prenatal/perinatal) or early childhood, thus clearly preceding the delinquent behavior. Therefore, it is possible to postulate that early childhood insults to the CNS may be the cause of some forms of juvenile delinquency.

### Juvenile delinquency and learning disabilities

There is a strong belief among those in the education community that some of the reasons for juvenile delinquency may be directly or indirectly related to the child's past or present educational experiences. Typically, juvenile delinquents dislike school and the teacher, they dislike school subjects requiring logical reasoning, persistence of effort and good memory. These same deficiencies are also common in specific learning-disabled populations. Both groups, the juvenile delinquent and learning-disabled, have many similarities.<sup>10</sup> These include negative self concept, males

outnumbering females by four-five to one, directional orientation problems and less than average IQ. Difficulty in school begins in primary grades. And, there is no single cause or cure for either condition.

This relationship was underscored in research done by Hogensen.<sup>11</sup> He examined reading failures in primary grades and delinquent behavior during adolescence and found statistically significant correlations between early reading problems and adolescent delinquency. No such relationship was found with social or economic status, broken homes or other demographic factors. His explanation is that continued failure in reading is a deeply frustrating experience and that continued frustration over prolonged periods of time will result in aggressive behavior directed outward toward society (delinquency) or inward toward self (neurosis).

Zinkus and Gottlieb<sup>12</sup> conducted a study with a focus on neurologic abnormalities. Of 44 male delinquents with learning disabilities, 60% had significant deficits in auditory sequential memory and 55% in visual-motor coordination. They noted that subtle neurologic abnormalities are often observed in children with learning disabilities. The inference is that many children with antisocial behavior have electroencephalographic abnormalities with the two populations having many common attributes. Almost half of those with perceptual disturbances were categorized as having mixed auditory and visual processing disturbances involving auditory sequential memory and visual-motor coordination.

A causal links study was done by Tremblay and associates.<sup>13</sup> They measured early disruptive behavior (grade one) and poor achievement (grades one and four) and compared these to measures of delinquent behavior at age 14. While several models were tried, the best predictive model was the link between grade one disruptive behavior and delinquent behavior when the child reached 14. In this case, poor school achievement was not a reliable predictive factor.

So, despite some inconsistencies, overall there is good evidence of a strong relationship between learning disabilities and juvenile delinquency. What about learning disabilities and vision? Is there a similar association?

### Juvenile delinquency, learning disabilities and vision

Park,<sup>14-15</sup> an ophthalmologist, was one of the earliest investigators to suggest that reading difficulty may have its origin in delayed maturation of the sensory-motor response to visual stimuli. In addition, he believed that orthoptics to develop binocular function was the place to begin. His observations do not stand alone. There is an abundance of literature found in optometric, education, and ophthalmologic publications that points to the association between learning disabilities and visual dysfunction.<sup>16-21</sup> Common among these studies are dysfunctions in binocular vision, accommodation, ocular motility, and visual perception/visual information processing.

Reports in the optometric literature date back to 1933 regarding the visual characteristics of the juvenile delinquent population.<sup>22-26</sup> These studies point to certain problem areas; refractive anomalies, fusion/stereopsis, accommodative infacility, convergence insufficiency, ocular motility dysfunction, and accommodative/convergence disorders.<sup>27-30</sup> A more recent study by Bleything<sup>31</sup> utilized a sample of 477 juvenile delinquents from the Stanislaus County Juvenile Hall (California). Taking advantage of a large sample and a single examiner/single protocol, this study sought to further define the visual profile of the juvenile delinquent. The chief aim was to clarify inconsistencies in the literature as to this special population. The intake process at this juvenile facility included visual screening consisting of: a symptom questionnaire, Keystone Visual Skills,<sup>a</sup> Winterhaven Copy Forms,<sup>b</sup> and the Motor Free Visual Perception Test.<sup>c</sup> Of those entering the facility, 62% failed this visual screening battery. Criteria used were: symptom questionnaire (three or more yes responses); Keystone Visual Skills (two or more responses other than the 'expected' on the standard recording form); Winterhaven Copy Forms (performance at least one year below age level); and, Motor-Free Perception Test (performance at least one year below age level). Failure of the screening resulted in referral for a complete optometric exam.

A frequency count was done on key words recorded in the case history. In terms of physical symptoms, the most frequent responses were: "headaches" and "eyes water." On the performance side, the

most frequent responses were: "reading," "blur," "lose place," and "words blur."

It is well to remember that the testing was a two-tier process. Juveniles admitted to the facility were given a battery of visual screening tests as part of the intake process. When they failed these tests a referral was made for a comprehensive optometric examination. Since the initial screening battery included a symptom questionnaire, Keystone Visual Skills and form perception tests and failure of these tests made them eligible for a complete exam, we, therefore would expect that of all the tests reported, these (screening) tests would show (artificially) a high fail rate (91.4% - 95.4%). In other words, the juveniles had to fail these tests to be included in the study population. Even so, there was still a very high fail rate for accommodative facility (66.9%), stereoacuity (65.8%), and various measures of ocular motility (58.9% - 62.3%). Nearpoint of convergence (NPC) was failed by 46.1%. It was rare to find, however, evidence of ocular disease. Only 1.5% failed an external ocular health exam and even fewer (0.4%) failed an internal ocular health exam.

Primary diagnostic categories that typify this population were found to be general binocular dysfunction, accommodative dysfunction, and visual-motor dysfunction. Still another way of evaluating the results is to examine the therapy indicated. Of the 62% who failed the screening and received a complete optometric examination; 100% needed vision therapy, 82.8% needed a near lens prescription, 17% needed a far lens prescription, 1.5% needed treatment for anterior segment disease, and 0.4% needed follow up for posterior segment disease.

So, we find the visual profile of the juvenile delinquent to be similar to that of the learning-disabled, the key point being the preponderance of dysfunctions impacting reading activities. We know there is a strong literature base on the association between juvenile delinquency and learning disabilities. This suggests, then, that the juvenile delinquent may be a subgroup in the visually-related learning-disabled population.

It is also well to note there is a strong literature base on the association between juvenile delinquency and head trauma, disruptions of fetal neuro development, prenatal/perinatal events and CNS trauma. This particular association suggests that

the juvenile delinquent may be a subgroup within the traumatic brain injury (TBI) population.

### **Role of optometry in juvenile delinquency**

Thus, juvenile delinquents tend to have healthy eyes but unhealthy visual function. Those factors that are unhealthy are similar in nature to what is found in the learning-disabled population, and probably more pronounced. Of particular note is the high prevalence of sensory-motor perceptual problems and these are hard to separate from sensory integration functions, including audition. As we describe sensory-motor-perceptual problems in the juvenile delinquent it is well to remember the high prevalence of CNS disturbances in this population. Bringing these thoughts together, it can be said that the juvenile delinquent has been set up, from the start — from prenatal to perinatal events — to have perceptual problems.

### **Optometric management**

There are some optometric case management strategies that seem evident. Birth trauma is common, so events of prenatal and perinatal nature are important elements of the case history. In addition, this group is prone to head trauma in the pre-school years. This all points to the need for a very complete optometric examination that should include a thorough assessment of neurological function such as pupillary responses, extra-ocular muscles and visual fields. Various functional tests are essential since many of the visual problems relate to ocular motility, accommodative dysfunction and convergence disorders. Of particular importance are tests of visual-motor perception skills since such dysfunctions are of high prevalence in this population.

It is extremely important to treat all ocular and visual problems found; this population needs all of the help that optometry can supply. Doing so will resolve at least one major risk factor in the equation. Other risk factors will remain, however. It is not unusual for this population to be behind in reading by as many as four grades. This means there is need to be teamed with an education specialist. Treating the visual dysfunction will provide the visual underpinnings for reading and learning. However, there is still the task of bringing the reading level to acceptable standards.

Yet another dimension is that of self esteem. Youths who have experienced chronic failure in the "society" of school have a difficult time viewing themselves in a positive manner. A mental health professional is also an essential team member. It is one thing to "repair" the visual system, to even eliminate the years of retardation in reading. However, unless there is a solid feeling that success is possible, a new role in society will not be developed by the juvenile delinquent.

This all duly recognizes there to be multiple risk factors in the various behavior patterns of the juvenile delinquent. This is not a simple and straightforward equation. The research literature gives fairly strong evidence of the association between neurological dysfunction and violent behavior; it explains little about non-violent behavior, however. Optometrists are experts in vision and it is therefore appropriate for us to be examining the concept that vision could be considered a risk factor in juvenile delinquency. Clearly, there is an association between vision and learning disabilities and learning disabilities and juvenile delinquency. Indeed, it is this comorbidity of visual dysfunction and learning disability that puts optometry in a position of serving as an important link in the remediation of the juvenile delinquent. While we can develop the argument that vision can be considered, along with other items, as a risk factor, we can't clearly identify vision as a causal factor in juvenile delinquency. But this does not diminish the role of optometry in the remediation of juvenile delinquency. Without doubt, we have a role in tandem with the education specialist and mental health specialist. And, as a matter of putting everything in context, it is well to underscore that vision is one of the few risk factors in juvenile delinquency that can be measured, diagnosed and actually treated successfully in a rather straight-forward way.

Society — the public — seems to be, more and more, approaching the solution to juvenile delinquency by punishing the "bad kid." Sociologists dwell on the poor family environment and psychologists view it as if the child is susceptible to bad behavior. None of these views takes into account the health profile of this population, particularly visual performance. This can be the unique contribution of optometry.

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