

# Volatile solvent abuse: an escalating health hazard among Hong Kong teenagers

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**The aetiology and complications of paint thinner abuse in a 12-year-old boy are discussed. The importance of multidisciplinary collaboration in the treatment and prevention of this increasingly common form of substance abuse among teenagers in Hong Kong is emphasised.**

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## Introduction

Recently, the print media in Hong Kong have run a number of editorials on "thinner abuse".<sup>1,2</sup> Although this kind of volatile solvent abuse (VSA) is recognised by most medical professionals, its recent increased use by teenagers in Hong Kong makes it desirable to promote professional and public awareness of the magnitude and potential seriousness of the problem. Based on a detailed case study and a brief literature review, we therefore highlight several aspects of VSA as it occurs locally.

## Case report

A 12-year-old primary six student presented to the Accident and Emergency Department of the Prince of Wales Hospital in July 1995, after being found in a near collapsed state at home. He lived with his parents in Tai Po, a district now notorious to local health workers for this form of drug addiction.<sup>2</sup>

The patient's birth and developmental milestones were normal. He came from a lower social class family in which both parents were full-time workers with little time for the children. His father was quick-tempered and drank frequently, leading to domestic violence at times. Being unhappy with the strained mari-

tal relationship, his mother often discredited the father in front of the patient. There was also a lack of warmth between the patient and his two siblings. He was a shy boy with no history of delinquency. His main hobby had been playing video games, which had gradually been replaced with paint thinner sniffing.

On the morning of the day of presentation, he had been sniffing paint thinner continuously for more than 4 hours at home, and entered a state of altered consciousness. Smelling strongly of the thinner and appearing drowsy, he was discovered by his mother, who immediately took him to the hospital. It was found that he had been involved in paint thinner sniffing for more than 6 months. This practice is widespread among teenagers in his neighbourhood, as well as within his school. He first joined his friends out of curiosity and peer group pressure. Soon he became addicted and was using paint thinner as a way of coping with frustration and disappointment, even though the relief was transitory.

Paint thinner was easily available, costing approximately HK\$6 per bottle. The patient initially sniffed it only with his peers, but progressed to solitary sniffing later. He did so daily and clandestinely, at one stage up to 3 times per day, for 2 to 4 hours each time. Although the first few minutes were accompanied by pounding headaches, the subsequent euphoria enticed him to continue. Within months, he experienced a sore throat, excessive sputum, and shortness of breath on exertion. He also described seeing dark patches and having tinnitus while being intoxicated. He added that his peers had heard the voices of devils, to which they reacted physically, as if fending off the devils from attacking.

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Feeling accepted by his peers, the patient ventured further into their subculture. He was led to different places for sniffing sessions, usually some other blocks within the housing estate, involving strangers who included adults using other illicit drugs, e.g. other volatile substances, cough mixtures, psychoactive pills, as well as intravenous heroin. Triad members also turned up now and then, either to extort money, or to recruit juniors. Sexual activities were practised, usually with the reinforcement of paint thinner or other stimulating compounds.

At school, toilet cubicles were the favourite place for a brief session. The patient reported that at least three other classmates in his class were regularly sniffing paint thinner. Although this entrenched addiction openly challenged the authority of the school, surprisingly little action had been taken.

The patient was noticed to be irritable at home, with temper outbursts that were out of character. He withdrew socially, and concentrated poorly in class. He identified his own deteriorating memory capacity, and described himself as "getting more stupid". He had tried to quit the habit before but failed within a month, succumbing to the craving for euphoria, and the need for an escape from his poor family situation.

The patient appeared to be a shy and thin boy. He spoke coherently, and exhibited intact perceptual and cognitive functions. However, more detailed neuropsychiatric assessment using the Wechsler Intelligence Scale for Children (WISC) revealed that although his full scale I.Q. was in the normal range (108), there was an abnormal discrepancy between his verbal I.Q. (122) and his performance I.Q. (90). This profile was consistent with cognitive impairment secondary to an organic cause, in this case, the residual effect of paint thinner intoxication. The discrepancy disappeared during a second neuropsychiatric assessment conducted 2 weeks later, showing that the transient intoxicating effect of the paint thinner had been eliminated.

The patient's mental state remained stable; there was no evidence of withdrawal. A physical assessment and spirometry did not suggest any neurological or pulmonary impairment. Psychiatric treatment was aimed at promoting family communication and cohesion, addressing his father's alcohol problem, as well as enhancing the patient's self-esteem. At follow up three months later, the patient had stayed away from paint thinner and his previous peers.

## Discussion

The reasons why volatile solvents are used as substances of abuse include their ready availability, low cost, absence of legal control, and the rapid onset of euphoria obtained.<sup>3</sup> To our knowledge, this is the first case of VSA to be formally reported in Hong Kong. In the United Kingdom and the United States, VSA has been popular since the 1960s<sup>3-5</sup>.

It occurs mainly in boys with a peak age of 13 to 15 years, and is usually a group activity.<sup>3</sup> A lifetime prevalence of 16.5% for teenagers aged 12 to 17 years was reported in a mixed American urban and rural population, compared with a point prevalence of 9.8% for boys aged 13 to 15 years from a Glasgow secondary school.<sup>4</sup> Local epidemiological data are unavailable.

Most commonly abused volatile solvents contain chlorinated aliphatic compounds or toluene, the main ingredient of paint thinners. Others include aromatic hydrocarbons, other propellents, glue, and spray paints. These compounds can be found in adhesives, dry cleaning substances, petrol, lighter refills, acrylic paints, fire extinguishing agents, fingernail polish, antifreeze, paint thinners, cleaning fluids, and amyl nitrites.<sup>3-5</sup> Our impression suggests that glue sniffing is not a popular activity in Hong Kong.

Solvents are often directly inhaled from their containers or from a saturated rag, as occurs locally.<sup>3,5</sup> Volatile solvents are rapidly-acting central nervous system depressants.<sup>5</sup> Their intoxicating effects resemble those of alcohol, with initial stimulation followed by depression. Desired effects are usually reached within a few minutes, and last for 30 to 45 minutes after cessation of exposure, leaving little trace to be detected. Multiple episodes of euphoria and altered states of consciousness can be attained each time and serve as a powerful reinforcement for addiction.<sup>3,4,7</sup>

Apart from the symptoms demonstrated by this patient, other symptoms of acute solvent intoxication include the blurring of vision, the slurring of speech, ataxia, abdominal pain, anorexia, nausea, vomiting, jaundice, chest pain, and bronchospasm.<sup>3-5</sup> Cognitive and affective symptoms include impaired judgement, irritability, and excitement, as seen in our patient.<sup>4,6</sup> Acute brain syndrome, psychosis, convulsions, and coma are less frequently encountered.<sup>4</sup>

Psychological dependence and tolerance may develop within three to six months of exposure. Typical

withdrawal symptoms appear within 6 to 24 hours after cessation of the last dose. The symptom complex is akin to alcohol withdrawal, albeit relatively rare and is usually of a mild degree.<sup>3,4</sup> In prolonged solvent abuse, irreversible hepatic and renal damage, aplastic anaemia, optic atrophy, encephalopathy, cerebellar degeneration, and disorders of equilibrium have been reported, with radiological and EEG abnormalities being evident in some cases.<sup>3</sup> The occurrence of permanent neuropsychological deficits remains controversial, but sudden death is well documented.<sup>3,4</sup>

Although the media often publicise the occurrence and method of paint thinner abuse, they tend to portray it as a relatively innocuous habit or a developmental adventure. This may falsely reassure both parents and health care workers, as well as policy makers, that "the kids will grow out of it". It is not sufficiently emphasised that apart from the potentially serious medical complications, some of the affected teenagers may proceed to using harder drugs of abuse.<sup>3-5</sup> Also, any family dysfunction behind the manifest thinner abuse may remain overlooked.<sup>8</sup>

There is little doubt that VSA is simultaneously a medical, psychological, and social problem which must be dealt with via the collaborative efforts of teachers, parents, social workers, general practitioners, special-

ists, and the community branch of the Police Force. The visible phenomenon of thinner abuse in Hong Kong is probably the tip of the iceberg, with the more sinister and fundamental social problems behind it which arise in a transforming society. The development of effective modes of treatment and prevention of this abuse should therefore remain a high health care priority.

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