

Oral Manifestation of Lead Poisoning

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Abstract

Lead was a key component in the medical sciences during its early days. Over the years the toxic effects of lead has been studied in detail and have been withdrawn from the modern drugs. However lead ingestion continues to be a problem in workers involved in battery and paint industry thus leading to occupational hazard. The systemic effects of lead poisoning have been discussed in several reviews and case reports. We have made an attempt to briefly review the oral findings in chronic lead poisoning in this article.

Keywords: Exogenous Pigmentation; Lead Line; Burtonian Line

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Introduction

During the early stages of evolution of the medical science a range of metallic compounds were used. However over the years this trend has reduced due to the identification of the toxic effects of these substances. Unfortunately unintentional ingestion of these heavy metals by industrial workers employed in paint, battery industry still remains a

major occupational hazard [1, 2, 3]. The commonly involved heavy metal agents in these occupational hazards are lead, mercury and arsenic [4]. These heavy metals enter the human organ systems by the medium of food, drinking water and air. Once they enter the body they form complexes with cellular compounds containing sulfur, oxygen, or nitrogen [4]. These lethal heavy metal compounds inactivate key enzyme systems and structurally alter vital proteins leading cellular dysfunction and death [4].

Lead Poisoning

According to one recent review lead poisoning has been recognized as a major public health risk especially in developing countries. Though occupational hazard due to lead exposure has been identified and public health measures have been undertaken recently lead poisoning still remains a cause of major occupation related health concern [5]. The toxicity occurring due to lead can be acute and chronic, the former being rare. Chronic toxicity on the other hand is much more common and occurs at blood lead levels of about 40–60 ug/dL [6]. If not recognized and treated on time it progresses to a severe form characterized by persistent vomiting, encephalopathy, lethargy, delirium, convulsions and coma [7].

Effects of Lead Poisoning on various organ systems

Among the organ systems the nervous system is the prime target, central nervous system being commonly targeted in children and peripheral nervous system in adults [8]. The

common symptoms of nervous system involvement include dullness, irritability, poor attention span, headache, muscular tremor, loss of memory and hallucinations [8]. The hemopoietic system is targeted by reduction in the synthesis of hemoglobin due to the inhibition of the key enzymes involved in the heme synthesis pathway [9]. Two types of anemia are observed in lead poisoning. Acute exposure to high levels of lead causes hemolytic anemia, whereas chronic exposure to high levels of lead causes frank anemia [10].

Chronic exposure to lead greater than 60 µg/dL can also cause acute nephropathy and chronic nephropathy [11]. Lead poisoning in acute or chronic forms causes cardiac and vascular damage leading to hypertension and cardiovascular disease [12]. Reduced libido, abnormal spermatogenesis, chromosomal damage, infertility, abnormal prostatic function and changes in serum testosterone levels are the common manifestations of lead poisoning on the male reproductive system. Whereas women are more susceptible to infertility, miscarriage, premature membrane ruptures, pre-eclampsia, pregnancy hypertension and premature delivery on lead poisoning [13].

Effects on the oral cavity

Oral manifestations of chronic lead poisoning is mainly in the form of a gingival discoloration known as lead line or burtonian line [14]. Henry Burton, first described the clinical description of lead line as a narrow leaden-blue line, about the one-twentieth part of an inch in width occurring in the gums [7]. The pigmentation is caused by a reaction between circulating lead with sulphur ions released by oral bacterial activity, which deposits lead sulphide at the junction of the teeth and gums. The lead also tends to extravasate from vessels in the gingiva which has increased capillary permeability due to constant inflammation [7]. The lead line has typical purple-blue lines within gingival tissue [15]. It may sometimes appear as a stippled bluish-black line at the junctions of the gums and teeth especially on the upper jaw [16]. The lead line is visible when oral hygiene is poor resulting in sub epithelial deposition of lead sulphide granules liberated by microorganism from

decomposing protein food deposits. It has been also observed that through oral hygiene procedures can cause the disappearance of these lines [17]. Furthermore other oral changes include sweetish metallic taste in the mouth, halitosis and dyspepsia [16]. The important laboratory findings include high levels of blood nitrogen compounds, basophilic stippling of the erythrocytes and anemia. The blood level of lead is raised beyond an 'unsafe level' is 10 g/dl (0.5 mol/l) or higher [7]. When the levels exceed further treatment is with ethylenediaminetetraacetic acid intravenously combined with the dimercaprol (BAL) is initiated [7]. Although lead poisoning is comparatively rare in occurrence the dental professional must be aware of the basic oral clinical presentation of this condition. The knowledge about oral features and the general presentation in some instances may help the dentist detect an undiagnosed case of chronic lead poisoning.

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