A HISTOLOGICAL AND A FORENSIC ODONTOLOGICAL APPROACH TO IDENTIFY IVORY AND IVORY SUBSTITUTES FOR FORENSIC PURPOSES. - A CASE STUDY -

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INTRODUCTION

The word "ivory" is traditionally applied to the tusks of elephants. Ivory can be carved into an almost infinite variety of shapes and objects. Ornaments made out of ivory are expensive. There are antique and historical ornaments made out of ivory that are of high value in terms of money and culture. Ivory in form of carved ornaments or in natural form of ñ pulp stonesò or as natural form of tusks itself can be available amongst people.

The law of Sri Lanka prohibits selling, purchasing and possessing ñivoryò without due permission. It is an offense to kill elephants in order to obtain tusks. On the other hand, there are instances of forged ñivoryò. Many people are being cheated by substituting ñivory like substancesò. Thus, detecting ivory on a scientific basis is essential for legal and forensic purposes.

There is growing concern over killing of wild elephants for commercial purposes in Sri Lanka especially in obtaining their tusks for jewelry and other trades.

The identification of ivory and ivory substitutes is based on the physical, morphological, histological, radiological and chemical characteristics of ñtusksò. Tusks in elephants and others are of dental origin. Artificial material can be excluded in the absence of accepted specific dental histology that is unique to elephant tusks or ivory.

The case

A sample was referred from courts to the department of Forensic Medicine at University of Peradeniya to ascertain whether the sample contained genuine ñivoryò. The police have arrested a suspect with ñivoryò like material in possession. The man was arrested by the police after having received some reliable information through an informant.

The request from courts and the police was to ascertain if the production sample was ñgenuine ivoryò. In other words the courts wanted to know if the sample contained some material that derived from elephantôs tusks or they were artificial ivory substitutes. The accused is reported to have made a statement to the effect that they were ivory substitutes which mimic ivory.

It is not an offense to possess ivory substitutes that are actually not made out of ivory. However it is an offense under the prevailing law to possess ivory or any item made out of ivory without due permission.

In identification and ascertaining the sample, first a careful visual examination was made. The morphology, the appearance, physical characteristics the colour, texture, weight, size, shape were examined and documented. An x ray examination was performed to visualize the interior of the substance. By this, the possibility of a substitute was excluded and the appearance of dental hard tissue was verified.

Next, ground sections were prepared of 15 ï 20 ε m thickness and the details of tissues were visualized through a light microscope. In obtaining sections for histology, care was taken not to damage the sample excessively and to preserve the value of the sample.

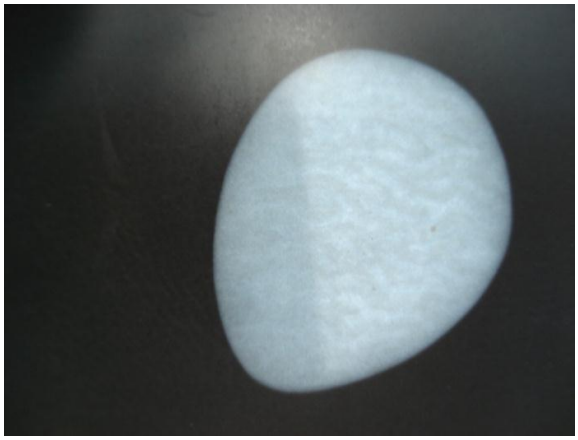
As results in the cross section of the putative ñivoryò prepared as a ground section showed evidence of dental origin. The characteristic Schreger lines in the dentine were also observed. The intersections of Schreger lines formed an angles > 115^0. This confirmed that the sample was Ivory and it originated from an elephant.

It must be noted that forensic odontological approach helped in the identification of the ivory sample and help in administering justice. In identifying ivory, it is important that the analyst has a satisfactory training in dentistry and preferably forensic dentistry. Also it is important to keep the value of the sample without subject it to unnecessary sampling for histology for which ample training is necessary in dental histology.

It was revealed by the police later that the accused admitted that he was guilty of the offense of possession of unauthorized ivory.

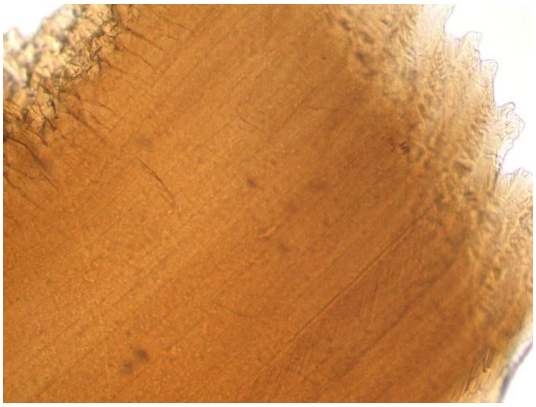
There have been no previous reported cases of ivory detection using the above comprehensive method in the Sri Lankan literature and therefore this case is important academically.

The Sample Ready for Investigation.



The X ray View

Ground Section (10x40)



Ground Section (10x10)

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1. Harvey Shell (2004) Is it Ivory ? Boone Trading Company.

2. Ivory Detection (2002) Manual National Wild Life Forensic Laboratory USA