

Analysis of postural distortion in human bite marks

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POSTER PRESENTATION
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ABSTRACT

Bite marks have often played an important role in many criminal investigations and sometimes present as the sole physical evidence in multiple cases. Despite the fact that bite mark evidence is accepted in courts, its fundamental validity and scientific basis is frequently challenged. Distortion of the bite mark may create complications and difficulties during the analysis and comparison of the bite marks. Postural distortion is one such phenomenon that occurs when the bite mark is recorded or viewed in a position that is different to the position of the tissue at the time of biting. The knowledge of the response of skin to movement and the areas susceptible to distortion may help Forensic Odontologist to better predict, analyse and interpret bite marks and its associated distortions. Photographic distortion is also one of the most common problem in bite mark analysis as the dentition of the biter and the corresponding bite mark is a 3-dimensional phenomenon. This presentation illustrates the effect of postural distortion on bite marks that are created on living human skin. The bite mark created are photographed with both 3D and 2D camera's.

Materials and methods: There are two phases of this research: Phase I: A 3D printed model of teeth mounted on a semi-adjustable articulator is used to create bite mark with ink on the upper arm of the subjects. Photographs of the marks with the scale are taken with a 3D and a 2D camera. Then the position of the arm is changed to three different positions: flexed, extended and rotated, and photographs are taken at these positions.

Phase II: A 3D printed model of teeth mounted on a semi-adjustable articulator is positioned in a biting apparatus. Then the arm of the subject is placed in the biting apparatus. Now the weights are loaded on to the apparatus and bite marks are produced on the upper arm of the subject. Photographs of the marks with the scale are taken with a 3D and a 2D camera. Then the position of the arm is changed to three different positions: flexed, extended and rotated, and photographs are taken at these positions.

The photographs of the bite marks taken will be analysed to measure the degree of distortion using the metric measurements in Adobe Photoshop.

Hypothesis: Most of the bite mark studies have created experimental bite marks on variety of substrates which do not display any properties of the skin, very few studies have created experimental bites on living subjects. Moreover, for better analysis of the bite mark a 3D camera is used to photograph the

marks which will help analyse the degree of distortion seen due to postural changes in more detail. Therefore, this presentation will help demonstrate as to how much degree of distortion is seen in a bite mark due to change in posture and whether this can be minimised by using a 3D camera while photographing a bite as compared to a 2D camera.