Abstract

This case illustrates how a fixed orthodontic retainer in a person suspected of having bitten a victim left wounds that are so distinctive that no other person could possibly be implicated in their commission.

Analysis

Analysis of the components of this injury was undertaken by our standard procedure. This involves the following steps:

a) Making a “simulated wound” by biting the teeth of a dental study cast into a substrate (dental wax) and comparing the features of the mark produced with those present in the supplied image of the alleged victim.

b) Comparing the simulated wound with that on the supplied image, paying great attention to correct scaling of the compared images. This allows us to determine if there is a pattern match (Figure 2).

c) Using the simulated wound comparison to place the teeth from the dental model by a similar procedure to that in step (b) (Figure 3).

d) Performing laser contour analysis of the teeth of the dental cast and using them to analyse the three-dimensional relationships between the features of the dentition and those of the wound on the supplied image.

e) Determining the degree of similarity between the features of the teeth on the dental cast, the simulated wound and the image of the wound supplied by police, and attempting to exclude the person from whom the dental study cast was taken on this basis.

The process is illustrated for the lower teeth of one supplied dental study cast.

Conclusions

In a similar manner to tool mark analysis, this type of analysis cannot be used to implicate a given individual as the causative agent in a bite, since there is no scientific basis for claiming that every set of teeth results in a bite mark that is recognizably different from that produced by every other dentition. There are also many uncontrolled variables in a bite, including the fact that surfaces are curved, the victim may pull away from the assailant causing unpredictable effects, and that human tissues do not make a perfect recording medium.

It shows how the presence of the orthodontic retainer wire on one of the dental casts submitted for analysis, which also meets the criteria for non-exclusion by comparison of both the upper and lower teeth and simulated wounds. This provides an additional degree of weight to the outcome of the analysis. It should always be remembered that the circumstances of the case will limit the pool of potential suspects.