Future of forensic odontology in India with cone beam computed tomography

India is second most populated country in the world with minimum utilization of its population for making extensive dataset!!

Dataset or population based studies are highly important and very significant for any kind of forensic identifications casework. Surprisingly there are plenty of research work published on Indian population on lip prints (cheiloscopy) and palatal rugae (rugoscopy), which do not have any authentic usage and application in the practice of forensic odontology. Whereas forensic radiology in regard to particularly with the usage of Cone Beam Computed Tomography (CBCT) is still in its naïve stages. Very few original research studies have been done using CBCT in forensic odontology on Indian population. Though there are many reviews from Indian authors discussing about CBCT 3D visualization applicability, its advantages of 3D representation of the teeth and the jaws whose benefits may be extended in numerous ways to the science of forensic odontology and disadvantages like noisiness of scanned image owing to its low radiation dose, metallic and motion artefacts.

It is understandable that due to limitation to access of this technology not many researches have been conducted so far, but its time now that next step is established. Dentists should realize the importance of 3d CBCT, and how best this data can be used in most effective manner in conducting population based studies to create data sets that would be really helpful in upcoming time and would be a tremendous contribution towards the field of forensic odontology.

There is dearth in adolescent and adult age estimation in the Indian context and much more extensive work is needed for real forensic applicability. Further the limited horizon of 2D radiology has to be widened by using CBCT in particularly to the following topics mentioned below. There is lot of scope of conducting studies on:

Age estimation: CBCT is non-invasive alternative to extraction, sectioning of teeth and resection of jaw bones. Large sample size studies can be piloted.

Sex Determination: disasters like manmade or natural; to mention few terrorist attacks or air plane crash, positive identification of victim's gender is the most difficult task that can be evaluated from anthropometric measurements obtained from CBCT scan. Further, bone measurements varies in different population hence more studies in different populations has to be conducted to enhance the ability of this method.

Frontal Sinus Pattern: helps in identification especially in cases wherein there are no intact bones but only group of bones available as evidence. CBCT can provide results with greater reliability as compared to other techniques.

3D facial reconstruction: The reconstructed image can be used for forensic identification. Couple of studies have been conducted and this method is still under perfection trials. More research studies can be done specifically in Indian population to improve its efficiency and accuracy.

To conclude, with the perpetual declining cost of CBCT technology, it is only a matter of time till CBCT finds its way into the regular oral and maxillofacial radiology practice. The lower radiation dose along with the increased diagnostic accuracy will help bring this technology into the conventional clinical practice. The applications discussed herein are merely the beginning. CBCT imaging can deliver the considerably-needed 3D perspective in certain cases that require additional information that is beyond the scope of the traditional routine methods. The use of CBCT is yet restricted owing to its recent introduction. As discussed above there is a need for better understanding the role and scope of this imaging modality in the practice of forensic odontology.

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