ASFO 2023 Suggested Research Topics:

1) We know that digital scanning works precisely enough to use in the fabrication of dental restorations. To have gotten to that point, research must have been completed. Create a Database/Library of existing literature on this topic to provide easy access to that research in the event any dental forensic scientist should need it for future research. This information can be used in the areas of bitemark analysis, dental age estimation, dental identification, human abuse and neglect, mass victim identification etc.

2) Create a dental radiographic database/guide to the appearance of restorations on radiographs (To be posted on the ASFO and ABFO websites as a resource). Comparison of BruxZir, FGC, ZirCAD, eMX etc.

3) Create a Database/Library of the most important Dental Identification research articles that give us the scientific foundation for the content in Dental Identification reports. These articles can then be cited in our Dental Identification reports. This will parallel how dental age estimation reports are currently written.

4) Hypothesis: the increasing range of types of restorative dental materials and methods will pose a challenge for accurate dental chart comparison due to radiopacity variation, difficulty in visual recognition and complex restorations using layering methods etc. Put another way, the forensic dentist today and in the future will face challenges in charting younger patients who have been treated using advanced methods. How would this impact forensic dentistry?

    i) Materials usage: Research could involve surveys of modern private or group practices to take a contemporary snapshot of the variety of restorative materials or methods in use (% amalgam, % resins, layering methods, use of monoblock milled fixed restorations (Cerec etc.).
    ii) Materials sales: Research could involve a survey of vendor sales indicating what might be the most popular materials selling today. This would work well if there is a good relationship with dental materials vendors who would be willing to supply such info.
    iii) Materials in patients: Could also involve analysis of individual practices, % of patients with amalgam or resins vs. age of patient. The question to be posed (although unimaginable), if all your patients died today, what kind of dental materials profile would you have recorded? What percentage would have amalgams or the latest resin you may have tried? We had a recent case in which a date of death date range was established based on the brand of restorative materials present. Thus it would be useful to know when new materials and techniques became introduced, and when their use became widespread, and when superseded. Could also involve survey of manufacturer's time lines for products.
    iv) Update the Bush 2007-2010 database of chemical composition of dental materials.

5) Hypothesis: the move to digital records will or will not assist in victim identification.

    i) Are there enough fields in the software to add notes such as dental material brand use? Which software packages are most compatible with missing person's databases etc.? Which are most popular today?

ii) Can we compare software packages that allow this, and make some kind of recommendation for approval by ASFO/AAFS Odontologists?

6) Compare computer assisted digital measurement methods of root translucency using the Bang/Ramm Technique (1970) for adult dental age estimation to manual calipers/ non-computer assisted measurement techniques. Which generates greater accuracy if any?

7) Microprobe analysis of translucent root dentin and histological correlation to gross transparency assessment.

8) What lighting method and root preparation technique gives the best result to visualize and measure root translucency in those adult dental age estimation techniques that utilize root translucency?

9) Documentation and comparison of neonatal line thickness against crown heights in fetal age.

10) Validation studies of current age estimation techniques.
    i) Ancestry specific population datasets, for example: Reliability of Third Molar Development for Age Estimation using the Demirjian (1973) Staging Technique in a United States Asian Population and compare results to existing US population specific studies available using the same technique.

11) The use or application of cone beam computed tomography in dental age estimation.
    i) CBCT studies for age estimation, for example.

12) The use or application of cone beam computed tomography in dental identification.
    i) For example, the usefulness of full body bag PM CBCT scans in ID cases, especially DVI situations.

13) Exploring the use of new technology for applications in forensic odontology:
    i) 3D imaging/CBCT/AI…
    ii) Can comparison of AM and PM 3D scans of teeth be effective in identification?
    iii) 3D imaging to assist patterned injury analysis

14) Bite mark research:
    i) Expert consensus, agreement on determination of bitemarks.
    ii) Inter and intra operator reliability/accuracy in patterned injury analysis
    iii) Any well-designed study that helps to add to the pool of knowledge in this field