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Potassium,  $p=0.039$ ; chlorine,  $p=0.027$ ; ionized calcium,  $p=0.002$ ) levels among three groups.

**Conclusions:** HIV positive individuals with and without ART have alteration in salivary composition. Some of these alterations (total protein and iCa levels) are due to HIV infection, while others (Na, K, Cl) could be due to ART or a combined effect of both. Salivary changes in HIV positive individuals could predispose them to oral diseases. Thus, regular oral examination and prophylactic regimen must be formulated to maintain their oral hygiene and quality of life.

<https://doi.org/10.1016/j.identj.2021.08.006>

### Sub-topic 1.2: Digital Dentistry

26.09.2021, 09:45 - 10:00 AEST

#### FC06

### Artificial intelligence implementation in tooth identification from X-ray images

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**Aim or Purpose:** Development of a convolutional neural network that can precisely and quickly identify teeth from x-ray images, without using neighbouring structures as a frame of reference.

**Materials and Methods:** Using a database of 11403 x-ray images that were precisely annotated by dental professionals we have trained, validated and tested a convolutional neural network (CNN) that can identify teeth according to their position in the oral cavity. Four “levels” were tested, the first one being classification according to the type of the tooth morphologically. This consisted of 4 categories: incisor, canine, premolar and molar. The second “level” added the differentiation between types of incisors, premolars and molars. This “level” had 8 categories, imitating a dental quadrant. The third “level” added maxillary or mandibular origin and a total of 16 categories. Finally, the fourth “level” had 32 categories, meaning every tooth had its own.

**Results:** The first level offered an 97.83% accuracy on unseen data. The second level offered 92.13%. “Level” three offered 91.14%. The fourth level, while being the most demanding, offered a 91.13%.

**Conclusions:** The results were the best in the 4 category “level” and the least successful in the 32 category “level”. Interestingly, the difference between the 32 and 16 category level was not significant at all. The developed CNN can identify the morphological type of the tooth with a very high accuracy rate. This opens a door into implementation of artificial intelligence in rapid analysis and cross referencing in (forensic) dental medicine.

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#### FC07

### The 4D Concept\_ Adding the missing link to the digital workflow

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**Introduction:** Recent digital technological advances have allowed for the mandibular movements to be tracked and the dynamic occlusion to be recorded in real time. The digital files created can be used towards assembling a complete virtual patient and for future restorations to be best designed using appropriate dental CAD software.

**Case Description:** A case report of a female patient that attended our private practice seeking a full mouth rehabilitation procedure is described. The clinical steps taken to transform the real patient as a complete virtual patient are outlined. Special emphasis is given to the way that the patients’ own mandibular movements were recorded clinically and incorporated in a dental CAD software.

**Discussion:** A virtual articulator using mean values is most often implemented in dental CAD software to design any proposed restorations. As errors could be introduced at this design stage, intraoral adjustments and corrections are often needed during the provisional stage.

Assembling a virtual patient and designing the restorations bringing the patients’ own mandibular movement to the scene could:

- Help design the most appropriate tooth shapes and occlusal morphology
- Lead to increased predictability from virtual design to actual outcomes
- Save chair time as less adjustments are generally needed
- Add the missing link to the digital workflow

**Conclusion/clinical significance:** The use of a virtual patient model incorporating the patients’ own jaw motion during dental CAD procedures will contribute towards the optimal design and manufacturing of restorations leading to successful long term clinical outcomes.

<https://doi.org/10.1016/j.identj.2021.08.008>

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#### FC08

### Artificial Intelligence DENTOMO: Opportunities and Prospects for analysis of CBCT in Dentistry

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