laboratory examined MM architectural changes during maximum intercuspation.

Objective: This work is an extension of our earlier studies in that it incorporates border jaw movements. It is hypothesized that a prototype in vivo ultrasonography protocol that will detect MM architectural changes during mandibular protrusion and lateral excursion can be developed.

Materials and Methods: The study was on the development of a prototype in vivo ultrasonography protocol based on cadaveric data.

Results: A protocol was successfully developed by identifying optimal probe positions and sites to visualize the MM laminae in mandibular protrusion and lateral excursion. The development involved correlation of anatomic specimens with in vivo ultrasonography, which enabled quantification and comparison of fiber bundle length, muscle thickness, and aponeurotic height.

Discussion: A novel ultrasonography protocol that will facilitate better understanding of normal MM morphology during mandibular protrusion and lateral excursion was developed. In the future, this protocol could be used as a basis to study MM changes in TMDs.

References

1. National Institute of Dental and Craniofacial Research [7/28/2013]. Facial Pain. Available at: http://www.nidcr.nih.gov/DataStatistics/FindDataByTopic/FacialPain/.
2. Ariji Y, Katsumata A, Hiraiwa Y, et al. Masseter muscle sonographic features as indices for evaluating efficacy of massage treatment. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110:517-526.
3. Gheorghe T. An in vivo study of the musculo-aponeurotic architecture of human masseter muscle. Master of Science Thesis. 2018. Discipline of Oral and Maxillofacial Radiology. University of Toronto, Toronto, Canada.

BLOCKCHAIN: A NEW DATA STANDARD IN ORAL AND MAXILLOFACIAL RADIOLOGY?

D. UZBELGER FELDMAN, C.A. TERRY, M.A. BADI, C. YESILSOY, and J. YANG, TEMPLE UNIVERSITY KORNBERG SCHOOL OF DENTISTRY, PHILADELPHIA, PA

Background: Despite the Health Insurance Portability and Accountability Act (HIPAA) efforts, protected health information (PHI) and patient's privacy and safety are still under risk. With exposure of greater than 200 million patients' records for the period 2009−2019, the U.S. government is wondering if enough is being done to keep data safe. Blockchain is becoming a gold standard in health care data management because of its trusted, autonomous, immutable, and secured distributed ledger properties.

Objective: The goals of this retrospective, randomized, double-blind study were to assess (1) the effectiveness of Blockchain patient data conversion, (2) backup storage requirements, and (3) HIPAA compliance, compared with the current data storing and sharing methods and the feasibility of the use of Blockchain in Oral and Maxillofacial Radiology (OMR).

Materials and Methods: Head and neck computed tomography (CT) scans (n = 92,903 files) from the Cancer Imaging Archive (Blockchain folder n = 46,465 and Monitoring folder n = 46,438) and deidentified PHI were randomly assigned by 1 operator. Data were then converted into cryptographic Blockchain hashes via syncing the CBCT scans database folder with the DDSBlockchain (Charlotte, NC, 28,277) folder into the Hyperledger private Blockchain platform by a second operator. Data conversion percentage was assessed, and an F-test Two-Samples for Variances was conducted to quantify data upload speed ($P < .05$). Storing sizes of the original data and the Blockchain data were compared, and sharing privacy and safety were corroborated through the HIPAA compliance checklist by a third operator within the private Blockchain platform.

Results: One hundred percent of data uploaded were converted into Blockchain. Blockchain conversion had an average speed of 0.617 files per second. No statistical difference ($P = .562$) was found when comparing the 2 folders upload speed (average 26 hours, 11 minutes, and 5 seconds). The Blockchain data report storage size was 1.22 MB, whereas the original data folder storage size was 5.36 GB. No HIPAA breach was found during the data upload, conversion, sharing, and storage processes.

Discussion: The Blockchain private platform promises to become a gold standard in OMR PHI data backup because of its data conversion effectiveness, low storage requirements, and trusted, autonomous, immutable, and secured distributed ledger capabilities for keeping data private and safe. Preliminary study results indicated the feasibility of adopting Blockchain in OMR as a new data backup management method.

Conflict of interest: D. Uzbelger Feldman is co-founder and HIPAA compliance officer at DDSBlockchain (Charlotte, NC, 28277).

References

1. Yaga D, Mell P, Roby N, Scarfone K. Blockchain Technology Overview. Gaithersburg, MD: National Institute of Standards and Technology, Computer Security Division, Information Technology Laboratory;2018: Publication NISTIR 8202.
2. Bova C, Drexler D, Sullivan-Bolyai S. Reframing the influence of the Health Insurance Portability and Accountability Act on research. Chest. 2012;141:782-786.
3. Dubovitskaya A, Xu z, Ryu S, Schumacher M, Wang F. Secure and trustable electronic medical records sharing using Blockchain. AMIA Annu Symp Proc. 2017;2017:650-659.
4. Clark K, Vendt B, Smith K, et al. The Cancer Imaging Archive (TCIA): maintaining and operating a public information repository. J Digital Imaging. 2013;26:1045-1057.

DIAGNOSTIC ACCURACY OF APPROXIMAL CARIES IN DIGITAL RADIOGRAPH BY CHINESE AND AMERICAN DENTISTS: AN IN VIVO STUDY

G. LI, and J. YANG, PEKING UNIVERSITY SCHOOL AND HOSPITAL OF STOMATOLOGY, BEIJING, CHINA; TEMPLE UNIVERSITY KORNBERG SCHOOL OF DENTISTRY, PHILADELPHIA, PA

Background: Because dental education system is not the same in both the United States and China, there may be differences between Chinese and American dentists in the radiographic diagnosis of dental lesions.

Objective: The aim of this study was to assess whether there were any differences in the accuracy of diagnosis of approximal caries between Chinese and American dentists.