

## Browser's Notes

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### Can a deep-learning model for the automated detection of vertebral fractures approach the performance level of human subspecialists?

Li YC, et al.

*Clin Orthop Relat Res.* (2021); *EPub Ahead of Print* PMID 33651768

Lateral radiographs of 941 patients over 60 years of age (mean age 76 years, 70% female) treated for vertebral fractures confirmed by CT or MRI were used to create and validate a deep-learning tool for the detection of vertebral fractures. Patients with a history of malignancy, infectious discitis, or spinal hardware were excluded. In total, 6358 normal and 1101 fractured vertebrae were studied. The deep-learning model was trained on 655 vertebral fractures from 565 radiographs and validated with 226 fractures from 188 radiographs along with similar numbers of normal vertebrae that were randomly chosen from the radiographs. Following the training and validation, the final AI deep-learning ensemble model was tested with 188 different radiographs from this dataset along with dataset of 52 patients from another medical center using CT/MR results as the “gold standard.” Genant classification was used to grade the severity of the vertebral fractures (Grade 1 < 25% vertebral height loss, Grade 2 26% - 40%, Grade 3 > 40%). Overall, the AI model was 92% accurate with 91% sensitivity, and 93% specificity for the testing data. Analysis time was about 1.5 min per case. Accuracy for Grade 2 and 3 lumbar vertebral fractures was 94–95% with sensitivities of 97–99% compared with less severe Grade 1 fractures, 84% accuracy, 78% sensitivity. Comparison of the AI model with human observers (radiologist and spine surgeon) found good agreement with kappa values of 0.72 and 0.77 for thoracic and lumbar vertebrae, respectively.

### The Buford complex: prevalence and relationship with labral pathologies.

Ozer M, et al.

*J Shoulder Elbow Surg.* (2020); *EPub Ahead of Print* PMID 32949757

The presence of a Buford complex (absent anterior-superior labrum with thick, cord-like middle glenohumeral ligament), SLAP lesions, and other labral pathology were determined by retrospective review of video recordings of shoulder arthroscopies performed on 3129 consecutive patients (mean age, 48.5, 56% female). Indications for arthroscopy were suspected rotator cuff tear, SLAP lesion, instability, subacromial impingement, acromioclavicular joint degeneration, or adhesive capsulitis. Eighty-three (2.65%) patients had a Buford complex, one bilaterally. Labral pathology correlated significantly with the presence of a Buford complex. The prevalence of a Buford complex was 4.6% for patients with labral pathology and 0.3% of those without a Buford complex. Labral lesions were found in 94% (78/83) of patients with a Buford complex vs. 52% of patients without. Superior labral lesions (all SLAP type 2) were found in 82% (69/83) of patients with a Buford complex compared to only 33% of those without. Conversely, of the 1007 patients with SLAP lesions, 6.3% (68) had a Buford complex compared to only 0.7% (15) of the patients without SLAP lesions. The authors conclude that careful assessment for SLAP tears is needed for patients with a Buford complex. They noted the Buford complex in their arthroscopy patient population, likely a subset of patients having had an MR, was less prevalent than previously reported.

Abstracted by C. S. Winalski, M.D.

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