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In paleopathology, skeletal lesions have been identified in individuals with *Mycobacterium tuberculosis* (TB) and chronic respiratory infections. These infections cause inflammation of the pleural cavity, and in some cases cause secondary osteoarticular infections, creating lesions on the ribs and vertebrae. Similarly, SARS-CoV-2 (COVID-19) infections cause inflammation of the pleural cavity, and the virus can migrate. Long-term SARS-CoV-2 complications are underexplored. The authors believe that SARS-CoV-2 may also lead to rib and vertebral lesions. The purpose of this study was to determine if TB or COVID-19 led to rib and vertebral lytic lesions visible on radiographs. Chi-square was used to compare the prevalence of skeletal lesions on chest radiographs among COVID-19, TB, and control groups. Each group consisted of 50 chest radiographs. Radiographs were reviewed using standardized systematic interpretation. When comparing COVID-19 patients to control patients, a statistically significant increase in rib lesions was observed ($p=0.000134$). For the TB group, a statistically significant increase in rib lesions was observed when compared with controls ($p=0.00000312$). However, evaluation of vertebral lesions in both TB and COVID-19 patients showed no statistically significant difference compared with controls ($p=0.307$; $p=0.558$). When comparing rib lesions across TB, COVID-19, and control groups, there was a statistically significant difference ($p=0.000142$), indicating that infectious etiologies were associated with an increased frequency of rib lesions. Comparison of vertebral lesions across all groups demonstrated no significance ($p=0.594$). These findings suggest that rib involvement may be more commonly associated with infectious etiologies on chest radiography, whereas vertebral lesions do not appear to differ significantly.