

A CASE OF A LARGE PEDUNCULATED-TYPE OSTEOCHONDROMA ON THE LOWER LEG OF AN ADULT FEMALE FROM LATE MEDIEVAL ILOK, EASTERN CROATIA

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Introduction

Osteochondroma is one of the most common benign tumors of the growing bone. It represents a cartilage-capped bone outgrowth that may be pedunculated or sessile in appearance (Helms 2007), mostly occurring on metaphyseal surfaces of long bones and almost completely absent from diaphyses and epiphyses (Ortner 2003, Marques 2019). They are classified into two categories: solitary (non-hereditary) and multiple osteochondroma (mostly hereditary) (Jenifer et al. 2016). Causes for the disease are yet unknown, but cases of reported osteochondromas range from prehistoric times to recent examples, and are not limited geographically (Murphy & McKenzie 2010). Here we present a unique case of a large pedunculated-type osteochondroma on the right fibula of a skeleton from the medieval site of Ilok-Krstbajer (Fig. 1), and try to verify our diagnosis by using a novel approach combining techniques that have not been used previously in the analysis of neoplasms from archaeological settings.

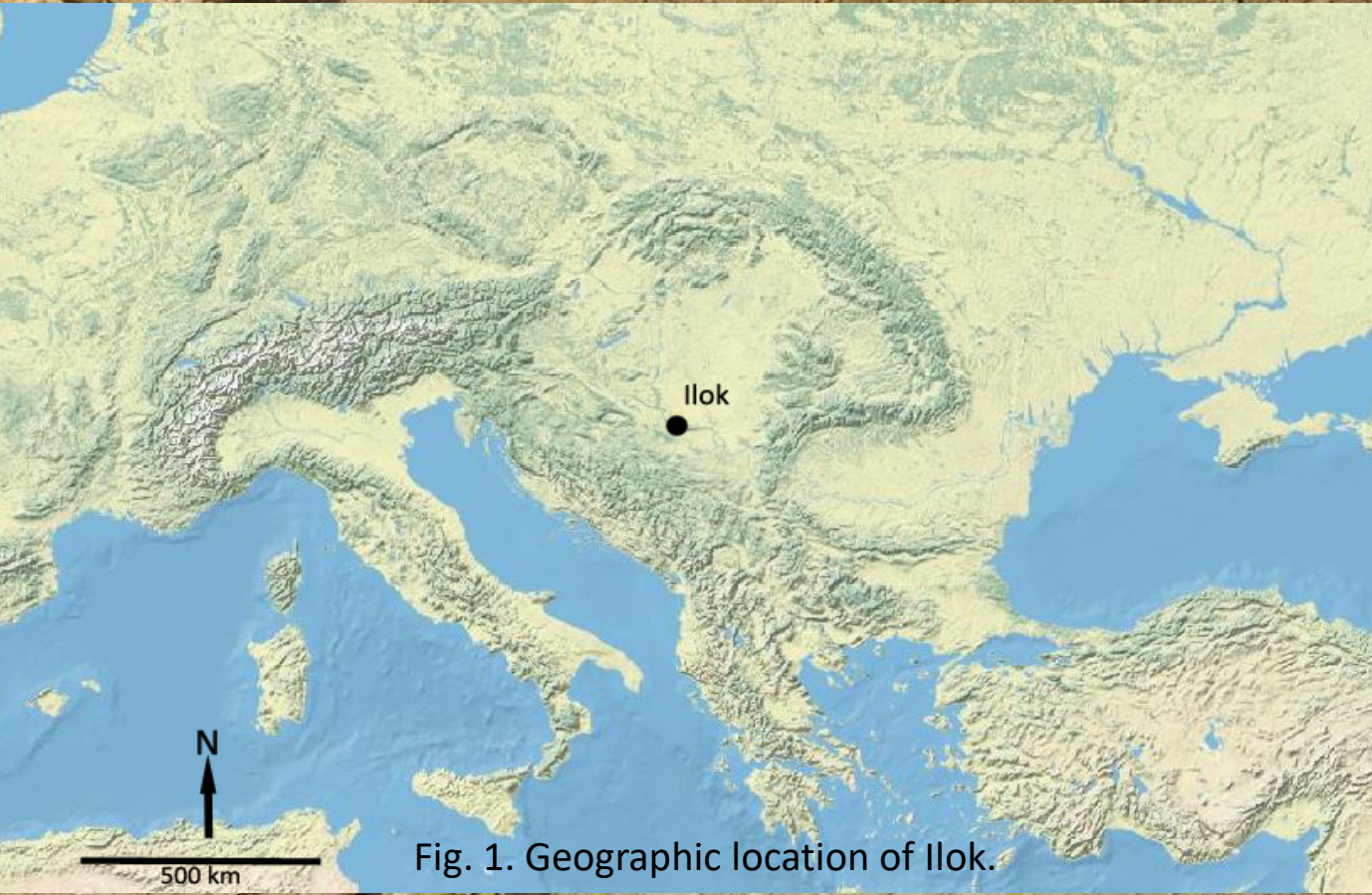


Fig. 1. Geographic location of Ilok.

Material and methods

The archaeological site of Krstbajer is located in the town of Ilok in eastern Croatia, on the right bank of the Danube River. Three seasons of systematic excavations conducted between 2015 and 2017 revealed the presence of 188 medieval burials dated between the end of the 12th and the 15th/16th century CE. Grave 176 contained a partially preserved skeleton of an adult individual oriented east-west lying on its back. A coin of Louis I of Anjou (1342-1382) (Fig. 2) was found within the grave fill just left of the right femur dating the use of the burial to the second half of the 14th and/or the early 15th century CE. Conventional bioarchaeological analysis of the remains from grave 176 was conducted at the Institute for Anthropological Research in Zagreb. The neoplasm in question was scanned on X-ray unit and Multislice computerized tomography (MDCT) unit at the University Hospital Centre Zagreb. The sample also was scanned using micro-CT device at the School of Medicine in Zagreb. And finally, CT guided biopsy (Fig. 3) and the subsequent histopathological analysis were conducted at the University Hospital Centre Zagreb and the School of Medicine in Zagreb.



Fig. 2. Coin from grave 176.

Results

The skeleton belongs to an adult female aged between 35 and 45 years at death with several pathological lesions, mostly in the vertebral column. The pedunculated-type of osteochondroma is present on the medio-posterior part of the right fibula (Fig. 4A-C). The cauliflower-shaped growth is 50 mm long in sagittal and 57.41 mm in transverse diameter. The tumor exhibits a bulbous, uneven, rough superior surface, and a flat, smoother inferior surface. The observed trabecular bone within the mass densifies outward, along with the tumor's expansion. X-ray showed pedunculated, well described mass without periosteal reaction or cortical disruption (Fig. 5). Micro-CT scanning revealed that the osteochondroma is fully integrated with the fibula, as the fibular cortical bone opens towards and anchors the osteochondroma (Fig. 6). The material for histopathological examination consisted of tiny, partly dust-like bony or osteochondromatous fragments. In most of the fragments, lamellar or lamellar/woven bone is either surrounding mature cartilaginous tissue or there are areas of enchondral ossification (Fig. 7A). In some fragments, there is loss of structure, reminiscent of osteomalatia, mainly surrounded by woven (reactive) bone (Fig. 7B).

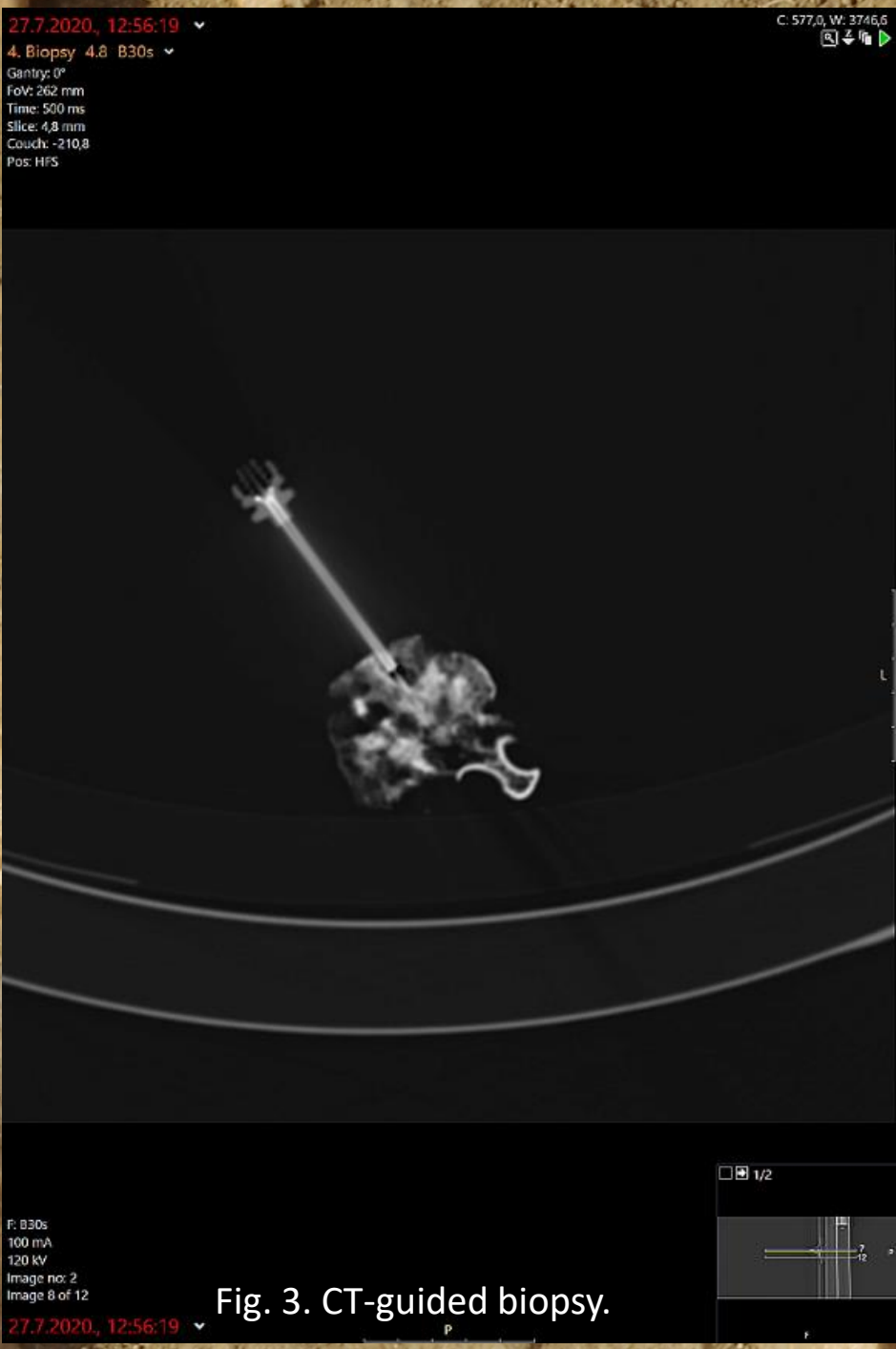


Fig. 3. CT-guided biopsy.

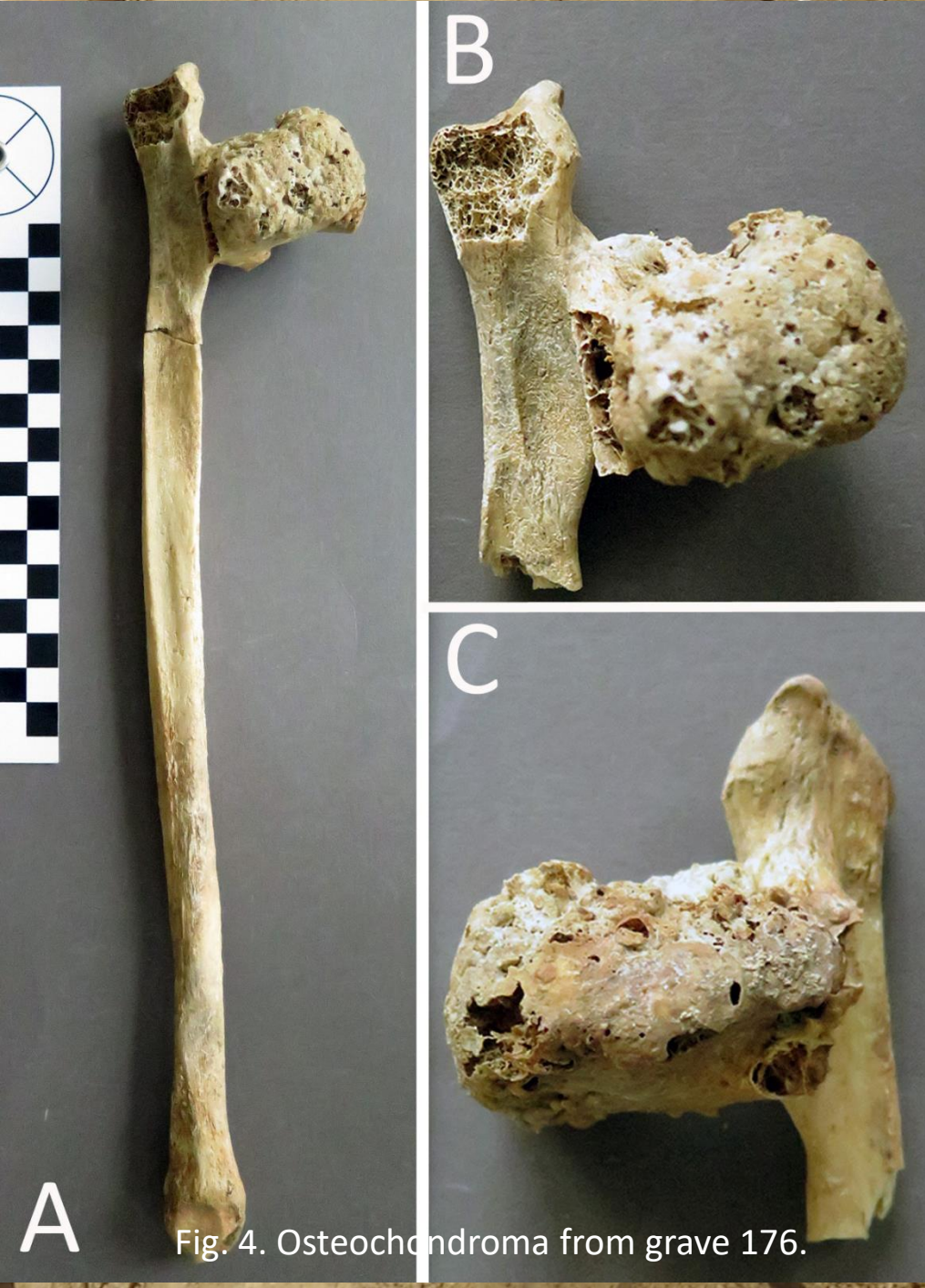


Fig. 4. Osteochondroma from grave 176.

Discussion and conclusion

Today, osteochondromas represent the most common benign bone tumor accounting for 20-50% of benign bone tumors and about 9% of all bone tumors (Garcia et al. 2011). In the presented case it is evident that the tumor had predominantly benign characteristics as no aggressive destruction of cortical bone or periosteal reaction was noted. Differential diagnosis took into consideration enchondromas, aneurysmal bone cysts and non-ossifying fibromas. However, both macroscopic and radiological appearance as well as localization of the presented case rule out the possibility of these disorders, and point out to osteochondroma as the main “suspect”. Micro-CT scans showed the full integration of the osteochondroma with the fibula and the trabecular bone formation within the medullary cavity thus pointing to a congenital origin of the pathology. And finally, histopathological analysis found only traces of reactive and reparatory changes with histological features consistent with a chondromatous lesion and without any elements of malignant growth. In our analysis we used a combination of conventional bioarchaeological methods, X-ray and micro-CT scanning together with CT-guided biopsy and histopathology to analyze the first case of a large solitary fibular osteochondroma from archaeological contexts globally. The specimen from Ilok is also the first case, at least to our knowledge, of confirmed diagnosis of ancient osteochondroma with an image guided biopsy. Considering the minimal invasiveness nature of the described procedure, it may set new analytical criteria for studies of ancient bone neoplasms.



Fig. 5. X-ray of the osteochondroma from grave 176.

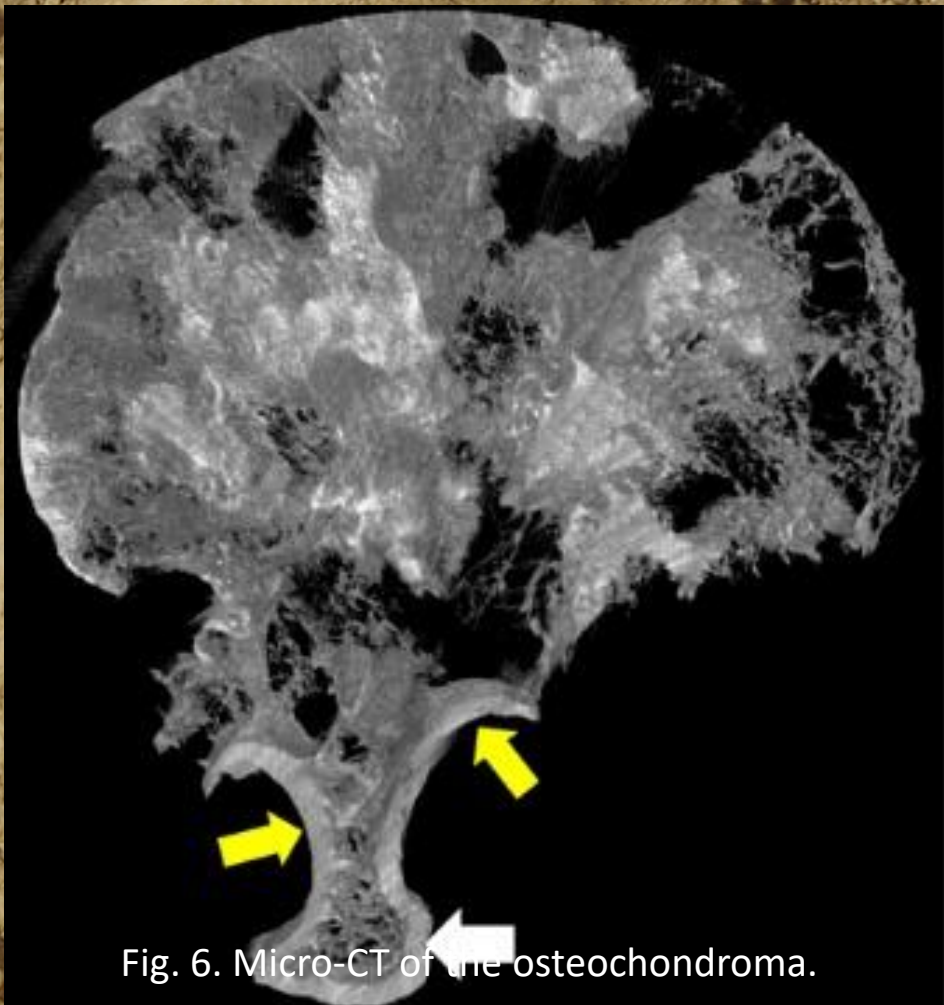


Fig. 6. Micro-CT of the osteochondroma.

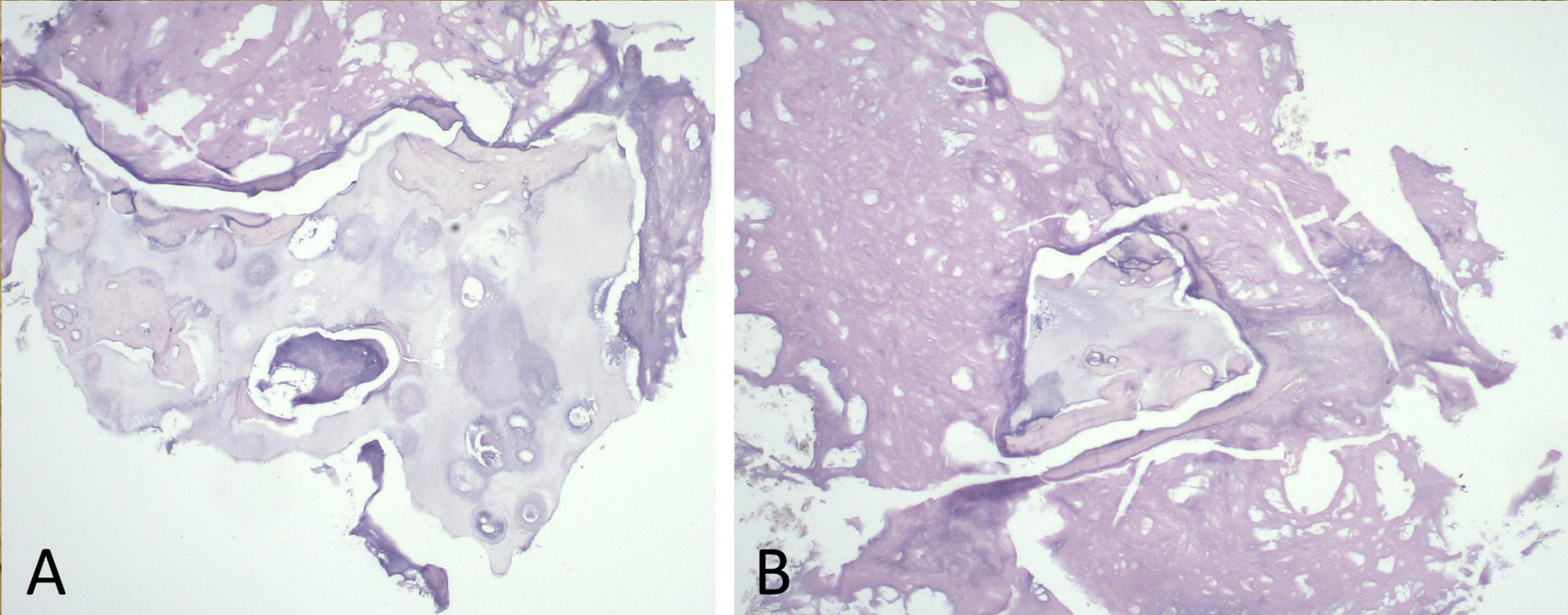


Fig. 7. Histological features of the osteochondroma from grave 176.

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