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## The effectiveness of a standard drill connected to a core biopsy needle: How to obtain specimens in very strong bone tumors

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### ABSTRACT

**Introduction:** Core biopsy is today recognized as the gold standard for the diagnosis of bone lesions; unfortunately, when the bone is too solid it can be very difficult to penetrate it; in case of failure, open biopsy is indicated but it is associated with greater contamination and complications. A possible solution is to connect a common orthopedic drill to the core biopsy needle.

The aim of the presenting study was to present a technique useful for performing biopsies in case of very strong bone lesions and to evaluate the adequacy and quality of the obtained specimen.

**Materials and methods:** A standard bone biopsy set was connected to a commercial drill to perform bone biopsies. Data was collected over a 2-year period (2015–2016). Information regarding technical success, diagnostic data and complication rates was all collated to assess the technical feasibility of this technique. **Results:** Out of 357 bone biopsies, 34 patients underwent the procedure using a common orthopedic drill connected to a core biopsy needle. Diagnostic material was obtained in each patient and the artifacts were considered irrelevant. No major complications occurred in any patient.

**Discussion:** The use of a core biopsy needle connected to a common orthopedic drill facilitates the penetration of thick cortical bone by simply applying continuous speed and pressure; nevertheless, the biopsy needle we use is not designed for a drilling procedure and for this reason it can be damaged, but if the biopsy is performed with particular attention, the mechanical failure can be avoided

**Conclusions:** Bone biopsy using a commercial hand drill has a technically high success rate with minimal complications. Further studies with more cases are necessary to verify our results.

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### Introduction

The mainstay of the treatment in oncological orthopedics is histological diagnosis; the orthopedic surgeon can proceed to the treatment without a preoperative diagnosis just in rare cases in which the imaging is very clear, as in non-ossifying fibromas and osteoid osteomas.

Biopsy has to be performed following oncological rules and considering the surgical access to reduce contamination and to allow the removal of the biopsy track with definitive surgery. This reduces the risk of local relapse, moreover in case of malignancies [1,2].

Bone biopsy samples may be obtained through two main techniques: core biopsy and open biopsy; core biopsies can be

performed without any guides or with imaging guides such as X-ray intensifiers, CTs or ultrasounds.

Closed techniques allow to reduce morbidity, costs and to achieve multiple sites. A large variety of needles ranging in size from 8 to 22 G are available to obtain aspiration, cutting and trephine sampling. The type of needle depends on the operator's preference, but bigger the needle, better the specimen quality and higher the possibility of obtaining a diagnosis. In modern orthopedic oncology core biopsy is considered the first biopsy modality that allows an accuracy rate in distinguishing benign from malignant lesions ranging from 68% to 100% [3]. Many different core biopsy needles are available: the Jashmidi bone marrow needle (Baxter Healthcare, Deerfield, IL, USA), the Temno bone marrow biopsy needle (Radiologic, Letchworth, Hertfordshire, UK), the CookTM needle (Australia). In some cases it can be difficult to obtain an adequate biopsy specimen because of the thickness of the cortical bone or because of the sclerotic nature of bone lesions.

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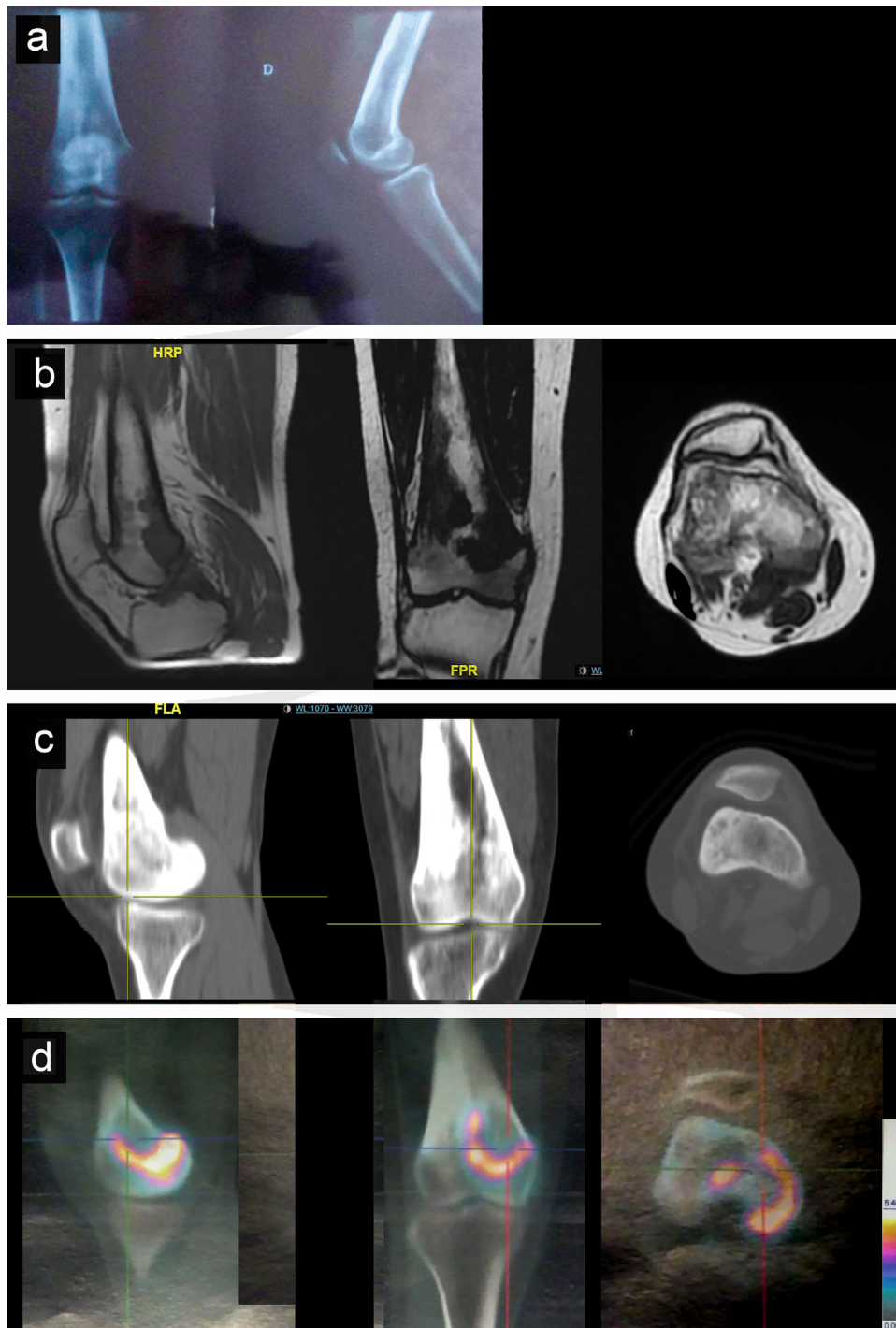
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Several benign and malignant bone diseases can be characterized by sclerotic bone and distinguishing between them can be very important considering their various nature.

The incidence of benign lesions such as bone islands, previous infections, old lesions or periostitis is not known; they are mostly incidental findings, usually being asymptomatic; sometimes pain can cause their discovering. Primitive malignant lesions are rarer but their diagnosis is fundamental, as for low-grade and high grade osteosarcomas; furthermore, metastatic lesions are very common from prostatic cancer, primary B cell lymphoma, Hodgkin's lymphoma, metastatic gastric carcinoma, metastatic cervical

carcinoma, metastatic pancreatic carcinoma, metastatic medulloblastoma and metastatic lung carcinoma [4].

Many studies have shown that the diagnostic yield of sclerotic bone lesions during core needle biopsy is lower (48–54%) than the yield of lytic lesions (87–90%) [[5]]. Normally a hammer can be used to overcome bone strength. This technique sometimes is not sufficient because of needle failure due to breakage or bending. A possible solution for this type of problem is to utilize a common core biopsy needle with a common orthopedic drill. Even if there are many electrical drilling systems for performing bone biopsies, they are expensive and not routinely available. With this study, we



**Fig. 1.** a) preoperative X-ray showing the osteoblastic lesion; the MRI (b) and the CT-scan (c) confirm the sclerotic nature of the tumor; d) the 16FDG-PET scan shows a lesion with intermediate uptake.

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