irradiation with a specific features or the damage, which characterized by a pathological fracture of a bone necrosis.

This experiment was carried out to detect the damage, which was still in the latent period. Rabbits, aged about 3 months, were used. Up-take ratio in the knee joint was higher than middle of the thigh, because of higher metabolic activity of the epiphysis. To investigate the radiation bone damage, 3000 rads of X-rays were irradiated on the left knee joint in a single dose.

A 40 µCi of ⁸⁵Sr was injected intravenously at 2 days after irradiation and the decay curves for ⁸⁵Sr incorporated in both side of the knee joints were made by simultaneous counting, applying a scintillation counter. A X-ray machine was operated at 200 KV and 20 mA with a 0.3 mmCu + 0.5 mm Al filter. X-ray examination and ⁴⁷Ca up-take test were carried out at 1, 3, 6 and 9 months after irradiation. The fine structural change of irradiated bone were investigated using a macro-autoradiographic technique.

The count rates for irradiated or unirradiated bones decreased rapidly in several days after irradiation and, thereafter, the slope of decay curve for irradiated bone became less steep than that of unirradiated bone. The discrepancy of the two curves became more significant, if the days between the irradiation and the measurement were prolonged.

Up-take of ⁴⁷Ca for the irradiated bones were higher than the unirradiated bone and the abnormal deposits of radioactivities were seen within the irradiated zones.

It was suggested the late bone damage following irradiation might be charactarized by the increase of bone matrix and the disturbance of the exchangeable pool, because of radiation fibrosis and vascular damage.

Selection of Nuclide and Procedure in Scintiscanning
for Tumors of the Bone and Its Soft Part
With Emphasis on Comparison among ⁹⁹mTc polyphosphate, ⁸⁵Sr and ⁸⁷mSr

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Scintigram is often very useful in orthopedic field, particularly in diagnosis of bone tumors. It is a well-known fact that ⁸⁵Sr, ⁸⁷mSr or ¹⁵F produces the positive pictures of malignant bone tu-
mors.

Among various techniques using radioisotopes for diagnosis of malignant tumors so far reported, scintiscanning using ⁹⁹mTc-labeled compound has
recently been attracting wide attentions because of its excellent result. At our hospital, scintigram using $^{87}$Sr, $^{88}$Sr, $^{99m}$Tc polyphosphate or $^{67}$Ga is taken in the course of routine tests for primary and metastatic bone tumors as well as tumors of the soft tissue. Reported here is the result of our comparative study of these isotopes used in scintiscanning.

Our procedure is: First take whole-body scintigram from anterior and posterior sides, and, if some abnormality is found in the above record or if an abnormality is suspected in X-ray picture, take local scintigram subsequently. To enhance the diagnostic value of scintigram, it is necessary to select a suitable nuclide and adjust the conditions of scintiscanning according to the type of tumor and site of focus. In cases of metastatic bone tumor, whole-body scintigram is often of greater value than X-ray picture, and greater advantage is gained from the scintigram readily showing the site of focus than from the one representing minute changes. In cases of primary bone tumor, diagnosis is usually established by X-ray and other tests, so that scintigram is required, not primarily for discovery of the focus, but for confirmation of a spread of tumor preceding operation or radiotherapy. With the above view in mind, we have taken scintigram for the tumor of the bone or soft tissue in over 100 cases since the opening of the present hospital in Nov., 1972. Selecting 12 cases of primary bone tumor, 3 cases of inflammation and 17 cases of metastatic bone tumor out of the above cases, we studied ratio between uptake of radiosotope by tumor and that by normal tissue, time-course change and the appearance of background other than the bone, specific to each nuclide, and, with X-ray or operation findings as reference, compared the results produced by different nuclides.

Clinical Study of Intervertebral Disc Scintigram Using $^{99m}$Tc-pertechnetate by Intradiscal Injection

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In order to study retension capacity of the injected substance into the intervertebral disc, 41 cases (78 discs) of low back pain were examined by scintillation camera after intradiscal injection of $^{99m}$Tc-pertechnetate at lumbar discography with a dosage of 300 µCi respectively. Scintigrams obtained immediately, 30 minutes, and one hour after injection were compared with discogram findings.

In 16 cases, clearance curves were recorded throughout the first one hour and retention ratio of $^{99m}$Tc-pertechnetate at one hour after injection was calculated. Results are as follows.