Abnormal radioisotope concentrations in the skull, thorax or the pelvis have been thus far difficult to interpret properly. PHO/CON, with 12 body section scintigrams it provides, has made it possible to obtain a three-dimensional view of areas of abnormal radioisotope concentration and easily distinguish them from hot areas representing pathological processes and thus has proven of value in enhancing diagnostic efficiency. In conclusion, this PHO/CO tomographic scintiscanner has the following advantages over the conventionally used ones: (1) It permits to delineate multiple lesions distinctly which would otherwise be seen overlapping. (2) It can be used more efficiently in the localization of lesions in the skull, thorax or pelvis. (3) It also affords greater effectiveness in the evaluation of therapeutic course. (4) It is effective in the diagnosis of a pseudarthrosis.

Application of Bone Scintigraphy to Disorders of Spine

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We applied bone scintigraphy to 48 cases of spinal disorders, which were spondylitis (18 cases), bony metastases of malignant tumors (6 cases), spinal tumors (5 cases), anomalies (3 cases) and ossification of spinal ligament (2 cases). It was difficult to distinguish spondylitis tuberculosa from spondylitis purulenta on bone scintigraphy. Several cases of spondylitis demonstrated pathologic conditions in the kidneys such as defective or asymmetric radioactivity at the time of bone scanning. In spinal tumor, chondroma of C6 vertebra showed heavy radioactivity, but non-secretory solitary myeloma revealed normal radioactivity. In cases of anomalies of spine (synostosis and odontoidem) and ossification of spinal ligament (posterior longitudinal ligament of cervical spine and yellow ligament of thoracic spine), there were no abnormal bone uptake. Bone scintigraphy is one of the useful methods for diagnosis, treatment and evaluation of prognosis in spinal disorders.

Limb Paralysis and Bone Scintigram (The Second Report)

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We have already reported that, in thirty patients suffering from paralysis of limbs due to cerebrospinal disorder, the more severely osteoporosis advances, the more phosphates are taken up in the bone of osteoporosis. The present report is to find a correlation between the incorporation of phosphates and blood supply in the affected bones. Either of the posterior paw of a rabbit was fixed with the gyps, which was taken off after three weeks’ fixation. Every four days after removal of gyps, we obtained bone scintigrams using 99mTc-phosphate and accumulation curves of intravenously administered 99mTc-albumin on the area of osteoporosis. 99mTc-phosphate as well as 99mTc-albumin was incorporated in the bone of osteoporosis in greater amount than in the unaffected side of bone. (The differences in amount of uptake of phosphate and of albumin between the pair of paws gradually decreased.) We also studied with fourteen patients of osteoporosis due to cerebrospinal disorders. In the patients of over one year’s duration of paralysis, the affected side of bone took up less 99mTc-albumin than the unaffected side of bone. On the other hand in the

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patients who had been in state of paralyses for more than one year, more $^{99m}$Tc-albumin was accumulated in the affected side than unaffected side of bones. Conclusively distinct correlation between the accumulation of phosphates and blood supply was not obtained.

**Bone Scintigraphy of New Bone Formation at the Donor Site Following Excision of Fibula**

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Where much of bone transplant is needed, especially when the situation requires a bone transplant which is long enough or can provide an adequate support, the fibula is chosen to serve for such a therapeutic purpose not infrequently. In the present study we made an observation of donor sites of fibulas for the time course of new bone formation following bone excision in an attempt to investigate the regenerating ability of the bone as related to age at operation by bone scintigraphy and roentgenography.

Thirty-six cases were involved in this study. The age at operation in this series ranged from 1 year and 9 months to 63 years and the duration of postoperative follow-ups averaged 3.5 years. Bone scintigraphy and roentgenography were done 1, 2 and 3 months postoperatively and at 6-month intervals thereafter.

Results:

In order to study the relationship between the age at operation and the regenerating capacity of bone, the subject patients were divided into 2 groups depending upon whether the operation was performed before or after closure of the linea epiphysialis.

Seventeen cases underwent operation before closure of the linea epiphysialis at an average age of 8.5 years. In all of these cases bone scintigrams demonstrated marked radioisotope concentration over the entire area of bone defect one month postoperatively before corresponding changes were visualized by roentgenograms. New bone formation was satisfactory in all instances.

Another 19 cases received operation after closure of the linea epiphysialis at an average age of 29.8 years. Bone scintigrams demonstrated a slight degree of radioisotope concentration at both proximal and distal ends of one defect but failed to reveal any discernible radiotsotope concentration in the diaphysis at any postoperative stages. Moreover, there was evidence of poor bone formation occurring in the defective area. These findings suggest that regeneration of the fibula might be unexpectable following surgical excision of the bone done later than closure of the linea epiphysialis, even if the periosteum is adequately preserved.

**Clinical Study of Renal Osteodystrophy in Patients Treated with Chronic Hemodialysis**

**Part 1. Calcium-Regulating-hormones**

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Calcium (Ca), phosphorus (P), and alkaline phosphatase (A1-P) in serum, and ionized calcium (Ca$^{++}$), parathroid hormone (PTH), calcitonin (CT), and 25-hydroxycholecalciferol...