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SOME VIEWS ON THE TECHNIQUE OF ROENTGEN
EXAMINATION OF THE SPINE

Roentgen examination of the spine—as all other medical, roentgenologic diagnosis—consists partly in producing the pictures most suitable for the object intended, partly in interpreting the changes observed in those pictures. The first is *roentgen technique*, the second *roentgen anatomy* and *roentgen pathology*. It may perhaps interest this audience to hear a little about the principles of the technique employed in roentgen examinations of the spine such as I have conducted them, first at Prof. *Fossell's* roentgen institute at Sophiahemmet, later in the department for roentgen diagnosis at the hospital in Lund; and to see some pictures illustrating that technique.

In deciding what is the optimum of exposure, voltage and tension for roentgen examination of the different organs, it is necessary to distinguish sharply between, on the one hand, those organs which move with the respiration, pulsation of the heart and peristalsis, and, on the other hand, those that are not influenced by these factors. With regard to the former it is a rule that, in order to get an absolutely good picture, the exposure should be made as short as possible, and the voltage and tension increased instead. Thus, for instance, when taking roentgenograms of the calculous gall-bladder, which lies right underneath the liver and moves considerably with the respiration, the exposure must be very short if the plate is to register the often extremely small concretions. The heat developed under this high tension is so great that a focus of considerable dimensions becomes necessary. As a result of this, the pictures will be lacking in sharpness, however; so that, for instance, the structure

of the gallstones will be far less clearly discernable than in a roentgenogram, taken later, of the specimen after removal. In order to get a structural organ to show up well in the roent-

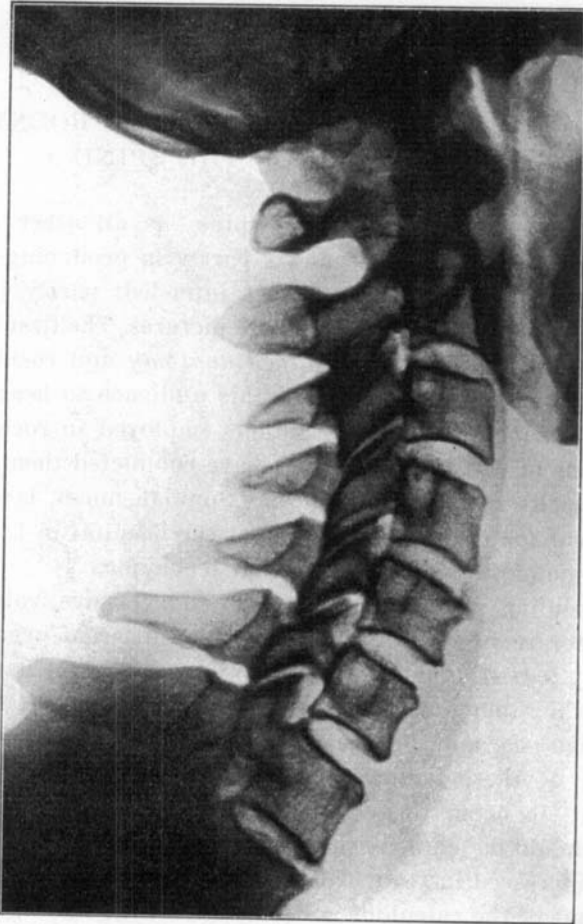


Fig. 1. Side view of cervical spine. Taken with the patient in sitting posture. (Lysholm's secondary diaphragm).

genogram, we must therefore use a tube with small focal spot; and we are then obliged to reduce the tension, and lengthen the exposure instead.

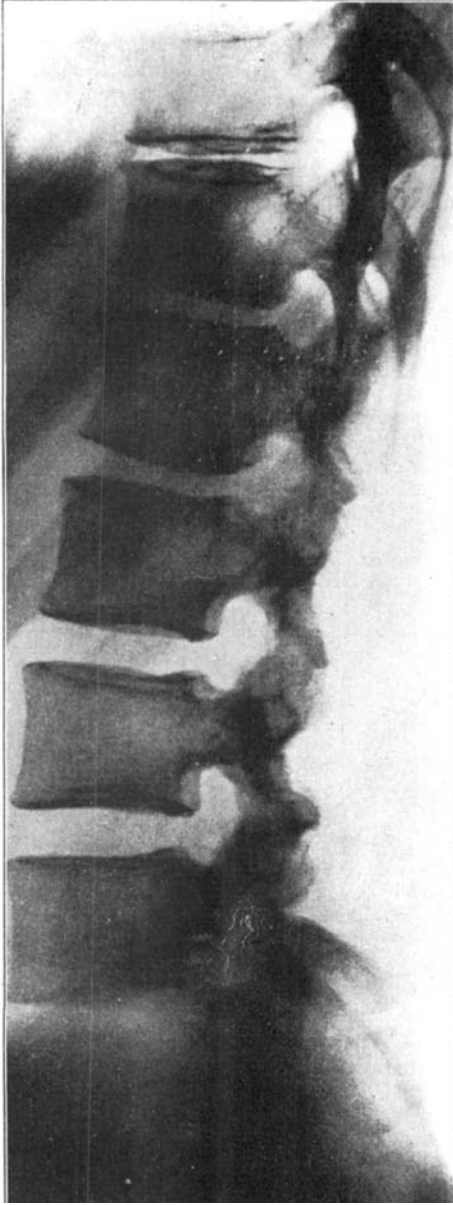


Fig. 2. Side view of lumbar spine. Only four vertebral bodies are shown absolutely well; the lumbosacral region is underexposed, such thoracic vertebrae as are visible are overexposed.

But how in the case of skeletal roentgen examinations? Of the peripheral parts of the extremities I needn't speak, as they don't present any difficulties. But in roentgenographing the

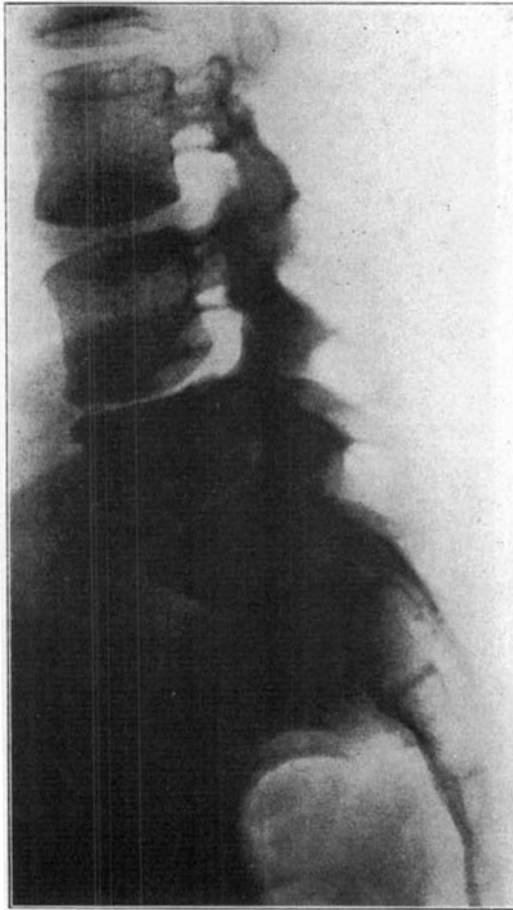


Fig. 3. Side view of lumbosacral region. The fifth lumbar vertebra and the upper part of the sacrum are shown absolutely well. The other lumbar vertebræ are overexposed.

shoulder girdle and the cervical spine, the respiration must be taken into consideration, and the exposures kept short, in consequence. As the thickness of these parts of the body is relatively

slight, it will in ordinary cases—that is to say, except in the case of very small children and old people—not be difficult to get perfectly good pictures. The greater part of the spine, and



Fig. 4. Side view of fifth lumbar vertebra, sacrum and coccyx.

the pelvic girdle, are not influenced by the respiration, and for those we can therefore use very long exposures, if only it is seen to that the patient is kept effectively immobilised. This also makes it possible to chose a relatively soft radiation, and thus

obtain considerably better contrasts. The sharpness of the pictures has, of course, already been ensured by using a tube with small focus.

It is thus by no means necessary—in fact, not even desirable—to make short exposure an objective in examining these parts of the skeleton. At least, this applies as long as we use the tubes

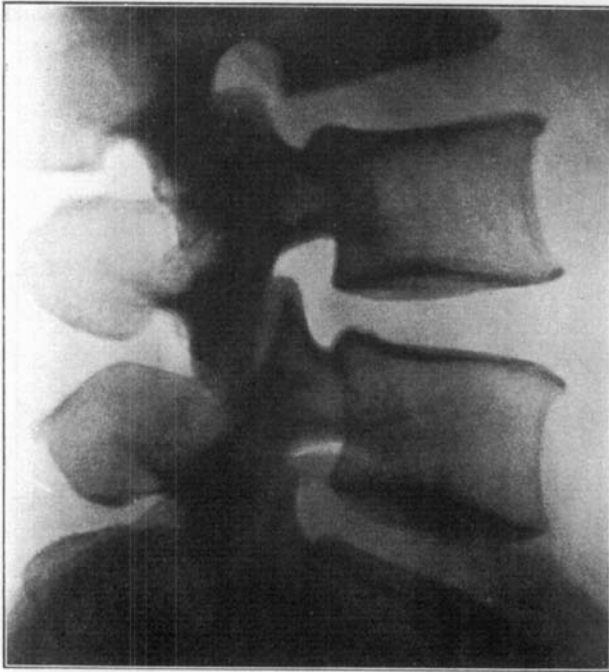


Fig. 5. Roentgenogram showing details of lumbar vertebræ. Both the vertebral bodies and the spinous processes stand out perfectly.

now most commonly on the market. It is possible, however, that the introduction of tubes with rotating focus may enable us to shorten the time of exposure while still adhering to the conditions which I have just outlined.

Of course, we always use a secondary diaphragm,—for the spinal portions of the back one of the Potter-Bucky type, for the neck one constructed by Lysholm. Lysholm has some new types under construction which will make it possible to shorten

the distance between the film and the object to be roentgenographed, whereby still greater sharpness will be obtained. We work with a tube of 3 KW, and I would advise most strongly

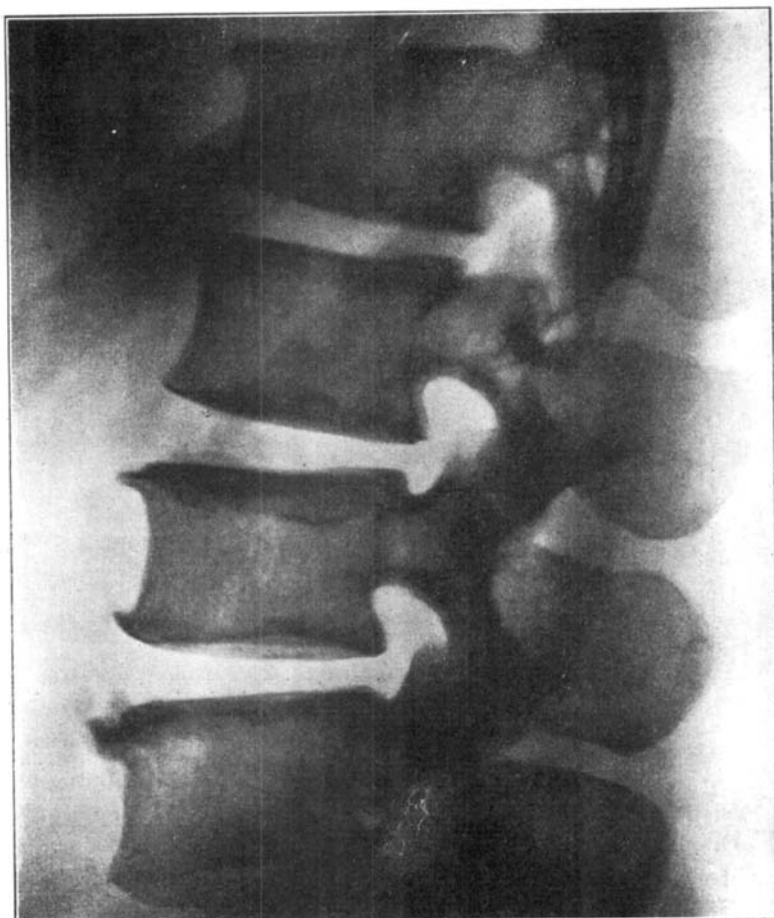


Fig. 6. Roentgenogram showing details of lumbar spine. Spondylosis deformans.

against using tubes with larger focus for examination of the spine. We pay particular attention to the immobilisation of the patient. The surface on which he is placed is curved; he lies

considerably better thus than on a flat surface. By increasing the fixation slowly, and by letting him relax completely between each time the pressure is increased, it is possible to obtain an immensely steady fixation, and the patient lies as walled in.

Before I proceed to show you some of our roentgenograms, I wish to emphasise how important it is *that the physician himself takes part in the roentgenologic examinations of the skele-*

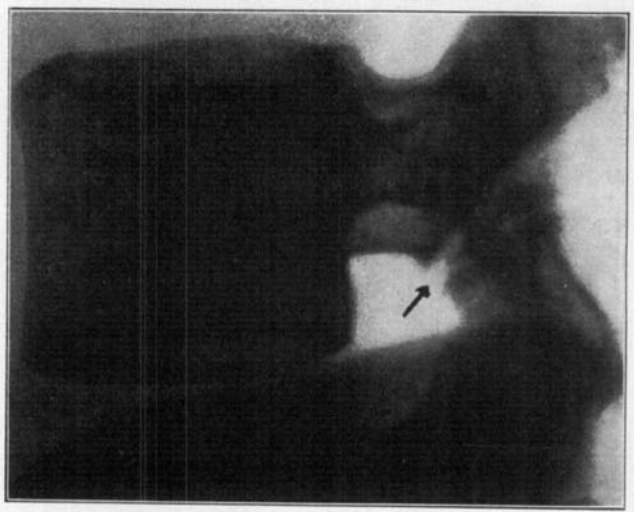


Fig. 7. Roentgenogram showing details of fifth lumbar vertebra. Spondylolysis.

ton. A nurse can do only the ordinary, typical adjustments. When it is a question of adjustments aiming at some particular detail of the skeleton—perhaps a part which relatively seldom becomes a subject for examination—the knowledge possessed by the roentgen-personnel will in most cases not be sufficient.

As I have repeatedly pointed out before, both in my lectures and in writing, one must under no circumstances omit to make use also of lateral projections for the spinal roentgen diagnosis. This may seem too evident to need any stressing; but experience—even from the last years—has shown me that the rule is by no means always followed. And yet it is of course so that the

roentgenograms taken in lateral projection in a majority of cases gives much more valuable information than the frontal views, both when it is a question of affections of traumatic origin and when it is a question of incipient inflammatory processes or tumour building. *The side view is the structural*

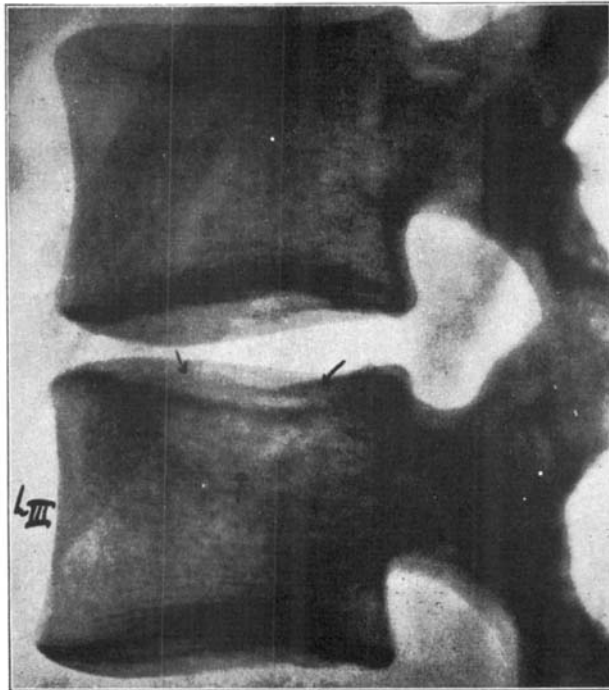


Fig. 8. Small tuberculous focus in the upper part of body of third lumbar vertebra. The Intervertebral space diminished anteriorly.

picture of the vertebral body. In the department for roentgen diagnosis at the hospital in Lund we therefore always lay weight on getting the best possible side views.