

The Medico-Legal Value of the Roentgen Rays.

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That the skiagram, in forensic medicine, has distinct uses and value is a fact that has for some time been known both to the medical and legal professions. As time glides onward we shall observe that the skiagram, "the exact picture of the true state of affairs," will replace in the majority of accident cases the ordinary witnesses; the court and jury arriving at a decision either for plaintiff or defendant in less than half the time previously required.

During the past several years I have been privileged to produce skiagrams both for lawyers and physicians, and in quite a number of instances I have in connection with them given expert testimony. Especially is this true of the skiagram and confirmatory testimony in connection with railroad damage suits. As a result of this I feel that my experience has been more than sufficient to enable me to deliver a few remarks in this special line of work concerning the uses and value of the Röntgen rays in forensic medicine. Space and time will, unfortunately, not permit me to detail the interesting and puzzling cases for which I made skiagrams and delivered expert testimony, but what I can do will be to review a few facts and give several hints gleaned from experience, which may be of value in connection with this method of diagnosis.

That is now considered advantageous to admit skiagraphic evidence into court is shown by the fact that the judges of advancing courts have permitted and even encouraged their use in addition to witness testimony in damage suits and even in other cases. This is true of all the courts in the eastern and middle states, with one or two exceptions. Judges, at-

torneys and jurists today do not care to have cases "hang on," but are very anxious to have all evidence handed in as soon as possible and the cases cleared up in as short a time as may be convenient. Photographs of accidents, convicts, etc., microscopic evidence, and many other scientific helps, are admitted into the various courts; why should the skiagram be excluded? Is there any reason for such rulings as were formerly made? Most decidedly not. There is not one fact offered today that is opposed to the uses of the skiagram in connection with court work—with, however, one condition, that it be produced by a person who is an expert in this line of work and not a novice.

The correctly produced skiagram is reliable, and when so produced can only illustrate the true state of affairs. It is, however, to be remembered that in order that a picture may be considered reliable, it must have been produced by a person who has had sufficient experience and as a result is skilled in the art of skiagraphy. The question as to who shall consider a skiagram as reliable evidence can in court only be decided by a person who is an expert in this particular work. A short time ago I was called as expert witness in a damage case against a railroad company and the question of a skiagram's reliability can best be illustrated by stating the facts of the case in question. Mr. H—— met with an accident and as a result brought suit against the railroad company, the plaintiff claiming heavy damages as a result of long-continued suffering and annoyance. The defendant company requested me to make a "picture" (skiagram) of the plaintiff's case, which the latter refused to permit, whereupon

the former would have made settlement. The plaintiff, however, had a skiagram made and was under the impression that he was in perfect readiness to battle with the defendant's x-ray expert. The case arrived at court and the facts laid before the jury and the judge by both sides. The plaintiff's skiagram was admitted as evidence by the judge into the court, and upon careful examination by me I decided that the photograph was unreliable in all respects. In the first place it had been made by a person who was not a physician (his occupation being salesman of x-ray instruments), at the same time the party in question had no experience in x-ray work (he having made only about a dozen attempts at skiagraphing various parts of the human body), a fact which he early admitted while on the witness stand. These facts alone would have rendered the photograph unreliable, but what is perhaps of more importance, dark lines were pointed out by the plaintiff's surgeon as "fracture lines"—at this time being "lines of callus," as he claimed. The "experts" in question had never seen four spine cases, which I made them admit when my time on the witness stand had come. What he claimed to be a shadow of callus I proved to the judge, attorneys and jurymen to be nothing more than the shadow of a spinous process—in fact the picture on very close examination showed five or six such supposed "fracture lines" which were nothing more than the shadows cast by the spinous processes of the respective vertebrae. This thus illustrates the fact that a skiagram may be unreliable, and should never be permitted to be entered as testimony until passed upon by a person whose expert competence is generally known.

From the foregoing points it may be observed that a skiagram in medico-legal cases is practically of no authoritative

value unless it has been produced by an expert. Again, it is very largely useless unless its value and exactitude are explained by either a surgeon or physician to the court. Its correctness can only be certified to by a person who is no other than an x-ray expert. The better way is for the expert who produced the skiagram to do the expert testifying, and never should an expert witness testify to a skiagram that has been made by an electrician or other non-medical man.

The value of a skiagram in medico-legal cases may be subdivided into the following headings: (1) The relation of a skiagram to the physician in making his diagnosis is of the utmost importance. A correct skiagram gives a proper diagnosis so that the attending physician or surgeon can treat said case or cases intelligently from the very beginning; the progress of reparation or cure can also be closely watched as time advances, so that the professional man can save himself from malpractice suits. I earnestly urge every physician to early have a skiagram taken of an accident, or other case, i. e. before any treatment has been resorted to, and a second skiagram after treatment has been instituted. Such records will protect the attending physician against any attempts at suits for damages in or out of court.

(2) The value of a properly taken skiagram to the judge, attorneys and jurymen is indeed so great as to leave the proceedings of an accident damage suit in darkness when no such evidence can be submitted. The time of such suit is greatly lengthened without such and, besides the expenses of the court are increased as such a suit "hangs on," a state of affairs that can be diminished when the time of trial is shortened as much as possible. When discussing the nature of an accident case, of necessity terms must be used which are of no mean-

ing to the usual run of jurymen, and in some cases to judges and attorneys. So when something tangible, as a skiagram, for instance, is submitted the jurymen, etc., will more readily understand and in the majority of cases the time of trial will be materially shortened.

The Röntgen rays show all kinds of *fractures*, no matter where located, with one or two exceptions, they being the base of the skull and fractures of certain portions of the vertebrae. The presence of a fracture can most decidedly be revealed in all other parts of the human body. Today we can show the exact structure of the bones, ligaments and tendons by means of the x-rays, and when fractures are present and are not reported by the skiagrapher, incompetence can be proclaimed.

Callus formation is in the majority of instances visible in the healing of a fracture, especially so when a proper technique is employed. The time necessary for the formation of callus depends upon the seat of the fracture, upon the age of the patient, upon his health, mode of treatment, etc. At any rate the repair of a fracture can be watched by the frequent production of skiagrams of the injured seat. An old fracture can be determined by the presence of callus, also a skiagram will reveal the fact whether or no the union is firm or false—whether the fracture has been united or not. By this means an epiphyseal separation may also be differentiated from an ordinary fracture, the former being more serious than the latter, thus affording more room for legal entanglements.

Dislocations can only be absolutely correctly diagnosed in early stages by means of the x-rays, the difficulty so experienced being due to excessive swelling, pain when examining by ordinary means, etc. When complicated by fracture a skiagram will be the only means of an absolutely correct

diagnosis. Reduction of dislocation as also of fracture can only be confirmed by this means of examination.

Foreign Bodies—These often remain undiagnosed, subsequently causing serious involvements. Thus when ascertained by this means dangerous probing has been avoided and the liability to infection has become nil.

Diseases of Bones are only diagnosed with absolute certainty by means of the x-rays.

Diseases of Heart and Lungs.—Certain diseases of these organs can only be diagnosed absolutely by means of the x-rays. Thus in a case of enlarged glands which gave rise to aphonia it was proved that there was no destruction of the true vocal cord, as the opposing side in a legal controversy had claimed.

Deformities.—The majority of legal cases belong to this class. The skiagram of fluoroscope reveals the actual degree of deformity of the osseous structures. If careful technic is employed there will be no resulting distortion or exaggeration of the true state of affairs. The question is often asked, "Could deformity have been avoided?" The answer to this may be as follows: The deformity is perhaps due to the fact that the physician did not know how to diagnose, and as a result properly treat, the case, and the deformity may have been due to the patient disobeying orders given by the surgeon or physician. Deformities in some instances will result no matter what care the physician and patient may take; in such cases it is always advisable to so inform the patient as early as possible. The attending physician, if afterward the latest, up-to-date, improved treatment has been employed, may be found by court to not be liable.

Functional Disability.—This does not bear a definite relation with the degree of

deformity, as in certain cases there is great deformity with little or no functional disability and vice versa. The important feature to be considered is whether or no the disability is temporary or permanent; if ankylosed is it true or false? The x-rays here again are the only means whereby an absolutely correct diagnosis can be made and an answer offered to the above.

POINTS ON THE TECHNIQUE OF MEDICO-LEGAL SKIAGRAPHY.

The technique in these cases does not vary greatly from that in any x-ray examination, except that especial care should be taken to have good, clear negatives. It is most important to have a detailed report of the case, as to the time after the accident, course of treatment, and physical signs of the accident. Examine carefully first with the closed fluoroscope, in a darkened room, so that the patient himself, or his attendants, may not see the result of the examination. Place the plate in position, in the presence of witnesses, and have a distinguishing mark upon it, such as a key or ring, for purpose of identification. Keep record of such details as the *time* of exposure, distance of the Crookes tube, position of the tube and part, etc. Take negatives from different points of view, and if possible take the injured and normal parts upon the same plate, for the purpose of comparison.

INTERPRETATION.

Now study the negative, provided it is satisfactory as to technique. Compare with previous negatives you have taken of the same part of the body and also with the corresponding normal part of the same person, being careful, however, to ascertain whether the supposed normal part has ever been the seat of a fracture. Print several copies, light and dark, so you can choose the print that shows the

condition the clearer. Write on the negative the names of the bones and try to make the picture intelligible to any one who examines it. Also make a tracing on the card, which will facilitate a proper understanding of the picture to untrained eyes. Having now made a positive diagnosis, write your expert diagnosis in a clear manner. An x-ray diagnosis will carry more weight in court if made by a physician, than if made by a man who is merely a photographer or a manufacturer of x-ray apparatus.

When called to court as an expert witness in a medico-legal case, it is important for the x-ray diagnostician to prepare himself carefully on the anatomy and pathology of the parts, to take with him negatives and prints of his x-ray examination, together with a set of bones of the part under consideration. When on the witness stand, he should be careful and accurate as to his statements, remembering the opposing party may also have an expert witness who would be likely to dispute his statements.

I can not do better in conclusion than quote the sensible, manly advice given by Sir William Blizard, of London. He says, "Be the plainest of men in the world in a court of justice. Never harbor a thought that if you do not appear positive you must appear little and mean. Give your evidence in as concise, plain and yet clear a manner as possible. Be intelligent, candid and just, but never aim at appearing unnecessarily scientific. State all the sources from and by which you have gained your information. If you can, make your evidence a self-evident truth. Thus, tho the court may at the time have a mean opinion of your judgment, they must deem you an honest man. Never be dogmatic or set yourself up for judge or jury. Take no side whatever but be impartial and you will be honest."

In conclusion again, I desire to say that I am of the belief that this distinguished body realizes the importance of x-rays in forensic medicine, having already been of great aid in diagnosing and deciding complicated legal cases appearing before the courts.

By hearty co-operation of both the legal and medical men in the future, the x-ray diagnoses will furnish the most scientific and unerring evidence in obscure cases.
