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THE EFFECT OF DIATHERMY ON TESTICULAR FUNCTION.*

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Diathermy, to speak generally, is a simple and harmless method of increasing the blood supply of an organ. It has therefore been used to produce a hyperemia and subsequently a functional stimulation of various ductless glands. Experimentally it has been shown that its application to one testicle of a dog produces a marked hyperemia in the treated organ as compared with the control organ. Kowarschik (1), who used the method on the testicles in a series of functional sexual disturbances of various sorts, reports very favorable results from it.

Although it seems from the foregoing statements that the results of the method are encouraging enough to warrant further experiments with it, two principal objections to it must be discussed. In the first place, it is well known that there is scarcely any other field of medicine in which an unbiased judgment of therapeutic results is more difficult to obtain than in disturbances of the male sexual function. Psychic factors play such an important rôle in them that it is often impossible to decide whether a therapeutic measure was effective in itself or succeeded merely as the result of suggestion. To illustrate the extent to which male sexual function is influenced by mental suggestion, only one fact need be mentioned, that *potentia coeundi* rather often persists for years in castrates with complete loss of testicles and epididymis. Aschner and Buch Casamor (2), as well as Bauer and Koch (3), have emphasized this consideration in their studies on the organotherapy of eunuchoidism and have pointed out how difficult it is to judge therapeutic effects. The question therefore arises as to how far the effects of diathermy of the testicles are based on an actual increase of internal secretion and how far on mere suggestion.

A second and still more important consideration must be examined. We know from the work of Crew (4) and of Moore (5), whose observations were later confirmed by Knaus (6), that it is obviously the function of the scrotum to keep the testicular tissue at a lower temperature than exists within the abdomen. The temperature within the abdomen is too high for testicular tissue, and spermatogenesis is therefore seriously affected in undescended testicles. Moore, using rabbits and

rats, was able to demonstrate that re-implantation of normally descended testicles causes degeneration of the germinal epithelium. Moore and Oslund (7), as well as Crew, raised the environmental temperature of the testicles of various animals by keeping the scrotum, into which the testicles had already descended, wrapped in wool, and demonstrated azoospermia after 50-80 days. Fukui (8) re-implanted normally descended testicles within the abdomen, and cooled one of them with chloroethyl. The treated testicle remained normal, but the untreated one degenerated. Other investigators have also confirmed the damaging influence of heat upon the testicles.

It follows, therefore, that the optimal condition for the normal procedure of spermatogenesis is a temperature which is not too high, and it was doubtful from the beginning whether heating by diathermy might not have a deleterious effect on spermatogenesis and therefore on the *potentia generandi*. Dick (9) has recently expressed the same doubts, and has cited three cases, including one of his own, in which an injury to the scrotum which did not harm the testicles led to azoospermia.

In order to study this question in human beings we applied diathermy in five instances of functional sexual disturbances. The sperma was examined before and after treatment, which was applied as follows, according to the method of Kowarschik: A lead plate of 200 square cm. was placed on the sacral region, the other electrode on the testicles, and a current of 0.5 ampère was used for 20 minutes.

Our results are best illustrated by a brief outline of each case history:

CASE REPORTS.

CASE 1. A physically normal psychopath, 28 years of age, complained of a sudden disturbance of his sexual power. Before diathermic treatment the spermatozoa, which were examined one and a half hours post coitum (p. c.), were found moving actively about. The patient's complaints were greatly lessened after six treatments by diathermy, but necrospermia was found an hour and a half post coitum. The spermatozoa did not show the least movement. The same condition was also observed five days after treatment, and it was not until five days later that the spermatozoa regained their motility.

CASE 2. An impotent man, 42 years of age, of normal masculine make-up in general, had not been relieved by psychotherapy (analysis) or by hormonal therapy with a testicular preparation. Spermatozoa, examined an hour and a half after ejaculation, were observed to move actively. After six diathermy treatments only faint movement of the spermatozoa was observed one hour after ejaculation. The subjective effect of treatment, however, was very striking, and the patient declared that diathermy was the best of all methods which had been applied to him. Examination of the spermatozoa two weeks after treatment showed a restoration of motility.

CASE 3. A physically normal man, 23 years of age, complained of *ejaculatio praecox*. The motility of the

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spermatozoa was normal before diathermy, but disappeared entirely after six treatments at an examination one and one-half hours p. c. There was evidence of subjective improvement as the result of treatment. The motility of the spermatozoa was restored after 11 days.

CASE 4. A physically normal man, 33 years of age, with no signs of hypogenitalism, complained of *ejaculatio praecox*. Examination before treatment revealed sperms of normal motility. After two diathermic treatments, examination three-quarters of an hour p. c. showed some spermatozoa completely without movement and others moving only sluggishly. The patient did not continue treatment.

CASE 5. A physically normal man, 35 years of age, complained of disturbance of sexual power. Examination before treatment revealed normal sperms. Necrospermia appeared after three diathermic treatments, which did not result in any considerable improvement of the patient's complaints.

A survey of these cases, although they are few in number, still permits definite conclusions; viz., that diathermy of the testicles provoked in these patients a necrospermia which was not present before treatment and which disappeared only after some time had elapsed. In all cases the spermatozoa lost their motility after diathermy and did not regain it until 10-14 days after treatment had been discontinued. There can be no doubt, therefore, that heating of the testicles by diathermy seriously affects spermatogenesis, and consequently *potentia generandi*. This fact, as a result, must be taken into consideration whenever such treatment is begun.

Whether or not the endocrine function of the testicles is increased by this method can scarcely be settled by the available evidence. It can be assumed theoretically, but we cannot explain the subjective success in our cases in this way. There was subjective improvement in three instances of disturbance of the sexual function, according to Kowarschik's observations, but it is highly probable that these effects on the obviously psychic disturbances in these cases were due merely to suggestion. We could not detect obvious signs of disturbed endocrine function of the testicles before treatment in any instance, and only objective improvement of such symptoms would be proof that endocrine function of the testicles had been increased. Subjective improvement in sexual function can easily be explained on the basis of successful suggestion. To decide this question it would be necessary to experiment on eunuchoids with objective morphologic symptoms.

Although it is not possible to determine, as yet, whether or not an increase in testicular endocrine activity is brought about by diathermy, we are certain that spermatogenesis and *potentia generandi* are seriously damaged, if only for a short period of time. This form of therapy is therefore not as harmless as it appears at first glance, and it is important to know whether the success of treatment is sufficient to compensate for the harm it may possibly achieve. There would be no risk, however, in initiating this treatment in eunuchoids, in whom oligospermia or azospermia would already be present, in order to increase their endocrine testicular function. We shall employ this method in such cases, particularly in those in which other therapeutic procedures have been without result. We shall not employ it, however, in patients with psychic disturbances of sexual power and with normal sperms, considering it inadvisable under such circumstances because of the risk of serious damage to the spermatozoa.

SUMMARY.

In five cases of disturbance of the sexual function without evidence of somatic origin, diathermic therapy was applied to the testicles. In some instances there was subjective evidence of success. In all cases, however, necrospermia was observed after treatment and was obviously caused by heating of the organ. It disappeared shortly after treatment was suspended. We cannot prove whether or not the endocrine function of the testicle is increased by this procedure, and, considering the serious although temporary damage it causes to spermatogenesis, we cannot recommend this method of therapy.

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