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Aspiration and Antiseptic Irrigation
of the Knee Joint.

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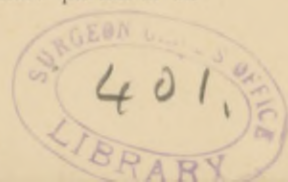
ASPIRATION AND ANTISEPTIC IRRIGATION OF THE KNEE JOINT.

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Chronic synovitis of the knee joint with effusion, under various methods of treatment, has in many instances been attended by results quite unsatisfactory both to the profession and to the patient. Counter irritation by iodine, blisters and other agents, compression, rest in bed and various schemes, have been adopted to meet the exigencies of these cases. Acute forms of the disease, especially those resulting from traumatism, are, in a certain proportion of cases, amenable to the foregoing measures, but all surgeons now and then have exhausted their skill and patience and left the subjects little if any the better for their pains. The tendency in many instances is for the disease to become chronic. An effusion once established persists and there seems to be an inability on the part of joint structures to carry away the offending fluid. As a consequence, the joint becomes enfeebled and flaccid from long continued tension; articular surfaces gradually undergo structural change; there is much pain and discomfort to the patient; movements of the joint are impeded and its integrity more or less permanently impaired. Finally, constant irritation results in supuration and total destruction of the articulation, conditions which render imperative, erosion, excision, or amputation.

What is true of synovitis as a result of traumatism has greater weight in dealing with tuberculous synovitis. Here, although the conditions are somewhat different, disastrous consequences are realized with far greater certainty. While it is true that absolute rest during the earlier stages of tubercular joint affections may prevent progress and perfect a cure, as asserted by Howard Marsh, unfortunately resort to this measure is not had at the proper time in a large proportion of cases. As a matter of fact the attention of patients themselves is not forcibly called to the probability of danger until they have passed beyond the point where rest as a curative means is in any sense available. In dealing with the later stages of chronic synovitis of the knee joint where partial or ex-



tensive disintegration of tissues has taken place, three alternatives are offered as a source of relief: (1) Amputation; (2) Excision; (3) Arthrectomy or, according to later nomenclature, erosion. The first is of course out of the question, except in those cases where not only the function of the joint, but the usefulness of the limb is wholly destroyed, and where danger to life is imminent. Between the two latter methods, a marked difference of opinion exists as to the better course. Excision and erosion each have their champions, equally respectable, and alike claiming that their own special procedure offers the greatest immunity from danger, and likelihood of radical cure. The weight of evidence, however, goes to show that early excision obviates the necessity of later amputation; that an earlier erosion is productive of more rapid recovery with greater utility as a final result.

Later contributions to the treatment of chronic arthritis, either traumatic or tuberculous, furnish material for inference that each of these three alternatives may be superceded by the method known as antiseptic aspiration and irrigation. My attention was especially directed to this subject in May last by Dr. Maurice H. Richardson's report of a series of cases successfully treated at the Massachusetts General Hospital. As the operation described by Dr. Richardson has but recently come into use in this country, the following report of cases may be of interest:

Case I.—Mrs. A. G.—, age 40, housewife, was referred to me in July, 1889, by Dr. W. A. Briggs, of this city, with the following history: Several years ago had suffered from a chronic abscess, located in the muscles of the back. This, under the usual treatment, was cured. Six years ago left knee was injured by a fall; joint remained slightly sensitive for two years, then began to enlarge perceptibly and became painful. Condition of joint has gradually grown worse. On examination, knee found to be tender and distended with fluid; locomotion impaired and movements imperfect. July 9th, assisted by Drs. W. A. Briggs and G. B. Somers, I aspirated the joint, removing two ounces of slightly turbid serum; I then injected the same amount of a five per cent. solution of carbolic acid, which in turn was reëxhausted. The limb was then placed upon a posterior splint and slight pressure applied over the patella. On the following day there was slight elevation of temperature and considerable joint pain, the latter being relieved by removal of the pressure. On exposure of the part the articulation was found to have refilled with fluid. The splint was readjusted and by the second day the temperature was normal; no pain or discomfort. On the seventh day the fluid in the joint had almost disappeared, and at the end of the second

week no fluid could be detected. The splint was removed, a plaster of Paris dressing applied, and patient allowed to go about on crutches. At the end of the fourth week the plaster dressing was removed. Movement of the joint, though slightly impaired, was painless. September 1st, eight weeks after the operation, patient was discharged well. At this time she could walk without crutches, and with a barely perceptible limp, the latter being due probably to protracted distension of the joint tissues. Patient was seen February 12th, and there has been no tendency up to the present time to relapse.

Case II.—J. T.—, age 49, carpenter. On May 5, 1889, left knee was injured by a blow from a bar of iron, causing pain and swelling. Resumed work almost immediately, but as symptoms persisted, I was consulted July 12, 1889, about two months after receipt of injury. Treatment by rest, blisters and pressure was recommended, but without avail. Accordingly, on July 19th, I proceeded to aspirate and irrigate the joint, as in the preceding case. The following day the knee was greatly swollen and somewhat tender; from this time, however, the symptoms rapidly subsided. August 10th.—Dressings were removed and excess of joint fluid found to have disappeared. There was, however, considerable stiffness, requiring repeated efforts by passive motion for its relief. September 10th.—Patient discharged and resumed work. At this time the movements of the joint were perfect and size of limb normal. Up to February 10th, no tendency to relapse has been shown.

Case III.—T. F.—, age 41, machinist. For eleven years has suffered, at varying intervals, from a painful affection of the left knee, which, during most of this period, has been slightly enlarged. On May 24, 1889, he fell from a horse, striking on the affected knee, causing a return of former trouble. June 3d.—Fluctuation in joint was apparent, accompanied by great pain, tenderness and heat. Resort was at once had to treatment by the irrigation method. About two ounces of bloody, sero-purulent fluid was withdrawn, and the joint thoroughly irrigated with a 3 per cent. carbolic acid solution. The case proceeded favorably, and at the end of a week no fluid could be detected. At the end of the second week, patient was allowed to go about on crutches. At the end of the fourth week there occurred a partial relapse, and the operation was repeated, the irrigation fluid employed being a five per cent carbolic acid solution. Subsequent to this there was no impediment to recovery, and the patient was discharged cured July 26, 1889. Function of joint unimpaired and locomotion perfect.

Case IV.—J. D. H.—, age 52, railroad conductor. About sixteen months ago fell and injured left knee, since which time it has been noticeably enlarged and at times painful. On examination, joint found to be greatly distended, partially flexed, immovable, hot and painful. Fearing that suppuration was imminent I

immediately resorted to treatment by aspiration and irrigation, as in the foregoing cases. Strength of irrigation fluid, three per cent. Amount of fluid removed, three and one half ounces. Microscopic examination revealed numerous pus cells and confirmed the early suspicion of impending suppurative disease. The following day, although the joint cavity had partially refilled, pain and heat had subsided and patient was resting comfortably. A plaster dressing was applied on January 2, 1890; this was removed February 17th. Owing to the urgency of the symptoms in this case, prolonged rest has been prescribed and the patient will be kept confined to his room several weeks longer. There is no excess of joint fluid and no symptoms tending to the discomfort of the patient.

Case V.—E. J. R.—, age 17, machinist. About one year ago fell and injured left knee, which has been weak ever since. Five days previous to consultation first noticed that it was swollen. On examination knee found to be enlarged and fluctuating. Measures $14\frac{1}{4}$ inches in circumference; sound knee $13\frac{1}{2}$ inches. The joint was treated by the aspiration and irrigation method; $1\frac{1}{2}$ ounces of serous fluid being removed. The limb was placed on a posterior ham splint with a slight compress over the patella, and bandaged from the toe up. December 7th, five days after operation, splint removed; no pain or tenderness in the joint and no excess of fluid could be detected. Circumference of affected knee, $13\frac{1}{2}$ inches; sound knee, $13\frac{1}{4}$ inches. Patient allowed to move about the house and two days later discharged, cured. February 15th, I learn that the joint is in perfect condition.

The various steps in the operation may be described as follows: The affected limb should be subjected to a careful antiseptic bath. The point of selection for puncture is at the upper external angle of the patella as the joint covering is thinner here than elsewhere. An aspirator needle of large size should be selected to avoid clogging during the act of exhausting the injection fluid which is rendered flocculent by coagula. The John Smith aspirator is especially adapted to this purpose, it being provided with an arrangement for injection as well as for exhaust. With this apparatus the operator should become thoroughly familiar before attempting its use. The aspirator having been prepared as an exhaust pump, the needle is thrust into the joint cavity, and the fluid removed at once. The instrument is then reversed, the flask is two-thirds filled with a five per cent. carbolic acid solution, and inverted. An assistant should then hold the cork firmly in place, while the air over the fluid is condensed by working the pump. The stop-cock between the flask and the knee joint is now opened, and the joint cavity is allowed to become well distended with the acid solu-

tion. A special precaution in this step is to have such an amount of solution in the flask that the latter need not be entirely emptied in filling the cavity, otherwise compressed air will be allowed to escape into the joint, which, in a measure, enhances the risk to the patient. The irrigation may be repeated two or three times, or until the return fluid is clear. The needle is then withdrawn, an antiseptic dressing applied to the puncture, and the limb laid upon a posterior splint, and bandaged lightly. On the day following the operation the joint will be found to have refilled with fluid. This, however, is gradually reabsorbed and at the expiration of from three to six weeks the limb is usually fit to use.

A few remarks upon the proper attitude of the surgeon in adopting a given line of action will be in place, as suggested by the subject chosen for discussion this evening. These comments, while but reflexes of warnings and maxims without number, from the most earnest advocates of a high standard of excellence in surgery, as regards *technique* of operation, efficiency in after treatment and the attainment of final success, have been accentuated by personal observation and emphasized by practical experience.

The rapid, almost bewildering progress in the art of surgery during the past decade, has proportionately added to the duties and responsibilities of the surgeon. Methods of procedure that were formerly suggested as a last and lamentable resort, in the light of modern pathology and with the immunity afforded by asepsis, are recognized as offering the brightest possibilities to the operator and the most perfect relief to the afflicted.

Foremost among these recently imposed duties is that of early and positive diagnosis, a necessity in every instance, but irreconcilably imperative in a very large class of pathological conditions. This fact failed of adequate appreciation, until it had become axiomatic; that it is often possible to avert disaster and save human life by a resort to operative measures in the incipiency of disease. The work of clearing away a doubt, of confirming a vague suspicion, or of demonstrating what has risen to the dignity of an opinion, has been in the main so simplified, that henceforth groping hesitancy must stand as the exponent of recklessness, incompetence or neglect. The contents of a cavity, though it be deeply seated or contiguous to important structures, are easily accessible for ocular or technical examination. Abdominal and joint incisions for purposes of exploration are of daily occurrence,

and in skilled hands are devoid of risk; and fragmentary portions of abnormal growths may be chipped off, and their nature determined beyond peradventure, through the agency of the microscope. Hence it may be truly said that with these sources of information, reinforced by the ordinary methods of physical examination, the judgment of the modern surgeon may be, and in a fair proportion of cases should be, infallible.

But an early diagnosis, be it an evidence of never so much dexterity and acuteness on the part of the observer, reflects little credit upon the profession, and offers even less measure of relief to the patient in the absence of its legitimate correlative, thoroughgoing and rational methods of treatment. Accuracy, promptitude and courage are the requisites of the present time. But little latitude is accorded the surgeon in deciding whether undue tension shall be relieved, whether a breast which is the seat of a suspicious looking growth shall be amputated, or whether a herniotomy or a laparotomy shall be undertaken in hope of averting impending peril. In these, as in nearly every exigency requiring operative interference, the words of Lawson Tait should be kept well in mind: "Early operations mean successful operations." In fact the policy of former years has been reversed and the injunction to proceed at once and radically is an accredited surgical aphorism.

Nor is it in operative cases alone that promptness is an efficient weapon in the surgeon's hands. For example, a large number of joint affections, whether traumatic, tuberculous or specific, are thoroughly amenable to appropriate measures, if skilfully and persistently employed. Here he will find a field for display, not only of his skill, but of his conscientious devotion to duty, and to this point attention cannot be directed with too much emphasis. To paint, or poultice, or blister a joint, which is the suspected seat of progressive disease, as a substitute for the more sensible and only rational plan of rest or extension, or of both combined, is wrong in theory, and disastrous in practice. In carrying out a correct policy in such a case, impediments will often be encountered. Be they in the shape of unreasonable and unyielding objections on the part of patient or friends who ignorantly plead for delay or temporizing treatment, withdrawal from the case, positive and unconditional, is an open avenue of escape from responsibility. But if poverty be the obstacle, and the already overburdened practitioner feels that he can ill afford the demand

for unrequited time and labor, the situation is quite different, though not hopeless. Such cases rightly belong to the proper institutions, or to the younger, less busy and perhaps more ambitious members of the profession, and to these they may properly be consigned.

A tolerably fair index to the quality of work that may be expected from an operator, is to be found in the completeness of his preparation when approaching any undertaking. Perfect system in the arrangement of preliminaries is a leading factor in the economy of energy, patience and time, and what is even more important, contributes greatly to the comfort and safety of the patient. Too frequently there is observed neglect of these steps, that to say the least, is discreditable. At a critical period in an operation absence of an essential instrument or appliance occasions an embarrassing delay, or necessitates the employment of an inferior article. A common illustration of this error is the omission of drainage tubing from the surgeon's outfit. The usual makeshift is a gum elastic catheter, which in point of size and antiseptic preparation, is more than probably illy adapted and wholly unsafe for use. Again, a bed, soiled and disarranged, has been used as a ghastly substitute for a suitable operating table. To one who has used, and who therefore appreciates the value of a thoroughly equipped irrigator, it is amazing that this simple, yet invaluable contrivance is not more generally employed. It is difficult to conceive of more unmistakable evidence of slovenliness on the part of an operator, than the presence of a hand-bowl with its contents of bloody opaque fluid, to which resort is had in the sponging of a wound. The fluid at the outset may have been aseptic or antiseptic, but after one or two rinsings of a sponge, it will completely have lost its identity as such. In consequence of careless indifference to details, an operation has now and then gone wrong, has fallen short of perfect success, or failed deplorably, and anticipated triumphs have found fruition in calamity.

The special features of recent operative methods are designated, in the main, by two words—cleanliness and thoroughness. The former suggests all the safeguards of asepsis and antiseptis. Champièrre closes a report of four hundred and sixty-three successful capital operations, done under most unfavorable surroundings, in sheds and barracks, with these significant words: "Splendor of means and luxury of antiseptic material are of little moment, while the surgeon's faith in the antiseptic method is the whole of

it." The latter, however, in this connection is infinitely more complex and comprehensive. Thoroughness exacts unwearying zeal and absolute singleness of purpose in the attainment of an end. It implies precision, painstaking, patience. It absolves the operator from restraint and begets boldness, which is curbed only by sound judgment. It sacrifices brilliancy to efficiency, rapidity of execution to the veriest plodding in the interest of accuracy and completeness. Independent of professional attainment, special skill and wide experience, which must ever remain variable quantities, the presence or absence of these attributes determines beyond question the value of the personal equation, a most important factor in the estimation of risk attending an operation. Says Mr. Keetley: "Let us never forget to distinguish between the dangers of an operation, and of the particular operator who does it." Certain it is that he who fails to recognize the intimate relation which scrupulous cleanliness and conscientious thoroughness bear to success in the practice of surgery, has grossly misinterpreted the spirit and teaching of his age.

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