OSTEO-ARTHRITIS OF HIP AND KNEE

DESCRIPTION OF A SURGICAL TREATMENT *

BY

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In dealing with this subject I shall largely confine myself to the description of a certain line of treatment which I have adopted in these cases, and in matters of classification shall largely be guided by the eminently sane and admirable classifications drawn up by the British Medical Association Committee on Arthritis.¹

Importance of the Bony Change

I have long held that the changes in osteo-arthritis as known, and changes in bone and joint found in the condition described as rheumatoid arthritis, have many features in common, and tend to blend, or at any rate present, all grades of similarity. (This statement has some support from Lawford Knaggs² in his report on the Strangeways Collection.) This means that I take the view that the manifestations of the two conditions are more or less similar, and that the disease is essentially the same in origin, and that variations are due to age influence and varying tissue resistance. In addition to this, the same treatment has in my hands benefited both types of case.

My second viewpoint is that from the first, in dealing with these cases by the method adopted by me during the past five years, I have been impressed by the gross pathological changes found in the bone, and have definitely come to the conclusion that all conditions classified as osteo-arthritis or rheumatoid arthritis are the result of a primary osteitis, and that arthritic changes are secondary. That is, that anything which happens to the joint is the result of something that has happened to the bone.

It has become traditional to describe the fine detailed changes that have occurred in the articular cartilages of the joint affected, dismissing the bony changes rather briefly. Radiological investigation has to some extent altered this, although not, in my opinion, stressing sufficiently the importance of the bony change.⁴

Deliberate Opening of Bones as a Treatment for Osteo-arthritis

This operative procedure, adopted by me as a treatment in all cases of osteo-arthritis and rheumatoid arthritis indifferently, is that which I reported in the *Medical Journal of Australia* on April 11th, 1931, describing the good result of an experimental opening of bones in a lad of 19 years of age. In the same journal (December 3rd, 1932, p. 690) a detailed report was made of methods, changes noted in bone, and more particularly in bone marrow.³

Origin of the Procedure.—A lady aged 59, for fifteen years the subject of rheumatoid arthritis, affecting hips, knees, wrists, fingers, in fact almost every joint—barely able to move, but not bed-ridden—in trying to be useful fell and fractured the neck of her left femur in October, 1929; the fracture was an extracapsular one, and a large piece of the trochanter was detached. Owing to pain and deformity no attempt in the way of fixation was made; the thigh flexed in abduction was elevated on pillows, comfort being the only objective. This patient reported very early that she was losing her old rheumatoid pains, and finally said that she had practically none. She required no sedative. A light plaster splint was applied and the patient returned home. The future progress was most interesting—freedom from pain,

no sign of recurrence, improved health evidenced by loss of an extreme anaemia, and improved function, not only of hands and limbs, but even the clearing up of an old iritis. This lady became most useful; she goes everywhere, and does most beautiful needlework, which she had been unable to do since early in her illness, owing to inability to thread a needle. Taking a line from this, it was determined to copy nature. It not being thought necessary to break bones, large openings were made in large bones.

Bones Selected and Method of Opening the Bones

The lower end of the femur, on the antero-lateral aspect, and the upper end of the tibia, on the upper and inner face, are the sites selected.

An incision is made right down to the bone, the periosteum is pushed back so as to expose a bare area of bone large enough to admit the use of a three-quarter-inch trephine or a large bit. In all early cases an ordinary brace and bit was used, but in an effort at refinement a trephine has been used in later cases, and now a Morse bit. The main point to be emphasized, however, is that the opening in the bone should be sufficiently large; small drill-holes are not sufficient. The opening is made right into the marrow cavity, and a Volkmann spoon is inserted towards the cancellous tissue of the bone. Some of the cancellous tissue is always scooped out, more or less space being left, the whole idea being to bring about a state of decompression. This tissue is practically always found to be more like dried sponge than like true cancellous tissue. The opening in the bone may be made in both limbs. Bony debris is removed and the wound closed without drainage.

Should the hip be affected a drill-opening about the diameter of an ordinary little finger is made along the neck of the femur, aiming to reach the vicinity of the spot where the neck joins the head. Openings are also made into the trochanter and acetabular margin. At this point I would like to observe that the hip-joint seems to escape rather often in cases of polyarthritis.

Instruments Used.—I have had made a simple implement for piercing the bones. This consists of an ordinary triangular file, tempered, and with its point cut on three faces, so as to resemble a diamond drill. This eats into bone very readily, is easy to use, and not so liable to slip. The opening made by this is enlarged by Morse bits of varying sizes. Their use renders these operations much simpler and quicker. I do not now make such large openings as I did at first, a half-inch Morse bit being used on the lower end of the femur and a three-eighths-inch bit on the neck of the femur. I am not sure that I may not go back to the larger opening.

Anaesthetic for Operation.—I prefer a general anaesthetic, but spinal or local anaesthesia may be used in suitable regions.

After-treatment.—A sedative for a few nights is advisable, but in many cases the ease from pain is so marked that patients can do without any drug.

Dressings.—For wounds the lightest of dressings. Wrapping up makes them uncomfortable. Friars' balsam on gauze is suitable after a day or two.

Exercise.—Patients may be allowed to sit in a chair after a week or two, but efforts at walking and weight-bearing must be watched, as so often the bones are very brittle and fracture may result. Blame might then be placed on the wrong party. Free movement of all limbs in bed is encouraged. When sitting up the sliding of the stockings feet on a piece of carpet placed on a polished floor is helpful and easy. Sitting on a tricycle is simple for younger patients. There is no weight on the bones when doing this. In advanced cases I insist on eight weeks as the time to elapse before attempting to put weight on the limbs. Massage, passive movement, or electrical stimulation has not been found necessary.

Drugs After Operation.—The use of drugs of the salicylate group is discouraged. For sleep luminal is sufficient.

Diet.—Any wholesome diet is permitted—bowels, of course, receiving attention. Free use of fluids is encouraged, and purgatives are to be avoided.

Recurrence of Symptoms.—Rare, and usually due to over-use of atrophied muscles and degenerate bones and joints. Flare-ups are usually localized, and opening of the bone in the region affected under a local anaesthetic will relieve.

* Read in opening a discussion in the Section of Orthopaedics at the Annual Meeting of the British Medical Association, Melbourne, 1935.

Observations Made at Operation

Changes Noted in Bone.—As already mentioned, one is struck by the amount of decalcification and of rarefaction of the bone going on to cavity formation in many cases, great thinning of the cortex being found in practically every instance. The longer the standing of the disease the greater the thinning.

The bone marrow in a typical case of osteo-arthritis of hip and knee will be found much altered. On opening the femur—and this can be demonstrated rather more clearly at the lower than at the upper end—a flow of clear, oily fluid, definitely under pressure, wells up, and if a little time is allowed will fill the wound and flow over. In it will be noted white granules, often larger than the head of a pin, and quite easily seen. This fluid and its granules I have demonstrated a score of times to onlookers. It is, of course, well known that by stirring up normal bone marrow one can demonstrate an oily content, as the fat content of marrow is probably always in a fluid state at body temperature. Microscopical examination of this altered bone marrow showed nothing of interest. Efforts at culture have all proved negative. All media, aerobic and anaerobic, have been employed. As recommended, a long period of incubation has been allowed. There has been no growth whatsoever. No animal experimentation has so far been done, but I hope to interest Dr. Kellaway, director of the Walter and Eliza Hall Research Institute, in this respect. In connexion with bone marrow a point that has interested me is that I have never yet seen an infected wound. I am not praising my asepsis, though in making a similar number of wounds for other surgical conditions one might expect an infected one. The wounds in the hip area and about the knee are in positions where dressings are rather hard to keep in place, and where soiling can easily occur, more especially as so many patients are more or less helpless. This has aroused the interest of both Mr. Lazarus, my operating assistant, and myself, and it is largely at his suggestion that I am stressing this point. It is possible that this bone marrow, or even all bone marrow, has bactericidal powers. I have had one test made in order to ascertain if this oily fluid has bactericidal powers similar to those of cod-liver oil.* Owing to difficulties in technique this experiment was of no value, but I think it will be well worth repeating when these difficulties are surmounted.

Whilst working on these cases I early formed the opinion that the condition was a primary osteitis and a secondary arthritis. Further than this, I now am of the decided opinion that it is probably the bone marrow which is the tissue primarily affected, and would urge work along these lines.

Changes Found in Joints.—I shall not weary you with these. A coarse grating indicates cartilage destruction; I know that this grating will lessen, and even in the worst cases gradually disappear after operation.

Observation on the Blood Count.—In practically every case of osteo-arthritis there is a varying degree of anaemia. Blood counts made in a number of cases where the improved colour of the patient was noted after operation showed an average increase of 200,000 red cells in less than three weeks. A leucocytosis is usually present, but the number of white cells diminishes after operation. I check these counts from time to time, and find them fairly constant. One woman of over 60 years of age had a gain of 1,000,000 red cells in one month.

Changes in Synovial Fluid.—In certain cases there is a definite increase in the synovial fluid. This is most noticeable in the subcrureus bursa. This fluid will be found on opening the bursa—as I always do if there is any increase—to be gelatinized and curdy, and can often be drawn out in one piece. This is important; I regard this gelatinized fluid as responsible for some of the flexion

that one finds, since it later becomes organized, makes a pad under the extensor expansion, and prevents straightening of the knee-joint. I now always empty out by incision any collection of fluid in this locality.

Results of Operation

On the morning after operation a patient will often say, "I have less pain than I have had for years." Commonly pain returns and lasts for about a week, and after this the relief will be found to be permanent. Too early attempts at active movement will light it up sometimes. In certain cases where a flare-up occurs I repeat the bone-opening procedure, selecting, if possible, fresh sites.

Improved Function.—This follows the relief of pain and lessened muscle spasm. When pain is relieved there is sometimes a tendency to try too much. Attempts at walking are often made too early. From the first I have tried to insist on eight weeks as the time which must elapse.

Types of Cases that do not do well.—Those of the type described by Poncet as "rhumatisme tuberculeux." These are either anaemic, thin, and sallow, or cases of long standing, where the flush of chronic sepsis is noted on the face. The latter cases do improve, but seem to take much longer. Cases in which there is the suspicion of a specific element with signs of bone sclerosis derive little benefit. One case with a malarial and dysenteric history, where both knees were very bad, was disappointing. The pain was greatly relieved, and movements of the knee-joints which were accompanied by a dry grinding sound became smooth with no grating; but there was no appreciable improvement in function. However, comparison with the results of other treatments gives one much encouragement to continue.

Other Methods of Treatment

Drug Treatment.—This means the use of salicylates or near salicylates. Beyond their analgesic effect drugs are not beneficial. Injections of gold are dangerous and not helpful.

Vaccine Therapy.—So far vaccine treatment has been found disappointing. Certain cases, where a tooth with root infection has been located and removed and a vaccine prepared from the infected material, have done well. These are very rare.

Bee Stings.—I am satisfied that the employment of bee-sting treatment is based on a fallacy, and that the treatment is useless.

Rest.—Most cases that have passed through my hands have previously had rest treatments, with little or no results.

Application of Heat.—Whether by packs, mud baths, diathermy, or other means, the relief of pain has only been temporary.

Fixation by Splints.—Fixation does not seem advisable, as this undoubtedly favours ankylosis, which may be in an unsatisfactory position and will not relieve pain.

Manipulation.—No good whatsoever can come from manipulation. One might as well spur on an exhausted horse. Pain is increased, flaring-up is caused. One patient with osteo-arthritis of hip and knee was subjected to manipulation under an anaesthetic on seven occasions for the purpose of breaking off exostoses. He states that his condition became much worse. After bone-opening he has greatly improved.

Removal of Septic Foci.—Teeth, tonsils, gall-bladder, and uterus all came under the light of suspicion, and have been separated from their owners with too often no good result. The B.M.A. Arthritis Committee issued a warning against ruthless and rapid removal of the so-called septic foci, and independent writers have stated that removal

of the teeth and tonsils has been followed by shock equal to that following a major surgical operation. The patient's resistance has been lowered, and the disease has made rapid progress owing to this. This has happened more often than is realized. It must not be thought that I am opposed to drainage of pus-containing areas; but I do advise caution, and more moderation, because the results have not been successful enough to justify the increased pain and suffering inflicted. The humiliation to the individual of losing all the teeth is considerable. In my opinion it is open to argument whether these so-called septic foci are really primary; it might be claimed that they are just as likely to be manifestations secondary to a general disease, and part and parcel of it. The infection may come from an entirely different source.

Causation of the Disease

Trauma does play some part, more especially in the monarticular disease of the hip or knee. Locality and unhygienic surroundings seem also to have a share in causation. The whole course of the disease, manifested more especially in children, has all the appearance of a sudden infection, and is in favour of germ invasion. I am inclined to discard all other explanations, such as disturbed metabolism, endocrine deficiency, toxæmias of unknown origin, in favour of an infection of unknown character. The explanation, I feel, lies in the bone marrow and the spleen, and further work is required in these regions.

As to whether the improvement that follows bone opening is due to relief of pressure—that is, a decompression—or whether something noxious is released from the part, or something useful is liberated into tissues, I cannot say because I do not know. Various suggestions, such as auto-vaccination, absorption of the patient's own blood which is liberated into tissues, have been made to me, but not by me.

After all, the result is the main thing, and one should not be hampered by ignorance of the causation of the disease or lack of knowledge of the reasons for improvement. My experience is that the patient always wants to know what causes it, and one's own profession wants to know the rationale of the treatment.

An Attempt at Systematization of Results

This has not been of much value owing to the great variation of age and condition in the patients. The types of cases operated upon range from partially helpless to completely helpless, from 10 years of age to 70 years of age.

I found the average duration of disease at time of operation where hip- and knee-joints were involved, either together or separately, was over six years, the duration on the patients' statements ranging from one year to twenty years. Taking the cases right through, an improvement really worth while can be expected in 80 per cent. of cases. Naturally the older the patient the less hopeful is the prognosis.

The number of cases operated on where hip- and knee-joints were involved is 106. Some recent cases are not included, as sufficient time has not elapsed to judge results.

The same line of treatment has been adopted in cases where other regions are affected by osteitis or osteo-arthritis. These cases include conditions such as spondylitis, sacro-iliac diseases, and delayed restoration of function after fractures.

Summary

1. All cases of osteo-arthritis and so-called rheumatoid arthritis belong to the same type of disease, and should be classed as such.

2. The condition in these cases is one of primary osteitis, with secondary arthritis. There is every reason to think that the bone marrow has undergone some disease change.

3. Many cases are improved by the simple procedure of opening the bone in the neighbourhood of the joint affected.

4. Improvement is manifested by relief of pain, improved health and outlook on life, with an improved blood-state. Restoration of function, while slower, does occur.

5. There is reason to think that articular cartilage, unless hopelessly damaged, will recover as a result of the procedure.

6. The progress of the disease is stayed and recurrence is exceptional, and then only in the nature of a slight flare-up, which can be dealt with by local opening of the bone.

7. The procedure is simple, unaccompanied by shock or unfavourable sequelae, and does not call for a long stay in hospital nor for expensive after-treatment.

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MEASLES AND CONVALESCENT SERUM

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An epidemic of measles in a school is usually serious; few escape, and there is a constant dread of complications. The introduction of the use of convalescent serum to prevent or to attenuate the disease does not yet seem to be appreciated as widely as it should, and this description of its effect in a recent epidemic may be of interest.

In September, 1935, in a preparatory school near Malvern, there were ninety-seven boys, of whom fifty-six had not had measles. On the eighteenth day of term a senior boy was diagnosed as a case of measles, his rash appearing the next day. Isolation of contacts was enforced, but in two weeks there were nine cases in different parts of the school. Of the remaining forty-six susceptibles twenty-two were given a small dose of convalescent serum, and most of them were included in the third batch of thirty-nine cases. Six formed the fourth batch, and the last remaining susceptible made the fifth. Thus the attack rate was 100 per cent., and there were none among them with a previous history of measles.

Epidemic in the Unprotected Cases

The thirty-four boys who received no serum went through the usual stages. They lay like logs for three days, ill and miserable, and they all had coughs. As time went on the intensity of the illness became less, the days of fever and prodromal symptoms were reduced, and convalescence was established earlier, but the accompanying bronchitis became worse up to the middle of the main outbreak, after which it diminished. I would emphasize, nevertheless, the severity of the respiratory symptoms in this group. The last few cases appeared to have acquired some protection through having lived in the measles atmosphere. They were mild cases and in severity of symptoms compare with those who had received a small dose of serum. But one boy who arrived in the school on November 10th fell ill on the 19th, and was the worst case in the last batch.