is of no consequence, and can be left to discharge itself into dressings or plaster for as long a period as is required, or as is compatible with the general hygiene of a ward! If, however, there is evidence of pus under tension which remains unrelieved, action should be taken.

In my opinion there are three indications for the inspection of a wound or part wounded, though of course others may arise:

(1) *Pain*; more than the general discomfort expected after a severe injury. An injured limb should not be unduly painful after it has been splinted.

(2) *Signs of interference with circulation*, e.g. oedema, which persists, discoloration, coldness of the skin, etc.

(3) *A sudden or persistent systemic disturbance*; a sudden sharp rise in the pulse rate may be the first indication of a gas infection.

The case of open fracture that has been received early, the wound excised, the limb comfortably splinted in good alignment, and is obviously making uneventful progress may well be left to itself for at any rate some weeks. The same remarks apply to the after-treatment of a case in which sepsis is present. At all times, though treatment of each case must be strictly on its individual merits; it is so easy to ride a particular hobby-horse too far when non-interference as a policy of treatment may be overdone as much as the policy of trying to save already destroyed limbs. If, when a case is first received, it is considered the condition is such that in the after-treatment easy access to the wound is going to be important, splinting should be arranged so that it complies with the essentials—but at the same time permits of easy access to the wound. In such a case you may find that a plaster splint with a window is not altogether satisfactory, and that splinting on a Thomas or Braun's splint with an under support of plaster and traction, if required, is preferable in the early stages.

Finally, all cases of open fracture (or closed) should be protected until it is certain that union is firm. Even in those cases without any apparent sepsis and in good alignment, union is slow compared with the closed fracture—mainly because of the delay in formation of ensheathing callus—and perhaps particularly slow in those areas of bone uncovered by muscle. (It is stated that at the present time there is a general tendency throughout the country for union in cases of fracture, open or closed, to be delayed.) In all cases there is the need for treatment under conditions which permit of a generous supply of food, light and air, combined with an activity of the body so far as is compatible with the necessary immobilisation of part of it; nor should the activity of mind be neglected. Rehabilitation of the body—with an avoidance of boredom—is an important factor in maintaining the morale necessary to cope with weeks or maybe months of disability.

THE TREATMENT OF OSTEOARTHRITIS BY INTRA-ARTICULAR INJECTION OF LIPIODOL AND GOMENOL'

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Osteoarthritis is not a lethal disease, but its impact on the efforts of a nation at war is particularly severe because of the prolonged period of disability which it causes.

There are at present no reliable figures to indicate the incidence or average period of disability in cases of osteoarthritis. Its incidence has been shown to be heavy, for in the Ministry of Health report of 1924 it was estimated that there were 372,000 cases of rheumatism under national insurance, and in 1928 Sir Walter Kinnear estimated the annual cost of rheumatism at more than £5,000,000. If wages lost through disability were added, he estimated the total cost at £17,000,000. Housewives who represent such a large proportion of the population are not as a rule included in national health insurance figures.

We must now consider the proportion of rheumatism which can properly be called osteoarthritis. In a recent series (not yet published) of 1,000 cases of chronic rheumatism, the following figures represented this group.

TABLE I.

GROUP OF OSTEOARTHRITIS IN 1,000 CASES OF RHEUMATISM.

	Male	Female
<i>Osteoarthritis</i> with normal weight, blood sedimentation rate and blood pressure (Group A)	21	62
<i>Osteoarthritis</i> with obesity (Group B)	6	47
<i>Osteoarthritis</i> with obesity and high blood pressure (Group D)	4	51
<i>Osteoarthritis</i> with high blood pressure (Group N)	8	24
<i>Occupational arthritis</i> and arthritis associated with <i>trauma</i> (Group H)	14	16
	53	200

So that 25.3 per cent of all cases which fell into the rheumatic field in this series were cases of osteoarthritis.

The period of disability naturally varies a great deal in different cases, and in particular there seem to be two classes of case. The first class runs what one may call a recurrent course, periodical flare-ups alternating with periods of comparative quiescence. The second class has a fairly long period of disability, but when once recovered has a tendency to remain well for a long period, sometimes many years.

In any article bearing on treatment it is as well to remember that this clinical variation exists, otherwise there may be a tendency to attribute merits to methods of treatment which by chance are tried out on a majority of patients of the second class, which they do not in fact possess. The only practical way to deal fairly with this problem is to take large numbers of cases and so even out the risk. Bearing this in mind, 100 cases of osteoarthritis have been analysed for period of disability (Table II). Cases due to occupation and/or trauma have been excluded as the outlook is rather different.

In addition those cases associated with obesity and/or hypertension have been kept separate, as it was thought that such important clinical associations might have a special effect. In both groups those cases rendered symptom-free underwent approximately nine months' treatment, and those that were only improved 20-23 months' treatment. It therefore becomes necessary to know what proportion of the cases are rendered symptom-free, improved, and not improved.

TABLE II.

DURATION OF TREATMENT IN MONTHS, IN 100 CASES OF OSTEOARTHRITIS.

Group	No. of Cases	Symptom-free	Improved	Not Improved
Group A	32	8.7	23.2	17.4
Groups B, D and N	68	9.0	20.6	11.0
All groups	100	8.8	21.9	14.2

Note.—See footnote to Table III.

TABLE III.

RESULT OF TREATMENT IN 100 CASES OF OSTEOARTHRITIS.

Group	No. of Cases	Symptom-free	Improved	Not Improved
Group A	32	10 (32 %)	13 (40 %)	9 (28 %)
Groups B, D and N	68	13 (19.2 %)	28 (41.1 %)	27 (39.7 %)
All groups	100	23 %	41 %	36 %

Note.—Osteoarthritis is divided into the following groups: A, with normal weight and blood pressure, B, D, N, associated with obesity and/or high blood pressure. (Fletcher (1939).)

Table III shows that in cases without obesity and or hypertension 32 per cent were rendered symptom-free and 40 per cent improved, but that where these factors were present only 19.2 per cent were rendered symptom-free, although 41.1 per cent were improved. This is a significant difference, for it leaves 39.7 per cent of cases associated with these factors unimproved.

Although such definite figures were not available a few years ago, it was well known that the treatment of these cases was prolonged and tedious.

The intra-articular injection of Lipiodol.

An attempt has been made to shorten the period of treatment and disability by injecting the affected joints with lipiodol. Such a procedure was advocated by Sicard and Forestier (1932). They said, however, that the injections were far from painless, and that synovial effusions often followed, and Kling (1938) quoted Burman *et al.* to the effect that only 4 cases out of 13 cases of osteoarthritis of the knees were benefited. He quoted one patient who was disabled by a severe persistent synovitis for months after the injection.

Other solutions have been tried, and Bettman (1927) used Jodipin, a product of oil of sesame with iodine, first made by Winternitz in 1897. He combined it with a local anaesthetic.

Petrov of Leningrad, quoted by Rosen (1930), used paraffin and vaseline oil, but did most of his work on tuberculous joints. Thomson (1933) injected a solution known as Pregl's iodine, described as a non-irritating, non-staining, watery solution of free and combined iodine with certain iodides. With this solution he obtained good results, but used it only in cases where he found a synovial effusion. Later, Scott (1938) advocated an injection of gomenol in a special compound of camphor and ether.

It seemed likely that lipiodol would be the most satisfactory because of the length of time it remains in the joint, and so this was used first. Twenty cases were so injected, in eighteen the knees were affected, in one case the acromio-clavicular joint, and in one the elbow. The results of these injections in 20 cases are appended (Table IV), and although the number is small they have again been divided into those without obesity and/or hypertension (Group A) and those with these factors (Groups B, D and N).

In those rendered symptom-free the average period of disability was 4.4 months, and in those only improved 2.3 months.

The patient who did best was symptom-free in 3 days, and the longest period taken to become symptom-free was 18 months. Out of 13 patients who became symptom-free 6 belonged to Group A (without obesity and/or hypertension) and 4 to Group N (with hypertension). The remainder of the results is shown in the Table. If any conclusion can be reached from such a small number of cases it is that those cases with obesity are the most difficult to deal with, but in all cases where this was a factor every effort was made to reduce weight.

In a few cases of infective arthritis joint injections with lipiodol were tried, but the results were not encouraging and the procedure is not recommended.

Selection of cases.

It seems probable that all cases of osteoarthritis are not suitable, and the following points were noted.

Joints with periarticular muscle wasting are not suitable. The diagnosis must be firmly established on a clinical, X-ray and pathological basis, otherwise joints affected with infective arthritis may be injected with very poor results. Not only will no improvement take place, but the condition may be worsened.

TABLE IV.

AVERAGE DURATION OF TREATMENT AND RESULT ATTAINED IN 20 CASES OF OSTEOARTHRITIS TREATED BY INTRA-ARTICULAR INJECTION OF LIPIODOL.

	Symptom-free	Improved	Not Improved
20 cases	13 (65 %)	3 (15 %)	4 (20 %)
Duration of treatment	4.4 months	2.3 months	2 months

Of the 13 cases symptom-free, 6 belonged to Group A, 2 to Group B, 1 to Group D, and 4 to Group N.

Of the 3 cases improved, 2 belonged to Group A, and 1 to Group B.

Of the 4 cases not improved, 2 were Group B and 2 Group N.

The joints must not be distended with the oil, 10 c.cs. is sufficient for an average knee. When weight-bearing joints are injected, on no account must ambulatory patients be treated,

and at least four days must be spent in bed after the injection. During this time the patient must not be allowed on his feet at all. In cases where such joints as the elbows are treated, it is as well to put them at complete rest for a few days. The joints should be surrounded with antiphlogistine immediately after the injection, and should be kept under a radiant heat cradle for 24 hours. Tight strapping should not be used. Sometimes there is a good deal of pain for 24 hours, and morphia may be indicated and should be given. After 48 hours, massage is helpful. Occasionally a synovial effusion appears, but this has generally subsided after a short time, at the most two weeks, although in one case it is said to have lasted six weeks. During this time bed rest is indicated.

Follow-up.

The 13 cases which have been noted as symptom-free have all been followed up.

Two cases were followed up for 2 years, ten cases were followed up for 3 years, one was followed up for 4 years, and one for 7 years. They were all symptom-free at the end of these periods. It is of interest that the patient who was followed up for 7 years had a very bad reaction after the injection; temperature rose to 103° , the knee became hot and swollen, and the synovial cell count rose to 20,000 per c.mm. with 70 per cent of lymphocytes. She took two weeks to recover.

The three cases marked "improved" were followed up for 6 months, 3 years, and 3 years respectively. Their chief complaint was stiffness, but the pain was improved in all cases.

The 4 cases not improved were followed up for 5 years, 3 years, 1 year and 3 months. In only one case did the injection appear to do harm. In this case there was considerable pain and disability for nine weeks; six weeks of this time were spent in bed. There was no opportunity to see the case personally, but it is understood that there was a synovial effusion. The case was seen again in about four months' time and was then symptom-free, and has remained so since.

The intra-articular injection of Gomenol.

Gomenol is an oil distilled from the leaves of *metaleuca viridiflora*.

Clerc (1930) studied this oil experimentally and found that it had an inhibitory action on tubercle bacilli, and to a lesser degree on staphylococci and bacillus coli. On vaporisation the oil retains these properties; but it is slightly toxic.

Bernou (1922) in his studies on oleothorax used this oil in combination with olive oil. He tried various strengths from 1 per cent to 20 per cent gomenol, and certain authors suggested adding eucalyptol as it shortened the period taken for the gomenol to dissolve, but this only applies to its admixture with paraffin as it is freely soluble in olive oil.

From the point of view of intra-articular injection it has one great advantage, that as a rule it is painless.

Scott suggested the admixture of camphor 5 per cent and ether 2 per cent with 20 per cent gomenol in olive oil, and this solution was used to inject a series of joints. Out of 20 cases the knees were injected 17 times, the elbows twice, and the knees and ankles once.

Since the war opportunities to follow up patients have not been so frequent, but of these 20 patients 10 were symptom-free, six were improved only, and four were not improved. This was the state of affairs when the patients left hospital, but of the 10 who were symptom-free at least 3 had relapsed within a year. In view of this, other patients may also have relapsed.

More recently gomenol in olive oil alone has been used, and it is possible that better results may be obtained.

It appears therefore that this solution is not as effective as lipiodol, and that there is a tendency to relapse in those cases which are improved at the time.

Summary.

1. Details are given of 20 cases of osteoarthritis where the affected joints have been injected with lipiodol.
2. Their disability time is favourably compared with a control series of 100 cases treated by other methods.

3. Precautions in the use of the injections are suggested.
4. Observations without definite follow-up figures are made with regard to the intra-articular injection of gomenol.

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Clinical Page

GLANDULAR FEVER

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History.

Glandular fever (*Infectious mononucleosis*) belongs to the group of virus diseases. It is an acute infectious condition, characterised by fever, enlargement of the lymphatic glands, changes in the blood (especially a lymphocytosis), and by the presence of heterophile antibodies. The discovery of the blood changes and the heterophile antibodies has established the existence of glandular fever as an "entity." Outbreaks of the condition in the last few years have revealed its extraordinary protean nature. Bernstein says of the condition that it closely resembles syphilis by virtue of its ability to simulate so many other diseases.

The disease was first described by Emil Pfeiffer, 1889, under the title of "Drüsenfeiber," although Filatow, a Russian paediatrist, gave an account of it in 1885. In Britain, the first article about this condition, as seen in children, was published by Dawson Williams in the *Lancet* in 1897. In November 1930 Sprunt and Evans, in America, published an article in which the existence of an infectious lymphocytosis was clearly stated. They named it "Infectious mononucleosis," but made no reference to Pfeiffer's "Drüsenfeiber." For some time subsequently the identity of the two types was denied in America. In March 1921 Morley and Tidy published the first case of glandular fever, in which the presence of lymphocytosis was recognised. By 1925 the identity of the two conditions was accepted tacitly by Britain and America, but on the European continent for many years its dual existence was still doubted. The argument that monocytic angina was glandular fever was put forward by Glainzmann in 1930, and about the same time an epidemic appeared in England. This febrile type was proved by Tidy, *et al.*, to be another manifestation of glandular fever. More recently, epidemic hepatitis appears to be the latest guise of this disease, and Bernstein supports this view. One must wonder what clinical coat glandular fever will don when it next presents itself?

Aetiology.

Its distribution is universal, and no age appears to be immune. The glandular and hepatic types affect children and adolescents between 6 and 20 years; the anginose and febrile types are mostly seen in adults of 20 and 30 years. The incubation period is from 5-12 days, usually 11 days. The degree of infectivity is not high, and is limited to small localised outbreaks. It is very rarely sporadic, and the duration of infectivity is about one week.

Clinical Manifestations.

It is now established that the manifestations of glandular fever are protean. The essential features may be stated as fever, glandular enlargement, faucial affections, jaundice, blood