

contributed constructively during the interview in the combined clinic on 60% of occasions (details of drug prescription in 50% and general "background" details in the remainder). He could have predicted the surgeon's decision in 78% of cases and the requirement for surgery in 95% of cases. He correctly identified all patients that the surgeon thought required total joint replacement, but in four cases was surprised when the decision was for more minor surgery (excision radial head in three and synovectomy of the knee in one). One other patient was referred for physiotherapy only.

The educational value of the combined clinic was limited for both consultants. The physician indicated that he had learnt something new in 36% of interviews (details of surgical technique in 80% and indications for surgery in the remainder) and the surgeon had learnt something new in 23% of consultations (details of drug treatment in 85%). There was no correlation between the impressions of the two consultants about whether any one consultation was educationally valuable or not.

All of the patients who were seen in the combined clinic appreciated the presence of a physician, and none was intimidated by the large number of medical staff. Only 38% of patients who consulted the surgeon alone would have preferred that a rheumatologist was present.

## Discussion

Combined orthopaedic and rheumatology clinics are widely held and are thought by many to be an efficient way of managing patients with complicated arthritic disease. Indeed attendance at such clinics is a requirement of some higher training programmes. Despite this our study is the only one that we know of that has investigated the efficacy of the combined approach. Unfortunately, subtle differences between the two groups of patients have made comparisons difficult. For example, the rheumatologist may have been able to persuade the surgeon to intervene in a larger number of cases than if he had been working alone. The larger proportion of patients on second and third line drugs, the greater number with elbow

problems (the surgeon having an interest in elbow surgery), and the larger proportion of consultant referrals, however, may also explain the higher incidence of surgery in the patients who attended the combined clinic.

The results of this pilot study show that the educational value of the combined clinic was limited for the consultants who took part, who were previously experienced in rheumatology and thought that the "learning curve" was relatively short. There is no doubt, however, that the combined clinic is popular with postgraduate doctors, and it improves lines of communication between physician and surgeon.

The outcome for most patients was similar in both clinics, with identical waiting times for surgery and an equal length of stay in hospital. The combined clinic was popular with patients but this may reflect the fact that patients tell doctors what they think they want to hear.

If, as the results of this small study indicate, the rheumatologist can predict the surgeon's decision in almost 80% of cases and the requirement for surgery in 95% then most of the patients could have been seen adequately and in a shorter time in a routine orthopaedic clinic as long as a satisfactory letter of referral was available.

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## References

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# Clinical Algorithm

## Management of Parkinson's disease

F B GIBBERD

Previous clinical algorithms on tremor and Parkinson's disease have considered the process by which the diagnosis of Parkinson's disease and its various subdivisions, such as postencephalitic and drug induced parkinsonism, are made.<sup>1,2</sup> This algorithm concentrates on the management of Parkinson's disease. The algorithm is compiled for idiopathic Parkinson's disease, but other forms are managed in a similar way with the additional treatments that associated problems necessitate. The algorithm is divided into two parts, on non-drug management and on drug treatment. For ease of presentation the algorithm is shown as two diagrams but in practice the two would be used together so that social support and remedial therapy would occur in parallel with drug treatment.

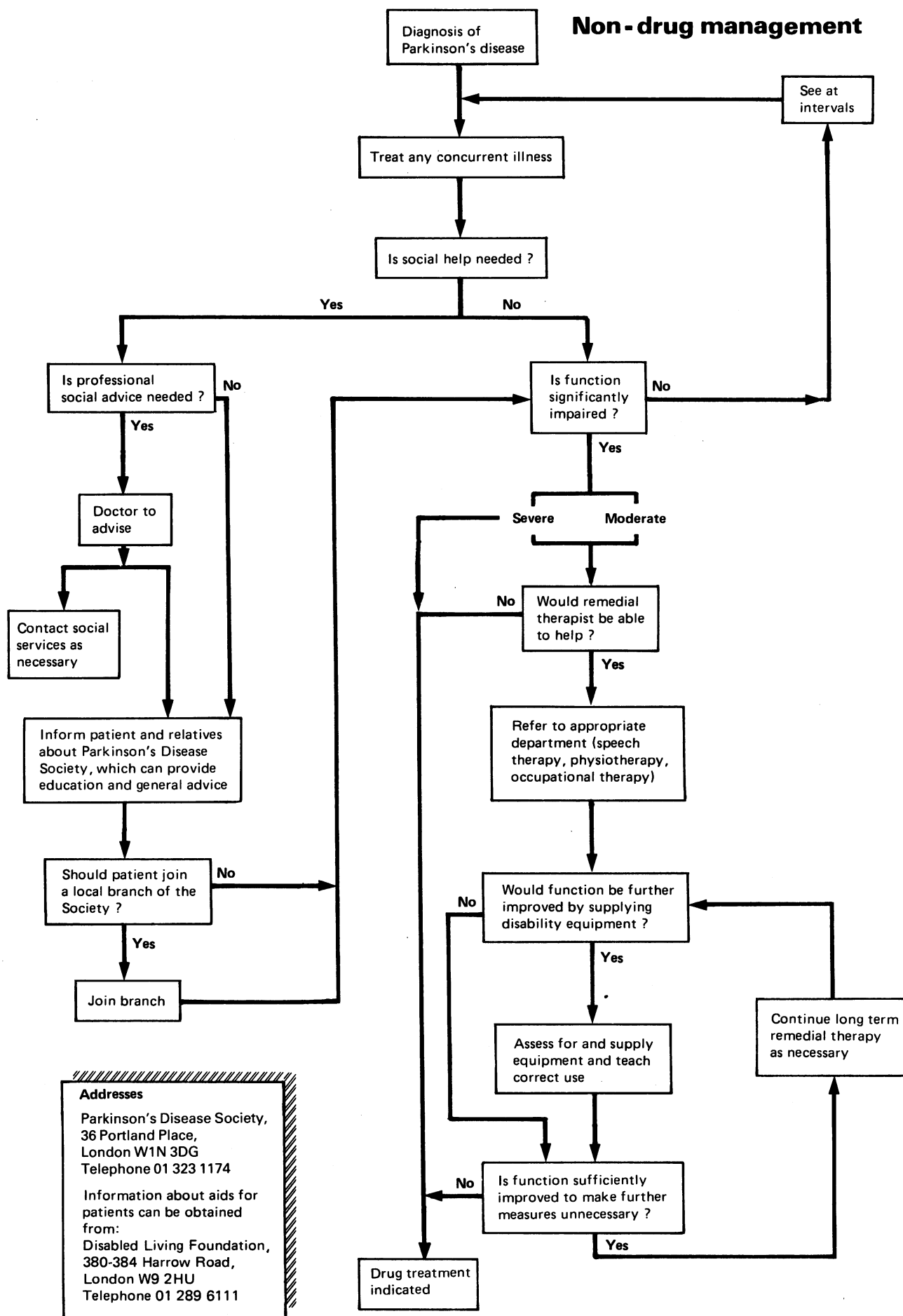
### Drug treatment: notes on the algorithm

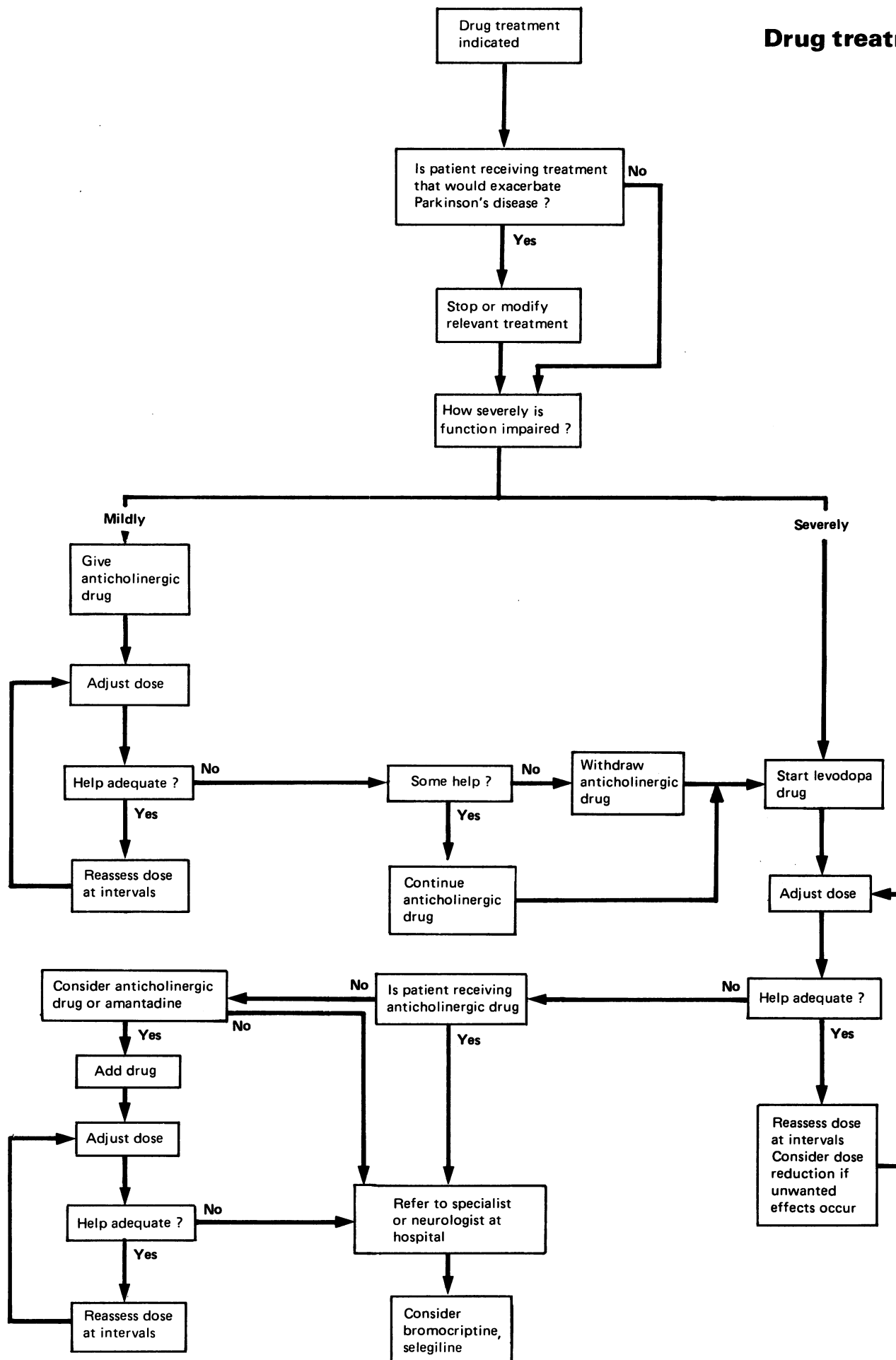
(1) Drugs which exacerbate Parkinson's disease include the phenothiazines (for example, chlorpromazine), the butyrophenones (for example, haloperidol), and the thioxanthenes (for example, chlorprothixene). There is an antagonism between levodopa and pyridoxine, although this does not occur if a dopadecarboxylase inhibitor is also given.

(2) Several groups of drugs are used to treat Parkinson's disease.

**Anticholinergic drugs**—Used in the early stages of the disease anticholinergic drugs may delay the need to give levodopa drugs and hence be of clinical value, but in the late stages of the disease they should be used cautiously because they may impair memory or hasten dementia. The drugs include the following (see the *British National Formulary* for the precise formulations and dosages):

- benzhexol (Artane, Bentex, Broflex) up to 5 mg three times a day,
- orphenadrine (Biorphen, Disipal) up to 100 mg four times a day,
- benztropine (Cogentin) up to 2 mg three times a day,
- methixene (Tremolil) up to 10 mg three times a day,
- procyclidine (Arpicolin, Kemadrin) up to 10 mg three times a day.



**Drug treatment**

*Levodopa drugs*

- levodopa (Brocadopa, Larodopa) up to 1 g six times a day, Levodopa with a dopadecarboxylase inhibitor:
- levodopa with benserazide (Madopar) up to 800 mg of levodopa with 200 mg benserazide, daily in divided doses,
- levodopa with carbidopa (Sinemet) up to 1.5 g of levodopa with 150 mg carbidopa, daily in divided doses.

*Other drugs*

- amantadine (Symmetrel) up to 100 mg twice a day,
- bromocriptine (Parlodel) up to 20 mg three times a day,
- selegiline (Eldepryl) up to 5-10 mg once daily.

The actions of bromocriptine and selegiline are dopaminergic and hence may exacerbate the unwanted effects of levodopa drugs.

(3) "Adjust dose" as used on the algorithm means adjust the dose to give the minimum dose needed to produce the maximum benefit with the minimum unwanted effects. It is rarely necessary to give therapy urgently, and the medication should therefore be started in small doses and increased slowly as the effect of each change is noted. If appreciable unwanted effects occur before there is any improvement the medication should be stopped. If unwanted effects and improvement occur simultaneously then careful adjust-

ment is necessary, and this may take several weeks and require repeated visits to a doctor. Of course, when there is adequate improvement the dose should not be further increased. It is rarely reasonable to attempt to remove all symptoms and signs, as this is usually impossible except in very mild disease. The aim should be for the patient to be able to lead a normal life. The benefits of anticholinergic drugs do not change much hour by hour or year by year. With the levodopa drugs, however, the unwanted effects increase the longer they are used, especially with high doses. Therefore the dose should be kept as small as possible and the patient discouraged from increasing the dose. The patient should be advised to take a small dose when he or she is doing less and needs less. If the on-off phenomenon or rapid deterioration occurs at a constant interval after a dose smaller doses given more frequently are often better than increasing the total dose.

I thank Dr Roberto Guiloff and Miss June Sutherland for helpful suggestions in drafting the algorithm.

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## Medical History

### A D Waller and the electrocardiogram, 1887

A H SYKES

This year is the centenary of the first recorded electrocardiogram. The paper in which A D Waller announced his discovery led directly to the work of Willem Einthoven, Sir Thomas Lewis, and others and so to the establishment of electrocardiography in clinical medicine.<sup>1</sup> It is, therefore, appropriate to recall Waller's achievement at this time.

**A physiologist's son**

Augustus Desiré Waller (1856-1922) was the only son of Augustus Volney Waller (1816-70), who made many important contributions to physiology including the eponymous degeneration of neurones following transection. A D Waller qualified in medicine at Aberdeen in 1878, but from the outset he was determined to emulate his father as a physiologist. He worked briefly with Ludwig in Leipzig and with Chauveau in Lyons (he was born in Paris and spent much of his boyhood in Europe, becoming fluent in French and German) and then with Burdon-Sanderson in the department of physiology at University College London. He spent a short time teaching physiology at the Royal Free Hospital School of Medicine and then for 18 years was lecturer in charge of physiology at St Mary's Hospital Medical School where his work on the electrocardiogram was undertaken. In 1902 he left to become

the first and only director of the physiological laboratory at the University of London situated in the former Imperial Institute, which was then the headquarters of the university. He was elected FRS in 1892 at the age of 35, the same age as his father had been on election. He was appointed professor in 1912 and received many awards in Britain and abroad (fig 1).

He and his wife and family lived a full life which revolved around his career as a physiologist. He had a laboratory at his spacious home in St John's Wood where he was helped by his wife, a former medical student. His children, his guests, and his pet bulldogs were often the subjects for his experiments, and it was one of his bulldogs, Jimmie, that was the subject of a now famous parliamentary question in 1909.<sup>2</sup> Visiting scientists were entertained, and there were family expeditions, frequently in the newly invented motorcar, to attend scientific conferences. A proposed visit to Einthoven in Leiden one winter was preceded by a telegram: "How is the skating?" He enjoyed giving popular lectures and was something of a showman, but his energy and enthusiasm were devoted to his chosen science and to the University of London. There are a few brief biographies,<sup>3,4</sup> but his personality is elusive and he left few personal papers to help any serious biographer.

**Capillary electrometer**

There were several forerunners to Waller in cardiac electrophysiology. The action current of the exposed frog heart had already been demonstrated by the use of relatively insensitive instruments, but the advent of Lippman's capillary electrometer in 1872 marked a great advance in speed and sensitivity. It was first used to record the electrical activity of the exposed heart of the frog by Marey in 1876.<sup>5</sup> It was taken up by Burdon-Sanderson for his wide ranging studies of electrophysiology including the heart.<sup>6</sup> This