

An Evaluation of the usefulness of speech and language therapy in the treatment of adult aphasia.

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In France, it is estimated that 25 new cases of aphasia (per 100 000 inhabitants) related to cerebrovascular accidents benefit each year from speech and language therapy. For cases of ischemic aphasia alone, 210 million of Francs have been spent in outpatient care in France in 1991 (1). Evidence-based medicine, which purports to improve both the quality of care and the effectiveness of the health system, is undergoing new developments: Practical Clinical Guidelines in pharmaceutical research, consensus conferences and accreditation procedures by ANAES, Opposable Medical References from the National Health Plan, among others. In this context, it is crucial that, on the basis of clinical and empirical studies, we determine what constitutes optimal conditions of speech and language therapy in adults. Nonetheless, numerous problems hamper direct measurement of the impact of speech and language therapy:

- general problems in the evaluation of treatment efficacy: measures of spontaneous recovery; selection of criteria on which to base judgement, which in turn influences the selection of evaluation tools (should we evaluate aphasic deficiencies, or communication disabilities, or both?), beta risk associated to small sample size, problems of sensitivity to the course of the disorder and ceiling effect when mild cases of aphasia are recruited into the study;
- specific problems related to the application of speech therapy to aphasia: there is a great diversity in the clinical presentation of aphasia and in the patients themselves, as well as in methods of speech therapy (which highlights the value of an agreed upon specification system).

In spite of these difficulties, two types of complementary evidence can be reported:

- clinical evidence based on single case studies or on group studies and meta-analytical investigations;
- evidence based on cerebral functional imaging, suggesting that speech therapy has a direct biological impact on the aphasic patient's cerebral processes.

Clinical evidence

Single case studies are useful in demonstrating improvement in a given patient upon administration of the technique(s) under study. On the other hand, group studies help us draw generalizations and operational conclusions from single case studies, that can then be applied to the entire aphasic population. We will base our presentation on those group studies reviewed by P.A. Joseph at the consensus conference on vascular hemiplegia, organized by SOFMERR in Limoges in 1998 (1), and on Robey's meta-analysis of 55 international studies selected for their high level of scientific quality among 479 articles on

the use of speech and language therapy in aphasia. Following ANAES recommendations, studies were categorized according to three decreasing levels of research evidence.

The first and most important question to be raised is that of the overall efficacy of speech and language therapy for aphasia. Wertz et al.'s study (1986), the most convincing piece of research in this area, unequivocally confirms that language treatment is efficient (3). This trial, conducted by the American Veterans Hospital Administration, used a prospective, multicentric, randomized cross-over design including 67 aphasic subjects who were randomly assigned to one of three of the following groups:

1) a 12 week treatment program conducted by a speech and language therapist, followed by 12 weeks without treatment;

2) a 12 week treatment program conducted by trained volunteers, followed by 12 weeks without treatment;

3) 12 weeks without treatment, followed by 12 weeks of treatment conducted by a speech and language therapist.

On the basis of the tests used in this study (Porch Index and Boston Diagnostic Examination of Aphasia), the authors found that n°1 and 2 treatment conditions were superior to n°3 for the first 12 weeks, and that n° 3 was superior to n°1 and 2 for the last 12 weeks.

Robey's meta-analysis, which took into account the magnitude of the therapeutic effect of the studies, reached similar conclusions; and some 12 other studies satisfying criteria for levels 1 or 2 of research evidence (ANAES) have since demonstrated that speech and language therapy is effective in the treatment of aphasia.

Other questions need to be raised regarding the impact of specific demographic and technical factors on the efficacy of language treatment.

The influence of the aphasic disorder itself can be conceptualized both in terms of global severity and clinical presentation. Several prospective studies which followed a randomized cross-over design (Brindley et al., 1989; Shewan & Kertesz, 1984; Wertz, 1981, 1986; Goldenberg, 1994) concluded that disorder severity is a negative prognostic factor, initial severity predicting outcome severity. But these studies also showed that language treatment of severe aphasia is not effective and that global aphasia should not be excluded from treatment. With regard to the clinical presentation, no difference has been noted between the efficacy of language treatment in fluent and nonfluent aphasias. Patients have the same rate of recovery from global aphasia as they do from other types of aphasia, but since the initial level of deficiency is more severe in the former case, the level of therapeutic outcome is also « lower » than that observed in other types of aphasia (Sarno et al., 1981).

Who should perform the language treatment? Some studies found no difference between treatment performed by speech and language therapists on one hand, and trained volunteers, relatives, nurses or occupational therapists on the other hand. But these studies are all subject to a high beta risk. Well-controlled studies (Kertesz, 1984; Wertz et al., 1986; Marshall et al., 1989) showed that treatment conducted by speech and language therapists gives superior results.

When should language treatment be initiated, and for how long? Contrary to the traditional notion of very early implementation of therapy as being beneficial, several studies (Basso et al., 1975; Basso et al., 1979; Wertz et al., 1986; Robey, 1998) failed to demonstrate the deleterious impact of delayed treatment. In Robey's meta-analysis, all patients treated before the 4th month improved, probably because of spontaneous recovery; beyond the 4th

month, the only patients who significantly improved were those who were treated. The size of the effect of language treatment is estimated to be twice that of spontaneous recovery.

The optimal duration of treatment is more difficult to establish on the basis of a review of the empirical literature, but there seems to be a general consensus that language treatment should be programmed for an initial period of 3 months, to be pursued or interrupted according to the results obtained.

How many treatment sessions are needed per week? Among well-controlled studies using a randomized cross-over design, findings regarding progress were all negative when the patient was treated once or twice a week (see for example Lincoln et al., 1984), while patients treated 5 to 8 hours a week or more all showed positive results. Studies involving patients treated 3 to 4 times a week yielded either positive or negative results, depending on the treatment program used. This increasing impact of language treatment according to treatment intensity is particularly well demonstrated by Brindley et al.'s study: 10 subjects with chronic Broca's aphasia were able to make substantial progress when administered an intensive language therapy program of 25 hours per week (4). Another recent study (Hinckley & Craig, 1998) showed the superiority of intensive treatment of word finding and naming difficulties in 40 subjects treated for 6 weeks, 23 hours per week, compared with a group treated at a frequency of 1 to 2 hours per week during 6 weeks, and even with a group treated 3 to 5 hours per week (5).

Most of these findings are included in the recommendations formulated by the jury of the consensus conference held in Limoges in 1996 (see appendix).

Evidence from cerebral imagery

This source of data is recent, since up until then it was technically impossible to directly examine changes in neuronal activity related to treatment-induced stimuli, in a live and awake subject. This type of evidence is extremely important, as it may convince skeptical scientists that language treatment works. We will only give two examples of this evidence.

Belin, Van Eeckhout et al. (6) studied the influence of melodic intonation therapy (TMR) on 7 aphasic subjects with PET techniques (7). In the absence of therapy, the listening to, and repeating of, word-stimuli increased the cerebral blood flow in areas of the right hemisphere corresponding to those left brain areas which are normally activated in healthy subjects, while decreasing the activation of residual language areas in the left hemisphere. In contrast, under melodic intonation therapy, repetition of word-stimuli reactivated Broca's area and the left prefrontal cortex, while decreasing cerebral blood flow in the Wernicke's area of the right hemisphere. This observation does not support the taking over of linguistic functions by the right hemisphere, considered useful and efficient in aphasic patients.

Musso et al. used a PET technique to examine the influence of intensive therapy on verbal comprehension processes in 4 subjects with Wernicke's aphasia due to an ischemic vascular accident. Twelve consecutive measures of cortical blood flow were taken, in association with a simultaneous measure of oral comprehension on the Token Test, the subjects undergoing intensive language therapy between recordings. This intensive program was tested on 20 other subjects with Wernicke's aphasia, and improvement on Token Test measures was assessed during non specific training tasks (such as watching TV, talking, writing) performed between recordings. Results showed a significant correlation between Token Test measures of oral comprehension and blood flow increase in the right posterior temporal lobe and the left precuneus. In conclusion, these two investigations confirm specific therapy-induced changes in cerebral blood flow, associated with improved test scores. They also suggest that the anatomical substrate of recovery is a very complex

phenomenon which is compatible with the hypothesis that several language areas organized in neuron networks may be involved, as opposed to a reductionistic hypothesis of left vs. right hemisphere alternative. Indeed, the melodic intonation therapy study (TMR) suggests that recovery of expressive functions is associated with an increase in metabolic activity in the left hemisphere, while the second study indicates that recovery of comprehension skills may involve participation of the right hemisphere. This right hemisphere involvement had been a subject of controversy up until then. Previous studies carried out by Heiss et al. and by Weiller et al. in the absence of language therapy had actually shown that right hemisphere activation was more frequent and pronounced in aphasic patients than in healthy subjects, but was similar in recovering and non recovering subjects, thus having little predictive value with regard to spontaneous recovery.

Research efforts should be pursued in this area, in order to improve our understanding of the impact of language therapy on the aphasic subject's cerebral processes; and hopefully in a near future they will guide our choice of therapeutic techniques according to the type of cortical network disturbance involved. As we have already noted, these studies also have a beneficial influence on scientists and health policy makers: Melodic Intonation Therapy, from which TRM is derived (Thérapie Mélodique et Rythmée) is now recommended by the American Academy of Neurology.

New perspectives

The efficacy of speech and language therapy in the treatment of adult aphasia has now been empirically demonstrated, and some its practice parameters, such as intensity and duration, have been clarified. Among the problems which remain to be resolved, we will have to harmonize two contradictory trends: the required standardization of practices which goes with a commitment to quality on the part of speech and language therapists, and the flexibility which is needed to apply these practices to daily treatment situations. Speech and language therapy works as a whole, but a whole that can vary from one day to the next, depending on the patient's psychological state, his (her) motivation, and the course of the disorder. Commitment to quality does not necessarily imply the blind application of the same program to all patients, at all stages of their evolution.

Efficiency, meaning the cost/benefit ratio of speech and language therapy will also have to be considered. Research in this domain is bound to be quite complex, if one is to take into account all the financial and economic parameters involved in language treatment. Clearly, a simple analysis of the ratio of « improvement of scores on tests of aphasia » over « financial cost of reimbursing treatment sessions and related transportation », will not suffice. We will have to take into account all other expenses involved, such as additional expenses engaged by the family because of the aphasic disorder, which can be alleviated by language treatment; we will also have to take into account the financial consequences of psychological manifestations such as depression, including the cost of anti-depressant medication, consultation with specialized physicians, hospitalization, etc., which language therapy can also reduce. Finally, we will have to specify the relative benefit of individual therapy over group treatment or support from aphasic patients' associations, with regard to the respective cost of these interventions.

Finally, and therapists will have to stand a firm ground with health policy makers in this regard, the implementation of quality in the language treatment of aphasia will need to take into account both the unique operational features of private practice and patients' needs and expectations. If, for instance, it is observed that an aphasic patient has not benefited from traditional individual treatment for several years, it does not mean that reimbursement of treatment should be blindly interrupted: it simply means that another way of helping the person has to be sought out.

In this manner, Evidence-Based Medicine will reach its objective of improving the quality of services offered to the French population, without being manipulated by technocratic decision makers who are ignorant of the daily life situation of aphasic persons.

SOFMERR CONCENSUS CONFERENCE, LIMOGES 1996
Conclusions from experts

Level of evidence n°1

- Speech and language therapy works for aphasia during the first year of the condition.
- There is no contra-indication associated with severity: language treatment is beneficial for severe aphasia as well.
- Language treatment performed by speech and language therapists gives better results than that performed by other persons or trained volunteers.

Level of evidence n°2

- It is possible to initiate treatment beyond the 6th month.
- Treatment is effective only if its intensity is of at least 5 hours a week.
- The initial duration of treatment should be 3 months.

No evidence, but agreement

- If the person's medical condition permits it, treatment should be implemented within the first 3 months.
- Recommended duration of each session: 45 minutes to 1 hour.

Recommendations from the Jury

« ALL APHASIC PERSONS should be able to benefit from language treatment, no matter how severe the disorder is. There is no empirical evidence in favor of « emergency implementation » of treatment. If the person's medical condition permits it, there is general agreement that early treatment, within the first 3 months, should be implemented. The most sustained benefits are obtained from treatment which provides a minimum of 6 hours per week. Each session should last from 45 minutes to 1 hour. Treatment performed by speech and language therapists is more effective than that carried out by volunteers or by other health professionals. There is more than one method of speech and language therapy, and the efficacy of alternating communication techniques and of computerized therapy has not been demonstrated. An initial treatment period of 3 months is recommended. Follow-up evaluations should determine whether treatment should be continued and they should necessarily include a functional assessment of communication. For a high proportion of vascular aphasias, the value of speech and language therapy during the first year and beyond is supported by empirical data ».