

Abstract

The devices dealt with here are mainly implantable stimulators and pumps which aim to improve functional independence and the quality of life in various groups of disabled people. Patients, relatives, carers and rehabilitation professionals need to know what such devices can and cannot do. Professionals will also need an understanding of how to determine which patients may potentially benefit from their use. They will need to understand what the expected benefits are in physiological terms, and their likely impact on disability and handicap. They should also know whether a neuroprosthesis might alter the broader rehabilitation management and be able to explain any evidence concerning added or reduced medical complications, side-effects or added benefits. They should know the probability of implant failure, infection, equipment faults or other complications, and how these are repaired or managed.

Service providers and purchasers need to be aware of the best way to organise the specialist and supporting services, the likely costs, benefits and savings, and the size of the present and likely future user groups. They also need to be aware that additional staff training may be required. For planning purposes they need to be forewarned of additional or improved devices which may become available in the next few years, and to know which existing devices are likely to come under heavy demand.

Strictly speaking, neuroprostheses restore function directly by their actions; they either substitute for lost *neuroconduction* by focal electrical stimulation, or they restore lost *neurotransmission* by focal chemical stimulation. Some of the devices described here work differently, by blocking or modifying abnormal local patterns of activity either electrically or chemically. This is sometimes called *neuromodulation* (although the term is controversial); so neuromodulators are not strictly neuroprostheses. However, the considerations involved in their development, selection, use and maintenance are so similar to those which apply to neuroprostheses that it seems hardly useful to maintain the distinction here. Clinical neuroprostheses are therefore described in Part 2 of this Report, and neuromodulators in Part 3. For some purposes, surface stimulation systems present a reasonable alternative to implantable stimulators, and should be considered. In these cases, the surface options are here discussed briefly. Some implanted mechanical and hydraulic devices which replace neuromuscular deficits are also mentioned.

The second and third sections of the Report aim to give a brief sketch of the current position of each type of neuroprosthesis and neuromodulator, with particular reference to practice in the UK. They aim to indicate which devices are currently under assessment, or in use within research projects, and which are available within the NHS. They summarise the clinical indications, contraindications, precautions, selection and investigation procedures, likely inpatient stay, number and duration of surgical operations, postoperative testing and training methods, and follow-up procedures. They indicate the main active clinical centres, how referrals may be made, and what initial information should be supplied. They give a few key references to the relevant field.

End of Abstract
