THE TECHNICAL AIDS OF TETRAPLEGIC PATIENTS

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OCCUPATIONAL therapy is of the utmost importance in the rehabilitation of tetraplegic patients because of the exceptional severity of the disability that such a therapy intends to compensate. In fact, it not only aims to improve the remaining functions of the patients but also may enable them to wash, eat, communicate, move about and entertain themselves, all main activities *a-priori* impossible for them to perform. But, to be efficacious, such a therapy has to implement various simple means, and also reliable and respectful towards the free resolutions of the patients.

Complex, expensive, depending on the help of a constant aid, the most sophisticated equipments are not really often used. Indeed, a lot of patients abandon them after a short while, in spite of their former aspect as a panacea.

It is in light of this negative experience that, despite the complexity of the problems to be resolved, it seems more practical to consider *only the simple methods*, although these methods demand from the patient a greater personal effort of adjustment and require practice to increase in efficiency.

Occupational therapists also have a gradual educational action. Thanks to this, the patients may forsake some previously used aids and also open a wider field for their functional abilities, even in the cases where *no* objective improvement in motor muscles can be observed.

A steadfast effort, overcoming former failures and weariness, is necessary and must be maintained *for a long time* and *with intelligence*: it is only thus that tetraplegic patients will best develop their remaining functions.

The following film¹ will display the patients' outcome to the highest level of their still restrained independence, starting with their previous total lying in bed and ending with their returning home.

You will be shown the means and implementation of occupational therapy that enable the patients to perform every activity of daily life, within the limits of the spinal injury. Those means will then improve the essential quality of such patients' lives.

The technical aids we are going to show you have all been designed and realised by occupational therapists for each individual patient. The adjustment of these aids requires daily researches and training, the result of which is going to be shown here. Occupational therapy preceding the use of such aids, as well as their unsophistication make them tolerable at every level.

During his bed-rest, a tetraplegic patient is strictly supine, which is a cause of isolation and retiring within himself: the setting-up of a driving mirror enables him to keep contact with people around and chiefly to preserve his bodily wholeness.

Various types of bells and pipettes lead to a starting independence: an en-

¹ A copy of this film is available by writing to the secretary of: Professeur Jacques Bourret, Hôpital de Rééducation et de Réadaptation fonctionnelles, Route de Vourles, 69230 Saint-Genis-Laval, France.

larged bell, in order to rectify the awkwardness of the patient's forearms; also a system of cross-pieces; and as long as the upper limbs are not functional, a bell is set, that the patient can use by bending his head; or else, a bell that the patient can sound by blowing, in the case of a conservative treatment of a fracture allowing no movement of the patient's neck.

Radio, TV, and reading are some of the rare possible entertainments for lying patients. The metacarpian bracelet can compensate for muscular deficiency of the fingers.

In all cases, an adjustable desk is necessary. And at higher stages of deficiency, the bracelet is replaced by an oral tip that may be set aside during reading.

Then, the patient is gradually verticalised; he has to deal with the problems of transfers with a wheel-chair.

Non-skidding gloves avoid cutaneous problems and convey impulse without reducing energy.

Wheel-pins, head-props or straps are used only during a short period of the patient's rehabilitation.

It is just the same with the extension-pieces of the brakes that compensate for the temporary lack of balance and strength.

The patient's ability to eat independently is always one of the earliest considerations, for it is usually eagerly requested by the patient himself and can be easily undertaken, even at an early stage.

The adjustment of a special knife is nearly always necessary, except in tetraplegia above C7, C8.

In this case, prehension is limited, and the fork has to be inserted into a metacarpian bracelet. That system enables an easy interchange of spoons and forks.

A non-skidding cover is also very useful as the picture shows it.

As for drinking, stemmed glasses are easier to hold.

The same adjustments are used for patients affected at a higher spinal level; the patients' wrists have to be steadied by cubitometacarpian braces.

Here a spontaneous arthrodesis may avoid braces: and so, it is sometimes enough to adjust the forks and spoons by twisting them a little, or making them longer to compensate for the insufficient lifting or supination of the upper limbs. After several years, a patient can eat without any adjusting help. Cutting however, is always difficult. And every tetraplegic patient has to find his own technics: this one is an example.

At higher levels of paraplegia, independence means only the use of a pipette.

As soon as the radial muscles are functional, the washing of the face, of the hands, of the upper limbs and sometimes also of the trunk, as well as hair brushing become possible again. Tooth-brushes have to be moveable inside the metacarpian bracelet, so that brushing can be effective.

Mechanical shaving is performed with the same technical aids; stops on shaving-brushes may be useful to prevent the patients' hands from sliding. With no functional radial muscles, independence is limited to tooth brushing and shaving. Technical aids are often just a starter to independence and will soon be set aside for the benefit of self-adjustment, as the film demonstrates. Electric razors can also be adjusted, if necessary.

Dressing oneself becomes possible as soon as the biceps reappear, and also a minimum balance of the trunk.

A long training and much ingeniousness are required in order to reach that independence that will always consume great energy.

Manual writing requires a daily training, starting with pregraphism and going

on with speed-exercises. A technical aid makes retraining easier and will remain compulsory at higher levels of tetraplegia.

Writing with the mouth is the only possible method in the cases with no mobility at all of the upper limbs. Training increases the oral dexterity, as well as the amplitude of the head movements, and also releases the patient from his feeling of insecurity due to his lack of sensitivity and balance. Yet, the possibilities of action remain limited.

For a better autonomy, electric typing machines are systematically recommended. Metacarpian bracelets are used when fingers are flaccid. Such adjustments are also used in cases of total lack of prosupination. For this patient, an adjustable desk is required for typewriting as well as for manual writing. The adjustment at the level of the patient's forehead, though less precise, is yet chosen for its amplitude. At the stage, no process can be achieved, except typing itself.

The maintenance of entertainments is one of the means for social and familial re-settlement.

Reading while sitting requires at the very most a metacarpian bracelet with a rubber-tipped stem, except at higher levels of tetraplegia.

Games and exercises of prehension require various adjustments, depending on levels of tetraplegia.

Contacts are restricted because of the lack of mobility. Collective games remain the best way for meeting other people.

The access and use of the telephone are systematically studied as means of calling and contact. Functional radial muscles enable the patients to lift the telephone receiver, to hold it and dial a number. Yet, adjustments are sometimes necessary for this too; such adjustments, that do not damage the receiver, are used in the cases when only the root of the limb can move. As for more severely handicapped patients, a telephone with finger-keys, commanded by an oral tip, is interesting if accessible for them in wheel-chairs. Electronic systems are commanded either by blowing or by the tongue, but they are too expensive to be largely extended.

When triceps and radial muscles are functional, patients can learn how to drive a car. New adjustments are added to the ones for paraplegic patients: a non-skidding steering wheel; a strap for transferring the key; and the self-starter. When the patients have no hand-muscles, they use a non-skidding steering wheel and drive with their arms stretched forward. Servo-driving is imperative.

At higher levels of tetraplegia, adjustments can also be performed, which help the constant aid during transferring.

Occupational therapists study housing on diagrams with the patient and his family. In most cases, such a study starts during the patient's first home-visit, and is developed later on.

The occupational therapist counsels but in no cases decides for the patients who have to be responsible for themselves, excluding a very sophisticated equipment that needs specialists, our study demonstrates that the independence of tetraplegic patients can be considered with simple means that are to be used in every department of occupational therapy.

SUMMARY

A twenty-minute film shows how tetraplegic patients can compensate their disability thanks to very simple means. The independence of tetraplegic patients is considered with non-sophisticated equipment that are to be used every day in every department of occupational therapy.

RÉSUMÉ

Un film de vingt minutes montre comment un tétraplégique peut compenser son infirmité grâce à des moyens très simples. L'indépendance de ces patients peut ainsi être obtenue à partir d'aides techniques non sophistiquées qui devraient être utilisées chaque jour dans tout service d'ergothérapie.

ZUSAMMENFASSUNG

Ein film von 20 Minuten zeigt wie Querschnittsgelähmte Patienten, ihrem Handicap können kompensieren dank einfachen Mitteln. Die Unabhängigkeit der querschnittsgelähmten Patienten wird mit täglichen Techniken erworben die man in dem Dienst der Ergotherapie gebraucht.