Proceedings of the Eighth International Symposium on ECHE, 1984, Dubrovnik

TO LIVE SHOULD MEAN MORE THAN TO SURVIVE

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At the symposium External control of human extremities, the year 1967, Fredrik Möhl and I had a paper here in Dubrovnik. It was called An Electromecahnical Forearm and Hand, where the fingers to some extent are adaptable to the article which the hand grips. (1) (2)
Today, 17 years later, I think we have spent at least 2 million US dollars in Swedish money on that project. I guess that 20% of that cost is spent on administration of the money. The technical and functional problems have been reasonable. Some few amputees have tried the SVEN/ES-hand in evaluation projects including sofisticated myoelectric control of the functions. (3)
The prosthesis is now in production in a small serial by the firms of Ken-Holmgren Orthopaedic INC and Systemteknik AB in Sweden.

The year 1964, the Russian myoelectric handprosthesis was presented. It was made in accordance with the design philosophy of motorizing the three point pinch grip, which later on has been followed by more or less efficient motorized versions in some other countries. But there has been no smarter or more sofisticated grip function on the international market.

We have during these many years tried to figure out the reasons why the UE prosthetic field has not progressed in a more reasonable way into products. Technical difficulties concerning electromechanical system design problems are probably not the explanation.
We have realized other explanations during these years:

1. The industrial short serial "syndrom".
2. National, often not formal, protectionism.
3. Almost every actual R&D-project demads at least 10 times more money a year to get a new product with a reasonable reliability applied on patients in a reasonable time.

Compare the development costs and delivery time of small industrial robotic arms, which have been on the market during the last five years. The slow progress in UE prosthetics is not typical for the medical technique in general. Industrialized countries seem to have intensions to spend more money on advan-

ced facilities in order to cure for survival, than on aids for rehabilitation. Thus after curing the doctors possibilities to help you as a disabled seem to be smaller. Therefore, today there are too many rehabilitation problems left just to the technicians, physical therapists and occupational therapists. Rehabilitation medicine is a medical speciality in our country, but those doctors are few and not prescribers in the field of prosthetics.

If we look at orthotics for paralysed people, the neurologist cures the patients to the best extent, but he is not a prescriber of orthoses or electrical stimulators, or educated in the field of rehabilitation. Therefore most of the patients do not get rehabilitation with orthoses in an adequate way. Prescribers for the orthoses are the orthopaedic surgeons and to some extent the doctors of rehabilitation medicine in Sweden.

The administrative team I work with has realized that there is not very much sense in R&D in most of the O/P field before we have prescribing doctors enough in the field of rehabilitation-doctors who know what technical aids can do for his patient. He should be able to formulate even adequate demads on better aids for his patient. The engineer can just tell him if and how aids can be improved as the doctor demands.

Technical staff and researchers can hardly get into an ethical discussion about the balance between the need of diagnostically relevant curing and rehabilitation. However, we realize that the technical resources for just curing today have the highest economical priority.

Technical staff often have to listen to legitimate claims from disabled persons concerning bad technical and functional quality. We should be able to offer higher quality which makes it easier for them to live.

Summary

The demands from the disabled to get aids with better function are legitimate.
Conclusion after 17 years of experience from adminstration of R&D in the field of orthotics and prosthetics is that medical rehabilitation however is a poor concept.
The results of research are therefore not followed up with adequate development demads and resources.
The lack of doctors who are specialists in rehabilitation of physical disabled people, using technical aids, will mean a constant poor quality in the field of orthotics and prosthetics in practice.

(1) Lymark H, Möhl F: An Electromechanical Forearm and Hand.
External Control of Human Extremities, Yugoslav Committee for Electronics and Automation, Belgrade 1967, p. 142

(2) Hedström L. Lymark H: Die SVEN-Handprothese
Orthopädie-Technik, 1978:6, p.74

(3) Almström C, Herberts P, Körner L: Experience with Swedish Multifunctional Prosthetic Hands Controlled by Pattern Recognition of Multiple Myoelectric Signals. International Orthopaedics, 1981:5,p.15