

# Health despite illness and disability

**Evolution from Disease Centred to Person- and Community-Centered Medicine as Drivers for innovation for enhancing the strategy for the rights for Health mainly for persons with disabilities.**

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## **Traditional Biomedicine Paradigm vs. Person-Centered Care**

The transition to a "Person Centered" medicine is an urgent need of our times, where the patient has the right to be the protagonist of his health choices, with the aim of leading to greater knowledge, sharing, acceptance and better results. Person-centered care is an approach that focuses on the needs, values and individual preferences of patients, making them an active part of their treatment path. In this context, all medical-surgical skills and potential are made available and guided by the needs and preferential values of the subject, compatible with evidence and indications of appropriateness and risks in their selection and application. This new paradigm for all medical science and for every intervention in support of Health interacts with the Community in all its manifestations and structures: in fact, the context of personal, family and community life represents the essential reference for determining on the one hand the needs, potential and choices of the Person and on the other hand the dimensions of feasibility, sustainability and effectiveness of each intervention. It should be remembered that Medicine must always combine humanistic and scientific aspects in a synthesis that can respect the uniqueness of the person for whom it works. "Disease centred" medicine had perhaps underestimated the humanistic and personological components of treatment in favour of the somewhat mechanistic ones of biology and epidemiology alone. Moreover, this approach also aims to collect and enhance the premises defined by the Alma Alta Charter, as well as the very important experiences developed over the years in the "Community Based" sector in many countries, not only in developing countries: it was a path that underlined how, even with limited medical and health resources but with the synergy of the active involvement of the person's living communities, it was still possible to create forms of positive health protection for many subjects affected by various pathologies and disabilities.

All this is particularly true for Medical tasks in Rehabilitation in general, but in Neurorehabilitation in a very specific way in relation to the constant and close connection that exists in our clinical field between the characteristics of the

conditions of Health and Disability and also between the conditions of recovery (subjectively adequate and satisfactory) by the person with respect to their own autonomy and functioning. The transition from a disease-centred to a person-centred model of medicine is driving the development and adoption of innovative robotic technologies for autonomy and people's health. A challenge that cannot have adequate answers from a traditionally based approach on parameters that are in some way substantially fragmented and operated in "silos" for organs, pathologies and procedural and temporal distinctions.

### **Stroke Care as an example :**

Extended care for multiple motor and cognitive problems and limitations, due to their modifiability, including in relation to the personal, environmental, and family context, throughout the lifespan and with significant interference with autonomy and quality of life. Technology has great and growing potential to support these treatments. Integrating these treatments into the home and community is of great importance.

### **The Development of New Technologies in Rehabilitation**

Medical rehabilitation is undoubtedly the field in which Medicine and overall Health defense activities are experiencing a transformation in methodologies and objectives today increasingly focused on the Person and his needs and free choices. It is therefore experiencing a truly epochal growth in value and intervention capacity to correspond to this transformation of the demand for autonomy and functioning that is growing in all populations; this evolution has favored, but is at the same time also supported by the integration of advanced computer and robotic technologies. This sector, which traditionally was based on manual therapies and simple mechanical devices, is now at the center of a revolution that promises to completely redefine the standards of care and functional recovery.

The Current Panorama: Robotic technologies in rehabilitation today represent a rapidly expanding sector, with solutions ranging from exoskeletons for motor rehabilitation to social robots for behavioral and cognitive support. The great variety of functional limitations, especially in the neuro-motor and cognitive fields that these devices can help to address is truly very wide, and equally wide is the variety of typologies that technological research is offering. Often, different devices can be integrated into their use in the care of individual patients: for example, the role of virtual reality as a "partner" in various types of neuro-motor treatments is very important. This very positive fact from a certain point of view also appears to be a problem as it causes a fragmentation of clinical experiences, a fragmentation of verification data collections and also a disparity in the offer of care and disparity in the training of operators and in the protocols applied. Another critical aspect is sometimes the limited industrial size of companies that after having conducted admirable research and design of products, do not always have the capacity to follow

their evolution with respect to the variation of the operational and clinical need. It must also always be emphasized that these systems do not replace the traditional personal therapeutic relationship, but integrate and enhance it through:

- Biomechanical precision: Millimetric control of movements and applied forces
- Adaptive customization: Algorithms that adapt in real time to the patient's abilities and their evolution.
- Continuous monitoring: Collection of objective data on the activities carried out and on rehabilitation progress

The fundamental key to use to enhance the therapeutic relationship as a whole (the Individual and personalized Rehabilitation Project) is therapeutic standardization, that is, the definition of specific shared and reproducible Protocols that can be positively compared with the criteria of evidence-based in relation to the large number of particular aspects that must be evaluated and analyzed in this global, continuous and personalized care activity. The success of these technologies depends on the close collaboration between medical, bio-psycho-social and engineering skills. Clinicians bring the understanding of the physiopathological mechanisms, the therapeutic needs as well as the personal and subjective aspects while engineers translate these requirements into innovative technological solutions. This synergy is essential to develop devices that are:

- Clinically effective and safe
- Technologically advanced but user-friendly
- Economically sustainable for healthcare facilities and also for the user
- Accessible for patients with different operating conditions and environmental contexts

The integration of AI , advanced wearable sensors and brain-computer interfaces is opening up previously further advanced scenarios also in terms of remote applications, thus also promoting the personalization and adaptation of technological potential to the times and conditions of life and autonomy of the person. The extreme personalization of therapies, remote monitoring, autonomous-assisted rehabilitation as well as continuous support for the conditions of autonomy achieved in life, and in safety, represent just some of the frontiers that we are starting to explore. A common basis of understanding for healthcare professionals and technologists is essential, facilitating the interdisciplinary dialogue necessary to advance this crucial field of modern medicine. Equally necessary is the understanding in the community of the relevance of these innovations both to guarantee all citizens the potential for treatment and recovery of possible autonomy, and the sustainability over time of life for each subject in relation to the specific socio-cultural and economic context.

### **3 - Assistive Robots for Domestic Autonomy**

There are now increasingly widespread experiences of research but also of widespread use of Robots for patient interaction and support with a focus on direct assistance, combining technology with the residual activities of the person as part of the healthcare team and also with both compassionate assistance and family or social daily life performances.

- Intelligent home assistants that can be humanoid or connected to the home to support various types of functions (nutrition, hygiene, movement, communication, health monitoring and therapeutic control, personal safety...)
- Robots for the continuation of personalized rehabilitation integrated into life activities

The main Person-Centered Benefits are the maintenance of autonomy in one's own environment, continuous non-invasive monitoring as well as any personalized preventive or safety interventions. All this can be achieved in a completely autonomous form on the basis of precise programming (in which AI can play an increasingly rich role) connected to a remote control in periodic off-line form or for some things also on-line with a competent center.

#### **4. Telepresence and Participatory Medicine**

The evolution of information technology and technology today in 2025 offers great opportunities for IT-healthcare which for example include the advancement of AI adoption and the review of virtual assistance strategies to define the future of patient-centered care and correlated with the personal, physical and socio-relational context. Telepresence for personalized remote visits and consultations can be integrated with robotic equipment that performs actions and collects data useful for both assessments and treatment performance. This can be integrated with both the potential strictly connected to rehabilitation treatment and the functioning of the person in relational life. The most immediate and obvious advantages for the Patient are scheduled and facilitated access to specialist care, the reduction of travel in a context of personalized continuity of care.

#### **Overall, what are the main critical success factors**

First of all, the construction and maintenance of a holistic approach to the Person which translates into: **A)** - Multi-dimensional integration with adequate consideration of physical, psychological, emotional, social and spiritual aspects. **B)** - Real personalization: through the full and continuous adaptation of interventions and technologies to specific individual needs and their variation over time. **C)** - A concrete and constant Empowerment for the person and his family context/care giver which translates into an always active participation in the decisions of the multidisciplinary team involved.

The design of action protocols as well as equipment must always be centered on the User. This means full Usability and therefore intuitive interfaces for all ages, full

accessibility with inclusive technologies for people with disabilities and finally complete acceptance both individual and community for the substantial overcoming of cultural and psychological barriers.

This requires as soon as possible that certain fundamental elements be emphasized in the overall development of this sector:

A) the constant presence (and therefore the stimulus and commitment to building, within the context and relationship with "treatment" and "care providers") of MOTIVATION for the recovery of functioning for every condition of impairment and disability, whether transient or ongoing, and of any origin. Motivation is essential for the individual to move from Rehabilitation to actual Habilitation, rebuilding the value and individual context of independent living based on the desire to choose.

B) the growth in research, production, and distribution, alongside the most advanced and sophisticated technologies, of products and equipment whose cost is much more accessible both to treatment facilities, including in developing countries, and to individuals who can thus actively and directly engage in recovery training.

#### **Consequences and prospects :**

Conversely, only a bio-psycho-social approach, therefore centred on the person in his/her entirety (of problems and potential) and on his/her time/place relationship with the context of life in the community is able to offer suitable tools to study and deal with these situations that are very often even intricate with each other. Within this new vision, the technological, IT and robotics offer is playing an increasingly positive role for the rights to reach a free life based on Abilitation,

It's clear that this progressive transformation of medicine, both culturally ,ethically and scientifically, allows for a very different approach to people with disabilities than in the past: they are considered as a whole, not for their individual and diverse impairments, but for their potential for functioning and autonomy aiming to "Abilitation"

#### **. We might say "despite" illnesses.**

This also applies to the focus on the essential value of their rights: rights to health, along with social and personal rights. What has sometimes been a negative sign in the past in the relationship between medicine and disability is disappearing, as if disability were a sort of "unchangeable chronic disease." Disability is therefore seen as a prerequisite only for compensatory social and welfare interventions, but certainly not for treatment aimed at modifying, much less making, those rights concrete.