

## OCCUPATIONAL THERAPY EXPERIENCE REPORTS REGARDING THE USE OF ASSISTIVE TECHNOLOGY IN BRAZIL

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According to the World Health Organization (WHO), data from 2011 point to 1 billion people living with a disability in the world, which means about 10% of the world population. These data only increase due to the evolution of medicine and the aging processes of the population. In Brazil, this number jumps to 23.9% of the population, according to the IBGE (2010 Census), the last census applied, and a large part of this population lives a reality of serious social needs, such as low income and lack of access to health services, according to research data from the Federal Senate regarding the living conditions of people with disabilities in Brazil, which only increases the difficulties of these people due to barriers, prejudices, inequalities and misinformation.

With the ratification of the International Convention on the Rights of Persons with Disabilities in 2009, Brazil assumed the responsibility of offering conditions to overcome the multiple barriers faced by these people to become independent and autonomous. So, issues of accessibility and availability of Assistive Technology (AT) resources become a "sine qua non" condition, since the use of AT by people with disabilities enriches and expands their socio-affective, cognitive and functional development, favoring its autonomy. (FERRADA; SANTAROSA, 2008).

Law number 13,146/15 (Brazilian Inclusion Law - LBI) guarantees approximately 45 million Brazilians a series of rights related to accessibility, education and health, in addition to establishing punishments for discriminatory attitudes. This is a great achievement for this group after several legal and social initiatives.

TA has a collection of resources and services considered indispensable in the process of empowerment and functionality of people with disabilities, their access is

guaranteed by LBI, in article 16, however, so that their indication of use, acquisition, training in use and application adapted to different contexts, there are many paths to be followed and many challenges to be overcome.

In this sense, reporting positive experiences in different contexts and periods seems to us to be a contribution to professionals in the area of rehabilitation, in order to stimulate new and continuous actions in this area.

## **DEFINITIONS AND CONCEPTS TO BE CONSIDERED**

When the purpose is to clarify or define what TA means, a small review of the history in the area was sought. According to Bracciali (2016) AT is a term used to identify the entire arsenal of resources that somehow contributes to providing an independent life for people with disabilities.

Author Romeu Sasaki, in a text written in 1996, states that the original term "Assistive Technology" was first defined in US federal law as the Education of Individuals with Disabilities Act (Public Law 101-476, 1990). In Brazil it was translated as "Assistive Technology", although it does not contain the meaning of the word "Assistiva" in the Portuguese dictionary. This word emerged over time and was consolidated with its use, as it is a routine phenomenon in living languages (SASSAKI, 1996).

Maria de Mello (1999) defines AT as any item or equipment used to increase, maintain or stimulate functional skills that can be a resource of great help in the process of intervention with people with disabilities, facilitating interaction in the social and family environment.

Decree 3,298/99, in article 19, and Decree, number: 5,296/04, article 61, define the right of Brazilian citizens with disabilities to technical assistance, that is:

Technical aids are products, instruments, equipment or technology adapted or specially designed to improve the functionality of people with disabilities, with reduced ability, favoring personal, total or assisted autonomy.

The Technical Assistance Committee created by the Special Secretariat for Human Rights of the Presidency of the Brazilian Republic (CAT/SEDH) brought together a group of Brazilian experts and representatives of government agencies, on December 14, 2007, approving the concept of AT as:

Assistive technology is an area of knowledge, with an interdisciplinary characteristic, which encompasses products, resources, methodologies, strategies, practices and services that aim to promote functionality, related to activity and participation, of people with disabilities, disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion (BRACCIALLI, 2016, p. 1014).

The International Classification of Functioning, Disability and Health (CIF/2003), considering the ISO 9999 classification of technical aids, defines AT as:

any product, instrument, equipment or technical system used by a disabled person, specially produced or generally available, which is intended to prevent, compensate, monitor, alleviate or neutralize the disability (p. 154).

According to the AT manual at the School of the Institute of Social Technology – ITS/ Brazil (2007), the AT concept has been revised in recent years, due to the scope and importance of this area to guarantee the inclusion of people with disabilities.

This way, AT or support brings together technical, human and social components and continues to think that the disadvantage is not a characteristic of the person, but of the product in relation to the environment. In this context, it shifts the gaze from the limitations of the individual, to highlight

the functional results, that is, it proposes a change from the conception of equipment related to the body to adaptations and devices related to activities (ROCHA; LUIZ; ZULIAN, 2003).

LBI/15, article 3 defines TA as:

III - assistive technology or technical assistance: products, equipment, devices, resources, methodologies, strategies, practices and services that aim to promote functionality, related to the activity and participation of people with disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion.

Regardless of the definition to be used, Rita Bersch (2008) recalls that the purpose of AT is to provide people with disabilities with greater independence, quality of life and social inclusion, aiming to improve **functionality**, through the expansion of their communication, mobility, control of their environment, skills of their learning, work and integration with family, friends and society.

## ACCESS TO ASSISTIVE TECHNOLOGY RESOURCES

One of the great challenges of the AT scenario in the country is the national market, which to this day is still fed with imported products, raising the prices of this technology, which are concentrated in the hands of those who have some purchasing power to acquire them (ZULIAN; ZANETTI, 2015).

Brazilian legislation deals with AT and/or technical assistance with resources granted to all Brazilian citizens with disabilities. However, in order to obtain the benefit, which is his right, he must resort to the Unified Health System-SUS, which is still unknown to most of those who could benefit from it.

The SUS grants AT and works with a pre-

fixed table of equipment (technical help). This means that it will not be able to supply what is not provided for in the table, despite the fact that it has been revised and fed with products through different ordinances, such as the decree, number: 1,272/13. Wheelchairs, orthotics, prostheses, hearing aids, insoles and various other equipment related to visual, physical and mental impairments belong to the list of products available.

But one of the problems in guaranteeing this right to people with disabilities is the difficulty of many professionals prescribing these products. Recalling that the product dispensed by the SUS follows a path that succinctly follows the following line: prescription of the AT product for the user by a health professional, description of the product for requesting it by the SUS, purchase of the product through bidding (purchase made by someone who does not know the demands of the then future user) and the delivery of the product to the applicant, so if the prescription is not adequate, or the description of the requested product is not detailed, the delivery of a quality product to the user.

For the prescription of devices, some basic procedures are necessary, such as: patient assessment, observation of their daily activities, knowledge of the reality in which they are inserted, information obtained from other professionals, social and financial situation, community and cultural factors. All these aspects will influence the choice of equipment, but the most important of all is the fact that the devices must not be adopted based on physical disability per se, but based on the patient's needs and functional abilities (ROCHA; CASTIGLIONI, 2005).

The professional, when indicating AT resources, needs to realize what is essential to guarantee the good usability of the resource.

The Occupational Therapist is still the professional with the best skills in indicating,

prescribing and/or making functional adaptations that facilitate or even enable the performance of activities of daily living (food, hygiene, clothing, locomotion, communication), activities of daily living practice, leisure or work.

In 2010, an MCT/FINEP public call was launched that referred to a selection of proposals to support research and development projects in AT, whose objective was to support initiatives for the development of low-cost technologies and/or those that contemplated the concept of universal design, in addition to supporting initiatives for the development and manufacture of equipment and devices with a view to substituting imports (ROCHA NETO, 2007). After this public call came several others, always with the objective of enhancing national development in the area and reducing costs in the sector.

AT thus becomes a broad field of study and domain of various disciplines such as: rehabilitation engineers, computer engineers, biomedical and electrical engineers, doctors, architects, designers, occupational therapists, physiotherapists, speech therapists and nurses who work to restore human function.

A network of AT research and development centers was created in Brazil and was called RNPDTA (National Network for Research and Development in Assistive Technology). In 2012, the National Reference Center for Assistive Technology was created with the objective of identifying research and developments in the area between public and private institutions and providing articulation between them to enhance processes and make it possible for new products with National Technology to reach the market, from in order to contribute to the expansion of offers at a more affordable cost (ZULIAN; ZANETTI, 2015).

## **ASSISTIVE TECHNOLOGY RATINGS**

The types of AT can be High Technology and Low Technology, that is:

- High Technology: encompasses sophisticated equipment that requires computer or electronic control, such as vocalizers and environmental control systems. These devices are produced in industries, usually in series and require specialized professionals. They are available on the market and consumers can find them in catalogs, medical and orthopedic equipment stores, including online.
- Low Technology: equipment or resources with little sophistication and made with low-cost materials, available on a daily basis, adaptations made by therapists or patients, or both. These equipments are produced in a more artisanal and individualized way.

Low-tech equipment is often made by the user's own family members, friends or by professional occupational therapists, carpenters, physical therapists.

## **POSITIVE EXPERIENCES IN THE RESEARCH, DEVELOPMENT AND PRODUCTION OF NATIONAL ASSISTIVE TECHNOLOGY**

Two experiences are presented with very positive results regarding the prescription, research, development, manufacture and application of AT with the user. Both demonstrate that Brazilian professionals in the field of rehabilitation have shown enormous dedication and commitment and have taken advantage of opportunities to offer AT resources to users. It is considered that people with disabilities can each day gain new spaces of circulation and access and have the best possible quality of life, regardless of the resource, whether of high or low technological complexity.

In the first case, the report refers to a partnership between Physiotherapy and Occupational Therapy with an intervention in a Family Health Unit (USF), a service located in Parque Meia Lua, in the municipality of Jacareí, State of São Paulo (LANDIM et al, 2009). The patient was a USF user, had a diagnosis of spinal cord injury level C7, ASIA C, 53 years old, whose cause of the accident was a fall, 1 year ago. Based on data collected from muscle strength assessments following the Kendall scale and from the functional assessment of the Canadian measure of functional performance (COPM), low-cost AT resources were prescribed.

The therapists directly assisted in the making of the devices, as illustrated in figures 1 and 2.

It was also possible to make some accessibility adjustments in the patient's residence, improving their circulation space and movement around the house and out of it, as shown in figures 3 and 4.

Besides, other resources were made to help the patient's physical rehabilitation intervention process, such as: knee and ankle abductor, made with pool noodles, knee extensor, using a water gallon and positioning orthosis for Upper Limbs (MMSS), made with pool noodles. The materials were made in the carpentry shop of the University of Vale do Paraíba-Univap, and adapted at the patient's home. Also, it was possible to intervene directly in the ergonomic aspects of the house through the manufacture of an internal and external ramp, which facilitated the mobility of the wheelchair user.

The researchers concluded that through the use of low-cost AT resources and a program of therapeutic exercises applied in an interdisciplinary way (physiotherapy and occupational therapist) it was possible to achieve the objectives outlined in the intervention project for the patient selected

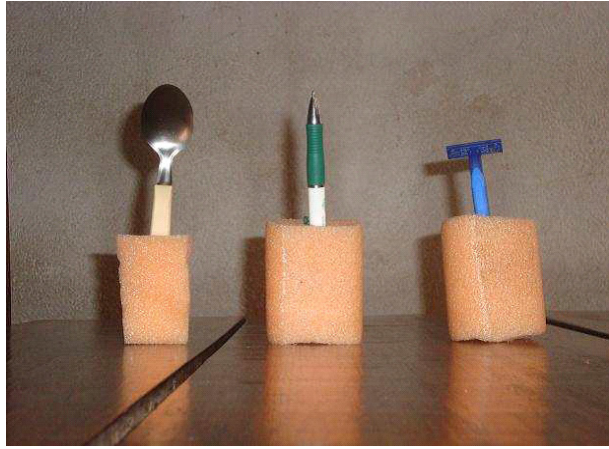


Figure 1 - Cutlery thickener, pen thickener, razor thickener, resources made with pool noodles.



Figure 2 - armchair table made of cardboard, Contact paper, ink, velcro and hot glue, using the paperboard technique.



Figure 3 and 4 - Ramp for steps, made with wood.

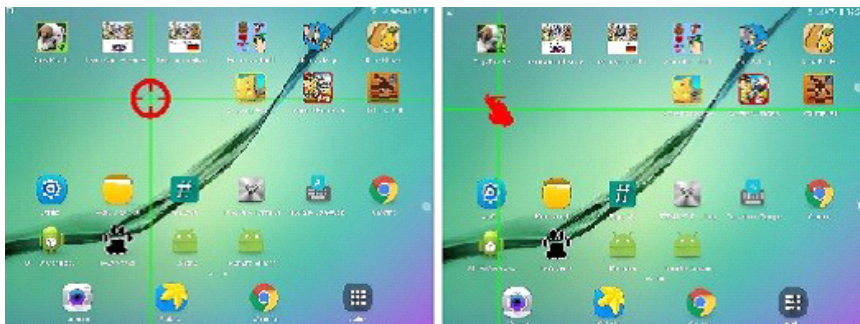


Figure 5: Scanning system and representative gestures on the mobile device screen.

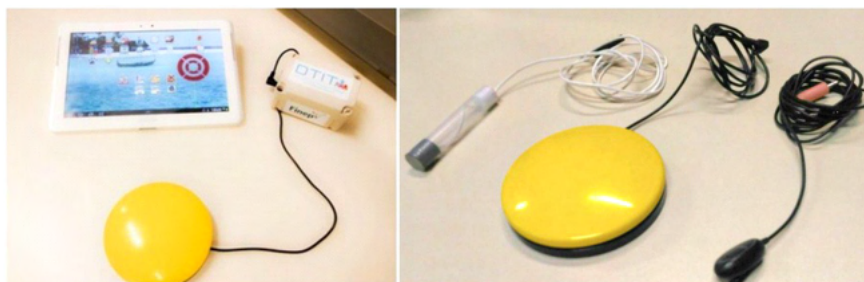


Figure 6: Tablet, controller board and touch sensor (trigger). Other sensors: capacitive, touch and audio sensor.

for the study. Through the interventions, the patient managed to have greater functional independence for some activities of daily living, obtained a physical, psychological and social improvement, reflecting in the improvement of the family's quality of life (LANDIM et al., 2009).

The second case is the report of a case treated at CTI – Centro de Tecnologia da Informação Renato Archer and at FACTI-Fundação de Apoio ao CTI, in Campinas S.P., with the use of AT of high technological complexity.

It is a digital technology solution, an accessibility interface to mobile devices for people with severe motor disabilities, which has a system that identifies, through specific sensors, a signal emitted by the user, based on their motor condition. residual, such as noise or physical touch. The signal is captured by the controller board and transferred via bluetooth to access a scanning application

that runs on the tablet, enabling the emulation of the functions of the hands manipulating the device. Thus, such handling is always under the user's control through sensors and allows access to any application installed on the device. Navigation on the device is based on screen scanning, where the intersection of two perpendicular bars indicates the point where the action must take place, offering the user the emulation of gestures, actions and touches, as they are done externally to the tablet. The tool operates over any application, as illustrated in figure 5 (ZULIAN et al., 2016; ZULIAN; ZANETTI, 2015).

According to Zulian and Zanetti (2015), by enabling communication and enabling access to information through the computer system, it was possible to ensure a means of communication for the patient. As well as opening a gateway to a more productive life for almost one million students with motor commitment in Brazil.

## FINAL CONSIDERATIONS

Interventions with T.A. reported prove the possibilities of developing and using specific resources for physical and environmental adaptations that greatly contribute to improving people's functionality. In addition, it demonstrates the enormous creativity and pro-activity of Occupational Therapy and Physiotherapy professionals in the development of low-cost products that can expand the functionality of their patients.

Currently, Brazil is seeking its independence with regard to the production and supply of national AT products, however, many other results are needed so that it is possible to reverse the still complicated scenario of availability of AT products of high technological complexity.

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