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# **Assistive Technology in India: A Guide to Assistive Technology For People with Spinal Cord Injuries**

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# ASSISTIVE TECHNOLOGY

Assistive Technology is a system of low-tech & high-tech tools and strategies that match a person's needs, abilities, and tasks. Assistive Technology is "any item, piece of equipment, or product system whether acquired commercially of the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."

## Core Assistive Technology Services:

- ✦ Assessment and evaluation for appropriate assistive devices: Power/Manual wheelchairs, walking aids (crutches, walker, sticks etc) based on patient's clinical conditions and controls in all environments.
- ✦ Provide better seating and positioning system for improving postural stability and alignment to increase comfort and sitting tolerance and decrease fatigue using proper custom designed cushions.
- ✦ On-site device customization and fabrication for wheelchair and its various accessories
- ✦ Computer adaptations and enabling accessibility features: Adaptive hardware and software based on patient's skills level (motor, cognitive, visual, communication)
- ✦ Assessment and suggestions for home modification and personal transportation for those who have barriers in their house and transportation.

Technology plays a significant role in the life of someone with a severe disability such as a spinal cord injury (SCI). SCI can have a major effect on virtually all aspects of one's life. Products and devices designed to increase an individual's level of function and independence can be instrumental in providing a person with SCI the highest possible level of function after injury.

The physical effects of SCI are varied. Depending upon the level and severity of injury, it can affect the ability to walk or to use one's arms and hands, to drive, and to control physical functions such as bowel and bladder control or to have sexual relations.

This Informed Consumer Guide is designed to provide an introduction to the many types of products and devices people with SCI can use in order to function more independently in their daily activities. People with new injuries may assume that certain activities cannot be performed any longer because of the disability. In many cases, however, devices have been developed to allow people with SCI to do the same things they did before the injury. Adaptive devices have been developed to enable people with SCI to participate in almost every type of sporting or

recreational activity. Cars and vans can be modified to enable someone in a wheelchair to drive or be a passenger while remaining in a wheelchair or transferring to a standard car seat.

The first step toward getting the types of products that one needs is to know the right questions to ask, and to know that appropriate products exist. This Guide, therefore, can help people with SCI arrive at that "first step" toward greater independence and self-sufficiency after a spinal cord injury.

## **Assistive Technology**

### **Personal Mobility:**

One of the major consequences of SCI is its effect upon a person's ability to walk. Some people with SCI are able to walk with the assistance of braces and crutches. Others may need--or choose to use--a manual wheelchair. Still others may require or prefer some sort of powered mobility device, such as a scooter (a three- or four- wheeled cart) or powered wheelchair. Deciding what type of mobility device to use is based upon a number of factors: medical diagnosis; personal lifestyle; cost of the device; and personal preference.

For someone who has recently sustained a spinal cord injury, a functional evaluation by physical therapists and other rehabilitation professionals is an important part of the process for determining the individual's best options. For someone who has had a spinal cord injury for a number of years, the best sources of information on products available often are other consumers who have practical experience with the product(s) being considered.

### **Wheelchairs:**

The majority of people with spinal cord injuries use a wheelchair at some point in their lives as a mode of personal mobility. For some this may mean using a powered wheelchair, while others may find a standard manual chair or a lightweight or sport chair more suitable. Selecting the appropriate wheelchair from the many options available often is an overwhelming task to someone with a new injury. The wheelchair should be decided through proper assessment, prescription and fitting process as explained above.

### **Seating and Positioning Systems:**

In general, wheelchair users also must use a specialized seating system to ensure adequate support and protection of soft tissues. Selection of an appropriate seating system is of utmost importance to someone with SCI in order

to avoid pressure sores, a risk for those unable to change position or who have diminished sensation. The seating system must be selected along with the wheelchair to ensure that the two systems are compatible and provide the best support possible to the user. Seating systems come in many different styles and formats, depending upon the user's needs and personal preference. The simplest and least expensive systems are foam cushions, generally three- to five-inches thick and covered with fabric. These may be flat foam or contoured to more closely match the shape of the user. Cushions are also available in air, flotation, gel, and water models. The varieties of cushions provide different levels of support and require varying levels of maintenance. Also available are hybrid cushions, combining the best characteristics of several types of cushions, such as foam and gel.

### **Driving and Transportation:**

Transportation often plays a key role in determining whether or not an individual will be able to work, go to school, or participate in recreational activities. For people who are able to drive, specialized products are available to operate an automobile or car with hand controls. Special access options, such as lifts or ramps for vans and wheelchair tie-down systems to stabilize wheelchairs inside a moving vehicle also are available.

### **Driving Controls:**

People with limited or no use of their lower limbs use hand controls to accelerate, brake, and shift gears. These controls may be mounted on the steering column or they may be comprised of a ring system on the steering wheel, allowing the driver to keep both hands on the wheel. Hand controls are available from a number of different companies and meet a variety of user needs.

### **Automobile Accessories:**

An assortment of accessory items, including wheelchair and transfer lifts, handles to assist in transfers from a wheelchair to car, car door openers, and swivel seats can be modified and made available to drivers and passengers with disabilities.

### **Van Accessories:**

In addition to the accessory items available for automobiles, specialty accessories are available. Included are such items as raised van tops, tie-down systems, and transfer bars designed specifically for vans can be purchased to make driving or riding in a van safer and more comfortable for someone with SCI.

## **Van Lifts and Ramps:**

Full-sized and mini-vans can be fitted with a variety of ramps and lifts. Lifts may be attached to the side door or to the rear door, and some newer models are designed to require less space and/or to leave part of the door free to accommodate passengers who are not in wheelchairs.

Some wheelchair users find ramps a preferred method of access. A variety of ramp systems are available including two-track and wider one-piece models. These ramps may be permanently installed, folding up or sliding under the van floor, or they may be portable, allowing use with more than one vehicle. Raised ceilings or lowered floors often are used in conjunction with a lift or ramp to equip a van to accommodate a person in a wheelchair.

## **Wheelchair Carriers and Loaders:**

Specialized wheelchair carriers can be attached to the outside of a car or van to carry wheelchairs from one location to another. Some carriers are combined with loaders, lifting and storing the chair on the car's bumper. Other loaders enable wheelchair to be lifted into a car trunk or onto a roof rack.

## **Making Your Home Accessible:**

Many people discover that their homes are not fully accessible to them after they have sustained a spinal cord injury. Doorways may be too narrow to accommodate a wheelchair; hallways may not provide sufficient turning room; bedrooms may be located up a flight of stairs. It may seem that the only option is to sell the home and move to one that is wheelchair accessible, and for some this may be a preferred option. In some cases, however, it may be possible to make renovations to an existing home, enabling one to remain there indefinitely. Some homes may simply require the installation of assistive devices such as special door hinges, elevating and lowering cabinets, and electronic faucets to make the home more accessible and "user friendly" to someone in a wheelchair.

## **Managing Your Environment:**

A spinal cord injury that causes quadriplegia can limit a person's ability to use arms or hands for such everyday tasks as picking up a telephone, typing, writing, or operating electrical entertainment equipment such as a television or VCR. There are a number of devices available, however, that can assist one with these tasks. Both products designed for the general public - such as speaker phones or

universal remote controls--and assistive devices designed especially for people with limited hand and arm function are available. Included are specialized telephones, assistive writing and typing devices, computers, safety and security systems, and environmental controls. Many of these systems are voice-activated, eliminating the need to use one's hands. Additional alternative input modes are also available.

### **Staying in Shape:**

Sports and recreation are important both as leisure activities and as ways to stay in shape mentally and physically. Some activities can be done without any adaptations or special equipment. Others require specialized equipment or modifications to accommodate wheelchair users, and the range of options open to people with SCI is expanding almost daily. Whether you are interested in fitness, skiing, cycling, basketball, rugby, tennis, hunting, or some other activity, there are products, facilities and people able to assist you in participating in the recreational activity of your choice.

### **Sports and Recreation:**

The competitive sports arena is alive and well for athletes with spinal cord injuries or other disabilities. If a sport is available to an able-bodied person, the likelihood is high that it is available also to someone with a spinal cord injury. Athletes with disabilities participate regularly in the Boston Marathon and other running events, with wheelchair division times recorded along with other divisions. Wheelchair basketball, quad rugby, archery, bowling, tennis, snow and water skiing, and just about every other sport can be played by someone who uses a wheelchair. In many cases, the key to competition is access to the appropriate equipment, whether it is a lightweight wheelchair or the newest skiing equipment. Specialized wheelchairs have been developed specifically for use in various sports, including racing, wheelchair sports, and basketball.

### **Standing Aids:**

Health care professionals often recommend that people with SCI stand several times per day to improve cardiovascular fitness, prevent bone deterioration, and exercise muscles. Standing frames and stand-up wheelchairs provide the support needed to accomplish this activity.

### **Hobbies and Recreation:**

A wide range of products is available to enable people with SCI to engage in the hobby or recreational activity of their choice. From music to gardening; from photography to fishing; from boating to flying, assistive technology is available.

### **Personal Care:**

For many people, the ability to be as independent as possible in personal care activities is of paramount importance. There are many devices that have been developed to enable people with limited physical function to perform personal care activities with little or no assistance from others.

Products are available in the following categories:

- † Bathing and Showering
- † Clothing Dressing Eating
- † Grooming and Hygiene
- † Health Care Holding
- † Reaching
- † Sexual Aids
- † Smoking
- † Toileting
- † Transferring

For those with new injuries, consultation with an Assistive Technology Expert will be helpful in determining the kinds of assistance required and the best products to help meet those needs.

### **Making Your Workplace Accessible and Usable:**

With the variety of adaptive devices available for almost any worksite, many people who have sustained spinal cord injuries have been able to return to their previous positions after their rehabilitation is completed. Whether in an office setting, a warehouse, or on the farm, to mention just a few examples, there are adaptive products and information resources available to make the return to work easier.

Product categories include:

- † Computers
- † Agricultural equipment's
- † Office equipment's
- † Tools
- † Desks

- † Specialized Working Station

### **Conclusion:**

A new spinal cord injury can mean major changes in lifestyle, but with the appropriate medical and informational resources and assistive technology, it may be possible to engage in the same activities as before the injury.

### **Frequently Asked Questions (FAQs) of Assistive Technology Services at Indian Spinal Injuries Centre**

What are the Assistive Technology Services?

Assistive technology services help people to select, buy and use assistive technology devices. This could include a pre-purchase evaluation to help determine which devices best fit their individual needs, training on how to use the devices after acquiring them and purchasing extended warranties to allow maintenance and repairs. What services do we provide?

- † Wheelchair Assessment and Prescription for all types of wheelchairs
- † Wheelchair Assembly and Fitting as per the requirement
- † Wheelchair Trial and Training
- † Seating and Positioning System for Wheelchair
- † Wheelchair Skills Training
- † Wheelchair handling and maintenance instructions
- † Computer Accessibility Evaluation
- † Adaptive Computer Operating Devices Fabrication
- † Home and Worksite Modification Evaluation and Suggestions
- † Personal Vehicle Accessibility Evaluation and Modification

What types of disabilities are served?

A broad category as following:

- † Spinal cord injuries
- † Cerebral palsy
- † Multiple sclerosis
- † Muscular dystrophy
- † Brain injuries
- † Stroke
- † Autism
- † Developmental delays
- † Macular degeneration
- † Amputation



## † Elderly persons

Is it true that Assistive technology will always be an expensive product? Will it suit my budget?

**No!** Primary goals of AT are enhancement of capabilities and removal of barriers to performance. The least complex intervention should be considered first. For example, a person having difficulty in feeding, brushing or writing, a low-tech universal cuff could be adapted according to the user's need. A head pointer or mouth stick is other low-tech device to negotiate computer-aided tasks. A low cost and low-tech wheelchair could be modified as per the individual's needs. Those who are able to afford there are high tech and cost-effective wheelchair are available only after doing proper assessment of the individual. If I am prescribed expensive product, is there any assistance for funding?

Our goal is that technology should reach the individuals irrespective of financial, social or environmental barriers. A person who cannot afford to buy an expensive product, we refer those individuals to the community-based organizations or private donors for some financial considerations. Our social worker department does the social and need assessment only after that we can decide to support to the needy individual. For support for poor people, we try to arrange some funds from ISIC Welfare Association and other charitable organizations. Currently we are in process to provide support under the ADIP scheme from Govt. of India.

Do I need a referral from a doctor or any Hospital?

**NO!** You are eligible to come directly to us to avail Assistive Technology Services.

Can I send my caregiver/parents/assistant or someone others to get the devices?

**NO!** We would always see and assess the individual who would use the device. Without seeing the person, we would not be able to select and modify the device. How much time it takes to deliver the AT device once the assessment is done?

Usually, it takes at least three working days to deliver the customized device. In some cases, it can be delivered on the same day. Such as wheelchair which requires less modification and adjustability.

Are there any after sale services available for the device?

**YES!** We do have follow up and maintenance services, you have to bring the device at our centre.

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Nekram Upadhyay has studied Assistive Technology and Rehabilitation Engineering at University of Illinois at Chicago and got trained at University of Pittsburgh, USA where he worked with Dr. Rory A. Cooper. He Joined Indian Spinal Injuries Centre, New Delhi in 2006 and established the Assistive Technology within the Rehabilitation Department at Indian Spinal Injuries Centre. His primary work is focused on finding and developing the best solutions of mobility-based systems for persons with Spinal Cord Injuries and similar kinds. Assistive Technology Services Centre at ISIC provides best possible Assistive Devices as per the individual's needs keeping in mind their affordability, accessibility and similar factors.

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