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# Multipurpose Stroke Therapy Wheelchair

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**ABSTRACT:** In today's conditions, the number of patients is increasing excessively in different cases. Our project is focus on the concept of multipurpose stroke therapy wheelchair. The abrupt loss of brain cells from a lack of oxygen is known as a stroke. A stroke is caused by a ruptured or blocked artery to the brain. Following the stroke, the affected area of the brain loses its blood supply and stops functioning. This results part that losses the well working condition of body. The project's goal was to provide a quality, multifunctional wheelchair at a reasonable cost while simultaneously promoting mobility. People who facing difficulties in walking. Our product used to carry patient directly from bed to wheelchair with less effort to the by chancellors. Also, we are trying to reduce the cost of the product and it aims to decrease the pressure injuries and fall while carrying patient.

**KEYWORDS:** Wheelchair, Stroke therapy, Pneumatic cylinder.

## I. INTRODUCTION

The area of our brains that regulates movement will suffer damage as a result of the stroke. In such circumstances, they experience weakness or paralysis on one side of the body and have trouble moving and carrying out daily tasks. The finest and most crucial component of recovery is physical therapy. To aid in the healing and recovery of the body's motions, a variety of therapies including manipulation, massage, exercise, skill training, and electrical therapy are utilised. Following a stroke, the main goal of physical therapy is to gradually increase the strength and range of motion in both body sides. The fundamental issue after a stroke is that our brains are unable to produce new cells to replace damaged ones. As a result, your recovery depends on your brain's capacity to reorganize its healthy cells and make up for what has been lost; this ability is known as neuroplasticity. Through physiotherapy, we can offer knowledgeable, helpful advice. Physiotherapist has a well knowledge about the stroke and its causes, they also work with the members of stroke team.

In today's condition, our life style is very difficult. Because of that number of patients are increasing day by day. Hospitals are being over crowded by the patients. Due to lack of technologies or high expense they can't provide proper care to the patients. The available technologies are very expensive, which can't available to the common peoples and small hospital managements. Paralysed peoples are facing many difficulties in their life. The primary issue with them is the transition from bed to stretcher and vice versa. It normally takes more work for a bystander to do this. Patient falls and pressure injuries are possible during this technique. Our project's primary goal is to provide a high-quality, versatile stroke rehabilitation wheelchair at an affordable price point for the general public. We are providing an exercising setup along with the wheelchair by including pneumatic cylinder setup and a cyclic arrangement for patients for improve and regain their strength and movements.

## II. RELATED WORKS

According to Teo Chin Teng [1] They specify that a wheelchair differs significantly from a traditional manual wheelchair. Therefore, the basic structure, such as the seat width and seat depth, will not change. Here are the key differences between electric wheelchair, and the wheelchair I designed with respect to a manual wheelchair. William Armstrong et.al [2] The demands of long-term wheelchair users are the primary emphasis of this recommendation. The

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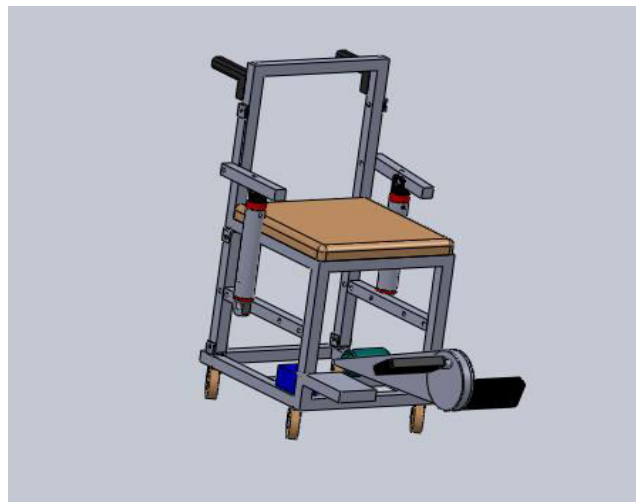
guidelines are directed at individuals who are engaged in wheelchair services, including design and planning, offering or supplying wheelchairs, and maintaining them. Sumedh J et.al A wheelchair concept has lot of advantages.[3] The user may simply be moved from the bed to the conveyor belt and vice versa. The wheelchair seat's 360-degree rotation allows the user to transfer from either side. Design and construction of a pneumatically propelled wheelchair stretcher device by Vishnu CR. [4] For a patient weight of 100 kg, a prototype of the pneumatically powered stretcher-chair device was created. Patient transfer is made simpler by this device's ability to convert from a chair to a bed. Considering the research of Imran Aslam et. al. described in this review [5] Workers' lifting dangers may be decreased by current technology. By applying cost-effective solutions that enhance technical tools, worker education, and policy creation, healthcare organisations may increase worker safety. Ajinkya S. Hande et.al [6] describes the design, manufacture, and testing of an improved wheelchair cum stretcher. When compared to other wheelchairs on the market, the developed system offers lower costs and allows patients with lower extremity paralysis to lie down and take breaks whenever they want. Ingle, Prof. Rohan [7] introduced a mobile operated wheelchair.it can be used by everybody whether they are educated or not the app name Arduino is used to control the wheelchair which is paired with Bluetooth devices. M wenger [8] created a revolutionary assistive therapy chair to help patients and therapists with neurorehabilitation by improving trunk control. Every year, around 16 million individuals worldwide have their first stroke, of whom 5 million continue to have mobility limitations. Impaired trunk control is one factor contributing to early post-stroke mobility issues. This refers to the trunk muscles' inability to support the body's erect posture, change weight distribution, or move the trunk. Osama [9] Controlled pulsing flow is used to regulate the pace and force of pneumatic cylinders. The essential components of a pneumatic system, according to this research, are three power conversion blocks. Air compressors are used to convert mechanical force into fluid power at the beginning. The fluid power is then transferred inside a pneumatic circuit via pipes and connections, while a control element establishes its direction, pressure, and flow rate. Antonio dylon [10] The exoskeleton developed in this research is primarily targeted at individuals needing repeated motion treatment due to weak or non-functional elbow joints. The patient may flex and extend their elbow joint with the aid of an exoskeleton with one degree of freedom.

### III. METHODOLOGY

The main aim of the project is to regain and improve the movements and strength of the paralysed people with proper exercise provided in the wheelchair. We are manufacturing this product by considering the affordability of the common peoples and also with high quality. We are introducing by simple exercise setup to the wheelchair.

In our project, the wheelchair's arms are attached to its frame using two appropriate joints, allowing us to move and repair them as needed. The lower part of the wheelchair consists of a cyclic exercise setup, by introducing a pedal which is actuated by a dc motor operating with the help of a battery. We are introducing a cyclic gear chain arrangement between the dc motor and the pedal so that we can decrease the rotational speed of the pedal.

### IV. EXPERIMENTAL RESULTS



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The wheelchair structure is basically a modification of a conventional wheelchair. The full frame is made up of galvanized iron and the back rest is made up of rexine material. The frame of the wheelchair is made up of galvanized iron so we can protect the frame from corrosion. Here we are using the standard dimensions of the wheelchair. We are designing the structure in such a way that it can move very closely towards the bed that will help to reduce the effort of the bystander to carry patient from bed to wheelchair. The frame consists of a seat with a simple setup for the bathroom purpose and rexine material used as back rest attached with the frame. The height of the frame is determined by considering the height of a common bed of the patient. Pneumatic cylinder is connected between horizontal rod and movable handle. While pneumatic cylinder is actuated and the hand get a reciprocating exercise. Control system and battery setup are arranged at the lower part of the wheel chair. For the wheelchair's smooth mobility in this instance, caster wheels are used. The main drawback is compressor, which is more expensive and bulkier. And this wheelchair can be modified for height adjustment, so we can use it in different bed height for the patients transfer.

## V. CONCLUSION

We are introduced a special type of wheelchair which can be useful in multiple purposes along with some exercise setup. Also, it reduces the effort of the bystander who is taking care of the patient. From the bed to the wheelchair and back again, we can move the patient with ease. Patients' ability to restore strength is helped somewhat by the wheelchair's constant and easy motions for their hands and legs.

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