

A DEVICE TO TRANSFER A CHILD WITH SPINA BIFIDA INTO THE BATHTUB

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Children with physical disabilities often require special assistance to perform everyday tasks such as getting into bed or taking a bath. Even as a child ages and is able to accomplish more tasks independently, he may still depend on parents or a caregiver to transfer into or out of a wheelchair to accomplish these tasks. The child may become increasingly frustrated, especially as he nears adolescence and desires more independence and privacy. Also, repetitively lifting a large child often becomes physically demanding for parents and caregivers. Devices that assist the child to transfer from his wheelchair to the bed or the bathtub with little or no assistance are beneficial for the child and caregiver. This poster will detail the design of a device that assists a child with spina bifida to transfer independently from his wheelchair into the bathtub.

SPINA BIFIDA

Spina bifida is one of the most devastating of all birth defects and the “most frequently occurring permanently disabling birth defect [1].” It is a defect of the spine in which one or more vertebrae is open and the spinal column is exposed. The degree of disability is determined by the location and extent of the defect. The damage to the spinal cord causes muscle atrophy and a lack or decrease of leg movement. Spina bifida often causes bowel and bladder complications. Many children with spina bifida have hydrocephalus, an excess of fluid in the brain. If the fluid is not drained with a shunt, the fluid can put pressure on the brain and lead to mental retardation. Although children born with spina bifida usually require surgery and extensive medical care, modern medical techniques allow most to live to adulthood [1].

Most children with spina bifida are able to sit and crawl independently, but are usually unable to stand or walk. Braces and wheelchairs allow more mobility and independence; however, children with spina bifida often remain dependent on parents and caregivers to transfer from a wheelchair to the bathtub, bed, or floor.

THE CHILD

A device was designed to help a eight-year-old boy with spina bifida transfer into the bathtub independently from his wheelchair or

the floor. Although the boy has no leg movement, he has full movement in his upper body and movement in one hip. He is able to crawl on his stomach and to raise himself to kneel independently. He is also able to lower himself from his wheelchair to the floor and to climb up into his wheelchair using his upper body. Although he is fairly independent, his grandmother must help him to transfer between his wheelchair and the bathtub. The strain caused by lifting the 75-pound boy has begun to cause her back pain, which will only become worse as he grows. As the boy nears adolescence, his privacy will become more important and he will desire to bathe alone.

THE DEVICE

The device was designed so that the boy would be able transport himself from his wheelchair or the floor into the bathtub without assistance. It is also designed so that it will require a limited amount of exercise to help him remain active. The device consists of a hand-operated chain hoist, which is allowed to move on a standard steel I-beam with a trolley. The device is shown attached to a A-frame in Figure 1. The device will be permanently installed in the bathroom ceiling so that the boy can use it.



Figure 1. The device before installation.

A seat and a safety harness are attached to the chain hoist. The child is able to lift himself vertically by sitting in the seat and pulling the chain hoist. Once he is high enough, he can pull himself over the tub using a steel pipe handrail as a guide. Then he is able to lower himself into the tub using the chain hoist.

Although this device was designed for the needs of a specific child, other children with similar disabilities would be able to use it, also. The device could be installed in a bedroom to help a child get into her bed or to transfer from the floor to a wheelchair. This device would help many children with physical disabilities to become more independent from their parents or other caregivers.

REFERENCES

1. Spina Bifida Association of America, 2002. "Facts About Spina Bifida." Retrieved November 10, 2002 from http://www.sbaa.org/html/sbaa_facts.html