

Revolutionizing Mobility: Future of Wheeled Mobility Devices



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In an era where technology is reshaping the way we interact with the world, assistive devices are playing a crucial role in enhancing mobility and independence for individuals with physical limitations. Among these advancements, wheeled mobility devices (WMDs) designed for chair transfer systems are transforming the lives of users by enabling seamless movement between seating arrangements with minimal caregiver effort.

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Need for Innovation in Mobility Solutions

For individuals with disabilities or those recovering from injuries, moving from one seat to another can be a significant challenge. Traditional mobility aids often require extensive physical effort from both users and caregivers. Recognizing these challenges, researchers and engineers have been developing innovative WMDs that could not only facilitate smooth chair transfers but also enhance user comfort and independence.

Engineering a New Solution

The latest advancements in WMDs incorporate ergonomic designs and mechanical innovations to assist users in transferring from one chair to another effortlessly. The proposed device consists of two main components and is currently being developed at the University of Moratuwa.

1. Reconfigurable Seating Device (RSD): This acts as a conventional wheelchair as well as to transfer the user from one seat to another.

2. Standing Assistive Device (SAD): This assists users to stand up from a seated position and to sit from a stand position, thereby enhance user's independence and reduce physical exhaustion of the caregivers.

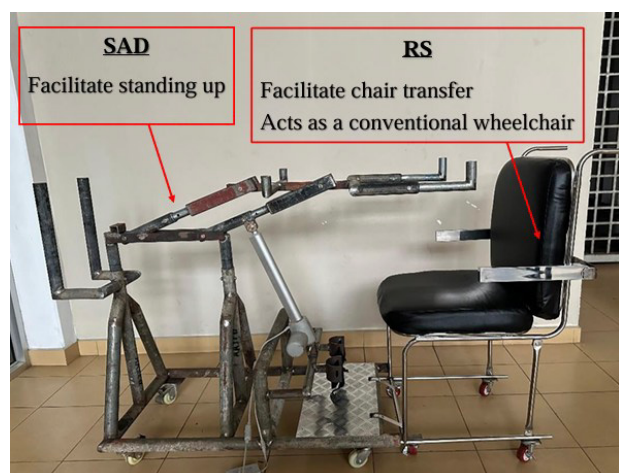


Figure 1: Wheeled Mobility Device

The operating procedure of the WMD ensures an efficient and secure transfer process. First, the user will be brought to a seated position on the RS. Then, the caretaker moves the user towards the target seat and then secure the standing sling to the patient around his/her waist. Next, the caretaker clamps the SAD to the RS using a mechanical lock. The caretaker then secures the user's leg using the shank locker and lowers the hook to an 18-degree inclination. After fixing the sling to the hook, the caretaker secures the hook under the user's armpit, allowing the user to hold onto it. The caretaker then lifts the hook to a 90-degree position, retracts the seat and backrest of the RS. Next, the user is lowered to the target seat by bringing the SAD to an 18-degree inclination. Finally, the caretaker unlocks and removes the SAD and RS, completing the transfer.

Special Features of the Wheeled Mobility Device

- 1. Customizable Fit** – The device can be adjusted to accommodate users with varying anthropometric measurements, ensuring comfort and safety.
- 2. Seat-Retracting Function** – The WMD provides a seat-retracting feature, which allows smooth transitions between seating arrangements.
- 3. Reduced Caregiver Effort** – By incorporating mechanical support, the device minimizes the physical strain on caregivers during transfers.
- 4. Enhanced User Independence** – The standing-up function in the WMD enables users to perform transfers with greater autonomy, reducing reliance on external assistance.

Growing Demand

The growing global demand for assistive technologies presents a significant market opportunity for innovative wheeled mobility devices. With an aging population, increased prevalence of mobility impairments, and a rising focus on inclusive healthcare, the need for efficient, user friendly transfer solutions is expanding rapidly. Healthcare facilities, rehabilitation centers, elderly care homes, and individual users represent key target markets. Additionally, the device's customizable features and caregiver friendly design make it highly attractive for both institutional and personal use. There is also strong potential for partnerships with hospitals and healthcare providers, as well as government and non-profit initiatives focused on disability support. As awareness and accessibility increase, this new generation of WMDs is well positioned to capture a meaningful share of the assistive technology market.



Figure 2: Operating procedure of the WMD

The Future of Wheeled Mobility Technology

As technology continues to evolve, the future of WMDs looks promising. Researchers are exploring more intuitive mechanisms that integrate robotics and biomechanical advancements to create devices that require even less manual intervention. The focus is shifting towards enhancing portability, adaptability, and ease of use to ensure that these devices seamlessly fit into the daily lives of users.

Collaboration between engineers, healthcare professionals, and end-users is key to advancing this technology. By prioritizing user-centered design and accessibility, future WMDs are expected to become even more efficient, affordable, and widely available.

Conclusion

The development of WMDs marks a significant step toward improving chair transfer solutions for individuals with mobility impairments. With continuous advancements in technology, these devices are set to redefine assistive mobility, offering new possibilities for those in need. As research and innovation progress, WMDs will continue to break barriers, empowering users to navigate their environments with greater ease and independence.

Article by

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