International Journal of Engineering Research & Technology (IJERT)

Interior Design for Persons with Parkinson's Disease

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Abstract—It requires careful design strategies while designing for people with Parkinson's disease. Parkinson's disease. People with Parkinson's disease gradually lose control over their body as they start getting strokes. Some of the aspects to be considered are

- Safety and accessibility: The circulation paths and passages to be provided needs to be wide than normal for hassle free passing, Flooring provided should be of anti-skid nature for non-slippery surfaces, Grab bars to be provided in strategic locations like Hallways, crossings, wherever necessary.
- Light and Visibility: Use of bright lighting will be used instead if dim lights, As far as possible two objects with contrasting colors in background and frontage are preferred in order to be differentiated,
- Integration of Technology: Use of smart home devices will be appreciated in order to integrate smart technology, Installation of fall detection such as sensors should be installed at regular intervals, Use of smart communication systems will be preferable such as intercom of video conferencing.
- Storage and Interior Units: Some shelves, cabinets should be designed so as to be easy to reach, Labeling or signage's should be used to label the furniture units, Encourage minimal clutter to reduce visual overload and improve navigation, Use of soft/circular edges to be encouraged and use of sharp edges should be avoided in order to avoid injuries.

By incorporating these design ideas you can create supportive and safe environment that enhances the quality of life for people with Parkinson's disease.

Keywords—Architectural Planning, Interior Design, Parkinson's Disease.

1. Background and Significance of the Study

1.1 *Background of the Study*

Parkinson's disease is a progressive neurological disorder that primarily affects movement, causing symptoms like tremors, stiffness, and slowness of movement. It's a neurodegenerative disease, meaning nerve cells in the brain gradually deteriorate, leading to the loss of dopamine, a crucial neurotransmitter for motor control. While persons with this disease find a major problem in mobility within a habitable space, some fact must be observed, analyzed and implemented in designing of their day to day circulation.

1.2 *Significance of the Study*

Studying interior design for individuals with Parkinson's disease is crucial because it can significantly impact their quality of life, safety, and overall well-being. By understanding the unique challenges posed by Parkinson's, interior designers can create environments that promote mobility, independence, and reduce the risk of falls and other accidents. This research helps develop accessible and supportive spaces that enhance daily living for people with Parkinson's.

2. Sample Plan and Design Considerations:

2.1 Sample Plan:

While considering the mobility and circulation issues, we have considered a small accommodation space with circulation for an average common man. A layout of three bedroom (3BHK) flat is considered as a sample for the study.

Published by, www.ijert.org

ISSN: 2278-0181

Source -https://puneeast.in/property/bluegrass-residences

Figure 0 layout Plan

Type :	Carpet Area	Balcony area	Total Carpet area
3 BHK Smart - Estate View	1253 sq.ft	71 sq.ft	1324 sq.ft

In this layout, a three bedroom sample flat is considered which is having common design and material specifications incurred in it.

3. MODIFICATIONS NEEDED FOR DESIGN CONSIDERATIONS:

For designing of the spaces for Parkinson's diseased persons, some modifications need to be done in the design and material specifications as well as additions needs to be done in considerations.

Following aspects needs to be addressed and implemented in the specified case:

3.1 SAFETY AND ACCESSIBILITY:

3.1.1 Provision of wide circulation paths: The circulation paths and passages to be provided needs to be wide than normal for hassle free passing. Normal circulation in a flat usually refers to standard pathways like hallways, corridors, and doorways that allow residents to move between rooms — like from the living room to the bedrooms or kitchen. These are designed just wide enough for comfortable daily use (often about 900 mm to 1000 mm wide in apartments). Wide circulation path means these movement spaces are broader than usual — typically 1200 mm to 1500 mm or even wider. For a person having Parkinson's disease, use of wide circulation paths is recommendable for easier mobility.

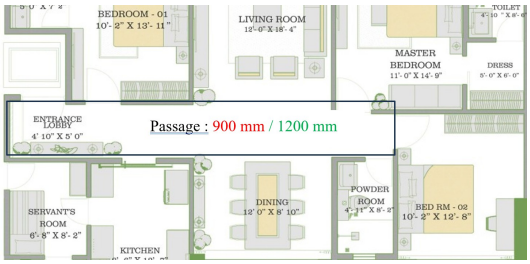


Figure 1 Passage layout

3.1.2 Anti-skid flooring: Flooring provided should be of anti-skid nature for non-slippery surfaces. Patients with Parkinson's disease often experience balance impairments, shuffling gait, and freezing episodes, which significantly increase the risk of falls within the home environment. Flooring becomes a critical component in mitigating these risks. Anti-skid or non-slip flooring materials are essential interventions that can greatly enhance safety, stability, and confidence in movement for individuals with Parkinson's disease.

One of the most critical aspects of interior design for individuals with Parkinson's disease is the selection and application of appropriate flooring materials. Due to balance impairments, shuffling gait, and the frequent occurrence of freezing episodes, individuals with Parkinson's are at a significantly higher risk of falls. To mitigate this risk, the use of anti-skid or non-slip flooring is essential. Such flooring enhances safety by providing better traction underfoot, thereby supporting more stable and confident movement. It also reduces anxiety related to mobility, as individuals can trust that the surface they are walking on will not contribute to slips or instability.

The ideal anti-skid flooring for Parkinson's patients should have a high coefficient of friction to maintain grip even when wet, while remaining smooth enough to prevent tripping. It should feature a matte finish to avoid glare and visual confusion, which are common visual disturbances in Parkinson's disease. Durability and low maintenance are also important, ensuring that the slip-resistance does not degrade over time due to wear or cleaning. Recommended materials include textured vinyl, rubber flooring, non-slip porcelain tiles, and low-pile carpeting. Each of these options offers a good balance between safety and ease of movement, without appearing overly clinical or institutional.

Anti-skid flooring is particularly crucial in high-risk areas such as bathrooms, kitchens, hallways, entrances, and around beds. In these zones, the likelihood of falls is heightened by environmental factors such as water spills, uneven surfaces, or transitions between different floor types. However, care must be taken to select surfaces that offer slip resistance without impeding the use of mobility aids like canes or walkers. Additionally, the flooring should harmonize with the overall interior aesthetics to maintain a sense of home and comfort,

ISSN: 2278-0181

rather than creating an overly medicalized environment. Overall, thoughtful integration of anti-skid flooring is a foundational element in designing Parkinson's-friendly homes that prioritize safety, mobility, and independence.

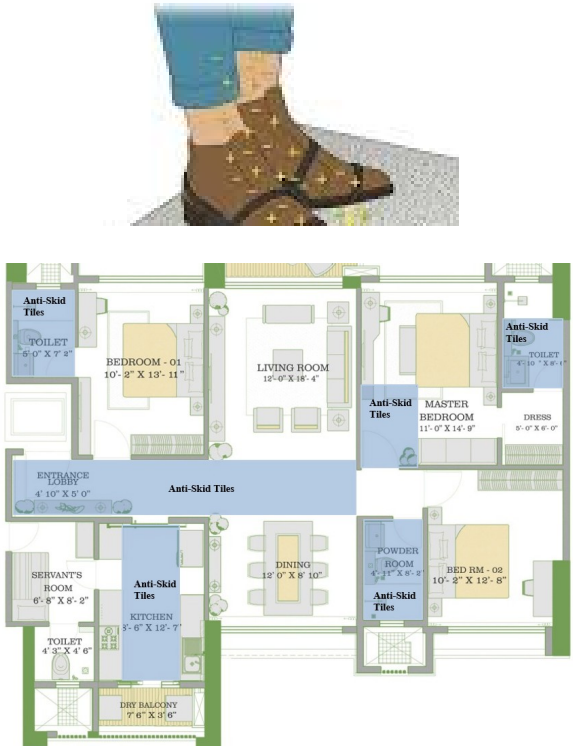


Figure 2 Anti-skid tile with Floor plan

3.1.3 Provision of Grab bars: Grab bars to be provided in strategic locations like Hallways, crossings, wherever necessary. The provision of grab bars is a vital element in interior design for individuals with Parkinson's disease, significantly enhancing safety, stability, and independence within the home environment. Parkinson's patients often experience balance problems, muscle rigidity, and sudden freezing of gait, all of which increase the risk of falls, particularly during transitions such as standing up, sitting down, or navigating confined spaces. Strategically installed grab bars offer essential support in high-risk areas like bathrooms, hallways, staircases, and bedrooms. In bathrooms, grab bars should be positioned both vertically and horizontally near toilets, showers, and bathtubs to assist with transfers and to provide stability when changing positions. In hallways, continuous grab bars can serve as a steadying aid during movement, while in bedrooms, bars near the bed help individuals safely get in and out. For maximum effectiveness, grab bars must be installed at appropriate heights (typically 33 to 36 inches from the floor) and securely anchored to withstand significant weight loads. Materials should be non-slip and easy to grip, such as textured stainless steel or coated metal. In addition, the color of the grab bars should contrast with the wall surfaces to enhance visibility for individuals with visual or cognitive impairments. Thoughtful placement and design of grab bars not only reduce the risk of accidents but also foster a sense of autonomy and confidence, empowering Parkinson's patients to navigate their living spaces more safely and independently.

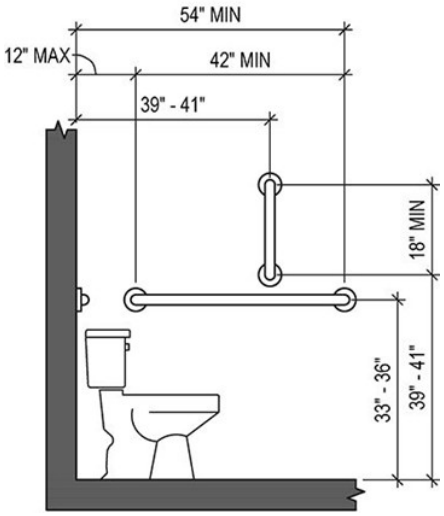


Figure 3 Section Showing Grab Bars

Figure 4 Bedroom Showing Grab Bars

3.2 LIGHT AND VISIBILITY:

3.2.1 Bright Lighting: Use of bright lighting will be used instead if dim lights. Bright lighting plays an important role in the care and management of individuals with Parkinson's disease. It helps regulate circadian rhythms, which are often disrupted in Parkinson's, leading to problems like poor sleep, daytime drowsiness, and

mood disturbances. Exposure to bright light, particularly in the morning, can help reset the body's internal clock, improving sleep patterns, mood, and overall alertness. Bright lighting also has a positive effect on mood, helping to reduce depression and apathy, which are common in people with Parkinson's. In addition, good lighting can enhance mobility by minimizing shadows and visual confusion that may worsen symptoms like freezing of gait, where a person temporarily feels stuck when trying to move. Well-lit spaces provide clearer visual cues, making it easier and safer for individuals to navigate their environment. Proper lighting, especially motion-activated lights at night, also plays a critical role in preventing falls, a major risk for those with Parkinson's due to balance and mobility challenges. Overall, the thoughtful use of bright, even lighting can greatly enhance both the safety and quality of life for people living with Parkinson's disease.

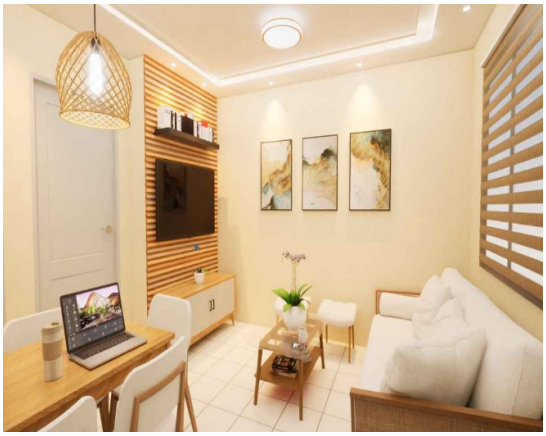


Figure 5 Bright Lighting inside the room

Figure 5 Bright Luminaires showing Lighting inside the room

3.2.2 Use of Contrasting colors: As far as possible two objects with contrasting colors in background and frontage are preferred in order to be differentiated. In Parkinson's disease, visual perception can be affected, making it harder for individuals to distinguish between surfaces, steps, and obstacles, especially if the colors are similar. Using contrasting colors creates a clear visual distinction between different areas or objects, helping the person recognize changes in floor level, furniture edges, or doorways more easily. It reduces the risk of tripping or accidents. Contrasts can also be used to make pathways, handrails, or bathroom fixtures like toilets and sinks more visible and accessible. Overall, applying contrasting colors thoughtfully around the home and in personal items can greatly enhance both safety and confidence for individuals living with Parkinson's disease.

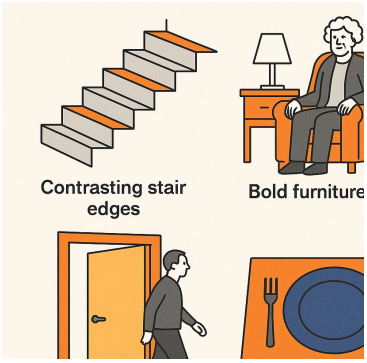


Figure 6 Contrasting colors used inside the room

3.2.3 Clear Signage: Signage's used should be very clear for proper navigation. In Parkinson's disease, challenges like slowed thinking, visual processing difficulties, and anxiety can make it harder to navigate unfamiliar or even familiar environments. Clear signage with large, bold letters, high-contrast colors (such as white text on a dark background), and simple symbols or pictures can make it much easier for a person to understand directions quickly. Signs should avoid clutter and use universally recognized icons (like a toilet symbol or an arrow) alongside short words. Placing signs at eye level and ensuring they are well-lit without glare is important, especially in hallways, doorways, bathrooms, and entrances. In homes, labels on doors (like "Bathroom" or "Kitchen") can help reduce confusion. In public places, consistent and predictable signage reduces stress and supports independent movement. Overall, clear, thoughtful signage empowers people with Parkinson's to feel more secure and oriented in their surroundings.

Figure 6 Clear signages inside the room

3.3 INTEGRATION OF TECHNOLOGY:

3.3.1 Smart Home Devices: Use of smart home devices will be appreciated in order to integrate smart technology. The use of smart home devices can significantly improve the quality of life for individuals with Parkinson's disease by promoting greater independence, safety, and comfort. Smart technologies such as voice-activated assistants, automated lighting systems, smart thermostats, and remote-controlled appliances can help overcome some of the physical limitations caused by Parkinson's, such as tremors, rigidity, and slowed movements. For example, voice commands can be used to turn on lights, adjust room temperature, or play music without the need for fine motor control. Automated lighting can prevent falls by ensuring that hallways and rooms are well-lit when motion is detected, especially at night. Smart door locks and video doorbells add security by allowing individuals to see and communicate with visitors without needing to rush to the door. Medication reminder apps and automated pill dispensers are also extremely valuable in ensuring timely and accurate medication management, which is crucial in Parkinson's care. Overall, integrating smart home devices creates a safer, more manageable environment that can greatly enhance daily living for people with Parkinson's disease.

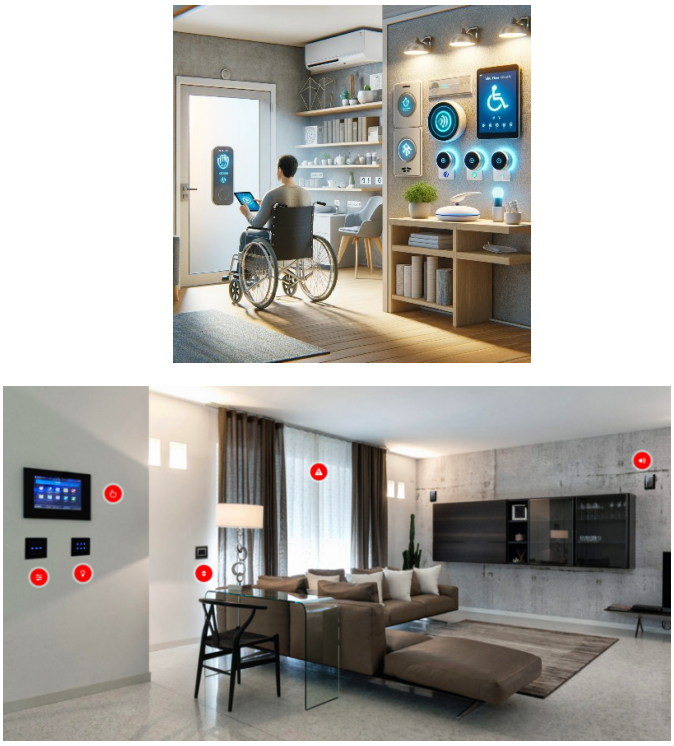


Figure 6 Smart Home Devices inside the room

3.3.2 Fall Detection Technologies: Installation of fall detection such as sensors should be installed at regular intervals. Fall detection technologies are critical tools for enhancing the safety and independence of individuals at high risk of falling, such as older adults or those with mobility conditions like Parkinson's disease. These systems use various technologies to detect falls in real-time and alert caregivers or emergency services, enabling faster response and potentially reducing injury severity. One common approach is the use of wearable devices, such as pendants, smartwatches, or wristbands, which are equipped with motion sensors like accelerometers and gyroscopes. These detect sudden changes in movement patterns that suggest a fall has occurred. Some advanced wearables also monitor vital signs, such as heart rate and oxygen saturation, to provide a fuller picture of the user's condition.

Beyond wearables, camera-based systems have emerged, particularly in healthcare and assisted living environments. These systems utilize AI-powered video analysis to monitor movements and detect falls without requiring the user to wear a device. Similarly, radar-based detection systems are gaining popularity for their non-intrusive nature. These use radio waves to monitor motion and identify abnormal patterns without recording video, thus offering a more privacy-conscious solution.

Smartphone-based applications are another option, using the phone's built-in sensors to detect falls and send automatic alerts. Many of these systems employ machine learning algorithms to improve accuracy and reduce false positives over time. However, despite these advancements, challenges remain. False alarms can occur when normal activities mimic falls, and users may forget or refuse to wear their devices. Privacy concerns are also relevant for camera-based systems, especially in private homes.

Looking ahead, the integration of fall detection with smart home systems, along with the use of AI to not just detect but predict falls before they happen, represents a promising future. These technologies are rapidly evolving, aiming to become more accurate, less intrusive, and better integrated into daily life and healthcare infrastructure.

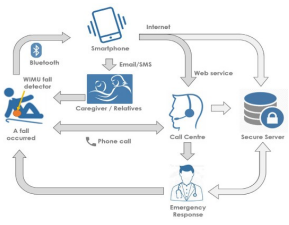
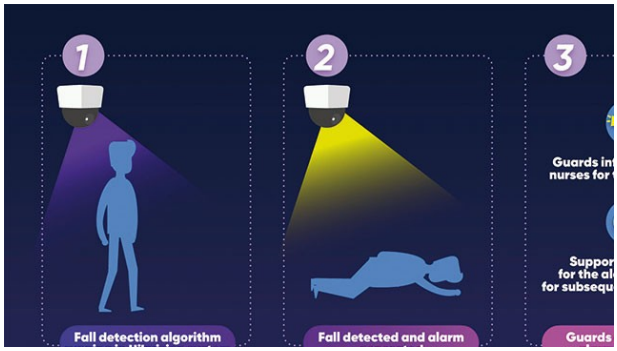
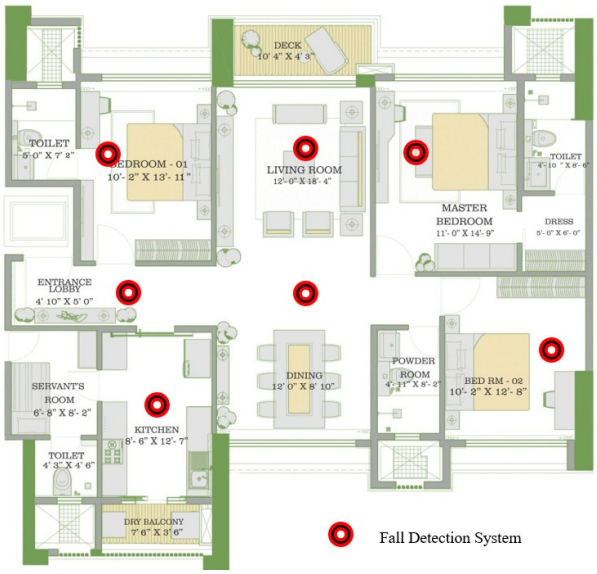


Figure 6 Smart Home Devices inside the room





3.3.3 Smarter Communication Systems: Use of smart communication systems will be preferable such as intercom of video conferencing. The use of smart communication systems, such as intercoms and video conferencing, can greatly benefit individuals with Parkinson's disease by improving connectivity, safety, and emotional well-being. Intercom systems within the home allow for easy communication between rooms without the need for physically moving, which can be difficult for those experiencing mobility issues or fatigue. This is particularly helpful for caregivers and family members to quickly check in or provide assistance. Video conferencing tools, such as tablets or smart displays with large touchscreens, enable people with Parkinson's to stay socially connected with family, friends, and healthcare providers, reducing feelings of isolation and supporting mental health. Overall, integrating smart communication systems into the daily lives of individuals with Parkinson's disease fosters greater independence, enhances safety, and nurtures vital emotional and social connections.

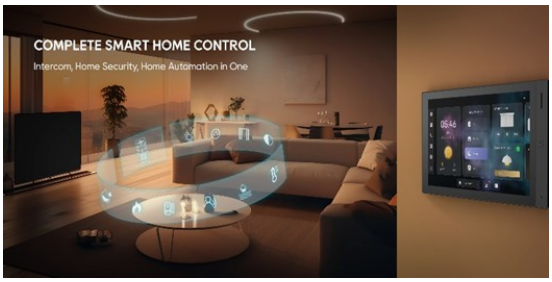


Figure 7 Smart Home Controls inside the room

3.4 Storage and Interior Units:

3.4.1 Easy to reach storage: Some shelves, cabinets should be designed so as to be easy to reach. Because Parkinson's often affects balance, strength, and coordination, bending down low, reaching up high, or opening difficult cabinets can increase the risk of falls and frustration. Designing storage solutions that keep everyday items at waist to shoulder height — known as the "safe zone" — makes access easier and safer. Pull-out shelves, open shelving, and lightweight containers are especially helpful. Storing frequently used items, like kitchen utensils, clothes, or medications, in clearly visible and easily accessible spots minimizes the need for stretching, stooping, or straining. Soft-close drawers and cabinets with easy-grip handles also reduce the effort needed to retrieve things. In general, thoughtful storage design helps maintain a person's independence while significantly reducing the physical demands and risks associated with accessing everyday essentials.

Figure 7 Easy to reach storage inside the room

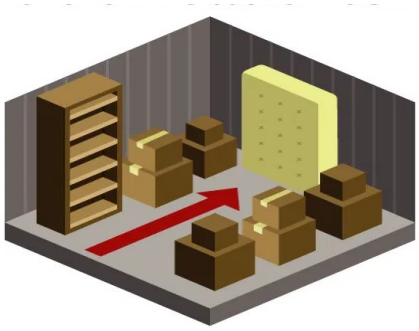


Figure 7 Easy to reach storage inside the room

3.4.2 Minimal Clutter: Keeping spaces free from clutter is extremely important for people with Parkinson's disease to promote safety, mobility, and mental calmness.

Because Parkinson's affects movement, balance, and reaction time, cluttered spaces with unnecessary objects or tight walkways increase the risk of trips and falls. A clean, open environment allows for easier navigation and gives individuals more confidence moving around without obstacles in their path. Reducing clutter also makes it simpler to locate important items, avoiding unnecessary bending, reaching, or frustration. Minimalistic, organized spaces can even help reduce cognitive overload, since too many visual stimuli can be overwhelming for someone with Parkinson's. Furniture with clear, open pathways around it, simple decorations, and logical placement of essentials create an environment that feels safer, more manageable, and more peaceful.

Figure 8 Showing Minimum clutter inside the room.

Figure 9 Showing Minimum clutter inside the room.

3.4.3 Soft Edges: In interior design for people with Parkinson's disease, using soft edges is crucial for both safety and comfort. Parkinson's often affects balance and motor control, making individuals more prone to falls and unsteady movements. Sharp furniture corners or hard edges can lead to serious injuries, while rounded edges significantly reduce the risk of cuts, bruises, and more severe trauma. Beyond physical safety, soft, curved shapes also create a calmer, more visually comfortable environment, which is important because Parkinson's can cause visual processing difficulties. A space designed with gentle lines feels less intimidating and easier to navigate, helping to minimize anxiety and confusion. Rounded furniture and flowing layouts encourage smoother movement and reduce the likelihood of "freezing" episodes, where sudden obstacles can cause a person to stop moving unexpectedly. Additionally, soft-edged design often incorporates more ergonomic and accessible features, like easy-to-grip handles and supportive seating, which further support independence and ease of use. Overall, a home with soft edges not only physically protects but also emotionally nurtures individuals with Parkinson's, enhancing both safety and overall well-being.

The incorporation of soft edges in interior design plays a critical role in enhancing safety, accessibility, and psychological comfort for individuals with Parkinson's disease. Due to the motor impairments and postural instability commonly associated with Parkinson's, the risk of falls and collisions within the built environment is significantly heightened. Rounded furniture edges and the elimination of sharp corners serve as important interventions to minimize the severity of injuries resulting from accidental contact. Furthermore, individuals with Parkinson's often experience visual and perceptual difficulties; thus, environments characterized by soft, flowing lines can reduce visual stress, promote smoother navigation, and lessen the occurrence of freezing episodes. Beyond the functional advantages, the use of soft-edged designs also fosters a more welcoming and less intimidating atmosphere, which can have positive implications for mental health, particularly in mitigating anxiety and depression. Therefore, the strategic use of soft forms within interior spaces is a fundamental element of designing therapeutically supportive environments for individuals living with Parkinson's disease.

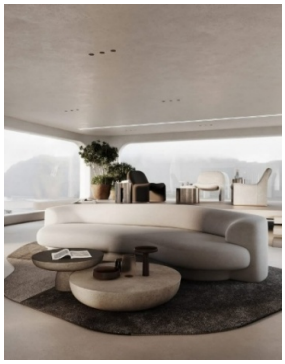


Figure 10 Soft Edges inside the room.

Figure 11 Sketches of Soft Edges inside the room.

4. Conclusion

Designing for individuals with Parkinson's disease demands a sensitive and comprehensive approach that addresses their unique physical and cognitive challenges. By prioritizing safety, accessibility, visibility, technological integration, and thoughtful interior detailing, we can create environments that not only reduce the risk of accidents but also foster greater independence and confidence. The incorporation of features such as wide circulation paths, anti-skid flooring, bright lighting, smart technologies, easy-to-reach storage, and soft-edged furniture ensures that spaces are both functional and supportive. Ultimately, these design strategies work together to enhance the overall quality of life, dignity, and well-being of those living with Parkinson's disease, enabling them to navigate their daily lives with greater ease and security.

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