Determining the relationship between the forces applied and the space required when manoeuvring four-caster chairs with heavy occupants (100kg)

Key findings

- Movement of four-caster vehicles (commodes or shower-chairs) can be viewed as a change in direction, i.e. the direction you face and a change of position, e.g., movement of the centre-point of the chair.
- When assistants change direction, e.g., from a corridor into a room, the forces applied to the vehicle-handles to overcome motion resistance vary substantially depending on the change of vehicle position that occurs during the movement even when the change of direction is the same.
- If the space in which the change of direction takes place is such that the change of position requires the assistant to apply a relatively large lateral force then the assistant may only be comfortable with an occupant of half the weight than would occur in a space that required a relatively small lateral force.
- Lateral forces are increased when front wheels are further away from the handles, e.g., mobile hoists.
- Findings can be generalised to different floor coverings.
- Wall positions have a direct effect on the manual handling of four-caster vehicles.
- Results are of particular relevance where the occupant is bariatric or the strength of the assistant is reduced.
- A method of identifying access solutions which maximise load ability has been identified.

Project aims

The project aimed to measure forces applied during assisted four-caster vehicles (glide-about commodes, shower-chairs, mobile-hoists) manoeuvres.

The resulting outcome will be a method of determining which access spaces do and do not facilitate assistants to manoeuvre.

Background

Architectural access is crucial to enablement and occupational therapists have a prime role providing guidance. However, most published architectural guidance is of a general nature and occupational therapists work with individuals for whom the pattern of physical, psychological and social details is highly specific. This is certainly so for assisted wheelchair users: some wheelchair occupants are heavy, others light, some assistants are older with reduced strength and others are employees with multiple manoeuvring tasks.

A broad aim is to provide access assessment methods which take account of specifics: vehicle, body shape, ability and architectural layout preferences and thus also allow resources to be targeted on individual needs and preferences.
Outputs to benefit service users and the profession

The investigation demonstrated a substantial relationship between wall positions and the preferred maximum load choices of assistants during four-caster manoeuvres. A method of identifying access solutions which maximises load ability is inherent in the approach. This is important information for occupational therapists and their service users.

A number of design improvements, particularly to hoists, have been noted as a result of the investigation and these can potentially contribute to improved products.

Publications


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