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A Novel Approach to the Safe and Effective Mobilization of a Super-Obese Patient: A Case Report

Purpose: The incidence of obesity is rising worldwide, as is the presentation of these patients to the acute hospital setting. As a result of their complex nature, including medical co-morbidities, psychosocial issues, and healthcare resource limitations, management of these patients requires a coordinated and intensive multi-disciplinary approach. Although there are considerable data reporting the surgical management of obese patients, there is very limited literature regarding non-surgical interventions, including approaches to safe and effective mobilization. **Methods:** A case report is presented of a 55-year-old super-obese male transferred to a major tertiary referral healthcare centre for management of his overall medical condition and rehabilitation. As a result of the patient's inability to tolerate the supine position because of central obesity, a novel approach to mobilization was undertaken whereby a bariatric tilt-table was used to facilitate standing and walking from the semi-prone position. This mobilization program was led by a physiotherapist with support and input from the multi-disciplinary team. **Conclusion:** It was safely and effectively implemented and enabled the patient to be discharged to his desired rural location.

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A Novel Approach to the Safe and Effective Mobilization of a Super-Obese Patient: A Case Report

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Abstract

Purpose: The incidence of obesity is rising worldwide, as is the presentation of these patients to the acute hospital setting. As a result of their complex nature, including medical co-morbidities, psychosocial issues, and healthcare resource limitations, management of these patients requires a coordinated and intensive multi-disciplinary approach. Although there are considerable data reporting the surgical management of obese patients, there is very limited literature regarding non-surgical interventions, including approaches to safe and effective mobilization. **Methods:** A case report is presented of a 55-year-old super-obese male transferred to a major tertiary referral healthcare centre for management of his overall medical condition and rehabilitation. As a result of the patient's inability to tolerate the supine position because of central obesity, a novel approach to mobilization was undertaken whereby a bariatric tilt-table was used to facilitate standing and walking from the semi-prone position. This mobilization program was led by a physiotherapist with support and input from the multi-disciplinary team. **Conclusion:** This novel approach to mobilization was safely and effectively implemented and enabled the patient to be discharged to his desired rural location.

INTRODUCTION

The incidence of obesity is rising world-wide with numerous co-morbidities including Type II diabetes and cardiovascular disease associated with obesity.^{1,2} Obese people may require hospital admission for various problems related to their co-morbidities or other medical conditions, and the proportion of obese patients within hospital wards is increasing.^{3,4} Obese patients pose unique challenges to healthcare workers because of their weight, size, and body habitus, and their often complex presentation with underlying psychosocial difficulties.^{3,5} Whilst there have been many publications about the surgical management of obese patients, there are less data about the safe and effective non-surgical management of obese patients, including mobilization programs.

The mobilization of obese patients can be difficult because of factors such as poor baseline mobility, marginal cardiorespiratory reserve, musculoskeletal problems, and psychosocial difficulties, all of which can be exacerbated by acute illness and further deconditioning.^{4,5} Such patients often require transfer from smaller healthcare centres to major tertiary referral healthcare centres because of difficulties encountered with their overall management. The larger healthcare centres then take on the challenge of managing these patients, which includes rehabilitating them to a point where they can be safely discharged home or transferred to an appropriate healthcare facility for ongoing rehabilitation or care. The specific challenges related to the mobilization of obese patients include safety of the patient and healthcare workers and resource considerations (e.g. identifying and sourcing equipment rated to safe working loads, load capacity of the environment, adequate space, and sufficient staffing/time).^{3,5,6} The safe management of these patients is of great importance, as injury to staff can result from inadequate equipment and staffing, and subsequent compensation claims for employees for injuries sustained during patient handling and mobility often resulting.^{3,6,7}

The mobilization program of deconditioned obese patients usually includes some form of strengthening exercises, use of appropriate equipment (e.g. bariatric beds, lifters, chairs/wheelchairs and standing/walking frames), and progression from in-bed activities (e.g. moving in bed, upright positioning) to out-of-bed activities (e.g. standing, sitting out of bed, walking). These interventions, whilst facilitated by appropriate equipment, remain highly labour intensive.³ Descriptions of mobilization programs for obese patients are scarce. Seemingly, most require that patients be able to tolerate the supine position first in order to position slings for mobile/ceiling-track lifters that enable safe transfer from bed to chair.^{3,5}

The purpose of this case report is to describe the safe and effective mobilization program of a super-obese (body mass index [BMI] > 50 kg/m²) patient who, because of his body habitus, was unable to tolerate lying supine and thus had to undertake mobilization from a semi-prone position.⁸

CASE HISTORY

The patient was a 55-year-old male initially admitted to a major rural hospital following a fall at home in July 2015. His past medical history included obesity, Type II diabetes, heart failure, obstructive sleep apnoea, hypertension, hypercholesterolemia, peripheral neuropathy, anaemia, anxiety, and depression. The bulk of his excessive weight was distributed abdominally (i.e. central obesity) and, by necessity, he preferentially adopted a semi-prone position (left side down) with his abdomen supported on the bed. He only tolerated the supine position for a few seconds as his abdominal weight led to severe dyspnoea and anxiety whilst supine.

Prior to admission to the rural hospital, his usual method of transferring from bed to standing involved shuffling and pivoting his body by degrees from the semi-prone position to one where his legs dropped off the bed, then pushing himself from semi-prone to upright with a ballistic movement. He usually walked independently with a four-wheeled walker (maximum 15 metres). He lived in a house with some personal support provided to him by caregivers but expressed a desire to relocate to South Australia to live with friends.

Whilst in the rural hospital, he was cleared of any injuries post-fall and commenced mobilizing with supervision from bed to chair/commode. After two weeks, he self-discharged home against the advice of the multi-disciplinary team. However, he was re-admitted straight away as upon return home, even with the assistance of emergency service personnel, he was unable to stand from the wheelchair and safely enter his house. He suffered another fall whilst in the rural hospital as a result of equipment failure whilst transferring, and thereafter complained of right hip pain and refused to mobilize and participate in therapy sessions. As the staff of the rural hospital were struggling to assess and manage his overall medical condition and unable to meet his rehabilitation requirements, he was transferred to the Royal Adelaide Hospital, an acute, tertiary-referral, public hospital, in early September 2015 for ongoing management.

On presentation to the Royal Adelaide Hospital (Adelaide, Australia), his weight was 260kg (BMI = 70 kg/m²), which depending on the criteria used, is categorized as super-obese,⁸ super-super-obese⁹ or obese class III.¹⁰ He was nursed in a bariatric bed with side-rails, opened to 45°, to allow mattress extenders to accommodate his girth. These side-rails, when lowered, projected slightly above the level of the compressed mattress and, along with an inability of the bed to be sufficiently lowered, precluded his usual semi-prone method of transferring from bed to standing due to risk of soft tissue trauma. He was nursed semi-prone in bed due to his intolerance of the supine position and required the assistance of six people to roll/move in bed. Because of his size and the equipment required in his care, the patient had to be nursed in an open ward area where he occupied two bed-spaces.

Initial assessment by the physiotherapist and occupational therapist revealed grossly normal upper and lower limb strength (manual muscle testing) but severely impaired lower limb sensation. He also had reduced eyesight due to diabetes-induced complications. Based on their initial assessment, these therapists deemed it unsafe to attempt any type of mobilization because of his weight, body habitus, deconditioning, safety concerns, and insufficient resources (i.e. equipment, space, staff). With additional input from other within-hospital equipment and manual-handling specialists, various pieces of equipment to facilitate safe mobilization were considered/trialled by staff over the next eight weeks. These included:

- A HoverMatt® and motor (HoverTech International), which by reducing friction, successfully enabled assisted in-bed movement.
- Various bariatric slings and lifters were considered/trialled, including ones that might potentially be utilized from the semi-prone position. In all instances, these were unsuccessful due to his weight, body habitus, and inability to tolerate supine whilst positioning the slings.

- An overhead gantry system, which slides on a beam, was considered but deemed unsuitable as he exceeded the safe working load and it was feared that his ballistic movement pattern, whilst moving from semi-prone to upright, would tip over the framework.

Whilst the HoverMatt® successfully facilitated assisted in-bed mobilization, any progression of mobilization beyond this was, at this point in time, impossible. After careful consideration and discussion of the failure to progress his mobility using usual methods, it was decided to trial a novel approach whereby mobilization was progressed from the patient's preferred semi-prone position using a bariatric tilt-table. As this tilt-table had to be hired, the patient in the meantime had commenced various functional in-bed exercises (e.g. rolling, bridging) and the maximum tilt function of the bariatric bed was used to commence orthostatic retraining.

The tilt-table was delivered after four days. Initial transfer to the tilt-table was undertaken using the HoverMatt® and seven staff, with the patient adopting his preferred semi-prone side-on position whilst on the tilt-table. The tilt-table was used once a day, with the tilt angle progressively increased and within two days he was able to tolerate standing at 85°. Once this upright position was tolerated, the time spent standing was progressively increased to 10 minutes (the most he ever tolerated because of subjective reports of fatigue), and he commenced ¼ squats and leg lifts whilst in this upright position on the tilt-table. During this phase, the patient required a toe amputation as a result of diabetes-related complications, from which he recovered well.

After approximately two weeks of requiring the HoverMatt® and manual assistance for transfers to the tilt-table, the patient commenced practising exercises to facilitate a manual transfer using a "commando crawl"- like technique to transfer semi-independently (verbal instruction only) from the bed to the tilt-table (see Figure 1).

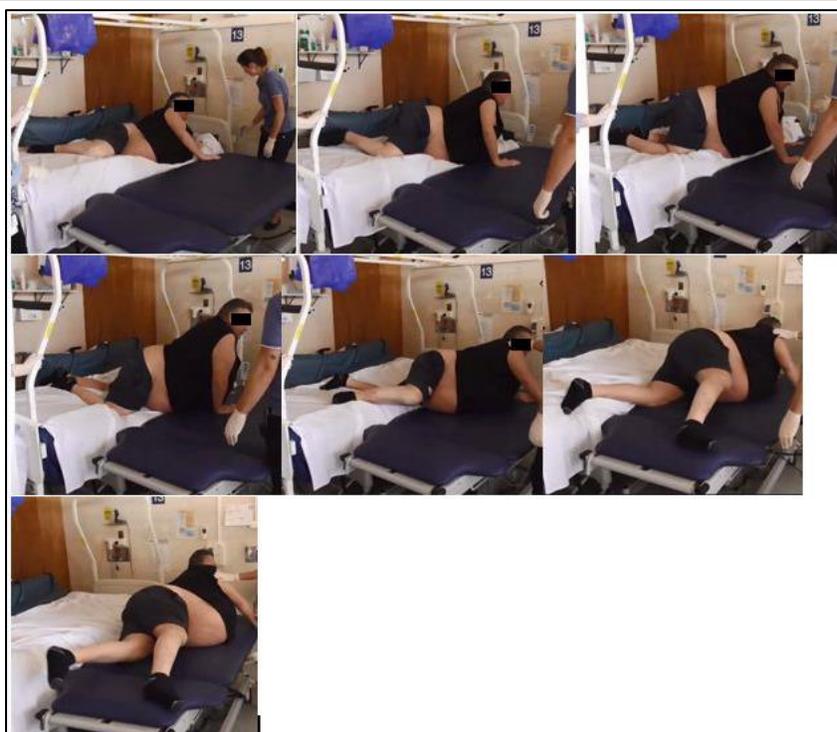


Figure 1. Transferring from bed to tilt-table.

He also progressed to dropping one leg (right) over the side of the tilt-table, placing his foot on the floor and lifting it back, and then moving both legs over the side of the tilt-table and lifting them back. Soon thereafter he was able to put both feet flat on the floor and, by pivoting his abdomen around on the tilt-table (so that he was lying across the tilt-table, in semi-prone) he was able to independently push himself into standing, with his arms and abdomen still supported on the tilt-table. After a few weeks of practising these components, the patient progressed to being able to do a semi-independent (verbal instruction only) standing transfer from the tilt-table (in semi-prone) to a bariatric chair positioned behind him (see Figure 2).

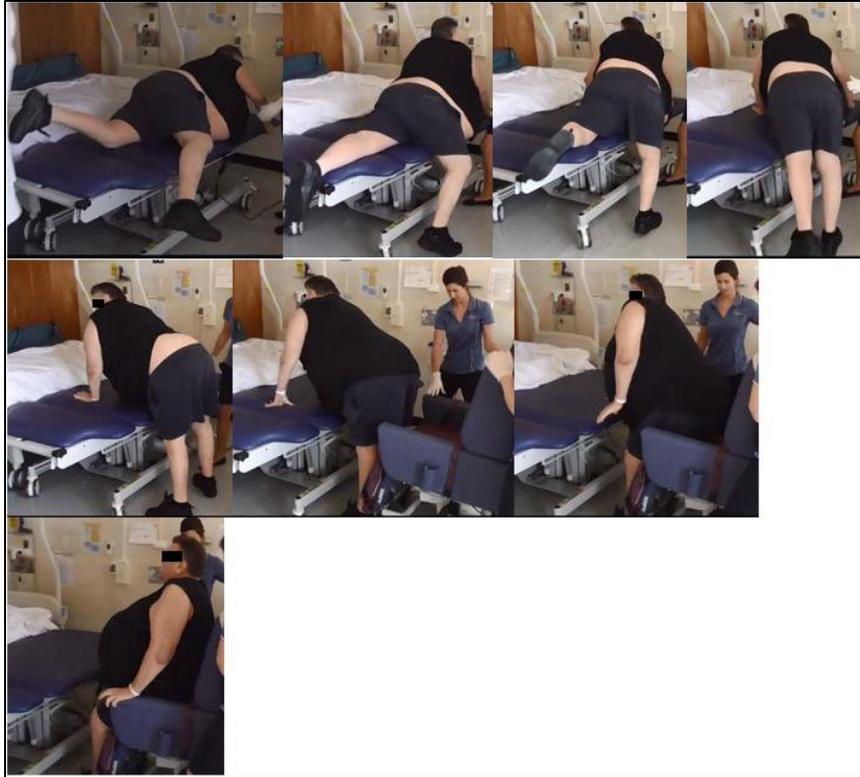


Figure 2. Transferring from tilt-table to standing and sitting

From this point, he then practised sit-to-stand from the chair, with the tilt-table in front of him, using his hands for support on the tilt-table, and then progressing to standing up next to his bed whilst holding the bed-rails for support, and then standing up from different chairs at progressively lower heights (e.g. commode, wheelchair) (see Figure 3). Approximately one month after commencement of the tilt-table mobilization program, he walked for the first time in nine weeks, initially managing two walks of 8 metres, using a four-wheeled walking frame (see Figure 4). Once he was able to stand independently, transfers back to bed were based around his preferred semi-prone position, achieved by him using his arms to support himself on the bed, and essentially climbing onto the bed (see Figure 5).



Figure 3. Transferring from sitting to standing.



Figure 4. Walking



Figure 5. Transferring from chair to bed.

A summary of his functional progression, based on the Intensive Care Unit mobility scale¹¹ and Functional Independence Measure (FIM), both calculated retrospectively, are shown in Table 1. His motor and total FIM scores improved by 30 points from admission to discharge, which exceed the minimal clinically important differences reported for the stroke population.¹²

Table 1. Weight, body mass index and functional status throughout admission at the Royal Adelaide Hospital

Variable	Admission	2 weeks post-admission	1 month post-admission	2 months post-admission	3 months post-admission (discharge)
Weight, kg	260	248	209	220	211
Body mass index, kg/m ²	70	67	56	59	57
Functional status					
ICU mobility scale	0	1	4	4	9
FIM					
Total	57	58	65	71	87
Motor	24	25	32	38	54
Cognitive	33	33	33	33	33

kg = kilograms; m = metres; ICU = intensive care unit; FIM = functional independence measure.

Up until this time-point, all attempts at mobilization were undertaken with the supervision of physiotherapy staff. Once he was able to walk semi-independently, nursing staff were taught how to assist and supervise transfers. He then commenced getting up, walking to the shower, and sitting out of bed for a few hours on a daily basis, with additional specific walking training with physiotherapy staff. Occupational therapy input also escalated at this time, with functional training to increase his independence in activities of daily living (e.g. showering, toileting, dressing) and identifying and arranging his discharge requirements (e.g. appropriate home modifications, equipment needs).

Other Management

A multi-disciplinary meeting specifically about this patient was held within five days of his admission to the Royal Adelaide Hospital as it was recognized that he was a complex case. These continued throughout his admission. Initially these meetings discussed plans concerning his mobilization program, with discharge planning also instituted comparatively early into his admission. The physiotherapist (JA) took on the lead role for the mobilization program with the complete support and engagement of the multi-disciplinary team and ward staff. At various stages throughout the patient's admission, advice was sought regarding mobilization options from other hospital staff and also, via the internet, with interstate colleagues who had experience in bariatric management. The multi-disciplinary management included review by a dietician and diabetes educator with the patient managed on a standard ward diet. As shown in Table 1, his weight reduced from 260kg at admission to 211kg at discharge.

A vital component of the success of this mobilization program was establishing and maintaining good communication between the patient and staff. Particular care was taken to ensure that consistent messages were delivered to the patient by all staff. By default, as the main person involved in the mobilization program, the physiotherapist (JA) took a lead role in communication and case-management with the patient. This was particularly important given his underlying anxiety, which had been exacerbated by his falls prior to admission to the Royal Adelaide Hospital. Further, his awareness of the burden that he was imposing on staff, including at the rural hospital, contributed to his feelings of anxiety, frustration, low self-esteem, and concern about his future. Whilst professional counselling (from clinical psychology) for his mental state was offered to the patient during his admission at the Royal Adelaide Hospital, this was declined.

Discharge Planning

When the patient was first admitted to the Royal Adelaide Hospital, it was envisioned that he would require eventual transfer to a dedicated rehabilitation facility. Compared to the care provided in an acute tertiary-referral hospital, the potential advantages of receiving rehabilitation within a dedicated rehabilitation facility included the higher staffing levels, model of care, and facilities that facilitate intensive multi-disciplinary rehabilitation and reduced bed-day costs. However, on review by a rehabilitation consultant approximately six weeks after admission to the Royal Adelaide Hospital, admission to a dedicated rehabilitation unit was refused on the basis that the consultant believed the patient would never return to independent walking and thus would require long-term bed-based care in a residential facility. Similarly, other rehabilitation facilities were unwilling to accept him, and thus, by necessity, all rehabilitation was undertaken at the Royal Adelaide Hospital.

The patient was discharged from the Royal Adelaide Hospital to a friend's house in a small country town in South Australia in December 2015, three months after admission to the Royal Adelaide Hospital. At this time, he was semi-independent with all transfers and walking with a four-wheeled walking frame (maximum 40 metres). Assistance was only required with setting up his environment (e.g. positioning chair for him to transfer into), and his friends agreed to provide this assistance post-discharge. He also required assistance from friends with donning and doffing socks and shoes but was otherwise independent in all activities of daily living. Prior to discharge, these friends were involved in a family meeting regarding his care needs and were shown how to safely provide assistance. Since his discharge, almost 12 months ago, he has not re-presented to hospital.

DISCUSSION

This case report describes the safe and successful mobilization of a particularly complex super-obese patient, who because of an inability to tolerate the supine position, was unable to be mobilized using usual techniques involving bariatric slings and lifters. A novel approach, based around the use of semi-prone positioning on a bariatric tilt-table, was safely and successfully implemented, injury-free for the patient and staff, and enabled the patient to eventually be discharged to a home setting.

The keys to the success of this super-obese patient's care were the multi-disciplinary involvement and their commitment, advice from colleagues with bariatric experience, rapport established between the patient and lead physiotherapist (JA) and lateral thinking that identified the tilt-table as a potential modality to allow semi-prone positioning for transfers.

The main limitation of this report is that it involves a single case only, thus limiting its generalizability. However, we believe that the approach outlined, based around semi-prone positioning on a bariatric tilt-table, will be of considerable interest to other healthcare professionals given the rising incidence of bariatric patients and the difficulties associated with their mobilization.

CONCLUSION

These results suggest that the use of a bariatric tilt-table that enables semi-prone positioning can be useful in facilitating the safe mobilization of bariatric patients, who because of central obesity, are unable to tolerate the supine position and thus unable to use standard methods of mobilization such as bariatric lifters and slings. A comprehensive and committed multi-disciplinary approach was also essential in the success of this patient's management. Varying approaches to mobilization, similar to the program described, will provide additional options in the safe and effective mobilization of bariatric patients.

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