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The Role of Physical Therapy in the Treatment and Discharge of an Elderly Homeless Patient with Fractures of the T12-L1 Vertebrae: a Case Report.

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The patient signed an informed consent allowing the use of medical information for this report and received information on the institution's policies regarding the Health Insurance Portability and Accountability Act.

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49 **Abstract**

50 Background and Purpose: On any given day there are over 600,000 homeless persons in the United
51 States. Many homeless people sustain injuries directly resultant of their living situations and are treated
52 at local hospitals.^{1,2} Following medical stabilization, many times hospitals encounter difficulties with
53 discharging homeless patients.¹ This case report examines the role of Physical Therapy in one such case
54 in the context of direct patient care and collaboration with the interdisciplinary team for safe patient
55 discharge.

56 Case Description: The patient was a 77 year old homeless male who sustained compression fractures to
57 his T12 and L1 vertebrae after falling from a 4 foot height. The decision was made to treat the fractures
58 non-surgically using a Thoracic Lumbar Sacral Orthotic (TLSO). The patient presented with deficient
59 range of motion (ROM) in his bilateral lower extremities limited by pain, and good strength and
60 coordination throughout both his upper and lower extremities. The patient initially presented as a high
61 fall risk, per the Tinetti Balance and Gait Assessment, and scored within normal cognitive functioning
62 per the Montreal Cognitive Assessment (MoCA).

63 Outcomes: The patient's self-reported pain levels decreased, his bilateral lower extremity range of
64 motion increased, and he scored as a low fall risk per the Tinetti. Following treatment at the hospital,
65 the patient was discharged to an inpatient rehab facility for further recovery because he could not return
66 safely to his current living situation.

67 Discussion: Hospitals often run into difficulties when discharging homeless patients. A major obstacle
68 is lack of patient compliance. Successful outcomes for homeless patients requires constant, open
69 communication among the interdisciplinary healthcare team, and between the healthcare providers and
70 the patient.³

71

72 Word count: 2,643

73

74 **Background and Purpose**

75 On any given day there are over 600,000 homeless persons in the United States.¹ Homeless people have
76 higher rates of premature mortality than the rest of the population, especially from unintentional
77 injuries, and have an increased prevalence of mental disorders.^{1,4} Many homeless people sustain
78 injuries directly resultant of their living situations, and are treated at local hospitals.^{1,2} Following
79 medical stabilization, many times hospitals encounter difficulties with discharging homeless patients to
80 a lower level of care.¹ The risk for potential legal action and poor portrayal by the media is great if a
81 homeless patient claims he/she was discharged improperly.³ Hospitals cannot discharge homeless
82 patients to other facilities unless those facilities agree to take them, which often they do not for various
83 reasons, such as lack of insurance or other means to pay for services.^{2,5} There are no easy solutions to
84 these problems; they require creativity and collaboration on the part of interdisciplinary teams at
85 hospitals.² This case report examines the role of Physical Therapy in one such case in the context of
86 direct patient care and collaboration with the interdisciplinary team for safe patient discharge.

87

88 **Case Description**

89 The patient was a 77 year old homeless male, who reported living out of his car with his girlfriend and
90 dog after being evicted from his apartment one year ago for violating the terms of his rent. The patient
91 was admitted to the hospital for treatment of compression fractures to his T12 and L1 vertebrae,
92 sustained after falling from a 4 foot wall. He received X-ray imaging which revealed compression
93 fractures to his T12 and L1 vertebrae. The patient also presented with a superficial abrasion with
94 bruising to his left forehead, and an absence of protective wounds to his hands and forearms. He
95 received computed tomography (CT) imaging to his head region which revealed no internal injuries.
96 Overall, the patient was in good health, did not smoke (quit 30 years ago), did not drink (quit 24 years

97 ago), and reported regular physical activity including daily walking and calisthenics. Except for a
98 myocardial infarction sustained eleven years ago with a coronary artery bypass graft, the patient
99 presented with minimal comorbidities. After primary medical stabilization of the patient, the decision
100 was made to treat the fractures non-surgically using a Thoracic Lumbar Sacral Orthosis (TLSO). The
101 patient's goals for physical therapy were to have minimal/no pain, and to ambulate with a normalized
102 gait pattern so as to return to his previous lifestyle and level of function.

103

104 **Clinical Impression 1**

105 The initial clinical impression of the patient was that he was limited in functional mobility and deficient
106 in range of motion and balance, both due to pain secondary to the confirmed fractures of his
107 thoracolumbar vertebrae. This presentation also led to the suspicion of balance deficits secondary to
108 pain and decreased thoracolumbar range of motion. Despite negative findings from CT imaging,
109 cognitive impairments were also suspected on account of the patient's head wound, especially since he
110 lacked any protective wounds to his hands or forearms, findings which were inconsistent with the
111 patient-reported history. It was determined that the patient would be administered gross strength testing
112 to determine if any deficits in strength were present, balance testing (Tinetti balance assessment), a
113 gross gait assessment to determine the presence of any gait deficits, and a cognitive screening (MoCA)
114 to determine if any cognitive deficits were present. The initial prognosis was that the patient would
115 progress through therapy and be discharged to an inpatient rehab facility.

116

117 **Examination**

118 Before any screenings were administered, Physical Therapy collaborated with Case Management to
119 determine what data would be most helpful when presenting the patient's case to potential inpatient
120 rehab facilities. The patient's medical diagnosis was compression fractures of the T12 and L1 vertebrae,

121 which was confirmed by x-ray imaging. Per the Tinetti mobility assessment, the patient initially
122 presented with balance impairments, and therefore use of a rolling walker assistive device was
123 indicated.⁶ Upon evaluation, the patient was found to have 5/5 strength within his available range
124 throughout his bilateral lower extremities. Occupational Therapy confirmed that the patient had 5/5
125 strength in his bilateral upper extremities. Strength testing was performed to establish a baseline
126 function, and to determine if the patient had any strength deficits secondary to his vertebral injuries.
127 Occupational Therapy also administered the MoCA on which he scored 26/30 which is considered
128 normal cognitive functioning.⁶ The MoCA was administered to rule out any cognitive impairments
129 sustained secondary to the patient's head injury. With his TLSO the patient was independent with bed
130 mobility, modified independent with supine to sit transfer, and modified independent with sit to stand
131 transfer (using upper extremities for assistance with transfers). The patient was able to maintain static
132 standing balance with eyes closed for greater than 20 seconds, and ambulated using a rolling walker
133 with stand-by supervision. The patient displayed good judgment with regard to his condition, and
134 demonstrated adequate understanding of spinal precautions. A baseline for the patient's perceived level
135 of pain was established using a Visual Analogue Scale (VAS) in order to evaluate improvements in
136 patient pain perception as treatment progressed. Based on the patient's diagnosis and evaluation, the
137 patient's prognosis for recovery was excellent to achieve his goals of returning to ambulating with no
138 impairments, and returning to his previous living situation after completion of inpatient rehab.
139 According to the American Academy of Orthopaedic Surgeons, patients who have sustained
140 compression fractures of the spinal column and who also receive non-surgical treatment with a brace
141 tend to avoid post injury problems with increasing physical activity and participation in rehab.⁷
142 Therefore the outlined plan of care and selection of interventions were developed to ensure the patient's
143 medical stability while in the hospital and to prepare the patient for inpatient rehab after discharge. See
144 Table 1 for further details regarding tests and measures.

145

146 **Clinical Impression 2**

147 The patient presented with deficient range of motion in his bilateral lower extremities limited by pain,
148 and good strength (5/5) and coordination (grossly observed) throughout both his upper and lower
149 extremities within his available range. The patient initially presented as a high fall risk, per the Tinetti
150 Mobility Assessment.⁶ Based on the examination data obtained through the patient interview, strength
151 testing, and the Tinetti balance and gait assessment, the patient presented with deficits in bilateral lower
152 extremity strength and range of motion, in cognition with regard to geographical orientation and recall
153 of recent events (as observed during the initial PT evaluation), and in balance. These findings were
154 consistent with x-ray imaging as interpreted by the referring physician. The patient was designated as
155 weight bearing as tolerated status, therefore the next plan of action was to proceed with physical
156 therapy interventions. The plan for this patient was for him to be seen daily for one PT session lasting
157 30-45 minutes each, Monday-Friday until discharge. Within each session, the therapist planned to work
158 with the patient in any or all of the following areas: balance retraining, safety awareness, gait training,
159 ambulation for endurance, assistive device training, brace management, bed mobility, and transfer
160 training. The therapist planned to reassess the patient using the tests and measures used during the
161 initial evaluation at the 5th and 10th PT encounters.

162

163 **Intervention**

164 According to Alexandru and So,⁸ conservative management of spinal compression fractures involves
165 gradual mobilization with use of an external orthosis. Younger patients tend to tolerate earlier
166 mobilization better than older patients, thus elderly patients tend to require more bed rest, predisposing
167 them to venous thrombosis and pulmonary embolism. Therefore it is critical to encourage mobilization
168 in elderly patients with spinal compression fractures being managed with external orthoses.

169 After initial education was provided to the patient, the teach-back method was utilized to ensure
170 patient understanding and retention of new/novel concepts. Teach-back was utilized on the two days
171 following initial education to ensure patient retention of new knowledge and to re-evaluate the patient's
172 memory. The patient's ambulation distance was increased each session to improve his ambulation
173 tolerance and to increase his time spent out of bed to prevent deconditioning, hospital acquired
174 pneumonia, and deep vein thrombosis. Therapeutic exercise was modified per patient tolerance to
175 positional changes and to increased exertion. This was done to ensure that the patient would be able to
176 tolerate an inpatient rehab regimen of therapeutic exercise. See Table 2 for details regarding
177 interventions performed and treatment progressions.

178 Daily notes were entered into the hospital's electronic medical record regarding the patient's
179 initial evaluation, daily treatments, and day-to-day Physical Therapy recommendations to be accessed
180 by all members of the patient's healthcare team. On-going communication with the patient was
181 conducted to assess his progress with therapy and his discharge goals. The patient was educated in:
182 spinal precautions (log rolling only, no bending at the waist while in standing, no twisting of the
183 thoracolumbar spine), the nature of his condition/deficits, exercise and ambulation program to increase
184 blood flow and strengthen musculature surrounding impaired vertebrae and also to prevent
185 deconditioning while in the hospital, a stretching regimen to increase mobility and reduce pain,
186 functional bed mobility (up/down, roll left, roll right, supine to sit, sit to supine), use of the rolling
187 walker assistive device, hospital safety protocols, Physical Therapy role and Physical Therapy
188 recommendations. The patient was also educated in TLSO brace management to include: application
189 and removal of brace and need for assistance with these activities, need to perform daily skin
190 inspections to avoid integumentary breakdown, and cleaning and upkeep. The patient demonstrated
191 compliance with, and adequate understanding of all education given to him. During the course of the
192 patient's treatment, coordination was conducted with the attending physician to confirm the order of the

193 TLSO and spinal precautions; Occupational Therapy for concurrent assessment of present level of
194 function and current functional limitations, and brace management; Nursing for medication schedule
195 and instruction for brace management; Case Management to determine the patient's options post
196 discharge and what goals the patient needed to meet which were required by specific inpatient rehab
197 facilities and transportation services.

198 Case Management played a larger role than usual in this patient's course of care. The patient was
199 medically stable at the time of discharge and therefore had the right to leave the hospital against
200 medical advice. It is not uncommon for homeless patients to opt for discharge to the street,^{2,3} and this
201 decision can put hospitals at risk for poor portrayal by the media^{2,3} and possible legal action if the
202 homeless patient claims that he/she was improperly discharged.² Early on in his case it became
203 apparent to Physical Therapy that this patient would become medically stable relatively quickly and
204 would no longer require skilled care in the hospital setting. It was also apparent that if he wanted his
205 vertebrae to heal properly, the patient could not be discharged to his current living situation - homeless
206 and living out of his car - due to the use of the TLSO and the spinal precautions to which he was
207 required to abide. During daily rounds, Physical Therapy updated the interdisciplinary team on the
208 patient's continuing progress. After each session with the patient, Physical Therapy met with Case
209 Management to discuss the patient's post-discharge needs weighed against his current options. Physical
210 Therapy communicated to Case Management that the patient required an inpatient rehab facility,
211 however many such facilities were unable to accept the patient due to his lack of insurance. The only
212 facility which would accept him was over 100 miles away, which compounded the discharge plan with
213 the issue of transportation, as transportation costs typically are paid out of pocket by the patient.^{1,5} It
214 took the combined effort of Case Management, Occupational Therapy, and Physical Therapy to
215 convince the patient to agree to go to the rehab facility instead of discharging himself back to the street.
216 By the time of his discharge, the patient indicated that he was comfortable with his decision and that it

217 was the best course of action for him to take.

218

219 **Outcome**

220 The patient remained in acute care for three days, after which point he was discharged to an inpatient
221 rehab facility. The patient was discharged because he was medically stable and no longer required
222 skilled care in the hospital setting. The patient was ambulatory at a modified independent level using a
223 rolling walker for upper extremity support. The patient also reported reduced pain levels on the visual
224 analogue scale, and scored within the low fall risk range on the Tinetti Balance and Gait Assessment.⁶
225 See Table 1 for details.

226

227 **Discussion**

228 All told, the patient spent a total of three days at the hospital, during which time he excelled at his
229 physical recovery and was deemed safe for discharge for his diagnosis of two compression fractures to
230 his lumbar spine. However, there were other aspects to the patient's case which did not progress as
231 linearly. The patient presented with bruising and abrasions to his left supra-orbital forehead region. The
232 wound was cleaned and dressed at the hospital. This wound was consistent with the patient's story of
233 falling from a 4 foot high wall. The patient presented with no protective wounds to his hands or
234 forearms. If the patient received the wound on his head from his fall, there is no evidence that he
235 attempted to break his fall or protect himself in any way. In a study by Rogoz and Burke,⁹ it was found
236 that older people experiencing homelessness in wealthy countries generally perform poorly on tests of
237 frontal lobe functioning, including the 21-item Depression Anxiety Stress Scale. The patient was
238 administered the MoCA, and did score within the range of normal cognitive functioning, albeit at the
239 very bottom cutoff point.⁶ The MoCA was administered as an additional assessment, secondary to the
240 CT scan, for traumatic brain injury, but he was not assessed specifically for depression. According to

241 Dierckx et al,¹⁰ caution should be taken when using the MoCA for detection of depressive symptoms.
242 According to the Substance Abuse and Mental Health Services Administration, roughly 30% of
243 chronically homeless people have mental health conditions, such as depression, and over 60% of
244 people who are chronically homeless have experienced mental health problems in their lifetimes.⁴
245 Given that the patient scored within normal cognitive functioning on the MoCA, no additional action
246 was taken regarding the patient's mental status.

247 Typically a patient at such a high level of function following conservative management of a spinal
248 compression fracture would be discharged home, not to an inpatient rehab facility. However, given that
249 the patient was homeless, this was not an option. His post hospital care required multiple factors which
250 were not at his disposal in his current living situation: he did not have a bed on which to lie supine (he
251 was a very tall gentleman, so he could not utilize the back seat of his car as a substitute for a bed), and
252 his means of shelter, i.e. his car, would not allow for him to abide by his spinal precautions, nor would
253 it allow him adequate space to perform proper brace management, e.g. donning and doffing. According
254 to the American Academy of Orthopaedic Surgeons, vertebral compression fractures normally take
255 between six and eight weeks to heal, given adequate immobilization of the affected segments.⁷ This
256 patient would have been unable to adhere to his spinal precautions and perform proper brace
257 management while living out of his car. The Physical Therapy department at the hospital recognized
258 this dilemma and therefore made the recommendation to Case Management that the patient be
259 discharged to an inpatient rehab facility. Unfortunately the closest rehab facility that would take the
260 patient was in another city over 100 miles away. Nevertheless, the Case Management department
261 obtained a bed for the patient at that facility along with medical transportation. Furthermore, the
262 interdisciplinary team, particularly Physical Therapy and Case Management, was able to help the
263 patient decide that inpatient rehab was his best option, thus avoiding potential complications from
264 trying to heal from his injuries in a homeless environment.

265

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288

289 **Tables**

290 Table 1

Tests and Measures	Initial Evaluation Results	Final results
Tinetti Balance and Gait Assessment	Balance score: 8/16, Gait score: 6/12, Total: 14/28, indicates high fall risk <input type="checkbox"/>	Balance score: 14/16, Gait score: 10/12, Total: 24/28, indicated low fall risk
Manual Muscle Testing (within available range) <input type="checkbox"/>	5/5 strength throughout both upper extremities and both lower extremities	Not assessed
Visual Analogue Scale (VAS) Pain Level	At rest: 6/10, With activity: 8/10	At rest: 4/10, With activity: 6/10
Montreal Cognitive Assessment (MoCA)	26/30, indicates normal cognitive function <input type="checkbox"/>	Not assessed

291

292 Table 2

	Rx Day 1	Rx Day 2	Rx Day 3
Intervention 1 Patient education	Educated patient on brace management, spinal precautions, hospital safety protocols, use of rolling walker	Utilized teach-back of education from Rx Day 1 to ensure patient comprehension and retention	Utilized teach-back of education from Rx Day 1 to ensure patient comprehension and retention
Intervention 2 Durable medical equipment	Provided patient with TLSO, assisted patient with application and removal, performed skin inspection	Assisted patient with application and removal, performed skin inspection	Assisted patient with application and removal, performed skin inspection
Intervention 3 Functional mobility	Instructed patient in general bed mobility, instructed patient in transfers, ambulated with patient using rolling walker 40 ft x 2	Ambulated with patient using rolling walker 100 ft x 4	Ambulated with patient using rolling walker 100 ft x 6
Intervention 4 Therapeutic exercise	In supine: heel slides, straight leg raises, ankle pumps: 10 reps x 3 sets each.	Sitting at edge of bed: sitting marches, long arc quads, heel raises: 10 reps x 3 sets each. In supine: passive glute/hamstring	In standing with rolling walker: marches, mini squats, hip abduction, heel raises: 10 reps x 4 sets each. In supine: self-stretch of glute/hamstring using bed sheet:

		stretches: 3 sets x 30"	3 sets x 30"
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