

Pulmonary Management of a Patient With Complete Thoracic Spinal Cord Injury and Coexisting Internal Injuries

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Introduction

Respiratory complications are the most prevalent source of morbidity and mortality in persons with SCI.¹ There are documented studies indicating that inspiratory muscle training (IMT) over 6-8 weeks is effective in persons with tetraplegia²⁻⁷; however, no studies exist that examine IMT in persons with paraplegia. Acute rehabilitation length of stay has decreased significantly over the past decade. The purpose of this report was to clinically examine and describe pulmonary status after IMT daily for two weeks in a single subject with paraplegia.

Subject

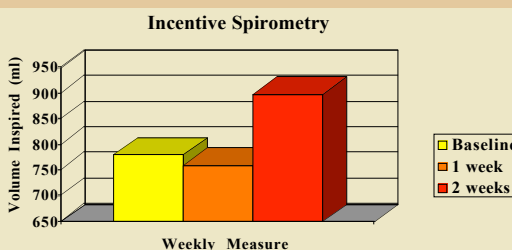
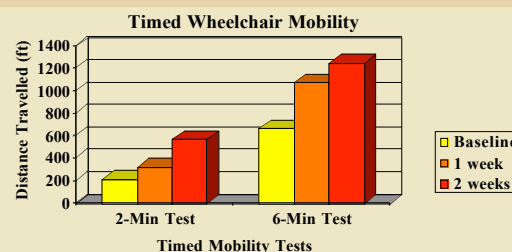
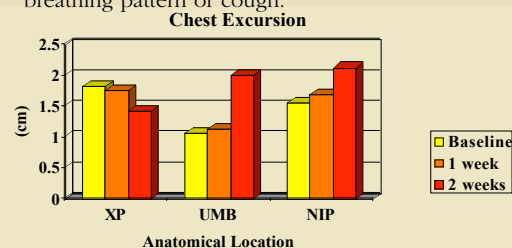
A 19-year-old male who sustained a complete SCI secondary to GSW to the chest, transecting the spinal cord at T12-L1. Other injuries sustained during bullet trajectory include diaphragm tear, liver laceration, stomach tear, left lung contusion, and rib and vertebral body fractures. Acute hospitalization lasted 27 days, complicated by two exploratory laparotomies, (L) thoracotomy with lysis of adhesions, placement of PEG tube, and needle pleurocentesis for (R) pneumothorax.

Intervention

Baseline tests and measures included chest excursion, incentive spirometry, breath support for phonation, 2- and 6-Minute wheelchair mobility tests, and assessment of cough and breathing pattern. These tests and measures were performed weekly. Resisted IMT was performed with a commercially available breathing device consisting of a mouthpiece, one-way valve at sealed end, noseclip, and various sized orifices through which to breathe. The patient trained twice daily for fifteen minutes in each session, five days per week. Resistance was increased according to manufacturer guidelines.

Outcomes

After 2 weeks of training, upper and lower chest excursion increased by 88% and 36% respectively; incentive spirometry increased by 15%; breath support increased by 1%; and timed mobility improved by 161% (2-Min) and 86% (6-Min). There were no observable changes in breathing pattern or cough.



Conclusions

Pulmonary management can be important in persons with SCI, regardless of level of injury. Resisted IMT was beneficial for this patient, with the greatest improvement noted in distance propelled in timed wheelchair mobility tests, volume inspired, and chest excursion. These improvements may be due to IMT, spontaneous recovery, a combination of IMT and natural recovery, and the confounding of additional rehab and pulmonary interventions. Further research is needed to determine the efficacy of resisted IMT in individuals with paraplegia, specifically with larger sample sizes and while controlling for confounding variables.

Clinical Relevance

With a decrease in acute inpatient rehabilitation lengths of stay over the past decade, physical therapists must utilize clinically relevant assessment skills and interventions that produce quick results and minimize respiratory complications. Aggressive pulmonary management can improve one's respiratory status, ultimately leading to improved functional mobility and quality of life.

References

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