The Effects of Early Mobility in Reducing Length of Stay for Adult Patients in the Intensive Care Unit Due to Trauma: A Systematic Review

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Overview

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Patients in the ICU due to Trauma

- High risk for complications associated with immobility[1]
- Extensive orthopedic and neurological injuries[1]
- Difficult to mobilize these patients[2]
  - Lines and tubes
  - Medical stability
  - Sedation
  - Severe weakness

Early Mobility

- No standard definition for the term “early”[3]
- Safe intervention to decrease the negative effects of bed rest and preserve ICU and hospital functional outcomes[4]
- Early mobility programs typically consists of exercises that begin in bed and progress to the end goal of ambulation[4]
- Typically beginning as soon as patients demonstrate sufficient physiologic stability[4]

Early Mobility Contraindications

- Neurologic[5]
  - No response to verbal stimulation
  - Elevated ICP
  - Agitation requiring sedative
- Respiratory[5]
  - Inability to maintain SpO2 >86%
  - FiO2 >0.6 or PEEP >12cmH20
  - RR >40breaths/min
- Circulatory[5]
  - MAP <60 mmHg or >115mmHg
  - HR >120 bpm or <50bpm at rest
  - Dysrhythmia requiring medication
- Other[5]
  - Renal replacement therapy
  - Unstable fractures
  - Open abdomen

Current Research in the ICU

- Six systematic reviews have found overall positive benefits of early mobility delivered in the ICU[4]
- Early mobility has been shown to decrease ICU and hospital lengths of stay[6]
- Importantly physical therapy can be performed safely for patients who are critically ill[7]

Purpose

To determine if mobility is an effective intervention to reduce length of stay (LOS) for adult (>18 y/o) patients in the Intensive Care Unit (ICU) due to trauma

Methods

Databases

- CINAHL
- ProQuest
- Pubmed
- HealthSource:Nursing/Academic Edition

Methods

Search terms

("Physical therapy" OR "physiotherapy") AND ("Intensive Care Unit" OR "ICU") AND ("length of Stay" OR "LOS") AND ("Trauma") NOT ("Pediatric" OR "Neonatal")

Methods

Search limits

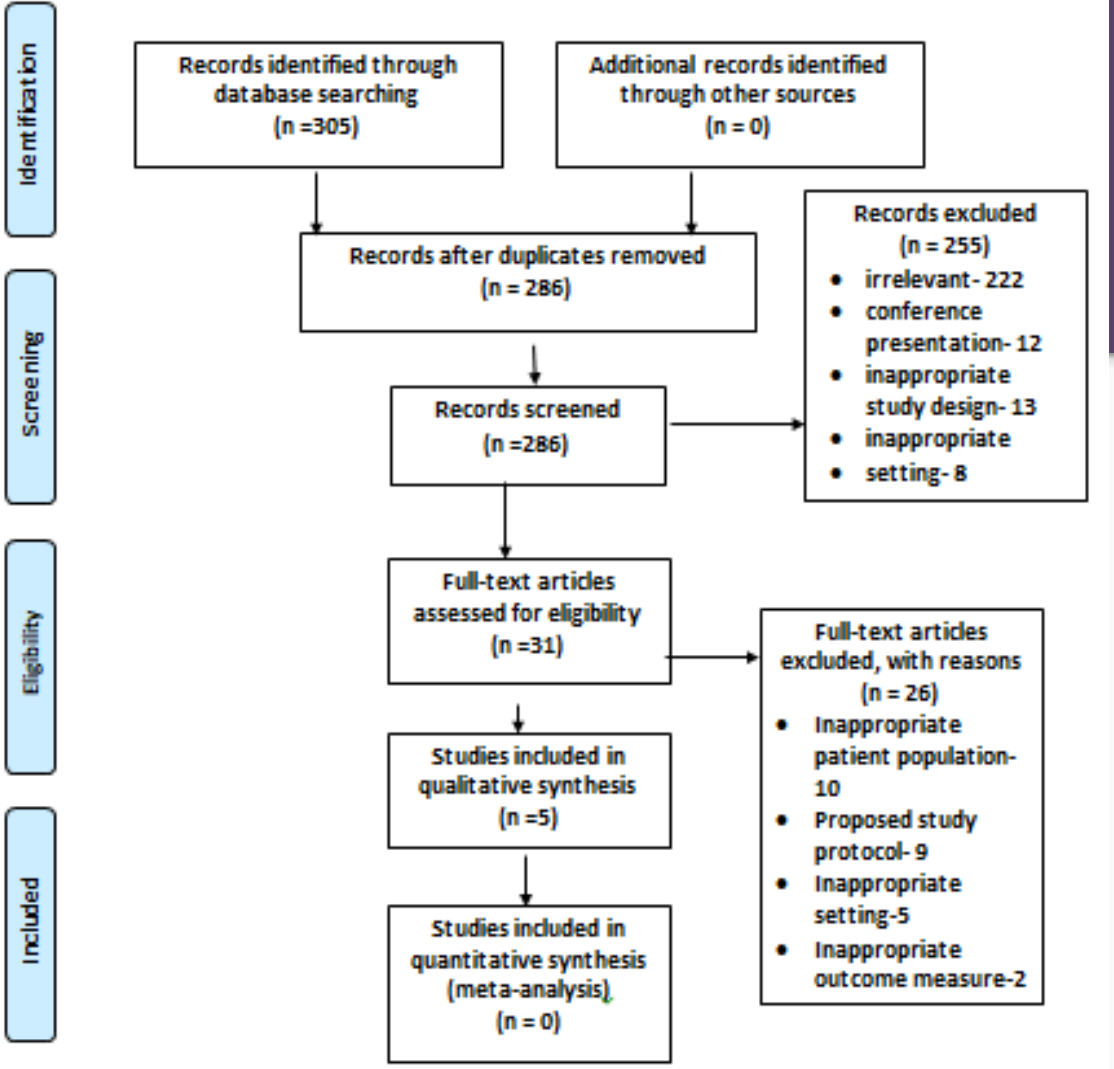
- English language
- Published within past 10 years
- Peer-reviewed

Methods

Selection Criteria

- Patients in the ICU due to trauma
- Adults >18 years
- Mobility performed as an intervention
- Measures of hospital and ICU length of stay

PRISMA


Identification
Screening
Eligibility
Included
Records identified through database searching (n =305)
Additional records identified through other sources (n = 0)
Records after duplicates removed (n = 286)
Records excluded (n = 255)
irrelevant- 222
conference presentation- 12
inappropriate study design- 13
inappropriate
setting- 8
Records screened (n =286)
Full-text articles assessed for eligibility (n =31)
Full-text articles excluded, with reasons (n = 26)
Inappropriate patient population- 10
Proposed study protocol- 9
Inappropriate setting-5
Inappropriate outcome measure-2
Studies included in qualitative synthesis (n =5)
Studies included in quantitative synthesis (meta-analysis) (n = 0)

Sackett Level

Author and Title	Study Design	Sackett Level of Evidence
Booth K et al - Progressive Mobility Protocol Reduces Venous Thromboembolism Rate in Trauma Intensive Care Patients[1]	**Pre and Post Intervention Study**	**4**
Clark DE et al- Effectiveness of an Early Mobilization Protocol in a Trauma and Burns Intensive Care Unit[8]	**Case Control Study**	**3B**
Gillick BT et al - Mobility criteria for upright sitting with patients in the neuro/trauma intensive care unit: an analysis of length of stay and functional outcomes[9]	**Case Control Study**	**3B**
Pandullo SM et al - Time for critically ill patients to regain mobility after early mobilization in the intensive care unit and transition to a general inpatient floor[6]	**Retrospective Study**	**4**
Sottile PD et al - Physical Therapist Treatment of Patients in the Neurological Intensive Care Unit[7]	**Retrospective Study**	**4**

Study Characteristics

- Sample sizes ranged from 30-2,167 participants
- Both males and females were included
- Average age range: 44.1-65 years
- Specific setting
  - Neuro/ Trauma ICU – 2
  - Burn/Trauma ICU - 1
  - Neurological ICU - 1
  - General ICU- 1

Study Characteristics Continued

- 3 studies specified a classification system of mobility progression[1,6,8]
  - Amount of classifications ranged from 3 to 6
  - Lower levels performed PROM and bed mobility
  - Higher levels performed transfers and ambulation

Study Characteristics Continued

- 1 study utilized a progression program without defining levels[7]
  - Categorized as ROM, bed based interventions, transfers, standing, and ambulation

- 1 study performed an upright sitting program[9]
  - Participants were assisted from supine to upright sitting with lower extremities in a dependent position off the side of the bed

Study Characteristics Continued

Primary Outcomes

- Hospital Length of Stay[1,6,7,8,9]
- ICU Length of Stay[1,6,7,8,9]

Secondary Outcomes

- Glasgow Coma Scale (GCS)[7,9]
- Injury Severity Scale (ISS)[1,8]

Author of Article	Mechanism of Injury	Specific Diagnosis	Scale Utilized for Severity of Injury	Hospital LOS	ICU LOS
Booth et al[1]	Not specified	TBI, undefined trama	ISS	Decreased	Decreased
Clark et al[8]	Blunt trauma, Penetrating injury, Burns	SCI, fracture	ISS	Decreased	Decreased
Gillick et al[9]	MVA, pedestrian injury, gunshot, assault	SDH, EDH, cerebral edema, Pneumocephalus, Hydrocephalus, cerebellar infarct SCI, spine subluxation	GCS	Decreased	Decreased
Pandullo et al[6]	Not specified	Not specified	Not specified	Decreased	Decreased
Sottile et al[7]	Not specified	SAH, SDH, ICH, trauma	GCS	Not specified	Not specified

Conclusion

There is weak to moderate evidence available on whether early mobilization affects length of stay in patients following trauma

Conclusion

- Physical therapy was safely involved in the ICU care of all patients following trauma
- Although not statistically significant, hospital and ICU LOS improved in all studies to some degree

Clinical Relevance

- Early mobility is a beneficial physical therapy intervention for patients with trauma
- Safety
- Reduction in acute care stay
- Importance of PT involvement in early mobility protocol

Limitations

- Varied study designs
- Small sample sizes
- Limited definitions of protocols
- Definition of early mobility as a treatment
- Varied mechanism of injury

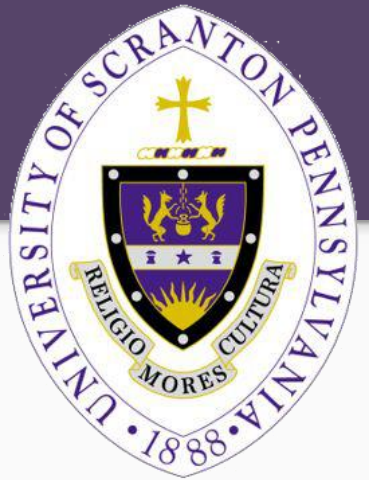
Future Research

- Include long-term follow-up with larger sample size
- Identify a standard definition of early mobility
- Identify a standardized early mobility classification
- Identify effects of early mobility on quality of life

Take Home Message

- Early mobility has been shown to decrease a patient's hospital and ICU length of stay in patients following trauma
- Utilizing early mobility as a treatment in the ICU is a safe and feasible option for patients following a traumatic event to prevent the detrimental effects of bed rest
- Physical therapists play a vital role in implementing an early mobility protocol as part of the interdisciplinary team

Acknowledgements



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Questions?