Long Term Employment and Functional Outcomes following Cervical Fractures and Fixation

Objective: This review aims to investigate the long-term functional and employment outcomes of patients following cervical spine fractures and fixation, whilst identifying key predictive factors for recovery

Introduction

Cervical fractures have shown to cause a profound impact on patients' quality of life due to the cervical spine's critical role in mobility, stability, and neurological function. Thus they often entail prolonged recovery times, potential neurological deficits, and long-term physical limitations, all of which can severely impact an individual's ability to return to work and resume their normal daily activities.

Despite advances in surgical approaches to these injuries, current literature mainly focuses on peri- and short post operative complications. Leaving long-term functional and employment outcomes unclear. This is significant due to the socioeconomic burdens this carries on the patients.

Method

. To conduct this literature review,astructures search uwas conducted primarily using PubMed, Medline, and Elsevier focusing on studies related to long-term outcomes following cervical fracture fixation. The search criteria included keywords such as "traumatic spinal injury" "long-term outcomes," "functional outcomes," "chronic pain," "post-fixation," "long-term employment," and "return to work," to ensure a comprehensive analysis of the available literature. Filters were applied to prioritize primary studies, systematic reviews, cohort studies and meta-analyses.

Conclusion

Current studies highlight that while some individuals regain significant function following cervical fixation, long-term follow-ups suggest that many individuals do not fully recover their pre-injury functional status. Employment outcomes remain suboptimal, with post-injury career transitions being common and functional recovery varying based on injury severity and treatment modality. Several key predictors of recovery and RTW rates were identified including pre-injury employment status, smoking status, injury location and gender. Understanding these factors is essential to improving rehabilitation strategies and post-injury quality of life. However these studies primarily reflect long-term outcomes following general traumatic spinal injuries rather than pertaining specifically to cervical spine injuries. Given the current gaps in long-term data further primary research is needed to develop targeted treatment strategies and workplace accommodations

References

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Results

Employment Outcomes:

- Return-to-work rates following spinal fractures vary significantly, ranging from 47% to 78.7%. However, Jaffe RH et al.'s cervical spine-specific data indicate that employment rates dropped from 79% pre-injury to 52% post-injury.
- Key Predictors of Return to Work:
  - Education level: Higher educational qualifications were linked to increasing employment retention.
  - Job nature: Physically demanding jobs reduce return-to-work rates.
  - Gender: Males 2.26× more likely to return to work than females
  - Surgical outcomes: Extended hospital stays and peri-operative complications lower return rates
  - Workplace accommodations: Remote work and flexible scheduling improve RTW rates, yet individuals receiving disability benefits may be less inclined to re-enter the workforce.
- Post-injury, there was was a rise in self-employment (from 9.1% pre-injury to 64.6% post-injury), suggesting barriers to reintegration with their previous employers.

Functional Outcomes:

- Surgical management was superior to conservative approaches with reduced complication rates and improved neurological recovery in the short term, yet there was no statistical difference in long-term functional recovery between surgical and conservative approaches.
- Health-Related Quality of Life (HRQoL):
  - The main predictor for low EQ-5D-3Lindex and high NDI scores was the severity of the traumatic spinal injury.
  - No significant change in EQ-5D-3L Index and Neck Disability Index (NDI) at 1, 2, and 5 years post-surgery, suggesting that perceived health status does not necessarily improve long term.
- Neurological improvement post-surgery:
  - 51.4% of patients improved by 1 AIS grade, and 15.5% improved ≥2 AIS grades in the 2 year follow-up.
  - 89 % of the patients with preoperative radiculopathy were without symptoms.

Long-Term Outcomes

- Very few studies long-term studies were found within the available literature, most follow-up periods range from 1 week to 26 months.
- A 10-year follow-up study reported significant reductions in neck-related pain post-surgery; however, 50% of patients continued to experience some degree of chronic pain.
- Chronic pain, workplace restrictions, and physical limitations remain significant barriers to full recovery and RTW.

Concluded on the table below are the positive and negative predictors for long-term neurological recovery:

Positive Predictors:	Negative predictors:
Less severe injury at admission (AIS C or D).	Longer ICU stays
Presence of Central Cord Syndrome.	Older age
Higher Lower Extremity Motor Score (LEMS).	
Injury at a higher cervical level (C0-C3), potentially due to a survival bias favouring less severe injuries.	
Non-smoking status, associated with a 3.03x better outcome	

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