Conclusions
Critical care polyneuropathy is a significant and debilitating condition. Patients who sustained a larger and more severe TBSA % burn injury requiring management in the ICU setting were at risk of developing a critical care polyneuropathy as a complication. This integrative review highlights the need for further long term studies investigating quality of life and functional outcomes.

The authors declare no known conflicts of interest associated with this publication


References
[3] Iarossi G, Faller D. Critical illness polyneuropathy [3], severe peripheral burn polyneuropathy [3], and in the literature is referred to in varying terms such as peripheral polyneuropathy [4], or mononeuropathy [5], critical illness polyneuropathy [1], severe critical illness polyneuropathy [6] and critical illness polyneuropathy [7][8], this complicates the research process. Early diagnosis of critical care polyneuropathy in the ICU setting and early rehabilitation are fundamental to reducing long term disability [8]. The aim of this integrative review is to identify the precipitating factors associated with development of critical care polyneuropathy in patients who have sustained a burn injury.

Methods
Inclusion Criteria
Original research and case reports published in the English language that identify the precipitating factors that contribute to development of critical care polyneuropathy in patients who have sustained a burn injury.

Exclusion Criteria
Studies reporting mononeuropathy were excluded as mononeuropathy is attributed to focalized local factors such as local debridement of the burn wound [3].

Literature Research Strategy
A systematic search was undertaken using the following electronic databases PubMed, Scopus, CINAHL and EMBASE. Time frame restrictions were not placed upon this search due to limited published literature in this area. Excluded from the review were opinion pieces, letters to the editor and grey literature.

Data Extraction and Analysis
A total of 20 studies were summarised and systematically synthesised. The reference lists of 8 included studies were also reviewed which resulted in identifying an additional two studies. Case reports were summarised separately to remaining studies.

Results
Study Characteristics
The studies included in this paper were retrospective cohort studies (n=14) including one cross-sectional study, single case reports (n=3), prospective cohort studies (n=2) and a retrospective chart review (n=1). No meta-analysis or systematic reviews were included in control trials were.

The studies included were published within the last three decades. The sample sizes varied widely in each study (n=1 to n=44) thus indicating overall small sample size. Flame burn was the most frequent mechanism of burn injury followed by electrical injuries. The age range of patients included in these studies was 15-76 years. Total Body Surface Area (TBSA) % ranged from 14% to 85% with burn depth classified as deep dermal to full thickness. Table 1 includes the pooled data from across the studies and demonstrates descriptive statistics for the cohort and prospective studies.

Case report
The three patients in the case reports were male with an age range of 19 to 30 years. The TBSA % involved ranged from 20-45% with burn depth classified as deep dermal to full thickness. All patients had bilateral upper and lower limb involvement. Each case recorded electromyography (EMG) and nerve conduction studies (NCS) findings.

Clinical and electrodiagnostic testing for critical care polyneuropathy
In this integrative review clinical assessment varied across each study and case report. Only two studies [1,3] commented with regard to assessment muscle strength. Detailed clinical assessments utilised were lacking throughout the studies. Methods of measuring muscle wasting were inconsistent or omitted, thus making comparisons between studies difficult. However, EMG and NCS were well reported on in both the primary studies and case reports. However the timing and intervals between testing was incompletely reported thus hindering a challenge to determine the appropriate timing of these assessments.

Outcome and follow up
There was general consensus in the studies and case reports that sensory deficits remained in the upper and lower limbs however sensory innervation occurred within the first 24 months post burn injury. The time frame required for resolution of sensory deficits was not defined, therefore difficulty arises in determining if these deficits are permanent. Long term follow up was reported in only one case report and three primary studies leading to inadequate reporting patient outcomes and highlighting disparity in the duration and intensity of rehab.

Discussion
The aim of this integrative review was to identify the precipitating factors that contribute to the development of critical care polyneuropathy in patients with a severe burn injury. Critical care polyneuropathy remains a complex condition to diagnose and treat in the burn population. There was inconsistent reporting of these risks in the included studies and this did not enable cross study analysis or comparisons. To date no specific assessment scale has been developed to measure the severity of critical care polyneuropathy [9]. Duration of mechanical ventilation required and severity of burn injury were identified the determining the development of critical care polyneuropathy. Inadequate details pertaining to clinical testing poses challenges to determine parameters contributing to the development of critical care polyneuropathy in conjunction with a severe burn injury. EMG and NCS are the most prominent electrodiagnostic test to confirm critical care polyneuropathy however it is recommended that these tests are used to determine outcomes in the development of critical care polyneuropathy. Inadequate testing can be attributed to multiple terms being used to describe this phenomenon. This review included a small number of primary studies and case reports demonstrating the need for further research in this area.

Table 1: Descriptive statistics and incidence for included cohort and prospective studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Survey n</th>
<th>%Male</th>
<th>Mean Age</th>
<th>SD Age</th>
<th>Mean TBSA</th>
<th>SD TBSA</th>
<th>Duration ICU</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage ICU</th>
<th>Duration Ventilation</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage Ventilation</th>
<th>Follow up</th>
<th>Percentage Follow up</th>
<th>Length TBSA</th>
<th>SD TBSA</th>
<th>Duration ICU</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage ICU</th>
<th>Duration Ventilation</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage Ventilation</th>
<th>Follow up</th>
<th>Percentage Follow up</th>
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<tbody>
<tr>
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<td>2013</td>
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<td>20.2</td>
<td>37.1</td>
<td>12.5</td>
<td>42</td>
<td>100</td>
<td>38.1</td>
<td>17</td>
<td>39</td>
<td>100</td>
<td>12.4</td>
<td>9.5</td>
<td>100</td>
<td>4.7</td>
<td>90</td>
<td>100</td>
<td>7.4</td>
<td>73</td>
<td>100</td>
<td>0.5</td>
<td>0.2</td>
<td>100</td>
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<td>90</td>
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<tr>
<td>Chai et al. [3]</td>
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<td>16</td>
<td>46</td>
<td>21.0</td>
<td>29.7</td>
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<td>46</td>
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<td>18</td>
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<td>Lee et al. [2]</td>
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