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Date: 24/02/2025

Impact of the 20mph Speed Limit on Spinal Trauma Admissions to the Major Trauma Centre for Wales

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Introduction

What is Spinal Trauma?
Spinal trauma can be defined as injury to the spinal column, spinal cord or associated structures due to external force or high-energy impact.

Causes of Spinal Trauma
Motor vehicle collisions (MVCs) are a common cause of spinal trauma (1). Other causes include falls, sport injuries and violence.

20mph Speed Limit in Wales
On 17th September 2023, Wales became the first UK nation to issue a new default speed limit of 20mph, with police enforcement beginning in January 2024. The new speed limit aims to reduce MVC incidence, related injury and burden on both emergency services and the NHS.

Effect of 20mph Speed Limit on MVCs
The probability of an MVC injury increases with crash speed (2). However, long-term studies are rarely conducted to assess the effectiveness of speed restriction policies, including speed limits (3). Therefore, literature evaluating the effect of 20mph speed limits on MVC-related injuries, including spinal trauma, is extremely limited.

Aims

1. To assess the number of MVC-related spinal trauma admissions to the Major Trauma Centre (MTC) for Wales 1-year before and 1-year after implementation of the new 20mph speed limit.
2. Access the SWTN database to find all patients admitted to the MTC with a mechanism of injury reported as 'vehicle incident' who sustained spinal trauma.
3. Time period of 17th September 2022 to 1st January 2025.
4. Analyse the data including demographics, mechanism of injury, description of injury and management.

Criteria

Inclusions: Patients admitted to the MTC with a mechanism of injury reported as 'vehicle incident' who sustained spinal trauma.

Exclusions: Vehicle incidents misreported or not defined as MVCs, MVCs caused by a transient loss of consciousness or seizure, MVCs caused by alcohol consumption, MVCs that did not happen in Wales, MVCs that did not happen within the time period and patients with pre-existing spinal trauma.

Methodology

1. A SWTN database was produced for all patients admitted to the MTC from 17/09/22-04/01/25 with the mechanism of injury reported as 'vehicle incident'.
2. Patients who sustained spinal trauma were identified using data from the SWTN database and from WCP reports.
3. All patients admitted between 17/09/22-16/09/23 were classified as 'pre-20mph'.
4. All patients admitted between 17/09/23-01/01/25 were classified as 'post-20mph'. This timeline includes a buffer period as enforcement of the speed limit only began in January 2024.
5. Information regarding details of the mechanism of injury and management were taken from WCP reports.
6. For all 'post-20mph' patients, ambulance summaries were accessed via WCP to ascertain the exact location of the MVC and determine if the event happened on a 20mph speed limit road.
7. SPSS was used to perform a statistical analysis of the data.

Results

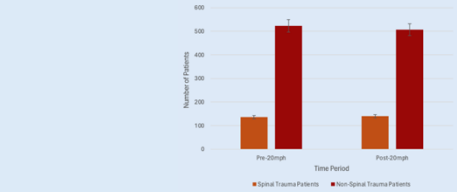

Figure 1: Bar graph with error bars showing the number of patients admitted to the MTC as 'vehicle incident' with and without spinal trauma during the pre-20mph and post-20mph period.

A total of 1,306 patients were admitted to the MTC with a mechanism of injury recorded as 'vehicle incident' between 17/09/22-04/01/25. Of these patients, 306 sustained spinal trauma. After 30 exclusions were made, a total of 276 patients were included in the study.

The following data was collected and compared for MTC patients sustaining spinal trauma during the pre-20mph (n=136) and post-20mph period (n=140).

- Age on admission
- Gender
- Anatomical region
- Type of road user
- Type of management

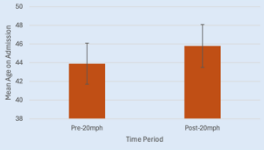

Figure 2: Bar graph with error bars showing mean age on admission for patients admitted to the MTC as 'vehicle incident' with spinal trauma during the pre-20mph and post-20mph period.

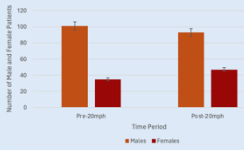

Figure 3: Bar graph with error bars showing gender of patients admitted to the MTC as 'vehicle incident' with spinal trauma during the pre-20mph and post-20mph period.

There was no statistical difference when comparing the total number of MVC patients who sustained spinal trauma before and after introduction of the new speed limit, X^2 (1, N=1306)=0.196, p=0.658. Only 15.7% of spinal trauma admissions after introduction of the speed limit took place on 20mph speed limit roads. However, a limitation is that the MVC location for 73 patients is unknown due to missing data.

Patient demographics were similar for both groups; there was no statistical difference in mean age on admission (P>0.05, 95% CI -6.85, 3.05) and most spinal trauma patients were male, both in the pre-20mph (73.4%) and post-20mph (66.4%) groups. The most frequent road user sustaining spinal trauma were car occupants before (44.9%) and after (47.9%) introduction of the new speed limit, followed by motorcyclists and pedestrians. Conservative management was the most common approach for treating spinal trauma patients both pre-20mph (64.0%) and post-20mph (50.0%). The only evident difference between the two groups was the most commonly affected anatomical region, which was the thoracic spine for pre-20mph patients (27.2%) and the lumbar spine for post-20mph patients (29.3%). However, the difference in number of thoracic and lumbar spinal trauma patients between the two groups was not statistically significant X^2 (1, N=276)=0.319, p=0.572.

Conclusion

The study is the first of its kind to evaluate the impact of speed limits on spinal trauma. It is evident that the 20mph speed limit has had no significant impact on the number of spinal trauma admissions to the MTC for Wales.

Whilst speed is an important risk factor, the nature of MVCs is multi-factorial. To reduce the number of spinal trauma admissions related to speed, additional measures including road safety campaigns and stricter police enforcement are required to improve driver compliance with speed limits. Further studies over a longer time period would be beneficial in determining the long-term effectiveness of the 20mph speed limit on spinal trauma.

Acknowledgments
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Impact of the 20mph Speed Limit on Spinal Trauma Admissions to the Major Trauma Centre for Wales.

Abstract

Authors
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Background: Motor vehicle collisions (MVCs) are a common cause of spinal trauma. On 17th September 2023, Wales became the first UK nation to issue a new default speed limit of 20mph. Past literature evaluating the effect of 20mph speed limits on MVC-related injuries, including spinal trauma, is extremely limited. This study aims to assess the number of MVC-related spinal trauma admissions to the Major Trauma Centre (MTC) for Wales 1-year before and 1-year after implementation of the 20mph speed limit, as part of a service evaluation.

Method: A SWTN database was produced for all patients admitted to the MTC between 17/09/22-04/01/25, with the mechanism of injury reported as 'vehicle incident'. Patients were classified as 'pre-20mph' (17/09/22-16/09/23) or 'post-20mph' (17/09/23-01/01/25), depending on the date of admission. All spinal trauma patients who met the inclusion criteria were included in the analysis. Patients with pre-existing spinal trauma or those involved in MVCs unrelated to speed, outside of Wales or not within the time period, were excluded. WCP reports were accessed to collect data on demographics, mechanism of injury and management. For all 'post-20mph' patients, ambulance summaries were examined to determine the exact location of the MVC, and a statistical analysis was performed.

Results: 1,306 patients were admitted to the MTC with the mechanism of injury reported as 'vehicle incident' between 17/09/22-04/01/25. Of these patients, 306 sustained spinal trauma. 276 patients were included in the study. There was no statistical difference when comparing the total number of MVC patients who sustained spinal trauma before (n=136) and after (n=140) introduction of the new speed limit, X^2 (1, N=1306) = 0.196, p=0.658. Only 15.7% of post-20mph spinal trauma admissions happened on 20mph speed limit roads. However, a limitation is that for 73 patients, the MVC location is unknown due to missing data. Patient demographics were similar for both groups; there was no statistical difference in mean age on admission (P>0.05, 95% CI -6.85, 3.05) and the majority of spinal trauma patients were male, both in the pre-20mph (73.4%) and post-20mph (66.4%) groups. The most frequent road users to sustain spinal trauma were car occupants both before (44.9%) and after (47.9%) introduction of the new speed limit, followed by motorcyclists and pedestrians. Conservative management was the most common approach for treating spinal trauma patients both pre-20mph (64.0%) and post-20mph (50.0%). The only difference between the two groups was the most commonly affected anatomical region, which was the thoracic spine for pre-20mph patients (27.2%) and the lumbar spine for post-20mph patients (29.3%). However, this difference is not statistically significant, X^2 (1, N=276)=0.319, p=0.572.

Conclusion: The 20mph speed limit has had no significant impact on the number of spinal trauma admissions to the MTC for Wales. To reduce the number of spinal trauma admissions related to speed, additional measures including road safety campaigns and stricter police enforcement are required to improve driver compliance with speed limits. Further studies over a longer time period would be beneficial in determining the long-term effectiveness of the 20mph speed limit on spinal trauma.