

---

July 12, 2021

***In response to “Epidemiology of Fractures Sustained During Electric Scooter Accidents A Retrospective Review of 563 Cases”***

**Zhong Huang**

Research scientist

Institute of Neuroanatomy and Cell Biology, Hannover Medical School, 30623 Hannover, Germany; Center for Systems Neuroscience (ZSN) Hannover, 30559 Hannover, Germany

**Other Contributors:**

**Zhi Qu**

Research scientist

Institute of Epidemiology, Social Medicine, and Health System Research, Hannover Medical School, 30625, Hannover, Germany.

**Dong Qu**

Research scientist

Institute of Legal Medicine, Hannover Medical School, 30625, Hannover, Germany

Dear Editor,

Shichman and colleagues' study depicted the characteristics of E-Scooter related injuries in Israel [1]. To compare with the status in German metropolitan area, we would like to review the relevant studies and make recommendations for injury prevention with peer researchers.

E-Scooters have been become popular among young adults in major cities in Germany since it was approved for sharing use on public roads in 2019. There were three retrospective studies on E-Scooters related injury from Hamburg, Munich and Frankfurt since then [3]. Data from emergency department or trauma centers which covered more than 3.5 million people in the cities above showed that from June 2019, there were 89 E-Scooter related injury patients in Hamburg in one year, 60 in Munich and 76 in Frankfurt in nine months [4-6].

In contrast to the patients' characteristics described by Shichman and colleagues, the average age of patients are similar but with a lower proportion of female. More injuries referred to the emergency department (ED) in the afternoon hours (12:00 to 17:59) in Shichman and colleagues' study, however, in German large cities injuries were mainly at night, with 37% of patients in Hamburg (23:00 to 07:00), 36.7% in Munich and 42.1% in Frankfurt (22:00 to 06:00), respectively.

Fractures account for 42.7% of all E-Scooters related injuries in Hamburg, 55% in Munich, and 48.6% in

Frankfurt. Among them the proportion of upper limb fractures are 44.4% in Hamburg, 45.5% in Munich and 28.9% in Frankfurt, and corresponding proportion of lower limb fractures are 13.9% in Hamburg, 9.1% in Munich and 9.2% in Frankfurt.

Although the association of helmet-wearing and injuries was not investigated by Shichman and colleagues, the authors speculated that holding one's hands outstretched would be ineffective when e-scooters deliver high-energy impacts. However, no E-Scooter related injury patients was documented as having worn a helmet in study in Hamburg, only one patient each was documented having worn the helmet in study in Munich and Frankfurt. Alcohol use among E-Scooter users in Germany is another point deserve our attention. There were 25 patients out of 89 injuries in Hamburg were alcohol intoxicated, 12 out of 31 fracture patients. In Munich the proportion of injury patients had alcohol before E-Scooter use is 36.7%. As new data analysis predicts that scooter accidents will keep a sustainable growth in the years ahead, we appreciate that the Shichman and colleagues' study has called the researchers' attention to E-Scooters related injuries. Data from three major German cities show that most prevalent E-Scooter related injuries are to the head and limbs. Most common fractures are of the limbs. To the traffic law-making department, we suggest a mandatory wearing of helmets and body protectors among E-Scooter users. Additionally, stricter monitoring and an increased public awareness campaign for victims of drunken driving accidents, such as nighttime alcohol testing for electric scooter users, are also needed.

Disclaimer: e-Letters represent the opinions of the individual authors and are not copy-edited or verified by JBJS.

## References

1. Shichman, I.; Shaked, O.; Factor, S.; Elbaz, E.; Khoury, A. Epidemiology of Fractures Sustained During Electric Scooter Accidents: A Retrospective Review of 563 Cases. 2021, 103, 1125-1131.
2. Badeau, A.; Carman, C.; Newman, M.; Steenblik, J.; Carlson, M.; Madsen, T. Emergency department visits for electric scooter-related injuries after introduction of an urban rental program. *The American journal of emergency medicine* 2019, 37, 1531-1533.
3. <https://www.bmvi.de/SharedDocs/DE/Gesetze-19/entwurf-verordnung-teilnahme-elektrokleinstfahrzeuge-strassenverkehr.html>. Zugegriffen: 20. Apr. 2020, B.f.V.u.d.I.V.ü.d.T.v.E.a.S.E.-V.e.
4. Kleinertz, H.; Ntalos, D.; Hennes, F.; Nüchtern, J.V.; Frosch, K.H.; Thiesen, D.M. Accident Mechanisms and Injury Patterns in E-Scooter Users. *Deutsches Arzteblatt international* 2021, 118, 117-121.
5. Mair, O.; Wurm, M.; Müller, M.; Greve, F.; Pesch, S.; Pförringer, D.; Biberthaler, P.; Kirchhoff, C.; Zyskowski, M. [E-scooter accidents and their consequences : First prospective analysis of the injury rate and injury patterns in the urban area of a German city with over 1 million residents]. *Der Unfallchirurg* 2021, 124, 382-390.
6. Störmann, P.; Klug, A.; Nau, C.; Verboket, R.D.; Leiblein, M.; Müller, D.; Schweigkofler, U.; Hoffmann, R.; Marzi, I.; Lustenberger, T. Characteristics and Injury Patterns in Electric-Scooter Related Accidents-A Prospective Two-Center Report from Germany. *J Clin Med* 2020, 9, 1569.

Conflict of Interest: None Declared

## Article Author Response

27 July 2021

### *Article Author(s) to Letter Writer(s)*

Hello,

I appreciate your referral of this response letter regarding our article: “Epidemiology of Fractures Sustained During Electric Scooter Accidents: A Retrospective Review of 563 Cases”

The fact that the e-scooter “phenomenon” and its related injuries is of rising interest is important and amplifies the danger and the efforts focusing on treating them worldwide.

The number of e-scooters related accidents in Germany are lower compared to the 3331 cases we encountered over a 2-year time period in a metropolitan area of around 1 million people. I would be happy to know how many shared e-scooters are available throughout these cities compared to our metropolitan.

The fact that the majority of accidents in the German studies were at night might be explained by the different trends of e-scooter use. In Our metropolitan area, the results show that people use it as a primary way of commuting to work and not only as a form of transportation for evening recreation.

Indeed our cohort did not extract helmet use in all patients, but in a different study by our author group we found high rates of head and maxillofacial injuries even with helmet use (exact number are under investigation and hopefully will be published in a future paper). The fact the we noticed high rates of head injuries while using a helmet amplifies that e-scooter accidents are of “high-energy” and hence, the morphology of the fractures as described.

In general, alcohol intoxication is less frequent in our country – we attribute this to different cultural norms. We hope to continue our research with absolute alcohol intoxication screening in the ED in the future.

In general, I understand that the main findings of our article and the ones depicted by the Hanover group are similar in regards to limb fractures as the most prevalent e-scooter related injury.

We appreciate the letter and will gladly relate to any future response to our paper.

Respectfully,

Ittai Shichman, MD