

## Two Cases of Hip Associated Fractures after Falls from the Segway Personal Transporter

Rasmus Kramer Mikkelsen\*, Anne Morup-Petersen, Jesper Hvolris

Bispebjerg Hospital, Orthopaedics Department, Copenhagen, Denmark

\*Corresponding author: Rasmus Kramer Mikkelsen, Bispebjerg Hospital Orthopaedics Dept, Copenhagen, Denmark, Tel: +45 22817061; E-mail: [mikkelsen\\_rasmus@hotmail.com](mailto:mikkelsen_rasmus@hotmail.com)

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### Introduction

The Segway Personal Transporter is a relatively novel form of transportation gaining popularity across the world. It is used mostly as a means of transportation for sightseeing tours. Little is known about the potential harms and injuries associated with the Segway® personal transporter.

We are reporting a case of acetabular fracture in a 73 year old man and a case of medial femoral neck fracture in a 59 year old female, both following a fall from a Segway® transporter.

### Case 1

A 73 year old semi-retired engineer was admitted to the emergency department with hip pain after a fall from a Segway before the injury he was physically active, running 5 kilometers two to three times a week. He had a history of hypertension, benign prostate hypertrophy and mild osteoporosis, the latter treated with strontium ranelate and vitamin D.

The patient was taking part in his son's bachelor party, which involved a sightseeing tour of Copenhagen on Segway. There was a no-alcohol-policy for the sightseeing and this was adhered to. The participants were given a five minute instruction in the use of the Segway and they were escorted by a tour guide and all wearing helmets. Our patient fell off the vehicle at an estimated speed of 5 km/h as he was trying to avoid another Segway vehicle. The vehicle spun around and he was thrown off and landed on his left hip.

Hip X-rays and CT scan showed a severely comminuted transverse fracture of the anterior column of the left acetabular cup. The femoral head was displaced two centimeters into the pelvic cavity. On day four ORIF was performed using the 12 hole Stryker Matta Pelvic system. After 6 weeks weight bearing was allowed. On follow-up six weeks after the injury the patient was without pain and had begun progressive weight bearing.

### Case 2

A 59 year old female, working as head of finance, was healthy and leading an active lifestyle riding her bike to work one hour per day. The patient has no past medical history and no osteoporosis.

The patient was on a sightseeing tour as part of a work related recreational day. The strict no alcohol rule was abided by. Whilst crossing the road the Segway driver in front came to a sudden stop. As our patient tried to avoid collision the other Segway the wheels of the two vehicles collided and the patient fell off and landed.

On the left hip, the patient's Segway had an estimated speed of 10-12 km/h. Plain X-rays revealed left femoral neck fracture, Garden type II. CRIF with three cannulated hip screws was carried out the day after the injury.

The patient was allowed full weight bearing and mobilization after surgery.

The recovery was uncomplicated, and the patient was able to resume work three weeks after surgery.

### Discussion

The Segway vehicle is a new form of transportation device released in 2001. Steering and driving the Segway is based on computerized dynamic stabilization technology [1]. According to the provider the transporter is intuitive and easy to operate. It accelerates when the operator leans forward and breaks when leaning backwards.

A Pubmed search reveals only two previous reports on series of injuries related to the Segway. Boniface et al. [2] reports a large increase in severe injuries from 2005 to 2008, and as in our cases, many are beginners on sightseeing tours and both report cases of acetabular fractures [2,3].

In our cases the patients were 73 and 59 years old respectively. For both it was the first time they tried the Segway. Both were given a five minutes introduction prior to a guided tour. The relatively advanced age of our two patients may have influenced their ability to quickly learn to operate a new type of vehicle.

The types of the types of injuries described above are serious. For instance the detrimental health risks following a hip fracture are well documented. The mortality rate in acetabular fractures is low compared to fractures of the hip, but other serious complications are associated. Following acetabular fractures 17% of patients develop posttraumatic arthritis, and due to immobilisation there is a high risk of deep vein thrombosis and pulmonary embolism [4].

### Conclusions

We have observed severe injuries from riding the Segway at only walking or running speed. It is remarkable that both patients were riding the vehicle for the first time, and it raises the question whether a short introduction is sufficient. We recommend more advanced introduction before sightseeing tours and first time use. Special care should be given to introduce beginners of advanced age, since this age group is expected to be more challenged when it comes to strength, balance and reaction time. Further investigation of Segway related injuries could be facilitated by creating a specific register code for hospital admittance after injuries caused by these vehicles [5].

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## References

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