

Final report

63p5 – GaitBase – An interdisciplinary project to simplify management of gait analysis data in children with neuromuscular disease

Short summary of the project

One exciting year with Aktion project is behind us. We spent this year hardworking to reach our goals. Our two teams had the opportunity to meet 5-times which led to some very interesting results. We have to admit that meeting personally is much more efficient than any other way of electronic communication. We are very grateful for this opportunity that couldn't be possible without generous support from Aktion.

This project aimed to help children with cerebral palsy and other neuromuscular diseases that often lead to pathological walking patterns. The sequels of these patterns might be constant pain and progressive physical disability. As these pathological walking patterns might be quite complex, a young interdisciplinary research field called gait analysis has been internationally established. It is based on biomechanical principals (kinematics and kinetics), the gait laboratory is often run by a biomedical engineer or human movement scientist and the result data are used mostly by orthopaedic surgeons, neurologists and/or rehabilitation specialists. Therefore gait analysis is a real interdisciplinary field with a strong technical background and a close cooperation between technicians, researchers and/or clinicians is needed.

Outcomes of the project

- 1) Establishment of an international interdisciplinary research group in the field of gait analysis
 - Relationship between the Medical University of Graz, Department of Paediatric Surgery, Austria and Czech Technical University in Prague, Faculty of biomedical engineering, Czech Republic has been improved. Several students work at the Faculty of biomedical engineering on the issue of gate analysis who are partly led with specialists from Graz. Their technical outputs are used in Graz.
 - Even more, our cooperation continues with other open questions taht are waiting for our research. Therefore we can say that we established foundation for international research group in the field of gait analysis.
- 2) GaitBase – database system for simple management of gait data – is done. Our greatest success is database size reduction. We were able to reduce data volume to 50.3 % of the original one. This could be done by using sophisticated mathematical and computer approach and also by long discussions about the data. Not to end here, we have better data quality. Our patients are now known – they have correct names, weight, height, sex and diagnose without misspells and logical mistakes. We were able to fix hundreds of bad examination reports. This helps with better patient communication and we can now use their anamneses to cure them more precisely. Our software GaitBase is able to graphically present data which are collected from the patients.

- 3) Undergraduate students - One master thesis is on the way now and one bachelor thesis is about to be made. This is one of the effects of wonderful cooperation between our two universities.
- 4) The results of the project will be used as a basis of the PhD doctoral thesis of Mgr.Ladecký
- 5) Publication and presentation of our results at conferences and/or peer reviewed journals
 - In spite of lack of time, we were able to publish two papers. The first one has been recently published in an international journal with impact factor "Česká a Slovenská neurologie a neurochirurgie". Article name is "Repeated multilevel Botulinum Toxin A treatment maintains the long-term walking ability in children with cerebral palsy". The second paper occurred in the journal "Pražská technika" (November 2012) with name "Analýza chůze". Such a result highly exceeded our aims and it is a good prove of our interdisciplinary and international cooperation.

List of Activities

All the visits that were mentioned in our original proposal were held just not in the intended order. Changes were made due to our work duties.

1. Mgr. Ladecký visit to Graz. (1.7.2012 to 14.7.2012) Participants: Martin Ladecký, Martin Švehlík and Markus Dreier. The main goal of this visit was to fully discuss and get to know the system of data management at the clinic.
4. Ing. Szabó and undergraduate students to Graz gait laboratory (20.9.2012 and 21.9.2012). Participants: Zoltán Szabó, Martin Švehlík, Markus Dreier and three students – Milan Poláček, Václav Čejka and Radim Krupička (PhD). This visit was aimed to motivate undergraduate students and give them an opportunity to work on their first international project. Václav Čejka who is nowadays working on his diploma thesis that covers gait data processing.
5. Dr. Švehlík and Marcus Dreier visit to Kladno (3.10.2012 and 5.10.2012). Main focus was on the equipment of the FBMI in Kladno and our expertise in EMG data processing that might be an interesting project for collaboration in future. However, actual problems with GaitBase development were discussed and solved.
6. Martin Ladecký visit to Graz. (11.10.2012 to 15.10.2012). Participants: Martin Ladecký, Martin Švehlík and Markus Dreier. This visit was very important progress with data management – data were transferred and a new database created.
7. Martin Ladecký visit to Graz. (15.11.2012 to 19.11.2012). Main focus was to create a user-friendly graphical user interface for the laboratory stuff.

Summary

Our international cooperation resulted in a successful project. The team on both sides was working hard to fulfil all the aims of the project. Nevertheless, we did not only fulfil our aims but also succeeded in publishing our results in peer-review journals. Moreover, the support from Aktion program allowed us to motivate, lead and educate students at doctoral as well as undergraduate level. It helped us to cultivate the previously established international partnership between the Medical University of Graz and FBMI Czech Technical University in Prague. We definitely plan to continue our established international cooperation.

Project Budget Summary in detail

Support in total: 22 000,- CZK

Name	CZK Travel costs	CZK Accommodation costs
Zoltán Szabó, Ing., Ph.D. Travel costs –1 journey by car Kladno-Graz-Kladno (20.9.2012 and 21.9.2012) for 4 people (Ing. Szabó and 3 students). The calculated car cost in this project was equal to one return second-class train ticket to Graz (3512 CZK). In this way we saved the cost of 3 return second-class train ticket to Graz.	3 512	
Martin Ladecký, Mgr. Travel costs – journey (train 2 nd class) Graz-Prague (1.7.2012 to 14.7.2012)	1 443	
Martin Ladecký, Mgr. Travel costs – journey (train 2 nd class) Prague-Graz-Prague (11.10.2012 to 15.10.2012)	2 516	
Martin Ladecký, Mgr. Travel costs – journey (train 2 nd class) Prague-Graz-Prague (15.11.2012 to 19.11.2012)	2 516	
Martin Švehlík, MD., Ph.D. Accommodation – 2 nights á 1200 CZK Board – 3 days á 500 CZK (3.10.2012 and 5.10.2012)		3 900
Marcus Dreier Accommodation – 2 nights á 1200 CZK Board – 3 days á 500 CZK (3.10.2012 and 5.10.2012)		3 900
Summary	9 987	7 800
Spent		17 787
Refunded		4 213