

**Horses and Humans Research Foundation
Midway grant reporting**

Written by Dr. Pilwon Hur (PI)

Midway grant report should include the following:

1. Summary of research project progress.

During the first 6 months, we have conducted the following working items to accomplish the proposed experiment: i) technical preparation of the experiment, ii) ethical approval processes, and iii) subject recruitment. Each of these are explained in detail in the following paragraphs.

i) Technical preparation for the experiment: Sensors that we developed for the rider and horse in the preliminary studies were bulky as mentioned in the proposal. Since participants with cerebral palsy could easily be distracted by the size and the weight of the sensors, we spent time on downsizing the sensors by the size of coin (e.g., US dime). Also, codes for synchronizing 10 sensors were optimized such that there are no loss of data and the data transmission rate is fast (e.g., 200Hz).

ii) Ethical approval processes: Due to the delay of the final approval of the grant award (i.e., mid of December) and the closing of the University at the end of the year, the ethical approval processes were delayed. We started application of both institutional review board (IRB) application and institutional animal care and use committees (IACUC) in January 2018. Both IRB and IACUC were approved in the mid-February, 2018.

iii) Subject recruitment: In the proposal, we proposed to recruit four children with cerebral palsy. Even though IRB and IACUC were approved in February, 2018, we couldn't start subject recruitment due to the delayed agreement between TAMU SRS and HHRF. As soon as the agreement was complete, subject recruitment started around May. So far, we have recruited and scheduled one subject for the experiment during September.

2. Time line, both completed items and planned project completion, with any changes from original application noted and explained.

Original time table

Time Table				
	Q1 2018	Q2 2018	Q3 2018	Q4 2018
Recruitment				
Data Collection				
Data Analysis				
Mid Report Preparation				
Abstract and Manuscript Preparation				
Grant Proposal Preparation (NIH R21)				

Final Report Preparation				
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Revised time table

Time Table						
	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019
IRB/IACUC Approval						
Recruitment						
Data Collection						
Data Analysis						
Mid Report Preparation						
Abstract and Manuscript Preparation						
Grant Proposal Preparation (NIH R21)						
Final Report Preparation						

Changes from the original plan

Due to the unexpected delay of agreement (e.g., terms and frequency of funding) between TAMU SRS and HHRF, the start of the project was delayed by about more than one quarter (e.g., 4-5 months). Thus, even though IRB and IACUC were approved in February 2018, subject recruitment could start in May 2018. The first experiment is scheduled on September. While collecting the data, we will perform the data analysis simultaneously. Also, we will prepare abstracts for conferences (e.g., PATH International, American Hippotherapy Association Conference, American Society of Biomechanics). We will also prepare the grant proposal and final report after the completion of the data collection. To complete the project by collecting data from four subjects, we request an extension of 6 months to complete the experiments for four subjects.

- Budget: budget expenditures to date and remaining budget items listed, with any changes from the original application noted and explained. Variance of more than 5% needs HHRF approval

Budget expenditures for the first half

Items	Planned	Completed	Comments
Sensors + Microprocessors	\$750	\$735.97	N/A
Batteries	\$100	\$0	We decided to use the existing old batteries in the PI's lab at TAMU
3D printing	\$100	\$0	We decided to use the existing 3D printing materials in the PI's lab at TAMU
Office Supplies	\$84	\$0	We decided to use the existing supplies in the PI's lab at TAMU
Graduate student stipend	\$3,011	\$4,264.03	We request to use the rest (i.e., batteries, 3D printing, office supplies tuition) of the money to cover graduate student's stipend. For the

			Spring semester (i.e., from January to May), we needed to pay \$7,686.96 (see the attached receipt). This amount is the minimum amount required by TAMU Mechanical Engineering Department. We request only 55% to cover the stipend. Also, stipend for June is not included.
Tuition	\$955	\$0	Tuition portion was added to student stipend
Total	\$5,000	\$5,000	

Remaining expenditure

Items	Planned	Completed	Comments
PI salary for summer	\$1,624		This is the minimum effort required by TAMU for PIs. Please note that one-month salary for the PI is \$10,623.
Graduate student stipend	\$2,422		
Tuition	\$954		
Total	\$5,000		

Comments about graduate student stipend: Since there was a delay in the beginning of the project due to the agreement issue, it seems that the graduate student didn't work for the requested stipend. However, there are several points to consider: i) The graduate student already completed the contract for the hiring before the Spring semester started. Usually, the hiring contract is done before the semester starts. ii) The graduate student worked on sensor development and software development for reliable and fast wireless sensor communication. This took about 3-4 months. iii) If the extension is approved, the student will not be paid for the extended period.

4. Summary of any complications or challenges that have been encountered and how they have been or are being addressed.

One challenge that we encounter is subject recruitment with the proposed inclusion criteria. The framework proposed in this project can be applied to various populations. However, to minimize the unwanted effect of biases, we controlled the subject population to children with cerebral palsy. Inclusion criteria include i) a diagnosis of bilateral spastic CP attributed to complications of prematurity, intracranial hemorrhage, and periventricular leukomalacia according to the definition of Bax; ii) aged 3 to 14 years; iii) no treatment of botulinum toxin, orthopedic surgery and neurosurgery within the 6 months before the onset of training; iv) Gross Motor Function Classification System (GMFCS) level I and II; v) able to signal pain, fear, or discomfort reliably; vi) with mild scoliosis (Cobb angle < 20°); vii) passive range of motion within functional limits; and viii) able to follow instructions.

Based on the inclusion criteria, we needed to recruit children who can walk (i.e., GMFCS level II). However, most of the CP children who met the rest of the criteria could not walk by themselves. So far, we have recruited and scheduled one subject for the experiment during September. Also, we are in contact with one more subject who meets the criteria. To tackle the issue, we are now expanding our reach to include facilities from

broader areas including Austin, TX. If the request for the 6-month extension, we can complete the experiment with four subjects.

5. Invoice signed by grant manager for expenses incurred (up to 50% of grant award)
Please find the attached receipts.

