



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Vladimir N. Sepetov	Project Number J1030
Project Title Understanding Musical Therapy: Does Periodic Sound Affect the Difficulty of Walking in Parkinson Disease Patients?	
Abstract Objectives/Goals The objective of my project was to find out if there is an immediate effect of a metronome tempo on the walking of a Parkinson Disease patient. My hypothesis was that if a periodic sound of 60 beats per minute is played while a Parkinson Disease patient is walking, then the patient will walk faster and be able to turn easier. Methods/Materials This project was a within subject study and was performed only on one subject, a Parkinson Disease patient who has had the disease for 12 years. In my experiments I measured the time it took for the subject to walk across a 7 meter hallway two times back and forth with and without a metronome. The following metronome tempos were used: 60 beats per minute; 100 beats per minute; 120 beats per minute; 140 beats per minute; 160 beats per minute; 200 beats per minute. A rest break was included after each experiment with the duration of approximately 1 minute. A control walk was done before each walk with a metronome, and metronome frequencies were randomized within each day of experimenting. Experimenting continued for 15 days. Results 140 beats per minute proved to be the best tempo for walking for the Parkinson Disease patient. 60 beats per minute was the worst tempo for walking and actually had a negative effect on the subject's walking. The effect of the metronome on the subject was most noticeable when the subject was feeling good (up to 25% improvement). Conclusions/Discussion From my results I concluded that the metronome helped the subject walk when the tempo was greater than 60 beats per minute. The most interesting result was that there is an optimum tempo for my subject (140 beats per minute), which is close to the subject's number of steps per minute (129 steps per minute). The importance of this finding is that millions of people with Parkinson Disease struggle everyday because they have a hard time walking, and that something as small as a metronome could help them.	
Summary Statement My project is about the effects of periodic sound on a Parkinson Disease patient's walking.	
Help Received Dr. Olga Issakova supervised the project, and my father helped me to interpret the data.	