BMD100 vs. Biopac

Objective

To compare the BMD100 to an established research-grade ECG system

Procedure

ECG was recorded from a subject with NeuroSky's BMD100 and the Biopac MP150 simultaneously. The Biopac electrodes were placed on the chest on either side of the sternum (V4 & V4R) and the BMD100 electrodes were placed as close as possible to them. The Biopac data was acquired using wet electrodes and the BMD100 used dry electrodes. Data was sampled by the Biopac at 500Hz with a built-in high-pass filter at 0.5Hz and low-pass filter at 35Hz. The BMD100 sampled data at 512Hz with a high pass filter at 0.5Hz, a low pass filter at 100Hz and notch filters at 50Hz and 60Hz.

A session of approximately 30 seconds long was recorded. The electrodes were tapped 3 times to indicate the start of the session and tapped another 3 times to indicate the end of the session. These artifacts were used to synchronize the Biopac recording to the BMD100 recording in Matlab. In order to calculate the correlation coefficient, the signals were interpolated to obtain a common sampling rate.

Results

A sample of the recordings can be seen in Figures 1 and 2. Figure 1 shows a 4 second segment of the Biopac and BMD100 recordings. The correlation coefficient between the Biopac and BMD100 was highly significant ($p<0.001$) at a value of 0.973.

Figure 2 shows a more detailed view comparing the Biopac and BMD100 recording of a single ECG waveform.

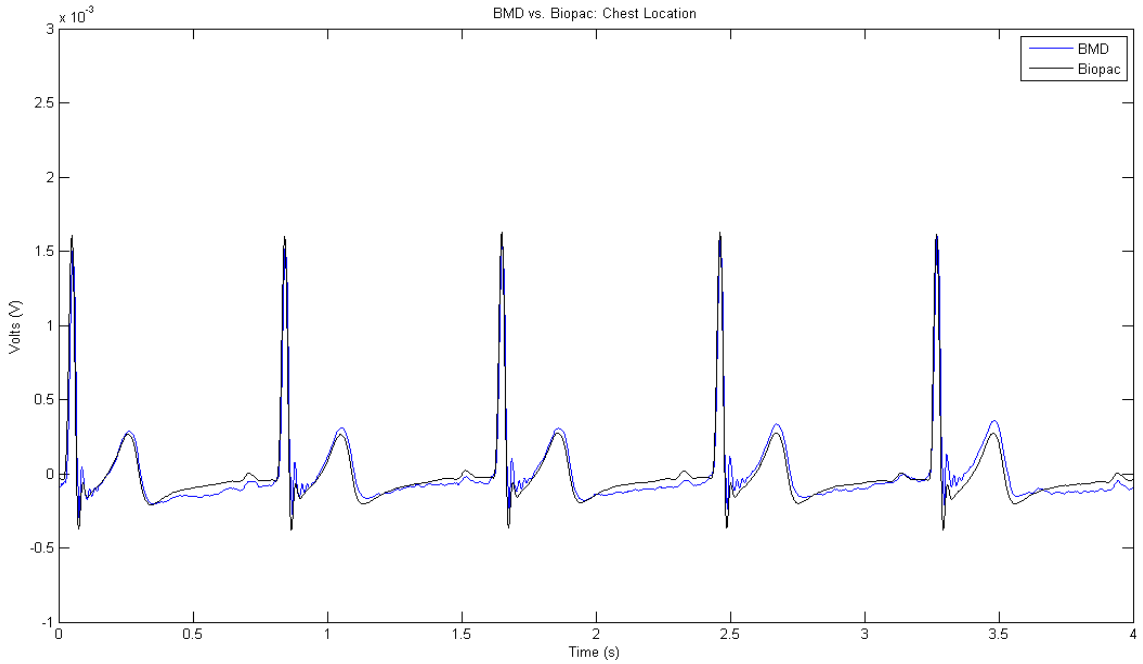

Figure 1 – A 4 second segment of the BMD100 and Biopac recorded from the chest location

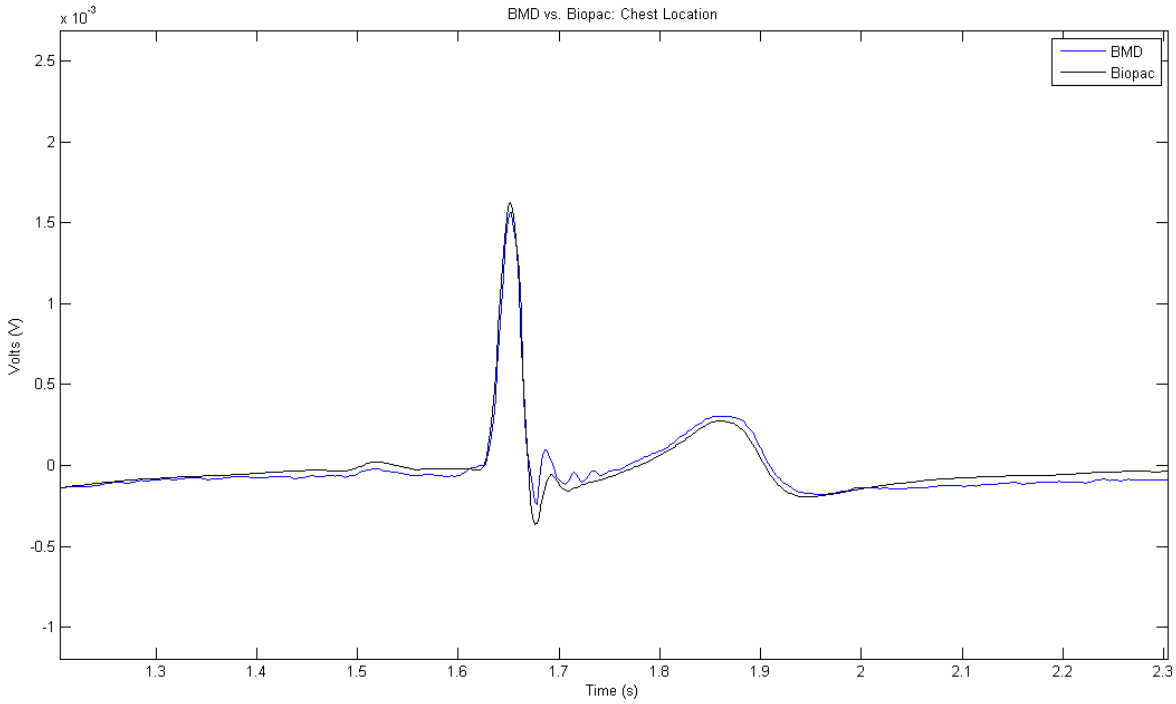

Figure 2 - A detailed view of an ECG waveform recorded by the Biopac and the BMD100