Tutorial 7 **Waveform amplitude average gaphs vs. step cycle**

1. load data file 2000/cb*/cbc0201

2. set range from 5-15s and display raw data **SRS5<CR>E15<CR>EscARG**

3. overlay waveform 8 (GS) for cycle setting to determine proper on/offset points

4. set cycles on waveform 6 (TA): **W6SCVA**

adjust baseline and if you do not see the cursors selecting set for the cycles, then adjust the delay to a short interval (10 ms should work): **DQD10<CR>VA**. At this point if you adjust the baseline with the mouse, you should see vertical lines appearing on the screen. Keep adjusting the baseline until more less of the onset of the cycles are properly lined up. Then hit D (done) and select M (manual) to further adjust the cycles. With the manual option you can set each step cycle individually. Read the instructions on the bottom of the screen to use your mouse. Define precisely the onset of each step cycle based on the TA waveform (usually the blue one displayed) and the offset based on the onset of GS (the gree waveform displayed). So as you see, we are not defining the flexion (TA) phase based from the onset of TA activity to the offset of TA activity but rather from the onset of TA to the onset of GS. The reason for this is that TA offset is hard to define precisely if the ENG fluctuates, but the onset of the extensor (GS) ENG is usually more precisely identifiable. Using this method, you have a step cycle that start from the onset of one phase (in our case flexion) until the onset of the next phase (extension). This definition for a step cycle is satisfactory for many different kinds of analysis, but sometimes you may wish to define the cycle differently (for example you want your cycle last only during the activity of a particular ENG, because you want to average traces that were collected stricly during the time when the selected ENG showed activity). (Later talk more about different types of settings?)
After you set each cycle, do **DQQQKQ** (exit by keeping the set parameters). Do **ARG**.

5. Set the waveform for for cycle analysis: **SCW6<CR>Esc**

6.Set waveform number for the amlitude analysis: **SLWN6<CR>Esc**

7. Set cycle percentage to 0, meaning that one cycle on the display will represent only flexion.

8. Normalize cycles and set the cycle to be displayed to 2: **SGNY<CR>C2<CR>Esc**

9. Perform waveform amplitude averaging: **AGWVAG**

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Note on the bottom of your x-scale the line that should say: “TA (mV) vs TA Cycle”

8. Read off (in the top right corner) the percentage active. You will see a value under “duration” that represent the % activity of the TA waveform during the step cycle. If you look on your x-scale, you should see that the length of the TA activity is approximately to the point what you read off under duration, but sometimes it can be hard to determine what do you call the end of the waveform activity (i.e. is the end where the ENG reaches baseline, or is it halfway down to the baseline etc.) Anyways, the value of percent % is the number you should use in the next step to set the cycle percentage again.

10. **SCP-enter the value you read under duration-<CR>EscG**, you should see a little (if obvious) shift in the waveform average display.

(11. You can also set the percentage to 50, if you want to have a cycle average that is half flexion and half extension (SCP50). However, often you will find that during locomotion it is not 50-50 flexion and extension. Although there is no problem using 50%, we often use the values read off from under duration on the constructed averages, just to get a more realistic-looking average of the step cycles.)

12. Print file and save it as a plt–**PFta.plt<CR>Esc**, or PP (print plotter)

13. Set the waveform level to a new number, 0 (lSart) to construct the average for lSart.

SLWN0<CR>Esc

14. Then do AGWVAG again, and you should see a similar average as for TA before. (Make sure you do not change the st/cycle/percent value.)

15. Save this again as a plt (**PFlsart.plt**), and print it if you wish.

16. Again, set the level to a different number (1) and so on until you do the averaging for all desired waveforms.

17. Use layout to create 10 (or the proper number) of equal size panels and fill them with the plt files you created for each waveform. It is important to have them equal size originally, so you can properly align and further edit them in ‘cdr’. (Talk about details for using layout?)