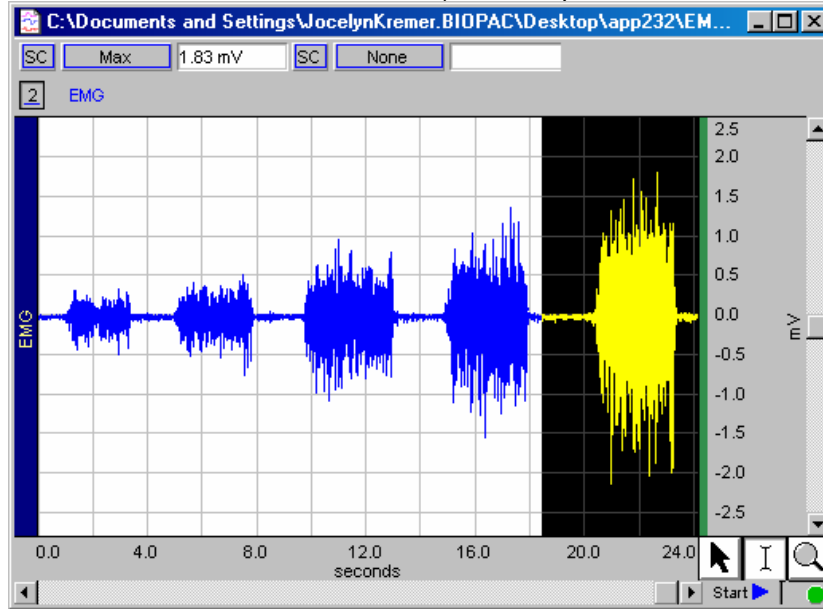



Application Note 232 EMG: Normalizing to Maximal Voluntary Contraction (MVC)

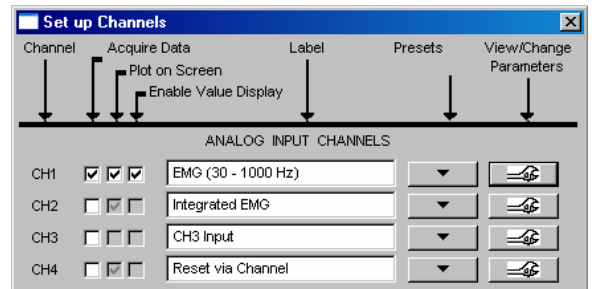
This Application Note will explain how to normalize EMG data to maximal voluntary contraction (MVC) and how to measure the area under the curve.


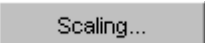
- This procedure works in *AcqKnowledge* (research systems) and *BSL PRO* (education systems).

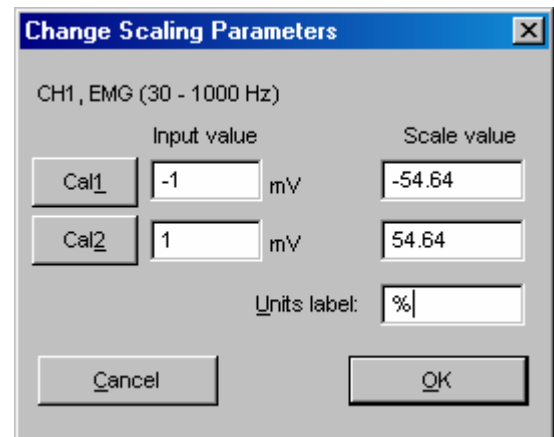
- Acquire data of subject performing MVC.
- Measure "Max" on the selected data (this example shows "Max" = 1.83 mV) and save the result to use in Step 6.



- Open a new file (File > New).
- Choose MP menu > Set up Channels.
- Choose a  Preset to establish the appropriate EMG bandwidth (this example uses EMG (30 - 1000 Hz)).
- Normalize EMG to MVC.



- Click  View/Change Parameters for the corresponding EMG channel
- Click  to access the scaling parameters.
- Compute the scaling factor as follows, using the MVC max measured in Step 2:
 - Max EMG in mV (1.83) = MVC (100%)
 - $100/1.83 = 54.64$
 - 54.64 is the scaling factor for this level of MVC

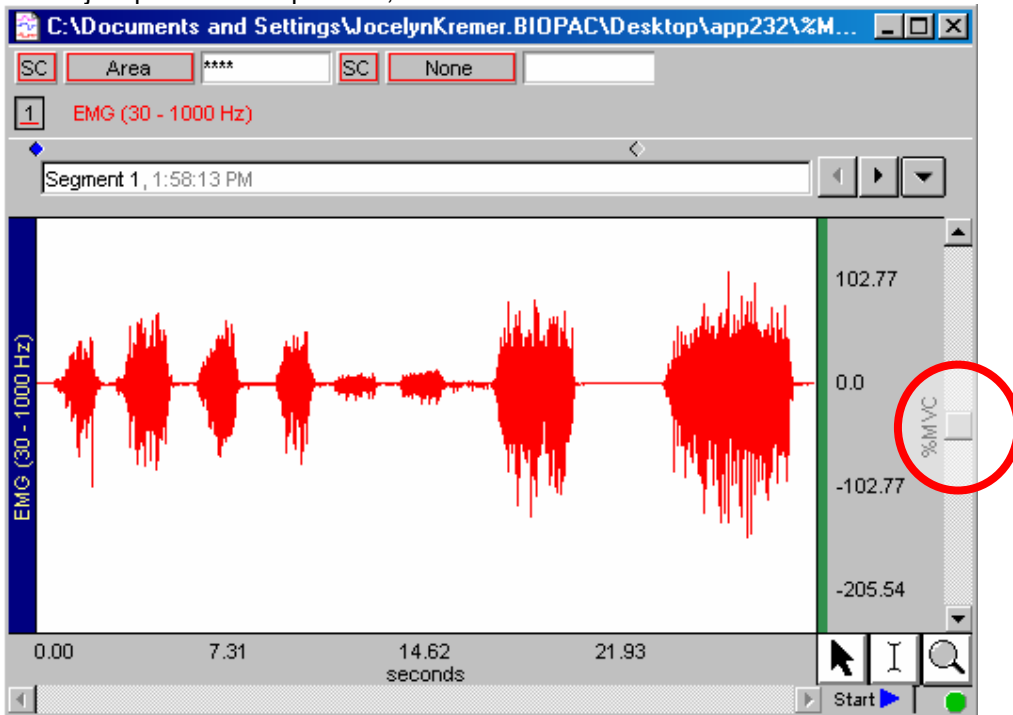


- Enter into Scaling as follows:

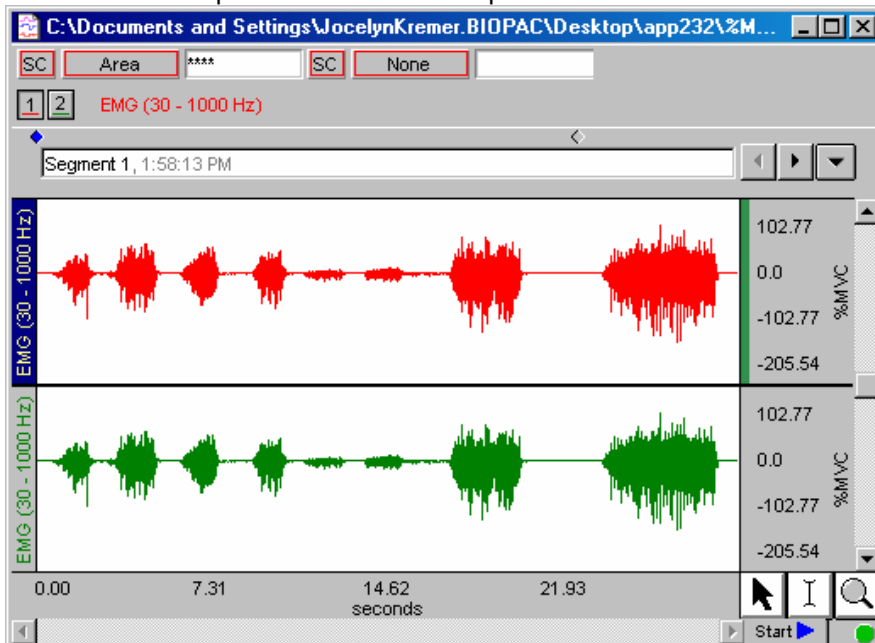
Input Value	Scale Value
Cal1 = -1	-54.64
Cal2 = 1	54.64
Units Label: %	

- Acquire new data of subject performing MVC.

- As subject performs the protocol, values will now be shown as %MVC.



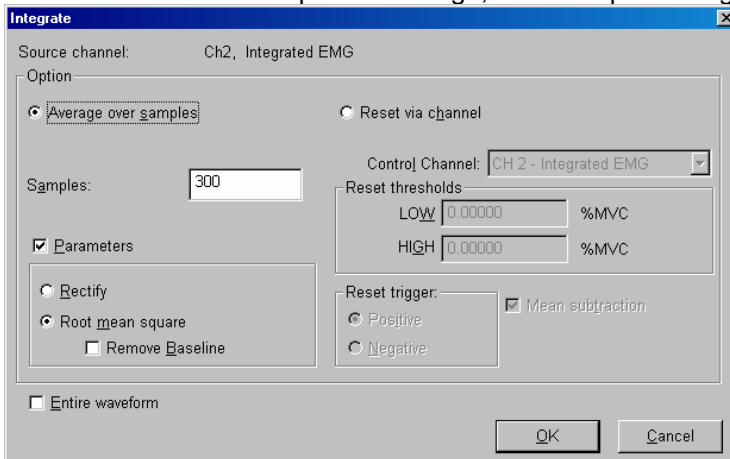
- Choose Edit > Duplicate Waveform to duplicate the channel.



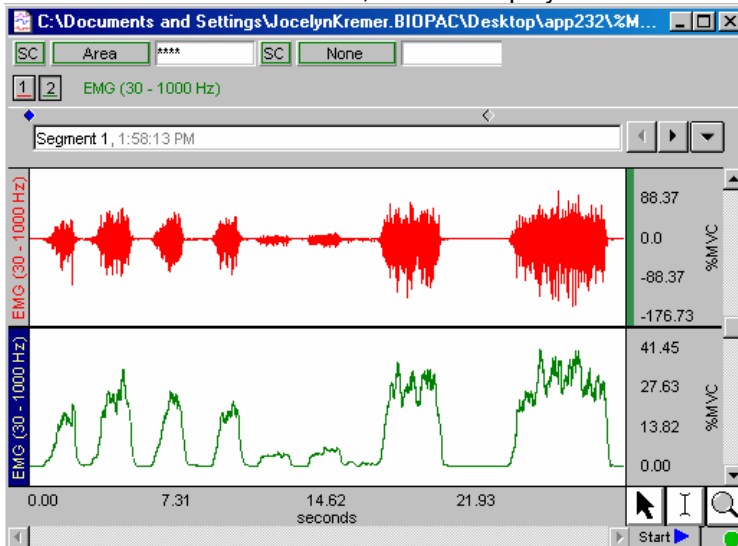
- Select and relabel the duplicated channel (double-click on the left-edge channel label of the duplicated channel); this example uses "Integrated EMG."

- Click Transform > Integrate to perform an integration on the entire waveform.

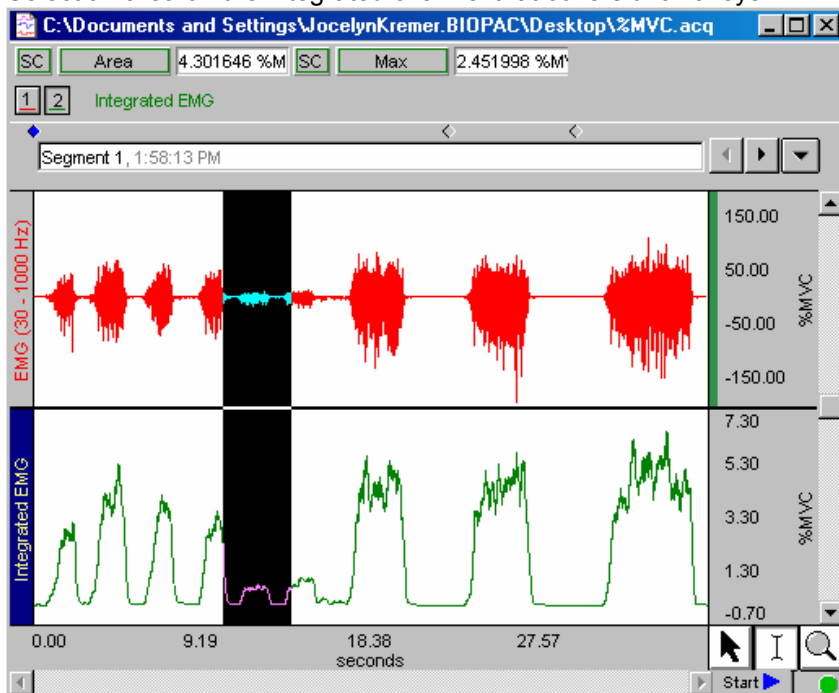
a) Enter the number of samples to average; this example averages over 300 samples.



b) Click OK and review the result; choose Display > Autoscale waveforms if necessary.

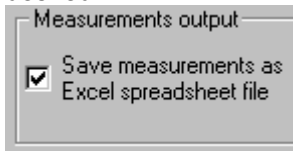


11. Select an area on the integrated channel that covers two valleys.

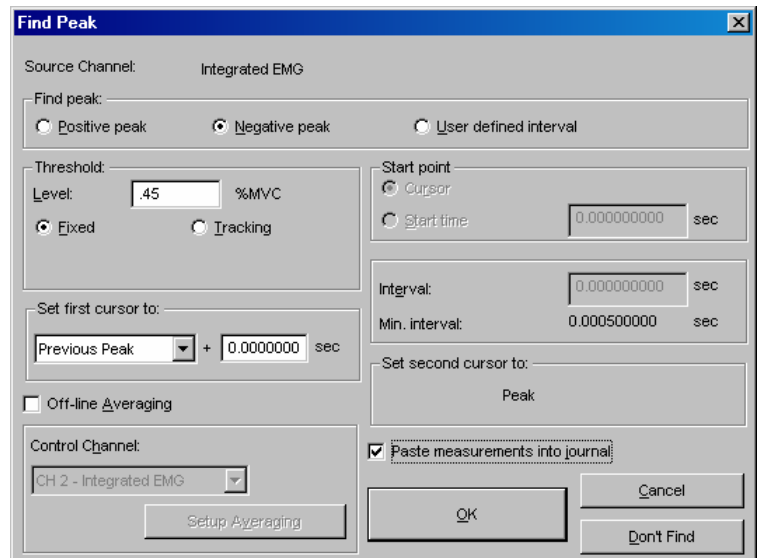


12. Select Transform > Find Peak.

- a) Select Negative peak
- b) Set Threshold to .45 (you will need to adjust this based on the data).
- c) Set first cursor to: Previous Peak (leave the "sec" value as is)
- d) Select Paste measurements into journal
 - AcqKnowledge users can select Save as Excel spreadsheet if desired.



- e) Click "Don't Find."



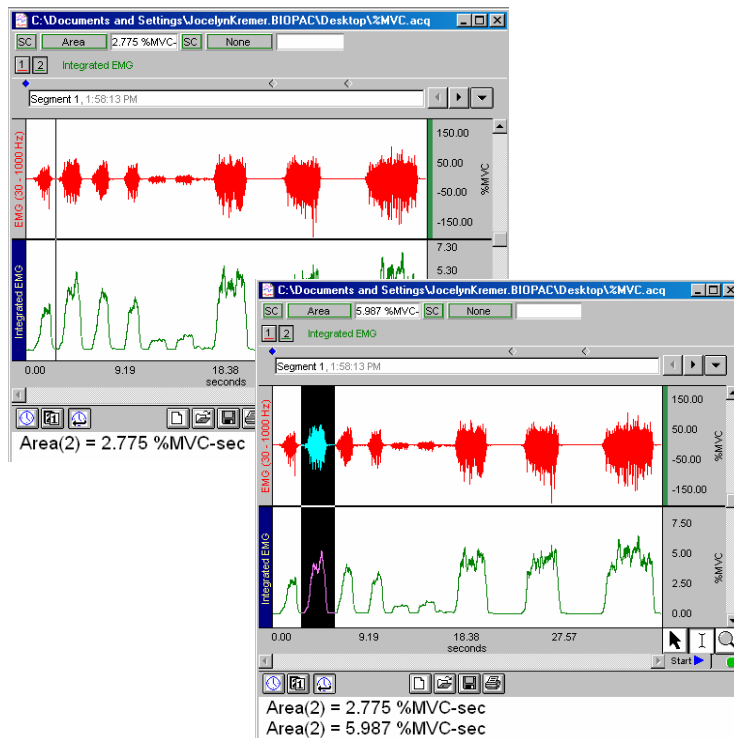
13. Click the cursor at the start of the data file.

14. Find peaks via Transform > Find... options or the toolbar icons.

- a) Use "Find Peak" and then "Find Next Peak" to measure individually.
- b) Use "Find All Peaks" to measure all at once.
- c) The last peak may not be found if there is not enough data after the peak.
- d) Use File > Preferences > Journal to set the measurement details to include (name, channel, etc.)
- e) Use Display > Preferences > General to set the result precision.



Find Peak and Find Peak



Find All Peaks

