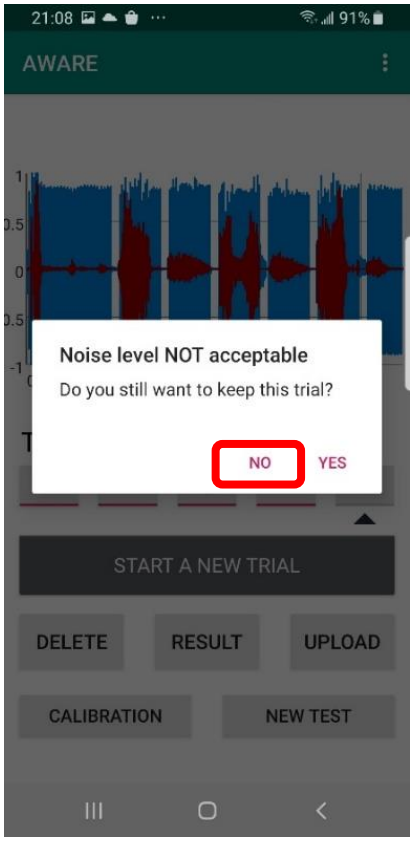
Experiment Protocols – Additional Notes



Check Data Quality

After finishing each trial, the app will conduct a two-step procedure to help the user check the quality of collected data:

1) ### Check noise level

   The program will detect the noise produced by breathing and evaluate if the noise level is acceptable. Breathing too fast or too hard will produce loud noise, which may overwhelm the probing signal.

   If the program says “Noise level acceptable”, click “OK” and proceed to next step.

   If the program says “Noise level NOT acceptable” and asks “Do you still want to keep this trial”, click “No” and then redo the trial. Try to slow down and make airflow smooth and steady when breathing.

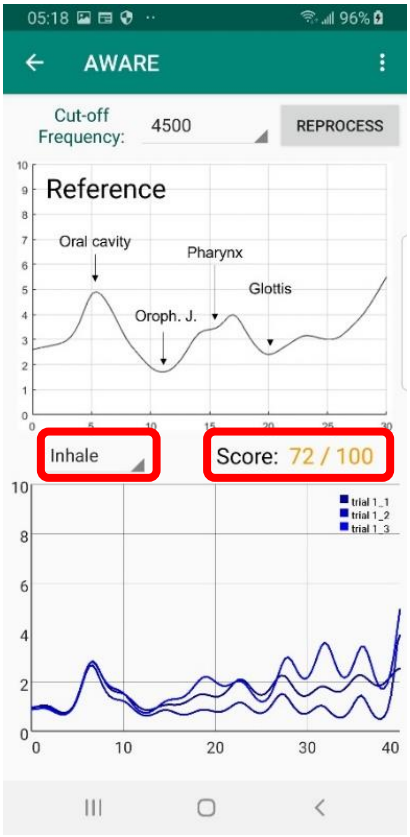
2) ### Check if the curves look similar to the reference

   The program will compute the cross-sectional area curve of each stage (nasal breathing, 3×inhalation, 3×exhalation), and calculate a similarity score compared to the reference curve. Click the drop-down list to see the results of different stages. For each stage, a separate curve will be displayed with respect to each trial.

   If the score is over 80 (shown in green), congratulations! This trial has been done with sufficiently high quality and no additional adjustment is needed. Just follow the same way and repeat for multiple trials.

   If the score is from 60 to 80 (shown in yellow), the quality of data is moderate. Visually check if the bumps and valleys can match the marked parts on the reference curve, particularly the bump corresponding to the Pharynx and the valleys corresponding to the Oroph. J and Glottis. If yes, no additional adjustment is required. If no, need to make certain adjustments according to how the curve looks like (see details below) in the following trials.

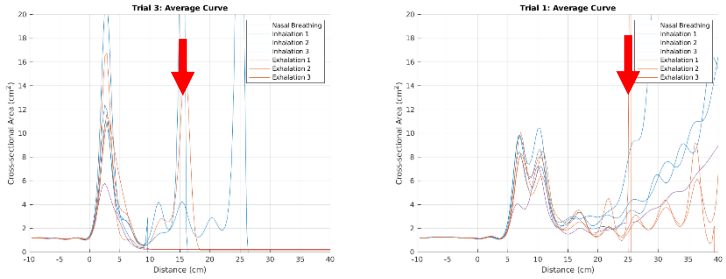
   If the score is below 60 (shown in red), the quality of data is low and unacceptable. Redo the trial and make certain adjustments according to how the curve looks like (see details below).



NOTICE: If the patients still cannot achieve a good data quality after a few attempts of improvement, just complete full five trials and upload.

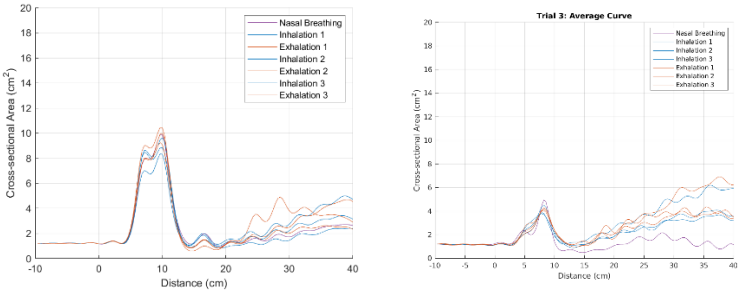
Common Problems and How to Improve

1) **Phenomenon:** The curve has some high spikes
   Examples:



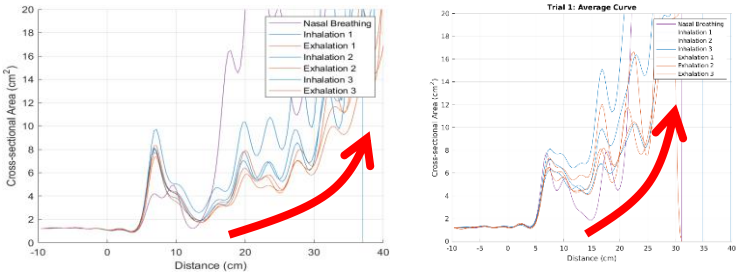
   Possible reason: breathed too hard or too fast.
   Ways to improve: **<u>Slow down when breathing. Try to maintain a smooth airflow. Do not breathe too hard at the beginning.</u>**

2) **Phenomenon:** All curves look like nasal breathing and do not exhibit significant bumps and valleys as shown in the reference curve
   Examples:



   Possible reason: The throat was barely open, or breathed through nose when doing oral breathing
   Ways to improve: **<u>Relax when breathing through the tube, do not intentionally restrict breathing. Think about blowing a balloon slowly.</u>**

3) **Phenomenon:** The curve has a significant increasing trend
   Examples:



   Possible reason: Airflow leaked from nose
   Ways to improve: **<u>Practice to only use mouth for breathing. DO NOT pinch nose or use nose clip.</u>**

4) **For other cases:** **<u>Carefully check if they follow the protocol and instructions correctly, then retry.</u>**