

Teachers' Guide to Voice Dosimetry

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This memo contains a manual of the NCVS Dosimeter. This manual was written as a guide for teachers participating in the research project NIDCD, ROI-DC04224 "Research Towards Occupational Safety In Vocalization". The basic functions of the NCVS Dosimeter are described, which are followed by the description of the dosimeter device and its components (Pocket PC, accelerometer, portable power supply and back-up battery pack, connectors and cables). Brief information is given on the dosimeter software. Detailed instructions are provided for attachment of the accelerometer to the skin of the neck as well as its detachment from the skin. The Dosimeter Operation chapter describes how to charge the pocket PC and the portable power supply, how to connect the power supply and the accelerometer to the pocket PC and how to start and stop the dosimeter application. The next chapter describes how to use the dosimeter application software and how to perform the necessary tests. The troubleshooting chapter provides information on dealing with some of the problems that can be experienced when using the NCVS dosimeter. In appendix A the dosimeter parts are described. In Appendix B, a sample of a daily log sheet is attached. Note that subjects are given copies of this entire document, excluding this page after a hands-on training of using the NCVS Dosimeter.

This memo is available online at the website www.ncvs.org/ncvs/library/tech.

Keywords: vocal dose measurement, voice accumulation, voice dosimetry, pocket PC, accelerometer

NOVS

A TEACHER'S GUIDE TO VOICE DOSIMETRY

NATIONAL CENTER FOR VOICE AND SPEECH

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"Research Towards Occupational Safety In Vocalization"

NATIONAL INSTITUTES OF HEALTH

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Importance of Quality in Data Collection

Our goal is to collect accurate information on how you as a teacher use your voice in the classroom. Obviously, collecting good data means not unnecessarily disrupting your normal daily activities. To that end, we have worked very hard to design a device which enables you to teach, talk, move, breathe and sing just like you do without a dosimeter on you. In this way, we will truly get information on "normal voice use" in the workplace.

Collecting good data also means making sure that the equipment is working correctly. To this end, it is essential that you operate the dosimeter exactly as you have been instructed to do. All connections need to be secure, all batteries need to be charged and/or changed regularly, and the dosimeter's accelerometer must be attached to your skin in the correct spot and with the correct combination of glue and tape. It is also essential that you do the regular soft phonation tests. We have built into the programming a test of the dosimeter's functioning each time you do the soft phonation task. So these regular tests not only help us collect data on your voice - they also help us determine if the dosimeter is working correctly (if the data are accurate and beneficial to our study).

How to engage your students, fellow teachers, and school administrators in your participation in this study

This study will put some demands on you - most of all to remember to do the periodic tests, and to keep the device on your body all day. It may prompt a few stares and comments from students and fellow teachers. How can you get them on your side to help you gather this important information?

First, get your students involved in the data collection. Tell them about the device. Tell them why the study is important. Have them help you to remember to do the soft phonation tests. They love to nag adults to do things, after all! Do a science and biology unit on the human voice (or partner with your colleagues who do teach these subjects). Develop teaching materials about how different professions place different demands on the human body. Build a lesson around keeping track of how your body is functioning.

With your colleagues and administrators, stress any of the above items that pertain to the subjects you teach. Nothing makes science and personal health more relevant to daily life than a project everyone can participate in on some level. With administrators, stress the importance of the study to the profession of teaching: if we can discover why teachers experience vocal fatigue and can begin to find ways to help teachers not fatigue, we may ultimately be able to reduce the number of good teachers who drop out of the teaching profession. We need all the good teachers we can get! We may also be able to help teachers become more effective in the classroom (i.e., helping their teaching through helping them with their vocal production). Finally, we may be able to make recommendations to OSHA and to teaching unions about safe voice use in the workplace.

CHAPTER 1.

Introduction

Welcome and thank you for participating in the Wilbur James Gould Voice Center's study entitled *Research toward Occupational Safety in Vocalization*.

This study aims to :

1. Design and construct a voice dosimeter, an instrument to measure vocal fold vibration or vocal "dose";
2. Measure the daily and weekly dose received by approximately 80 to 100 teachers on the job AND at home;
3. Provide a voice-economy oriented therapy program to a subset of these teachers;
4. Relate vibration dose at the larynx to vocal output;
5. Relate auto-perceptive measures of recovery time to vocal fatigue, short term rest periods and tissue health; and
6. To provide amplification to another 20 teachers who are in a classroom setting.

You are being asked to participate in Aim 2, measurement of vocal dose on the job and at home.

1.1 Purpose

The purpose of the dosimetry phase of the study is to collect data on how you use your voice every day. This data will be used to calculate vocal dose, a parameter that we have proposed to quantify the amount of voice use. We hope to be able to use this parameter to figure out a safe "limit" for voice use, and to determine the amount of recovery time needed once this limit has been exceeded. Hopefully, these measures can be related to vocal fatigue among people in vocally demanding professions like yours.

The measurement of dose is based on vocal fold vibration. The "vocal folds" are two tiny folds of muscle in your larynx, or "voice box", which come together hundreds of times a second to produce sound. Your vocal tract (pharynx, mouth, tongue, lips) turns this sound into your "voice". To understand the concept of vocal dose, think of clapping your hands, as you would at the end of a concert or some other live performance. Think about the skin on the palms of your hands, and the different feeling you get from clapping slowly and softly versus loudly and quickly. Imagine the "sting" on your palms after a minute of loud, vigorous clapping. How long do you think you could keep it up before your hands became completely numb and useless? Now imagine clapping at different speeds and loudnesses almost continuously for half an hour, or even half a day. That is what your vocal folds are doing when you speak, sing, laugh or cough, only much, MUCH faster!

1.2 Basic Function of the Dosimeter

The voice dosimeter is a portable electronic computing device consisting of the following:

- a Compaq iPAQ Pocket PC, with an input cable attached
- the Dosimeter Application software
- the accelerometer cable
- an in-line attenuator which connects between the accelerometer cable and the input cable
- a portable, rechargeable power supply for the Pocket PC
- a back-up external battery pack which runs on 4 "AA" batteries (provided)

The dosimeter is carried in a fanny pack or belt pack (provided). The interface to the user is through the accelerometer, which is attached to the skin of the throat, for continuous data input; and also through the touch-screen of the Pocket PC, for occasional data input from the user in the form of on-screen dialogues. The dosimeter with all its components is shown in Figure A-1 of the appendix.

We have identified three things about your voice which we need to calculate dose: your speaking pitch (measured as the fundamental frequency, denoted F_0), your intensity or loudness (measured as sound pressure level, or SPL) and your voicing time. The dosimeter will measure these three things through a transducer called an "accelerometer", a tiny sensor that measures the vibration of anything that comes in contact with its metal case. Therefore, the accelerometer will need to be attached to your skin, in the vicinity of your larynx, to measure vocal fold vibration. A thin cable runs from the accelerometer to a Pocket PC, which we have modified with our own software to extract the important parameters from your speech and store them as numerical data in a file. Your actual speech is not saved in any way, so you needn't worry about confidentiality or that there will be a record of your conversations while wearing the dosimeter. In fact, in the "Start Recording" mode only a fraction of a second of your speech is saved into internal buffers at any given time in order to process the data; these buffers are constantly overwritten while the dosimeter application is running.

In addition to collecting the data from the accelerometer, the dosimeter will automatically prompt you every 2 hours to perform a Verification and Soft Phonation Test. This test accomplishes 2 important functions:

1. It allows us, the study investigators, to verify that the dosimeter is working properly at various times throughout the day by walking you, the user, through three simple tests of the hardware. The dosimeter automatically calculates and stores the results of the tests.
2. It asks you to perform 4 tasks which you will use to rate your voice quality throughout the day and allows you to log the results automatically on the Pocket PC.

The Soft Phonation Test has been devised by voice researchers to quantify the amount of vocal fatigue due to vocal fold tissue swelling during prolonged periods of voice use, and to quantify the amount and rate of recovery during periods of voice rest. It is made up of 4 tasks:

1. Soft /i/ ("eee") on a comfortable pitch, sustained for 5 seconds
2. Soft glide from low to high pitch, on /i/
3. Soft, high-pitched staccato /i/ ("hee-hee-hee-hee-hee")
4. Soft, high-pitched singing of the "Happy Birthday" song

You will also rate the effort and discomfort associated with speaking based on the last 2 hours of voice use. Your ratings based on these tasks will supplement the data collected from the accelerometer, to give us a more complete picture of how you use your voice, from the start of your school day up until you're ready to go to bed. This is exactly the kind of information we need to accomplish Aims 3 and 5 (above) of our overall study.

CHAPTER 2.

Brief Description of the Voice Dosimeter and its Components

This section is intended to familiarize you with some general aspects of the dosimeter and its components. Detailed operating instructions of the hardware and software are presented in Chapters 4 and 5.

2.1 Pocket PC

The heart of the dosimeter is the Pocket PC, a commercially available device also known as a "Personal Digital Assistant" or PDA. It comes with a "cradle" which connects to a transformer that plugs into any AC outlet, to recharge the internal battery (or continuously power the unit). The cradle is also used to connect the Pocket PC to a laptop or desktop computer, for transferring files between the two. You will use the cradle to recharge the Pocket PC every night. During the day, you will use the external battery pack to keep it running.

You will be given 2 Pocket PCs and two cradles, so that you will always have a spare. Normally you will switch them every other day, so that the previous day's data can be retrieved (by a Tech Support person) while you are using the second Pocket PC. The spare can also be used if there is a malfunction of one of the devices. You will switch to the spare if you are directed by one of the Voice Center personnel to do so (i.e., chief engineer or tech support).

During the day keep the Pocket PC that you are not using turned off, in its cradle and plugged into a wall outlet, so that it will be fully charged for the next day of use. At night, put the Pocket PC you have been using all day in its cradle so that it may recharge overnight. You may want to keep one cradle at home at one at school so that you will always have one available. NOTE: if the Pocket PC internal battery ever becomes fully depleted, all memory contents, settings and the dosimeter application software will be lost!

For more details on charging the Pocket PC, see Chapter 4.

2.1.1 Pocket PC System Settings

There are a few important system settings on the Pocket PC that must be set for the Dosimeter application to function properly. They will be already set when you receive your dosimeters, or they are automatically set by the software, or they will be set by your Tech Support person, *so normally you won't need to worry about these settings*. However, there may be some circumstances (as in troubleshooting over the phone) where you may be asked to verify these settings, so for reference they are listed here.

- **Time**

1. From the "Start" menu (see Appendix A), select "Settings" (third from bottom).
2. Select the "System" tab.
3. Tap on the Clock symbol.
4. Set Time Zone, Time and Date for "Home"
5. Tap "ok" at the top right of the screen to exit this window.

- **Microphone AGC**

1. From the "Start" menu (see Appendix A), select "Settings" (third from bottom).
2. Select the "System" tab.
3. Tap on the Microphone AGC symbol.
4. Select the radio button labeled "Disable".
5. Tap "ok" at the top right of the screen to exit this window.

- **Voice recording format**

1. From the START menu (see Appendix A), select "Settings" (third from bottom).
2. Tap on the up arrow (▲) at the bottom right of the screen.
3. Select "Options..." at the top of the pop-up menu.
4. Select the "Options" tab (third tab, near bottom of screen)
5. The highlighted window of the drop-down menu under the heading "Voice recording format:" should read "**11.025 Hz, 16 Bit, Mono (22 KB/s)**". If it doesn't, tap on the down arrow to the right of the drop-down menu window and select that option.
6. Tap "ok" at the top right of the screen to exit this window.

- **Sound Notifications**

1. From the "Start" menu (see Appendix A), select "Settings" (third from bottom).
2. Select the "Personal" tab.
3. Tap on the "Sounds and Notifications" symbol.
4. Make sure all boxes are unchecked
5. Tap "ok" at the top right of the screen to exit this window.

2.2 Portable Power Supply and Back-up Battery Pack

When the internal battery is fully charged, the Pocket PC will run for approximately 2-4 hours. Our study requires that you wear the device for the entire day; for instance, if you start school at 8 am, teach until 3 pm, coach the soccer team from 3:30 to 5:30 pm, go home at 6 and make dinner, then go to choir rehearsal from 7:30 to 10 pm, go home again at 10:30 pm and get ready for bed at 11 pm, you will have worn the dosimeter for 15 hours.

You will be supplied with a rechargeable portable power supply to power the Pocket PC while you are wearing it. This power supply is capable of powering the Pocket PC for the entire day, as long as both the Pocket PC and the power supply are fully charged overnight. As a back-up to this power supply, we may also provide with a regulated external battery pack which takes 4 "AA" batteries, which also plugs into the Pocket PC . The back-up battery pack is only capable of powering the Pocket PC for about 8 - 10 hours, so you should change the batteries at the end of your school day if you are using this device. You will be provided with a small supply of fresh batteries to use if needed for an emergency situation.

For more details on connecting the power supply or battery pack, see Chapter 4.

2.3 Connectors and Cables

We have chosen miniature professional audio connectors for a reliable, easy and the secure connection. The female connector on the Pocket PC input cable has a spring tab on the outside which lines up with the notch on the inside of the male connector on the accelerometer cable. To make the connection, press the mating ends together until a gentle click is heard and the black button on the female connector pops up. You should never have to force the connection - if the two ends don't seem to mate properly, make sure you are bringing the connectors together straight on and that the tab and notch are lined up. If you still can't get them to mate, try another accelerometer cable (You will be given two).

For more details on connecting the accelerometer cable see Chapter 4.

2.4 Dosimeter Software

The Dosimeter software collects your voice data throughout the day without any interaction from you once you have started it. The exception is the Verification and Soft Phonation Test, described above, which you will do every 2 hours (or as close to this as possible).

For more details on using the software see Chapter 5.

CHAPTER 3.

Attaching and removing the accelerometer

This chapter and the following give detailed, step-by-step instruction on how to start and end your dosimetry sessions each day. Please study these chapters and follow the directions closely, without shortcuts. Much effort has gone into designing these steps to ensure the most accurate results and to make your experience as comfortable as possible. Once you have read these chapters, you can refer to the AM and PM checklists on your daily logsheets (Appendix B) to guide you through the proper sequence each day.

For the greatest accuracy in measuring the vibration of your vocal folds, the accelerometer must be attached directly to your skin using a strong but non-permanent surgical glue called Mastisol . It is safe and medically approved for attaching instruments of any kind to the skin. It removed using a solvent called Detachol, made by the same medical products manufacturer for that purpose. ***You will be given a supply of the glue and remover which should be much more than you will actually need, if used properly.*** At the end of the data collection cycle, you will return the remainder of the glue and remover for subsequent use by other subjects. Please follow the directions below exactly, and be careful not to contaminate the containers or their contents. Specifically, never use anything but the ***clean*** end of a cotton swab to apply the Mastisol, do not double-dip the same end of a swab, and discard the swab after both ends have been used once. Similarly, use the flip-tab dispenser on the Detachol bottle to apply a small amount to a clean cotton ball or gauze pad, and use that to remove the dried glue from your skin and the accelerometer.

Detailed directions are given below.

3.1 To attach the accelerometer:

1. Place the cable underneath your shirt/ top. Pull the accelerometer out of the shirt's/ top's neck-line.
2. Soak a ***clean*** cotton swab in Mastisol adhesive (Figure 3-1). (***Do not reuse cotton swabs or double-dip!***)



Figure 3-1

3. Use the swab to apply the glue both to the metal part of the accelerometer as well as to the skin on the softest part of the front of the neck, i.e. the recess between the Adam's apple and the top of the sternum, usually about 1 cm to 1 inch above the sternum (Figure 3-2).



Figure 3-2

4. Place the accelerometer on the glued spot on your neck *with the metal part facing the skin* and hold it with your finger for about 30 seconds (Figure 3-3).



Figure 3-3

5. Meanwhile, form a service loop in the cable and use a piece of hypo-allergenic adhesive tape (provided) to secure the cable below the loop (Figure 3-4).

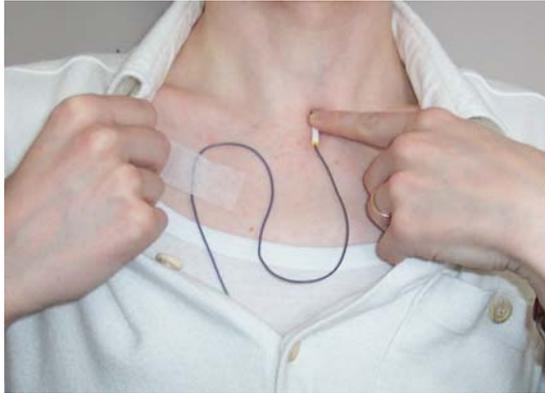


Figure 3-4

6. Cut one of the supplied suture strips in half with a scissors. Apply one half of the strip horizontally over the accelerometer as shown (Figure 3-5).

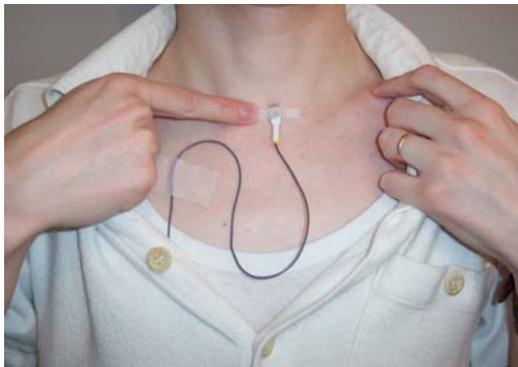


Figure 3-5

NOTES:

- *The device will only function properly, if there is a firm contact between the accelerometer and the skin. Use enough glue on the accelerometer and the skin to ensure a proper and long-lasting contact.*
- *The service loop shall be done in such a way that the cable does not pull or twist the accelerometer away from the skin. Depending on the cable, each accelerometer may need slightly different loop to ensure the accelerometer is lying flat on the skin. It is worth to spend some extra seconds to find the correct position of the loop. If not done correctly, the cable will be pulling or twisting the accelerometer which may cause its slow detachment from the skin.*
- *An itching sensation suggests that the accelerometer is slowly detaching from the skin and will require reattachment.*
- *Avoid touching the accelerometer during the day; doing so will produce erroneous data.*

3.2 To remove the accelerometer:

1. Gently pull off the adhesive tape which is holding the cable loop.
2. Apply a small amount of Detachol adhesive remover to an end of a cotton swab.
3. Using the cotton swab, ease off the suture strip and the accelerometer from the skin.
4. and Gently wipe all the glue from your skin.
5. Clean the accelerometer and the cable with the same cotton swab. Remove as much dried glue as you can by this method. ***Do not scrape the accelerometer with any object other than the cotton swab, moistened cotton ball or gauze pad. Do not immerse the accelerometer sensor or cable in the Detachol bottle or in water!***
6. Wash your neck with soap and warm water. Pat dry with a towel.

Notes:

- *Gentle removal of the glue from your skin as described above should minimize irritation to the skin.*
- *After detaching the accelerometer from the neck, wash out all the Detachol liquid with water and soap to prevent secondary irritation of the neck by long exposure to the Detachol.*
- *Some redness from rubbing may be normal, especially after many days.*
- *If the skin is slightly irritated, you can consider applying lotion over night to promote its healing.*
- *Vigorous rubbing is NOT necessary nor recommended, and will increase the likelihood of irritation and redness.*

CHAPTER 4. Dosimeter Operation

4.1 Charging the Pocket PC and portable power supply

1. Put the Pocket PC in its cradle.
2. Make sure the yellow-tipped connector on the wire running from the transformer is firmly inserted into the back of the cradle.
3. Plug the transformer into a nearby AC wall outlet. The amber light on the Pocket PC at the top right will flash while it is charging.
4. When the pocket PC is fully charged, the amber light stay on continuously.
5. Connect the Unity Digital portable power supply to the Unity Digital transformer and plug it into a nearby AC wall outlet (Figure 4-1).



Figure 4-1

4.2 Connecting the charger or battery pack and accelerometer cable

1. Remove the Pocket PC from the overnight charging cradle.
2. Connect the Unity Digital portable power supply to the Pocket PC (Figure 4-2a)
3. Alternatively, install 4 fresh "AA" batteries into the battery pack and connect the battery pack to the Pocket PC (Figure 4-2b).
4. When the charger or battery pack is connected properly, the amber light on the front of the Pocket PC (next to the ON/OFF button) will come on, and either stay on or flash on and off.
 - If the amber light does not come on at all, there is no power to the computer. Check whether the connector has been properly inserted into the Pocket PC

or, in the case of the back-up battery pack, whether the batteries have been placed correctly in the holder.



Figure 4-2

5. Put on the belt pack and place the Pocket PC in it.
6. Carefully connect the in-line attenuator to the input cable of the Pocket PC, then connect the accelerometer cable to the in-line attenuator(Figure 4-3).



Figure 4-3

7. The dosimeter is ready for use.

4.3 Starting the Dosimeter Application

1. Turn on the Pocket PC (ON/OFF on front, top right)
2. Tap on the "Start" menu (Windows icon on top left of screen)
3. Select "Dosimeter" from Start Menu list ( icon - please see Appendix A for labeled pictures of the Pocket PC and Dosimeter application). The Dosimeter Application main screen appears. At this point, the Dosimeter software is running but not collecting data.

4. Tap the "Start Recording" button, top center of screen. The Verification and Soft Phonation Test dialogue automatically appears.
5. Follow the on-screen directions to perform all the tasks.
6. When you have completed all the tasks, you will be automatically returned the main screen.
7. The "Recording Time Elapsed:" display will continuously count up the number of seconds the program is running.

4.4 Stopping the Dosimeter Application

It is very important that you stop the dosimeter application in the correct way so that the data files and log files can be properly written and saved by the pocket PC. The screen shots in Figure 4-4 below are also shown in Section 5 of this manual, "Using the Dosimeter Application", but because of their importance they are repeated here.

To stop the application:

1. Select the "Display Stop Recording Button" on the main screen (Figure 4-4a).
2. Tap the "Stop Recording" button (Figure 4-4b). A screen giving you final shutdown instructions will appear (Figure 4-4c).
3. Follow these instructions to end your session.

If the dosimeter application is ever stopped by accident, for instance if the "Stop Recording" button is inadvertently pressed while the dosimeter is in your belt pack or if you press it by mistake, the screen in Figure 4-5c will appear to alert you of this condition. If this occurs, you can restart the application after pressing "ok" to continue taking data.

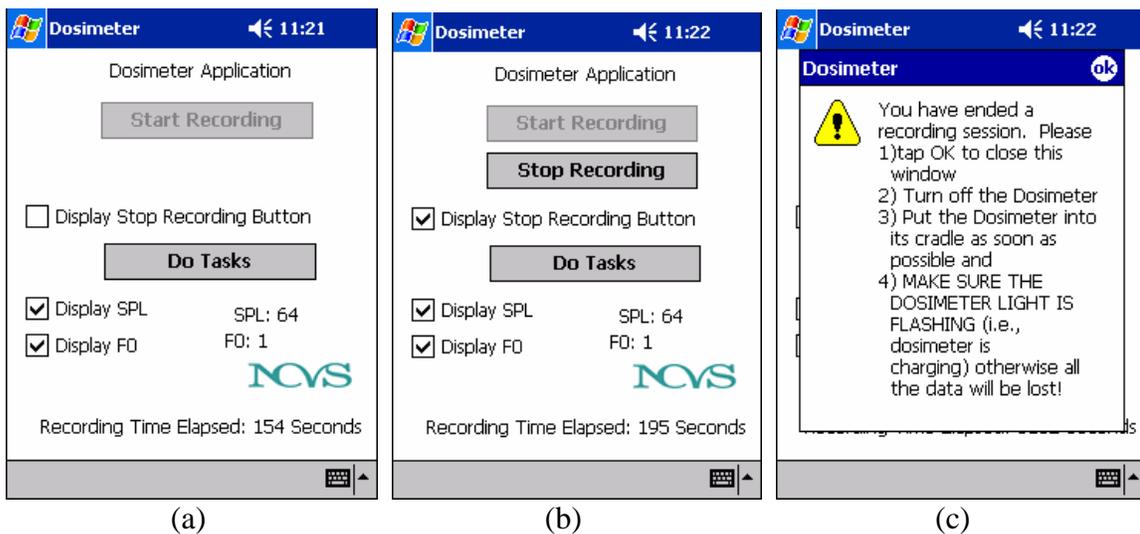


Figure 4-4

CHAPTER 5.0

Using the Dosimeter Application

This section guides you through the operation of the Dosimeter Software by giving a step-by-step description of the Dosimeter Application Screens. Most of the time it is running, the Dosimeter displays the Main Application Window. At other times, you will see the Verifications Test screen, signaling that it is time for you to do the Verification and Soft Phonation tasks.

The Verification Test comes up immediately when you press "Start Recording", and then automatically comes ups every 2 hours thereafter. Each screen gives you step-by-step instructions as described below.

You also have the option to do the Verification Test sooner than 2 hours, if you know that you will not be able to do it at the next appointed time. To do this, tap on the "Verify Progress" button on the main screen and follow the instructions as described below; the next Verification Test will then come up automatically 2 hours after that.

If you do not respond to the Verification Test exactly every 2 hours, it will wait for you while continuing to record data. It is necessary, however, to try to do the tests as close as possible to every 2 hours.

5.1 Main Application Window

1. This is the first window displayed when you start the Dosimeter application (Figure 5-1).

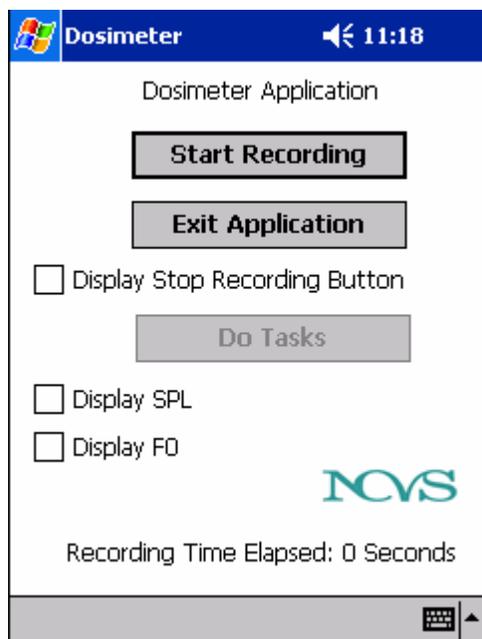


Figure 5-1

2. Figure 5-2 shows how you can see the SPL and F0 values when you check in the boxes for the Display SPL and Display F0. These values should change as you speak or not speak to indicate that the application is performing and saving the calculations on your voicing data.

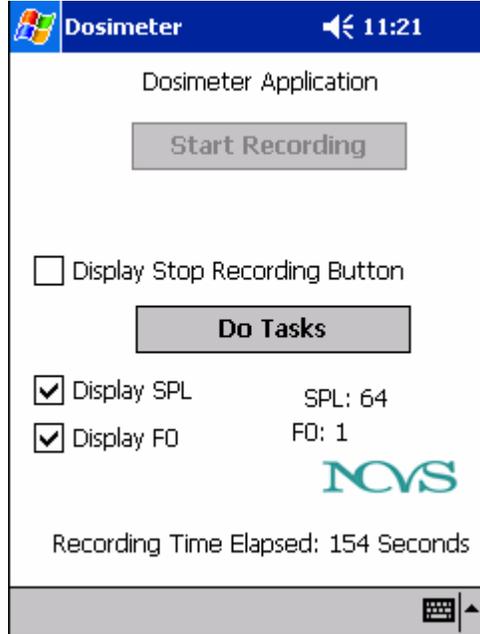


Figure 5-2

3. Check the 'Display Stop Recording Button' to see the 'Stop Recording' button (Figure 5-3). This is normally hidden so that the 'Stop Recording' button is not activated in error.

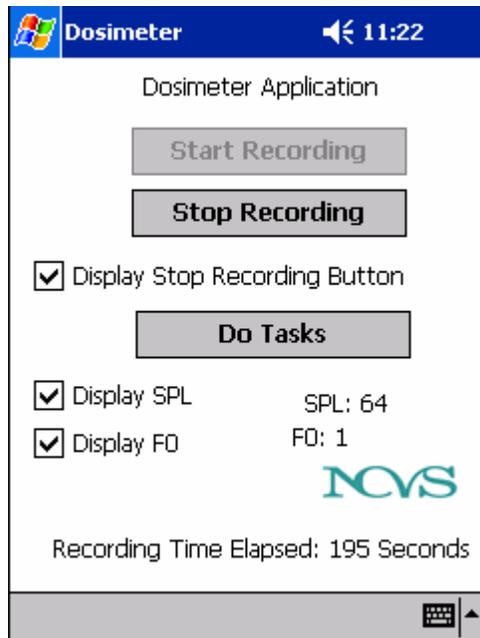


Figure 5-3

5.2 Verification Test screens

1. The noise test is the first test displayed as part of the 6 screen Verification process(Figure 5-4).

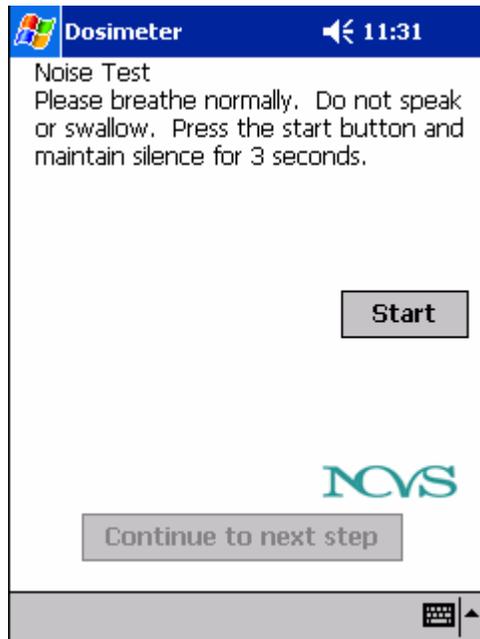


Figure 5-4

2. Once you press the Start, you will see a screen similar to Figure 5-5:

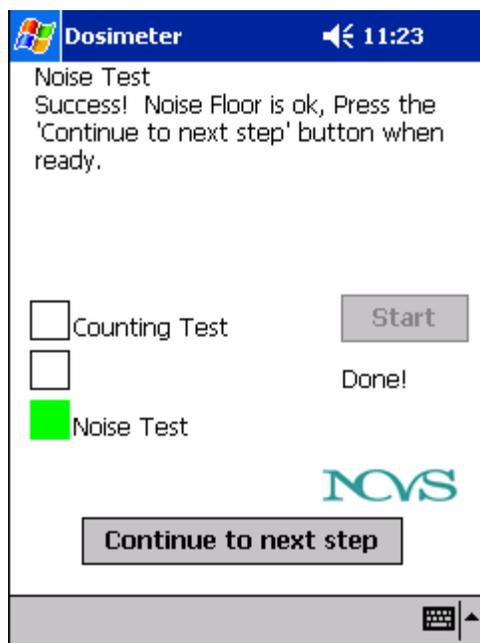


Figure 5-5

3. As you start the noise test, you will see a count down indicator where the above screen says 'Done!' to let you know how much longer you have to go. The LED's will light up according to the noise detected. In the case of this test, only the bottom LED should light up, the other two, if lit up, will be red. Momentary lighting of the upper LED's could happen and still pass this test, but if they are lit too much/too long, the test will fail.
4. The Soft Phonation test is the second screen for the verification process(Figure 5-6). You have 4 tasks to perform, once you have completed the tasks, tap the "Continue to next step' button when finished.

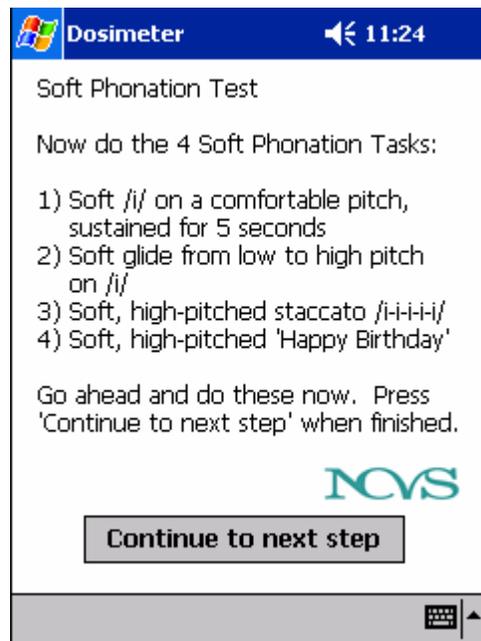


Figure 5-6

5. Figure 5-7 is the 3rd screen in the Verification process. Select the level that best represents your soft voice quality after performing all of the Soft Phonation Test tasks. Press Save my results to continue on to the next step.

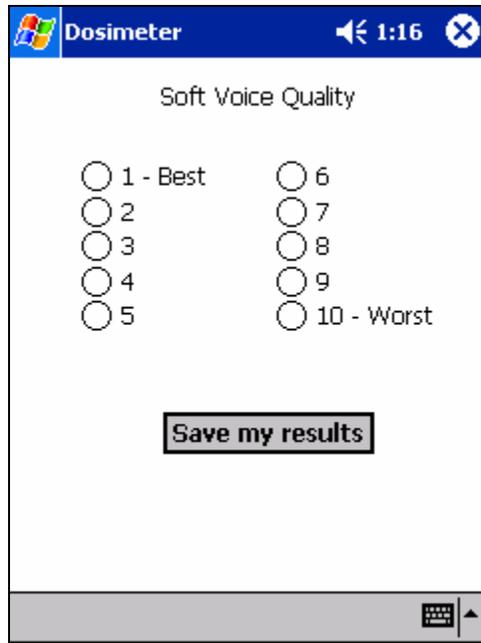


Figure 5-7

6. The counting test is the 4th screen in the verification test (Figure 5-8). Press start when you are ready to begin the test.

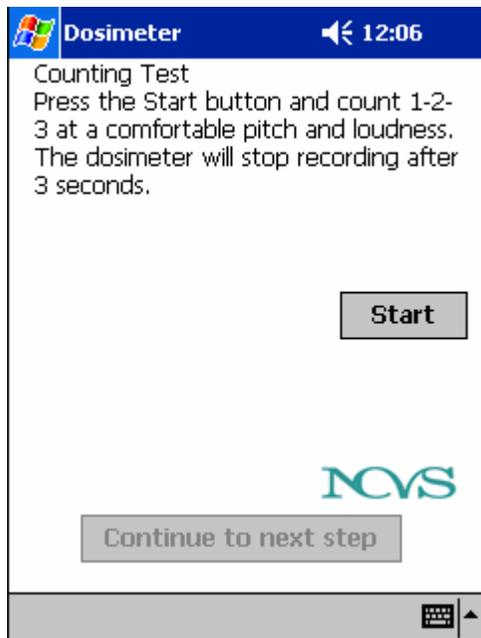


Figure 5-8

- For this test, you want to light up all three LEDs a few times during the count down. You do not need to keep them all lit the entire time to pass (Figure 5-9).

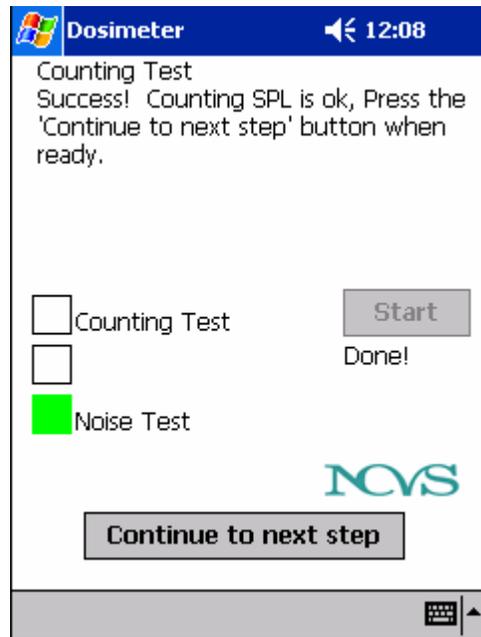


Figure 5-9

- Figure 5-10 is the last screen in the verification process. Select the levels that best describe your effort and discomfort levels on the last 2 hours of voice use.

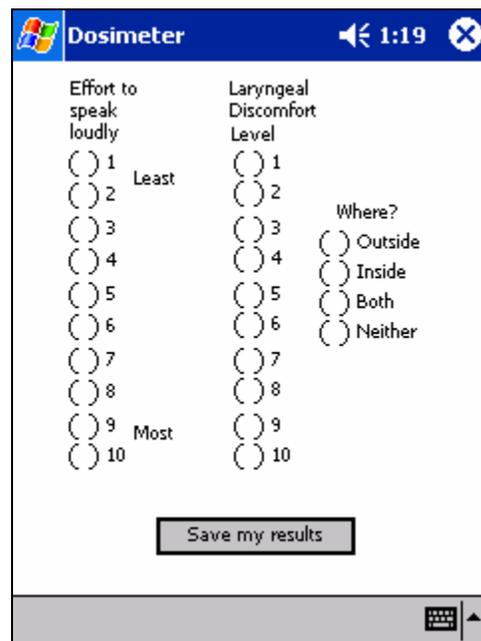


Figure 5-10

9. You must select an answer to all three items. If you do not, you are prompted to select them as in the dialog below (Figure 5-11).

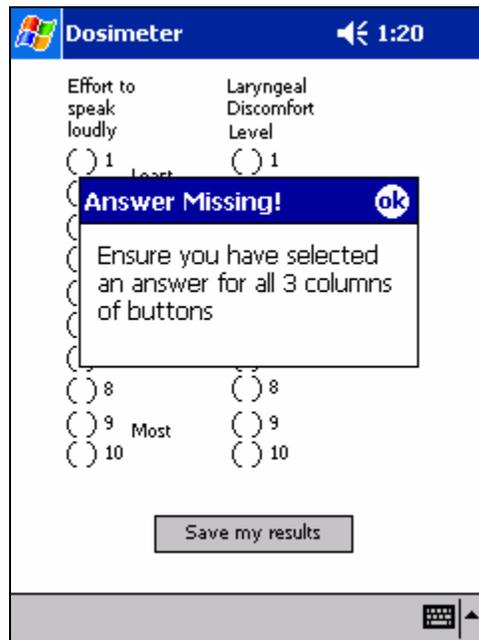


Figure 5-11

10. At the end of the day, when you are ready to shut down the application, you may do so by selecting the "Display Stop Recording Button" on the main screen (Figure 5-3) and tapping the "Stop Recording" button. A screen giving you final shutdown instructions will appear (Figure 5-12). Follow these instructions to end your session.

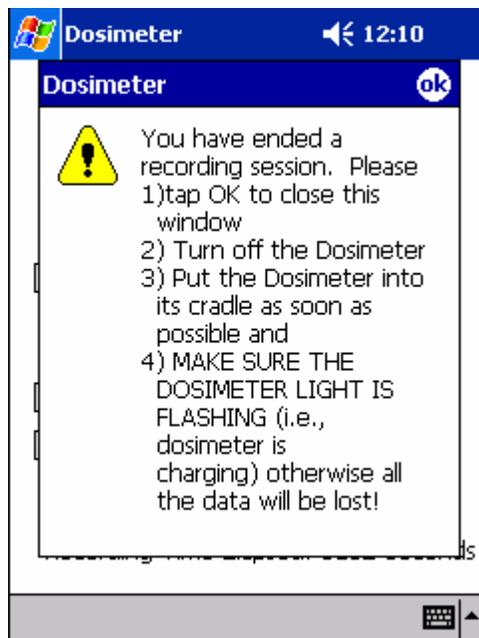


Figure 5-12

CHAPTER 6.0

Troubleshooting (FAQ)

- **I can't find the Dosimeter application**

Tap on the "Start" icon at the top left of the PocketPC Window. You should see a drop down list of applications. If the Dosimeter application isn't listed there, it may no longer be installed, call for technical assistance.

- **The Pocket PC won't turn on or just flashes and turns off**

It sounds like the power has drained. Replace your batteries in the battery pack and recharge the Pocket PC as soon as possible. The batteries are the main source of power, but when they run out, the Pocket PC must be fully charged to continue collecting and processing data. It is important to charge the unit on the cradle every night to ensure a full internal battery charge.

- **I took the dosimeter out of my belt pack, and instead of the main window there is a window with a yellow exclamation mark and a message that says "You have ended a recording session". What do I do?**

If the application has accidentally been stopped, for instance if the "Stop Recording" button is inadvertently pressed while the dosimeter is in your belt pack or if you press it by mistake, hit "ok" and then restart the application. Tap on the start menu and then tap on the Dosimeter application. You will then begin a new session, starting with the Noise test.

- **How do I know it is recording?**

If the application is recording, you will see the 'Recording Time Elapsed' counter incrementing every second. To see if voiced data is being collected, you can tap on the 'Display SPL' box. As you talk, you should see the value displayed after this changing every second as your voice levels change. Also the verification you go through when you start the application tests the recording process.

- **How do I stop the application?**

Tap on the box for 'Display Stop Recording Button'. You will then see the Stop Recording button. If it is enabled, you can press this to stop recording and you can then exit the application by tapping the 'ok' icon at the top right corner of the screen. The Stop Recording button is hidden this way to prevent accidental presses of the button. Be sure to press the 'ok' icon at the top right of the final dialogue window to fully exit the Dosimeter application, then shut off the pocket PC.

- **The Pocket PC shows a popup window saying power is low and to save my work, what do I do?**

The power supply batteries have run out and the internal battery in the Pocket PC is running low. You need to replace the batteries in the battery pack as soon as possible, and recharge the Pocket PC when you can. The Dosimeter application monitors the power level, once it reaches too low, it will stop recording, close out data files, and end the application. Attempts to restart the application at this point will not be successful until the power supply is renewed or the internal battery is recharged.

Appendix A: Identifying the Pocket PC and Dosimeter Application

Figure A-1 is labeled picture of the Pocket PC

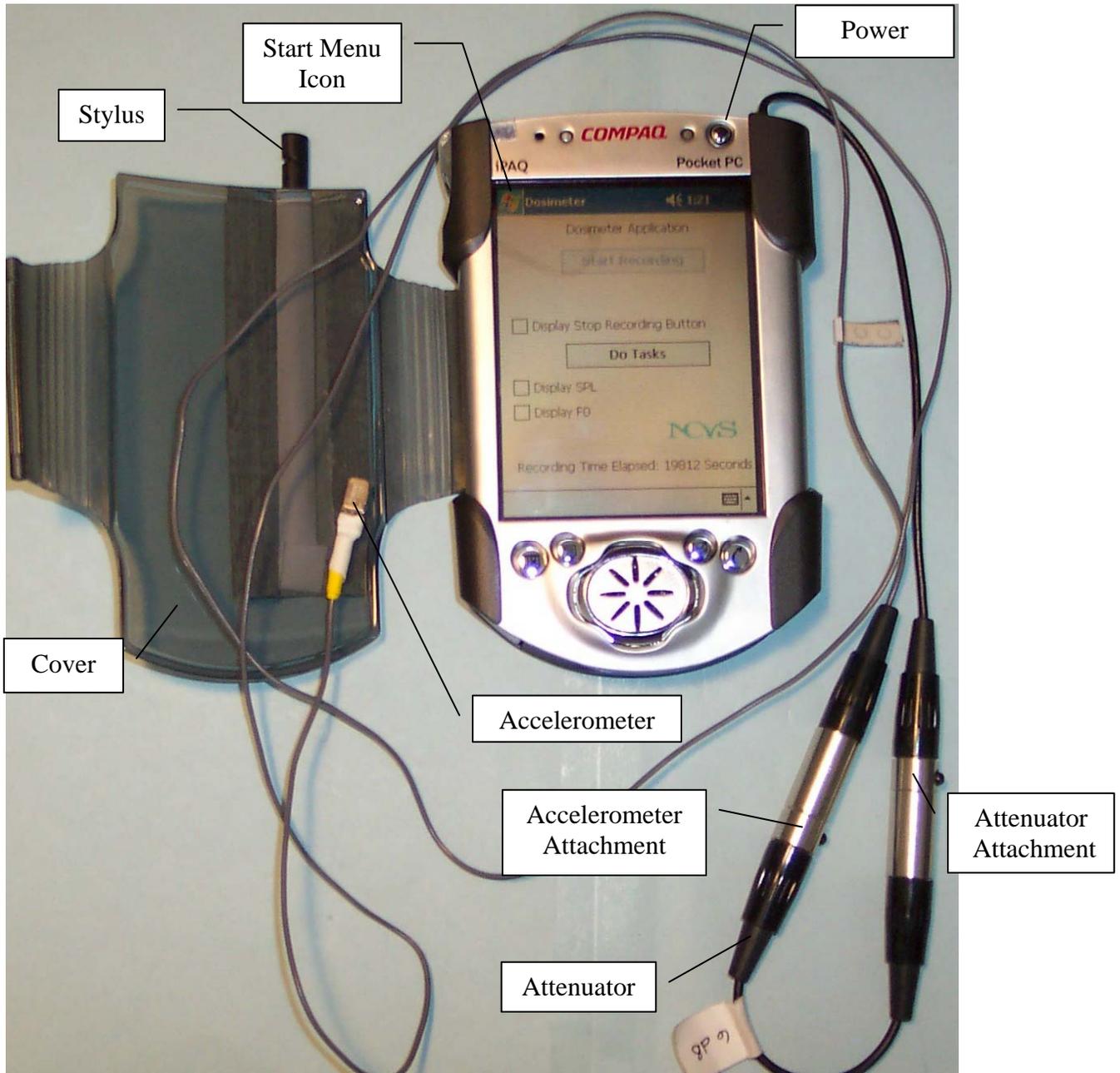
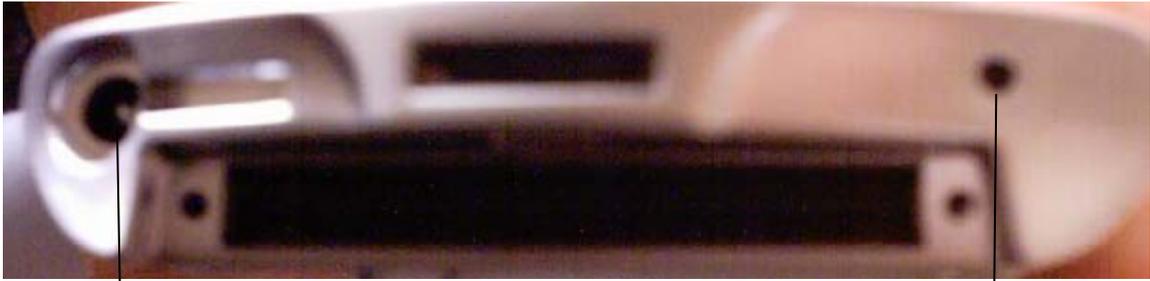


Figure A-1

Figure A-2 shows the bottom of the PocketPC.



External Battery
Pack connection

Reset Button (use the tip
of the stylus to press if the
Pocket PC 'locks up')

Figure A-2

Appendix B: Sample Daily Logsheet

| | | |
|---|--|-------------|
| Day 1 Date | Protocol # 00-168 Subject # | Dosimeter # |
| AM Checklist: <input type="checkbox"/> Attach accelerometer to throat using Mastisol <input type="checkbox"/> Select charged pocket pc from two days ago <input type="checkbox"/> Attach the power pack to the dosimeter and check that the indicator light comes on <input type="checkbox"/> Connect accelerometer cable with attenuator to pocket pc <input type="checkbox"/> Turn on pocket pc <input type="checkbox"/> Start application | PM Checklist: <input type="checkbox"/> Close application by displaying and pressing the “Stop Recording” button <input type="checkbox"/> Turn off pocket pc <input type="checkbox"/> Disconnect accelerometer cable with attenuator from pocket pc <input type="checkbox"/> Place pocket pc in cradle to charge overnight <input type="checkbox"/> Let the power pack charge overnight. <input type="checkbox"/> Detach accelerometer cable from throat with Detachol solution. <input type="checkbox"/> Clean accelerometer (especially the metal part) with Detachol <input type="checkbox"/> Wash throat with soap and water gently after removal to remove solution. You may consider applying body lotion on the attachment place, if irritated. | |

Remember: You may review the soft phonation task video any time if you need more instruction on rating your voice

| | |
|---|--|
| Daily Log Sheet: Call Andrew Starr if you have any questions! 303 909-9574 | |
| <p>Vocal Activities Related To Teaching: Please, provide us with your teaching schedule so that the recorded data on voice can be properly interpreted.</p> <p>Please, fill in the following information: Time of arrival to work: Lunch time: Time of leaving the work: Classes - times and subjects: (e.g. 9:00-9:45 – Math; 10:00-10:20 staff meeting...)</p> | <p>Other Vocal Activities: List vocal activities you performed in addition to teaching, e.g., church choir, coaching, etc. Give the times at which the activities took place. Also note any clothing that may have interfered with the accelerometer, e.g, turtleneck, scarf, etc. Write down anything unusual about your voice that you can't comment on with the pocket pc. Think of this as your vocal diary.</p> |
| <p>Were you sick today? YES NO night? Hrs</p> | <p>How many hours of sleep did you get last night?</p> |

In addition to the dosimetry data and the logs of your soft phonation, effort and discomfort rating that are automatically stored in the pocket PC, you will also be asked to keep a written log of your activities that are pertinent to your voice use and hence, this study. The purpose of this is to provide us with the information we would need to interpret your dosimetry results, to verify their validity, and to incorporate data about your experience which we otherwise would not know about (e.g., how much sleep you got each night).

The top half of each daily log sheet includes an AM and PM checklist, with all the steps you need to follow to properly start the dosimetry session each morning and to end it each night. You are encouraged to follow each step, exactly as written, every day and to actually check each one off as you go along. This serves as our written record of your compliance with all the steps of this study, which we will need when reporting on the results.

Your participation and cooperation is greatly appreciated!

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Revisions

- 1.0 Peter P. Popolo and Jan Svec – handout for teachers (2-5-2003)
- 1.1 Andrew Starr – new additions with revamped NCVS Dosimeter (Aug. 2004)
- 2.0 Eric Hunter – Formatted for technical memo and other minor edits (Oct. 2004)