

Thousand Smiles Foundation

The screenshot displays a user interface for managing patient records. On the left, there is a search bar with the input 'gom' and a 'SEARCH' button. Below the search bar are two rows of patient profiles. The top row contains three cards: one pink card for '363 6/Gutierrez, Gloria' (Test 1), one white card for '301 7/Romero, Roberto' (Test 1), and one blue card for '314 20/Gomez, Angel' (Test 1). The bottom row shows the tops of three more patient profiles. To the right of the profiles is a 'Medical History' section with icons for Routing Slip, Medical History, and Examination. It also includes a 'Patient ID' field (301) and details for 'Romero, Roberto' (First Name: Roberto, Gender: Male, Date of Birth: 01/22/2009). The interface is divided into sections: 'Pregnancy', 'Birth', and 'Growth Stages', each containing various questions and input fields.

EMR Charts App User Manual

Version 0.3 – December 2020

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Revision History

Name	Date	Reason For Changes	Version
Syd Logan	12/15/2020	Initial, write general section, coarse outline of remainder. Corresponds to Version 3.0 of the application	0.1
Syd Logan	12/17/2020	Describe logout, change station context menu items	0.2
Syd Logan	12/19/2020	Add description for exiting via options menu item	0.2.1
Syd Logan	12/26/2020	Add more detail on general layout of chart section, start work on Dental	0.2.2
Syd Logan	12/27/2020	Minor Edits	0.2.3
Syd Logan	12/28/2020	Complete Dental section	0.3

1. Introduction

1.1 Purpose

The purpose of this document is to document the user functions of the Thousand Smiles EMR Chart Application.

1.2 Primary Intended Audience

The primary users of the EMR Chart App include the following:

Caregivers: Caregivers provide care to patients. Caregivers include X-Ray, ENT, Dentists, Audiologists, Surgery Screeners, Hygienists, etc., as well as those who support them directly and might need access to the chart, for example dental assistants and nurses. Each caregiver has a section of the EMR chart application that supports the viewing and recording of patient data specific to the class of care provided by that caregiver.

Runners: Runners are users which take a registered patient from the waiting area to a caregiver for care. They monitor stations for vacancy, identify patients in need of care, and ensure that the routing slip maintained in the chart accurately reflects the movement of the patient through the clinic.

1.3 Assumptions

The manual assumes some basic familiarity with the use of Google's Android OS or Kindle Fire OS (the tablets in use at our clinic are Kindle Fire HD 10 models). People with iOS (iPhone) experience will be able to adapt easily to Android after a little use.

2. Organization

The document is organized into two broad sections. The first section details basic functionality of the system that is of interest to all users, regardless of their function. This includes items such as the following:

- Starting the application
- Logging in
- Selecting a station (Dental, ENT, etc.)
- Searching for patients
- Patient checkin and checkout
- Exiting the application

Following this, there will be sections that describe the chart app in terms of its individual users:

- Runners
- Dentists
- ENT

and so on.

Each user, for example a dentist, is supported directly in the application with screens which allow for the viewing and editing of clinical data that is relevant to their function only. For example, a dentist can view and edit a tooth chart, while ENT is able to view audiograms obtained for the patient. The reverse is not the case, e.g., ENT cannot edit tooth charts, and dentists cannot view audiograms. This simplifies navigation of the charts by focusing the content to areas which are meaningful to the individual users of the system, and it protects the integrity of the chart by only allowing changes to a specific area of the chart to be made by the specialists who provide the care. Finally, isolation of chart data based upon speciality allows us to conform to **Standard Official Mexicana NOM-024-SSA3-2010** regulations which state that patient data only be viewed on a need-only basis.

Each of these sections will go into detail of how to use the chart app to record clinical data for a specific patient type (e.g., Dental), and how to view patient data from previous clinics, again based on the type of the patient. These sections will detail each screen available.

3. Common Functions

The following subsections describe functionality common to all users of the EMR Chart application.

3.1 Selecting The Language

This application has been localized for both English and Spanish language speakers. Please refer to <https://www.amazon.com/gp/help/customer/display.html?nodeId=201556190> for details on how to change the language. Please restart the application after any such change for best results.

3.2 Starting the Application

To start the application, first ensure that the tablet is powered on. The power button is located in the upper right hand corner. Once powered on, the tablet will boot showing the main desktop. Navigate the desktop and locate the following icon (Figure 3.1), and with your finger, double tap it.



Figure 3.1 Application Icon

You will then see a splash screen similar to Figure 3.2, identifying the Chart application and its version. After a few seconds, you will be taken to the login screen.

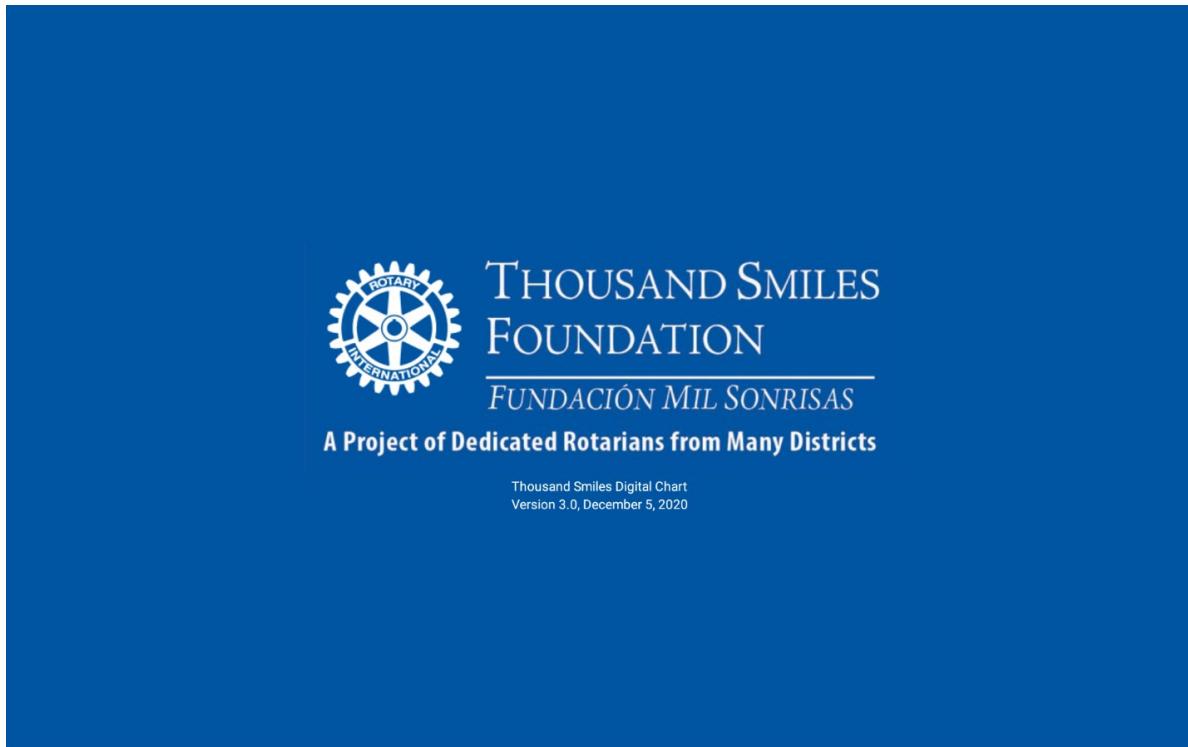


Figure 3.2 Splash Screen

3.3 Logging in

Figure 3.3 illustrates the login screen. Enter the username and password that you used when registering for the clinic at <http://thousandsmiles.org>, then click on the SIGN IN button to login.

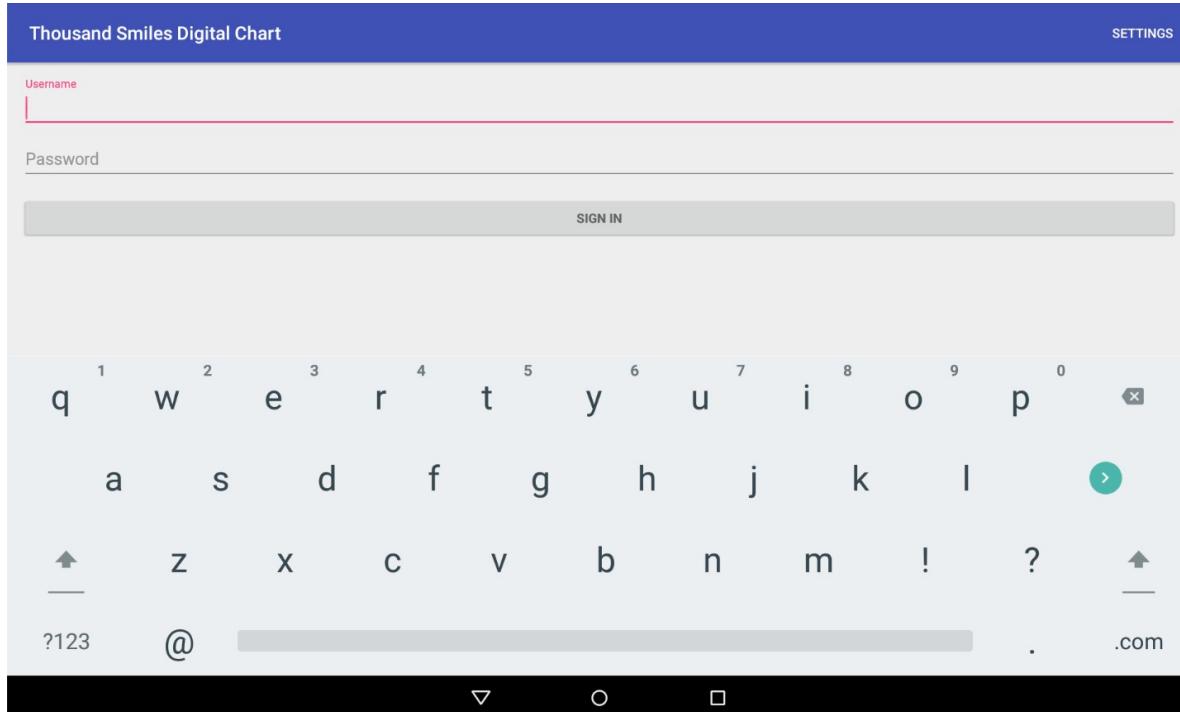


Figure 3.3 Login Screen

3.4 Changing the IP Address of the Server

In most cases, the IP address of the server hosting the clinic data will be set prior to the clinic. For new tablets, or if instructed by an administrator to do so, the IP address can be changed by clicking on the Settings link (see Figure 3.3) in the login screen, or by pressing and holding down the options button on the patient search screen. Figures 3.4 and 3.5 illustrate changing the IP address to the default for our clinics, which is 192.168.0.128. Click on the item (IP address or Port), edit the value using the built in keyboard, and click OK to save.

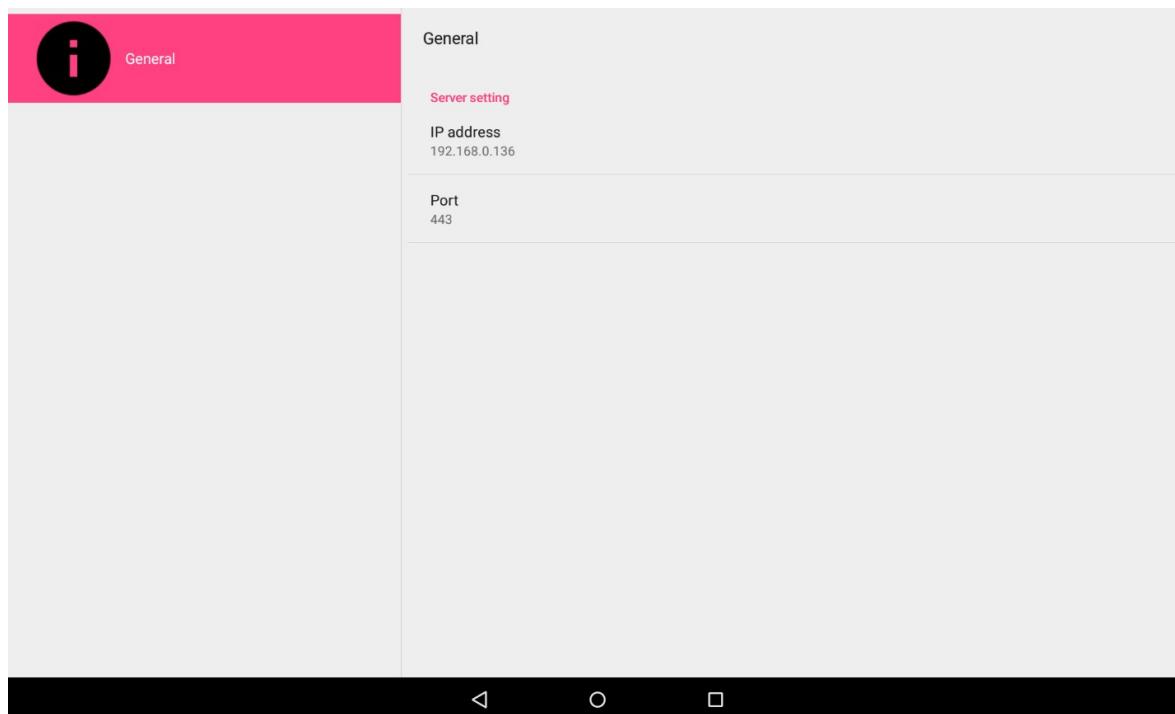


Figure 3.4 General Settings Dialog

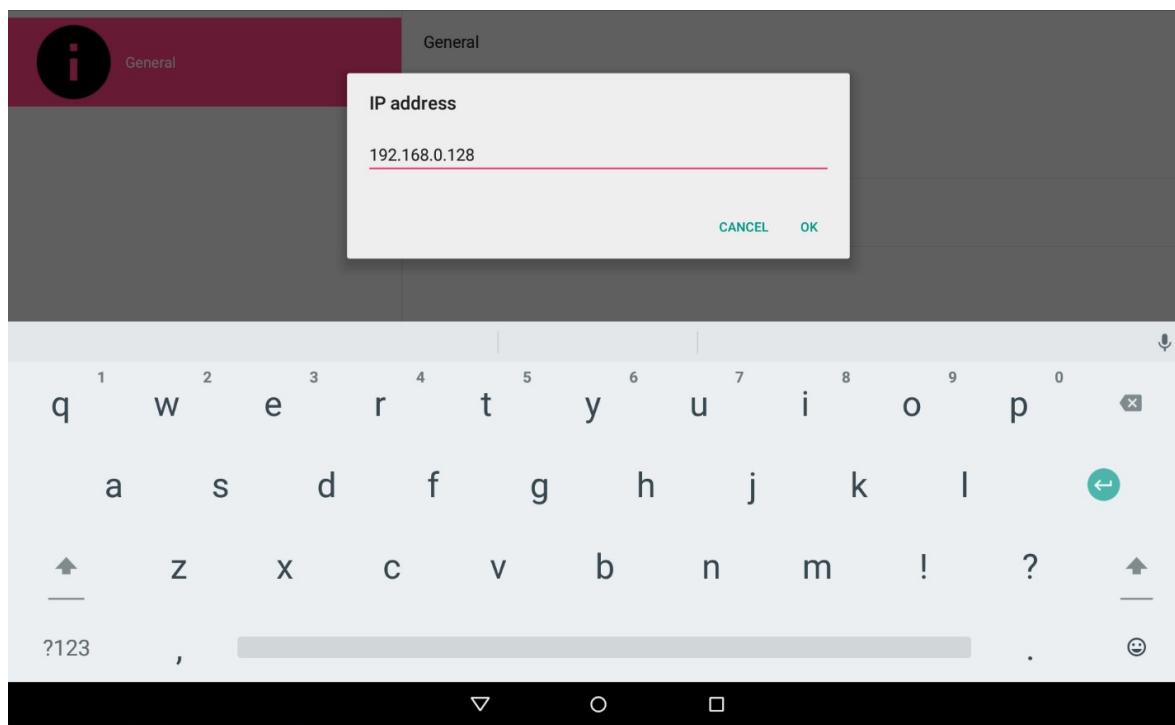


Figure 3.5 Changing the IP address of the server

3.5 Selecting a Station

Once you are logged in, you will need to select your station. The station selection controls what views you will have into the charts. For example, selecting ENT will configure the application to show only those portions of the chart that are relevant to ENT practitioners. Runners should select the Runner icon, regardless of the specialty they are supporting. See Figure 3.6, below.

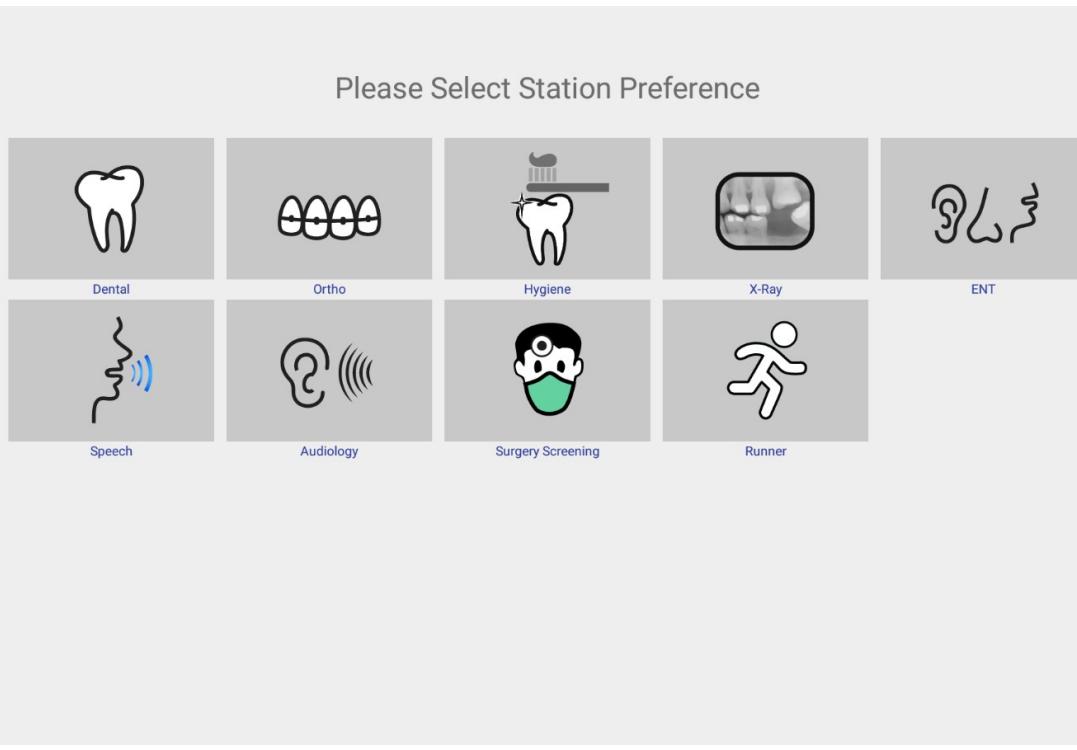


Figure 3.6 Station Selection Screen

To change your selection, you can either restart application, re-login, and make a new selection, or refer to “Changing the Station Type” later in this document. You only need to make the selection once for each login.

3.6 Patient Flow

Before we continue, it helps to briefly go over how patients flow in the clinic. In general:

- Patients are categorized at registration time based on the care needed.
- Headshots of the patient are taken at time of registration. These headshots are an aid to identifying the patients, visible in all patient searches, and at all times when the patient chart is being viewed.
- Registered patients are staged in a waiting area until called.
- The system assigns at registration time a routing slip consisting of stations the patient should visit based on that care. That routing slip is viewable and editable by runners and caregivers on the tablet.
- Runners are assigned to a specific station or set of stations, and they use the chart app to find a patient which needs to be seen by the station(s) that they support.
- Patients are checked in by the specialist (who also has a tablet) at the station in order to gain access to the chart. Access to chart data is based on the station type.
- Once a patient is seen, the runner or station must remove the patient from the routing slip.
- The patient is then checked out by the specialist.
- The runner then takes the patient to the staging area, or, if there is no longer an item in the routing slip, discharges the patient.

The following sections provide details of the above steps.

3.6.1 Categorization of patients

When patients are registered at the beginning of the day, they are categorized based on the general care they are to receive, based on input from the patient (“I need to see a dentist”) or a best estimate made by the registration personal. Categories include dental, surgery, hearing aids (patient is here to receive a hearing aid), and so on. The selection of a category will pre-fill in the chart, for this visit, a routing slip (See Section 3.6). The routing slip for a dental patient might include X-Ray and Dental, or for a cleft patient, Surgery Screening and ENT.

3.6.2 Runner Responsibilities

The main job of a runner is to make sure that patients are routed to stations based on the routing slip. To do this, they will:

- Identify a station to support for the day. See Section 3.4 for details. For example, a specific runner might support X-Ray. Each station should have one or more runners supporting it.
- Identify when a patient needs to be taken to the station(s) the runner is supporting. For example, a dental station may be staffed with a dentist and assistant, and be ready for the next patient.
- Search for a patient that has “Dental” in the routing slip. See Section 3.6, Patient Search.
- Locate the patient in the staging area, either by name, comparing to the photo displayed in the search result, or patient ID.
- Escort the patient to the station (e.g., dental chair)
- Remove the station from the patient’s routing slip. Once removed from the routing slip, the patient will not be listed in subsequent searches made by the runner for that station. For

example, once Dental has been removed from the patient's routing slip, the patient will no longer appear in search results for dental patients.

3.7 Patient Search

When a patient is not checked in at the station, the main screen of the EMR Chart application consists of a search screen. See Figure 3.7. This search screen is used by the runner to find patients to escort to a station, and at the station it is used to find patients to check in and gain access to the contents of the chart.

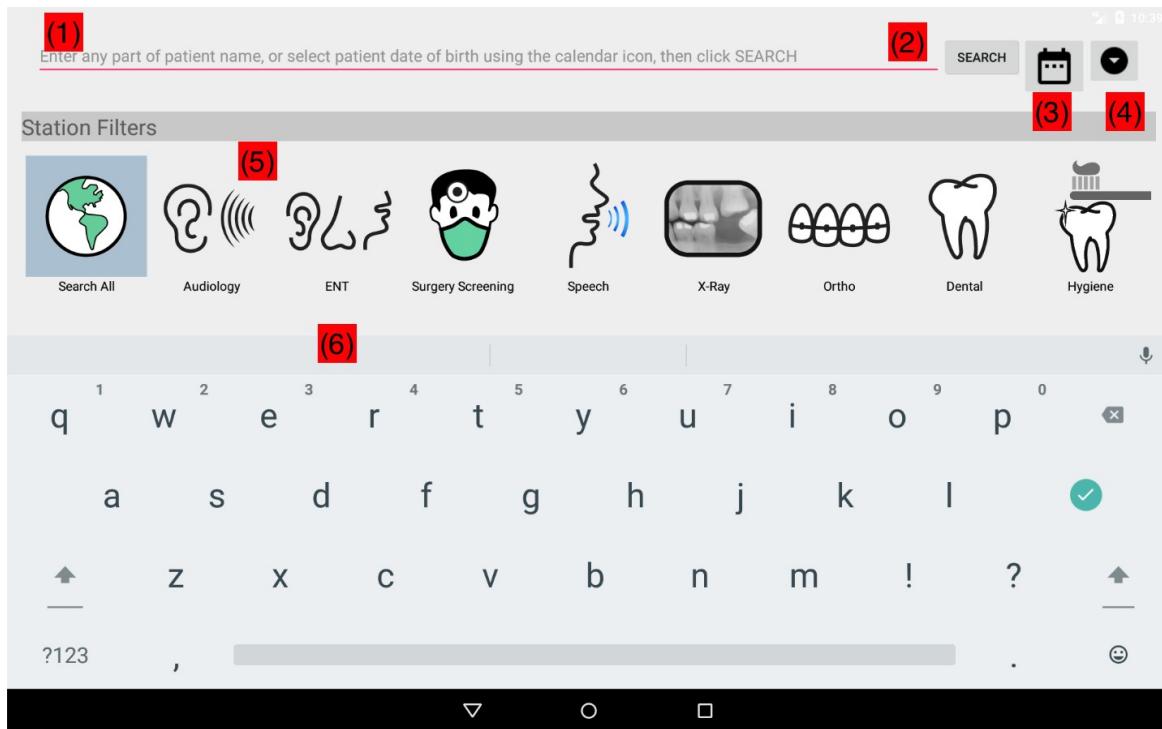


Figure 3.7 Main Search Screen

The search screen consists of the following sections (numbers are highlighted in Figure 3.7):

- (1) Patient search field. Here, enter 2 or more letters from the patient's name (first, middle, last) or a date of birth. Search results will be filtered accordingly.
- (3) Calendar – use this to select the patient date of birth when searching by date of birth of the patient rather than by name. Note that you can only search by name OR by date of birth, not by both.
- (4) Options menu. Press and hold to access a menu to logout, change settings such as host IP address, or change your station type.
- (5) Station Filters. Selecting a station will filter the search results so that only patients that have that station in their routing slip will be displayed. Click "Search All" to search all patients registered at today's clinic, regardless of the content of the routing slip.
- (2) Search button. Clicking this will cause the tablet to search for, and display, patients matching the search criteria specified in (1). If no search criteria was specified, all patients registered for today's clinic matching the specified Station Filter in (4) will be displayed.

- (6) Results area. Headshots of matching patients will be displayed below the station filters. Click on a headshot to get more information about the patient, and the check the patient in.

3.7.1 Example: Search for Dental Patients by Name

The following shows steps that can be used to find Dental patient 788 based on the father's last name Gomez. This can be used by a runner to find a specific patient based on knowing the name of the patient. A station would use similar steps to find a patient to checkin (view and edit the chart) when presented with the patient by a runner.

- 1) Select Dental in the Station Filters. See Figure 3.8
- 2) Enter "gom" into the search field. See Figure 3.9.
- 3) Hit the Search button.
- 4) Using your finger, scroll through the headshots looking for a match based on the photo, or name of the patient. See Figure 3.10.
- 5) Click on the matching photo (Figure 3.11 and 3.12) to get more details and verify the patient (runners) or check the patient in (station).
- 6) Repeat steps 1 – 5 until you are able to find the patient. If unable, verbally verify that the patient has registered for the clinic, sending them back to the registration table if necessary. You might also use the "Search All" filter to search for the patient in case they were mis-categorized as Dental at registration, or for whatever reason, Dental was removed from the routing slip.

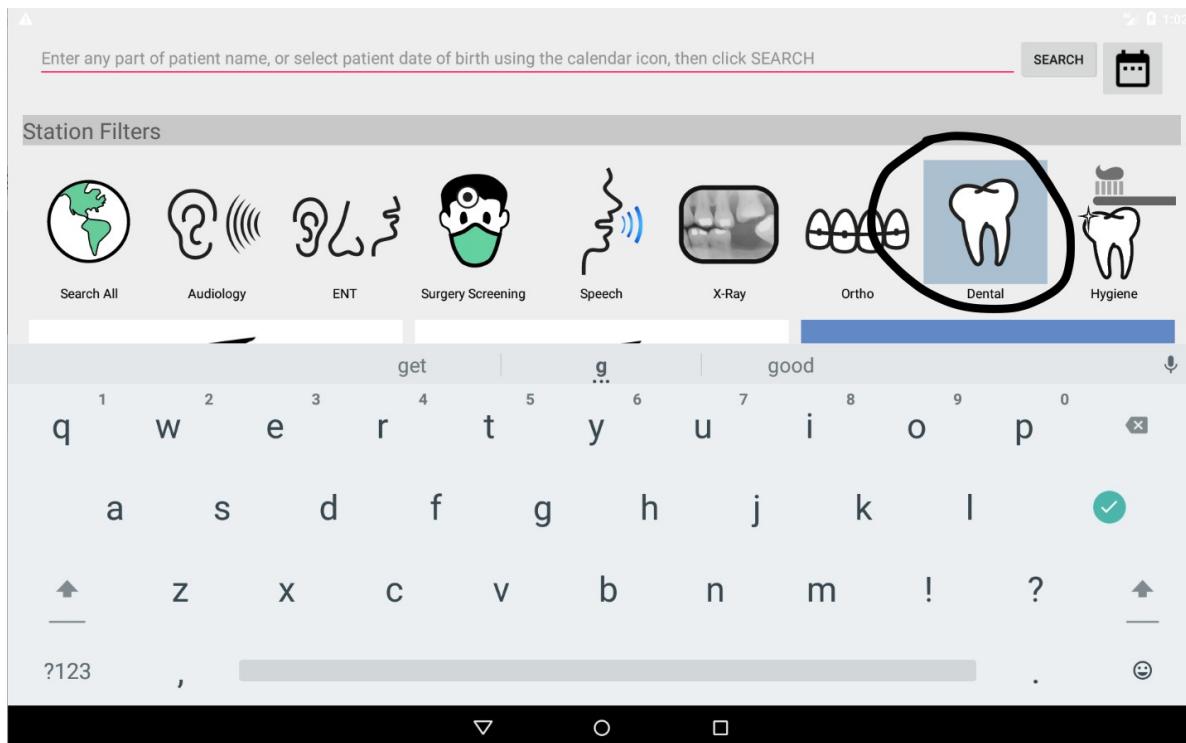


Figure 3.8 Selecting Dental Station Search Filter

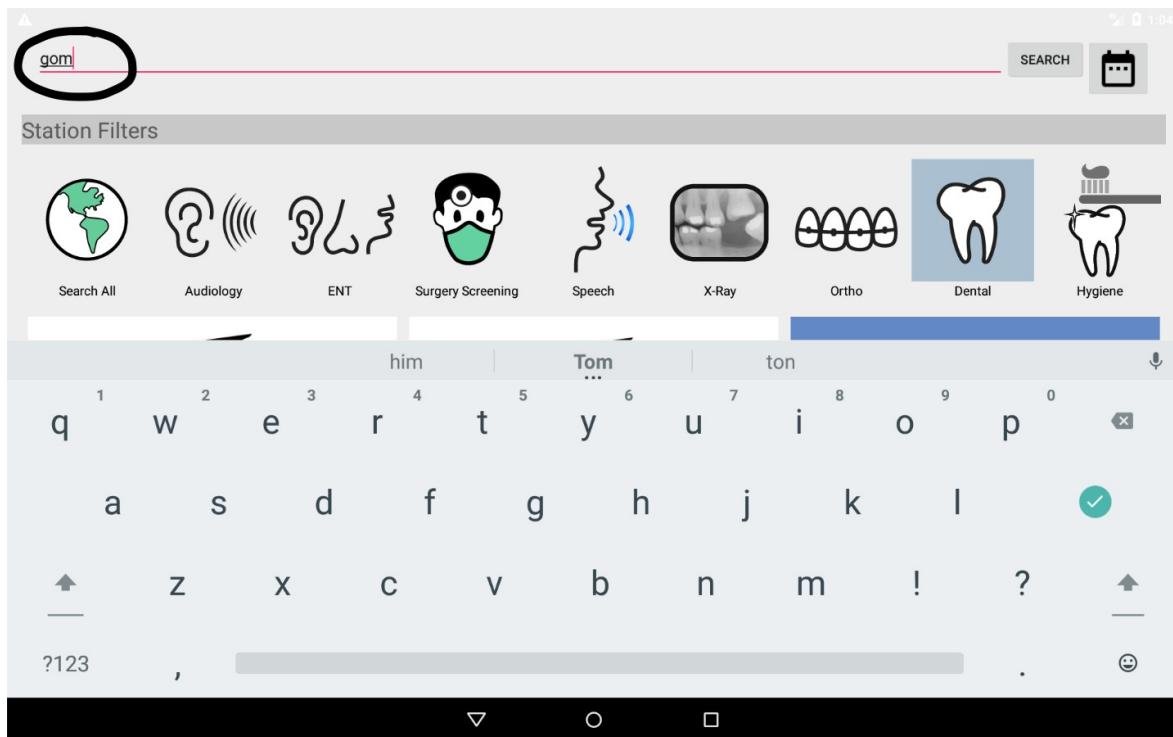


Figure 3.9 Entering Search Term “gom”

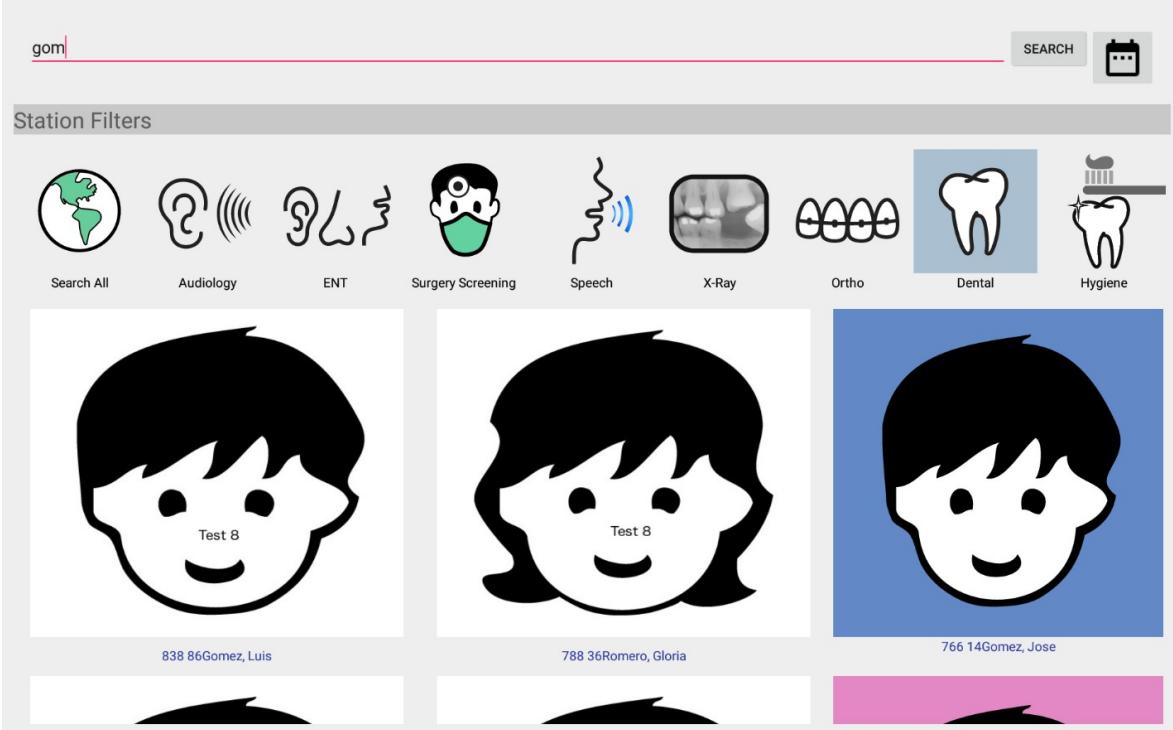


Figure 3.10 Search Results

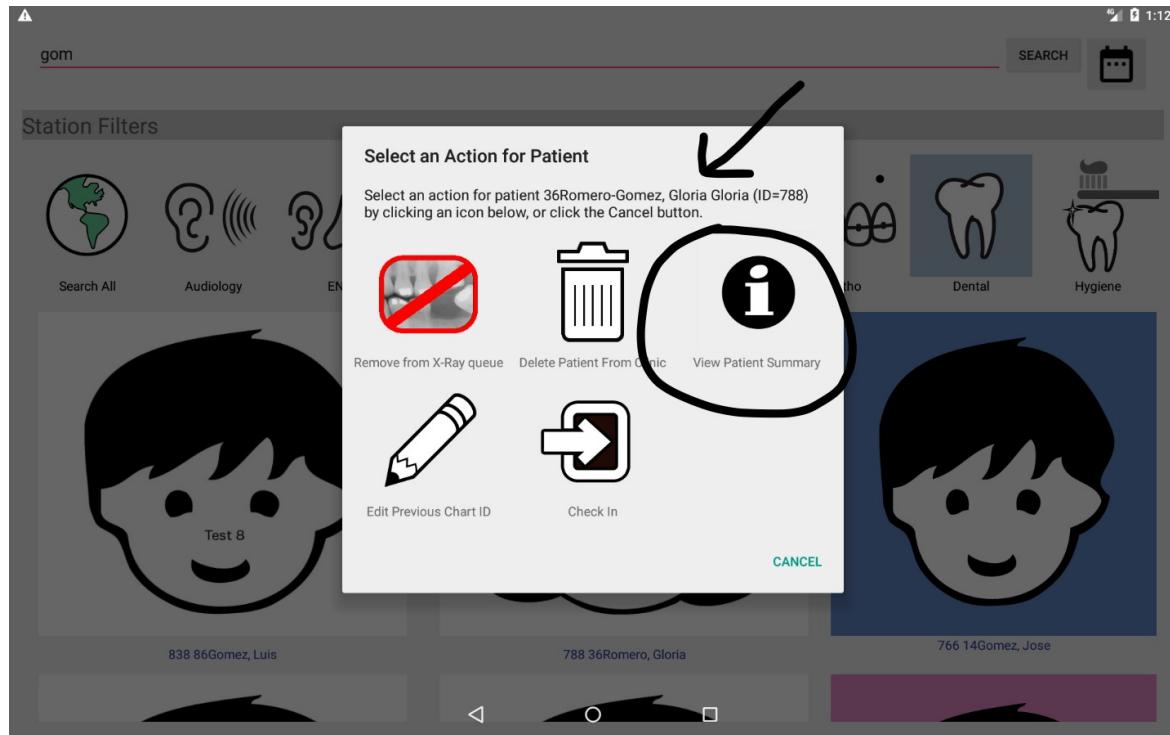


Figure 3.11 Clicking on headshot leads to full name and DOB of patient, plus options

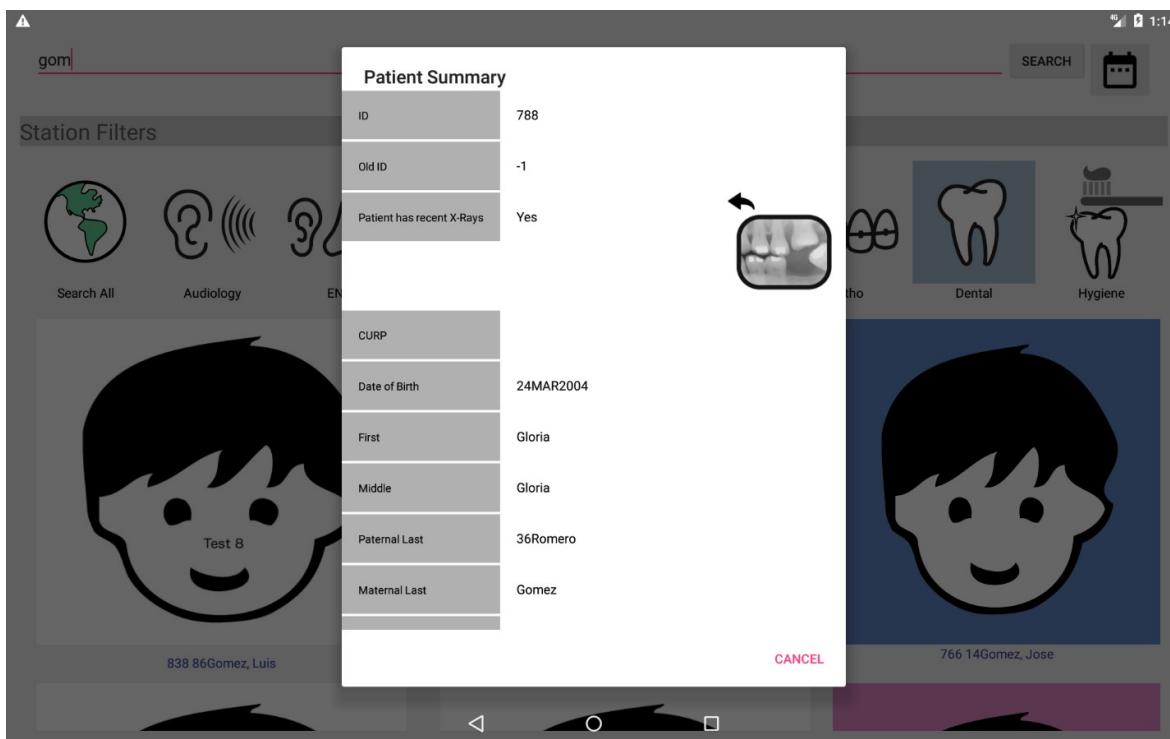


Figure 3.12 Clicking the “View Patient Summary” button for more patient info

3.7.2 Example: Find all patients waiting for Dental

This is the typical way a runner will find the set of patients with a specific station in their routing slip. Use this when you want to find a patient to route and it doesn't matter which patient it is. Otherwise, search by name or date of birth.

- 1) Select Dental in the Station Filters. See Figure 3.8
- 2) Hit the Search button. You do not need to use a search term to see all patients that have Dental in the routing slip.
- 3) Using your finger, scroll through the headshots. See Figure 3.10.
- 4) Click on any photo (Figure 3.11 – Figure 3.12) to get full patient details, check in the patient, or perform other tasks.

3.7.3 Example: Find a Dental Patient based on Date of Birth

These steps are identical to search by name, but instead of entering part of the patient name, you want to search by patient date of birth.

- 1) Select Dental in the Station Filters. See Figure 3.8
- 2) Click on the Calendar Icon, locate and select the patient DOB. See Figure 3-13 and 3-14.
- 3) After dismissing the date selector, the DOB will display in the search field (Figure 3-15).
- 3) Hit the Search button.
- 4) Using your finger, scroll through the headshots looking for a match based on the photo, or name of the patient. With date of birth searches, only one or two results will usually match, making this the preferred way to search if the patient date of birth is known. See Figure 3.16.
- 5) Click on the matching photo (Figure 3.11 and 3.12) to get more details and verify the patient (runners) or check the patient in (station).
- 6) Repeat steps 1 – 5 until you are able to find the patient. If unable, verbally verify that the patient has registered for the clinic, sending them back to the registration table if necessary. You might also use the “Search All” filter to search for the patient in case they were mis-categorized as Dental at registration, or for whatever reason, Dental was removed from the routing slip.

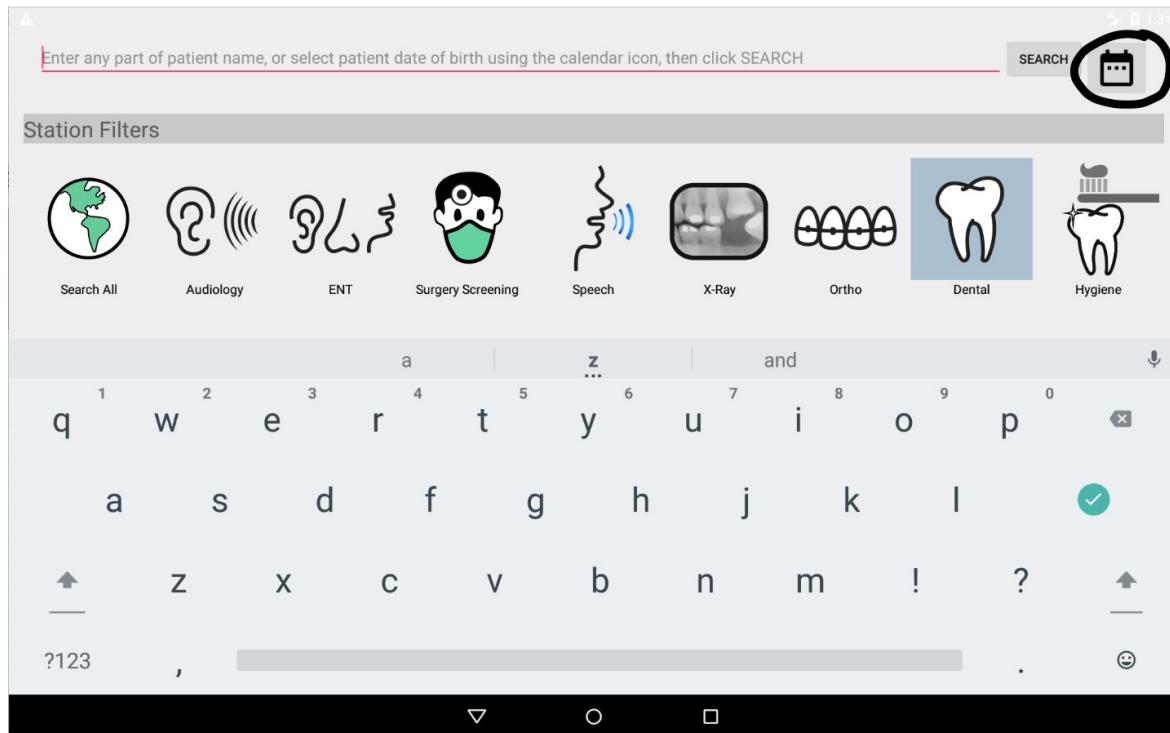


Figure 3-13 Location of the Calendar Icon

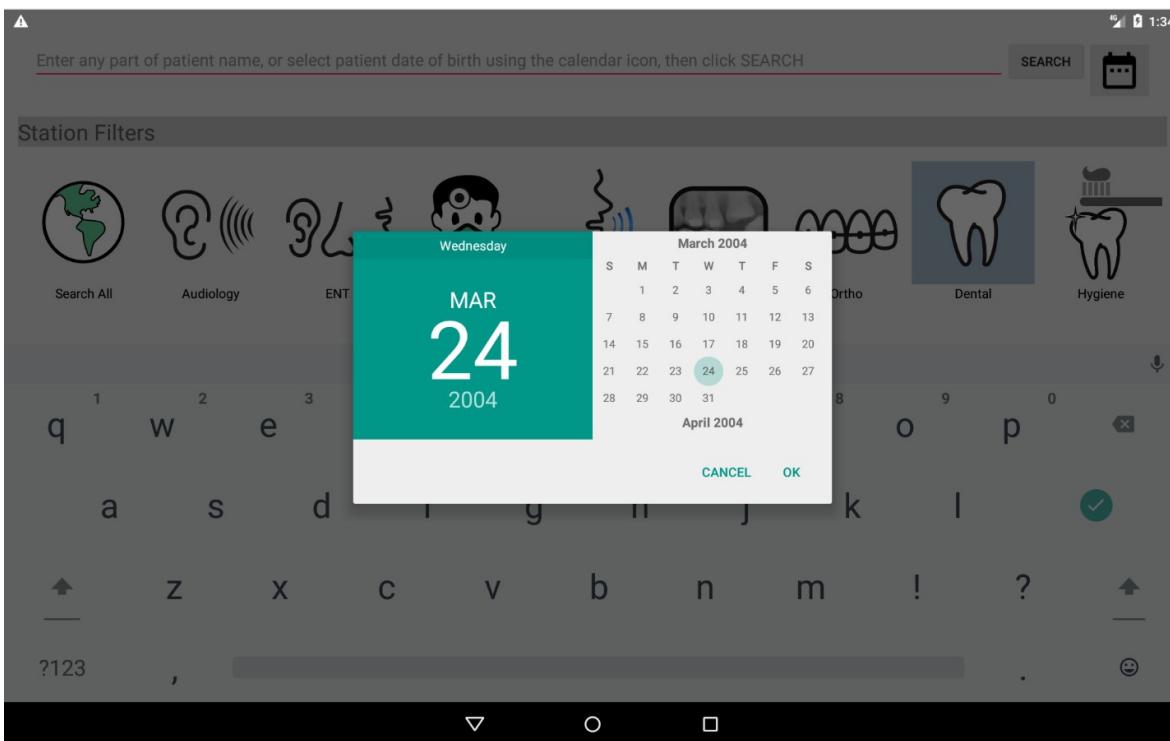


Figure 3.14 Calendar/Date of Birth Selection

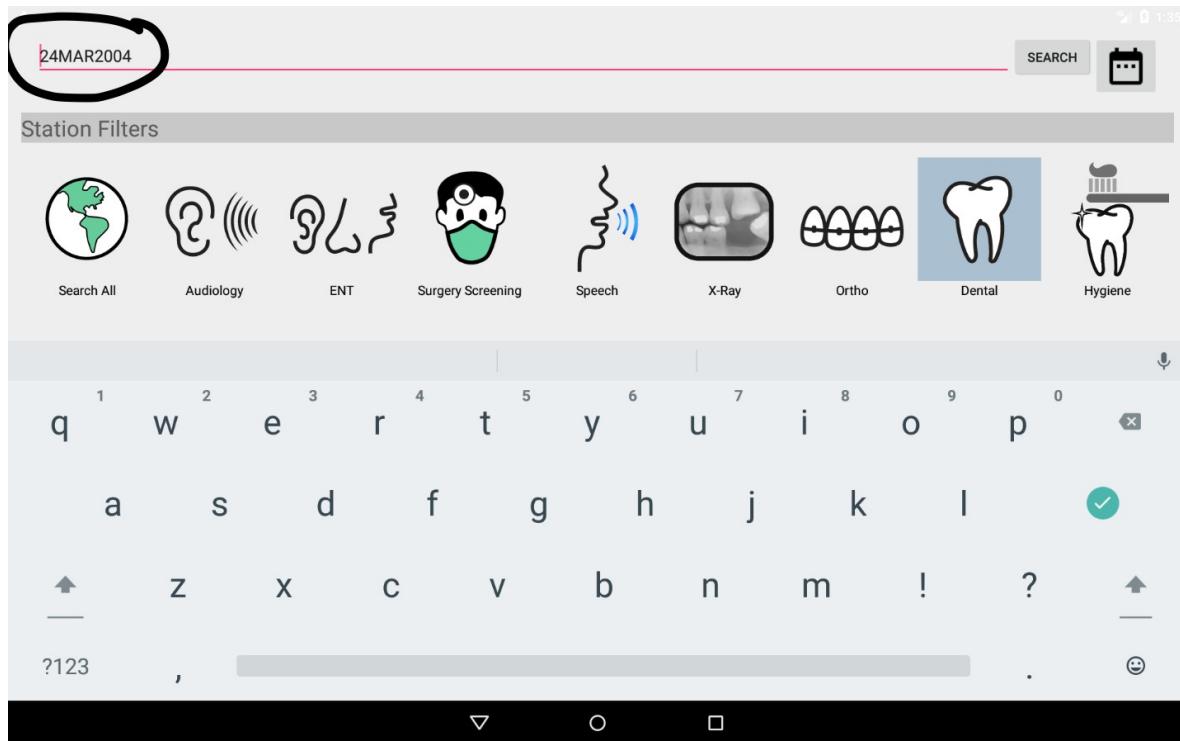


Figure 3.15 Search Field set to date selected in calendar control

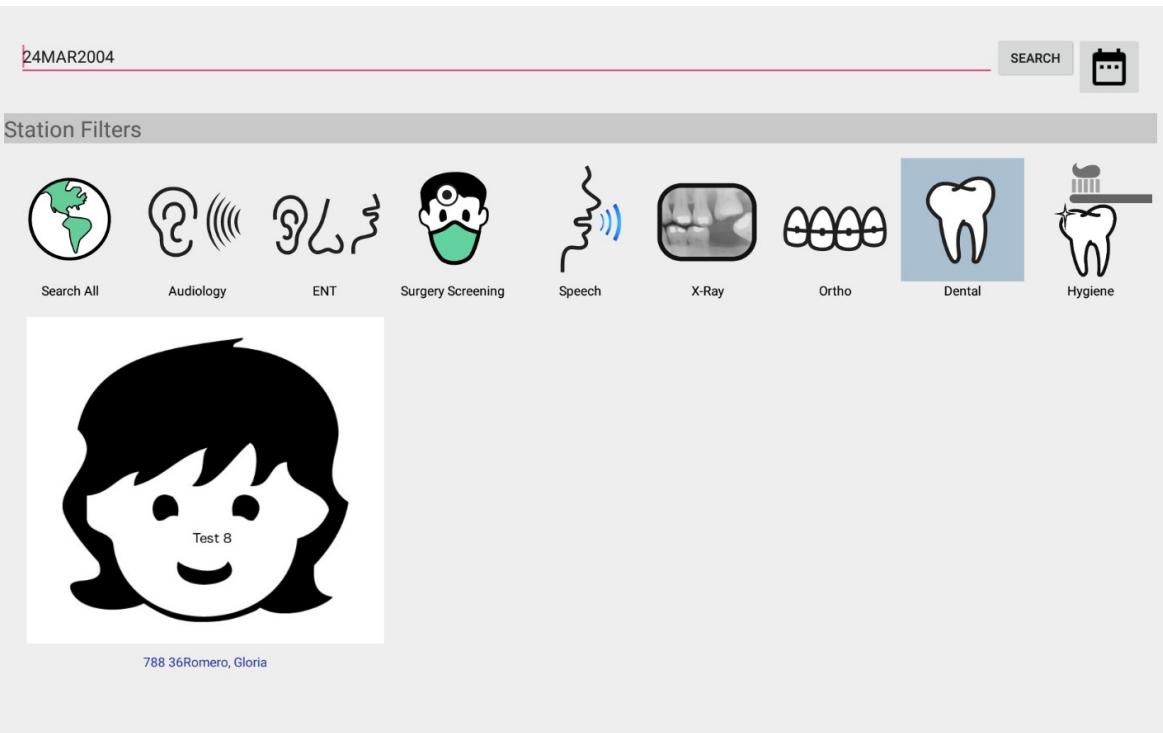


Figure 3.16 Patient registered for the clinic that has dental in routing slip and matches enter DOB

3.8 Patient Checkin, Data Access, and Checkout

Once a patient is identified at the staging area and taken by a runner to a station (e.g., a dental chair, X-Ray, etc..) that patient must be “checked in” in order to view and edit the patient’s digital chart. After the patient care has been provided at the station, the patient must be “checked out” in order to close the chart for that patient and return the tablet to the search screen where the process can be repeated for the next patient.

3.8.1 Checkin

A patient is checked in using the “Check in” button as shown in Figure 3.17. To get to this dialog, simply click on a headshot in the search results screen. When this button is touched, you will be asked to verify the checkin (Figure 3.18). By clicking “Yes”, you will be taken to the content of the patient’s chart, tailored to your station, for viewing or editing. Refer to Section 4 for more details on viewing and editing the patient chart for your specific station.

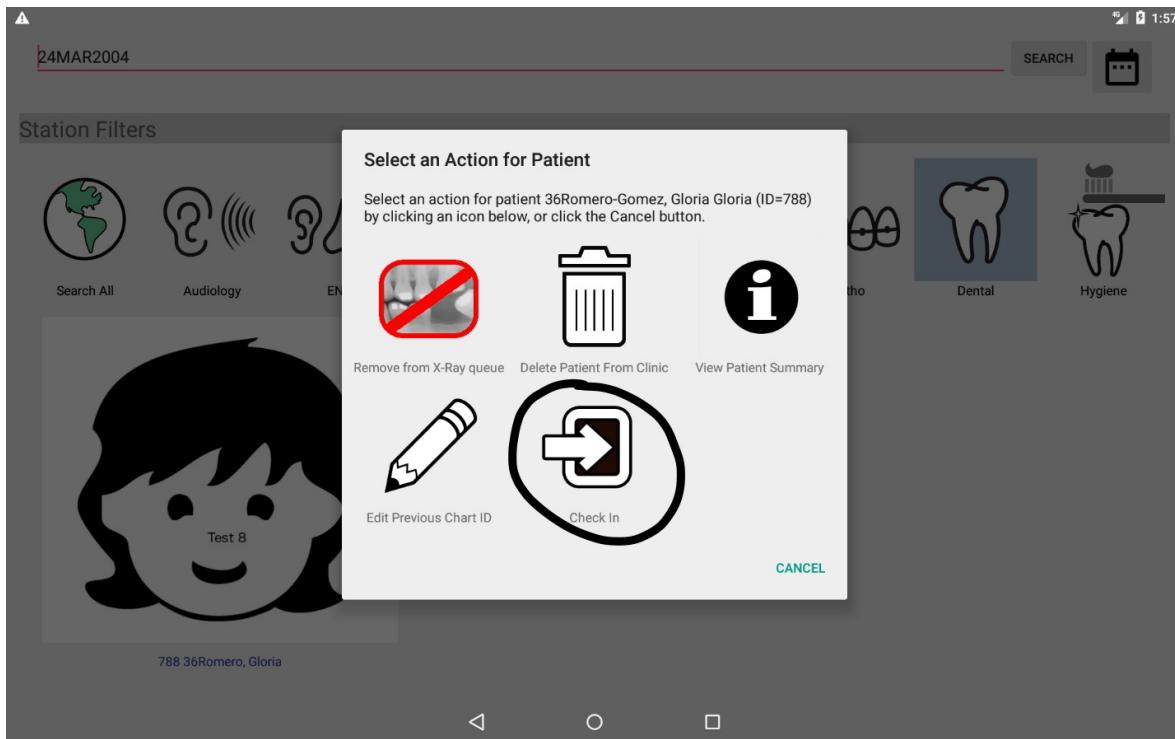


Figure 3.17 Patient Check In Button

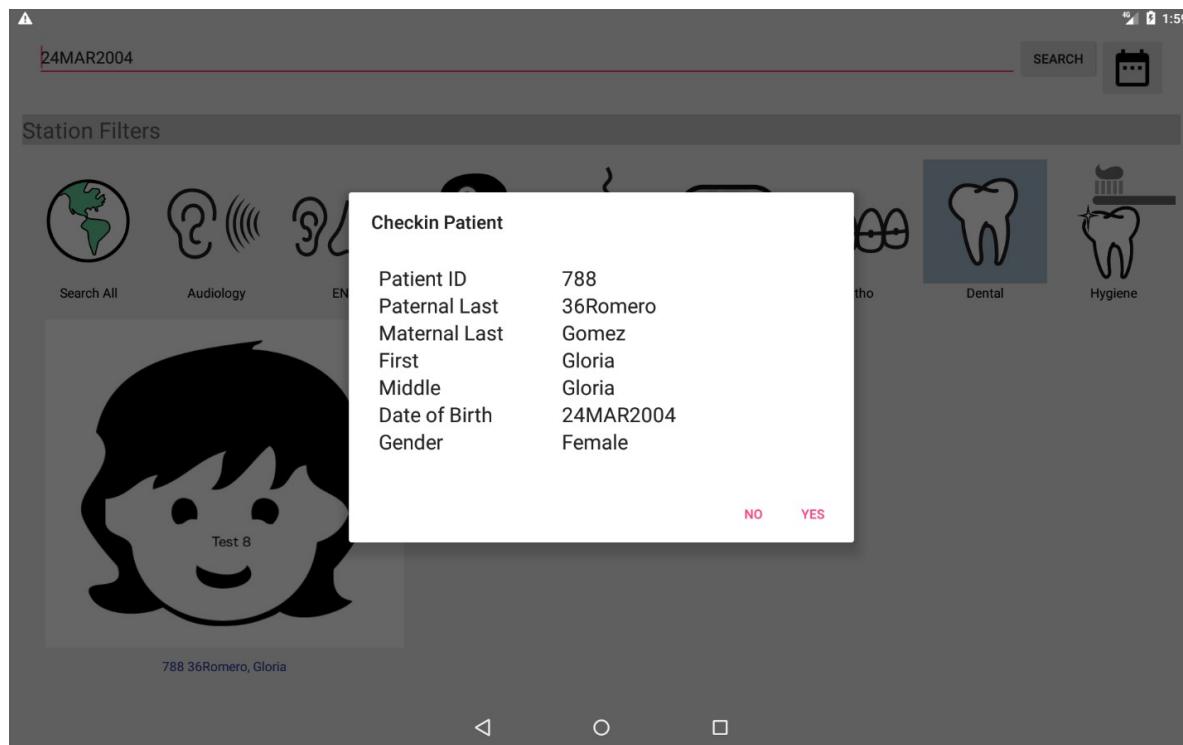


Figure 3.18 Verifying the Patient Checkin

3.8.2 Accessing Chart Data

Upon patient checkin, the screen of the device is split into four basic sections, illustrated in Figure 3.19.

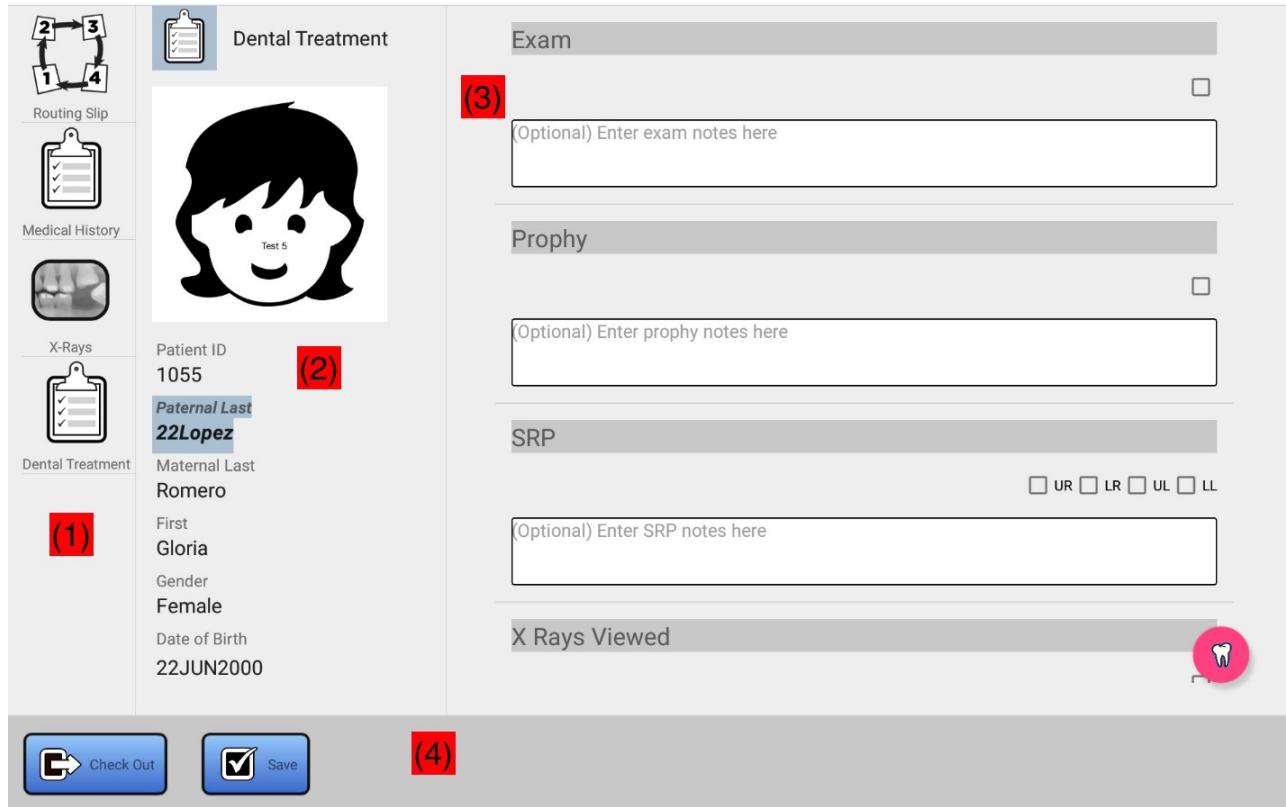


Figure 3.19 Patient Chart Screen Layout

(1) is the chart selector. Click on any item to access that part of the patient chart, each item represents a distinct view into the chart. The items which are displayed in (1) are based on the station that was selected (see Section 3.4). For example, if the station selected is Dental, then the items displayed in (1) will represent the patient dental chart. In all cases, these items will include Routing Slip and Medical History, since both are relevant to a patient regardless of the care that is being given. Items relevant to the station located elsewhere in the chart, relevant to the station are also available here. For example, Dental will have access to the data recorded and stored in the X-Ray portion of the chart for the patient selected. Runners will only see the Routing Slip.

Making a selection in (1) controls what is displayed in area (3).

(2) is the patient information. This section identifies the patient to which the chart data corresponds. The headshot will be that of the patient taken the day of the clinic. The ID, name, gender, and data of birth should match that which is found on the patient wristband, if present.

(3) is the chart data. What displays here depends on the item selected in (1). For example, if X-Ray is selected in (1), patient X-Ray data will be shown. This area can be used to view records, and at times create new records. The data displayed here is typically read/write, meaning you can add or edit items in the chart, or view them. In some cases, however, it is read-only. For example, X-Ray staff can add or view X-ray data for the patient, but this data can only be viewed by Dental staff.

Similarly, Audiology can create audiograms, but ENT can only view them. This is to maintain the integrity of the data in the chart. Items in the chart cannot be deleted, this is also to ensure the integrity of the chart. Starting with Section 4 of this manual you can find detailed documentation for each area of the chart (X-Ray, Dental, ENT, and so forth).

(4) is the menu area. Here, you will see buttons displayed that allow you to save data, check out the patient, and perhaps other functions.

3.8.3 Checking out the Patient

You must “check out” the patient once all patient data has been added to the chart at the station, and you have removed your station (Dental, X-Ray, etc.) from the patient routing slip. Once the patient is checked out, you will be returned to the search screen, allowing you to search for, and check in, the next patient. In Figure 3.20, we have completed (but not saved) the dental treatment record for patient 788, and are ready to dismiss the patient back to the staging area. This can be done by clicking on the “Check Out” button that is circled in Figure 3.20. If there are changes to be saved (as there are in this case, since there is a Save button displaying), then you will be prompted to save those changes as a part of the check out process (Figure 3.21). You will also be given a dialog allowing you to add final notes and specify a return to clinic interval. See Figure 3.22. Once that dialog is dismissed, you will return to the search screen where you can search for the next patient.

Figure 3.20 Patient Checkout Button

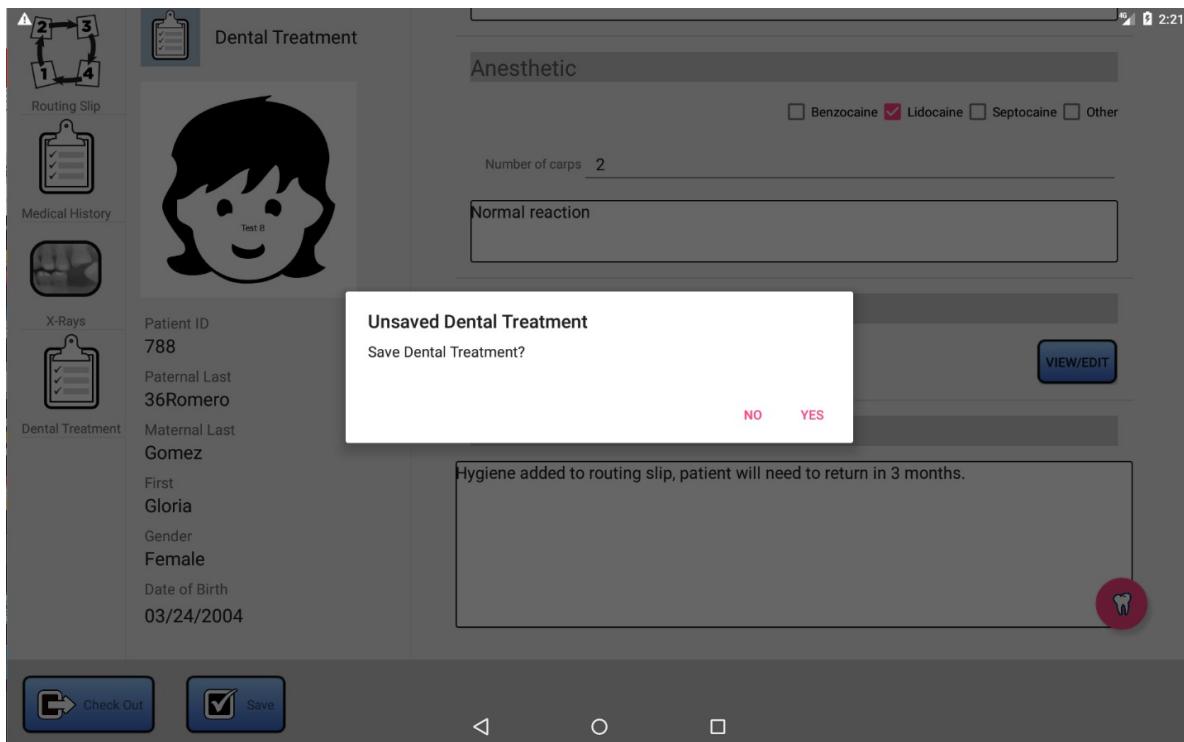


Figure 3.21 Handling unsaved changes at patient checkout

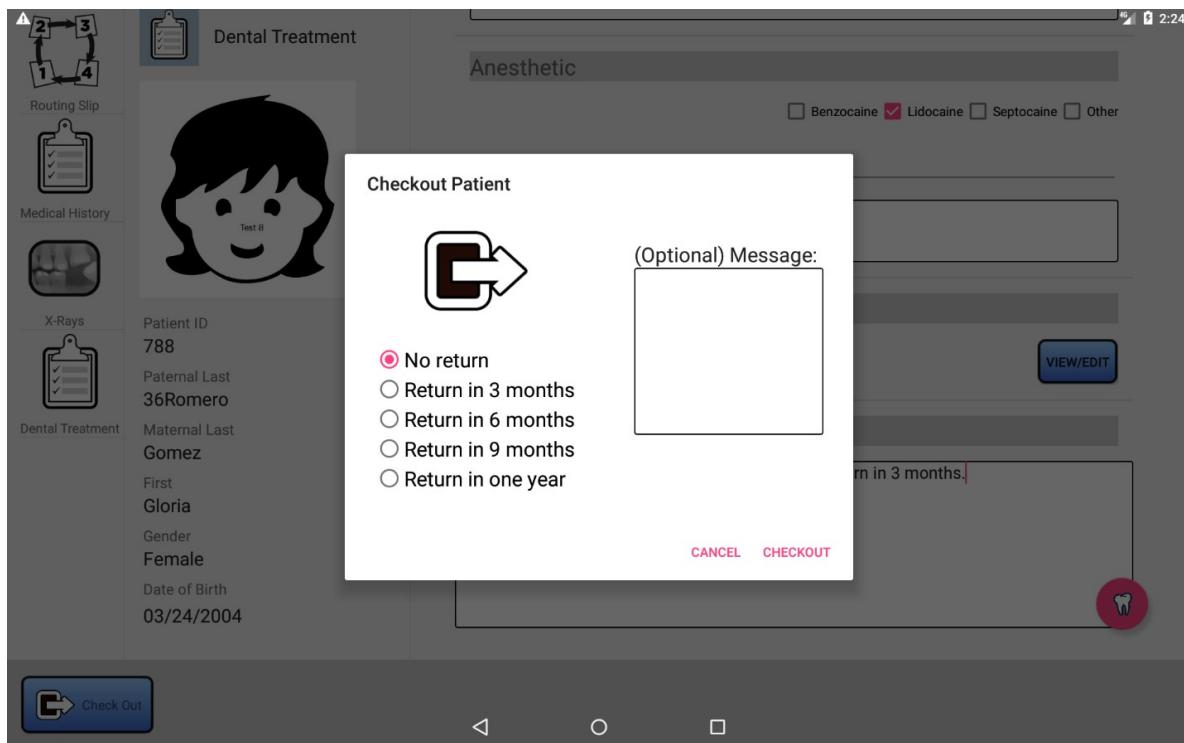


Figure 3.22 Checking Out – Return to Clinic and Final Notes

3.9 Routing Slips

3.9.1 Introduction

When a patient is registered, he or she is categorized based on care needed as. The categories are:

- Dental
- Orthodontics (Ortho)
- Ears (not cleft, but has hearing issues)
- Hearing Aids (returning Ears patient for hearing aid dispensing)
- Cleft (Initial visit)
- Cleft (Returning visit)
- Other

The category is assigned based on discussion with the patient, family, or perhaps consultation with a caregiver present in the registration area. Each category implies a sequence of steps in the care of the patient, and a list caregivers/stations that the child should visit while at the clinic. For example, a dental patient may visit X-rays, a dentist, and hygiene before the day is complete. These stations are all present in the patient routing slip.

Runners use the routing skip to find patients to take to the station(s) that they are supporting.

Caregivers use the routing slip to add additional points of care that were not assigned by default at registration. For example, a dentist may add hygiene to the routing slip of a dental patient after determining a child's teeth are in need of cleaning. Or, ENT may add audiology to the routing slip in order to get an audiogram taken for a child that he or she has seen.

3.9.2 Changing the Routing Slip

Both runners and caregivers, working together, ensure that the routing slip is accurate by removing stations from the routing slip of a patient once work is completed. It doesn't matter who actually performs this step, but not doing so will make the job harder on a runner because a patient who has already seen dental, for example, will see that patient in dental search results, leading to confusion. Once removed from the routing slip, say dental, a patient will no longer show in the list of patients needing to be taken to a dental chair when a search is performed.

To see the routing slip, the caregiver or runner must check in the patient (a runner can check in patients just like any of the caregivers, but the only part of the chart they have access to is the routing slip). Figure 3.23 identifies the location of the routing slip portion of the chart. Click on that icon to view and modify the routing slip, as shown in Figure 3.24.

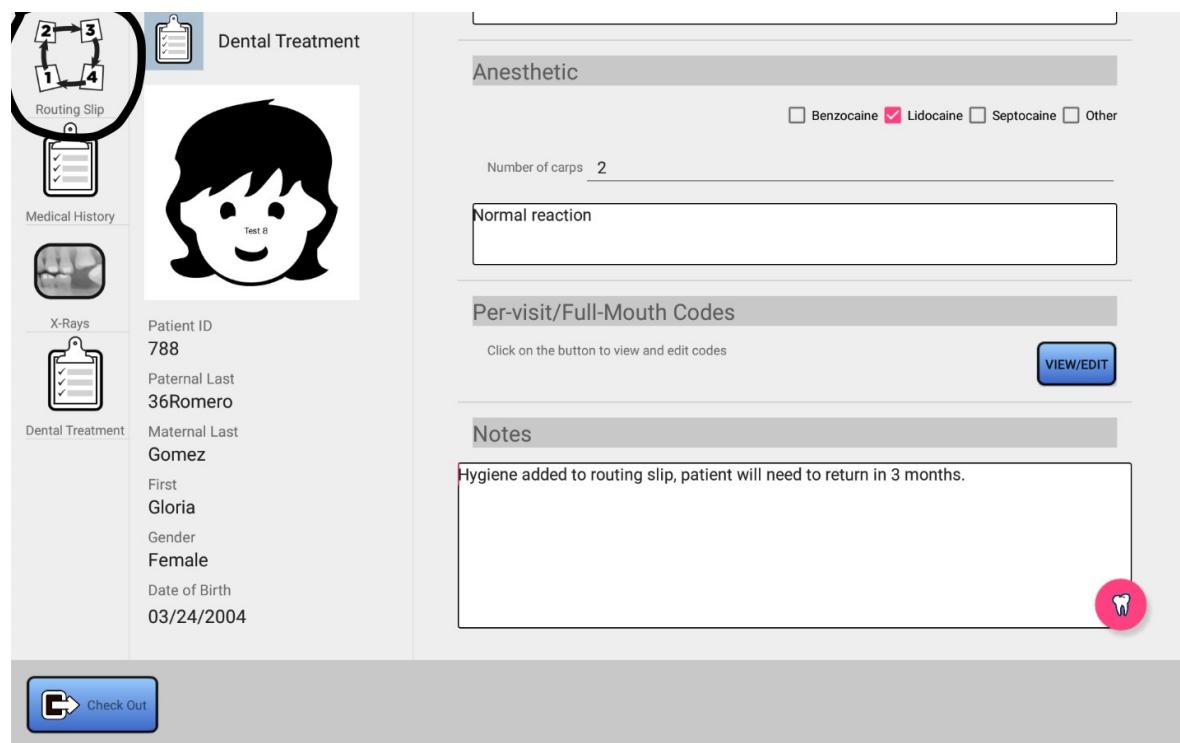


Figure 3.23 Routing Slip Icon

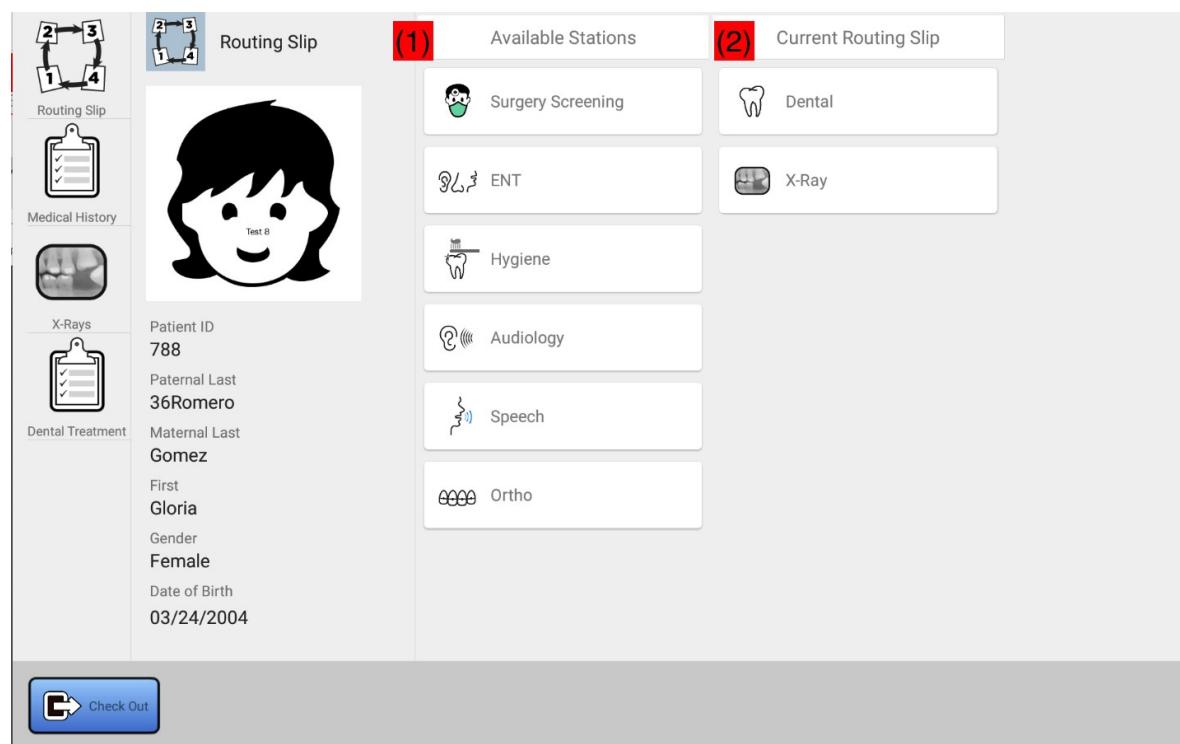


Figure 3.24 Routing Slip

In Figure 3.24, you can see that the routing slip consists of two columns. The left column (identified by (1) in the figure) list stations that are available in the clinic, but not a part of the current routing slip. Searches made for patients filtered by any of these stations will result in the patient not being shown in the results. The right column (identified by (2) in the figure) contains the current patient routing slip.

You can use your finger to drag and drop items from one list and drag them to the other. Hold your finger down over the item for about 1 second, then you will see it detach from the current list (Figure 3.25). Then, while still holding your finger down, drag it to the other list and lift your finger. It will then be added to the destination list (Figure 3.26).

You can make as many changes as necessary. Use the Save button on the lower left corner of the screen to save changes.

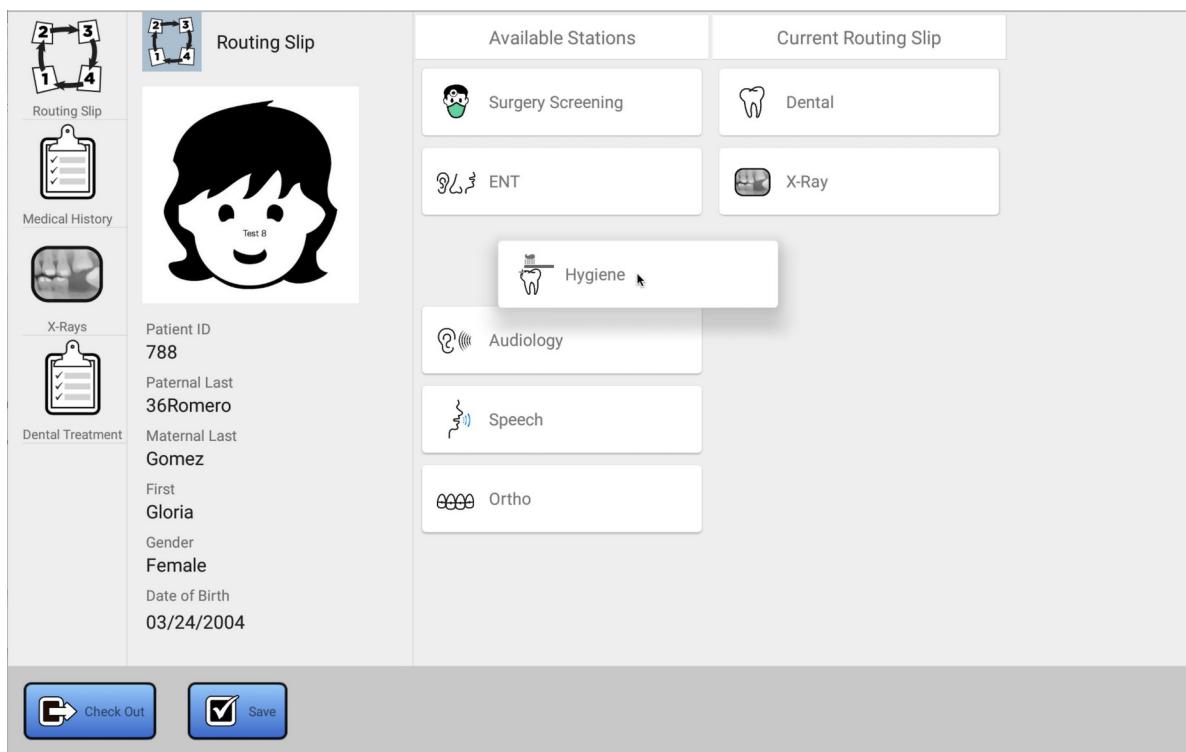


Figure 3.25 Dragging Hygiene from the available list to the routing slip

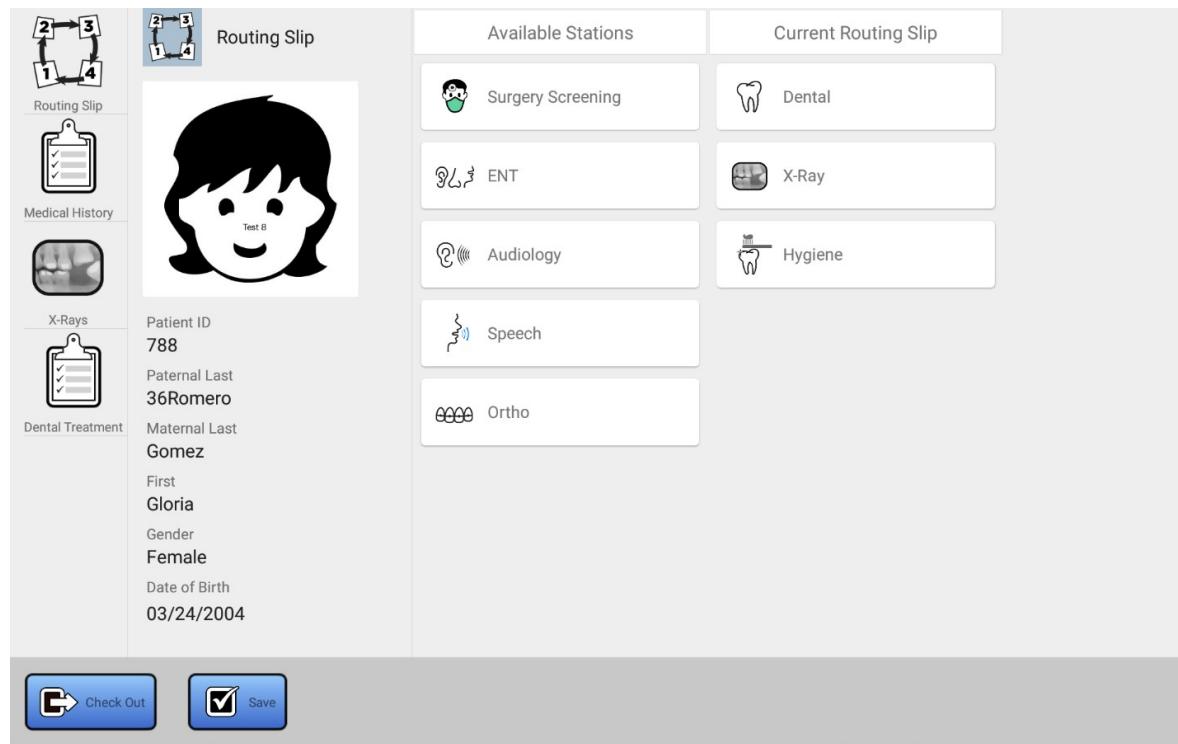


Figure 3.26 Hygiene is now on the routing slip

3.10 Removing a Patient from the Clinic

On occasion, patients will leave the clinic without notice prior to visiting each station on the routing slip. When this child is called by the runner, there is no response after repeated attempts. Or, a child may need to be discharged at the discretion of staff (for example, the child might have a fever and needs to be sent home).

This can be done by the following steps:

1. Search for the patient using the search screen.
2. Select the patient.
3. Click on the “Delete Patient From Clinic” button and follow the instructions (Figure 3.27).

Note: none of the data that was obtained (X-Rays, chart entries) will be removed. The patient will simply no longer be listed in search results.

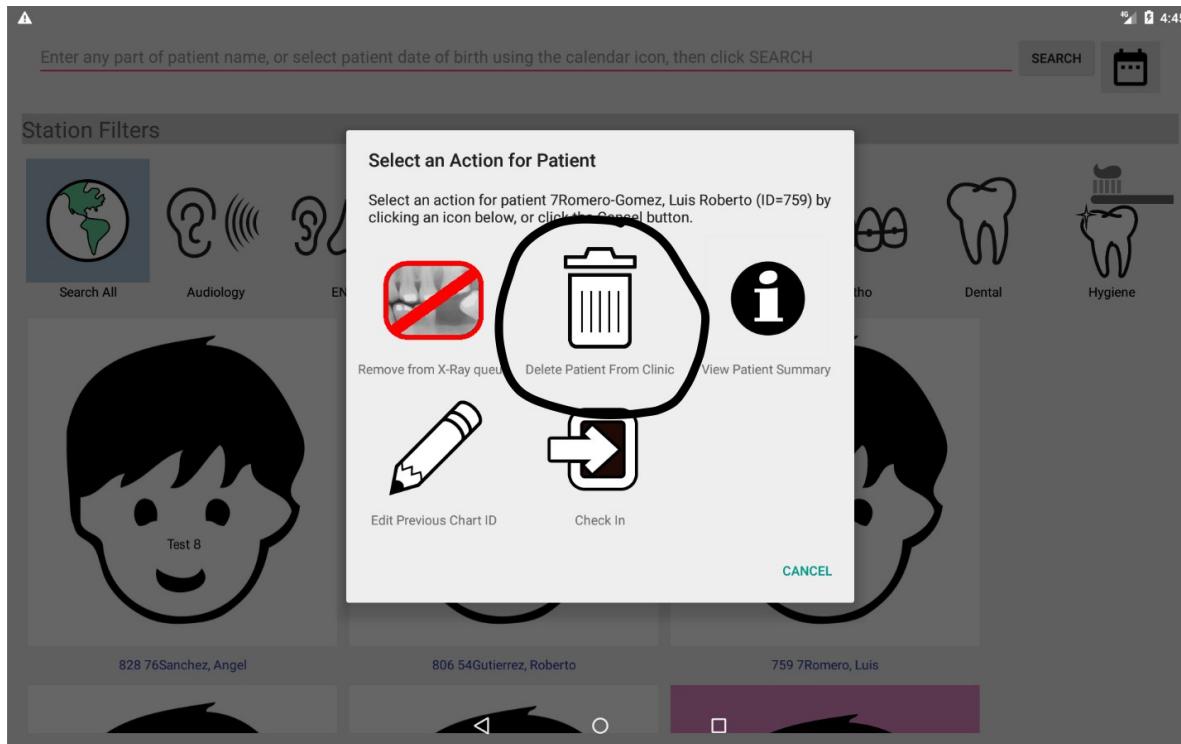


Figure 3.27 Removing a Patient from the Clinic

3.11 Recording the Paper Chart ID

For cleft patients that have a paper chart (as of this version of the chart application, surgery screening patients still have paper charts, ENT and Audiology are digital), it is necessary to retrieve the paper chart (or previous) ID that was assigned to the patient in the legacy database in order to find the paper charts. This is because the ID assigned by the tablet-based EMR is a different number than that used in the older system.

Similarly, dental and ortho may find this feature useful until such time that everything has gone digital. This paper chart number might also be used to record the chart number for charts in archive, in case we are completely digital yet for some reason, there is a need to go back and look at something in the older paper charts. However, there can only be one “paper” chart ID recorded for each patient.

Regardless of the reason, you can record a paper chart number by following these steps:

1. Search for the patient using the search screen.
2. Select the patient.
3. Click on the “Edit Previous Chart ID” button (Figure 3.28).
4. Edit and save the previous chart ID (Figure 3.29)

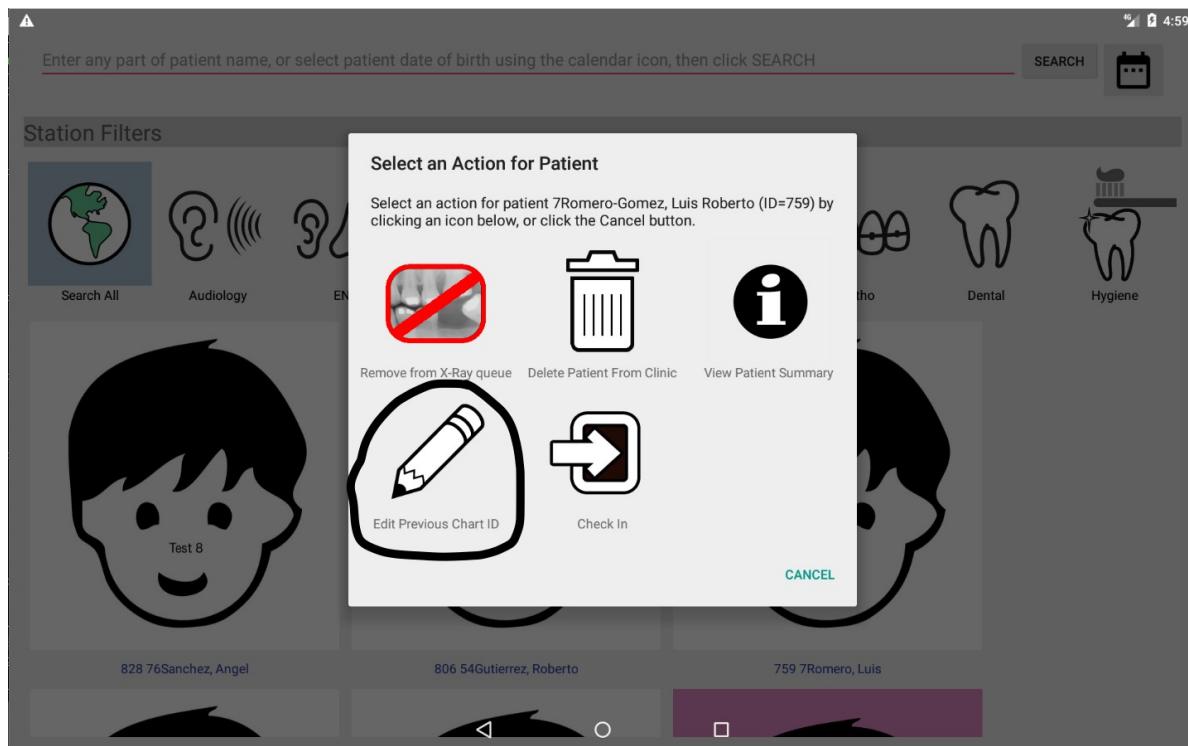


Figure 3.28 Edit Previous Chart ID

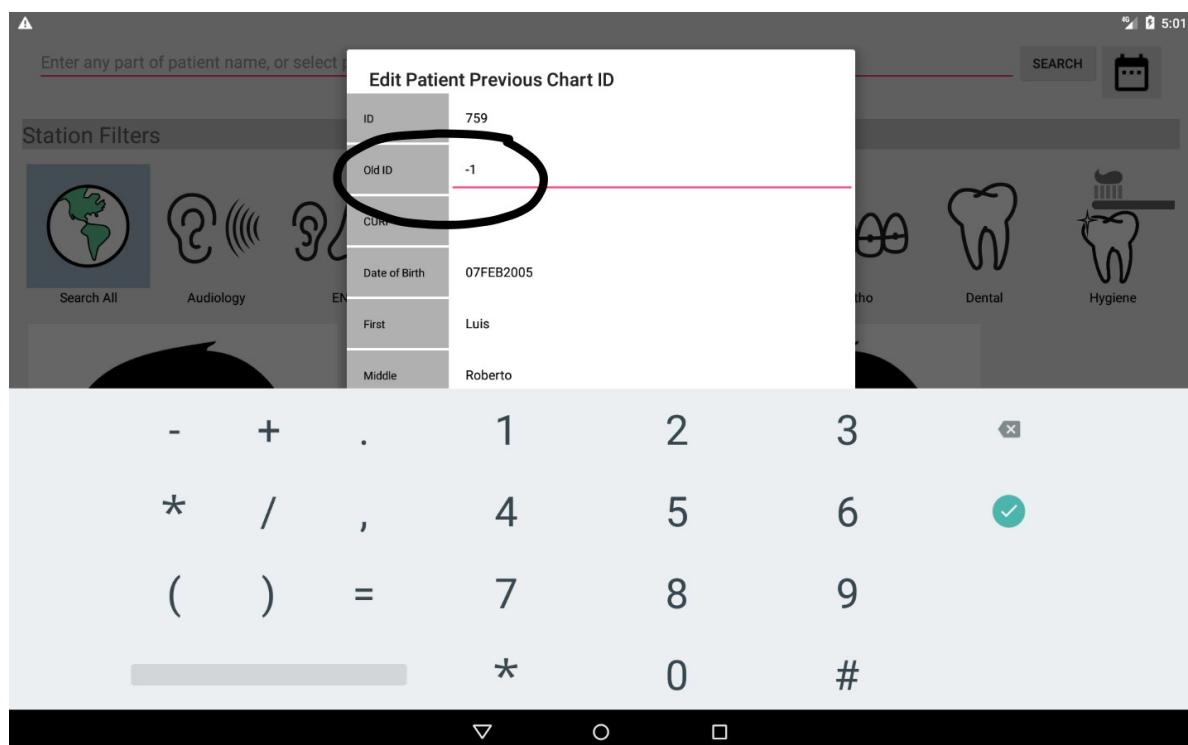


Figure 3.29 Editing Previous Chart ID

Note that the chart ID “-1” is reserved to indicate that no such chart exists.

3.12 Retrieving the Patient Paper Chart ID

As described in the previous section, patients may have previous paper charts, and their ID may be stored in the database. Looking up this paper ID chart may help in searching for that chart. The expected use case for this at this point is surgery screening and perhaps orthodontics, which currently are not supported in the digital charts. To view the previous paper chart ID, follow these steps:

1. Search for the patient using the search screen.
2. Select the patient.
3. Click on the “View Patient Summary” button (Figure 3.30).
4. The patient ID is displayed as shown in Figure 3.31

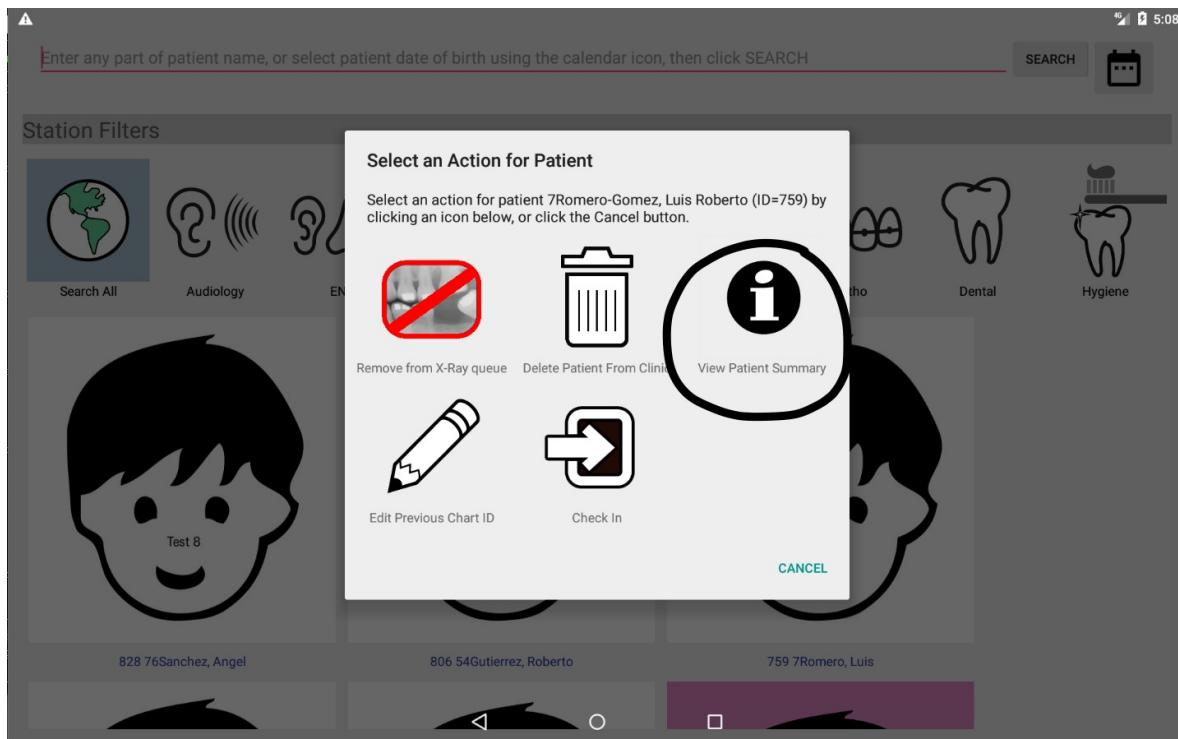


Figure 3.30 View Patient Summary button

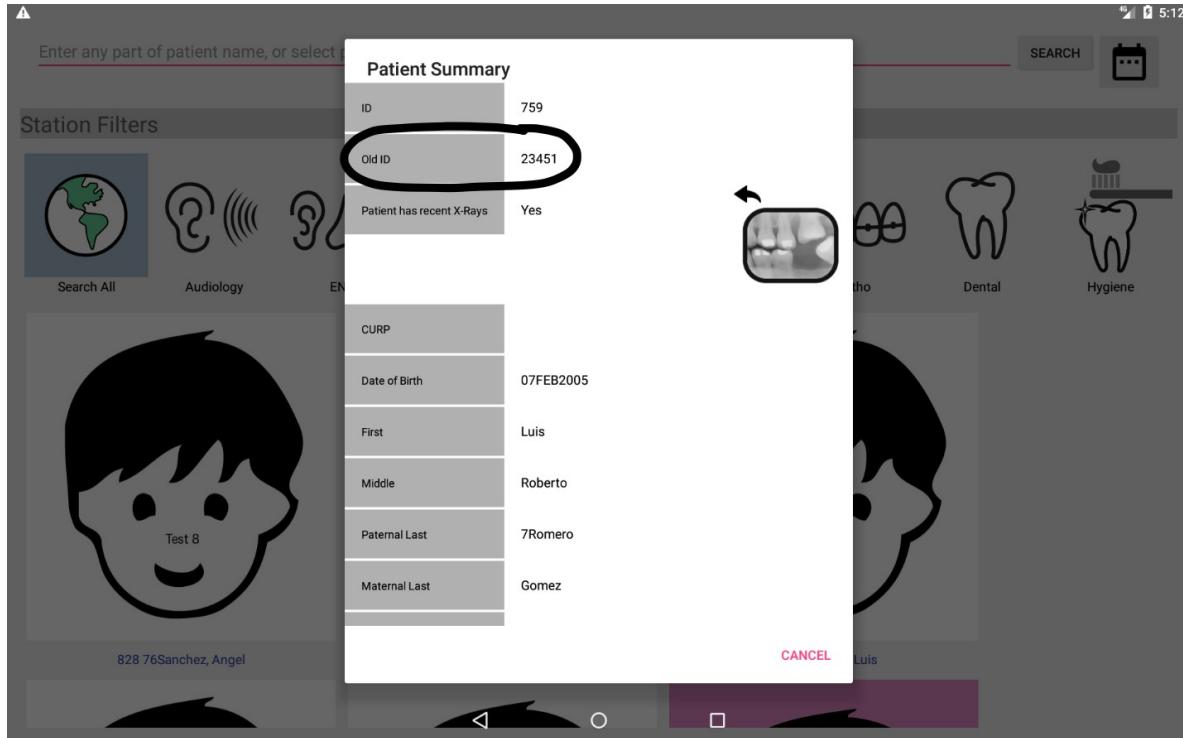


Figure 3.31 Old Chart ID (-1 indicates there is none recorded for this patient)

3.13 Removing X-Ray from the Routing Slip

The policy of Thousand Smiles is that patients are given no more than 1 set of x-rays per 12 month (1 year) period. However, all dental patients, regardless of this status, will have x-ray added to their routing slip automatically at time of registration (this may change in the future).

Any patient that has x-ray in their routing slip, yet has recent x-rays will be flagged in the following ways:

1. On the action dialog that is displayed when a headshot is clicked in the search results page, a button will be displayed allowing the runner or any caregiver to see that the patient has recent x-rays, and x-ray is in the current routing slip. This button can be used to remove x-ray from the patient's routing slip, if desired. See Figure 3.32.
2. The patient info screen will indicate with an icon and status that the patient has had x-rays in the past year. See Figure 3.32.

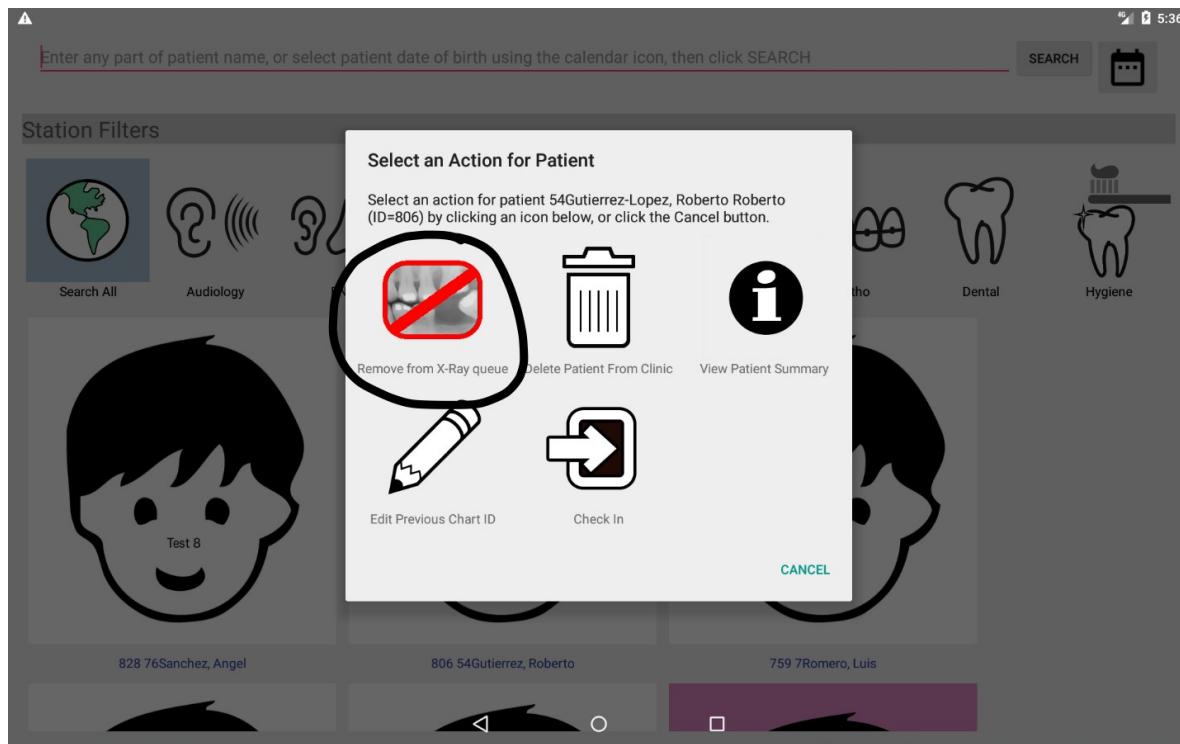


Figure 3.32 Patient with Recent X-Rays showing button for removing x-ray from routing slip

3.14 Exiting and Restarting the Application

When you are no longer using the application, you should exit the application. This will ensure that the next user has to log in, and any patient chart accesses performed by that person are not logged as having been done by you. Exiting the application can be done in two ways:

- Minimizing the application and swiping it away
- Using the options menu on the search screen and selecting the exit function

3.14.1 Exiting by Swiping Away the Application

You can exit in this way by:

- Swiping up from the bottom of the screen (but don't swipe too far up or the app drawer opens).
- Tapping the small square icon on the bottom of the screen. See Figure 3.33.
- Swiping left or right as though you are trying to flick the application off the screen. See Figure 3.34

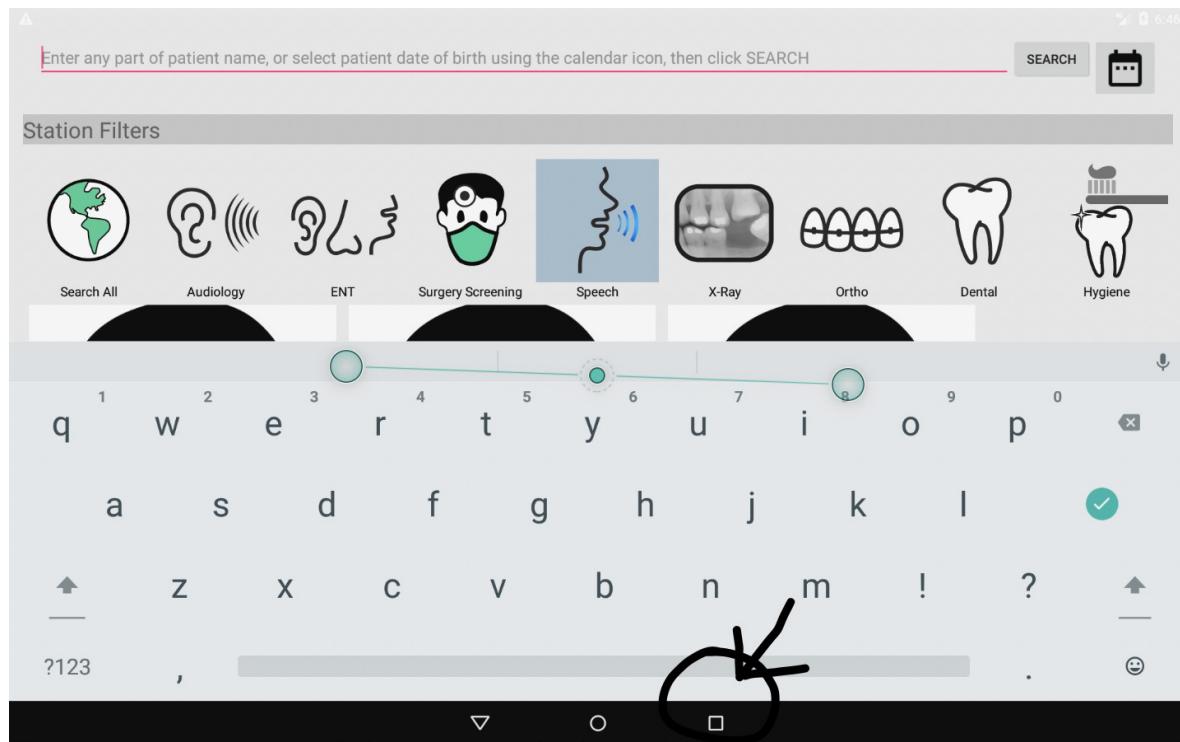


Figure 3.33 Location of the Square Icon.

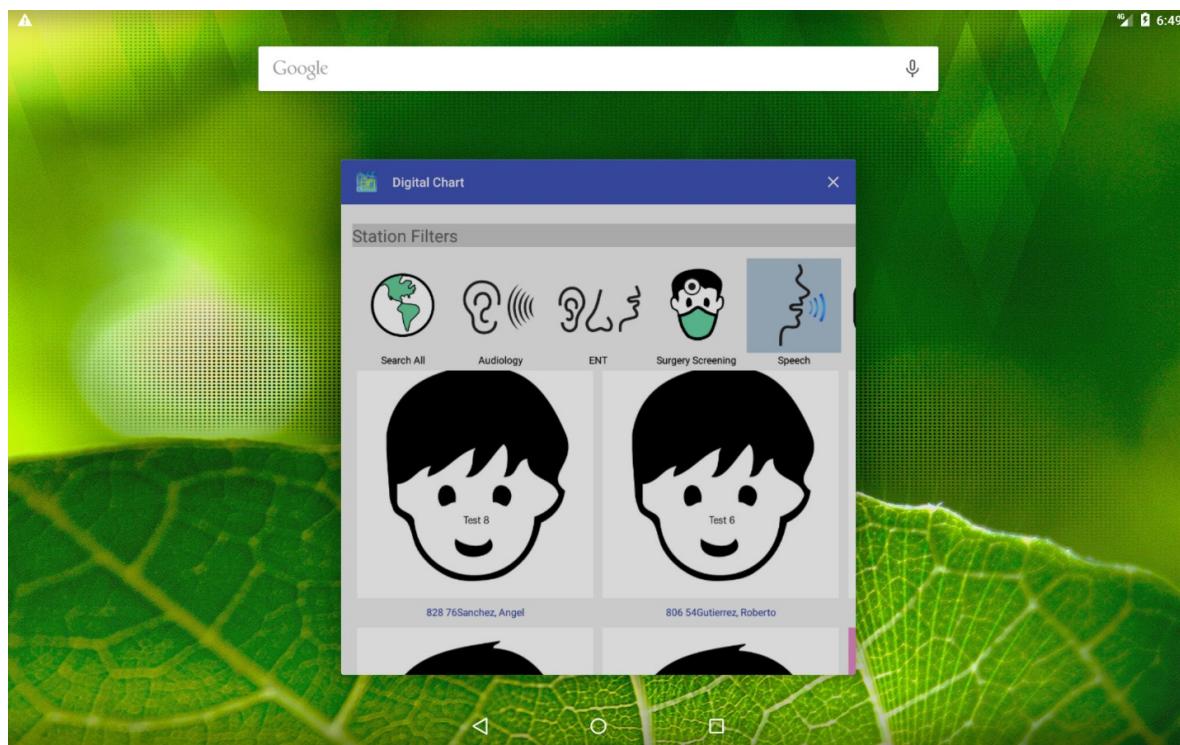


Figure 3.34 Swipe the minimized application left or right with your finger to exit.

3.14.2 Exiting via the Options Menu

From the search screen, press and hold down on the options menu button in the upper right hand corner of the screen, then select the Exit menu option from the menu that appears to exit the application. This method will ask for confirmation before exiting. See Figure 3.35.

3.15 Changing the Station Type

In rare circumstances, you may want to change your station type. This will allow you to see portions of the chart associated with a different caregiver. To do so, press down on the options menu and select the “Change Station” item (Figure 3.35). This will return you to the station selection screen.

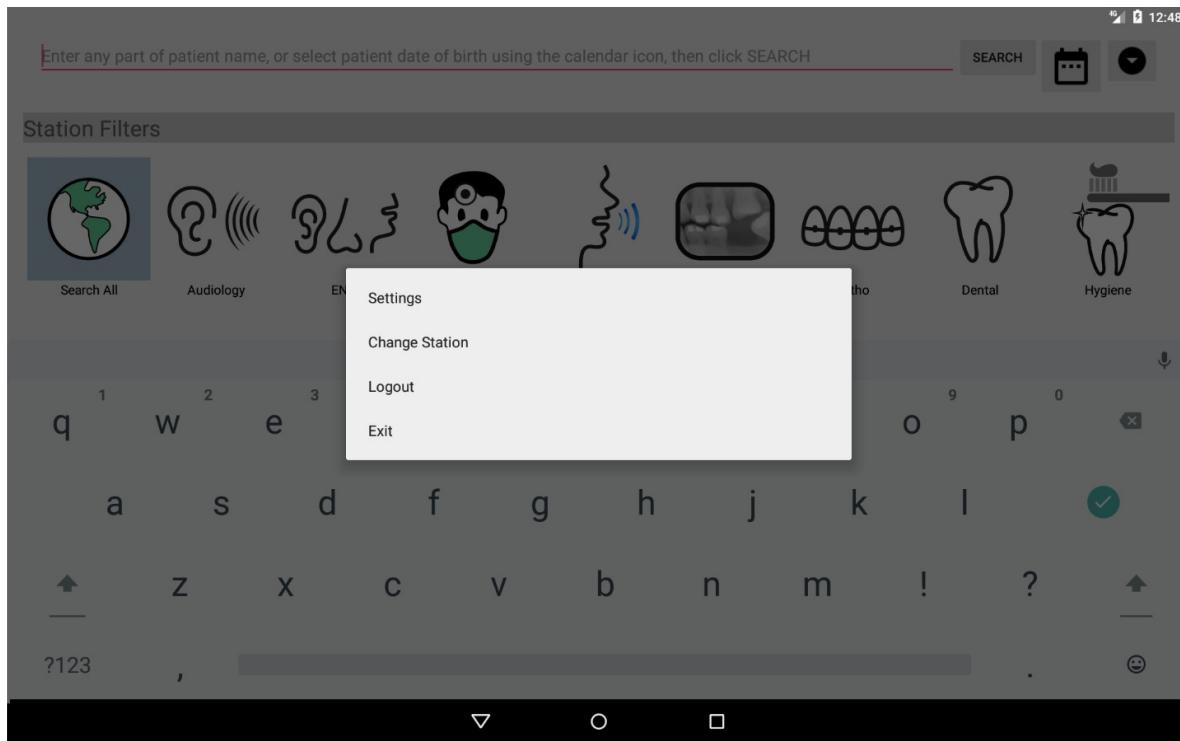


Figure 3.35 Patient Search Screen Option Menu

3.16 Logging Out

To log out (return to the login screen), press down on the options menu on the patient search screen, and select “Logout” from the menu that displays (Figure 3.35). The application will return to the login screen, allowing another user to login. This is advised whenever you are done for the day, or someone else is going to use your tablet. If someone else uses a tablet to which you are currently logged in, and viewing of chart data or changes made will be logged as though you were the one performing them, which is not desirable.

4. Dental Chart

4.1 Overview

The dental chart screen layout is shown in Figure 4.1.

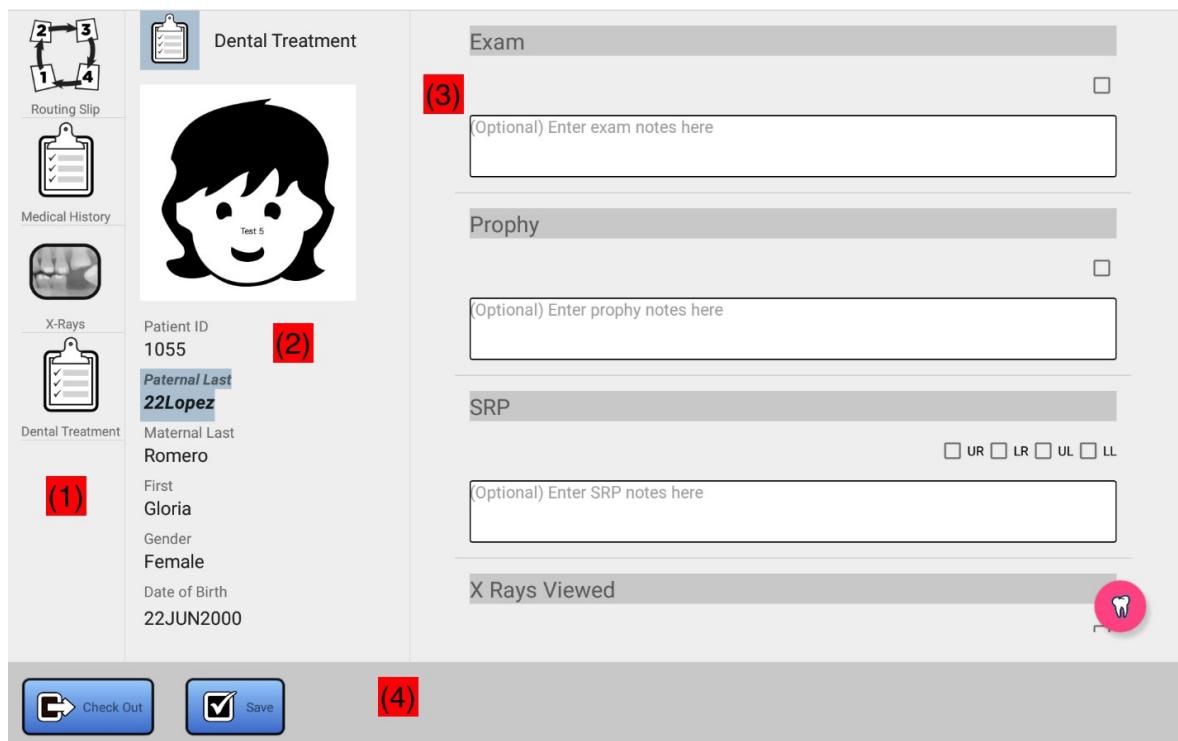


Figure 4.1 Dental Chart Screen Layout

(1) Allows you to selection a view into the chart. Common options include the ability to view and modify the patient Routing Slip (see Section 3.8), and to view and edit the patient Medical History. Options which are specific to Dental include the viewing X-Rays (Section 4.1.2) and the creation of dental treatment records (Section 4.1.4).

(2) Is the patient information. This identifies the patient to which the data being viewed corresponds. The headshot will be that of the patient taken the day of the clinic. The ID, name, gender, and data of birth should match that found on the patient wristband, if present.

(3) This area can be used to select a specific record for the patient corresponding to selection made in area (1). For example, clicking on the X-Rays icon in area (1) will display a list of X-Ray records obtained at the current, and previous clinics. Area (3) is also where the actual dental chart data for the patient can be viewed or modified.

(4) Use the “Check Out” button to check the patient out (see Section 3.7.3) and use the “Save” button to save any edits that you make to the patient chart.

4.2 X-Rays

Selecting the X-Rays button (Figure 4.1) will display a list of X-Ray records that were obtained at the current and any past clinics for the patient (Figure 4.2). These will be ordered in clinic order, with the most recent clinic displayed first. If no X-Ray data is present in the chart for the patient, a message will display indicating that no X-Rays were found, and this area will be blank.

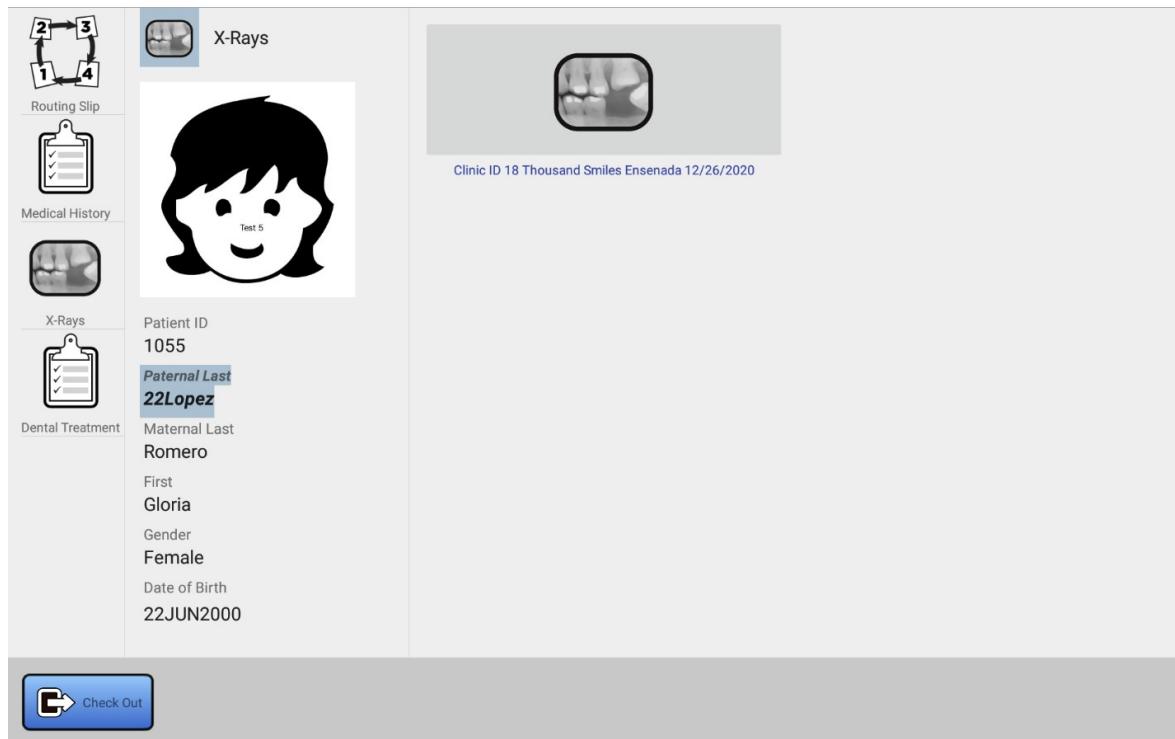


Figure 4.2 List of X-Ray records for Patient 1055

Use your finger to scroll up and down through the list should there be more X-Ray records than can fit on the screen.

To view a dental record, simply touch it with your finger. You will see a screen similar to that in Figure 4.3.

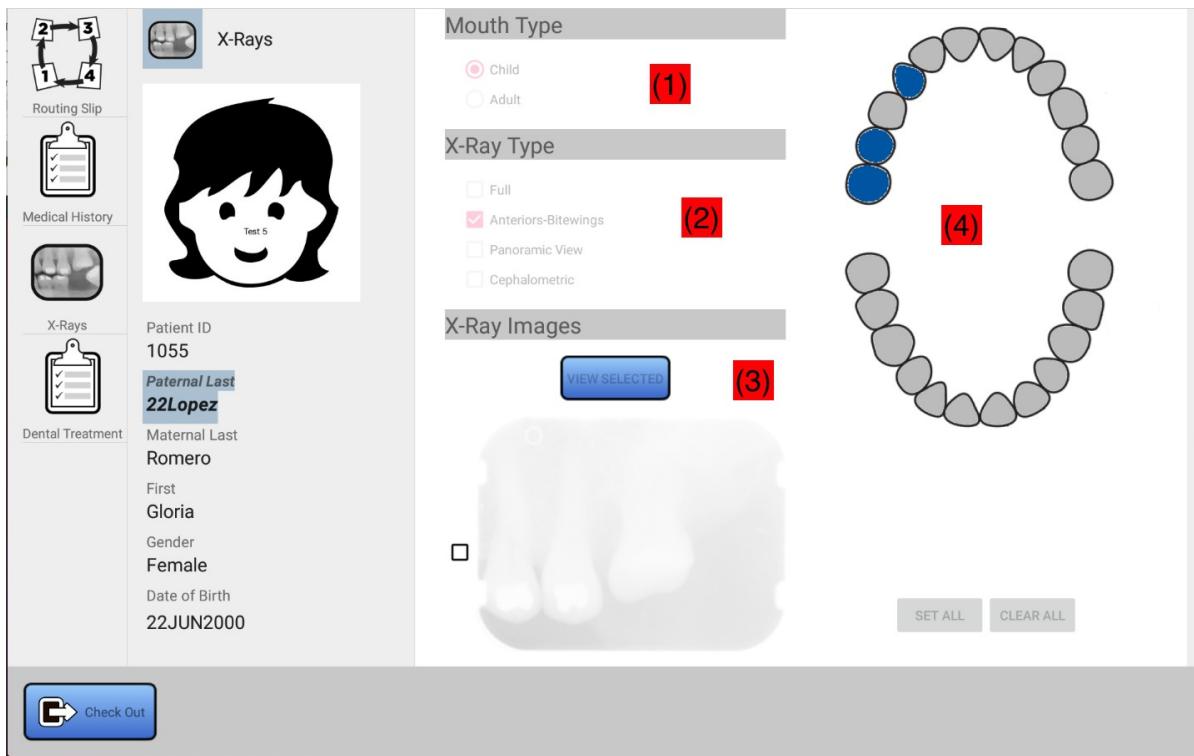


Figure 4.3 X-Ray Data

In Figure 4.3:

(1) is the mouth type

(2) is the X-Ray types that were taken for this patient at the selected clinic.

(3) is a scrollable list of X-Ray thumbnails for the patient. This list includes not only the X-Rays taken at this clinic, but X-Rays taken at all previous clinics for the patient. Use your finger to scroll the list up and down. Use the checkbox to select individual X-Rays to view. More than one X-Ray can be selected for viewing, simply click on the checkboxes. When X-rays are selected, the “View Selected” button will be enabled. See section 4.1.3.

(4) is the coverage chart. This gives a general representation of the teeth which are covered in the X-Rays taken *at the selected clinic only*.

4.2.1 Viewing A Set of X-Rays

To view one or more of the X-Rays (area (3) in Figure 4.3. follow these steps.

1. Using your finger, scroll through the thumbnails.
2. Select the X-rays to view by clicking on the checkbox(es) to the left of each X-Ray you wish to view.
3. Click on the “View Selected” button.

The result is shown in Figure 4.4:

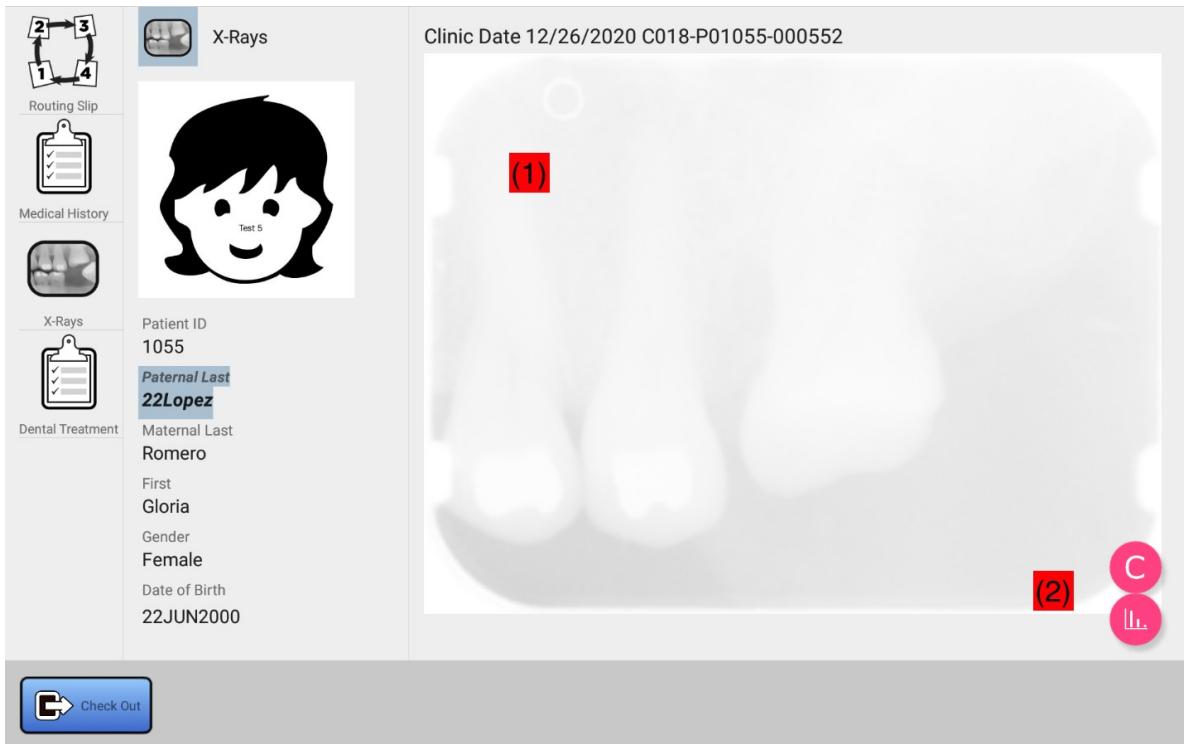


Figure 4.4 Viewing Selected X-Rays

(1) is the X-Ray viewing area. This area will display one of the selected X-Rays at a time. Above the X-Ray is displayed metadata corresponding to the image, including the X-Ray ID and the clinic at which the X-Ray was taken. The X-Ray ID is of the form CXXX-PYYYYY-ZZZZZZ where:

- XXX is the clinic number (in this case 18)
- YYYYY is the patient ID (in this case 1055)
- ZZZZZZ is the ID of the X-Ray image in the database (in this case, 552)

Use your finger to flick the displayed X-Ray image left to right (or right to left) to view the next selected X-Ray image, if any. As you flick left or right, any enhancements that were made to the image will be removed.

You can zoom in on the image by placing your thumb and index finger on the display and pinching. Pinching in will zoom the image out, while pinching in will zoom the image in. Pinch in completely to restore the original image.

When zoomed in, you can use your finger to pan around the zoomed in image. Do this by pressing your finger on the screen, and while holding down your finger, move it in any direction.

(2) are the image enhancement buttons. The “C” button will perform a false coloring of the X-Ray being viewed. See Figure 4.5. Below the “C” button is the histogram equalization button. This button can be used to enhance the luminosity of the image, and its overall contrast. See Figure 4.6. Results will vary based upon the image being processed. The enhancement applied will be preserved as you pinch zoom and pan the image with your fingers. Flicking left or right to view

other X-Rays will discard any changes made. Changes made with these buttons cannot be saved in the chart, as they are viewing enhancements only.

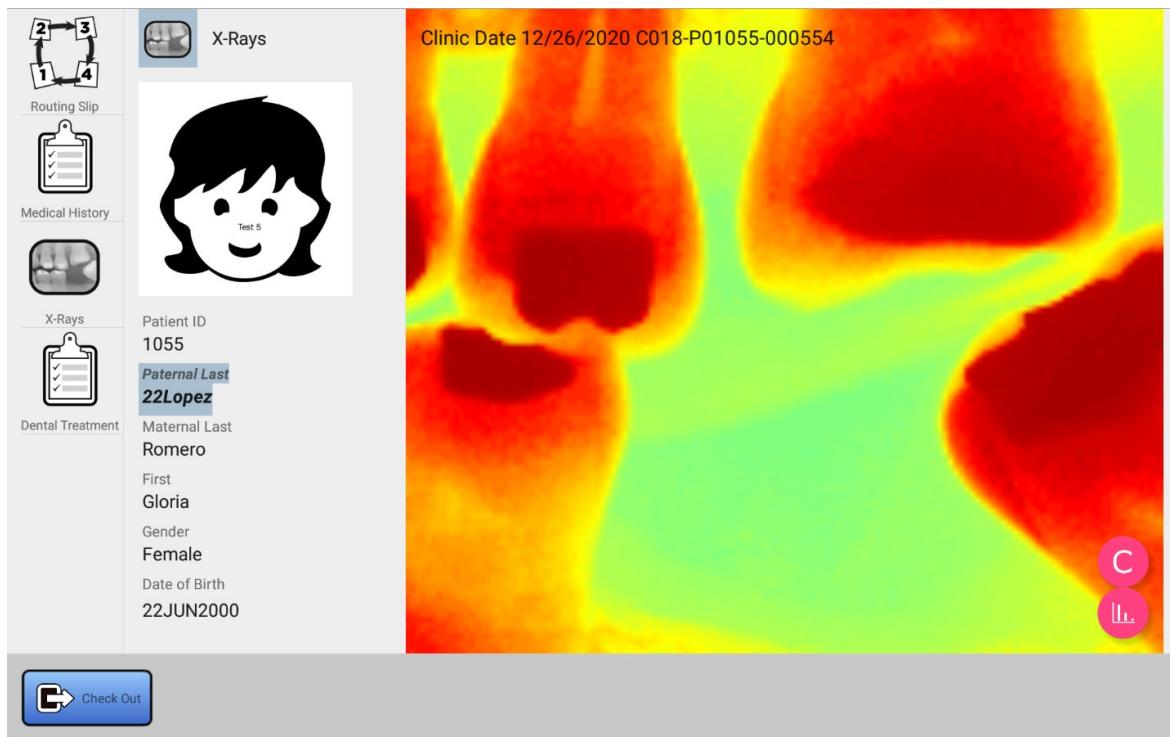


Figure 4.5 False Coloring



Figure 4.6 Histogram Equalization

4.3 Creating and Viewing Dental Treatment Records

Dental treatment records document diagnosis and treatment performed at a specific clinic. To view a list of treatment records, select the Dental Treatment icon (Figure 4.7). The work area will display a button allowing you to create a new Dental Treatment Record for this clinic, and it will list all previously created dental treatment records for this patient. This list will display with the most recently created dental treatment record first. If there are more dental treatment records that can be displayed, use your finger to scroll the list up and down to locate the dental treatment record of interest. The data and location of the clinic is displayed below each record to aid in identification.

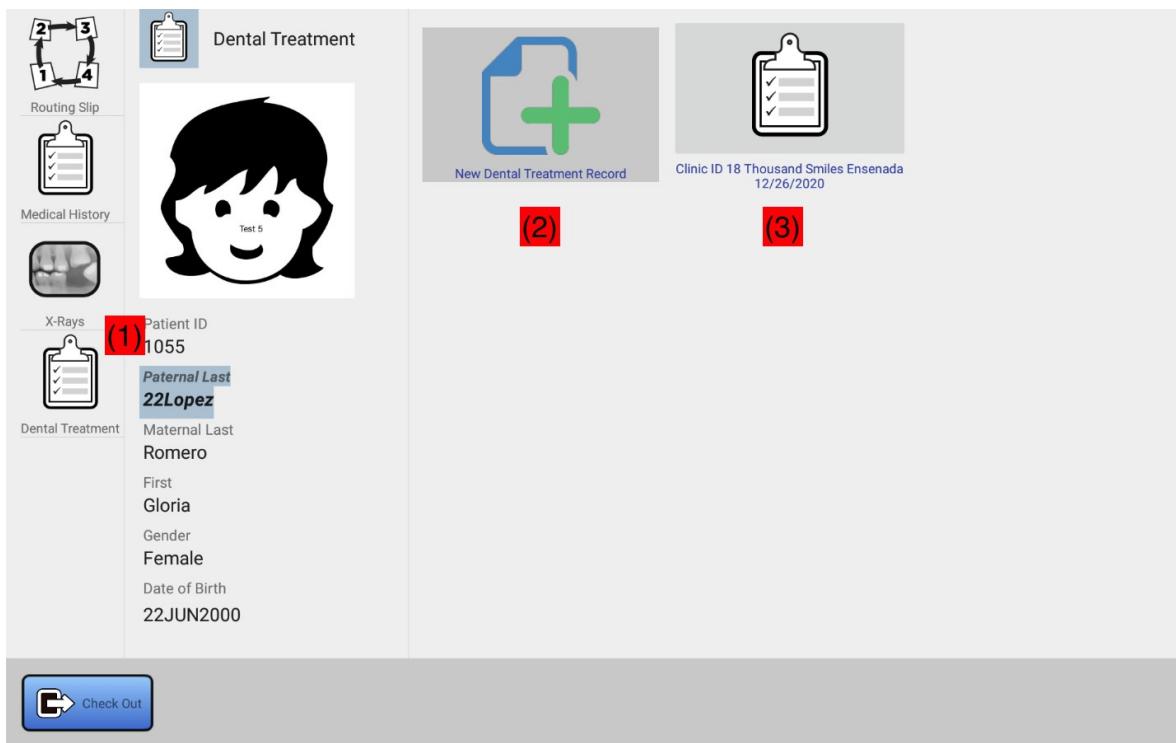


Figure 4.7 Dental Treatment Selector

In Figure 4.7:

- (1) Dental Treatment button. Click this to view a list of dental treatment records, and a button that can be used to create a new one.
- (2) Click the “New Dental Treatment Record” icon to create a chart entry for this clinic.
- (3) Click on an existing chart record from a prior clinic to view data for the specified clinic.

4.4 Dental Record Organization

Dental records are organized into two sections.

The first section is the Dental Treatment, or per-visit chart. This portion of the chart allows a dentist or assistant to record data that pertains to the general visit. Here, text fields and checkboxes are present which can be used to record data that applies to a visit by a patient, or that applies to the entire mouth. See Figure 4.8.

Dental Treatment

(Optional) Enter orthodontic notes here

Oral Surgery

Evaluation Tx

(Optional) Enter oral surgery notes here

Anesthetic

Benzocaine Lidocaine Septocaine Other

Number of carps: 3

(Optional) Enter anesthetic notes here

Per-visit/Full-Mouth Codes

Click on the button to view and edit codes

VIEW/ED

Check Out **Save**

Figure 4.8 Per-Visit Dental Chart

The second section is the per-tooth (tooth chart) chart, shown in Figure 4.9. This portion of the chart records work that is scheduled has been completed for a specific tooth. It can be accessed by clicking on the red tooth icon located at the lower right corner of the per-visit chart (see Figure 4.8). Each tooth can have an infinite list of work associated with it. Work can be added, removed, and marked compete, on a per-tooth basis, by clicking on the tooth and entering the data using CDT codes. The tooth chart uses colors to indicate, on a per-tooth basis, what tooth has work that has been completed, partially completed, or completed entirely. This tooth state show is cumulative, it follows the patient from clinic to clinic. Therefore, at a glance, the tooth chart will give you an overview of the state of treatment for the child.

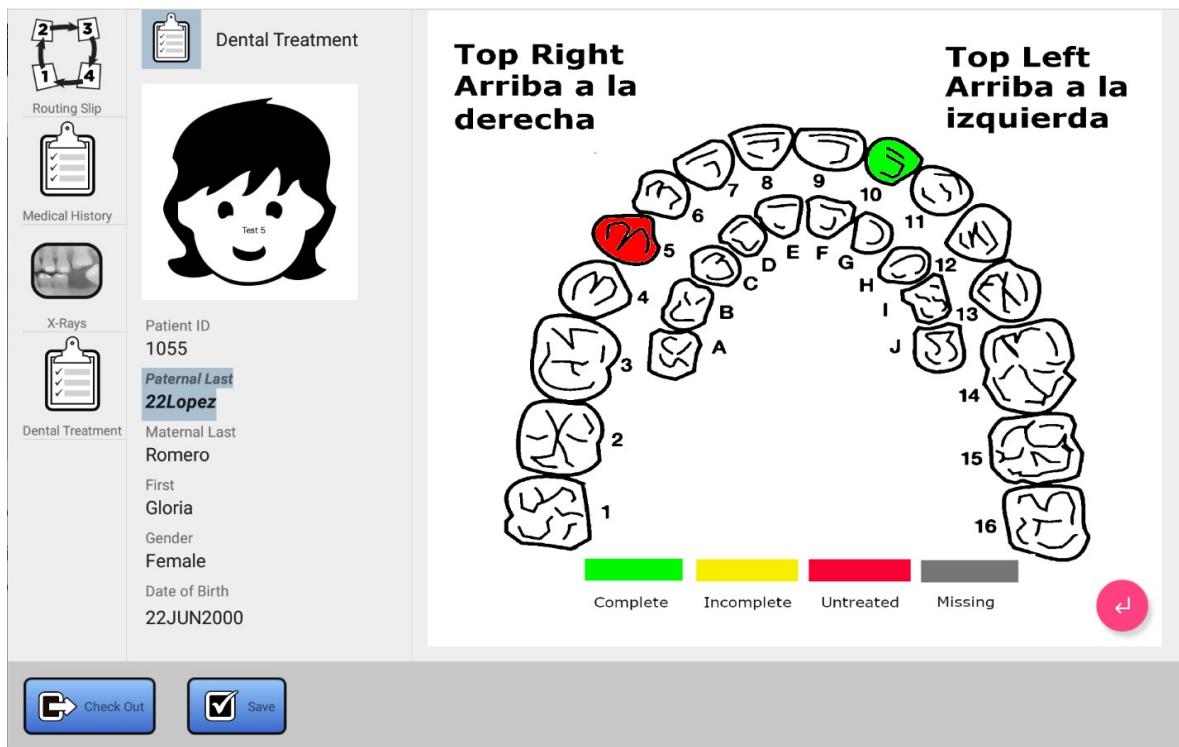


Figure 4.9 Tooth Chart

The following section documents how to edit CDT codes, which apply to both the Per-Visit and Tooth Charts. Following that, the Per-Visit and Tooth Charts are documented in detail.

4.5 Editing CDT Codes

4.5.1 Overview

A Dental Procedure, or CDT code defines a dental treatment. These codes are standardized by the American Dental Association (ADA). There are several hundred of these codes defined. Thousand Smiles maintains a database of several dozen of the most commonly used codes.

Each code consists of a number in the format *DnXXX*, and a description. The *DnXXX* code is formatted as follows: *D* is always the first character in a CDT code, *n* indicates the category, and *XXX* is a 3-digit code which indicates a specific treatment within that category. For example, D4342 can be broken down as follows:

D – constant, all CDT codes start with the letter D.
4 – PERIODONTICS
342 – Root Planing (1 to 3 teeth)

The following categories are supported in our database as of this writing (Table 4.1):

Code (n in DnXXXX)	Meaning
1	Preventative Services
2	Restorative Dentistry
3	Endodontics
4	Periodontics
5	Removable Prosthodontics
6	Fixed Prosthodontics
7	Oral Surgery
8	Orthodontics
9	Persons Served (Encounter Codes)

Table 4.1 CDT Code Categories

The CDT code editor is aware of all of the codes in the database, and can be easily searched to add codes to the per-visit or tooth chart. Details on how to access the CDT code editor are provided in sections 4.17 (Per-Visit Chart) and 4.18 (Tooth Chart), but regardless, the operation is the same within the editor itself.

4.5.2 Searching For Codes

To find a code, you may type any portion of the code, the category, or the specific treatment. For example, to find all the codes in Periodontics, type in “D4” (Figure 4.10). Or you can start typing the word “periodontics” and it will display after a few characters have been typed (see Figure 4.11). If you know a code, for example D4342, typing that in will display the associated code and description (Figure 4.12).

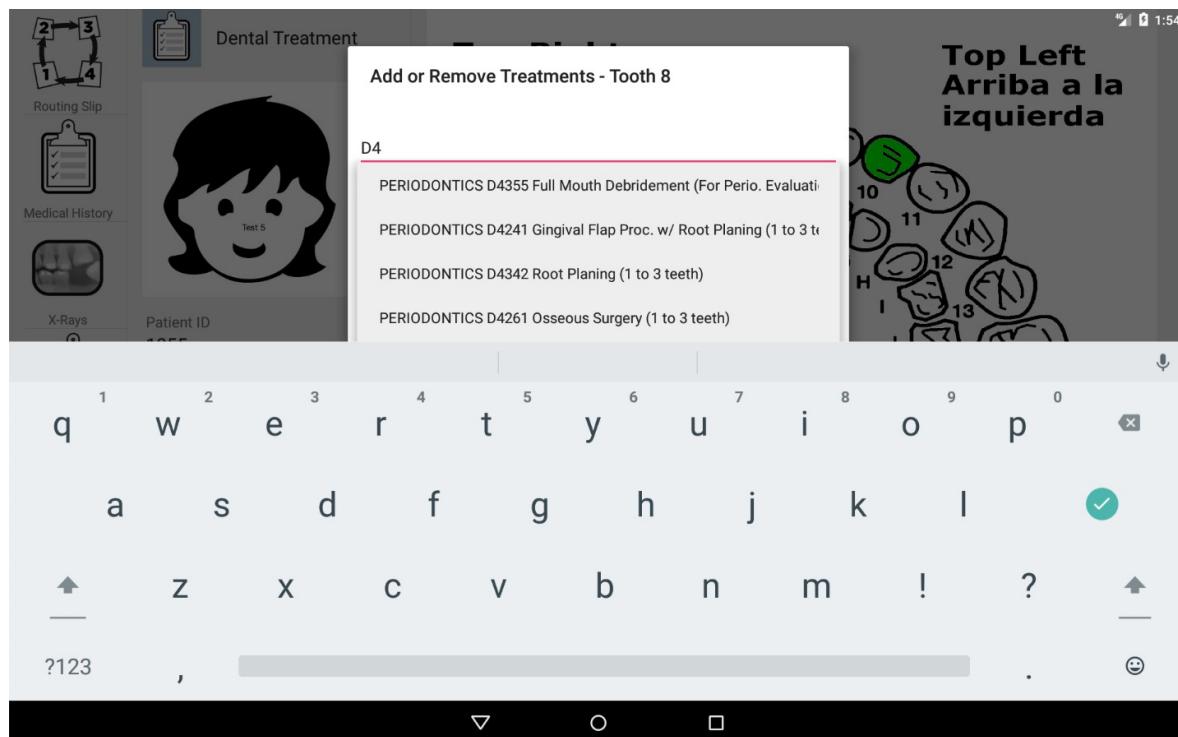


Figure 4.10 Search Using Portion of CDT Code

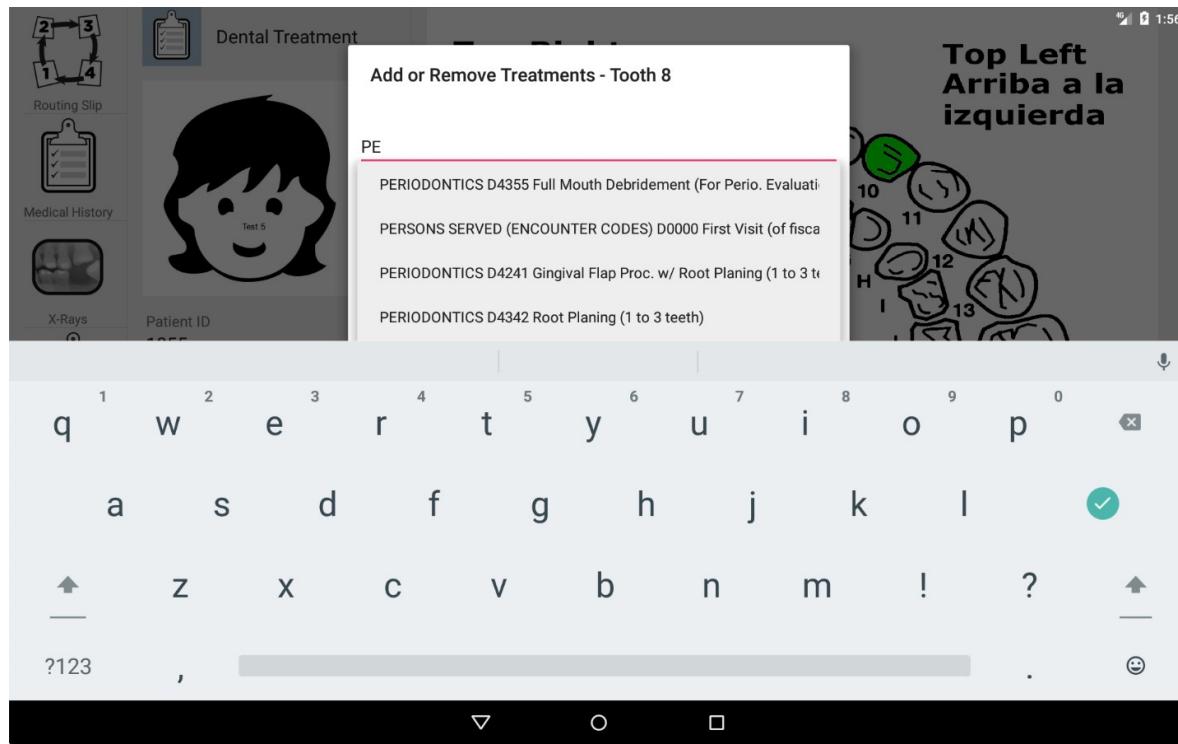


Figure 4.11 Search Using Letters in Category Name

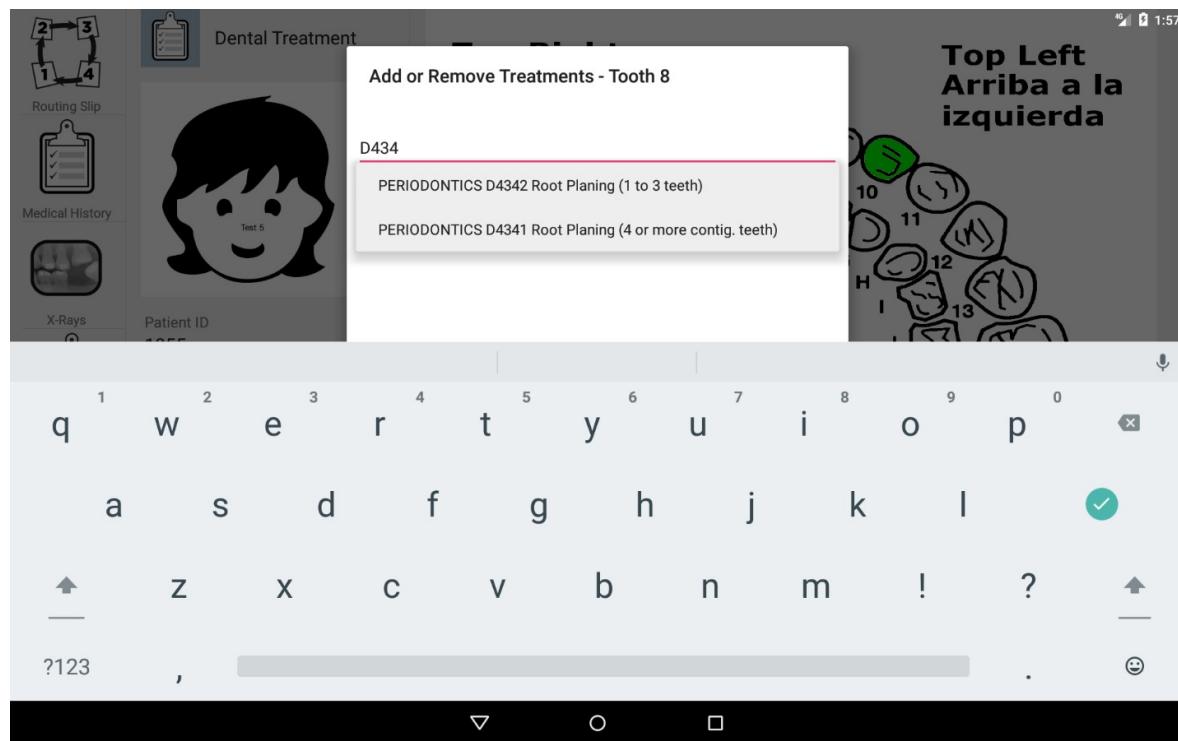


Figure 4.12 Search using portion of CDT code number

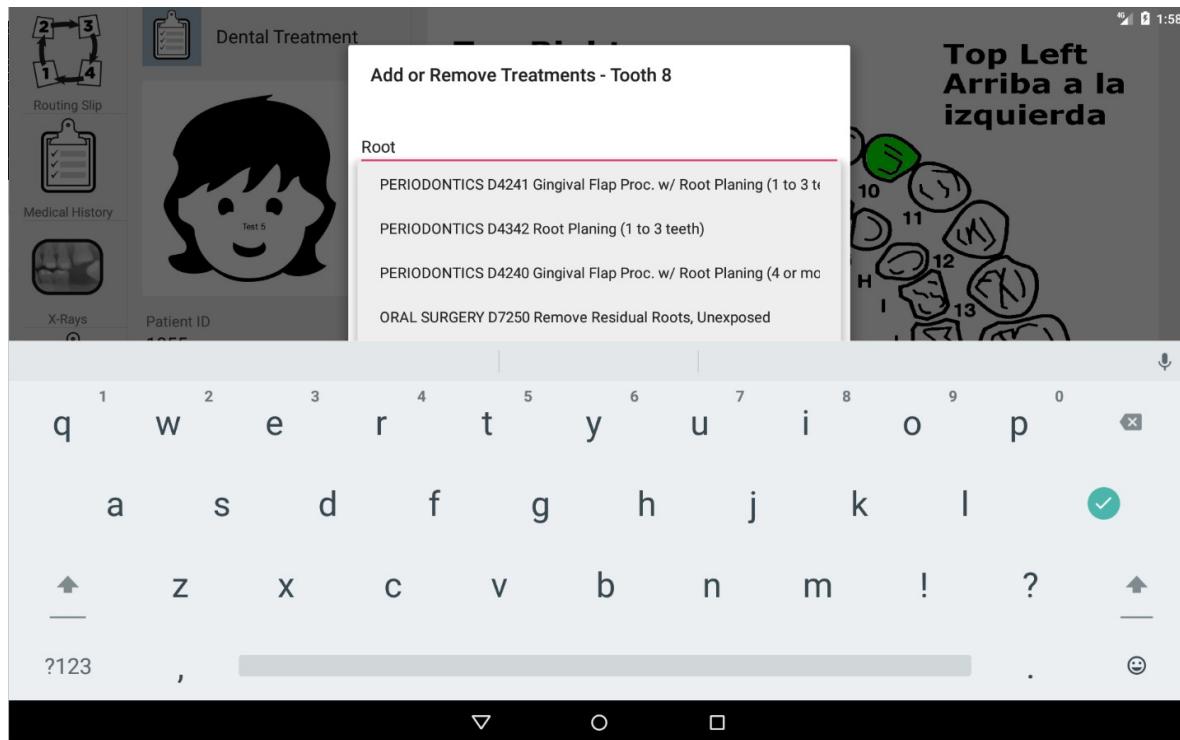


Figure 4.13 Search by Description

4.5.3 Adding a CDT Code

Matching codes, as can be seen in Figure 4.13, will display in a list. To select a code, touch it with your finger. See Figure 4.14. You can then click the Add button to add it to the list of treatment codes for this patient or the selected tooth. Clicking add results in a dialog (Figure 4.15) which allows you to provide more data for this treatment, including selecting the surfaces affected by the condition or treatment, and whether or not the treatment has been repaired.

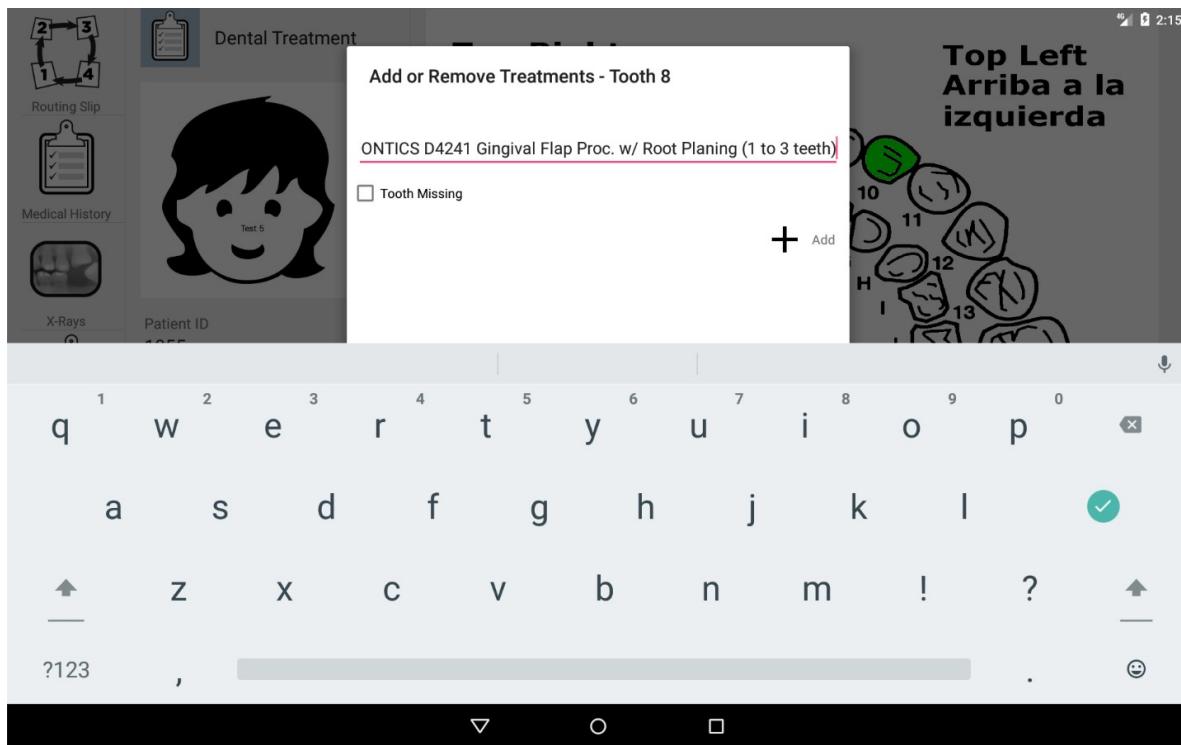


Figure 4.14 Selecting a Treatment

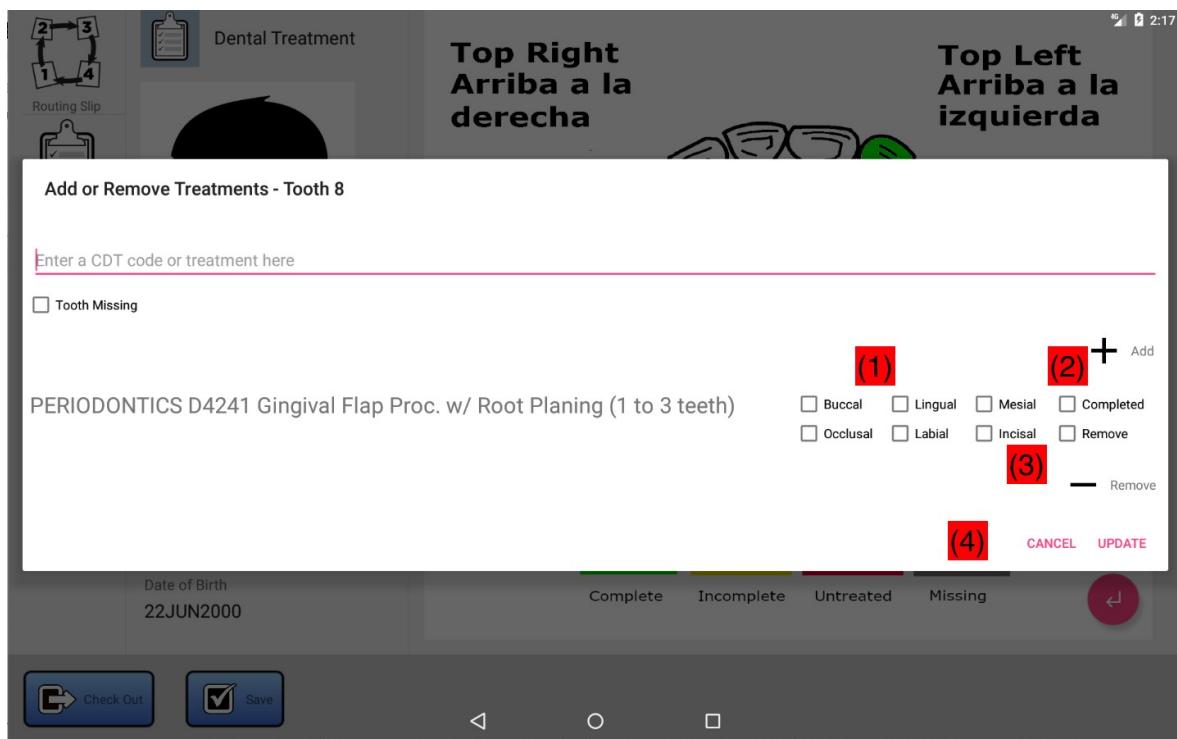


Figure 4.15 (See text which follows)

In Figure 4.15:

- (1) Check all sides of the tooth surface which apply to the condition. This portion of the editor is not available when editing whole-mouth conditions.
- (2) Check “Completed” if the work on the condition is complete.
- (3) Check on remove to remove the condition from the list
- (4) Use the UPDATE button to save your changes, or use CANCEL to cancel.

4.5.4 Removing a CDT Code

To remove one or more treatments using the CDT code editor, click on the “Remove” checkbox for each treatment you wish to remove, then click on the “Remove” button (3) in Figure 4.15. The dialog will update with the checked items removed. Finally, when all changes for the tooth are complete, make sure to click the “Update” button. Removed treatments are not made permanent in the chart unless you click the Save button.

4.5.5 Marking a Tooth Missing

To mark a tooth missing, click the “Tooth Missing” checkbox in the CDT editor, and then click UPDATE button to save your changes. See Figure 4.16. Missing teeth will be shown in gray on tooth charts.

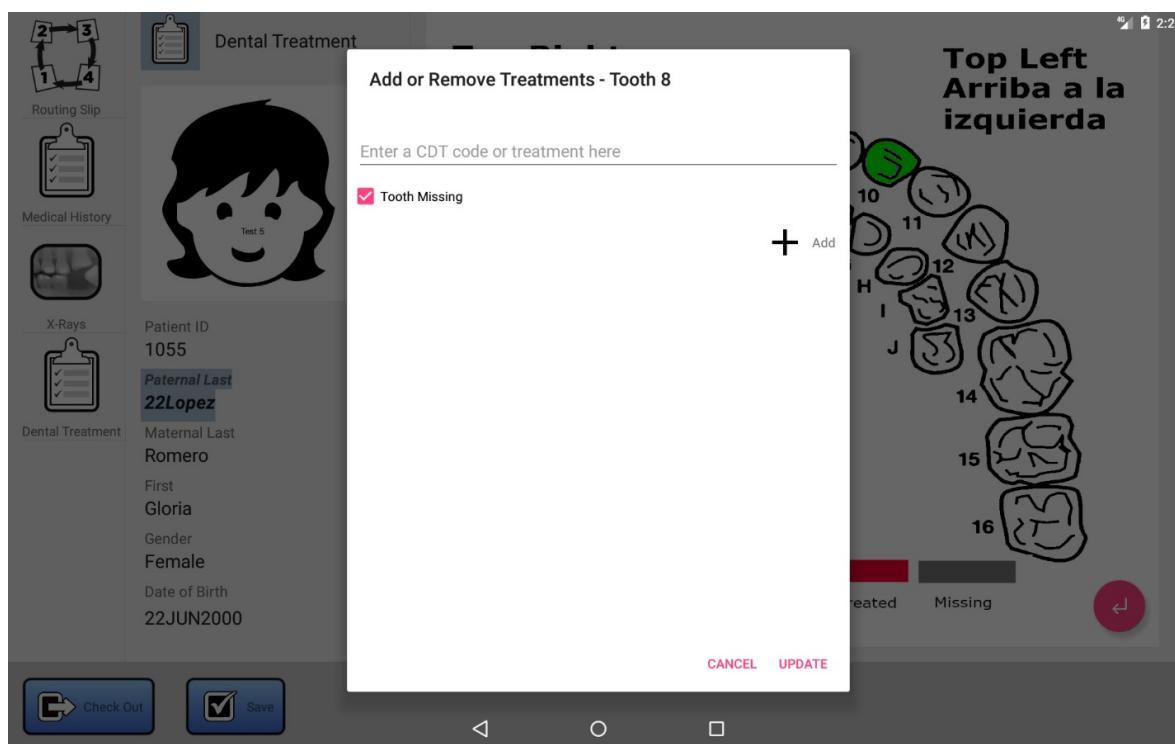


Figure 4.16 Marking Tooth 8 As Missing

4.6 Dental Treatment

The Dental Treatment (or per-visit) chart generally mimics the paper charts that were in use by Dental at Thousand Smiles prior to going digital, with the added support of supporting whole-mouth, or per-visit CDT codes (see Section 4.5 for details on editing CDT codes). The Dental Treatment chart effectively is used to record general comments and notes in a variety of categories related to the dental care given to a patient on a per-visit basis. To edit any per-tooth conditions and treatments, use the Tooth Chart, which is described in Section 4.7.

Creating a Dental Treatment Chart is described in section 4.3. In this section, we describe in detail how to edit the chart.

4.6.1 Organization of the Dental Treatment Chart

The following figure illustrates the layout of the Dental Treatment Chart screen

The screenshot shows the Thousand Smiles EMR Charts App interface for a dental treatment visit. The left sidebar contains icons for Routing Slip, Medical History, X-Rays, and Dental Treatment, with the Dental Treatment icon highlighted. The main area displays patient information: Patient ID 1247, Paternal Last Name 26Gomez, Maternal Last Name Romero, First Name Jose, Gender Male, and Date of Birth 19JUN2000. The central part of the screen is divided into several sections:

- Dental Treatment (1)**: A placeholder for a patient headshot, currently showing a cartoon face.
- Anesthetic (4)**: A section for selecting anesthetic types. It includes checkboxes for Benzocaine, Lidocaine, Septocaine, and Other, and a field for the number of carps (0).
- Number of carps (5)**: A numeric input field.
- (6)**: A label indicating the number of carps entered.
- (Optional) Enter anesthetic notes here (7)**: A text input field for notes.
- Per-visit/Full-Mouth Codes (8)**: A section for viewing and editing CDT codes, featuring a "VIEW/EDIT" button.
- Notes (9)**: A large text area for general notes, with a pink circular icon containing a white tooth symbol (10) to its right.
- (11)**: A "Save" button at the bottom left.

Figure 4.17 Per-Visit Dental Treatment Screen

On the left hand side of the form, you will find identifying information for the patient.

- (1) This label confirms you are viewing or editing a Dental Treatment
- (2) Most recent patient headshot
- (3) Patient ID, name, DOB. Father's last name is highlighted. Data should match parent/patient wristband, if any.

On the right hand side of the form is the chart data, organized in sections. Each section can be used to indicate that a specific treatment or examination was performed.

- (4) Item Header. This identifies a specific piece of data stored in the Dental Treatment, usually corresponding to a treatment or examination performed on the child the day that care was provided.
- (5) Check boxes. Click the checkbox to check or uncheck. Usually there is a single checkbox provided. Checking the checkbox indicates that the care was provided. Leave it unchecked to indicate that the care was not provided. When multiple checkboxes are present, this can be used to provide more detail on the type of treatment that was administered.
- (6) In some cases, additional fields are present to allow further detail on the care provided for this particular item.
- (7) Free-form notes. Clicking on this box will display a soft-keyboard that can be used to enter free-form notes for the specific care provided for this item.

Note that the form consists of multiple sections consisting of items organized as described in (4) – (7). You can use your finger to scroll the form vertically in order to access each item.

- (8) Per-visit CDT codes. Use of this item is not typical, but it is provided to allow you to view and edit CDT codes that apply only to per-visit or whole mouth treatments, rather than treatments corresponding to a specific tooth or tooth surface. Codes that you add here generally should come from the D9XXX PERSONS SERVED (ENCOUNTER CODES) CDT category. Use the Tooth Chart button (10) to enter codes for a specific tooth or surface.
- (9) Per-Visit notes. Enter any free-text here that you wish. Use your finger to scroll vertically for notes that extend beyond the size of the text area provided.
- (10) Tooth Chart. Click on this icon to access the tooth chart (see section 4.7 for details)
- (11) Save button. When done editing, use the Save button to save all changes made on this form, and in the tooth chart.

4.6.2 Editing the Dental Treatment Form

For each treatment, check the corresponding checkbox (5), and enter optional comments in the provided text area (7). Use (9) to enter general notes for the visit. Use (8) to enter CDT codes that pertain to whole mouth codes. Click on (10) to access the tooth chart to enter per-tooth and per-surface codes.

When done, click on the Save button (11) to save your changes.

4.7 Tooth Chart

The tooth chart is where per-tooth and per-surface treatments can be applied.

To access the tooth chart, click on (10) in Figure 4.17. You will then be shown the tooth chart (Figure 4.18).

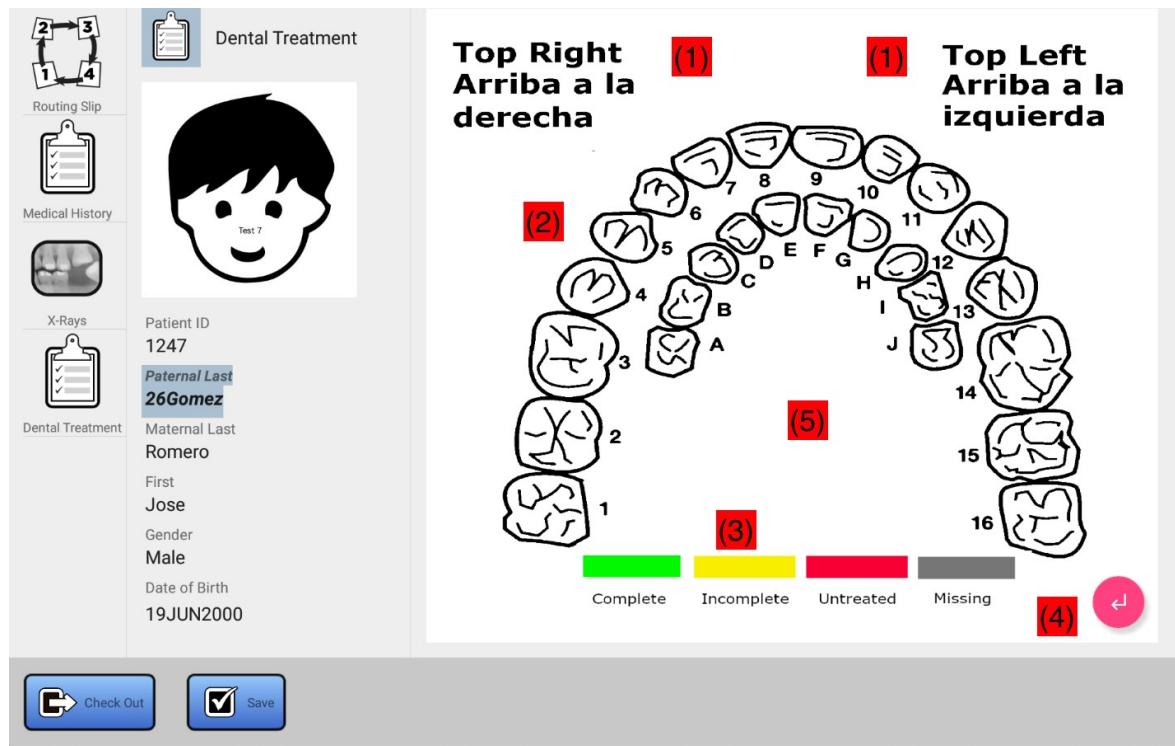


Figure 4.18 Tooth Chart

In Figure 4.18:

- (1) Identifies the orientation of the mouth (upper/lower, left/right) depicted by the chart.
- (2) Teeth. Touch a tooth to access the CDT code editor for that tooth. For details on editing tooth codes, see Section 4.5 of this document. See Figure 4.19. *The data associated with the tooth is an aggregation of all care given the patient, up to and including the current clinic* (assuming the data was entered for that patient). Thus, it can be used to view work that was diagnosed at a previous clinic, but has yet to be completed.
- (3) Legend. Each tooth in (2) may display a color. Use this legend to decode the color displayed on teeth.
 - No Treatments (White) - A white tooth indicates that no treatments are associated with the tooth, and the tooth is present
 - Complete (Green) – treatments have been marked complete for this tooth
 - Incomplete (Yellow) – some, but not all treatments are marked complete for this tooth
 - Untreated (Red) – no treatments are completed yet for this tooth
 - Missing (Grey) – the tooth was marked missing in the CDT editor
- (4) Back Button. Use this button to return to the main Dental Treatment chart (Section 4.6)
- (5) Swipe area. Use your finger here to swipe between upper mouth and lower mouth views.

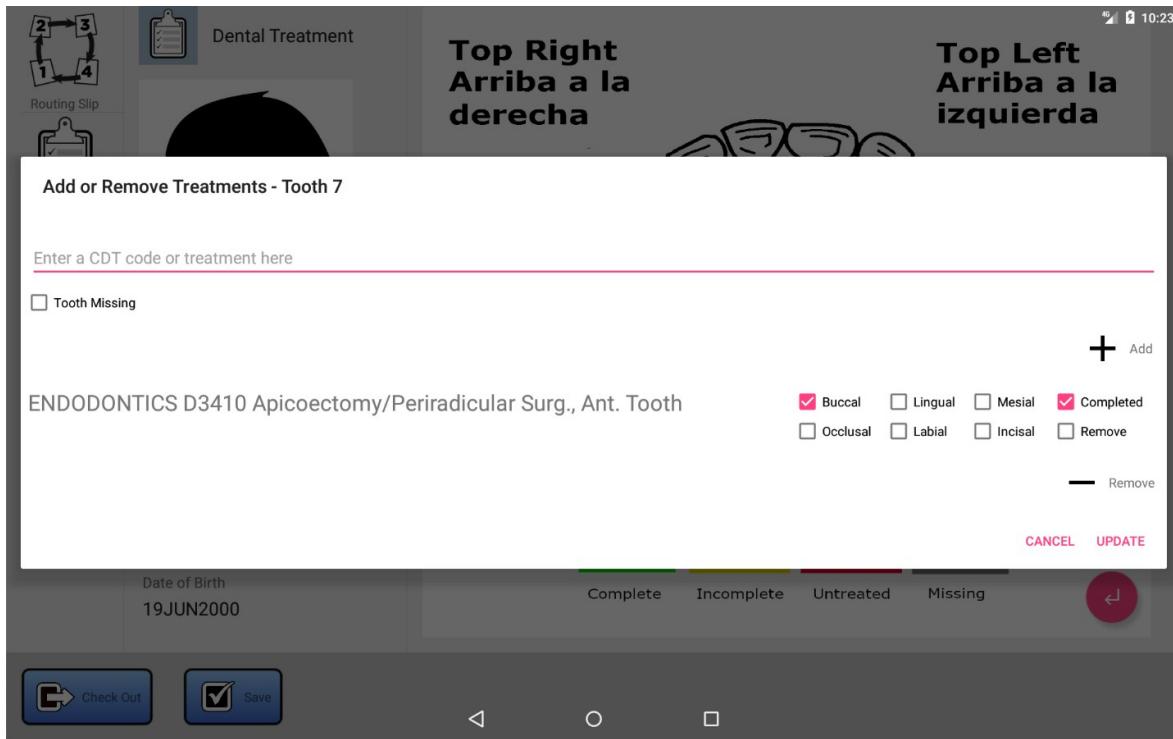


Figure 4.19 Click on a tooth to access the CDT codes for that tooth.

5. ENT Chart

TBD

6. Audiology Chart

TBD

7. X-Ray Chart

TBD