# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)


**Internship Report**

## Anatomy Mapper

An Internship report submitted in partial fulfilment of the requirement for the degree of

**BACHELOR OF TECHNOLOGY**

in

**INFORMATION TECHNOLOGY**

Submitted by:

**Harsh Soni**

**0901IT181024**

**Internship (DLC-9) – 160801**

**Faculty Mentor:**

**Prof. Vikas Sejwar**

Submitted to:

**DEPARTMENT OF INFORMATION TECHNOLOGY**
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR - 474005

MAY-JUNE 2022

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**

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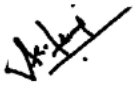
# CERTIFICATE

This is certified that **Harsh Soni** (0901IT181024) has submitted the internship report titled **Anatomy Mapper** under the mentorship of **Prof. Vikas Sejwar**, in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in **Information Technology** from Madhav Institute of Technology and Science, Gwalior.

**Prof. Vikas Sejwar**
Professor
Information Technology



**Dr. Akhilesh Tiwari**
Professor and Head,
Department of IT

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**

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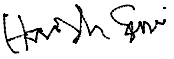
# DECLARATION

I hereby declare that the work being presented in this internship report, for the partial fulfilment of requirement for the award of the degree of Bachelor of Technology in Information Technology at Madhav Institute of Technology & Science, Gwalior is an authenticated and original record of my work under the mentorship of **Prof. Vikas Sejwar**, Department of Information Technology.

I declare that I have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.



Date: 26/05/2022
Place: Gwalior

Harsh Soni
0901IT181024
IV Year,
Information Technology

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# ACKNOWLEDGEMENT

The full semester **Internship** has proved to be pivotal to my career. I am thankful to my institute, **Madhav Institute of Technology and Science** to allow me to continue my disciplinary/interdisciplina internship as a curriculum requirement, under the provisions of the Flexible Curriculum Scheme (based on the AICTE Model Curriculum 2018), approved by the Academic Council of the institute. I extend my gratitude to the Director of the institute, **Dr. R. K. Pandit** and Dean Academics, **Dr. Manjaree Pandit** for this.

I would sincerely like to thank my department, **Department of Information Technology,** for allowing me to explore this internship. I humbly thank **Dr. Akhilesh Tiwari**, Professor and Head, Department of Information Technology, for his continued support during the course of this engagement, which eased the process and formalities involved.

I am sincerely thankful to my faculty mentors. I am grateful to the guidance of **Prof. Vikas Sejwar** , Department of Information Technology, for his continued support and guidance throughout the internship. I am also very thankful to the faculty and staff of the department.

Harsh Soni
0901IT181024
IV Year,
Information Technology

# ABSTRACT

Currently I am pursuing internship under Puneet Pugalia, Kolkata. I am working as a ReactJS frontend developer and the project which I am working on is **Anatomy Mapper**.
I have integrated several different features with APIs and done UI and state management tasks in this web application.
We are making this project for our US based client Dr. Matthew Molenda. He is a expert in Dermatology. He want to make such application where a Senior Doctor or Surgeon can pin different body parts and can prescribe different types of surgeries and ordered and unordered procedures and can generate reports for patients.

**PAGE NO.**

# Chapter 1: INTRODUCTION

## 1.1 Objective:

Anatomy Mapper provides different functionalities to the user who is a medical representative or a Doctor or a Physician such as providing diagnosis, different types of procedures like operations, surgeries, plotting different body parts and describing various types of clinical procedures to be done on them.

The main objective of Anatomy Mapper is to create Patient's report based on surgeon's prescription . This will also helpful for any Doctor or Surgeon in providing Tele-medicine.

This report will include :

- Patient's Details such as Patient' Name, Age, Gender, Photo, DOB etc.
- Clinic's Details such as Clinic Name, Address, Contact, Country etc.
- A map contains pinned anatomic sites with various medical information.
- Different types of procedural and diagnosis lists , each list contains different anatomic sites with prescribed operations by the doctor in a planned manner.
- This also includes feature to add images and files with description of different anatomic sites to make the final report more comprehensive

## 1.2 Problem Statement :

During covid times its become difficult for doctors to provide proper treatment and proper procedures and operations to any patient. Also if a doctor is based on another country and if any clinic in other country wants the doctor to prescribe proper treatment then there was no proper mechanism or application to make perfect reports for the patients.

To solve this problem, we have come up with a web based application which can

run on multiple devices such as PC, Tablets and SmartPhones.

This application consists of map which has all the anatomic body parts and if the user hover over any body part then it will give the description of that site. User can mark that site, edit it, and can suggest or prescribe different types of procedures. A site can also contain images, videos, description to make the report more understandable, so that other doctors or physicians can easily understand it.

## 1.3 Proposed Methodology

This app has been made using different technologies like ReactJs, Javascript, Material UI (ReactJS frontend framework), PHP, MySQL and Plesk Obsidian (solution provided by other company to host such large and scalable fullstack application and to provide durabilility and reliability to the application).

Several ReactJS libraries used to achieve the solution to the problem :

Material UI

React QR Code

File server React Library

HTML to PDF

and many more…

The main aim is to design such solution which can be easily understandable by other programmers and users such that its code can be easily manipulated according to the business needs in the future and also to provide easy to use and detailed interface to the user.

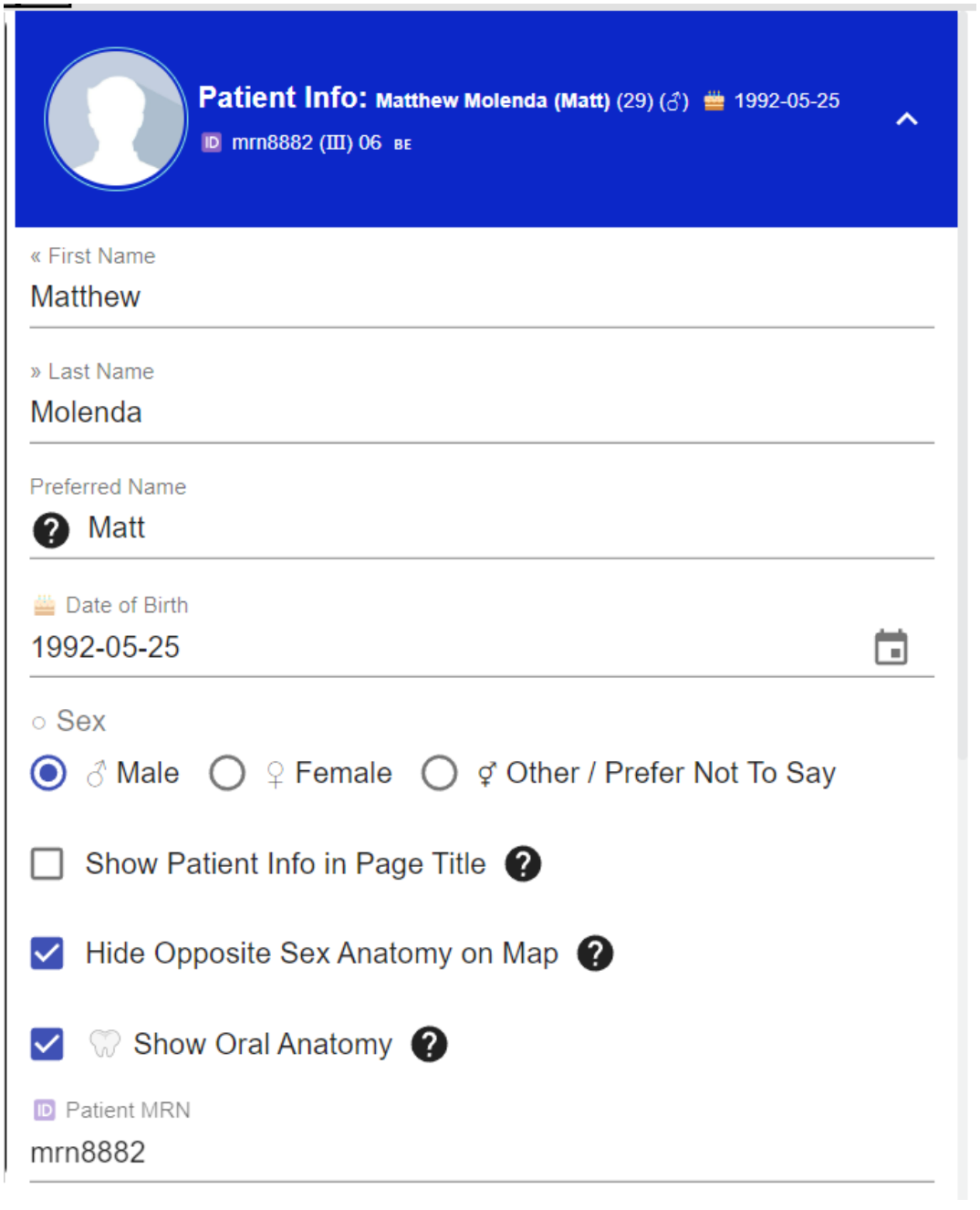
This project is divided into several modules , files and folders so that it can be easy to manage in future and debugging can be made very simple in the future.

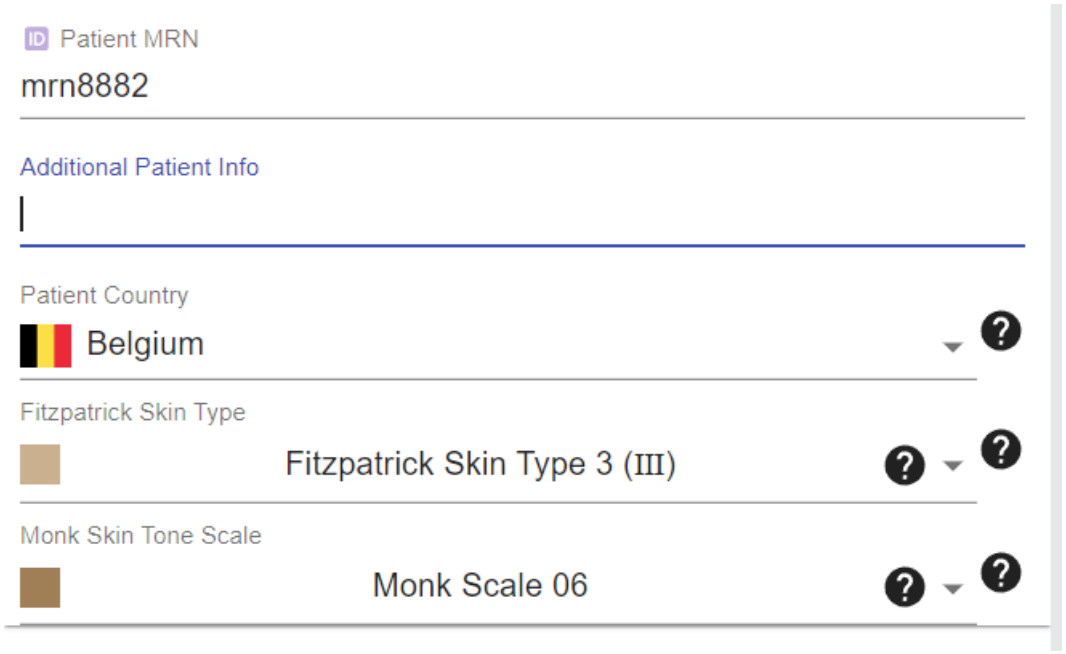
# Chapter 2 : FEATURES OF ANATOMY MAPPER

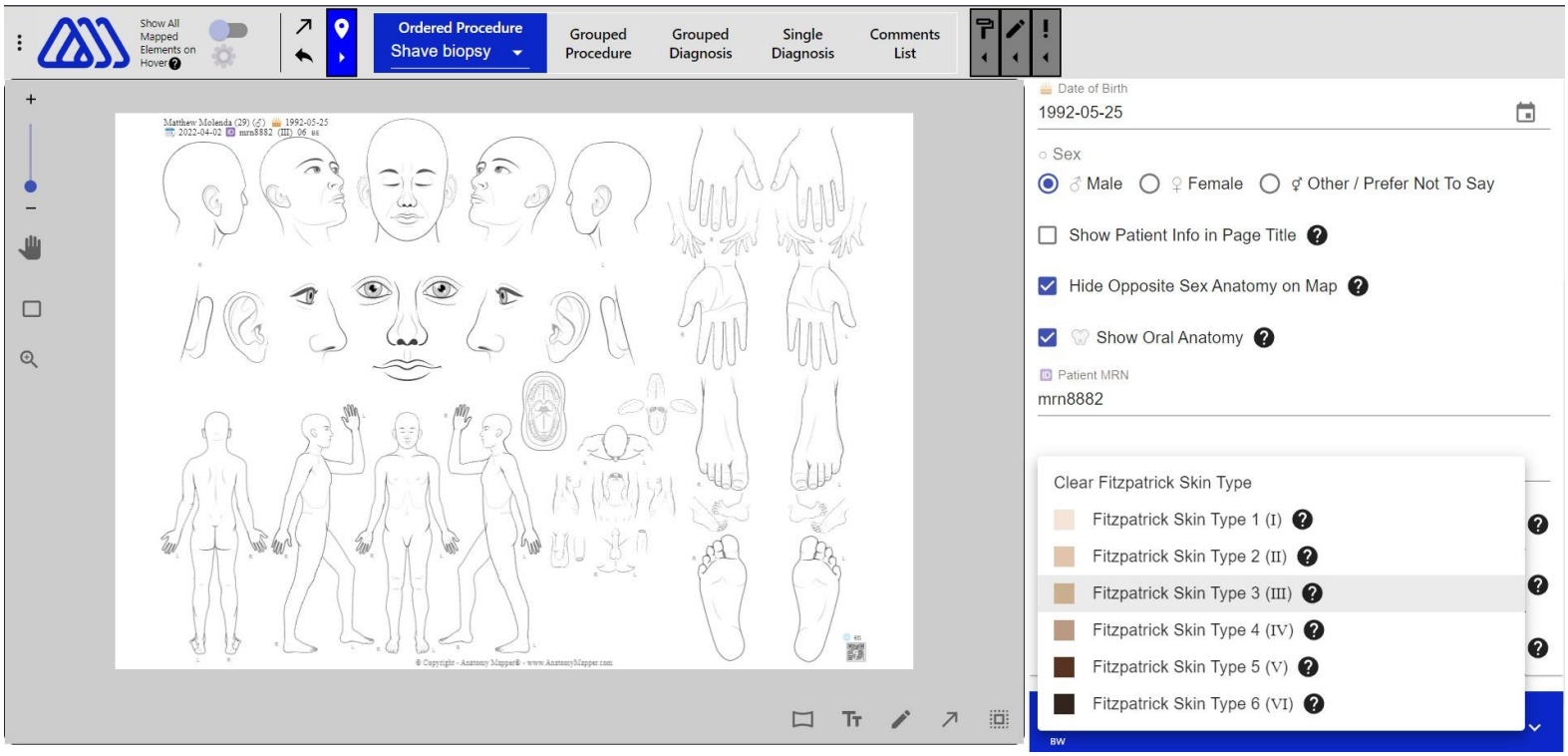
## 2.1 Detailed Forms

There are two forms which are provided in this application . These forms are Patient Information form and Clinic information form. This forms enables user to fill suitable and detailed information about patient and clinic. Further these information can be seen in the report generated. These details also get stored in the browser's local Storage so that user does not have to fill every time he visits the application. Only he has to change some of the information according to the business needs.

### 2.1.1 Patient Info Form

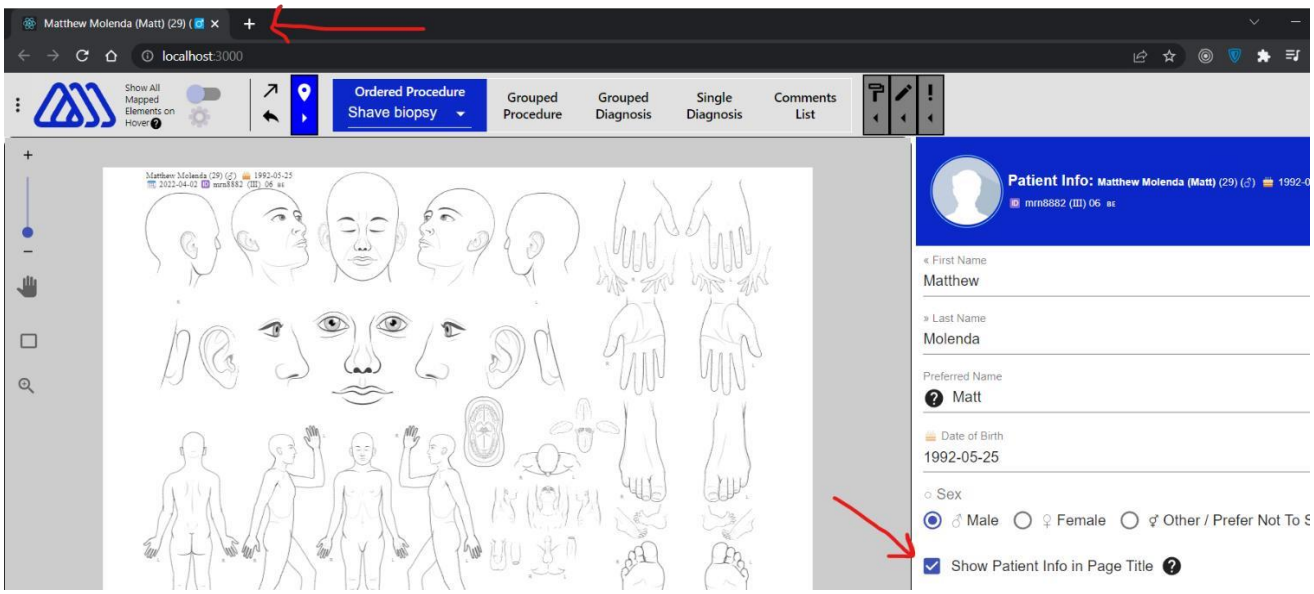




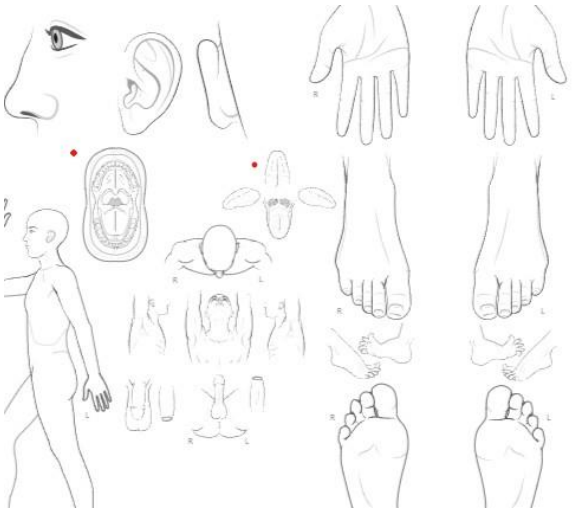

Patient info form contains various information like first name , last name , Preferred name, dob, sex

Show patient info in page title – when this option is check it will show the patient info in page title like this

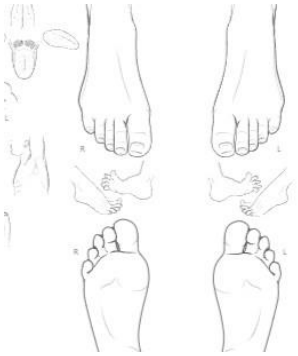



If Hide opposite sex anatomy is checked then it will not show body parts of the opposite sex on the svg map – if male is selected then female anatomic sites will not appear on the svg map and vice-versa.

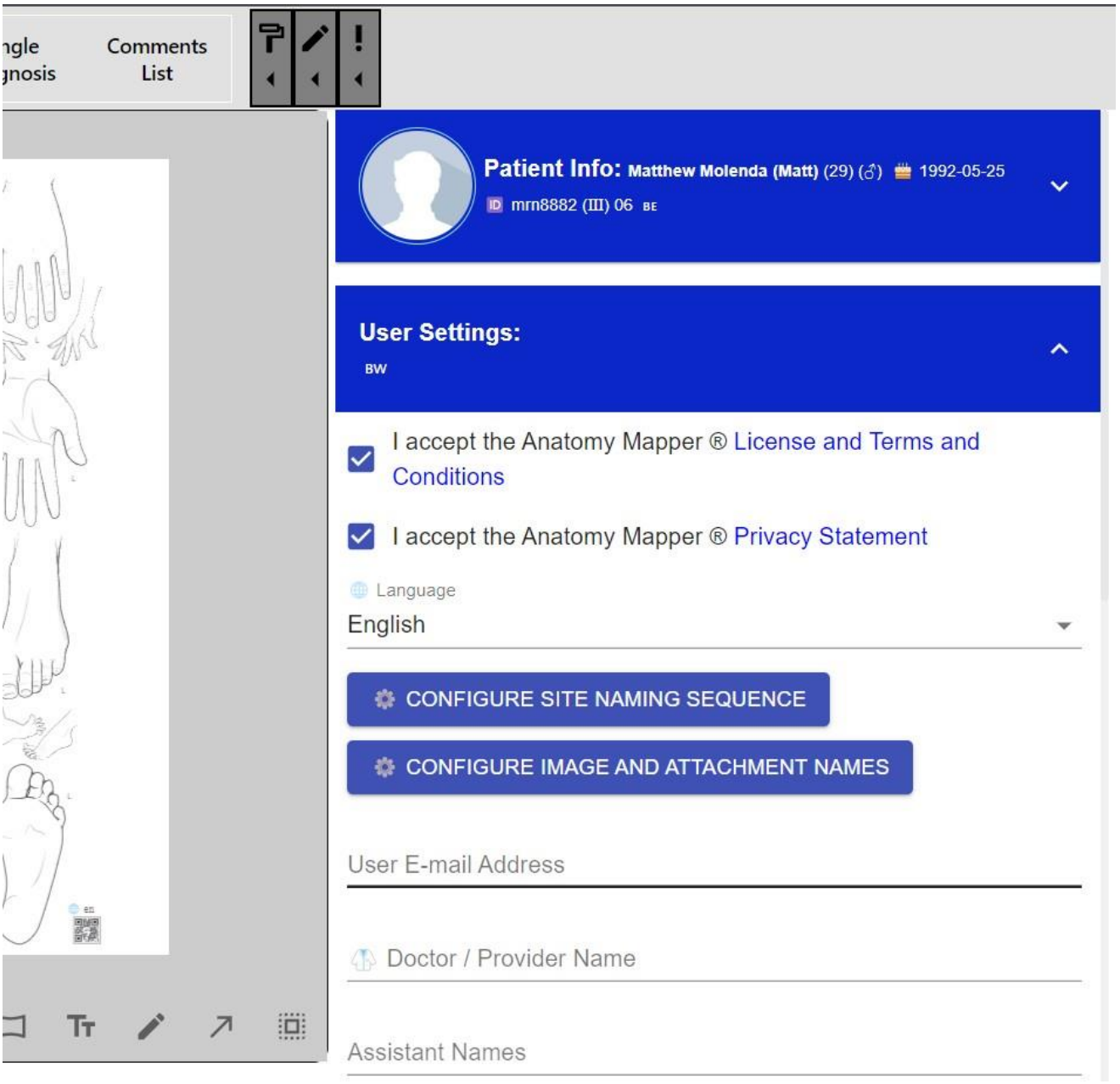

Show oral Anatomy checked – will show oral cavity, inside mouth in the svg map

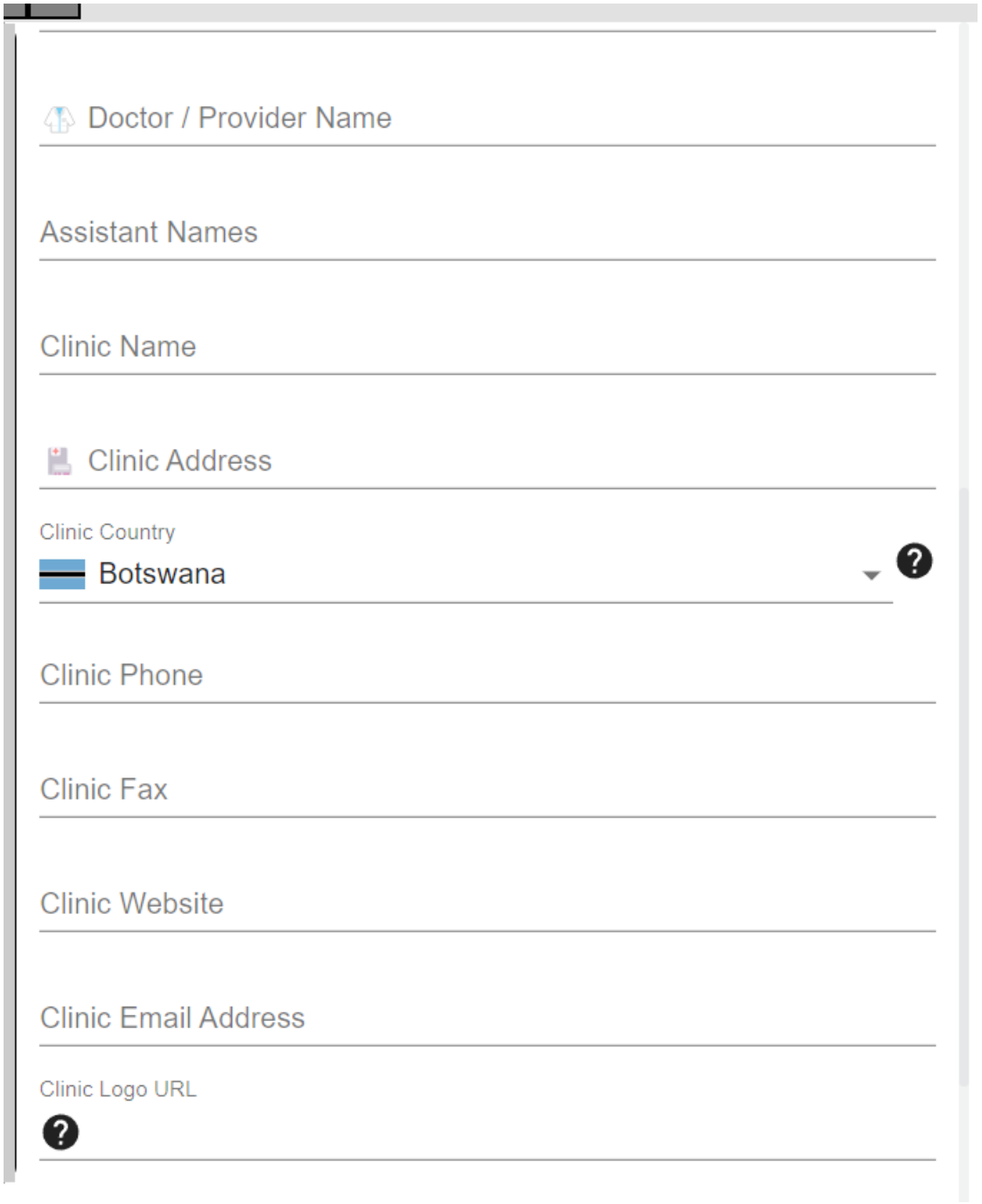



Also there is a option to select country from which the patient belongs and option to select different skin types.



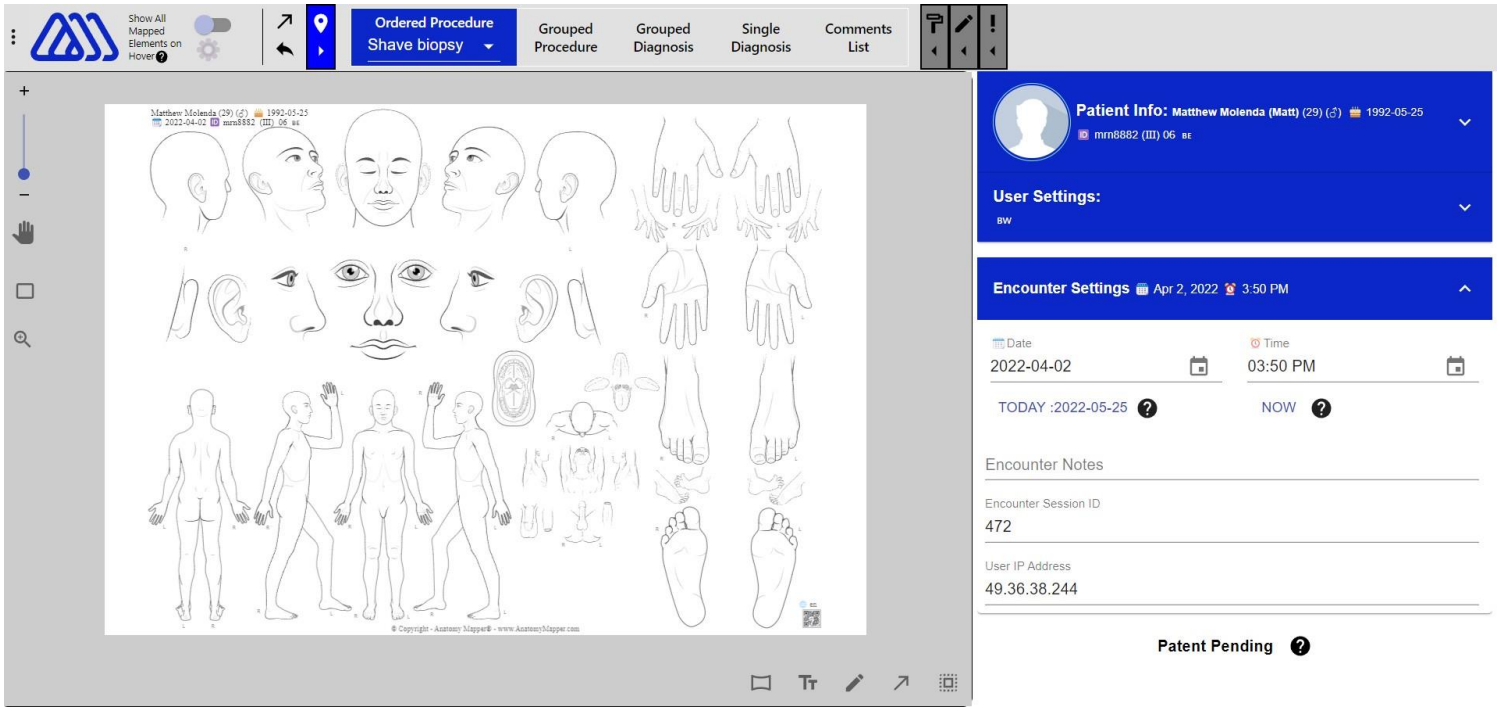
### 2.1.2 Clinic Info Form (User Settings)






The Clinic info form enables user to provide Clinic information so that it can be seen in the generated report. This information also get saved in the browser's local storage so user does not have to fill it every time he opens the app.

### 2.1.3 Encounter Settings




There is a feature to provide encounter details means when this report has been generated and when the encounter is going to take place including date and time.

User can also add a encounter note which will be later displayed in the generated report.

## 2.2 List Selector

There are different types of lists which can be selected before plotting the pins and mapping different anatomic sites.

These lists include –

1. Ordered procedure - Shave biopsy, Shave removal, Punch Biopsy, Punch Excision, Excision

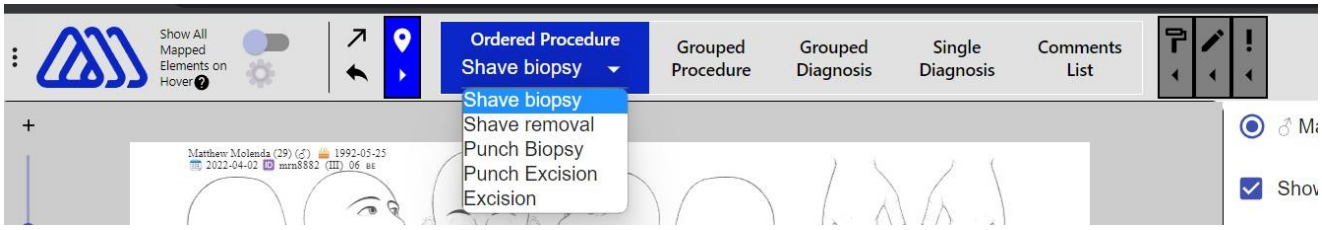
2. Grouped Procedure

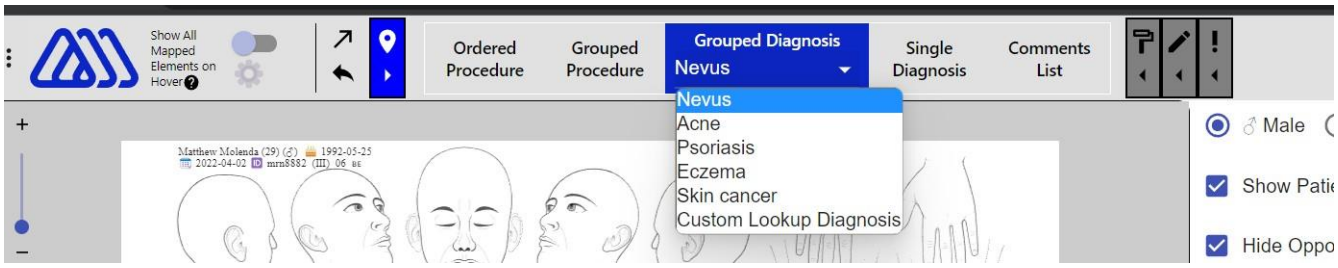
3. Grouped Diagnosis

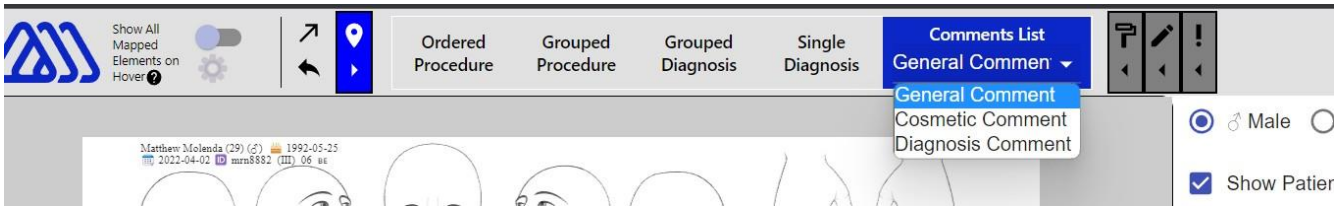
4. Single Diagnosis

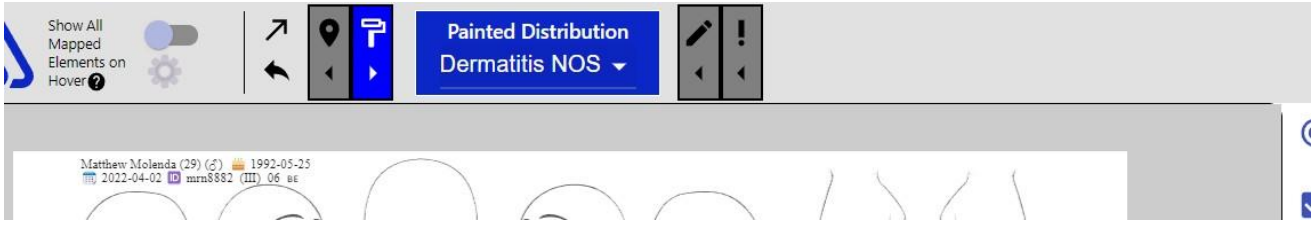
5. Comments List

6.Painted Distribution List

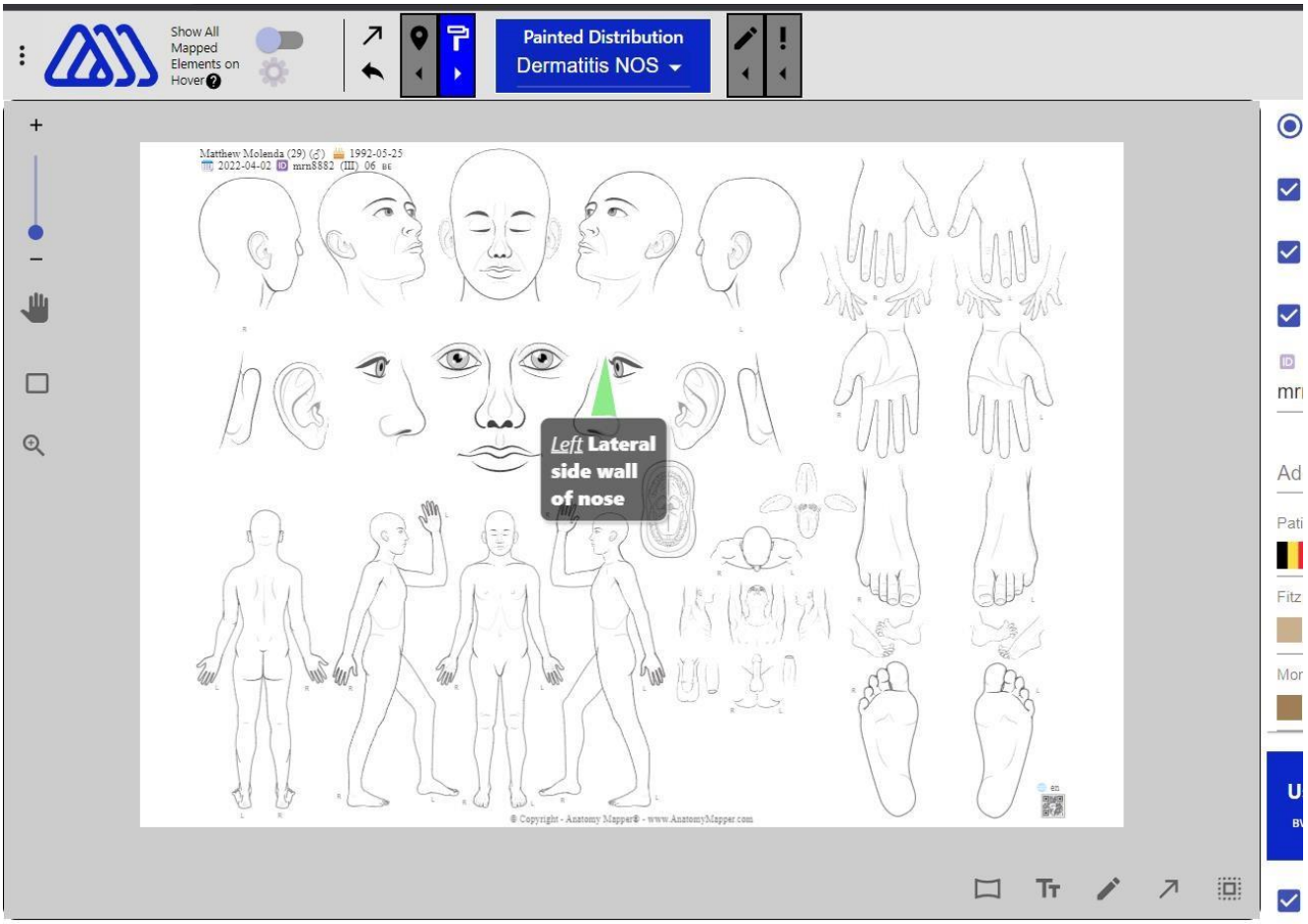


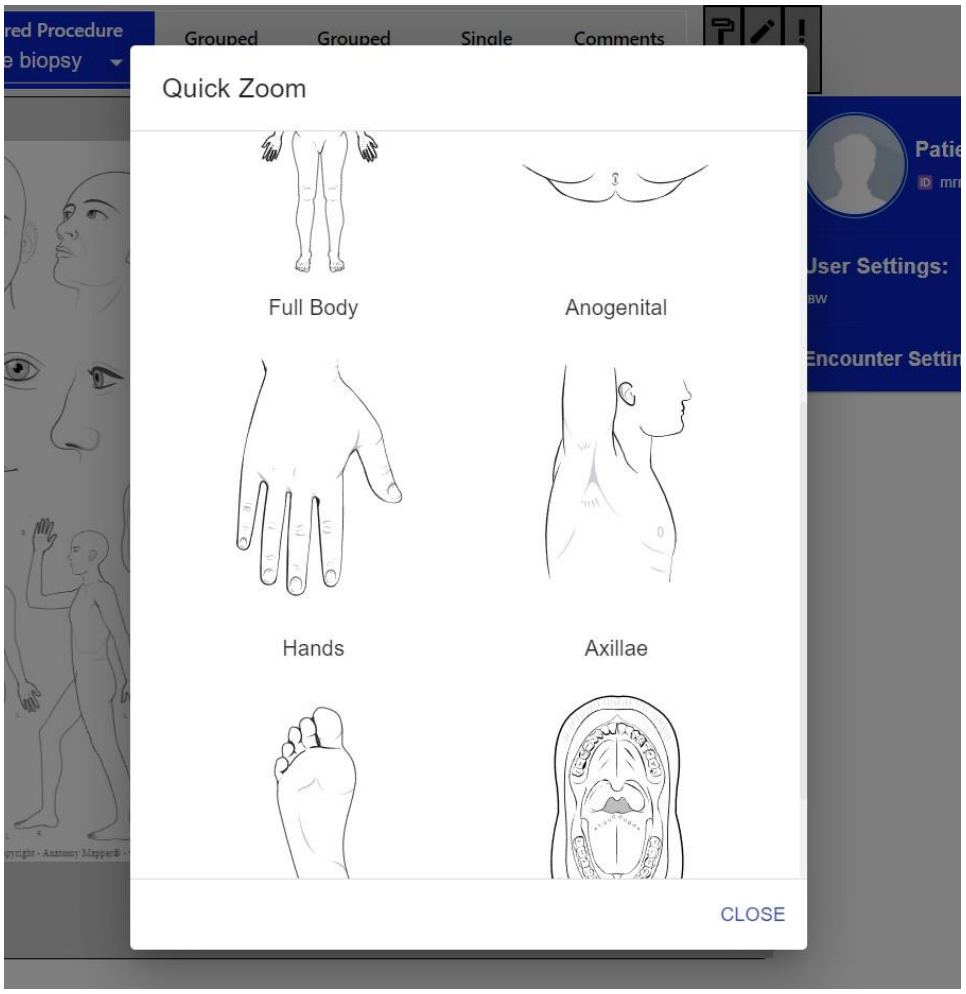
## 2.3 SVG Map



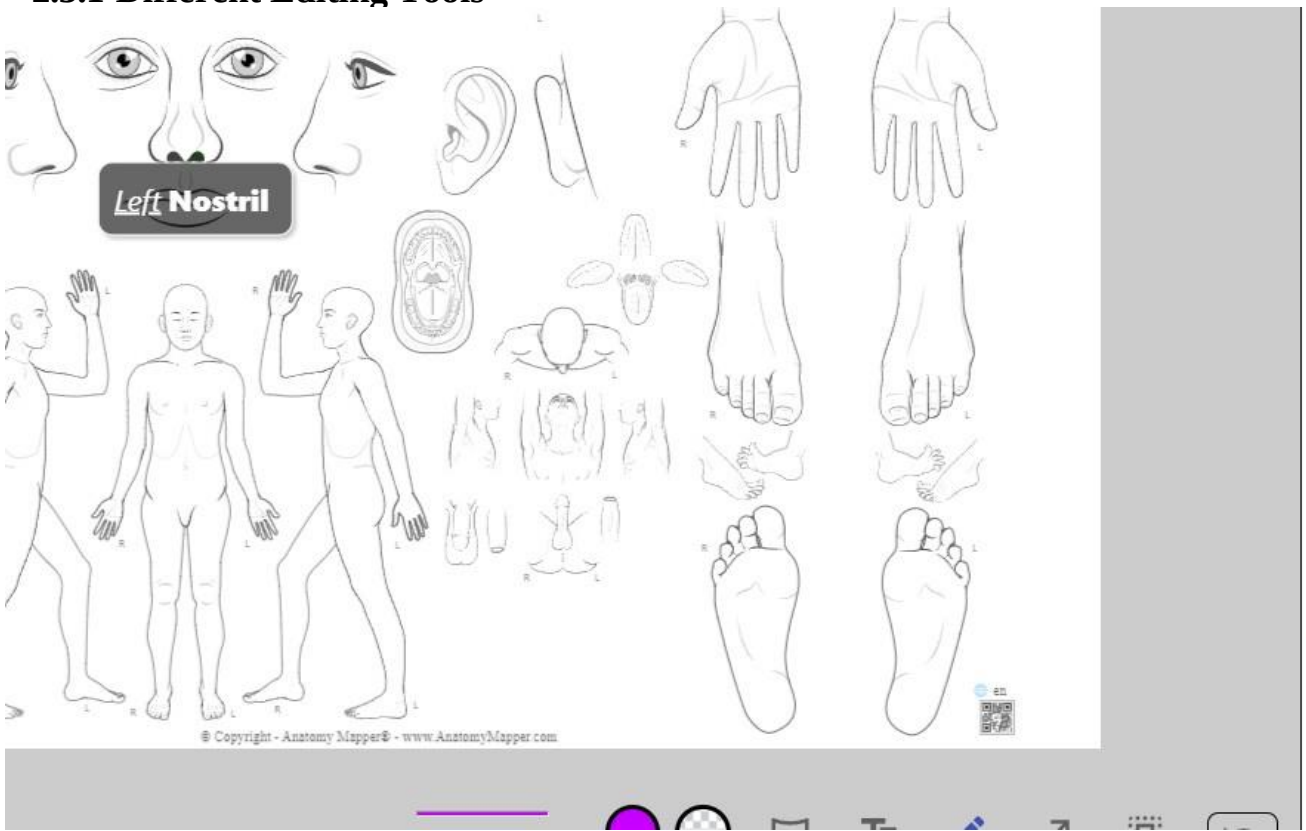

The main feature of the Anatomy Mapper is the SVG Map which contains all the human body parts from head to toe including oral cavity.

Different features provided by SVG map –

- We can zoom in and out to any anatomic site
- User can hover over any site to see its corresponding details such as Anatomic name, ICD codes, Laterality, Enhanced Modifiers, Prefixes, Suffixes etc.
- These little details helps the user to understand that anatomic site in-depth
- Quick Zoom - There is also a feature from which user can quickly go to any anatomic site , which is shown below.




### 2.3.1 Different Editing Tools

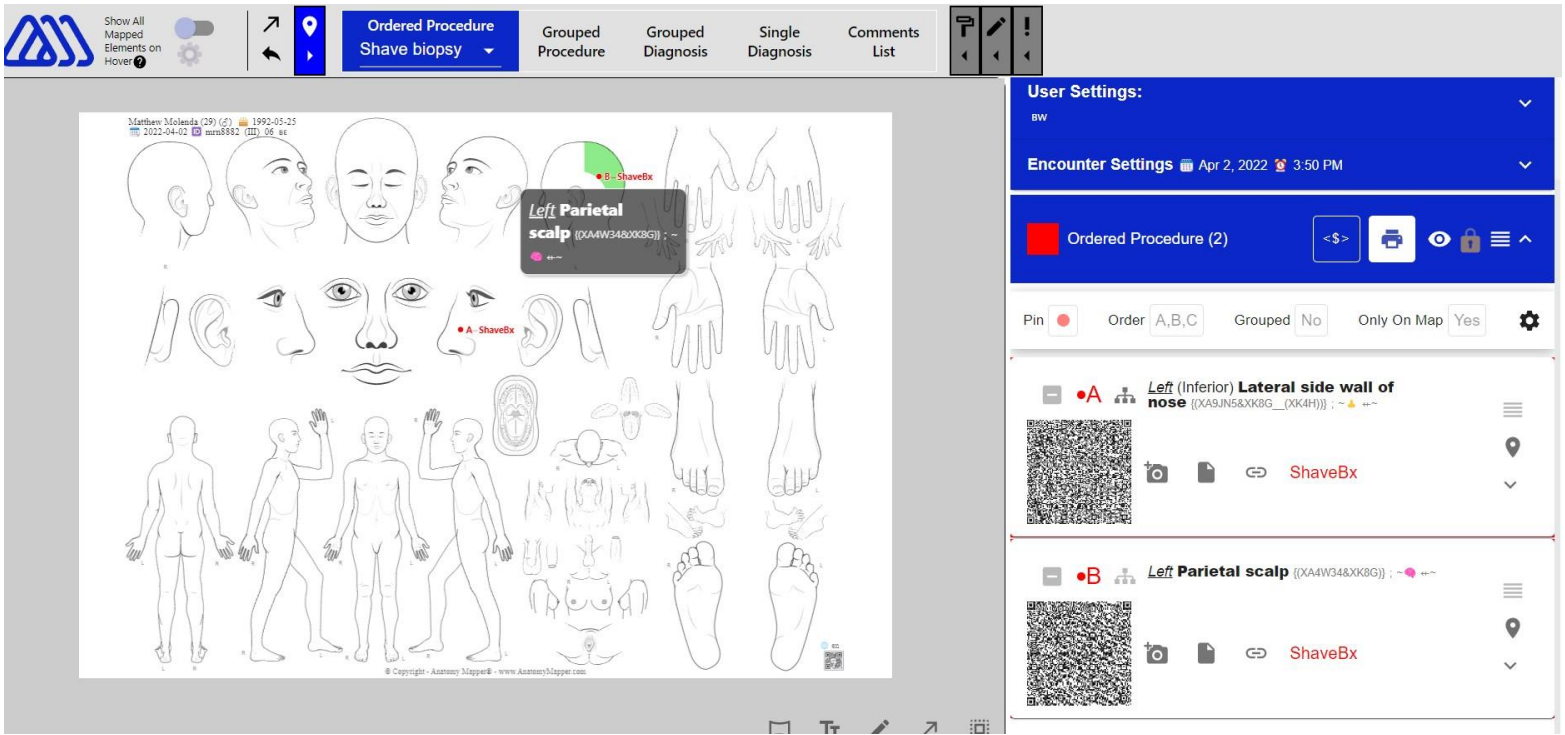


There are different editing tools which are provided with the svg Map. They are situated at the bottom right of the map.

These tools contains –

- Drawing Shapes
- Writing any text on the map , anywhere
- Drawing arrow
- Pencil tool for drawing – more useful when the app is used with touch devices
- Selecting plotted sites and pins
- Undo operation
- Changing the color of shape, text, arrow and pencil
- User can also adjust the thickness of the drawings

### 2.3.2 Mapping and Plotting Pins



Based on the selected list option on the top of the app, user can plot different pins on the SVG map. These pins can be ordered and unordered means based on type of list selected pins can be arranged alphabetically or numerically also.

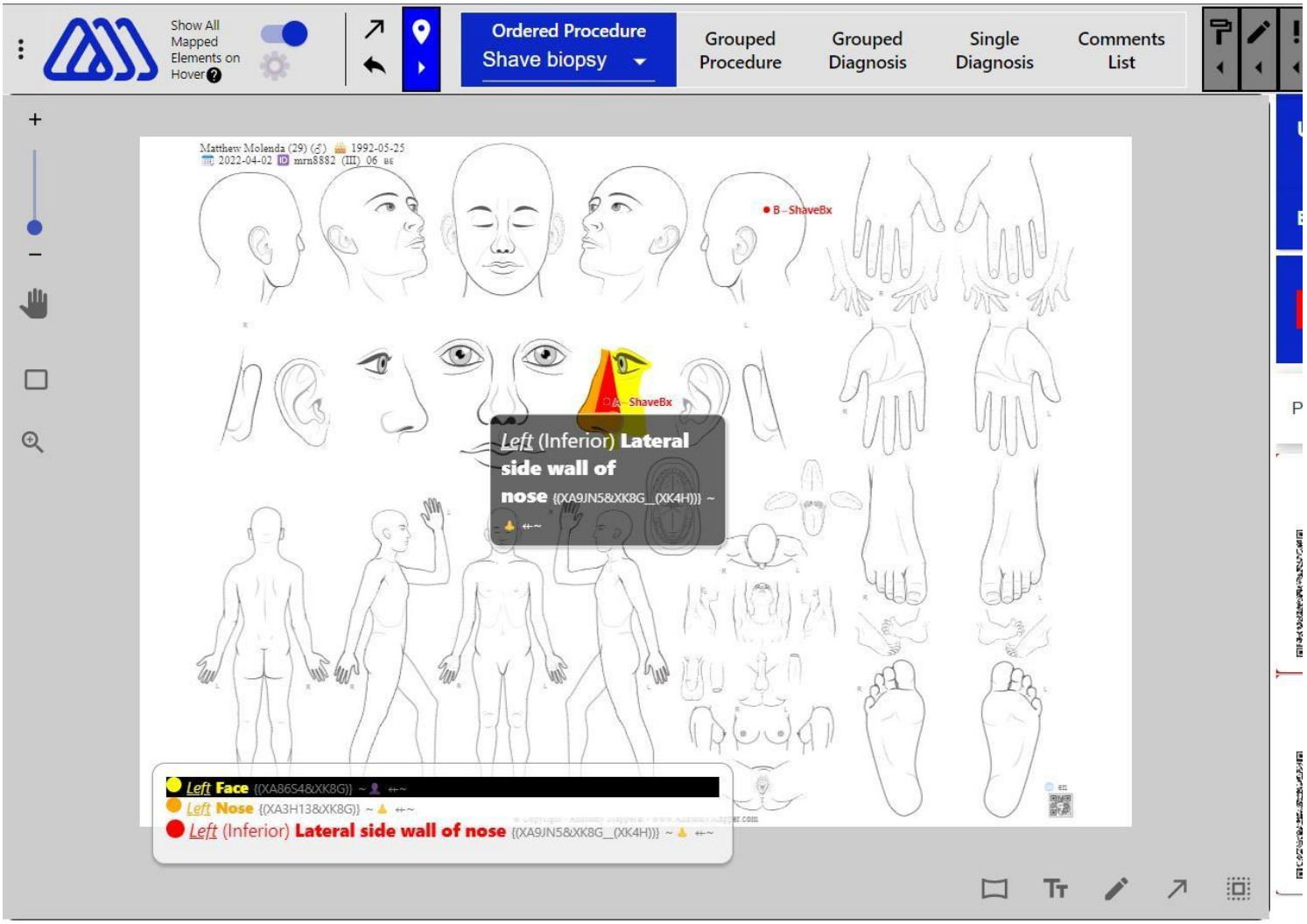
User can also change the shape of all the plotted pin. Available shapes are circle, square, triangle and start (asterix).

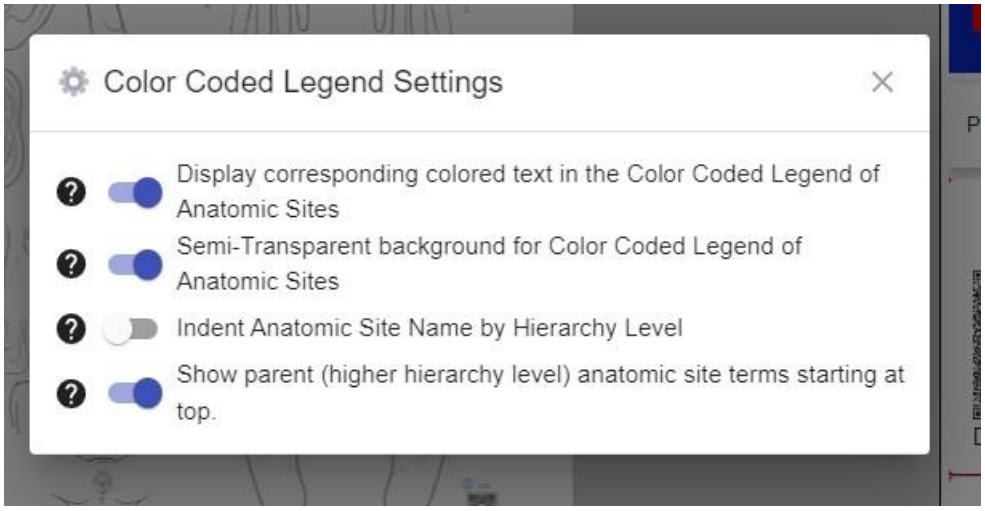
Each pin contains different attributes like –

- Laterality
- Prefix
- Suffix
- Enhanced Modifiers
- Anatomic site name
- ICD code string
- Foundation ID code string
- Anatomy mapper ID code String
- Custom Description
- Auto related names etc.

  These attributes can be further changes using Name Builder which is provided for all the plotted pins.

## 2.4 Color Coded legend and settings




Color coded legend helps user to better understand any anatomic site – deeply as well as its relative position corresponding to its parent anatomic sites.

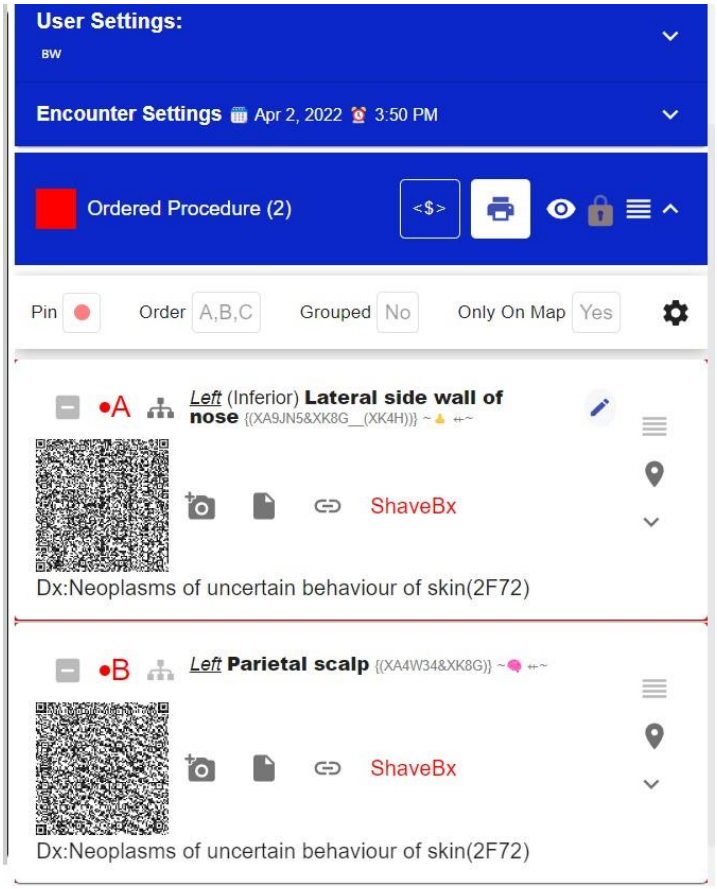
To enable this feature there is a switch provided to the top left of the application which

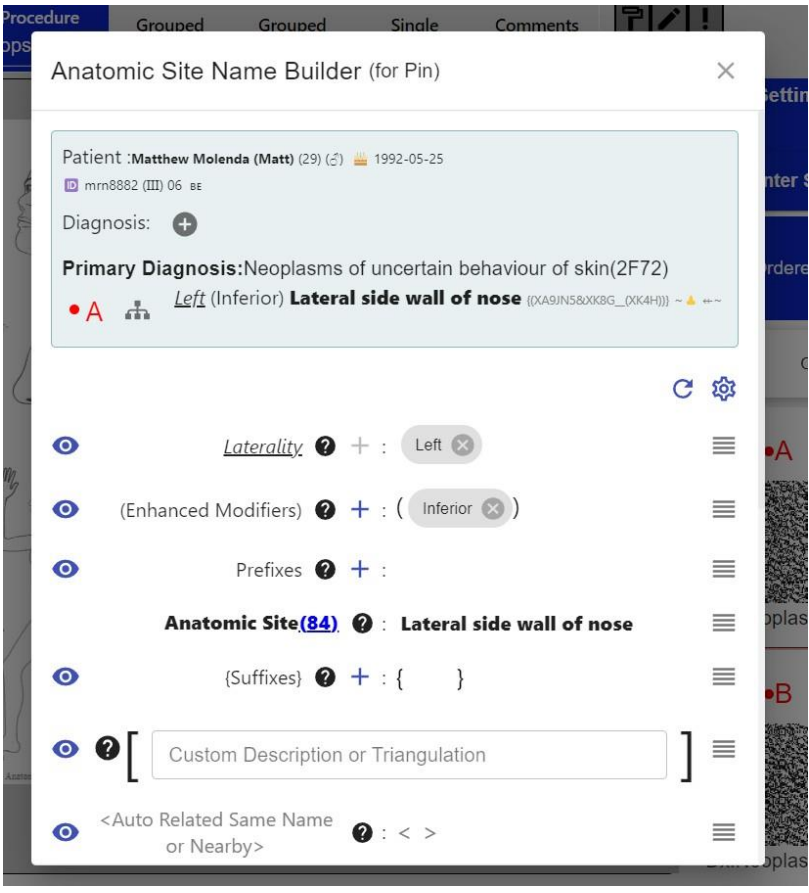
says Show all Mapped elements on hover . This will bring up a extra modal on the SVG map which is Color coded legend.

There's a color feature provided so that user can easily understand the different attributes corresponding to the site when he hover over it.

To open the settings for the Color coded legend, user can click the settings icon below the switch. There are four options which are provided in the settings.

### 2.5 Side List and Name Builder




After plotting the pins, these pins can be seen in their corresponding side list. If the ordered procedure is selected on the top in the list selector and then user plots the pins then these pins will appear in the Ordered Procedure List in the Side below Encounter Settings.

Every item in the list can be drag and dropped up and down to change its order in the list.

Every pin has many attributes associated with each of them. There's a feature which

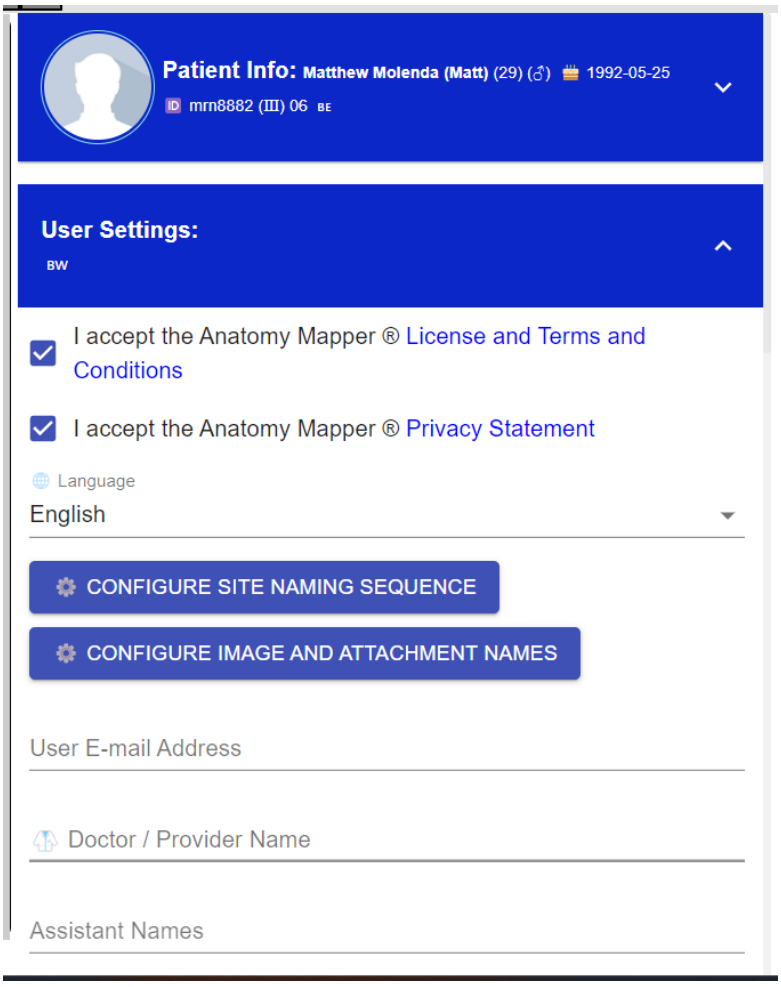
enables user to modify and delete those attributes.

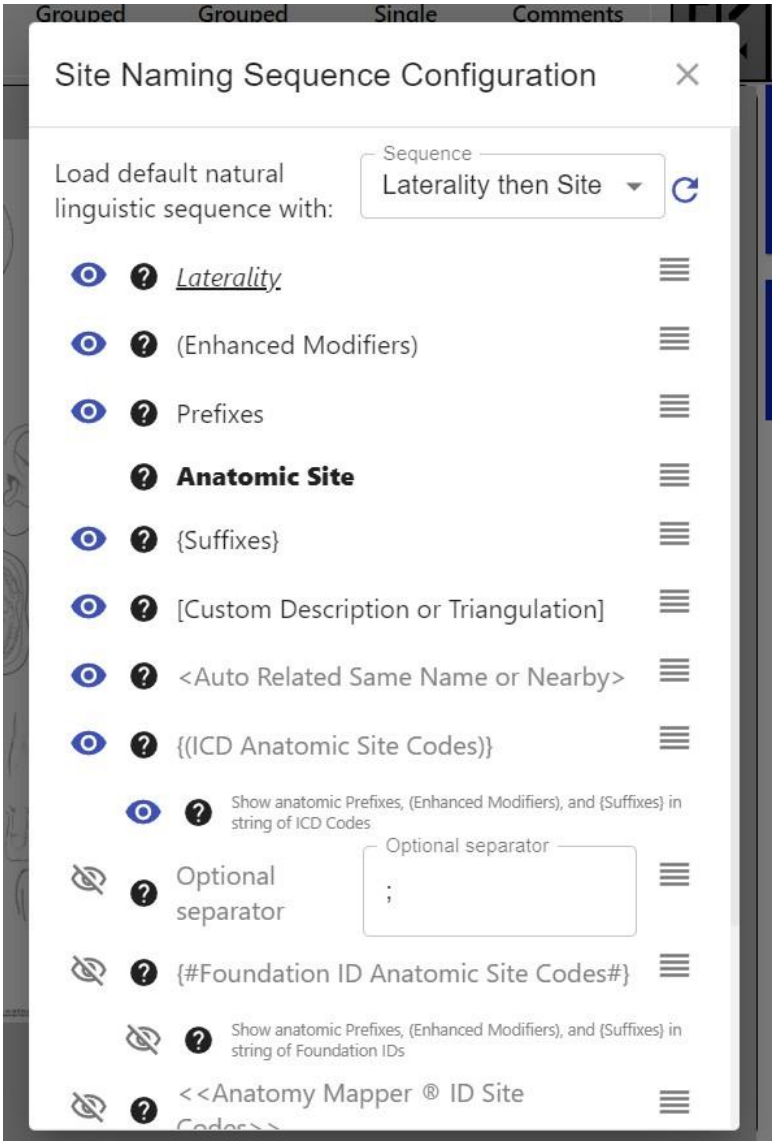
This feature is called Name Builder which can be open for each of the plotted pins by clicking the edit button provided in each of the items in the list.

As the user does changes in the name builder like editing some attributes, changing the visibility of the attributes and ordering them, these changes will automatically get saved as the Name builder is closed and it will reflect in the corresponding pin.

Name builder is basically used to edit the Name string and code string of the anatomic site. These together also known as Anatomic site name.

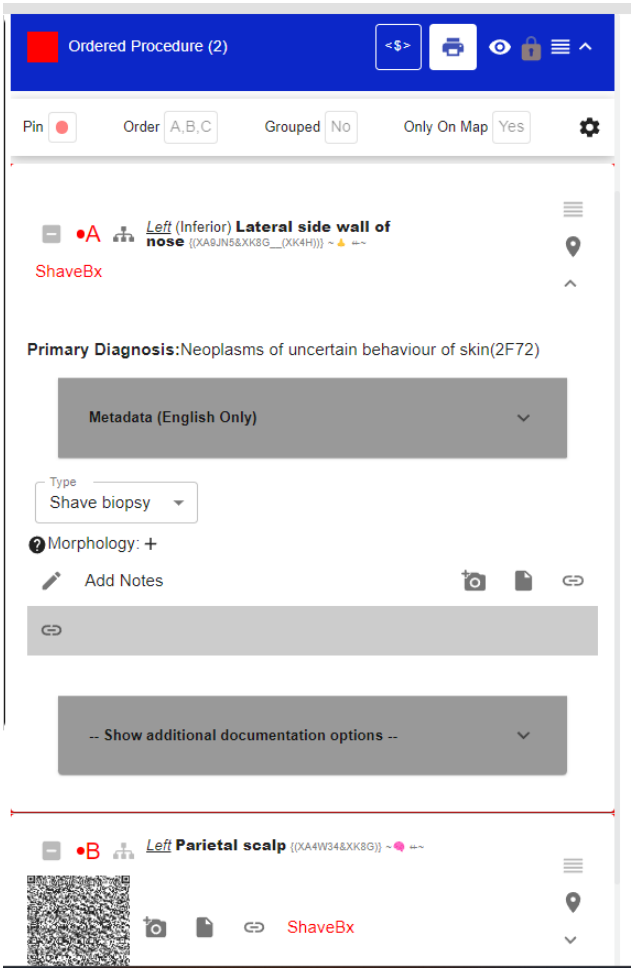
### 2.6 Sequence Name Configuration (SNS)



Sequence name configuration (SNS) is just like Name Builder. It provides default format for the Anatomic site name. Any changes in the SNS will directly reflect in the hover label and Color coded legend when the user hovers over any Anatomic site in the SVG map.

## 2.7 Adding Images and Attachments

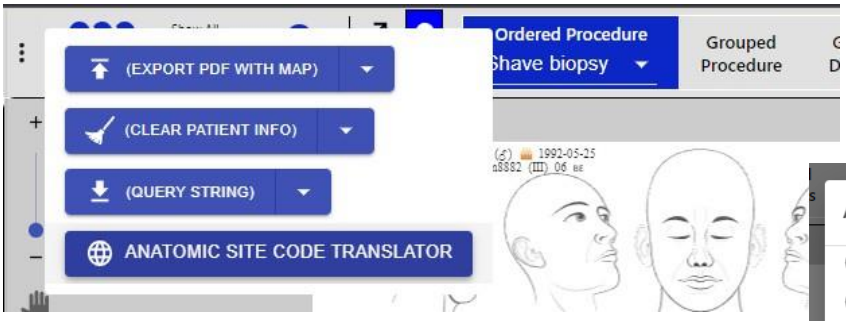


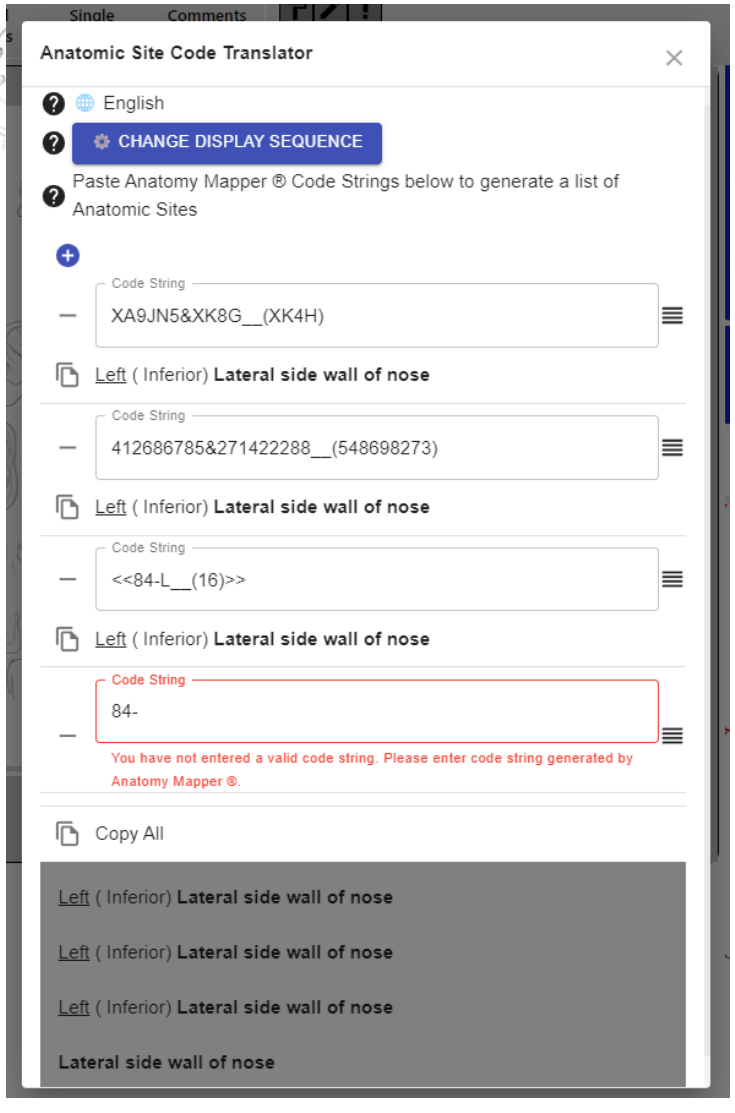

For every item in the lists, user can add images , files and notes so that procedures can more understandable by others to whom the report is to be forwarded.

## 2.8 Getting Details using QR Code


Every item has QR code present inside it. It can be scanned to get all the corresponding details on any device quickly.

## 2.9 Code String to Name String Translator



Every laterality , anatomic site, prefix and suffix has ICD code, foundation ID and Anatomy mapper ID associated with it.

All ICD codes can combine together for laterality , anatomic site, prefix and suffix to make a ICD code string. Same for Foundation ID and Anatomy mapper ID.

Eg:-

ICD code string **- XA9JN5&XK8G__(XK4H)**

Foundation ID string **- 412686785&271422288__(548698273)**

Anatomy mapper ID string **- 84-L__4&3(16){1&5}**

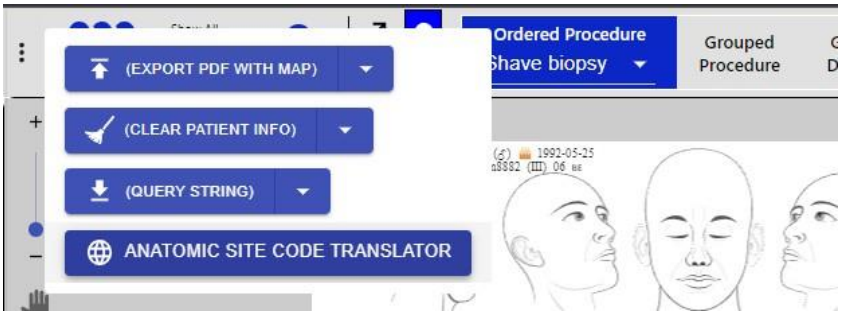
**Format of string –**

**<anatomic side>&<laterality>_<prefixes separated by &> (<prefixes separated by &>) {<suffixes separated by &>}**

The feature code to name string translator provides fields to the user to paste these strings into the fields and it will automatically converts them into corresponding Anatomic Site name strings.

There is also a feature to copy individual name string or all name strings at once.

## 2.10 Generating Reports




This option is used to generate reports in the PDF format. As the User clicks the option , report will get downloaded and he can send it to the patient or other Doctors.

## Chapter 3 : System Description

Any machine can be used to run the code for the above project with good hardware configurations with NodeJS , ReactJs and any text editor installed on the machine.

To view the result of the above, user must need a browser – Google Chrome is recommended.

## Chapter 4 : System Requirements

For end user -

Any PC or touch screen device is suitable for this app with a good processor and RAM. It just needs to be opened on any browser but Google chrome is recommended.

For Developers –

VS Code, Node JS and React JS installed on the System, recommended Intel Core i5 processor, 4GB of RAM but 8GB is recommended.

Google Chrome browser and good internet connection.

### 4.1 Frontend –

ReactJS is used with Material-UI library.

File Server React Library

React QR code Library

HTML to PDF React Library

### 4.2 Backend –

Plesk Obsidian – Online Platform to manage web application like AWS, Google Cloud

For Database – MySQL used

Server side – php is used as a server side programming language

## Chapter 5 : Result

I (Harsh Soni) at this company has worked on the above features which is described in this report. I am able to program all the features.

## Chapter 6 : Conclusions and Outcome

I am helping this company out in making this project as an Industry Standard so that it can help many Clinics and Doctors across the globe in providing better , clean and perfect treatment to any other doctors and clinics in any other part of the world. This application can revolutionalize tele-medicine.

My role –

- Made several complex React components.
- Implemented all the features which are described above in this report.
- API integration and State management
- Made the application to work in different languages

## References

All the above pictures are screenshots from the Anatomy Mapper application