ONLINE DENTAL MANAGEMENT SYSTEM

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ABSTRACT

With the advancement of information technology, the use of information and communication technology has covered every aspects of the life. However, in Malaysia there are some dental clinics are still using the manually managing their records. The manual record management method can caused a lot of problems in the management process such as time wasting, lack of efficiency and so on, thus there is a need to replace it into the computerized management system as computerized management system can solve the problems that are always encounter by the manual record management method to make the daily operation of the dental clinics more easier and effectively. In this project, beside using Hypertext Preprocessor (PHP) as the main programming language in developing the system, some open source web technologies such as Hypertext Markup Language 5 (HTML5), Cascading Style Sheets (CSS) and JavaScript (JS) are also implemented which enhances the functionality and usability of this web based application. In short, this project will help to improve the daily clinic operation of my client which is CHOO Specialist Orthodontic & Dental Clinic as well as cutting down some operational costs.

ABSTRAK

Dengan kemajuan teknologi maklumat, penggunaan teknologi maklumat dan komunikasi telah meliputi setiap aspek dalam kehidupan kita. Namun demikian, di Malaysia masih ada klinik pergigian yang masih mengurus rekod mereka secara manual. Kaedah pengurusan rekod secara manual boleh menyebabkan banyak masalah dalam proses pengurusan seperti membuang masa, kekurangan kecekapan dan sebagainya, Dengan itu, kaedah pengurusan rekod secara manual patutnya digantikan kepada mengurus rekod dengan menggunakan system berkomputer yang boleh mengelakkan menghadapi masalah-masalah yang ada pada kaedah pengurusan rekod manual sementara boleh meningkatkan operasi harian klinik pergigian dengan lebih mudah dan berkesan. Dalam projek ini, selain menggunakan Hypertext Preprocessor (PHP) sebagai bahasa pengaturcaraan utama dalam membangunkan system ini, beberapa teknologi web sumber terbuka seperti Hypertext Markup Language 5 (HTML5), Cascading Style Sheets (CSS) dan JavaScript (JS) juga dilaksanakan untuk meningkatkan fungsi dan kebolehgunaan aplikasi berasaskan web ini. Ringkasnya, projek ini akan membantu meningkatkan operasi klinik pergigian sementara dapat mengurangkan kos operasi.

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LIST OF ABBREVIATIONS

ODMS	Online Dental Management System
RAD	Rapid Application Development
SDLC	System Development Life Cycle
CASE	Computer-Aided Software Engineering
JAD	Joint Application Development
OO	Object Oriented
UMP	University Malaysia Pahang
HTML	Hypertext Markup Language
PHP	Hypertext Preprocessor
CSS	Cascading Style Sheets
JS	JavaScript
SMS	Short Message Service

PART 1

SYSTEM INTRODUCTION

1.1 INTRODUCTION

With the advancement of information technology, the use of information and communication technology has covered every aspects of the life. However, in Malaysia there are some dental clinics are still using the traditional way to manage the patient records, for example they are manually record the information details of their patient in a dentist card instead of systematically record it into a computer. The manual record management method can caused a lot of problems in the management process such as time wasting, lack of efficiency and so on. Thus there is a need to replace it into the computerized management system as computerized management system can solve the problems that are always encountered to make the management job more easily and effectively.

The Online Dental Management System (ODMS) is web based system which covers all aspects of management and operations of clinic. The Online Dental Management System (ODMS) is developed on the purpose to improve the daily operation for the CHOO Specialist Orthodontic & Dental Clinic to become more efficiently and effectively. The ODMS is a multiuser system and it is designed for the use of three types of users which are included the dentist, receptionist and also the patient and all the three types of user will have their own specific username and password to login to the system. In this multiuser system, the users are sharing the same system but with different functionalities and privileges. For example, the dentist has the privileges to view all the information of patient as administrator but the basic user which is the patient has limited privileges and only able to view their own information as others patient information should be protected.

As what I had mention earlier, by using this system the dentist will be able to view all the information details which are included patient personal information, treatment history, addition note for the oral health of patient, dental radiographs diagram and also appointment records of the patient by only need to insert some details of the specific patient. In this system, there is an interactive teeth illustration charting for each patient is provided where dentist can view the addition note for oral health to check the condition of the teeth as well as to view the last treatment received by the teeth easily by click on the specific tooth. Besides, dentist is also able to add or edit the addition note for oral health of the tooth by click on that specific tooth. Moreover, dentist may also click on specific tooth to record the treatment received by the tooth and then the system will automatically calculate and record the treatment fees in the database. Thus, by having the teeth illustration chart the dentist would be able to examine the oral health of the patient accurately as well as record the treatment details of the payment easily. Besides, this system is consider as a real time system as it has auto refresh feature where the patients would be able to view the appointment records simultaneously once they make the appointment. Besides, there is also a queue list where the receptionist user can view and know the number of appointments in the queue and the queue list will get updated simultaneously once the dentist done with the treatment. The more details on the functionality and usability of the system will be discussed in the Part 2 later. Lastly but not least, the dental clinic also able to reduce their incoming and outgoing telephone resources as the patient is now able to make the appointment with the dentist easily by using this online system anytime and anywhere.

1.2 PURPOSE OF THE PROJECT

The manual record management method which is currently in used by CHOO Specialist Orthodontic & Dental Clinic caused a lot of problems in the management process of the dental clinic. For instance, by manually record the patient information in a dentist card is time wasting and lack of efficiency. Besides, patients also cannot check their appointment time in the fast and convenient way as it is time consuming for administrator to access the information which is recorded at their patient dentist card and manually records the information details of the patient in a dentist card may also encounter problems in searching and updating the information of the patient as well. In addition, the manual record management method is also not secure as some personal information of the patient can be easily exposure to others if the record card is lost and the information also can be modified and deleted easily.

Due to the weakness of the manual record management method, the Online Dental Management System (ODMS) is developed on the purpose to overcome the problems encountered and to make the daily operation of CHOO Specialist Orthodontic & Dental Clinic become more efficiency. The main aim and objectives for the development of ODMS are as below:

- To develop a system to manage the patient information and appointment records more effectively and also improve the daily operation of dental clinic.
- To provide interactive teeth illustration chart to assist dentist examines the oral health of the patient.
- To develop a system to automatically calculate the treatment fees for each appointment and allow patient to check their treatment fees simultaneously.

1.3 SCOPE

1.3.1 System user

- Administrator (Dentist)
- Receptionist (Nurse)
- Basic User (Patient)

1.3.2 System platform

- This system use English as official language.
- Internet access is required to use this system.
- User need to login before use the system.

Administrator

- User can view all the information details of the patient which are included patient personal information, appointment records, note for oral health, treatment history and dental radiographs diagrams.
- User can add or edit the addition note for oral health of patient's teeth.
- User can add treatment operation details of patient.

Receptionist

- User can view, add, update and delete the information details of the patient which are included patient personal information, appointment records, appointment queue list and also dental radiographs diagrams.
- User can view and print the payment receipt for patients.
- User can send Short Message Service (SMS) to notify patients before their turn to receive the treatment.

Basic User

- User can view his/her own appointment records and the personal information.
- User can check and make appointment with dentist.

1.3.3 System functionality

- This system can view, add, update and delete all the patient information details.
- This system can view the schedule of the dentists.
- This system provided interactive teeth illustration chart to allow dentist examines the oral health of the patient more accurately and efficiently and makes the process of recording patient treatment details more easily.
- This system can automatically calculate the treatment fees for each appointment.
- This system allows patients to check and book their appointment.
- This system allows patients to check their treatment fees simultaneously and also allow them to print their payment receipt.
- This system keeps the information of the patients in secure database and allows the information to be easily track by the dentist.

1.4 EXISTING SYSTEM

1.4.1 Review of the existing system

Online Dental Management System (ODMS) is an enhanced system that is developed to overcome the problems that exist when using the manual record management method. However, in market there is already some existing system which had been developed in order to easier the management job for dental clinic. One of the available existing systems will be the Suzy Dental which is developed by the Suzy System Company. By referring the Suzy Dental web page, Suzy Dental is a dental management system which is used by the three type of users which are included dentist, staff and also patient. Some important features and module which are included in the system are as below:

i. Patient Information
   - Patient can be alerts on recall status and other information

ii. Electronic Appointment Book
   - Click on the appointment book to get instant access to patient records.

iii. Patient Recall
   - Patients are recalls for the additional appointment, treatments and also procedures.

iv. Patient Billing
   - Provide with instant billing with several billing method option.

v. Referral Tracking
   - Track all incoming and outgoing referral.

vi. Treatment Planning
   - Provide multiple treatment plans.

vii. Insurance Management

- All insurance claims can be submitted electronically and the can be printed out immediately.

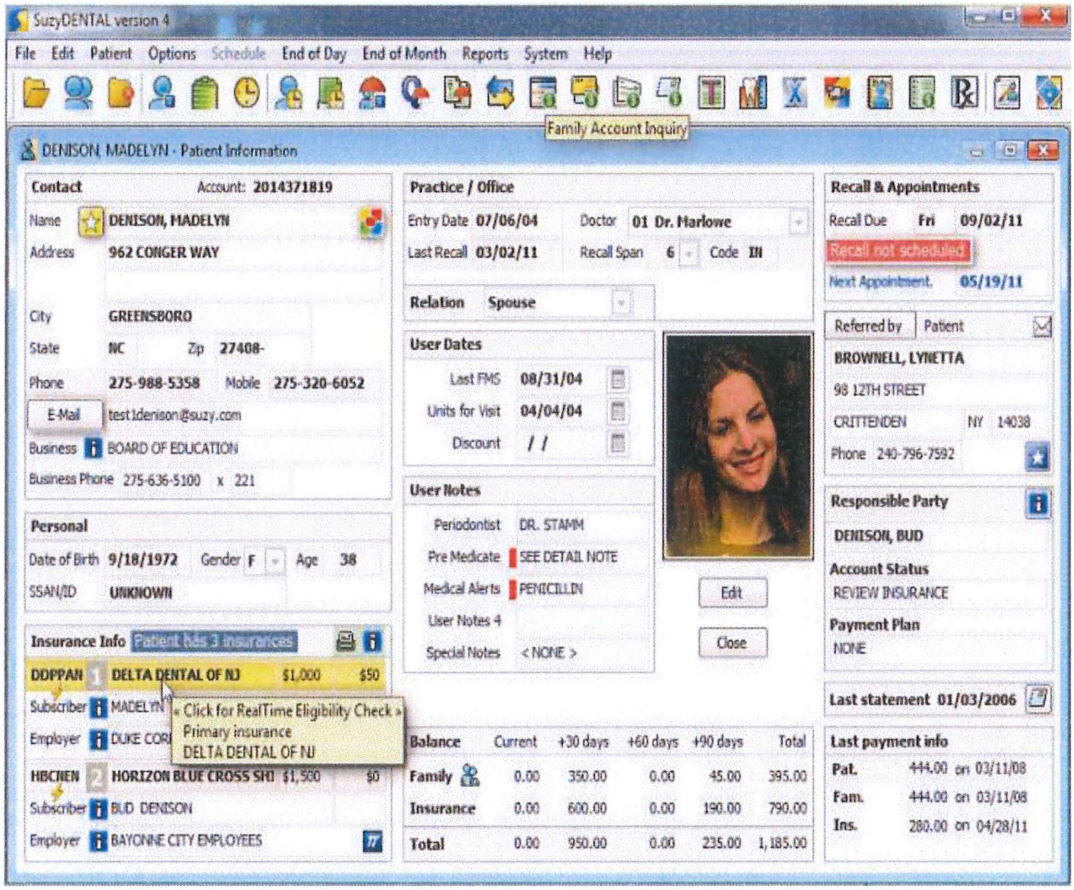


Figure 1: System interface of Suzy Dental.

Another existing system available in market will be the Dental Clinic Management System which is developed by Ray Info Solution Pvt. Ltd. It is software which is designed to be used in dental office. This software creates a user-friendly interface, where any doctor would be able to use this software with basic computer skills. Some important features and module which are included in the system are as below:

i. Appointments
   - Can add an appointment to new patient or to an existing patient.

ii. Findings & Treatments
   - Able to view the list of patients where treatment is needed to be given.

iii. Staff and Users
   - Able to add new staff required by the clinic or can manage existing staff information.

iv. Reports & Billings
   - Customized report of the total amount of treatment charges for selected patient.
   - Reports can be viewed or printed at a time.

v. Treatments
   - Add or edit the available treatments in clinic.

vi. Billing
   - Add or edit the available treatments and respective charges in the clinic

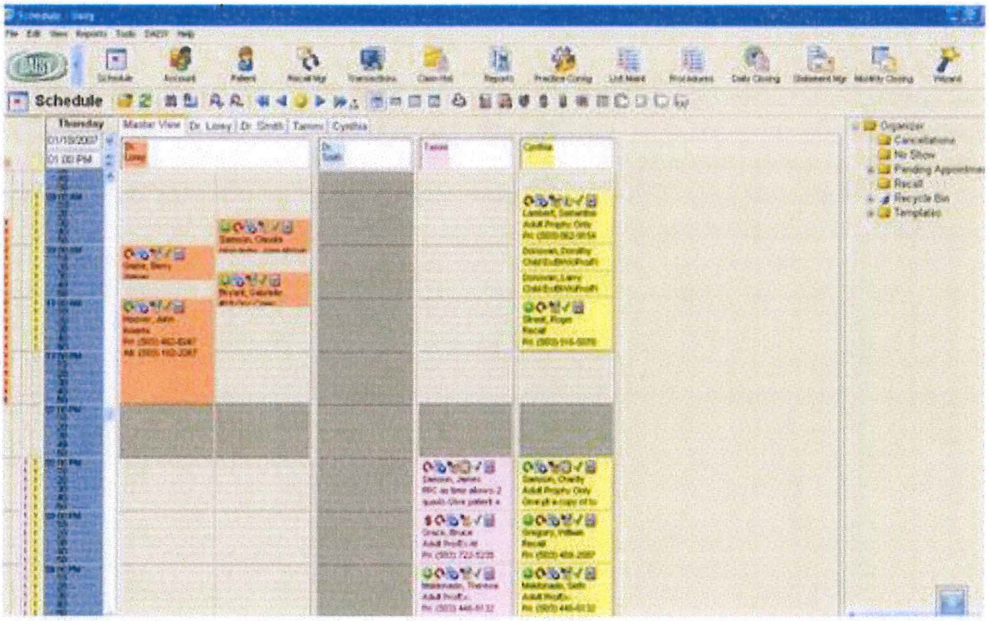


Figure 2: System interface of Dental Clinic Management System.

1.4.2 Limitation of the existing system

The existing system which are available in market such as Suzy Dental and Dental Clinic Management System provided many useful functionalities and features which can be efficiently easier the access and management job for the information of dental patients. However, there are still some limitations can be found from these systems. For example, the Suzy Dental can only support for Windows 95, 98, NT and XP. This may cause the software failed to function properly if the Windows version installed by the computers of clinic is any newer Windows version such as Windows 7 and so on. Besides, the design of the Suzy Dental is also complicated and not user-friendly. While for the case of Dental Clinic Management System, the system does not provided any teeth illustration charting features which allow dentist to examine the oral health of patient more accurately and efficiently and make the process of recording treatment details more easily. Moreover, not all the web browsers are compatible for Dental Clinic Management System. In addition, this system is also just available for computers which are installed with Windows XP only.

PART 2

REPORT BODY

2.1 INTRODUCTION

This part will discuss on the method that we are going to use in developing the system and also describes the overall view of the Online Dental Management System (ODMS). There are some factors such as methodology, techniques and also tools to be applied in developing the system must be consider in order to ensuring the system is well developed. Thus, this chapter will be focus on discussing the chosen methodology in developing the system. Methodology is the systematic study of methods that will manages the project systematically to ensure the flow of the project can be process smoothly. Besides, it also describes every single stage of the project life cycle in depth, so that the developers would be able to know when and how their tasks should be done. Some issues such as the scope of the project, development time and so on must be considered deeply before make the decision on choosing the suitable methodology. In this project, the Rapid Application Development (RAD) software development methodology is used in developing the Online Dental Management System (ODMS).

2.2 STUDY OF THE METHODOLOGY

Rapid Application Development (RAD) is refers to a software development life cycle designed to give much faster development and higher quality systems than the traditional life cycle such as traditional waterfall SDLC. It is designed to take advantage of some powerful development software such as Computer-Aided Software Engineering (CASE) tools, prototyping tools and code generators and thus RAD able to drastically raise the quality of systems while reducing the time it takes to build them. The RAD life cycle can divided into four phases as shown in Figure 1 below. The first phase will be the requirement planning phase, which is often used in any System Development Life Cycle (SDLC) to obtain business functions, data subject areas that the system will support, project scope, system requirement and constraints based on discussions and agreements with the client side. Next, the process continues with user design phase which is also known as functional design stage. In this phase, a workshop is used to model the system's data and processes and to build a working prototype of critical system components. In this project, a succession of collaborative workshops called JAD sessions is used by involves the client or end user in the design and development of the system. The system analyst work closely with users and this interactive process ensure that the system built in meets with the requirement of the client. Besides, this process also happened in the construction phase, where users can voice out their opinion and contribute towards the system acceptance, testing and integration. In the construction phase which is also known as the development stage, the construction of the physical system and the conversion system will be completed. Lastly, the process enters the last phase which is the cutover phase. In this phase, it included final user testing, data conversion, and the implementation of the system. In short, RAD enables organizations to develop a faster production of a working system that meets the client's requirements while reducing development costs and maintaining quality.

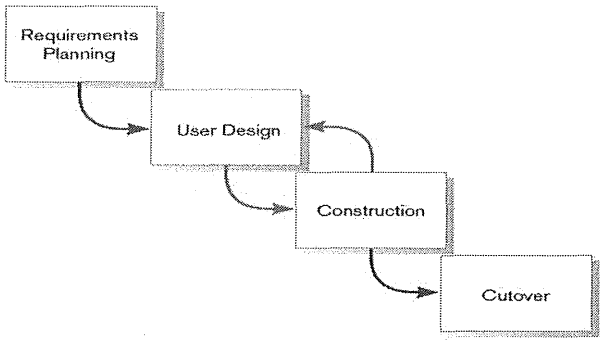


Figure 3: RAD methodology summary diagram

The main reason for the RAD methodology to use in this project is because RAD suits better in web development. In addition, by involving the clients or end user in the development process, a system that is closely resembled with the client requirements can be produced. The table below has shown the comparison of RAD with some other methodology.

Methodology	Weakness
Waterfall model	• Project requirement always change during the development. • Late in producing working system. • Not suitable for complex and OO design. • Poor choice when the user requirement are not well-known.
Spiral model	• Costly in getting the risk analysis expert. • Not suitable for small scale project.
Rapid application development	• Requires professional staffs. • Usable for modular system only. • Cost of modeling and automated codegeneration is very high.

Table 1: Comparison of other methodology

2.3 USER REQUIREMENT

The capture of user requirements is the process of gathering information about user needs. The requirement analysis and gathering process is a very most important phase for every system planning process as with the clear and accurate user requirements, a well-designed system which meets the user needs can be produced.

For this project, a meeting was conducted on the 25th of February 2014 during my visit to CHOO Specialist Orthodontic & Dental Clinic. This meeting was held at the meeting room, where Dr Choo has briefed about her expectation to this project. By using the manual record management method, she explained that manually record the information detail of the patient is time wasting and lack of efficiency.

After collected and analyzed the requirements and expectation for this project from Dr Choo, the Online Dental Management System (ODMS) has been introduced to Dr Choo. Besides, the system functionalities and constraints were also presented to Dr Choo. At the end of the meeting, Dr Choo has agreed with the solution that proposed and the due date of the project has been set to 17th of December 2014.

On the other hand, due to the confidentiality of the dental clinic information, Dr Choo did not provide the complete set of data. Hence only some available data will be inserted into the system. As the meeting is conducted in an informal session, no prior documents were created as proof to our discussion. Hence, verification and evaluation can only be done after the testing phase is over.

2.4 DESIGN DESCRIPTION

Design description will cover the conceptual facet of the system development. Several programming languages are used to develop the Online Dental Management System (ODMS) which are included Hypertext Preprocessor (PHP), Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript (JS). Besides, Notepad will be used as the coding editor for this project and the database used will be MySQL. In addition, the Microsoft Visio will be used for creating entity relationship diagram and the flow chart of the Online Dental Management System (ODMS).

2.4.1 DIALOGUE DIAGRAM

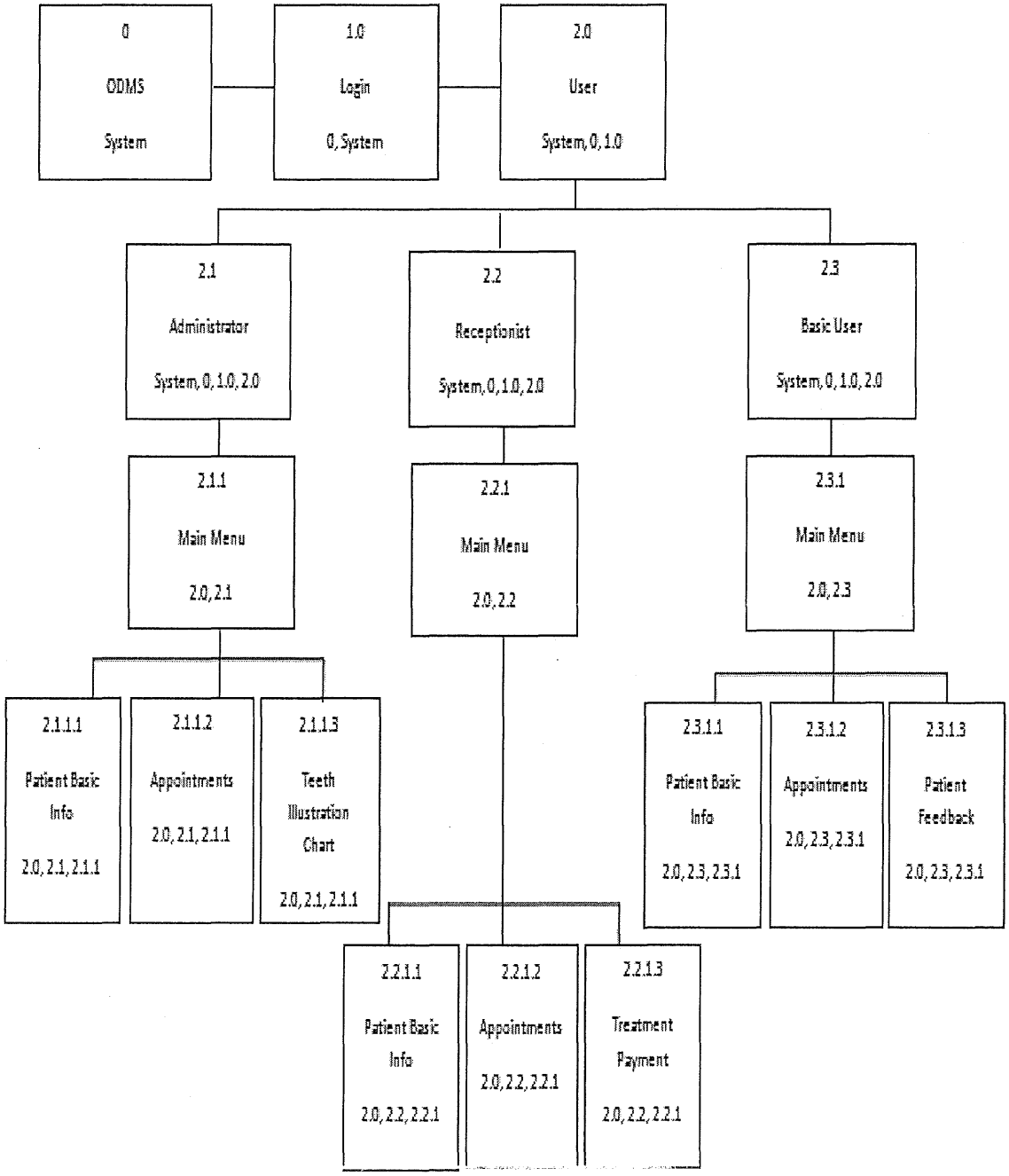


Figure 4: Dialogue diagram for Online Dental Management System (ODMS)

2.4.2 SYSTEM FLOW DIAGRAM

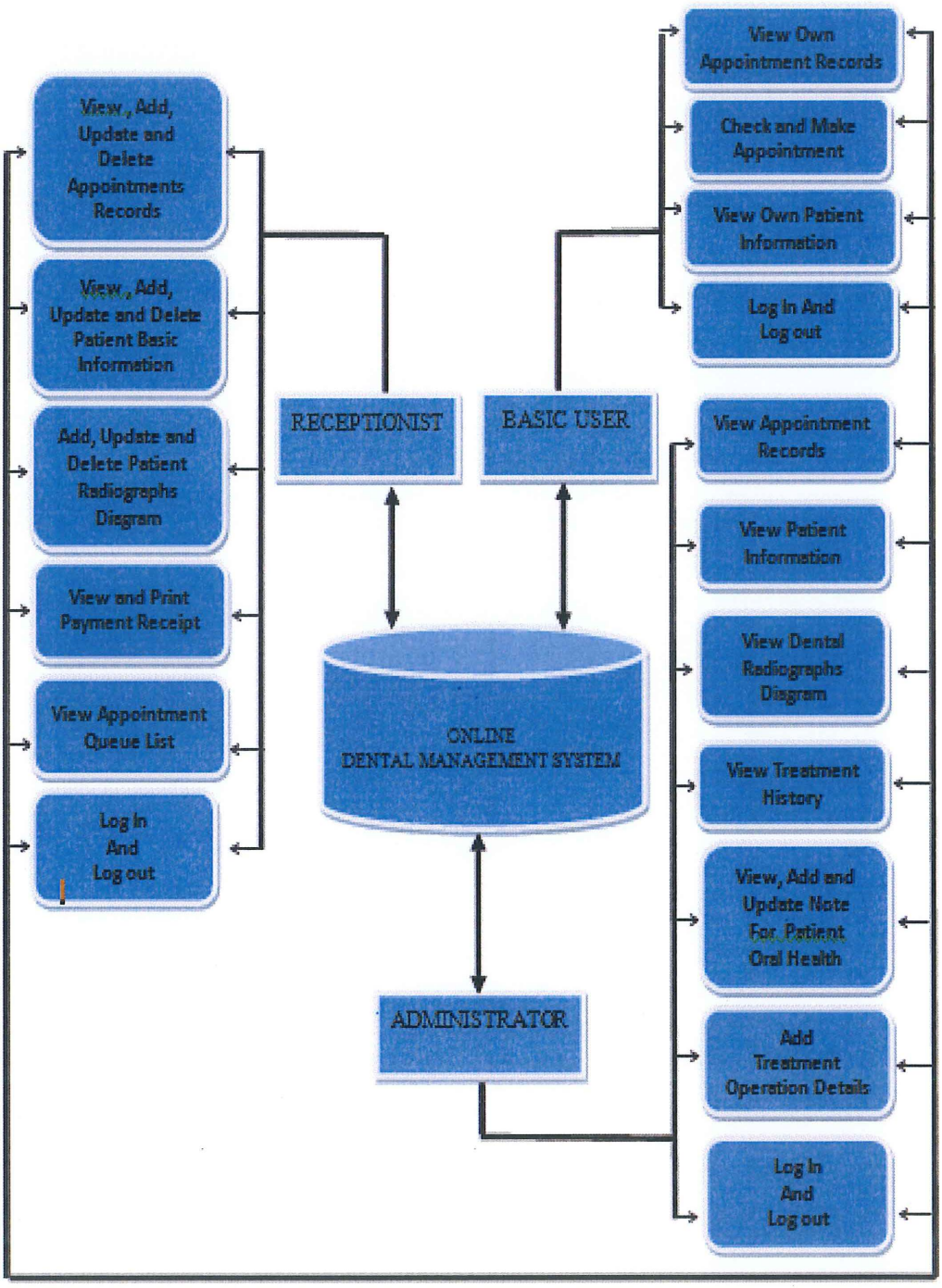


Figure 5: System flow diagram for the Online Dental Management System (ODMS)

2.4.3 DATA DICTIONARY

Field Name	Description	Data Type	Data Size	Constraint
ID	adminlogin ID number	Integer	10	PK
Username	Username for login	Varchar	50	
Password	Password for login	Varchar	50	
Category	Type of User	Varchar	50	

Table 2: Data Dictionary for 'adminlogin' Table

Field Name	Description	Data Type	Data Size	Constraint
ID	appointment ID number	Integer	11	PK
Name	Patient's name	Varchar	20	
IC	Patient's IC number	Varchar	15	
Event	Activity of the appointment	Varchar	100	
Date	Date of appointment	Date		
Time	Time of appointment	Varchar	50	
Phone	Patient's phone	Varchar	20	

	number			
Status	Status of the appointment	Varchar	50	

Table 3: Data Dictionary for 'appointment' Table

Field Name	Description	Data Type	Data Size	Constraint
ID	patientinfo ID number	Integer	11	PK
Name	Patient's name	Integer	50	
IC	Patient's IC	Varchar	50	
Gender	Patient's gender	Varchar	10	
Email	Patient's email	Varchar	50	
Address	Patient's address	Varchar	100	
Phone	Patient's phone number	Varchar	50	
DOB	Patient's date of birth	Date		
Occupation	Patient's occupation	Varchar	50	
Religion	Patient's religion	Varchar	50	

Medicalproblem	Health condition	Varchar	50	
Username	Patient's username for login	Varchar	50	
Password	Patient's password for login	Varchar	50	

Table 4: Data Dictionary for 'patientinfo' Table

Field Name	Description	Data Type	Data Size	Constraint
ID	radiography ID number	Integer	11	PK
fname	Patient's name	Varchar	30	
lname	Patient's IC	Varchar	40	
filename	Patient's radiographs diagram	Varchar	50	

Table 5: Data Dictionary for 'radiography' Table

Field Name	Description	Data Type	Data Size	Constraint
ID	radiography ID number	Integer	11	PK

Name	Patient's name	Integer	20	
IC	Patient's IC	Varchar	15	
Gender	Patient's gender	Varchar	10	
Phone	Patient's phone number	Varchar	15	
Eighteen	Tooth number	Varchar	100	
Seventeen	Tooth number	Varchar	100	
Sixteen	Tooth number	Varchar	100	
Fifteen	Tooth number	Varchar	100	
Fourteen	Tooth number	Varchar	100	
Thirteen	Tooth number	Varchar	100	
Twelve	Tooth number	Varchar	100	
Eleven	Tooth number	Varchar	100	
Twentyone	Tooth number	Varchar	100	
Twentytwo	Tooth number	Varchar	100	
Twentythree	Tooth number	Varchar	100	
Twentyfour	Tooth number	Varchar	100	
Twentyfive	Tooth number	Varchar	100	
Twentysix	Tooth number	Varchar	100	
Twentyseven	Tooth number	Varchar	100	

Twentyeight	Tooth number	Varchar	100	
Fourtyone	Tooth number	Varchar	100	
Fourtytwo	Tooth number	Varchar	100	
Fourtythree	Tooth number	Varchar	100	
Fourtyfour	Tooth number	Varchar	100	
Fourtyfive	Tooth number	Varchar	100	
Fourtysix	Tooth number	Varchar	100	
Fourtyseven	Tooth number	Varchar	100	
Fourtyeight	Tooth number	Varchar	100	
Thirtyone	Tooth number	Varchar	100	
Thirtytwo	Tooth number	Varchar	100	
Thirtythree	Tooth number	Varchar	100	
Thirtyfour	Tooth number	Varchar	100	
Thirtyfive	Tooth number	Varchar	100	
Thirtysix	Tooth number	Varchar	100	
Thirtyseven	Tooth number	Varchar	100	
Thirtyeight	Tooth number	Varchar	100	

Table 6: Data Dictionary for 'teethchart' Table

Field Name	Description	Data Type	Data Size	Constraint

ID	treatment ID number	Integer	11	PK
Name	Patient's name	Integer	20	
IC	Patient's IC	Varchar	20	
Gender	Patient's gender	Varchar	20	
Phone	Patient's phone number	Varchar	20	
Date	Date of appointment	Date		
Time	Time of appointment	Varchar	50	
Treatment18a	First treatment for tooth number 18	Varchar	50	
Treatment18b	Second treatment for tooth number 18	Varchar	50	
Treatment17a	First treatment for tooth number 17	Varchar	50	
Treatment17b	Second treatment for tooth number 17	Varchar	50	
Treatment16a	First treatment for tooth number 16	Varchar	50	
Treatment16b	Second treatment for tooth number 16	Varchar	50	

Treatment15a	First treatment for tooth number 15	Varchar	50	
Treatment15b	Second treatment for tooth number 15	Varchar	50	
Treatment14a	First treatment for tooth number 14	Varchar	50	
Treatment14b	Second treatment for tooth number 14	Varchar	50	
Treatment13a	First treatment for tooth number 13	Varchar	50	
Treatment13b	Second treatment for tooth number 13	Varchar	50	
Treatment12a	First treatment for tooth number 12	Varchar	50	
Treatment12b	Second treatment for tooth number 12	Varchar	50	
Treatment11a	First treatment for tooth number 11	Varchar	50	
Treatment11b	Second treatment for tooth number 11	Varchar	50	
Treatment21a	First treatment for tooth number 21	Varchar	50	
Treatment21b	Second treatment for tooth number 21	Varchar	50	

Treatment22a	First treatment for tooth number 22	Varchar	50	
Treatment22b	Second treatment for tooth number 22	Varchar	50	
Treatment23a	First treatment for tooth number 23	Varchar	50	
Treatment23b	Second treatment for tooth number 23	Varchar	50	
Treatment24a	First treatment for tooth number 24	Varchar	50	
Treatment24b	Second treatment for tooth number 24	Varchar	50	
Treatment25a	First treatment for tooth number 25	Varchar	50	
Treatment25b	Second treatment for tooth number 25	Varchar	50	
Treatment26a	First treatment for tooth number 26	Varchar	50	
Treatment26b	Second treatment for tooth number 26	Varchar	50	
Treatment27a	First treatment for tooth number 27	Varchar	50	
Treatment27b	Second treatment for tooth number 27	Varchar	50	

Treatment28a	First treatment for tooth number 28	Varchar	50	
Treatment28b	Second treatment for tooth number 28	Varchar	50	
Treatment48a	First treatment for tooth number 48	Varchar	50	
Treatment48b	Second treatment for tooth number 48	Varchar	50	
Treatment47a	First treatment for tooth number 47	Varchar	50	
Treatment47b	Second treatment for tooth number 47	Varchar	50	
Treatment46a	First treatment for tooth number 46	Varchar	50	
Treatment46b	Second treatment for tooth number 46	Varchar	50	
Treatment45a	First treatment for tooth number 45	Varchar	50	
Treatment45b	Second treatment for tooth number 45	Varchar	50	
Treatment44a	First treatment for tooth number 44	Varchar	50	
Treatment44b	Second treatment for tooth number 44	Varchar	50	

Treatment43a	First treatment for tooth number 43	Varchar	50	
Treatment43b	Second treatment for tooth number 43	Varchar	50	
Treatment42a	First treatment for tooth number 42	Varchar	50	
Treatment42b	Second treatment for tooth number 42	Varchar	50	
Treatment41a	First treatment for tooth number 41	Varchar	50	
Treatment41b	Second treatment for tooth number 41	Varchar	50	
Treatment31a	First treatment for tooth number 31	Varchar	50	
Treatment31b	Second treatment for tooth number 31	Varchar	50	
Treatment32a	First treatment for tooth number 32	Varchar	50	
Treatment32b	Second treatment for tooth number 32	Varchar	50	
Treatment33a	First treatment for tooth number 33	Varchar	50	
Treatment33b	Second treatment for tooth number 33	Varchar	50	

Treatment34a	First treatment for tooth number 34	Varchar	50	
Treatment34b	Second treatment for tooth number 34	Varchar	50	
Treatment35a	First treatment for tooth number 35	Varchar	50	
Treatment35b	Second treatment for tooth number 35	Varchar	50	
Treatment36a	First treatment for tooth number 36	Varchar	50	
Treatment36b	Second treatment for tooth number 36	Varchar	50	
Treatment37a	First treatment for tooth number 37	Varchar	50	
Treatment37b	Second treatment for tooth number 37	Varchar	50	
Treatment38a	First treatment for tooth number 38	Varchar	50	
Treatment38b	Second treatment for tooth number 38	Varchar	50	
Total	Total payment fees	Integer	11	
Paymentstatus	Payment status	Varchar	50	

Table 7: Data Dictionary for 'treatment' Table

2.4.4 ENTITY RELATIONSHIP DIAGRAM

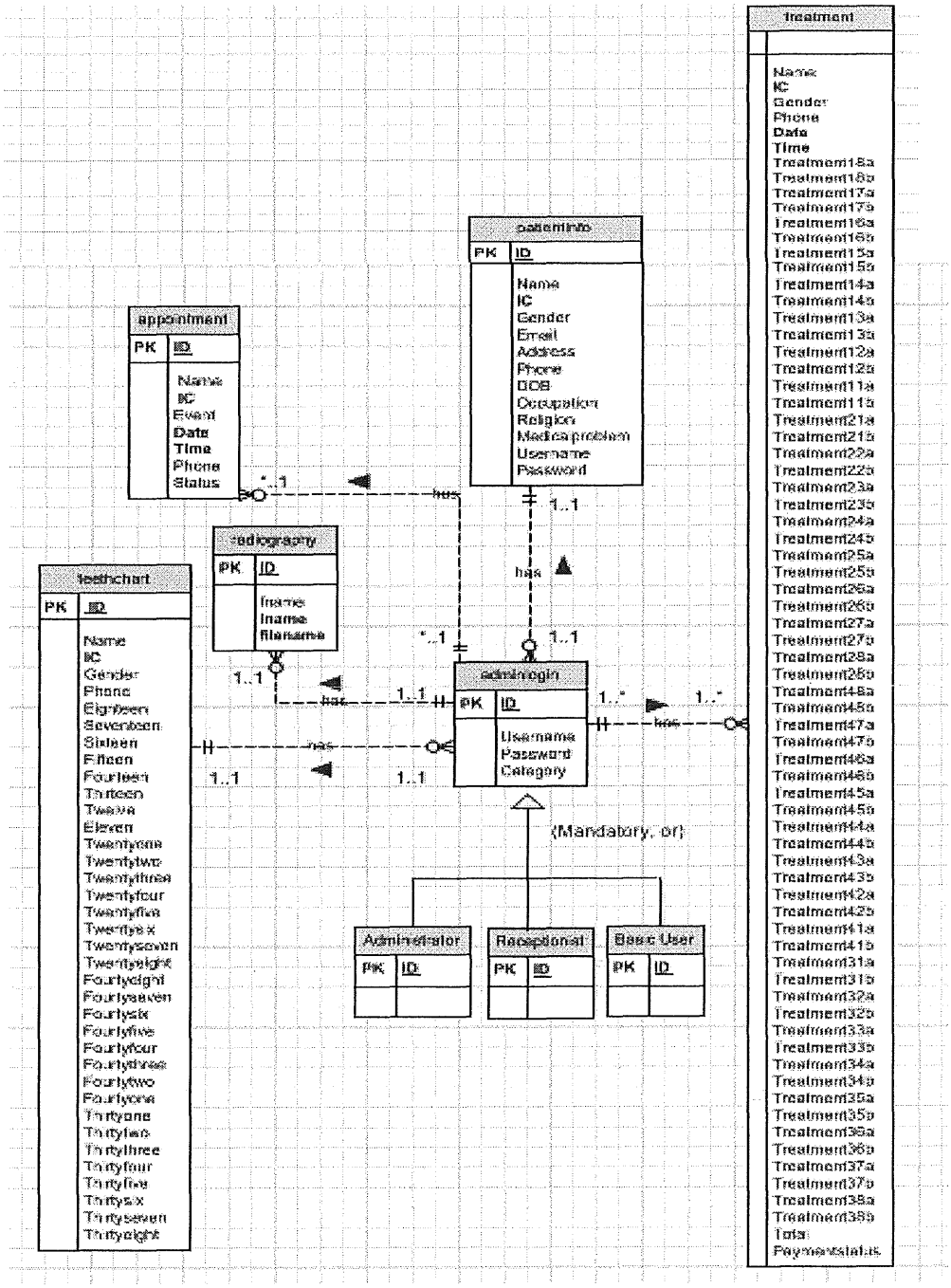


Figure 6: Entity Relationship diagram for the Online Dental Management System (ODMS)

2.4.5 CONTEXT DIAGRAM

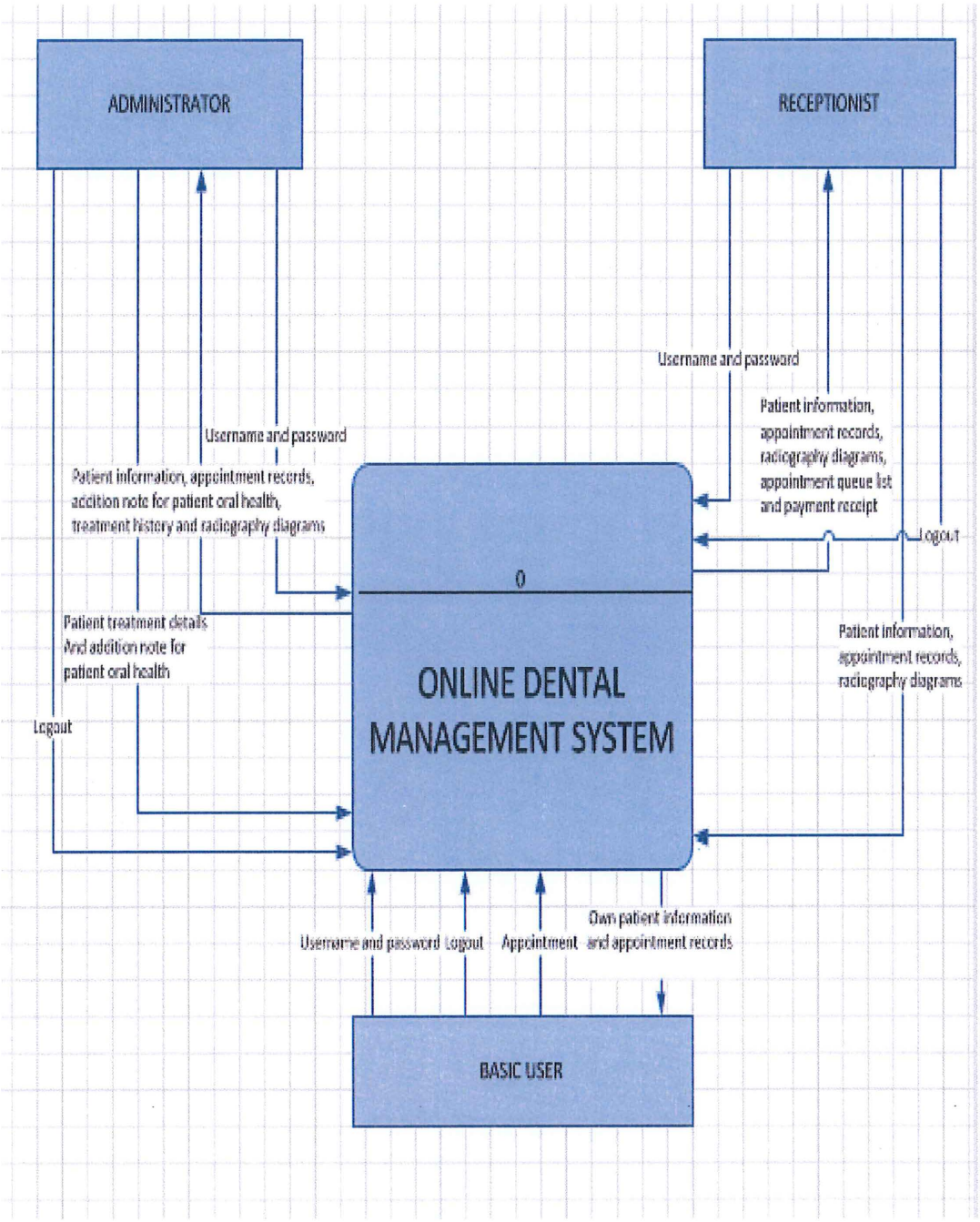


Figure 7: Context diagram for the Online Dental Management System (ODMS)

2.4.6 USE CASE

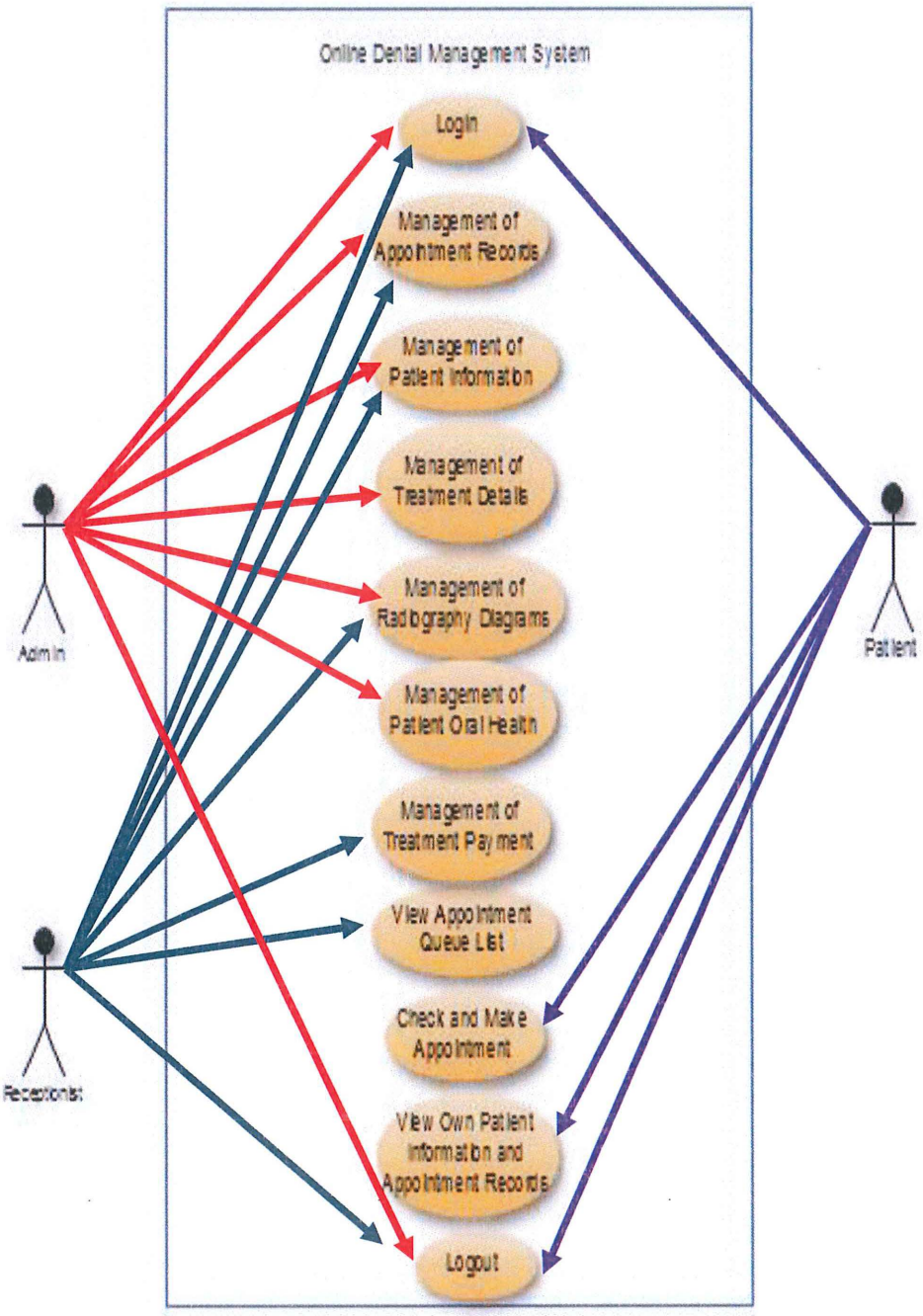


Figure 8: Use Case diagram for the Online Dental Management System (ODMS)

2.4.7 SEQUENCE DIAGRAM

2.4.7.1 Administrator

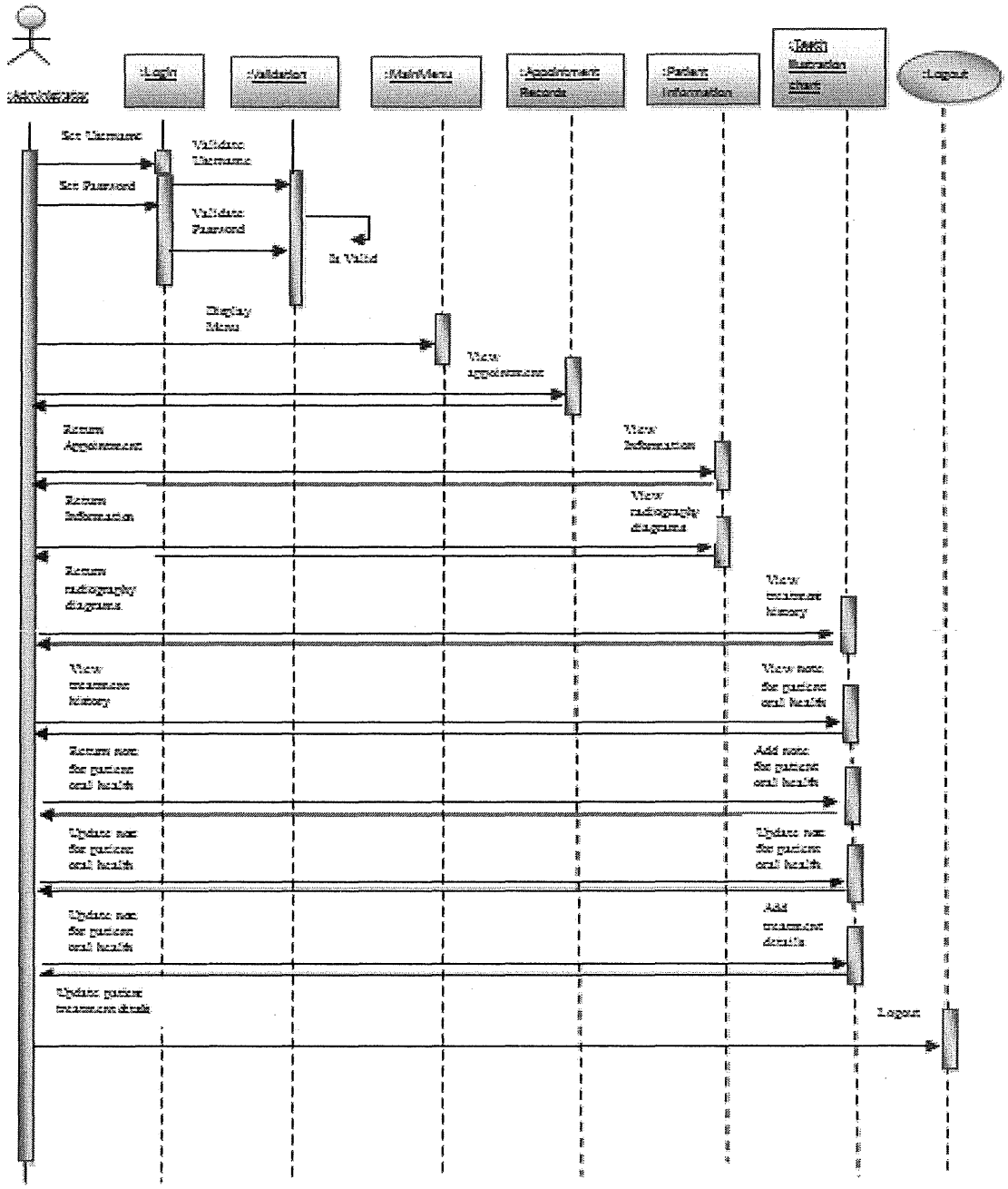


Figure 9: Sequence diagram (Admin) for the Online Dental Management System (ODMS)

2.4.7.2 Receptionist

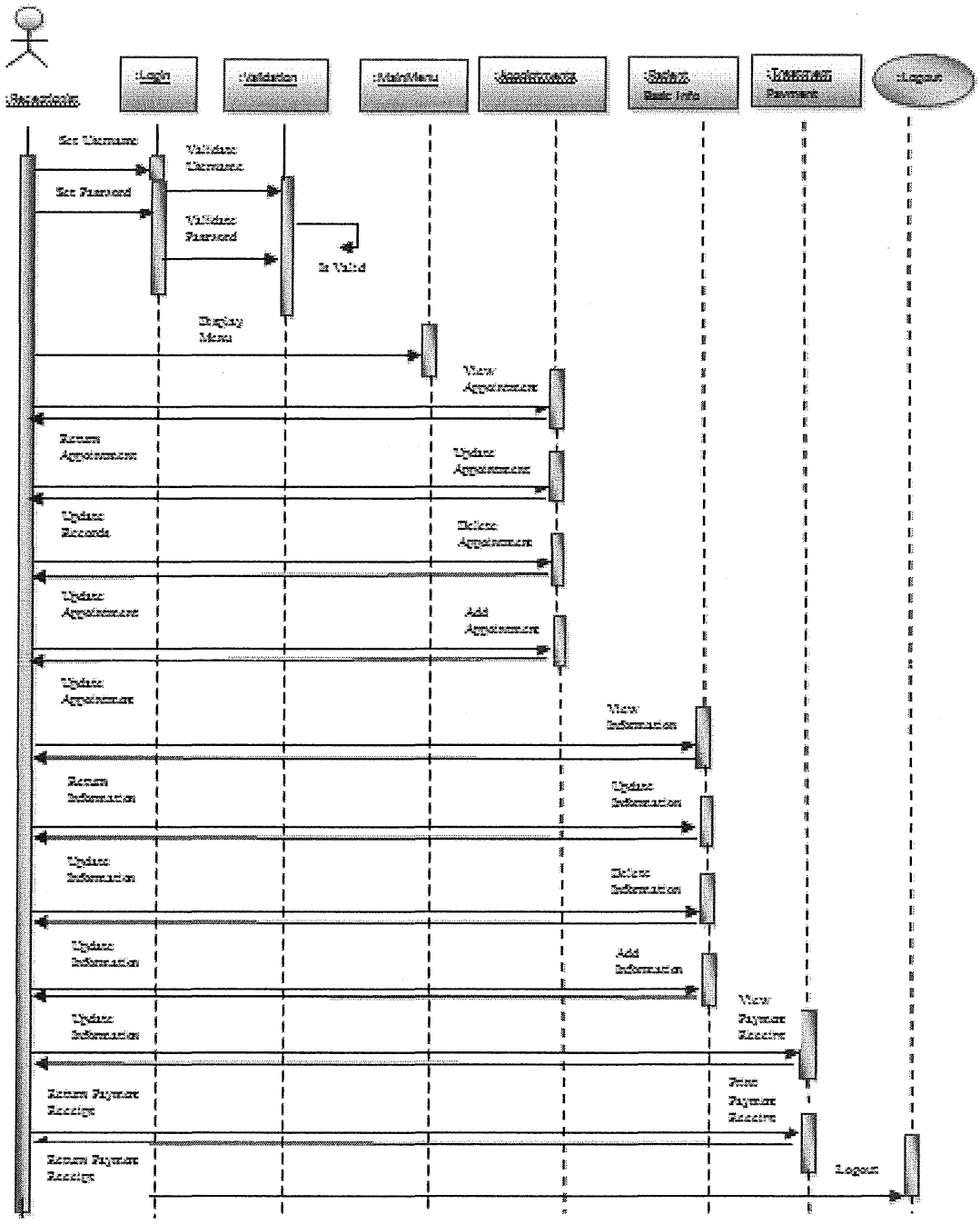


Figure 10: Sequence diagram (Receptionist) for the Online Dental Management System (ODMS)

2.4.7.3 Basic User

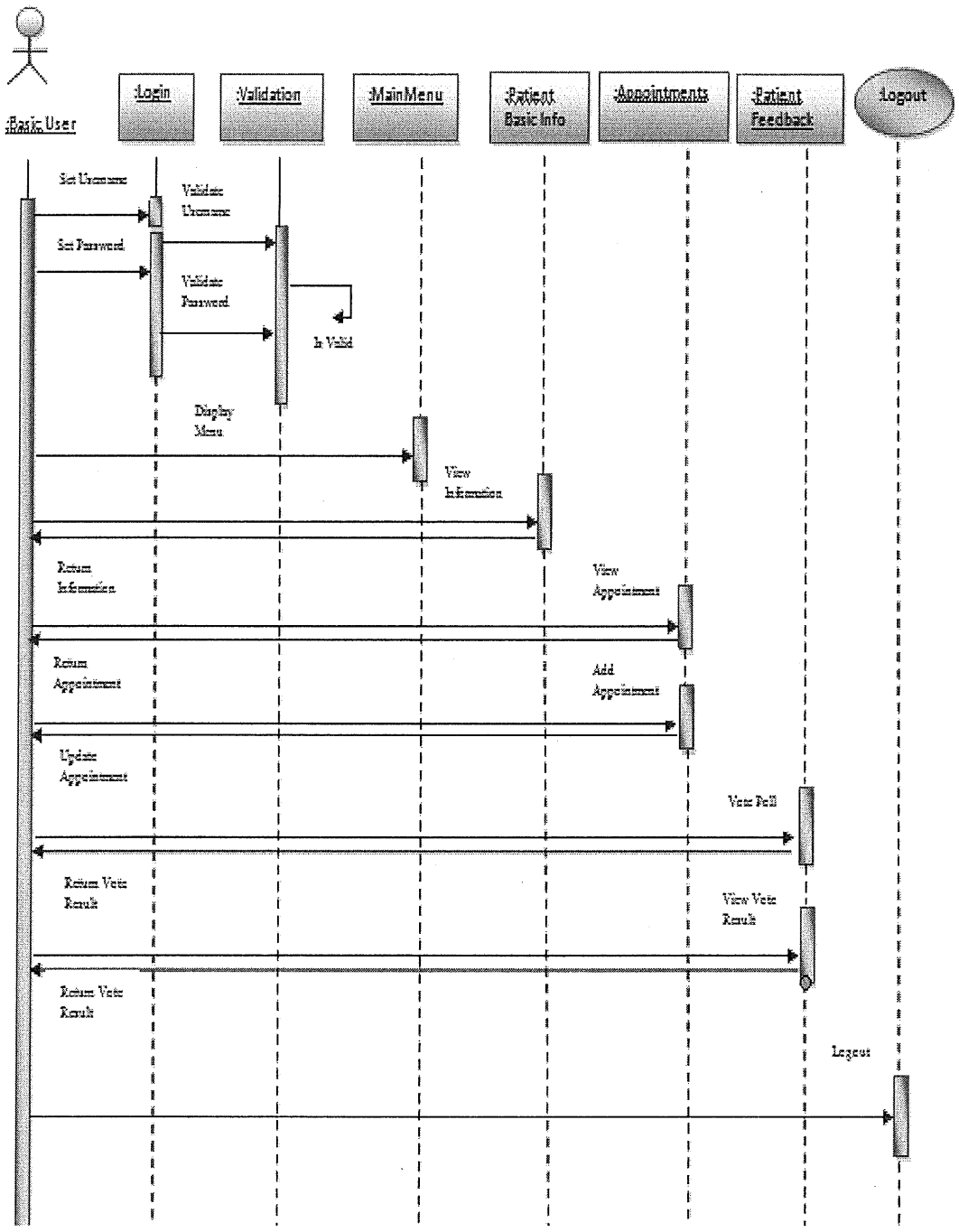


Figure 11: Sequence diagram (Basic User) for the Online Dental Management System (ODMS)

2.4.8 ACTIVITY DIAGRAM

2.4.8.1 User Login

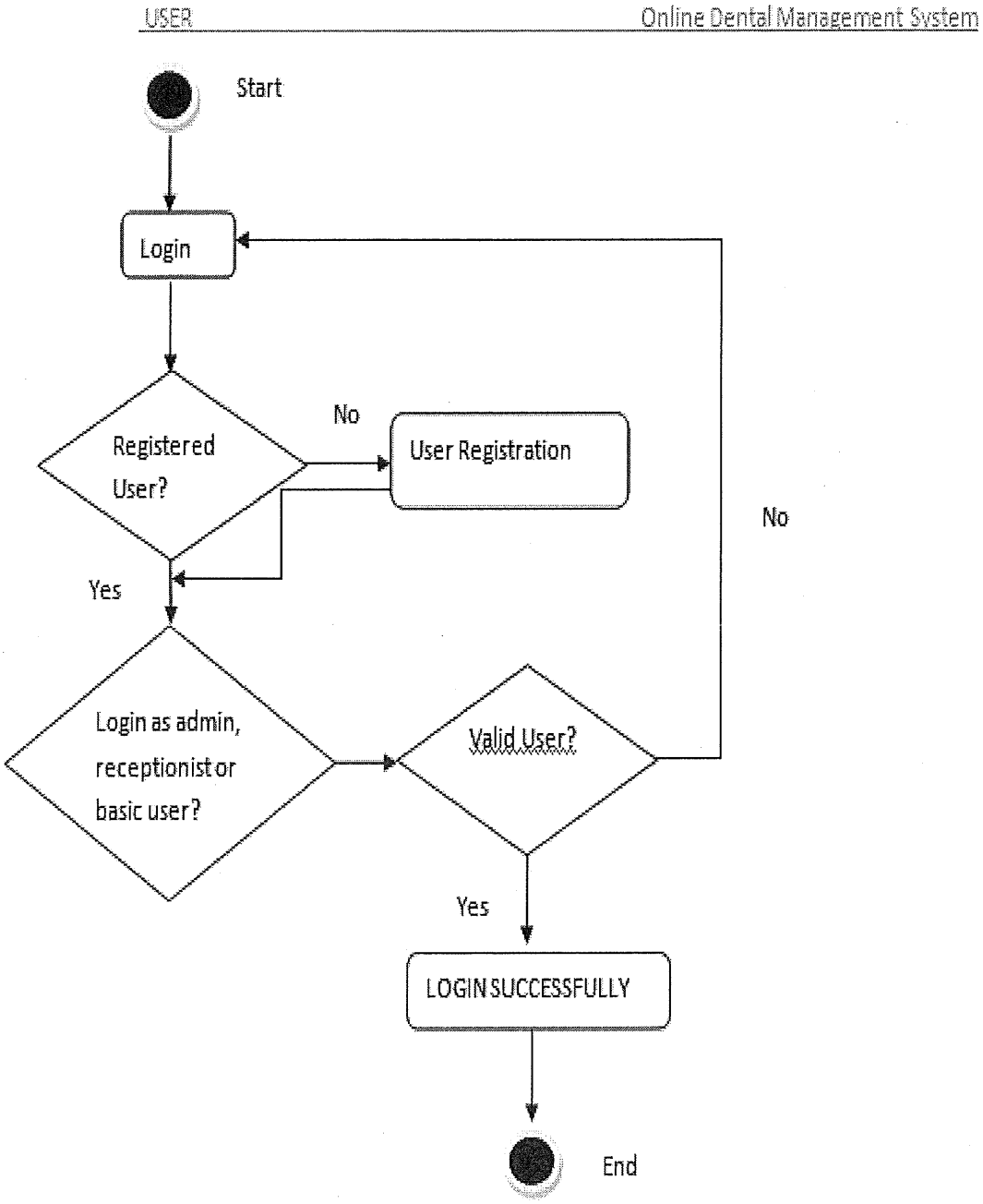


Figure 12: Activity diagram (Login section) for the Online Dental Management System (ODMS)

2.4.8.2 Overall System

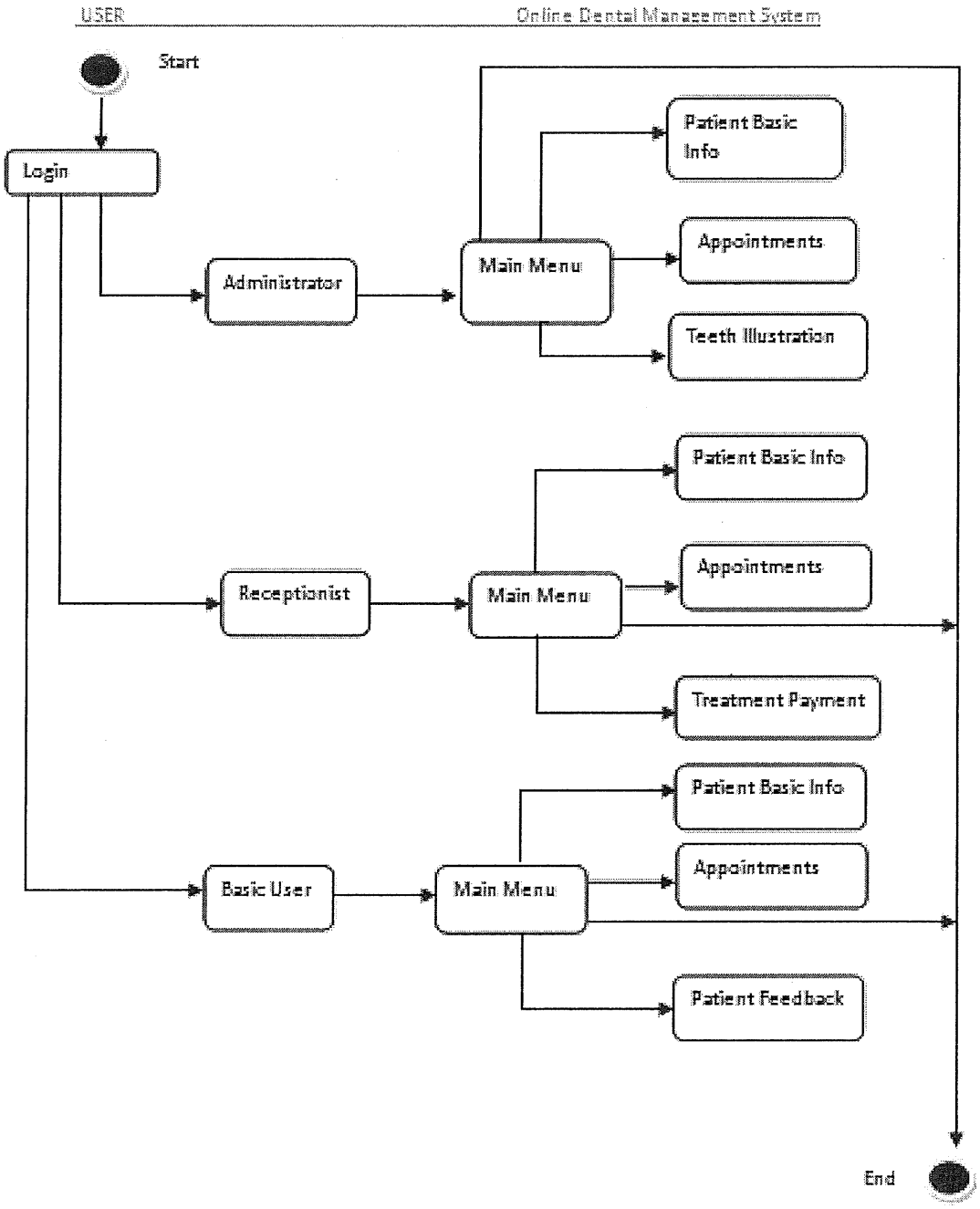


Figure 13: Activity diagram (Overall system) for Online Dental Management System (ODMS)

2.4.9 CLASS DIAGRAM

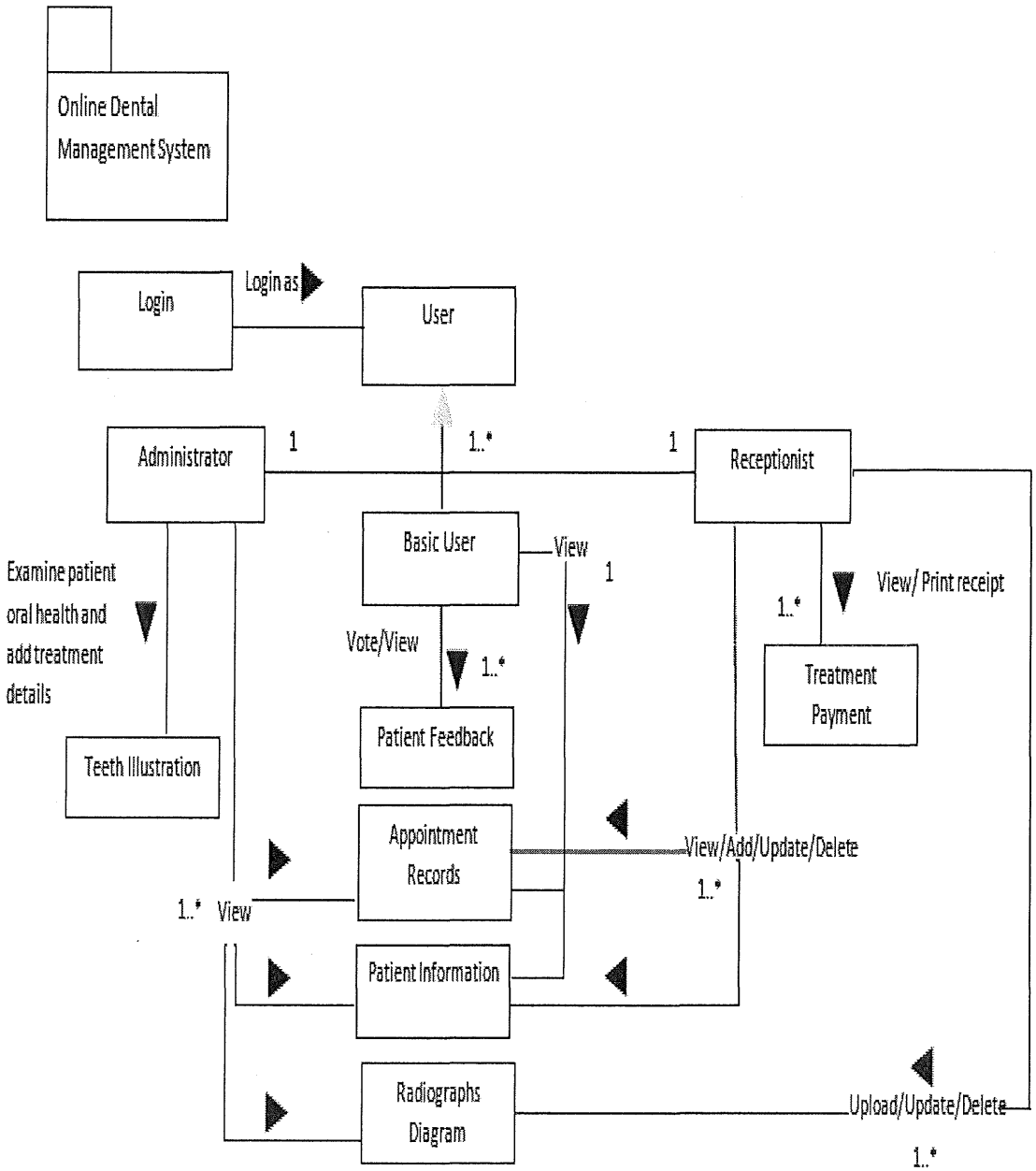


Figure 14: Class diagram for the Online Dental Management System (ODMS)

2.4.10 FLOW CHART

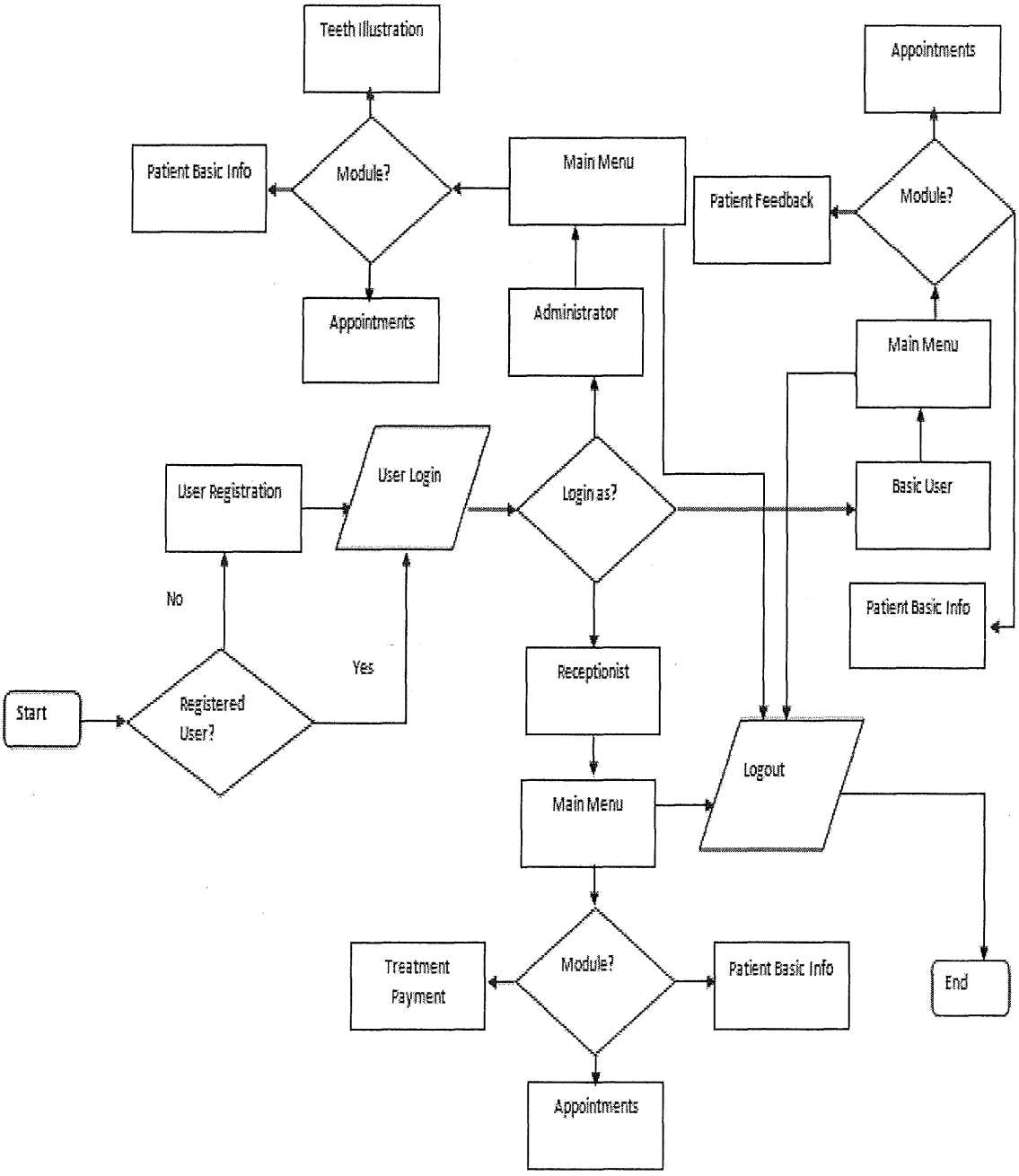


Figure 15: Flow Chart for the Online Dental Management System (ODMS)

2.4.11 SYSTEM INTERFACE

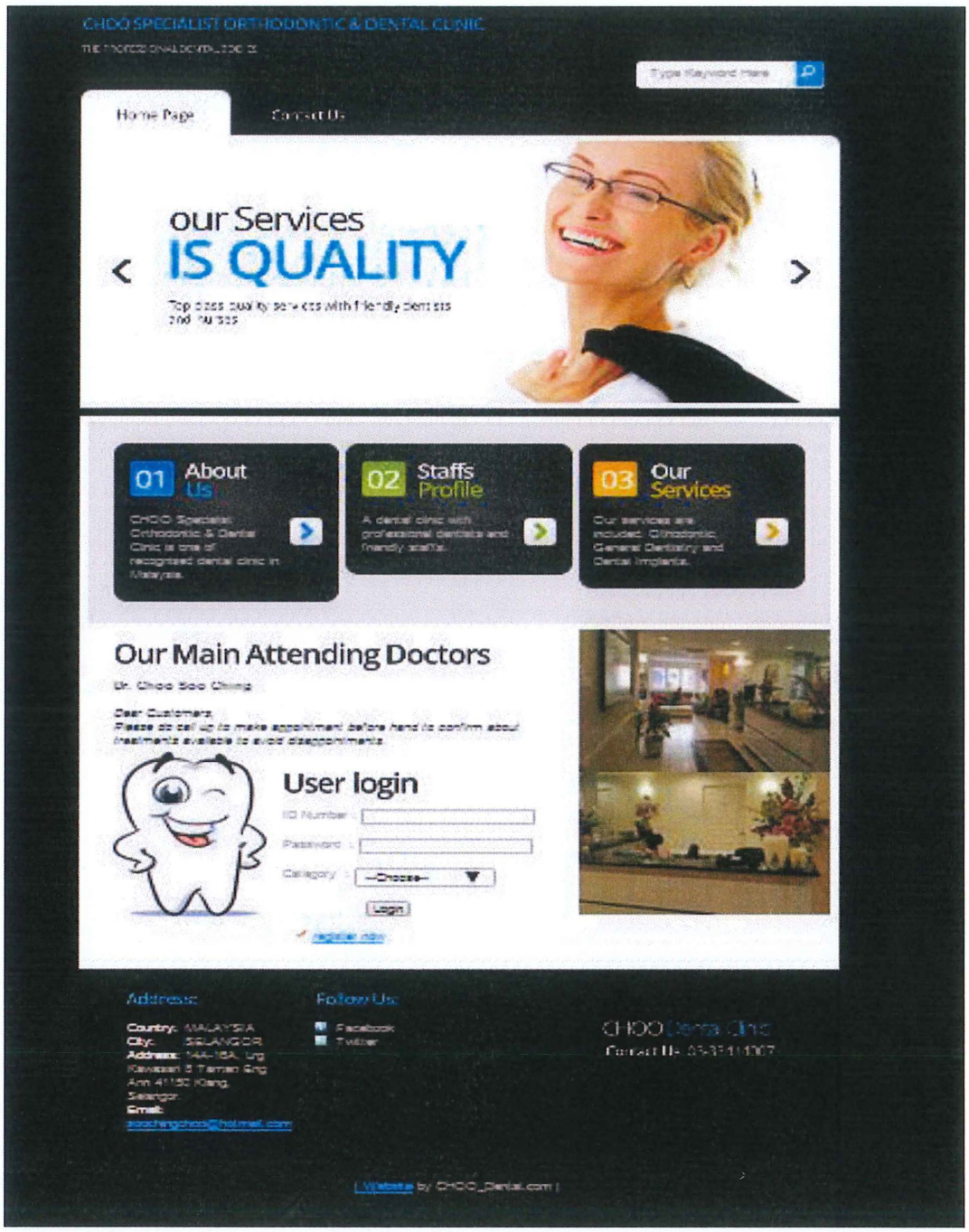


Figure 16: Home page for the Online Dental Management System (ODMS)

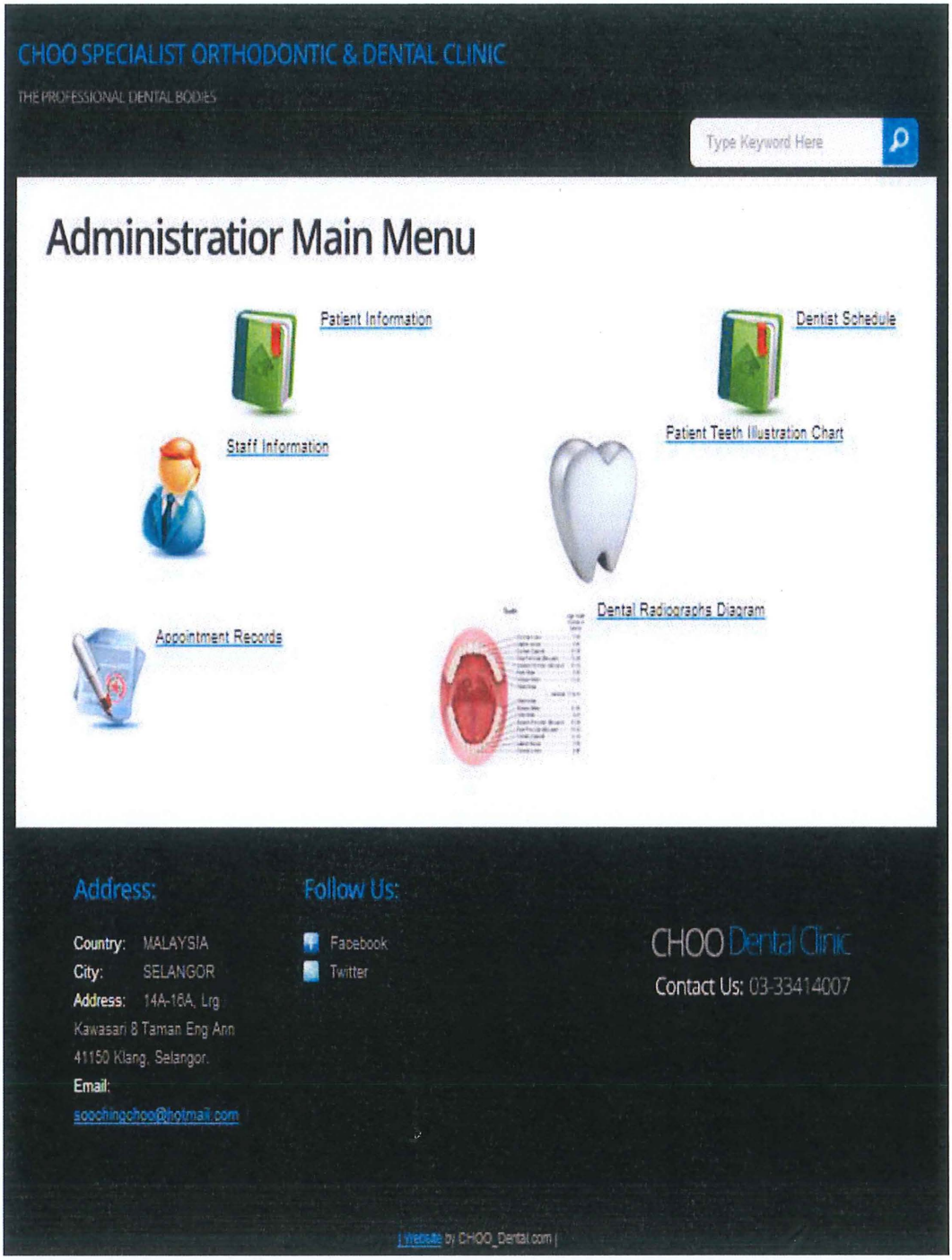


Figure 17: Admin main menu page for the Online Dental Management System (ODMS)

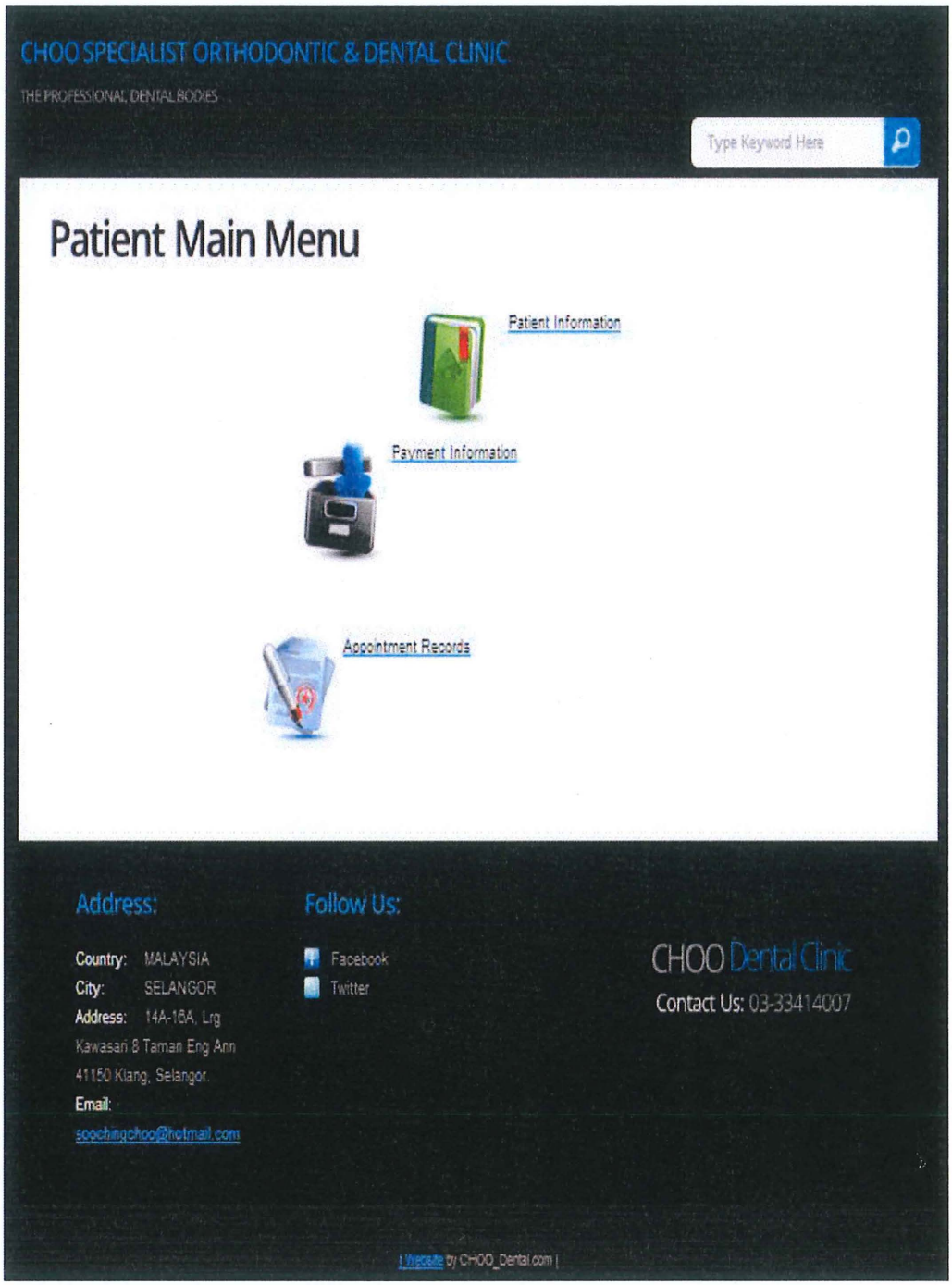


Figure 18: Patient main menu page for the Online Dental Management System (ODMS)

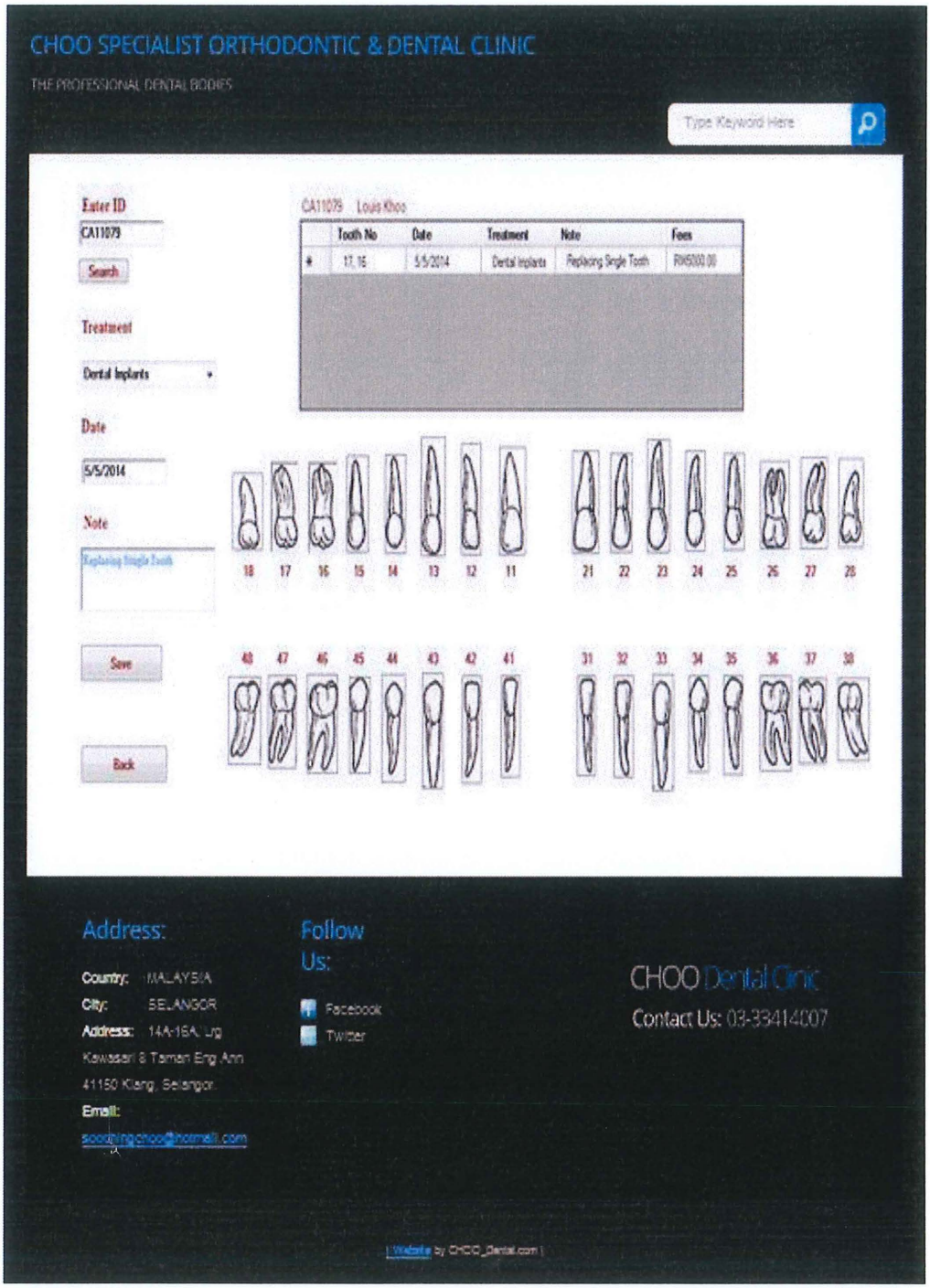


Figure 19: Teeth illustration chart page for the Online Dental Management System (ODMS)

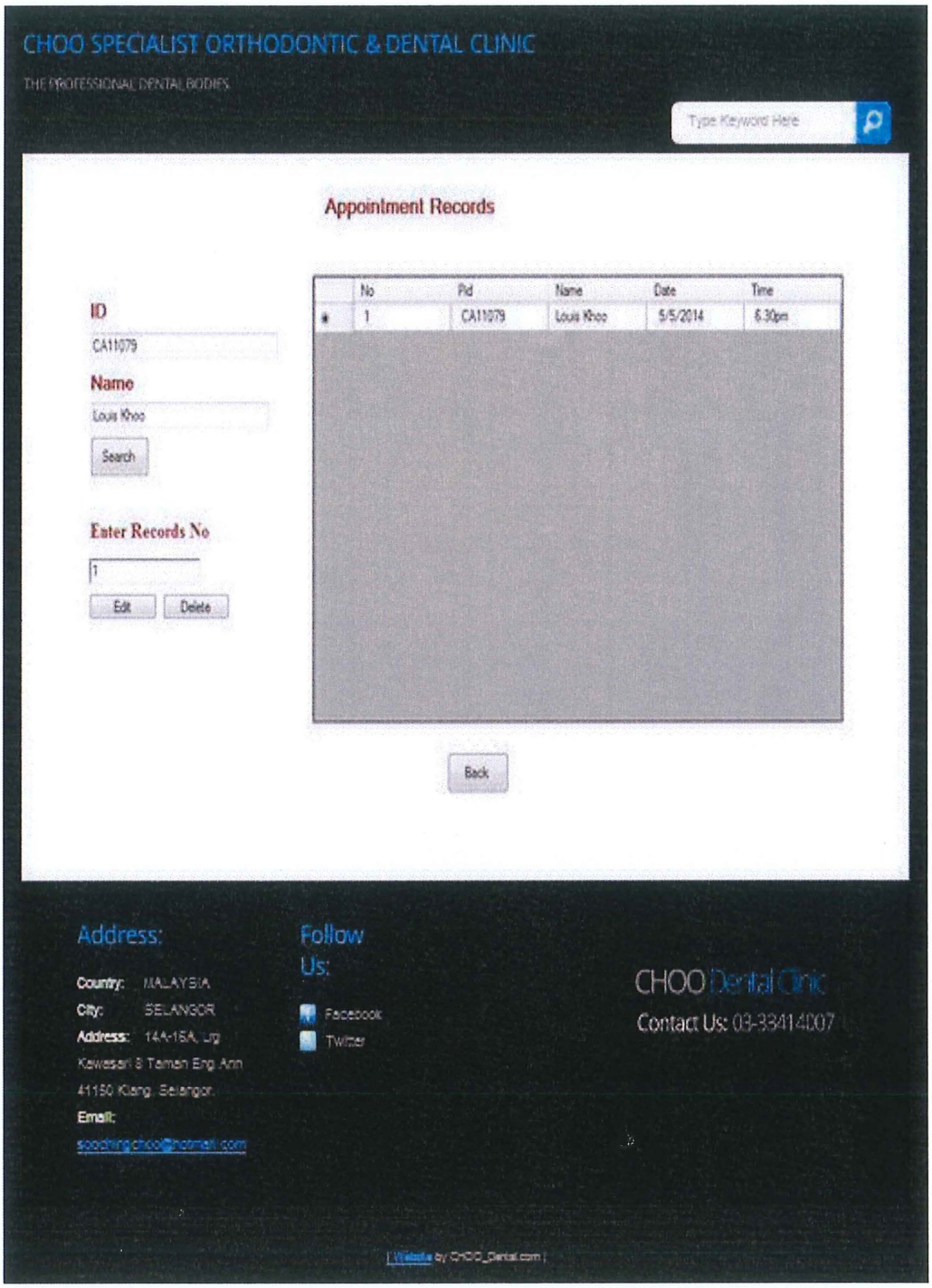


Figure 20: Appointment record page for the Online Dental Management System (ODMS)

Figure 21: Patient information page for the Online Dental Management System (ODMS)

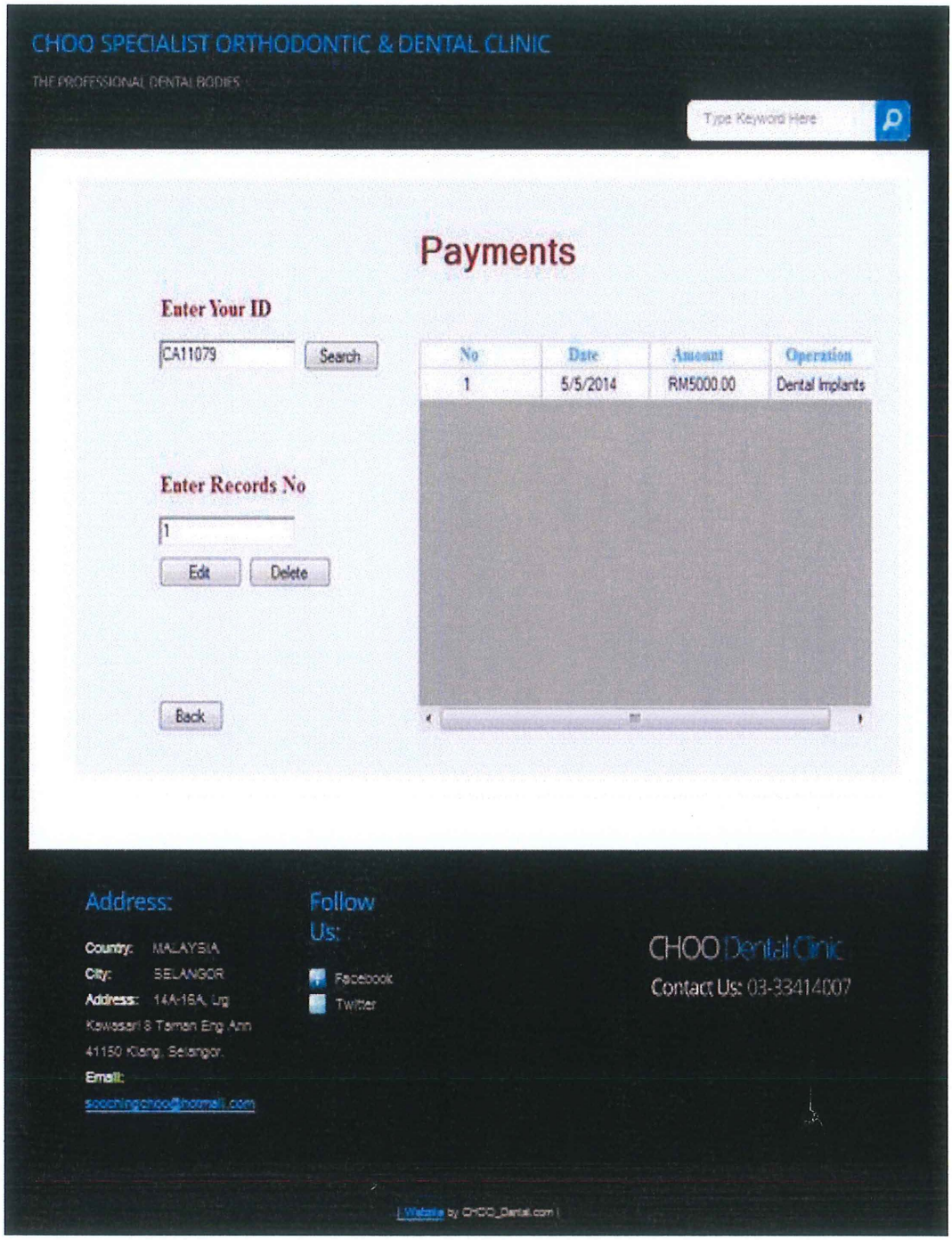


Figure 22: Payment information page for the Online Dental Management System (ODMS)

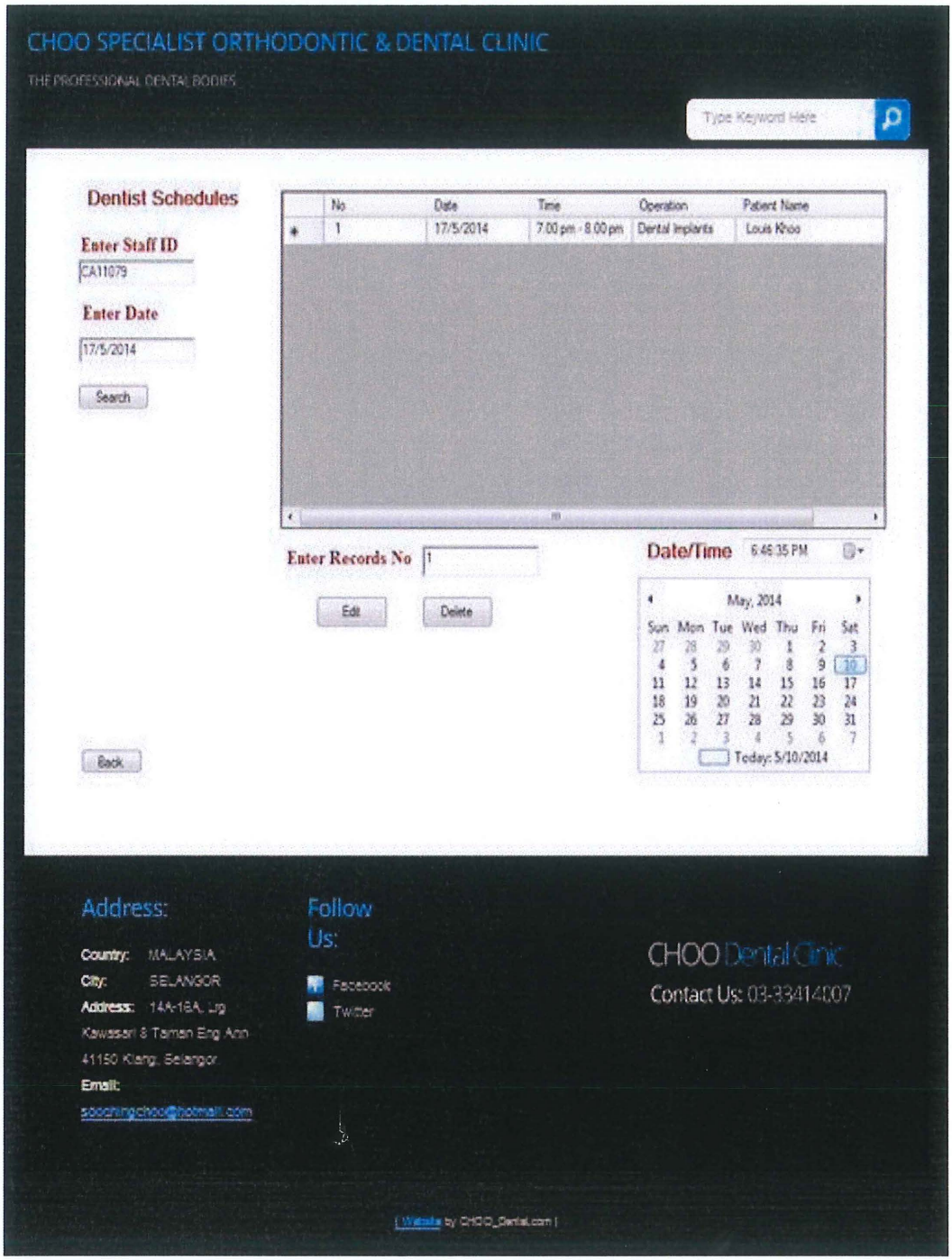


Figure 23: Dental schedule page for the Online Dental Management System (ODMS)

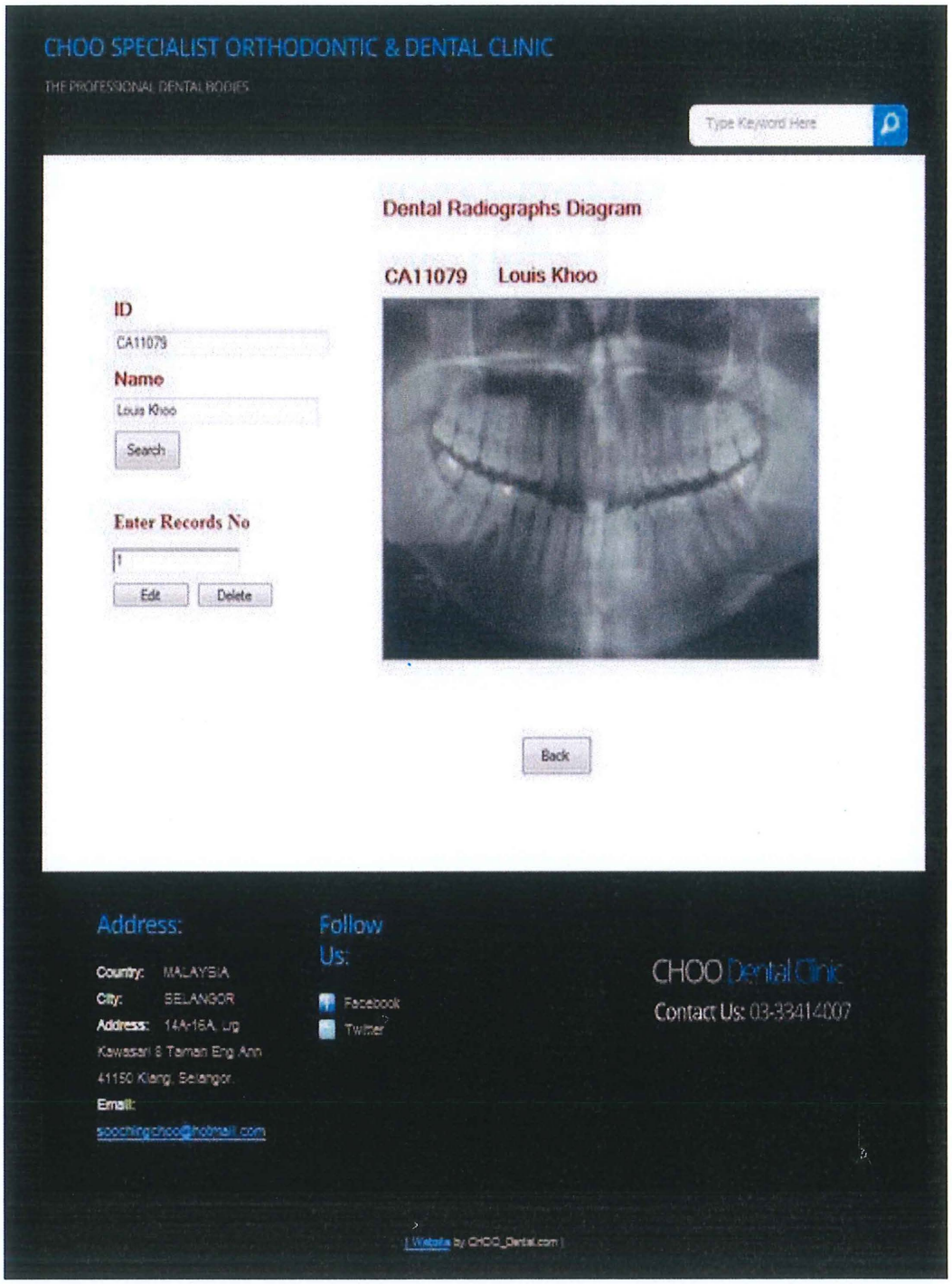


Figure 24: Dental radiography page for the Online Dental Management System (ODMS)

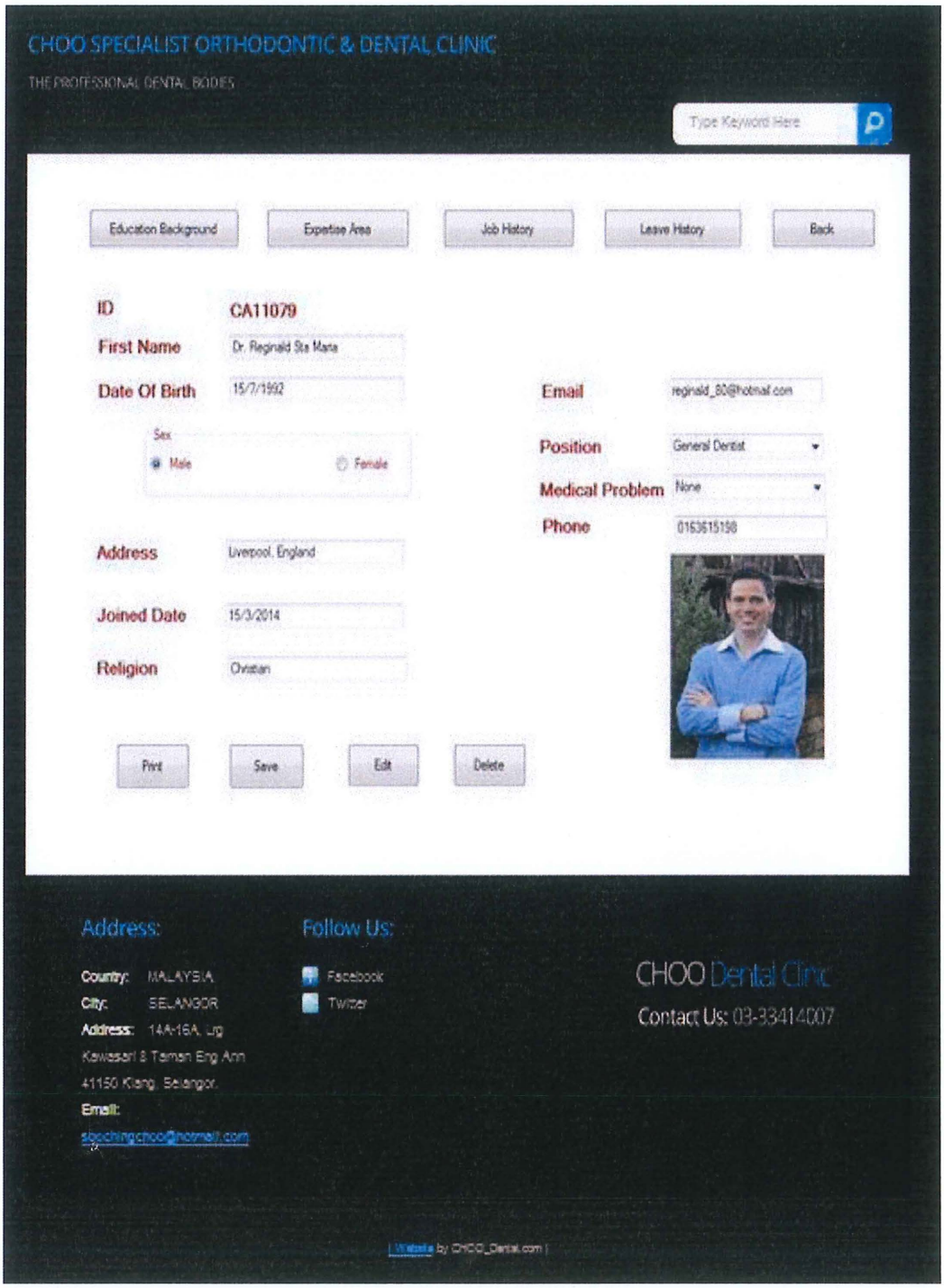


Figure 25: Staff information page for the Online Dental Management System (ODMS)

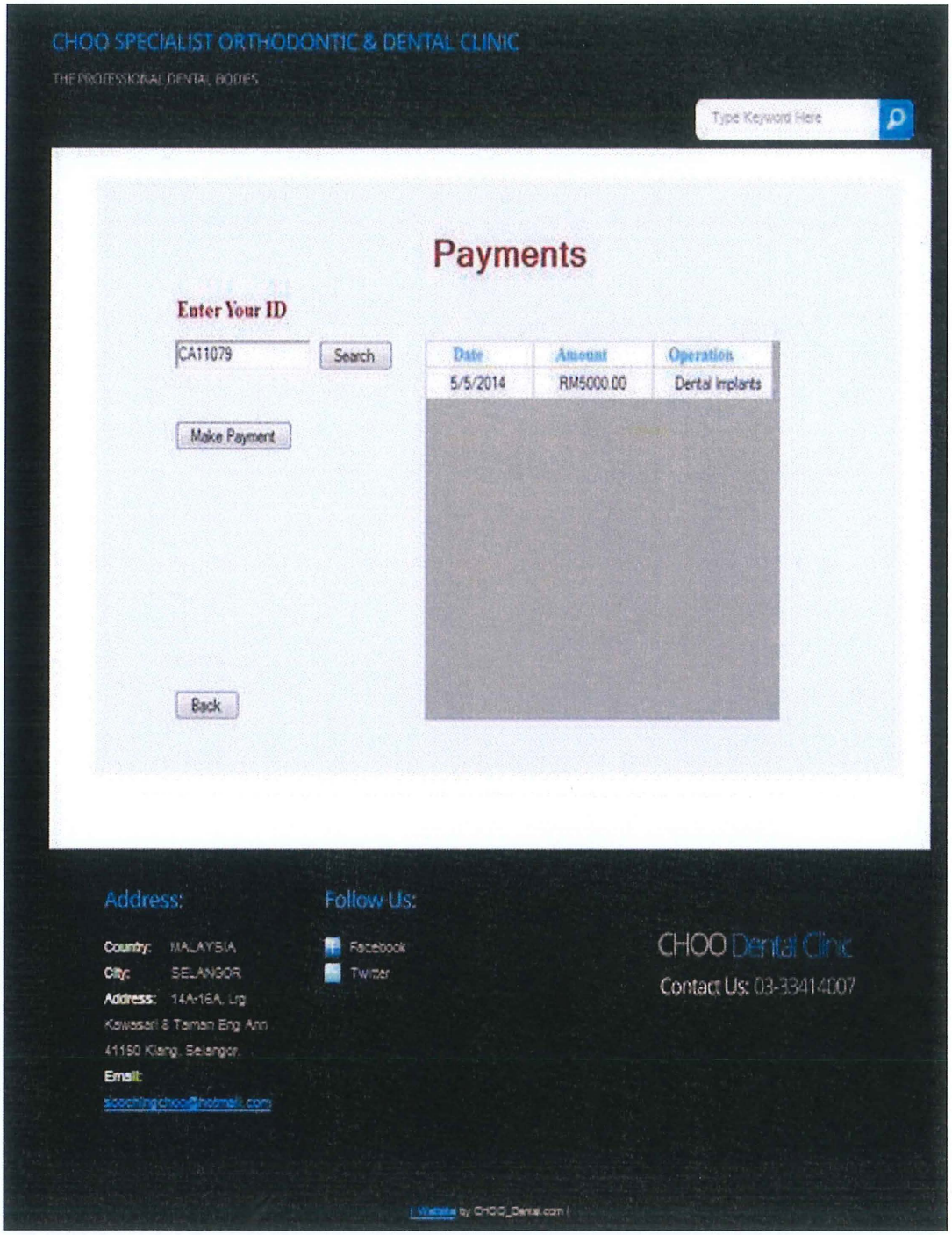


Figure 26: Make payment page for the Online Dental Management System (ODMS)

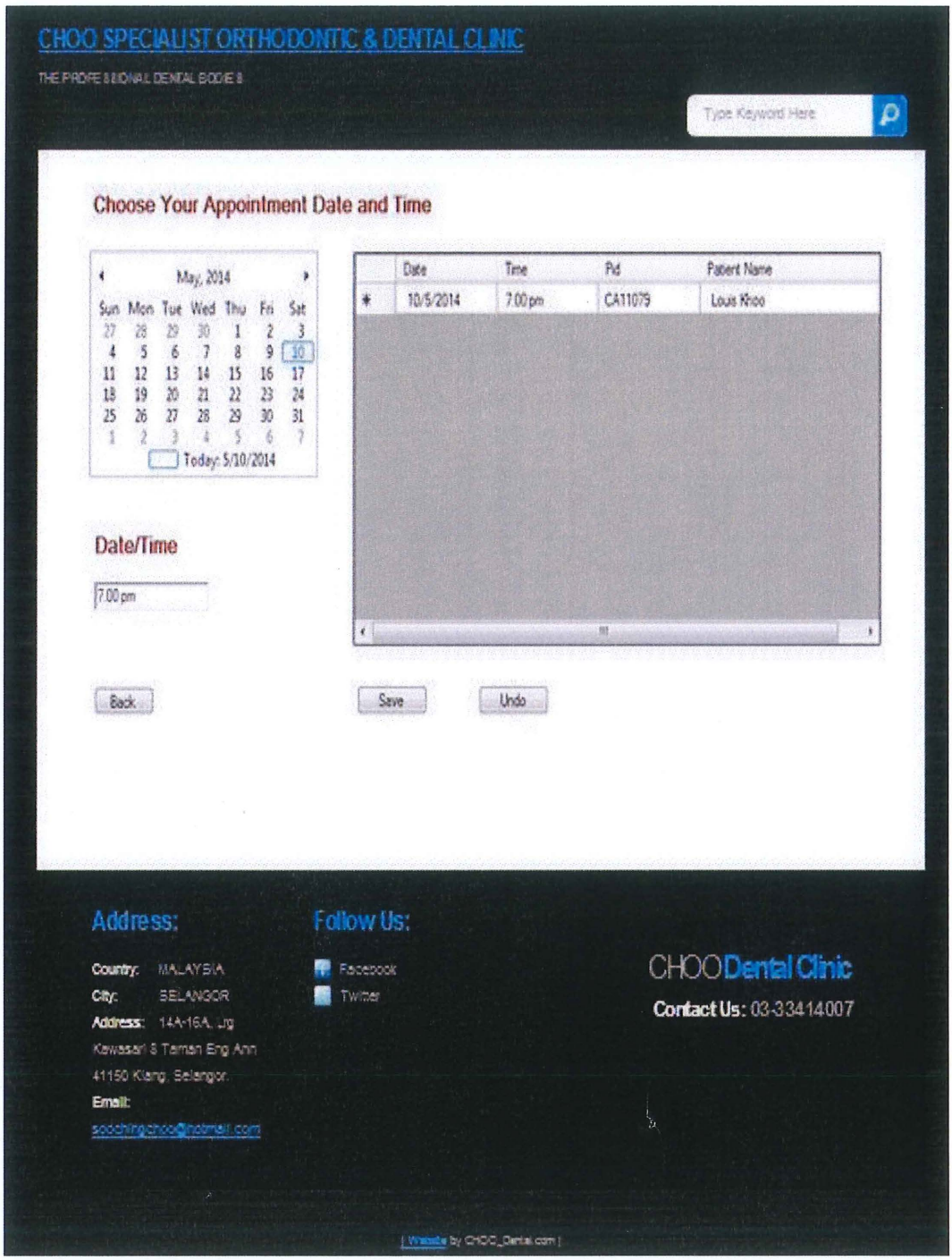


Figure 27: Make appointment page for the Online Dental Management System (ODMS)

2.5 DEVELOPMENT PLAN

2.5.1 Review on the tools used for project development

HTML

HTML stands for hypertext markup language. This project is a web-based application, hence HTML is appropriately chosen for displaying the system interfaces on the web browser. HTML elements form the building blocks of all websites and it allows images and objects to be embedded and also can be used to create interactive forms. Besides, it able to create structured documents by implying the structural semantics for text such as headings, paragraphs, links and other items. In addition, scripts languages such as JavaScript (JS) can also be embedded and thus make the HTML web pages become more attractive.

PHP

PHP stands for hypertext preprocessor. PHP is a server-side scripting language which is designed for web development and it also can be used as a general-purpose programming language. PHP codes are executed on a web server which will then generated the resulting web page on web browser. The PHP files can contain text, HTML, CSS and also JavaScript and can support wide range of database. In this project, the system is developed by using the PHP as the main scripting language.

CSS

CSS stands for cascading style sheets. CSS is a style sheet language used to formatting the document written in markup language. CSS is designed to enable the separation of document content included elements such as colors, fonts, and so on. The external style sheets can enable multiple pages to share the same formatting and save a lot of work for developers. In this project, CSS is used to formatting the document written in HTML to improve content accessibility and reduce the complexity of the document content.

JS

JS stands for JavaScript. JS is used to add functionality towards a web page by adding interactivity with the webpage, such as forms validation, communicate with the MySQL database and so on. JS give ability for user to make changes towards item with multiple type of event handling. In this project, JS is used to add the functionality of the system by use the event handling from the JS library.

MySQL

MySQL is a widely used open-source relational database management system (RDBMS) where the SQL is stands for structured query language. The database used in this project is MySQL by integrated with third party proprietary and free graphical administration applications which is phpMyAdmin.

2.6 SOFTWARE AND HARDWARE TOOLS

This section will list out the software and hardware that are used for project development.

2.6.1 Software Tools

Software Tools	Purpose
Notepad	Coding.
Snipping Tools	Snipping image for print screen photo.
Microsoft Office Word 2007	Documentation the project.
Microsoft Office Power Point 2007	Present the project.
Microsoft Office Visio 2007	Drawing and mapping charts.
Microsoft Office Project 2007	Drawing Gantt chart and planning project.
Google chrome	Searching information.
phpMyAdmin (MySQL)	Database platform.

Table 8: Software Tools

2.6.2 Hardware Tools

Hardware Tools	Specification	Purpose
Laptop	Type : Dell Name : Dell Inspiron N5110 Processor : Intel® Core™ i7-2630QM RAM : 4.00 GB System type : 64-bit Operating System Clock speed : 2.00 GHz	• Research Searching. • System platform to run the application software. • Main tool for overall project development.
Printer	Type : Canon Name : Canon MP 110	• Printing documentation

Table 9: Hardware Tools

2.7 SYSTEM IMPLEMENTATION

This section is explaining about the development of the designed Online Dental Management System (ODMS) based on the design and development plan in previous section which are included the system module, interface design and database creation. The system modules which are going to discuss in this part are included home page module, user login module, administrator/receptionist login module, administrator main menu module (patient basic info, appointments, and teeth illustration chart), receptionist main menu module (patient basic info, appointments, and treatment payment) and also basic user main menu module (patient basic info, appointments and patient feedback).

2.7.1 Interface Design

In developing a system, the system interface is one of the important aspects that the developer should bear in mind as the interface will act as a medium for interaction between user and system to produce the input and output of the system thus a user-friendly system interface should be designed. The input of the system is allowing the user to manipulate the system and the system will produce the output based on the manipulation of the user. The programming languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript (JS) are used in developing the system interface of this Online Dental Management System (ODMS).

2.7.2 System Modules

2.7.2.1 Home Page

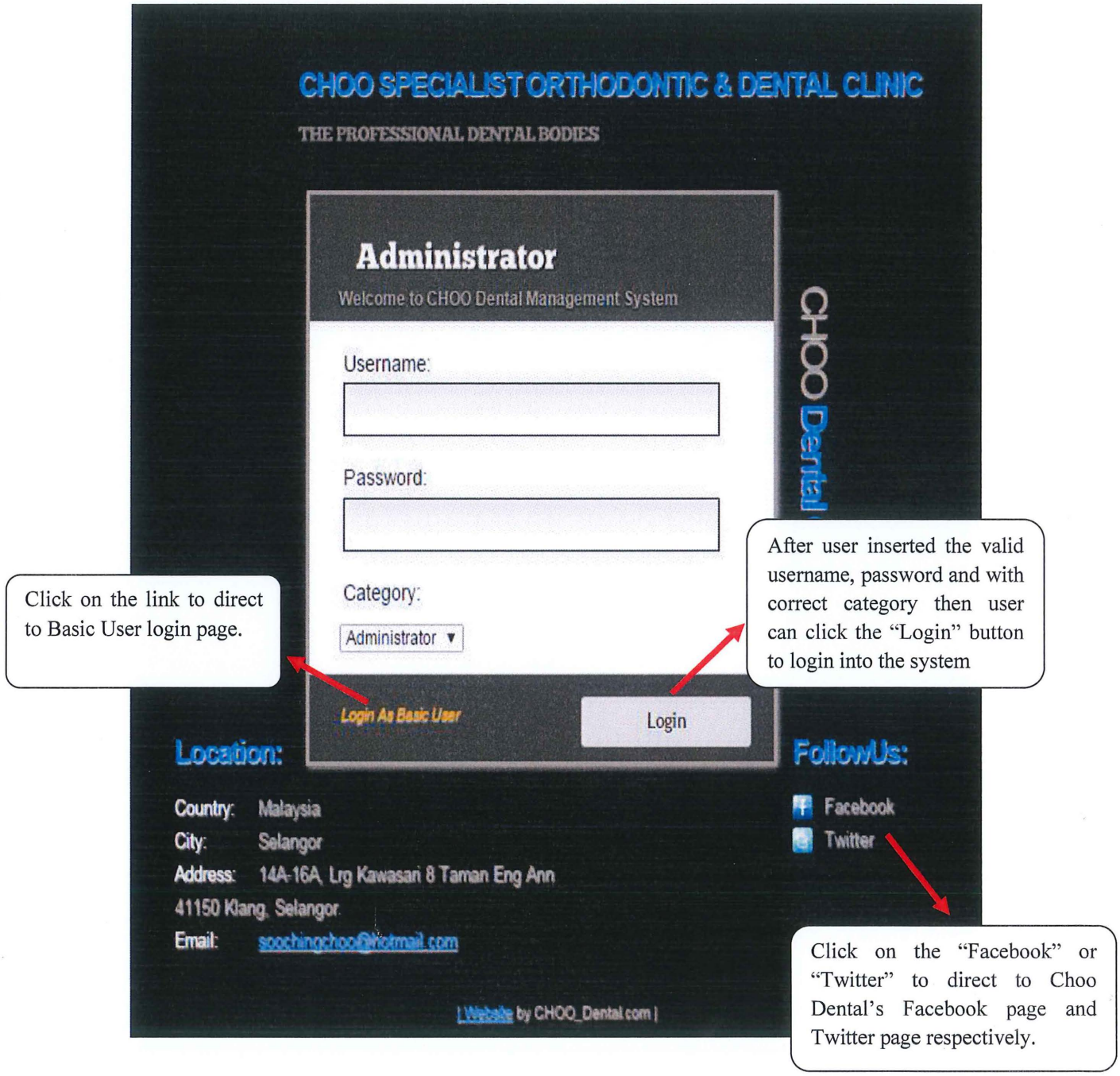


Figure 28: Home page for the Online Dental Management System (ODMS)

2.7.2.2 Basic User Login Page

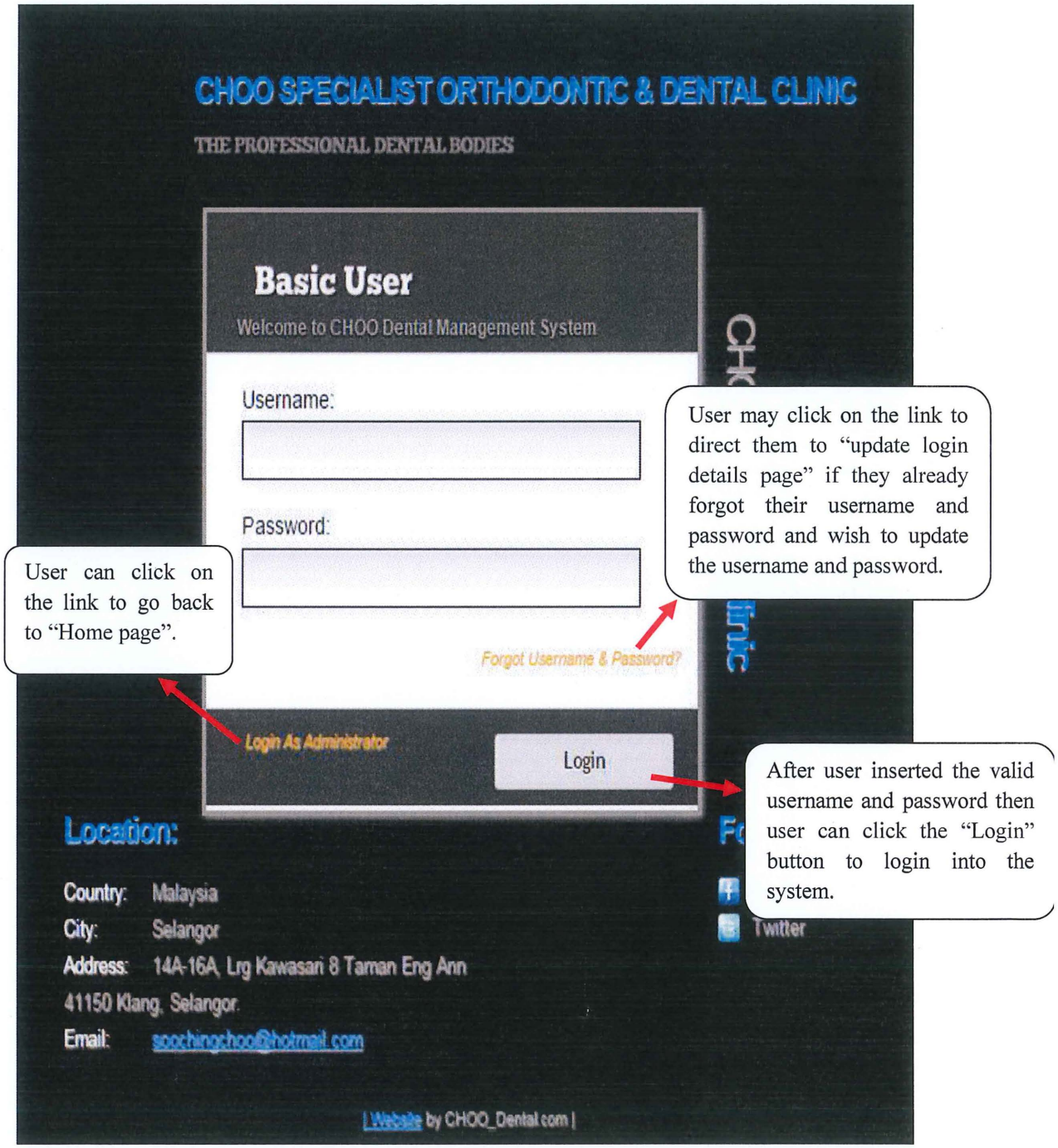


Figure 29: Basic User login page for the Online Dental Management System (ODMS)

2.7.2.3 Update Login Details Page

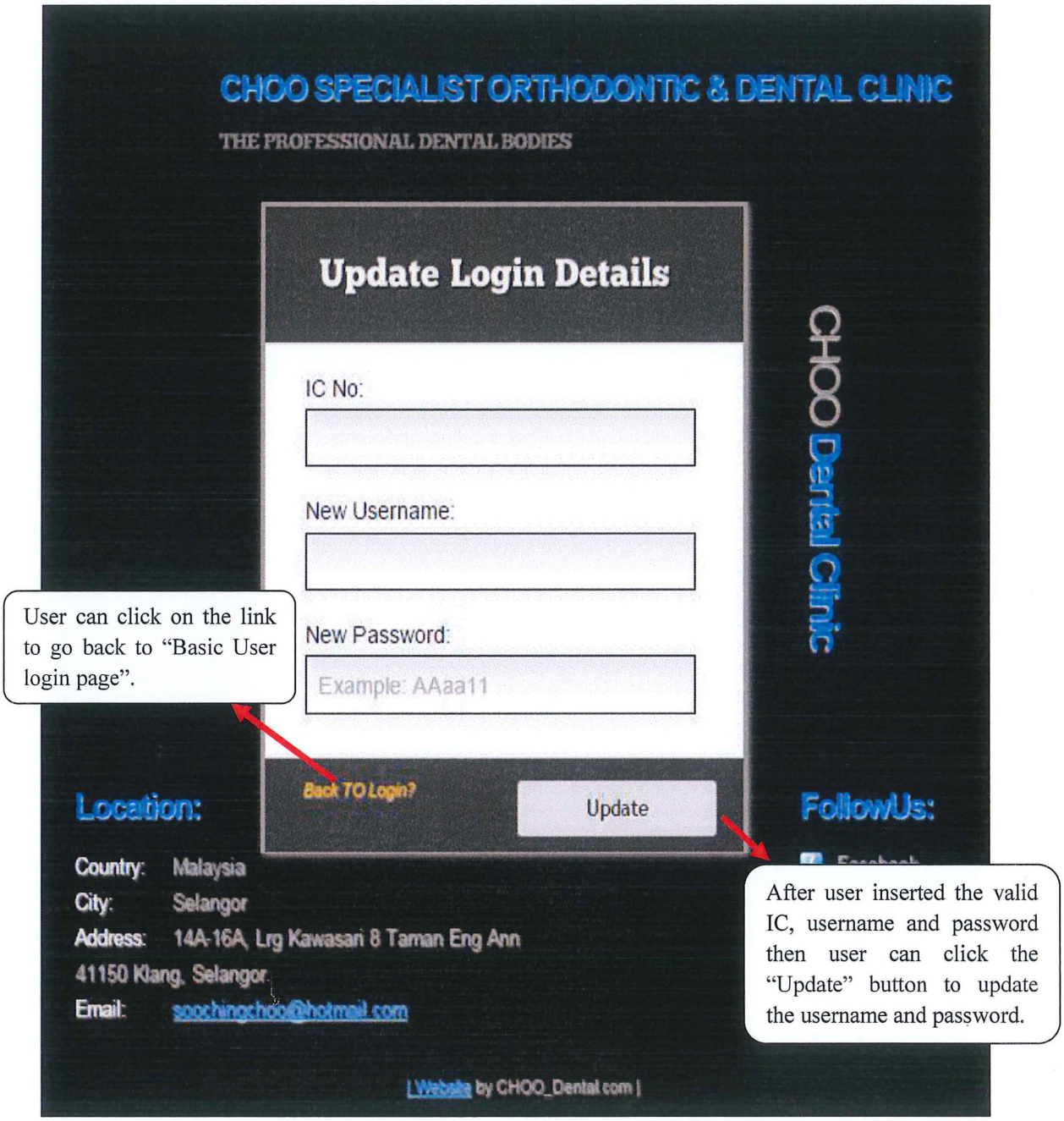


Figure 30: Update login details page for the Online Dental Management System (ODMS)

After the username and password have updated successfully, a message box as the figure below will shown.

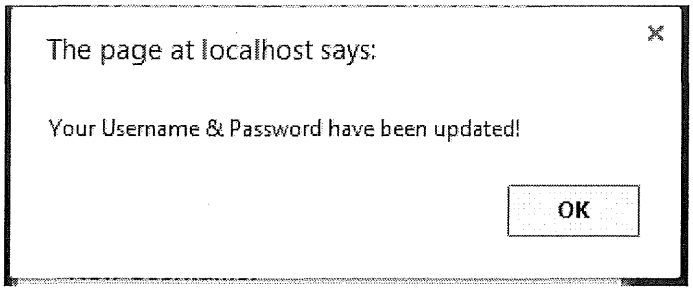


Figure 31: Update successfully message box.

For the administrator login page, an error message box as the figure below will be shown if the user inserted incorrect username, password and category .

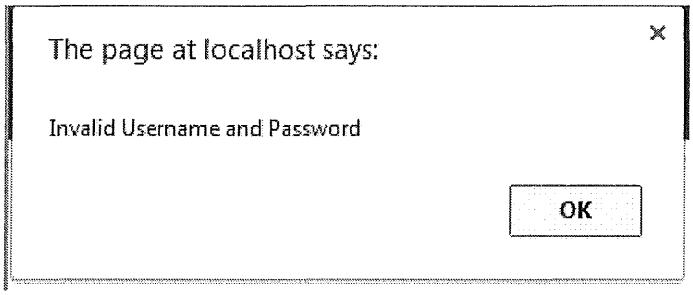


Figure 32: Login failure message box.

For the basic user login page, an error message box as the figure below will be shown if the user inserted incorrect username or password.

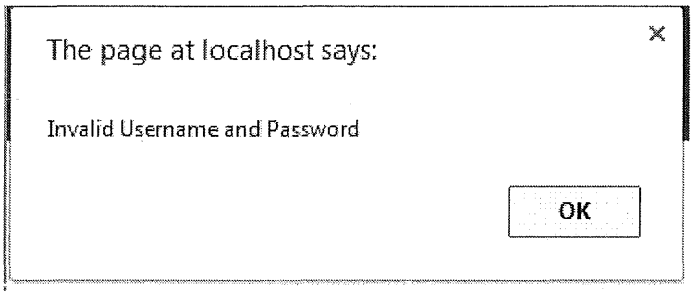


Figure 33: Login failure message box.

2.7.2.4 Basic User Welcome Page

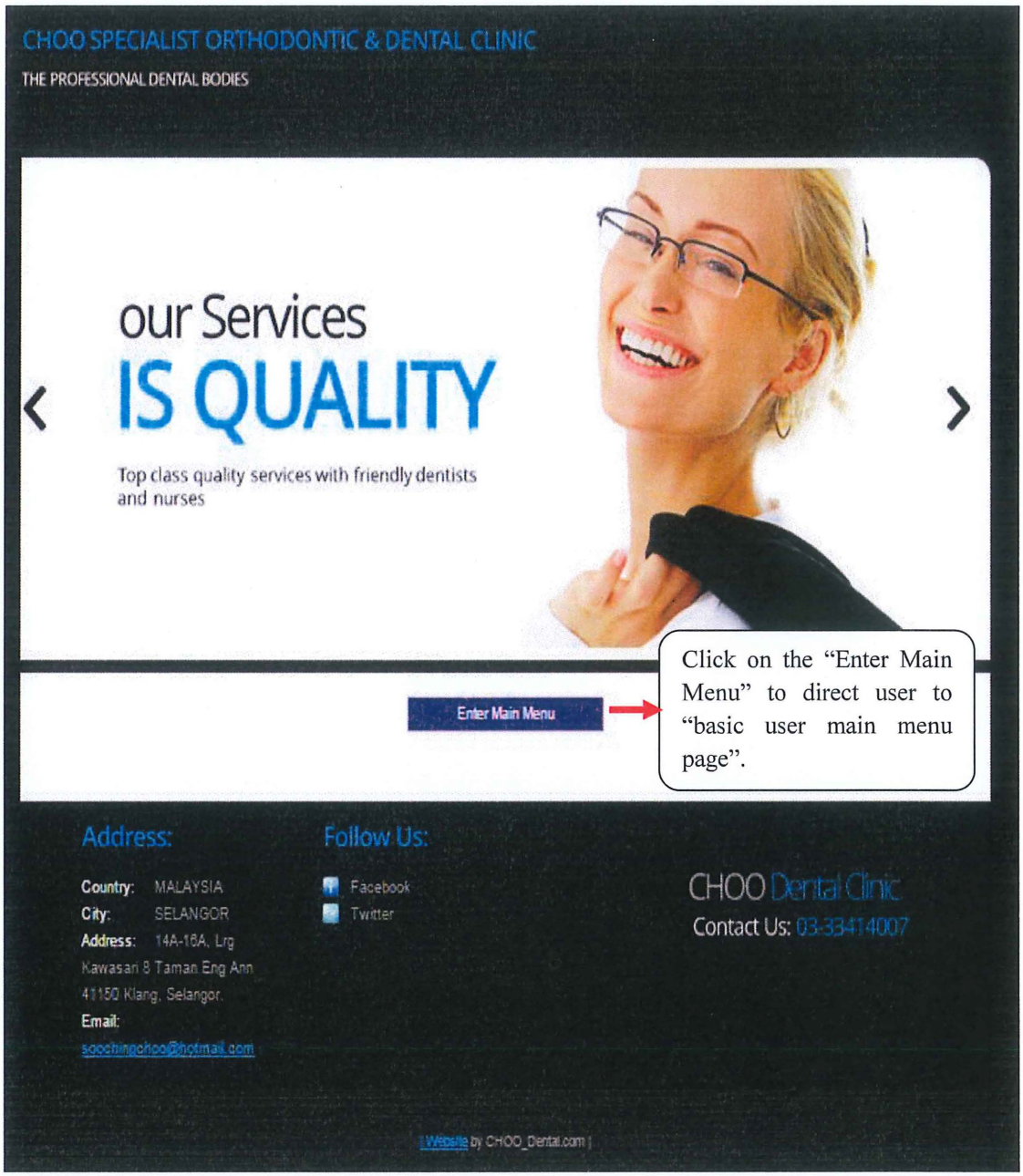


Figure 34: Basic user welcome page for the Online Dental Management System (ODMS)

2.7.2.5 Basic User Main Menu Page

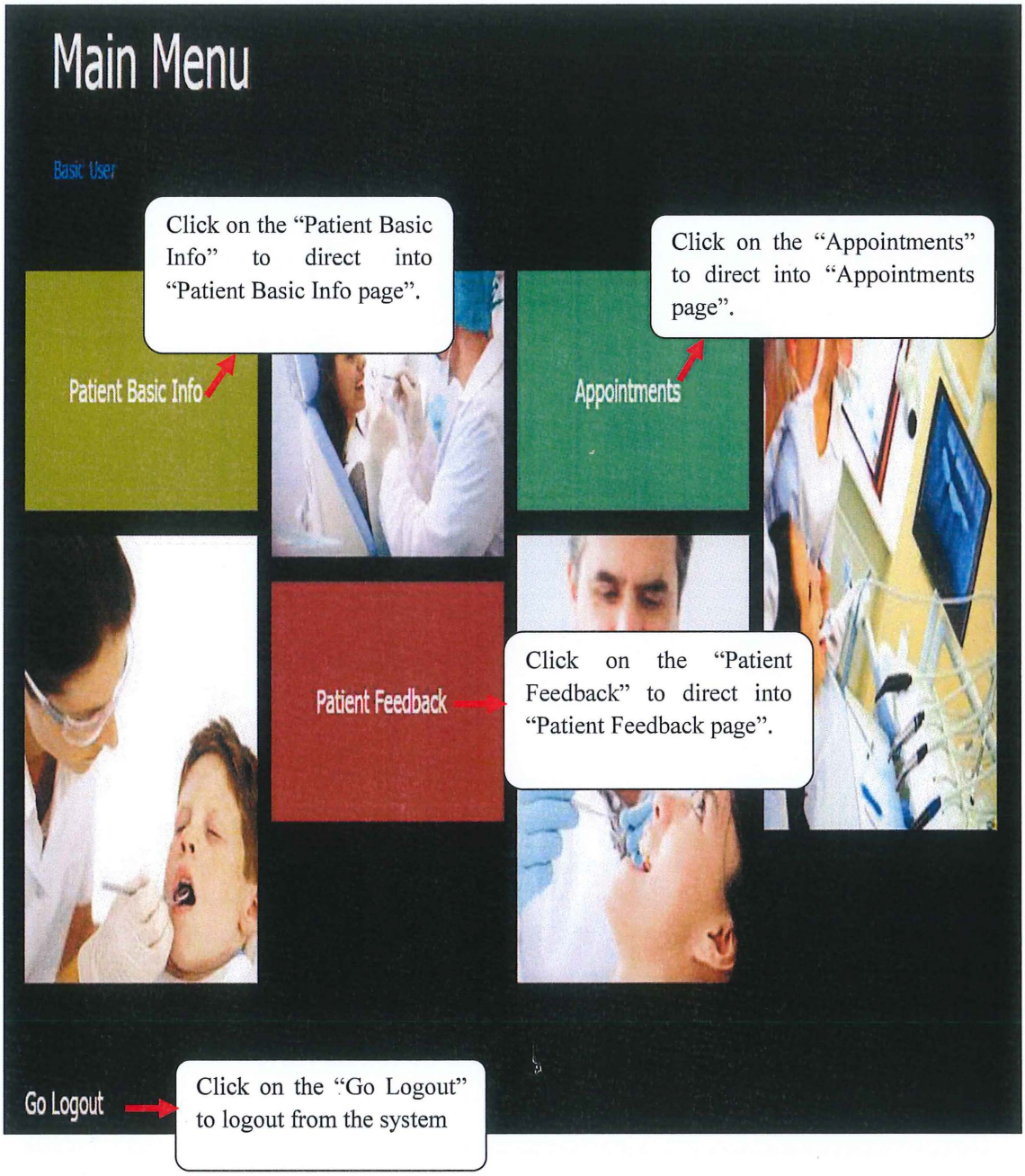


Figure 35: Basic user main menu page for the Online Dental Management System (ODMS)

2.7.2.6 Basic User Patient Basic Info Page

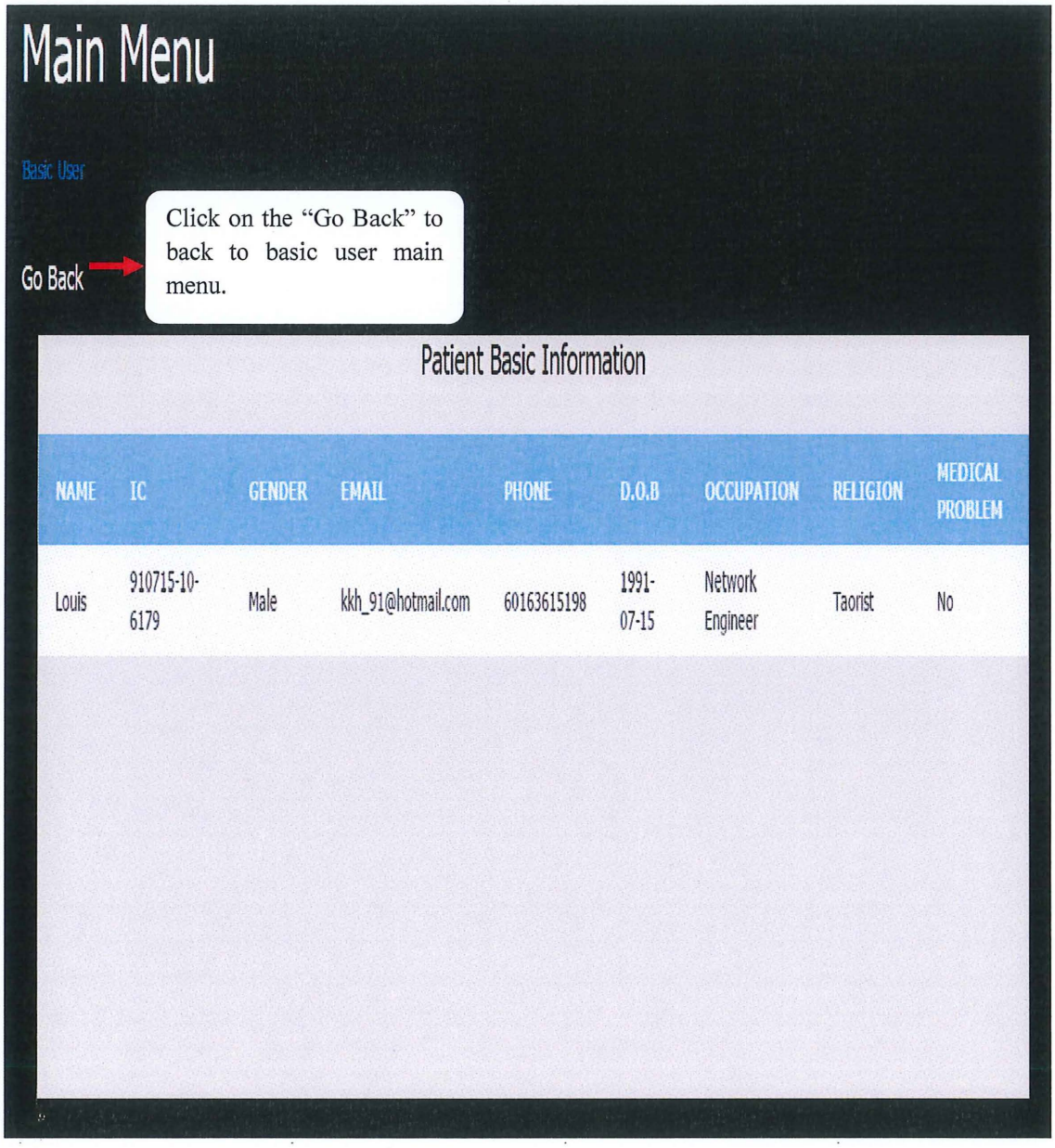


Figure 36: Basic user patient info page for the Online Dental Management System (ODMS)

2.7.2.7 Basic User Appointments Page

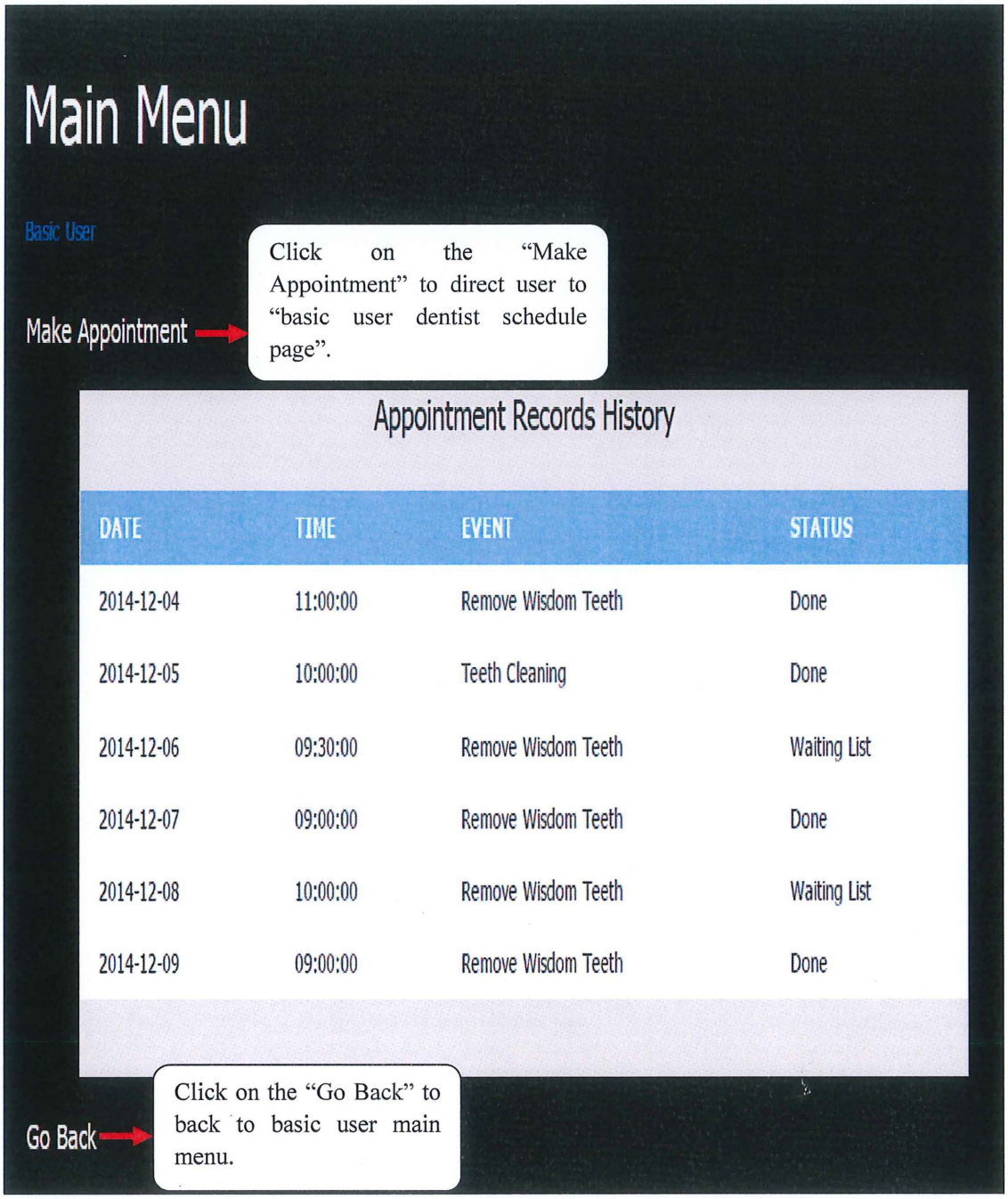


Figure 37: Basic user appointments page for the Online Dental Management System (ODMS)

2.7.2.8 Basic User Dentist Schedule Page

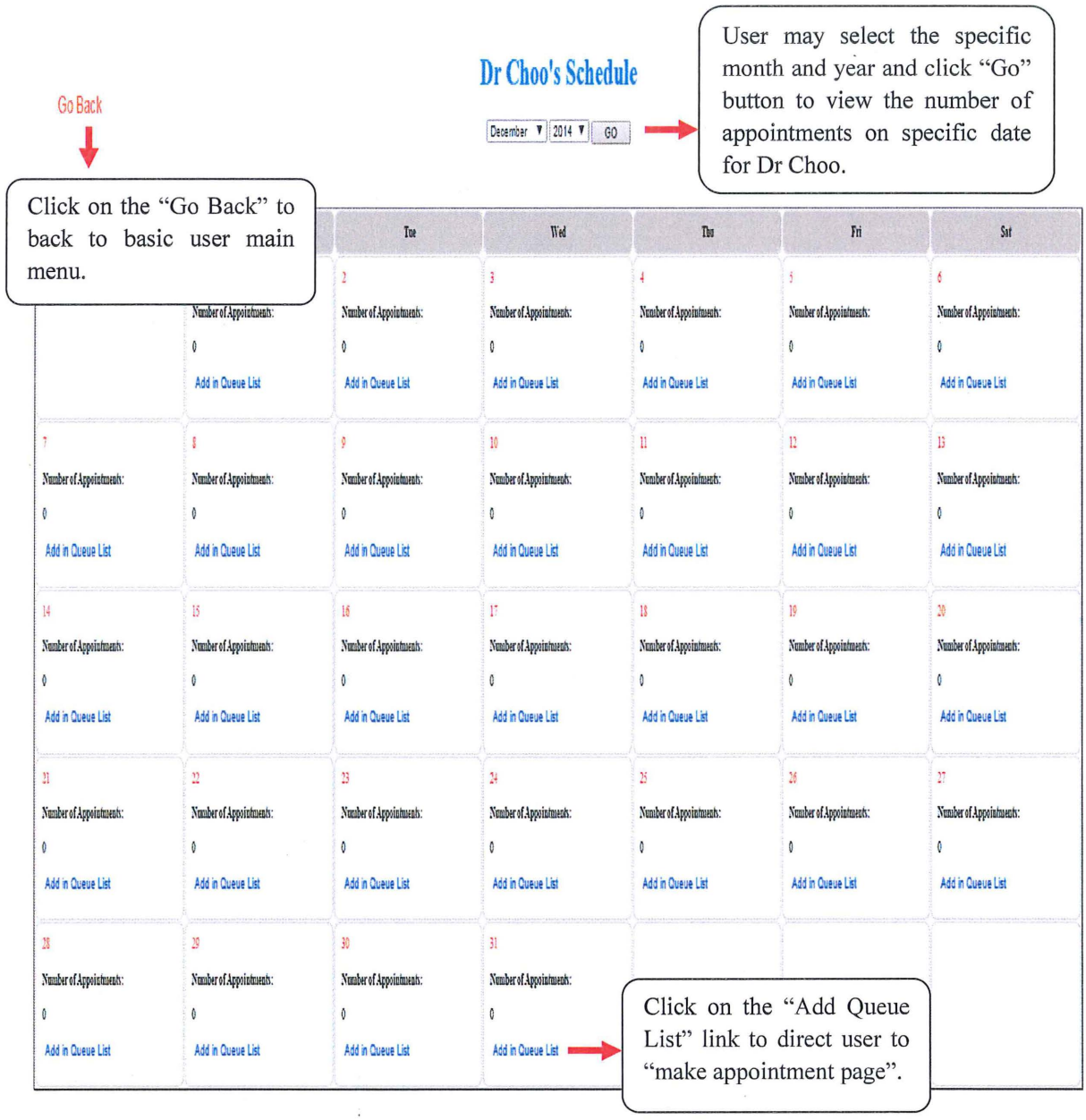


Figure 38: User dentist schedule page for the Online Dental Management System (ODMS)

2.7.2.9 Basic User Make Appointment Page

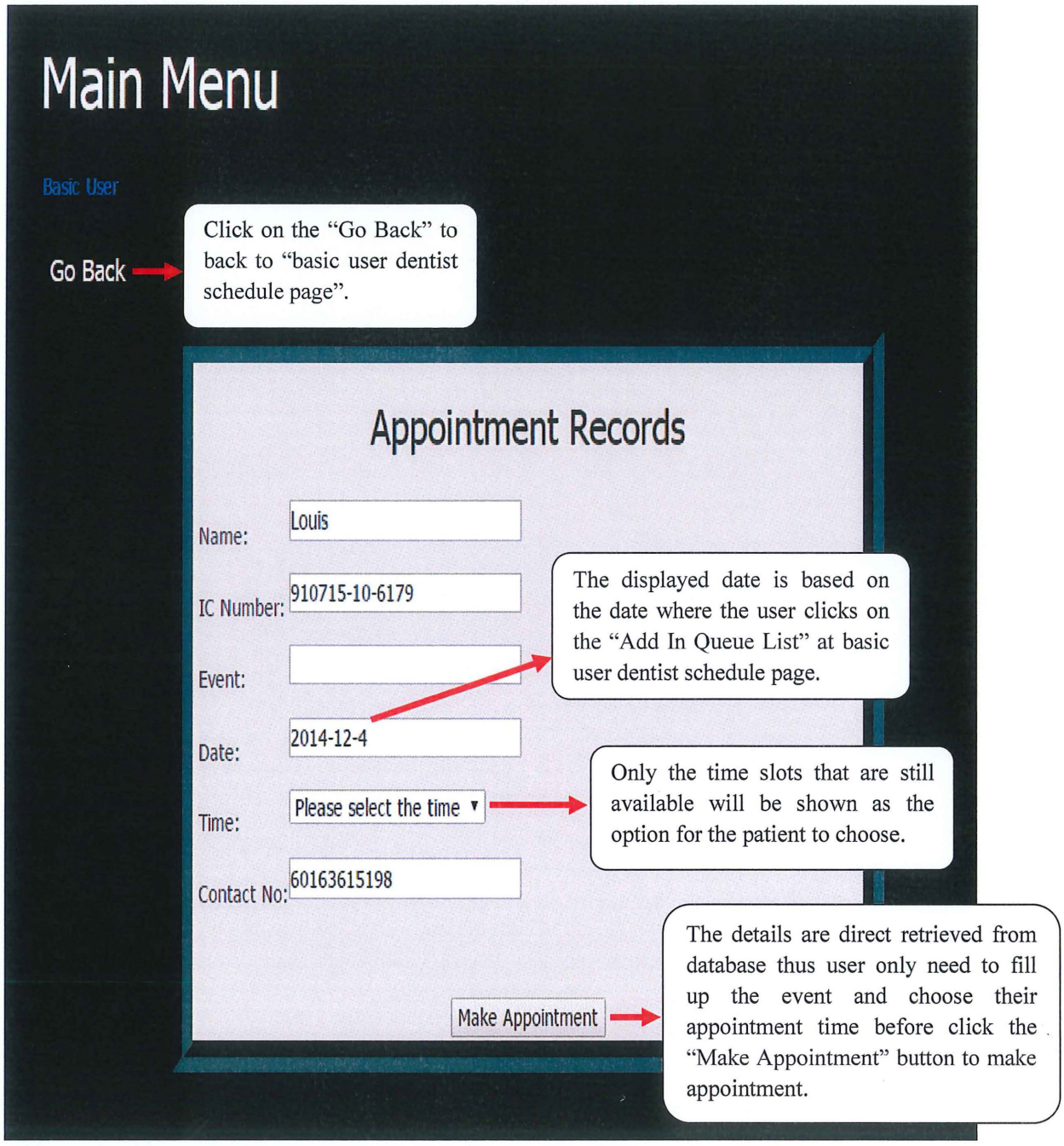


Figure 39: User make appointment page for the Online Dental Management System (ODMS)

Firstly, the system will check the date and time for that specific patient and if the patient never do appointment on that specific date and time then only allow the patient to make the appointment and a message box as the figure below will shown.

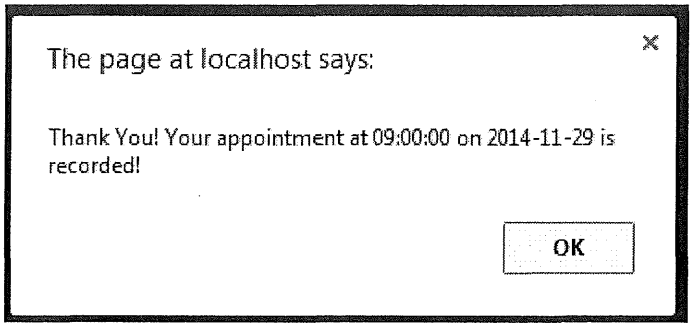


Figure 40: Message box which shown after user successfully make the appointment and the user will be notify with the date and time for his/her newly added appointment.

If the system realised that this patient already got his/her appointment in the database then an error message box as below will be shown.

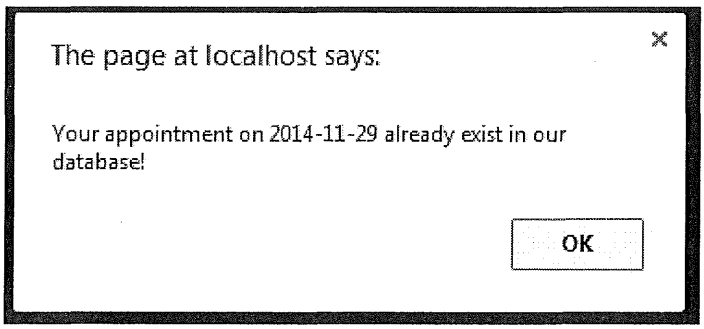


Figure 41: An error message box that notify user on exist appointment on that specific date.

2.7.2.10 Basic User Patient Feedback Page

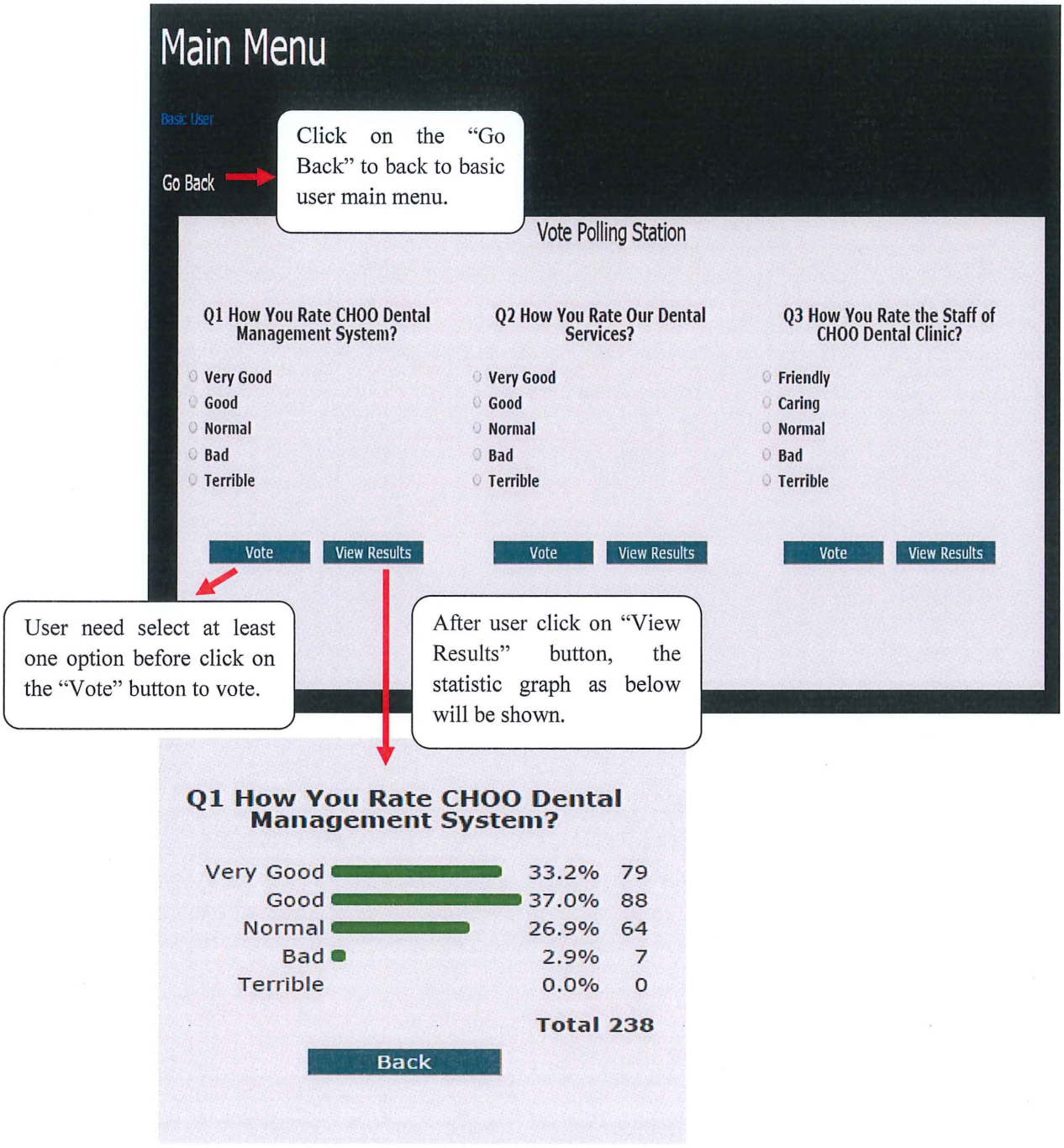


Figure 42: User patient feedback page for the Online Dental Management System (ODMS)

2.7.2.11 Administrator Welcome Page

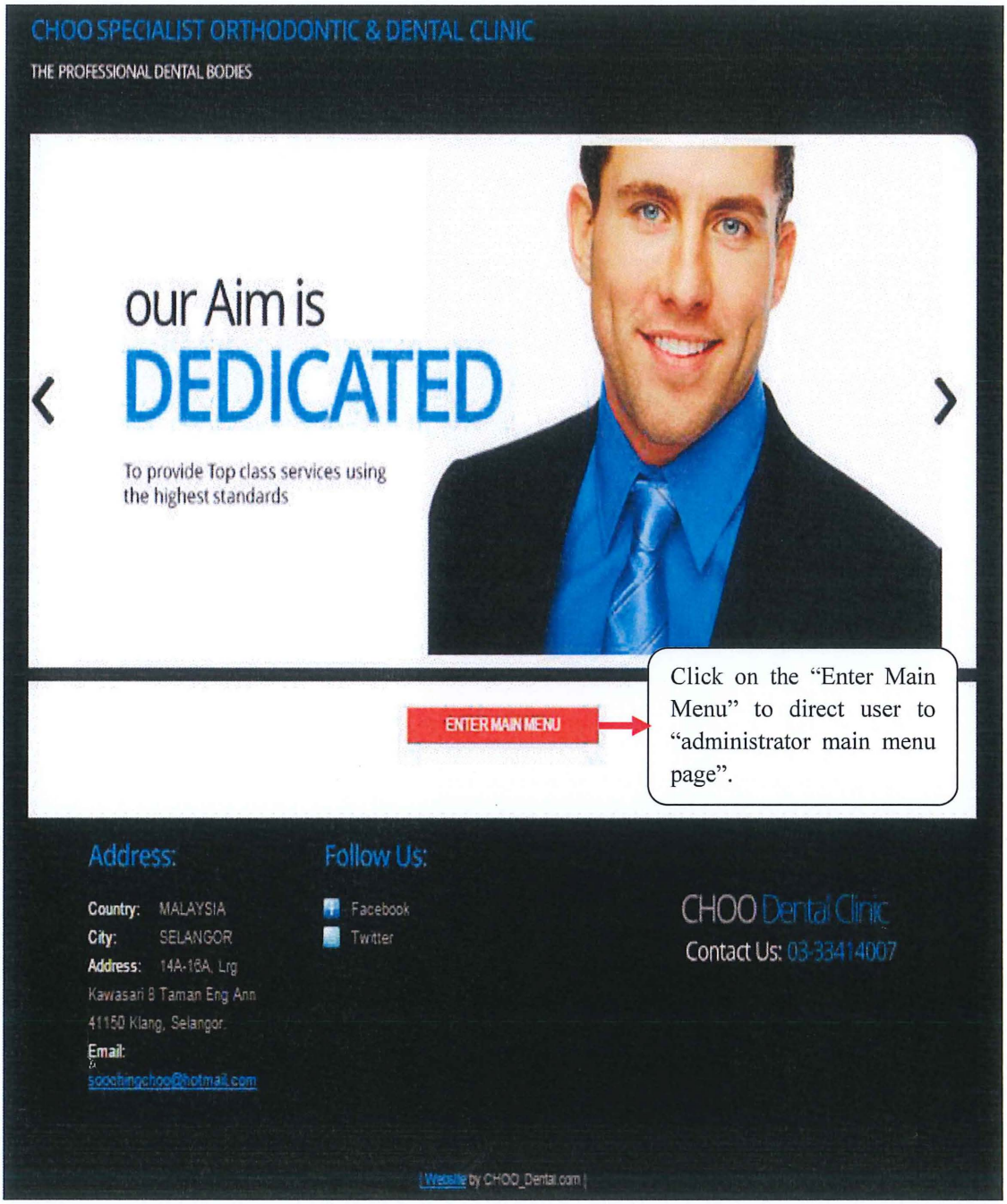


Figure 43: Administrator welcome page for the Online Dental Management System (ODMS)

2.7.2.12 Administrator Main Menu Page

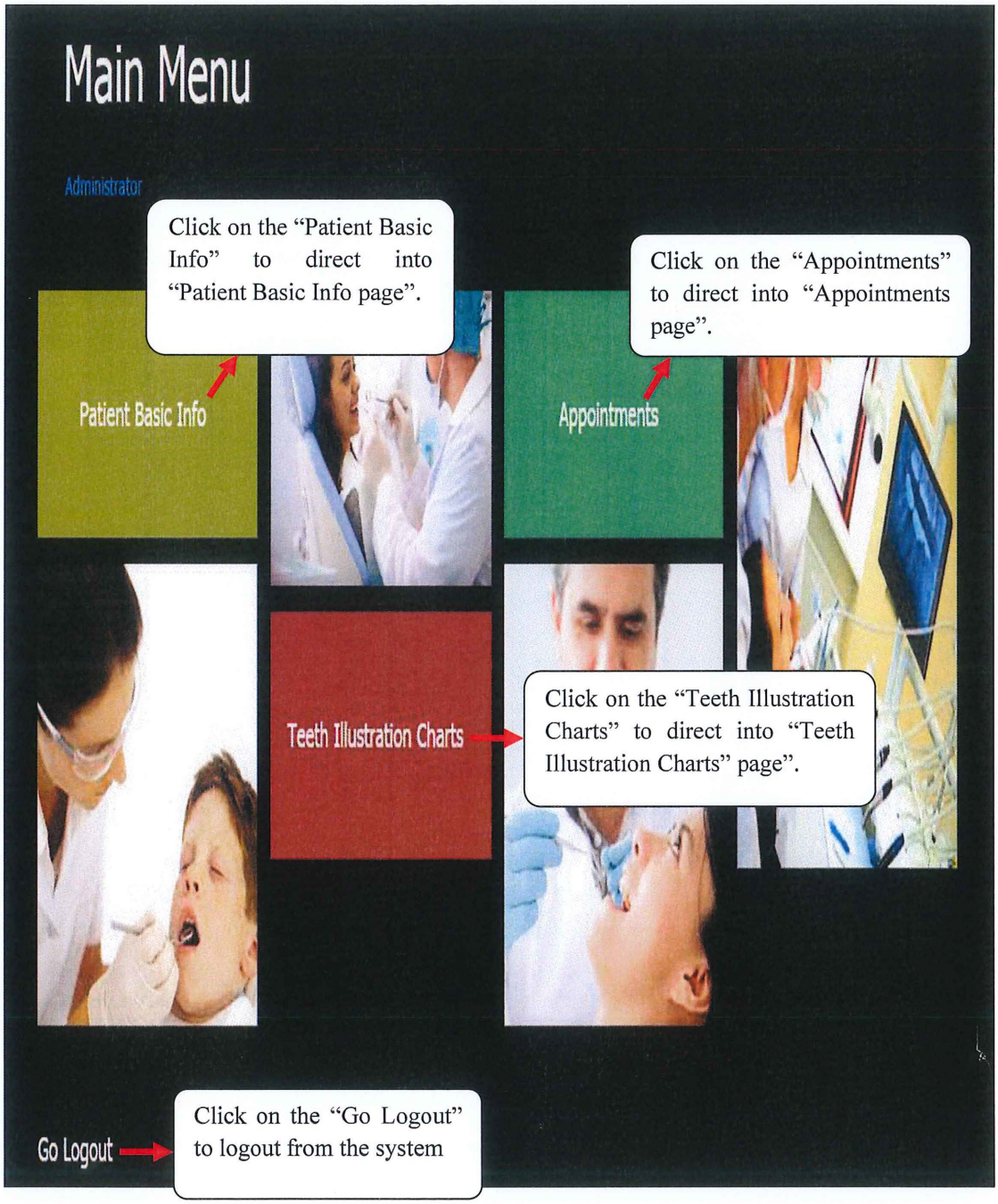


Figure 44: Admin main menu page for the Online Dental Management System (ODMS)

2.7.2.13 Administrator Patient Basic Info Page

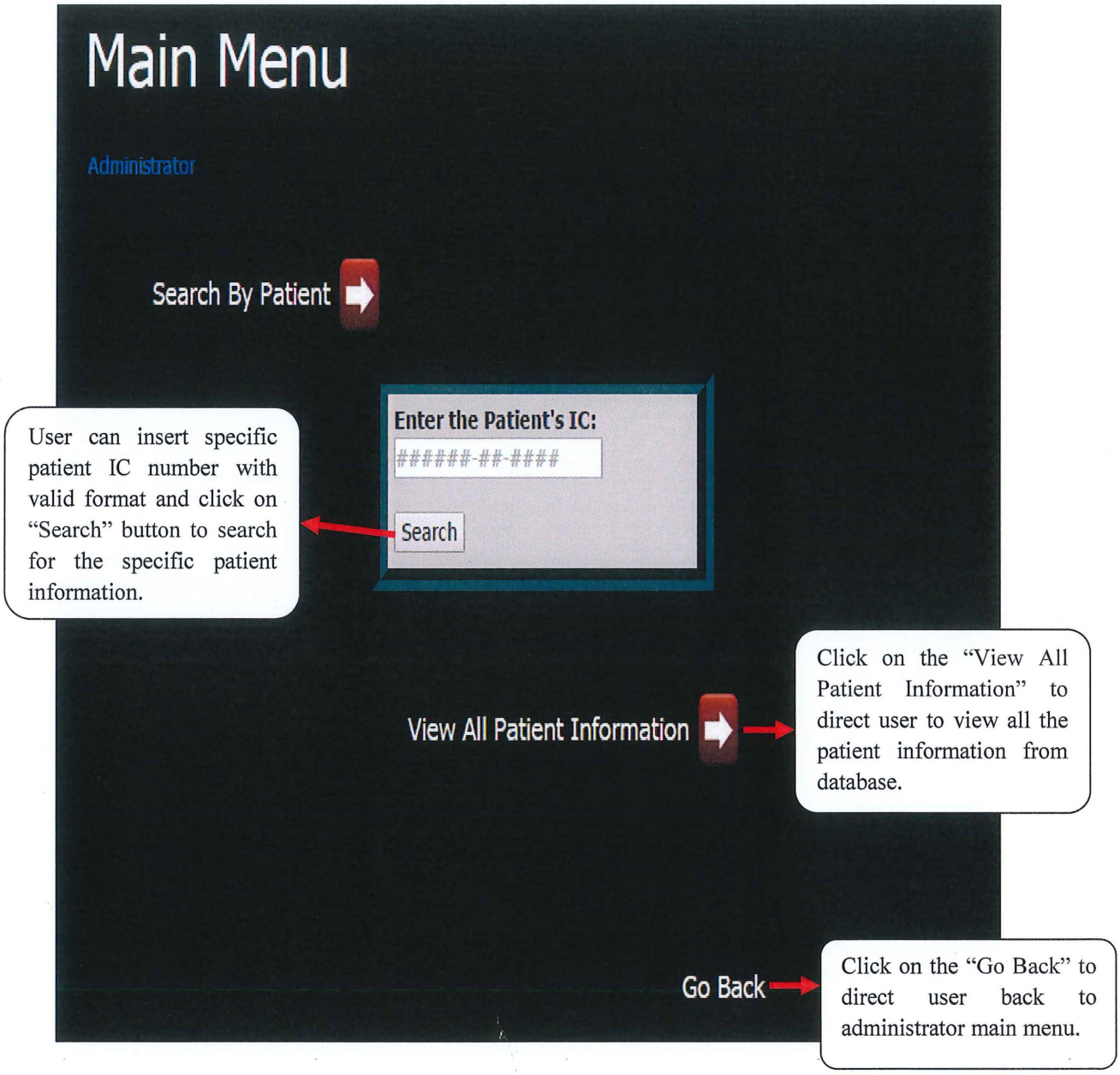


Figure 45: Admin patient basic info page for the Online Dental Management System (ODMS)

For the "Search by patient", if the user inserted correct and valid IC number then the figure as below will be shown.

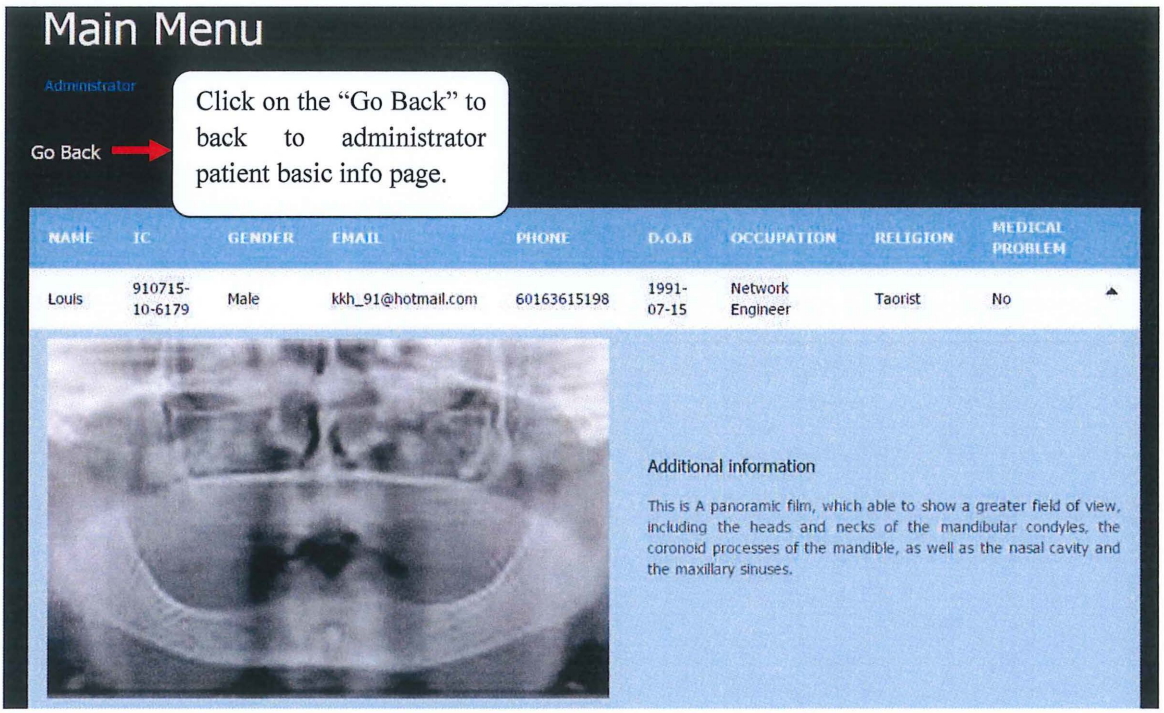


Figure 46: Figure displayed the patient information with the IC number of "910715-10-6179".

However if the user inserted incorrect and invalid IC number then the error message box as figure below will be shown.

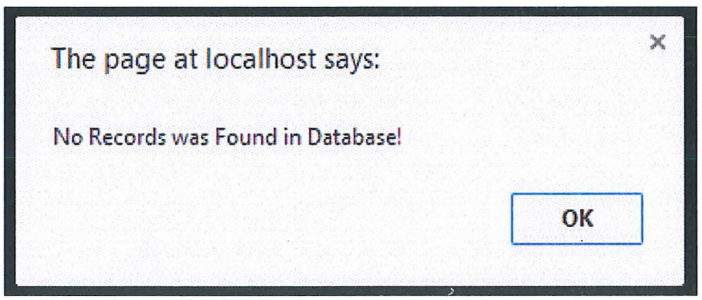


Figure 47: Error message box that notify user no records was found for the inserted IC number.

The figure as below will be shown after user click on the "View All Patient Information" button.

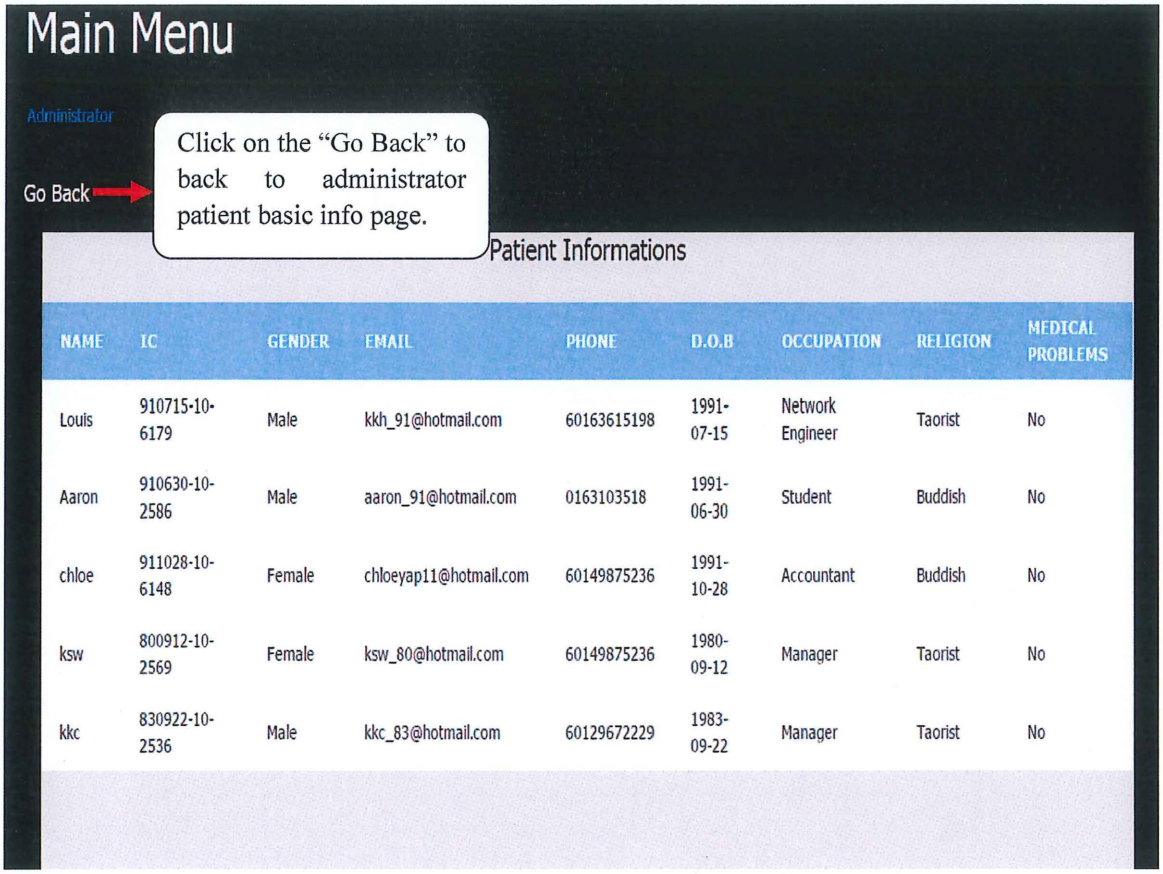


Figure 48: This figure shown all the patient information which retrieved from database.

2.7.2.14 Administrator Appointments Page

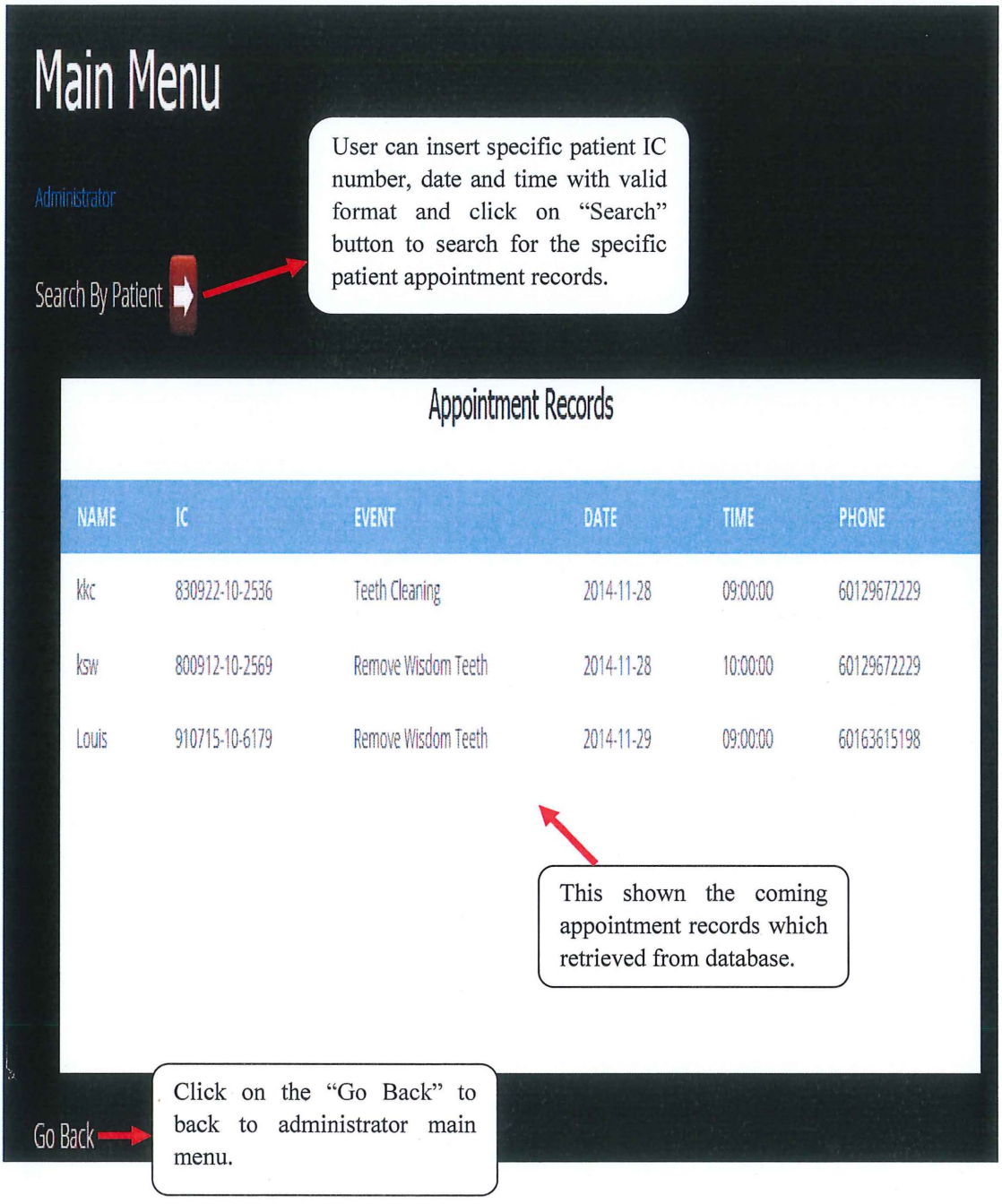


Figure 49: Admin appointments page for the Online Dental Management System (ODMS)

For the "Search by patient", if the user inserted correct and valid IC number, date and time then the figure as below will be shown.

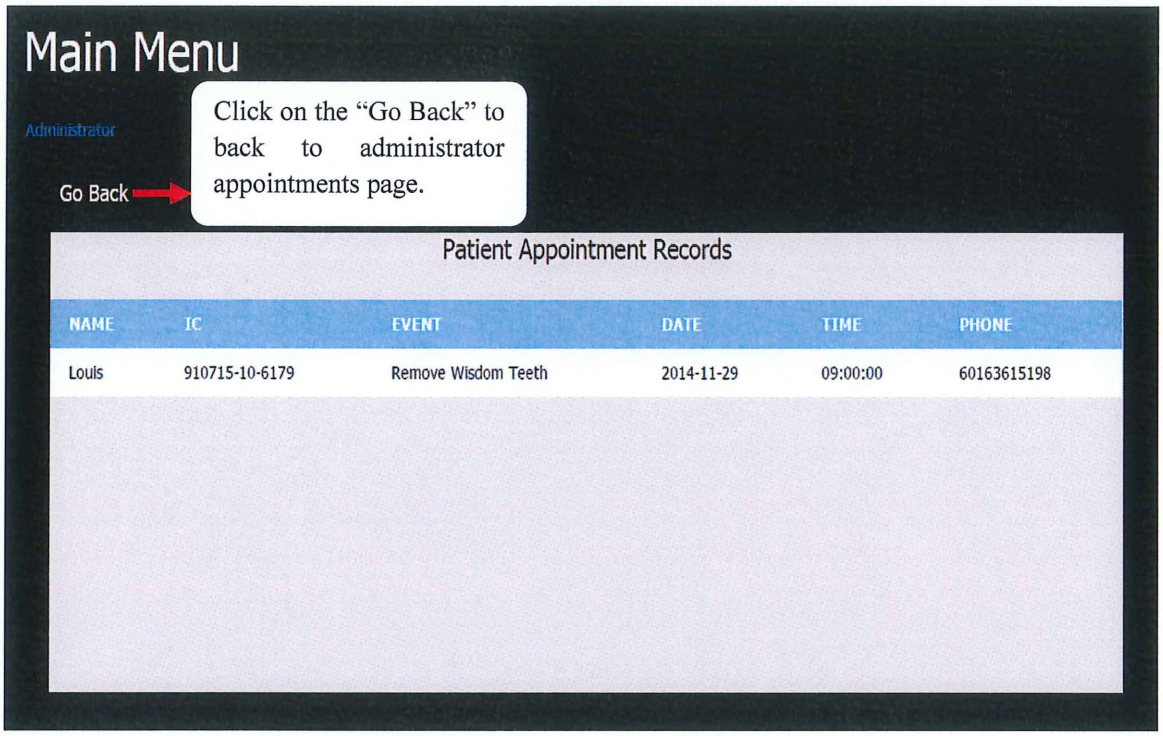


Figure 50: This figure had shown the appointment records with the IC number of "910715-10-6179" at 9am on 29-11-2014.

However if the user inserted incorrect and invalid IC number, date and time then the error message box as figure below will be shown.

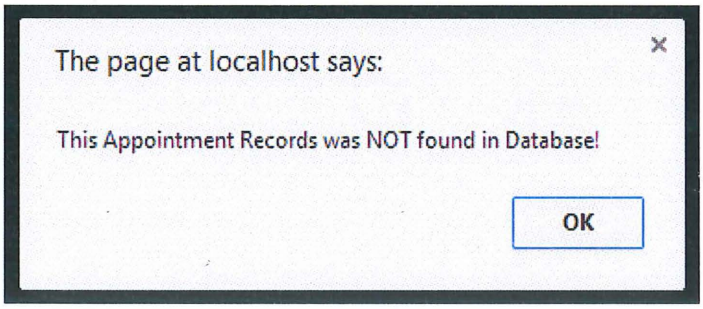


Figure 51: Error message box notify user this appointment records was not found in database.

2.7.2.15 Administrator Teeth Illustration Chart Page

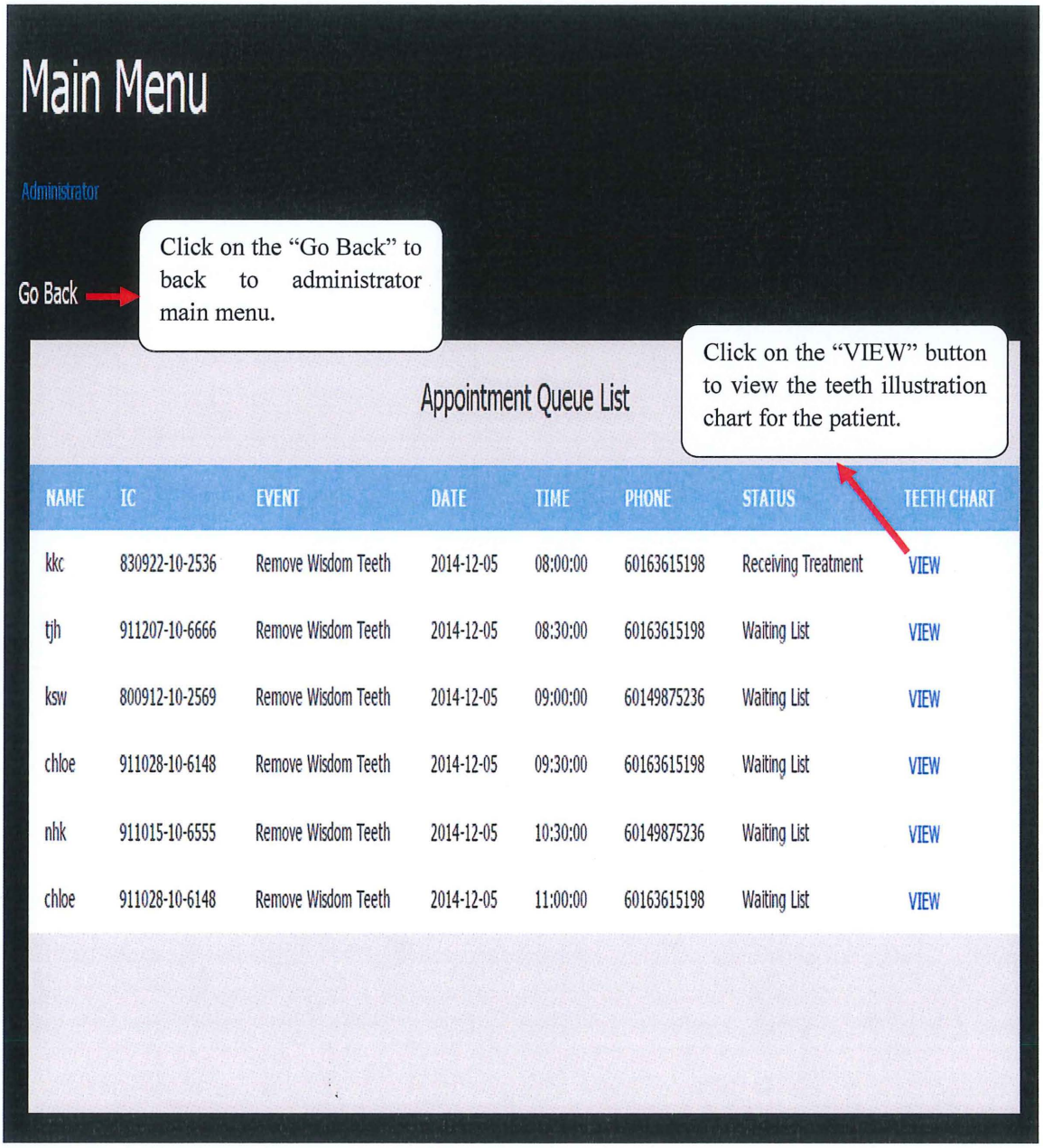


Figure 52: The page that displayed after the user click on "Teeth Illustration Charts".

After the user click on the "VIEW" button as shown in figure 52 then the figure as below will be shown.

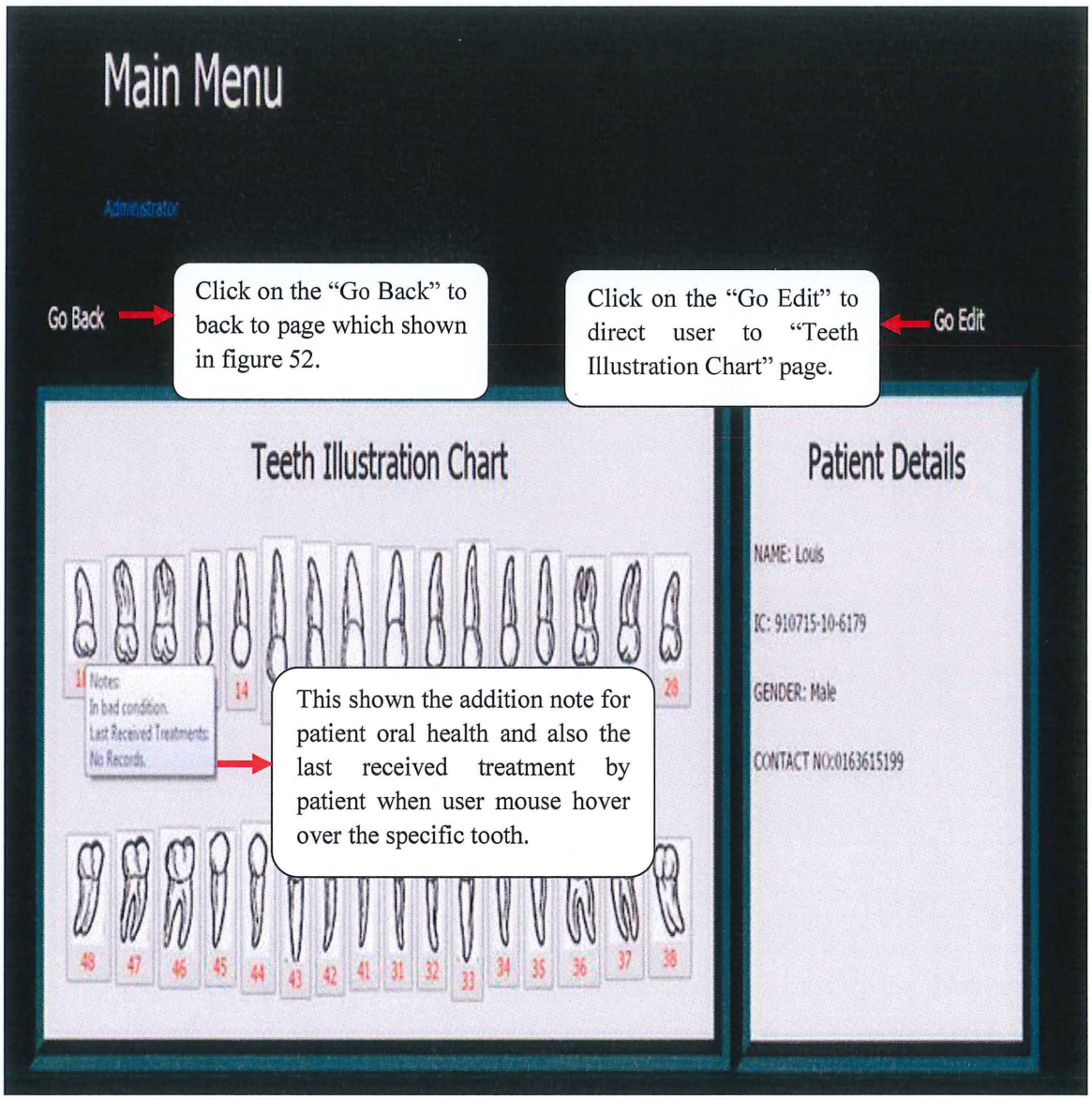
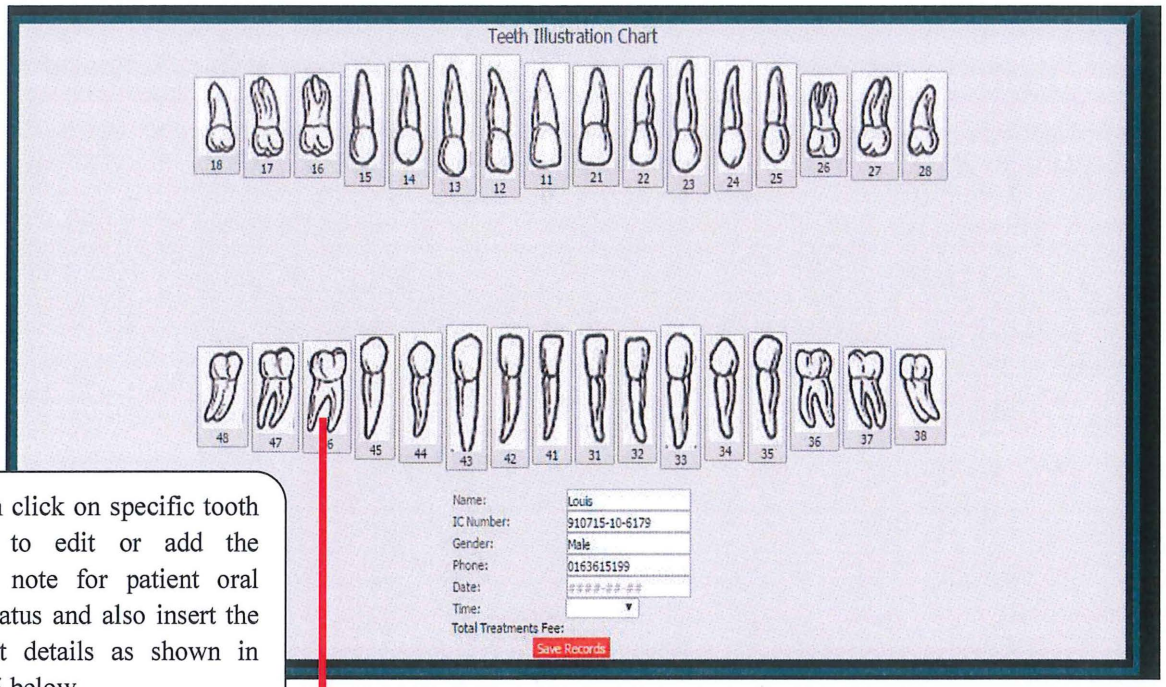


Figure 53: This figure had shown the information for the patient which matched with the inserted IC number.

If the user click on "Go Edit" then the figure as below will be shown.



User can click on specific tooth number to edit or add the addition note for patient oral health status and also insert the treatment details as shown in figure 55 below.

Figure 54: This figure had shown the teeth illustration chart which can be use by dentist to record treatment details and also add or edit addition note for patient oral health status.

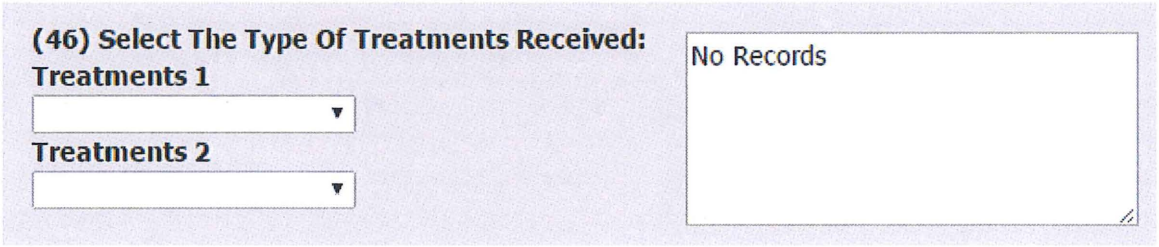


Figure 55: This figure had shown the pop up dropdown list and the textarea after user click on the tooth number 46 in this case.

When the user select the treatments option from the dropdown list, then system will automatically calculate the treatment fees based on the treatment that had been selected by user and display to the user as shown in figure below.

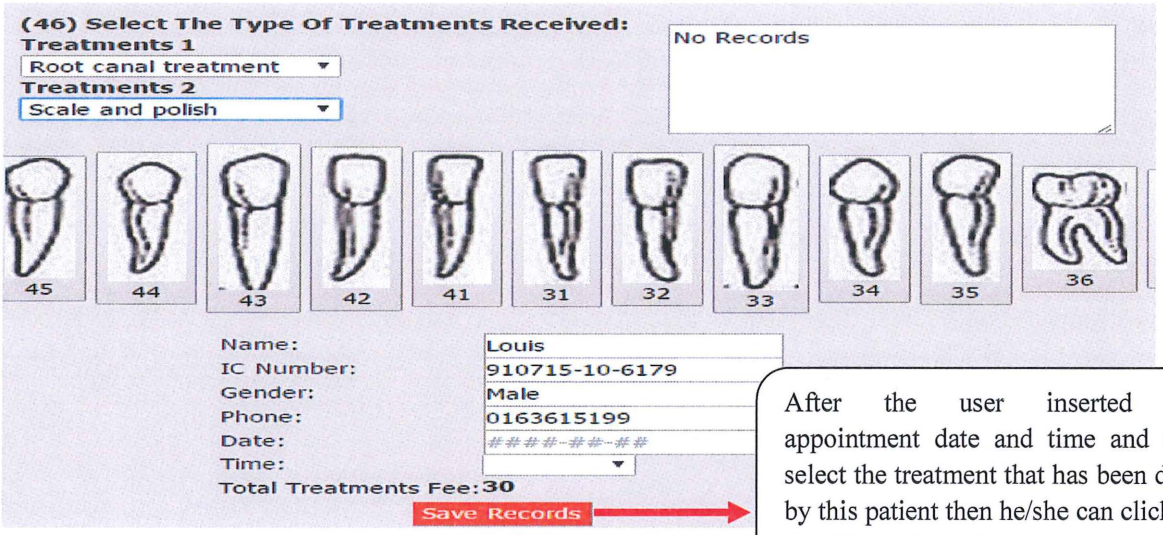


Figure 56: This figure had shown the calculated total treatment fees after the user select the "Root canal treatment" and "Scale and polish" treatment.

Before the system save this record, firstly it will check the appointment table in database to make sure the inserted appointment date and time are found in database and then it will check the treatment table in database to make sure the treatment payment record for this appointment is not found in database. The system will only save the records if only if in the circumstances that meet both condition and the message box as figure below will be shown once the record is saved successfully.

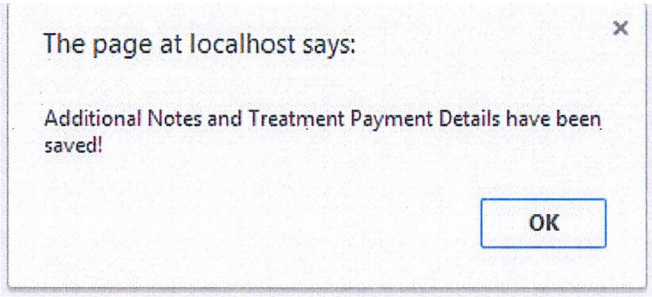


Figure 57: Message box that notify user that the note and treatment details have been saved.

If the inserted appointment date and time was not found in database then the system will only update the addition note for the patient(Louis in this case) oral health status and the message box as figure below will be shown.

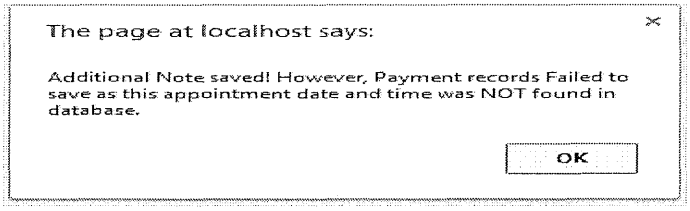


Figure 58: Message box that notify user that the note has been saved but the treatment payment details failed to save as the inserted appointment date and time was not found in the database.

If the system realized there is exist the treatment payment record for the inserted appointment date and time for this patient (Louis in this case) then an error message box as below will be shown.

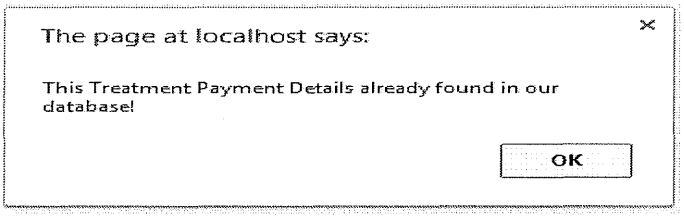


Figure 59: Message box that notify user that treatment payment record for the inserted appointment date and time for this patient already exist in the database.

If the system realized no treatment is selected by the user before click the "Save Records" button, then an error message box as below will be shown.

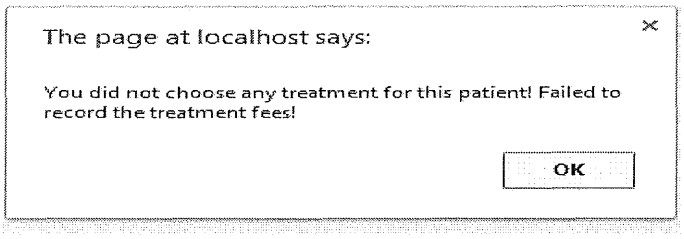


Figure 60: Message box that notify user that he/she did not choose any treatment for the patient thus the system has failed to record the treatment fees.

2.7.2.16 Receptionist Welcome Page

Figure 61: Receptionist welcome page for the Online Dental Management System (ODMS)

2.7.2.17 Receptionist Main Menu Page

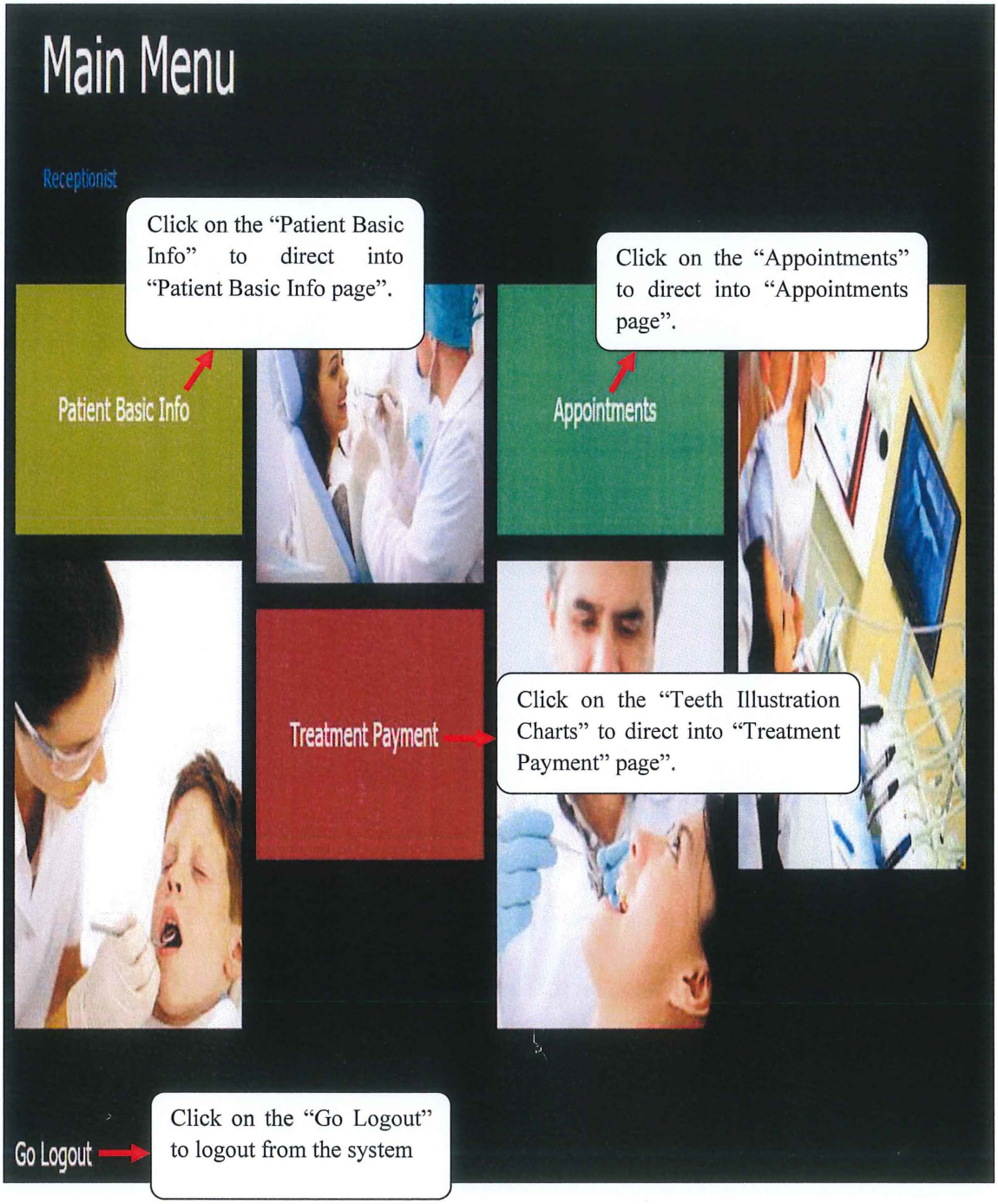


Figure 62: Receptionist main menu page for the Online Dental Management System (ODMS)

2.7.2.18 Receptionist Patient Basic Info Page

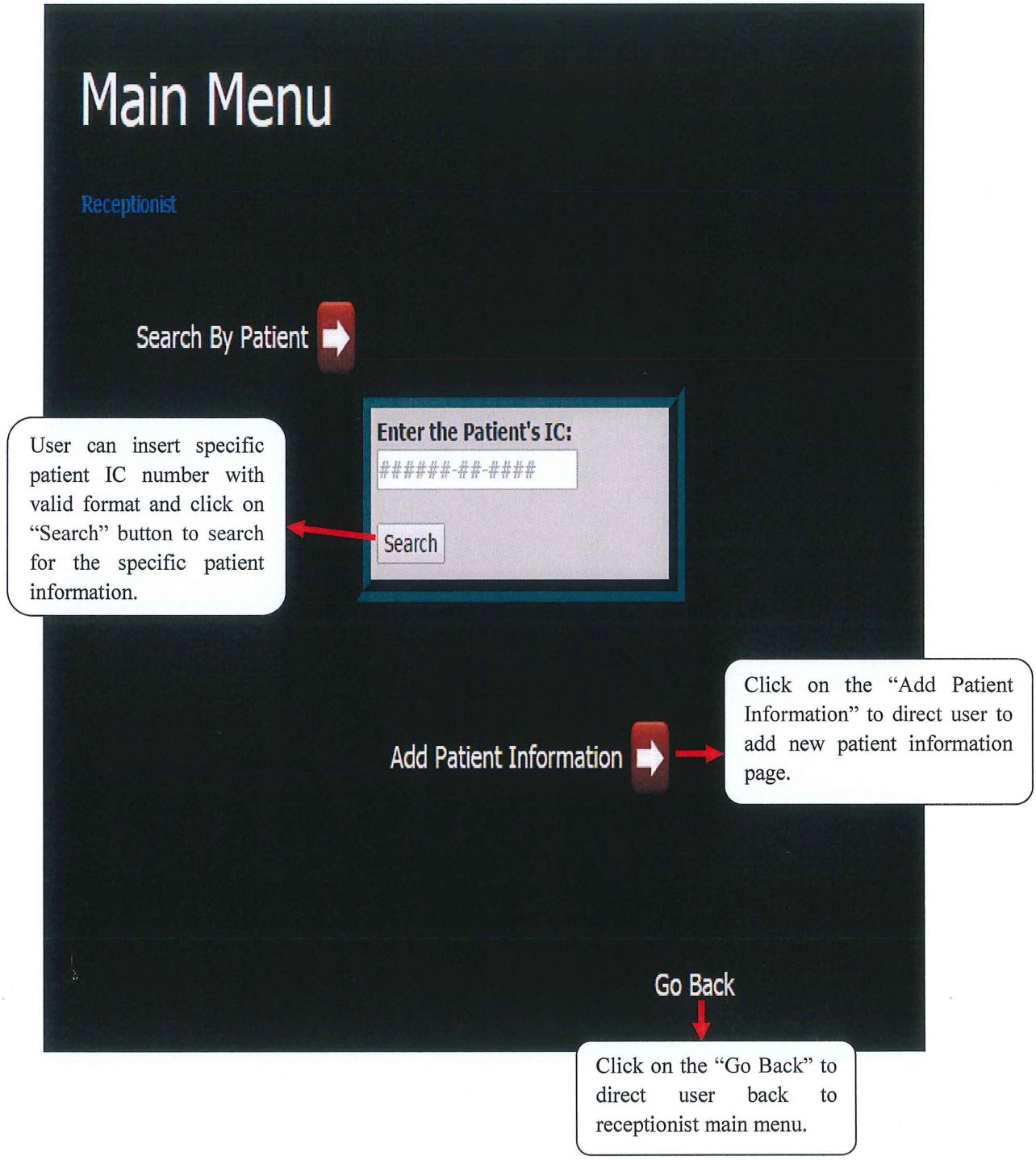


Figure 63: Receptionist patient info page for the Online Dental Management System (ODMS)

For the "Search by patient", if the user inserted correct and valid IC number then the figure as below will be shown.

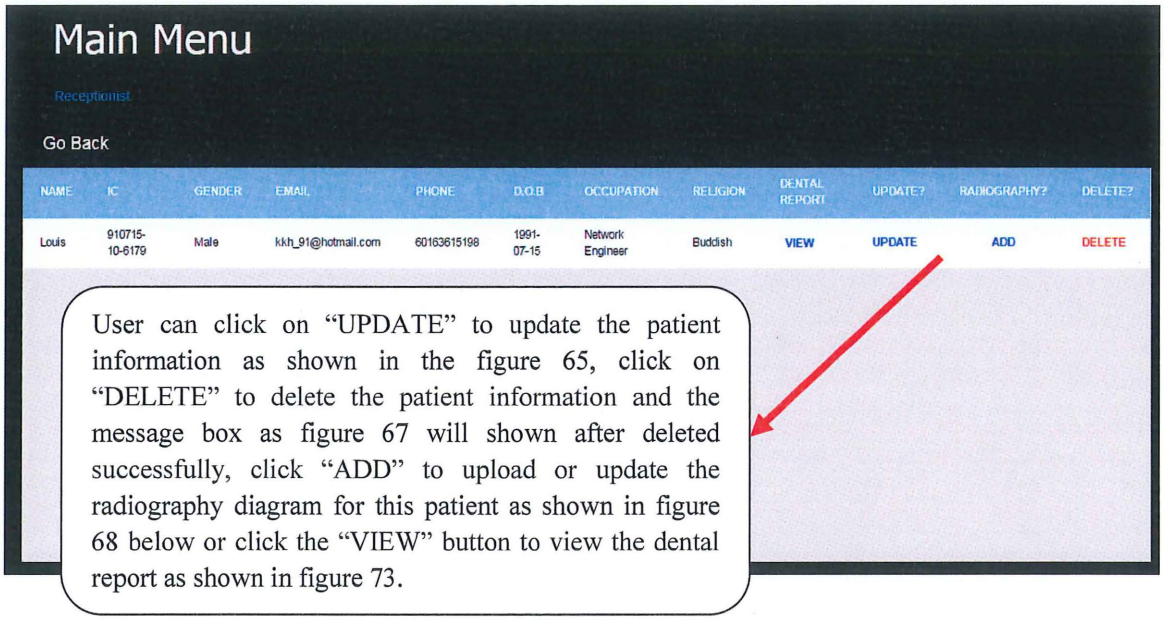


Figure 64: This figure displayed the patient information with the IC of "910715-10-6179".

Figure 65: Update form.

By changing the content in update form and click the "UPDATE" button, the patient information will be updated and the message box as figure below will be shown.

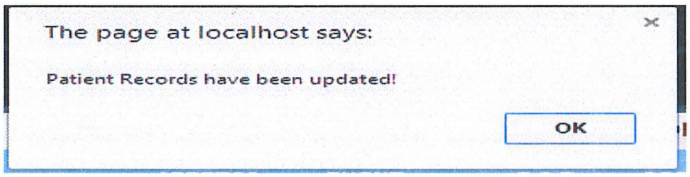


Figure 66: Message box that notify the user the patient information have been updated.

If the user clicks on the "DELETE" link button as shown in the figure 64 then the patient information for the patient will be deleted and the message box as below will be shown.

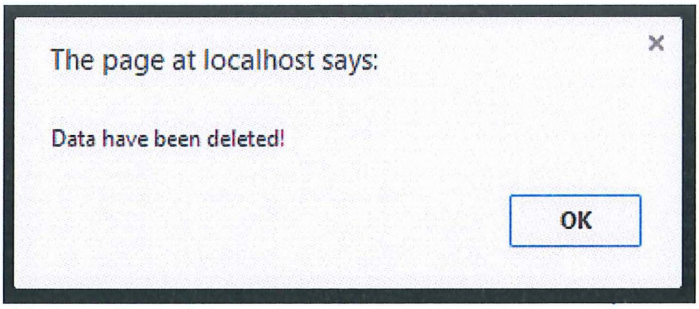


Figure 67: Message box that notify the user the patient information have been deleted.

If the user clicks on the "add" link button as shown in the figure 64 then the figure as below will be shown on the screen.

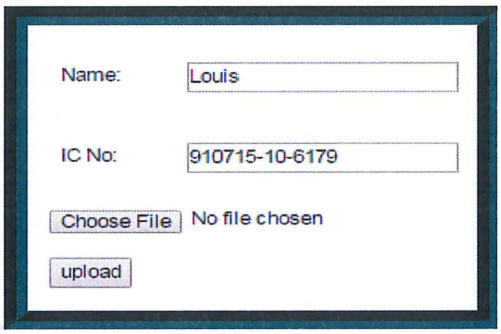


Figure 68: This figure displayed the form that will pop up once the user click on the "ADD" link.

User can choose the radiography diagram and click the "upload" to upload to the database. However, the file that is chosen by the user must not exist in the database and must in (jpeg, gif or bmp) format. Otherwise, error messages as figure 69 and 70 will be shown respectively.

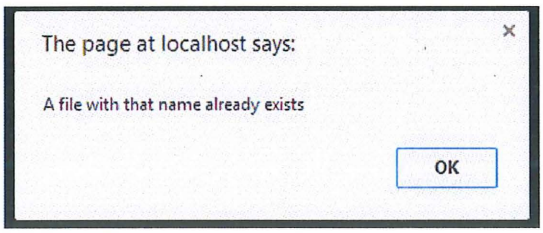


Figure 69

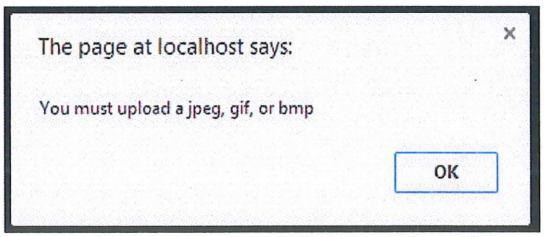


Figure 70

If the user choose a valid file and the patient do not have radiography diagram database before then the chosen radiography diagram will be added into the database and a message box as below will be shown.

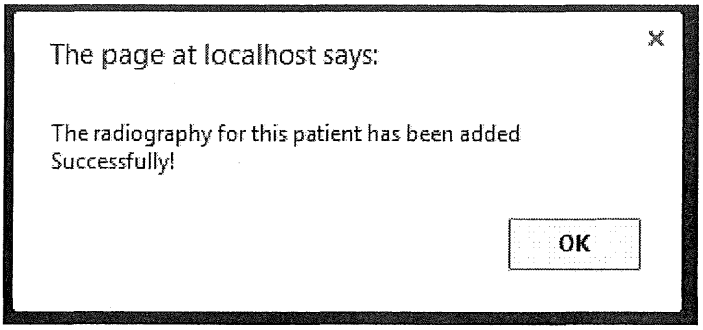


Figure 71: Message box that notify user that the radiography has been added successfully.

If the users choose a valid file and the radiography diagram for this patient already exist in the database then the chosen radiography diagram will update the existing radiography diagram and a message box as below will be shown

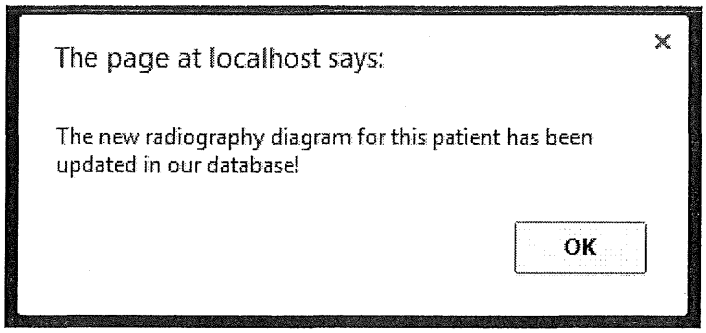


Figure 72: Message box that notify user that the radiography has been updated successfully.

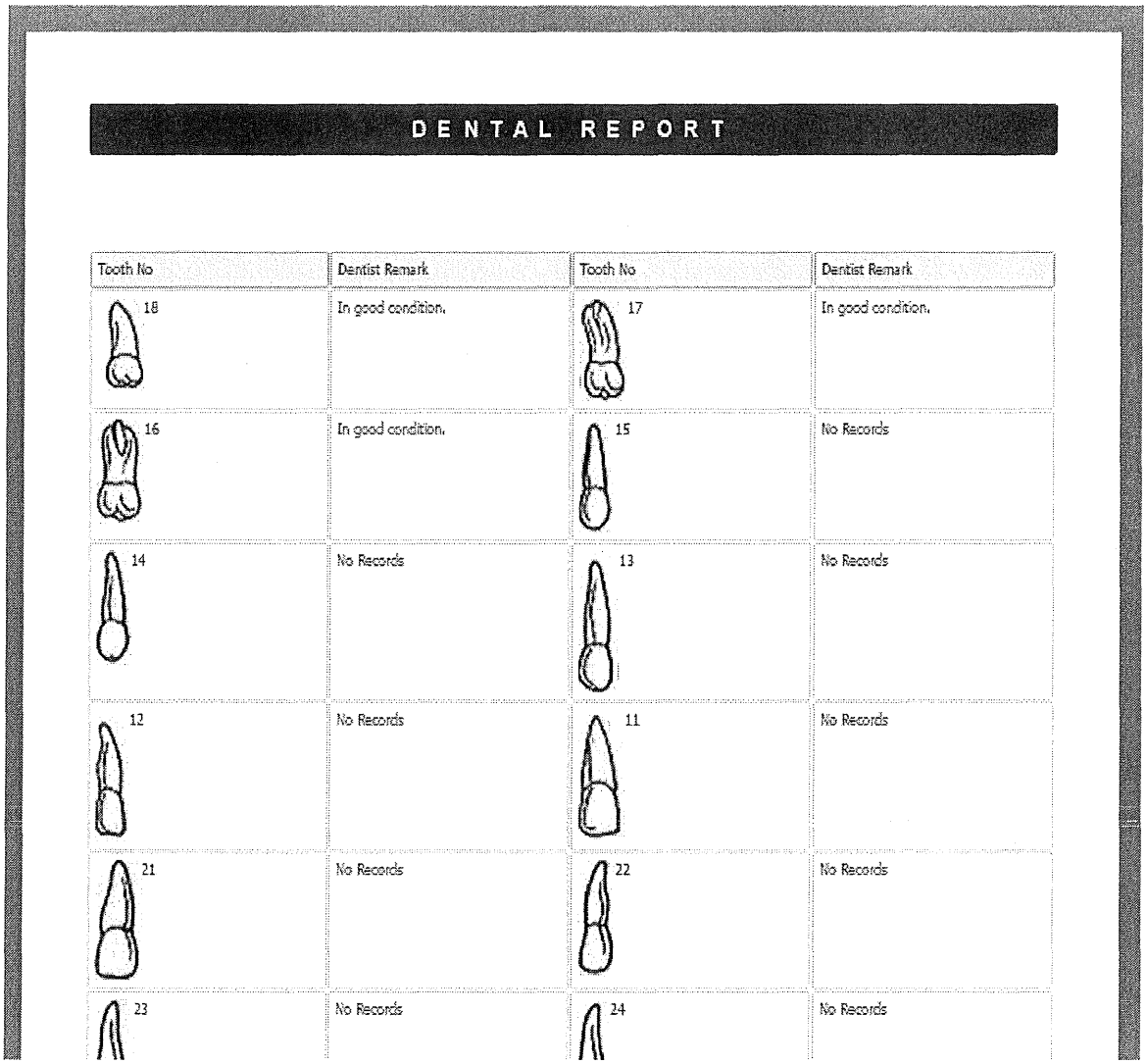


Figure 73: This figure displayed the dental report page that will shown once the user click on the "VIEW" link and the user may also print this dental report.

The figure as below will be shown after user click on the "Add Patient Information" button.

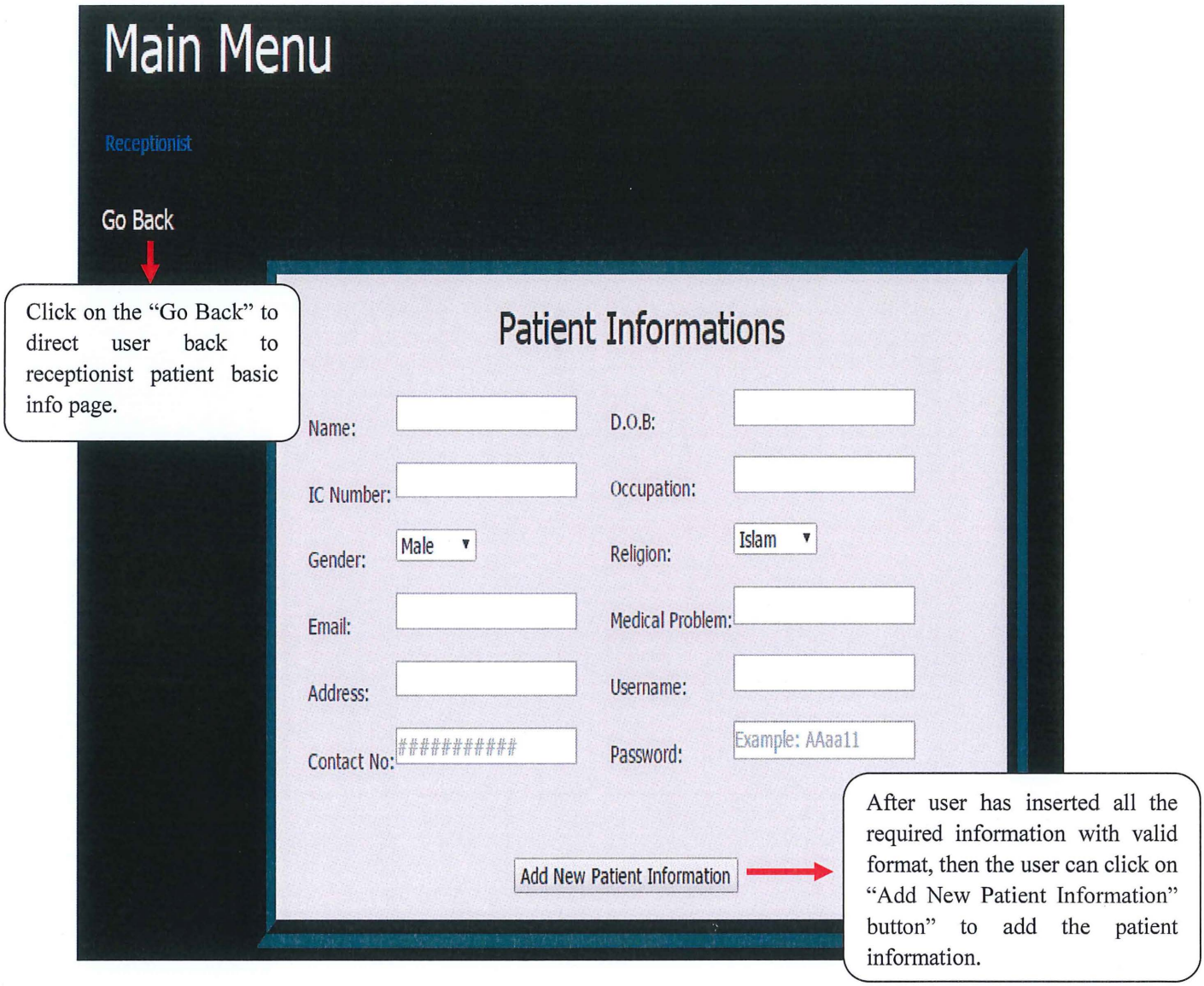


Figure 74: Receptionist add patient basic info page.

If the system realised that the inserted IC number in the add patient basic info page already exist in database then an error message as below will be shown.

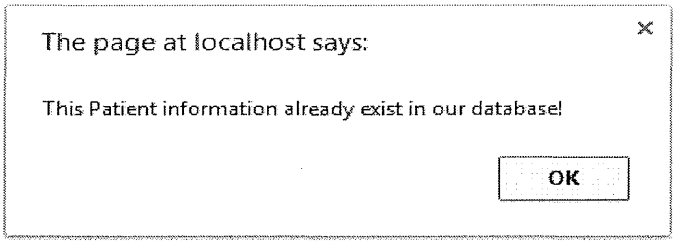


Figure 75: Error Message box that notify user the patient information for this IC already exist.

If the user inserted a valid IC number and the system cannot find any match IC number in the patientinfo table from database then the system will add the patient informtion into database and a message box as figure below will be shown.

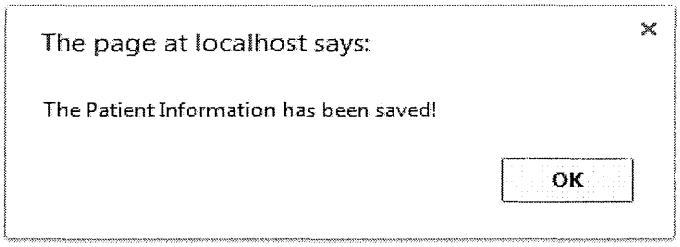


Figure 76: Message box that notify user the patient information has been added into database.

After the user click ok for the message box in figure 76, another message box as below will be shown.

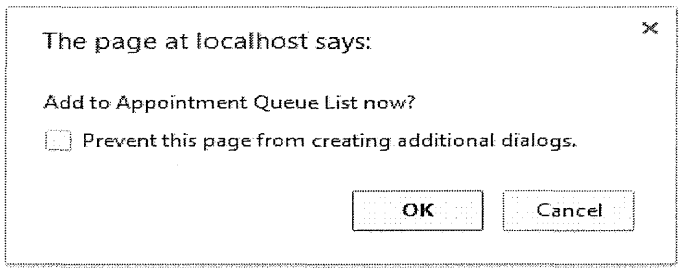


Figure 77: Message box that allow user to choose whether want to add appointment into queue list now. If user clicks the "ok" button then the system will direct user to the page as shown in the figure 78 or direct user to receptionist main menu page by click the "cancel" button.

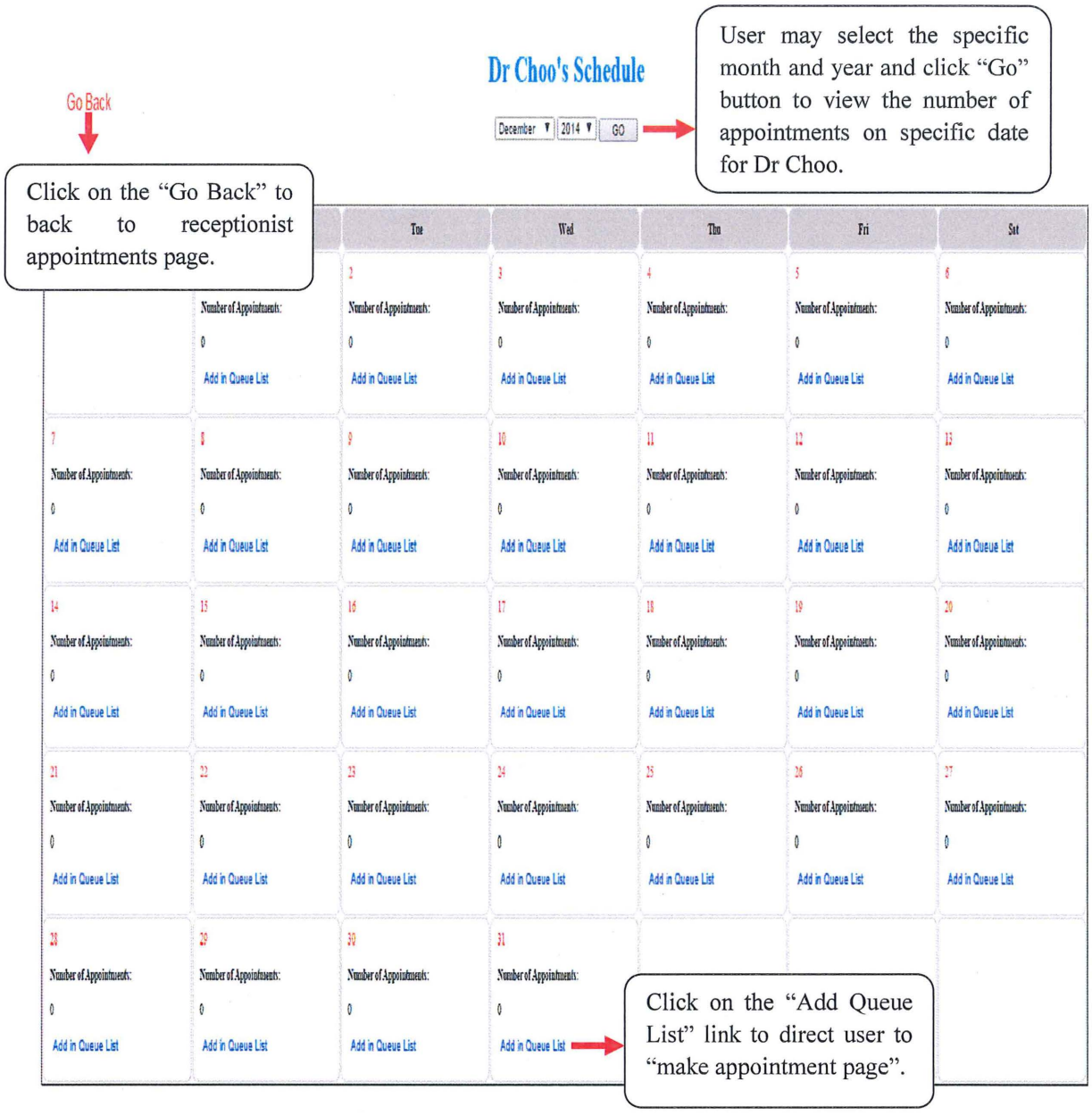


Figure 78: Dentist schedule page for the Online Dental Management System (ODMS)

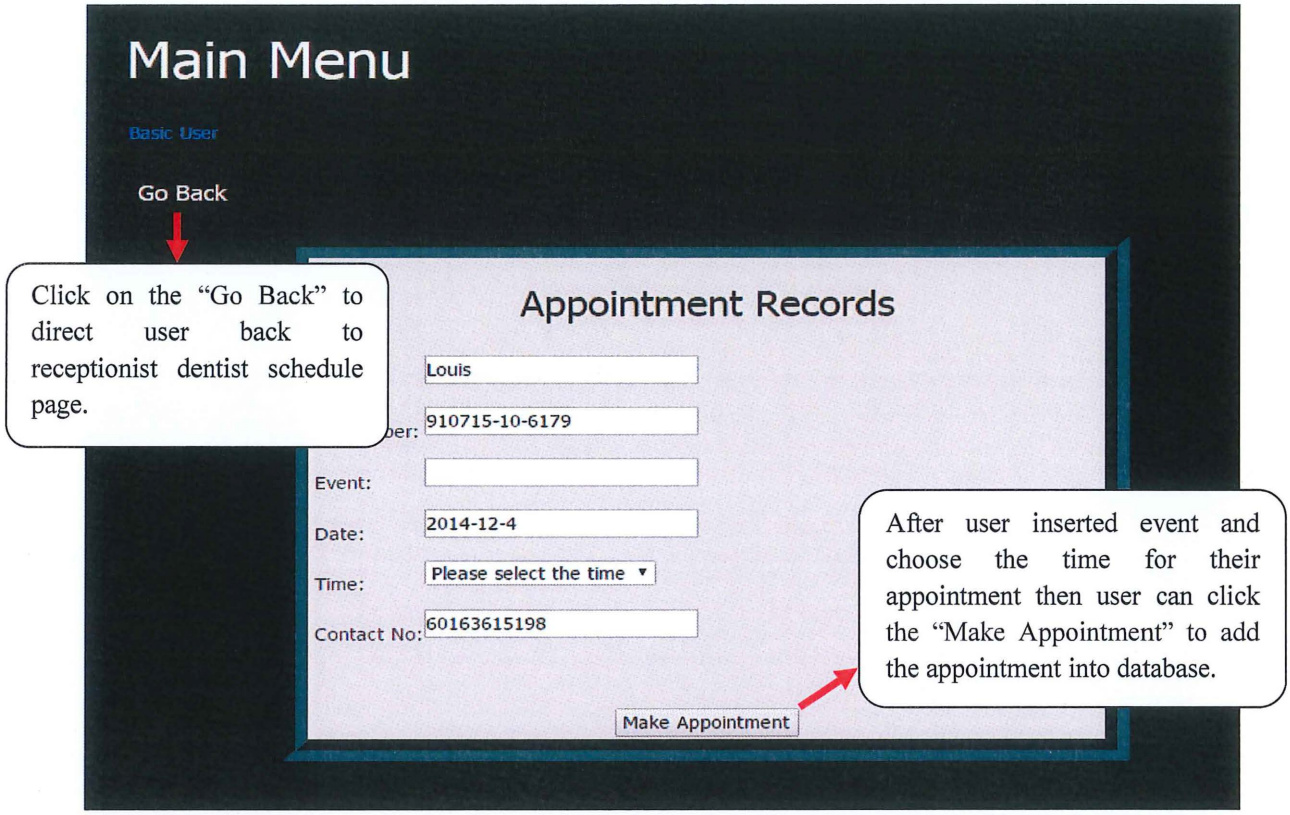


Figure 79: This figure displayed the page which allow user to make appointment.

Firstly, the system will check the date and time for that specific patient and if the patient never do appointment on that specific date and time then only allow the patient to make the appointment and a message box as the figure below will shown.

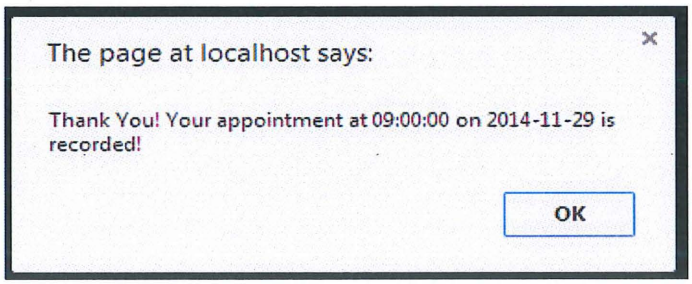


Figure 80: Message box which shown after user successfully make the appointment and the user will be notify with the date and time for his/her newly added appointment.

If the system realised that this patient already got his/her appointment in the database then an error message box as below will be shown.

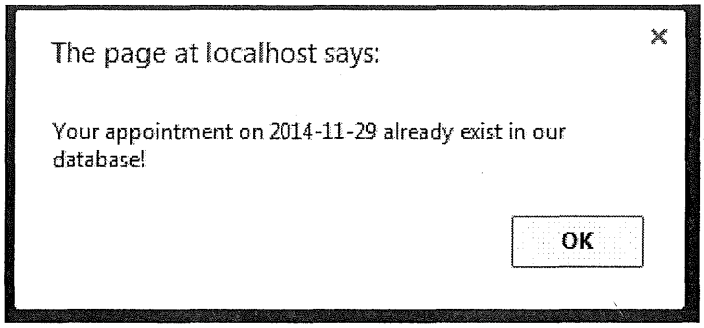


Figure 81: An error message box that notify user on exist appointment on that specific date.

2.7.2.19 Receptionist Appointments Page

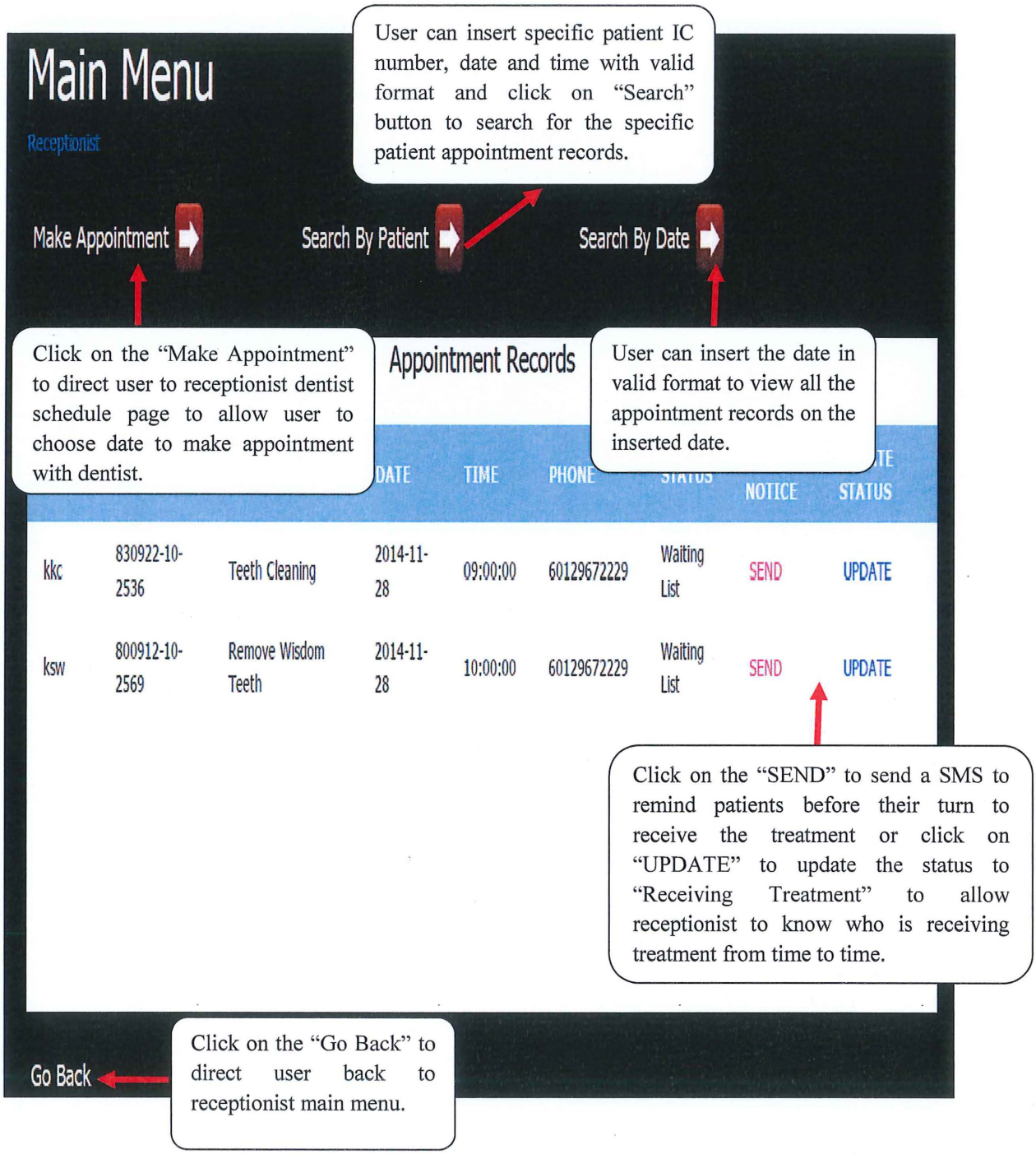


Figure 82: Receptionist appointments page for the Online Dental Management System (ODMS)

For the "Search by patient", if the user inserted correct and valid IC number, date and time then the figure as below will be shown.

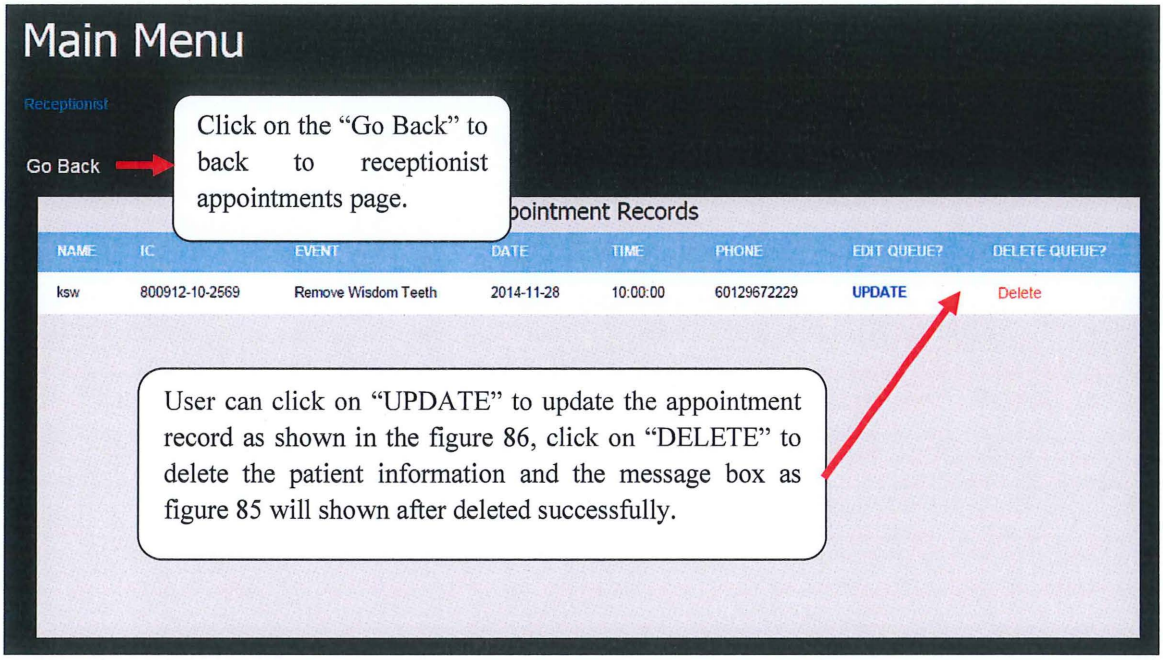


Figure 83: This figure had shown the appointment records with the IC number of "800912-10-2569" at 10am on 28-11-2014.

However if the user inserted incorrect and invalid IC number, date and time then the error message box as figure below will be shown.

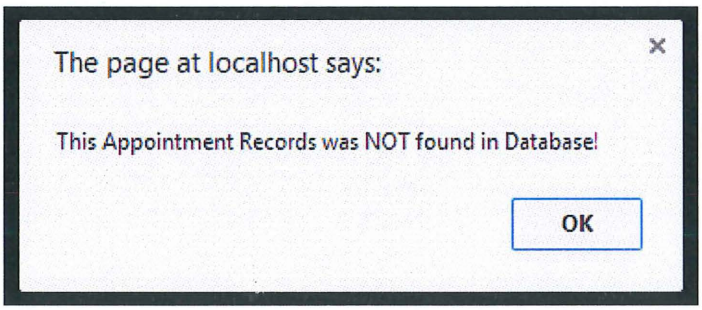


Figure 84: Error message box notify user this appointment records was not found in database.

If the user clicks on the "DELETE" link button as shown in the figure 82 then the appointment record for the patient will be deleted and the message box as below will be shown.

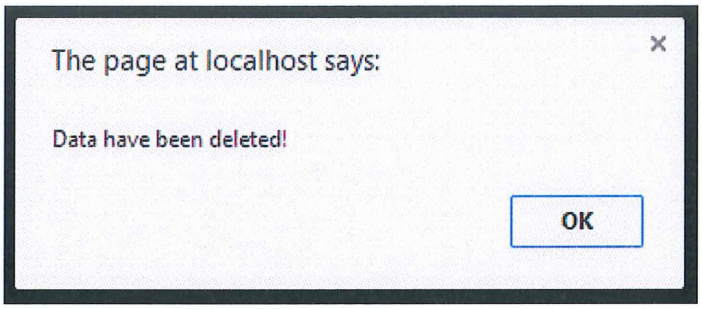


Figure 85: Message box that notify the user the appointment record has been deleted.

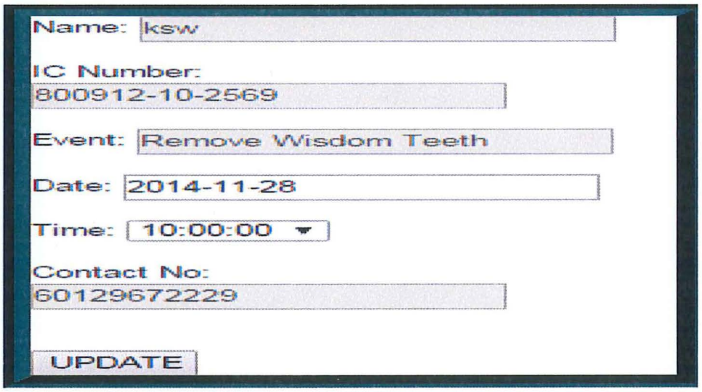


Figure 86: The update form which pop up when the user click on the "UPDATE" which shown in the figure 83. The user can change the appointment date and time and then click on the "UPDATE" button to update the appointment and a message box as figure below will shown after the appointment record has been updated successfully.

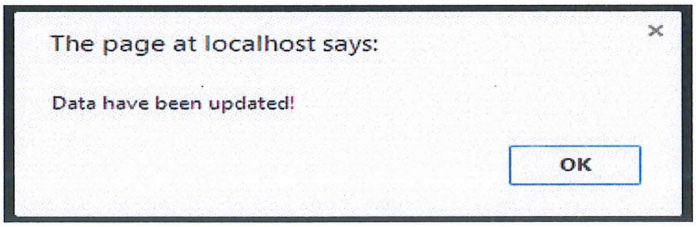


Figure 87: Message box that notify user the appointment has been updated.

If the system realised that the inserted appointment date and time for update already exist in the appointment table in the database then an error message box as figure below will be shown.

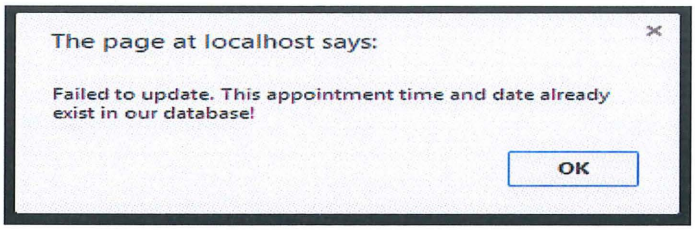


Figure 88: Message box that notify user the appointment failed to update.

For the "Search by date", if the user inserted correct and valid appointment date (2014-11-28 in this case) then the figure as below will be shown.

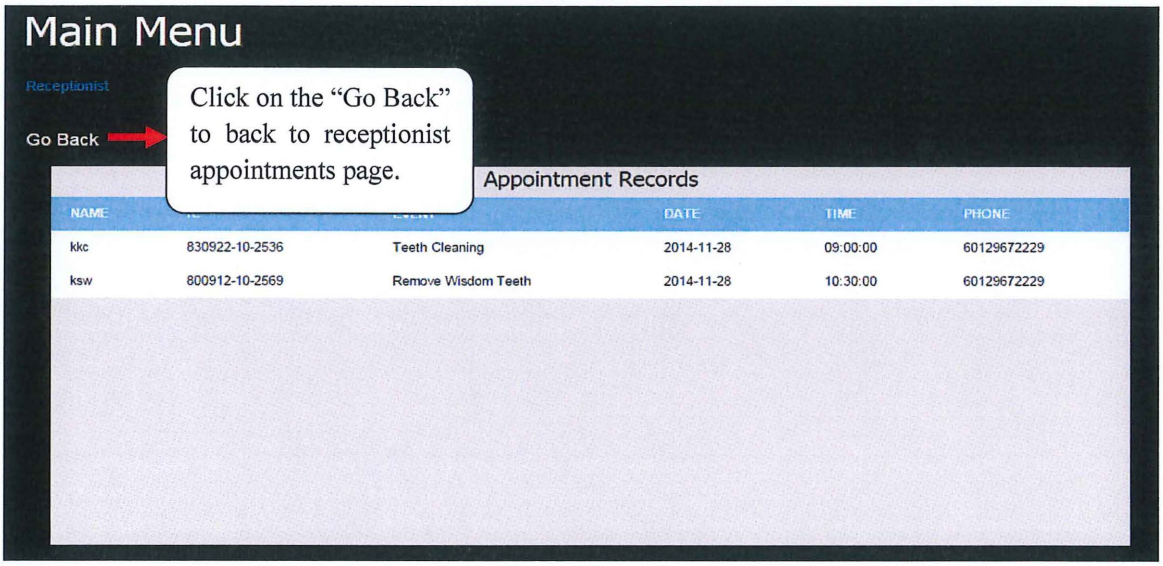


Figure 89: This figure had shown the appointment records on 28-11-2014.

However if the user inserted incorrect and invalid appointment date then the error message box as figure below will be shown.

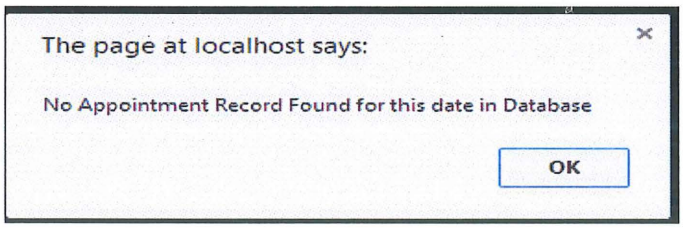


Figure 90: Error message box notify user no appointment records found for the inserted date.

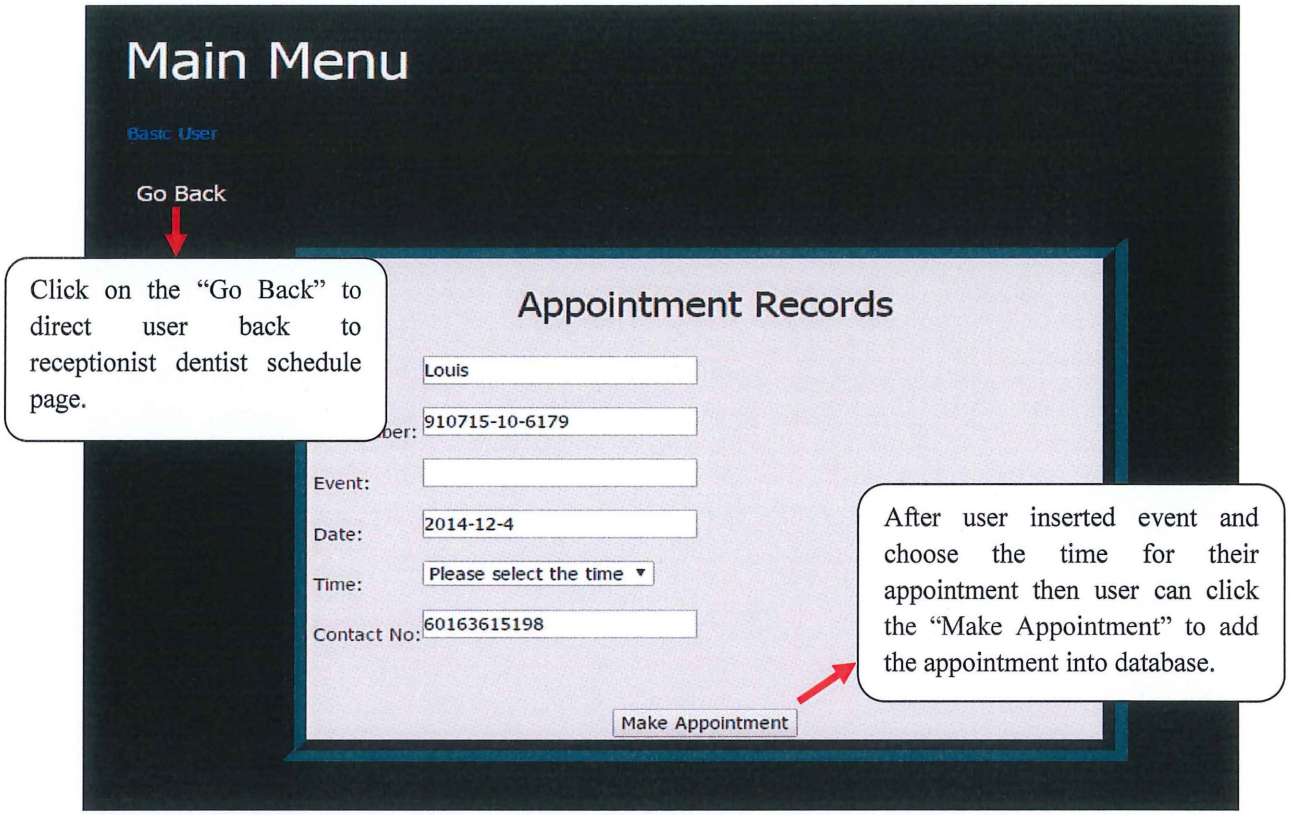


Figure 91: This figure displayed the page which allow user to make appointment.

Firstly, the system will check the date and time for that specific patient and if the patient never do appointment on that specific date and time then only allow the patient to make the appointment and a message box as the figure below will shown.

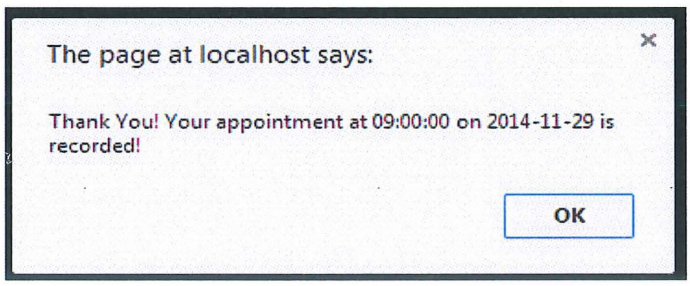


Figure 92: Message box which shown after user successfully make the appointment and the user will be notify with the date and time for his/her newly added appointment.

If the system realised that this patient already got his/her appointment in the database then an error message box as below will be shown.

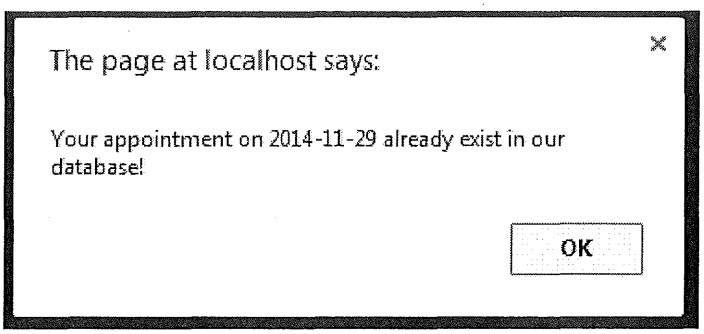


Figure 93: An error message box that notify user on exist appointment on that specific date.

2.7.2.20 Receptionist Treatment Payment Page

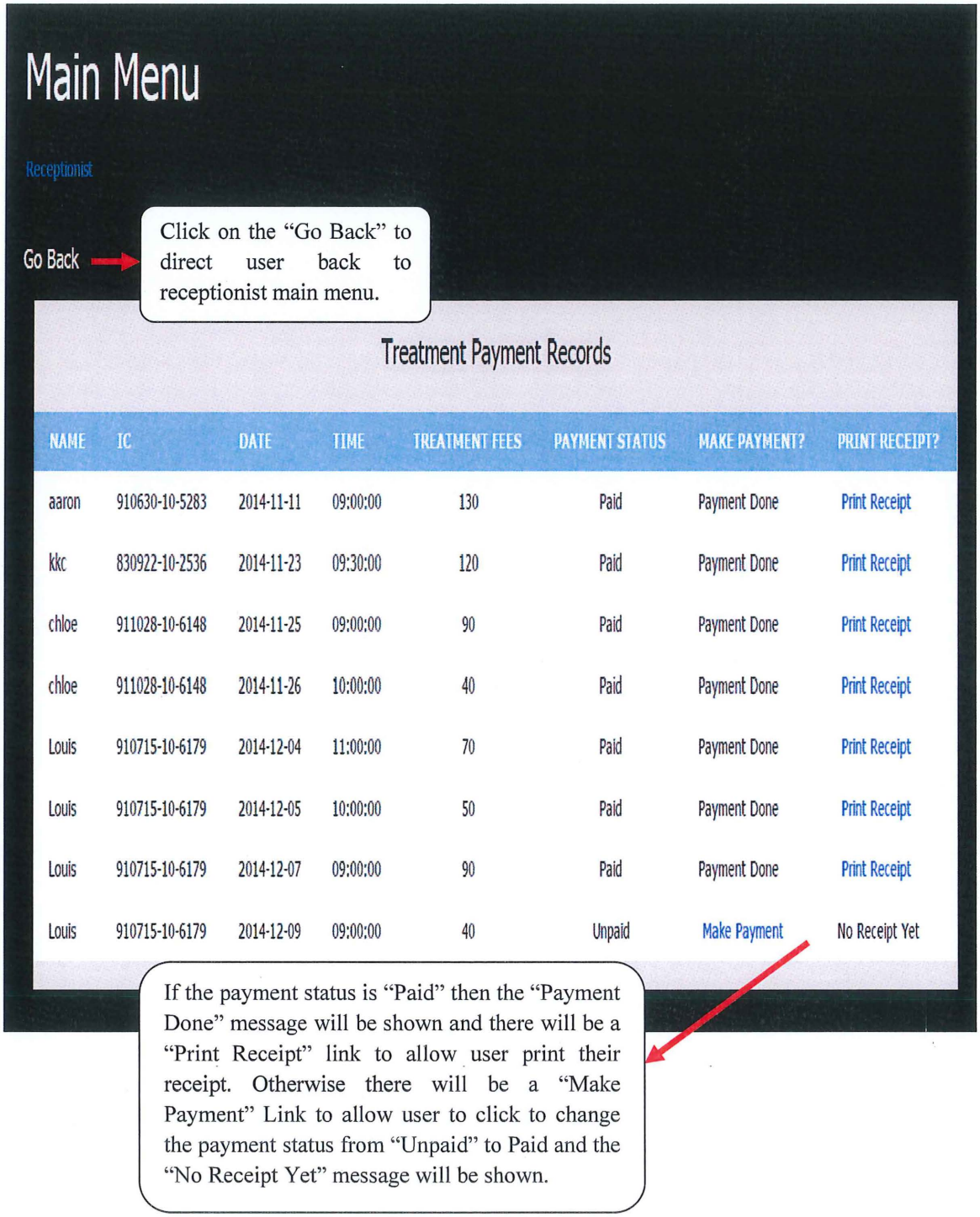


Figure 94: Treatment payment page for the Online Dental Management System (ODMS)

If the user clicks on the "Make Payment" link button as shown in the figure 94 then the payment status will be updated and the message box as below will be shown.

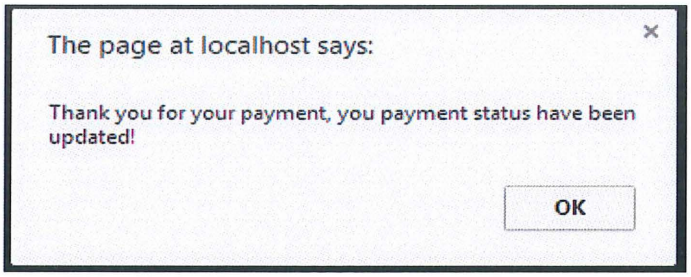


Figure 95: Message box notify user that status for the treatment payment record has been updated to "paid" and the payment receipt for this record is ready to print.

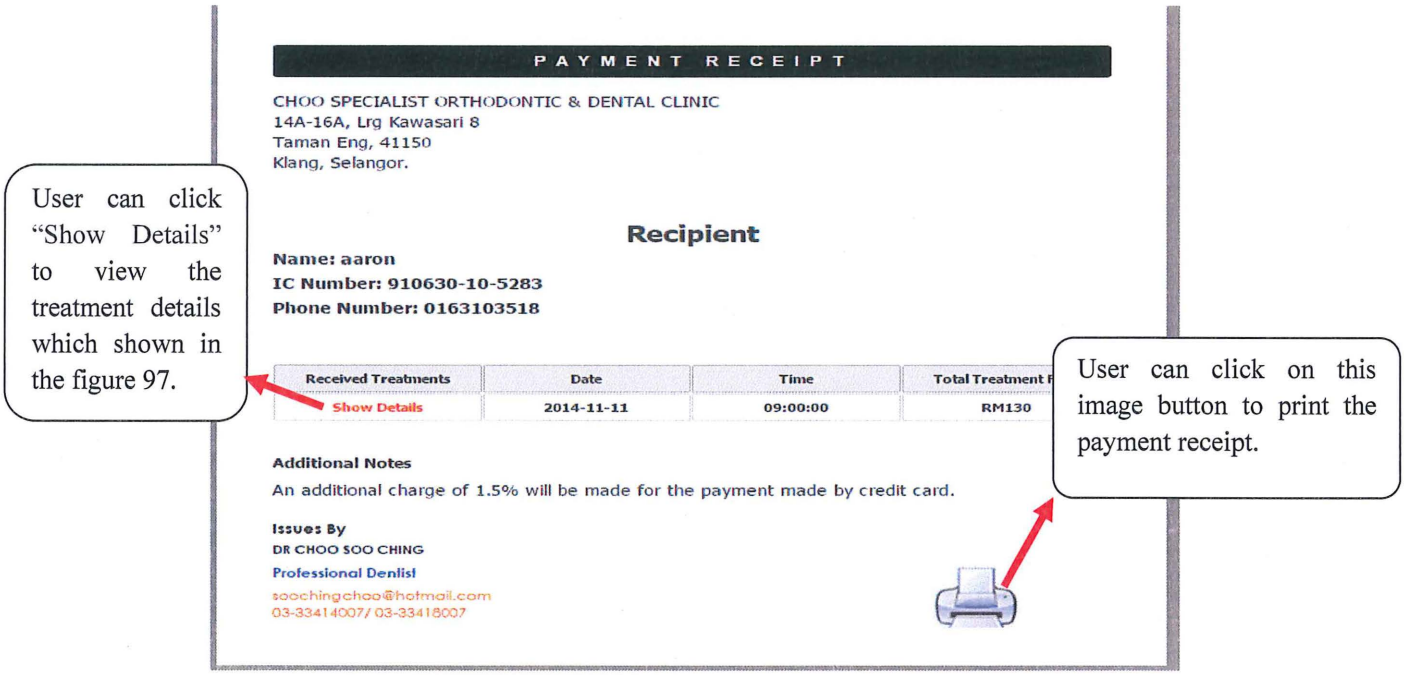


Figure 96: This figure displayed the payment receipt for the treatment on 2014-11-11 for patient.

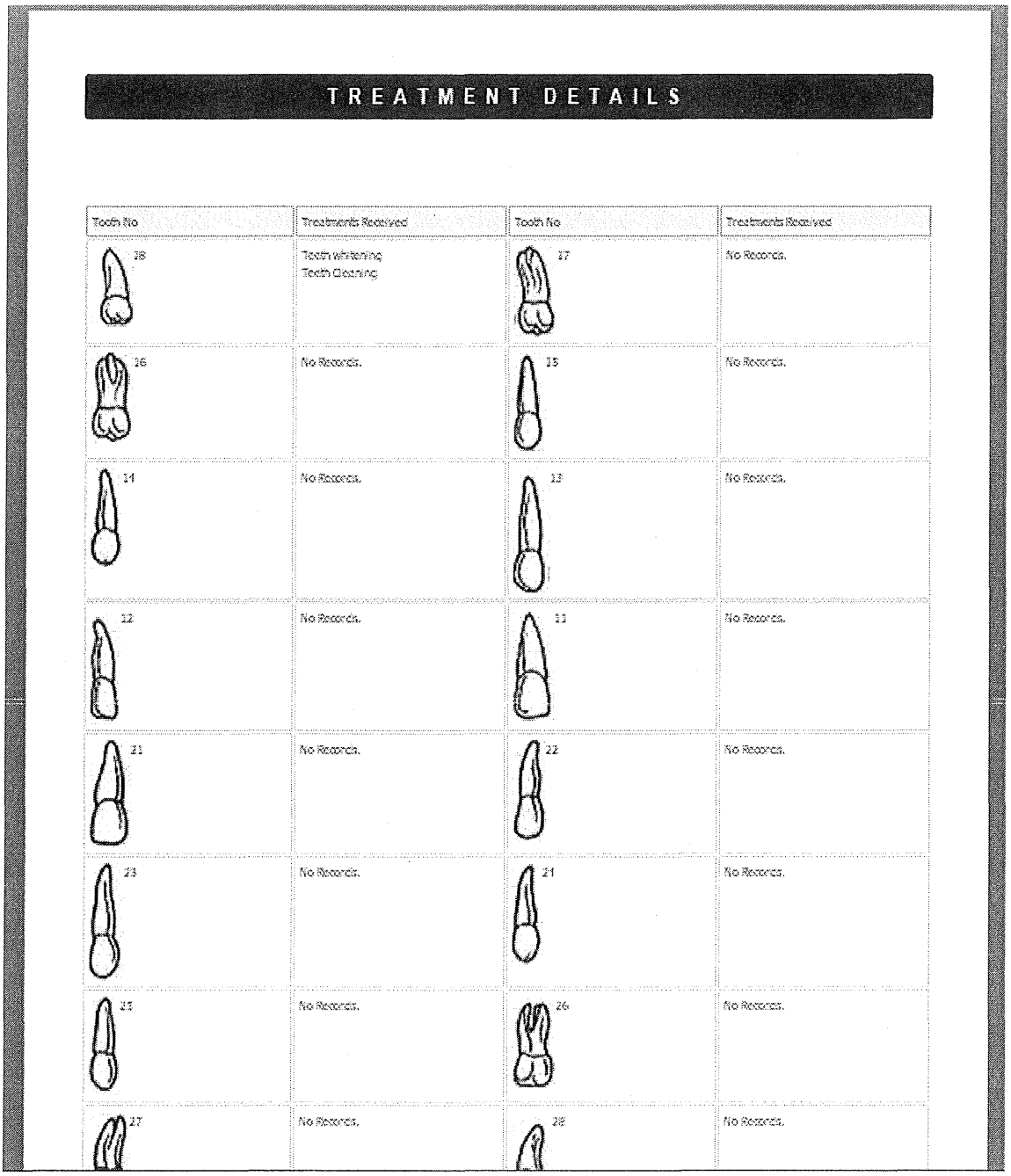


Figure 97: This figure displayed the treatment details page after user click the "Show Details" which shown in the figure 96.

2.7.3 Database Creation

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	ID	int(10)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
2	Username	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
3	Password	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
4	Category	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext

Figure 98: Database creation for "adminlogin" table.

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
2	name	varchar(20)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
3	ic	varchar(15)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
4	event	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
5	date	date			No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
6	time	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
7	phone	varchar(20)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
8	status	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext

Figure 99: Database creation for "appointment" table.

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index More
2	name	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
3	ic	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
4	gender	varchar(10)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
5	email	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
6	address	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
7	phone	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
8	dob	date			No	None		Change Drop Browse distinct values Primary Unique Index More
9	occupation	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
10	religion	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
11	medicalproblem	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
12	username	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
13	password	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More

Figure 100: Database creation for "patientinfo" table.

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
2	fname	varchar(30)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
3	lname	varchar(40)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
4	filename	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext

Figure 101: Database creation for "radiography" table.

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
2	name	varchar(20)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
3	ic	varchar(15)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
4	gender	varchar(10)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
5	phone	varchar(15)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
6	eighteen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
7	seventeen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
8	sixteen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
9	fifteen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
10	fourteen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
11	thirteen	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
12	twelve	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
13	eleven	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
14	twentyone	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
15	twentytwo	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
16	twentythree	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
17	twentyfour	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
18	twentyfive	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
19	twentysix	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
20	twentyseven	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
21	twentyeight	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
22	fourtyeight	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
23	fourtyseven	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
24	fourtysix	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
25	fourtyfive	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
26	fourtyfour	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
27	fourtythree	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
28	fourtytwo	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
29	fourtyone	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
30	thirtyone	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
31	thirtytwo	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
32	thirtythree	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
33	thirtyfour	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
34	thirtyfive	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
35	thirtysix	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
36	thirtyseven	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext
37	thirtyeight	varchar(100)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index Spatial Fulltext

Figure 102: Database creation for “teethchart” table.

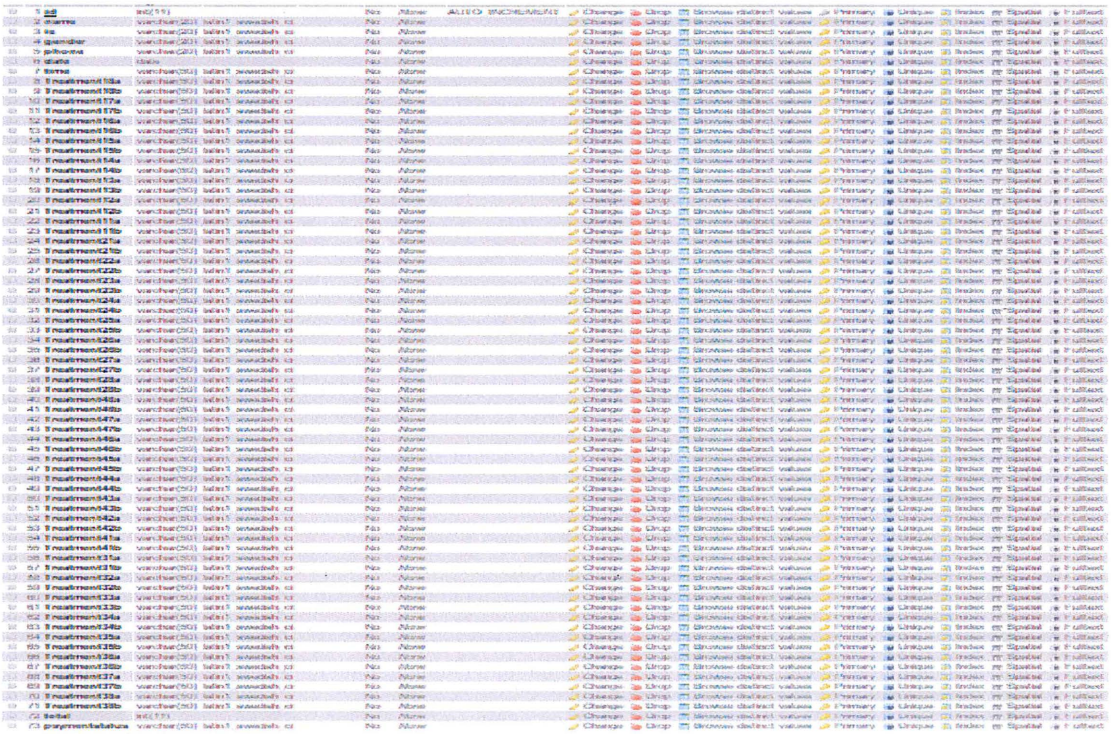


Figure 103: Database creation for “treatment” table.

2.8 PROJECT LIMITATION

One of the limitations of this project is the system functionality provided is not good enough as some modules of other existing system such as patient recall, patient tracking, treatment planning and so on are not included in the Online Dental Management System (ODMS). In term of user friendliness, the ODMS has not reach the mark yet as the first time user may get confused with the capability provided by the system via the complicated system interfaces.

2.8.1 Development Constraints

The development platform is web based, thus if the Online Dental Management System (ODMS) were to be released to the web, then the source code can be viewed by the public.

2.8.2 Time Constraints

The given time frame for developing large scales projects such as the Online Dental Management System (ODMS) is not enough. Gathering of the user requirement is a very time consuming process, where an agreement on system requirement must be made between user and developer before any real development can be done. In fact, more time is required so that a perfect and error-free system can be produced.

2.8.3 Future Enhancement

The developed system is still in its initial stage and can be further improve in future. For instance, the concepts used in ticket controlled queue system where the system will auto generate the ticket number to control the queue can be consider to add into the system in order to make the queue control more efficient. Besides, some missing modules of other existing system can also be added into the system to improve its functionality.

2.9 TESTING PLAN (UNIT TESTING PLAN)

2.9.1.1 Testing Environment

2.9.1.1.1 Hardware

- Dell Inspiron N5110 with Window 7 Home Premium operating system
- Database server (phpMyAdmin (MySQL))

2.9.1.1.2 Software

- Notepad
- XAMPP (Apache and MySQL)

2.9.1.2 Unit Testing Plan Stop Criteria

The test will be stop if all the conditions below are meet:

- The basic success scenarios of the use cases related to the integration set are meets.
- All bugs related to the scenarios are fixed.
- Further bug fixed are not required.
- All the test cases have been executed and 70% of the bugs have been fixed and remaining 30% do not have any critical problem.

2.9.1.3 Unit Testing Details

2.9.1.3.1 Functionalities Tested

- Validate username and password
- View radiography diagrams (Administrator)
- View treatment history (Administrator)
- View addition note for patient oral health (Administrator)
- Add treatment details (Administrator)
- Add addition note for patient oral health (Administrator)

- View appointment records (Administrator, Receptionist and Basic User)
- Delete appointment records (Receptionist)
- Update appointment records (Receptionist)
- Add appointment records (Receptionist)
- Make new appointment (Basic User)
- View patient information (Administrator, Receptionist and Basic User)
- Delete patient information (Receptionist)
- Update patient information (Receptionist)
- Add patient information (Receptionist)
- View payment receipt (Receptionist)
- Print payment receipt (Receptionist)
- Upload radiography diagram (Receptionist)
- Update radiography diagram (Receptionist)
- Delete radiography diagram (Receptionist)

2.9.1.4 Unit Testing Plan Procedures

- Identify part of the system to be tested.
- Create the Test Plans.
- Prepare the data to be tested for each Test Plan.
- Undergo the test on each Test Case.

2.9.1.5 Test Cases with Expected Results

Sl: No:	Test Case (Administrator)	Condition to be tested	Expected Results
1	Validate username and password	Insert valid username and password	Enter main menu for administrator
2	View radiography diagrams	Click "Patient Basic Info", insert valid IC, click "search " button	Return patient information (included radiography diagram)
3	View treatment history and addition note for patient oral health	Click "Teeth Illustration Charts", insert valid IC, click "search " button	Return treatment history and addition note
4	Add treatment details	Click "Teeth Illustration Charts", insert valid IC, click "search " button, click "Go Edit" button	Return teeth illustration chart (for add treatment details)
5	Add addition note for patient oral health	Click "Teeth Illustration Charts", insert valid IC, click "search " button, click "Go Edit" button	Return teeth illustration chart (for add addition note)
6	View appointment records	Click "Appointments"	Return appointment records
7	View patient information	Click "Patient Basic Info", insert valid IC, click "search " button Or Click "Patient Basic Info", click "view all patient information" button	Return patient information

Table 10: Test case (Administrator) and expected result Table

Sl: No:	Test Case (Receptionist)	Condition to be tested	Expected Results
1	Validate username and password	Insert valid username and password	Enter main menu for receptionist
2	View patient information	Click "Patient Basic Info", insert valid IC, click "search " button	Return patient information
3	Add patient information	Click "Patient Basic Info", click "Add Patient Information " button	Return add patient information page
4	Update patient information	Click "Patient Basic Info", insert valid IC, click "search " button, click "update" button	Update patient information
5	Delete patient information	Click "Patient Basic Info", insert valid IC, click "search " button, click "delete" button	Delete patient information
6	View appointment records	Click "Appointments"	Return appointment records
7	Add appointment records	Click "Appointments", click "Make appointment " button	Return make appointment page
8	Update appointment records	Click "Appointments", insert valid details(IC, date and time), click "search " button, click "update" button	Update appointment records
9	Delete appointment records	Click "Appointments", insert valid details(IC, date and time), click "search " button, click "delete" button	Delete appointment records
10	Upload radiography diagram	Click "Patient Basic Info", insert valid IC, click "search " button, click "add" button, choose radiography diagram, click "upload" button	Upload radiography diagram
11	Update radiography diagram	Click "Patient Basic Info", insert valid IC, click "search " button, click "add" button, choose radiography diagram, click "upload" button	Update radiography diagram

12	Delete radiography diagram	Click "Patient Basic Info", insert valid IC, click "search " button, click "delete" button	Delete radiography diagram
13	View payment receipt	Click "Treatment Payment", insert valid details(IC, date and time), click "search " button	Return payment receipt
14	Print payment receipt	Click "Treatment Payment", insert valid details(IC, date and time), click "search " button, click "print" button	Print payment receipt

Table 11: Test case (Receptionist) and expected result Table

Sl: No:	**Test Case (Basic User)**	**Condition to be tested**	**Expected Results**
1	Validate username and password	Insert valid username and password	Enter main menu for basic user
2	View appointment records	Click "Appointment"	Return appointment records
3	Make appointment records	Click "Appointment", click "Make Appointment " button, choose date, click "Add in Queue List" link	Return make appointment page
4	View patient information	Click "Patient Basic Info"	Return patient information

Table 12: Test case (Basic User) and expected result Table

2.10 TESTING PLAN (INTEGRATION TESTING PLAN)

2.10.1 Testing Environment

2.10.1.1 Hardware

Hardware component is an implementation work product consisting of physical part of a system. The hardware components are as below:

- Workstations (Dell Inspiron N5110 with Window 7 Home Premium operating system)
- Database server (phpMyAdmin (MySQL))

2.10.1.2 Software

Software component is an implementation work product consisting of an encapsulated cohesive piece of computer software that offers a set of services and act as part of the system. The software components are as below:

- Notepad
- XAMPP (Apache and MySQL)

2.10.1.3 Communication

The Online Dental Management System (ODMS) connect to phpMyAdmin database server and run by using XAMPP.

2.10.1.4 Security

High level of security in the integration environment for development and testing for the system. Examples of security features of the system are as below:

- Password Authentication in phpMyAdmin server and Online Dental Management System (ODMS).

2.10.1.5 Specific Test needs

Specific tests are needed to ensure the system free of error, secure and function well. List of specific test are as below:

- Test Cases
- Test Execution
- Test Stop
- Test Result and Data

2.10.2 Integration Testing Plan Procedures

Procedures that listed out all essential tasks which are needed to be carry out in order to implement the integration test successfully.

2.10.2.1 Order Of Integration Testing Plan

Step

1. Prepare the integration Test Plan.
2. Design the Test Scenarios and Test Cases.
3. Executing the Test Cases followed by reporting the system defects.
4. Tracking and re-testing the system defects.
5. Step 3 and 4 repeated until the progress of integration testing plan is completed successfully.

2.10.2.2 Activities, Techniques And Tools

The activities involved in the integration test are as below:

- Determine integration test strategy that could be adopted and later prepare the test cases and test data accurately.
- Understand the architecture and design of the system and identify all the critical modules which are needed to be tested on priority.
- Obtain interface design and create test cases to verify all the interfaces in detail.

Two important criteria in integration testing are:

- Entry criteria – Any unit must have passed the unit testing before about to undergo integration testing.
- Exit criteria – The thread being integrated passes its integration tests.

2.10.2.3 Test Cases with Expected Results

Sl: No:	Test Case	Condition to be tested	Expected Results
1	User login	Insert valid username and password	Enter main menu for user
2	Administrator main menu option	Click "Patient Basic Info"	Return patient basic info page
3	Administrator main menu option	Click "Appointments"	Return appointment page
4	Administrator main menu option	Click "Teeth Illustration Chart"	Return Teeth Illustration Chart page
5	Receptionist main menu option	Click "Patient Basic Info"	Return patient basic info page
6	Receptionist main menu option	Click "Appointments"	Return appointment page
7	Receptionist main menu option	Click "Treatment Payment"	Return Treatment Payment page
8	Basic User main menu option	Click "Patient Basic Info"	Return patient basic info page
9	Basic User main menu option	Click "Appointments"	Return appointment page
10	Basic User main menu option	Click "Patient Feedback"	Return Patient Feedback page
1	User logout	Click "Go Logout" button	Logout from the system

Table 13: Test cases and expected results Table

When the system is developed completely, unit testing will be undergoes and each of the functionality of the system will be tested. Prior to unit testing, then it will be followed by integration testing phase. The system will be tested as a whole, which concentrates more on the performance and the interactivity of the system. This process is required so that we can ensure the system is free from errors and able to function well.

PART 3

CONCLUSION

The manual record management method which is currently in used by CHOO Specialist Orthodontic & Dental Clinic caused a lot of problems in the management process of the dental clinic. Due to the weakness of the manual record management method, the Online Dental Management System (ODMS) is developed on the purpose to overcome the problems encountered to make the management job of CHOO Specialist Orthodontic & Dental Clinic become more efficiency. From part 1, I have discussed the introduction, purpose of the project, project scope, few existing system for dental clinic as well as discuss the limitation of the existing systems. In part two, methodology, user requirements and detailed system architecture and design have been discussed. In addition, class diagram, activity diagram, sequence diagram, system flow diagram, entity relationship diagram, use case and so on are discussed and explained. The interface design is also roughly created as how the actual system will appear like. Moreover, the system development plan and system implementation details which are included the system interfaces, system modules and also the database creation are also discussed and in the end of part 2, the unit and integrated testing plan are discussed and implemented.

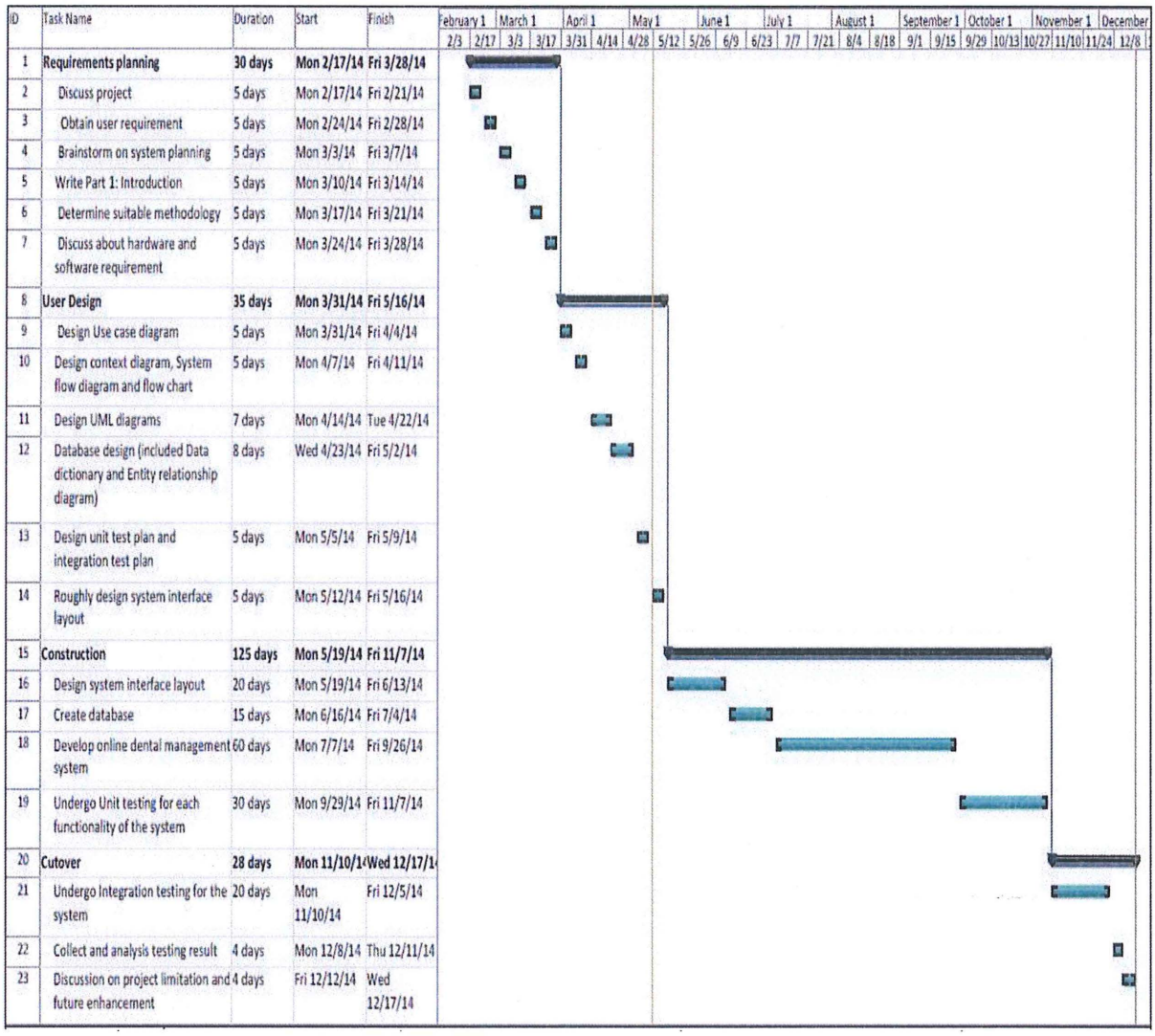
Conclusively, the Online Dental Management System (ODMS) has been successfully developed within the duration given by the project's client and it has also achieved the established objectives and purposes intended in the beginning of the project. However, the developed system is still in its initial stage and can be further improve in future. For instance, the concepts used in ticket controlled queue system where the system will auto generate the ticket number to control the queue can be consider to add into the system in order to make the queue control more efficient. Besides, some missing modules of other existing system can also be added into the system to improve its functionality. In conclusion, the Online Dental Management System (ODMS) not only can improve the record management of CHOO Specialist Orthodontic & Dental Clinic but also can improve the daily operations of dental clinic from time to time.

REFERENCES

1. James E. Purcell, CISSP, GSEC, GCIH, PMP, MCSE, Comparison of Software Development Lifecycle Methodologies(2012)
2. Ray Info Solution Pvt. Ltd, Dental Clinic Management System (2012)
3. Suzy System, SuzyDENTAL version 4 (2011)
4. McConnell, S. (2010). Rapid development: taming wild software schedules. Microsoft Press.

APPENDICES

A: Gantt chart



ID	Task Name	Duration	Start	Finish
1	**Requirements planning**	**30 days**	**Mon 2/17/14**	**Fri 3/28/14**
2	Discuss project	5 days	Mon 2/17/14	Fri 2/21/14
3	Obtain user requirement	5 days	Mon 2/24/14	Fri 2/28/14
4	Brainstorm on system planning	5 days	Mon 3/3/14	Fri 3/7/14
5	Write Part 1: Introduction	5 days	Mon 3/10/14	Fri 3/14/14
6	Determine suitable methodology	5 days	Mon 3/17/14	Fri 3/21/14
7	Discuss about hardware and software requirement	5 days	Mon 3/24/14	Fri 3/28/14
8	**User Design**	**35 days**	**Mon 3/31/14**	**Fri 5/16/14**
9	Design Use case diagram	5 days	Mon 3/31/14	Fri 4/4/14
10	Design context diagram, System flow diagram and flow chart	5 days	Mon 4/7/14	Fri 4/11/14
11	Design UML diagrams	7 days	Mon 4/14/14	Tue 4/22/14
12	Database design (included Data dictionary and Entity relationship diagram)	8 days	Wed 4/23/14	Fri 5/2/14
13	Design unit test plan and integration test plan	5 days	Mon 5/5/14	Fri 5/9/14
14	Roughly design system interface layout	5 days	Mon 5/12/14	Fri 5/16/14
15	**Construction**	**125 days**	**Mon 5/19/14**	**Fri 11/7/14**
16	Design system interface layout	20 days	Mon 5/19/14	Fri 6/13/14
17	Create database	15 days	Mon 6/16/14	Fri 7/4/14
18	Develop online dental management system	60 days	Mon 7/7/14	Fri 9/26/14
19	Undergo Unit testing for each functionality of the system	30 days	Mon 9/29/14	Fri 11/7/14
20	**Cutover**	**28 days**	**Mon 11/10/14**	**Wed 12/17/1**
21	Undergo Integration testing for the system	20 days	Mon 11/10/14	Fri 12/5/14
22	Collect and analysis testing result	4 days	Mon 12/8/14	Thu 12/11/14
23	Discussion on project limitation and future enhancement	4 days	Fri 12/12/14	Wed 12/17/14

B: User requirement documentation

Meeting with the user

This document is to certify that Khoo Kok Hong (CA11079), has arranged an informal meeting with the client of this project, Dr Choo Soo Ching for a user requirement gathering session. The details of the meeting are as follows:

Venue: CHOO Specialist Orthodontic & Dental Clinic meeting room

Time: 4:30 pm

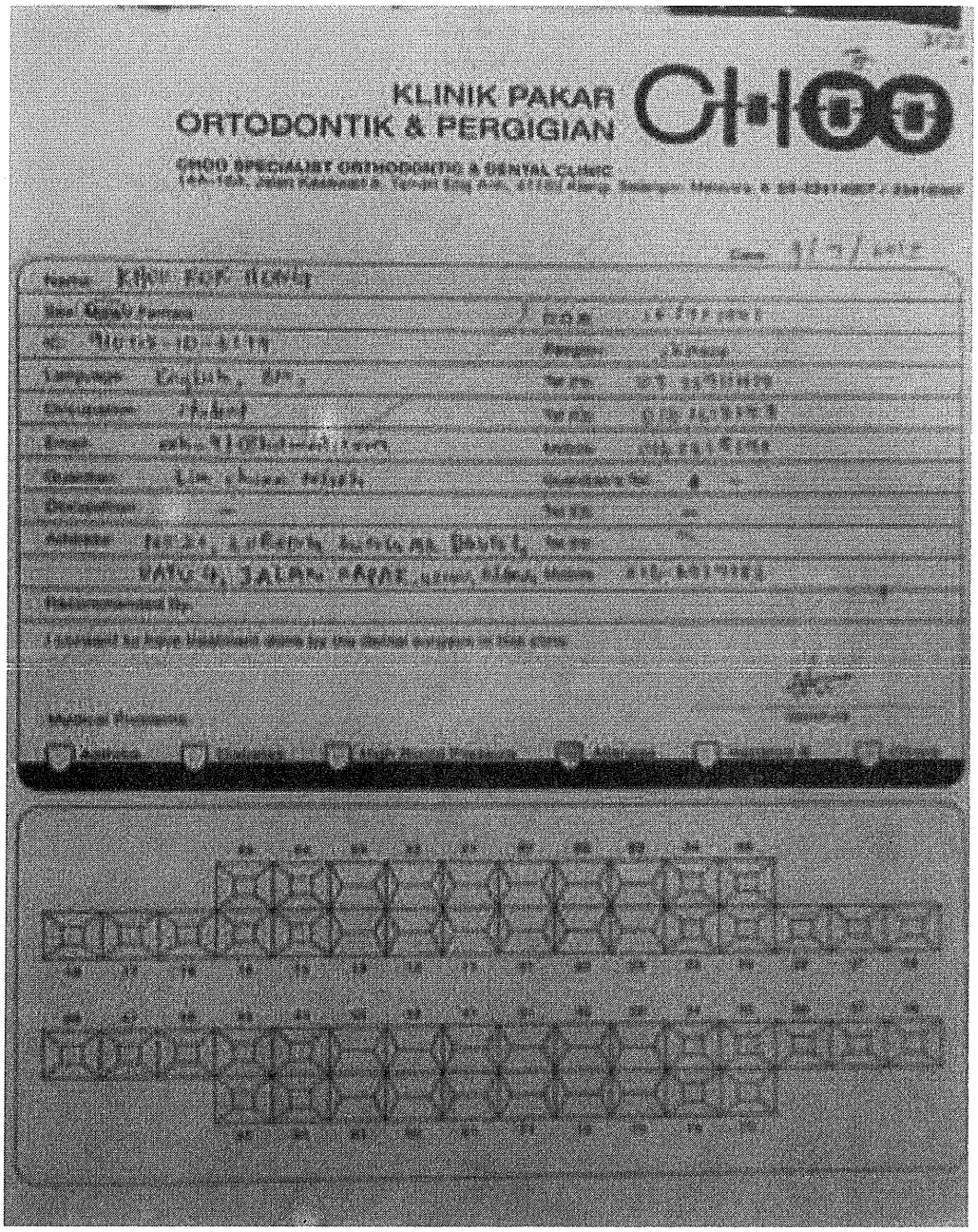
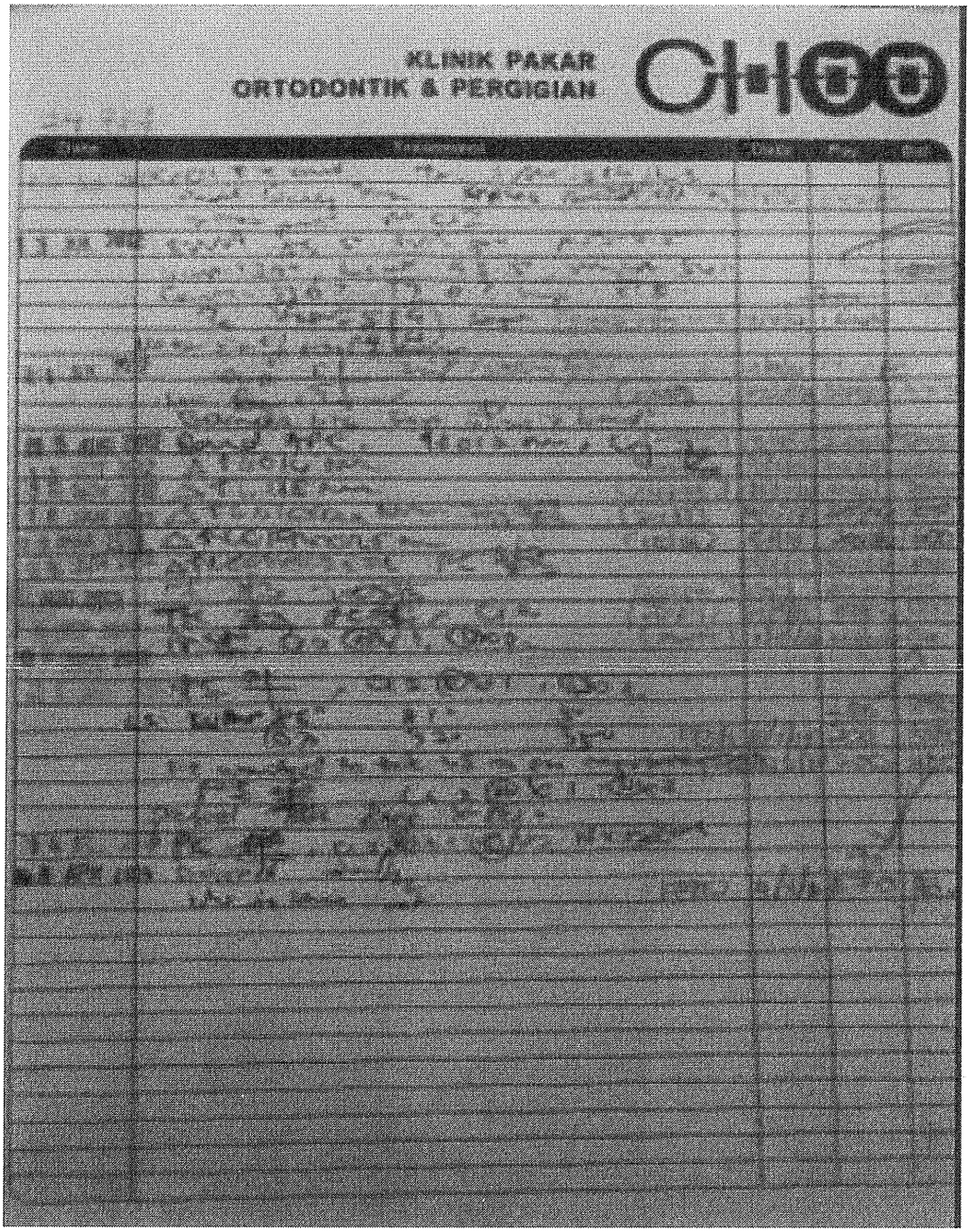
Date: 25th of February 2014

Yours truly:

.....

(Dr Choo Soo Ching)

C: Dentist Card of CHOO Specialist Orthodontic & Dental Clinic (Front View)



D: Dentist Card of CHOO Specialist Orthodontic & Dental Clinic (Back View)