WPI

AUTHORS

Cameron Crane
Jacob Adams
Ryan Biberon
Leona (Nhi) Nguyen Ngoc Yen

A REDESIGN
OF
DANISH DENTAL SOFTWARE

2023 | An Interactive Qualifying Project

A REDESIGN OF DANISH DENTAL SOFTWARE

DENTAL IT

An Interactive Qualifying Project
Proposal submitted to the faculty of
WORCESTER POLYTECHNIC INSTITUTE in
partial fulfillment of the requirements for the
Degree of Bachelor of Science.

Cameron Crane
Jacob Adams
## Ryan Biberon
Leona (Nhi) Nguyen Ngoc Yen

WPI

Faculty Advisors: Peter Hansen, James Halan
Sponsors: CoworkIT, SolutionWeb
Submitted May 2nd, 2023

ABSTRACT

Dental management information systems in Denmark are extremely outdated and lack modern appeal in appearance and functionality. This project aimed to assess dentists' needs and develop a concept for new, modernized software that addresses their common concerns. Throughout this project, we conducted research through a comprehensive literature review and interviewing dentists. In addition, two software mockups were developed to visually convey our ideas. Furthermore, multiple user tests with dentists and software developers were completed to gather further feedback and assist in updating design choices. Finally, a complete list of recommendations was produced, highlighting our findings and suggestions. These deliverables were given to the software company SolutionWeb for future development.
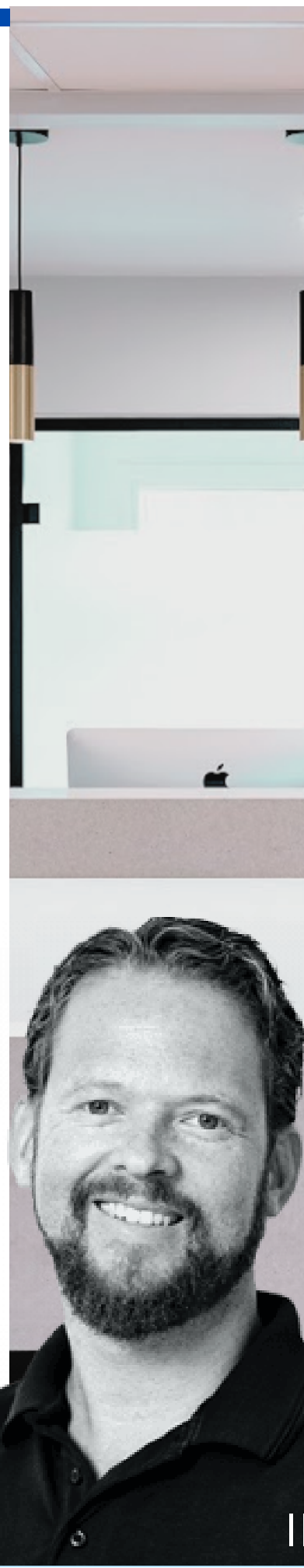
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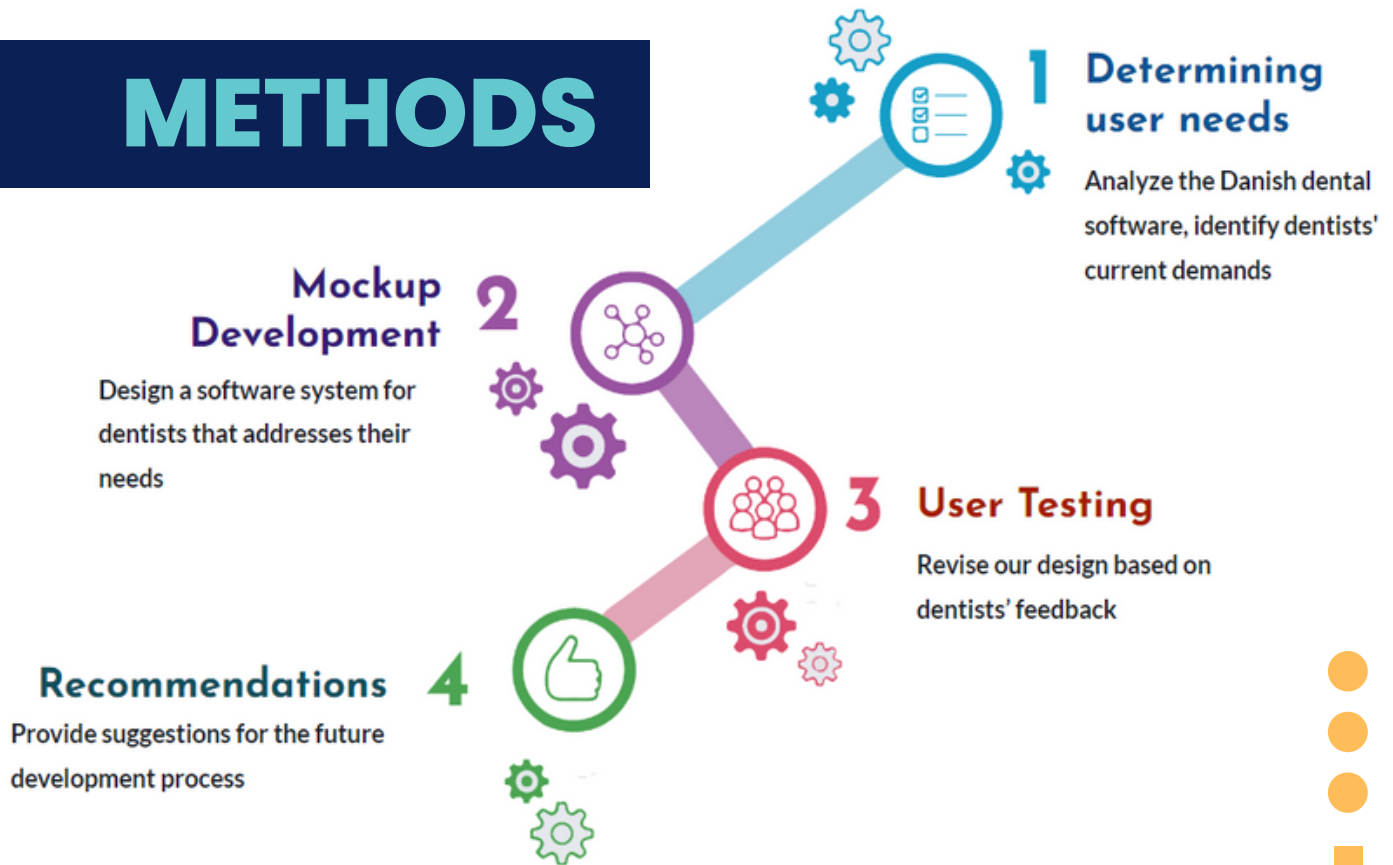
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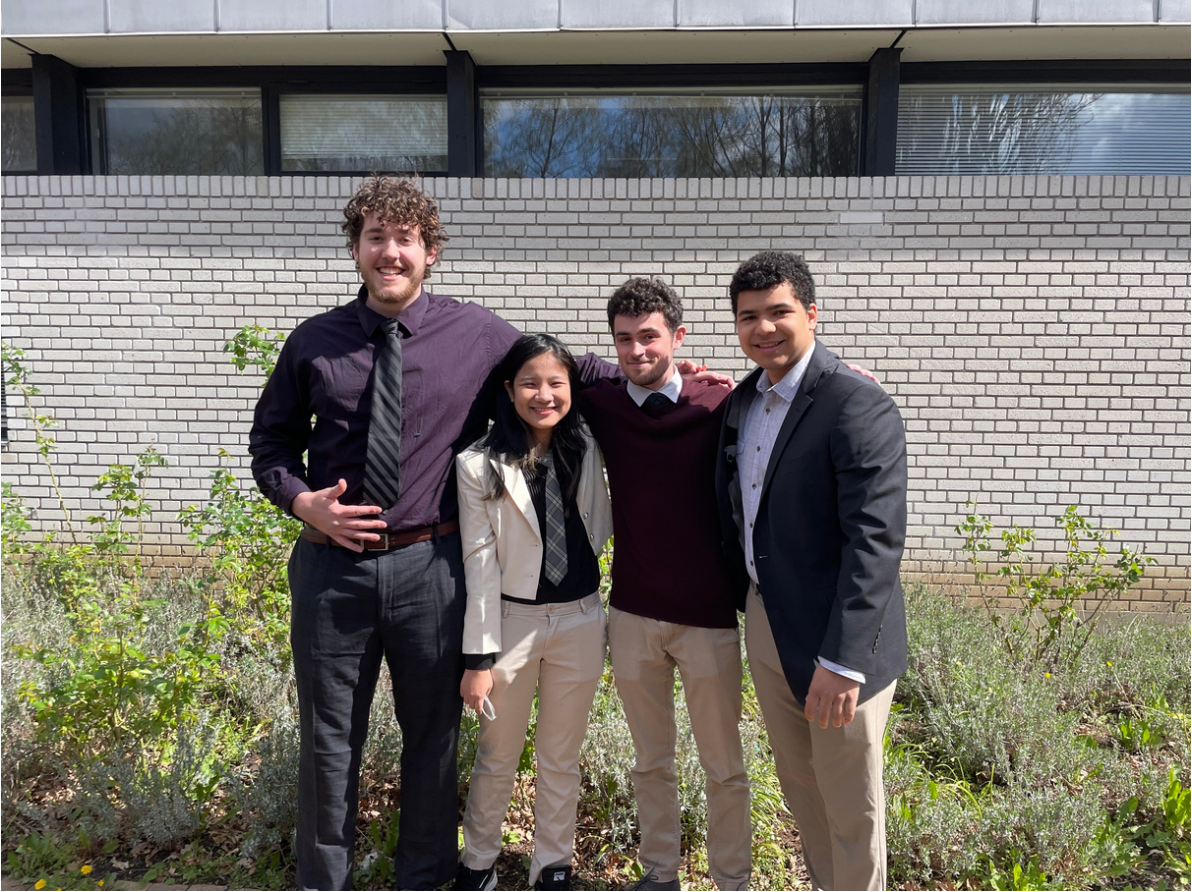
THE

DENTAL IT

TEAM

EXECUTIVE
SUMMARY

Dr. Morten Worsøe, a dentist with a clinic in Copenhagen, Denmark, pioneered this project. He had experienced significant troubles with his current dental software, Dental Suite. Plandent's Dental Suite and Nordenta's Al Dente dominate the Danish market despite undergoing limited changes since 2008. Dr. Worsøe reached out to Mads Ehrhardt, the CEO of CoworkIt, a network of small information technology (IT) companies that connects small businesses and individuals struggling with their IT systems. SolutionWeb was called upon to aid Dr. Worsøe in improving his dental software. These partners challenged our team to develop the framework for a modern dental software system.

Our mission for this project was to advise CoworkIt and SolutionWeb by **identifying the areas of improvement for current dental software and designing a system that successfully addresses these areas.**

METHODS

1 Determining user needs

Analyze the Danish dental software, identify dentists' current demands

Mockup Development 2

Design a software system for dentists that addresses their needs

3 User Testing

Revise our design based on dentists' feedback

Recommendations 4

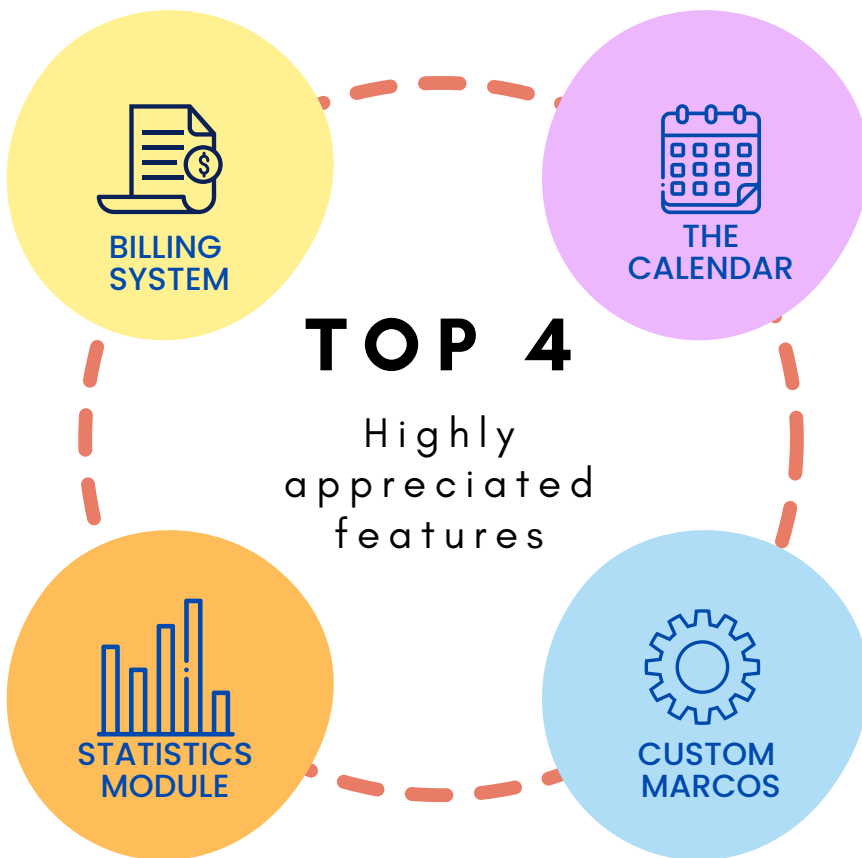Provide suggestions for the future development process

The **methodology** our team developed first required extensive background research and a literature review of a dental clinic's various technology and day-to-day operations. This action allowed us to learn the different technological processes that dentists utilize to treat their patients. Through conducting research and gathering background information, our team developed a methodology for the project focusing on the following **four objectives:**

Analyzing Danish Dental Software
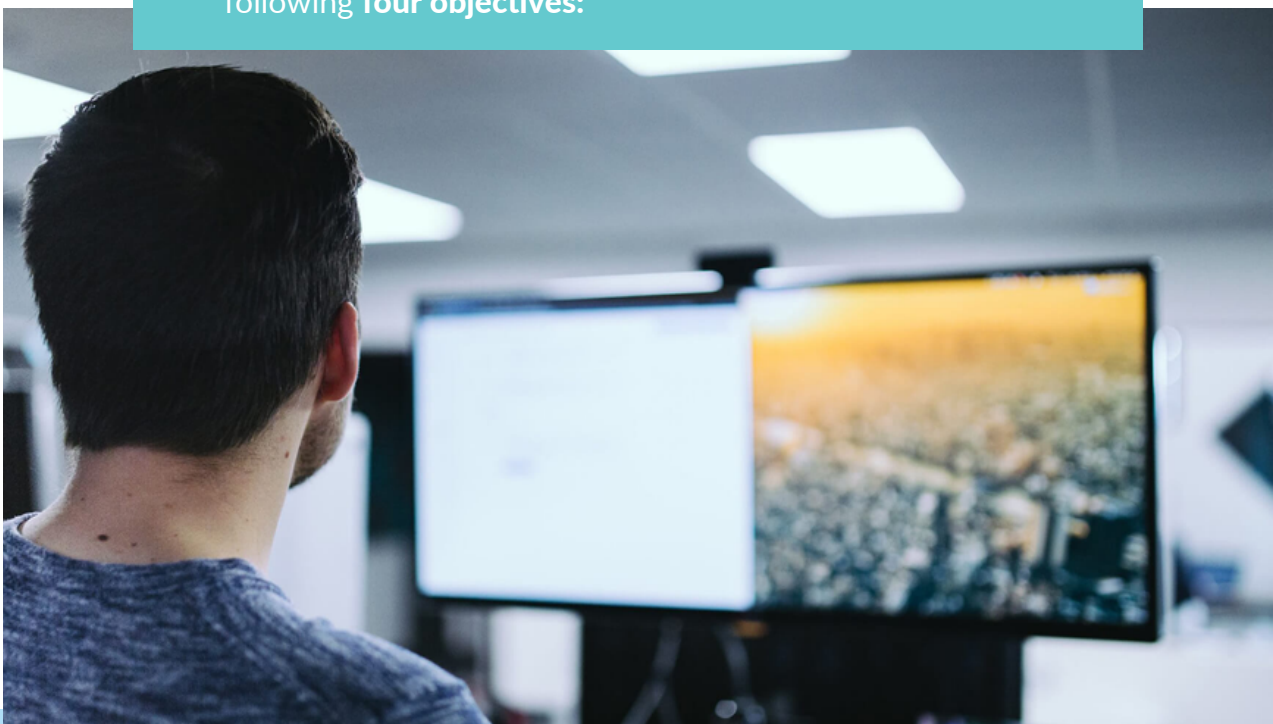
Objective 1

We created a list of prominent interview questions and interviewed five dentists in Greater Copenhagen. We were connected to these dentists through Dr. Worsøe and CoworkIt. These interviews aimed to give our team a complete understanding of liked and disliked features and functions of a dental software system. On top of this, we aimed to identify features that dentists would like to see implemented into their clinical software. As a result of these interviews, we filled out a table containing all the aspects we found dentists needed or wanted in their dental software. This data set outlined notable features and functions, what they do, and how dentists utilize them. After concluding our interviews, we created a table of the features and functions that dentists liked in their current system.

TOP 4

Highly appreciated features

BILLING SYSTEM

THE CALENDAR

STATISTICS MODULE

CUSTOM MARCOS

After concluding our interviews, we created a table of the features and functions that dentists liked and disliked in their current system. The prominently disliked features of the current system include the poor user interface and graphical design, the lack of system customization, the workflow of filling out the patient journal, the patient note-taking system, and the lack of integration with other common dental systems. From these initial interviews, we identified the most desired features as seamless patient journal workflow and increased system customization.

From these initial interviews, we identified the most desired features as seamless patient journal workflow and increased system customization.

V

Develop an initial mockup

Objective 2

A mockup is a visual representation or prototype of a product or design created to demonstrate the concept's functionality so a developer can gather feedback. Once we analyzed the preliminary interview results, **we created a low-fidelity mockup using Balsamiq.** Balsamiq is a rapid user interface wireframing tool that roughly sketches a software's functions and workflow. This mockup acted as a first draft sketch of the software, emphasizing the workflow and functions we aimed to implement. We then showed the Balsamiq mockup to our sponsors, CoworkIt and SolutionWeb, and their team of programmers for review. Additionally, we met with Dr. Worsøe to receive further feedback.

A key takeaway from these meetings was that we needed to minimize the number of search bars on each page to **ensure dentists could navigate through their software with minimal clicking and typing.** On top of this, we needed to make use of the available space on each page, as the empty areas could have contained significant information. Lastly, there needed to be **different customizable pages for each type of treatment** instead of one universal page for all treatments.

Home Page
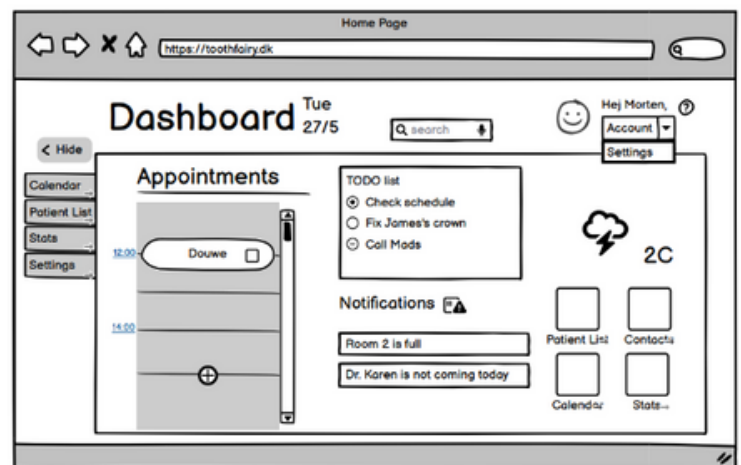
Develop a final mockup

After receiving feedback from our sponsors and Dr. Worsøe, **we created our final mockup** using Figma. Figma is a design platform that contains many tools and modification abilities to produce a robust high-fidelity mockup. This second iteration primarily consisted of user interface upgrades, workflow enhancements, and customization improvements.

This second iteration primarily consisted of user interface upgrades, workflow enhancements, and customization improvements.

We decided to create tiles, the rounded white boxes, as the primary way to display and access different features and functions of the system. Each tile contains a header highlighting its general purpose and multiple components performing related functions. In addition, we implemented a **search bar** on top of each page so that dentists could search for any aspect of the entire system. However, each page's layout allows users to access a plethora of different components so that they do not have to rely on using the search bar.

A primary goal of this project was to create our system in an extremely visually appealing manner. We decided to use base colors commonly found in healthcare organizations, like blue, gray, and white. The background of each page is a soft gray, while each tile is a bolder white. This color choice draws attention to each tile. In addition, we decided to utilize an orange accent color as a contrast so that essential elements like the account and the selected tab in the sidebar are highlighted.

Our design included a customizable dashboard. The size of the tiles displayed on the dashboard can be adjusted according to the user's preference.
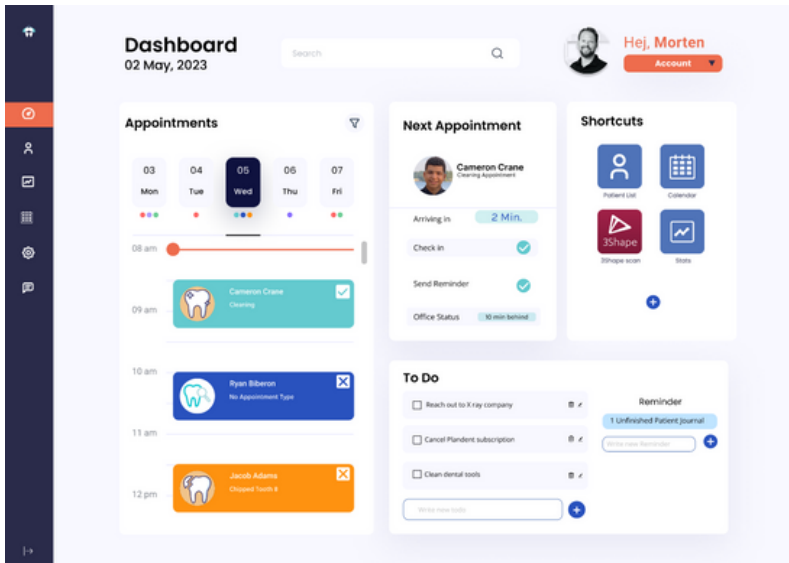
The **Next Appointment** tile allows for appointment updates, reminders, and check-ins. The **Shortcuts** tile provides access to frequently used functions and integrations with other software systems. A **To-Do list** is also included for users to keep track of critical daily tasks. The software allows for tiles to be interchanged to suit the needs of individual dental clinics.

Our team's mockup also enables users to create new treatments using old or new templates for their treatment plans. Dentists can add or edit their questions throughout the treatment procedures or modify any of the aspects on the template, for example, tooth diagram display in either row or jaw display. After all the procedures are done, the software will bring them to a confirmation page, where a checklist is visible, and the bill is created. The confirmation list not only reminds the dentists to make sure they have done all the steps for the treatment, but patients can also see their treatment steps in the history of their dentist.

One of the most innovative features of our software is the resume, which is displayed on the treatment plan. The resume contains all the highlights or essential information from the patient's journal. The dentist can choose what is displayed in the resume by bookmarking the important information in the journal. Additionally, dentists can also edit or modify the resume manually.

User Testing

After finishing the first iteration of the Figma mockup, **our team began to conduct user testing and reached out to the dentists that we initially interviewed. We demonstrated the software's full functionality and workflow.** We took pauses before moving to the next page, allowing dentists to ask questions and give feedback. Our team also presented different templates for the treatment pages to hear their thoughts on the customization.

Objective 4

Recommendations

Our team also created a list of recommendations for the software's next steps and future innovations resulting from all the research and data we gathered. Firstly, software connected to the cloud would allow for better security, more flexibility, and easier scalability. These features would make sharing files between dental clinics easier and allow easier patient access to their own data. Since dentists use many different systems, ensuring the **software works on mobile devices, Windows PC, and MacOS** is also very important. We also found that **artificial intelligence (AI)** could benefit many different aspects of the software. AI benefits include features like autocomplete, predicting a patient's teeth after treatment, or diagnosing a patient for oral diseases. In addition, **maximum customizability** would allow dentists that practice differently to have software that fits their specific needs. Our last major recommendation is **third-party software integration.** For example, the software could include functions that can open 3D files from another software directly in the patient's journal. This feature would help avoid the frustrations of switching between multiple software to complete tasks.

Cloud services, platform diversity, the use of artificial intelligence, customizability, and third-party software integration are some highlighted suggestions.
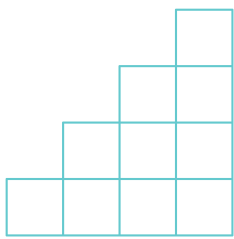
IN CONCLUSION

In conclusion, our team developed two functioning mockups visually representing the results of our findings. We delivered these mockups and all of the data supporting our design choices to the software company SolutionWeb. Our team has a high level of confidence that new dental software based on our recommendations would address many common frustrations expressed by Danish dentists. Furthermore, the software would help optimize dentists' management information systems, thus improving Danish dental care.
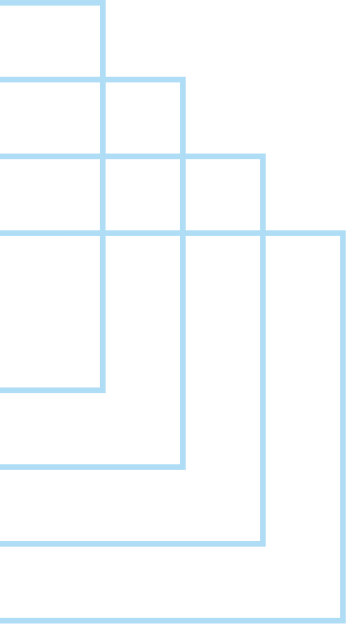
TABLE OF CONTENTS

Computer systems utilized in dental clinics in Copenhagen, Denmark, have undergone limited iterations since 2008, when the programs were first released (Worsøe, 2023). **Due to the lack of software innovation and the absence of competition in the Danish dental software market, the current system has fallen behind the global standard of modern technology.** In addition, complex technology management processes, limited reliability, and a non-user-friendly interface have resulted in less-than-optimal workflow and frustrated dentists (Worsøe, 2023). Therefore, an improvement in dental software is necessary to increase productivity and enhance the quality of dental care in Denmark.

1.

INTRODUCTION

 SolutionWeb, a software company, and CoworkIt, a company with an extensive information technology (IT) network, are working to develop a better solution for dentists. First, these companies aim to gather valuable information about dentists' IT landscape. Then, the software developers aim to use this information to implement advanced technologies to enable dentists to boost their workflow and introduce innovative and more optimal user interface design.

Mads Ehrhardt
CEO of
coworkit

Morten Worsøe
Dentist of
WORSØE
HENVISNINGSKLINIK
FOR BIDFUNKTION

Douwe Hoekstra
CCO of
SOLUTION
WEB

Our Sponsors

Our team of four students from Worcester Polytechnic Institute (WPI), strives to help these companies with their mission. **We aim to innovate dental data management systems. We will evaluate and redesign dentists' IT systems, revamping their day-to-day operations and improving dentists' and patients' experiences.** We will accomplish this by conducting scholarly research and interviewing dentists to identify their demands using the latest technology. These steps will allow us to **develop a solution to improve the efficiency and functionality of dental services across multiple platforms.** Ultimately, we will provide CoworkIt and SolutionWeb with complete data and analyses of our design choices. On top of this, we will hand over a fully designed dental software mockup containing critical features and functions.
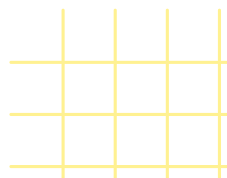
2. BACKGROUND

The Dental Record - 1881
by the European Orthodontic Society

History of Dental Records

Before computer integration in the 1980s, dental records were kept on hand in dental offices and organized in large file cabinets (net health, n.d.). Files were stored as dental charts, documents with common jargon, and information formats. These management methods allowed dentists to easily share and track patient records. Digitalization eventually enhanced dentists' ability to store more patient information on computers, save office space, and increase the reliability of saving documents. However, **dental software currently varies in sophistication and robustness in every country.**

Context of the Danish Healthcare System

The Danish government aids dental clinics in Denmark by compensating dentists for their work. The government fully covers patients under 18, while older patients' coverage can vary widely. According to Dentist 1, 15% of regular private practice revenue comes from government reimbursements. Furthermore, the government requires specific information to document patient appointments which must be manually completed after an appointment.

Electronic health records (EHRs) have become commonplace in modern healthcare. In Denmark, EHR portals were standardized through the creation of the National Danish Electronic Health Record Database in 2007 for medical records for hospitals. (M & Vosegaard, 2008) (Bansler, 2021). However, **The absence of a unified dental record system forces dentists to share files through a system called Electronic and Data Interchange (EDI). The existence of this system means dentists do not have a streamlined system** to transfer patient journals or other important information.
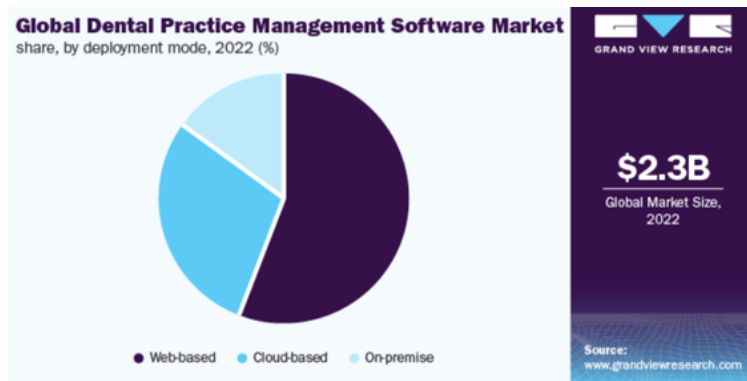
al dente
Nordenta

DENTAL suite®

In Denmark, patient records are referred to as a patient's dental "journal" (Worsøe, 2023). The journal tracks the status of a patient's teeth across multiple visits and records completed work. In addition, a dentist uses a journal for taking notes, recording charts, and organizing additional dental files.

The way these programs organize patient information and minimize the time spent updating patient records separate each system. Dental Suite and Al Dente are the primary journal software for many dentists in Denmark.

Multiple types of software compose the worldwide technical landscape of dental clinics. For example, different software is used to operate procedural dental practice machines, keep track of patients' personal information, and keep track of billing and booking information (Worsøe, 2023).

Context of the Danish Healthcare System

Danish Software Market Leaders

The global market for dental equipment and software is large and growing. The market for dental office equipment contains many components, from dental imaging equipment to casting materials and basic clinic equipment like chairs and lights. The global market for dental equipment is estimated to hit $8.9 billion by 2026 (MarketsandMarkets Research Pvt. Ltd., 2022). More specifically, the global dental practice management software market alone is estimated to grow to $3.11 billion by 2029 (Meticulous Research, 2022).

Global Dental Pacetice Management Software Market 2022

The Danish dental software market is minuscule compared to the United States. **Two Danish companies, Nordenta and Plandent, currently lead the market in Denmark.** Other companies have a high barrier to entry into the Danish market due to language requirements and GDPR regulations.

Nordenta, a Danish company founded in 1986, is another prominent player in the Danish dental software market. Nordenta, similar to Plandent, offers many different dental and medical products. Nordenta's IT services are offered through their program Al Dente. This software offers many of the same features as Dental Suite with different integrations.

Plandent, established in 1985, is a private company headquartered in Finland and a significant player in the Danish dental software market. Plandent's dental software is called Dental Suite. The software offers IT security, payment solutions, a calendar application, a bookkeeping system, and DentalSuite courses for dentists. In addition, Plandent also sells a wide variety of dental equipment, including hardware and materials, in addition to software. Plandent supplies an extensive range of dental equipment and procedural instruments for dentists in Denmark.

The range of services and products limits the resources of these companies and inhibits the desire for innovation in the Danish software sector. Furthermore, the relative lack of competition in their market also discourages the companies from enhancing their dental software.

Dental Suite features - A dental software from Plandent

In addition to hosting the patient journals, Dental Suite and Al Dente offer services such as a calendar, automatic bill generation, and statistical analysis of company metrics. All of these services are essential to how dentists conduct their daily business. However, **many dental practices vary in size and specialization**, requiring dentists to differently implement similar features.

Since every dentist conducts their practice slightly differently and thus needs software that suits their work style. **Dental Suite and Al Dente offer few customization options**, leaving many dentists frustrated with software that does not best fit their needs. In addition, Dental Suite and Al Dente have not experienced significant changes since 2008. The age of the software limits its ability to change and fit the individual needs of users. For example, one dentist requested a small software change to technical support at Dental Suite, and he was told it would take 500 man-hours to implement that change (Worsøe, 2023).

Software in the Dentists Office

Office management software is a major aspect of the technical landscape in a modern dental clinic. Office management software includes booking online appointments and text or email reminders to patients. User-friendly features like this help increase the odds that a patient attends their appointment (14 Creative How-to Ways to Reduce Patient Cancellation Rates, 2016). This software also helps dentists analyze clinic trends and manage staff.

Dentists use various tools and machines to work on a patient's teeth in a clinic. Imaging tools allow them to visually explain critical information to patients and analyze their teeth over time. These tools include X-ray machines, digital cameras, and 3D scanners, among others.
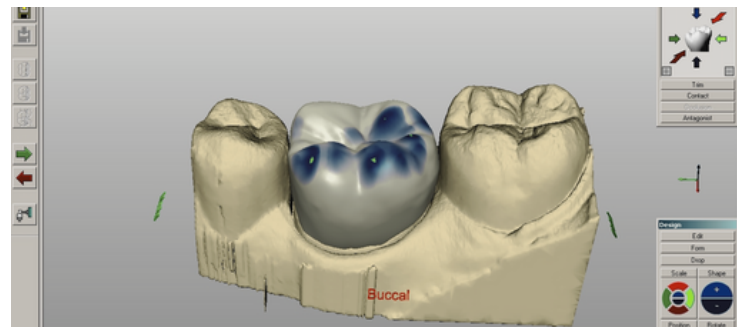
For example, dentists use cameras to take pictures of notable jaw issues to easily portray and analyze patients' teeth. Currently, **these tools produce image files that must be physically transferred and uploaded into the electronic health journal of a patient**. Photographing a patient's teeth on an iPhone and digitally uploading them to their journal is currently difficult. In addition, **procedural technologies and imaging tools must work hand in hand with the office management systems to effectively portray a patient's information**. However, Danish dental software lacks this standardized integration.

Concept of System Design

System design refers to the architecture, interfaces, and data for a system that satisfies the stakeholders' requirements. Two main aspects of the system design are user experience (UX) and user interface (UI). UX refers to the user's perception of functions, how easy the product is to use, and how easily the user can complete a task. UI refers to the visual elements on the screen, like buttons, toggles, and icons.

Design principles consist of the visual aspects of a product and a set of guidelines that inspire layout and style decisions. Having **cohesive design principles** is critical for having positive user interactions. This concept refers to having themes and design elements match the intention of the software. For example, colors should complement one another, and design elements should be chosen to create a unified appearance. **Designers can use and combine design principles to make their work stand out**. The cardinal axiom for user interface design is: **"A user interface is well designed when the program behaves exactly how the user thought it would"** (Spolsky, 2008).

The four relevant aspects of the design

Concept of System Design

Identifying user purpose and shared values is critical for creating a positive user experience. Therefore, the needs of the user are the top priority when designing a product. Therefore, all design aspects should be chosen to help the user quickly find and accomplish the goal of why they are using the product.

Principles revolving around the user's purpose

Unification of brand identity

Maintaining unified components and patterns

Considering values shared among users

 Brand identity is when the designer incorporates perceptual patterns. More specifically, the brand identity is composed of colors, fonts, spaces, shapes, icons, illustrations, photographs, animations, voice and tone, and sounds. Considering these patterns ensures the team can develop a unique design style and maintain consistent UI/UX elements. This concept is critical for connecting with the user and making the design stand out.

The system should have **unified guidelines for components and patterns.** Components are reusable and system-specific sections of a page. For example, modules, portlets, widgets, blocks, or other labels can be classified as components depending on the design context (Nathan, 2009).

This figure shows how components and patterns are related. Component chunks (orange) and patterns (red) are displayed on the home pages of comcast.net (left) and fancast.com (right) (Nathan, 2009).

 In the context of system design, patterns are the recurring elements that provide users with familiarities across different pages. These two aspects are the main building blocks of design and will shape the look and feel of the software. Consistency across the entire design is vital so the user knows what to expect while using the software. (User Interface Design for Mere Mortals, 2007).

3. PROJECT GOALS

Our team aimed to innovate dental data management systems in Copenhagen. We focused on evaluating and redesigning dentists' IT systems to revamp their day-to-day operations and enhance both dentists' and patients' experiences. This effort allowed us to develop a solution to improve the efficiency and functionality of dental services across multiple platforms.

Objectives

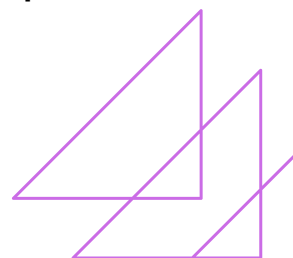| Analyze Danish dental software and identify dentists' current needs and dissatisfactions with their current systems | Design a software system for dentists that addresses their identified needs and builds on the current software's good features | Gather feedback from dentists on our redesigned dental software and alter our designed software system based on their feedback | Provide data-driven recommendations to CoworkIt on important features and integrations that should be implemented into the software |

Overview

This project spanned 14 weeks. The first seven weeks took place at WPI, consisting of preliminary background research and forming our plan for when we arrived in Denmark. T**he second seven weeks occurred in Copenhagen**, where we conducted our research plan and executed our project deliverable. We leveraged our project partners and connections to best foster our research and aid us in quickly gathering accurate information. Appendix A lists our primary sponsors' names, companies, and job titles.

This project aimed to improve the dental office management workflow. We sought to create mockups for software that allows dentists to prepare for appointments, manage patient information, and conduct other necessary clinic processes in an intuitive and natural workflow. **The following sections detail the methods we utilized to accomplish our objectives.**

To comprehensively analyze Danish dental software, we needed to gather information on how dentists view the current system. We used a **literature review and interviews with dentists** to gather information to shape our final software design.

4.

DETERMINING USER NEEDS

Literature Review

Our team researched and analyzed reports and documents containing information about dental software through a literature review. Utilizing WPI's wide variety of online databases, we have extracted preliminary background data revolving around our primary objectives.

Through conducting a literature review, we were able to familiarize ourselves with the different types of technology and workflows in a dental clinic. This greatly aided our team in identifying the vast number of processes that dentists operate daily. Essentially, the literature review provided us with all of the necessary background information so that we could easily transition to the interview process.

Interviews

Interviewing dentists was the most efficient way to gain insight into their needs and issues with the current software. Obtaining information from dentists about their day-to-day responsibilities and how software assists them allowed us to identify areas the current software does not fill. Interviews also allowed our team to ask dentists if they have any major issues with the current software or smaller inconveniences that could be better performed through a software upgrade.

During this first stage of interviews, we spoke to five dentists in the Greater Copenhagen area. We created a condensed list of interview questions to obtain the most valuable information. Interview questions can be found in Appendix B.

Our team - Jacob and Ryan - standing in front of Dr Worsøe's clinic

4/5 dentists our team interviewed used Dental Suite, Plandent's software. On the other hand, three dentists used additional manually implemented software programs in their dental clinic aside from Dental Suite.

Favored Aspects of the Current Software

Our team received insight into the features dentists liked most about the current software. Below is a list of the features in the current system, ordered by the most favorable, from the interview data: **the billing system, the calendar, the viewable statistics, and the custom macros.**

Four out of five (4/5) dentists were satisfied with Dental Suite's billing system to a certain extent. For example, the bill connects to information provided by some insurance companies. Insurance reimbursements make up an essential portion of most dentists' income. Thus, dentists are fond of these integrations and how it makes it easy to file reimbursements efficiently. In addition, the billing system allows for parts of the patient bills to be auto-generated and sent as a result of filling out the patient journal. Dentists appreciated these aspects of the billing system.

Four favorite features about the sofware based on our dentits' interviews

A significant finding from the initial interviews was that dentists enjoyed previewing their entire day using the calendar. Furthermore, **4/5 dentists said they liked quickly assessing the type of work they had to do daily based on custom color coding** implemented into the calendar.

Additionally, **2/5 dentists liked Dental Suite's statistics feature**, allowing them to access metrics relating to their practice. Statistics that we found to be important include data and charts relating to revenue, patient trends, and monthly summaries, among other metrics. Moreover, every dentist we spoke to was fond of implementing statistics, even if they did not like Dental Suite's capabilities.

We also learned that one of the features that dentists used regularly was the ability to create their own macros. **All five dentists expressed great interest in the ability to create these macros**. A macro refers to a sequence of events that can be played back to help with repetitive tasks.

Overall, the current software does what it is required to do and contains enough features to allow dentists to conduct their daily business operations. However, o**nly 1/5 of the dentists are satisfied with the current software.**

Disliked Aspects of the Current Software

Our interviews concluded which features of the Dental Suite were disliked. We found that the most disliked aspects of the current Dental Suite system include the following:
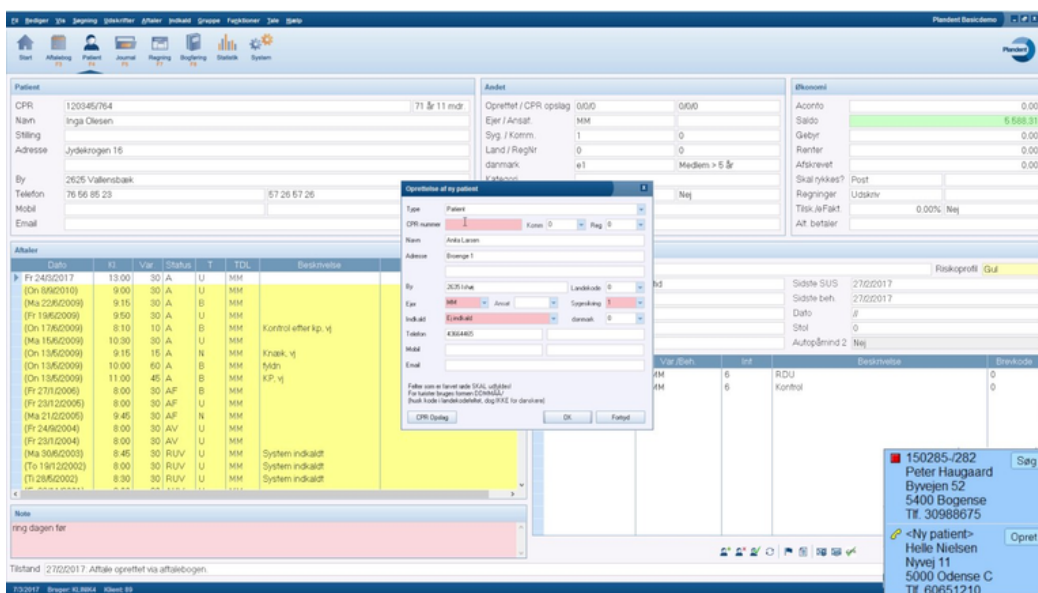
- User interface
- Outdated technology
- Workflow of the patient's journal
- Lack of system customization
- Note-taking elements

Disliked features lists

The complete list and analysis of disliked features identified among the five dentists can be found in Appendix C.

Dental Suite current user interface

One dentist explained that Dental Suite has a very poor **user interface**. Another dentist agreed, stating that the interface is simply "ugly." Two other dentists agreed that the interface was outdated and sometimes challenging to read and navigate. Another aspect that **4/5 of dentists disliked** was the **lack of system customization**. Customization primarily entails the ability for a dentist to manually create a new patient treatment and choose which questions and information will compose it. We found that dentists prefer this alternative over having the same prompted questions for each type of treatment.

The **note-taking system** was identified as a prominently disliked feature as the text boxes are too small for the information stored in them. In addition, two dentists agreed that the text boxes for notes on an image or patient require much scrolling within a complex and difficult-to-read format.

The **workflow of the patient journal** was generally despised among dentists as they spend much of their time working on completing it when they would rather be spending that time working on patients (Worsøe, 2023). Ultimately, most of these widely disliked features directly result from the outdated technology they use.

*A complete list of the **features specific dentists disliked** can be found in Appendix D, **as many of their opinions varied.***

Desired Innovations

Every dentist had suggestions that they would like to see implemented in future dental software. Likewise, dentists wanted varying functions and features in the software system. Some easier-to-implement features include a **seamless journal workflow and increased system customization.**

A **quick and easy-to-navigate patient journal** containing all of the details a dentist requires is a high priority on the features list. Dr. Worsøe suggested creating a subsection of the journal as a **patient resume.** The patient resume bookmarks all content that a dentist highlights. Implementing the resume was a reasonable consideration for mockup development since it allows dentists to manually select which patient information they deem to be most important. In addition, the patient's resume would benefit dentists as they would not have to scroll through a patient's journal to access their most prominent information.

In addition, 4/5 **dentists expressed great interest in increased customization** for all aspects of their dental software. Due to the many different ways dentists practice, they wanted different functions in their software.
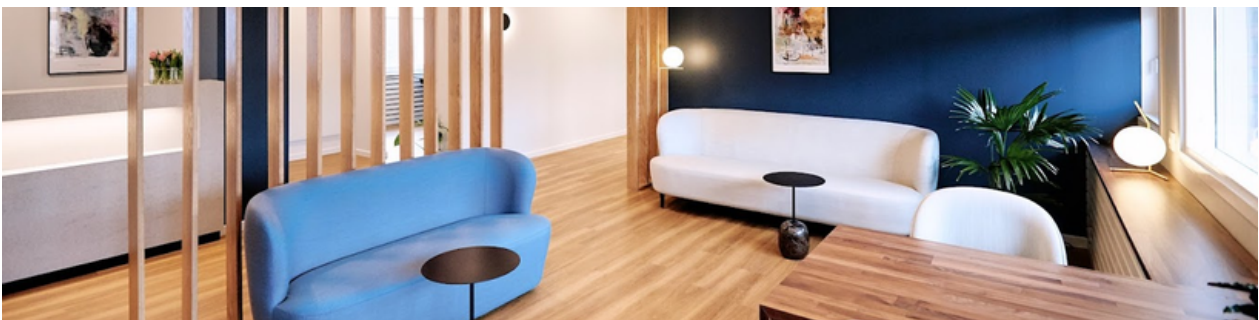
Dr. Morten Worsøe's dental clinic

Dentists also requested some more difficult aspects to implement, including integrating **Google Lens** to help diagnose patients and voice control to fill in rote patient information and note-taking. **Artificial intelligence (AI)** was suggested to advance patient care and potentially identify oral cancer and other diseases through image processing. Integrating complex technologies in the office, such as Google Lens or voice assistants like Alexa, would enable dentists to document their patient journals without taking breaks from the treatment to type. However, the feasibility of implementing this technology was not prioritized for our project.

Analyzing our interviews, we created a detailed list of essential and disliked features. Then, we used this data to develop two different software mockups. The complete list of features can be found in Appendix E.

5. LOW-FIDELITY MOCKUP DEVELOPMENT
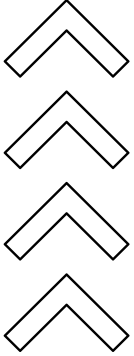
Low-fidelity (lo-fi) prototyping was the beginning step in the design process to translate a high-level design concept into an initial testable deliverable. The role of the lo-fi mockup was to test the design's functionality rather than the aesthetic. The team used Balsamiq to design our lo-fi mockup.

Balsamiq is a rapid, low-fidelity user interface wireframing tool that roughly sketches a software's workflow. We used it to quickly create a system design that could be tested without any programming.

Low-Fidelity Mockup Findings

We implemented our interpretations of the initial interview data in the low-fidelity mockup. The mockup included 31 wireframes connected through working buttons, enabling users to move between pages. We found that Dental Suite had a massive amount of information on each page. Our design contained minimal components and search bars for users to quickly find specific information on any page. To avoid replicating the complexity of Dental Suite, our team aimed to create a simple page design with few buttons and fewer words. Since dentists were so frustrated with the tedious journal process, we prioritized a linear workflow to simplify each page and step in a treatment.

01 Minimize search bars so that a dentist could navigate the software quickly with limited interaction

02 Software needs to separate pages for different types of treatment and only show relevant information

03 The design needs to utilize more page space with valuable components

We completed the Balsamiq development and **presented our drafted mockup to our sponsors and their team of programmers for review**. Some key takeaways from this meeting were:

Our focus group concluded that more search bars would lead dentists to type rather than engage with patients. Any information that needs to be accessed must be readily available without having to search.

Journal page
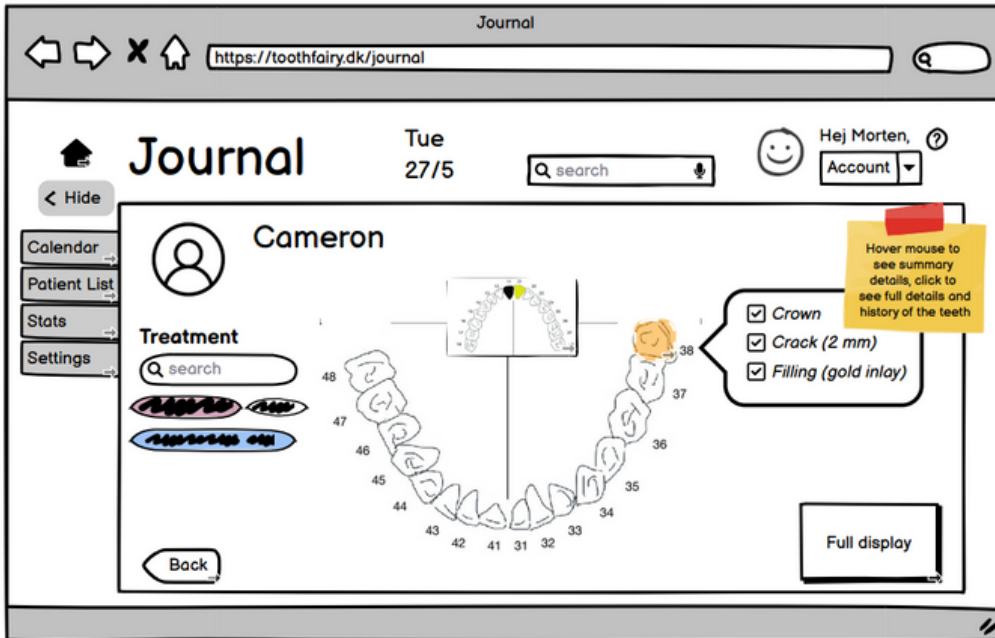
A Journal page showing tooth diagram in full details - Lo-fi Mockup

New Patient
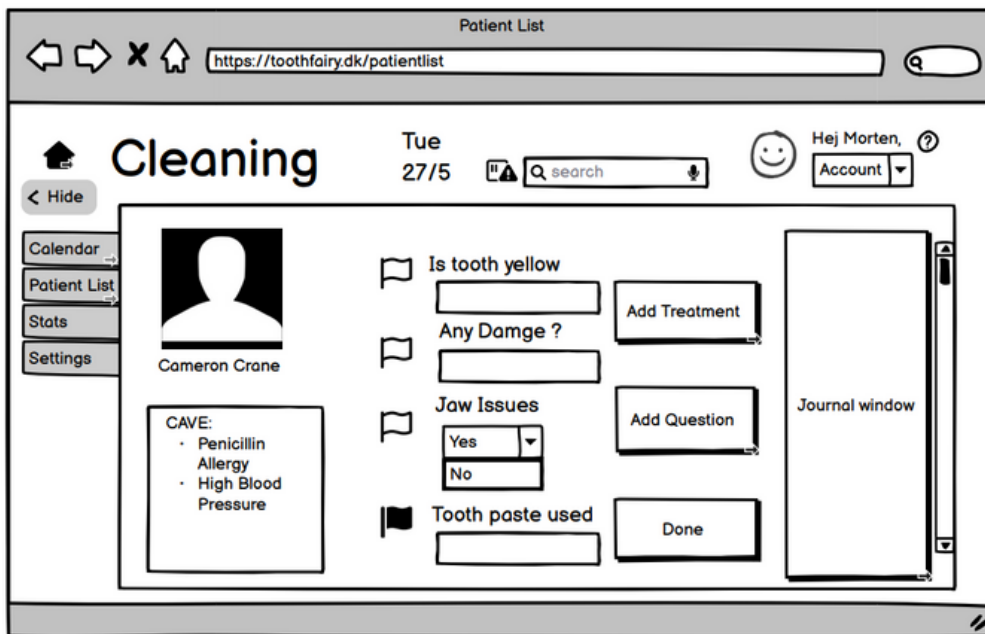
A Cleaning Treatment page - Lo-fi Mockup

Our sponsors explained that they want to see a process completed with as few steps and typing as possible. Initially, we designed this mockup with larger text, fewer components, and buttons to create open and spacious pages. We received feedback that pages should not be limited based on the amount of information on each page. The accessibility of critical information outweighed our minimalistic design's goal for less distracting components.

6. HIGH-FIDELITY MOCKUP DEVELOPMENT
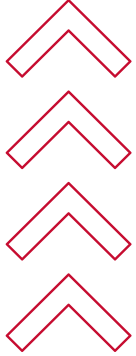
After showing our low-fidelity Balsamiq mockup to our project sponsors and receiving feedback, **we used a program called Figma to create the final high-fidelity mockup**. Figma is a design tool that contains many tools and modification abilities to produce a robust, high-fidelity mockup of the user's design. Figma offered entire team collaboration through a cloud-based platform. This feature allowed all of us to edit the mockup in real-time. On top of this, Figma allowed our team to add buttons and components that link to specific pages and other information. This function lets users click on the design to navigate through the workflow.

Figma allowed us to create our final product before receiving feedback for revisions. We applied design theory to decide on colorways, themes, and general workflow to complete the mockup.

Figma

 Once we created the high-fidelity Figma mockup, we conducted contextual inquiries. In these contextual inquiries, we asked dentists to provide their full thoughts on our design, including what they liked, disliked, and would like to see. After the evaluation process, we analyzed the data and identified patterns in the feedback we received.

The team made significant improvements in the Figma mockup compared to the existing software. **The main differences between the Figma mockup and the current software are listed as follows:**

|	
Journal layout	Confirmation checklist before finishing a treatment
Patient list	Creating new custom treatments
Patient resume	Customizable dashboard
CAVE display	Ability to export and import journals to another user

Customizable Dashboard

The dashboard is the initial landing page of the software to be used by dentists and staff. We quickly learned, through our interviews, that **each dentist has varying needs and wishes to optimize how the dashboard operates**. Because of this, we decided to create the dashboard in a fully customizable way to tailor it to dentists' personal needs, which can be done in the dashboard settings.
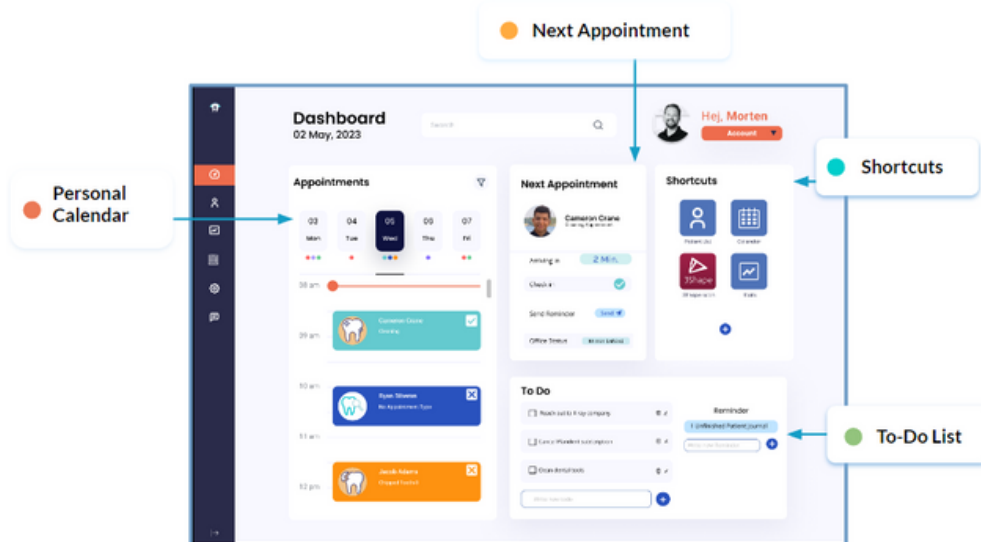

The dashboard is linked to the navigation bar; every software feature is accessible from this page. Different size tiles with varying information allow users to access custom components they can use to complete their daily tasks.

 For example, a user can select to view the calendar with all of their appointments and dates for the month or can minimize it to contain only daily or weekly appointments. Additionally, our team has developed the "Next Appointment" tab, where users can view the details and updates on upcoming appointments. This section keeps the user updated on a patient's arrival time and can send an auto-generated appointment reminder to the patient. This feature can alternatively be used to cancel or delay an appointment. A patient can also be checked in through this section, transitioning to the treatment process.

 In order to allow for maximum user personalization, **we added the "Shortcuts" tab**. This tab enables users to select their most essential add-ons or features manually. Some accessible shortcuts include X-ray programs, the patient list, and 3Shape, a 3D scanner software. On top of this, the software we designed will allow for complete integration, so no software will need to be closed and reopened.

 We implemented a **to-do list** to allow dentists to view critical daily tasks. Users can add tasks to be completed, edit them accordingly and check off the box when they are completed. We understand that each dental clinic is entirely different, and each operates according to different guidelines and principles. Therefore, a comprehensive to-do list might vary between solo practitioners and a clinic with multiple dentists.
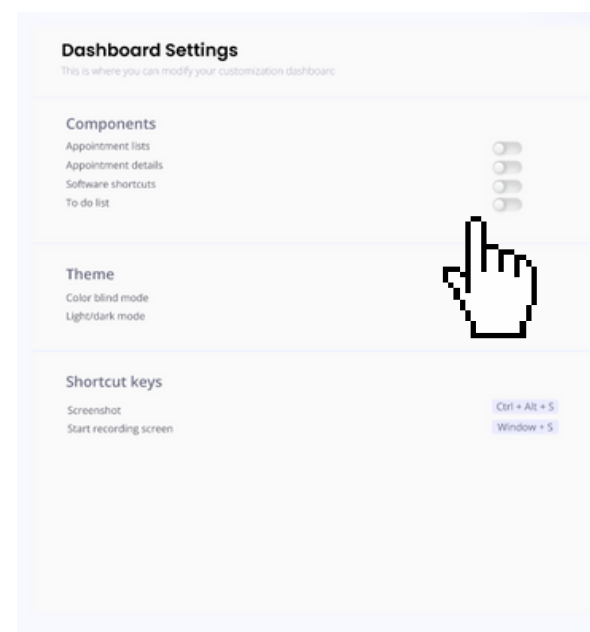
Creating New Custom Treatments

By minimizing the amount of time spent on filling out patient journals, our team has developed shortcuts where users can easily access the appointment's treatment based on the scheduled event that appears on the calendar. For example, if a patient has an upcoming cleaning appointment, the dentist can access the cleaning treatment page with one click on their appointment. This action will trigger a specific set of pages related to only cleaning and updates the journal accordingly. Furthermore, for appointments that do not have a predetermined treatment, the dentist can select a new treatment from the treatment menu.

Our interviews and research identified the lack of **treatment flexibility** as an underlying issue. Treatment can be selected from the treatment options page at any time. The treatment options page lists all available treatments and enables users to create macros for their treatment plan. **When users select one treatment, they can choose from an existing template or create a new one**. While creating the new template, the user can select their layout and enable the functionalities they wish to display. Some functions for the treatment plan include questions for the procedure, a patient resume, a CAVE notification, a journal shortcut, and a confirmation page.
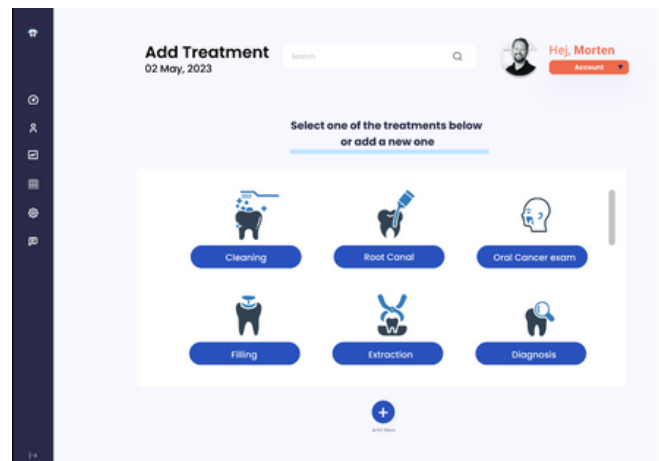
Questions for a custom treatment can come from a preset template that the dentist can also manually edit. Most questions are formed as a drop-down menu or multiple-choice to reduce the number of steps and typing. Naturally, users can add or modify any of their questions.

We found that preference for small features varies between dentists, like the jaw display. Regarding the tooth diagram, the user can designate the display as either "Jaw" or "Row." This customization will give dentists personal preferences and create habits to facilitate their work.
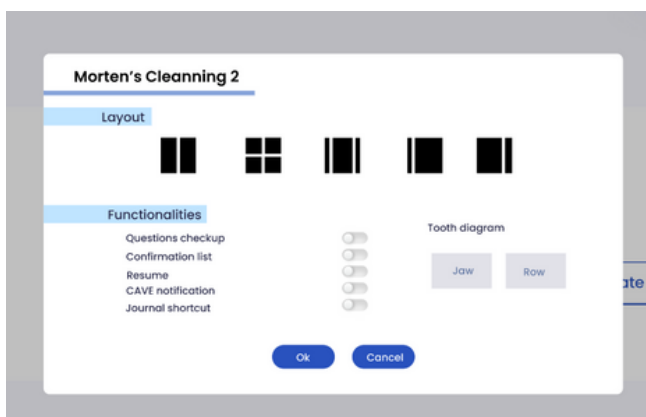
When a user arrives at the treatment page, there will be steps for the user to follow in order to complete treatment. For example, in a cleaning, users must select the tooth or teeth they want to treat using the tooth diagram before proceeding to the next step. Diagrams displayed are chosen in the template settings when the user creates the treatment plan.

Patient's Resume

The dentist can access the patient's resume, which contains an overview of crucial patient dental information. Critical information can be flagged in the journal so that it is viewable from the patient's resume. T**he resume automatically connects to the journal so that the resume and journal always have the most up-to-date information.** The resume placed on the right gives the dentist an abridged overview of the patient's history.
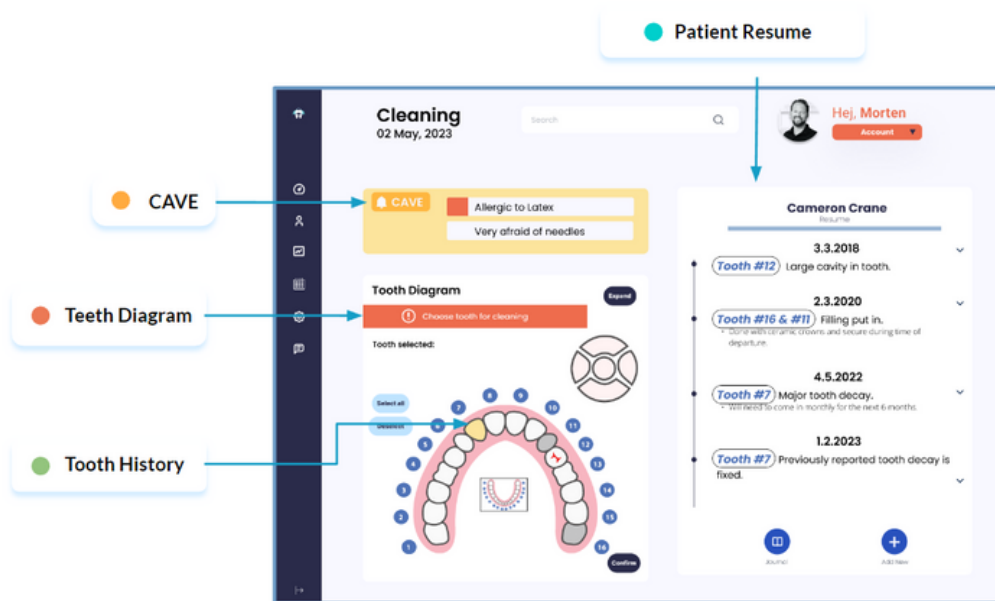
The resume also lets the **user take notes, record new treatment details, and auto-save** to the patient journal. After tooth selection, the dentist will be asked several questions about the treatment and might fill in some measurement requirements. For example, a simple treatment like cleaning may only ask for tooth status questions. However, for risk-involved procedures like surgery, dentists may be required to measure the patient's blood pressure before the treatment begins.
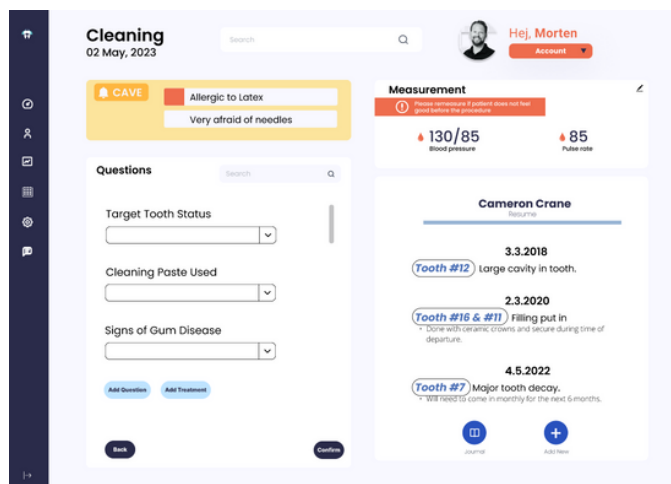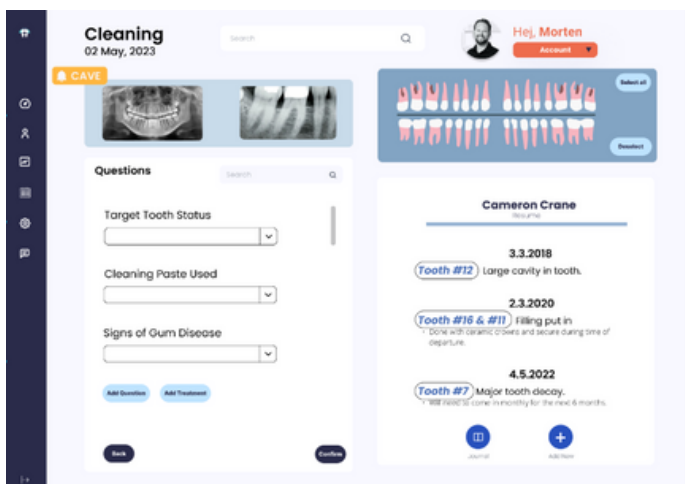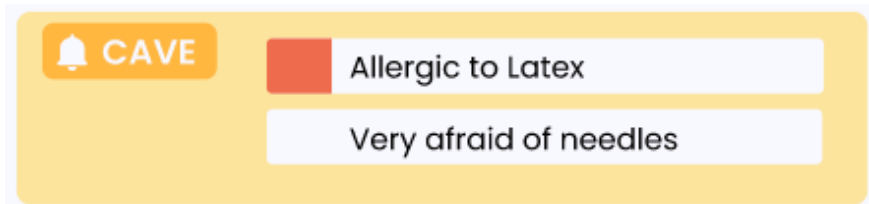
CAVE Display

The **CAVE display** is a term introduced to us by Dr. Worsøe. It is a term that is used **to notify dentists of critical patient information such as allergies**. Dentist 2 criticized the CAVE display for disappearing once it was clicked. Forgetting important information displayed in the CAVE could result in severe consequences for the patient and the dentist. Hence, **our design made the CAVE viewable on every page**. Minimizing the CAVE is an alternative option. This makes sure dentists are aware of the CAVE while allowing it to take up less page space.

Confirmation Checklist before Finishing a Treatment
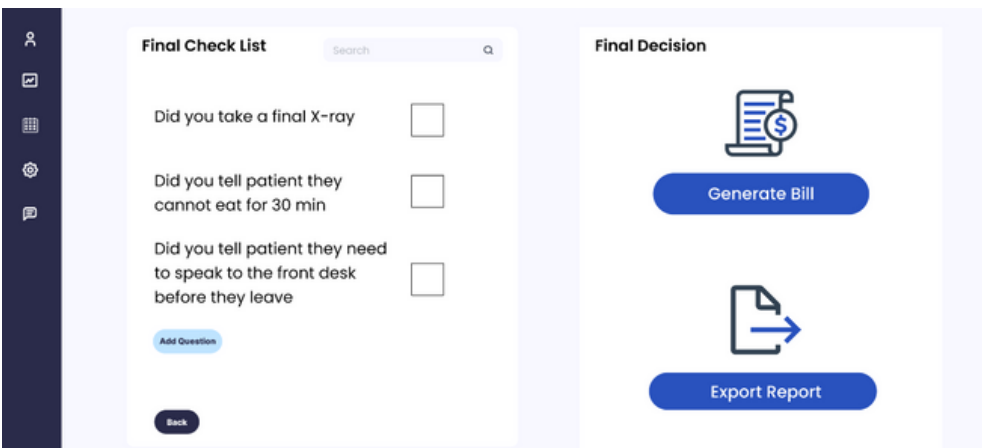
A After completing the treatment, the confirmation page will appear. **The confirmation page contains a checklist to ensure the dentist completed all of the necessary steps for the treatment.** An option to generate a bill or export the report for the treatment is available on the checklist page. This functionality can be modified or disabled based on the dentist's preference.

Journal Layout

After a treatment is finished, the user can access the patient journal and review any updates. **The patient journal features two horizontal layouts with the CAVE display, appointment summary, and tooth diagram situated at the top. The primary focus of this page is the patient journal**. This layout is designed to help the dentist concentrate on the journal and refer to additional details when necessary. The appointment tab only displays the previous and upcoming appointments so the focus remains on the journal. If the dentist wants to view the complete appointment history, they can. The same options apply to the tooth diagram, which has been reduced in size. Full details are expandable and viewable when the user clicks the tooth diagram.

To capture the attention of dentists, **the journal is positioned at the center of the screen**. The left side of the journal history displays dates, tooth treatments, and their details. The right side of the page contains file attachments. If the user hovers their mouse over the file attachment, they can preview it, and they can also import charts and graphs directly into the patient journal. This feature allows dentists to organize their files and locate them quickly.

Patient List

If a dentist needs to access a certain patient at any time, even outside of an appointment, they need to be able to do so quickly and easily. In order to do this, **our team created a patient list page, which is just a list of every single patient**
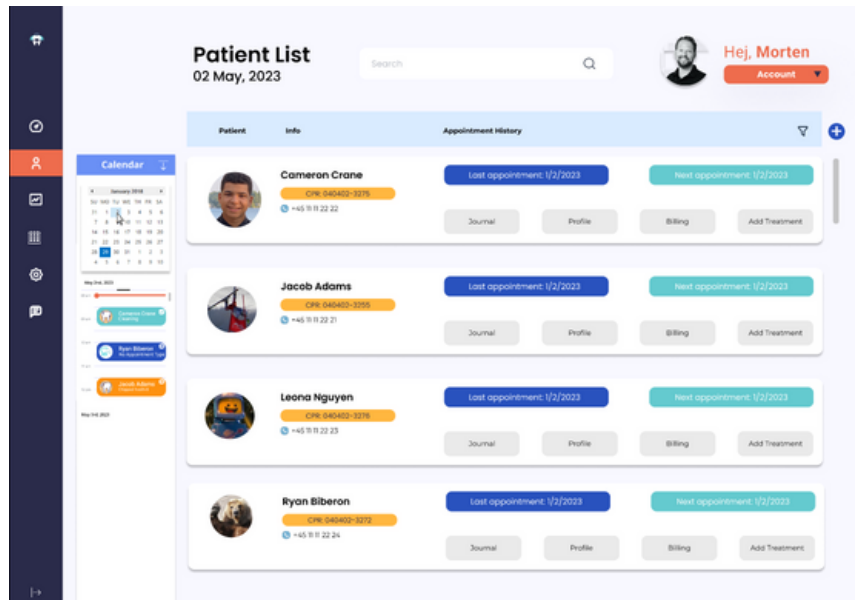
This list can be searched using a name, CPR number, or other defining characteristics. It can also be sorted and filtered by specific parameters such as the date of appointment, alphabetical order, or by treatment. This filtering allows dentists to find their patients outside of an appointment quickly.

Ability to export and import journals to another user

The design of the mockup allows for effortless exporting of journals and patient profiles to other offices and internal office computers using a secure messenger platform. Files can be exported from the treatment page or the patient profile page. In addition, a secure file-sharing system would allow for seamless exportation of patient files.

User Interface and Experience

  To unify the look and feel of the mockup, we used elements from a consistent design library. The colors and fonts we used as references are shown in the image below.
 The navigation bar allows users to access all areas of the software from one vertical list. Users can choose to minimize the navigation bar to save screen space.

Color selection

DESIGN
LIBRARY

Header 1

Header 2

Body

Buttons

Button   Button   Button   Button

✦ Theme

We decided to use **base colors commonly found in healthcare organizations**, like blue, gray, and white. The background of each page is a soft gray, while each tile is a bolder white. This color choice draws attention to each tile. In addition, we decided to utilize an **orange accent color as a contrast** so that essential elements like the account and the selected tab in the sidebar are highlighted.

✦ Button Elements

Most elements are made from simple shapes in an effort to not confuse buttons with other elements. On top of this, the team gave buttons a hover effect so that when the user hovers their mouse over, a contrasting version of the button will appear, indicating that it is clickable.
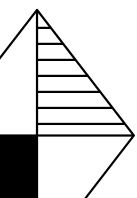
7. USER TESTING

Receiving dentist reviews was a necessary step in the evaluation process of our Figma mockup. Therefore, **we conducted three user tests to obtain valuable feedback from dentists.**

Contextual Inquiry

Our team showed dentists each page in our Figma mockup during these evaluations. We explained each page's features and functions and allowed dentists to express their thoughts after walking through a page. This process let us gain valuable information on each page. After walking the dentist through the entire Figma mockup, **we asked them to be brutally honest about what they liked, disliked, and what the system lacked**. This process allowed us to observe what features and functions were appreciated and what was disliked. On top of this, we were recommended some functions that we had yet to think of.

This evaluation process provided us with credible feedback from the individuals who will be using this system. Not only did user testing provide qualitative data on which features needed to be changed and what did not, but we were also able to quantify this feedback and formulate data-driven conclusions. After we received feedback from these dentists, we made informed decisions on the functionality of different software features. **A comprehensive data analysis from the interviews can be found in Appendix F**.

Positive Feedback

Dentists found different aspects of our mockups appealing based on their needs and preferences. **Some of the most well-liked features were directly integrating with other platforms, the patient resume system, the system customization, and the patient list.**

Overall, the most complimented feature of the mockup was the ability to integrate with other software. All of the dentists we spoke to were excited about the possibility of not having to switch computers to utilize the different software they had in their offices. For example, Dentist 3 explained how it would save them much time if the dental software could open 3D jaw files directly in the journal, so she would not have to open another software. In addition, previewing the 3D image files could help dentists compare the tooth results over time. Dentist 2 was also excited about having integrated 3D components, as that was the feature he was working on integrating into his software.
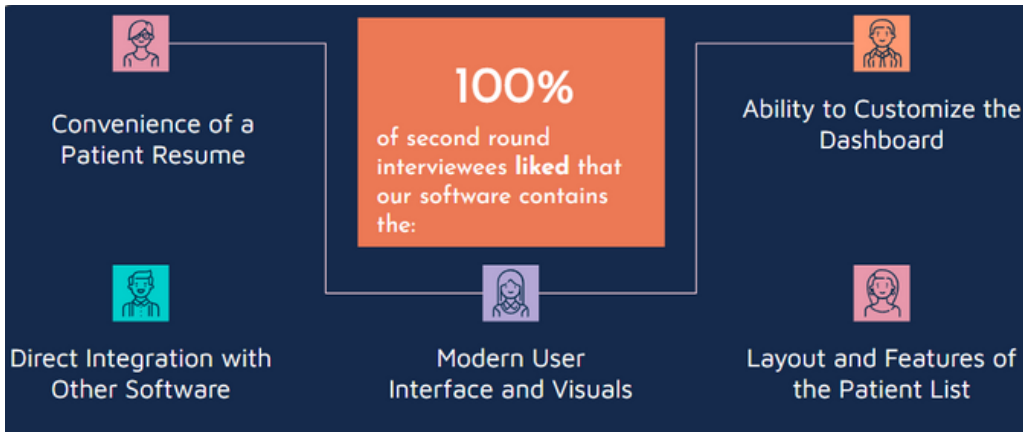
 The patient resume is one of the more unique components of the mockup. Both dentists we spoke to in the second round were interested in the resume concept. Dentist 2 integrated a resume into his software already and thus spoke highly about its value. He raved about how important it was to have a big-picture overview and suggested that it could be used to hold further references. Likewise, Dentist 3 thought the resume would be helpful despite initially not fully understanding its function.
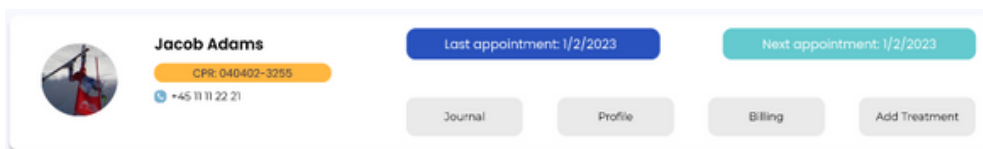
 The patient list was found to be well-liked by Dentist 3 and Dentist 2. These comments resulted from being able to **search and sort patients through filters** like name, appointment history, and contact information. It was also found that having direct access to a patient's journal, profile, and billing information from the patient list was liked. On top of this, dentists can also add a new treatment from the patient list.
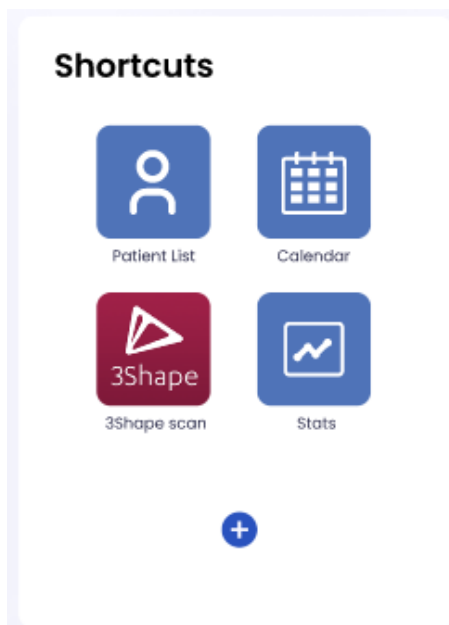
 A generally appreciated aspect of our design is complete control over system customization. For example, Dentist 2 explained how selecting which shortcuts and software integrations will be easily accessible from the dashboard is helpful. Similarly, another customization option that Dentist 2 was fond of was the flexibility of creating new and editing existing treatments.

Negative Feedback

The dental clinic of an interviewee

 Although most dentists seemed to agree with our version of the system, there were **some disliked features and design insights that they thought were not optimal**. For example, Dentist 3 mentioned that the **functionalities** are very much the same as Dental Suite, and the first page of the treatment page looked more confusing to her. Alternatively, Dentist 2 stated the opposite, disliking that it looks less comprehensive than the current software. Finally, Dentist 2 commented that his **familiarity bias** would guide him to support the software he uses over the new one.

 Dentists also mentioned too many button procedures to click on in treatment. Our goal was to make the design require minimal typing and look clean to be easy enough to convert into another system, like an iPad or touch screen. However, the design might not work for all dentists since **different dentists have different favorable insights depending on their work styles**. Hence, our team thinks that there should be more customizable options for this to fulfill all dentists' desires.

 Since some dentists had complained about the **CAVE notification** disappearing, we made our CAVE notification remain on the page consistently in a visible spot. However, Dentist 2 disliked this, stating that it took up too much space and he would only want to be forced to look at it sometimes. He prefers the ability to close out the CAVE once he is reminded of the information.

 A key finding of the negative recommendations was that other parties suggested or liked almost all of the things dentists disliked. From this, we can conclude that the ability to enable the features you like will make this software the best for the most number of dentists possible. Besides, things will be disliked, but the community will be served if the new software is upgraded from the current version and is widely used.

8. RECOMMENDATIONS

Based on the different rounds of interviews with dentists in the Greater Copenhagen area, we have composed **a list of essential features we believe the software needs to succeed**. Our recommendations consist of features that serve as the foundation for the current dental software and new suggested features that would allow the new software to positively impact dentists.

Customizability

Our first recommendation is that the software allows for maximum customizability. We believe this feature would best work by allowing users to change a page's layout by dragging and dropping different components to suit their personal needs. In addition, these components should be able to change in size to allow for user specifications. Customizing pages can serve as a selling point for dentists who rely on a few specific features in their current system. On top of this, personalized treatment plans can be marketed to appeal to dentists that practice differently. Furthermore, **different dashboards for dentists and staff** will provide users with relevant information. We believe allowing users to toggle between features will be a highly valuable feature.

In addition to being able to customize the dashboard, **users should be able to customize specific treatment pages**. For example, a cleaning treatment will look and function differently from a treatment page relevant to a root canal. Having access to different treatment layouts will allow dentists to fulfill their niche workstyles.

Cloud Server

Another important recommendation is that **the software should be cloud-based**, which creates many storage and security advantages (Sether, 2016). For example, many dentists have expressed interest in **allowing patients to view their own records as well as share information from one dentist to another**. A cloud-based service would allow sharing to be done rapidly and securely by dentists and patients. Instead of each dentist having to maintain a protected server, transitioning to the cloud leaves it up to the service provider. This will provide far better security than any on-premise server at a much lower cost.

Patient Access

We recommend that patients are able to access their own personal dental information. One advantage of personal patient access to data is to subdue patient curiosity. This would let patients that are interested in their dental history access their personal information. The second advantage of personal patient access would be to allow patients to share their information with other dentists. This feature would be beneficial in the extreme case that a patient's dentist passes away and cannot share the information themselves. The patient could complete the process of sharing their information with another dentist. Since the software would be cloud-based, we believe this step would be straightforward to implement. A mobile application would perfectly serve this purpose, connecting to the cloud and allowing patients to sign in on any device.

A Dentist Social Network

A recommendation we propose is a messaging and sharing service directly in the software. With the patient's permission, this platform would allow users to send messages across the office and easily share secure files with other dentists, including journals. Dentist 2 thought using social groups where staff could share suggestions and ideas directly in the application would be beneficial. An example of this would be if a receptionist could notify the entire office that a health inspector has arrived to check the clinic. Correctly utilizing this feature would foster a clinic with strong communication, leading to a more unified workspace.

Platform Diversity

We believe that another essential feature is that this software should be **platform agnostic.** The availability of the **software on different types of devices is vital for many dentists as it would allow for increased flexibility**. As we learned through our interviews, many dentists use different platforms for everyday tasks, including Windows PC, Macs, and iPhones. One use for this feature is that a dentist could open the software on their phone, take a picture of a tooth directly in the software and upload it into the system from their phone. The photo could then be accessed from any computer in the office without transferring any physical files. If done correctly, this feature would be designed so dentists do not have to worry about GDPR file storage regulations. Patient files will be auto-deleted from the mobile device after the upload to the system (GP mythbuster 62, 2023).

Auto-Complete

An API (application programming interface) acts as a liaison between two software programs. This allows them to interchange information and seamlessly work together. In the context of our dental software system, an **API would suggest completing the word** that the user might want to type by sending a service in return with a request token.

Our team believes that the HealthOS API would be a suitable option for implementing auto-completion and suggestion features in our software. HealthOS is an API that has access to an extensive library of health terminology. HealthOS's library includes areas in medicines, lab tests, diseases, and exercises. On top of this, it contains built-in functions to autocomplete these words. HealthOS has a protocol that lets any platform request and store data. This function can be accessed by a request token issued by the user. In addition, the API has the option for language binding to make integration from English to Danish easier.
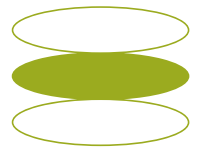
Artificial Intelligence

Artificial intelligence is a relatively new technological breakthrough but can provide countless benefits. For example, integration with AI could enhance dentists' ability to treat a patient by quickly identifying issues with a tooth. **We suggest Diagnocat AI**. This AI has 24/7 accessible cloud storage and can be viewed from any device. It also provides support in aiding clinical diagnoses by highlighting anatomical areas, shared findings, and reviews for 65 conditions. Similarly, Diagnocat automatically produces reports to document results properly and can immediately present information to patients. **This automated service studies jaw X-rays and 3D images and provides image processing for radiology reports that can be intangible to a dental clinic. This feature can aid in identifying oral diseases and other hard-to-find jaw issues.**

Another possibility for AI implementation is DALL-E 2, from OpenAI. "DALL-E 2 is an AI system that can create realistic images and art from a description in natural language" ( ). Using this AI model, dentists could attempt to generate high-definition images of a patient's teeth after a treatment or operation. This visual could aid in convincing a timid patient to receive a treatment that the dentist believes to be highly beneficial. Similarly, this image processing could help both patients and dentists visualize final results.

Software Integration

We recommend allowing dentists to integrate as much common dental and office software as possible. For example, one **commonly used software is 3Shape**, a 3D modeling software that dentists often use. We recommend that this software be able to preview 3Shape files within a window. Additionally, the user should be able to access the 3Shape software with the click of one button without closing our system. Other important integrations include the ability to view any files within the software, including 3D files and X-rays. This integration would allow the dentist to see any images or 3D models in the patient journal without changing software or interrupting the workflow.
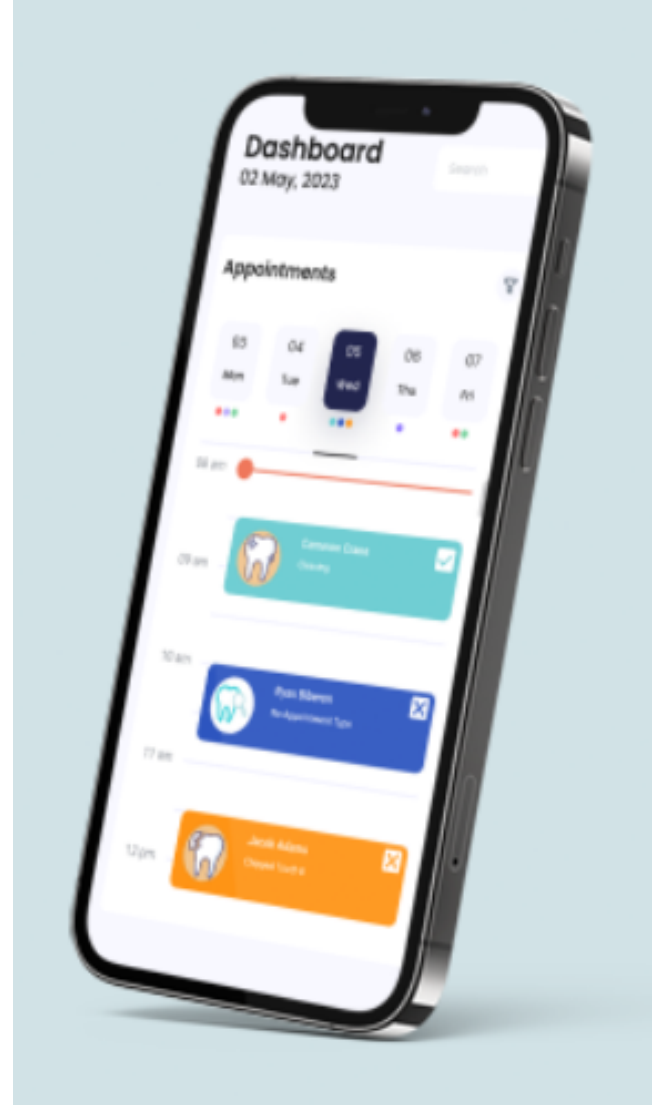
Layout Community Workshop

Our team recommends access to a marketplace where different software templates would be easily available. Templates can be treatment plans, charts for analysis, or patient resumes. T**his means that if a dentist customizes their software to their liking, they could upload this layout to the marketplace**. Other dentists could then view it, download it and apply it to their own software. This concept would also be beneficial in the case that a dentist uses multiple computers. With multiple computers, dentists could customize each one to have a display that best fits that machine's screen size and purpose. The user would have various template options to select from to create a unique and personal page. Users can contribute to the workshop online, and individuals can use these templates once they are published. These templates could also be linked to an account, such that if a dentist logs into their account, they can access their custom setup.

We believe dentists would have access to better templates than a developer could produce if dentists could upload their own saved templates. **The templates would be better because they would be created by dentists for dentists based on real experience and customer interactions.**

User Permission Levels
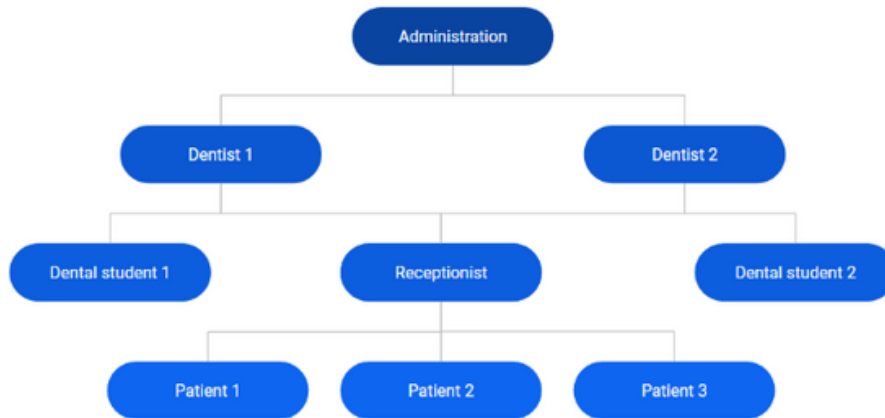
User hierarchy

We suggest that there are different access rights for different level users. We recommend a four-level user hierarchy composed of an administrator, a dentist, a dental hygienist/assistant, and a receptionist. The administrator is the individual that owns the dental clinic or makes the company's financial decisions. The administrator could view all dentists' calendars and patients' information. An administrator also controls the software's security settings, the creation and deletion of accounts, and the information staff has access to. For example, an administrator could access the office income statistics while the secretary cannot. Dentists could view hygienists' calendars, assign tasks, and record procedures. A dentist could also give other dentists and staff permission to access their schedule. A receptionist could have the authority to see all the dentists' and hygienists' calendars. The receptionist account could also view the patients' contact information or appointment history. However, they would not have the right to view the patients' treatments. Finally, the patient account could only access their journal and profile.

Time Bar

Our final recommendation is to make sure dentists can always view how much time they have remaining to treat a patient before the next one arrives. We suggest doing this by integrating a small component containing the amount of time left to treat a patient. Dentist 1 explained how this is a widely used feature of Dental Suite. This component could be placed wherever the dentist finds it most useful. On a busy day, dentists will have a quick analysis of their time to help better manage their day.
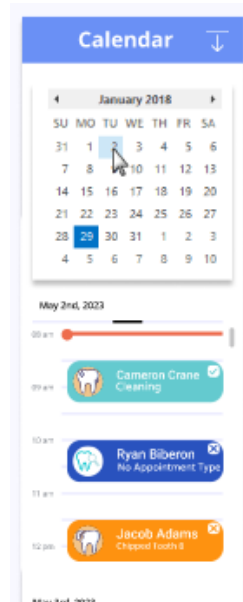
9.
CONCLUSION

In conclusion, our team developed two functioning mockups visually representing the results of our findings. In addition, we compiled all of our data and analyses in a comprehensive folder for further review. Finally, we delivered these mockups and all of the data supporting our design choices to the software company, SolutionWeb and CoworkIt. They will use our deliverables to assess the viability of creating new dental software in Denmark. Our team has complete confidence that if SolutionWeb were to create new dental software based on our recommendations, it would address many common frustrations of Danish dentists. Furthermore, the software would help optimize dentists' management information systems, thus improving Danish dental care.

APPENDIX A - List of Sponsors

Morten Worsøe
Dentist of

Douwe Hoekstra
CCO of

Mads Ehrhardt
CEO of

APPENDIX B -
Questions for Dentists:

#	Question
1	What is your full name?
2	How long have you practiced dentistry?
3	How many patients do you typically see in a day? How about in a year?
4	Can you walk us through an average day in your office?
5	How often do you send files to other dentists? Is it easy or hard? What do you like / not like about sharing information?
6	How do government regulations affect your daily practices?
7	What devices do the system work on? Do you wish there were more?
8	Are all systems you use equally good at running the software?
9	What IT programs/systems do you currently use? How long have you used it? Do you use either Plandent or Nordenta?
10	Do you find your systems' UI (user interface) appealing to view?
11	Are you ever frustrated by your current IT systems? If so, why?
12	Are there specific features of your IT system that frustrate you? Which features and why?
13	What features of an IT system are most important to you?
14	How well do your different software integrate with each other?
15	Is it easy to integrate new technology into your workplace?
16	Do you wish your system has features it does not have?
17	How difficult would it be for you to change IT systems?
18	Would you consider changing?
19	How easy was it to learn the system you currently use?
20	How is the system backed up?
21	Do you currently use an on-premise server to store data? If so, would you prefer a cloud service?
22	How much time do you spend each day working on patient journals?
23	Does every patient chart/journal require the same amount of time?
24	What percentage of the work that you do is online?
25	Is there software that you really like the UI / UX of?
26	How do you pay for your system? Are you ok with the price? Would you pay more for a better system?
27	Would improved software speed up your patient care?

APPENDIX C - List of Primary Disliked Features

Most Disliked Features
Paper Journals
Billing is tedious
Dental Suite: comes with own X ray software - pointless as when you buy x-ray machine it comes with a software with it
Windows on windows
2 day training to add a new treatment to system
Accessibility of statistics module

APPENDIX D - Complete List of Disliked Features

Disliked Current Features:	#
Irrelevant Questions + Checkboxes to Answer on Patient Journal	1
Longevity of Filling Patient Journal	4
Clinic Communication	1
Unstructured Patient Journal Flow	2
Outdated Technology	4
User Interface	4
Note Taking (manual)	3
System Customization	4
Billing	2
Accessibility to Statistics Module	1
3D Scanner Integration with Dental Suite	1
Submitting Patient Journal DIRECTLY after Appointment	1
Learning Dental Suite	1
Combined Billing for Different Teeth (cannot combine more than one procedure in same bill)	1
All Employees access the same Information	2
Too Much Scrolling	2

APPENDIX E - List of Features in the Low Fidelity Mockup

Low Fidelity Mockup: Complete List of Features
Import + export journals (of others)
Prompt to make sure certain questions are asked
Getting medicine information directly from SSN from journal
See journal changes over time
Seeing how a day looks based on custom colors
Online booking
Voice command in software
Full customization/control of software
Web software
Desktop application
Mobile application
All 3 (web, desktop, mobile)
Work on windows and mac
3D scan of teeth
Natural tooth diagram
Printable patient information
Patient access to personal records
Dental record adapts to planned treatment
Searchable treatments and patient entries
Cloud based software system

APPENDIX F - Full Interview Data Analysis

Figma Test - *Dentist 1*

Liked Features	Quantification	Disliked Features	Desired Features	Side Notes
Patient Resume	More than original	Unsure how software would handle complex treatments	Chain some treatments - like an anesthetic paired with a surgery and a replacement crown	He can only charge per tooth, cannot group or pair teeth together
Treatments linked to bills	Same as original		From journal, go right to integrated software like 3Shape	100-120 new patients each month - those numbers can turn into really beneficial trends and statistics
To-Do list and + sign to add new and miscelaneous treatments	More than original		Wants to add or remove teeth from the jaw diagram (some people have 3 wisdom teeth)	Difficult to know how the journal functions - needs to see how each different treatments works
Dashboard and customization	More than original		Filter: geographic areas, gender, age groups etc. for the patient list	
Treatment customization to cater to each patient	More than original		Revenue for patients, number of patients, etc. for Statistics module	
Highlighting and moving parts of journal into the resume	More than original		Section that shows you how much time you are working with and how much time you have left. ON EVERY SCREEN!!!	
Smaller preview ability of X-ray and mouth pictures. Fully opens picture/X-ray when you click on it	More than original			
See the history of each tooth. Looks easier than Dental Suite	More than original			
Dragging teeth that are being worked on	More than original			
Patient list	More than original			
Really likes to be able to view all colleagues calanders and schedule	More than original			
Being able to drag and drop files to share with clinic as well as other dentists	More than original			
Dragging and dropping different features and components exactly as he would like to	More than original			
Looks easier to use!!! He thinks a lot of people would like this	More than original			

Figma Test - Dentist 2

Liked Features	Quantification	Disliked Features	Desired Features	Side Notes
Patient Resume	More than original	Too much clicking from one window to another	Viewing ALL dentists appointments in the calendar (Treater 1, Treater 2)	current system - he can see the entire day, if he is behind, how workflow is going. because clinic communication is important
Workflow for different treatments / appointments	More than original	Does not have a "big" view	To see the entire day in one view to help with clinic communication and customer service (calendar)	Consider a receptionist's job - must be easy for them to navigate, work, take phone calls, etc.
Remarks on specific teeth	More than original	CAVE - taking up too much space	Complete overview for upper and lower jaw in one view	
Auto generated bill based on treatment selected	Same as original	Clicking to open pictures	Mouth diagram	
UI looks nice	More than original		Can add more information to one screen (less clicking)	
Likes the patient list filter options. easy access to profile and journal	More than original		CAVE - pop up when you click the button (do not want to see it all the time, but wants to know it is there)	
Statistics	Same as original		Statistics - data on patients not coming on time, patients not responding to calls or SMS, patient trends, etc.. Economic overview.	
Add ons	More than original		Management system for clinic economics	
Add new treatment - linked to bill, saves treatment for future	More than original		Wants to see pictures, X-rays, etc. at the same time as he is working (seeing multiple pictures at the same time)	
History of tooth in one click	More than original		Complex picture system (grouping photos) with information	
Sharing to other dentists using Messenger	More than original		Potentially a social group where dentists can collaborate, share data, and learn in a secure system	
Shortcuts			Diagnostics - system runs tests based on pictures. (ex. identifying oral cancer)	
			Shortcuts for learning (tutorial type videos)	

Figma Test - Dentist 3

Liked Features	Quantification	Disliked Features	Desired Features	Side Notes
Color coded treatments are extremely important	Same as original	Figma mockup looks and functions exactly the same as Dental Suite	Swiching from specific tooth to the journal	She claims to be able to fully customize treatments and treatment questions
She likes to click on a tooth and see the tooth history	More than original	Checklist at the end??	Must have patient be able to send their information to other dentist	
If a patient comes from another dentist with the same journal system, she likes to be able to import and export	Same as original	Looks even more complicated than Dental Suite		
Important to see history of teeth and jaw through the journal	More than original			
Generating bill	Same as original			
Patient list - she has to have to know how to use it, but she likes to be able to search patient information	More than original			
She likes how the journal looks	Same as original			
Putting scans of crowns into the patient journal	More than original			
Next appointment tab - being able to track status of patient	More than original			
REALLY like journal integrations and 3Shape integration	More than original			
Likes to be able to easily access patient information	More than original			

APPENDIX G - Full Low Fidelity Mockup PDF

https://drive.google.com/file/d/1ij7R_v-eFVXkNUc_BVPHSLVYXfzAYi1u/view?usp=sharing

APPENDIX H - Full High Fidelity Mockup PDF

https://drive.google.com/file/d/1i5a0hz5F35E-wHAXWKzoU-wN7-YZmX6g/view?usp=sharing

APPENDIX I - Video of the Working Mock-up

https://drive.google.com/file/d/1JBo9pkaX8Tc4M4UuJswGihNp84Mdepbi/view?usp=sharing

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