ADA Technical Report No. 1065 for Use Cases of the Orthodontic Electronic Health Record

Technical Report 1065 Working Space

Exported on 2019-10-08

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The Council on Dental Practice of the American Dental Association has approved American Dental Association Technical Report No. 1065 for Use Cases of the Orthodontic Electronic Health Record. Working Groups of the ADA Standards Committee on Dental Informatics (SCDI) formulate this and other specifications and technical reports for the application of information technology and other electronic technologies to dentistry's clinical and administrative operations. The ADA SCDI has representation from appropriate interests in the United States in the standardization of information technology and other electronic technologies used in dental practice. The ADA Standards Committee on Dental Informatics confirmed approval of ADA Technical Report No. 1065 on January 17, 2013.

Publication of this technical report that has been registered with ANSI has been approved by the American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611. This document is registered as a technical report according to the *Procedures for the Registration of Technical Reports with ANSI.* This document is not an American National Standard and the material contained herein is not normative in nature. Comments on this document should be sent to the American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611.

This Technical Report was prepared by SCDI Working Group 11.6 on Integration of Orthodontic Standards. The ADA Standards Committee on Dental Informatics thanks the members of Working Group 11.6 and the organizations with which they were affiliated at the time the Technical Report was developed:

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# Executive Summary

These use cases have been developed by orthodontic providers to guide software developers in producing orthodontic software that meets their needs. These use cases are not intended to work directly with an existing EHR, however they can be used by the software developers of a particular EHR or other software to implement functionality most likely needed by the orthodontic provider. These use cases cover various scenarios, like sending records to any other colleagues, however they do not discuss the technical details of how this is to be done. The intention is to focus on the needs of the orthodontic community and are purposely technology-agnostic. Specific technologies (DVDs, thumb drives) or brands (DICOM, Invisalign, ...) could be mentioned to aid in explanations, however they are not intended to be part of these use cases. This document takes into consideration HIPAA, GDPR and other privacy/security concerns wherever necessary.

# FOREWORD

(This Foreword does not form a part of ADA Technical Report No. 1065 for Use Cases of the Orthodontic Health Record).

In 1992, there was interest in the standardization of clinical information systems related to electronic technology in the dental environment. After evaluating current informatics activities, a Task Group of the ANSI Accredited Standards Committee MD156 (ASC MD156) was created by the ADA to initiate the development of technical reports, guidelines, and standards on electronic technologies used in dental practice. In 1999, the ADA established the ADA Standards Committee on Dental Informatics (SCDI). The ADA SCDI is currently the group that reviews and approves proposed American National Standards (ANSI approved) and technical reports developed by the standards committee's working groups. The ADA became an ANSI accredited standards organization in 2000.

The scope of the ADA SCDI is:

"The ADA SCDI shall develop informatics standards, specifications, technical reports and guidelines and interact with  
other entities involved in the development of health informatics standards aimed at implementation across the dental  
profession."

"The ADA SCDI is currently launching an effort to extend ANSI/ADA Specification No. 1000-Standard Clinical Data Architecture for the Structure and Content of an Electronic Health Record (and its other dental informatics standards) to cover the requirements of orthodontics. Increasingly, the health record format and content transcend national boundaries for patients, health professionals, and vendors. Consistency of content, terminology, and format are essential for general health care use. Thus, the ADA works both nationally and internationally to form standards for dental products and technologies.

"Orthodontic informatics was first described as a subdivision of dental informatics that deals with the storage, retrieval, sharing, and optimal use of orthodontic, orthognathic, and dentofacial orthopedic information of the craniofacial region for decision making (diagnosis) and problem solving (treatment planning).  
"Another subdivision of health informatics is imaging informatics, which plays a significant role in orthodontics because, as clinicians and researchers, we use imaging every day in our practices. Imaging is the basis for representing anatomically true data and for evidence-based orthodontics.

"The objective of Working Group 11.6 "Integration of Orthodontic Standards" is to extend or modify the existing electronic health record architecture to include the structure, formats, and relationships of these additional information elements and the protocols for exchanging them among stakeholders. First is to define the breadth of the data by developing orthodontic use cases for sharing digital information, hence this technical report. The point of the use cases is to identify where existing data transmission standards should be modified to handle the specific needs of the orthodontic community."**1**  
  
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**1** Harrell WE Jr, Stanford S, Bralower P. ADA initiates development of orthodontic informatics standards. Am J Orthod Dentofacial Orthop 128:153-6, 2005.  
**ADA TECHNICAL REPORT NO. 1065 FOR USE CASES OF THE ORTHODONTIC ELECTRONIC HEALTH RECORD**

# RATIONALE

Currently, there is no informatics communication standard for orthodontic electronic data. This Technical Report is designed to examine the specific needs of the orthodontic community for data communication. Based upon the use cases, the Working Group 11.6 will be in a position to ensure that the unique data requirements for orthodontics are adequately reflected in existing data transfer and storage standards, such as ANSI/ADA 1067, ANSI/ADA 1058 and ANSI/NIST-ITL. It is within the scope of SCDI Working Group 11.6 on Integration of Orthodontic Standards to define one. One of the first steps involved in defining an informatics communication standard is to define a list of use-cases in which the standard will actually be used. Such a list varies from specialist to specialist and keeps changing as technology offers new aids to orthodontic providers. We recognize this list will constantly grow and be revised.

This Technical Report will form the foundation for development of specific data interoperability requirements for *Proposed ADA Technical Report No. 1056 for Orthodontic Record Interoperability*. These specific requirements will provide input to modify and adapt existing dental and health record data storage and transfer standards. The Working Group decided to separate it from TR1056 for the following reasons:

* The process of collecting, analyzing, formulating and finally reviewing use cases is complex and will extend over a large period of time, through constant updates. As an independent technical report, it will be easier to revise.
* The collection of Electronic Orthodontic Record Use-Cases could find relevance beyond the creation of TR1056. As a separate document, it would be easier for other Working Groups to utilize its information. Use-cases are not necessarily associated with interoperability. It is a description of how the record will be utilized.

**What is the solution?**  
To create a list of approved use-cases that define the most common usage scenarios of the electronic health record within the scope of orthodontics.

# SCOPE

1. To create, initially a preliminary, eventually an approved list of common clinically related use-cases that define the utilization of the electronic health record within the scope of orthodontics.
2. To continuously update the list, by adding or modifying use-cases, as needed by the orthodontic community.
3. To encourage efforts to harmonize data definitions and technical specifications with other relevant data transmission standards and data storage standards.
4. This Technical Report:
   1. does not suggest new or currently unused use-cases;
   2. does not provide use cases which cover financial transactions.
5. The intended audience includes:
   1. software developers;
   2. qualifying agencies;
   3. consumers;
   4. other parties interested in implementing the standard for interoperability and transferability of the orthodontic electronic health record.

# APPLICABLE DOCUMENTS

* ANSI/ADA Standard No. 1000: Standard Clinical Data Architecture for the Structure and Content of an Electric Health Record, 2010
* ADA Technical Report No. 1048: Attachment of DICOM Datasets Using E-mail in Dentistry, 2011
* ADA Technical Report No. 1059: Guidelines for the Application of the DICOM Standard to Radiographic Cephalometric Data, 2010
* ADA Technical Report No. 1060: The Secure Exchange and Utilization of Digital Images in Dentistry, 2011
* ADA Technical Report No. 1058: Forensic Dental Data Set
* ADA Technical Report No. 1067: Requirements for an Electronic Dental Record System
* ADA Technical Report No. 1079: Standard Content of Electronic Attachments for Dental Claims
* ADA Technical Report No. 1084: Reference Core Data Set forCommunication Among Dental and other Health Information Systems
* ANSI/NIST-ITL 1-2011, Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information: Forensic Dental Supplement

ADA standards and technical reports are available from the American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611, <http://ada.catalog.org>

ANSI/NIST-ITL 1-2011 is available from the National Institute of Standards and Technology, 100 Bureau Dr., Gaithersburg, MD 20899, [www.nist.gov](http://www.nist.gov))

# DEFINITIONS

**ANSI/NIST-ITL –** Standard Dental Forensics Supplement– American National Standard for Information Systems: Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information, Dental Forensics supplement. Available at <http://www.nist.gov/itl/iad/ig/ansi_standard.cfm>  
**DICOM -** Digital Imaging and Communications in Medicine Available at <http://medical.nema.org/>  
**DVI –** Disaster Victim Identification  
**Missing Person -** as defined by law enforcement agencies  
**NamUS –** National Missing and Unidentified Persons System. See <http://www.namus.gov>  
**LEA -** law enforcement agency  
**CD -** compact disc  
**RM** removable media such as DVDs, removable USB storage devices - "thumb drives", or removable hard drives  
**DVD -** digital versatile disc  
**USB -** universal serial bus, a port on computers used to connect external devices such as printers, keyboards, mice, storage devices.  
**UVIS/UDIM –** Unified Victim Identified System / Unified Dental Information Module. See <http://en.wikipedia.org/wiki/Unified_Victim_Identification_System>  
**Unidentified Deceased** – a person (or part of a person) that has not been positively linked to a specific identity  
**EHR -** electronic health record (operated by institutions [such as a hospital] and contains data entered by clinicians and/or billing data to support insurance claims)  
**FastID INTERPOL's international disaster victim identification project –**. See <http://www.interpol.int/INTERPOL-expertise/Databases/FASTID/Fast-and-efficient-international-disaster-victim-identification>  
**PHR -** personal health record (initiated, controlled and owned by the patient)  
**PC -** personal computer  
**Plass DVI Disaster Victim Identification System –** developed by PlassData. See <http://www.plass.dk/dok/dvi/DVIBrochure.pdf>  
**WinID** **–** a dental computer system that matches missing persons to unidentified human remains. See <http://www.winid.com>

# USE CASE DESCRIPTIONS

The following Use Cases are specified to highlight the broad range of data requirements and data interface / transmission requirements incumbent upon the orthodontic community. They are not meant to be all encompassing, but rather to illustrate the broad range of data interchange needs to ensure data interchange standards include the appropriate data elements for this community.

These use cases are not intended to be used for legal purposes.

Please note the following conventions:

* Use Case numbers 01-99 are used to describe higher level, less detailed situations: they usually make use of one or more of the 101-199 use cases
* Use Case numbers 101-199 are used for more granular building block use cases for the 01-99 use cases.
* Use Case numbers 201-299 are used for allowed options, lists implementations used for any of the 01-199 use cases.
* Use Case numbers ending in 00 (00, 100, 200, ...) are reserved.

|  |
| --- |
| **No bacwkards compatibility**  The Use Case numbers of rev 2 are not backwards compatible with rev 1. Two use cases with the same number on rev1 and rev2 may have a completely different meaning and may be completely unrelated.  Backwards compatibility shall be maintained going on after revision 2. |

[Create New Use Case](https://confluence.panio.info?newSpaceKey=TR1065&spaceKey=TR1065&templateId=76152833&title=Use+Case+No.+XX+-+My+Use+Case)

## Use Case No. 01 - Orthodontic Office Visit for Examination, Second Opinion, or Temporary Treatment

This use case demonstrates various scenarios related to an orthodontic visit such as:

* when a new patient visits an orthodontic office for the first time
* when a transfer patient visits an orthodontic office for the first time
* when a patient is seeking a second opinion from a different orthodontic provider
* when a patient currently in treatment with an orthodontic provider calls another orthodontic provider for an office visit in cases of
  + emergency
  + need for a retainer check/adjustment when the patient cannot visit his/her orthodontic provider (i.e. Patient is temporarily away from home for school or military service, patient is out of town camping, vacationing, or traveling for business, etc.).
  + patient being hospitalized - situation where a patient's orthodontic appliances need to be removed but cannot be done so by the patient's orthodontic provider of record in a timely manner for various reasons (i.e. Patient is hospitalized and appliances need to be removed for necessary medical treatments. An orthodontist with hospital privileges needs to perform the task and there may not be enough time to contact the patient's orthodontic provider to address the urgency of medical needs.).

### Prerequisites

* This patient may or may not have had previous orthodontic treatment.
* This patient may or may not currently be in orthodontic treatment.
* This use case will cover the scenario of the initial visit prior to the taking of any imaging records.

### Steps

1. [Use Case No. 101 - Initial Contact](#scroll-bookmark-12)
2. [Use Case No. 102 - Staff Prepares the Patient and Updates EHR with Any New Information](#scroll-bookmark-13)
3. [Use Case No. 103 - Patient Sees Orthodontic Provider](#scroll-bookmark-14)
4. [Use Case No. 104 - Patient Released from Appointment](#scroll-bookmark-15).

## Use Case No. 02 - Patient Encounters at Practices That Have Multiple Practitioners and/or Locations

This use case scenario describes the situation where an orthodontic practice has multiple practitioners/locations, and the patient can be seen by the same orthodontic provider or same group of orthodontic providers in multiple locations.

### Prerequisites

* Multiple practices have computers set up under separate databases at different office locations (Practices that have computers set up under a same database access the same EHR through a secure network across workstations. This type of set up is essentially the same as one-office practice set up and, therefore, this use case does not apply).

### Steps

When a patient starts treatment with the practice:

1. On the first appointment, during ([Use Case No. 01 - Orthodontic Office Visit for Examination, Second Opinion, or Temporary Treatment](#scroll-bookmark-9)), the patient is informed that his/her treatment records may be transferred to the different locations of the practice should the patient be seen in a different location.
2. On subsequent visits, if the patient has to go to a different location, the doctor or office staff transfers the most recent EHR file using a legally approved method ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).
3. Patient makes an appointment at the secondary location ([Use Case No. 01 - Orthodontic Office Visit for Examination, Second Opinion, or Temporary Treatment](#scroll-bookmark-9)).
4. Secondary location updates EHR then transfers updated EHR back to the primary office ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).

## Use Case No. 03 - Creating Digital Orthodontic Records

This use case scenario demonstrates the creation of orthodontic records using a device capable of creating a digital file in a standard format for the property of the device or using a device that can transform (scan/capture) analog records into the digital format respective of the type of record. This could take place in the provider's practice/clinic or at an external imaging center.

### Prerequisites

* The provider determines that creation of dental records would be beneficial in the best interest of the individual.

### Steps

#### Direct digital creation:

1. The patient is taken to an area where creation of digital orthodontic records is normally obtained. This can be an area specifically setup for an imaging device (such as Cone Beam CT), a visible light device (such as a camera or intraoral scanner) or any other data capturing device.
2. The EHR of an individual’s file is accessed, and the requisite data populates in the imaging software acquiring the data.
3. Basic information of what records the patient needs is entered into the imaging software.
4. Using the software and/or corresponding device (such as digital X-ray machine and digital camera) the digital images are transferred to individual’s EHR utilizing standard identifiers attached to the metadata and placed in the proper address within the patient’s EHR file.  In other words, digital data acquired is linked to EHR, tagged with identifiers in the metadata and uploaded in the proper location of the patient's EHR.  This may be applicable for digital 2D and 3D visual light images, radiographic images, models etc.
5. The images in the individual’s EHR will include that components in a patient’s record ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)).
6. Digital records may be transformed into analogue records for clinical applications (e.g. 3D printer for study models or 3D face model for use with treatment planning and visualized treatment objectives).

#### Indirect digital creation:

1. The EHR of an individual’s file is accessed, and the requisite data populates in the imaging software acquiring the data.
2. Basic information of what records the patient needs is entered into the imaging software.
3. An EHR compatible software and or device (scan/capture) is utilized to transform an analog record to its digital parallel with the use of the metadata and identifiers to transfer the data in the proper location in an individual’s EHR.
4. The images in the individual’s EHR will include that components in a patient’s record ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)).
5. Digital records may be transformed into analog records for clinical applications (e.g. 3D printer for study models or 3D face model for use with treatment planning and visualized treatment objectives).

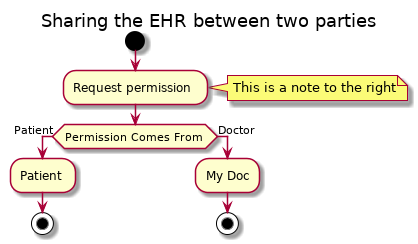
## Use Case No. 04 - Sharing the EHR between Two Parties

This use case demonstrates common scenarios for sharing EHR information. These records include components of data used in [Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24).

### Prerequisites

* Provider has access to EHR ([Use Case No. 106 - Electronic Health Record Access](#scroll-bookmark-28))
* Provider has acquired images or data from the individual ([Use Case No. 03 - Creating Digital Orthodontic Records](#scroll-bookmark-20))
* Acquired images or data have been transferred to their EHR and updated.

### Steps



1. The doctor first acquires HIPAA-compliant permission from the patient/guardian ([Use Case No. 106 - Electronic Health Record Access](#scroll-bookmark-28)) to transfer the requested records to:
   1. another orthodontist when a patient is transferring or seeking a second opinion. ([Use Case No. 01 - Orthodontic Office Visit for Examination, Second Opinion, or Temporary Treatment](#scroll-bookmark-9)).
   2. a dental consultant (e.g. radiological review).
   3. a specialist or health care provider.
   4. a general dentist or referral (e.g. progress report).
   5. an examining body for the purpose of taking a dental examination, such as a dental specialty board certification or state specialty license. The examining body may request the electronic submission of dental records for the examination.
   6. a state agency when a state agency requests for patient records for evaluation, such as in response to patient complaints. The provider should comply with state laws about patient records and LEA regulations.
   7. another provider when a patient/guardian has submitted a request for records to be sent.
2. Provider completes letter for: dental consultant, specialist, general dentist, examining body, state agency etc... ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)). The correspondence letter is transferred and properly indexed in the EHR.
3. Initiating provider decides which components of the individual’s EHR ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)) is accessible to the recipient and is HIPAA compliant.
4. Practice transfers records using a legally approved method ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)) along with the doctor's report and comments about progress.
5. The dental consultant, specialist, general dentist/other referral source, examining body, or state agency imports EHR into their digital imaging system ([Use Case No. 105 - Downloading and Uploading of Data](#scroll-bookmark-30)). The imported data accessible for the recipient are utilized and evaluated for their respective use.

If applicable, the recipient, who is a provider, updates the EHR with his/her findings.  The findings are uploaded ([Use Case No. 105 - Downloading and Uploading of Data](#scroll-bookmark-30)) and transferred  back to the initiating provider.

## Use Case No. 05 - Public Aid or Insurance Eligibility

This use case scenario is for practices to obtain eligibility information from insurance companies and public and government aid agencies that fund orthodontic treatment. The scenario includes submission of attachments, prior authorization, and pre-determinations. As an example, the request for information from a benefits payor may be to determine a patient's eligibility for Medicaid.

### Prerequisites

Requires a verified need to obtain legal consent of an individual to grant access to a specific section of the EHR ([Use Case No. 106 - Electronic Health Record Access](#scroll-bookmark-28))

### Steps

This use case scenario illustrates how Electronic Health Record Systems can provide information needed for insurance companies, public aid/granting organizations and government aid agencies to determine eligibility for treatment funding/reimbursement. The illustrations include provision of information and attached documents needed for eligibility determination (e.g. policy or aid/grant identifying information, attachments, prior authorization, pre-determinations).

The use case will be divided into three sub-cases: insurance eligibility (e.g. employer-based dental insurance benefits estimation), government aid eligibility (e.g. Medicaid qualification) and public aid/grant eligibility (e.g. [AAO Donated Orthodontic Services](https://www.aaoinfo.org/1/donated-orthodontic-services), [Smiles Change Lives](http://www.smileschangelives.org/) or [Smile for a Lifetime](http://www.s4l.org/)).

Each of these use cases may involve submitting documents mentioned in [Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24) and/or [Use Case No. 203 - Orthodontic Claim Attachment](#scroll-bookmark-34) for electronic supporting documentation. The records required for submission may be different in each locality (e.g. Medicaid in the U.S. varies by state).  For each use case below the practice first acquires regulatory compliant permission from the patient/guardian to transfer the requested records to the benefits payor.  The practice also obtains consent for treatment from the guardian/patient. Once consent is obtained, the doctor can transfer records to the benefits payor using a legally approved method ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).  The practice should also request pre-authorization or pre-determination (if required) from the benefits payor or their designated agent prior to treatment.  The benefits payor may require pre-authorization or pre-determination within a certain period of time prior to the treatment.  The practice may elect to request pre-determination in order to improve the benefits estimate for the patient.

Subcase 1: Insurance eligibility

A practice gathers insurance plan information for a patient from the patient’s guardian or financially responsible party (FRP). The practice uses the insurance plan information, patient demographic and treatment recommendation to request all available information on benefits that are available to pay for the patient’s treatment.  The practice informs the FRP of available benefits.  The potential benefits can be used to decide on treatment finance offerings and FRP options for payment.  This eligibility estimate can be improved once benefit remittance information is collected, reflecting the actual benefits awarded by the benefits payor.   Just prior to administering treatment, the practice should  re-check proof of coverage.

Subcase 2: Government aid eligibility

A practice asks for proof of government aid coverage from the patient’s guardian or FRP.  The practice then assesses eligibility based on age, application wait period, limits on number of eligibility determination requests and other known government aid eligibility constraints.  The practice performs an exam, generating materials required for submitting to the government for an eligibility determination (e.g. report of medical necessity, imaging, standard forms).  If coverage is denied, there may be an opportunity to appeal on behalf of the patient.  The practice checks proof of coverage again at the treatment appointment.

Subcase 3: Public aid/grant eligibility

A patient’s guardian or FRP, or an agent for that person, can submit an application to a public aid or granting organization.  The application submitter may request information on diagnosis, treatment recommendation and other clinical details to meet the requirements of the application.  Depending on government regulation, the practice may be legally obligated to provide all requested information. Regulatory constraints may also dictate the timeframe within which the request must be fulfilled.

Should we also cover pre-authorization, calculate benefits, AoB, filing claim, reimbursement management / benefits processing, continuation claims, final payment?  I would suggest that we might break these up into separate use cases?

## Use Case No. 06 - Transfer of Orthodontic Patient's Treatment Between Practitioners (Active or Retention)

This use case scenario describes the situation where a patient is transferring to a different orthodontic provider for continuation of treatment.

### Prerequisites

* An individual is currently a patient of an orthodontic provider (initial provider).
* The patient and/or the orthodontic provider has interest in continuing treatment with a different orthodontic provider (new provider) (e.g. the patient has moved to a different location, or initial provider is closing their practice).
* The patient has already identified a new provider. This currently happens in different modalities and it is likely that these modalities will keep changing as new technology arises.

### Steps

1. Initial provider begin process for transferring care.
2. [Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26).
   1. Orthodontic provider adds *AAO Transfer Form* or equivalent data in addition to the data discussed in [Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26).  (AAO has agreed to share AAO Transfer Form for electronic data transfer with all vendors.
3. Practice transfers records, AAO Transfer Form, and any doctor's report and comments about progress to the new provider using a legally approved method ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).
4. Patient makes initial contact with the new provider's office ([Use Case No. 01 - Orthodontic Office Visit for Examination, Second Opinion, or Temporary Treatment](#scroll-bookmark-9)).

## Use Case No. 07 - Accessing De-identified Records for Research Purposes

This use case describes the situation when research involves patient EHR. According to the IRB guidelines, all research projects must be performed with de-identified patient information. In order to de-identify the patient properly, patient names and other HIPAA identifiers must be masked. If any demographic information (such as zip code and race combination) is likely to reveal the identity of such patient, this information needs to be masked also. In order for software to generate de-identified EHR for research purposes, it needs to provide a module for users to mask certain information when exporting the patient's EHR.

### Prerequisites

The research study has met human studies guidelines. If required by IRB, patient approval is obtained, as per IRB guidelines.

### Steps

1. The investigator submits a formal request to the owner of patient records (the owner can be hospital, university, private practice, or organizations). The request includes the information criteria for the records, such as age, race, vicinity, problem type, treatment time, etc. The request should also include exactly what information is needed for the research, such as radiographs, 3D models, intra-oral pictures, etc.
2. Once the owner of the records receives the request, the owner uses the module provided by the software to generate EHRs with the patient information de-identified per IRB protocol. These generated EHRs only includes the information specific in the written request.
3. Patient consent is given before information is shared with the recipient ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26)).
4. The de-identified EHR is transmitted to the research personnel via [Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19).
5. Access to the EHR including components accessed is recorded into the originating provider’s EHR.  The update includes the individual's file was de-identified and the IRB protocol is uploaded into the originating provider’s EHR justifying the access to data with individual's permission ([Use Case No. 105 - Downloading and Uploading of Data](#scroll-bookmark-30)).
6. The research personnel receives the de-identified EHR with no identifiers to any individuals. From here the research can proceed.

## Use Case No. 08 - Sending Information to Dental or Orthodontic Laboratory

This use case describes a scenario where an orthodontic practice needs to send patient electronic health record (EHR) information to an outside lab to acquire services such as making appliances, creating study models, etc.  
Ensure that orthodontic software is compatible with e-prescribing dental appliances as specified by ADA SCDI TR-1054.  
There are two scenarios in this use case, one is for labs that have a website for secure ordering and patient records transfer, another one is for labs that do not have such portal.

### Scenario 1 (labs with secure online ordering and EHR transferring services)

1. The doctor accesses the ordering page through either online website or company supplied software.
2. During the order process, the doctor is asked to enter basic information about the patient such as name, date of birth, and patient identifier number. Before the order can be submitted, the doctor also has to answer if he has the EHR for the patient.
3. Once the lab order has been submitted, the doctor uploads only necessary components of the EHR (including laboratory prescription section) to the lab (e.g. 3D study models, digital impressions) either through the online secure order website, or through the company supplied encrypted software ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).The lab order may also be submitted in its analog form through delivery service or mail,
4. When the lab receives the EHR, the system compares the patient information in the submitted order with those contained in the EHR to make sure they are the same patient and there are no errors in spelling (e.g. study model patient identifiers and dates).
5. When the order is processed, the lab also updates the patient’s EHR (laboratory prescriptions section) with notes indicating what has been done in the electronic lab component of the patients chart ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)).  The EHR is uploaded into the initiating provider's EHR ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).
6. When the finalized order is delivered to the provider, either through delivery service or mail, the doctor updates his/her EHR marking the lab prescription as complete.

### Scenario 2 (labs without online ordering and EHR transferring services)

1. The doctor (or office staff) calls the lab to order service for a patient.
2. During the ordering, the lab customer service representative requests the patient's basic information such as name, date of birth, and patient identifier number .  The lab also confirms if the doctor has the patient's EHR.
3. Once the lab order has been submitted, the doctor uploads only necessary components of the EHR (including laboratory prescription section) to the lab (e.g. 3D study models, digital impressions) either through the online secure order website, or through the company supplied encrypted software ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)). The lab order may also be submitted in its analog form through delivery service or mail.
4. When the lab receives the EHR, the system compares the patient information in the submitted order with those contained in the EHR to make sure they are the same patient and there are no errors in spelling (e.g. study model patient identifiers and dates).
5. When the order is processed, the lab also updates the patient’s EHR (laboratory prescriptions section) with notes indicating what has been done in the electronic lab component of the patient's chart ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)).  The EHR is uploaded into the initiating provider's EHR ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).
6. When the finalized order is delivered to the provider, either through delivery service or mail, the doctor updates his/her EHR marking the lab prescription as complete.

## Use Case No. 09 - Missing Persons, Living Amnesiacs and Unidentified Deceased

This use case scenario demonstrates the types and sources of data that may be useful in identifying individuals, whether they be unidentified deceased, missing persons or living amnesiacs. Requests for this information may be received from organizations such as a Law Enforcement Agency (LEA), a mass disaster response team, or a coroner's office.

1. The LEA or medical examiner's office requests orthodontic information that may assist in identifying an individual. The data may contain [Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24). Non-DICOM format data and information should also be transmitted, including information as to how to retrieve casts and other physical artefacts that may be useful in the identification process.
2. If DICOM compatible images cannot be generated, the practice shall provide the original image with the date of acquisition, a description of the original image storage format and an image converted to a standardized format, with a description of that format. The practice shall also include any relevant information concerning the conversion process (including data compression).
3. In the case of missing persons, the orthodontic practice management software will provide patient “time in” and “time out” of the orthodontic practice to help identify the whereabouts of the individual that may have been missing around the general time frame.  Treatment notes may also provide notes on behavior and attitude around the time the individual may have gone missing. The information may be transmitted to the LEA requesting the information.
4. Practice sends the data in a standardized transmission format to the requesting organization.
5. The LEA or other requesting organization consolidates the data via a Forensic Management Software package such as UVIS/UDIM, WinID, Plass DVI or appropriate Forensic dental database such as the National Crime Information Center - NCIC Missing Persons File, NamUS, or Interpol's FastID, etc.

## Use Case No. 10 - Inactive Patient

This use case scenario demonstrates the scenario necessary to inactivate the patient files for an orthodontic practice.

### Patient did not return

1. The orthodontic provider deems or determines the patient is no longer in treatment and is unlikely at best to return to the practice in the foreseeable future.
2. If appropriate the office staff will contact the patient or the patient's next of kin and confirm that the patient is unlikely at best to return to the practice in the foreseeable future.
3. [Use Case No. 107 - Management of Inactive Patient Records](#scroll-bookmark-47)

### Missing Patients

1. Information is received in the office that a patient of record has been reported to the authorities as missing.
2. The office staff will contact the patient's next of kin and local law enforcement agency (LEA) to confirm that the patient is missing.
3. For legal reasons, the records will be needed by the Law Enforcement agency (LEA) to enter into the national missing person's database for potential matches with unidentified persons or bodies and potentially for identification.
4. All digital files associated with that patient should be identified and archived as "read only" files and saved onto removable media in a EHR compatible format to be provided to the LEA.
5. [Use Case No. 107 - Management of Inactive Patient Records](#scroll-bookmark-47)

### Deceased Patients

1. Information of death is received in the office regarding a patient of record.
2. The office staff will contact the patient's next of kin and confirm that the patient is dead.
3. [Use Case No. 107 - Management of Inactive Patient Records](#scroll-bookmark-47)

## Use Case No. 101 - Initial Contact

This use case scenario describes the general situations where a patient makes an appointment at an orthodontic office and various methods of obtaining patient's EHR prior to being seen by a provider.

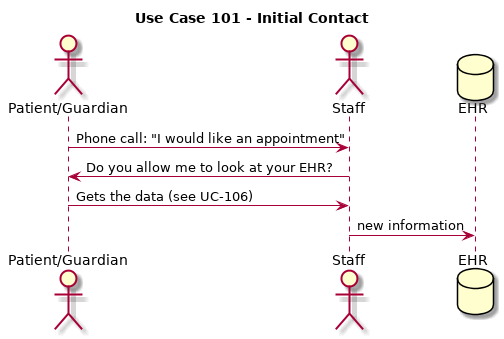
### Prerequisites

There has to be a desire for an individual to see an orthodontic provider.

### Steps

1. Patient or guardian calls the orthodontic provider's office for an appointment. Orthodontic provider's office staff asks the patient for access and permission to a previous EHR.
   1. [Use Case No. 106 - Electronic Health Record Access](#scroll-bookmark-28)
   2. If the patient does not have access to the EHR, the orthodontic provider asks the patient to provide a copy of any personal electronic health records (EHR) by contacting the other orthodontic provider and requesting the Electronic Health Record (EHR) to be sent according to [Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19).
2. Patient arrives at the orthodontic provider's office for the appointment. Ideally the patient's EHR is available prior to their arrival with consent given. The front office staff
   1. asks for identification for verification of identity.
   2. asks for consent. If the patient is not legally able to provide consent himself/herself, then the staff identifies the legal guardian and/or power of attorney.
   3. asks for the identity of the financially responsible party for the patient.
   4. accesses or creates the EHR.
      1. If the patient has the EHR, the staff downloads contents of the removable media into the practice's EHR ([Use Case No. 105 - Downloading and Uploading of Data](#scroll-bookmark-30)).
      2. If the patient does not have the EHR, and it has not arrived from the other office, the office contacts the orthodontic provider of record (name, phone number of office) and request sharing of EHR [Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26).
      3. If there is no previous EHR or one cannot be accessed at the appointment, an EHR is created by the front office. Otherwise, the patient will need to reappoint or decline treatment depending on local regulations.

### Diagram



## Use Case No. 102 - Staff Prepares the Patient and Updates EHR with Any New Information

This use case scenario describes the general activities involved after a patient has arrived and before he/she is seen by a doctor. Staff asks for Chief Complaint and any updates that need to be entered into EHR.

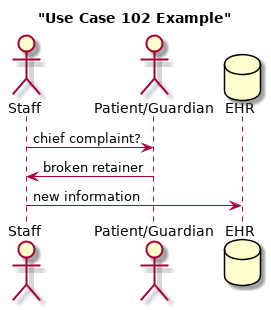
### Prerequisites

* Patient has made the [Use Case No. 101 - Initial Contact](#scroll-bookmark-12).
* Patient is seated in the dental chair.

### Steps

1. Staff asks patient/guardian what the reason for the appointment/chief complaint is.
2. Patient/guardian reports reason for appointment/chief complaint (e.g. broken retainer, lost retainer, poking wire on retainer, etc.).
3. All new information is entered into the patient's EHR.

### Diagram



## Use Case No. 103 - Patient Sees Orthodontic Provider

This use case scenario describes the general situation where a patient sees a provider.

### Prerequisites

* [Use Case No. 102 - Staff Prepares the Patient and Updates EHR with Any New Information](#scroll-bookmark-13).

### Steps

1. Provider updates pertinent medical/dental record  and reviews the EHR (e.g. images, diagnostic records and clinical notes) ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)). Patient treatment status and progress in treatment are assessed.
2. Provider provides a clinical exam on the patient:
3. The data collected from the examination are updated into the patient's EHR.
4. After reviewing the patient data and performing examination, if necessary, obtain any necessary supplemental diagnostic records ([Use Case No. 03 - Creating Digital Orthodontic Records](#scroll-bookmark-20)).
5. Provider provides an evaluation and assessment of the current data and updates his/her findings in EHR. ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24))
6. Diagnosis and treatment options are discussed. A general treatment outline is provided to the patient/guardian, which may include the extent of care needed, length of treatment, what procedures would be next, and cost. All questions concerning treatment are answered.
7. Provider updates his treatment notes summarizing the patient visit.  It is updated to the EHR ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24))
8. If the treating doctor is not the orthodontic provider of record, the original orthodontic provider is notified.

## Use Case No. 104 - Patient Released from Appointment

This use case scenario describes the general situations where a patient is released from an appointment after seeing a provider.

### Prerequisites

Patient has been seen by an orthodontic provider ([Use Case No. 103 - Patient Sees Orthodontic Provider](#scroll-bookmark-14)).

### Steps

At end of a visit, one of the following will take place:

1. Reappointed for further treatment
2. Orthodontic staff agrees on a time and date for the next appointment with patient or legal guardian.
3. Orthodontic staff generates the appointment in the practice management system.
4. Orthodontic staff gives patient or legal guardian a reminder (in paper form or other digital messaging system like email, text, etc.).
5. The patients treatment status and provider information is updated into EHR.

* Put on recall

1. Patient needs to be seen again, however is not ready to commit to a specific time and date yet.
2. Orthodontic staff adds the patient to the practice management's Recall list. The system will eventually remind the practice to contact the patient/legal guardian (or automatically contact the patient/legal guardian).
3. The patients treatment status and provider information is updated into EHR.

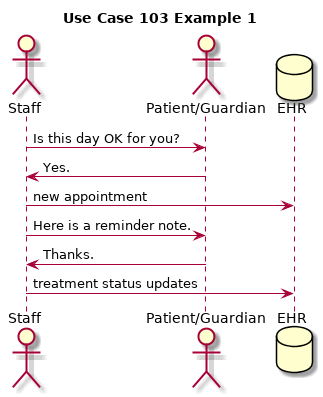
* Inactivate the patient (patient's treatment status).

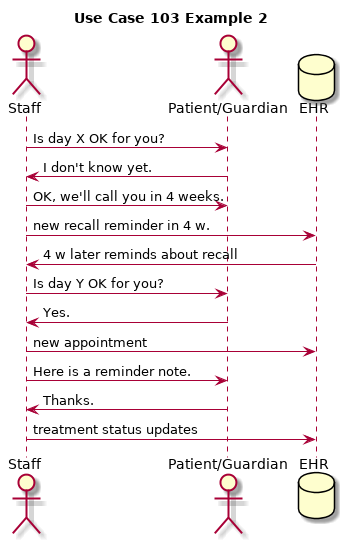
1. Orthodontic staff updates the EHR with the following information:
   1. activity performed today
   2. reason for inactivation (the patient status and responsibility for treatment will be updated in EHR)
2. Notify the individual, he/she has access to the updated EHR.  ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26))
3. If the treating doctor is not the orthodontic provider of record, the original orthodontic provider is notified.

* Dismiss the patient (patients treatment status).
  1. Orthodontic staff updates the EHR with the following information:
     1. activity performed today
     2. reason for dismissal (the patient status and responsibility for treatment will be updated in EHR)
  2. Notify the individual, he/she has access to the updated EHR.  ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26))
  3. If the treating doctor is not the orthodontic provider of record, the original orthodontic provider is notified.

Patient is physically released from practice.

### Examples





## Use Case No. 105 - Downloading and Uploading of Data

This use case describes the situations where an orthodontic provider's office sends/receives contents of a patient's EHR to/from another orthodontic provider's office for continued care of a patient. The images with their associated data (patient demographics, imaging equipment, image information, etc.) and diagnostic clinical records are added/uploaded/imported to the EHR allowing the use of the dental practice's imaging and management system.

### Prerequisites

* The EHR must be independent of the practice management software and be able to be transferred to other offices in the same practice, other practices, labs and research facilities via hard copies, digital removable media (such as USB flash drives or CD) or files sent digitally. Paper documents may be scanned into the EHR.

### Steps

1. Downloading Data:
   1. A new patient arrives with a digital removable media ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)) containing a copy of EHR from the previous orthodontic office or the office receives digital copy of EHR from another orthodontic provider.
   2. The new orthodontic office imports the data provided to the existing management/imaging software that may or may not be the same as the one used by the previous orthodontic office.
   3. The orthodontic office returns the digital removable media back to the patient or disposes of the patient data securely.
2. Uploading Data:
   1. The orthodontic provider decides to refer the patient to another specialist for ancillary care.
   2. The provider identifies images and other clinical data that the other specialist will be able to access.
   3. The EHR compatible data can be exported using a legally approved methods ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).

## Use Case No. 106 - Electronic Health Record Access

Electronic records require access by different parties (health care provider, state federal agencies, institutions, boards).  This case documents how EHR is accessed by a party.

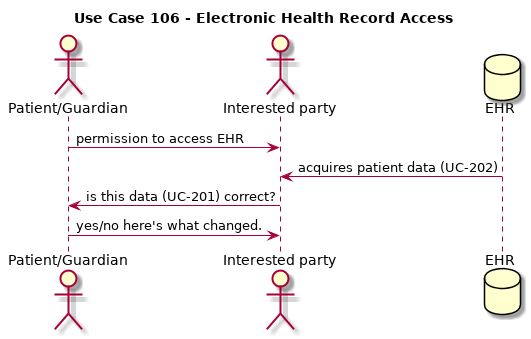
### Prerequisites

* The individual has an existing EHR.
* Someone interested in acquiring the data (a stakeholder) must exist.

### Steps

1. Stakeholder acquires HIPAA-Compliant permission from the patient/guardian to access EHR information.
2. Acquire EHR ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).
3. If applicable, confirm (e.g. with patient) EHR is current. ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)).

### Diagram



## Use Case No. 107 - Management of Inactive Patient Records

Actions taken at end of patient's inactivation process.

### Prerequisites

[Use Case No. 10 - Inactive Patient](#scroll-bookmark-45)

### Steps

1. In the case the records were needed for legal purposes (i.e. if the patient were involved in criminal activities or a victim of criminal activities or to confirm identity), all digital files associated with that patient would have to be identified and archived as read only.
2. Hard copy records could be converted to high quality EHR compatible format and handled as needed.
3. Any ongoing financial arrangements would be reviewed and adjusted as needed.
4. There might be interest in discontinuing the use of any digital files for marketing purposes (e.g. out of respect to the patient's family).
5. The files should be maintained or purged in a secure manner as prescribed by official regulations and accepted practice standards.

## Use Case No. 201 - Contents of Electronic Health Records

This use case contains a list of data elements which make up an Orthodontic Electronic Health Record.

### Prerequisites

Current approved data elements can be found in ADA/ANSI TR-1084.

The EHR can be made available to a person providing service to the patient or one interested in using the data for research with the patient's consent. The EHR compatible data can be exported using a legally approved methods ([Use Case No. 202 - Legally Approved Methods to Share EHR Data](#scroll-bookmark-19)).

### Items

* Personal information: name, address, birth date, gender, ID audit trail, legal guardian
  + (The front office verifies personal information and updates any that has changed.)
* Patient status: living, deceased, missing
* Medical history (allergies, chronic illnesses, current medications, etc)
* Medical data
* Dental history
  + chronic dental conditions (history of recurring caries, trauma, dry mouth, habits, radiographs, etc)
  + oral cancers
  + implants
  + periodontal status
  + ongoing Diagnoses per visit if applicable
  + oral examinations per visit
  + diagnostic and clinical treatment records
* Orthodontic information:
  + initial malocclusion
  + initial diagnosis
  + initial treatment plan
  + type and prescription of appliances
  + projected treatment finish date
  + frequency/history of wear
  + patient compliance (how cooperative the patient is)
  + patient education
  + patient letters (documented correspondence)
  + clinical treatment records and progress notes
  + Any Treatment Plans offered to the patient so they may be compared
  + Any referrals to medical or dental providers
  + All appointments scheduled, completed and missed including reason for missing appointments
  + Third party payer information
* Orthodontic diagnostic records (e.g. DICOM DIR)
  + digital X-rays
    - periapical, bitewing or vertical bitewings (TR 1094)
    - CBCT's (TR 1098)
    - cephalometric x-rays
    - panoramic x-rays (TR 1050)
    - other radiographic images
  + cephalometric tracings
  + superimpositions
  + digital study models or scanned stone models (3D)
  + visible light images in 2D (TR 1050, and enhanced displays)
  + facial 3D data
  + visible light video data
  + hard copy photographs and x-rays can be digitized ([Use Case No. 03 - Creating Digital Orthodontic Records](#scroll-bookmark-20))
* Electronic Laboratory Records
  + Lab Scripts (TR 1041, TR 1054, TR1075)
* Financial Documents
  + Coding transactions (CDT SNODENT CODES)
  + Contract
  + Payment transactions
  + Payment balances
  + Insurance and 3rd party payment information
* Legal Documents
  + Consent for treatment
  + Legal guardian
  + Owner of contract (financial responsible individual)
  + Risks and Limitations of Treatment
  + Provider/practice responsible for contract
  + Patient orthodontic status: new, active treatment, inactive treatment, active retention, inactive retention, dismissed, inactivated
* Practice management database
  + scheduling (patient data in practice)
  + recall
  + reports
  + analysis
  + correspondence

## Use Case No. 202 - Legally Approved Methods to Share EHR Data

This use case scenario describes legally approved methods by which electronic health record (EHR) data is shared

* between orthodontic providers ([Use Case No. 06 - Transfer of Orthodontic Patient's Treatment Between Practitioners (Active or Retention)](#scroll-bookmark-35)).
* between an orthodontic provider and a general dentist, a referring dentist, or other health care specialist for the purpose of providing consultation/diagnosis or care to a patient ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26)).
* with dental consultants for radiological review ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26)).
* with third party payers, public aid or insurance submission for authorization ([Use Case No. 05 - Public Aid or Insurance Submission](https://confluence.panio.info/display/TR1065/Use+Case+No.+05+-+Public+Aid+or+Insurance+Submission)).
* with state agencies and boards for the purpose of examinations and evaluations ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26)).
* with institutions for research ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26)).

The patient may obtain a copy of his/her EHR for their records via any of the methods described in this Use Case.

### Prerequisites

* The EHR must be independent of the practice management software.  It should be a standard database with uniform datasets and dataset identifiers that may be shared by different parties.
* There must be an existing EHR with scanned hard copies, digital removable media or files.
* There must be a need to access or update EHR ([Use Case No. 106 - Electronic Health Record Access](#scroll-bookmark-28)).

### Items

1. Securely exchanged (e.g. email TR-1048, TR-1051).
2. Securely uploaded to or downloaded from a secure repository (such as to a designated website or to a secure medical network through encrypted channels via various modalities of file transfer protocols SFTP, HTTPS using TR 1085).
3. By using approved encrypted removable media that cannot be altered but may be disputed by the individual (e.g. CDs, DVDs, Blu-Ray, HDDVD, USB, SDHC, CF, or removable hard drive).
4. Contents of the orthodontic EHR ([Use Case No. 201 - Contents of Electronic Health Records](#scroll-bookmark-24)) or ([Use Case No. 203 - Orthodontic Claim Attachment](#scroll-bookmark-34)) may be packaged for transfer to a different party ([Use Case No. 04 - Sharing the EHR between Two Parties](#scroll-bookmark-26), [Use Case No. 05 - Public Aid or Insurance Eligibility](#scroll-bookmark-31), [Use Case No. 06 - Transfer of Orthodontic Patient's Treatment Between Practitioners (Active or Retention)](#scroll-bookmark-35)).

## Use Case No. 203 - Orthodontic Claim Attachment

Data elements for providing supporting clinical information to substantiate a claim to a payer related to orthodontic care (such as an HL7 CCDA claim attachment).

### Prerequisites

Current approved data elements can be found in ADA/ANSI TR-1079.

### Items

As a reference, some of these data elements could be:

* Benefits Requested
* Possible orthognathic surgery
* Stage of dentition
* Oral hygiene acceptability
* Overjet
* Overite
* Openbite
* Spacing
* TMD
* Abnormalities
* Presence of caries or need for replacement of restorations
* Craniofacial anomalies
* Other medical conditions
* Habits
* Handicapping Labiolingual Deviation Index (HLD)
* Salzmann Index
* Free text
* Orthodontic narrative
* ...