

(12) **United States Patent**
Sanchez

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(54) **SYSTEMS AND METHODS FOR CONSOLIDATED MANAGEMENT AND DISTRIBUTION OF ORTHODONTIC CARE DATA, INCLUDING AN INTERACTIVE THREE-DIMENSIONAL TOOTH CHART MODEL**

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,068,482 A 5/2000 Snow
8,121,718 B2 2/2012 Rubbert et al.
(Continued)

FOREIGN PATENT DOCUMENTS

WO WO 98/53428 A1 11/1998
WO WO 2007/130573 A2 11/2007

OTHER PUBLICATIONS

International Searching Authority, International Search Report and Written Opinion for International Application No. PCT/US2013/039231, Jan. 12, 2015, 10 pages, European Patent Office, The Netherlands.

(Continued)

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CPC **A61C 7/002** (2013.01); **A61C 7/14** (2013.01); **A61C 7/36** (2013.01); **G06T 19/20** (2013.01);

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(58) **Field of Classification Search**
None
See application file for complete search history.

(57) **ABSTRACT**

Various embodiments provide a computer-implemented method for dynamically manipulating a three-dimensional virtual model representing a patient's teeth so as to facilitate visualization of an orthodontic treatment plan being applied thereto. The method comprises: rendering the three-dimensional virtual model based, at least in part, upon one or more images of a patient's teeth, and manipulating the three-dimensional virtual model via a translational movement in a two-dimensional computer display area and along a plane vertically oriented relative to the oppositely-oriented teeth. The translational movement imposes a translational manipulation upon a first one of the two sets of oppositely oriented teeth and a rotational manipulation upon a second one of the two sets of oppositely oriented teeth, the simultaneous manipulation being configured to open the teeth relative to one another so as to facilitate visualization of an orthodontic treatment plan. Associated computer program products and systems are also provided.

29 Claims, 22 Drawing Sheets

