



# Multimedia patient education to assist oral impression taking during dental treatment: A pilot study



Dandan Pei<sup>a,b,c</sup>, Beilei Liang<sup>a,b</sup>, Wenzhi Du<sup>c</sup>, Peng Wang<sup>a,b</sup>, Jie Liu<sup>c</sup>, Min He<sup>c</sup>, Yi Lu<sup>a,b,c,\*</sup>

<sup>a</sup> Key Laboratory of Shaanxi Province for Craniofacial Precision Medicine Research, College of Stomatology, Xi'an Jiaotong University, Xi'an, China

<sup>b</sup> Clinical Research Center of Shaanxi Province for Dental and Maxillofacial Diseases, College of Stomatology, Xi'an Jiaotong University, Xi'an, China

<sup>c</sup> Dept. of Prosthodontics, Stomatology Hospital of Xi'an Jiaotong University College of Medicine, Xi'an, China

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## ABSTRACT

**Introduction:** Proper cooperation between patient and dentist is of great help to make a good oral impression. However, patients are frequently confused when information is given through traditional verbal description. The present study compared the effectiveness of the multimedia information delivery ways with the traditional verbal manner on patients' understanding level in oral impression taking.

**Methods:** The recruited 191 participating patients were randomly assigned to the control group (the verbal group) and two intervention groups (the video group and the picture group) according to the information delivery manner. After intervention, the patients' understanding degree was measured by questionnaire and performance evaluation of behavior feedback on the provided information quantitatively. Also, patients' self-assessment of satisfaction was interviewed by telephone. All data was analyzed by SPSS 14.0 software, and  $p \leq 0.05$  was set as significant difference in advance.

**Results:** One-Way ANOVA and Chi-square showed there were no statistically significant differences in the mean age, gender composition, and educational level among the three groups ( $P > 0.05$ ). In both questionnaire assessment and performance evaluation, One-Way ANOVA followed by LSD indicate that the video group gained a higher score than the verbal group or the picture group ( $P < 0.05$ ). The questionnaire score in the picture group is significantly higher than in the control group ( $P < 0.05$ ), but no significant difference was shown between these two groups in patients' performance evaluation ( $P > 0.05$ ). Higher percentage of satisfaction was reported by patients in the two multimedia groups than that in the control group.

**Discussion:** Oral impression taking is a consecutive process that requires action cooperation between dentists and patients simultaneously. This particularity makes it more suitable for multimedia delivery. The delivery of tailored information using multimedia in this study was favored by most patients and could improve the degree of patient understanding of the oral impression taking procedures.

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## 1. Background

Obtaining an oral impression of distinct integrity is frequently required during dental treatment to translate the intraoral situation to a cast model. Alginate is used as a major dental impression material worldwide in many clinical procedures because of its simple use and cost-effectiveness. It is extensively used for removable dentures, study casts, creating the opposing model for crown restoration and so on [1]. In order to make it more accurate, impressions should be taken by having patients perform physiological

movement of the lips, tongues and cheeks as quickly as possible after tray seating and by maintaining that position accordingly [2,3]. While, patients always complain about the impression taking procedure as an unpleasant and even horrible experience [4].

To alleviate the discomfort and make a good oral impression with alginate, it is concurred that proper cooperation between patient and dentist is of great help [2,3]. Typically in practice, brief introduction is usually given by dentists on impression taking and key points of patient's cooperation needed through a traditional verbal description first. However, patients are frequently confused when a consecutive dental treatment is described only in words [5]. Therefore, improving information communication ways is necessary to enhance the universally poor patient recall and to overcome the difficulty understanding of the provided medical information.

\* Corresponding author at: Dept. of Prosthodontics, Stomatology Hospital of Xi'an Jiaotong University College of Medicine, #98 Xiwu Road, Xi'an 710004, China.

E-mail address: [luyi1962@163.com](mailto:luyi1962@163.com) (Y. Lu).

To deepen the extent of the patient understanding, multimedia interventions is now employed for a large range of medical education [6–9], which uses a combination of interactive computer programs, videos, and animation, and could be tailored to a person's information seeking preference. With the use of multimedia, large amounts of information related to the impression taking process can be delivered in a vivid way, which seems to offer a promising and practical alternative to help the patients know about the impression taking process and understand the involved tips. The effectiveness of using multimedia as a medical education tool has been evaluated on other medical fields in previous studies with variable results [10–14]. However, there is no data available to address the effect of multimedia assisted oral impression taking previously.

Thus, we developed the present study to evaluate whether the multimedia is a powerful tool for assisting the impression taking information delivery in dental clinic. We recruited patients who are searching for dental treatments to participate in this prospective, randomized, controlled study. The present study was aimed to compare the effectiveness of two kinds of medical information delivery using multimedia (a tailored video presentation and a serial of pictures presentation combined with verbal recording) with the traditional verbal description manner (the verbal recording) on patients' understanding of impression taking procedure. The null hypothesis tested was that there was no significant difference in patients' understanding among the three groups.

## 2. Methods

A randomized, controlled, single-blinded trial was conducted in Dept. of Prosthodontics, Stomatology Hospital of Xi'an Jiaotong University in China. The study was approved by the Ethics Committee of Stomatology Hospital of Xi'an Jiaotong University (approved no. [2016]001).

The flow chart of the study was shown in Fig. 1. After recruited, the participating patients were randomly assigned to the control group and two intervention groups as follows: the video group received information of the whole oral impression taking process with tailored movie and voiceover; the picture group was shown a serial of key pictures of the impression taking procedure combined with the same voiceover; the control group received the information with verbal recording only. The outcomes were measured by both questionnaire and performance of patients' cooperation quantitatively. Also, patients' satisfaction with information delivery manner was interviewed through the telephone call after patients were back home to avoid patients' possible embarrassment if interviewing face to face. Data of age, gender, and highest level of education were collected from the participants. To ensure the consistency of this trial, the study was carried out by the same research group in a separate clinical center to avoid the possible interference around.

The allocation sequence generated by the author D. P. was concealed from the recruited patients, as well as the dentist and the assistant involved in clinical contact with the patients. After intervention, the three outcome measures were conducted separately by different evaluators. The dentist and assistant involved in the impression taking and patients' performance evaluation were unaware of what kind of education the patient received before. The nurses involved in the questionnaire evaluation and telephone interview were aware that a study was ongoing but not aware of the study hypothesis. All the information about the groups and treatments were blinded to the data analyzer. The representative meaning of the computer randomization number was interpreted after the end of the statistical analysis.

### 2.1. Participants

Inclusion criteria was that patients who needed clinical oral impression treatment, were aged 18 years or above, were Chinese mandarin speaking, and had the ability to provide consent. The exclusion criterion was patients who had received oral impression treatment in the latest 5 years or any patient who did not wish to take part in the study. Informed consent was obtained from all the patients before their participation. Finally, 191 subjects were recruited to participate in the study, of which 65 (34.0%) to the video group, 60 (31.4%) to the picture group and 66 (34.6%) to the control group. We confirm all patient identifiers have been removed so the patients described are not identifiable and cannot be identified through the details of the article.

### 2.2. Randomization and multimedia intervention

Randomization was performed using the random number generator, and each recruited subject was randomly assigned to one of three groups: #1 was for the control group, #2 for the video group, and #3 for the picture group. After the patient was assigned into a group randomly, the educational information is presented using an iPad to the patient individually in a single room. Patients in the video group viewed a tailored educational video with a running time of 3 min. The video was prepared based on the information mentioned in the literature [2,3] by Department of Prosthodontics, Stomatology Hospital of Xi'an Jiaotong University including text, audio, and video, and mainly designed by the chairmen of the department, who is an expert in Prosthodontics. Information of the whole process of oral impression taking process and the patient's cooperation key points such as relaxing, deep breath and the movement of the tongue was provided in the video. The picture group was shown the same audio file as the video group combined with static key images captured in the video. To avoid the inconsistency of verbal description, the control group used the same audio recording as the intervention groups.

### 2.3. Outcome measure

The primary outcome measure was the understanding level assessed by both questionnaire and performance of cooperation quantitatively. The supplementary outcome measure was patient's subjective self-assessment satisfaction with the way of information delivery evaluated through telephone interview.

#### 2.3.1. The questionnaire evaluation

After intervention, the patient was asked by the nurse immediately to complete a questionnaire which was designed to assess the understanding and retention of the information presented. The questionnaire consisted of 5 choice questions evaluating comprehension on the information provided. The questionnaire reading level was determined to be at the middle school level (the Chinese government provide the middle school level education and below for free). The questions were pilot tested on 6 randomly selected individuals to clarify phrasing and ordering of questions.

#### 2.3.2. The performance evaluation

After questionnaire evaluation, patient's performance was evaluated by the same dentist and assistant. When the dentist was taking an oral impression from the patient, the patient was required to cooperate with the dentist at the appropriate time as instructed by the previous received intervention. At the same time, the assistant scored the patient's performance based on the number of correct behavior feedback on the tailored information during the oral impression taking process.

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