

## DIGITAL SMILE DESIGN: OPTIMAL PROGRAM SELECTION FOR STUDENTS

Sheshenin I.V., Motousova S.A., Grigoryev S.S.

*Ural state medical university, Ekaterinburg*

**Summary.** This article presents programs that allow making a digital smile design. The programs that are used most often in the world were analyzed. The Visagi-Smile program was chosen as the most suitable by many criteria for introduction into the studying process of the dental faculty.

**Keywords:** *digital smile design, digital photography, restoration*

### Introduction

The development of modern dental technology significantly improves the quality of treatment. The introduction of digital technology into dental practice helps restore patients' oral health and the appearance of a smile. But sometimes the result of aesthetic restoration does not live up to the expectation of the patient [1].

Currently, digital technologies in dentistry allow us to present the final result of work taking into account the individual characteristics of the patient. To do this, you need to take several photos of the face in different projections and conduct a photo analysis.

Digital Smile Design (DSD) — a program that allows analyzing the maxillofacial region of the patient and planning the appearance of a future restoration. In addition to accessible and high-quality compliance with the patient, the DSD application facilitates collaboration with the dental technician when waxing is necessary [2].

To apply this technology of smile design, the dentist must have skills to work with it. The early introduction into practice of a dentist of modern technologies makes the process of working with them easier and more efficient. The introduction of digital design skills into education process of dental students significantly improves the qualifications of future dentists and improves the quality of dental care in future.

**The purpose of the study:** selection of the optimal program “digital smile design” for the introduction of dental students into the studying process.

**Materials and methods:** based on the electronic databases PubMed and Google Scholar, programs that allow the digital design of a smile are analyzed. All studied programs were compared among themselves. Evaluation criteria were significant areas analyzed by digital smile design [6].

For comparison, we selected the most highly rated programs: Photoshop CS6, Keynote, Smile Designer Pro, Cerec SW 4.2, Planmeca Romexis Smile Design (PRSD), VisagiSMile, DSD App [5].

Photoshop CS6 and Keynote were created not specifically for DSD, but are widely used among dentists and dental technicians as digital smile design programs and are presented in literature reviews in the field of aesthetic dentistry [7].

Smile Designer Pro is a specialized digital design program used in dentistry. Cerec SW 4.2 and PRSD are software for CAD/CAM systems, which can be used to design restorations of the anterior tooth group and may require frontal and intraoral images [4].

The VisagiSmile application and the DSD App are based on the psychological component of the external image. In these programs, a person's temperament, its external manifestation, can be used as a smile design factor [4].

### Research results and discussion

All studied programs were compared among themselves. Evaluation criteria were significant areas analyzed by digital smile design [6].

The facial components were highlighted (table 1). Face parameters reflect the general structure of the lower third of the face. The appearance of the teeth plays a paramount role in creating a future smile (table 2). For a holistic perception of a smile, adaptation of the teeth to the surrounding soft tissues is necessary, which allows taking into account the parameters of the gums and cheeks. These components are reflected in the gingival parameters table (table 3).

The largest number of parameters is taken into Photoshop CS6, Keynote, and in the specialized program Visagi-Smile.

Because we plan introducing these programs into the educational process, the cost of software was an important factor (table 2). To use Keynote, you need a technique with iOS 10.0 software. The use of the Cerec SW4.2 program implies the presence of a Sirona dental CAD/CAM System.

All selected programs meet the requirements of digital design. Photoshop CS6 uses the largest number of components to analyze and plan the result, but it is not a specialized program for DSD [5].

The Visagi-Smile program analyzes all the necessary components. Its distinguishing feature is the correlation of the patient's appearance with the shape of the teeth of the future restoration. In our opinion, the Visagi-Smile program is optimal for introducing dental students into the educational process.

Table 1

**Analysis of the facial component in programs used for digital smile design**

<i>Parameters</i>	<i>Photo-shop CS6</i>	<i>Keynote</i>	<i>Cerec SW4.2</i>	<i>DSD App</i>	<i>SDP</i>	<i>Visagi-Smile</i>	<i>PRSD</i>
Intersection line	+	+	+	+	+	+	+
Midline of the face	+	+	–	+	+	+	+
Tooth midline abnormality	+	+	+	+	+	+	+
Midline of teeth	+	+	–	–	–	+	+
Third parties	+	+	–	–	–	+	–
Facial angle	+	+	+	–	–	–	–
Nasolabial angle	+	+	+	–	–	–	–

Table 2

**Analysis of the dental component in programs used for digital smile design**

<i>Parameters</i>	<i>Photo-shop CS6</i>	<i>Keynote</i>	<i>Cerec SW4.2</i>	<i>DSD App</i>	<i>SDP</i>	<i>Visagi-Smile</i>	<i>PRSD</i>
Tooth shape change	+	+	+	+	+	–	+
Tooth characteristic	+	–	+	–	–	+	–
Tooth shadow	+	+	+	+	+	+	+

Table 3

**Analysis of the gingival component in programs used for digital smile design**

<i>Parameters</i>	<i>Photo-shop CS6</i>	<i>Keynote</i>	<i>Cerec SW4.2</i>	<i>DSD App</i>	<i>SDP</i>	<i>Visagi-Smile</i>	<i>PRSD</i>
Lower lip line	+	+	+	–	+	+	+
Buccal passage	+	+	–	–	–	–	–

Table 4

**Price analysis**

<i>Price</i>	<i>Photo-shop CS6</i>	<i>Keynote</i>	<i>Cerec SW4.2</i>	<i>DSD App</i>	<i>SDP</i>	<i>Visagi-Smile</i>	<i>PRSD</i>
Purchase	–	F <sup>1</sup>	F <sup>2</sup>	F <sup>1</sup> / 70\$	–	Free	–
Monthly subscription	1300 rubles	F <sup>1</sup>	F <sup>2</sup>	–	–		31\$
Annual subscription	15600 rubles	F <sup>1</sup>	F <sup>2</sup>	800\$ <sup>3</sup>	1000\$	200\$ <sup>3</sup>	372\$

*F<sup>1</sup> – Free with iOS 10.0 and later version*

*F<sup>2</sup> – Free with CEREC (CAD/CAM Sirona)*

*\$<sup>3</sup> – advanced features and technical support online*

On the basis of the department of therapeutic dentistry and propaedeutics of dental diseases, a pilot test of the Visagi-Smile program was conducted.

Full face photographs were taken with a smile and a retractor mounted on 30 patients on a Canon EOS 600D digital SLR camera.

Photos were uploaded to Visagi-Smile on a personal computer with Internet access. The photo noted the main points of the face, the guidelines of the eyes, nose, lips.

The next step was the editing of the shape and color of the teeth. This program offers auto-correction, while the student can independently change the parameters of the tooth. As a result of our work, we obtained an aesthetic visualization of the future restoration.

### Conclusion

1. VisagiSmile program is optimal for digital smile design, as it contains the basic parameters of aesthetic modeling of a smile.

2. The software at the basic level is free and easy to understand, which contributes to the introduction of dental students in the educational process.

### References

1. Bini, V. Aesthetic digital smile design: software-aided aesthetic dentistry: part I/V. Bini // CAD/CAM Int. Mag. Digital Dent. – 2014. – № 2. – P. 12–17.
2. Bini, V. Aesthetic digital smile design: software-aided aesthetic dentistry: part II/V. Bini // Cosm Dent. – 2015. – № 1. – P. 14–22.
3. Coachman, C. Digital smile design: a tool for treatment planning and communication in esthetic dentistry/C. Coachman, M. Calamita // Quintessence Dent. Technol. – 2012. – № 35. – P. 103–111.
4. Ermarkevich, M. I. Aesthetic digital design in the planning of prosthetics of the frontal group of teeth/M. I. Ermarkevich, T. N. Manak // Innovations in medicine and pharmacy: materials of scientific-practical. conf. – Minsk, 2016. – № 3. – P. 118–123.
5. Aesthetic principles of the upper front teeth: Application of golden proportion (Levin) and golden percentage (Snow)/E. R. Markovics, K. Janosi, C. Biri, D. Cerghizan [et al.] // Acta Med Marisiensis. – 2013. – № 59. – P. 25.
6. Vedernikova, V. L. Using the method of photoanalysis for prosthetics of patients with tooth defects in the anterior jaw/V. L. Vedernikova, S. E. Zholudev // Ural Medical Journal. – 2012. – № 8. – P. 17–20.
7. Žujić, D. Treatment of complete loss of upper jaws with production of restoration from zirconium dioxide with support for implants/D. Žujić, V. Žujić, D. Stolica // Actual problems in dentistry. – 2017. – Vol. 13, № 1. – P. 18–24.