TASHKENT STATE DENTAL INSTITUTE
COMPARATIVE ANALYSIS OF INTRAORAL SCANNERS

R.A. Amanullaev
Scientific supervisor: Doctor of Medical Sciences, Professor of the Department of Pediatric Surgical Dentistry,TSDI

A.O. Manukyan
1st year Master, Department of Pediatric Surgical Dentistry,TSDI

ABSTRACT

The evolution of intraoral scanners (IOSs) is rapid, and new IOSs appear on the market with different properties depending on the manufacturers. There is no uniform rating system based on a defined set of aspects that has reported in the literature that can be used to compare these devices. This validation study aimed to compare different IOSs based on objective and comprehensive parameters.

Keywords: intraoral scanner, dentistry, IOSs, comparison analysis.

INTRODUCTION

The widespread use of computer-aided design/computer-aided manufacturing (CAD/CAM) technology in dentistry poses new challenges and goals for dentists. The integration of intraoral scanning systems into the digital dental workflow creates new solutions for dental treatment. There are two types of initial steps of CAD/CAM technology: direct and indirect imaging method. During indirect approach the workflow starts with a traditional impression taking, then the stone cast is scanned by a laboratory scanner [1]. The first step of the direct CAD/CAM workflow is to take an optical impression with intraoral scanner (IOS) devices [2, 3]. The accuracy of digital impression-taking required to ensure a successful clinical workflow has been demonstrated in scientific studies [2].

MAIN PART

Amornvit, P., Rokaya, D., & Sanohkan, S. in 2021 Comparison of accuracy of current ten intraoral scanners. They said, that: “Within the limitations of this study, the following conclusions can be drawn. (1) More the scan distance, less the accuracy for all the scanners (2) In all studied scanners, the trueness varied but precision was favorably similar (3) Diagonal scanning showed less accuracy for all the scanners. Hence, when scanning the full arch, the dentist needs to take more caution and good

scan pattern (4) Trios series showed the best scan results compared to other scanners" [1]

In same year, Revilla-Leon, M., Frazier, K., da Costa, J. B., Kumar, P., Duong, M. L., Khajotia, S., & Urquhart, O. did Panel survey about "Intraoral scanners: An American Dental Association Clinical Evaluators Panel survey" [2]

In a result of this research: "A total of 369 panelists responded to the survey. IOS use was split among the ACE Panel; 53% indicated they use one in their practice. The top reason respondents began using IOSs was to improve clinical efficiency (70%). Ninety percent of respondents use IOSs for single tooth-supported crowns, and 58% began using IOSs less than 4 years ago. Most users are at least mostly satisfied (91%) with the results. Among nonusers, the top reason for not using an IOS was the high level of financial investment (66%); 34% and 40% of nonusers are thinking of buying or training with IOSs in 2021, respectively" [2].

"The differences among IOSs were demonstrated in point scores (summary chart[max. 10 points] + weight of IOSs[max. 2.5 points] + circumference of IOSs[max. 2.5 points] + in vitro scanning time[max. 2.5 points] + pauses in data capture[max. 2.5 points] + accuracy[max. 10 points] = summary[max. 30 points]). Trios 4 Pod achieved the greatest cumulative score (23.37 points), furthermore it earned the highest points for summary chart and scanning speed. Regarding scanning continuity, the best-performing IOSs, which tied at identical point scores, were the Trios 3 and 4 Pod, Trios 4 Move, iTero Element 2, CS3600 and CS3700. The most accurate IOS was the CEREC Primescan, although it earned the lowest points of the comparative assessment (heaviest IOS). GC Aadva scored 5.73 points of a maximum of 30 points, which was the poorest result in this study". [3]

CONCLUSION

The rating system shows the differences between IOS scanners based on available data and parameters and can be used to help doctors choose the equipment that is most convenient for them. New generations of IOS have special properties, as well as higher accuracy than older versions.

REFERENCES:

1. Amornvit, P., Rokaya, D., & Sanohkan, S. (2021). Comparison of accuracy of current ten intraoral scanners. BioMed Research International, 2021.

2. Revilla-Leon, M., Frazier, K., da Costa, J. B., Kumar, P., Duong, M. L., Khajotia, S., & Urquhart, O. (2021). Intraoral scanners: An american dental association clinical evaluators panel survey. The Journal of the American Dental Association, 152(8), 669-670.

3. Róth, I., Czigola, A., Fehér, D., Vitai, V., Joós-Kovács, G. L., Hermann, P., ... & Vecsei, B. (2022). Digital intraoral scanner devices: a validation study based on common evaluation criteria. BMC Oral Health, 22(1), 140.