

Digital and conventional impressions have similar working times

Abstracted from

Gallardo YR, Bohner L, Tortamano P, Pigozzo MN, Laganá DC, Sesma N.

Patient outcomes and procedure working time for digital versus conventional impressions:

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Address for correspondence: Dr Yolanda Natali Raico Gallardo, Department of Prosthodontics, University of Safio Paulo, 2227 Lineu Prestes Ave, Butantafi, Safio Paulo, Brazil. E-mail: yraico@usp.br

Question: Are digital impressions more efficient than conventional techniques?

Data sources Medline, Cochrane, Science Direct, Scopus and Embase were electronically searched and complemented with hand searches. Studies published from 1955 to July 2016 were considered.

Study selection Clinical studies (prospective, retrospective and RCTs) relating to digital implant or tooth impression techniques, comparing patient reported outcome measures (PROMs) and procedure working times compared to conventional impression techniques were considered. The following exclusions were adhered to; in vitro studies, ex vivo studies, systematic reviews, clinical cases, animal studies and any studies not comparing digital and conventional impression techniques.

Data extraction and synthesis Data extraction was carried out independently by two reviewers. Risk of bias assessment was conducted using the Cochrane⁴ tool for RCTs and a modified Newcastle-Ottawa scale for non-RCTs. In all 2943 publications were reviewed following the initial electronic search, of which 2916 were excluded at this stage. A qualitative analysis was conducted.

Results Five studies were included; all three of the RCTs included were at 'high' risk of bias and the observational studies were judged to have a methodology of medium quality. Given the differences in the studies, a meta-analysis could not be performed. Three studies conducted involved implant supported prostheses only, two reported on tooth supported prostheses with a total of 155 participants included. Four studies comparing PROMs between the different impression techniques reported, a digital impression technique reduced anxiety and nausea, being considered more comfortable than a conventional impression technique. The remaining study reported no difference in patient comfort when comparing techniques.^{3,6,7,8} With respect to procedure working time three studies reported that the digital impression technique required less time;^{3,6,7} conversely two studies reported less time for the conventional technique.^{2,8}

Conclusions This systematic review draws two conclusions; working times are similar for both conventional and digital impression techniques and patients prefer the experience of digital to conventional impressions. It does acknowledge the lack of relevant studies in this area.

Commentary

With the continued advances in technology, we must be alive to the potential impact and opportunities such technology may provide in the delivery of dental care.⁶ The establishment of CAD/CAM-technology, which has been used in dentistry since the mid 1980s has improved immensely with time, allowing for accurate digital impressions to be taken and the milling or 3-D printing of restorations.⁵ It is hard to deny that as with all aspects of life, dentistry is not immune to technological advances and in order to provide the best possible care for patients we must be willing and able to adapt to these changes. The aim of this systematic review was to explore the evidence that compares patient-centred outcomes and procedure length for digital versus conventional impression techniques.

The authors performed a literature search in five mainstream databases to identify studies which were published from 1955 to July 2016. The rationale for restricting the time period of publications however, was not identified and there was no mention of language restrictions. In addition, authors were contacted for missing or unclear information. The methodology used to include and exclude studies was well explained and logical in its approach. Another measure of the quality of this review is that the authors preregistered their protocols in the PROSPERO registry (CRD42016039254) and adhered to their published plan.

The authors provide justification for excluding 22 of the eligible articles, although a list of the excluded studies was not provided. A search of the reference list of the included studies was carried out. This review identified that there is a lack of evidence available comparing digital versus conventional impressions for the construction of both a tooth or implant-supported prosthesis from the patient's perspective. Only a limited number of studies were found to address the review's inclusion criteria and the overall quality of RCTs was considered to be high risk of bias due to the lack of blinding.

It is understandable that the blinding of the operator (performance bias) cannot be achieved because of the nature of the intervention. Most of the studies completed randomisation when deciding which impression technique should be used first. One of the included studies performed a randomisation to divide the population into digital and conventional samples. None of the three RCTs reported a sample size calculation, nor was a population representative sampling performed. Neither sex nor age distribution was reported, and no pooled estimates were performed to prevent inclusion of potential bias. Due to marked heterogeneity of the studies' design, a meta-analysis was

not completed. The lack of standardised protocols to measure the procedure working time may lead to high variation of results. Therefore, the review outcomes are presented as a narrative systematic review. The main drawbacks presented by the authors were methodological flaws, which raises some reservations about the presented results. This was further confirmed as the authors concluded the time efficiency of both techniques were similar. Until this essential aspect of study design is standardised it will be hard to compare conventional and digital impression working times.

In summary, this review highlights that while many studies are available comparing the clinical outcome there is very little high-quality evidence addressing patient outcomes. The authors established the clinical time efficacy for both digital and conventional impressions is similar, however patients have a greater preference for digital impressions. More high quality, well conducted patient reported outcome measured RCTs with a standardised protocol for working time measurements involving a larger sample are needed to generate reliable results.

Victoria Cave and William Keys

Aberdeen Dental Institute, Aberdeen, Scotland

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Practice point

- No significant difference was found in the working time for digital versus conventional impressions.
- While there might be a patient preference for digital impressions, this systematic review is not of high enough quality to provide general dental practitioners with the relevant information to alter their current clinical practice.
- Digital impressions are becoming increasingly common in modern dentistry; however, there is a lack of well conducted research into digital impression efficiency compared to conventional impressions. Future clinical trials should assess the working time efficiency and cost-effectiveness of both digital versus conventional impressions.

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