

What's new for the clinician?

- excerpts from and summaries of recently published papers

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Compiled and edited by V Yengopal

1. Digital versus conventional impression method in children

H Yilmaz, MN Aydin. *Int J Paediatr Dent.* 2019; 29: 728-35.

Since the emergence of 3D systems, research has been conducted to examine their accuracy and reliability, and only clinically insignificant differences have been shown in the precision of conventional and digital methods.¹

In orthodontics and in paediatric dentistry, impressions are taken from children for diagnosis and treatment procedures. Today, a digital change is evident in dentistry in the field of impression taking. This is because with the development of the systems in this field, a complete change can be expected in the impression-taking procedure, often considered as the worst experience by patients and children.¹

In addition to that, the comfort of impression methods and the time required are important because it is known that children are more stressed in their encounters with the dentist than the elderly, and their chairside times are shorter.

Yilmaz & Aydin¹ reported on a trial that sought to compare impression-dependent factors between digital and conventional methods (eg. gag reflex, queasiness, smell/taste, heat/cold, and so forth) and the time required to take impressions in children (7-13 years old).

The null hypothesis was that there were no significant differences between conventional and digital impression-taking methods in terms of comfort and the total time required for impression taking.

MATERIALS AND METHODS

A total of 30 children were considered for this crossover trial. The study, however, was conducted on 28 children (17 girls and 11 boys - mean age = 10.16 ± 1.77)

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as one patient did not come to his appointments, and one patient decided to quit the study.

When including individuals in the study, patients who needed conventional impressions for the fabrication of a fixed or removable appliances were selected in addition to the digital impressions taken as a routine diagnostic record.

This was considered as a prerequisite. Those individuals who met the pre-requisites were included in the study. The following criteria were also considered: not to have previously experienced digital or conventional impression taking, not to have temporomandibular joint and periodontal discomfort, and not to be using psychiatric or neuropathic drugs.

The study was a crossover design and included digital and conventional impressions taken by one operator at 14- to 21-day intervals from the same patient. The operator assessed both impression-taking methods for the presence/absence of squeezing, hand/arm/foot movement, breathing difficulties, queasiness, gag reflex, vomiting, and crying in the patient and scored the procedure between 0 and 100.

Following that, the patient was asked to report his or her feeling of general discomfort, difficulty breathing, smell/taste discomfort, heat/cold disturbance, queasiness, gag reflex, and a pain spot. The patient responses were recorded by using a 100-mm VAS index, which was supported with facial emojis designed specifically for children.

Digital impressions were taken by using an up-to-date intraoral scanner (Trios 3-Cart, Color-2017, 3shape, Denmark) - adhering to the scanning pattern recommended by the company for routine diagnosis and recording.

In the upper jaw, the occlusal, buccal, and lingual surfaces of the teeth and the palate were scanned. In the lower jaw, the occlusal, lingual, and buccal surfaces of the teeth were scanned in the order given.

The intraoral scanning process was divided into the patient registration, lower jaw scan, upper jaw scan, and bite scan stages considering the progress of the process with the device.

The time was paused by the observer at each stage which was recorded separately. A follow-up appointment was arranged for the patient to visit the clinic 14-21 days later, and then the patient underwent the conventional impression-taking procedure.

Alginate was used for conventional impression taking and was hand-mixed. Similarly, as with the digital impression method, the same sequence of operations was recorded separately in the four stages: tray selection, lower jaw impression, upper jaw impression, and bite registration with wax.

In both impression methods, care was taken not to allow any missing space on all occlusal, buccal, and lingual surfaces. When these did occur, the missing areas were scanned in the digital impressions, and impressions were retaken in the conventional method.

RESULTS

The mean age of the 28 paediatric patients included in the study was 10.16 ± 1.77 (range=7.08-12.92), and 60.7% were girls. Mean durations of patient registration/tray selection, lower jaw scan/impression, and total scan/impression did not differ between the digital and conventional impression-taking groups ($P > .05$).

The mean duration of the upper jaw scan/impression, however, was found to be significantly shorter in the digital impression group ($P = .008$), whereas the bite scan/registration took less time in the conventional impression group ($P < .001$).

When the two groups were compared in terms of patient comfort, the total discomfort score ($P < .001$) assessed by the clinician and the average VAS score ($P < .001$) provided by the patient were found to favour the digital impression group. The total discomfort score had seven different criteria, which were recorded by the clinician. When that score was compared with the average VAS score completed by the patient, the values were found to be similar in terms of assessing patient comfort ($P < .001$).

Patients' preferences, determined according to questions prepared for comparison of the two methods after the patients' impression experiences, showed that patients preferred the digital impression taking format, and reported it to be more comfortable, and less stressful than the conventional impression-taking method ($P < 0.01$).

CONCLUSION

Although digital impressions and conventional impressions each had specific superiorities at different stages of impression taking, the methods were similar in terms of the time required to take impressions. When the comfort of the impression methods was assessed using the VAS scores by the children and

the observer clinician, the digital impression method was considered to be more comfortable than the conventional method in both scoring methods. According to the questionnaire investigating preference for the method of impression taking, most of the children preferred the digital method.

Implications for practice:

More comfortable digital systems are available for impression taking among children who seem to show preference for this compared with the conventional impressions which many dislike.

Reference

1. Yilmaz H, Aydin MN. Digital versus conventional impression method in children: Comfort, preference and time. *Int J Paediatr Dent.* 2019; 29: 728-35.

2. Should we be placing linings under composite resins?

I Blum, N Wilson. *Br Dent J*. 2019; 226, 749-52.

Composite resin fillings, especially in the developed world, have become the gold standard for both anterior and posterior fillings.

This increase has been attributed to various factors, including: increasing patient demand for tooth-coloured restorations; developments in composite and adhesive technologies; improvements in the handling characteristics of composites and related adhesive systems; the introduction of faster and easier composite placement techniques and facilitating devices, and reduced concerns over the longevity of posterior composites, together with encouraging data on the efficacy of composite repairs; the phase-down in the use of dental amalgam; and the progressive shift toward preventatively-orientated, minimum intervention approaches to the restoration of posterior teeth.¹

There is now good evidence that does not support the placement of a lining (liner, base or combinations thereof) under posterior composites, irrespective of the depth of the preparation, except in situations where the lining is intended to have therapeutic pulpal effects in deep cavities,¹ makes composites quicker and easier. The consequences of the clinical approach of 'no more linings' under composites based on published evidence includes:

- **The need to review relevant teaching**

Composites have been taught in dental schools in many countries around the world and for most it remains the material of choice for restoring anterior teeth as well as occlusal and occluso-proximal defects in posterior teeth.¹ However, important variations in teaching have been reported, notably variations in the selection of liners, base materials and lining techniques.¹

Many dental schools have recently been found to recommend the use of a glass-ionomer (GI) material to line specifically deep cavities to replace dentine and on the understanding that, in bonding to dentine, GI's hermetically seal off the floor and, when present, axial walls of the cavity. In addition, it remains a widely held view that the anti-bacterial effects of fluoride release from GI bases are clinically significant throughout the clinical service of the restoration. Such thinking is considered misguided.¹

- **The challenge to change custom and practice in conservative (operative) dentistry**

It will be no mean feat to achieve the change to the widespread practice of no more linings under composites. Perhaps the greatest concerns to overcome are the potential damage to the pulp and an increased incidence of postoperative sensitivity, both of which may have negative effects on patient satisfaction and, in turn, diminish confidence in a practitioner and practice.¹

There are published studies that have reported an increase in microleakage, postoperative sensitivity and secondary caries when a lining is present under a posterior composite.

- **The need to adopt new approaches to the management of caries**

Traditionally, dental schools have taught that all caries, except possibly for some residual softened, unstained dentine close to the pulp, should be removed before proceeding to restore a tooth. Evidence has now been presented that states that once isolated from their source of nutrition by a restoration of sufficient integrity, bacteria in caries either die or remain dormant and therefore pose no risk to the tooth. Thus, 'the seal is the deal'.

There is also substantial evidence that removing all caries in an asymptomatic, vital tooth is not required, especially if one is attempting to avoid pulpal exposure.¹ Indeed, there is increasing evidence that continuing to excavate until the base of the preparation is formed of hard, albeit somewhat discoloured dentine, may do more harm than good.

- **Increased reliance on adhesive bonding**

If more caries is to be left in the base of preparations, practitioners may reasonably seek new reassurances on the nature, adequacy and durability of the bond formed between dental adhesive and residual caries-affected dentine in unlined cavities.

If this bond suffers certain limitations, does it mean that the integrity of the bond along the cavosurface margin is all the more critical? And what may be the consequences of this bond failing?

Practitioners asking such questions may take comfort as there is published evidence that there is an increase in microleakage, postoperative sensitivity and potentially secondary caries when a lining is present under a posterior composite. Also evidence has showed that the sealing effect of bonding agents on different dentine substrates provides adequate protection and renders the dentine insensitive, reducing or eliminating postoperative sensitivity and the possible adverse effects of resins on the pulp.¹

- **Reductions in the time taken to place composite restorations**

With no need to place a lining, which may be compound sub-base and base, let alone the use of deep cure composites and simplified caries management, it is anticipated that placement times for state-of-the-art posterior composites will be found to be similar, not significantly different to those for traditional direct restorations of dental amalgam.

• Enhanced biomechanics of restored tooth units

Studies investigating the longevity and reasons for failure of complex posterior composites placed with or without a lining, found that posterior composites placed on top of a GI lining suffered more fractures than posterior composites placed using a total-etch technique.¹ A more recent Cochrane review concluded that 'using a liner is an unnecessary step in routine composite-based restorations in adult posterior teeth'.¹

• Simplified repair protocols

Repair rather than replacement of failing restorations is now widely taught.¹ From the growing body of evidence on the benefits and efficacy of repairs, it is suggested that the repair of posterior composites which have been placed without a lining, rather than lined, will be found to be quicker and simpler with the possibility of enhanced performance in clinical service.

• Increased restoration longevity

Posterior composites without linings may remain in clinical service longer than composites with linings.

With the prospect of repairs to unlined composites being more efficacious than repairs to lined composites, it may be anticipated that the longevity of unlined composites which are well maintained in clinical service, will exceed the longevity of lined composites.

Any measure which effects an increase in restoration longevity has an important impact on 'teeth for life' through a slowing down of the 'restorative cycle' and, as such, should be adopted. Available evidence favours the adoption of 'no more lining' under composites for this very reason.

Implications for practice

The review article provides evidence of the progress that has been made in term of new approaches to restoring teeth with new generation composite materials. It requires a mind-set change from many colleagues who have been taught differently and provides further evidence of the need for practitioners to keep up to date with the latest evidence guiding clinical practice.

Reference

1. Blum I, Wilson N. Consequences of no more linings under composite restorations. Br Dent J. 2019; 226, 749-52.

Do the CPD questionnaire on page 587

The Continuous Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.



Online CPD in 6 Easy Steps

- 1 Go to the SADA website www.sada.co.za.
- 2 Log into the 'member only' section with your unique SADA username and password.
- 3 Select the CPD navigation tab.
- 4 Select the questionnaire that you wish to complete.
- 5 Enter your multiple choice answers. Please note that you have two attempts to obtain at least 70%.
- 6 View and print your CPD certificate.