

Bonded composites versus ceramic veneers



This evidence summary aims to locate and summarise evidence to identify if bonded composites should be used rather than ceramic veneers for the repair and aesthetic enhancement of worn and otherwise damaged anterior teeth. It does not include detailed descriptions of the studies cited nor does it include information that was not presented in the literature.

The [Curious about](#) website encourages dental professionals to raise issues where a review of the available evidence would provide a useful resource for other dental professionals. Where there is a lack of evidence, the topic is considered for research and an award is made available.

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Key findings

- A conclusion could not be reached as to whether bonded composite veneers perform better than ceramic veneers for the repair and aesthetic enhancement of worn and otherwise damaged teeth. This is due to a lack of reliable evidence.
- Surface quality changes and temporary post-operative sensitivity are more frequent in composite veneers than ceramic veneers.
- Patients are equally satisfied with porcelain and composite laminates after placement but in the longer term porcelain veneers provide significantly greater satisfaction.

Review question

This evidence summary was prepared in response to the following question: Should bonded composites be used rather than ceramic veneers for the repair and aesthetic enhancement of worn and otherwise damaged anterior teeth?

Key terms

Composite:

A material made from a mixture of resin and silica used in tooth-coloured fillings and other restorative work.⁽¹⁾

Ceramic:

Any product made essentially from a non-metallic inorganic material usually processed by firing at a high temperature to achieve desirable properties.⁽²⁾

Veneers:

A layer of tooth-coloured material usually porcelain or acrylic resin attached to the surface of a tooth by direct fusion, cementation or mechanical retention.⁽¹⁾

The case for action

Aesthetics has become important to society and one reason people seek dental treatment is to improve their appearance. Over a third (37.3 per cent) to more than half (52.8 per cent) of individuals have reported dissatisfaction with their dental appearance⁽³⁻⁵⁾ with factors carrying particular importance being tooth colour, shape, position, restoration quality and general arrangement, with anterior teeth being especially important.⁽⁶⁾

Tooth damage and wear

Tooth damage, due to factors such as trauma, dental caries⁽⁷⁾ and wear can cause aesthetic concerns and restorations may be necessary for a number of reasons. Trauma can fracture, chip or crack teeth⁽⁸⁾ while wear can affect tooth colour, shape or visibility⁽⁹⁾ leading to compromised patient satisfaction and/or oral health/function.

Veneers

Historically, unaesthetic anterior teeth were improved using full crowns but, as dentistry has progressed, veneers have become a more conservative approach to altering appearance in some cases.^(10;11) While veneers are not a novel concept, composites and adhesive techniques have developed over the last 40 years and direct composite restorations, prefabricated composite veneers and porcelain veneers have emerged.⁽¹²⁾

Ceramic laminate veneers

Ceramics produce restorations with a stable colour and retainable smooth surface finish⁽¹³⁾ though failures occur due to debonding, fracture, chipping, marginal defects and microleakage.^(14;15) Survival rates for porcelain veneers over periods of up to 16 years have been estimated to vary between 100 and 64 per cent⁽¹⁵⁾

with differences being seen in different classes of material.^(16;17) Ceramic restorations can provide excellent aesthetics and durability but are more difficult to repair than their composite counterparts and may not be suitable for all patients.⁽¹⁸⁾

There have been suggestions that ceramic veneers are overused and in some cases alternative approaches, such as bleaching, composites or tooth or gingival recontouring, may be more suitable⁽¹⁹⁾ especially as some veneer approaches can be destructive due to, for example, aggressive tooth preparation.⁽¹⁹⁻²²⁾ An alternative approach may also be beneficial for the patient in that they sometimes cost less and maintain natural tooth anatomy.⁽¹⁹⁾

Composite laminate veneers

Direct composite laminate veneers require minimal preparation compared to indirect composite veneers, cost less and are easier to repair, so are useful in young patients.^(18;23) However, composites can have inherent limitations such as shrinkage, limited toughness, colour instability and susceptibility to wear that reduce the lifespan of the restoration and cause postoperative complications, for example, shrinkage contributing to microleakage.^(13;24) Indirect composite laminate veneers are an alternative to both ceramic and direct composites and due to processing have improved properties over their direct counterparts.^(25;26) Survival rates for composites vary greatly – 25 to 86 per cent last two to three years;⁽²⁷⁻²⁹⁾ there are no long term clinical studies.

The evidence

Overall, a conclusion could not be reached as to whether bonded composite veneers perform better than ceramic veneers for the repair and aesthetic enhancement of worn and otherwise damaged teeth. This is due to a lack of reliable evidence. The evidence that was located is presented below according to publication type.

Systematic review (Cochrane review)

The Cochrane review found no reliable evidence to show a benefit of one type of veneer restoration over the other with regard to restoration longevity.⁽³³⁾ The authors included one clinical trial^(31;32;35) but it was not possible, due to the manner in which data was reported, to perform statistical analysis of the results. The main publication included in the review showed porcelain veneers to have the best overall survival over the period. Six per cent of veneers were recorded as 'absolute failures' all of which were composite restorations (four direct composites and seven indirect composites).⁽³⁵⁾ The systematic review did not comment on patient satisfaction as evaluated in this trial and for this reason the data is covered below.

Clinical trials

Survival, secondary caries and sensitivity⁽³⁰⁾

Composite and ceramic veneers were found to have statistically similar survival rates. Indirect composites were recorded to fail, 87 per cent survival compared with 100 per cent for ceramic veneers, with all failures occurring within 13 months of placement. No secondary caries were seen with either material. Temporary post-operative sensitivity developed with both ceramic and composite veneers (nine per cent of ceramic and 26 per cent of composite).

Surface quality changes⁽³⁰⁾

Surface quality changes were more frequent in composite veneers than ceramic with minor voids, defects, staining at margins and slightly rough surfaces all being more frequent.

Patient satisfaction and professional recognition⁽³²⁾

Initially patients were equally satisfied with porcelain and composite laminates but, after two years, porcelain veneers provided significantly greater satisfaction. With regards to aesthetics and the recognition of veneers fabricated from the different materials, dentists were able to identify veneers in comparison to natural teeth in patients but unable to differentiate between types of veneer.

Treatment times

Treatment time for a direct composite veneer was reported to be 46 minutes, an indirect composite 70 minutes and a porcelain veneer 62 minutes with times decreasing if more than one veneer was placed.⁽³¹⁾ This information may be useful for cost benefit analysis though longer treatment times, approximately 120 minutes per veneer, have been cited.⁽³⁰⁾

Methods

Search strategy

Online searches were made of Ovid MEDLINE (1946 to present) including the following search terms: dental veneers, composite resins, compomers and dental porcelain. Key terms and free text terms were included and filters to identify meta-analysis, systematic reviews, economic evaluations and clinical studies were employed. There was no limit in article language

The following databases were also searched using equivalent terms with no limits:

- PubMed MEDLINE
- Science Direct
- Cochrane library (DARE, NHS EED, HTA Database, Cochrane reviews)
- International Association for Dental Research
- Centre for Reviews and Dissemination
- TRIP

Hand searching of reference lists and grey literature was also carried out. All searches were conducted in May 2014. Studies were included if they compared ceramic and composite veneers to examine any endpoint for example survival, failure, patient satisfaction etc. Studies were excluded if experimental work was carried out on extracted teeth or if data covering anterior teeth or the materials of interest were presented in a manner preventing extraction.

Results

In total over 200 articles were located. Following a primary sift by the author, 21 articles were obtained as full text; following examination of the full text articles, data from two clinical trials⁽³⁰⁻³²⁾ and one Cochrane review,⁽³³⁾ were included (Appendix 1). The Cochrane

review, current as of 2004, examined the effectiveness (longevity and patient satisfaction) of direct versus indirect laminate veneer restorations. One meta-analysis aggregating an overall survival result for four types of veneers was excluded as though three studies covering composite veneers were included data covered premolar teeth as well as anterior teeth and no analysis was made of the data relevant to this summary.⁽³⁴⁾ One publication was excluded as it was included in the systematic review⁽³⁵⁾ and a further study was excluded as it was not clear where the veneers had been placed.⁽³⁶⁾

The located publications were appraised and most contained weaknesses. The Cochrane review⁽³³⁾ was of high methodological quality and included one clinical study.^(31,32,35) This study had methodological flaws that lead to the authors of the review to conclude that the results should be viewed with caution. The main weakness of the study relates to the exclusion of indirect restorations that failed to reach the desired quality and restorations that were not placed according to their original allocation (eight direct composites were placed in place of eight indirect composite veneers due to colour matching issues) not being considered failures. Despite the need to use an alternative restoration type, 'intention to treat' analysis was not performed. This could lead to the effectiveness of indirect restorations being overestimated. Gresnigt *et al*⁽³⁰⁾ employed a split mouth approach to their study. While this design of trial may allow valid inferences about the differences between composite and ceramic veneers that are precise, due to the elimination of host-related factors, it is possible that the conclusions reached are less valid for the same reasons.⁽³⁷⁾ For this study in particular, it is not clear who placed the veneers, which may introduce both patient and examiner bias and/or introduce performance bias.⁽³⁸⁾

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Appendix 1

Author and year	Study type	Population	Follow up	Aim	Outcome measure(s)	Salient findings
Wakiaga 2003 ⁽³³⁾	Systematic review	112 patients (180 veneers) in The Netherlands	2.5-years	Examine effectiveness of direct versus indirect laminate veneers	Longevity, post treatment pain, cost	No reliable evidence to show a benefit of one type of veneer over the other with regard to the longevity
Gresnigt 2013 ⁽³⁰⁾	Randomised controlled split mouth trial	10 patients. Age range 20 – 69 in The Netherlands	Minimum 12 months maximum 36 months	Evaluate clinical performance of composite or ceramic laminate veneers	Caries, debonding, chipping, fracture, post-operative complaints	Statistically similar survival rates. Surface quality changes more frequent in composite veneers.
Meijering 1997 ⁽³²⁾	Questionnaire	112 patients (180 veneers) in The Netherlands	1 and 2 year recalls (Baseline observations also made)	Measure satisfaction of patients to the aesthetics of veneers	Patient satisfaction	Clinical procedures and number of veneers did not affect satisfaction. After 2 years porcelain gave significantly better results.
Meijering 1995 ⁽³¹⁾	Longitudinal clinical trial	112 patients (180 veneers) in The Netherlands	N/A	Treatment times for the fabrication of veneers	Treatment time	Mean time for one DC-VR* was 46 min for one IC-VR [‡] 70 min and for one P-VR [◊] 62 min. Times decreased where more than one VR was placed in the patient.

Studies included in this summary.

Key:

* Direct composite veneer

‡ Indirect composite veneer

◊ Porcelain veneer