Available online at www.sciencedirect.com
ScienceDirect
journal homepage: www.intl.elsevierhealth.com/journals/jden

Review

Systematic review of short- (5–10 years) and long-term (10 years or more) survival and success of full-arch fixed dental hybrid prostheses and supporting implants

Q1 TaeHyun Kwon [a], Paul A. Bain [b], Liran Levin [c,a,*]

[a] Division of Periodontology, Department of Oral Medicine, Infection, and Immunity, Harvard School of Dental Medicine, Boston, MA, USA
[b] Countway Library of Medicine, Harvard Medical School, Boston, MA, USA
[c] Department of Periodontology, School of Graduate Dentistry, Rambam Health Care Campus, Faculty of Medicine, Technion, IIT, Haifa, Israel

ARTICLE INFO

Article history:
Received 12 March 2014
Received in revised form
27 May 2014
Accepted 30 May 2014
Available online xxx

Keywords:
All on four
Complications
Edentulism
Fixed complete denture
Tilted implant

ABSTRACT

Aim: The aim of this systematic review was to investigate the short-term (5–10 year mean follow-up) and long-term (10 year or more) survival and success of fixed full arch dental hybrid prosthesis and supporting dental implants. Q2

Methods: Studies reporting interventions with full-arch fixed dental hybrid prostheses were identified by searching PubMed/Medline (NCBI), Web of Science (Thomson Reuters), the Cochrane Register of Controlled Clinical Trials (EBSCO), and Dentistry and Oral Sciences Source (DOSS; EBSCO) from the earliest available dates through July 17, 2013. Through a series of review process by two examiners, potentially qualifying studies were identified and assessed with respect to the inclusion criteria.

Results: A total of 18 studies were included for the quality assessment and the systematic review. Within the limitation of available studies, high short-term survival rates of full arch fixed dental hybrid prostheses (93.3–100%) and supporting implants (87.89–100%) were found. However, the availability of studies investigating long-term outcomes seemed scarce. Furthermore, the included studies were subjected to potential sources of bias (i.e. publication, reporting, attrition bias).

Conclusion: Despite seemingly high short-term survival, long-term survival of implant supported full arch fixed dental hybrid prosthesis could not be determined due to limited availability of true long-term studies. Although it may be a valuable option for a patient with a completely edentulous ridge(s), the strategic removal of teeth with satisfactory prognosis in sake of delivering an implant supported full-arch dental hybrid prosthesis should be avoided.

* *Corresponding author at*: Department of Periodontology, School of Graduate Dentistry, Rambam Health Care Campus, Haifa, Israel. Fax: +972 4 85431717.
E-mail address: liranl@technion.ac.il (L. Levin).
http://dx.doi.org/10.1016/j.jdent.2014.05.016
0300-5712/

Please cite this article in press as: Kwon TH, et al. Systematic review of short- (5–10 years) and long-term (10 years or more) survival and success of full-arch fixed dental hybrid prostheses and supporting implants. Journal of Dentistry (2014), http://dx.doi.org/10.1016/j.jdent.2014.05.016

1. Introduction

Hybrid prosthesis often refers to fixed rehabilitation composed of a metal-based substructure covered with acrylic resin.[1] With the advancement in dental implantology over the years, hybrid prosthesis has been successfully utilized to rehabilitate completely edentulous ridges.[2] In general, an edentulous arch could be rehabilitated in this method, using four to eight endosseous implant fixtures with screw retained hybrid restoration.[3,4] In those cases, a one-piece full-arch hybrid prosthesis consisting of a metal framework, acrylic base and denture teeth is fabricated and screwed onto the implants.[3,4] This treatment modality allows patients to have a completely fixed prosthesis, which can only be removed by the dental professional.[1] Furthermore, by often utilizing a distally cantilevered prosthesis and angulated implant fixtures, it may require lower number of implant fixtures and complicated surgical procedures such as maxillary sinus augmentation and guided bone regeneration, compared to a conventional method (i.e. rehabilitating with full-arch ceramo-metal implant supported fixed partial dentures).[4–7] Previous studies have reported high success rates of the prosthesis as well as supporting dental implants using this concept[6–8]; however many of these studies had reported minimal-short-term interventions with follow-up of less than 5 years.[9–17] Furthermore, to the best of authors' knowledge, there may be no available literature, systemically evaluating the long-term results of this specific treatment modality. Therefore, the aim of this systematic review was to investigate both short (5–10 years) and long-term (10 years or more) survival and success of fixed dental hybrid prosthesis and supporting dental implants used for rehabilitating a completely edentulous ridge.

1.1. Objectivesx

1. To investigate the short and long-term survival of full arch fixed dental hybrid prostheses and their supporting implants.
2. To investigate mean alveolar bone loss around dental implants, incidence of prosthodontics complications, and patient satisfaction.

1.2. PICOS (Participants, Interventions, Comparisons, Outcomes, study Designs)

PICOS questions were pre-determined in order to specifically address and achieve the aforementioned aims and objectives (Table 1).[18]

Table 1 – PICOS (Participants, Interventions, Comparisons, Outcomes, Study Designs).

Participants	Generally healthy subjects with completely edentulous arch(s)
Interventions	Implant supported full arch fixed dental hybrid prostheses
Comparisons	Not applicable[a]
Outcomes	1. Cumulative survival of prostheses and their supporting implants 2. Mean alveolar bone loss of supporting implants, incidence of prosthodontic complications, patient reported satisfaction
Study designs	Randomized controlled trial, prospective cohort study, retrospective cohort study, case-series

[a] The primary objectives of the current study were on prognosis.

2. Materials and methods

2.1. Search method and identification of studies

Studies reporting interventions with full-arch fixed dental hybrid prostheses were identified by electronically searching PubMed/Medline (NCBI), Web of Science (Thomson Reuters), the Cochrane Register of Controlled Clinical Trials (EBSCO), and Dentistry and Oral Sciences Source (DOSS; EBSCO) from the earliest available dates through July 17, 2013. The search strategies were assembled from synonyms for All on Four, All on Six, hybrid, or tilted implants and all likely modes of implant or treatment failure (Appendix 1). Medical Subject Headings (MeSH) were included in the PubMed strategy. Supplemental hand-search was conducted by reviewing the reference lists of related papers and review articles. No language limit was applied for the initial search. The authors adhered to the PRISMA standard for reporting systematic reviews.[18] The search was developed and conducted by an experienced reference librarian (PAB). Any duplicates were removed. Through title and abstract review by two independent examiners (TK, LL), potentially qualifying studies were identified. Thereafter, these studies received full text assessment with respect to inclusion criteria. Any disagreement between the examiners was resolved by discussion until agreement was reached. The inter-examiner agreement on study selection was evaluated according to kappa statistics.

2.2. Inclusion criteria

This review was based on reports from randomized controlled studies, prospective cohort studies, retrospective cohort studies, case–control studies and case series, which were identified by the systematic literature searches as described above. The additional inclusion criteria for study selection were:

- The publications reported in English, Hebrew, Korean or German.
- The studies involve human subjects.
- The studies must have a mean follow up time of 5 years or more.
- The studies must have minimum of 10 subjects who completed 5 year follow-up.
- All study subjects must have received full arch fixed dental hybrid prosthesis/prostheses.

2.3. Type of outcome measurements

The primary outcome measurements were cumulative survival rates of dental implants and prostheses. The secondary outcome measurements were mean alveolar bone loss (in mm) around

Please cite this article in press as: Kwon TH, et al. Systematic review of short- (5–10 years) and long-term (10 years or more) survival and success of full-arch fixed dental hybrid prostheses and supporting implants. Journal of Dentistry (2014), http://dx.doi.org/10.1016/j.jdent.2014.05.016