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CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Flexible Dentures for Edentulism: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

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Research Questions

1. What is the clinical effectiveness of removable partial or complete flexible dentures for edentulism?
2. What is the cost-effectiveness of removable partial and complete flexible dentures for edentulism?
3. What are the evidence-based guidelines on the use of removable partial or complete flexible dentures?

Key Findings

Two randomized controlled trials and six non-randomized studies were identified regarding the clinical effectiveness of removable partial or complete flexible dentures for edentulism. Additionally, no economic evaluations or evidence-based guidelines were identified regarding removable partial or complete flexible dentures for edentulism.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were removable partial or complete flexible dentures and people of all ages with partial or complete edentulism. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and August 29, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	People of all ages, in any setting, with partial or complete edentulism
Intervention	Flexible, non-metal, non-acrylic partial or complete dentures, using thermoplastic materials, including: - Thermoplastic polycarbonate - Thermoplastic polyamide - Thermoplastic acrylic - Thermoplastic nylon/nylon-like material - Thermoplastic resin
Comparator	Conventional partial or complete dentures, using the following materials: - Acrylic - Acrylic with metal
Outcomes	Q1: Clinical effectiveness (e.g., wear resistance and longevity, masticatory function, fit and comfort, quality of life, side effects, adverse events) Q2: Cost-effectiveness (e.g., incremental cost per health benefit gained, cost per patient adverse events avoided, cost-minimization) Q3: Guidelines on appropriate use
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized control trials, non-randomized studies, economic evaluations, evidence-based guidelines.

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Two randomized controlled trials[1,2] and six non-randomized studies [3-8] were identified regarding the clinical effectiveness of removable partial or complete flexible dentures for edentulism. No relevant health technology assessments, systematic reviews, meta-analyses, economic evaluations or evidence-based guidelines were identified regarding removable partial or complete flexible dentures for edentulism.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Two randomized controlled trials[1,2] and six non-randomized studies [3-8] were identified regarding the clinical effectiveness of removable partial or complete flexible dentures for edentulism.

The first identified randomized controlled trial (RCT)[1] compared patient preference and satisfaction with thermoplastic resin removable partial dentures and conventional metal clasp-retained removable partial dentures. The authors reported that overall satisfaction, oral appearance, mucosal pain, food impaction, oral comfort and speech score improved for those patients using thermoplastic resin removable partial dentures compared to metal clasp-retained removable partial dentures.[1] The authors concluded that thermoplastic resin removable partial dentures can offer greater satisfaction compared to metal clasp-retained removable partial dentures.[1] The second identified RCT[2] evaluated maximum bite force by comparing thermoplastic complete dentures to conventional heat-cured acrylic complete

dentures in completely edentulous patients. The authors reported that patients with a thermoplastic denture had a higher biting force than patients with conventional acrylic dentures after six months of denture use.[2]

The first identified non-randomized study (NRS)[3] reported oral health-related quality of life for acrylic versus flexible partial dentures after denture use. The authors reported an improvement in oral health-related quality of life for those patients using flexible partial dentures and concluded that thermoplastic materials are a possible alternative for patient management.[3] The second identified NRS[4] evaluated the clinical and functional parameters of different materials of removable partial dentures. The authors reported that Polyamide VALPLAST material main advantages are aesthetic satisfaction and easiness to insert and remove compared to cobalt-chromium alloy and heat polymerized polymethyl methacrylate material.[4] The third identified NRS[5] assessed the satisfaction level among patients using different types of removable partial dentures. The authors reported no significant difference in satisfaction levels between metal and acrylic, or acrylic and flexible removable partial dentures.[5] The fourth identified NRS[6] evaluated and compared chewing efficiency and occlusal forces of thermoplastic (acetal and polyamide) materials and polymethyl methacrylate based materials for removable partial dentures.[6] Overall, dentures made of polymethyl methacrylate or acetal material showed an increase in chewing efficiency and occlusal force.[6] The fifth identified NRS[7]compared cast chromium cobalt alloy and flexible nylon materials for removable partial dentures. The authors concluded that flexible nylon material had higher patient satisfaction and aesthetics compared to cast chromium cobalt alloy.[7] The last identified NRS [8] reported that flexible denture material is effective for preventing midline fractures and is well tolerated by patients compared to methyl meth-acrylate denture material.[8]

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

1. Fueki K, Yoshida-Kohno E, Inamochi Y, Wakabayashi N. Patient satisfaction and preference with thermoplastic resin removable partial dentures: a randomised cross-over trial. *Journal Prosthodont Res*. 2019 Jun 10. [epub ahead of print]. PubMed: PM31196765

2. Fayad MI, Alruwaili HHT, Khan MS, Baig MN. Bite force evaluation in complete denture wearer with different denture base materials: a randomized controlled clinical trial. *J Int Soc Prev Community Dent*. 2018;8(5):416-419. PubMed: PM30430068

Non-Randomized Studies

3. Akinyamoju CA, Dosumu OO, Taiwo JO, Ogunrinde TJ. Akinyamoju AO. Oral health-related quality of life: acrylic versus flexible partial dentures. *Ghana Med J*. 2019;53(2):163-169
PubMed: PM31481813

4. Manzon L, Fratto G, Poli O, Infusino E. Patient and clinical evaluation of traditional metal and polyamide removable partial dentures in an elderly cohort. *J Prosthodont*. 2019 Aug 13. [epub ahead of print].
PubMed: PM31407833

5. Aljabri MK, Ibrahim TO, Sharka RM. Removable partial dentures: patient satisfaction and complaints in Makkah City, KSA. *J Taibah Univ Med Sci*. 2017;12(6):561-564.
PubMed: PM31435295

6. Macura-Karbownik A, Chladek G, Zmudzki J, Kasperski J. Chewing efficiency and occlusal forces in PMMA, acetal and polyamide removable partial denture wearers. *Acta Bioeng Biomech*. 2016;18(1):137-144.
PubMed: PM27150898

7. Hundal M, Madan R. Comparative clinical evaluation of removable partial dentures made of two different materials in Kennedy Applegate class II partially edentulous situation. *Med J Armed Forces India*. 2015;71(Suppl 2):S306-312.
PubMed: PM26843744

8. Dhiman RK, Chowdhury SR. Midline fractures in single maxillary complete acrylic vs flexible dentures. *Med J Armed Forces India*. 2009;65(2):141-145.
PubMed: PM27408221

Economic Evaluations

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Systematic Reviews – Alternative Population

9. Sultan M, Aboul Ela A, Salloum M. Impact of thermoplastic acrylic denture base versus conventional base on the patient satisfaction in implant supported mandibular overdenture: a systematic review. *Indian Journal of Science and Technology*. 2016;9(45). http://www.indjst.org/index.php/indjst/article/view/98518/75564

Literature Reviews

10. Bogucki ZA, Kownacka M. Elastic dental prostheses - alternative solutions for patients using acrylic prostheses: literature review. *Adv Clin Exp Med*. 2018;27(10):1441-1445. PubMed: PM30063127

11. Vojdani M, Giti R. Polyamide as a denture base material: a literature review. *J Dent (Shiraz)*. 2015;16(1 Suppl):1-9. PubMed: PM26106628

Additional References

Position Papers

12. Fueki K, Ohkubo C, Yatabe M, et al. Clinical application of removable partial dentures using thermoplastic resin. Part II: material properties and clinical features of non-metal clasp dentures. *J Prosthodont Res*. 2014;58(2):71-84. PubMed: PM24746524