Protocol

The impact of wearing dentures on dietary intake, nutritional status and eating-related quality of life

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Review scope

Despite a wealth of evidence pertaining to the association between tooth loss and nutrition, to date, a systematic appraisal of the evidence relating to an impact of wearing dentures on nutritional wellbeing has not been performed. The aim of this research is to explore the impact of wearing dentures on diet, nutritional status and eating-related quality of life. The object is to conduct a systematic appraisal of the literature relating to this area. The questions that will be address in this review are presented below.

Questions

The overall question is:

Is nutritional status and wellbeing affected by wearing dentures?

The specific questions are:

Dietary intake

1. Does being edentulous and wearing full dentures ***reduce risk*** of inadequate nutritional intake [low protein, energy, fibre, wholegrains, fruit and vegetables and high saturated fat] compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
2. Does being edentulous and wearing full dentures ***increase risk*** of inadequate nutritional intake [low protein, energy, fibre, wholegrains, fruit and vegetables and high saturated fat] compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
3. Does being partially dentate and wearing partial dentures ***reduce risk*** of inadequate nutritional intake [low protein, energy, fibre, wholegrains, fruit and vegetables and high saturated fat] compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?
4. Does being partially dentate and wearing partial dentures ***increase risk*** of inadequate nutritional intake [low protein, energy, fibre, wholegrains, fruit and vegetables and high saturated fat] compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?

Nutritional status

5. Does being edentulous and wearing full dentures ***reduce risk*** of undernutrition [low BMI/ MNA score/ % weight loss/ low protein intake] compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
6. Does being edentulous and wearing full dentures ***increase risk*** of undernutrition [low BMI/ MNA score/ % weight loss/ low protein intake] compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
7. Does being partially dentate and wearing partial dentures ***reduce risk*** of undernutrition [low BMI/ MNA score/ % weight loss/ low protein intake] compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?
8. Does being partially dentate and wearing partial dentures ***increase risk*** of undernutrition [low BMI/ MNA score/ % weight loss/ low protein intake] compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?

Eating-related quality of life

9. Does being edentulous and wearing full dentures ***reduce*** eating-related quality of life compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
10. Does being edentulous and wearing full dentures ***increase*** eating-related quality of life compared with: (1) being edentulous and not wearing full dentures; (2) being dentate?
11. Does being partially dentate and wearing partial dentures ***reduce*** eating-related quality of life compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?
12. Does being partially dentate and wearing partial dentures ***increase*** eating-related quality of life compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?
13. Does being partially dentate and wearing partial dentures ***reduce*** eating function (chewing/swallowing) compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?
14. Does being partially dentate and wearing partial dentures ***increase*** eating function (chewing/swallowing) compared with: (1) being partially dentate and not wearing partial dentures; (2) being dentate?

Searches

Relevant information will be identified and retrieved through conducting searches of the following bibliography databases (Medline, EMBASE, CiNAHL, PubMed). Moreover, registers of the ongoing systematic reviews will be searched by Cochrane oral health page http://oralhealth.cochrane.org/priority-reviews and PROSPERO http://www.crd.york.ac.uk/PROSPERO/. Clinical trials will be searcher by Clinical Trial.gov https://clinicaltrials.gov/ and The WHO International Clinical Trials Registry Platform http://apps.who.int/trialsearch/ will be used.

A search strategy will be developed in Medline based on the key search terms provided in Appendix A and will be adapted for the other databases. The search strategy will be piloted to ensure key papers known to the authors are identified.

The dateline for inclusion will be:

- Start date: 01/01/1980
- End date: present

Types of study to be included

The review will include systematic reviews, randomised controlled trials, quasi-experimental studies, and quantitative observational studies (for the assessment of quality of life, semi-quantitative studies will be included).

The following hierarchy of evidence will be considered when selecting studies to enable a pragmatic data synthesis of the “best available evidence” (Petticrew and Roberts 2006): 1) Systematic reviews; 2) RCTs; 3) cohort studies; 4) case-control studies; 5) cross sectional studies. Articles not peer-reviewed and published will be excluded. Articles written in non-English language will be included if they contain an English language abstract.

Condition or domain being studied

Nutritional status

Eating related quality of life.

Participants/population

Apparently healthy adults aged 18 years and over from any country.

Intervention(s), exposure(s)

Wearing full dentures

Wearing partial dentures

Comparator(s)/control

Being edentulous without wearing full dentures

Being partially dentate without wearing partial dentures

Being dentate (20+ natural teeth)

Context

Main outcome(s)

Dietary intake including; intake of energy, protein, saturated fat, fibre, wholegrains, fruits and vegetables;

Nutritional status including; body mass index, weight change, MNA (mini nutritional assessment) nutrition score.

Eating related quality of live measured using validated questionnaires.

Timing and effect measures

Data from included studies will be extracted at the greatest gap between exposure and outcome.

Screening

First screening – title and abstract

Titles, abstracts of all records identified in the electronic search will be reviewed and obviously different topic articles will be eliminated by one reviewer. A random 10% sample of titles and abstracts will be double screened by a second reviewer and inter-rater reliability will be assessed (% agreement and Cohen's Kappa). Any differences between the reviewers' decisions will be resolved by discussion and, if consensus is not reached, a third reviewer (PM) will be consulted.

Second screening – full paper

When the studies apparently meet the inclusion criteria or when there is not enough information in the abstract, two review authors will review the full article. Any differences between the reviewers' decisions will be resolved by discussion and, if consensus is not reached, a third reviewer (PM) will be consulted. The reasons for exclusion of studies in this phase will be logged. The reporting of reviews will be according to PRISMA statement (www.prisam-statement.org. Moher et al 2009).

Data extraction (selection and coding)

Data from included studies will be extracted using a pre-designed form (Appendix B), including citation, research, question(s) addressed, study design, aims/objective, participant characteristics, information regarding confounders, details of the exposure(s), comparator(s) and outcome(s) and results. The abstraction tool will be piloted on a small sample of literature selected for inclusion in the review and modified as necessary. Data extraction will be undertaken by one reviewer and checked by another reviewer. Disagreements between the review authors will be resolved by consensus with involvement of a third review author (PM) where necessary. Where possible, the authors of each study will be consulted when there are incomplete or missing relevant data. The main findings of the data extraction will be presented in summary of included studies tables. Studies that address a specific research questions will be grouped together in the summary data synthesis.

Quality assessment

The quality of the included papers will be assessed using the Newcastle-Ottawa Quality Assessment Scale (NOS) (Wells et al 2009). The NOS assigns a score ranging from 0-9 (low to high) to a study based on the quality in terms of study design, selection of participants, comparability of groups and the assessment of exposure and outcome. NOS score and classifications (e.g. poor/good) will be presented in the summary table.

Strategy for data synthesis

A narrative synthesis of findings will be provided.

Evidence synthesis will be conducted by vote counting method (McKenzie and Brennan 2019) and depicted in Harvest Plots (Ogilvie et al 2008).

References

Petticrew M, Roberts H (2006). Systematic reviews in the social sciences: a practical guide.Hoboken (NJ): Wiley.

Hooley M, Skouteris H, Boganin C, Satur J, Kilpatrick N (2012). Body mass index and dental caries in children and adolescents: a systematic review of literature published 2004 to 2011. Systematic Reviews 1:57

McKenzie JE, Brennan SE. Chapter 12: Synthesizing and presenting findings using other methods. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.0 (updated July 2019). Cochrane, 2019. Available from www.training.cochrane.org/handbook.

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097.

Ogilvie D, Fayter D, Petticrew M, Sowden A, Thomas S, Whitehead M, Worthy G. 2008. The harvest plot: A method for synthesising evidence about the differential effects of interventions. BMC medical research methodology. 8(1):8.

Wells, G, Shea B, OConnell D et al (2009) The Newcastle-Ottawa Scalie (NOS) for assessing the quality of nonrandomised studies in meta-analysis. Ottawa, ON: Ottawa Hospital Research Institute. Accessed 07/07/2019.

Appendix A: Key words for inclusion in search strategy

Key word	Search term
Diet	• "Diet"[Mesh] • "Diet, Food, and Nutrition"[Mesh] for food types
Appetite	• "Appetite"[Mesh]
Dietary patterns	•
Food choice	• "Food"[Mesh] • "Diet, Food, and Nutrition"[Mesh] which also includes beverages
Energy intake	• "Energy Intake"[Mesh] but under 'Diet, Food, and Nutrition' in the index tree
Protein (dietary protein is a better keyword)	• "Dietary Proteins"[Mesh]
Saturated fat (dietary fats is better)	• "Dietary Fats"[Mesh]
Fibre	• "Dietary Fiber"[Mesh]
Wholegrains	•
Fruits and vegetables	• "Fruit"[Mesh] • "Vegetables"[Mesh]
Healthy eating index	• "Healthy Diet"[Mesh]
Diet quality	•
Undernutrition	•
Malnutrition	• "Malnutrition"[Mesh]
Protein energy malnutrition	• "Protein-Energy Malnutrition"[Mesh]
Sarcopenia	• "Sarcopenia"[Mesh]
BMI (body mass index)	• "Body Mass Index"[Mesh]
MNA (mini nutritional assessment)	• "Nutrition Assessment"[Mesh]
Body weight	• "Body Weight"[Mesh]
Quality of life	• "Quality of Life"[Mesh]
Eating related quality of life	•
Eating	• "Eating"[Mesh]
Eating behaviour	• "Feeding Behavior"[Mesh]

Chewing	• "Mastication"[Mesh]
Dental prosthesis/prostheses	• "Dental Prosthesis"[Mesh]
Dentures	• "Dentures"[Mesh] (part of the dental prosthesis tree)
Conventional dentures	•
Partial denture	• "Dentures"[Mesh] (part of the dental prosthesis tree)
Toothloss	• "Tooth Loss"[Mesh]
Edentulous/edentulism	• "Mouth, Edentulous"[Mesh]

Search string (from 1/1/1980 to present):

- ("Diet"[Mesh] OR "Diet, Food, and Nutrition"[Mesh] OR "Appetite"[Mesh] OR "Dietary Proteins"[Mesh] OR "Dietary Fats"[Mesh] OR "Dietary Fiber"[Mesh] OR "Fruit"[Mesh] OR "Vegetables"[Mesh] OR "Healthy Diet"[Mesh]) AND ("Dental Prosthesis"[Mesh] OR "Tooth Loss"[Mesh] OR "Mouth, Edentulous"[Mesh])
    - Added human and English only = 2750 hits
- ("Malnutrition"[Mesh] OR "Protein-Energy Malnutrition"[Mesh] OR "Sarcopenia"[Mesh] OR "Body Mass Index"[Mesh] OR "Nutrition Assessment"[Mesh] OR "Body Weight"[Mesh]) AND ("Dental Prosthesis"[Mesh] OR "Tooth Loss"[Mesh] OR "Mouth, Edentulous"[Mesh])
    - 401 hits
- ("Quality of Life"[Mesh] OR "Eating"[Mesh] OR "Feeding Behavior"[Mesh] OR "Mastication"[Mesh]) AND ("Dental Prosthesis"[Mesh] OR "Tooth Loss"[Mesh] OR "Mouth, Edentulous"[Mesh])
    - Added human and English only = 2644 hits
    - If this is changed to remove eating, feeding behaviour and mastication, the number of hits is 1095

Appendix B: Data extraction form

Citation			
Question(s) addressed			
Study design (including statistical analysis):			
Aims/objectives:			
Participants	Total sample size at baseline:		
	Country:		
	Region (urban (city)/rural):		
	Ethnicity:		
	Socioeconomic status:		
	Gender:		
	Age:		
	Health background/status:		
	Any information on confounders:		
Exposure and outcomes	Exposure/comparison (including n, age and gender (if different from above) for each group for the analysis/es used):		
	Other relevant baseline statistics for each group (for the analysis/es used):		
	Duration:		
	Outcomes measured:		
	Scale/measure used:	Exposures:	Outcomes:
	Descriptive statistics or events for each group at post-treatment or follow-up		
	Other relevant statistical results		
Quality assessment (with reason)			