



## REVIEW ARTICLE

# A Systematic Review on Impact of Edentulism on Nutritional Status of Elderly Adults as Compared to Dentulous Adults

Dr. Priyanka Sutariya,<sup>1\*</sup> | Dr. Shruti Mehta<sup>2</sup> | Dr. Hitendra Shah<sup>3</sup> | Dr. Viraj Shah<sup>4</sup> | Dr. Vinita Karia<sup>5</sup> | Dr. Tanvi Goyal<sup>6</sup>

<sup>1</sup>PhD scholar (Gujarat University) Professor, Department of Prosthodontics, College of Dental Sciences and Research Centre. Ahmedabad

<sup>2</sup>M.D.S (Prosthodontics) Professor and Head, Department of Prosthodontics, College of Dental Sciences and Research Centre. Ahmedabad

<sup>3</sup>M.D.S (Prosthodontics) Professor, Department of Prosthodontics, College of Dental Sciences and Research Centre Ahmedabad

<sup>4</sup>P.G student, Department of Prosthodontics, College of Dental Sciences and Research Centre Ahmedabad

<sup>5</sup>P.G student, Department of Prosthodontics, College of Dental Sciences and Research Centre Ahmedabad

<sup>6</sup>P.G student, Department of Prosthodontics, College of Dental Sciences and Research Centre Ahmedabad

## Abstract

**Background:** Age related changes in oral structures and nutritional deficiencies cause difficulties in wearing complete dentures amongst elderly adults

**Objective:** To identify the impact of edentulism on nutritional status of elderly adults.

**Methodology:** To conduct the present study, information of existing literature are collected from textbooks, printed journals, and electronic databases such as pubmed, scopus, and science direct.

**Result:** Prevalence of malnutrition rises with an increase in age. Edentulous subjects more likely to report trouble in chewing their food as compared to dentulous subjects. Edentulous subjects had significantly lower intake of calories, protein, carbohydrate, fibres, vitamins A, C, B1, and B6. Intake of calcium and protein was lower in women with dentures than in dentate women. Compromised oral functional status was associated with lower serum albumin levels and lower BMI in functionally dependent elderly people.

**Conclusion:** There is good quality evidence that edentulism is associated with poor diet and compromised nutrition. Although the majority of the studies cited here have not established a cause and effect relationship, results from Sheiham and others. However, more longitudinal studies on this topic are required to further understand the potential role of nutrition in the prevention of age related changes and reduce the failure of complete denture treatment in elderly adults.

**Keywords:** Aging, Complete Denture, Elderly adults, Nutritional Assessment, Nutrition.



## 1 | INTRODUCTION

Aging begins at conception, but from a practical viewpoint, aging begins at birth.

Thereafter, two phases of aging must be considered-the chronologic age and the physiologic age; the first denoting the passage of time, the second, the resultant effect of the passage of time on the functional elements of the body. The rate of aging varies in individuals, and an applicant for social security at the age of 65 years may have mental alertness approximating the age of 50, but a masticating mechanism approximating the age of 75 years. (1)

The normal age-related changes of the masticatory apparatus are attrition of the teeth, loss of elasticity and surface texture of the mucosa, reduction in the bulk and control of the masticatory muscles, arthritis in the temporomandibular joints, a moderate reduction of taste perception and resting salivary flow rate, and a certain loss of periodontal attachment. (2, 3) Epidemiologic studies have shown that older people today tend to have few remaining functional teeth and that their general dental health is usually poor. (4) The oral problems of particular importance are a high prevalence of root surface caries and poor oral hygiene. However, older individuals often can adapt to or compensate for such physiologic changes. For example, an age-related reduction in the unstimulated salivary flow rate due to structural changes in the salivary glands is not necessarily associated with a similar reduction of the stimulated salivary flow rates; in fact, the latter may increase with age. (5)

Nutrition is the process of providing proper food elements for the maintenance of health and growth. Nutrition includes digestion, absorption, assimilation, and the actual use of nutrients by the cells of the body. Diet is related to the variety and amount of food that is eaten. A proper diet must be followed for an individual to be well-nourished. (6)

Even after wearing well-made dentures, edentulous people have difficulty in chewing foods that are hard

or tough in texture (7–11). Furthermore, there is ample evidence that they modify their diets and that even the foods they are doing eat aren't always easy to chew. (12, 13) This situation leads to the question of whether edentulous patients have adequate nutrient intake to maintain general good health. Thus the objective of the present study was to synthesize evidence on the impact of edentulism on the nutritional status of elderly adults as compared to dentulous individuals.

## 2 | METHOD

To conduct the present study, information on existing literature is collected from textbooks, printed journals, and electronic databases. General information was collected from google. Information in the electronic databases is collected from HON certified websites such as PubMed, Scopus, Science direct. The highest level of evidence in the form of meta-analyses of systematic reviews was collected from the Cochrane library by indexing mechanism with sets of queries. The literature search was carried out by using the following search terms: Aging, Complete Denture, Elderly adults, Nutritional Assessment, Nutrition.

The research question formulated for the study was: Do edentulous oral status and denture therapy impact nutritional status as compared to the dentulous oral status of elderly adults? The collected articles of good quality are organized with the research question and objectives of this study. The articles are tabulated for comparison of data for scholarly critical appraisal.

## 3 | RESULTS

The review procedure is described in Figure 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement was followed to assess the quality of the included articles. (14, 15) As shown in the Figure 1, a total of 353 studies were identified: After the removal of duplicates, 243 were considered potentially relevant and were screened for pertinent content. This was

**Supplementary information** The online version of this article (<https://doi.org/10.15520/jcmro.v3i11.368>) contains supplementary material, which is available to authorized users.

**Corresponding Author:** Dr. Priyanka Sutariya, PhD scholar (Gujarat University) Professor, Department of Prosthodontics, College of Dental Sciences and Research Centre, Ahmedabad  
Email: [drpri\\_vaibhav@yahoo.co.in](mailto:drpri_vaibhav@yahoo.co.in)

a scientific review that didn't require the ethics approval of an ethics panel. Because of the heterogeneity of the study designs, a narrative synthesis approach, instead of a meta-analysis, was utilized to look at the results. Different estimators of effect size (ES) were calculated consistent with the info to be compared. Cohen's *d* values were reported as indicators of effect size (ES) for comparing the mean values. We interpreted the importance of the ES using the benchmarks for "small ES" ( $d = 0.2$ ), "medium ES" ( $d = 0.5$ ), and "large ES" ( $d = 0.8$ ) as defined by Cohen. (16) The ES of the difference between two proportions was estimated consistent with the arcsine transformation by Cohen, and a Cohen's *h* value was obtained. We interpreted the importance of those ES using the benchmarks for "small ES" ( $h = 0.2$ ), "medium ES" ( $h = 0.5$ ) and "large ES" ( $h = 0.8$ ). Finally, odds ratios were converted into ES using a method proposed by Hasselblad & Hedges. (17) Figure 1 Table 1

Prevalence of malnutrition rises with an increase in age. Edentulous subjects more likely to report trouble in chewing their food as compared to dentulous subjects. Edentulous subjects had significantly lower intake of calories, protein, carbohydrate, fibers, vitamins A,C,B1,B6 and folates. intake of calcium and protein was lower in women with dentures than in dentate women. Compromised oral functional status was associated with lower serum albumin levels and lower BMI in functionally dependent elderly people.

There is good evidence that edentulism is associated with poor diet and compromised nutrition. Although the bulk of the studies cited here haven't established a cause and- effect relationship, results from Sheiham and others (18) , Allen and McMillan (25) and our group do suggest that tooth loss may cause the dietary change. As a result, those with edentulism may be at elevated risk for several chronic illnesses such as cancer, diabetes, hypertension, and heart disease.

Oral rehabilitation with simple mandibular implant overdentures appears to offer a solution to the lack of intake of healthy, hard-to-chew foods by people wearing conventional dentures. Additional studies must be carried out to support these recent findings. (26)

## 4 | DISCUSSION

Research to advance the treatment of edentulism must also continue. Conventional dentures have long been the quality treatment for edentulism. However, even with new conventional dentures, which improve simple chewing, dietary intake often remains unchanged. (27) Numerous studies over the past 2 decades have shown that implant-retained overdentures significantly improve ease of chewing (28–32), and investigators are now measuring the effect of implant therapy on nutrition. Sebring and others (33) and Sandström and Lindquist (34) both conducted investigations to work out whether patients with implant-retained overdentures and traditional dentures changed their eating patterns. They found no significant alterations in dietary intake for either group and Sebring et al. further noted no increase within the consumption of nutrients among the implant group. Those studies suggest that, even with improvements in their ability to chew, people don't change their diets. However, Allen and McMillan (25) reported that subjects who received mandibular implant overdentures did alter their food choices, as compared to patients who received conventional dentures. What this prospective study suggests is that appropriate oral rehabilitation can overcome the poor dietary habits of individuals wearing conventional dentures. As-yet-unpublished data from a randomized clinical test, including blood studies and anthropometric tests, tend to support the hypothesis that nutrition improves in subjects wearing mandibular 2-implant overdentures. Further research to check the truth effect of implant therapy on the nutritional state is a priority. Unfortunately, none of these studies measured physiological variables.

Milne et al. (35) examined trials to evaluate interventions designed to improve the nutritional status of older people and their clinical outcomes; extra protein and energy sources were provided, usually as commercial sip-feeds. Most studies were randomized or quasi-randomized controlled trials of oral protein and energy supplementation in older people and were included in the review except groups recovering from cancer treatment or in critical care. Sixty-two trials were included ( $n = 10\,187$ ), of which

only 38 involved undernourished older people or frail dependent older people. In 2015, this review was updated by WHO and a further 29 trials were included within the evidence synthesis.

Baldwin et al. (36) published a Cochrane review that examined the evidence that dietary advice in adults with disease-related malnutrition improves survival, weight, and anthropometry; estimated the dimensions of any additional effect of oral nutritional supplement (ONS) combined with dietary advice and compared the consequences of dietary advice with those of ONS administration. Forty-five studies ( $n = 3186$ ) met the inclusion criteria. Dietary advice was compared with: no advice ( $n = 1053$ ); ONS ( $n = 332$ ); dietary advice and ONS ( $n = 731$ ). Dietary advice plus ONS was compared with no additional intervention ( $n = 1070$ ). Four studies from this review targeted older people and were included in the WHO review.

Munk et al. (37) undertook a systematic review and meta-analysis to evaluate the evidence for an effect of individualized dietary counselling on physical function, readmissions, mortality, nutritional status, nutritional intake, and quality of life in nutritionally at-risk older patients following discharge from hospital. Four randomized controlled trials ( $n = 729$ ) were included. Overall, the evidence was of moderate quality. Dietitians provided counseling in all studies. Three studies from this review were included in the evidence synthesis by WHO.

There is adequate, moderate-quality evidence to suggest that oral nutritional supplement (ONS) with or without dietary advice improves the nutritional status of undernourished older people. Four trials examined the benefit of ONS for undernourished older people in community settings. Data on weight gain reported as an outcome was pooled in the meta-analysis. Overall, the pooled treatment effect was in favour of the ONS group (mean difference 3.17 [2.12 to 4.21],  $P < 0.01$ ). Also, 14 trials from hospital or long-term care settings that examined the benefit of ONS reported significant reductions in mortality and increased weight gain in the intervention groups compared with usual care or placebo. (38)

There is adequate, low-quality evidence to suggest that ONS with or without dietary advice may im-

prove the nutritional status of older people at risk of undernutrition. Fifteen trials that investigated the benefit of ONS in a hospital or long-term care settings reported significant improvements in body weight. A further seven trials showed a significant improvement in handgrip strength. However, trials from community settings showed no benefit of ONS for older people at risk of undernutrition in either improving body weight or reducing mortality. Outcomes related to functional status were reported in many trials. Improvements in activities of daily living were assessed in 12 studies; however, the results in only three trials achieved statistical significance. Health-related quality of life was measured in 17 studies. (38)

#### SAMPLE DIETS FOR EDENTULOUS PATIENTS (39–41)

Denture patients may only be one-fourth as efficient in chewing food as persons who possess natural teeth. Although the sequence of eating food is incising, then chewing, and eventually swallowing, it's much easier for denture patients to find out eating procedures within the opposite order, namely, swallowing, chewing, and incising. Logically, then, foods of the right consistency must be chosen so that these functions can be learned during this order. For the primary day, the patient with new dentures should select liquid foods that require only swallowing. Foods should be selected from the four food groups.

- Milk group: Fluid milk could also be taken in any form.
- Meat group: Eggs could also be taken in egg-nogs. Pureed meats (such as baby food meats) could also be mixed with thin bechamel sauce and used as a soup.
- Vegetable-fruit group: These foods could also be used as juices.
- Bread-cereal group: Thin gruels could also be cooked in either milk or water.

The diet for the second and third day should include foods that need a minimum of chewing.

- Milk group: Fluid milk could also be taken, as within the diet.
- Meat group: Tender meat, like finely chopped beef, ground liver, tender chicken, or fish during a white sauce.



- Vegetable-fruit group: additionally to fruit and vegetable juices, tender cooked fruits and vegetables (skins and seeds must be removed), like asparagus tips, cooked carrots, green beans, potato, chopped spinach or other greens, winter squash, applesauce, peaches, pears, and apricots, could also be used. Dried peas could also be utilized in a strained thick soup.

- Bread-cereal group: Cooked cereals, like Cream of Wheat, milk toast and softened bread, boiled rice, spaghetti, macaroni, or noodles may bread used.

The diet for the fourth and subsequent days are often expanded.

- Milk group: Cheddar type cheeses also as fluid milk and pot cheese are often added.

- Meat group: Steak, chops, roast, fish, eggs altogether forms, and cooked legumes could also be eaten.

- Vegetable-fruit group: All cooked and raw fruits except those which require an incision, like apples and corn on the cob, could also be eaten.

- Bread-cereal group: All bread and cereals except those with hard crusts that require an incision, like sandwiches, crusty bread, and hard rolls, could also be included.

After several weeks, solid food requiring incision could also be allowed additionally to the foods within the initial diet plan. the power of patients to manage foods like sandwiches, raw apples, corn on the cob, and raw celery is a private variable. Theoretically, if all mechanical, biologic, and psychological obstacles involved within the wearing of complete dentures are overcome, the patient should be ready to masticate foods of all textures, even those requiring prehension and division.

## 5 | CONCLUSION

This systematic review analyses recent evidence that nutrition and aging are related to complete denture treatment in older adults. However, an easy conclusion about the efficacy of nutrition and aging on the success of complete denture treatment can't be established due mainly to the cross-sectional design of many of the included studies. In summary, more

prospective cohort studies in older adults are needed to further understand the potential role of nutrition within the prevention of aging-related changes and reduce the failure of complete denture treatment in elderly adults.

## REFERENCES

1. Ryan, Edward J.(1951) The Dental Problems of Senescence, J. PROS. DEN. 1:64-70.
2. Wolff,A., Ship,J.A, Tylenda, C.A, Fox,P.C,Baum B.J (1991) Oral mucosal appearance is unchanged in healthy, different-aged persons. Oral Surg. Oral Med. Oral Pathol. 71:569-572
3. Walls, A.W.G. (1992) The aging mouth. In Oxford Textbook of Geriatric Medicine, eds. Evans, J.G., Williams, T.F. pp. 179-195. Oxford: Oxford University Press
4. Katz, R.V, Neely, A.L, Morse, D.E (1996) The epidemiology of oral diseases in older adults. In Textbook of Geriatric Dentistry. 2nd ed. eds. Holm - Pedersen, P., Loe,H. pp.263-301.Copenhagen : Munksgaard
5. Budtz-Jørgensen E. Prosthodontics for the elderly. Chicago: Quintessence Publishing Co, Inc.; 1999.
6. Adam C.D Gerodontologic Aspects of Diet and Nutrition, J. PROS. DEN. 1961.11:345-348.

7. Zarb GA. Nature and significance of the edentulous state. In: Brånemark PI, Zarb GA, Albrektsson T, editors. Tissue-integrated prostheses- osseointegration in clinical dentistry. Chicago: Quintessence Publishing Co, Inc.; 1985. p. 77-87.
8. Carlsson GE, Otterland A, Wennstrom A, Odont D. Patient factors in appreciation of complete dentures. *J Prosthet Dent* 1967; 17(4):322-8.
9. Chauncey HH, Kapur KK, Feller RP, Wayler AH. Altered masticatory function and perceptual estimates of chewing experience. *Spec Care Dentist* 1981; 1(6):250-5.
10. Hartsook EI. Food selection, dietary adequacy, and related dental problems of patients with dental prostheses. *J Prosthet Dent* 1974; 32(1):32-40.
11. Manly R, Vinton P. A survey of the chewing ability of denture wearers. *J Dent Res* 1951; 30:314-21.
12. Wayler AH, Muench ME, Kapur KK, Chauncey HH. Masticatory performance and food acceptability in persons with removable partial dentures, full dentures and intact natural dentition. *J Gerontol* 1984; 39(3):284-90.
13. Wayler AH, Chauncey HH. Impact of complete dentures and impaired natural dentition on masticatory performance and food choice in healthy aging men. *J Prosthet Dent* 1983; 49(3):427-33.
14. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ*. 2009;339:b2700.
15. Moher D, Liberati A, Tetzlaff J, Altman DG. PRISMA group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *J Clin Epidemiol*. 2009;62(10):1006–12.
16. Cohen J. Statistical power analysis for the behavioural sciences. 2nd ed. Hillsdale, NJ: Erlbaum; 1988.
17. Hasselblad V, Hedges LV. Meta-analysis of screening and diagnostic tests. *Psychol Bull*. 1995;117:167–8.
18. Sheiham A, Steele JG, Marcenes W, Lowe C, Finch S, Bates CJ, and others. The relationship among dental status, nutrient intake, and nutritional status in older people. *J Dent Res* 2001; 80(2):408-13.
19. Joshipura KJ, Willett WC, Douglass CW. The impact of edentulousness on food and nutrient intake. *J Am Dent Assoc* 1996; 127(4):459-67.
20. Krall E, Hayes C, Garcia R. How dentition status and masticatory function affect nutrient intake. *J Am Dent Assoc* 1998; 129(9):1261-9.
21. Fontijn-Tekamp FA, van't Hof MA, Slater AP, van Waas MA. The state of dentition in relation to nutrition in elderly Europeans in the SENECA study of 1993. *Eur J Clin Nutr* 1996; 50(Suppl 2):S117-22.

22. Papas AS, Palmer CA, Rounds MC, Russell RM. The effects of denture status on nutrition. *Spec Care Dent* 1998; 18(1):17-.
23. Greksa LP, Parraga IM, Clark CA. The dietary adequacy of edentulous older adults. *J Prosthet Dent* 1995; 73(2):142-5.
24. Mojon P, Budtz-Jorgensen E, Rapin CH. Relationship between oral health and nutrition in very old people. *Age Ageing* 1999; 28(5):463-8.
25. Allen F, McMillan A. Food selection and perceptions of chewing ability following provision of implant and conventional prostheses in complete denture wearers. *Clinical Oral Implants Research* (in press).
26. B.Hutton et al. Is There an Association Between Edentulism and Nutritional State? *J Can Dent Assoc* 2002; 68(3):182-7.
27. Gunne HS, Wall AK. The effect of new complete dentures on mastication and dietary intake. *ActaOdontolScand* 1985; 43(5):257-68.
28. Fontijn-Tekamp FA, Slater AP, Van Der Bilt A, van't Hof MA, Witter DJ, Kalk W, and other. Biting and chewing in overdentures, full dentures and natural dentitions. *J Dent Res* 2000; 79(7):1519-24.
29. Boerrigter EM, Geertman ME, Van Oort RP, Bouma J, Raghoobar GM, van Waas MA, and other. Patient satisfaction with implant-retained mandibular overdentures. A comparison with new complete dentures not retained by implants — a multicentre randomized clinical trial. *Br J Oral Maxillofac Surg* 1995; 33(5):282-8.
30. Allen PF, McMillan AS, Walshaw D. A patient-based assessment of implant-stabilized and conventional complete dentures. *J Prosthet Dent* 2001; 85(2):141-7.
31. Awad MA, Locker D, Korner-Bitensky N, Feine JS. Measuring the effect of intra-oral implant rehabilitation on health related quality of life in a randomized controlled clinical trial. *J Dent Res* 2000; 79(9):1659-63.
32. Awad MA, Feine JS. Measuring patient satisfaction with mandibular prostheses. *Community Dent Oral Epidemiol* 1998; 26(6):400-5.
33. Sebring NG, Guckes AD, Li SH, McCarthy GR. Nutritional adequacy of reported intake of edentulous subjects treated with new conventional or implant-supported mandibular dentures. *J Prosthet Dent* 1995; 74(4):358-63.
34. Sandström B, Lindquist LW. The effect of different prosthetic restorations on the dietary selection in edentulous subjects. A longitudinal study of patients initially treated with optimal complete dentures and finally with tissue-integrated prostheses. *ActaOdontolScand* 1987; 45(6):423-8.
35. Milne AC, Potter J, Vivanti A, Avenell A. Protein and energy supplementation in elderly people at risk from malnutrition. *Cochrane Database Syst Rev*. 2009; (2):CD003288. This systematic review was updated by WHO in 2015.
36. Baldwin C, Weekes CE. Dietary advice with or without oral nutritional supplements for disease-related malnutrition in adults. *Cochrane Database Syst Rev*. 2011;(9):CD002008.
37. Munk T, Tolstrup U, Beck AM, Holst M, Rasmussen K, Hovhannisyan K, Thomsen T. Individualized dietary counselling for nutritionally at-risk older patients following discharge from acute hospital to home: a systematic review and meta-analysis. *J Hum Nutr Diet*. 2016;29(2):196–208.
38. ICOP guidelines. WHO. Evidence profile:Malnutrition.2017:1-35

39. Nizel, A. E.: Nutrition in Clinical Dentistry, Philadelphia, 1960, W. B. Saunders Co., pp. 383-391.
40. Barone, J. (1965). Nutrition of edentulous patients. The Journal of Prosthetic Dentistry, 15(5), pp.804-809.
41. Bandodkar K, Aras M. Nutrition for geriatric denture patients. The Journal of Indian Prosthodontic Society. 2006;6(1):22.

---

**How to cite this article:** Sutariya, D.P., Mehta D.S., Shah D.H., Shah D.V., Karia D.V., Goyal D.T. A Systematic Review on Impact of Edentulism on Nutritional Status of Eldrly Adults as Compared to Dentulous Adults. Journal of Current Medical Research and Opinion. 2020;739–748. <https://doi.org/10.15520/jcmro.v3i11.368>

---



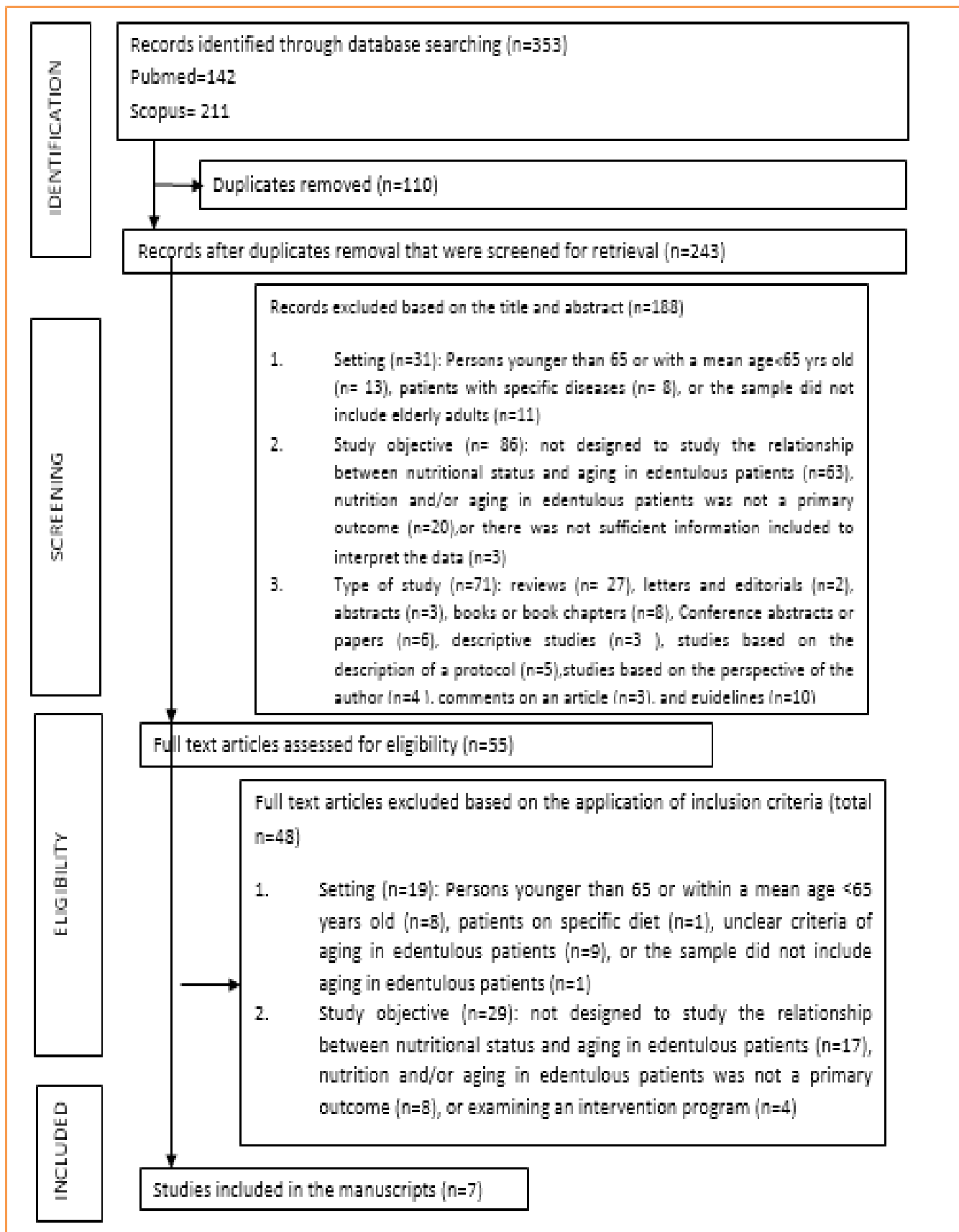


FIGURE 1: Flow diagram of study selection

## EDENTULISM AND NUTRITIONAL STATUS

**TABLE 1:** Summary of important articles regarding the connection between edentulism and nutrient intake

Reference	Study design	Study sample	Primary classification	Primary Outcome	Key results
Sheiham and others (18) (2001)	Cross-sectional	755 elderly adults, some living in the community and others living in institutions	Dentition status	Nutrient intake measured by food diary, blood sample and urine sample	After adjustment for age, socioeconomic factors and sex, edentulous subjects has significantly lower intake of numerous nutrients
Jo-shipura and others (19) (1996)	Prospective, cross-sectional	49,501 male health care professionals	Dentition status	Dietary intake	Pronounced differences in intake of hard to chew foods between dentate and edentulous subjects; amount of processed food eaten increased with degree of edentulism
Krall and others (20) (1998)	Cross-sectional	638 middle aged and elderly man	Dentition status	Intake of various nutrients	Progressive impairment of dentition status was related to decreasing intake of calories, protein, carbohydrate, fibre and numerous vitamins and minerals; dentition status and nutrient intake were related to masticatory function
Fontijn-Tekamp and others (21) (1996)	Cross-sectional	1424 elderly men and women in 13 different towns	Dentition status	Nutrient intake	Significantly lower intake of carbohydrate, fibre, calcium, iron and vitamins B6, B1 and C in edentulous subjects without prosthetics B6, B1 and C.
Papas and others (22) (1998)	Cross-sectional	691 subjects for one portion and a subset of 181 for a second portion	Dentition status	Nutrient intake	Significantly lower intake of vitamin A, C and B6, folates, protein and calories in man with dentures than in dentate man. Intake of calcium and protein was lower in women with dentures than in dentate women.
Greksa and others (23) (1995)	Cross-sectional	34 edentulous and 38 dentate subjects	Dentition status	Nutrient intake determined by 24-h dietary recall	Edentulous subjects more likely to report trouble in chewing their food, diet of dentate subjects tended to be better, as indicated by lower consumption of fat and cholesterol and higher consumption of protein, vitamins and minerals
Mojon and others (24) (1999)	Cross-sectional	324 older adults living in institutions	Compromised oral functional status defined by the presence of specific health disorders	Nutritional status as measured by serum albumin level and body mass index	Compromised oral functional status was associated with lower serum albumin levels and lower BMI in functionally dependent elderly people