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SUPERANNUATED IN PROSTHODONTICS

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ABSTRACT

PURPOSE: This study was aimed to review the role of geriatric nutrition regarding Prosthodontics. **METHODOLOGY:** An electronic literature search was conducted through Medline via; Pubmed and google. The search was limited to full text articles which are published in English language only. A total of 2590 articles were found out of these, 1590 were not related to present search and hence were excluded from the study. Finally 750 articles were found to be relevant. **RESULTS:** Literature review states that Geriatric nutrition plays a major role in the field of Prosthodontics. **CONCLUSION:** Aging is a continuous process; essentially a gradual deterioration of the body functions and abilities. We the prosthodontists, is in a position to reduce the number of prosthetic failures by a thorough understanding the physical, mental, and metabolic changes that occur during aging.

Keywords: Geriatrics, Prosthodontist, Food groups, Diet, Balanced diet, Reservoir denture, Complete denture, Overlay denture, Fixed prosthesis, Implants.

MAIN TEXT

INTRODUCTION:

Today there are enough older people to command for attention in the science of medicine and dentistry.¹ Since the life span of the human population is ever increasing, attention is being

focused more critically upon the needs and problems of the aging person. The gerodontist has learned that he must study and be familiar with the aging process in order to cope with the problems of the aged.² Emphasis should be given to the understanding of the important

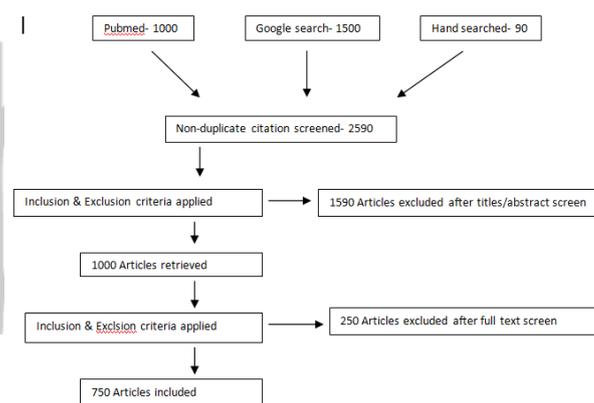
relationship between the adequate oral function and proper digestion and nutrition. The greater life expectancy of edentulous patients is very likely to increase or prolong the risk of denture dissatisfaction and its functional implications.³

A great number of geriatric patients will seek dental care including complete prosthodontic care. The success of complete dentures is related to technical procedures, functional factors, aesthetics, biological determinants and psychological factors. The psychological factors include preparedness of the patient, attitude towards dentures, relation and attitude towards dentist, ability and intelligence to learn use of dentures and the patient's personality.⁴

METHODOLOGY:

An electronic literature search was conducted through Medline via Pubmed, google search and hand searched articles between January 1975 and August 2021 using the key words Geriatrics,

Prosthodontist, Food groups, Diet, Complete denture, Fixed prosthesis, Implants, Balanced diet, Reservoir denture, Overlay denture. A total of 2590 articles were found out of these, 1590 were not related to present search and hence were excluded from the study. Finally 750 articles were found to be relevant. The strategy of search is mentioned in flow chart-1:



Flow chart- 1

DISCUSSION:

Oral Rehabilitation of Geriatric Patient with Removable Partial Dentures⁵

Guidelines

- a. The design should be as simple as possible with free gingival end

contacting the alveolar ridge or palate, approximately 3mm from the teeth surface in order to reduce the negative effect on oral hygiene.

- b. Saddles should be tooth supported, if possible, in distal extension removable partial dentures, occlusal rests should be placed in such a way that tilting of abutment teeth will not take place.
- c. Major connectors, minor connectors, reciprocating clasp arms, and occlusal rests should be rigid, in order to withstand and distribute occlusal forces.
- d. The denture should be designed in such a way that appropriate retention is achieved by two retentive clasps. In distal extension R.P.Ds retention is improved by placement of indirect retainers opposite to fulcrum line.
- e. The dentures should provide bilateral and simultaneous occlusal contacts between natural and prosthetic teeth is centric occlusion at an acceptable vertical dimension.

Oral Rehabilitation of Geriatric

Patient with Complete Dentures⁶

Immediate Complete Denture

Clinical treatment plan includes:

Removal of posterior teeth 3-4 weeks prior to denture fabrication. It is important to maintain one or two occlusal contacts in the premolar region to maintain the vertical dimension of occlusion, Primary impression, Functional secondary impression in an individual tray, Recording the jaw relation in centric relation at an acceptable vertical dimension, Arrangement of posterior teeth, Arrangement of anterior teeth, which are usually placed in the same portion as the natural teeth to support neuromuscular and psychological adaptation to the dentures, Alteration of the cast to compensate for bony changes is only indicated for esthetic reasons or when these are severe bony undercuts.

After extraction and adjustment of the alveolar ridge, the dentures are inserted, the occlusion corrected and patient instructed to return the following

morning.

Post operative care:

Instructions in oral and denture hygiene, Regular control of occlusion and fit of the dentures, Soft relining materials and tissue conditioning materials may be used as an effort to keep the occlusion of the teeth and tissue changes in harmony, Gross tissue changes are usually completed 3-6 months after extraction. At that time a permanent denture is prepared or the immediate denture is relined or rebased.

Well-adapted denture wearers:⁷

Well adapted denture wearer with relatively well fitting dentures:-

These are those patients whose dentures have an acceptable VDO and relatively stable occlusal relationship, but adaptation between the denture base and underlying mucosa is poor. Relining or rebasing is the treatment of choice.

Well-adapted denture wearer with severe tissue deterioration:-

These are those patients whose dentures have significant decrease in VDO and unstable occlusal conditions and poor adaptation of denture base to denture bearing mucosa. In this

situation it is important to use the patients dentures diagnostically to determine which changes the patient will be able to accept. This could be done by temporarily relining of the dentures using a tissue conditioning material. The patient is allowed to use the temporarily relined dentures for 1-2 weeks if denture function and esthetics are acceptable the altered denture could be rebased, after a final functional impression. If esthetics is poor new dentures should be fabricated.

Poorly adapted denture wearers:-

In elderly patients who have no existing dentures or who do not accept the diagnostic dentures, prognosis for prosthetic treatment is questionable such patients should be left alone.

In elderly patients who have had a number of recent unsuccessful prosthetic treatments, a careful interview and examination is important.

Prosthetic treatment should not be considered if there is underlying psychiatric disease. Anatomic alteration with pre-prosthetic surgery may be useful.

Oral Rehabilitation of Geriatric Patient with Fixed Prosthesis⁸

The following documentation is generally needed-

A set of full mouth intra oral radiographs,

A complete chart of periodontal status (pocket- probing depths and probing attachment), An assessment of the caries activity, prevalence, incidence and history, special emphasis should be given to root caries, Evaluation of pulp vitality of all teeth, An analysis of the occlusion and function of masticatory systems. It is important to gain clear perception of the patients motivation for dental treatment and desire to maintain teeth.

Replacing teeth with acid – etched composite- (bonded bridges)

Recently, the development of electrolytic etching of cast alloy frame works(Lavaditis and Thompson 1982) has provided the basis for improved bonding strength of acid- etches composite bonded bridges. This technique also led to thinner but strongest frame works allowing bonding to enamel surface without additional retention.

In geriatric dentistry, the use of acid-etch resin

bonded restorations may have a promising future. These bridges require much less chair side time and therefore costs less. The ideal abutment teeth for acid etch bridges should be caries free and devoid of previous restorations.

Oral Rehabilitation of Geriatric Patient with Implants⁹

Indications:

Insufficient retention of prosthodontic appliance due to:

Extensive resorption of alveolar bone, Hypersensitivity and highly vulnerable mucosal conditions, Defects of jaws after trauma or tumor resection, Disturbed innervations of the oral and peri-oral muscles following trauma or cerebro-vascular disease, Functional disturbances, preventing the patient from wearing prosthetic device due to age related adaptation difficulties to dentures, Severe nausea and gag reflex, Psycho-social inability to accept a prosthetic device inspite of adequate morphological and functional prerequisites.

Contra indications

Oral rehabilitation with conventional prosthetic device, which has been accepted,

Insufficient residual bone volume and quality, Lack of motivation for treatments with implants, Lack of motivation for sufficient oral hygiene measures, General medical conditions eg: diabetes and osteoporosis, Alcoholic and / or narcotic misuse because of questionable oral hygiene and predisposition towards general disease, Special oral conditions after radiation therapy, Certain psychological conditions such as dymorphophobia or other mental conditions that might indicate negative psychological outcome, Inability to perform meticulous post-operative care and longstanding maintenance program.

Implant procedure⁹

There are at present two different well-documented implant designs, Both methods have been shown to be successful in aged patients.

1. **Osseointegrated titanium implants:** ad modum Branemark (Biotes tm)
2. **Endosseous implants of aluminum oxide ceramics:** ad modum schult (Frialit.R) --for single tooth loss.

Prosthetic Treatment with Implants for Geriatric Patients:⁹

Despite well-documented and anecdotal claims for the success of complete denture therapy; dentists and patients do not always agree as to what constitutes a successful denture experience. Current research indicates that the provision of a stable prosthesis may very well be the single most important determination to success in complete denture therapy along with the fulfillment of patient's esthetic expectations.

Criteria for success:

The individual unattached implant is immobile when tested clinically. There is no evidence of peri-implant radiolucency assessed on different radiographs. The mean vertical bone loss should be less than 0.2 mm annually after the first year of service. There should be no persistent pain or discomfort attributable to the implant. The implant design should not preclude placement of crown or prosthesis with an appearance satisfactory to the patient and dentist.

Overlay dentures¹⁰

The overlay denture is complete (or partial) denture prosthesis, which is constructed over existing teeth or root structures.

Definition:- Removable partial denture or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth and /or dental implants (OR) A prosthesis that covers and partially supported by natural teeth, natural tooth roots and /or dental implants.

Advantages of over dentures in geriatric patients:¹⁰

The natural root provides support for the denture. They stabilize the dentures during occlusion and mastication and prevent trauma of the denture supporting oral mucosa.

The roots and periodontal ligament membrane will aid in minimizing future loss of alveolar ridge. The existence of periodontal ligament membrane may preserve the proprioceptive response and give the patient a sense of discrimination, not possible with conventional complete dentures.

The roots can be provided with various

types of retentive devices to give added retention to the removable dentures. If the periodontal ligament membrane is significantly reduced a complete over denture may be more favorable than R.P.D.

Criteria for selection of abutment teeth for over dentures:

The abutment teeth should have greater than or equal to 5mm periodontal support at least 2-3mm attached gingival. Proper endodontic treatment of abutment teeth should be possible. Canines and molar are both ideally located and numerous enough to provide optimal dental support for the denture. In most cases two abutments will give sufficient stability. However, two diagonally opposite abutments may give very unstable denture. The abutments should have a height of 2-3mm with a dome shaped contour.

ORAL FACTORS THAT AFFECT DIET & NUTRITIONAL STATUS¹¹

1. Xerostomia

Xerostomia refers to a subjective sensation of dry mouth. A variety of factors can cause xerostomia. Depending on the cause, treatment is provided to a patient suffering from xerostomia. In severe xerostomia

salivary substitutes can be used and if the xerostomic patient is edentulous, then reservoir space for artificial salivary substitute can be created in partial as well as complete upper or lower dentures (Fig 1).



Fig 1: Reservoir Denture is an effective solution in edentulous patients with Xerostomia

Xerostomia affects almost one in 5 older adults. It is associated with difficulties in chewing & swallowing all of which can adversely affect food selection & contribute to poor nutritional status. The use of drugs with hypo salivary side effects may have deleterious influence on denture bearing tissue.

Deficient masticatory performance leads to consumption of more drugs than those with superior performance.

2. Sense of taste & smell

Age related changes in taste and smell may alter food choice & decrease diet quality in

some people. Factors contributing to this reported decreased function may include health disorders, medications, oral hygiene, denture use & smoking. Sense of smell decreases markedly with age much more rapidly than sense of taste. Diminished taste is the result of aging. Sensory changes may diminish the appeal of some foods (e.g. sensitivity to the bitterness of cruciferous vegetables) limiting their consumption & potential health benefits function.

3. Oral infectious condition

Poor oral health leads to impaired masticatory function. Whether masticatory function plays a role in food selection is still matter of debate but impaired masticatory function leads to inadequate food choice & therefore alter nutrition intake.

4. Effect of dentures on taste and swallowing

A full upper denture can have an impact on taste and swallowing ability. The hard palate contains taste buds so taste

sensitivity may be reduced when an upper denture covers the hard palate. As a result swallowing can be poorly coordinated & dentures can become a major contributing factor to death from choking.

5. Effects of dentures on chewing ability

As adults age, they tend to use more strokes and chew longer to prepare food for swallowing. Masticatory efficiency in complete denture wearers is approximately 80% lower than in people with intact natural dentition.

6. Effects of dentures on food choices, diet quality & general health

The effect of dentures on nutritional status varies greatly among individuals. Some people compensate for decline in masticatory ability by choosing processed or cooked foods rather than fresh food & by chewing longer before swallowing. Others may eliminate entire food groups from their diet. Dentate adults tend to eat more fruits & vegetables than full denture wearers.

7. Nutrient needs of the elderly

The oral aspects of aging as related to nutritional deficiencies have been reviewed in dental literature, where in many of the degenerative changes seen in the oral cavity may be due to essential nutrients.

FOOD GROUPS ¹¹

Foods may be divided into five major groups these are (Fig 2).

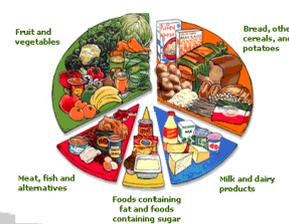


Fig 2: food groups

Vegetables and fruits

Meat and fish

Bread and other cereals

Milk and dairy products

Food containing fat and sugar

BALANCED DIET: ¹¹

A balanced diet is defined as ““A balanced diet is that which supplies all the essential nutrients in adequate amounts and in biologically available forms””.

-Z.S.C.Okoye

“A diet containing all essential (macro & micro) nutrients in optimum quantities and in appropriate proportions that meet the requirements.”

In constructing balanced diet, the following principles should be borne in mind:

- a) First & foremost daily requirement of protein should be met 10-15% of daily energy intake.
- b) Fat, should be limited to 15-30% of daily energy intake.
- c) Carbohydrate rich in dietary fiber should constitute the remaining food energy.
- d) Requirements of micronutrients should be met.

A nutritional education guide “The food guide pyramid” emphasizes foods from the 5 major food groups shown in the lower 3 sections of pyramid. Each of these food groups provides some, but not all, of the nutrients required (Fig 3).

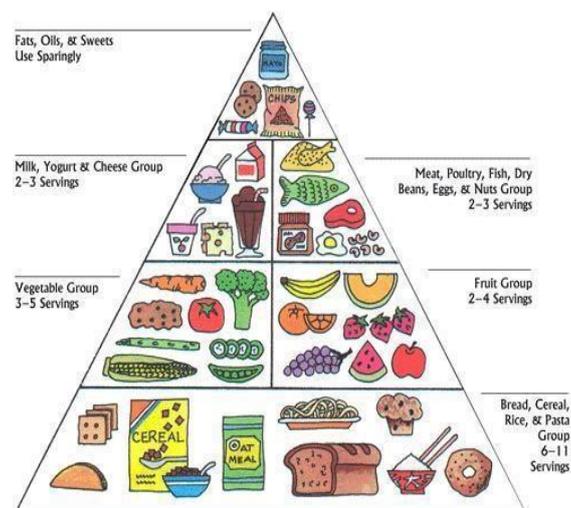


Fig 3: Food Pyramid

Food in each group cannot replace those in another. None of these major food groups is more important than another for good health, one needs them all.

ASSESSING NUTRITIONAL STATUS

Triphasic nutritional analysis

Phase I

It should be used to screen all patients & consists of obtaining information from a medical, social history screening for clinical signs of deficiency, conducting selected anthropometrical measurements & assessing the adequacy of dietary intake.¹³

Qualitative dietary assessment

The purpose of this is to determine what an individual is eating now, what he or she has eaten in the past & recent changes in the diet. If potential problems are detected the nutritional

evaluation should progress to phase II. However if at the conclusion of phase I enough information is available to ensure a rational basis for therapy, the nutritional assessment should be terminated & appropriate dietary counseling instituted.¹¹

Phase II

When the parameters described here indicate existence of a nutritional problem more information should be accumulated. A semi quantitative dietary analysis & routine blood chemistry should be undertaken.¹¹

Semi quantitative dietary analysis

At this level of evaluation, dietary intake is assessed using more quantitative means. Nutrients in all foods & beverages consumed during a 3-5 day period are calculated using food composition tables or computer assisted nutrient analysis programs.

Average caloric & nutrient intakes can be quantitated & compared with norms the services of a registered dietician serving as a consultant are invaluable at this level of assessment.¹¹

Biochemical assessment

Common automated blood tests are also useful in providing more definitive information regarding the nutritional status of the patient. However most indices fall within standard ranges for young adults & many of the parameters are affected by an age related decline in renal function & body water as well as the effect of drugs & chronic disease.

Phase III

The final phase of the analysis is reserved for more complex nutritional problems & should be accomplished under the direction of a physician. The analysis in this phase includes comprehensive nutritional biochemical assays of blood, urine & tissues as well as tests of metabolic & endocrine function.

DIET SUGGESTIONS FOR A NEW DENTURE WEARER⁹

The logical sequence of eating food is biting, chewing and swallowing and it is much easier the new denture wearers to master this complex of masticatory movements in the reverse order. Consequently, food of a consistency that will require only swallowing, such as liquids, should be prescribed for the first few days after insertion of the denture. The use of soft foods is advocated

for the next few days and a firm or regular diet can be eaten by the end of the week.

First post insertion day:-

Vegetable fruit groups: juices

Bread cereal group: gruels cooked in either milk or water.

Milk group: fluid milk may be taken in any form

Meat group: eggs in egg-nogs, pureed meats, meat broths or soup. The sample menu should contain glass milk at least once a day.

Second and third post insertion day:

Vegetable-fruit group: tender cooked fruits and vegetables (seedless and skinless)

Bread cereal group: cooked cereals, softened bread, boiled rice, noodles and macaroni.

Milk group: fluid milk and cottage cheese.

Meat group: chopped beef, ground liver, tender chicken, fish in a cream sauce, scrambled eggs, and thick soups. The sample menu must include butter or margarine, a glass of milk at least once a day.

Fourth day and after:-

By the fourth day or as soon as the sore spots have healed, firmer foods can be eaten in addition to the soft foods.

These should ideally be cut into small pieces before eating. The sample menu must contain butter or margarine and glass of milk.

CONCLUSION

The elderly have both the greatest level of need for prosthodontic services and the greatest degree of complicating dental, medical and behavioral factors. Age alone is not a contraindication to complex prosthodontic treatment; patients of advanced age may still have many years of life ahead, during which they will appreciate the aesthetic and functional advantages of a restored dentition. The dental aspects of planning prosthodontic treatment for the older patient should focus on the integrity of individual teeth as well as the potential contribution of each tooth to the masticatory system. In this way, the clinician is best prepared to anticipate the full range of restorative occlusal and functional challenge likely to arise in the course of

treatment.

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